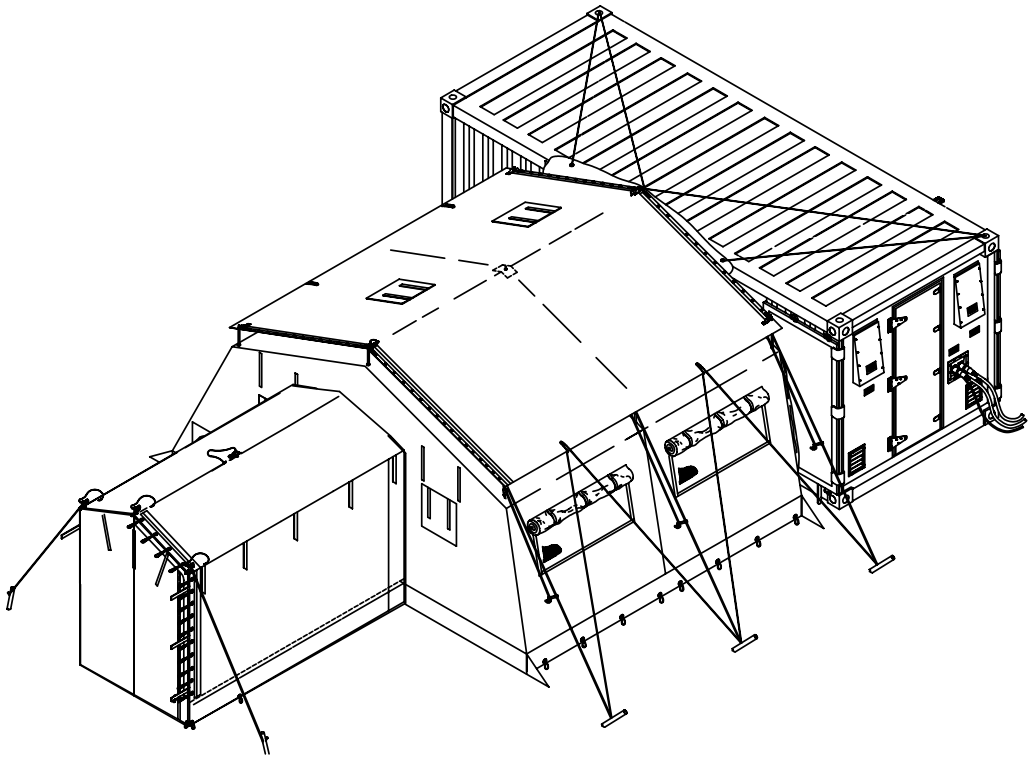
TM 10-3510-226-10

TECHNICAL MANUAL

OPERATOR'S MAINTENANCE MANUAL
FOR

CONTAINERIZED BATCH LAUNDRY (CBL)

NSN 3510-01-527-2209
NSN 3510-01-527-2210



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HEADQUARTERS, DEPARTMENT OF THE ARMY

31 AUGUST 2005

WARNING SUMMARY

This warning summary contains general safety warnings and hazardous materials warnings that must be understood and applied during operation of this equipment. Failure to observe these precautions could result in serious injury, illness, or death to personnel. Also included are explanations of safety and hazardous materials icons used within this technical manual.

EXPLANATION OF SAFETY WARNING ICONS



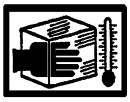
BIOLOGICAL - abstract symbol bug shows that a material may contain bacteria or viruses that present a danger to life or health.



CHEMICAL - drops of liquid on hand shows that the material will cause burns or irritation to human skin or tissue.



CRUSHED HANDS – keep hands and fingers away from frame assembly ridges and eaves.



CRYOGENIC - hand in block of ice shows that the material is extremely cold and can injure human skin or tissue.



ELECTRICAL - electrical wire to arm with electricity symbol running through human body shows that shock hazard is present.



EXPLOSION - rapidly expanding symbol shows that the material may explode if subjected to high temperatures, sources of ignition or high pressure.



EYE PROTECTION - person with goggles shows that the material will injure the eyes. Eye protection must be worn to prevent injuries to eyes.



EYE PROTECTION - Particles flying through the air will harm face. Eye protection must be worn to prevent injuries to eyes.



FINGERS JAMMED – hinges can pinch, crush, or amputate hands and fingers.

WARNING SUMMARY-CONTINUED



FINGERS CRUSHED - Injury to personnel may occur if fingers between the washer drum and the washer cabinet.



FIRE - flame shows that a material may ignite and cause burns.



HEAVY OBJECT - human figure stooping over heavy object shows physical injury potential from improper lifting technique.



HEAVY PARTS - heavy object on human figure shows that heavy parts present a danger to life or limb.



HELMET PROTECTION - arrow bouncing off head with helmet shows that falling parts present a danger.



HOT AREA - hand over object radiating heat shows that part is hot and can burn.



POISON - skull and crossbones shows that a material is poisonous or is a danger to life.



SHARP OBJECT - pointed object in hand shows that a sharp object presents a danger to limb.



SHARP OBJECT - pointed object in hand shows that a sharp object presents a danger to limb.



SLICK FLOOR - wavy line on floor with legs prone shows that slick floor presents a danger for falling.



VAPOR - human figure in a cloud shows that material vapors present a danger to life or health.

WARNING SUMMARY-CONTINUED

GENERAL SAFETY WARNINGS DESCRIPTION



WARNING

Electrical voltage and current cannot be seen, but contact with energized equipment can kill you, render you unconscious, or severely burn you. Electricity is unlike most other dangerous things you can come in contact with because it gives no warning. To ensure your safety and that of other maintenance personnel, always observe the following precautions:

Electrical power must be disconnected before any electrical system work is performed to prevent electrical shock, injury, or death (electrocution). Only trained and qualified personnel (MOS 51R, 52C, 52D, or 52G) may perform maintenance or attempt to correct electrical discrepancies on the electrical system.

The CBL must be electrically grounded. Failure to ground the CBL may result in serious injury or death from electrical malfunction.

ALWAYS place POWER OFF warning tags on circuit breakers or power supply switches so that no one will apply power while you are performing maintenance.

FOR ARTIFICIAL RESPIRATION, SEEK MEDICAL ATTENTION AND REFER TO FM 21 – 11.



WARNING

Use extreme caution when handling soiled hospital laundry. The CBL is designed to service hospital units, and the chance of exposure to laundry contaminated with blood and other body fluids is high. Soiled hospital laundry items may also contaminate clean laundry and operator clothing if not handled with adequate precautions. Inspect Personal Protection Clothing and Individual Equipment (PPCIE) prior to use, ensure immediate removal of contaminated or penetrated PPCIE. Follow your unit's SOP regarding personal contamination prior to leaving area or continuing with subsequent activities. Always wear supplied safety equipment such as gloves, apron, and mask. Always wash hands after handling soiled laundry. Failure to comply may result in serious illness or death to personnel.

WARNING SUMMARY-CONTINUED



WARNING

Use extreme caution when handling soiled hospital laundry. The CBL is designed to service hospital units, and the chance of exposure to sharp objects such as needles, knives, or medical instruments is likely. Sharp objects of this nature may be contaminated with body fluids such as blood, and may carry the chance of infection with disease as well. Use extreme caution when handling soiled hospital laundry items, and inspect each and every item for the presence of sharp objects. Always wear supplied safety equipment such as gloves, apron, and mask. Always wash hands after handling soiled laundry. Failure to comply may result in serious illness or death to personnel.



WARNING

A single 10-pound dry chemical fire extinguisher is supplied with the CBL. Ensure the fire extinguisher is located adjacent in the TEMPER, just outside the CBL container door, and is visible and readily accessible in case of a fire. Do not allow the fire extinguisher to be obstructed by laundry or other operating equipment. If fire occurs, send for help immediately, shut down power to the CBL, and try to fight the fire from outside if possible. Failure to observe safety precautions may result in serious injury or death to personnel.



WARNING

The CBL weighs approximately 16,200 pounds with a full packout. Always use a properly rated lifting device to move and stack the CBL. Ensure the slings used in the lift are properly rated for the load, crane or lifting device. Do not allow personnel below a suspended or swinging system if using an overhead lift.



WARNING

Some items associated with or installed in the CBL require two or more personnel to lift/move. Use the appropriate number of personnel when moving large, bulky, or heavy items. To avoid serious injury, lift with your legs, and not your back, and never attempt to lift an item alone if it requires more than one person.

WARNING SUMMARY-CONTINUED



WARNING

The CBL operates with hot water at approximately 120 ° F. Allow pipes and water to cool before conducting any type of work on the system. Failure to follow this warning could result in serious burn injury to personnel from scalding.



WARNING

Avoid eye, skin, and clothing contact with graywater. Graywater is to be considered hazardous at all times. Full protection in the form of rubber gloves, apron, face shield, and safety glasses MUST be used when performing any type of maintenance that involves graywater. Remove any contaminated clothing. If graywater contacts eyes or skin, flush with clean water and seek immediate medical attention. Failure to wear proper protective clothing and equipment may result in serious illness.



WARNING

Leather gloves and face/eye protection must be worn when performing maintenance. If contact with eyes or skin is made, flush with clean water and seek immediate medial first aid for eyes. Failure to do so could result in serious injury to eyes or hands.



WARNING

Rubber gloves, face/eye protection, and dust mask should be worn when handling chemicals such as Sodium Bisulfite and Nanofilter Membrane Cleaning agent. Failure to wear proper clothing and equipment may result in skin irritation and/or serious eye injury. If chemicals contact eyes or skin, flush with clean water and seek immediate medical attention.



WARNING

Always secure container doors open or closed. Unsecured container doors may be accidentally moved by wind, gravity, or personnel. If no means of securing a container door is provided, dunnage may be wedged to secure a door open. Unsecured container doors may injure personnel and damage equipment.

WARNING SUMMARY-CONTINUED



WARNING

Use caution when operating the washers. The washers are equipped with a suspension to dampen vibration, and the washer drum may be observed to move in the washer cabinet. Injury to personnel may occur if fingers are slipped between the washer drum and the washer cabinet.



WARNING

Inspect all PPCIE for damage prior to use. Ensure immediate removal of contaminated or penetrated PPCIE. Follow unit SOP regarding personal contamination prior to leaving area or continuing with subsequent activities. Failure to comply may result in serious illness or death to personnel.



WARNING

When using a generator place it at least 50 feet from the CBL container. Failure to observe safety precaution may result in serious injury or death to personnel from carbon monoxide poisoning.

LIST OF EFFECTIVE PAGES / WORK PACKAGES

Dates of issue for original manual is:

Original … 0 … 31 August 2005

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 30 AND TOTAL NUMBER OF WORK PACKAGES IS 43 CONSISTING OF THE FOLLOWING:

Page/WP No.	*Change No.	Page/WP No.	*Change No.	Page/WP No.	*Change No.
Title (2 pgs)	0	WP 0016 00 (32 pgs)	0	WP 0035 00 (6 pgs)	0
a-f (6 pgs)	0	WP 0017 00 (28 pgs)	0	WP 0036 00 (4 pgs)	0
A-B (2 pgs)	0	WP 0018 00 (18 pgs)	0	WP 0037 00 (4 pgs)	0
i-iv (4 pgs)	0	WP 0019 00 (26 pgs)	0	WP 0038 00 (8 pgs)	0
WP 0001 00 (4 pgs)	0	WP 0020 00 (6 pgs)	0	WP 0039 00 (4 pgs)	0
WP 0002 00 (20 pgs)	0	WP 0021 00 (4 pgs)	0	WP 0040 00 (2 pgs)	0
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WP 0006 00 (42 pgs)	0	WP 0025 00 (6 pgs)	0	Index (4 pgs)	0
WP 0007 00 (36 pgs)	0	WP 0026 00 (8 pgs)	0		
WP 0008 00 (38 pgs)	0	WP 0027 00 (14 pgs)	0		
WP 0009 00 (26 pgs)	0	WP 0028 00 (2 pgs)	0		
WP 0010 00 (22 pgs)	0	WP 0029 00 (32 pgs)	0		
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WP 0015 00 (16 pgs)	0	WP 0034 00 (2 pgs)	0		

*Zero in this column indicates an original page or work package.

**HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 31 AUGUST 2005**

TECHNICAL MANUAL

OPERATOR
MAINTENANCE MANUAL

FOR

CONTAINERIZED BATCH LAUNDRY (CBL)

NSN 4510-01-527-2209
NSN 4510-01-527-2210

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms, located in the back of this manual direct to: Commander, U.S. Army Tank-automotive & Armaments Command / ATTN: AMSTA-LC-CECT / Kansas St. / Natick, MA / 01760-5052. You may also send in your recommended changes via mail or by fax. Our fax number is DSN 256-5205 or Commercial 508-233-5205. Our e-mail address is amssbriml@natick.army.mil. A reply will be furnished directly to you.

Distribution Statement A: Approved for public release; distribution is unlimited.

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HOW TO USE THIS MANUAL

This Manual contains General Information, Operating and Maintenance instructions for the Containerized Batch Laundry.

Chapter 1 contains introductory information on the Containerized Batch Laundry and its associated equipment as well as a Theory of Operation. Chapter 2 includes operating instructions under usual and unusual conditions. Chapter 3 contents include operator troubleshooting, Chapter 4 contains PMCS and maintenance instructions. Chapter 5 contains references and other supporting information.

Manual Organization and Page Numbering System. The Manual is divided into five major chapters that detail the topics mentioned above. Within each chapter are work packages covering a wide range of topics. Each work package is numbered sequentially starting at page 1. The work package has its own page numbering scheme and is independent of the page numbering used by other work packages. Each page of a work package has a page number of the form XXXX YY-ZZ where XXXX is the work package number (e.g. 0010 is work package 10) and YY is reserved to permit unlimited expansion of the TM to incorporate new configuration data without affecting the WP sequence numbers already assigned, and to permit adding one or more WPs between any two existing WPs during any revision cycle. ZZ represents the number of the page within that work package. A page number such as 0010 00-1/2 blank means that page 1 contains information but page 2 of that work package has been intentionally left blank.

Finding Information. The Table of Contents permits the reader to find information in the manual quickly. The reader should start here first when looking for a specific topic. The Table of Contents lists the topics contained within each chapter and the Work Package Sequence Number where it can be found.

Example: If the reader were looking for instructions on “Preventive Maintenance Checks and Services”, which is an Operator Maintenance topic, the Table of Contents indicates that Operator Maintenance information can be found in Chapter 4. Scanning down the listings for Chapter 4, “Preventive Maintenance Checks and Services” information can be found in WP 0029 00 (i.e. Work Package 29).

There is not a Glossary at the back of the Manual.

An Alphabetical Index can be found at the back of the Manual. It lists specific topics with the corresponding work package.

CHAPTER 1

GENERAL INFORMATION, EQUIPMENT DESCRIPTION AND THEORY OF OPERATION

CONTAINERIZED BATCH LAUNDRY (CBL)

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
GENERAL INFORMATION

SCOPE

This manual contains an equipment description, operating instructions and maintenance procedures for the Containerized Batch Laundry (CBL). It also includes references to publications that contain information on separately documented components of the CBL. The CBL provides a fully automated operation of washers and dryers with a capability to handle 150-200 pounds of laundry per hour.
Type of Manual: Operator's Maintenance
Model Number and Equipment Names:

43260001-1 Laundry, Batch, Containerized Model 2
43260001-2 Laundry, Batch, Containerized Model 3

Purpose of Equipment: To provide a fully automated operation of washers and dryers with a capability to handle 150-200 pounds of laundry per hour.

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by (as applicable) DA PAM 738-750, Functional Users Manual for the Army Maintenance Management System (TAMMS); DA PAM 738-751, Functional Users Manual for the Army Maintenance Management Systems - Aviation (TAMMS-A); or AR 700-138, Army Logistics Readiness and Sustainability.

HAND RECEIPT (HR) MANUALS

This manual has a companion document with a TM number followed by "-HR" (which stands for Hand Receipt). TM 10-3510-226-10-HR consists of preprinted hand receipts that list end item related equipment (i.e., COEI, BII, and AAL) that must be accounted for. As an aid to property accountability, additional HR manuals may be requisitioned through normal publication channels.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your CBL needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to the address specified in DA PAM 738-750, Functional Users Manual for the Army Maintenance Management System (TAMMS), or as specified by the acquiring activity. We will send you a reply.

CORROSION PREVENTION AND CONTROL (CPC)

Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with the CBL be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items. Corrosion specifically occurs with metals. It is an electrochemical process that causes the degradation of metals. It is commonly caused by exposure to moisture, acids, bases, or salts. An example is the rusting of iron. Corrosion damage in metals can be seen, depending on the metal, as tarnishing, pitting, fogging, surface residue, and/or cracking. Plastics, composites, and rubbers can also degrade. Degradation is caused by thermal (heat), oxidation (oxygen), solvation (solvents), or photolytic (light, typically UV) processes. The most common exposures are excessive heat or light. Damage from these processes will appear as cracking, softening, swelling, and/or breaking. The form should be submitted to the address specified in DA PAM 738-750, Functional Users Manual for the Army Maintenance Management System (TAMMS).

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Destruction of Army materiel to prevent enemy use shall be in accordance with TM 750-244-3.

PREPARATION FOR STORAGE OR SHIPMENT

Before placing the CBL in administrative storage or preparing the system for shipment, current maintenance services must be applied; defects and failures corrected; and Modification Work Orders (MWO's) applied. Prepare the system for storage and shipment as described in Chapter 2, WP 0012 00.

Placement of equipment in storage
Equipment should be placed in storage for limited periods only, when a shortage of maintenance capability exists. Items should be mission ready within 24 hours, or within time factors set by directing authority. During storage periods maintenance records must be kept current.

Storage site selection
Covered space is preferred. When sufficient covered space is not available, priority should be given to items that are most susceptible to deterioration from the elements. Open sites should be improved hardstand, if available. Unimproved sites should be firm, well-drained locations, free of excessive vegetation.

WARRANTY INFORMATION

Warranty information for CBL components is contained in the commercial literature accompanying the components.

NOMENCLATURE CROSS-REFERENCE LIST

The following lists cross-reference and common names used throughout this manual to official nomenclatures.

COMMON NAME	OFFICIAL NOMENCLATURE
ASH	Army Space Heater
Bootwall	Modified TEMPER endwall
Breaker Box	Main Breaker Panel
CBL	Containerized Batch Laundry
FDECU	Field Deployable Environmental Control Unit
PLC	Programmable Logic Controller
Pond Heater	Sinking Deicer with Guard
QD, QDC	Quick Disconnect Coupling
TEMPER	Tent, Extendable, Modular, Personnel
WTS	Water Treatment System

LIST OF ABBREVIATIONS/ACRONYMS

^{0}C	Degree(s) Celsius (Centigrade)
^{0}F	Degree(s) Fahrenheit
AAL	Additional Authorization List
AC	Alternating Current
AMP, A	Ampere(s)
AR	Army Regulation
ASH	Army Space Heater
AVIM	Aviation Intermediate Maintenance
AVUM	Aviation Unit Maintenance
BII	Basic Issue Item
BOI	Basis of Issue
CAGEC	Commercial And Government Entity Code
CARC	Chemical Agent Resistant Coating
CB	Circuit Breaker
CBL	Containerized Batch Laundry
CCW	Counterclockwise
cm	Centimeter(s)
COEI	Components of End Item
CPC	Corrosion Prevention Control
CPVC	Chlorinated Polyvinyl Chloride
CTA	Common Table of Allowances
CW	Clockwise
DA	Department of the Army
DISE	Distribution Illumination Systems, Electrical
DMWR	Depot Maintenance Work Requirement
DS	Direct Support
ea	Each
ECU	Environmental Control Unit
EIR	Equipment Improvement Recommendation
EMP	Electromagnetic Pulse
ESD	Electrostatic Discharge
FC	Female Connection
FDECU	Field Deployable Environmental Control Unit
FM	Field Manual
ft	Foot, feet
GFCI	Ground Fault Circuit Interrupt
GPH	Gallons Per Hour
GPM	Gallons per Minute
HCI	Hardness Critical Item
hp	Horsepower
hr	Hour
Hz	Hertz
IAW	In Accordance With
in.	Inch(es)
ISO	International Organization for Standardization
JTA	Joint Table of Allowance
Kg	Kilogram(s)
kPa	Kilopascal(s)
kw	Kilowatt(s)
LAR	Logistics Assistance Representative
lb	Pound()s
lt	Liter(s)
m	Meter(s)
MAC	Maintenance Allocation Chart
MC	Male Connection
MSDS	Material Safety Data Sheet
MTD	Munitions Technologies Division
MTOE	Modified Table of Organization and Equipment
MWO	Modification Work Order
N/A	Not Applicable
NBC	Nuclear, Biological, Chemical
NIIN	National Item Identification Number
NSN	National Stock Number
ORD	Operational Requirements Document
oz.	Ounce
P/N	Part Number
PAM	Pamphlet
PDISE	Power Distribution Illumination System, Electrical
PLC	Programmable Logic Controller
PMCS	Preventive Maintenance Checks and Services
POL	Petroleum, Oil and Lubricant
PPCIE	Personal Protection Clothing and Individual Equipment
PR	Pair
psi	Pound(s) per Square Inch
PVC	Polyvinyl Chloride
QDC	Quick Disconnect
qt(s)	Quart
Qty	Quantity
rpm	Revolutions per Minute
RPSTL	Repair Parts and Special Tools List
RTV	Room Temperature Vulcanized
SF	Standard Form
SMR	Source, Maintenance and Recoverability
SOP	Standard Operating Procedure
SRA	Specialized Repair Activity
TAMMS	The Army Maintenance Management System
TDA	Table of Distribution and Allowances
TM	Technical Manual
TMDE	Test, Measurement, and Diagnostic Equipment
TOE	Table of Organization and Equipment
U/M	Unit of Measure
UOC	Usable on Code
UUT	Unit Under Test
UV	Ultra Violet

LIST OF ABBREVIATIONS/ACRONYMS-CONTINUED

V	Volt(s)
VAC	Volt Alternating Current
W	Watt(s)
WP	Work Package
wt	Weight
WTS	Water Treatment System

QUALITY OF MATERIAL

Material used for replacement, repair, or modification must meet the requirements of this TM. If the quality of material requirements is not stated in this TM, the material must meet the requirements of the drawings, standards, specifications, or approved engineering change proposals applicable to the subject equipment.

SAFETY, CARE, AND HANDLING

Be alert and note **WARNINGS**, **CAUTIONS**, and **NOTES**. These provide for safe operation of the equipment, and protect you and your equipment from injury and damage.

No precautions regarding radioactive components or electrostatic discharge (ESD) are advised.

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
EQUIPMENT DESCRIPTION AND DATA

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The CBL contains two commercial type washers and dryers and is capable of handling 150-200 pounds of laundry per hour. An advanced water reuse system allows water used after the first wash cycle to be reused. The CBL is assembled, operated, and disassembled by personnel in MOS 92S (Shower/Laundry and Clothing Repair Specialist) with unit level and direct support maintenance being performed by personnel in MOS 63J, (Quartermaster and Chemical Equipment Repairer). Power supply connections must be made by MOS 52C or 52D qualified personnel.

Characteristics

- Two industrial frontloading washers
- Two industrial frontloading dryers.
- Three person assembly and disassembly (not including TEMPER).
- A 16-ft by 20-ft TEMPER with modified endwall (bootwall) attaches to the CBL for use as a work station.

Capabilities and Features

- Can continuously process 150-200 pounds of laundry per hour – approximately 75 sets of BDU's hourly.
- Programmable electronic controls provide fully automated operation of washers and dryers.
- Contains utility connections for source water, graywater, and electrical power.
- Wall mounted exhaust fans allow removal of excess heat as needed.
- Water Reuse System recovers over 50% of the laundry wastewater.
- Nano-filtration system removes biotoxins that may be found in soiled hospital clothing and linens.
- On-board source water pump and water boiler.
- Dedicated FDECU and ASH for temperature control and ventilation.
- Programmable Logic Control (PLC) provides automatic monitoring and control of reuse filtration system.
- Automatic soap dispensing system.

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES-CONTINUED

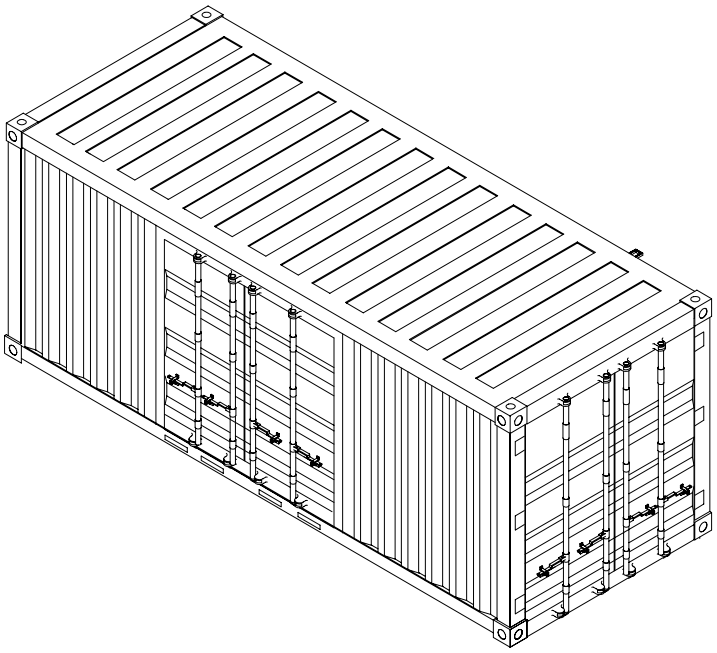


Figure 1. Laundry, Batch, Containerized (CBL) in Stowed Configuration.

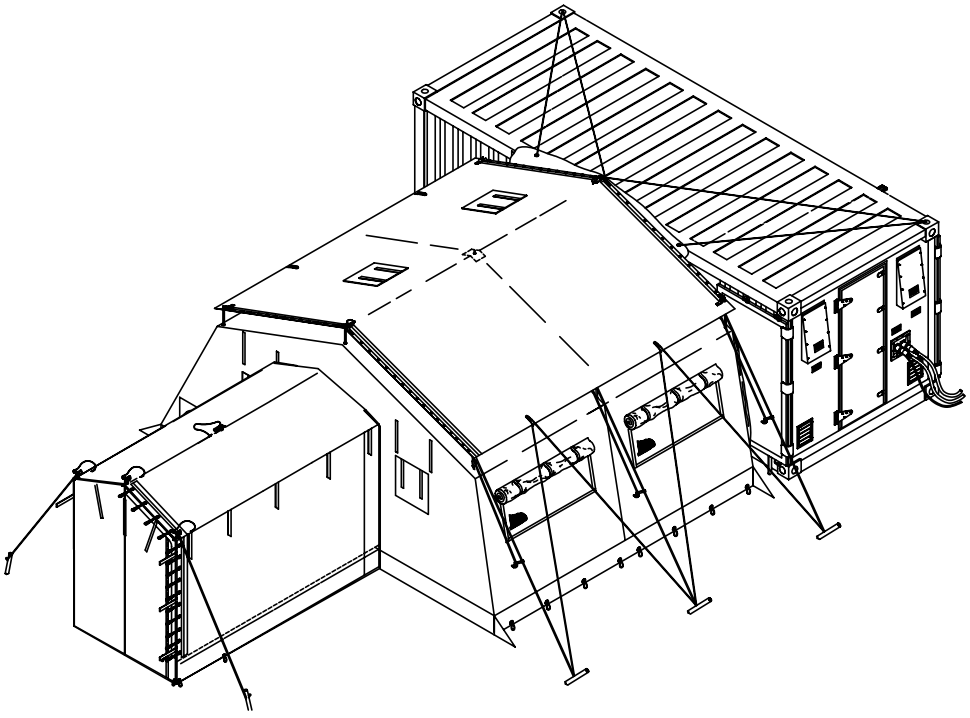
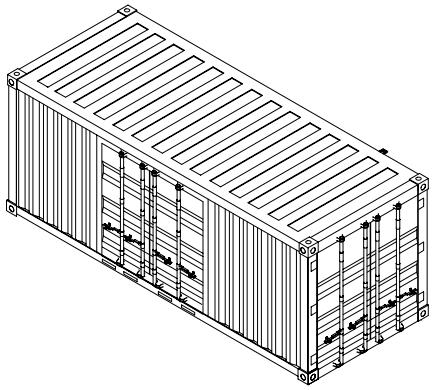
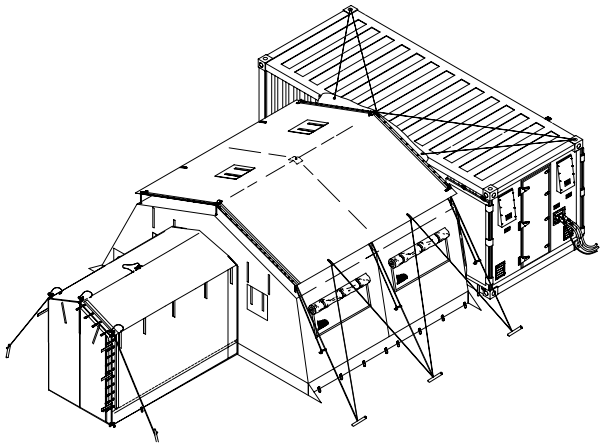
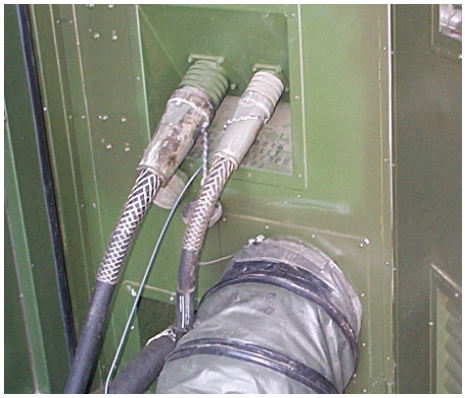


Figure 2. Laundry, Batch, Containerized (CBL) in Deployed Configuration.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

Modified ISO Container The CBL is built into a modified general cargo container with forklift pockets and ISO fittings for moving and lifting the container. Two false walls with personnel doors are fitted to the container, providing access to the rear of the washers and the dryers. A forklift with a capacity of 17,500 pounds or a dolly mobilizer is required for lifting.	
TEMPER A standard 16-ft x 20-ft TEMPER is fitted to the CBL for use as a work station for laundry operations. A modified TEMPER endwall (bootwall) forms a weather tight connection between the TEMPER and CBL.	
Main entrance doors The CBL main entrance doors serve as the operational access to the CBL washer and dryer facilities.	

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Washer Endwall The washer endwall features panels for power input, source water inlet, graywater outlet, fuel inlet, water boiler exhaust vent, ASH return air connection, and air vents. A door is fitted to provide access to machinery and controls located behind the washers.	
Washer and CBL Subsystem Power Entry Panel The washer and CBL subsystem power entry panel is located on the service panel on the washer endwall. External power is connected to the 100 A male power connector to operate the washers and all CBL subsystems except the dryers. The 60 A female power connector is provided to power the FDECU as well as the interior TEMPER lights and convenience outlets.	
Water Boiler Exhaust A water boiler exhaust vent is located on the washer endwall to exhaust combustion gases to the outside air.	

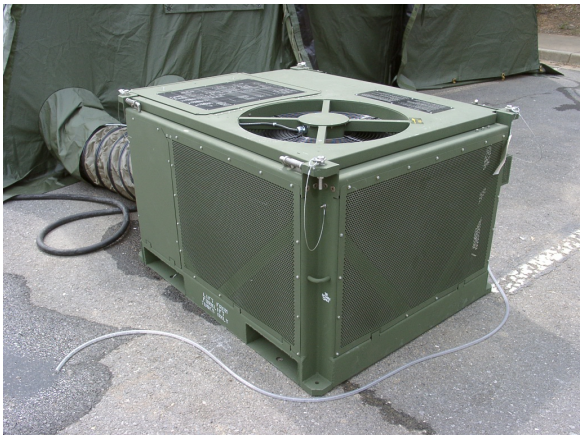
LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Dryer Endwall The CBL employs weathertight wall panels just inside the outer container end doors. The dryer endwall has a door with upper and lower latches that permits access to the rear of the dryers. The dryer endwall has a power input panel for the dryers, two exhaust fans, and dryer vents.	
Dryer Power Entry Panel The dryer power entry panel is located on the dryer endwall. External power is connected to the power entry panel to operate the two dryers.	
Exhaust Fans Two exhaust fans are mounted at the top of the dryer endwall. The exhaust fans provide for flow-through ventilation and help to remove hot air from the interior of the CBL.	
Dryer Vents The two dryer vents are located on the dryer endwall. Warm air from the drying process is vented outside the CBL.	

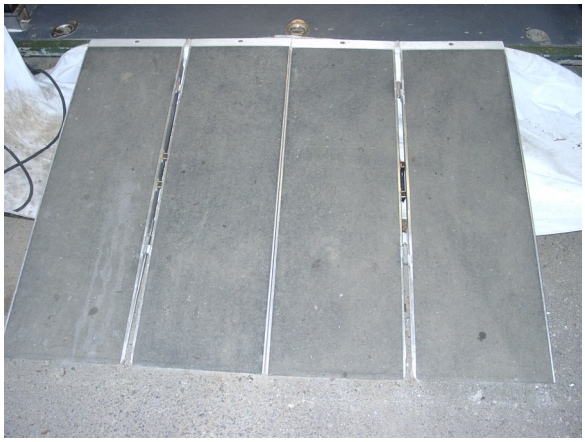
LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Power Cables Three 50-foot, 100 Amp cables, three 100 Amp Pigtails, and one 50-foot, 60 Amp cable are included with the CBL in order to power the CBL and its subsystems.	
Water Hoses and Miscellaneous Fittings Hoses with quick disconnect couplings (QDC) conduct source water from the 3,000 gallon source water bag to the CBL as well as conduct graywater from the CBL to a 3,000 gallon graywater collection bag.	
3000-Gallon Source Water Tank A 3000-gallon fabric water tank is supplied with the CBL for source water. The source water tank is clearly marked “Source Water”.	

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

3000-Gallon Graywater Tank A 3000-gallon fabric water tank is supplied with the CBL to receive graywater. The graywater tank is clearly marked "Graywater".	
Army Space Heater (ASH) The Army Space Heater (ASH) is used to heat the TEMPER and CBL during cold weather operation.	
FDECU The FDECU is installed outside the TEMPER and controls the climate inside the TEMPER and CBL within a temperature range of 32 ^{o}F to 120 ^{o}F.	

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Ramp Two folding ramps are provided to allow easy entry to the CBL and to make the use of laundry carts more efficient. Each ramp has a set of two pins that engage in holes located in the threshold of the CBL entryway.	
Interior and Blackout Lights The CBL is fitted with three fluorescent light fixtures mounted to the ceiling and controlled through the Programmable Logic Control (PLC). The center fixture is equipped with a blue lens for blackout conditions. A battery backup keeps the blackout lights illuminated in a power outage situation.	

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Main Electrical Panel The main electrical panel distributes power throughout the CBL, with the exception of the dryers. A series of circuit breakers protect the various subsystems.	
Dryer Electrical Panel The dryer electrical panel protects the two dryers with independent circuit breakers.	

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Programmable Logic Control (PLC) The Programmable Logic Control is placed in a control panel located to the left of the F-1A filter. The PLC monitors and provides control of all operation of the CBL through touch screens. The control panel integrates an emergency shutdown switch that permits the total shut down of all CBL systems in the event of an emergency.	
Washers Two washers are used in the CBL, each capable of processing 50 pounds of laundry at a time or approximately 18 full sets of BDU's. Each washer has a programmable microprocessor controller which regulates the operating cycles. Wash and rinse water from the washers is processed through a filtration system that permits water reuse, conserving source water use. The washers rest on frames with heavy duty casters that allow the washer to be rolled out for maintenance. The washers have also been fitted with braces to lock the washer's suspension during transit. The CBL is fitted with isolation valves for each washer, allowing one washer to function while another is inoperable or being maintained in place.	

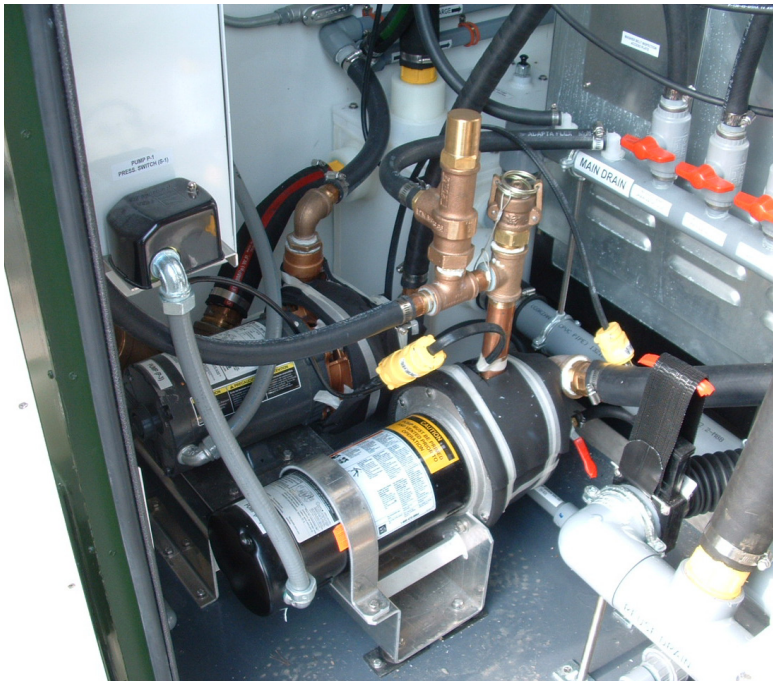
LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Dryers

Two electric dryers are installed in the CBL. Each dryer is capable of drying 75 pounds of laundry at a time and is equipped with a programmable microprocessor controller which regulates the dryer's operating cycles.
The dryer exhaust discharges outside the CBL through ducts to external vents. The CBL dryer vents are located on the false wall on either side of the single service door at the dryer end of the container.



LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Automatic Soap Dispenser Laundry detergent, bleach, and laundry sour are automatically dispensed as required by the laundry program. In the event of a failure of this system, laundry detergent, bleach, and sour may still be dispensed through the washer dispensers.	
Water Inlet Pump P-1 The water inlet pump is located at the washer end of the CBL behind the service panel on the left side. This pump accepts source water from the external water supply and pumps it to the water boiler and to the cold water inlet on the washer.	

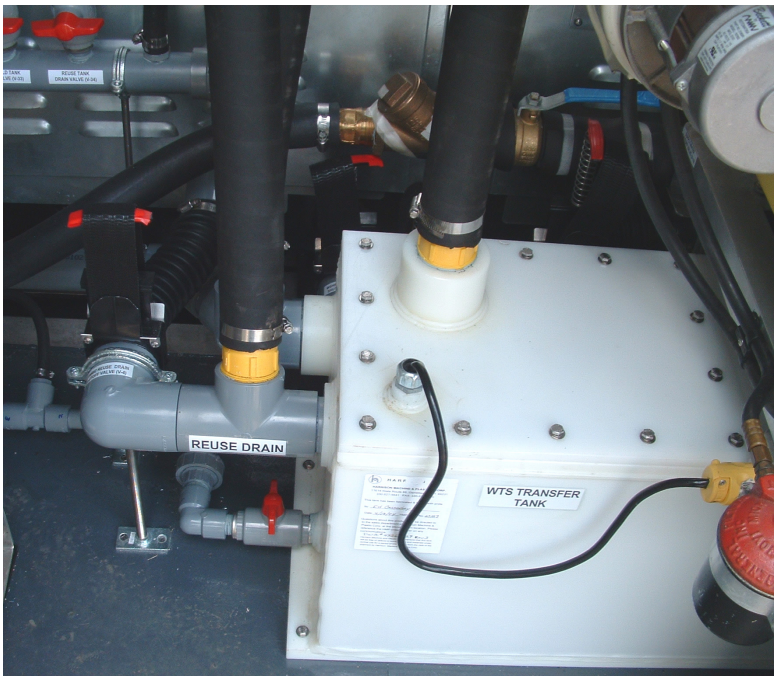
LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Water Boiler The water boiler is located at the washer end of the CBL behind and to the right of the service wall. The boiler heats the source water that is being supplied to the washers. A mixing valve on the top of the boiler controls the temperature of the outgoing water. A second mixing valve controls the temperature of the reuse water being supplied to the washer.	
P-3 Filtration Pump The P-3 filtration pump is located at the washer end of the CBL behind the service panel on the left side. The pump accepts the recyclable graywater from the WTS hold tank and pumps it through the F-1A/F-1B and F-2 filters to the Nano Feed Tank.	

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Nanofilter Feed Pump P-4 The nanofilter feed pump is located in the operator compartment to the right of Filter F-3 and against the back wall. Pump P-4 is a multistage pump that is designed to pump water from the nanofilter feed tank to the nanofiltration vessels, carbon filter and reuse tank mounted to the ceiling of the CBL, then to the F-3 carbon filter, and finally to the Reuse Tank.	

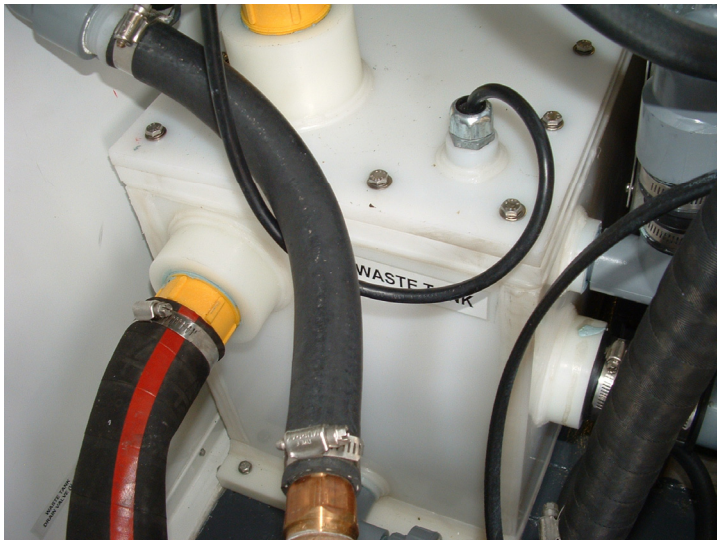
LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

WTS Transfer Tank and Pump The WTS transfer tank is located below the water boiler. The WTS transfer tank collects all graywater that is to be recycled and routes it to the WTS hold tank located above the washers. Prefiltered graywater is pumped to the WTS hold tank by means of a sump pump installed inside the WTS transfer tank.	
Water Treatment System Hold Tank The water treatment system holding tank is mounted above the washers and collects the recyclable graywater from the washers. Water from the WTS holding tank is then sent through the filtration system.	

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Nanofilter Feed Tank The nanofilter feed tank collects wash water that has been filtered by filters F-1A/F-1B, and F-2. Water is held in the nanofilter feed tank and supplied to the nanofiltration vessels on the ceiling of the CBL.	
Reuse Tank The reuse tank is located over the washers and collects the filtered and purified water that will be recycled through the washers during a subsequent wash cycle.	

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Waste Tank and Pump The waste tank is located at the washer end of the CBL behind the service panel. The waste tank collects all graywater that has not been recycled and routes it to a 3K fabric water bag located outside the CBL. Waste water is removed from the CBL by means of a sump pump installed inside the waste tank. Municipal sewers may be used if authorized.	
Filter F-1A and F-1B Filters F-1A and F-1B are located in the operator compartment against the far wall. Filters F-1A and F-1B are designed to filter gross impurities from water originating from the water treatment system holding tank.	

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Filter F-2

Filter F-2 is located in the operator compartment to the right of Filter F-1A. Filter F-2 has a string filter cartridge and is designed to continue the filtering process by further purifying the water from Filter F-1A or F-1B. It also protects the system by filtering gross impurities if there is ever a failure with the F-1A or F-1B filters.

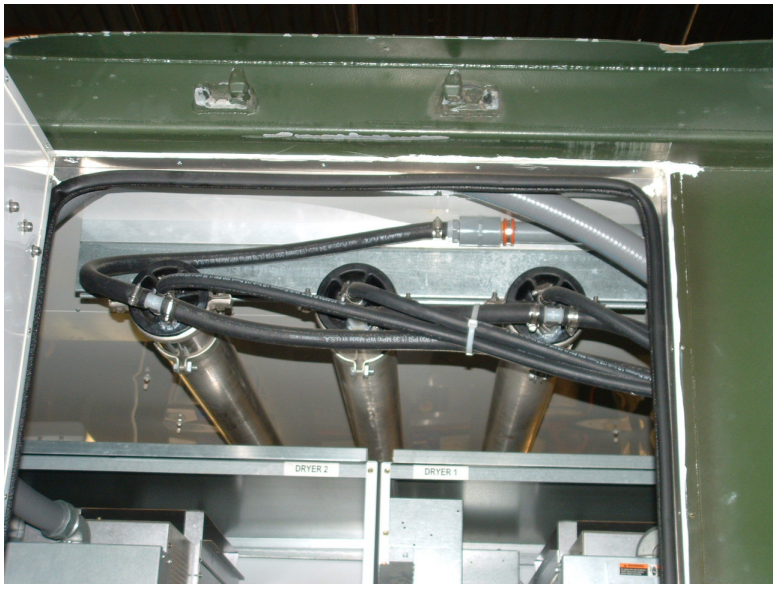
Filter F-3

Filter F-3 is located in the operator compartment and to the right of Filter F-2. Filter F-3 has a carbon filter cartridge and is designed to filter the reuse water a final time before storing in the reuse tank.

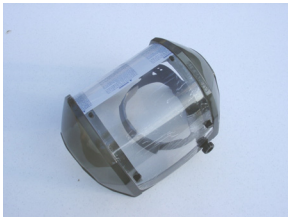


Nanofilters

Three nanofilters are used to filter impurities and biotoxins from the reuse water.



LOCATION AND DESCRIPTION OF MAJOR COMPONENTS-CONTINUED

Air Compressor A portable air compressor is fitted to the CBL to evacuate water from the system when the CBL is inactive in ambient temperatures below 32 °F . The air compressor is stored under the dryer circuit breaker panel.	
Safety Items Various safety items are included with the CBL that include a fire extinguisher, safety goggles, replacement safety lenses, full face shields, dust masks, heavy duty rubber gloves, latex surgical gloves, and rubber aprons, and the MSDS Book.	  

EQUIPMENT DATA

External dimension:		
Length	20 feet	(6.10 meters)
Width	8 feet	(2.44 meters)
Height	8 feet	(2.44 meters)
Internal dimension:		
Length	19 feet, 4 inches	(5.80 meters)
Width	7 feet, 6 inches	(2.25 meters)
Height (Canadian Container)	7 feet, 3-3/8 inches	(2.18 meters)
Height (Turkish Container)	7 feet, 1-3/8 inches	(2.17 meters)
Door dimensions:		
Main entrance door		
Height	6 feet, 11-5/8 inches	(2.12 meters)
Width	7 feet, 7 inches	(2.31 meters)
Double Service doors (Washer and Dryer Access)		
Height	6 feet, 11-5/8 inches	(2.12 meters)
Width	7 feet, 7 inches	(2.31 meters)
Weight:		
CBL, Minimum Packout weight	14,960 pounds	(6786 kilograms)
CBL, Full Packout weight	16,200 pounds	(7348 kilograms)
CBL, empty	12,800 pounds	(5806 kilograms)
Required electrical input:		
Laundry, Batch, Containerized (CBL)		300 A, 208 V, three phase AC
Washer (each)		15 A, 208 V, single phase AC
Dryer (each)		100 A, 208 V, three phase AC
Fan, exhaust (each)		10 A, 110 V, single phase AC
Lighting		10 A, 110 V, single phase AC
Required Source Water Flow Rate	10 gallons/minute	37.85 liters/minute
Environmental:		
Operating temperature range	-25° to 120° Fahrenheit	-32° to 49° Celsius
Maximum operating elevation (with factory boiler settings)	3000 feet	914 meters

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
THEORY OF OPERATION

General

The Laundry, Batch, Containerized (CBL) operates as a standalone system, and is comprised of two washers, two dryers, an internal water boiler, a water reuse filtration system, utility connectors (source water, graywater, and electrical), circuit breaker panels to distribute power and provide circuit protection, and a Programmable Logic Control (PLC) which provides centralized control of all components outside of the washers and dryers. The system is a manned station designed to process 150 to 200 pounds of laundry per hour including batches of uniforms and hospital linens.

CBL

The CBL is housed in a modified 8-ft x 8-ft x 20-ft ISO cargo container **(Figure 1, Item 1)**. Two 50-pound capacity automatic washers and two 75-pound capacity automatic electric dryers are housed within the CBL container. Main access to the CBL is through double entrance doors, which are opened before attachment of the TEMPER **(Figure 1, Item 2)** and bootwall. Service entry doors **(Figure 1, Item 3)** at each end of the CBL allow access to the back of both the washers and dryers.

TEMPER

The 16-ft x 20-ft TEMPER **(Figure 1, Item 2)** is used as a work station for accepting, sorting, and distributing laundry. The TEMPER attaches to the CBL container **(Figure 1, Item 1)** by means of a modified endwall. The TEMPER is equipped with lighting and utility receptacles to provide the necessary illumination and electrical service for the workspace. The TEMPER lighting is equipped with blue sleeves for operation in blackout condition.

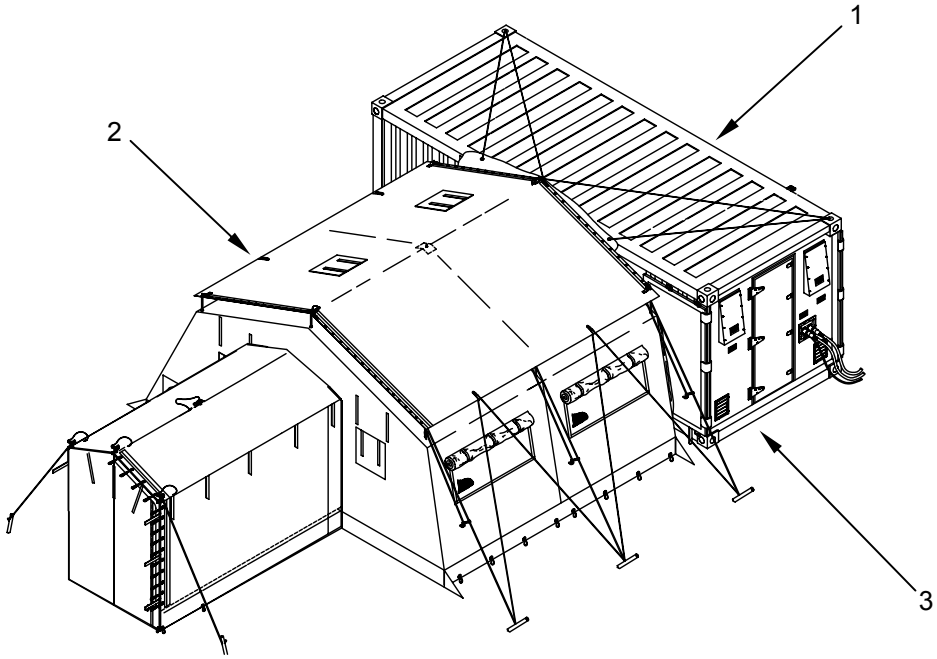


Figure 1. CBL.

Source Water System

The CBL receives water service from an outside water source or 3,000-gallon fabric water bag **(Figure 2, Item 1)** set up outside the CBL. Source water enters the CBL through QDC fittings on the water service panel. Water is fed to the water inlet pump P-1**(Figure 2, Item 2)** and distributed to the cold water inlet **(Figure 2, Item 3)** on both washers as well as the cold water inlet on the water boiler **(Figure 3, Item 4)** and the service spigot **(Figure 3, Item 5)**. Heated water from the boiler is then fed to the hot water inlets **(Figure 2, Item 6)** on the washers and to the Automatic Soap Dispenser **(Figure 3, Item 7)**.

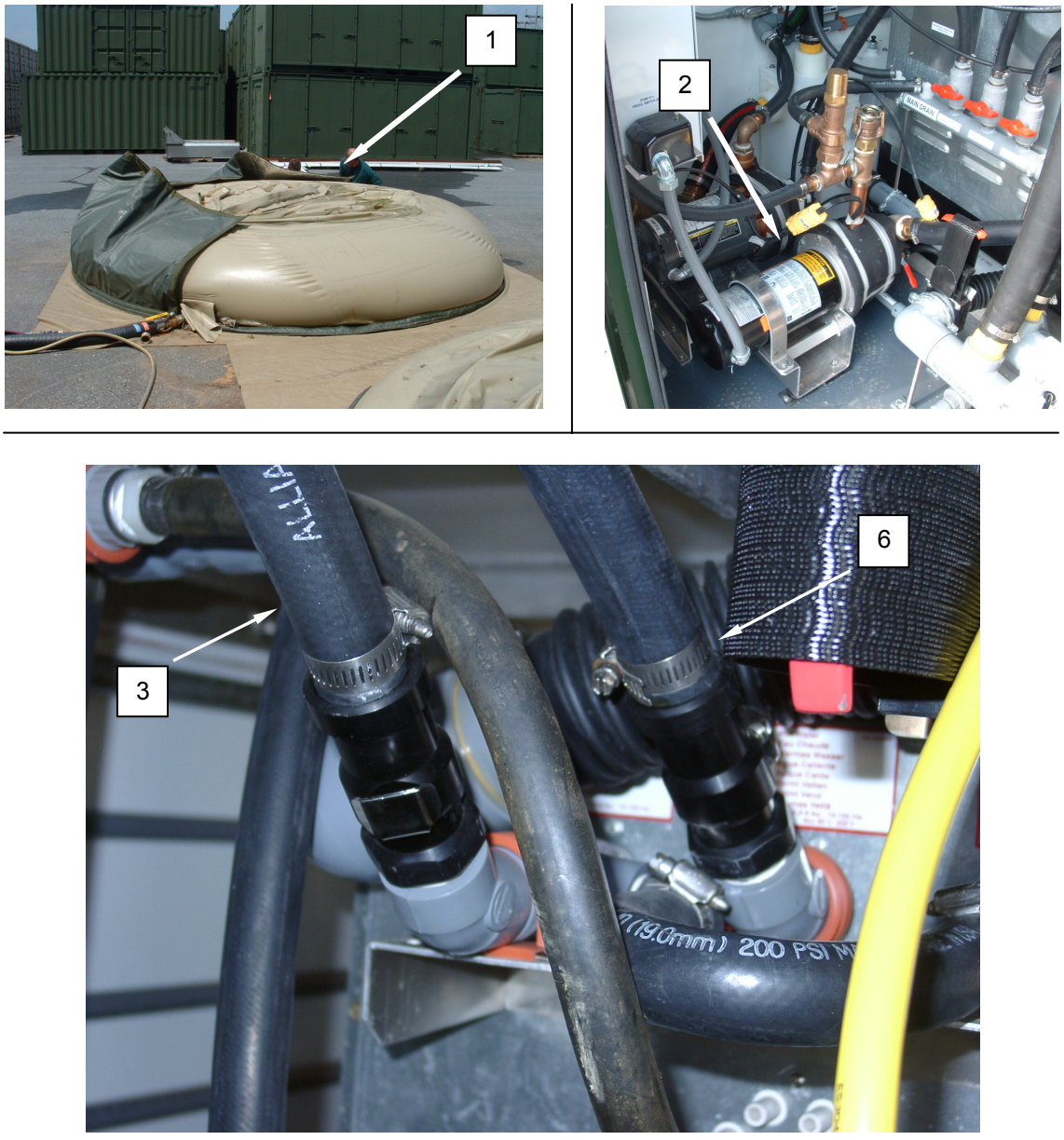


Figure 2. Source Water System.



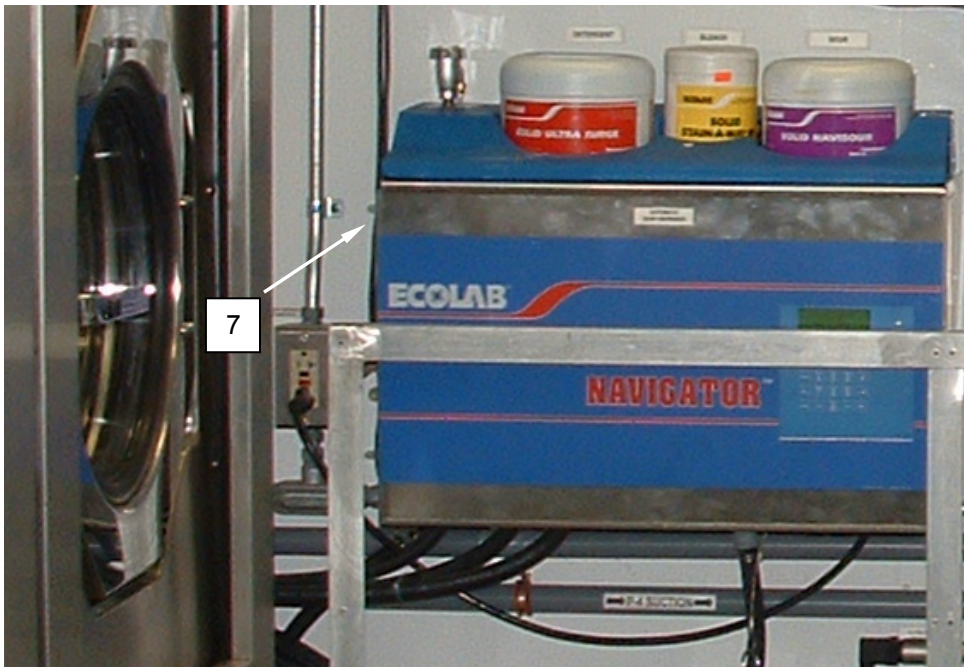


Figure 3. Source Water System.

Water Reuse System

The CBL utilizes a water reuse system that filters water discharged from the washers and stores it in a reuse tank for use in subsequent wash loads. Water from the washer is discharged from a reuse drain into the Water Treatment System (WTS) transfer tank **(Figure 4, Item 1)** located behind the washers. When the WTS transfer tank is full, the untreated water is pumped up to a WTS holding tank **(Figure 4, Item 2)** located over the washers. Pump P-3 **(Figure 4, Item 3)** takes water from the WTS hold tank and sends it through the F-1 **(Figure 4, Item 4)** and F-2 **(Figure 5, Item 5)** filters to remove gross impurities. Water is then routed to the nanofilter feed tank **(Figure 5, Item 6)** for collection. Water from the nanofilter feed tank is fed into Pump P-4 **(Figure 5, Item 7)** and through a series of three nanofiltration vessels **(Figure 5, Item 8)** that remove all remaining impurities and bacteriological products. Water then passes through carbon filter F-3 **(Figure 5, Item 9)** and is stored in the reuse tank **(Figure 5, Item 10)** for later use.

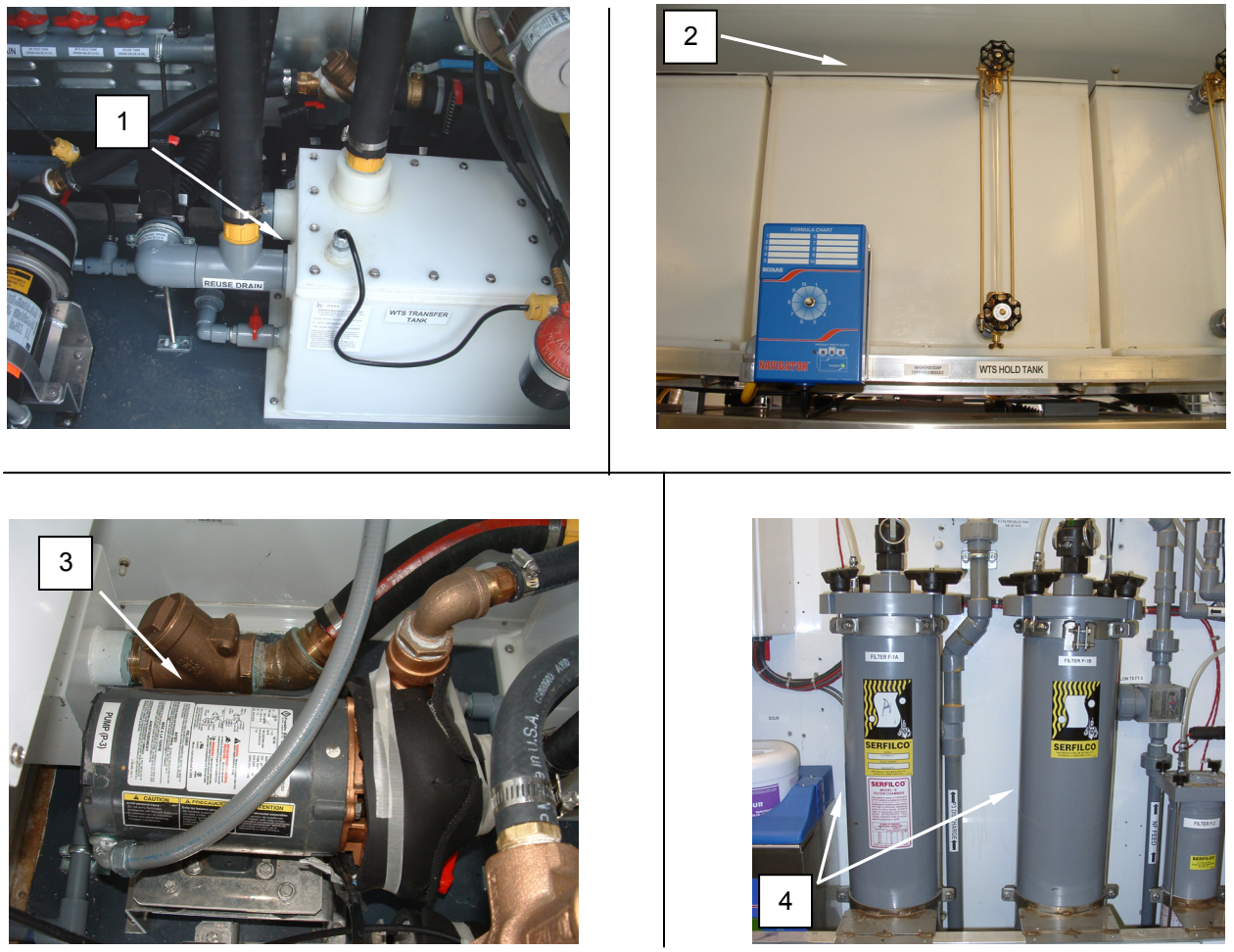


Figure 4. Water Reuse System.

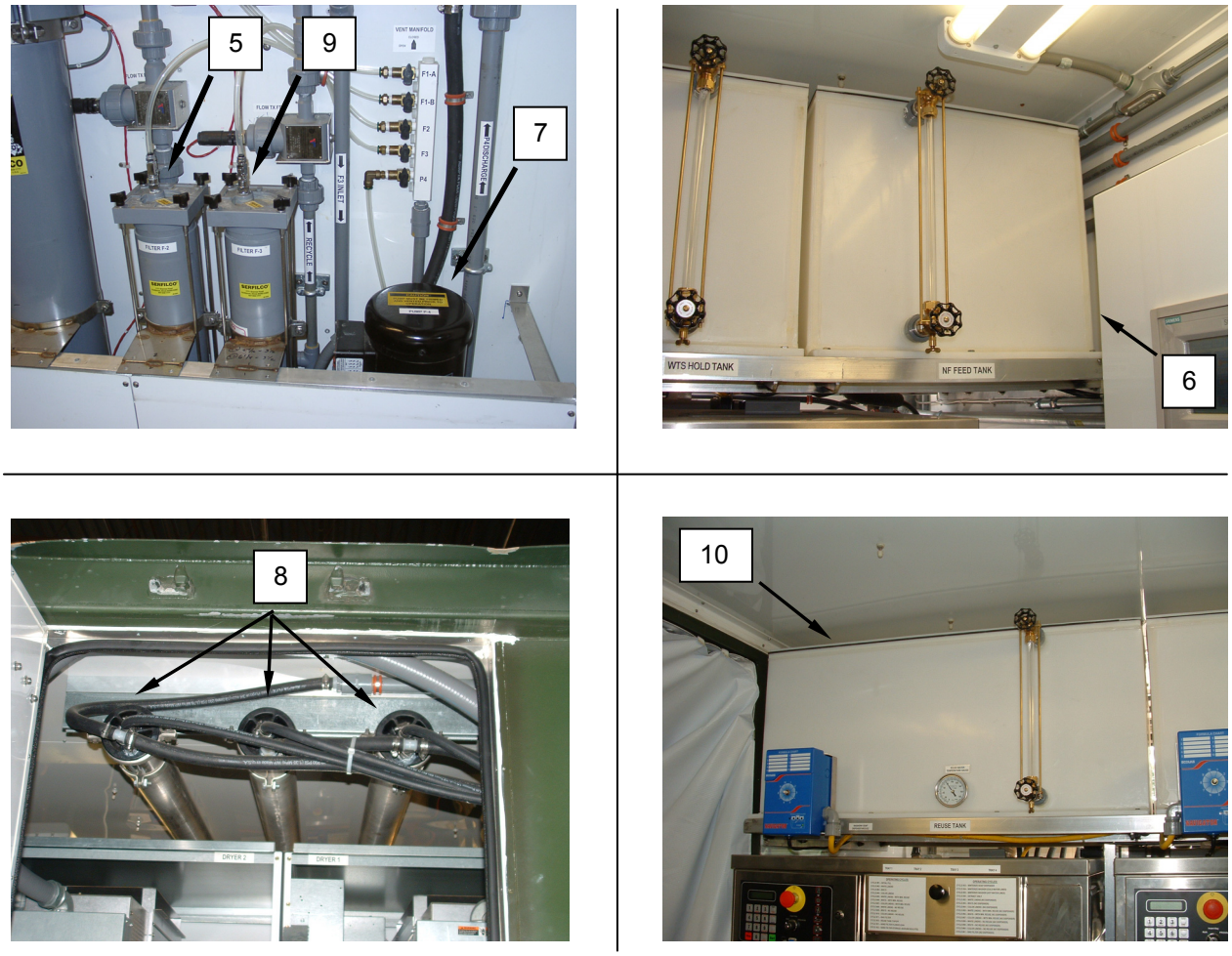


Figure 5. Water Reuse System.

Graywater System

Drainage from the WTS holding tank, nanofilter tank, and reuse tank is discharged through PVC piping to the waste tank **(Figure 6, Item 1)** located beside washer No. 1. A sump pump in the waste tank pumps the graywater into a 3,000-gallon fabric water bag set up outside the CBL or an approved waste water system.

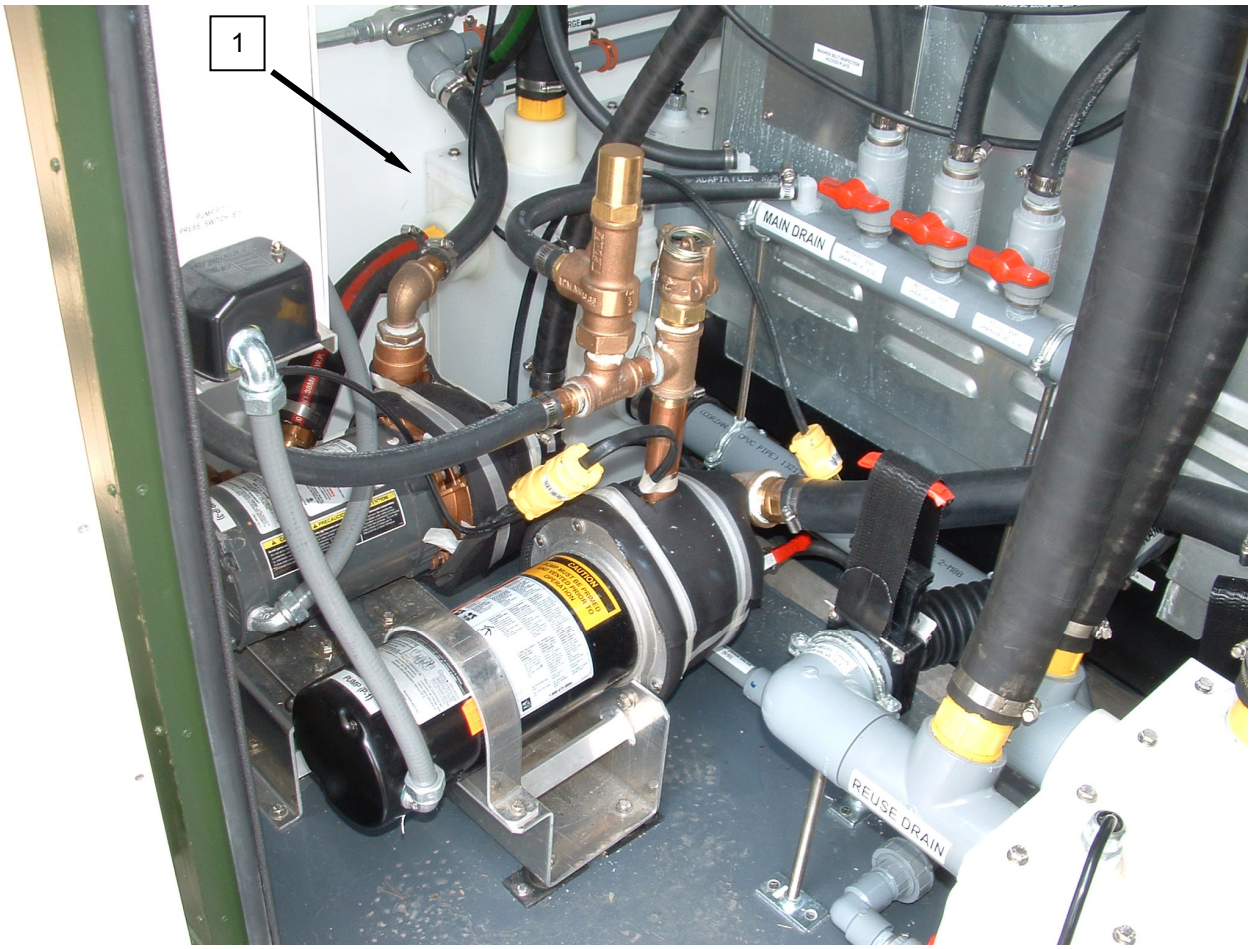


Figure 6. Graywater System.

Electrical System

The CBL receives 208 VAC power from a 100 kW generator or approved municipal power source through three 100A cables. One cable feeds the power service panel at the washer end **(Figure 7, Item 1)** of the container. Two cables feed the dryer power service panel located on the service panel at the dryer end **(Figure 8, Item 2)** of the container.

The power service panel **(Figure 7, Item 3)** at the washer end of the container distributes power to the main circuit breaker panel **(Figure 8, Item 4)**. Power is then distributed through circuit breakers to the washers, exhaust fans, CBL lighting, source water pump, soap dispenser, PLC, water boiler, and filtration system pumps. Service outlet receptacles **(Figure 8, Item 5)** that are GFCI protected are located at each end of the container and at the center for powering work lights and other external components. A 60A outlet **(Figure 7, Item 6)** is provided for powering the FDECU, ASH, TEMPER lighting, and utility receptacles. All outlet receptacles are controlled and protected by the main circuit breaker panel.

The dryer power service panel **(Figure 8, Item 7)** distributes power from the two 100A cables to the dryer breaker panel **(Figure 9, Item 8)**. Power is then distributed to each dryer through circuit breakers.

Operating control for most electrical components is centralized at the Programmable Logic Control (PLC) **(Figure 9, Item 9)**. In the event of a failure of this component, all systems can be either bypassed or manually operated.

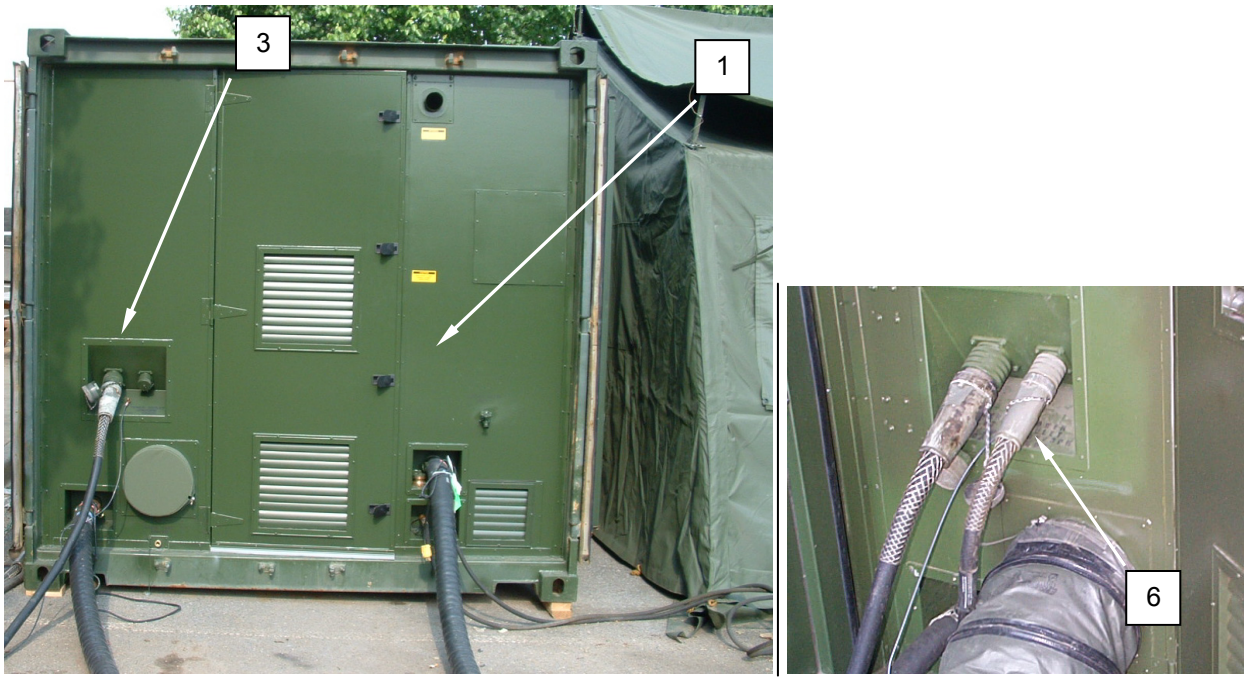
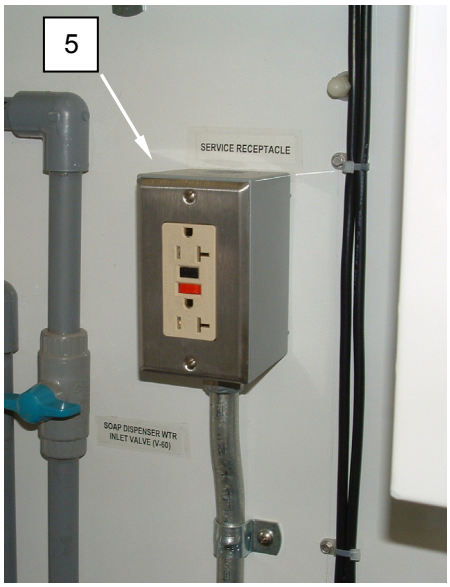


Figure 7. Electrical System.





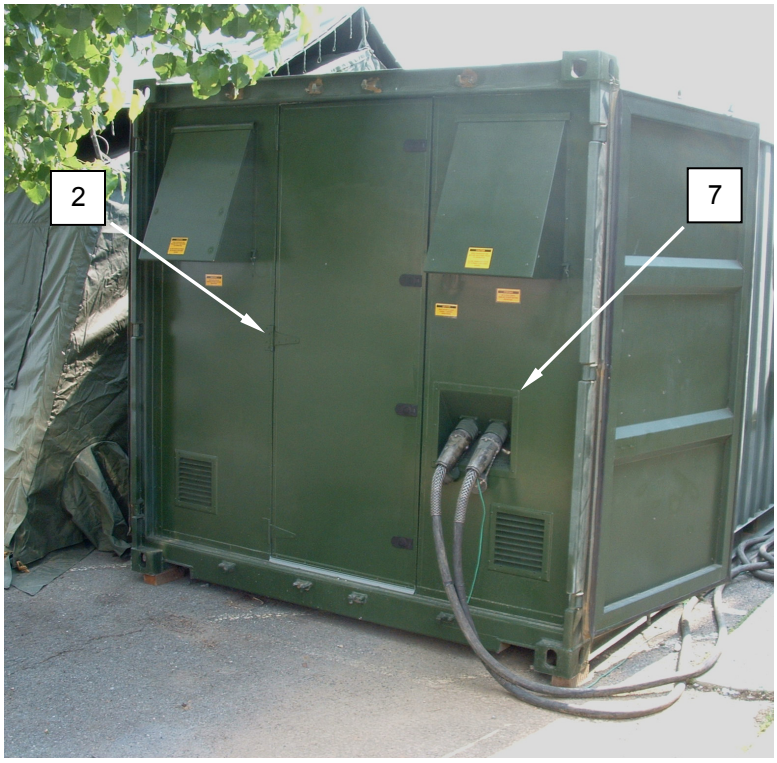


Figure 8. Electrical System.



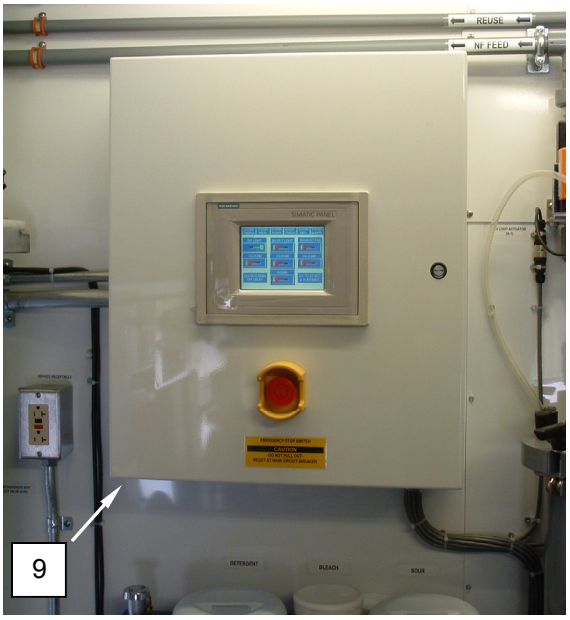


Figure 9. Electrical System.

Ventilation and Climate Control
Dryer exhaust is vented directly to the outside through vents **(Figure 10, Item 1)** installed at the dryer end of the CBL. The vents are connected to the dryers by flexible hose.

Container ventilation is accomplished by the use of two exhaust fans **(Figure 11, Item 2)** mounted to the upper portion of the service panel at the dryer end of the container. The exhaust fans are protected by collapsible rainhoods **(Figure 10, Item 3)**.

Supply air for the boiler is supplied through two filtered vents **(Figure 11, Item 4)** located in the service access door behind the washers. An additional filtered vent **(Figure 11, Item 5)** is located in the lower portion of the service panel and is accessible from under the boiler.

A Field Deployable Environmental Control Unit (FDECU) or Army Space Heater (ASH) is installed outside the TEMPER to provide air conditioning and heat.

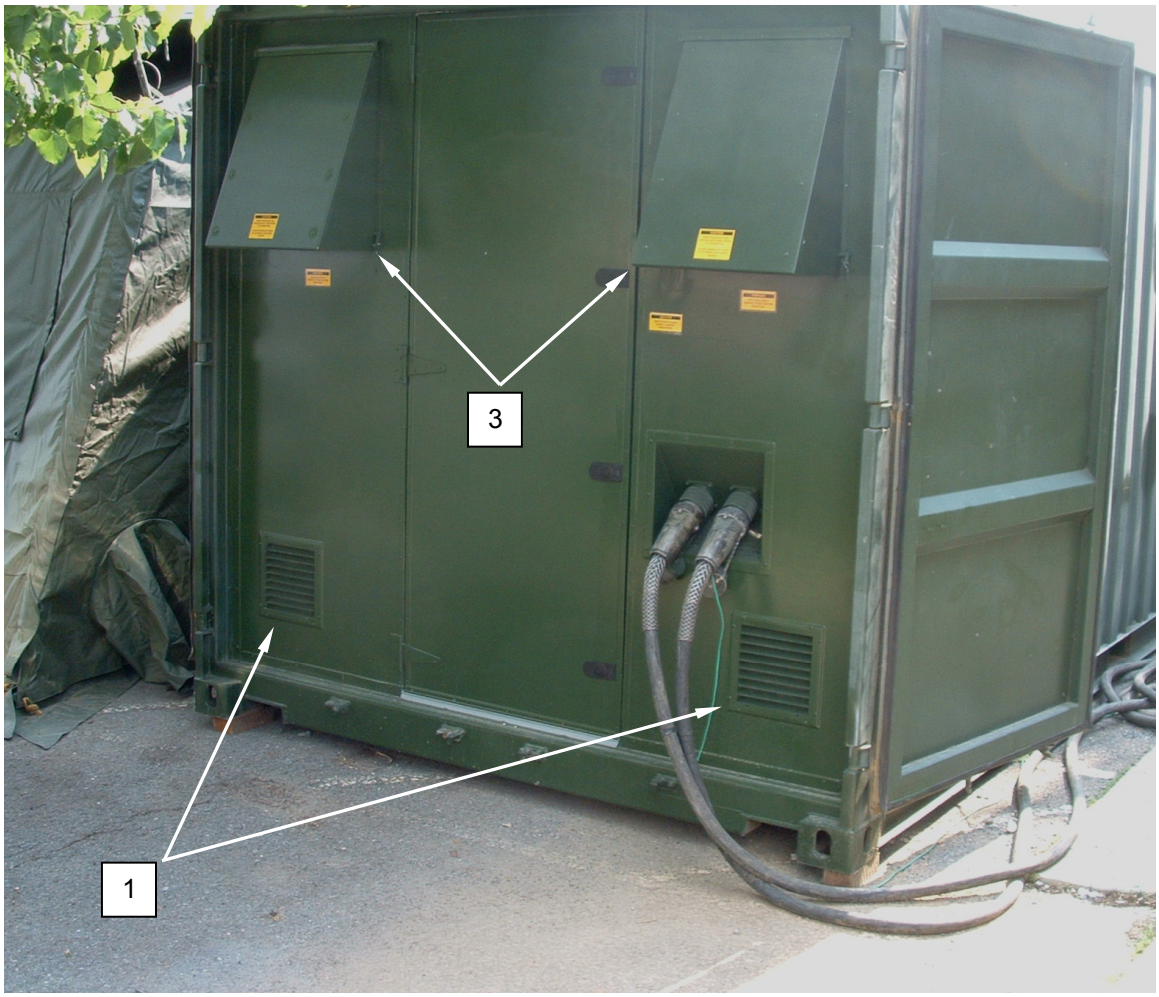


Figure 10. Ventilation and Climate Control.

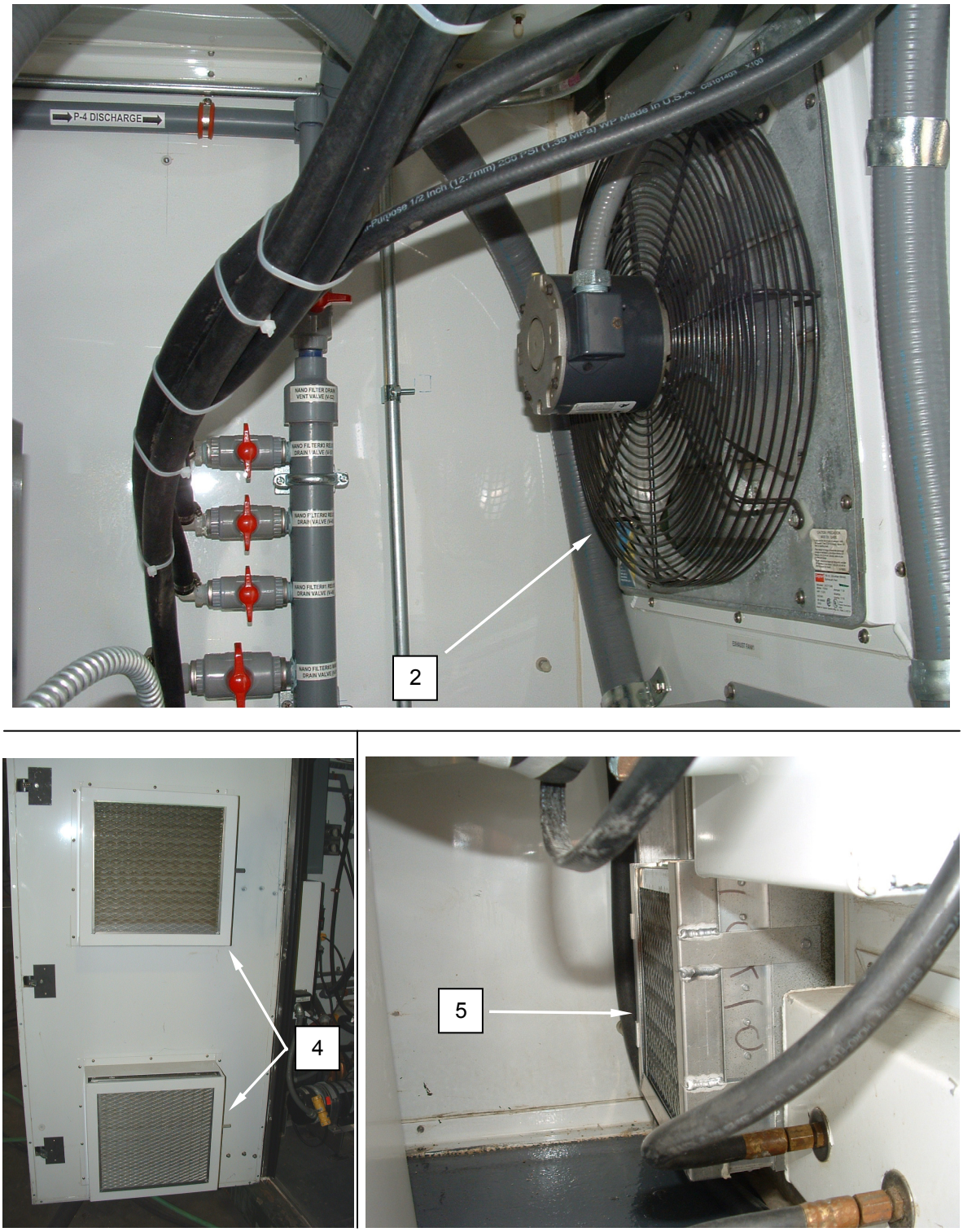


Figure 11. Ventilation and Climate Control.

Lighting
Two ceiling-mounted fluorescent light fixtures **(Figure 12, Item 1)** provide interior lighting. A blackout lighting fixture **(Figure 12, Item 2)** provides light in blackout conditions or power outage conditions.

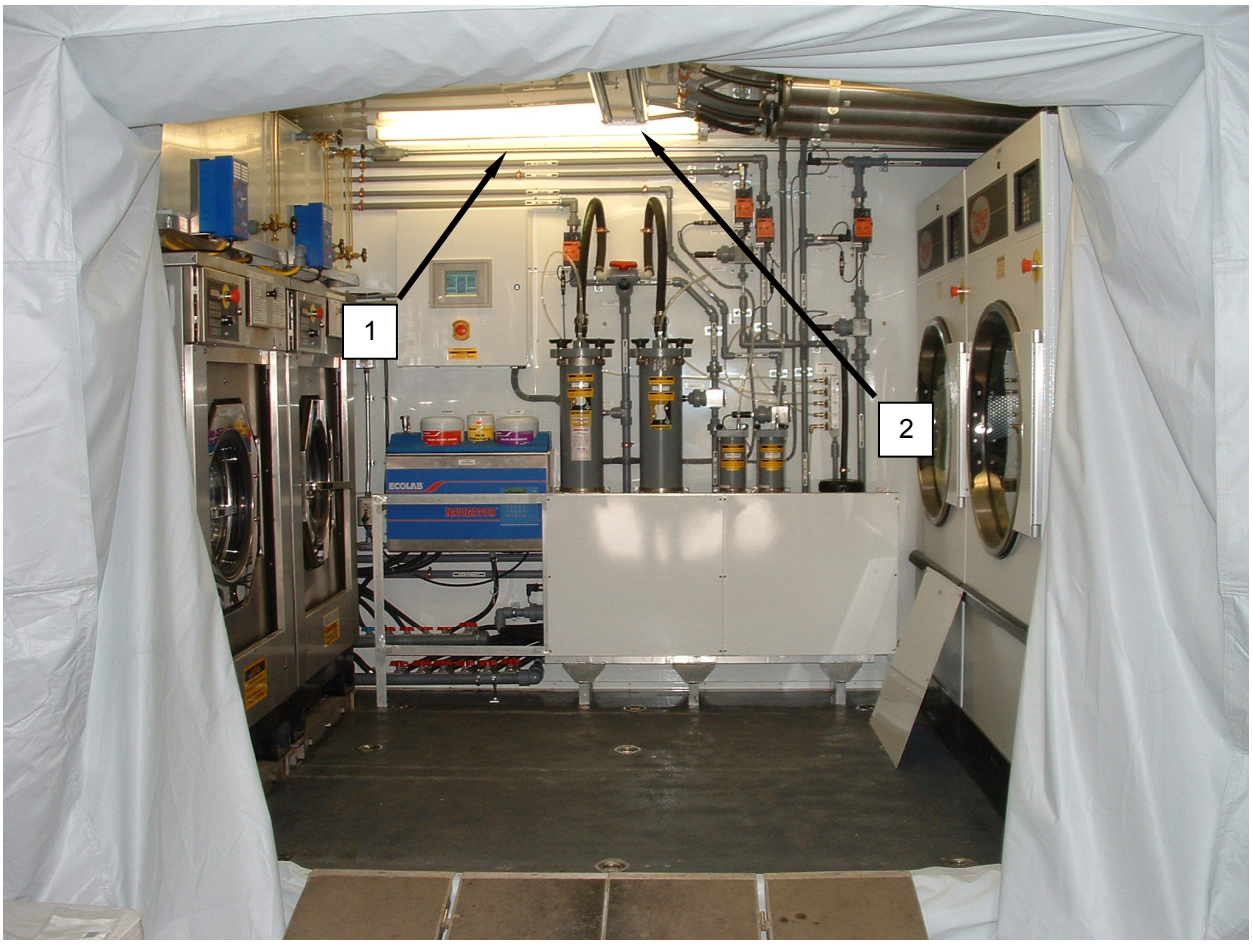


Figure 12. Lighting.

Flow of Laundry (Refer to Figure 13 for diagram)



WARNING

Use extreme caution when handling soiled laundry. The CBL is designed to service hospital units, and the chance of exposure to laundry contaminated with blood and other body fluids is high. Soiled laundry items may also contaminate clean laundry and operator clothing if not handled with adequate precautions. Always wear supplied safety equipment such as gloves, apron, and mask. Always wash hands after handling soiled laundry. Failure to comply may result in serious illness or death to personnel.



WARNING

Use extreme caution when handling soiled laundry. The CBL is designed to service hospital units, and the chance of exposure to sharp objects such as needles, knives, or medical instruments is likely. Sharp objects of this nature may be contaminated with body fluids such as blood, and may carry the chance of infection with disease as well. Use extreme caution when handling soiled hospital laundry items, and inspect each and every item for the presence of sharp objects. Always wear supplied safety equipment such as gloves, apron, and mask. Always wash hands after handling soiled laundry. Failure to comply may result in serious illness or death to personnel.

Laundry is brought into the TEMPER and sorted into 50-pound loads according to laundry type (white linens, BDU's, colored linens). When the first full load is ready, it is placed into a laundry cart and taken into the CBL operating area. The first load is placed in a washer, the door is latched, and the washer is set for the appropriate cycle. Another load may then be placed in the remaining washer.

When the first load completes it's wash cycle, the laundry cart cover is placed on top of a laundry cart and the wet laundry is emptied onto the cover. The dryer opposite the washer then may be opened, and the wet laundry may be moved with the cart to the dryer door. The dryer door is closed, and the dryer is set for the appropriate drying cycle. Another load may then be placed in the empty washer. The laundry load in the second washer then follows the same process when the wash cycle has completed. Allowing a 5- to 10 minute stagger of laundry times between each washer and dryer set ensures the maximum operating capacity of the CBL as a system.

When the laundry is dry, it is placed atop the cart cover and taken from the CBL operating area into the TEMPER, where it is folded on the work tables provided. Clean and folded laundry is then taken from the CBL to the designated storage area.

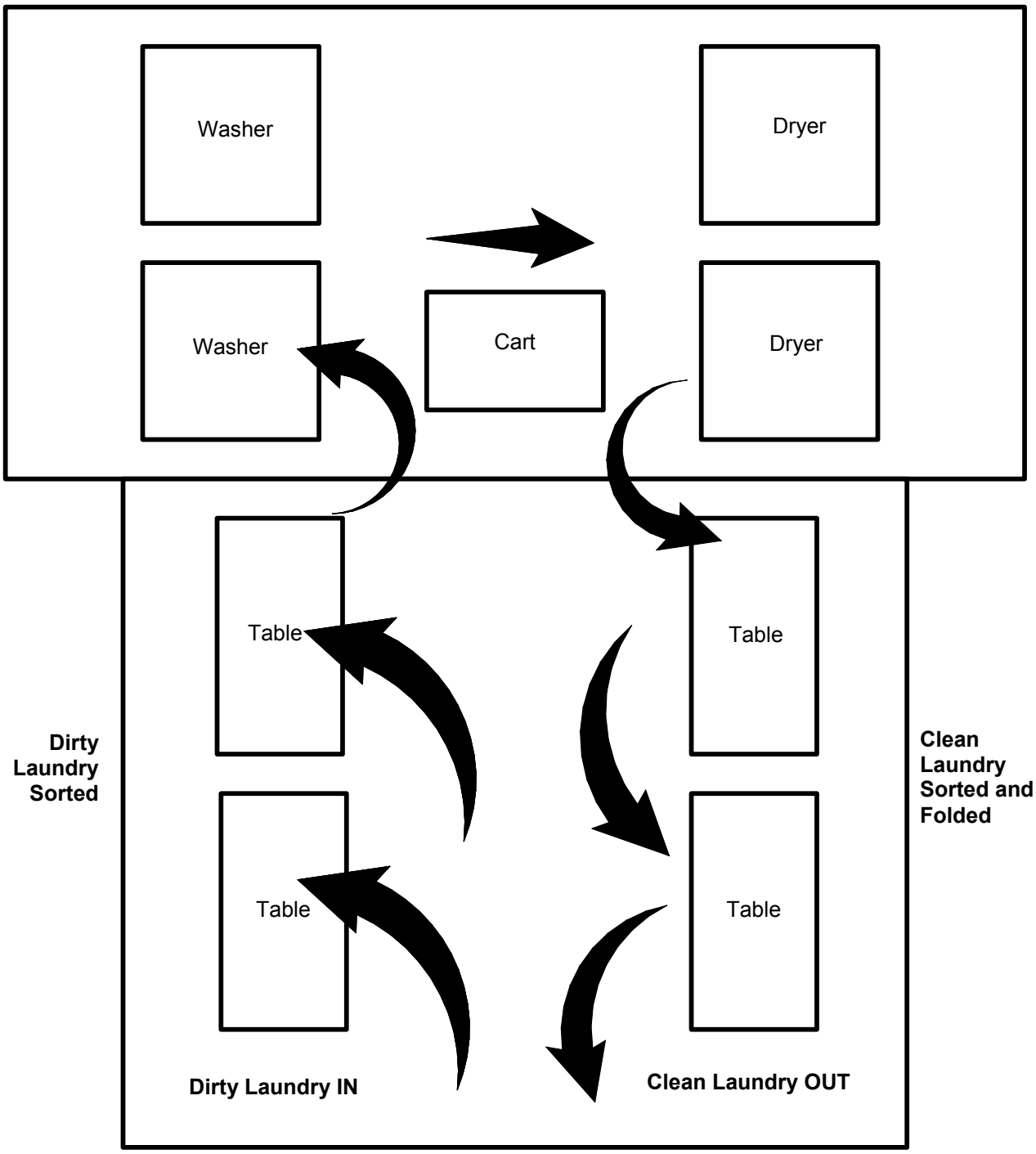


Figure 13. Laundry, Batch, Containerized (CBL) Laundry Flow.

CHAPTER 2

OPERATOR INSTRUCTIONS

CONTAINERIZED BATCH LAUNDRY (CBL)

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS

GENERAL

This work package provides a description and location of Containerized Batch Laundry (CBL) controls and indicators. Personnel operating and maintaining the CBL should know the location and proper use of every control and indicator. The following illustrations show the locations of the controls and indicators on the CBL as well as providing references for associated equipment.



WARNING

Do not attempt to use any controls until you have reviewed the operating instructions in WP 0008 00 and WP 0009 00. Failure to observe safety precautions and operating procedures may result in serious injury or death to personnel by electrocution or burns.

CAUTION

Do not attempt to operate the CBL or any of its controls until you have reviewed the operating instructions in WP 0008 00 and WP 0009 00. Failure to observe correct operating procedures may result in serious damage to the CBL or CBL components.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS

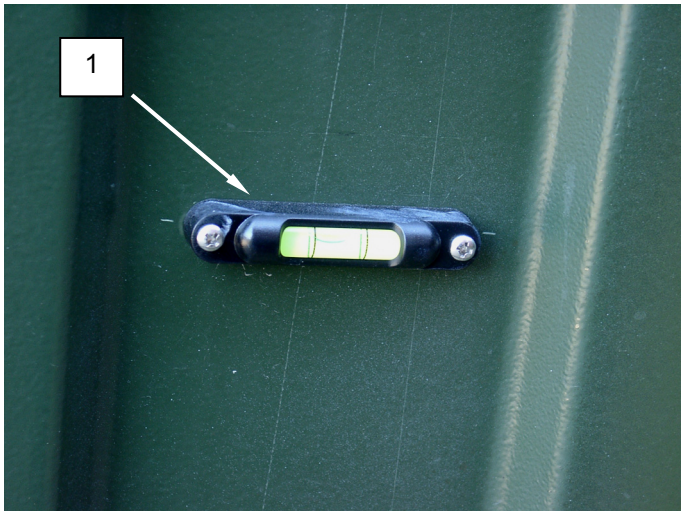


Table 1. CBL Container Level.

Key	Item	Function
1	Container Level	Provides indication of container inclination.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

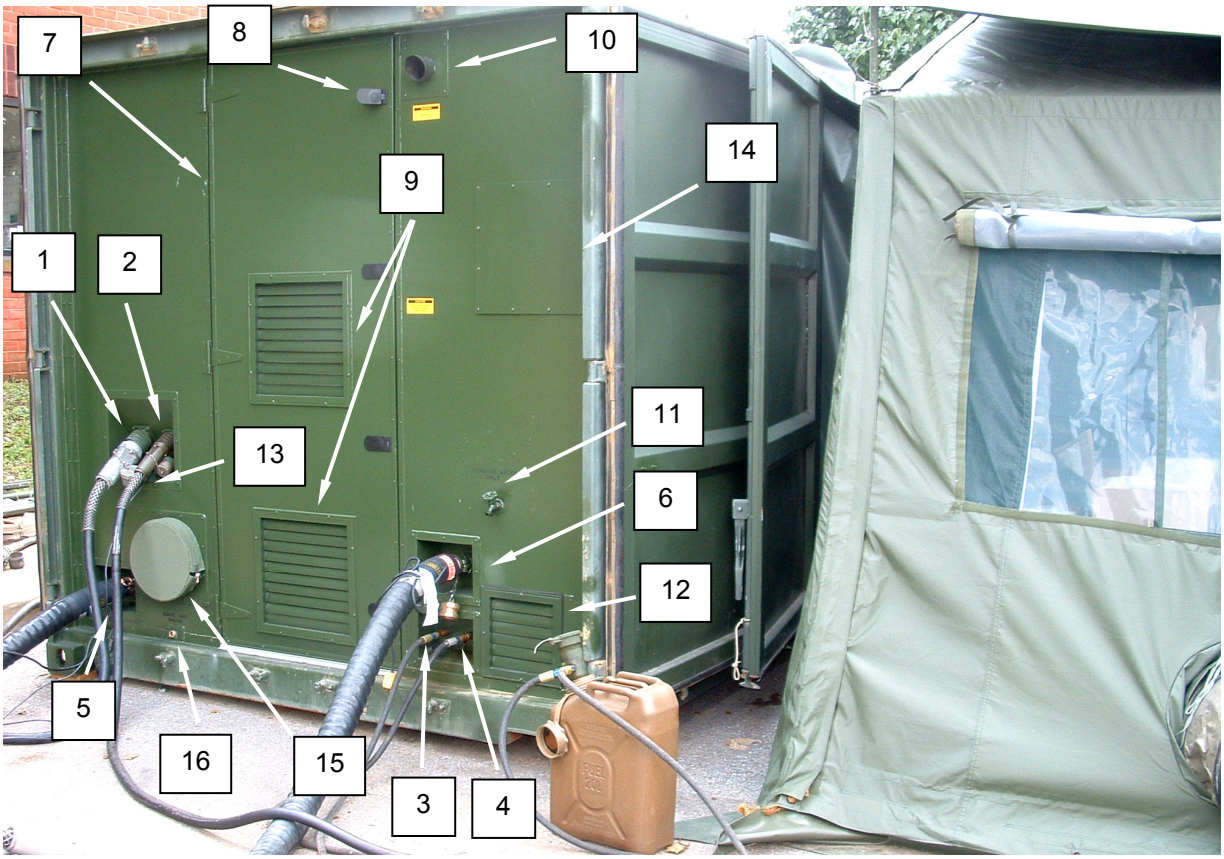


Table 2. CBL Washer End.

Key	Item	Function
1	100 Amp Power Inlet Connector	Provides power to washers and other CBL subsystems
2	60 Amp Power Outlet	Supplies power to TEMPER distribution box for TEMPER lighting and FDECU
3	Fuel Supply Inlet Connector	Connection for external fuel supply for water boiler
4	Fuel Return Outlet Connector	Return connection for water boiler external fuel supply
5	Graywater Outlet Panel	Male connection for graywater outflow
6	Supply Water Inlet Panel	Female connection for supply water inlet
7	Service Door	Allows entry to the rear of the washers
8	Service Door Latch	Latch used to lock service door
9	Ventilation Louvers	Fresh air ventilation louvers with removable filter screens
10	Water Boiler Exhaust	Combustion exhaust port for internal water boiler
11	Service Water Spigot	Provides a source of water for cleaning filters
12	Ventilation Louver	Removes warm air from boiler
13	Grounding Stud	Provides grounding hookup for system
14	Boiler Service Access Panel	Provides access to boiler components
15	ASH duct	Interface with ASH heater
16	Waste Tank Drain	Exterior drain for waste tank

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

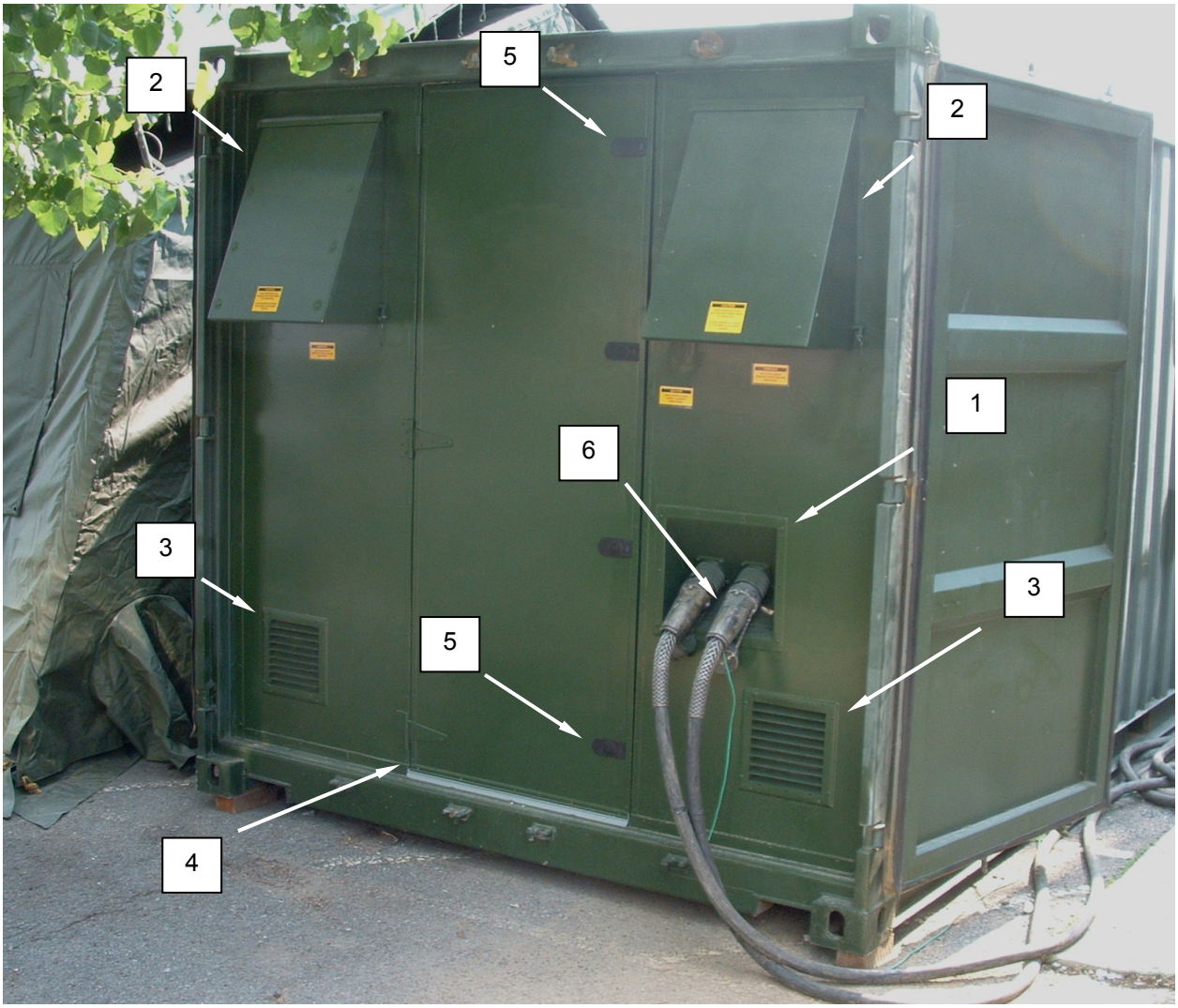


Table 3. CBL Dryer End.

Key	Item	Function
1	Power Inlet Panel Dryer End	Provides power to dryers
2	Exhaust Fan Rainhood	Outlet for air from exhaust fans
3	Dryer Vent	Outlet for dryer air
4	Service Door	Allows entry to the rear of the dryers
5	Service Door Latch	Latch used to lock service door
6	Grounding Stud	Provides grounding hookup for system

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED



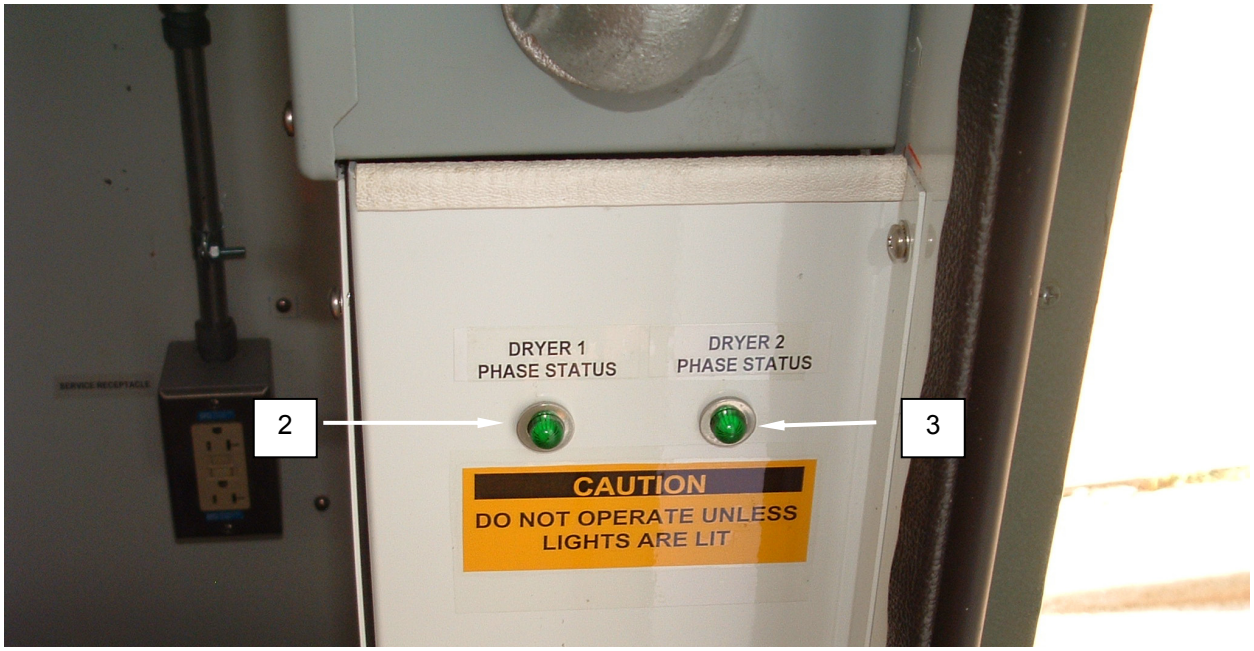


Table 4. Phase Indicator Lights.

Key	Item	Function
1	Washer Panel Phase Indicator Light	Indicates proper electrical connection to washer circuit breaker panel.
2	Dryer No. 1 Phase Indicator Light	Indicates proper electrical connection to Dryer No. 1.
3	Dryer No. 2 Phase Indicator Light	Indicates proper electrical connection to Dryer No. 2.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

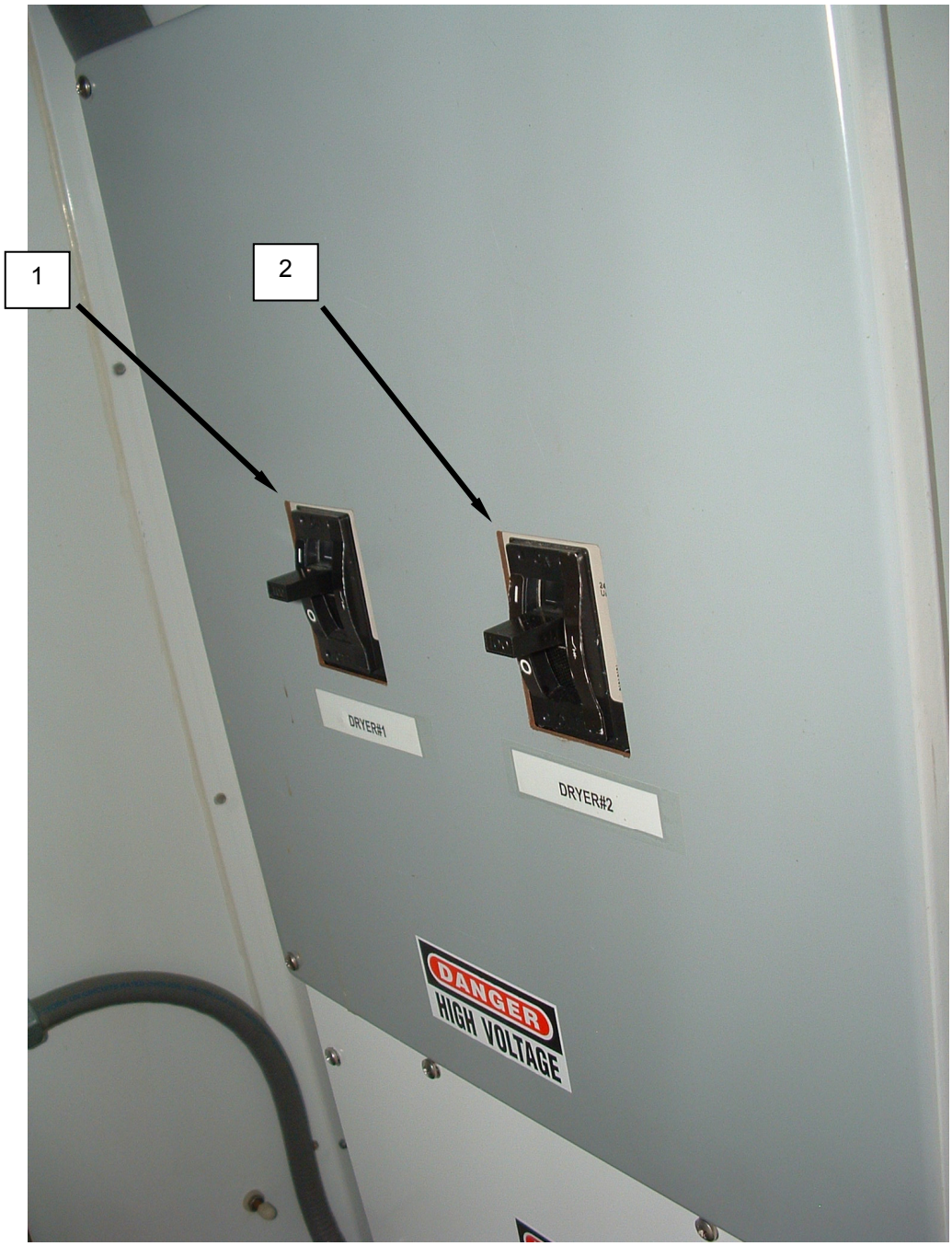
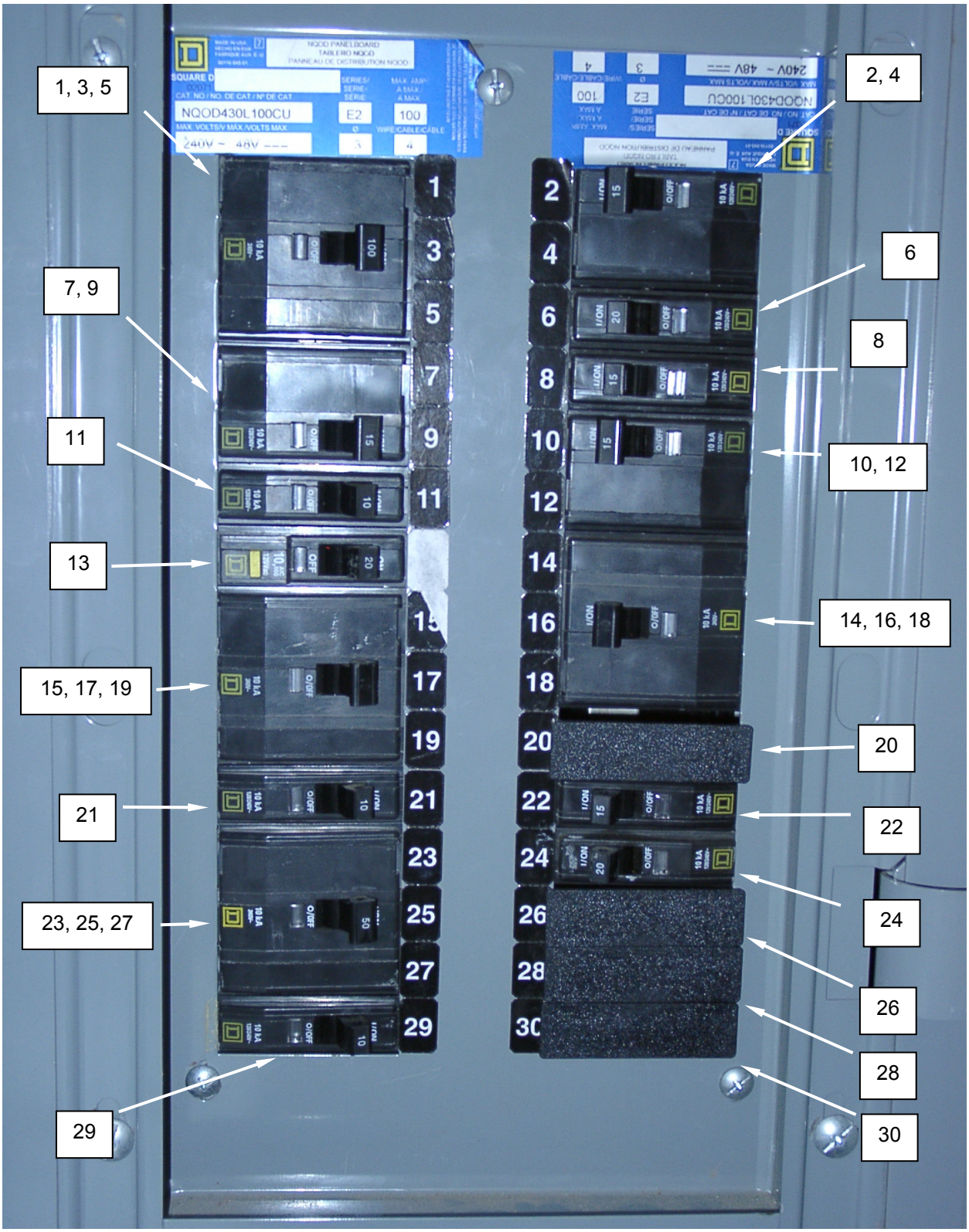


Table 5. Dryer Circuit Breakers.

Key	Item	Function
1	Dryer No. 1 Breaker	Controls Dryer No. 1
2	Dryer No. 2 Breaker	Controls Dryer No. 2

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED



DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

Table 6. Circuit Breakers CBL.

Breaker No.	Load Description	Breaker No.	Load Description
1	Main	2	Washer No.1 Receptacle
3	Main	4	Washer No.1 Receptacle
5	Main	6	P-2 WTS Transfer Pump (GFCI)
7	P-1 Pump	8	Control Panel
9	P-1 Pump	10	Washer No.2 Receptacle
11	Internal Lights	12	Washer No.2 Receptacle
13	P-5 Waste Pump Receptacle (GFCI)	14	P-4 Pump
15	P-3 Pump	16	P-4 Pump
17	P-3 Pump	18	P-4 Pump
19	P-3 Pump	20	Spare
21	Exhaust Fans	22	Boiler
23	60A Service	24	Service Receptacles
25	60A Service	26	Spare
27	60A Service	28	Spare
29	Soap Dispenser	30	Spare

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

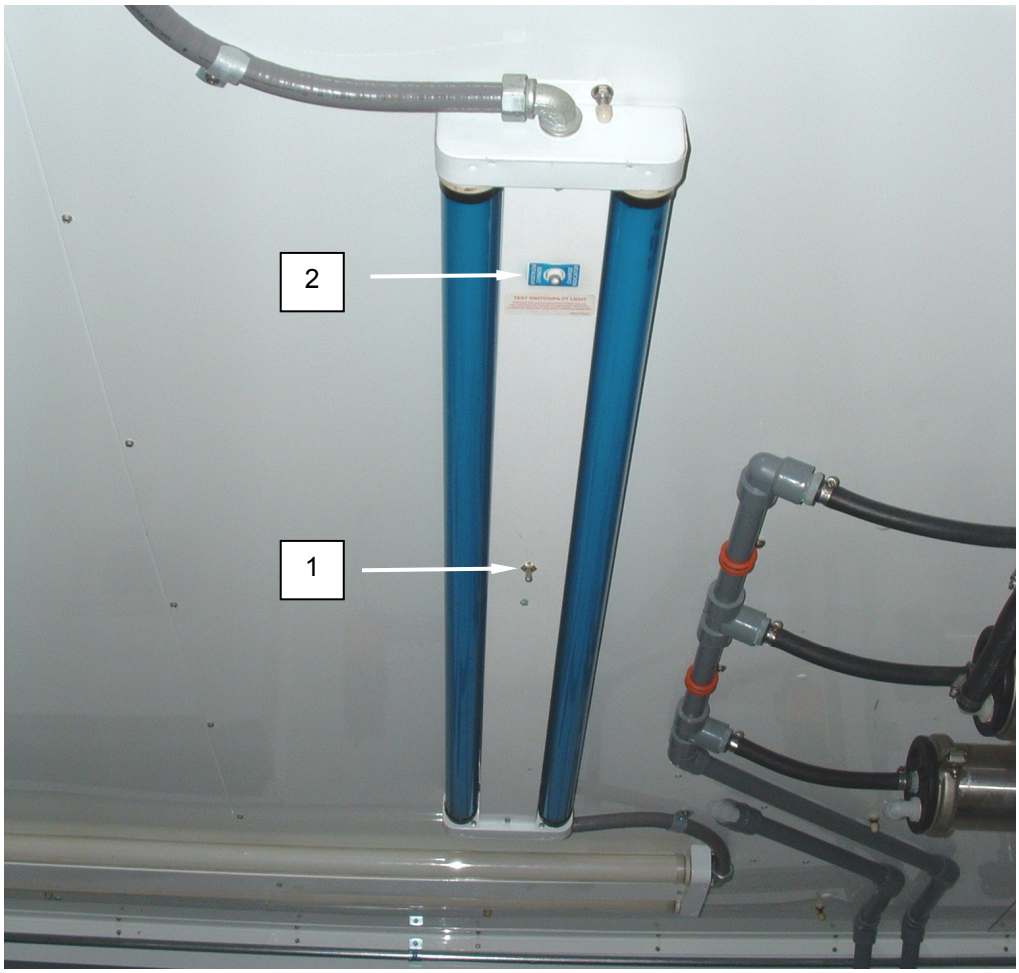


Table 7. Blackout Light Battery Backup Indicator and Override Switch.

Key	Item	Function
1	Override switch	Overrides the battery backup capability of the blackout lights so that the lights will not continue to operate when main power is shutdown.
2	Backup Battery Charge Indicator	Indicates that the battery installed in the blackout light is being charged.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

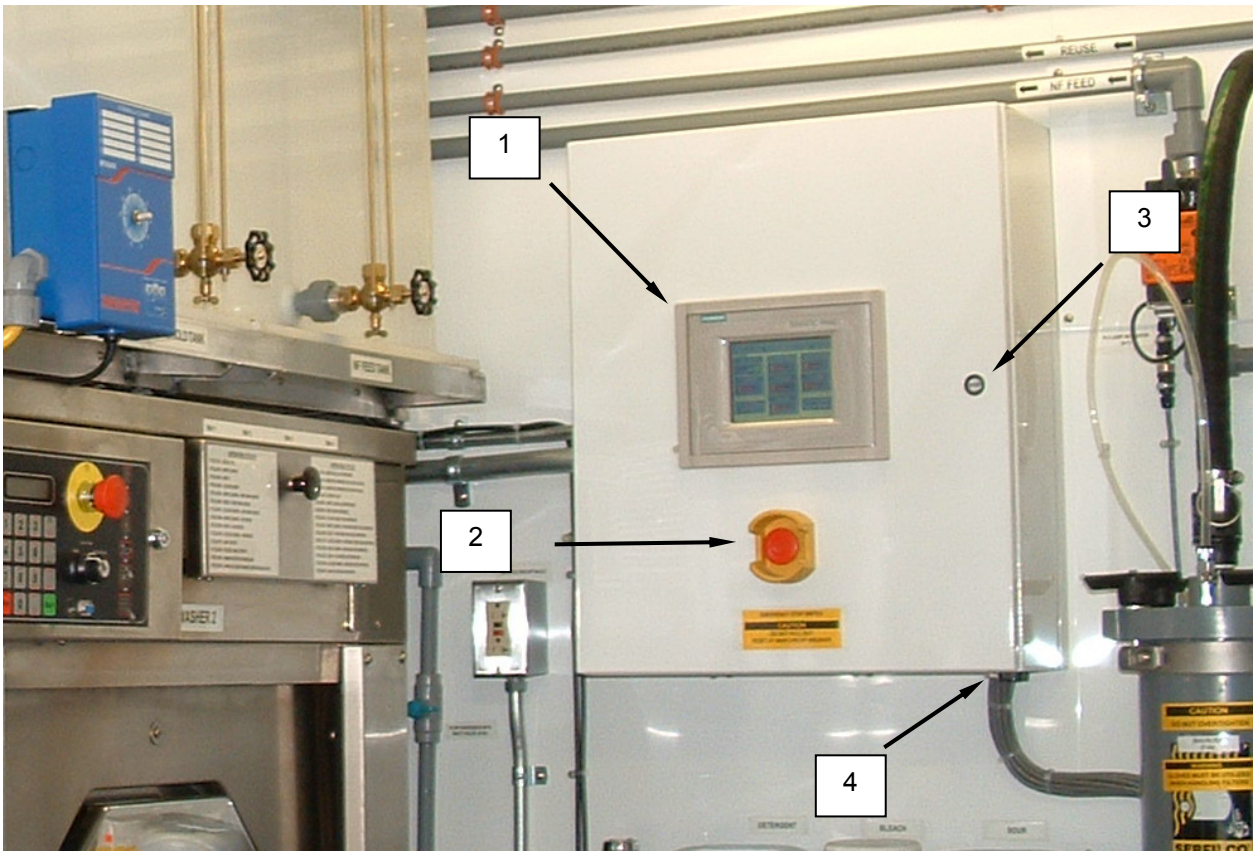


Table 8. Programmable Logic Control (PLC).

Key	Item	Function
1	PLC Touchscreen	Operates the PLC (refer to WP 0007 00 for operating instructions for the PLC)
2	Emergency Shutdown	Shuts down electrical functions of the CBL.
3	PLC Enclosure Lock	Allows access to PLC enclosure interior, including bypass switches.
4	Audible Alarm	Sounds when the PLC detects system malfunctions.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

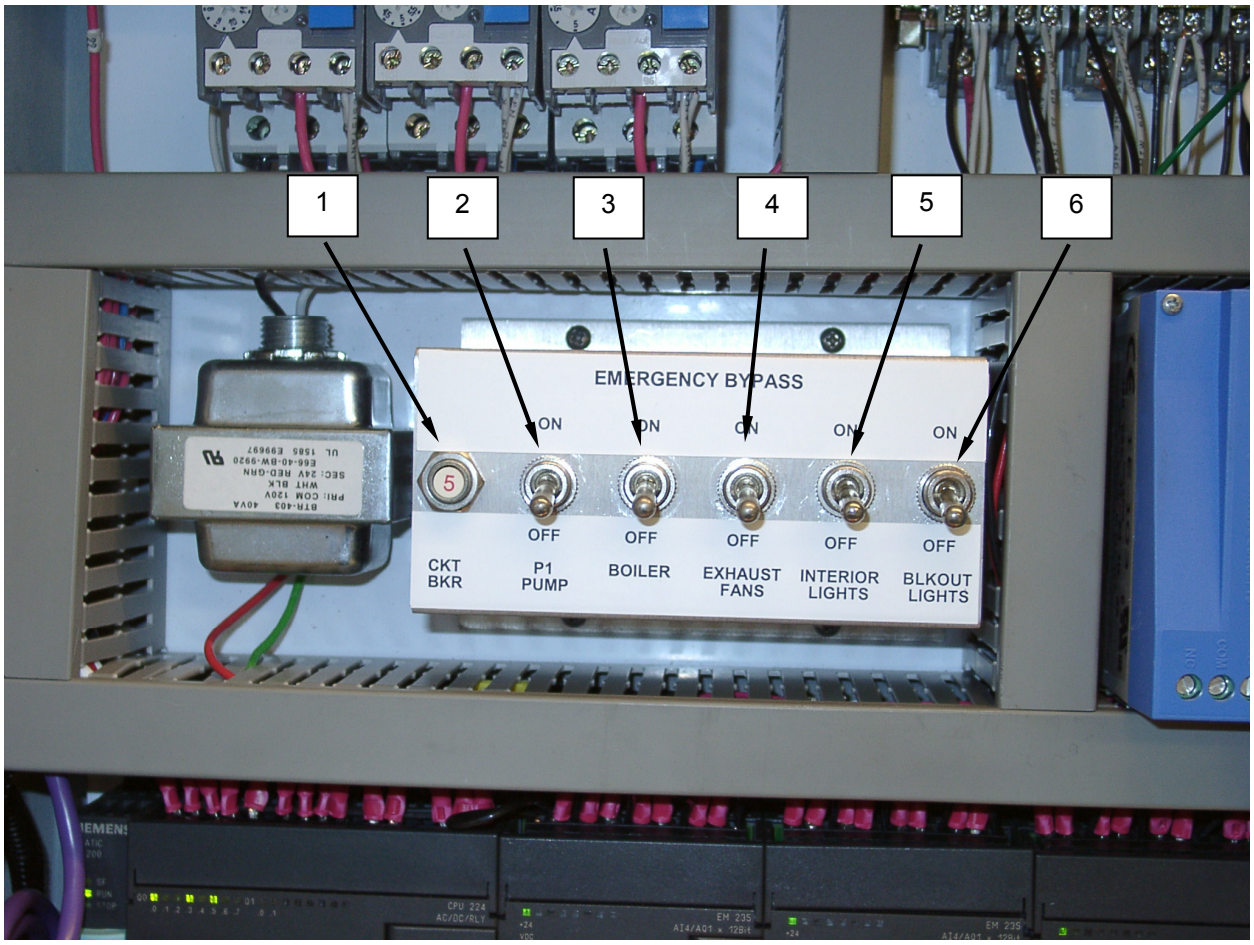


Table 9. Programmable Logic Control (PLC) Bypass Switches.

Key	Item	Function
1	PLC Circuit Breaker	Provides protection for PLC electrical components.
2	P-1 Pump Bypass Switch	Bypasses PLC control of P-1 Pump.
3	Boiler Bypass Switch	Bypasses PLC control of Boiler.
4	Exhaust Fans Bypass Switch	Bypasses PLC control of Exhaust Fans.
5	Interior Lights Bypass Switch	Bypasses PLC control of Interior Lights.
6	Blackout Lights Bypass Switch	Bypasses PLC control of Blackout Lights.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

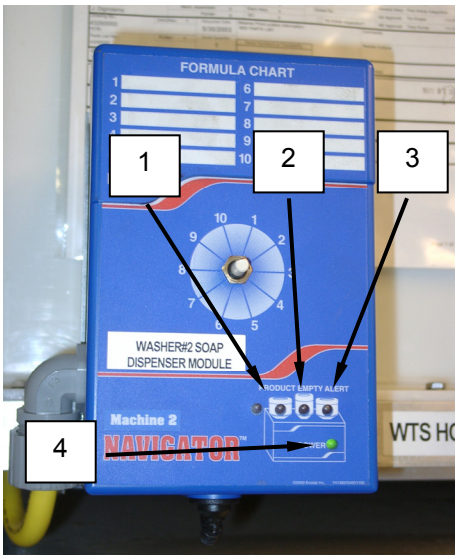




Table 10. Automatic Soap Dispenser Controls.

Key	Item	Function
1	Detergent Empty Indicator Light	Indicates detergent container must be replaced.
2	Bleach Empty Indicator Light	Indicates bleach container must be replaced.
3	Laundry Sour Empty Indicator Light	Indicates laundry sour container must be replaced.
4	Dispenser Control Module Power Indicator Light	Indicates the control module has electrical power.
5	Dispenser Power Indicator Light	Indicates the Dispenser has electrical power.
6	Alarm Acknowledge Key	Used to acknowledge and silence an Automatic Soap Dispenser alarm.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

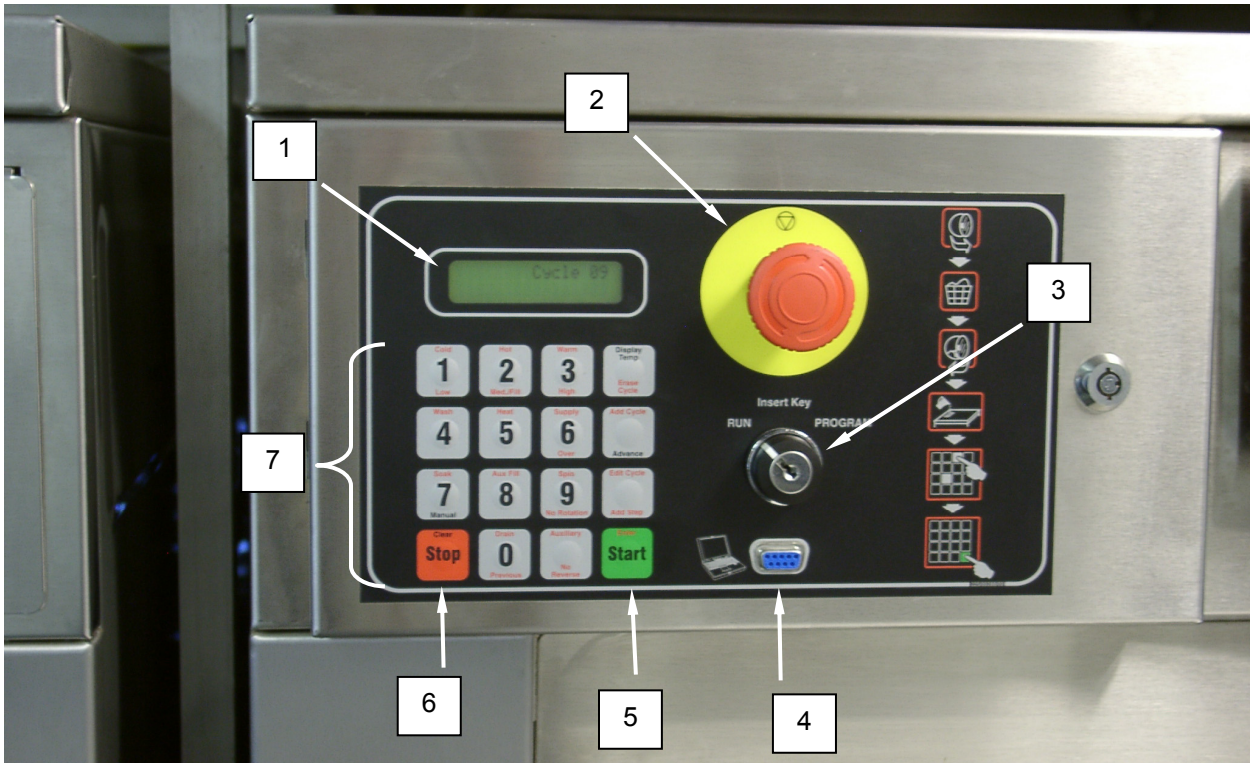


Table 11. Washer Controls.

Key	Item	Function
1	Display	Displays programming information to operator.
2	EMERGENCY STOP	Shuts down washer manually.
3	Key Switch	Switches Washer Controls to RUN or PROGRAM.
4	Programming port	Serial connection for downloaded programming.
5	Start Button	Starts operation of Washer.
6	Stop Button	Stops washer program.
7	Numeric Keypad	Permits manual entry of programming information.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

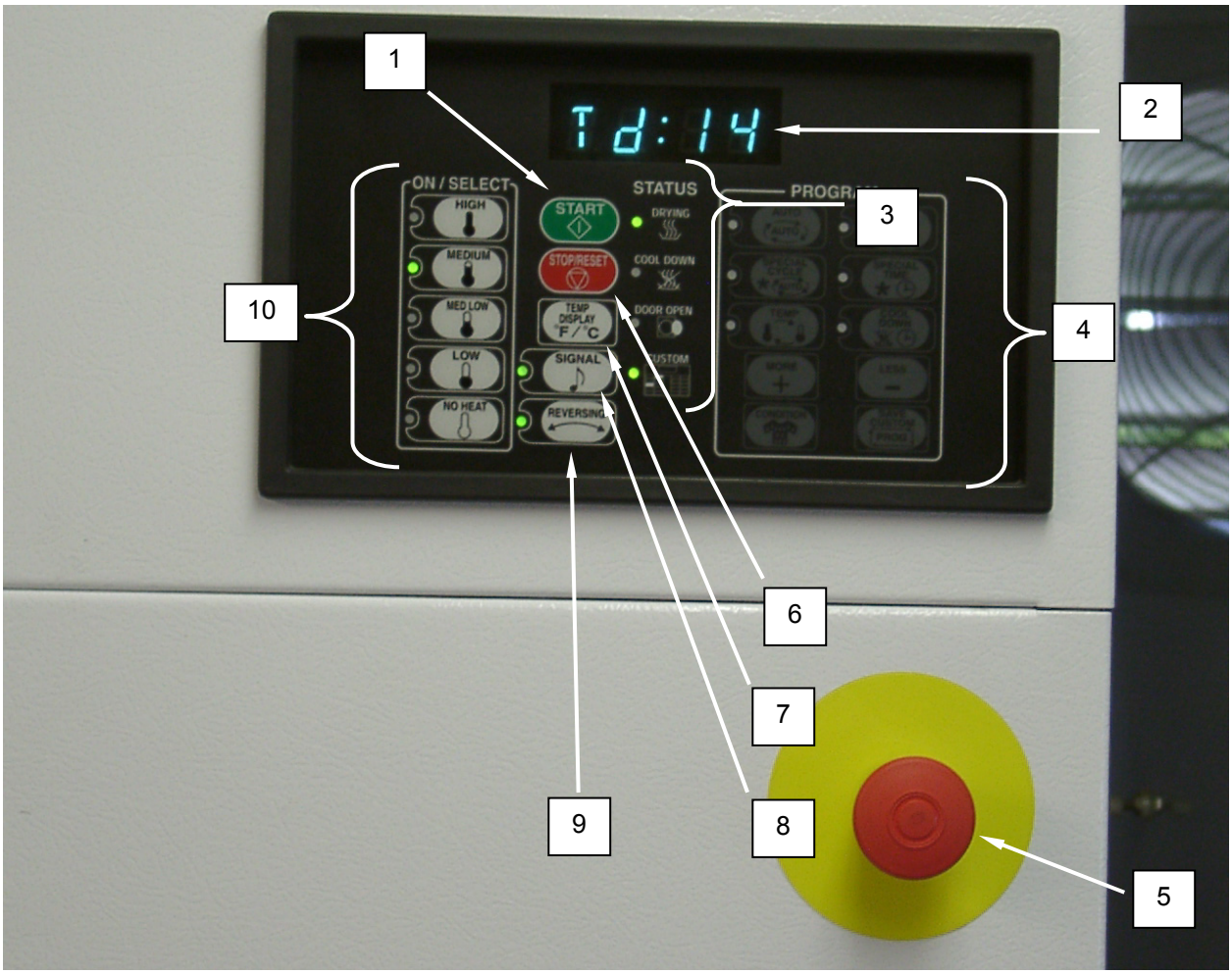


Table 12. Dryer Controls.

Key	Item	Function
1	Start Button	Starts operation of Dryer
2	Display	Displays programming and Cycle information to operator
3	Status Lights	Provide information as to whether the dryer is drying, cooling down, or if the door is open.
4	Programming Keypad	Permits manual entry of programming information
5	EMERGENCY STOP	Shuts down Dryer manually
6	Stop/Reset	Stops Dryer and Resets operating Program
7	Temperature Display Selector	Selects between degrees Fahrenheit and degrees Celsius
8	Signal button	Allows the operator to select the volume of the audible signal to indicate the drying cycle is complete.
9	Reversing Selector	Allows selection or either reversing or single direction operation.
10	Temperature Selection buttons	Selects for five levels of heat.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

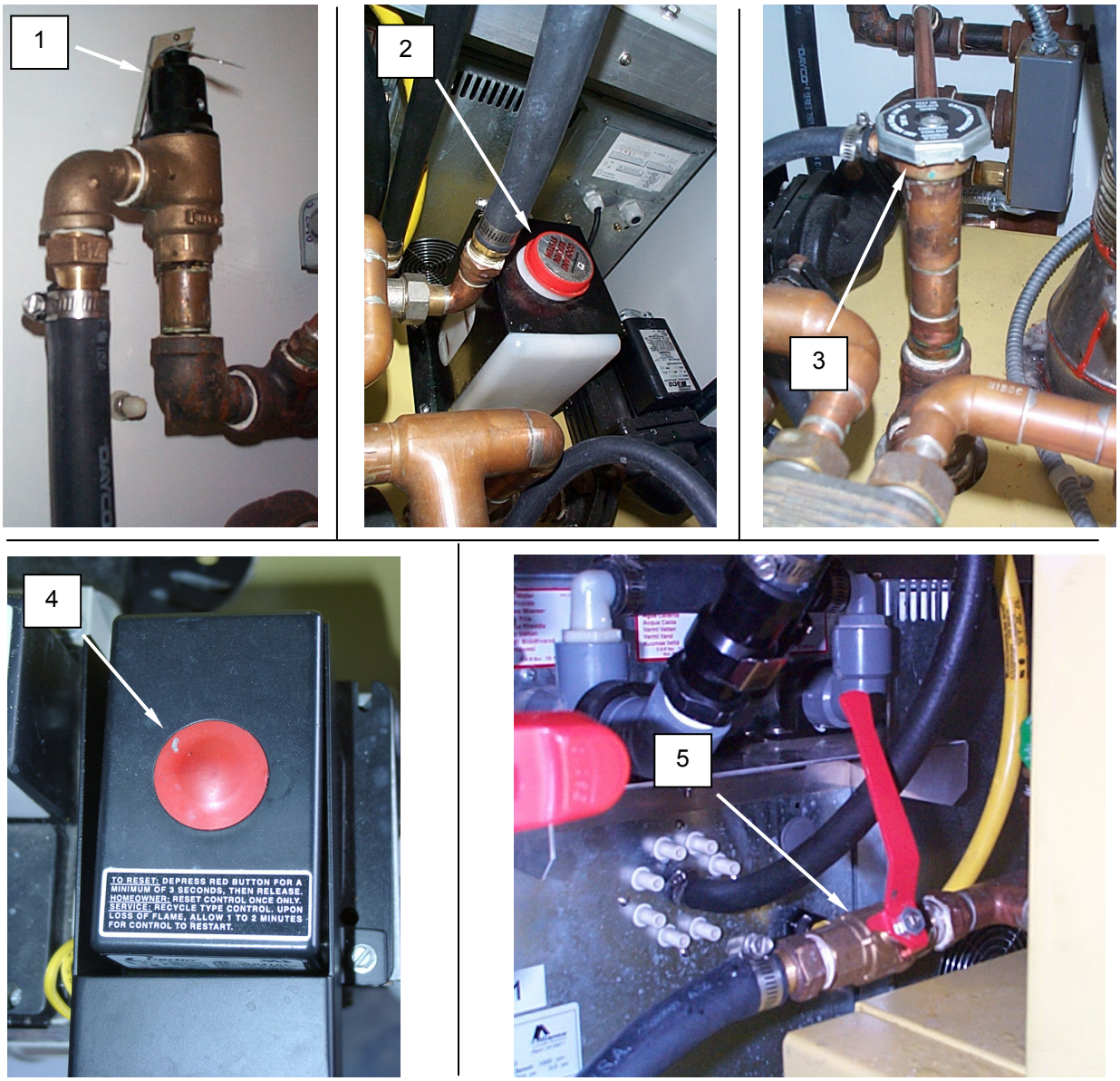
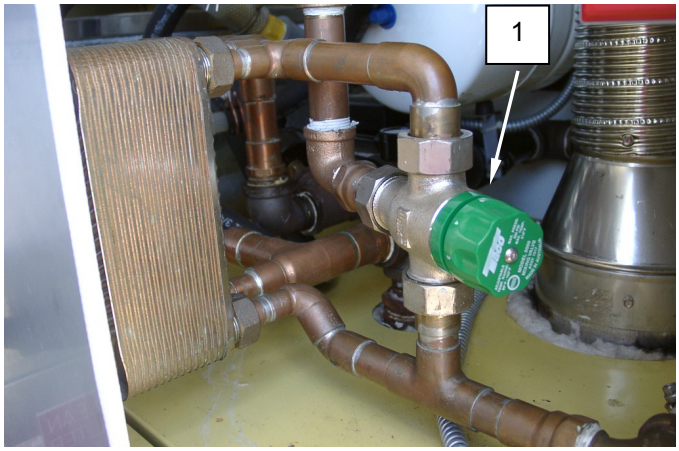


Table 13. Boiler Controls.

Key	Item	Function
1	Boiler Pressure Relief Valve	Releases excess boiler glycol/steam at preset pressure.
2	Glycol Reservoir	Holds excess boiler glycol and provides hot fill access.
3	Boiler Service Fill	Use to fill a cold boiler.
4	Burner Reset Switch	Use to reset burner that has shut down due to burner malfunction.
5	Boiler Water Drain Valve	Used to drain boiler water passages.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED



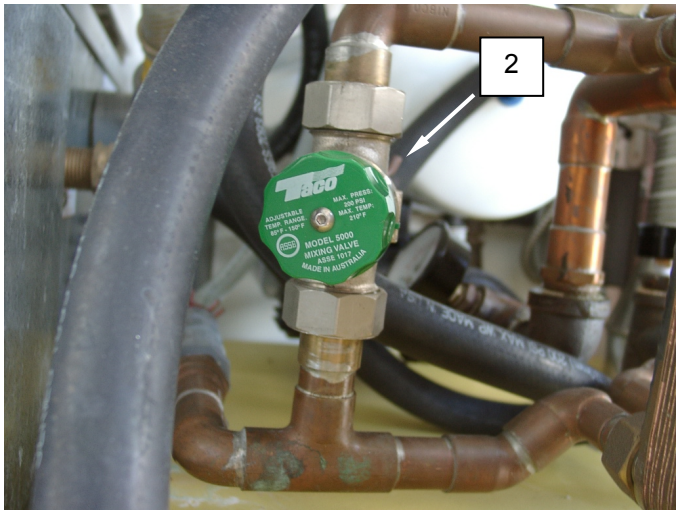


Table 14. Mixing Valves.

Key	Item	Function
1	Source water mixing valve control	Controls the temperature of the source water from the boiler to the washer hot water inlet.
2	Reuse water mixing valve control	Controls the temperature of the reuse water from the boiler to the water reuse system holding tank.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

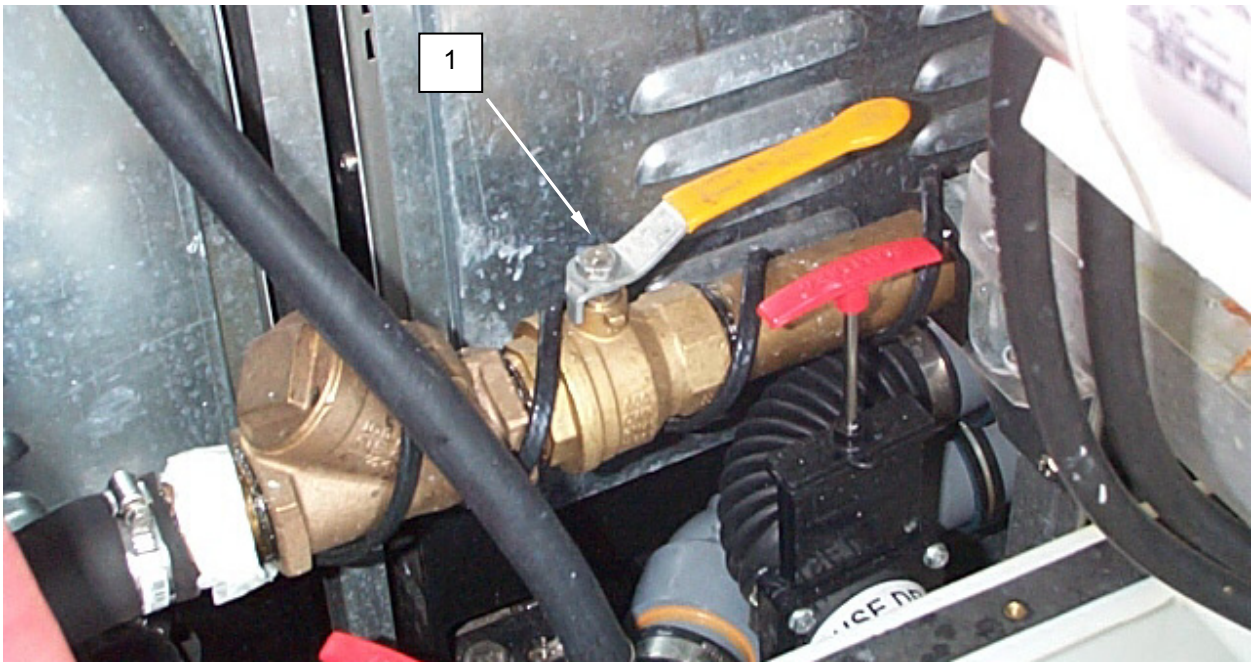
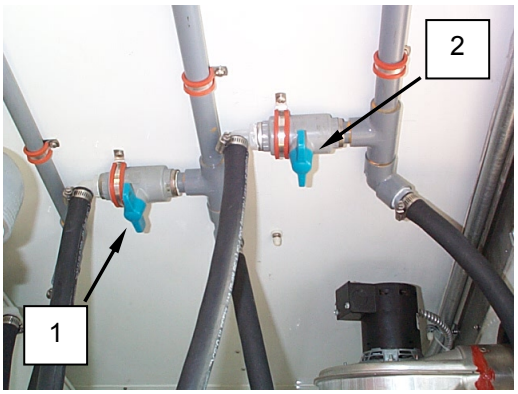


Table 15. Main Water Inlet Valve.

Key	Item	Function
1	Source water valve V-57	Controls the source water supply to the CBL.



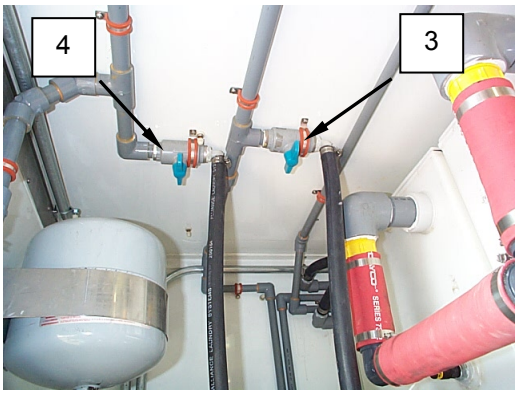


Table 16. Washer Hot and Cold Water Supply Valves.

Key	Item	Function
1	Hot Water Supply Valve V-5	Provides hot water to washer No. 1.
2	Cold Water Supply Valve V-6	Provides cold water to washer No. 1.
3	Hot Water Supply Valve V-7	Provides hot water to washer No. 2.
4	Cold Water Supply Valve V-8	Provides cold water to washer No. 2.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

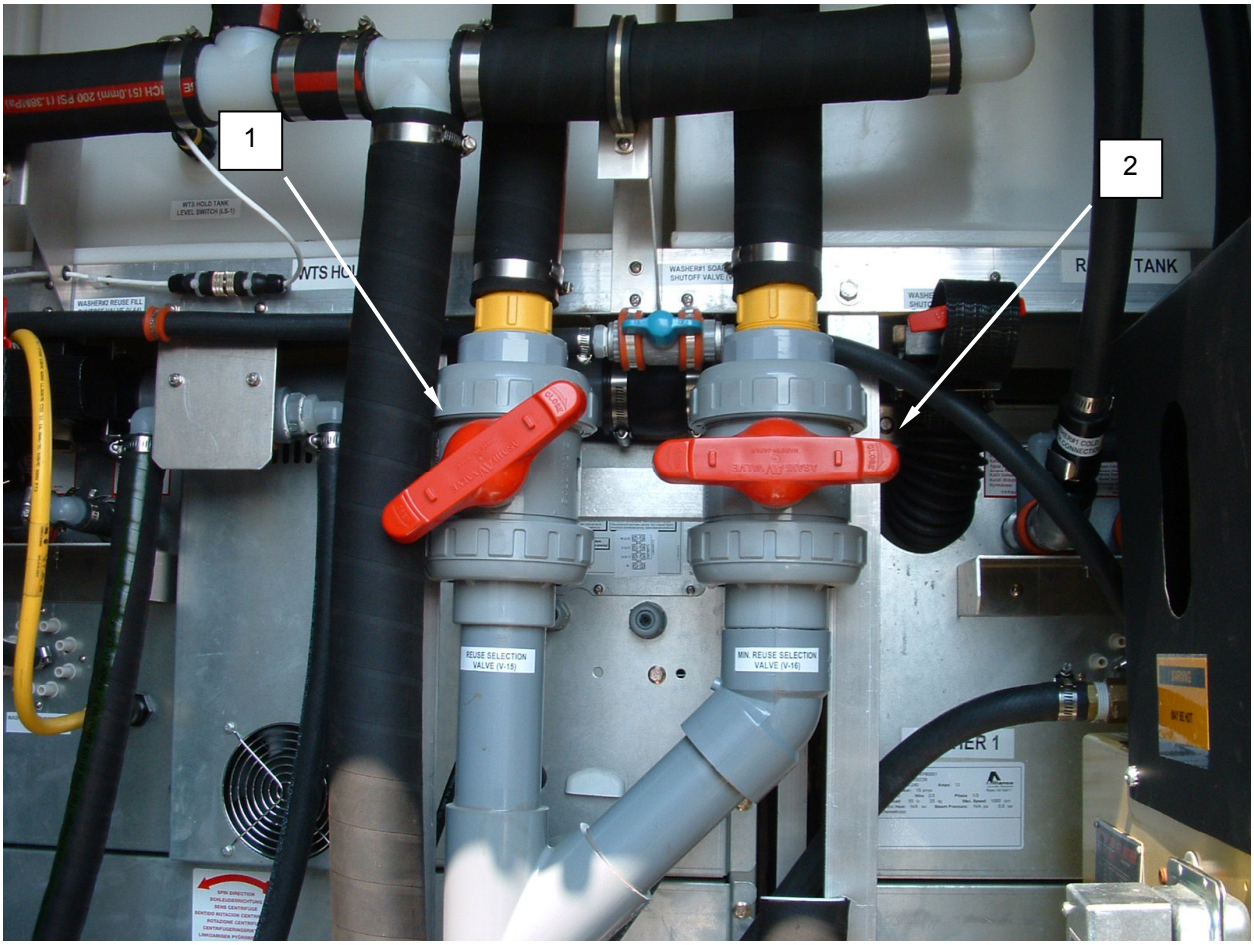


Table 17. Water Recycling Reuse Valves.

Key	Item	Function
1	Valve V-15	Controls operation from full filtration mode to minimum water reuse mode. With Valve 15 open, water is allowed to flow through the reuse filtration system. Valve 16 must be closed.
2	Valve V-16	Controls operation from full filtration mode to minimum water reuse mode. With Valve 16 open, the last rinse goes to reuse tank. Valve 15 must be closed.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

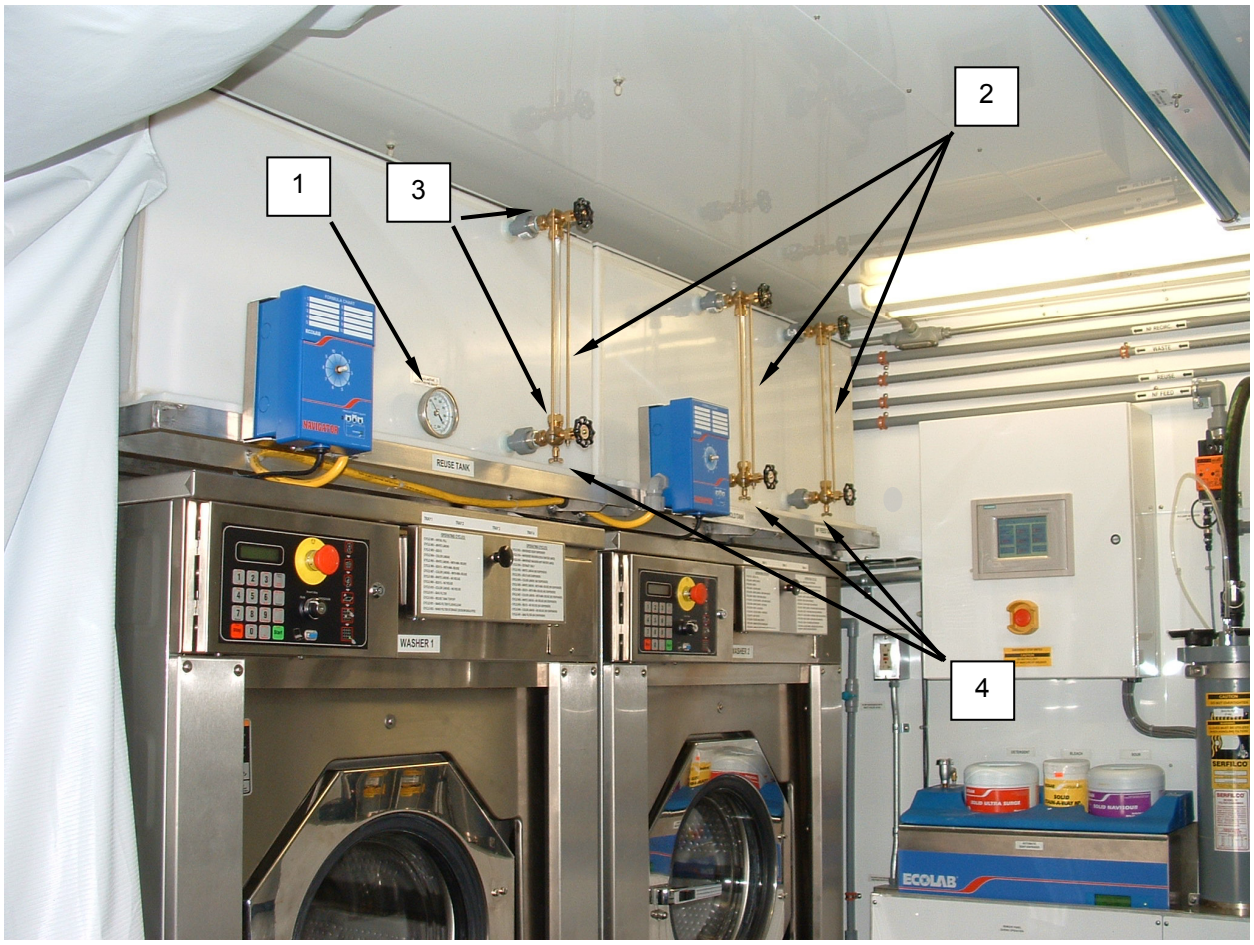


Table 18. Holding Tank Indicators.

Key	Item	Function
1	Temperature gauge	Provides indication of the water temperature in the Reuse Tank.
2	Sight Glass	Indicates the amount of water contained in each tank.
3	Sight Glass Isolation Valves	Control water supply to sight glass. Used to isolate sight glass in order to service and replace sight glass.
4	Sight Glass Drain Cock	Provides drainage for sight glass.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

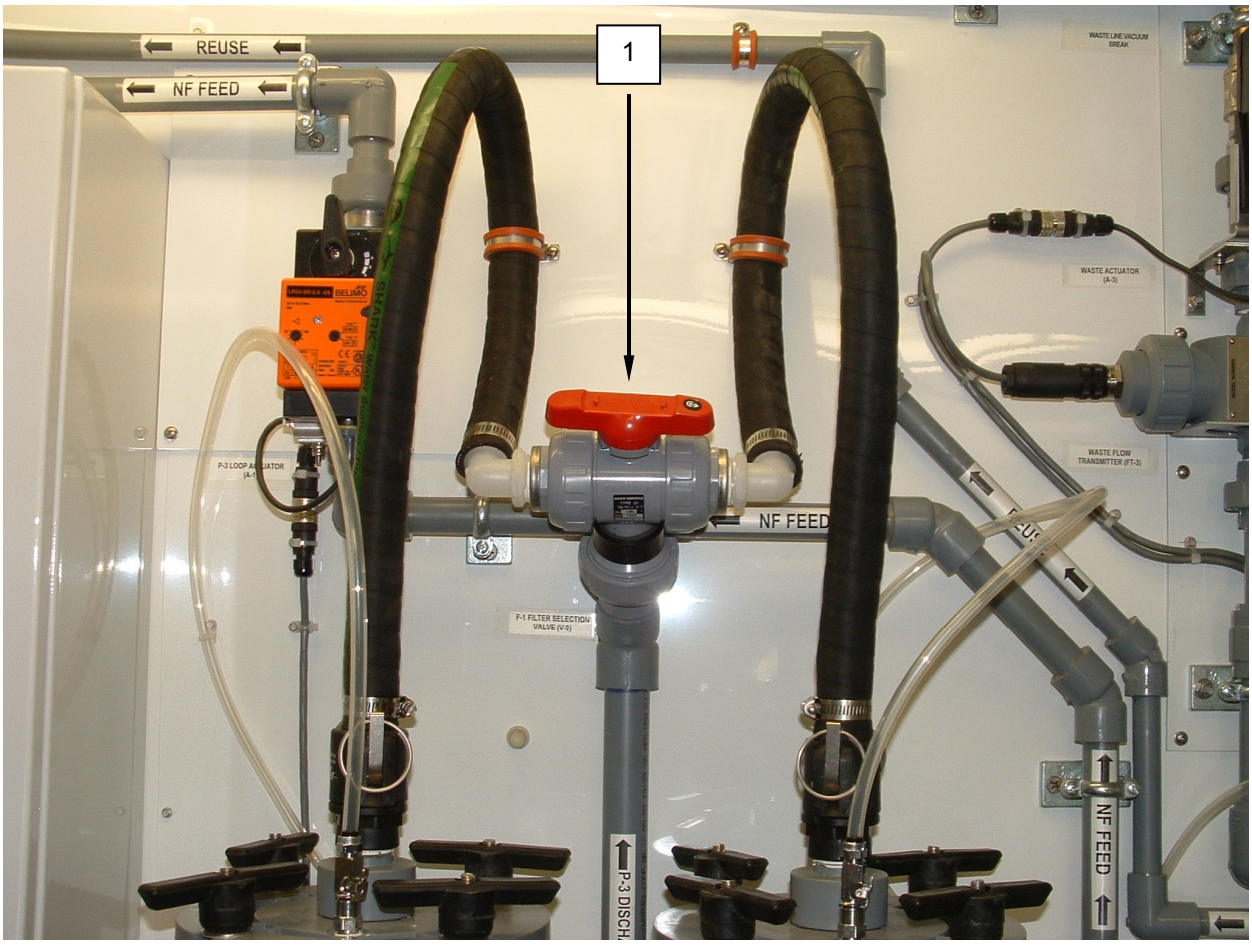
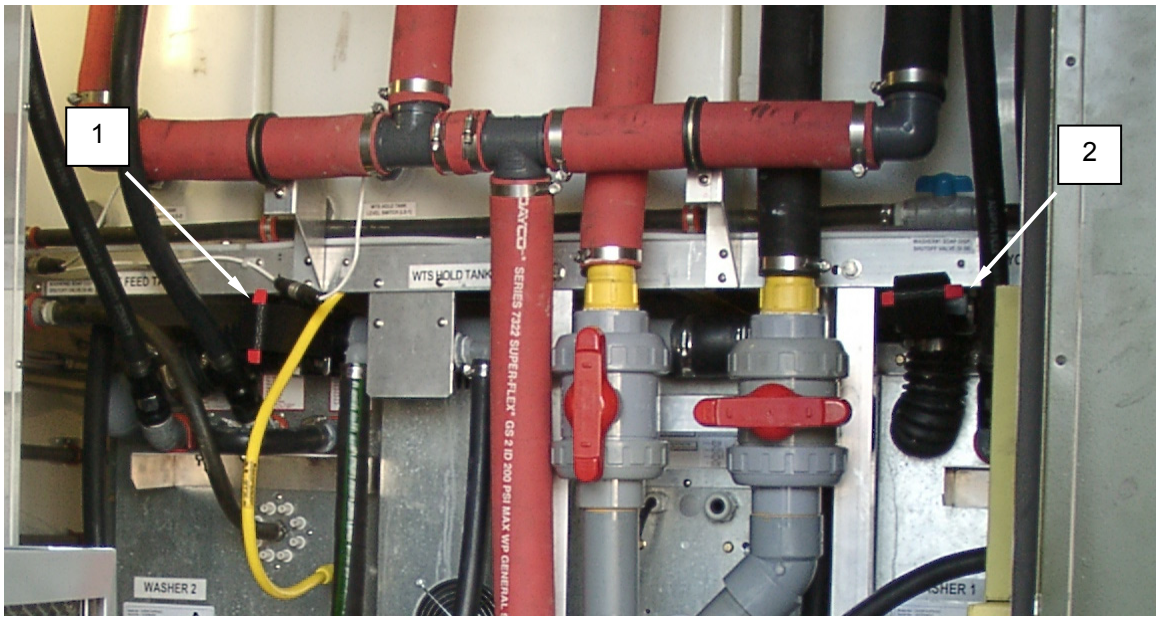
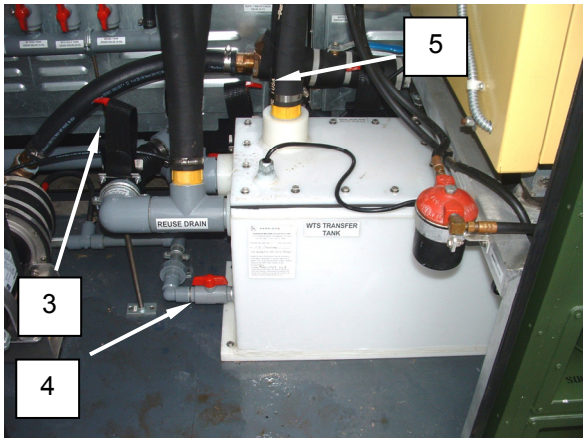


Table 19. Filter Selector Valve.

Key	Item	Function
1	V-9	Provides selection between Filters F-1A and F-1B.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED





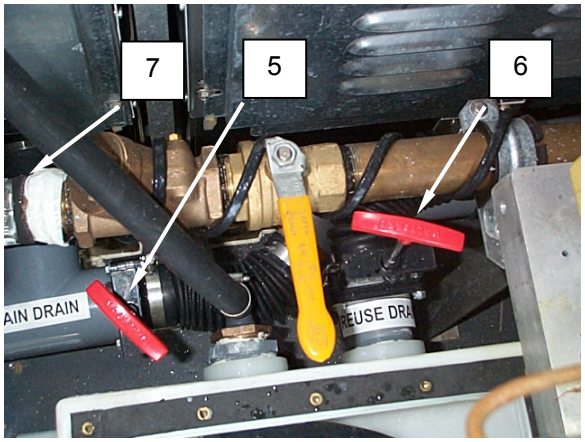


Table 20. Reuse Drains.

Key	Valve	Function
1	V-64	Drains Reuse Tank to Washer No. 2
2	V-63	Drains Reuse Tank to Washer No. 1
3	V-4	Directs Washer No. 2 discharge to WTS Transfer Tank
4	V-35	Drains WTS Transfer Tank to Main Drain
5	V-1	Drains Washer No.1 to Main Drain
6	V-3	Directs Washer No. 1 discharge to WTS Transfer Tank
7	V-2	Drains Washer No. 2 to Main Drain

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

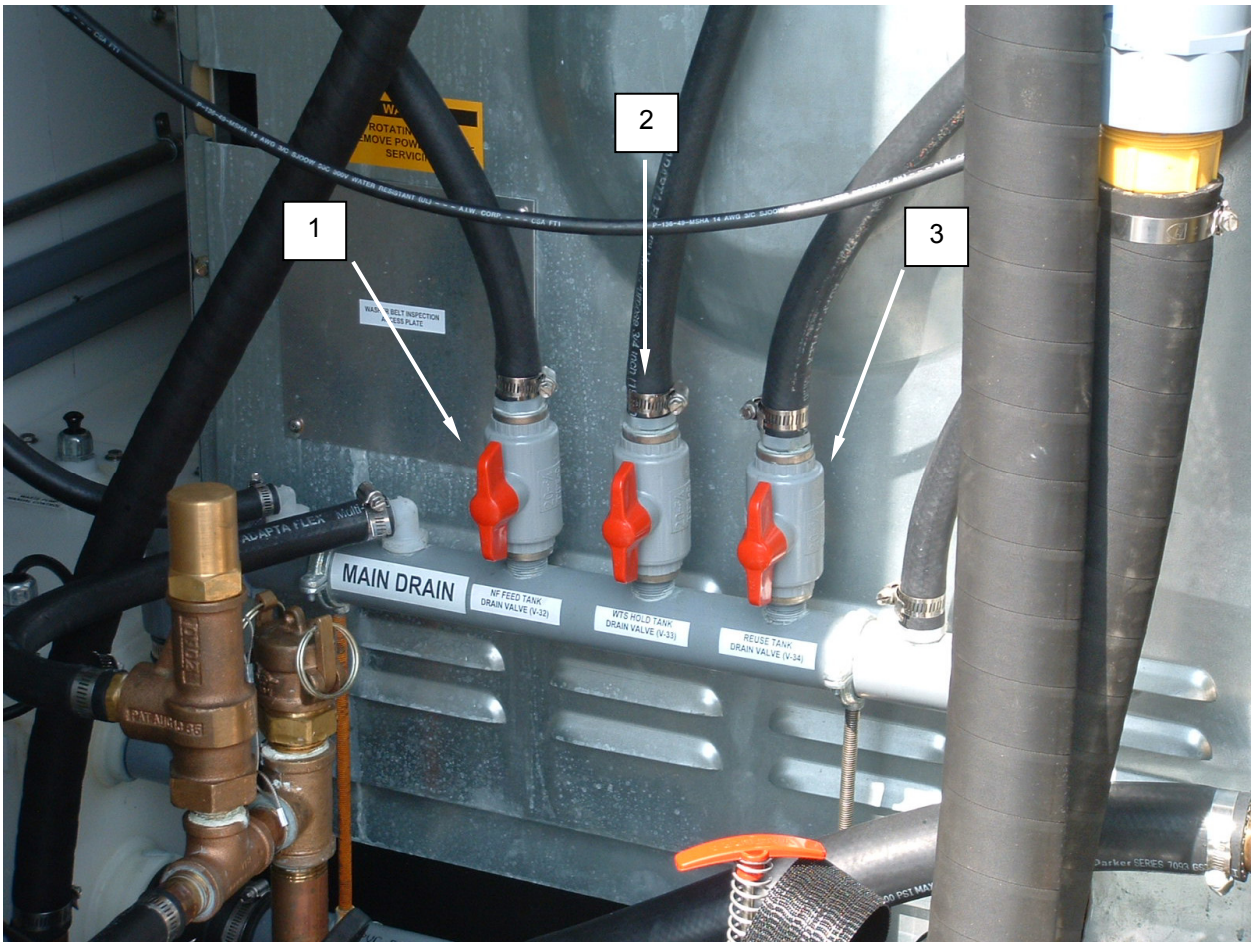


Table 21. Holding Tank Drain Manifold.

Key	Valve	Function
1	V-32	Drains Nanofilter Holding Tank.
2	V-33	Drains Water Treatment System Holding Tank.
3	V-34	Drains Reuse Tank.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

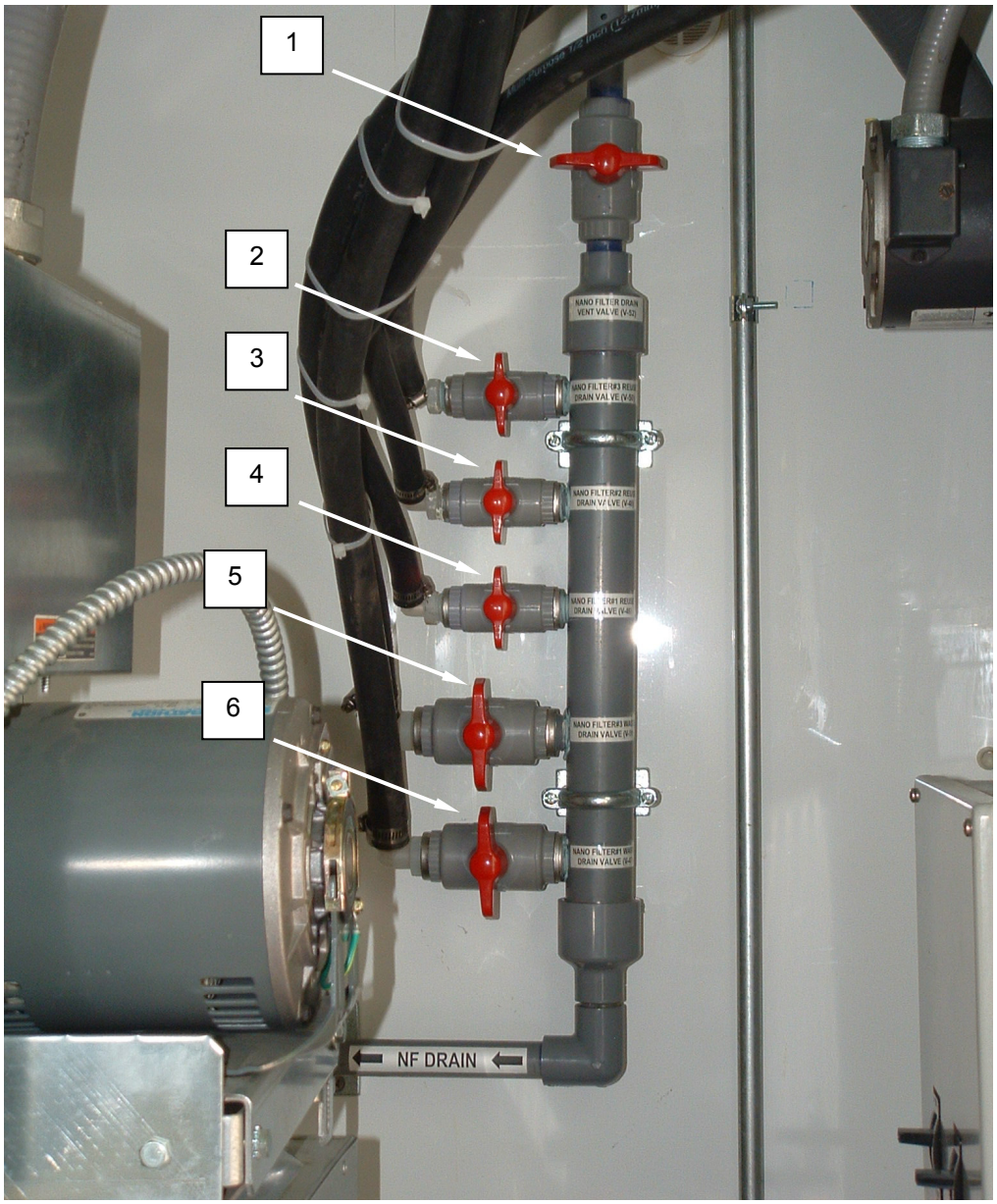


Table 22. Nanofilter Drains.

Key	Valve	Function
1	V-52	Nano Filter Drain Vent Valve
2	V-50	Nano Filter No. 3 Reuse Drain Valve
3	V-48	Nano Filter No. 2 Reuse Drain Valve
4	V-46	Nano Filter No. 1 Reuse Drain Valve
5	V-51	Nano Filter No. 3 Waste Drain Valve
6	V-47	Nano Filter No. 1 Waste Drain Valve

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

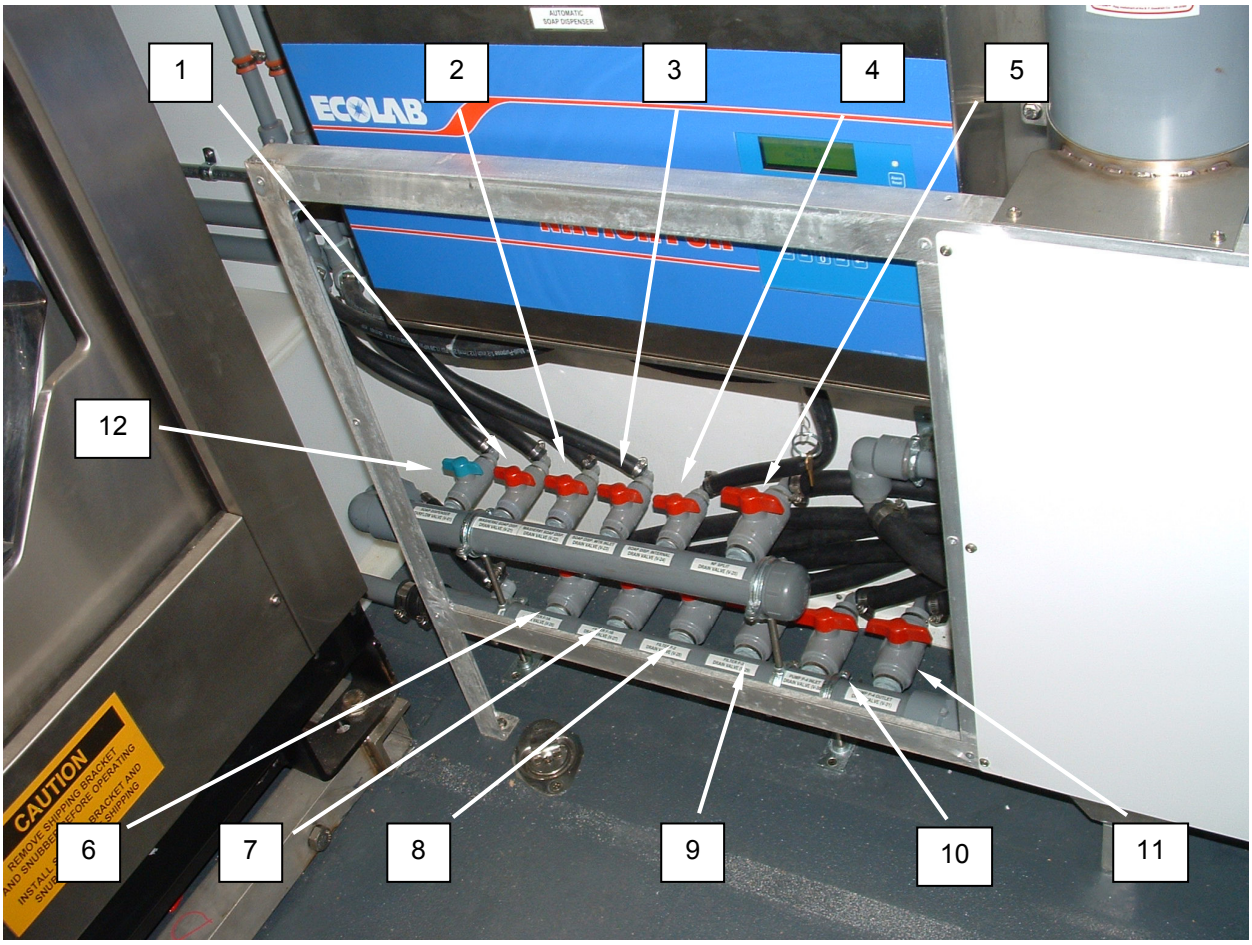


Table 23. Drain Manifold.

Key	Valve	Function
1	V-21	Washer No. 2 Soap Dispenser Drain Valve
2	V-22	Washer No. 1 Soap Dispenser Drain Valve
3	V-23	Soap Dispenser Water Inlet Drain Valve
4	V-24	Soap Dispenser Internal Drain Valve
5	V-25	Nanofilter Split Drain Valve
6	V-26	Filter F-1A Drain Valve
7	V-27	Filter F-1B Drain Valve
8	V-28	Filter F-2 Drain Valve
9	V-29	Filter F-3 Drain Valve
10	V-30	Pump P-4 Inlet Drain Valve
11	V-31	Pump P-4 Outlet Drain Valve
12	V-61	Soap Dispenser Overflow Drain Valve

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

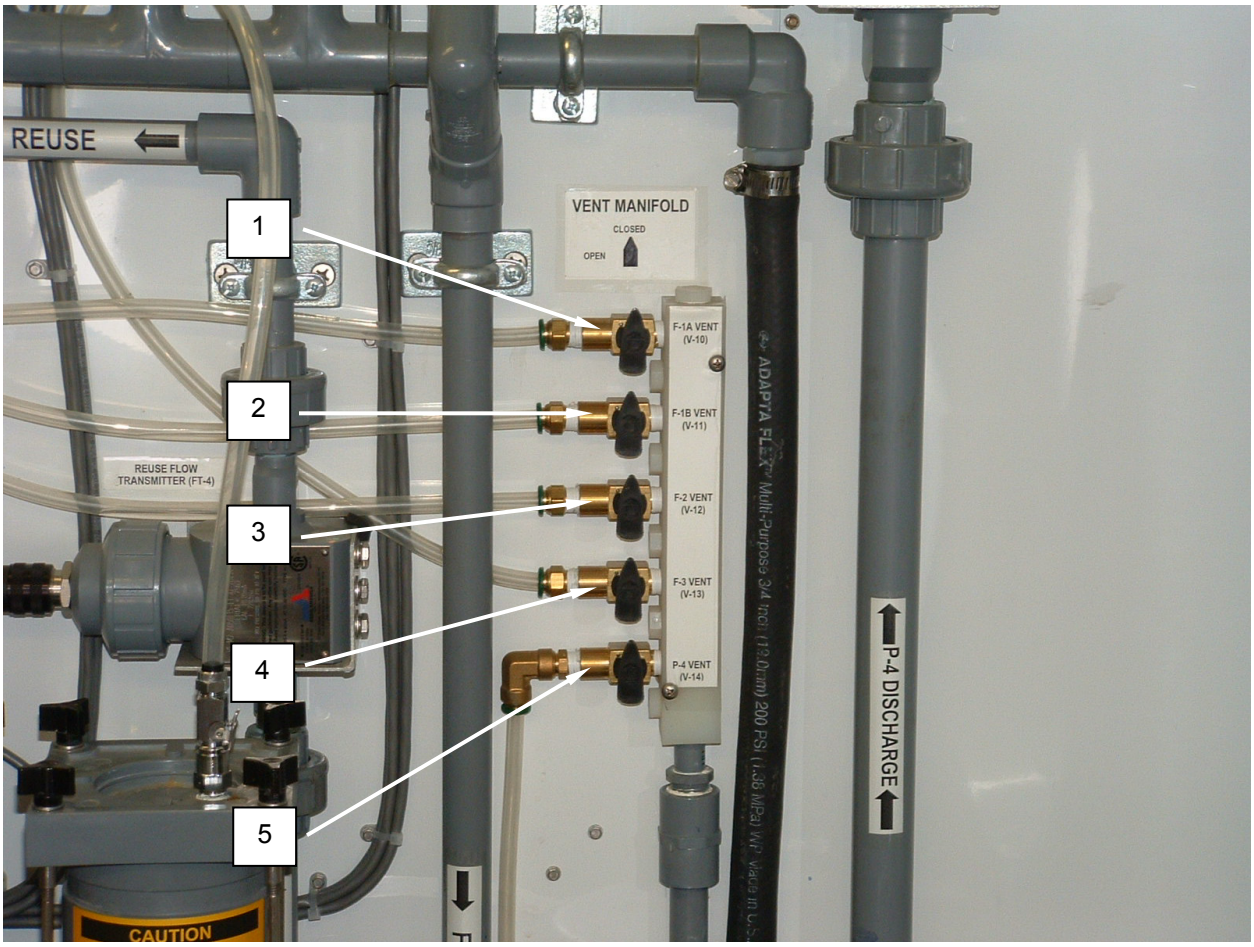


Table 24. Vent Manifold.

Key	Valve	Function
1	Filter F-1A Vent Valve V-10	Vents air from filter on initial fill or after service.
2	Filter F-1B Vent Valve V-11	Vents air from filter on initial fill or after service.
3	Filter F-2 Vent Valve V-12	Vents air from filter on initial fill or after service.
4	Filter F-3 Vent Valve V-13	Vents air from filter on initial fill or after service.
5	Pump P-4 Vent Valve V-14	Vents air from pump on initial fill or after service.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS-CONTINUED

TEMPER

The controls and indicators specific to the 16 foot x 20 foot, TEMPER are detailed in TM 10-8340-224-13.

FDECU

The controls and indicators specific to the FDECU are detailed in TM 10-4120-411-14.

ASH

The controls and indicators specific to the ASH are detailed in TM 9-4520-258-14.

100 kW Diesel Generator

The controls and indicators specific to the MEP-007A and MEP-007B 100 kW Diesel Generator are detailed in TM 5-6115-457-12.

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2209
OPERATION UNDER USUAL CONDITIONS – UNPACKING AND INVENTORY

SECURITY MEASURES FOR ELECTRONIC DATA

There is no volatile computer data associated with the CBL.

The Containerized Batch Laundry consists of one 16-ft x 20-ft, TEMPER with modified endwall and liner, and one container outfitted with the required components.

SITING REQUIREMENTS

NOTE

Access to one Tool Kit, General Mechanic's: Automotive and a 6-in. face x 8-in. long head wood mallet (WP 0043 00) are required to assemble and prepare the CBL for use.

Site must be:

- Easily defensible, as dictated by Unit Standard Operating Procedure (SOP).
- Approximately 50 $\times$ 50 ft.
- Hardstand or other improved areas; however, any area that is level, free of large holes, trees, debris; properly drained in event of bad weather, and within the guidelines of the Unit Standard Operating Procedure (SOP) is acceptable.
- Positioned to allow unobstructed utility hookups (source water, graywater, electrical) to CBL.

LIFT AND MOVE CBL

Refer to TM 55-8115-204-23&P Unit and Direct Support Maintenance Manual (including RPSTL) for General Cargo Container as necessary for specific lifting and moving instructions.



WARNING

The CBL weighs approximately 16,200 pounds with a full packout. Always use a properly rated lifting device to move and stack the CBL. Ensure the slings used in the lift is properly rated fro the load, crane or lifting device Under No Circumstances should anyone stand under the CBL when it is being lifted or moved. Failure to comply may result in serious injury or death.

Lifting

NOTE

Movement of CBL requires a forklift with a minimum rating of 17,500 pounds or similarly rated Material Handling Equipment.

1. Use built-in forklift pockets **(Figure 1, Item 1)** to move and lift CBL.

CAUTION

CBL must be level for proper operation of the equipment and to prevent damage to equipment.

2. Place CBL container in staked location.

3. Inspect the levels **(Figure 1, Item 2)** affixed to the container exterior. Adjust the level of the CBL by shimming tightly with wood scraps, stones, or bricks tapped into place with mallet.

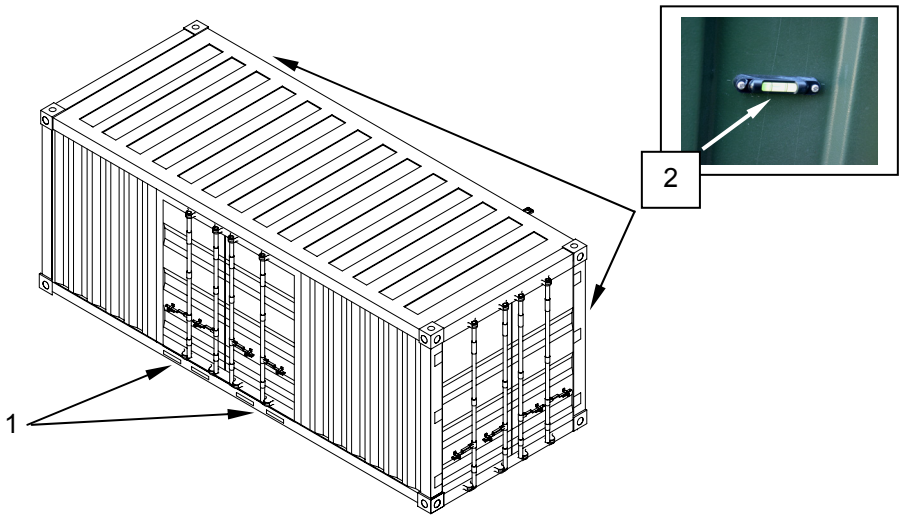


Figure 1. Lift and Move the CBL.

UNPACK AND INVENTORY CBL

Double entrance doors

1. Unlatch latching mechanisms **(Figure 2, Item 3)** of right-hand door **(Figure 2, Item 4)** and open right-hand door.

2. Unlatch latching mechanism **(Figure 2, Item 3)** of left-hand door **(Figure 2, Item 5)** and open left-hand door.

3. Open and hook doors with restraining ropes (if fitted) (Just the rear doors).

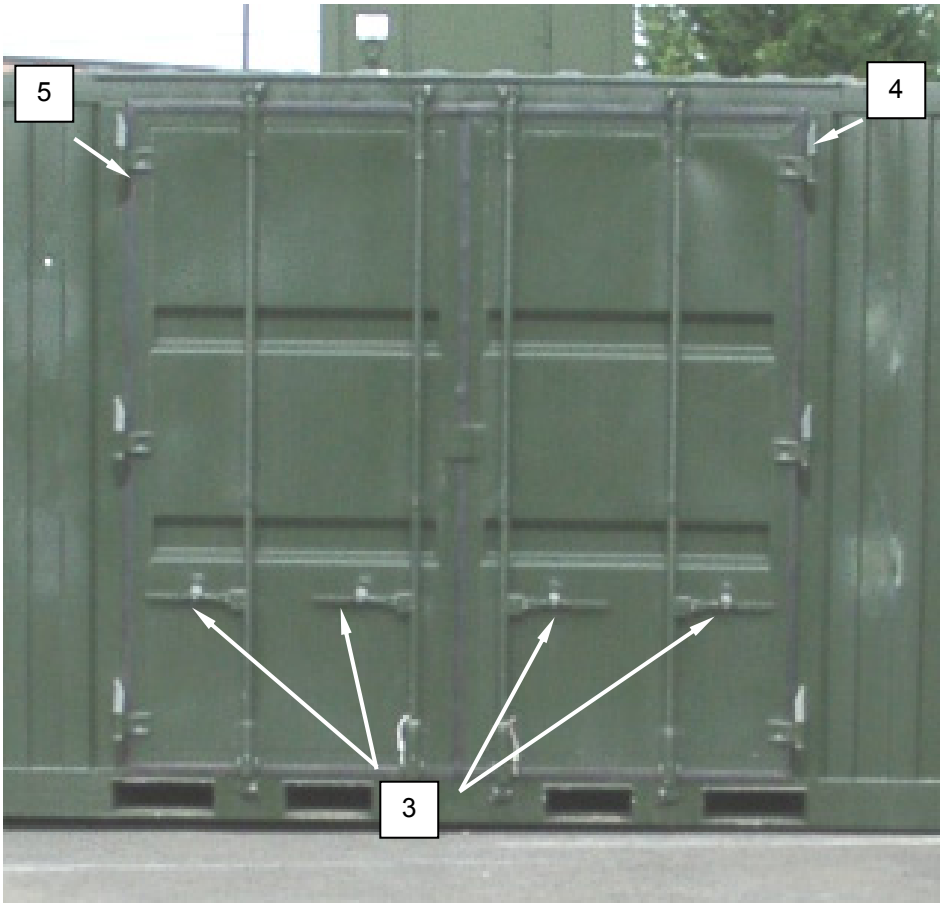


Figure 2. Double Entrance Doors.

Open CBL End Doors



WARNING

Always secure container doors open or closed. Unsecured container doors may be accidentally moved by wind, gravity, or personnel. If no means of securing a container door is provided, dunnage may be wedged to secure a door open. Unsecured container doors may injure personnel and damage equipment.

CAUTION

Unsecured container doors may cause damage to equipment.

1. Disengage latching mechanisms **(Figure 3, Item 3)** of double end doors **(Figure 3, Item 6)**, and open doors.

2. Open and hook doors on back side of container with restraining ropes (if fitted). If doors are not fitted with ropes, use whatever is available to prop open doors.

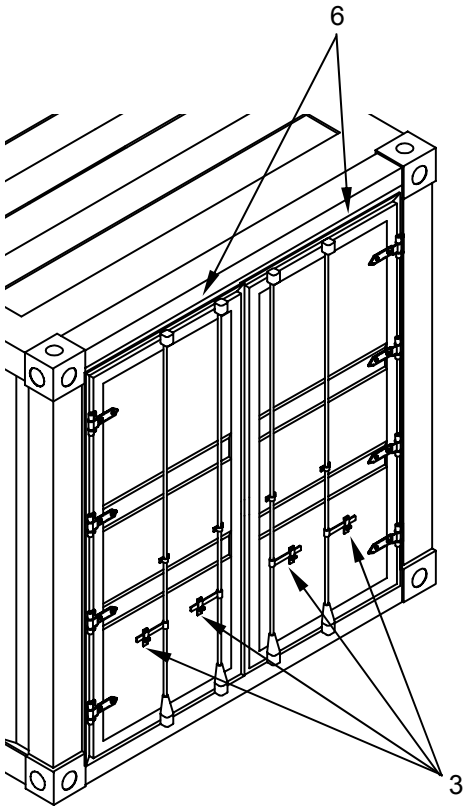


Figure 3. Double Entrance Doors.

Remove CBL Contents



WARNING

The CBL components are heavy, awkward and difficult to maneuver. To prevent injury, six persons are required to remove and install these components. To avoid serious injury, lift with your legs, and not your back, and never attempt to lift an item alone if it requires more than one person. The FDECU and ASH must be removed from the CBL with a forklift or other equipment rated for at least 1500 pounds. The FDECU and ASH must not be moved using manpower.

Remove all loose items from interior of CBL as detailed in the inventory detailed in Table 1 that follows.

Inventory CBL

NOTE

The CBL may be found packed in two configurations – Minimum or Full Packout. The inventory for both packouts is the same, the only difference being that select components are shipped separately in the Minimum packout.

NOTE

Table 1 may be reproduced and used as a checklist.

The equipment and components used to support the CBL during operation are packed inside the container in the center operating area, inside the dryers, and behind the dryers during system transport. Inventory the items supplied by referring to Table 1 below.

Table 1. CBL Support Equipment Inventory.

Item	Quantity	Check
TEMPER, 16-ft	1 ea	
TEMPER Frame Sections	1 Set (in 2 bag assemblies)	
Arch Assembly	3 ea	
Header Assembly	3 ea	
Purlin Assembly	10 ea	
Eave Extender Assembly	6 ea	
Ridge Extender Assembly	3 ea	
Frame Sections Covers	2 ea	
Intermediate Window Section	2 ea	
Intermediate Section Lines	8 ea	
TEMPER Fly, 16-ft	1 ea	
End Liner (Temperate)[1]	1 ea	
End Liner Modified[1]	1 ea	
Intermediate Liner	2 ea	
Tent Floor (8 ft) Single Ply	2 ea	
Tent Floor (8 ft) Insulated	2 ea	
Vestibule Assembly w/Door	1 ea	
Vestibule Floor Single Ply	1 ea	
Vestibule Floor Insulated	1 ea	
Vestibule Container	1 ea	
Vestibule Frame Assemblies	3 ea	
Vestibule Tent Line (19 ft)	4 ea	
Tent Pins (12 in) Type II Steel	30 ea	
Tent Pins (24 in) Wood Size 2	15 ea	
Tent Pin Container	1 ea	
Plenum Side Entrance (16 ft)	1 ea	
End Section	1 ea	
End Section, Modified (Bootwall)	1 ea	
Endwall Tent Line (19 ft)	4 ea	
Window Section Tent Line (19 ft)	8 ea	
Tent Fly Tent Line (19 ft)	6 ea	
50-ft 100-Amp Cable	3 ea	
50-ft 60-Amp Cable	1 ea	
4-ft 100-Amp Pigtail	3 ea	
Fuel Drum Adapter	1 ea	
Fuel Hoses (1 supply, 1 return)	2 ea	
Lights	4 ea (in 1 cased set)	
5-Gallon Fuel Can (empty upon transport)	1 ea	
TEMPER Electric Distribution Box	1 ea	
TEMPER Electrical Distribution Stand	1 ea	
TEMPER Convenience Outlet, Duplex w/GFCI	4 ea	
3000-Gallon Water Tank (shipped separately in Minimum Packout Configuration)	2 ea	

[1] End liner may come in two pieces.

Table 1. CBL Support Equipment Inventory – Continued.

Item	Quantity	Check
Bottom - Insulated Liner for 3000-Gallon Water Tank	2 ea	
Sides - Insulated Liner for 3000-Gallon Water Tank	4 ea	
Top - Insulated Liner for 3000-Gallon Water Tank	2 ea	
Ground Rod	2 Sets	
MSDS Book	1 ea	
10-lb Fire Extinguisher	1 ea	
Water Hoses, 20-ft length, 2-in diameter (1 source water supply, 1 waste water drain)	2 ea	
Ramp Sections	2 ea	
FDECU (shipped separately in Minimum Packout Configuration)	1 ea	
H120 ASH Heater (shipped separately in Minimum Packout Configuration)	1 ea	
FDECU/ASH Stacking Fixture Assembly (shipped separately in Minimum Packout Configuration)	1 ea	
FDECU Tie Down Side Clamp (shipped separately in Minimum Packout Configuration)	2 ea	
FDECU Tie Down Anchor Clamp (shipped separately in Minimum Packout Configuration)	2 ea	
FDECU Mounting Bolt (shipped separately in Minimum Packout Configuration)	8 ea	
FDECU Mounting Bolt Washer (shipped separately in Minimum Packout Configuration)	8 ea	
Tow Strap, 15-ft (shipped separately in Minimum Packout Configuration)	1 ea	
Foot Locker (Located behind dryers)	1 ea	
Extension Cord, 50-ft	4 ea	
Tow Strap, 15-ft (shipped separately in Minimum Packout Configuration)	1 ea	
3000-Gallon Water Tank Valve Assemblies	4 ea	
3000-Gallon Water Tank Repair Kit	2 ea	
Tent Pin Alignment Tool, 8” Length	3 ea	
Screwdriver, Standard Tip 7 ¾” Long	1 ea	
Screwdriver, Phillips Tip, Size #1, 7 ¾” Long	1 ea	
Screwdriver, Jewelers	1 ea	
Wrench, Adjustable, 10”, Chrome, Crescent, 15/16” Capacity	1 ea	
Wrench, Strap, Large Size (6 3/8” dia)	1 ea	
Nut Driver, Solid Shaft, 5/16”	1 ea	
Air Compressor Adapter Hose.	1 ea	
Funnel, 32 ounce	1 ea	
Measuring Cup	1 ea	
Spoon, Stainless Steel, 11 inch	1 ea	
Brush, Lab Cleaning	1 ea	
Drop Light	2 ea	

Table 1. CBL Support Equipment Inventory – Continued.

Item	Quantity	Check
Safety Components	1 ea	
Goggles, Clear Lens	4 ea	
Replacement Lens	4 ea	
Face Shield, Double Matrix	1 ea	
Replacement Window, Face Shield, Double Matrix	1 ea	
Gloves, Rubber, Size 9	2 ea	
Gloves, Rubber, Size 10	2 ea	
Gloves, Rubber, Size 11	2 ea	
Apron, Wash, Rubber	2 ea	
Mask, Dust	1 box	
Gloves, Natural Rubber, Size SM/MED	1 box	
Gloves, Natural Rubber, Size MED/LG	1 box	
END OF FOOTLOCKER		
Cargo Strap Large (2 ea minimum – shipped separately)	5 ea	
Cargo Strap Small	10 ea	
Tables	4 ea	
30 gallon Trash Can, with lid	1 ea	
Sinking Deicer with Guard	2 ea	
Air Compressor	1 ea	
Filter, Bag, Polypropylene, EPDM Seal Ring, 5 micron Used on F-1A and F-1B Filter Chamber	8 ea	
Cartridge, Filter, Powered Carbon, 30” Used on F-3 Filter Chamber	2 ea	
Anti Freeze	1 gal	
Broom	1 ea	
Dust pan	1 ea	
Laundry Cart	2 ea	
Laundry Cart Transfer Top	1 ea	
Detergent Solid Ultra	8 cases	
Sour Navisour Solid	3 cases	
Bleach Solid Stainaway	1 case	
Packaged Sodium Bisulfite	2 cases	
TM 10-3510-226-10	1 ea	
TM 10-3510-226-23	1 ea	
TM 10-3510-226-10HR	1 ea	
TM 10-3510-226-23P	1 ea	
Washer Key Set	1 ea	
Dryer Key Set	1 ea	
Distribution Box Key	1ea	
Cartridge, Filter, Used on F-2 Filter Chamber	6 ea	
Waste Tank Hose	1ea	

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER USUAL CONDITIONS – TEMPER ASSEMBLY

TEMPER ASSEMBLY

NOTE

If this is the first time the CBL is being deployed, the procedures outlined in TM 10-3510-226-23, “Service Upon Receipt” must be carried out prior to system startup.

The following procedures provide detailed instructions for erecting TEMPER window sections, TEMPER door sections, end section, modified end section, and vestibule for use with the Containerized Batch Laundry (CBL). For repair procedures or more detailed information on the TEMPER, refer to TM 10-8340-224-13.

The CBL employs a 16-ft by 20-ft, TEMPER assembly **(Figure 1, Item 1)** with modified endwall **(Figure 1, Item 2)**, liners **(Figure 1, Item 3)**, and floors **(Figure 1, Item 4)**. The modified endwall (bootwall) is attached to the container. The 16-ft by 20-ft, TEMPER assembly is made up of two 8-ft sections. The modified endwall (bootwall) and all other TEMPER components are packed inside the center section of the CBL. A vestibule assembly **(Figure 1, Item 5)** is also included.

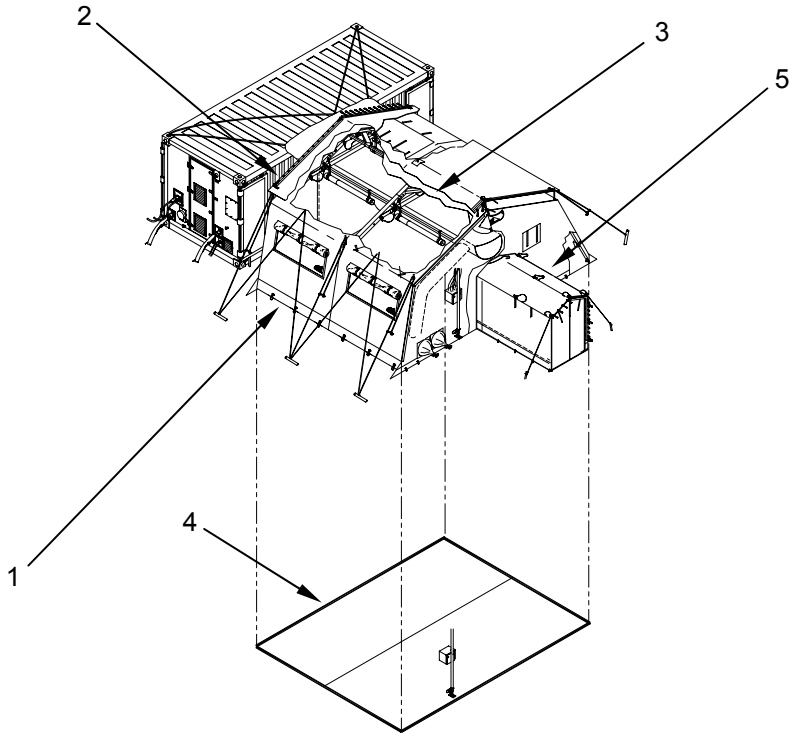


Figure 1. Laundry TEMPER with Modified End Section.

TEMPER ASSEMBLY-CONTINUED

Electrical components of the 16-foot TEMPER include one power distribution box **(Figure 2, Item 6)** and four fluorescent lights **(Figure 2, Item 7)**. Convenience outlets **(Figure 2, Item 8)** are also provided.

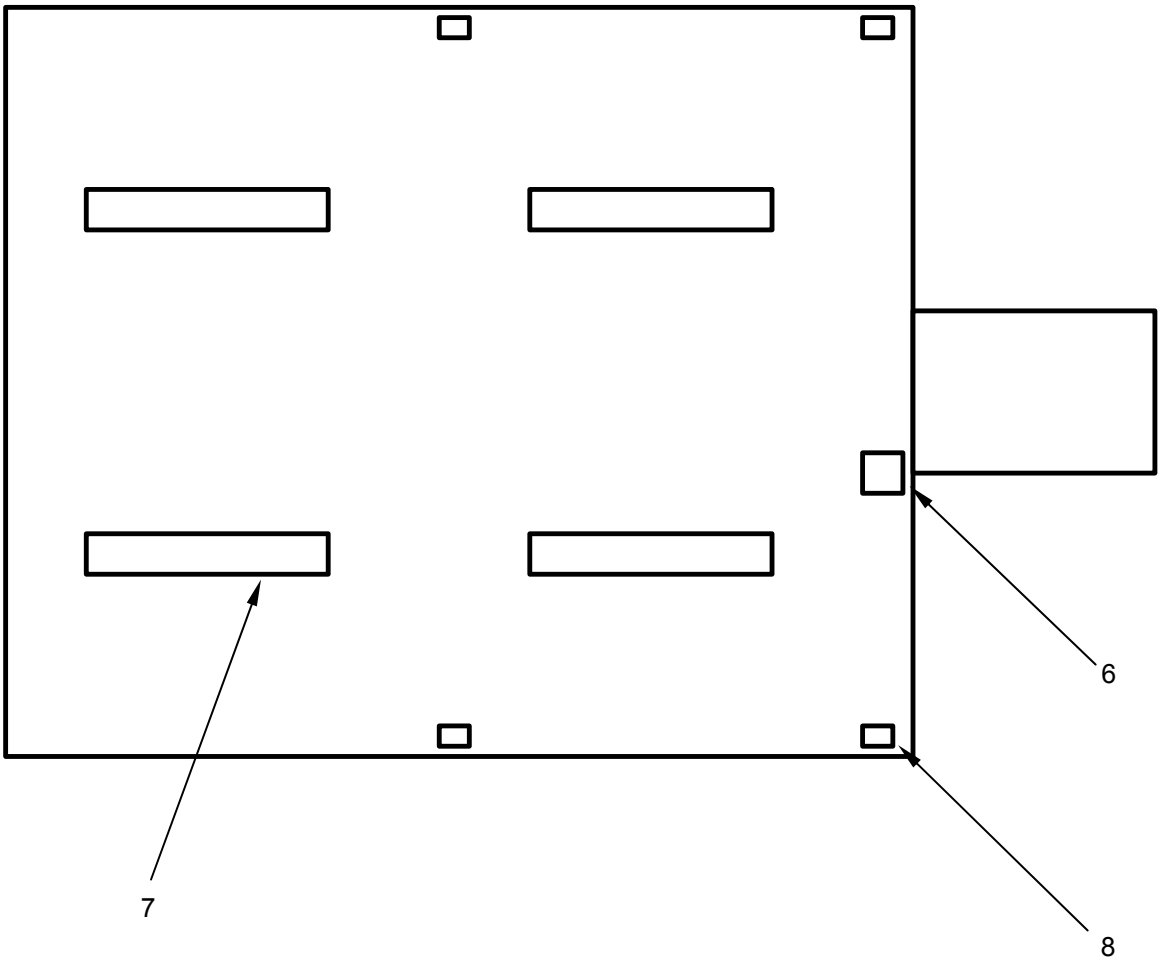


Figure 2. Laundry TEMPER Electrical Layout.

TEMPER ASSEMBLY-CONTINUED



WARNING

The assembled TEMPER section is heavy. At least twelve persons are required to move a 16-ft TEMPER section into position. Ensure sufficient personnel are available before attempting to lift the tent. Lift with your legs and not with your back to prevent serious back injuries. Personnel in the 5th percentile size group may require a step aide during this procedure. Failure comply may result in injury to personnel.



WARNING

Frame assembly hinges can pinch, crush, or cut hands and fingers. Keep hands and fingers away from frame assembly ridges and eaves. An expedient way to keep clear of potential danger areas is to keep your hands “outside the triangle” at all times.

NOTE

The frame assemblies are erected in three stages: kneeling, partially-erect, and erect. These stages permit the attachment of components without the aid of ladders. Both rigid and sectionalized arch assemblies are in use in the field. After initial assembly, the sectionalized arch assembly does not vary in function from the rigid arch assembly. Erect tent from top to bottom, end section towards opposite end section.

NOTE

For clarity, subsequent illustrations may show only one or both 8-ft TEMPER sections as necessary.

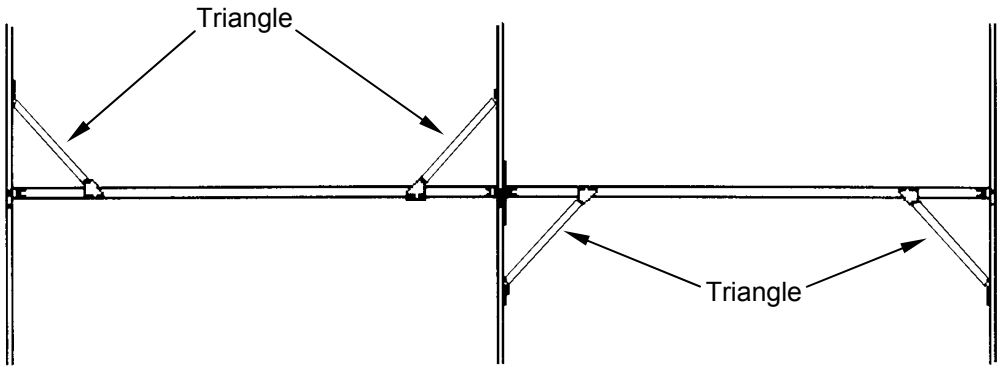


Figure 3. Frame Assembly Danger Points.

TEMPER ASSEMBLY-CONTINUED

Arch Assembly



WARNING

Frame assembly hinges can pinch, crush, or cut hands and fingers. Keep hands and fingers away from frame assembly ridges and eaves.

CAUTION

Do not twist or turn frame components when handling. Damage to equipment may result.

1. Remove roof arch assembly **(Figure 4, Item 9)** and side arch assemblies **(Figure 4, Item 10)** from frame sections cover assembly bundle.
2. Ensure all quick release pins **(Figure 4, Item 11)** are disengaged.

CAUTION

Insert quick release pins towards inside of tent end assemblies. Tent fabric may tear if inserted towards outside.

3. Use the tent pin alignment tool to align holes in roof arch assembly **(Figure 4, Item 9)** with holes in ridge gusset plate **(Figure 4, Item 12)**. Insert quick release pin **(Figure 4, Item 11)**.
4. Move side arch assembly **(Figure 4, Item 10)** away from roof arch assembly **(Figure 4, Item 9)**.
5. Connect roof arch assembly **(Figure 4, Item 9)** and side arch assemblies **(Figure 4, Item 10)** to form arch assembly **(Figure 4, Item 13)**.
6. Lay arch assembly **(Figure 4, Item 13)** flat on the ground.

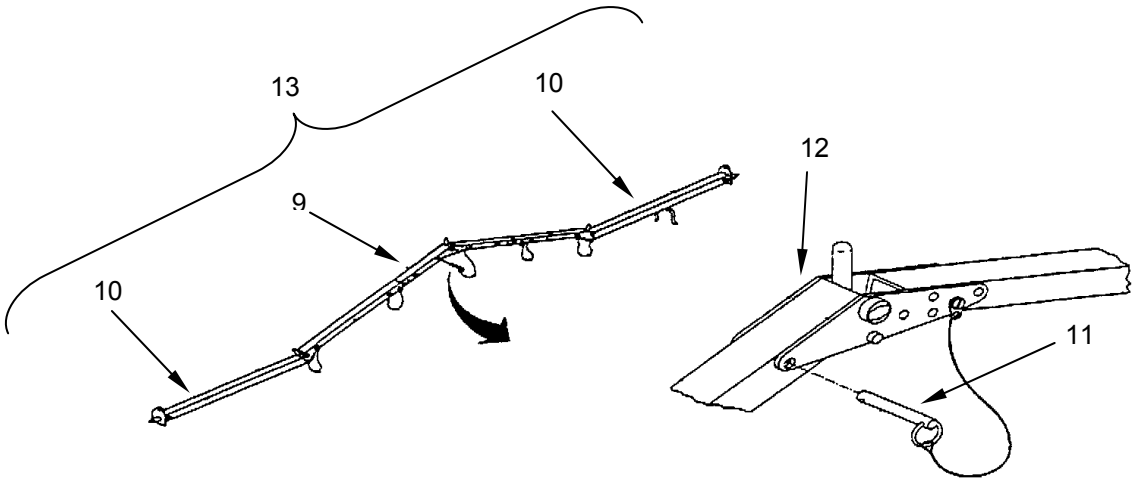


Figure 4. Arch Assembly.

TEMPER ASSEMBLY-CONTINUED

Header Assembly

NOTE

The header assembly will be pinned to the arch assembly between the ridge and eave. The header has beveled edges. During assembly, the shorter side faces up.

1. Identify the header assembly **(Figure 5, Item 14)**.
2. Slide the header assembly end plates **(Figure 5, Item 15)** over arch assembly **(Figure 5, Item 13)**.
3. Align arch assembly **(Figure 5, Item 13)** and header assembly end plate holes **(Figure 5, Item 16)** and insert quick release pin **(Figure 5, Item 11)**.
4. Lay assembly on the ground. Repeat procedures for each arch assembly.

NOTE

The CBL will require three arch and header assemblies to complete the 16-ft TEMPER assembly.

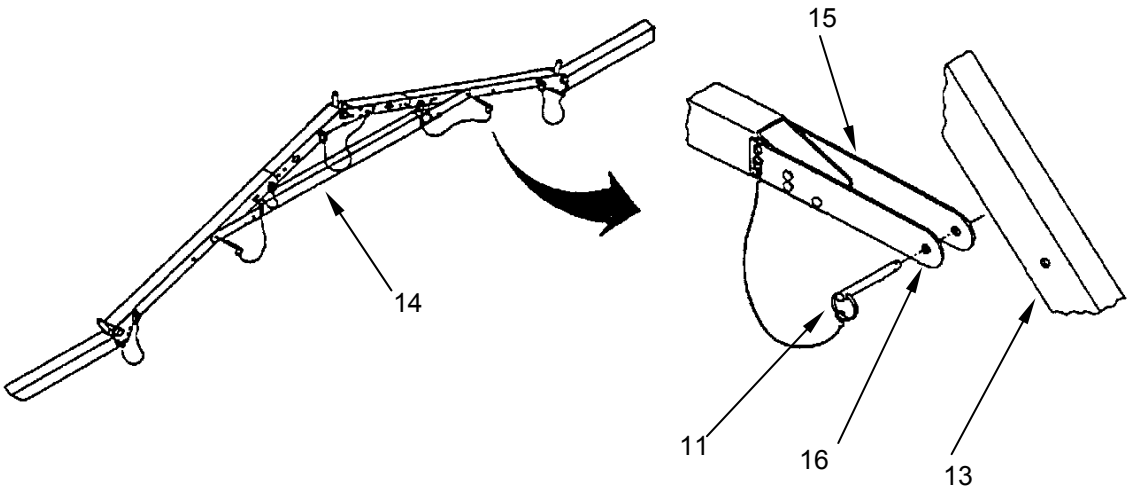


Figure 5. Header Assembly.

TEMPER ASSEMBLY-CONTINUED

Purlin Assembly

NOTE

Purlins connect the arch assemblies together. An 8-ft section of the frame will be completed with five purlins. Purlins consist of a pipe section with two diagonal braces attached. Ten purlins will be required to set up the 16-ft TEMPER assembly for the CBL.

1. Identify five purlins **(Figure 6, Item 17)** for installation at ridge **(Figure 6, Item 18)**, eaves **(Figure 6, Item 19)**, and bases **(Figure 6, Item 20)**.

2. Starting at the end arch, hold two arch assemblies **(Figure 6, Item 13)** upright and parallel, 8 feet apart, in kneeling position.

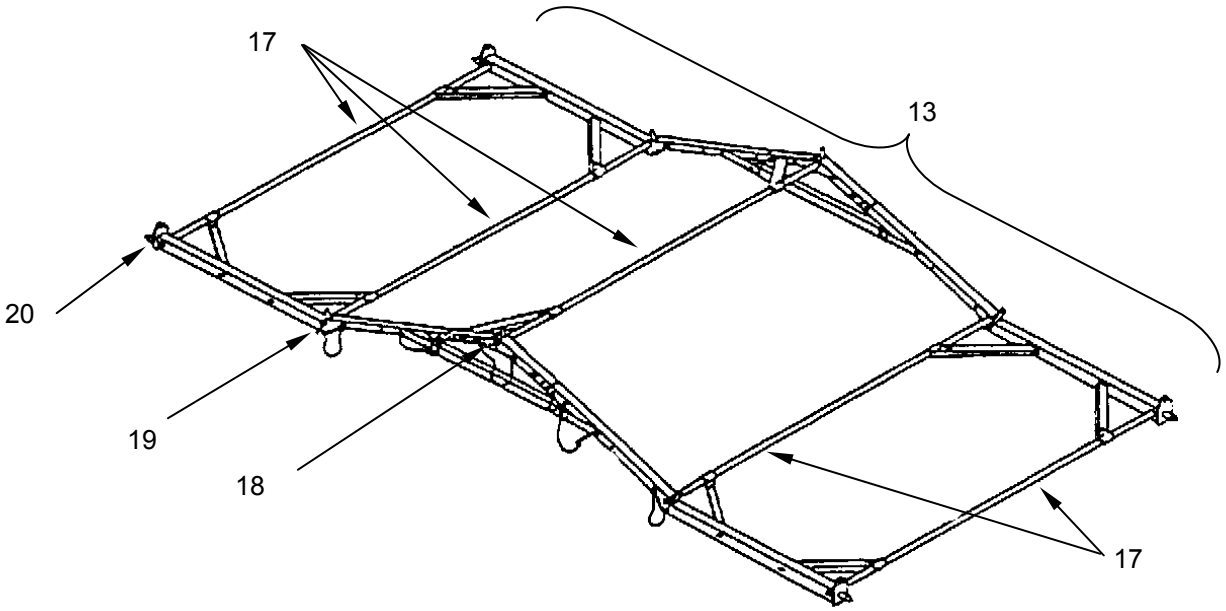


Figure 6. Purlin Assembly.

TEMPER ASSEMBLY-CONTINUED

3. Install round purlin **(Figure 7, Item 17)** at ridge **(Figure 7, Item 18)**.

4. Identify end fitting **(Figure 7, Item 21)** on each end of purlin **(Figure 7, Item 17)**.

5. Fit end fitting **(Figure 7, Item 21)** in each arch assembly boss **(Figure 7, Item 22)** simultaneously.

6. Rotate purlin **(Figure 7, Item 17)** 90° so that end fittings **(Figure 7, Item 21)** lock into boss **(Figure 7, Item 22)** at each arch assembly **(Figure 7, Item 13)**.

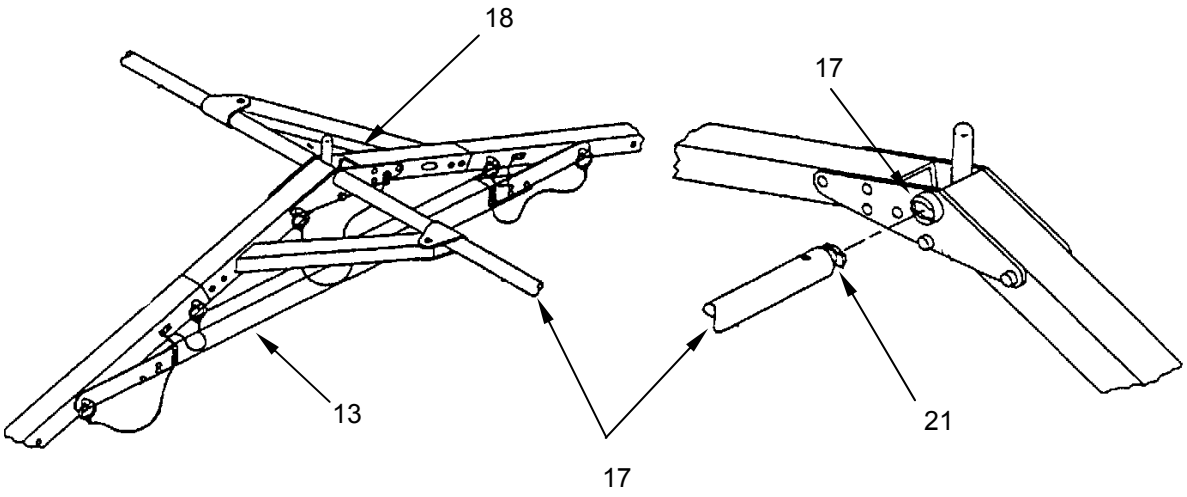
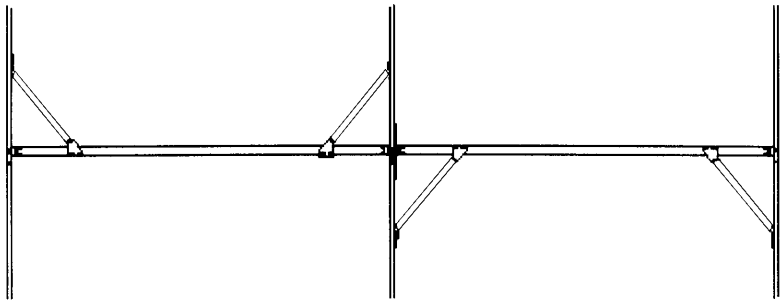


Figure 7. Purlin Assembly Detail.

NOTE

When installing additional purlin assemblies to complete sections, stagger the placement of the diagonal braces as shown below.



(top view)

Figure 8. Purlin Assembly Diagonal Brace Placement.

TEMPER ASSEMBLY-CONTINUED

7. Unfasten retaining strap **(Figure 9, Item 23)** and rotate a purlin diagonal brace **(Figure 9, Item 24)** toward arch assembly **(Figure 9, Item 13)**.

NOTE

The brace stud and brace shackle are located at the end of the purlin diagonal brace. The slot on the arch assembly is approximately two feet away from the ridge.

8. Holding brace shackle **(Figure 9, Item 25)**, align and place brace stud **(Figure 9, Item 26)** in arch assembly slot **(Figure 9, Item 27)** located two feet from ridge.

9. Rotate brace shackle **(Figure 9, Item 25)** 90^0 to lock brace stud **(Figure 9, Item 26)** in place.

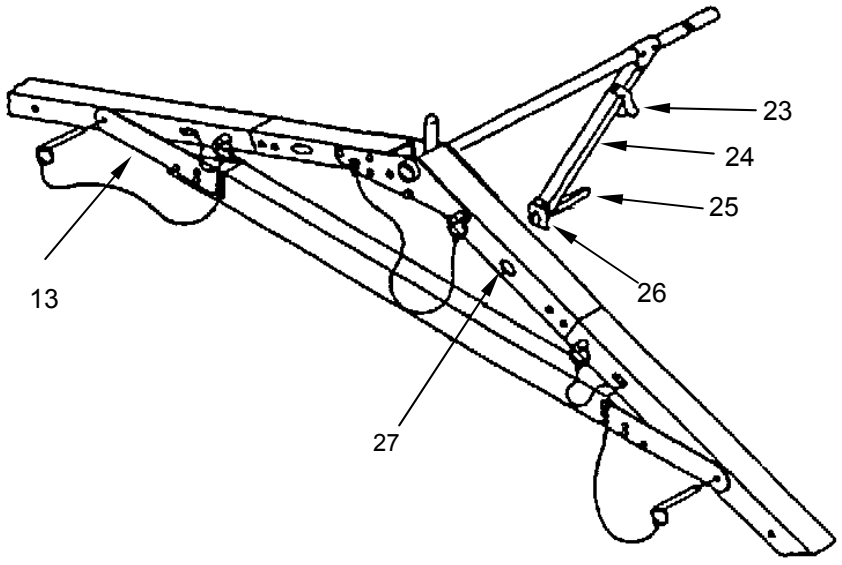


Figure 9. Purlin Assembly Diagonal Brace Detail.

TEMPER ASSEMBLY-CONTINUED



WARNING

Do not lock brace shackle toward purlin diagonal brace. Arch assembly may collapse causing injury to personnel or damage to equipment if improperly locked.

10. Lock purlin diagonal brace **(Figure 10, Item 24)** by pressing brace shackle **(Figure 10, Item 25)** down towards arch assembly **(Figure 10, Item 13)** until it is secure.

11. Install remaining purlin diagonal brace **(Figure 10, Item 24)** repeating steps 7 through 10 above.

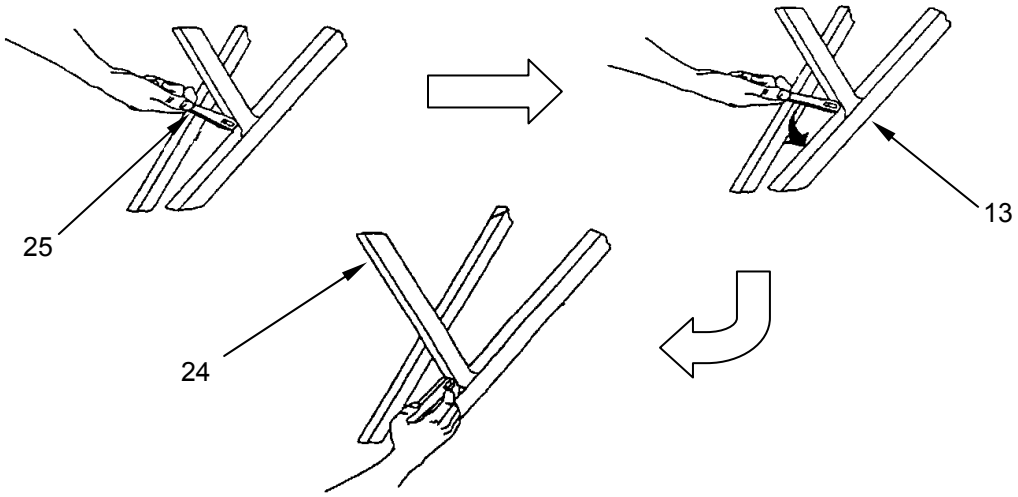


Figure 10. Purlin Assembly Diagonal Brace Detail.

TEMPER ASSEMBLY-CONTINUED

12. Install purlin **(Figure 11, Item 17)** at each eave **(Figure 11, Item 19)** repeating steps above. Begin at " 4. Identify end fitting...".

13. Install purlin **(Figure 11, Item 17)** at each base **(Figure 11, Item 20)** repeating steps above. Begin at " 4. Identify end fitting...".

14. Add second 8-foot TEMPER frame sections by installing additional purlin assemblies, repeating steps 1 through 13. When completed, the frame section is now in a kneeling position.

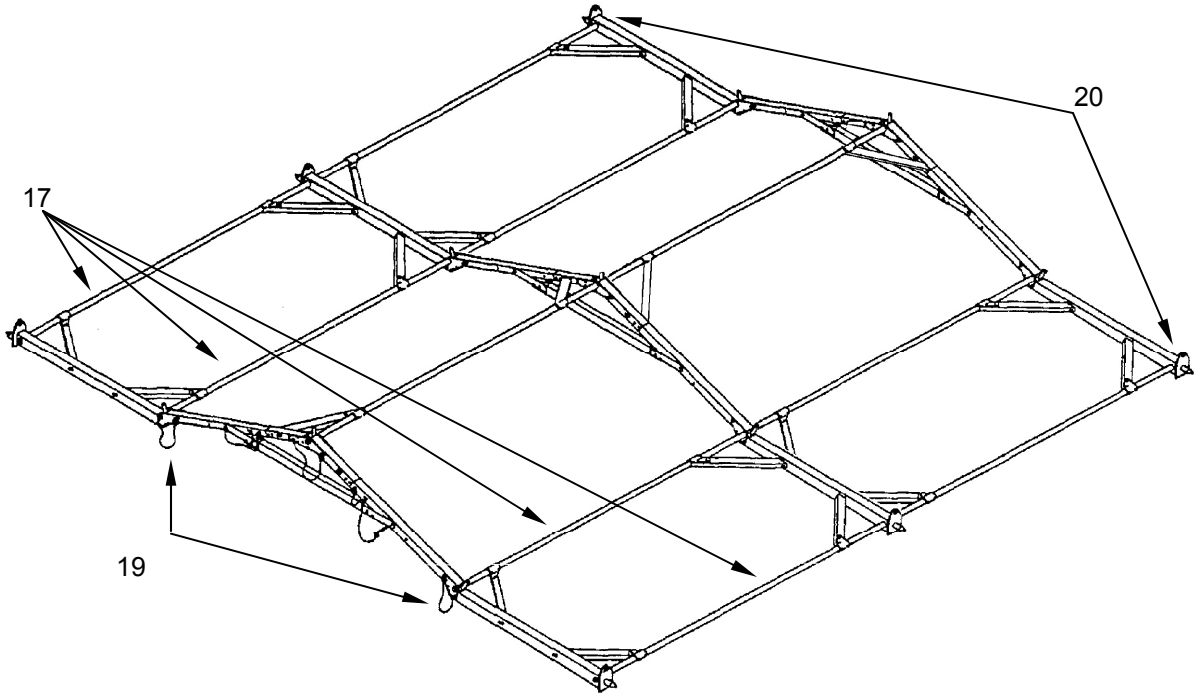


Figure 11. Purlin Assembly.

TEMPER ASSEMBLY-CONTINUED

Install the light supports

1. Identify light support strap assembly **(Figure 12, Item 28)** in light set case. Wrap each running end of light support strap assembly once around header **(Figure 12, Item 14)** at header/arch joint so the double D-ring **(Figure 12, Item 29)** faces the tent roof.

2. Secure end of light support strap assembly **(Figure 12, Item 28)** through double D-ring **(Figure 12, Item 29)** assembly on standing end of strap. Tighten webbing until taut.

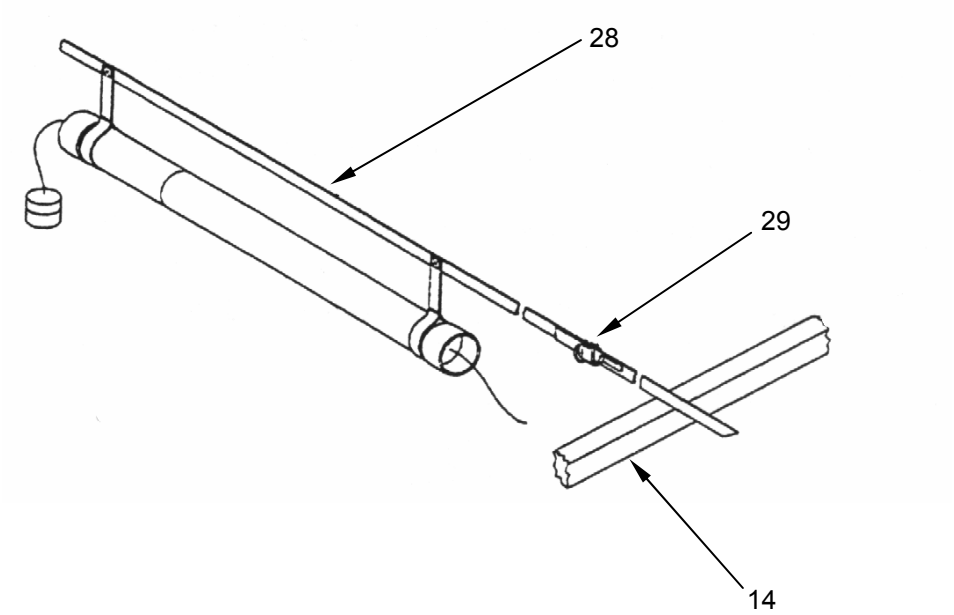


Figure 12. Install the Light Supports.

TEMPER ASSEMBLY-CONTINUED

Placement of Window and Door Sections

1. Identify the window section **(Figure 13, Item 30)**.

NOTE

Four soldiers are required to carry each window or door section to the frame section ridge.

2. Place window section **(Figure 13, Item 30)** next to extendable frame.

3. Identify large, spindle grommets **(Figure 13, Item 31)** at the center of each side of the window section **(Figure 13, Item 30)**.

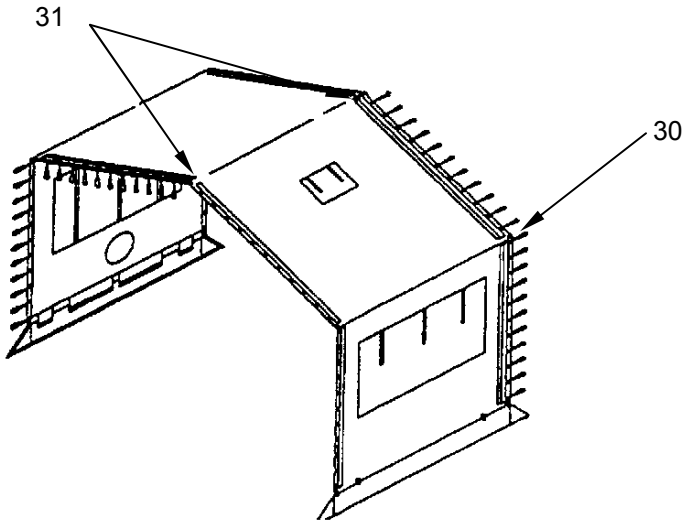


Figure 13. Identify Door and Window Section Components.

TEMPER ASSEMBLY-CONTINUED

4. Place the large spindle grommets over ridge spindles **(Figure 14, Item 32)**.

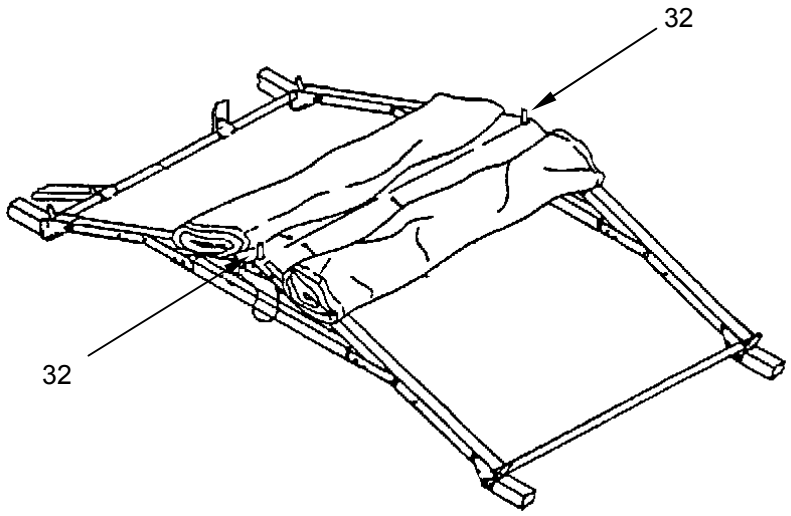


Figure 14. Place the Large Spindle Grommets Over Ridge Spindles.

5. Unroll tent fabric until fabric reaches eave spindles **(Figure 15, Item 33)**. Place grommets over each of the four eave spindles.

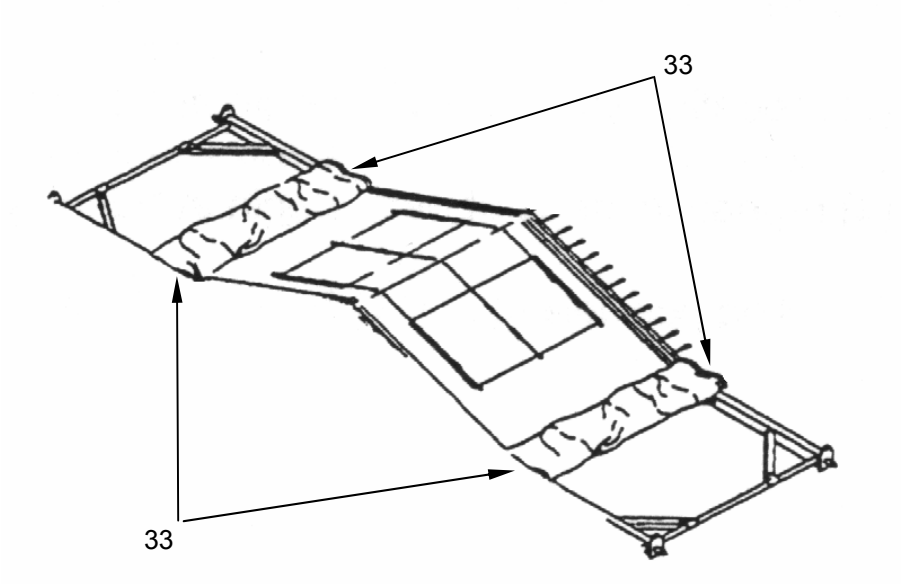


Figure 15. Unroll Tent Fabric.

TEMPER ASSEMBLY-CONTINUED

Placement of Modified End Section (ISO Bootwall)

1. Identify modified end section (bootwall) **(Figure 16, Item 34)**. Modified end section (bootwall) should be stenciled “ISO Bootwall”.

2. Identify large spindle grommet **(Figure 16, Item 31)** at peak of modified end section (bootwall).

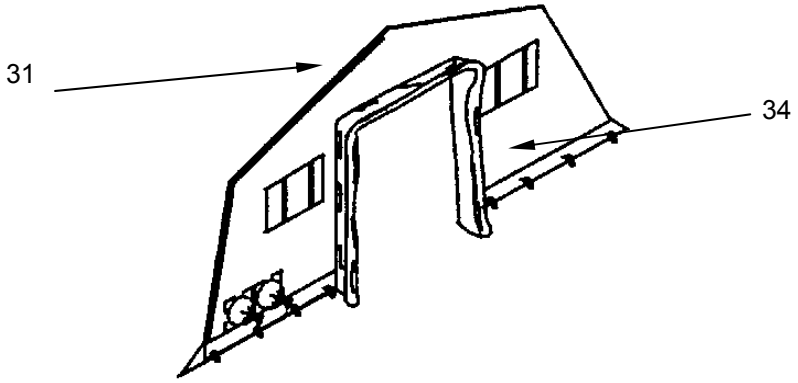


Figure 16. Identify Modified End Section (ISO Bootwall) Components.

NOTE

It is important the modified end section is placed on the side of the frame assembly facing the container. The modified end section connects to the container at a later stage.

3. Place large spindle grommet located at peak of modified end section over ridge spindle **(Figure 17, Item 32)** facing the container.

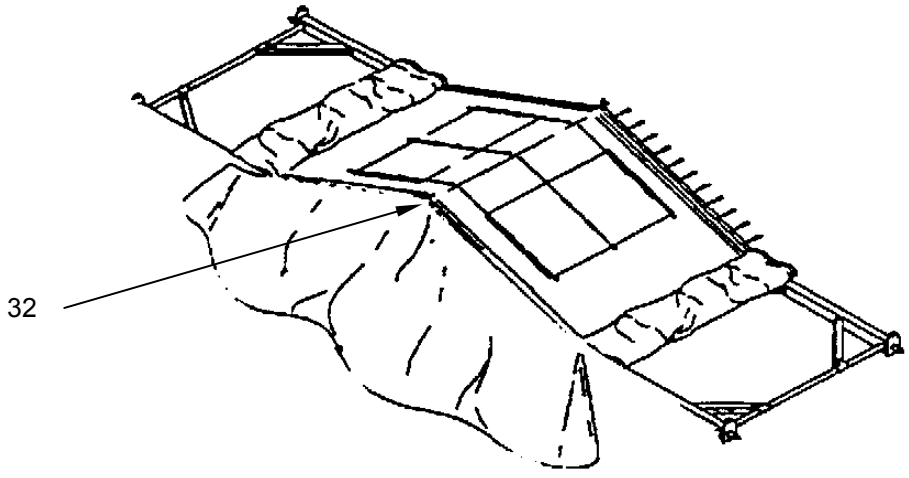


Figure 17. Placement of Modified End Section (ISO Bootwall).

TEMPER ASSEMBLY-CONTINUED

Placement of End Section

1. Identify end section **(Figure 18, Item 35)**. Regular end section has zip doors **(Figure 18, Item 36)** rather than the bootwall attachment on the modified end section.

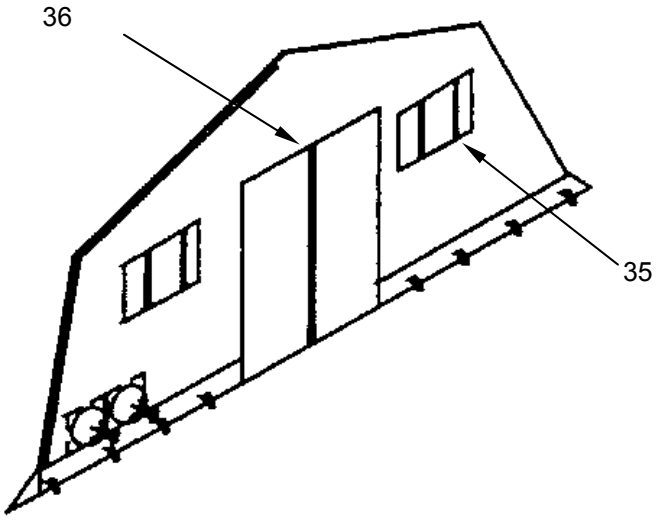


Figure 18. Identify End Section Components.

2. Place large spindle grommet located at peak of end section over ridge spindle **(Figure 19, Item 32)** opposite container.

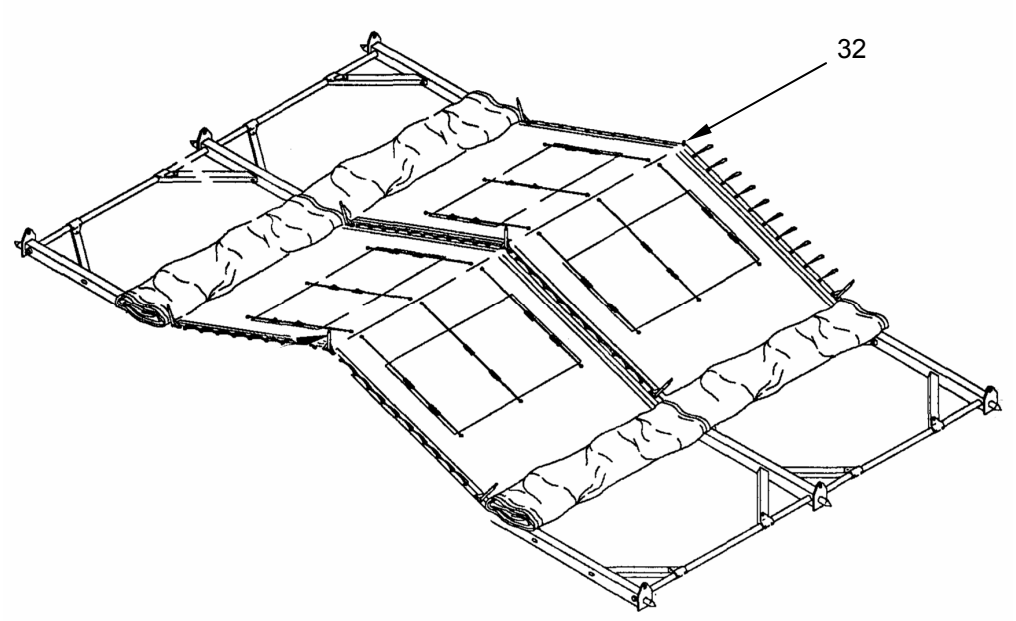


Figure 19. Place Large Spindle Grommet.

TEMPER ASSEMBLY-CONTINUED

NOTE

Ridge extenders and eave extenders are very similar in appearance. Ridge extenders have one attached hitch pin, and will sit upright when placed on the apex of the arch.

3. Identify the three ridge extenders **(Figure 20, Item 37)**.

4. Place the ridge extenders **(Figure 20, Item 37)** over the ridge spindles **(Figure 20, Item 32)** opposite the container.

5. Align holes in ridge spindles **(Figure 20, Item 32)** and ridge extenders **(Figure 20, Item 37)**.

6. Install the attached hitch pins **(Figure 20, Item 38)** through holes in ridge extenders **(Figure 20, Item 37)** and spindles **(Figure 20, Item 32)**, ensuring both components are secure.

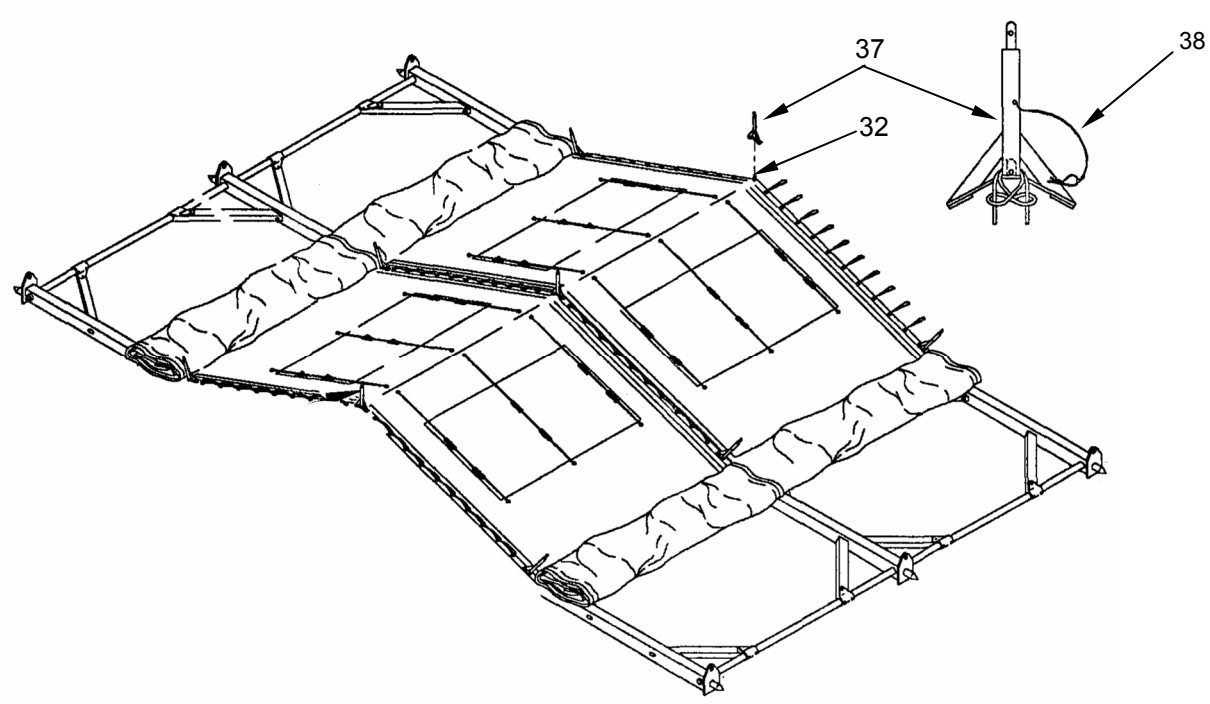


Figure 20. Placement of End Section.

TEMPER ASSEMBLY-CONTINUED

Placement of Tent Fly

1. Identify tent fly **(Figure 21, Item 39)** and lay out beside window or door section.
2. Identify the large, ridge extender spindle grommet **(Figure 21, Item 40).**
3. Roll up both sides of fly **(Figure 21, Item 39)** to large, ridge extender spindle grommet.
4. With a minimum of one individual placed at each large ridge extender spindle grommet **(Figure 21, Item 40)**, lift and move fly **(Figure 21, Item 39)** to frame section ridge purlin.
5. Place the large, ridge extender spindle grommets **(Figure 21, Item 40)** on the ridge extender spindles **(Figure 21, Item 41)**
6. Place the fly hitch clip pins **(Figure 21, Item 38)** through the holes in the ridge extender spindles **(Figure 21, Item 41)** which protrude through the large ridge extender spindle grommets **(Figure 21, Item 40)**.

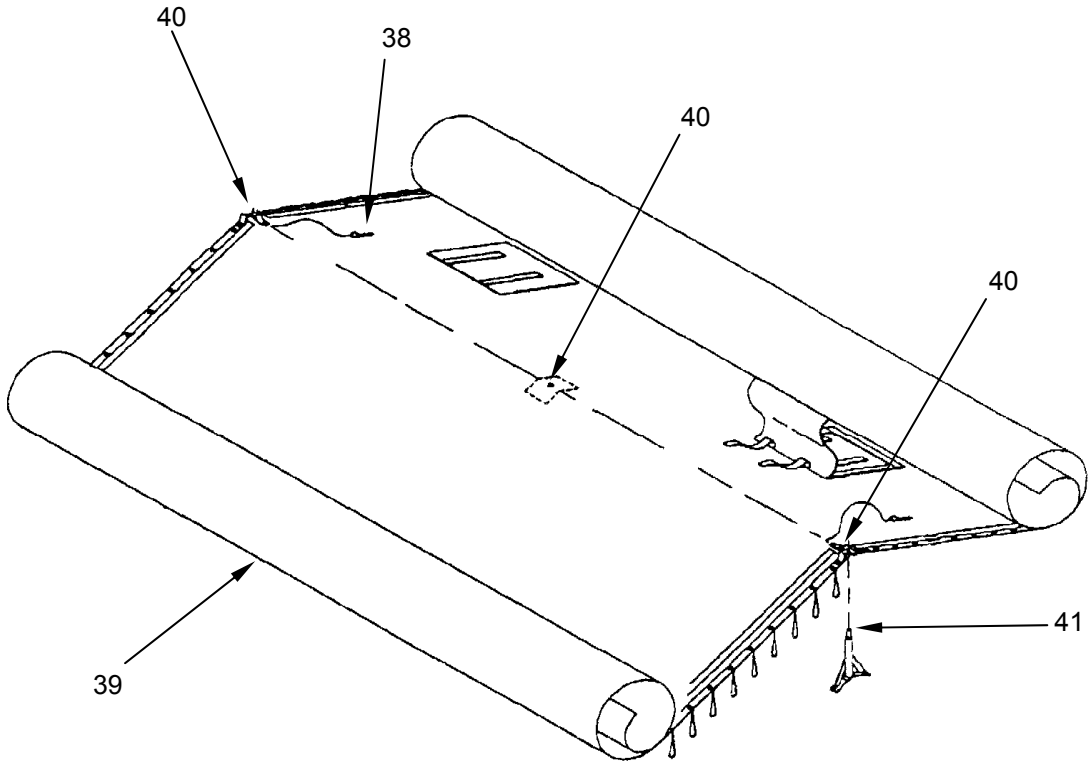


Figure 21. Placement of Tent Fly.

TEMPER ASSEMBLY-CONTINUED

Becket Lacing Window/Door and End Sections

At this point, lacing together of window, end sections, and tent fly may be accomplished simultaneously. Begin all lacing from the ridge line and work towards the eave. Becket lacing procedure is the same throughout the erection process and is accomplished as follows:

CAUTION

Do not step on tent components. Material may be torn and dirt ground into material.

NOTE

For easier lacing, place eave grommets with becket laces over eave spindles first to provide fabric tension, then overlap adjoining window section and end section eave grommet without laces.

1. Place becket side eave grommet **(Figure 22, Item 42)** over eave spindles **(Figure 22, Item 33)**.

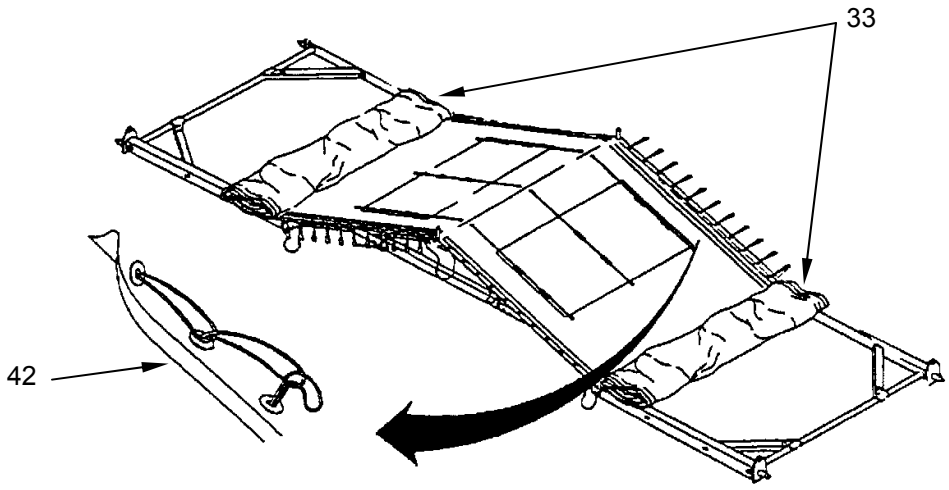


Figure 22. Place Becket Side Eave Grommet over Eave Spindles.

TEMPER ASSEMBLY-CONTINUED

2. Identify first becket lace **(Figure 23, Item 43)** and becket grommet **(Figure 23, Item 44)** near the ridge.

3. Insert the first becket lace **(Figure 23, Item 43)** through first becket grommet **(Figure 23, Item 44)** and second becket lace **(Figure 23, Item 45)** through second becket grommet **(Figure 23, Item 46)**.

4. Insert second becket lace **(Figure 23, Item 45)** through the loop of first becket lace **(Figure 23, Item 43)**.

5. Pull second becket lace **(Figure 23, Item 45)** tight away from ridge.

6. Insert third becket lace **(Figure 23, Item 47)** through grommet **(Figure 23, Item 44)** and through loop of second becket lace **(Figure 23, Item 45)**.

7. Pull third becket lace **(Figure 23, Item 47)** tight away from the ridge.

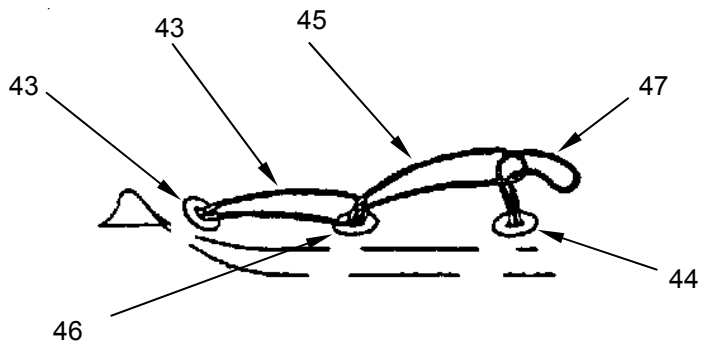


Figure 23. Begin Becket Lacing.

TEMPER ASSEMBLY-CONTINUED

8. Continue lacing and close hook and pile weather flap **(Figure 24, Item 48)** until reaching the last becket lace **(Figure 24, Item 49)**.

NOTE

Ensure weather flap fabric is slid under the ridge extender brace.

9. Place remaining window and end section grommets over eave spindles.
10. Upon reaching last becket lace **(Figure 24, Item 49)** at eave, insert next-to-last becket face **(Figure 24, Item 50)** through loop of last becket lace.
11. Pull the next-to-last becket lace **(Figure 24, Item 50)** back towards the ridge and tie off with half-hitch knot.
12. Complete lacing all window/door and end sections up to eave.

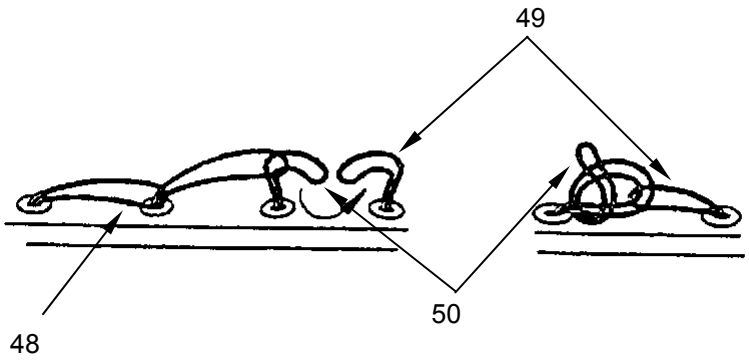


Figure 24. Complete Becket Lacing.

TEMPER ASSEMBLY-CONTINUED

13. Identify the six eave extenders **(Figure 25, Item 51)**.

14. Place eave extenders **(Figure 25, Item 51)** on eave spindle **(Figure 25, Item 33)** with brace towards ridge.

15. Align holes on spindle **(Figure 25, Item 33)** and eave extender **(Figure 25, Item 51)** and insert the hitch clip pin **(Figure 25, Item 38)** ensuring it secures both components.

NOTE

Do not leave any beckets below the eave at this time.

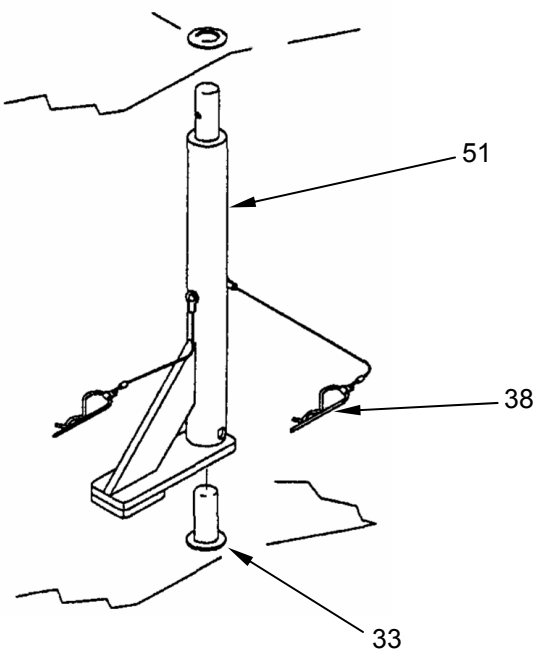


Figure 25. Install Eave Extenders.

TEMPER ASSEMBLY-CONTINUED

Install Guy Line

1. Identify one 19-ft guy line **(Figure 26, Item 52)** and one tent slip **(Figure 26, Item 53)** for placement at each of the four eave extender bases **(Figure 26, Item 54)**.

2. Identify two 19-ft guy lines **(Figure 26, Item 52)** and tent slips **(Figure 26, Item 53)** for placement at the end ridge extender base **(Figure 26, Item 55)**.

3. Thread the guy line **(Figure 26, Item 52)** through one side of the tent slip **(Figure 26, Item 53)** and then through the brace and around the pole of the eave **(Figure 26, Item 3)** extender. Thread two guy lines through the ridge extender **(Figure 26, Item 4)**.

4. Bring guy line **(Figure 26, Item 1)** through other side of tent slip **(Figure 26, Item 2)** and tie an overhand knot at end of guy line. Repeat steps 1 through 4 above for all extenders.

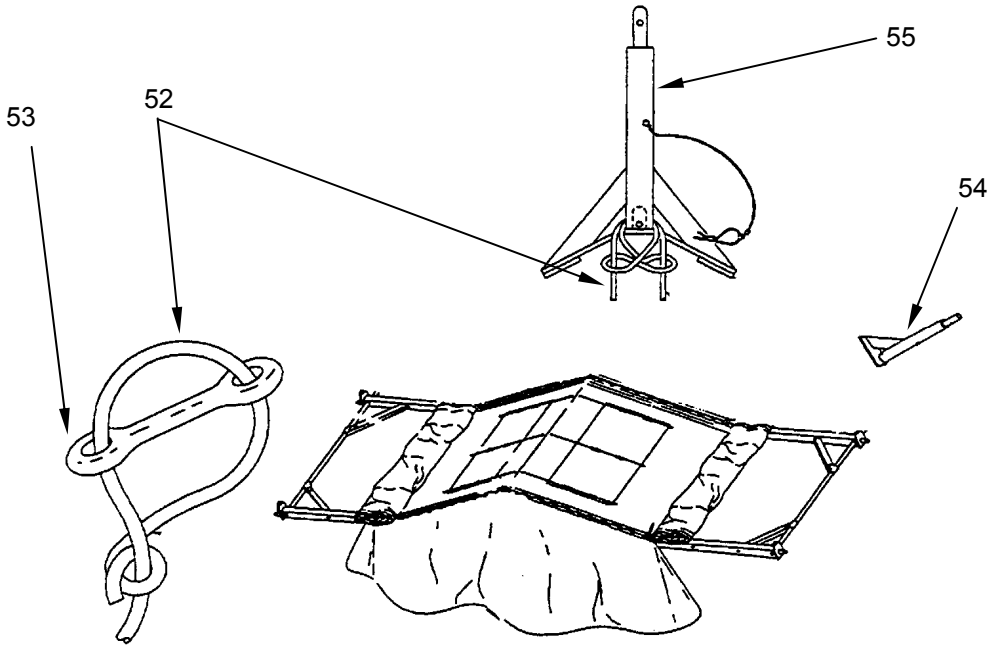


Figure 26. Install Guy Line.

TEMPER ASSEMBLY-CONTINUED

Raising the Frame to Partially-Erect Position



WARNING

Eliminate the possibility of tripping or falling by moving fabric and guy lines. Injury to personnel may result from falls. Failure to comply may result in injury to personnel.



WARNING

Frame assembly hinges can pinch, crush, or cut hands and fingers. Keep hands and fingers away from frame assembly ridges and eaves. An expedient way to keep clear of potential danger areas is to keep your hands “outside the triangle” at all times. Failure to comply may result in injury to personnel.

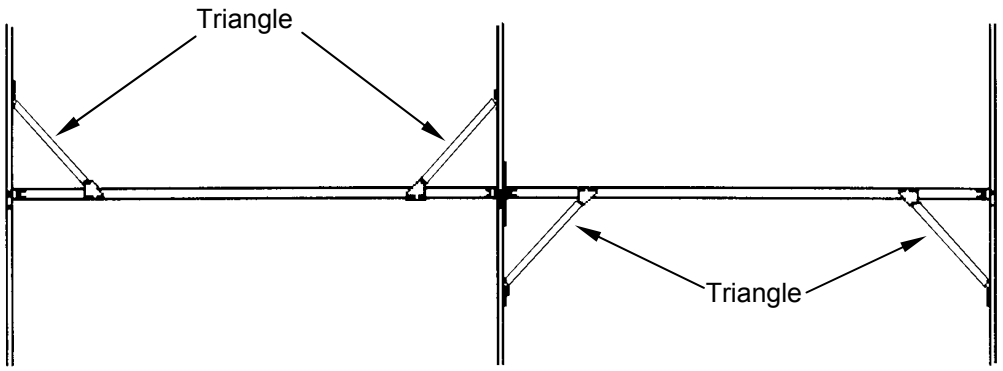


Figure 27. Frame Assembly Danger Points.

CAUTION

Avoid folding wall fabric into joints. Material may rip or tear if caught in joint.

NOTE

Many TEMPER components are installed with the frame in the partially erect position. This is done in order to install roof or roof mounted components without the need for a step aid.

1. Fold wall fabric **(Figure 28, Item 56)** towards ridge **(Figure 28, Item 18)** to expose eave gussets **(Figure 28, Item 57)**. Place folded fabric on ridge fabric **(Figure 28, Item 56)**.

2. Identify quick release pin **(Figure 28, Item 11)** and ensure it is hanging free.

3. Identify the locking hole in the side arch assembly **(Figure 28, Item 10)** and ensure it is free of debris.

TEMPER ASSEMBLY-CONTINUED



WARNING

Two soldiers should be placed at each arch leg to raise frame. Lift tent from correct squatting position, using your legs and not your back. Failure to observe safety precaution may result in serious back injury.

CAUTION

Tent frame must be raised uniformly to avoid twisting or turning. Damage to frame can result.

4. Step in next to the eave gusset **(Figure 28, Item 57)**.

5. Place one hand on the side arch assembly **(Figure 28, Item 10)** and one hand on the eave purlin **(Figure 28, Item 58)** outside the diagonal brace **(Figure 28, Item 59)**.

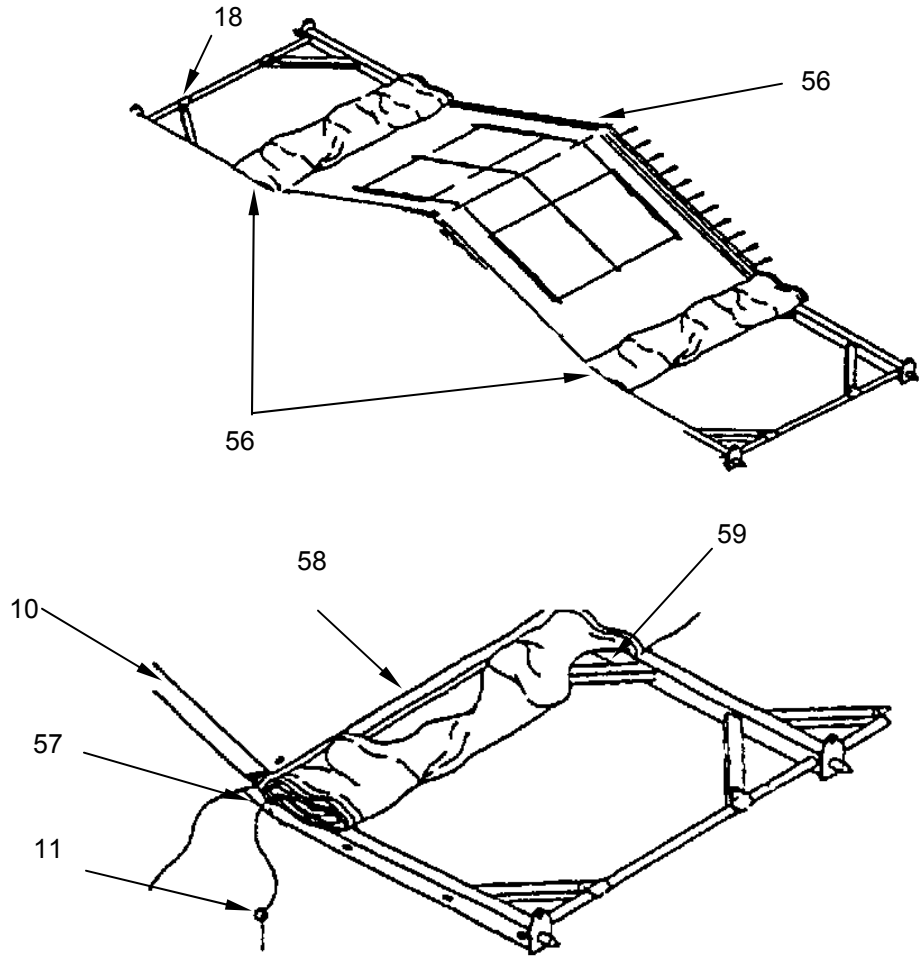


Figure 28. Raising the Frame to Partially-Erect Position.

TEMPER ASSEMBLY-CONTINUED

6. Get in a stable squatting position.

7. Lift frame straight up to shoulder height; drag side arch assembly **(Figure 29, Item 10)** inward. Place weight of the frame on side arch assembly foot **(Figure 29, Item 60)**.

CAUTION

Insert quick release pins towards inside of tent on end assemblies. Tent fabric may tear if inserted towards outside.

8. Align holes of eave gusset **(Figure 29, Item 57)** and side arch assembly **(Figure 29, Item 10)** and install quick release pin.

9. Identify purlin flap **(Figure 29, Item 61)** on interior of window/roof section.

10. Secure purlin flap **(Figure 29, Item 61)** to frame at eave purlin using hook and pile fasteners.

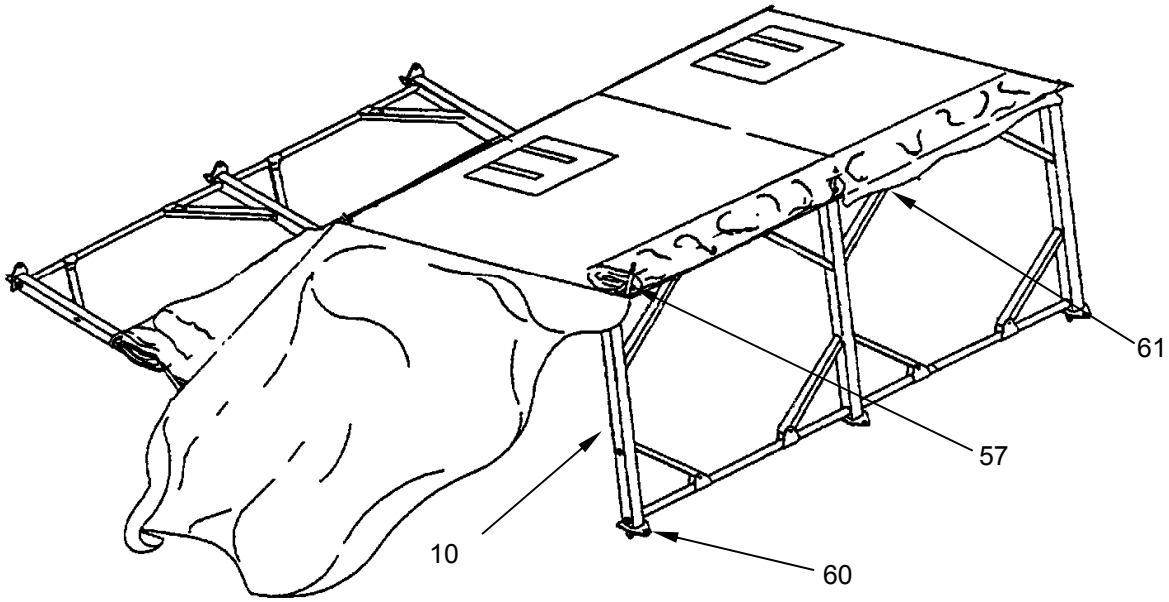


Figure 29. Raising the Frame to Partially-Erect Position.

TEMPER ASSEMBLY-CONTINUED

Floor

CAUTION

Clear and level ground of sharp objects before installing floor.

NOTE

Partially install the floor to keep the liner clean while it is being put up. Installation will be completed when tent is fully erected.

NOTE

Installation procedures for single ply and insulated floors are identical.

1. Unroll floor sections **(Figure 30, Item 62)** and install black side down. Place all floor sections alternating hook and pile fasteners **(Figure 30, Items 63)**.

2. Secure tie tapes **(Figure 30, Item 64)** on narrow edge of floor to base purlins **(Figure 30, Item 17)** on raised side of tent.

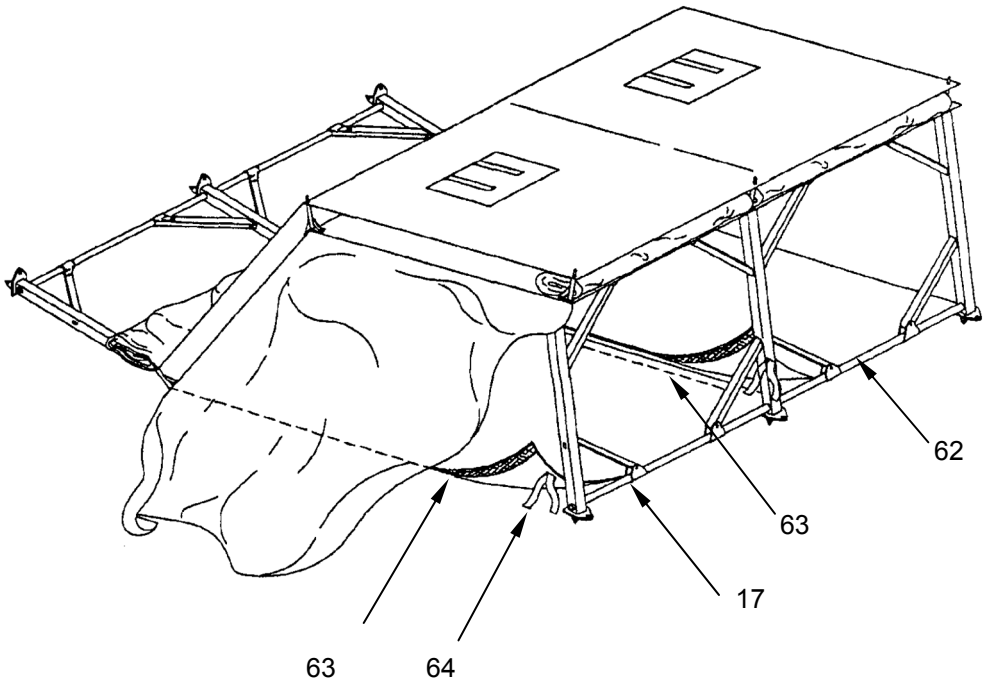


Figure 30. Single Ply Floor.

TEMPER ASSEMBLY-CONTINUED

Liner

1. Identify liner sections **(Figure 31, Item 65)**.
2. Unwrap tent liner **(Figure 31, Item 65)** and unfold it inside tent.
3. Identify three liner, nylon support straps **(Figure 31, Item 66)** and snap hooks **(Figure 31, Item 67)** at center of liner.

NOTE

Position outside support straps on ridge purlin, inside the diagonal brace.

4. Wrap D-ring **(Figure 31, Item 68)** portion of outside support straps **(Figure 31, Item 66)** around ridge purlin **(Figure 31, Item 69)**. Attach to snap hook **(Figure 31, Item 67)**.
5. Clip remaining strap around ridge purlin **(Figure 31, Item 69)** in similar manner.
6. Identify the tie tape **(Figure 31, Item 64)** at center edge of liner **(Figure 31, Item 65)**.
7. Secure the tie tape **(Figure 31, Item 64)** to the header **(Figure 31, Item 14)** using a bow knot.
8. Secure the opposite tie tape on the opposite header using a bow knot.
9. Secure liner to frame members with tie tapes **(Figure 31, Item 64)**.
10. Place the light support strap assembly hangers **(Figure 31, Item 70)** through slits in the liner.
11. Secure liner tie tapes **(Figure 31, Item 64)** to light support strap assembly **(Figure 31, Item 28)**.
12. Press hook and pile fastener together between each liner section.

TEMPER ASSEMBLY-CONTINUED

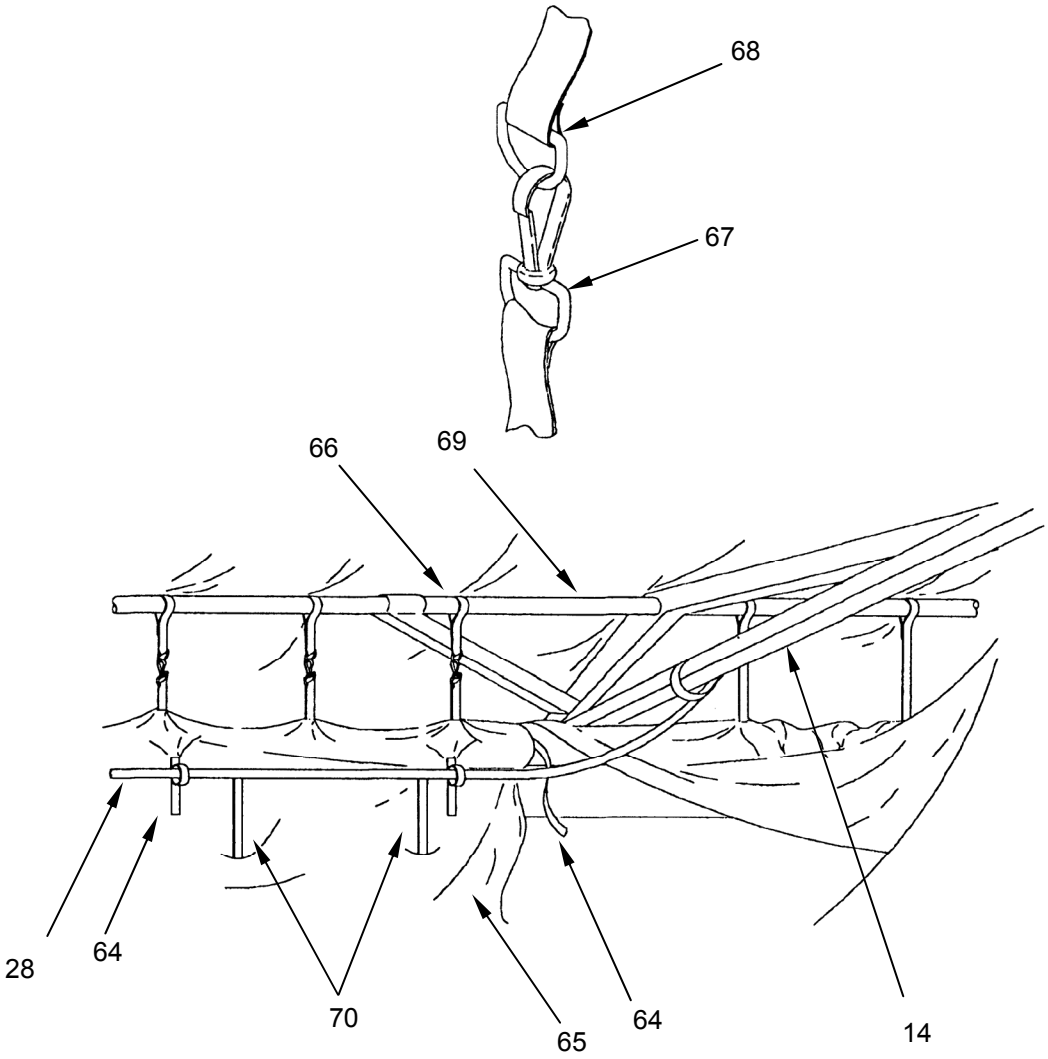


Figure 31. Liner.

TEMPER ASSEMBLY-CONTINUED

Install Luminaries

1. Wrap light hanger strap **(Figure 32, Item 71)** around each end of luminaire **(Figure 32, Item 72)** on inside of rubber end caps **(Figure 32, Item 73)**.

2. Pull strap **(Figure 32, Item 71)** up through the “D” ring **(Figure 32, Item 74)** and press down to engage hook and pile fastener.

3. Mate plug properly to next luminaire **(Figure 32, Item 72)**, ensuring reflecting surface faces up and lamp faces down.

4. Repeat for second luminaire on other side of TEMPER section. Plug the luminaires together on the end opposite the container.

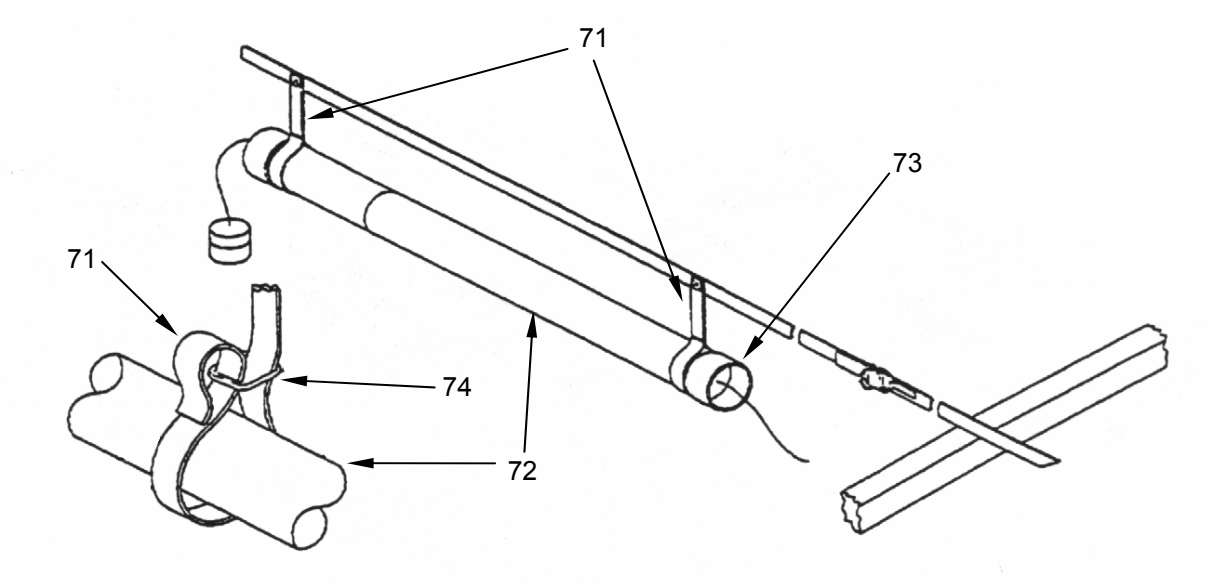


Figure 32. Install Luminaries.

TEMPER ASSEMBLY-CONTINUED

Fully Erecting the Frame



WARNING

Frame assembly hinges can pinch, crush, or amputate hands and fingers. Keep hands and fingers away from frame assembly ridges and eaves. An expedient way to keep clear of potential danger areas is to keep your hands “outside the triangle” at all times.

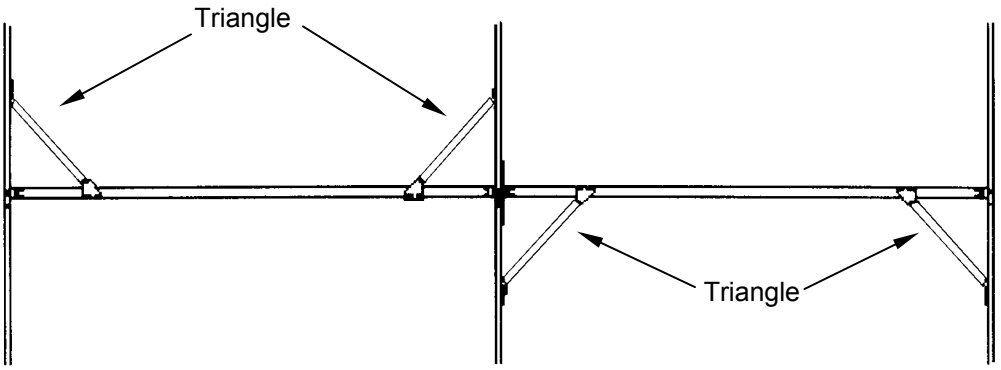


Figure 33. Frame Assembly Danger Points.

TEMPER ASSEMBLY-CONTINUED

CAUTION

Avoid folding wall fabric into joints. Material may rip or tear.

1. Fold wall fabric **(Figure 34, Item 56)** towards ridge fabric **(Figure 34, Item 56)** and lay on roof **(Figure 34, Item 75)** to expose eave gussets **(Figure 34, Item 57)**.

2. Identify quick release pin **(Figure 34, Item 11)** and ensure it is hanging free.

3. Identify the locking hole in the side arch assembly **(Figure 34, Item 10)** and ensure it is free of debris.

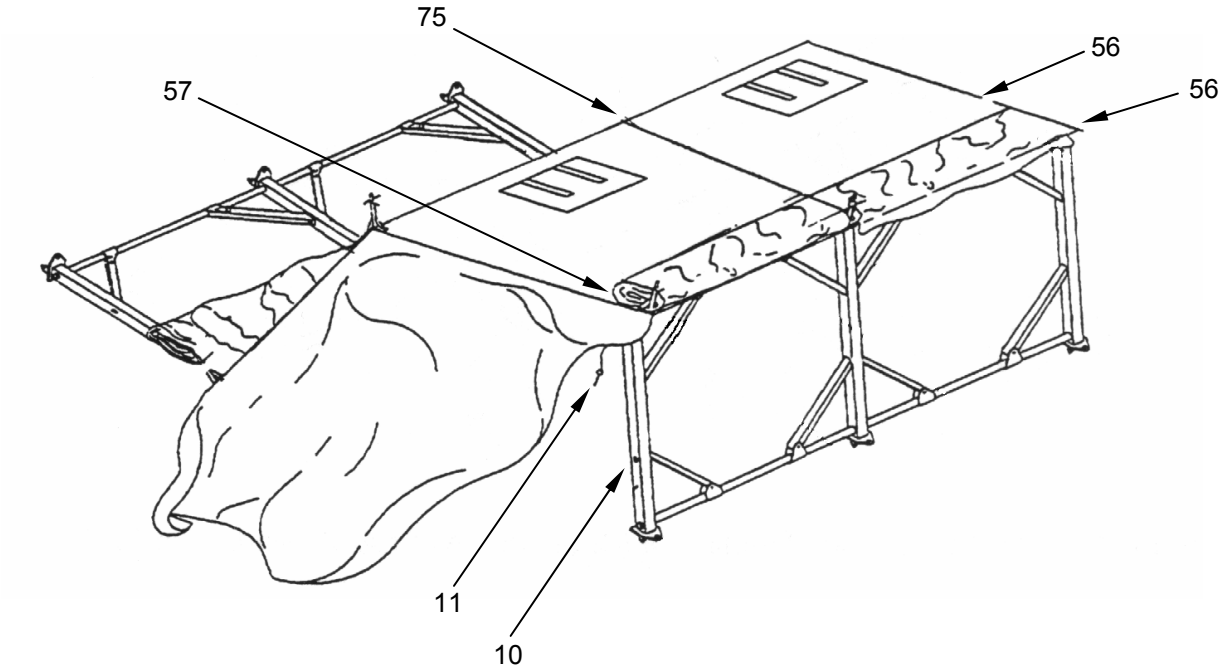


Figure 34. Fully Erecting the Frame.

TEMPER ASSEMBLY-CONTINUED



WARNING

Two soldiers should be placed at each arch leg to raise frame. Lift tent from correct squatting position, using your legs and not your back. Failure to observe safety precaution may result in serious back injury.

CAUTION

Tent frame must be raised uniformly to avoid twisting or turning. Damage to frame can result if lifted unevenly.

4. Step in next to the eave gusset **(Figure 35, Item 57)**.
5. Place one hand on the side arch assembly **(Figure 35, Item 10)** and one hand on the eave purlin **(Figure 35, Item 58)** outside the diagonal brace **(Figure 35, Item 59)**.
6. Get in a stable squatting position.
7. Lift frame straight up to shoulder height, dragging side arch assembly **(Figure 35, Item 10)** inward.
8. Place weight of the frame on side arch assembly foot **(Figure 35, Item 60)**.

CAUTION

Insert quick release pins towards inside of tent on end assemblies. Tent fabric may tear if inserted towards outside.

9. Align holes of eave gusset **(Figure 35, Item 57)** and side arch assembly **(Figure 35, Item 10)** and install quick release pin **(Figure 35, Item 11)**. Identify purlin flap **(Figure 35, Item 61)** on interior of window/roof section.
10. Secure purlin flap **(Figure 35, Item 61)** to frame at eave purlin **(Figure 35, Item 58)** using hook and pile fasteners.
11. Repeat steps 2 through 10 for the remaining side.

CAUTION

Frame bases set more than 20 ft 4 inch apart may cause end section fasteners to tear apart.

12. Set frame bases 20 ft 4 inch apart.

TEMPER ASSEMBLY-CONTINUED

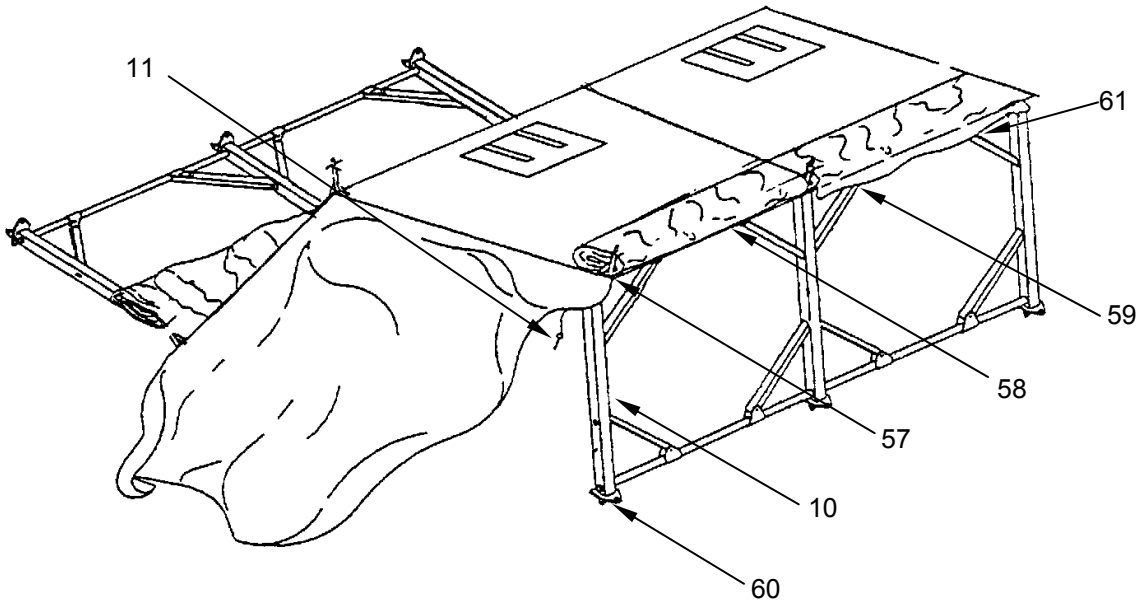


Figure 35. Fully Erecting the Frame.

TEMPER ASSEMBLY-CONTINUED

Moving the TEMPER Section into Position



WARNING

The assembled TEMPER is heavy. At least twelve persons are required for the 16-ft TEMPER. Two soldiers should be placed at each arch leg to raise frame. Lift tent from correct squatting position, using your legs and not your back. Failure to observe safety precaution may result in serious back injury.



WARNING

Helmet must be worn. Throwing tie ropes with attached stakes over container may cause injury to personnel. Failure to observe safety precaution may result in serious injury.

1. Using two soldiers at each arch assembly pick up and move the TEMPER section within two feet of the container, centering the ridge on the TEMPER section with the center of the open personnel doors.

2. Join hook-and-pile fasteners **(Figure 36, Item 63)** of modified endwall **(Figure 36, Item 34)** and double entrance doorframe **(Figure 36, Item 76)**.



WARNING

Do not climb on the container. There are no handholds or folding steps to use. Failure to observe safety precaution may result in serious injury.

3. Tie the ropes on the rain guard **(Figure 36, Item 77)** to a tent stake. Throw the tent stake over the container to ensure the rain guard ropes can be secured.

4. Pull rain guard **(Figure 36, Item 77)** onto the roof of the CBL **(Figure 36, Item 78)** using rain guard cords **(Figure 36, Item 6)**. Remove tent stakes.

5. Run rain guard cords **(Figure 36, Item 79)** through the container lifting eyes **(Figure 36, Item 80)**, and tie off to the cleats located on the far side of the container.

6. Secure the lower end of the bootwall to the ground with 12-in. steel pins **(Figure 36, Item 81)**.

7. Enter the TEMPER and complete securing floor tie tapes to base purlins. Complete securing liner tie tapes to eave purlins.

TEMPER ASSEMBLY-CONTINUED

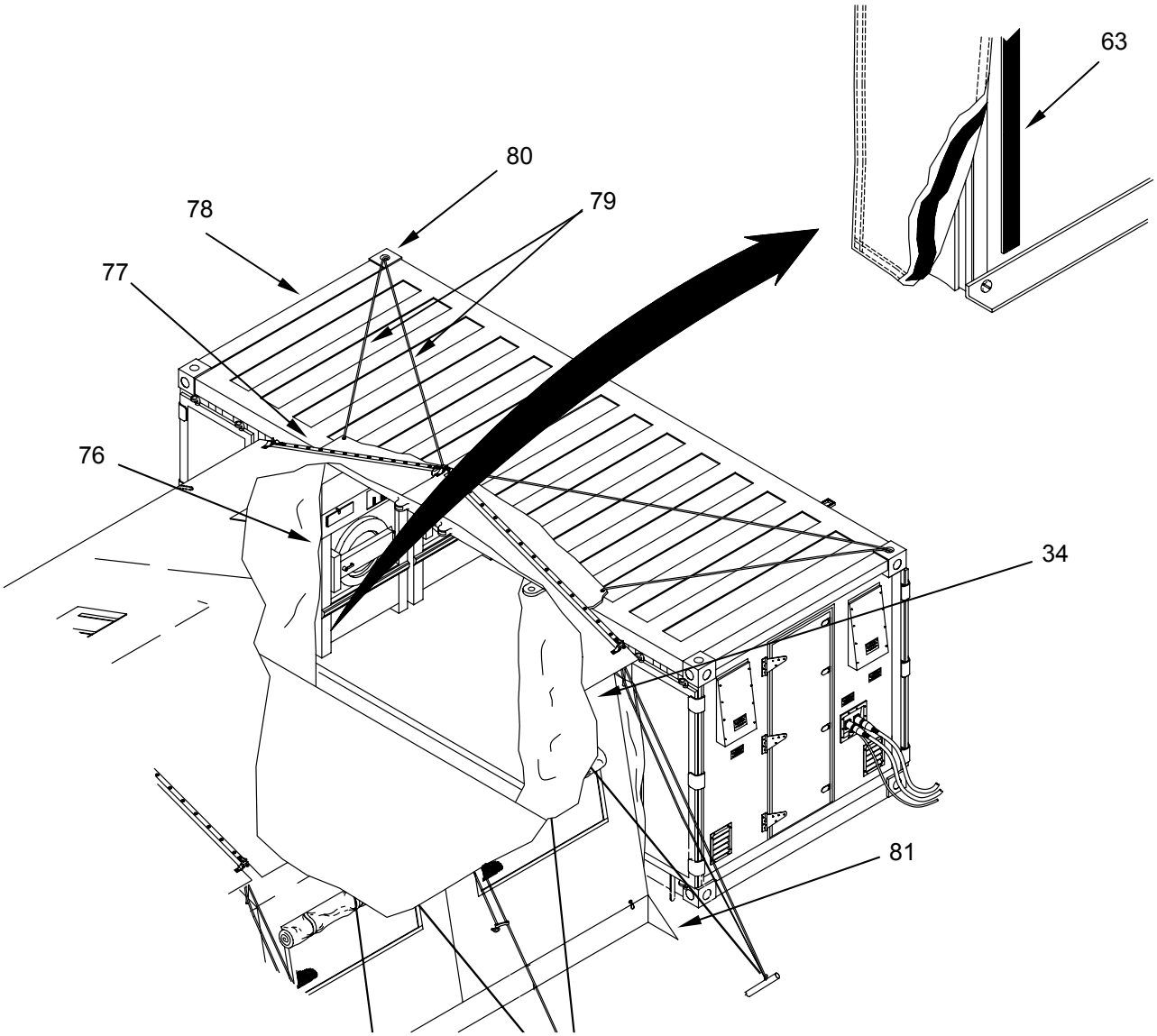


Figure 36. Moving the TEMPER Section into Position.

TEMPER ASSEMBLY-CONTINUED

Install Power Distribution Panel, Electrical Cables, and Convenience Outlets



WARNING

Electrical voltage and current cannot be seen, but contact with energized equipment can kill you, render you unconscious, or severely burn you. Electricity is unlike most other dangerous things you can come in contact with because it gives no warning. To ensure your safety and that of other maintenance personnel, always observe the following precautions:

Electrical power must be disconnected before any electrical system work is performed to prevent electrical shock, injury, or death (electrocution).

ALWAYS place POWER OFF warning tags on circuit breakers or power supply switches so that no one will apply power while you are performing maintenance.

1. Place the cables **(Figure 37, Item 82)** and convenience outlets **(Figure 37, Item 83)** in tent and connect cables to distribution box **(Figure 37, Item 84)** as shown.

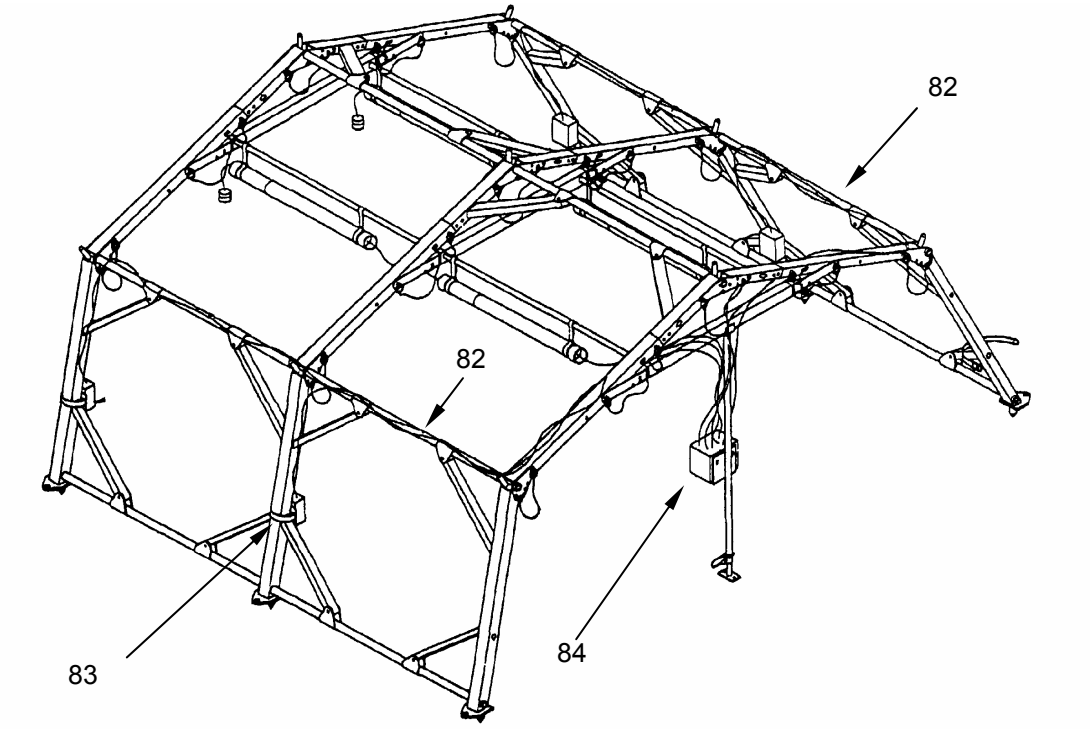


Figure 37. Install Power Distribution Panel, Electrical Cables, and Convenience Outlets.

TEMPER ASSEMBLY-CONTINUED

2. Place power panel stand **(Figure 37, Item 85)** between liner and tent fabric at left entrance side of tent.

3. Disconnect quick release pin **(Figure 37, Item 11)** at the bottom of stand.

4. Extend outer column of stand to engage frame header in U-clamp **(Figure 37, Item 86)**.

5. Step on base plate **(Figure 37, Item 87)** to provide tension on stand.

6. Insert quick release pin **(Figure 37, Item 11)** to lock stand in place and stake to ground.

NOTE

Stand should not move. If necessary readjust hitch pin for sufficient tension on stand.

7. Insert mounting bolts **(Figure 37, Item 88)** in rear of distribution box **(Figure 37, Item 84)** through keyhole slots in power panel stand **(Figure 37, Item 85)**.

CAUTION

Connect all cables and dust caps together. Dirt and dampness may damage electrical connections.

8. Connect the FDECU power cable **(Figure 37, Item 89)** to the 60 A outlet **(Figure 37, Item 90)** on the TEMPER distribution box **(Figure 37, Item 84)**.

9. Connect the 60 A power input cable **(Figure 37, Item 85)** from the CBL power input panel to the power input connector **(Figure 37, Item 86)** on the TEMPER distribution box **(Figure 37, Item 84)**.

10. Connect the ASH to any 120 VAC outlet **(Figure 37, Item 91)** either on the distribution box or the TEMPER convenience outlets.

TEMPER ASSEMBLY-CONTINUED

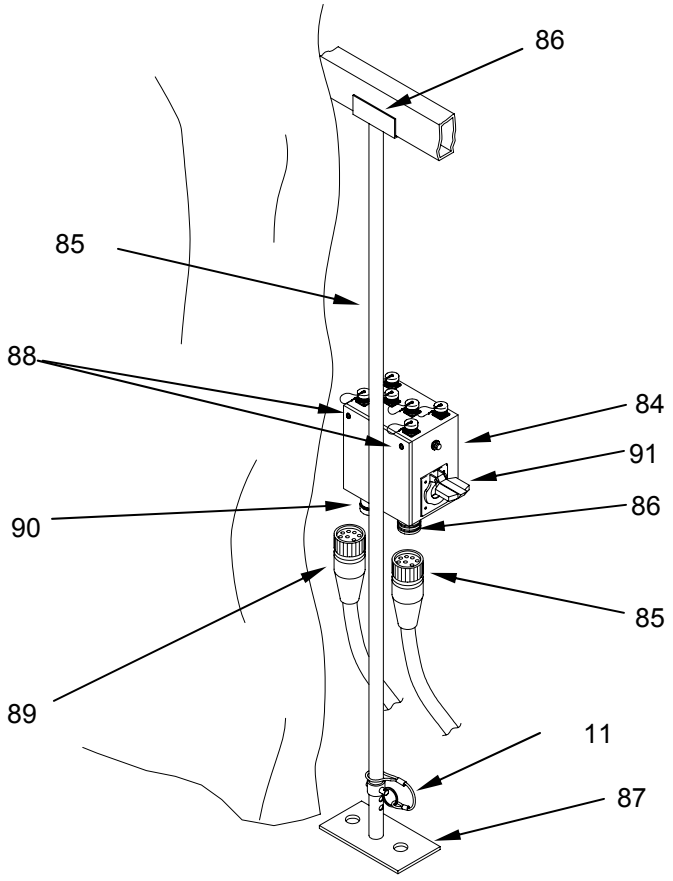


Figure 37. Install Electrical Cables and Convenience Outlets.

TEMPER ASSEMBLY-CONTINUED

Complete Becket Lacing and Bootwall Attachment

1. Roll up window flaps **(Figure 38, Item 92)** and secure.

2. Have two soldiers on the ground complete lacing the window section **(Figure 38, Item 30)** and the end sections **(Figure 38, Item 35)** together. Secure weather seal flap **(Figure 38, Item 93)**.

3. Pull sod cloth **(Figure 38, Item 94)** under base purlins **(Figure 38, Item 17)** and end wall section **(Figure 38, Item 35)**.

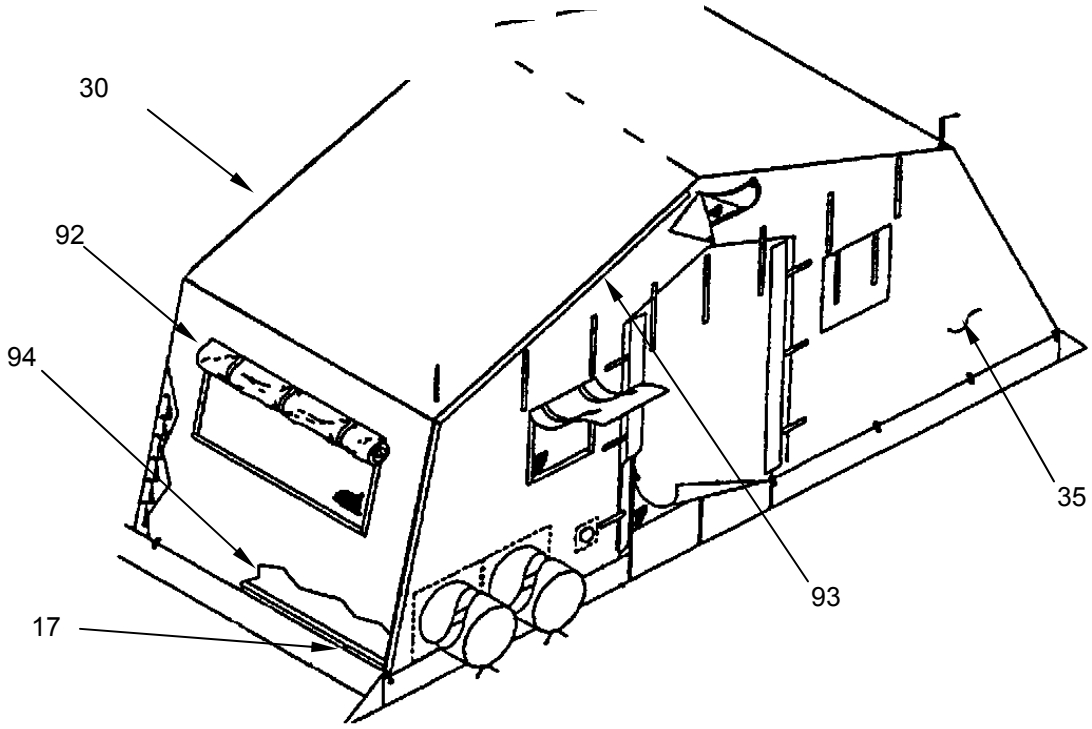


Figure 38. Complete Becket Lacing and Bootwall Attachment.

TEMPER ASSEMBLY-CONTINUED

Stakes and Guy Lines

WARNING

Stakes and guy lines must be used to prevent excessive movement of the tent section in high winds. Failure to stake and tie down tent section may result in personal injury or damage to equipment.

1. Place a 24-in. wooden stake **(Figure 39, Item 95)** approximately 10 ft from the sides at the corners of the tent section at each eave extender and slant stake(s) towards tent.

2. Connect loop of eave extender guy line **(Figure 39, Item 96)** and ridge extender guy lines **(Figure 39, Item 97)** to bottom notch of wooden stake **(Figure 39, Item 98)**.

3. Connect loop of fly guy line **(Figure 39, Item 99)** to top notch of wooden stake **(Figure 39, Item 95)**.

4. Stake tent frame foot to ground using 12-in. steel pins **(Figure 39, Item 81)** through foot loops.

5. Stake foot loops **(Figure 39, Item 100)** to ground and tighten all guy lines.

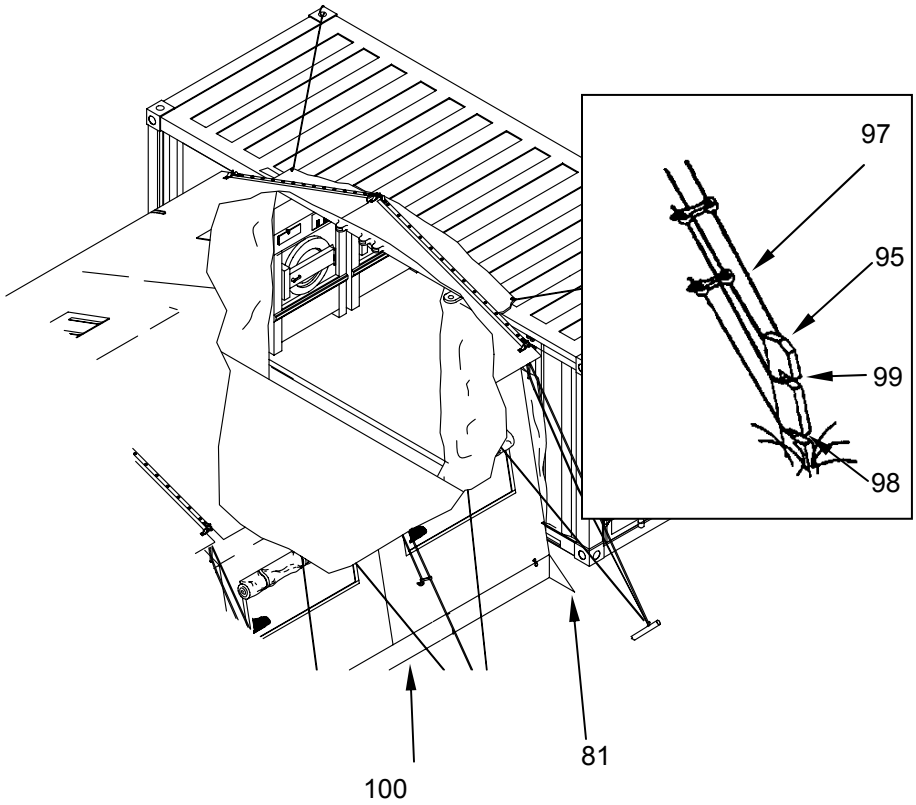


Figure 39. Stakes and Guy Lines.

TEMPER ASSEMBLY-CONTINUED

Install the Vestibule

1. Unroll vestibule adapter **(Figure 40, Item 101)** tent door.
2. Identify and lay out guy lines **(Figure 40, Item 52)**.
3. Identify and lay out vestibule fabric **(Figure 40, Item 102)**.
4. Identify, lay out and assemble vestibule frame sections **(Figure 40, Item 103)** inside of TEMPER tent.
5. Identify ridge spindle grommets **(Figure 40, Item 104)** at one end of vestibule **(Figure 40, Item 102)** and vestibule adapter **(Figure 40, Item 101)**.
6. Align vestibule spindle grommets **(Figure 40, Item 105)** with vestibule adapter spindle grommet **(Figure 40, Item 106)**.
7. Insert vestibule frame spindles **(Figure 40, Item 107)** in vestibule adapter and vestibule spindle grommets **(Figure 40, Items 105,106)**.
8. Secure ridge grommets **(Figure 40, Item 104)** with hitch clip pins **(Figure 40, Item 38)**.
9. Becket lace the vestibule fabric **(Figure 40, Item 102)** to the adapter **(Figure 40, Item 101)** starting at the ridge and working towards each eave.
10. Tie off at eave with half hitch knot.
11. Cover with weather seal flaps **(Figure 40, Item 108)**.
12. Install remaining hitch clip pins **(Figure 40, Item 38)**.
13. Complete becket lacing.
14. Carefully bring one completed vestibule frame **(Figure 40, Item 103)** underneath vestibule **(Figure 40, Item 101)**.
15. Place completed vestibule frame spindles **(Figure 40, Item 107)** through three grommets **(Figure 40, Item 105)** at center of vestibule.
16. Place hitch clip pins **(Figure 40, Item 38)** through spindles.

CAUTION

Orient the hitch clip pins towards inside of vestibule at vestibule door frame so that the rounded end of the pin is against the fabric of the vestibule. Vestibule door fabric may tear if the hitch clip pins are oriented towards the outside.

17. Carefully bring one completed vestibule frame **(Figure 40, Item 103)** underneath vestibule **(Figure 40, Item 101)**.
18. Place completed vestibule frame spindles **(Figure 40, Item 107)** through three grommets **(Figure 40, Item 105)** at end of vestibule.
19. Install vestibule door **(Figure 40, Item 109)** and secure ridge hitch clip pins **(Figure 40, Item 38)**.

TEMPER ASSEMBLY-CONTINUED

20. Becket lace from ridge to eave, seal weather flap **(Figure 40, Item 108)** install remaining hitch clips pins **(Figure 40, Item 38)** and complete becket lacing.

21. Extend frames **(Figure 40, Item 103)** and fabric **(Figure 40, Item 102)**.

22. Install two guy lines **(Figure 40, Item 52)** under hitch clip pins **(Figure 40, Item 38)** on eave spindles **(Figure 40, Item 33)** of last vestibule frame.

23. Place 24-in. wooden stakes **(Figure 40, Item 95)** about 6 feet out, facing towards vestibule door.

24. Tie guy lines **(Figure 40, Item 52)** to stakes **(Figure 40, Item 95)** and tighten.

25. Secure vestibule fabric **(Figure 40, Item 102)** to vestibule frame **(Figure 40, Item 103)** with tie tapes.

26. Install a 12-in steel pin **(Figure 40, Item 81)** in base plates of end vestibule frame **(Figure 40, Item 103)**.

27. Identify and install single ply floor **(Figure 40, Item 110)** and secure with tie tapes **(Figure 40, Item 64)** to vestibule frame **(Figure 40, Item 102)**.

28. Install insulated floor **(Figure 40, Item 62)** on top of single ply floor **(Figure 40, Item 110)**.

29. Secure with tie tapes **(Figure 40, Item 64)**.

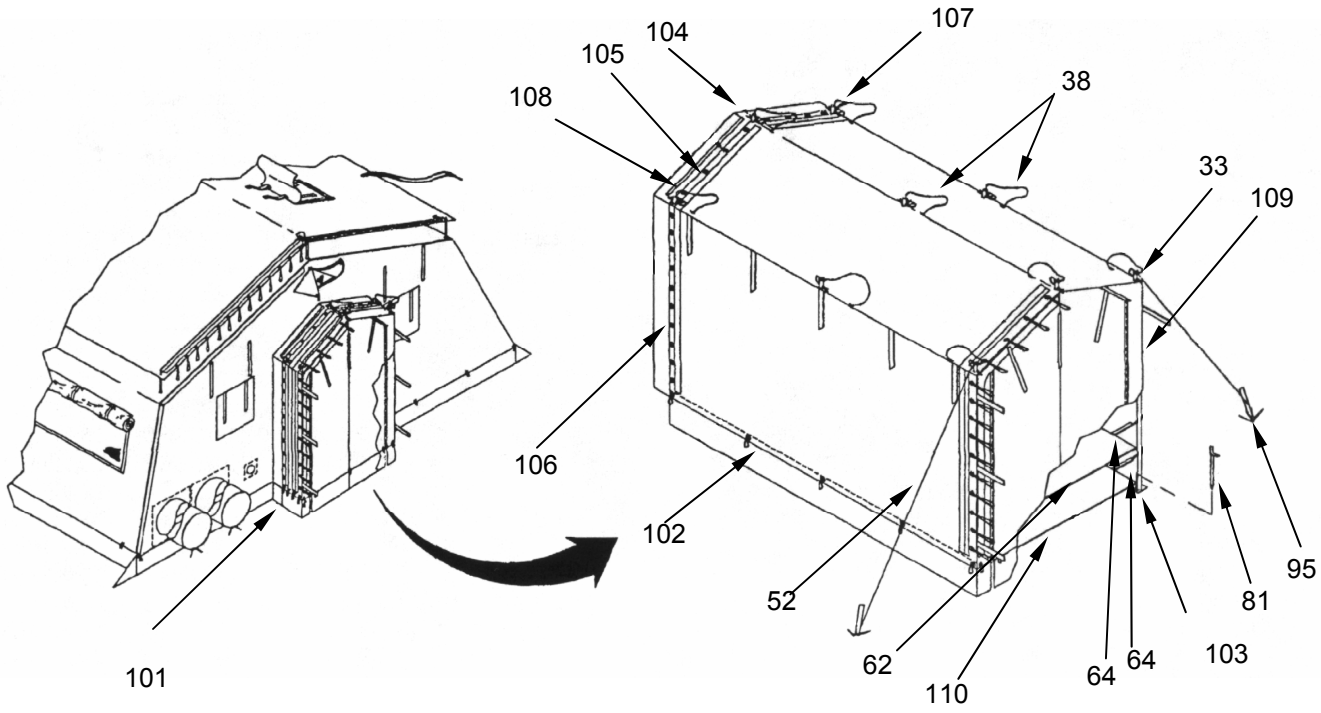


Figure 40. Install the Vestibule.

END OF WORK PACAKGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER USUAL CONDITIONS- ASSEMBLY AND PREPARATION FOR USE

ASSEMBLY AND PREPARATION FOR USE

PREPARE RAMPS FOR USE



WARNING

Protective leather gloves should be worn when handling the folding ramps. When opening (unfolding) or closing (folding) the hinges may pinch, crush, or cut hands and fingers. Failure to comply may result in serious injury to personnel.

1. Remove the two ramp sections **(Figure 1, Item 1)** from their stowage area within the interior of CBL.

2. Place the first ramp section in place at the left side of the entrance to the CBL by unfolding the ramp and inserting the two pins **(Figure 1, Item 2)** on the underside of the ramp into the first two holes **(Figure 1, Item 3)** at the left side of the container entrance.

3. Place the second ramp section in position at the right side of the entrance to the CBL by unfolding the ramp and inserting the two pins **(Figure 1, Item 2)** on the underside of the ramp into the second pair of holes **(Figure 1, Item 4)** located at the right side of the container entrance.

PREPARE RAMPS FOR USE-CONTINUED

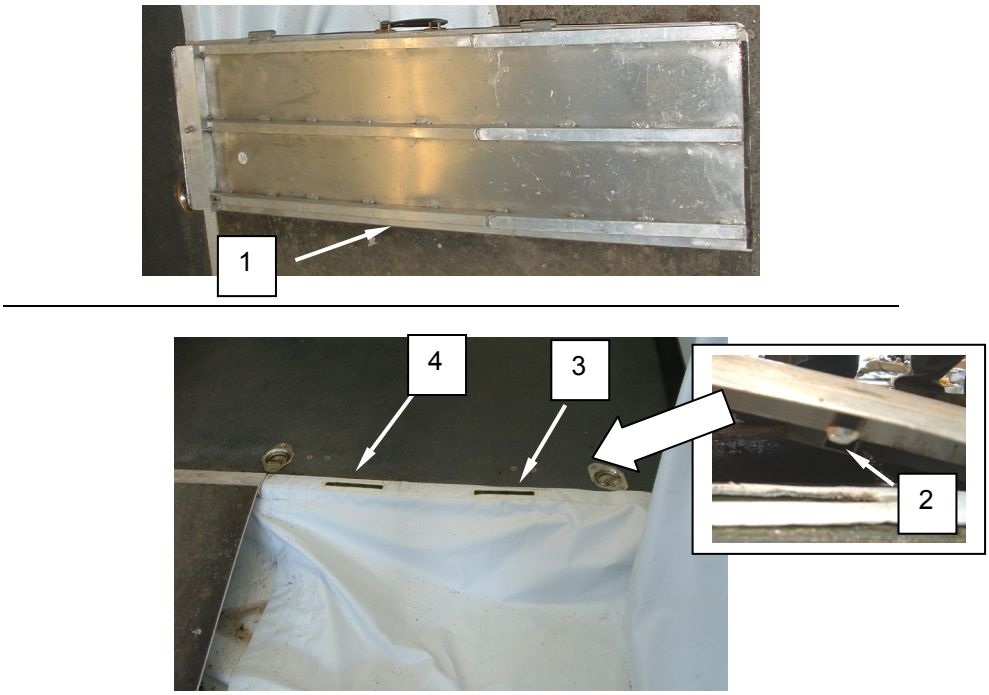


Figure 1. Prepare Ramps for Use.

LAY OUT AND CONNECT WASHING SYSTEM COMPONENTS



WARNING

To prevent damage to laundry system hoses and cables, observe the following: When crossing hoses and cables, graywater is always placed below source water. Source water and graywater lines are always placed below electrical. Failure to observe this rule can result in death or injury by electrocution or transmission of disease by source water contamination.

Components must be positioned where indicated by staking. Layout and connect the laundry graywater system, source water system, and electrical system in the order listed.

PREPARE 3000 GALLON GRAYWATER FABRIC WATER BAG FOR USE

The preferred method of graywater disposal involves utilizing existing sanitary sewer systems connected to wastewater treatment facilities. When the preferred methods are unavailable refer to the disposal methods outlined in FM 21-10, Field Hygiene and Sanitation, and FM 8-10-15, Employment of the Field and General Hospitals, Tactics, Techniques, and Procedures, Appendix C, Field Waste.

The 3,000-gallon fabric water bag designated for graywater should be set up level to, or down slope from, the washer end of the CBL. The water bag should be setup in accordance with TM 10-5430-237-12&P. The water bag should be positioned no farther than 15 feet from the service panel at the washer end of the CBL.

PREPARE 3000 GALLON GRAYWATER FABRIC WATER BAG FOR USE-CONTINUED

CAUTION

Whenever a graywater hose must cross the path of an electrical cable, the graywater hose must be positioned beneath electrical cable, and if possible be separated by a section of culvert. Damage to electrical equipment may result from improper positioning of hose and cables.

NOTE

The graywater hose is outfitted with female connections while the source water hose is outfitted with male connections. Be sure to use the proper hose for the graywater and source water applications.

NOTE

CBL users need to obtain approval from local authority that maintains the installation sanitary discharge permit (such as the "Environmental Office"), to ensure that discharges are within limits, and that no special permit restrictions/additional fees would be required for discharge.

NOTE

The water tank shown in Figure 2 is fitted with the bottom section of the insulating jacket. This must be fitted before the tank is placed into operation regardless of ambient temperature.

NOTE

The travel cover for the water tank is used as the liner underneath the water bag.

NOTE

Be sure to center the water bag on the insulated base.

1. Lay out the liner **(Figure 2, Item 5)** and insulated base **(Figure 2, Item 6)** at the intended site of the 3,000-gallon fabric water bag **(Figure 2, Item 7)**.

PREPARE 3000 GALLON GRAYWATER FABRIC WATER BAG FOR USE-CONTINUED

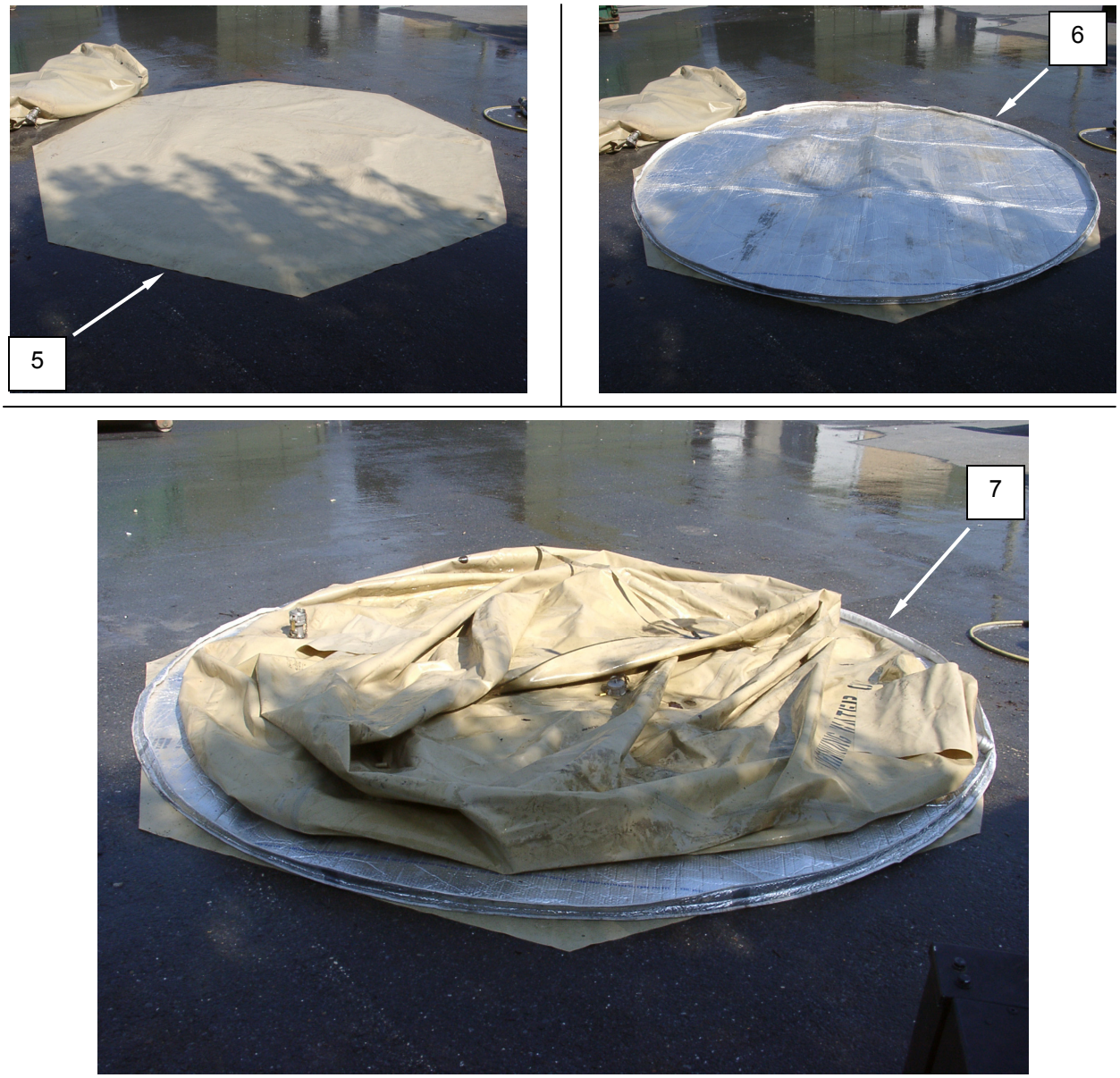


Figure 2. Assemble the Graywater 3000-Gallon Water Tank.

2. Remove the dust plug **(Figure 3, Item 8)** from the inlet connector **(Figure 3, Item 9)**, and connect the graywater shutoff valve **(Figure 3, Item 10)** to the inlet connector of the 3,000 gallon fabric water bag **(Figure 3, Item 7)**.

PREPARE 3000 GALLON GRAYWATER FABRIC WATER BAG FOR USE-CONTINUED

3. Lay out the 2-in. x 20 ft long drain hose **(Figure 3, Item 11)** with the female quick disconnect fittings from the graywater connection on CBL service panel. This is located at the washer end of the CBL to the connector on the graywater shutoff valve **(Figure 3, Item 10)** of the 3,000-gallon fabric water bag **(Figure 3, Item 7)**.

4. Remove the dust plug **(Figure 3, Item 8)** from the graywater connection **(Figure 3, Item 12)** on the service panel, and connect the ends of the hose **(Figure 3, Item 11)** to the graywater connection and the connector on the graywater shutoff valve **(Figure 3, Item 10)**.

5. Open the graywater shutoff valve **(Figure 3, Item 10)**.

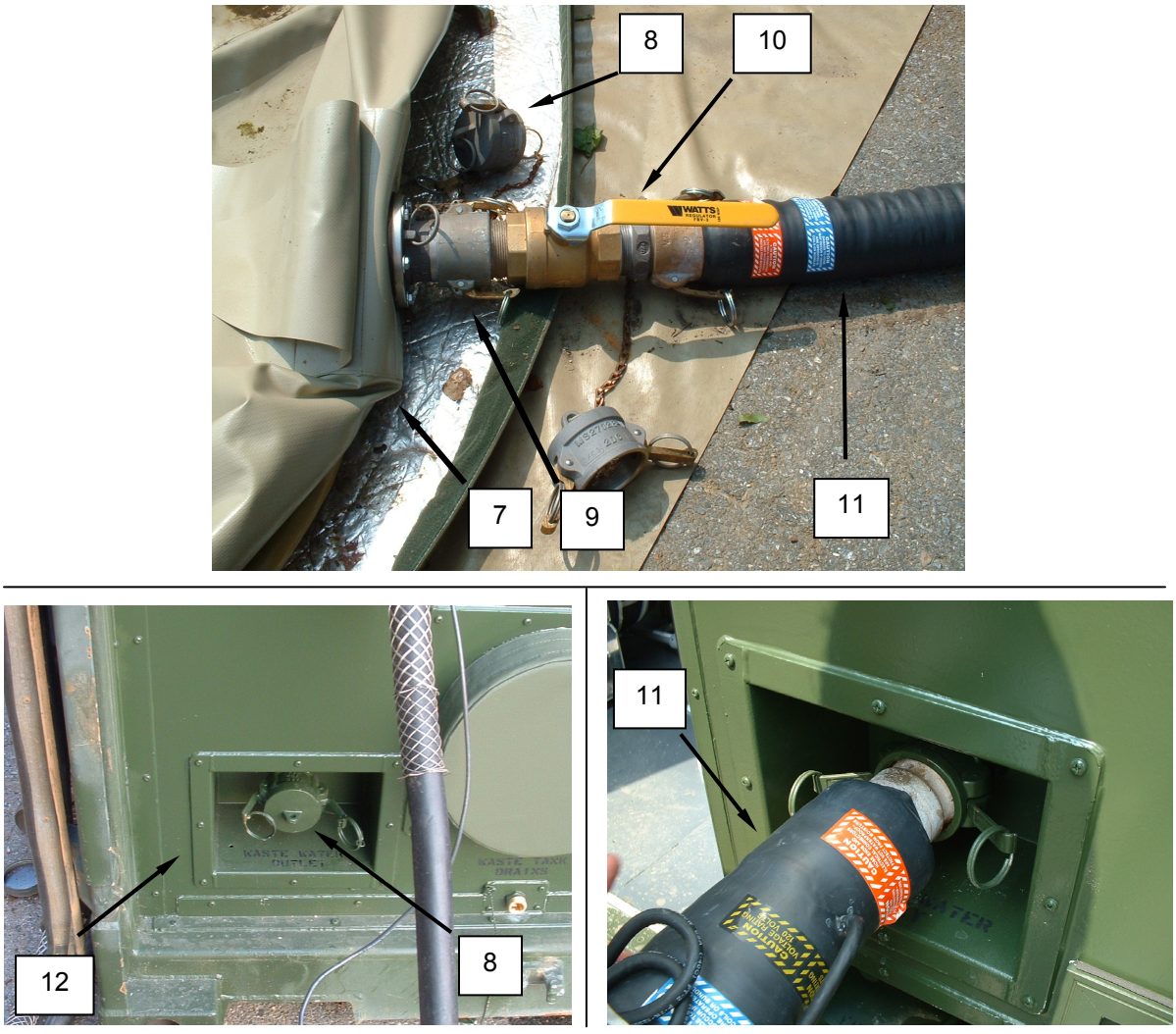


Figure 3. Preparing the Graywater 3000-Gallon Water Tank.

ASSEMBLY OF 3000 GALLON SOURCE WATER FABRIC WATER BAG FOR USE

The 3,000 gallon fabric water bag designated for source water should be set up level to, or upslope from, the washer end of the CBL. The water bag should be setup in accordance with TM 10-5430-237-12&P. The water bag should be positioned no farther than 15 feet from the service panel at the washer end of the CBL.



WARNING

While source water for the CBL may be from an approved supply, the source water should not be considered potable. Failure to observe precautions may result in serious illness or death to personnel.

CAUTION

Whenever a source water hose must cross the path of an electrical cable, the hose must be positioned beneath electrical cable, and if possible be separated by a section of culvert. Damage to electrical equipment may result from improper positioning of hose and cables.

NOTE

The **source water hose** is outfitted with **male** connections while the **graywater hose** is outfitted with **female** connections. Be sure to use the proper hose for the graywater and source water applications.

NOTE

The water tank shown in Figure 4 is fitted with the bottom section of the insulating jacket. This must be fitted before the tank is placed into operation regardless of ambient temperature.

1. Lay out the liner **(Figure 4, Item 13)** and insulated base **(Figure 4, Item 14)** at the intended site of the 3,000 gallon fabric water bag **(Figure 4, Item 3)**.

ASSEMBLY OF 3000 GALLON SOURCE WATER FABRIC WATER BAG FOR USE

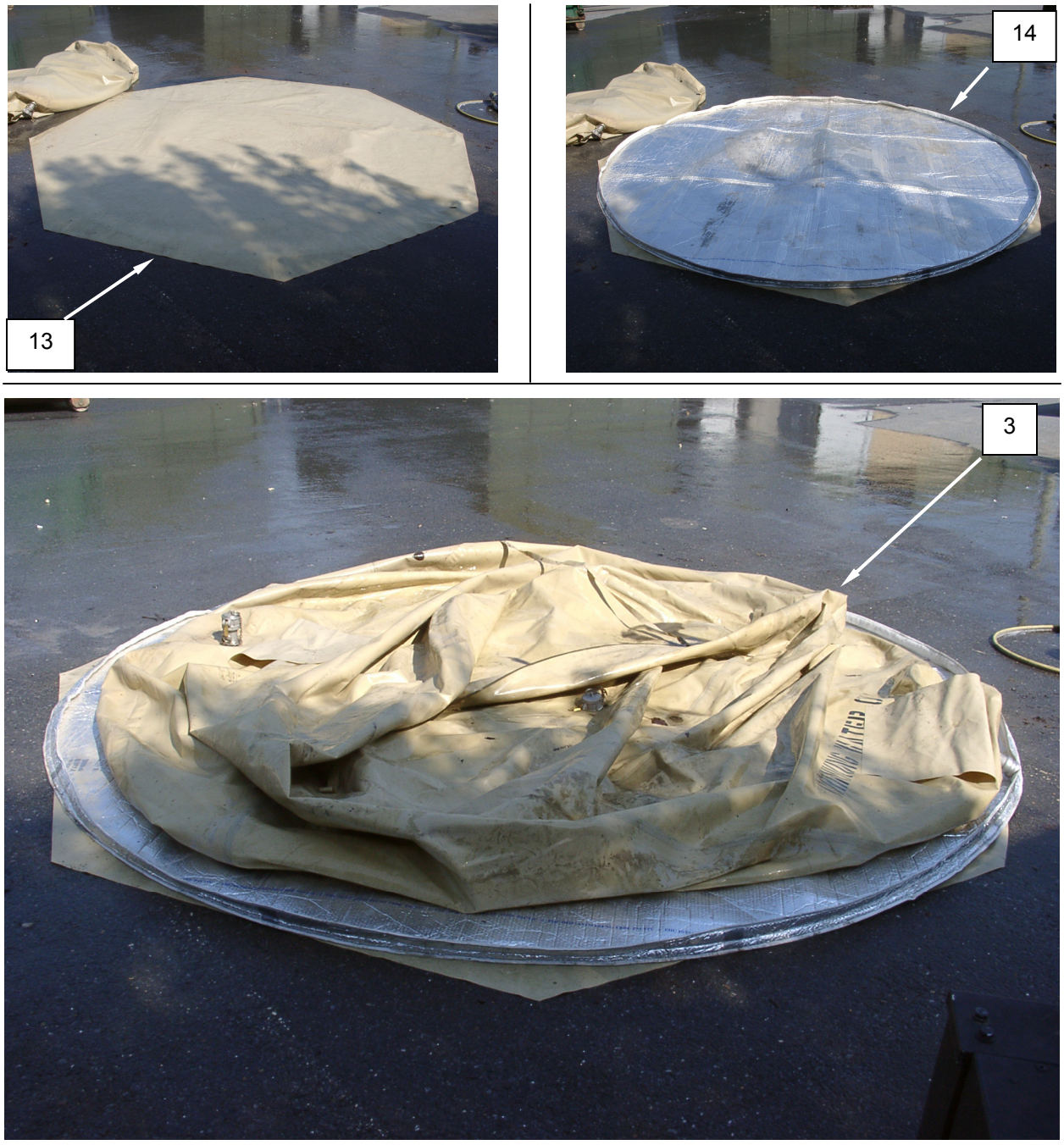


Figure 4. Set Up the Source Water 3000-Gallon Water Tank.

ASSEMBLY OF 3000 GALLON SOURCE WATER FABRIC WATER BAG FOR USE-CONTINUED

2. Remove the dust cap **(Figure 5, Item 15)** and set aside. Install the water shutoff valve **(Figure 5, Item 16)** onto the connector **(Figure 5, Item 17)** of the water bag. Ensure that the valve handle **(Figure 5, Item 18)** is in the OFF position as shown on the valve handle label.

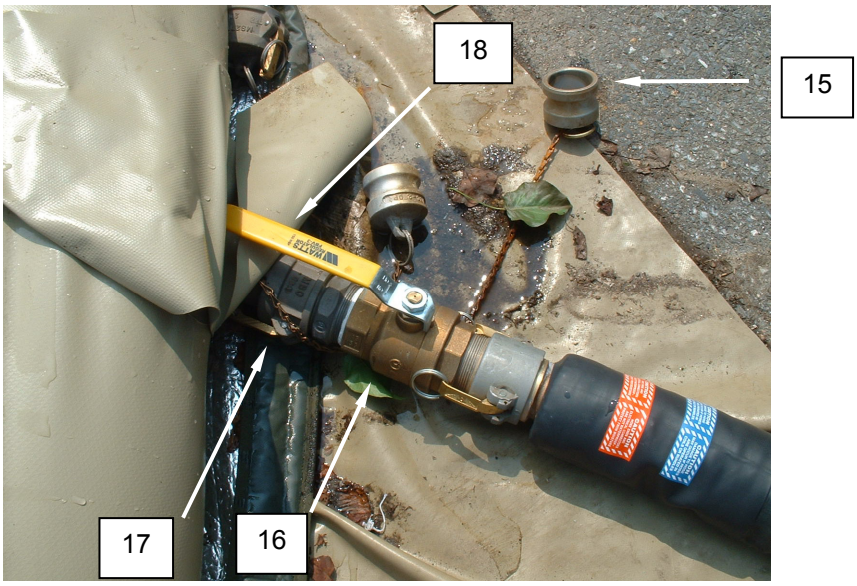


Figure 5. Preparing the Source Water 3000-Gallon Water Tank.

CAUTION

Do not operate the water shutoff valve until the handle has been repositioned to keep the handle from facing the tank. Failure to ensure proper valve installation may result in damage to the tank and a loss of source water.

3. Use the adjustable wrench provided to remove the valve handle **(Figure 5, Item 18)** from the valve **(Figure 5, Item 16)**. Install the valve handle 180 degrees from the original installation.

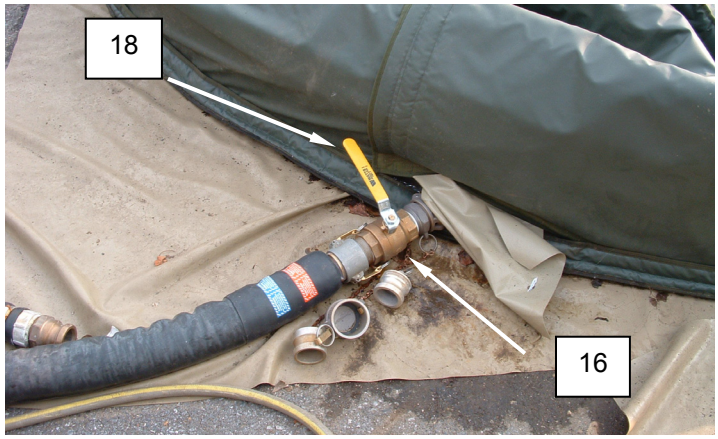


Figure 6. Install the Valve Handle on the 3000-Gallon Water Tank.

ASSEMBLY OF 3000 GALLON SOURCE WATER FABRIC WATER BAG FOR USE-CONTINUED

4. Lay out the 2-in. x 20-ft cold water supply hose **(Figure 7, Item 19)** from the water inlet connection **(Figure 7, Item 20)** on the service panel at the washer end of the CBL to the connector on the water shutoff valve **(Figure 7, Item 16)**.

5. Remove the dust cap **(Figure 7, Item 15)** from the hose and water inlet connection **(Figure 7, Item 20)** on the service panel and connect hose **(Figure 7, Item 19)**. Remove the dust cap from the hose and connect the hose to the connection on the water shutoff valve **(Figure 7, Item 16)**.

6. Fill the water bag **(Figure 7, Item 3)** with water from an approved source.

7. Open the water shutoff valve **(Figure 7, Item 16)**.

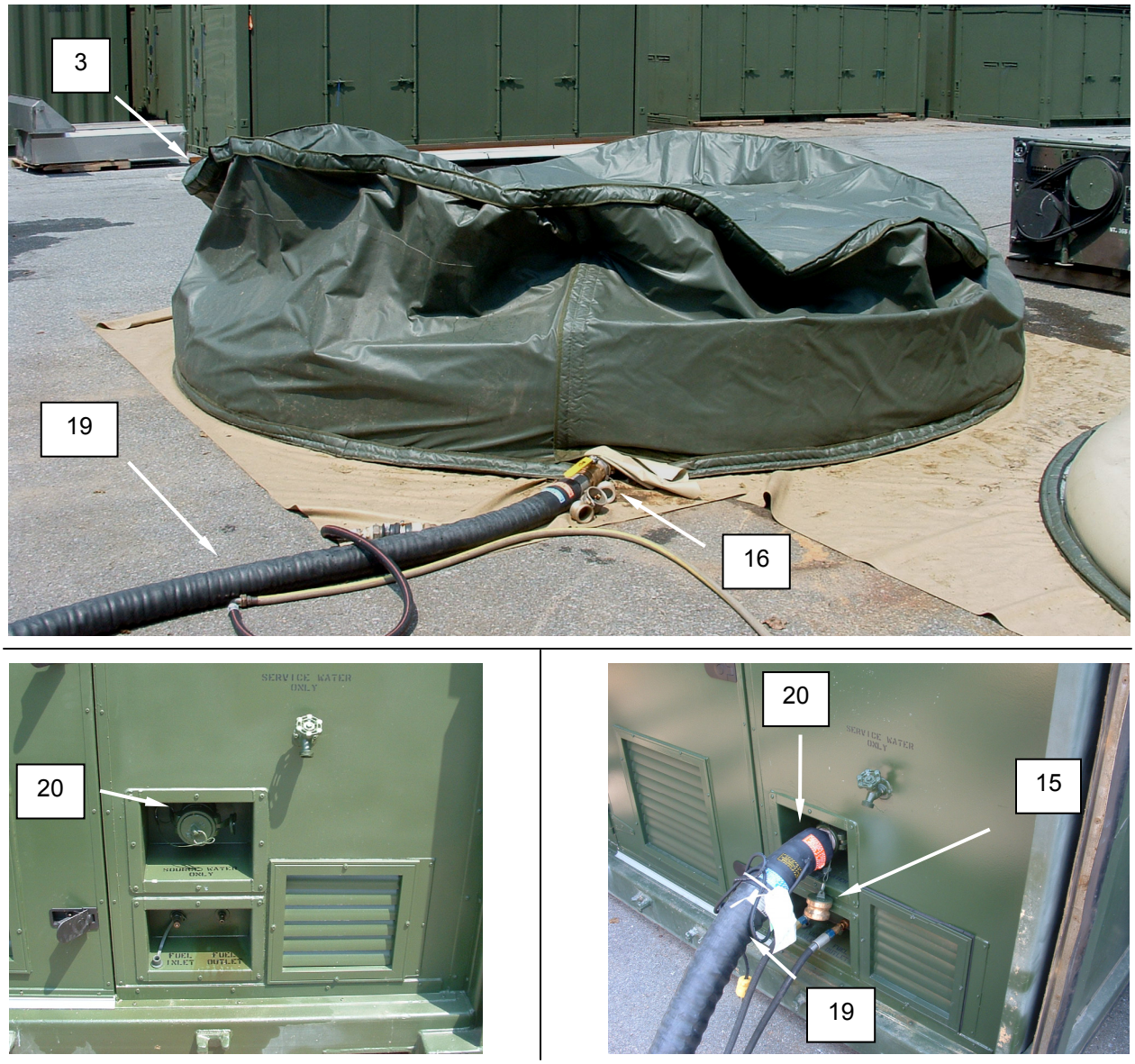


Figure 7. Set Up the Source Water 3000-Gallon Water Tank.

SET UP FUEL SUPPLY



WARNING

Fuels are toxic and flammable. Do not refuel near open flame or other ignition source. Do not refuel within the container, and do not refuel in any space that is not adequately ventilated. Wear all necessary protective clothing, and avoid fuel contact with skin and clothing. Do not breathe in fuel vapors. If fuel contacts skin or eyes, flush immediately with clean water and seek medical attention. Do not allow fuel to spill; fuel can make traffic areas slippery. Failure to observe safety precautions may result in chemical injuries to eyes, skin, and respiratory system; tripping or falling injuries or death; or burn injuries or death.

CAUTION

Under no conditions should fuel be allowed to spill, either within the container for the safety considerations given in the above warning, or outside to prevent contamination to the environment. Fuels spills must be reported and contained or cleaned according to unit SOP.

NOTE

Place the fuel can more than 5 ft from the CBL container.

1. Locate the one 5 gallon fuel can (empty upon transport) **(Figure 8, Item 21)** supplied with the CBL in order to support the operation of the water boiler.



WARNING

Use only approved fuels with the CBL. Use of heavier fuels may diminish performance or cause failure of the boiler, and the use of gasoline may cause an explosion. Failure to observe safety precaution may result in serious injury or death.

2. Fill the fuel can with an approved fuel such as JP-8, DF-1, or DF-2 and install the fuel can adapter **(Figure 8, Item 22)**.

3. Connect the return hose **(Figure 8, Item 23)** from the fuel can adapter **(Figure 8, Item 22)** to the return connection **(Figure 8, Item 24)** on the service panel **(Figure 8, Item 25)** at the washer end of the CBL. Connect the fuel supply hose **(Figure 8, Item 24)** from the fuel can adapter to the fuel supply connection **(Figure 8, Item 26)** on the service panel.

SET UP FUEL SUPPLY-CONTINUED

CAUTION

If 55-gallon drums of fuel are to be used with a pickup tube extension, ensure the pickup tube extension is securely attached to the pickup tube. A loose extension may disconnect from the pickup tube and be lost in the fuel drum.

Bulk supplies of fuel such as 55 gallon fuel drums can also be used if the return tube **(Figure 8, Item 27)** is removed and attached to the pickup tube **(Figure 8, Item 28)**.

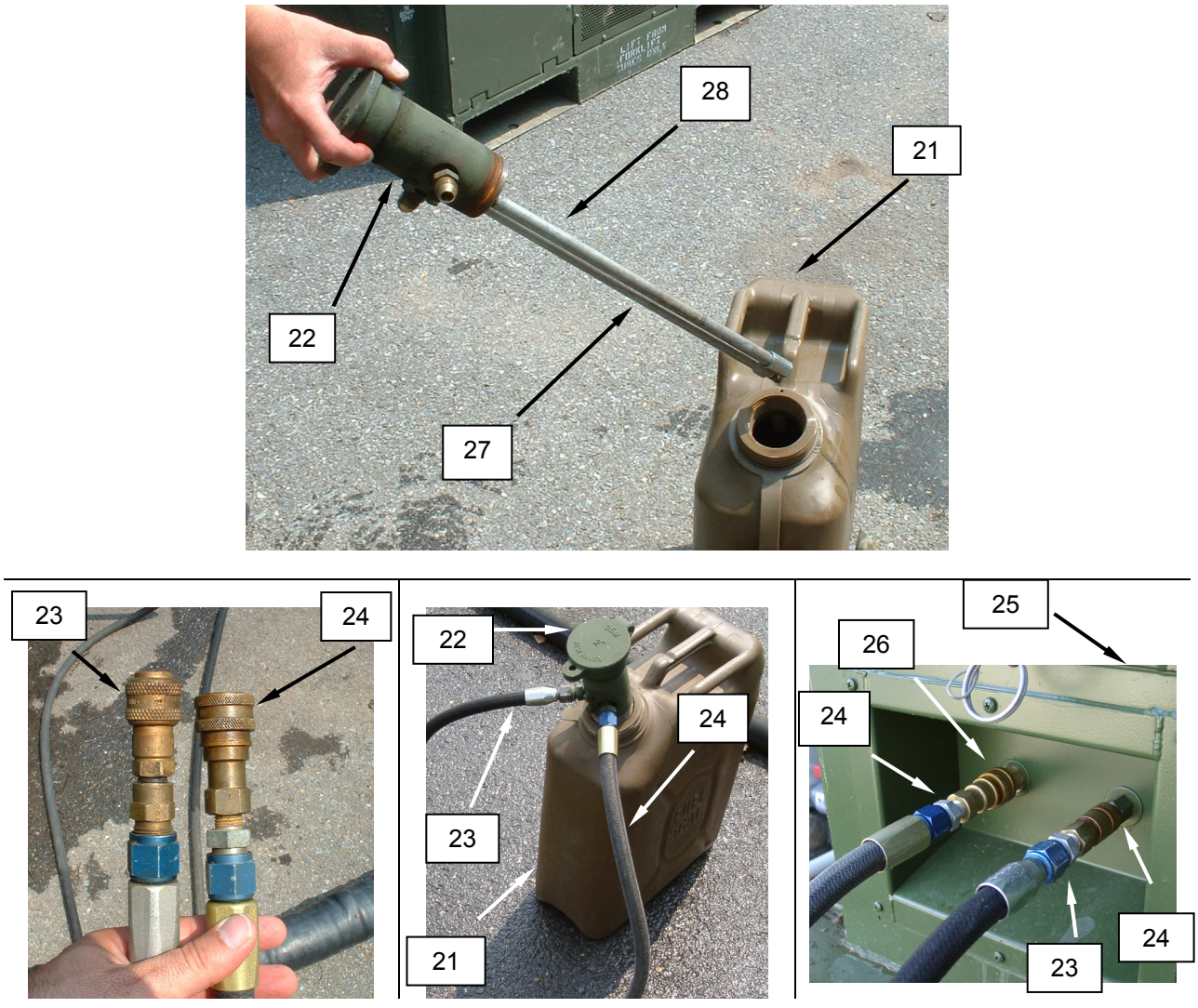


Figure 8. Setting Up the Fuel Supply.

PREPARE POWER DISTRIBUTION SYSTEM FOR USE



WARNING

The generator must be positioned at least 50 ft from the CBL container. Failure to observe safety precaution may result in serious injury or death to personnel from carbon monoxide poisoning.

The power source for the CBL is a 100kW Diesel Generator. A power source with a lower power rating should not be used. Please note that cables should not be connected to the generator at this time.

Installing Ground Rods at Power Input Service Panels

The CBL may be grounded in one of the following locations at the power entry points. One power entry point is at the washer end of the CBL on the service panel or the second power entry point is at the dryer end of the CBL on the service panel. The CBL must have a fixed grounding rod. If chosen location is found to be a hardstand surface an alternate location must be found to meet CBL grounding needs. When the CBL is in full operation and the washers, dryers, and water treatment system are in full operation, the grounding rod is required to be in place.



WARNING

The CBL must be electrically grounded in one location since the system is bonded internally. Failure to ground the CBL may result in serious injury or death from electrical malfunction.



WARNING

Leather gloves and eye protection must be worn when inserting grounding rod. Failure to do so could result in serious injury to eyes and hands.

CAUTION

Improper or insufficient grounding of the CBL may result in equipment malfunction or equipment damage.

CAUTION

Ensure that the main breaker on the main breaker panel is set to OFF and both breakers in the dryer breaker panel are also set to OFF to prevent any shorting of equipment when power is initially established.

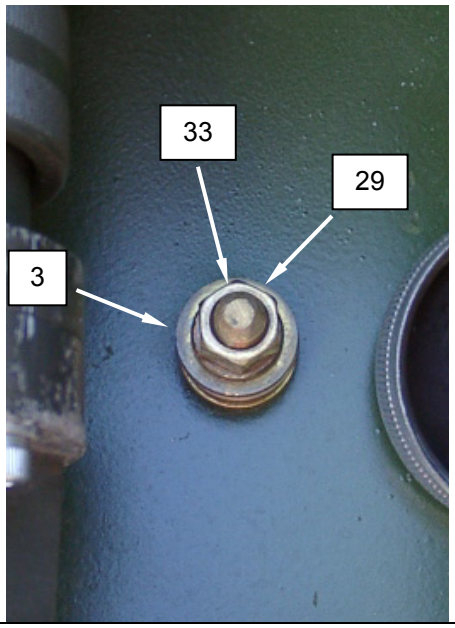
1. Remove nut **(Figure 9, Item 29)**, lockwasher **(Figure 9, Item 30)**, and flat washer **(Figure 9, Item 31)** from stud **(Figure 9, Item 32)** on power entry panel.

2. Install one flat washer **(Figure 9, Item 31)** and then connect ground cable terminal **(Figure 9, Item 32)** to stud **(Figure 9, Item 33)**.

PREPARE POWER DISTRIBUTION SYSTEM FOR USE-CONTINUED

3. Install flat washer **(Figure 9, Item 4)**, lockwasher **(Figure 9, Item 3)** and nut **(Figure 9, Item 2)**. Tighten nut securely.





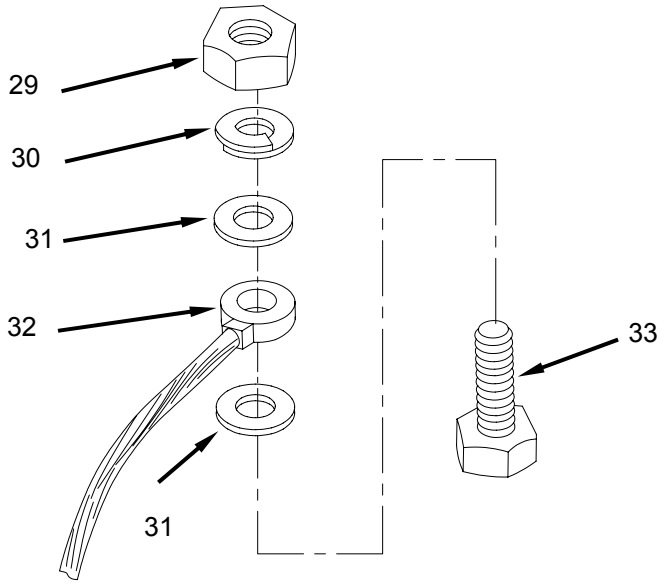


Figure 9. Ground the CBL.

PREPARE POWER DISTRIBUTION SYSTEM FOR USE-CONTINUED

Connect 100 A Pigtail Cables to Generator



WARNING

Connections to generator must only be made by MOS 51R, 52E, 63J, or qualified civilian electricians. Failure to connect pigtails properly may result in serious injury or death to personnel from electrical malfunction.

Before connecting the 100 A cables from the generator to the CBL, three 100 A pigtails must be installed on the generator. If connecting to municipal power pigtails are necessary. Connection is for CBL only.



Figure 10. Connect 100 A Pigtail Cables to Generator.

PREPARE POWER DISTRIBUTION SYSTEM FOR USE-CONTINUED

Lay Out and Connect Power Cables

1. Switch the main circuit breaker in the main breaker panel to the OFF position. Switch the breakers in the dryer breaker panel to the OFF position.



WARNING

Power source must be shut down and secured before assembling any cables. Failure to do so may result in serious injury or death by electrocution.

NOTE

Coordinate with Facilities Support Section Power-Generation Personnel, Prime Power team, and Utilities team as necessary to facilitate required power hookups.

2. Connect one 50-ft, 100 A cable **(Figure 11, Item 34)** to CBL main power receptacle **(Figure 11, Item 35)** located on power service panel **(Figure 11, Item 36)** at the washer end of the CBL.

3. Connect the TEMPER 50-ft, 60 A power cable **(Figure 11, Item 37)** to the smaller 60 A power outlet **(Figure 11, Item 38)** on the power service panel **(Figure 11, Item 36)**.

4. Connect one 50-ft, 100 A cable **(Figure 11, Item 39)** to each dryer power input receptacle **(Figure 11, Item 40)** on the dryer power service panel **(Figure 11, Item 41)**.

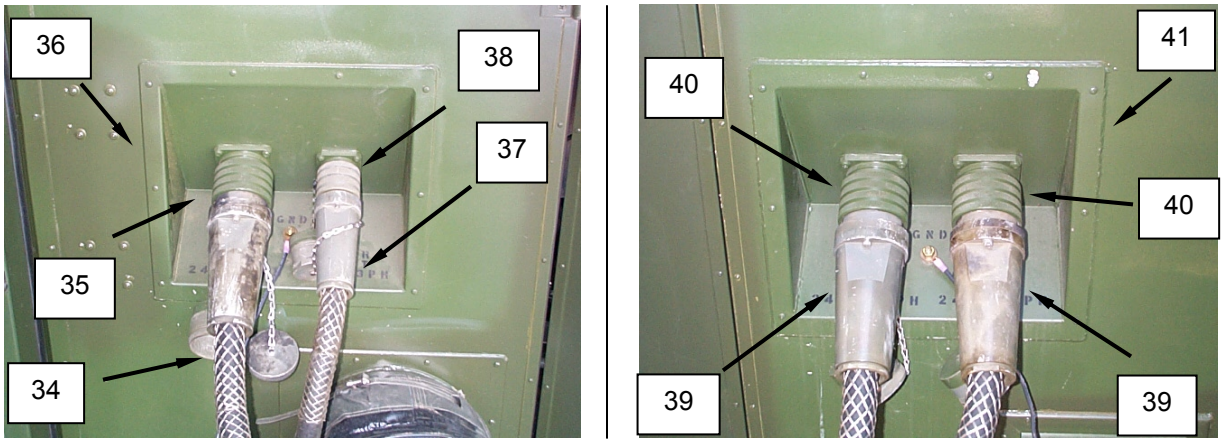


Figure 11. Lay Out and Connect Power Cables.

PREPARE POWER DISTRIBUTION SYSTEM FOR USE-CONTINUED

Check Phase Indicators



WARNING

Remember that the CBL can be a wet environment. Always use caution when operating electrical controls and equipment. Failure to observe safety precautions may result in serious injury or death to personnel.

1. Open the door to the main breaker panel and make certain that the main breaker **(Figure 12, Item 42)** is switched to the OFF position. All other breakers should also remain in the OFF position at this time.

2. Verify that all cables are connected and that power is being supplied to the CBL from the 100 kW generator or approved commercial source.

3. Verify that all power cables to both power inlet service panels and TEMPER distribution box have been connected and are secure.

4. Verify that the grounding rod and cable have been installed at one of the power inlet service panels.

5. Open the Main Breaker Panel and switch the main breaker to the ON position **(Figure 12, Item 42)**.

6. Switch breaker No. 8 (Control Panel) **(Figure 12, Item 2)** to the ON position.

CAUTION

Be certain that all phase indicators are illuminated when power is being supplied to the CBL. If one or more indicators are not illuminated, the incoming power is not in phase. Failure to correct the problem immediately may cause damage to the equipment.

NOTE

Observe the Phase Indicator light **(Figure 12, Item 43)**. The indicator light should be illuminated. If not, switch breaker No. 8 (Control Panel) **(Figure 12, Item 44)** to the OFF position and immediately contact Facilities Support Section Power-Generation Personnel, Prime Power team, or Utilities team as necessary. A condition where the phase indicator is not illuminated indicates that the incoming power is not in proper phase and must be corrected before the CBL can be operated.

7. After verifying that the Phase Indicator light **(Figure 12, Item 43)** is illuminated, place each of the remaining breakers in the ON position. For a complete description of the function of each breaker, refer to WP 0004 00, “Controls and Indicators”.

PREPARE POWER DISTRIBUTION SYSTEM FOR USE-CONTINUED

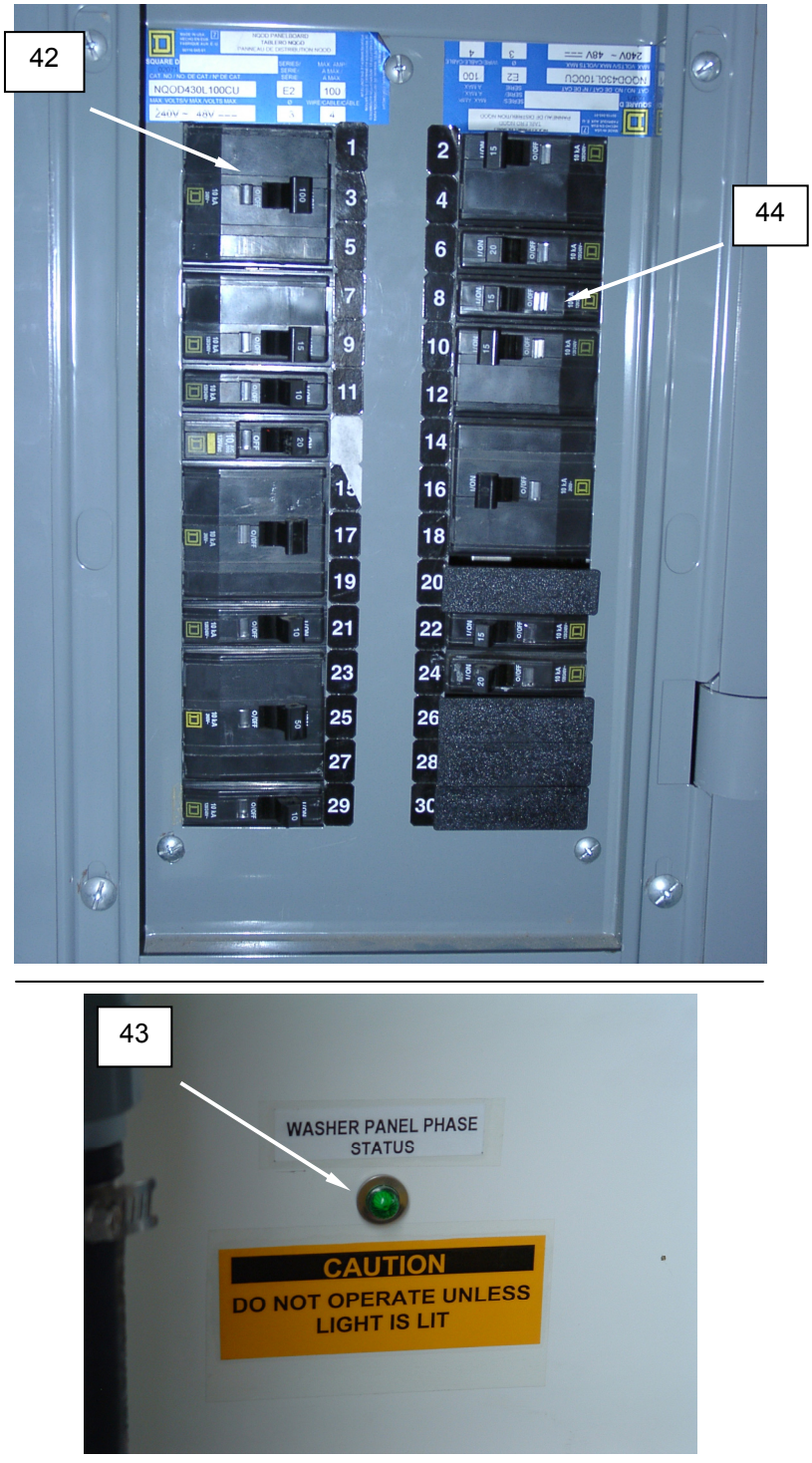


Figure 12. Check Phase Indicators.

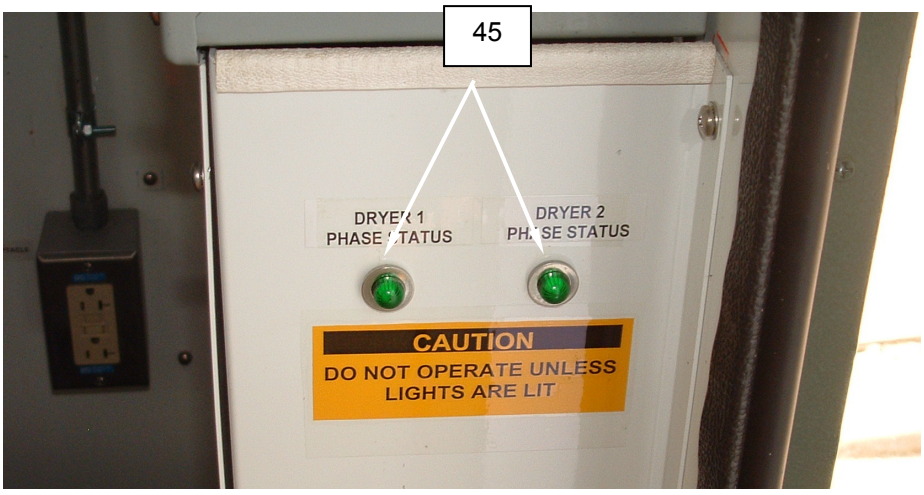
PREPARE POWER DISTRIBUTION SYSTEM FOR USE-CONTINUED

8. Observe the Dryer Phase Indicator lights **(Figure 13, Item 45)**. The indicator lights should be illuminated. If not, immediately contact Facilities Support Section Power-Generation Personnel, Prime Power team, or Utilities team as necessary. A condition where all the phase indicators are not illuminated indicates that the incoming power is not in proper phase and must be corrected before the CBL can be operated.

9. Switch the dryer circuit breakers **(Figure 13, Item 46)** ON. The dryer breaker panel is behind the dryers and can be accessed through the service entry door at the dryer end of the CBL.

CAUTION

Be certain that all phase indicators are illuminated when power is being supplied to the CBL. If one or more indicators are not illuminated, the incoming power is not in phase. Failure to correct the problem immediately may cause damage to the equipment.



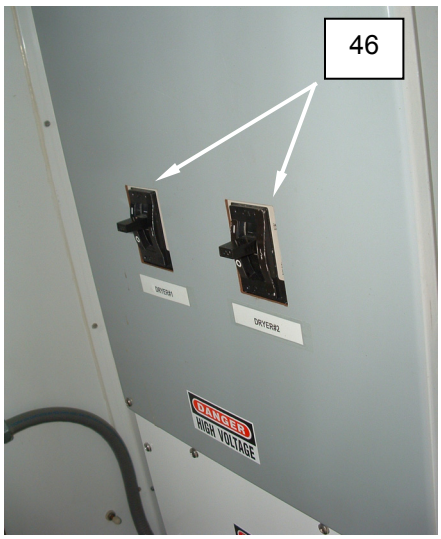


Figure 13. Check Dryer Phase Indicators.

PREPARE CBL FOR USE

1. Switch the CBL interior lighting ON at the PLC **(Figure 14, Item 47)**.

2. Switch the TEMPER lighting (**Figure 14, Item 48)** ON.

3. Remove straps **(Figure 14, Item 49)** from stacked ASH **(Figure 14, Item 50)** and FDECU **(Figure 14, Item 51)**.

4. Remove retention plates **(Figure 14, Item 52)** from attaching brackets **(Figure 14, Item 53)**.

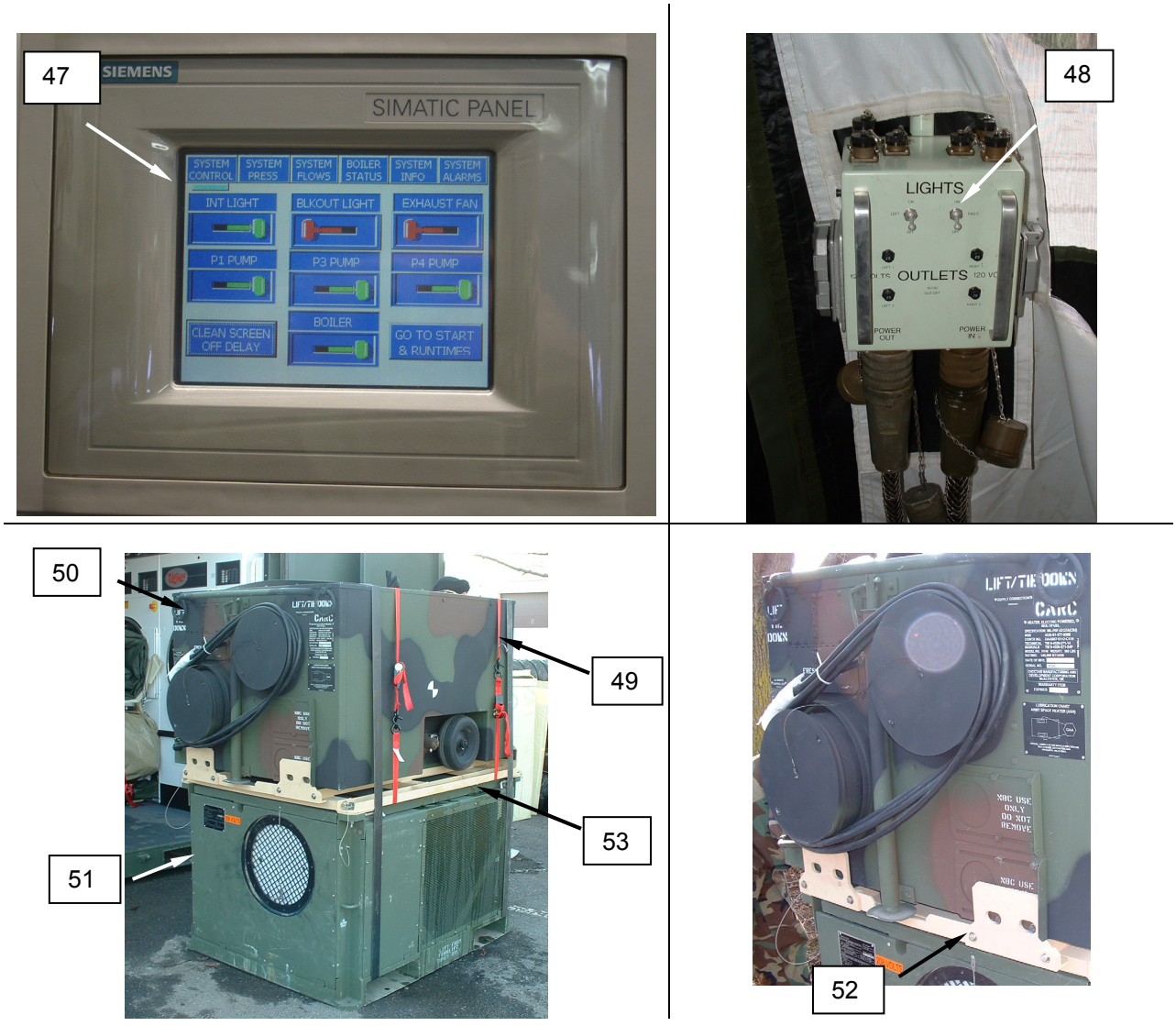


Figure 14. Prepare CBL for Use.

PREPARE CBL FOR USE-CONTINUED

5. Lift ASH **(Figure 15, Item 50)** and place into position on left of CBL container.

6. Remove attaching bracket bolts **(Figure 15, Item 54)** and nuts **(Figure 15, Item 55)**. Install nuts **(Figure 15, Item 55)** back onto bolts **(Figure 15, Item 54)** to ensure hardware is kept together. Remove attaching bracket **(Figure 15, Item 53)** from FDECU **(Figure 15, Item 51)**. Stow attaching bracket **(Figure 15, Item 53)** with attached hardware in area between the CBL container and the TEMPER.

7. Lift and place FDECU **(Figure 15, Item 51)** into position on left of TEMPER.

8. Set up and operate the FDECU **(Figure 15, Item 51)** or ASH **(Figure 15, Item 50)**, as applicable. Refer to TM 9-4520-258-14 for procedures to setup and operate the ASH; refer to TM 10-4120-411-14 for procedures to setup and operate the FDECU.

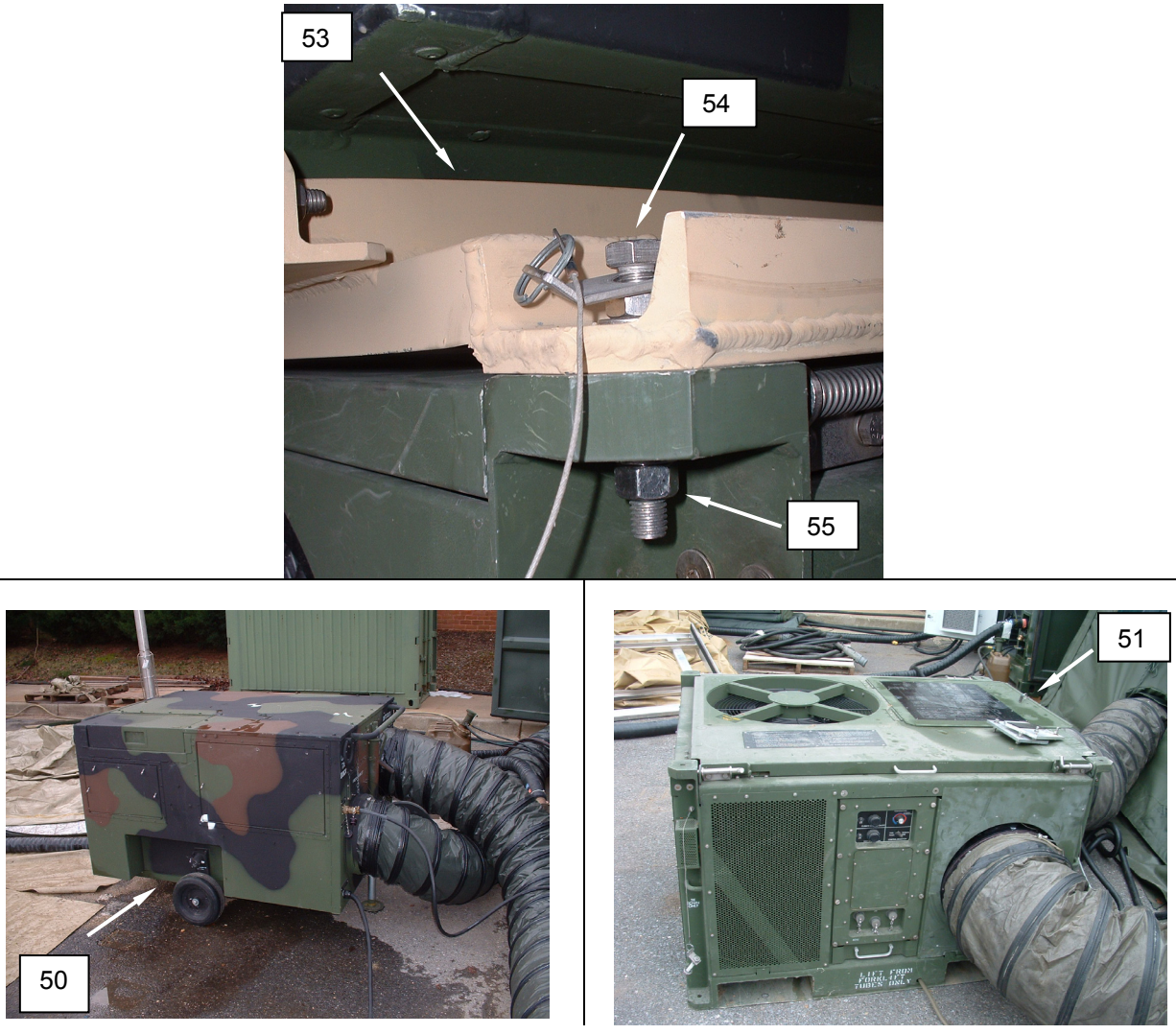


Figure 15. Prepare CBL for Use.

PREPARE DRYER AND DRYING SYSTEM FOR USE

1. Ensure both circuit breakers **(Figure 16, Item 46)** on the dryer breaker panel are in the ON position. The dryer breaker panel is behind the dryers and can be accessed through the service entry door at the dryer end of the CBL.

2. Ensure lint screen is installed properly. (Filter was removed as part of packout.)



Figure 16. Dryer Circuit Breaker Panel.

PREPARE WASHER AND WASHING SYSTEM FOR USE

Remove Washer Shipping Brackets and Snubbers

CAUTION

Do not attempt to operate the CBL without removing the shipping brackets and snubbers. Severe vibration may occur, resulting in equipment damage.

Ensure the shipping brackets **(Figure 17, Item 56)** and snubbers **(Figure 17, Item 57)** have been removed before proceeding with washer operation. Store brackets in the CBL TEMPER, and hang the snubbers beneath the washer.

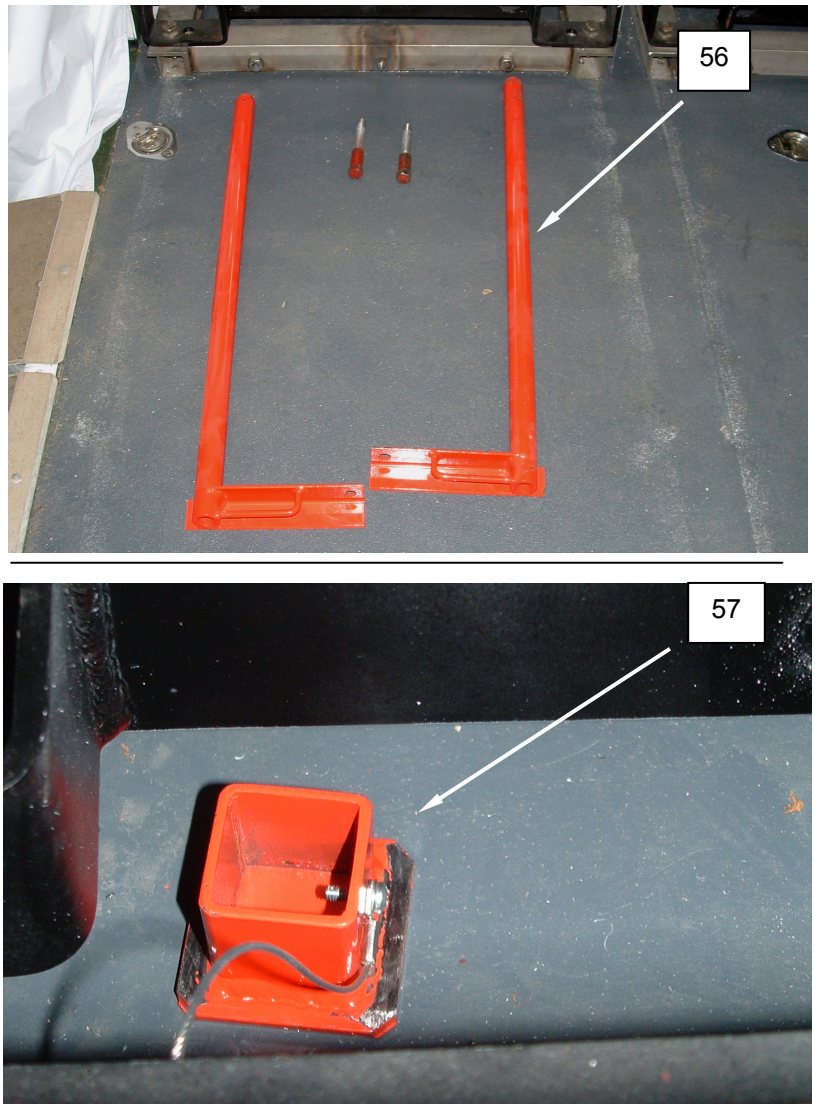


Figure 17. Remove Washer Shipping Brackets and Snubbers.

PREPARE FILTRATION SYSTEM FOR USE

The CBL is shipped without filters installed in the filtration system. Before the CBL is placed in operation the filter elements must be installed.

1. Loosen the captive screws retaining the three protective panels **(Figure 18, Item 58)** and remove the panels. Store the panels in the space alongside dryer No. 2.



Figure 18. Prepare Filtration System for Use.

Install the F-1A and F-1B Filter Elements

1. Disconnect the filter vent hose **(Figure 19, item 59)**.

2. Disconnect the QD fitting **(Figure 19, item 60)** and hose **(Figure 19, item 61)** from the filter cap **(Figure 19, item 62)**.

3. Use a strap wrench **(Figure 19, item 63)** to loosen the QD male fitting **(Figure 19, item 64)** from the filter cap **(Figure 19, item 62)**.

PREPARE FILTRATION SYSTEM FOR USE-CONTINUED

4. Loosen and remove the retaining knobs **(Figure 19, item 65)** securing the filter cap **(Figure 19, item 62)** to the filter housing **(Figure 19, item 66)**, and remove the filter cap **(Figure 19, item 62)**, from the filter housing.

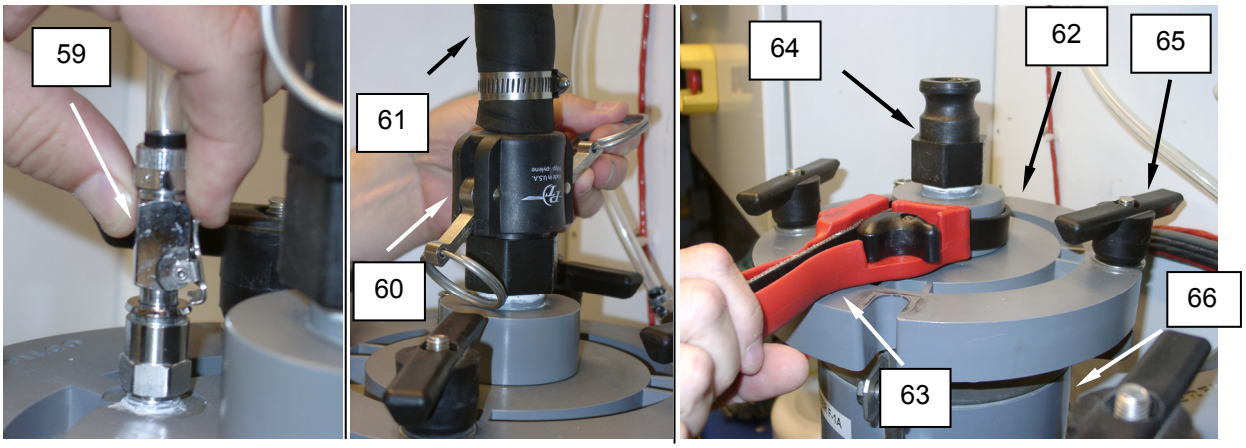


Figure 19. Install the F-1A and F-1B Filter Elements (Socks).

5. Loosen the QD male fitting **(Figure 20, item 64)** enough to install the filter sock **(Figure 20, item 66)** to the filter retainer plate **(Figure 20, item 67)**.

NOTE

If the sock has a tag fitted, this must be removed before proceeding.

NOTE

Ensure O-ring is properly seated to prevent the O-ring from rolling and loss of water.

6. Fit the filter sock **(Figure 20, item 66)** to the filter retainer plate **(Figure 20, item 67)** so the grooved edge (flange) lays against the filter. Ensure the seam of the bag opening is thoroughly captured by the filter retainer.

7. Tighten the filter retainer plate **(Figure 20, item 67)** hand tight using the QD male fitting **(Figure 20, item 64)**.

8. Ensure O-ring **(Figure 20, item 68)** is seated correctly and lubricate as needed.

9. Wet the filter sock **(Figure 20, item 66)** thoroughly with clean source water.

PREPARE FILTRATION SYSTEM FOR USE-CONTINUED

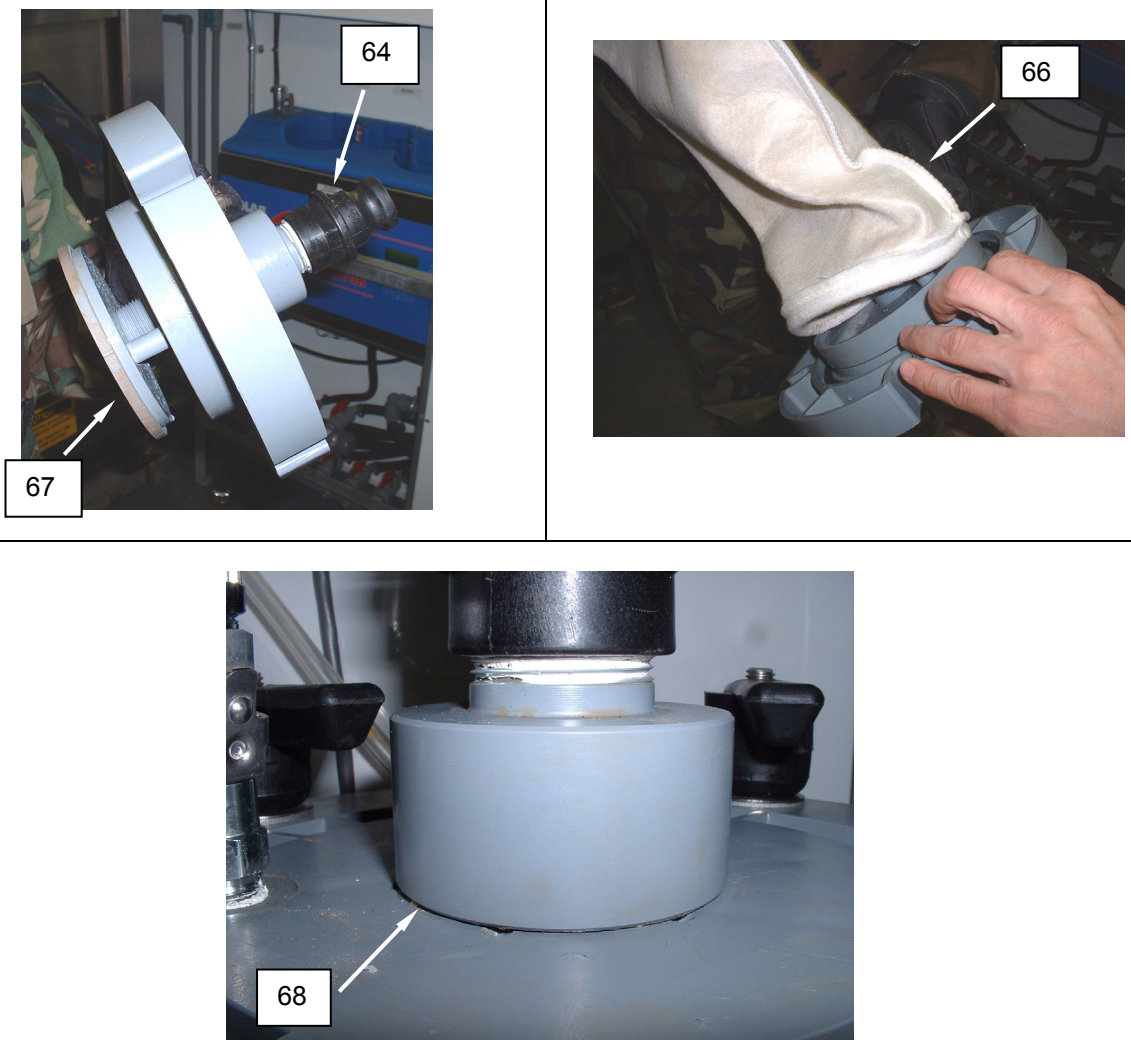


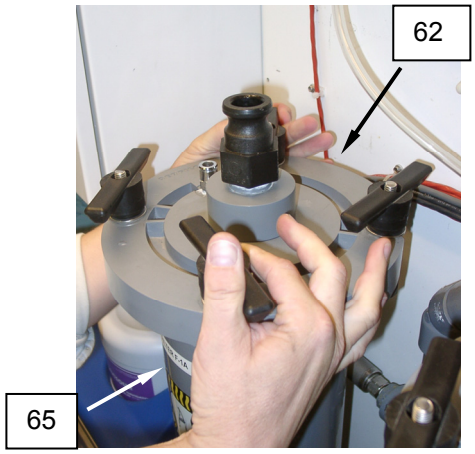
Figure 20. Install the F-1A and F-1B Filter Elements (Socks).

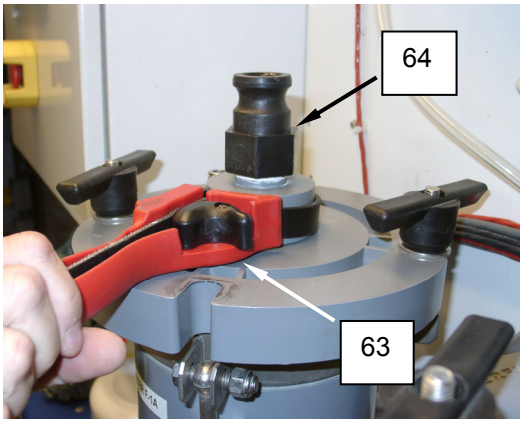
10. Install the filter cap **(Figure 21, item 62)** with filter onto the filter housing **(Figure 21, item 66)**. The filter sock may be folded to aid insertion into the filter canister.

11. Hand tighten the QD male fitting **(Figure 21, item 64)**. Use a strap wrench **(Figure 21, item 63)** to tighten the QD male fitting an additional ¼ turn.

12. Secure the filter cap **(Figure 21, item 62)** in place with the two back (3,2) retaining knobs **(Figure 21, item 65)**. Tighten until resistance is met. Tighten the two front (1,4) retaining knobs until resistance is met (balancing the tightening sequence). Go back and securely tighten the retaining knobs **(Figure 21, item 65)**.

PREPARE FILTRATION SYSTEM FOR USE-CONTINUED





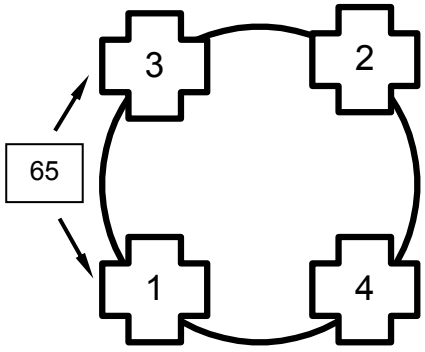


Figure 21. Install the F-1A and F-1B Filter Elements (Socks).

13. Install the QD fitting **(Figure 22, item 60)** with hose **(Figure 22, item 61)** onto the QD male fitting **(Figure 22, item 6)**.

14. Install the filter vent hose **(Figure 22, item 59)**.

PREPARE FILTRATION SYSTEM FOR USE-CONTINUED

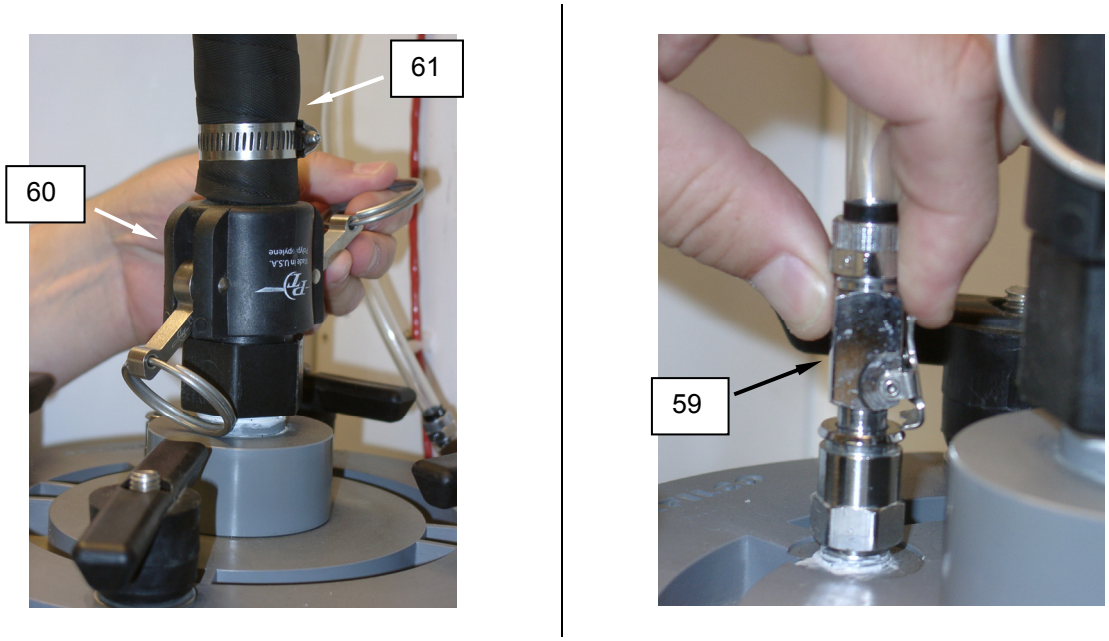


Figure 22. Replace the F-1A and F-1B Filter Elements.

PREPARE FILTRATION SYSTEM FOR USE-CONTINUED

Install the F-2 Filter Cartridge

1. Remove four thumbscrews **(Figure 23, item 69)**, and remove the filter cover **(Figure 23, item 70)**.
2. Install the filter support **(Figure 23, item 71)** into the filter cartridge **(Figure 23, item 72)**.
3. Wet the filter cartridge **(Figure 23, item 72)**, and install the filter cartridge into the filter housing.

CAUTION

Do not drop filter cartridge into filter housing. Dropping cartridge may chip filter support washer **(Figure 23, item 73)**.

4. Carefully guide the filter cartridge and filter support **(Figure 23, item 71)** into the filter housing **(Figure 23, item 74)** allowing filter support to drop down into the filter housing.
5. Inspect o-ring **(Figure 23, item 75)** and lubricate as needed.
6. Install filter cover **(Figure 23, item 70)**, and fasten access cover in place with the two back (3,2) thumbscrews **(Figure 24, item 76)**. Tighten until resistance is met. Tighten the two front (1,4) thumbscrews **(Figure 24, item 76)** until resistance is met (balancing the tightening sequence). Go back and securely tighten the thumbscrews **(Figure 24, item 76)**.

PREPARE FILTRATION SYSTEM FOR USE-CONTINUED

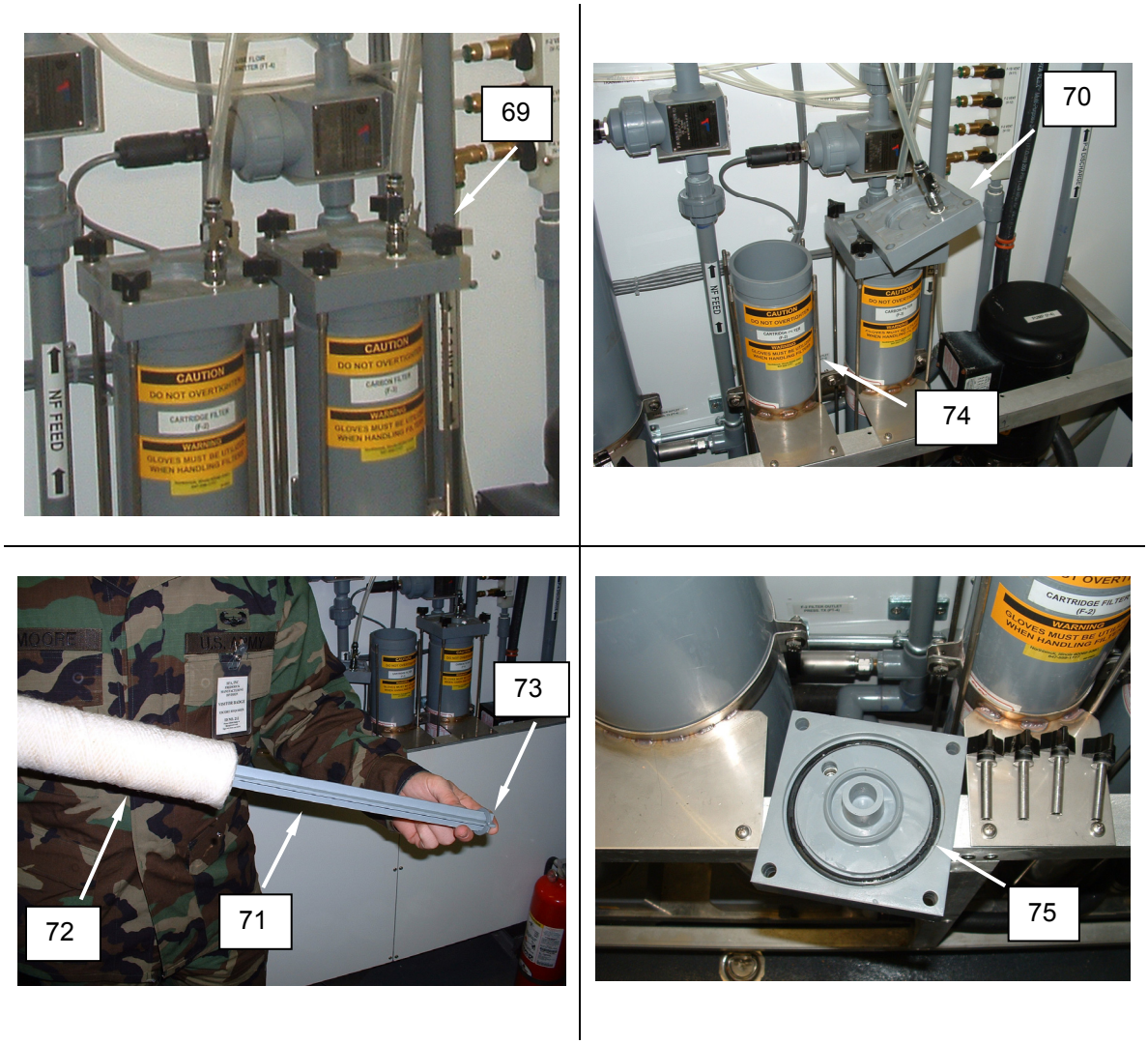


Figure 23. Replace the F-2 Filter Cartridge.

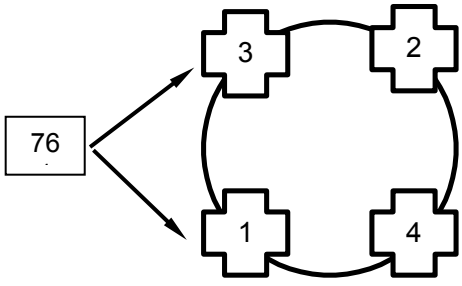


Figure 24. Filter Retaining Knob Tightening Sequence.

PREPARE FILTRATION SYSTEM FOR USE-CONTINUED

Install the F-3 Filter Cartridge

1. Remove four thumbscrews **(Figure 25, item 77)**, and remove the filter cover **(Figure 25, item 78)**.
2. Install the filter support **(Figure 25, item 79)** into the filter cartridge **(Figure 25, item 80)**.
3. Wet the filter cartridge **(Figure 25, item 80)**, and install the filter cartridge into the filter housing.

CAUTION

Do not drop filter cartridge into filter housing. Dropping cartridge may chip filter support washer.

4. Carefully guide the filter cartridge and filter support **(Figure 25, item 79)** into the filter housing **(Figure 25, item 81)** allowing filter support to drop down into the filter housing.
5. Inspect o-ring **(Figure 25, item 82)** and lubricate as needed.
6. Install filter cover **(Figure 25, item 78)**, and fasten access cover in place with the two back (3,2) thumbscrews **(Figure 26, item 83)**. Tighten until resistance is met. Tighten the two front (1,4) thumbscrews **(Figure 26, item 83)** until resistance is met (balancing the tightening sequence). Go back and securely tighten the thumbscrews **(Figure 26, item 83)**.

PREPARE FILTRATION SYSTEM FOR USE-CONTINUED

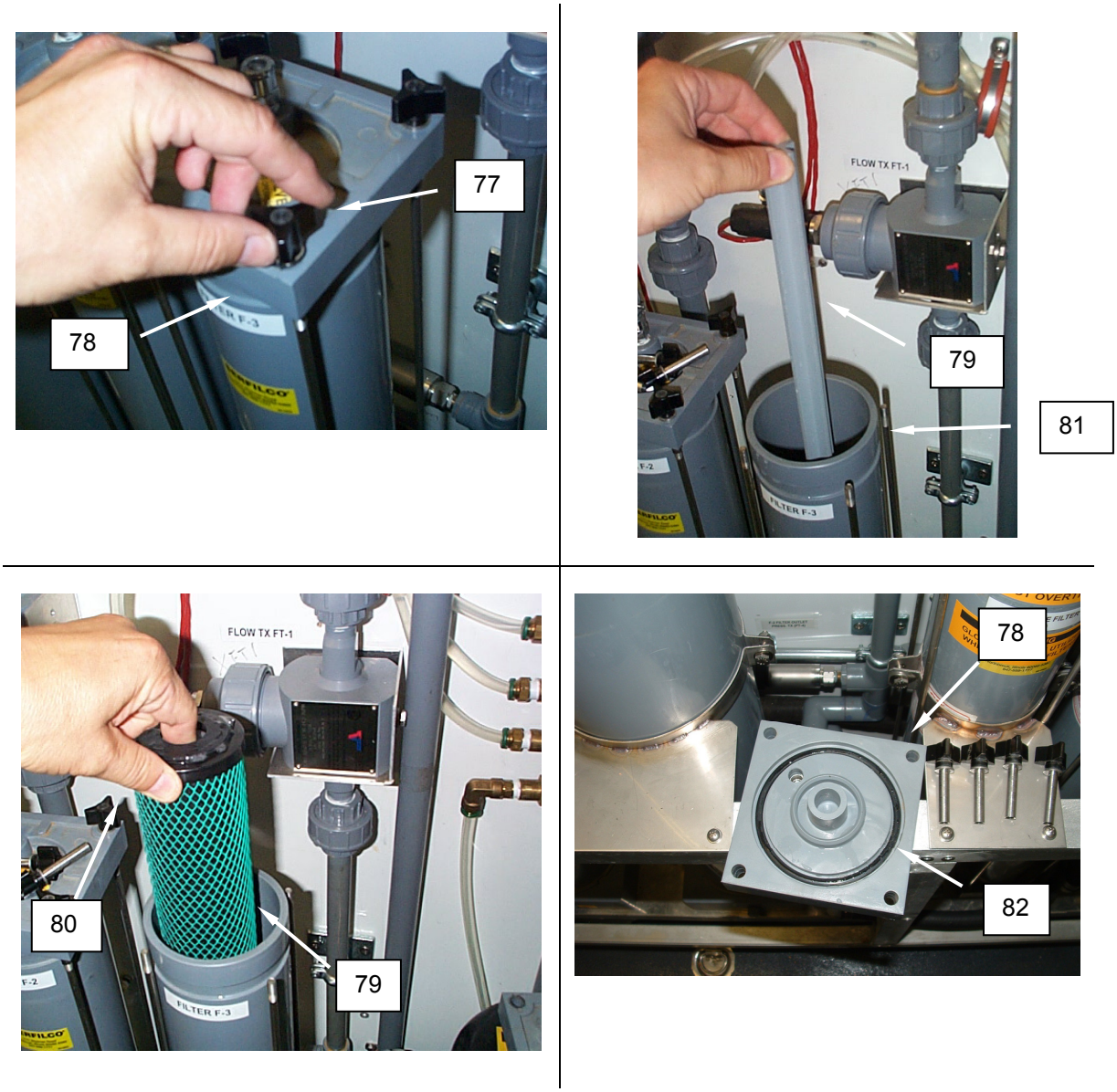


Figure 25. Replace the F-3 Filter Cartridge.

PREPARE FILTRATION SYSTEM FOR USE-CONTINUED

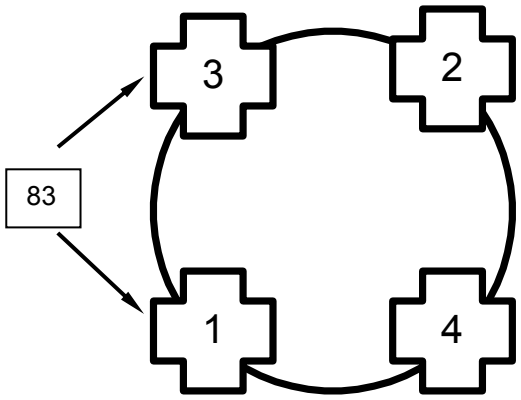


Figure 25. Filter Retaining Knob Tightening Sequence.

NOTE

For first time use, nanofilter will already be in place.

7. Ensure the nanofilters **(Figure 26, Item 84)** have been installed IAW procedures given in TM 10-3510-226-23, “Unit Service Upon Receipt”.

8. If desired, the three protective panels **(Figure 26, Item 58)** may be installed at this time. Secure panels with the captive screws and tighten.

PREPARE FILTRATION SYSTEM FOR USE-CONTINUED

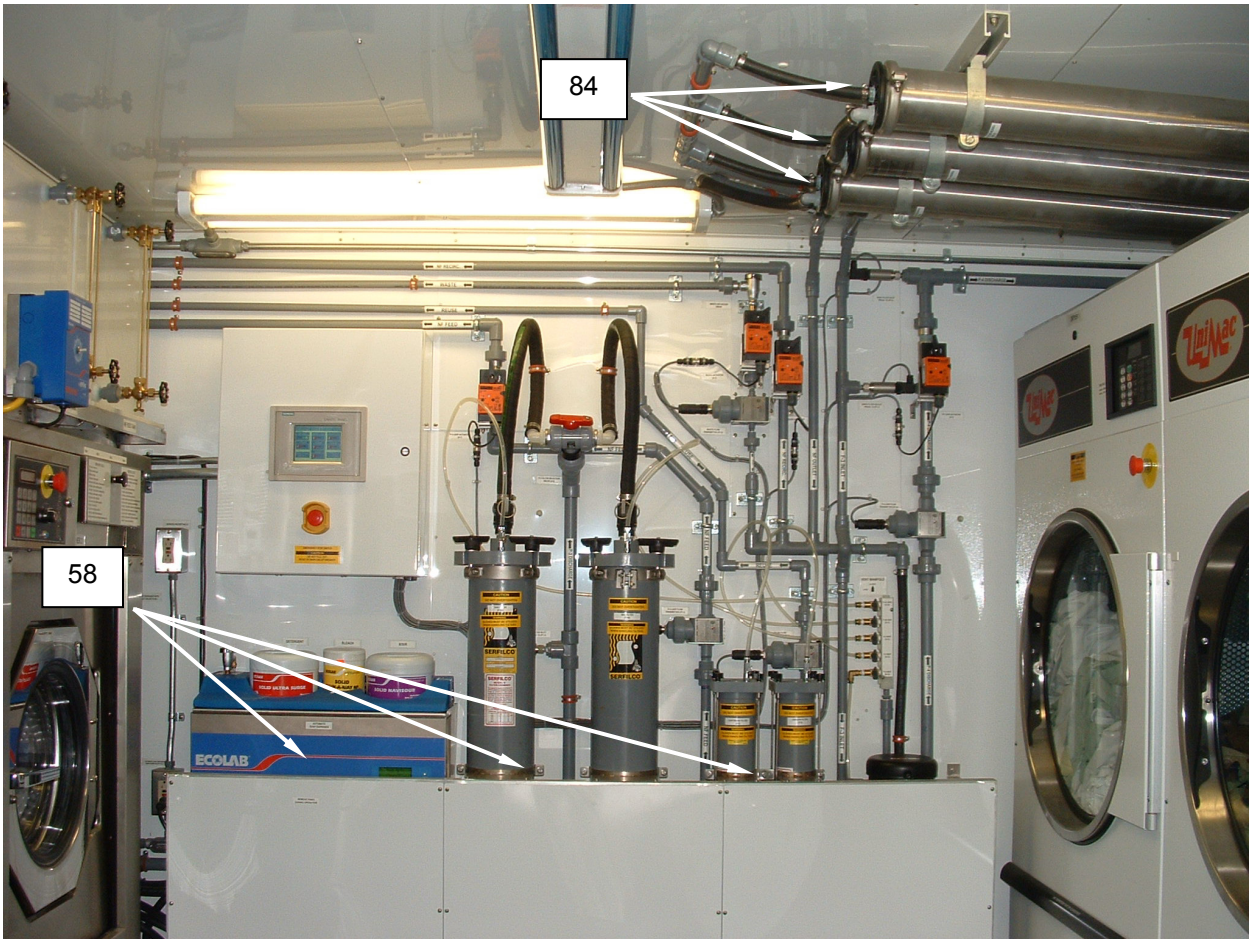


Figure 26. Prepare Filtration System for Use.

PREPARE AUTOMATIC SOAP DISPENSER FOR USE

1. Ensure the correct laundry chemicals are available before proceeding.

2. Remove the lid from the detergent canister **(Figure 27, Item 85)**. Invert the detergent canister **(Figure 27, Item 85)** and quickly place the canister in the recess closest to washer No.1.

3. Remove the lid from the bleach canister **(Figure 27, Item 86)**. Invert the bleach canister **(Figure 27, Item 86)** and quickly insert the canister into the center recess.

4. Remove the lid from the laundry sour canister **(Figure 27, Item 87)**. Invert the laundry sour canister **(Figure 27, Item 87)** and quickly insert the canister into the remaining recess. Retain canister lids.

5. Open the hot water supply valve **(Figure 27, Item 88)** to the Automatic Soap Dispenser.

6. Ensure the toggle switch **(Figure 27, Item 89)** on the Automatic Soap Dispenser is in the ON position. A green signal light **(Figure 27, Item 90)** will indicate the Automatic Soap Dispenser is on and functioning.

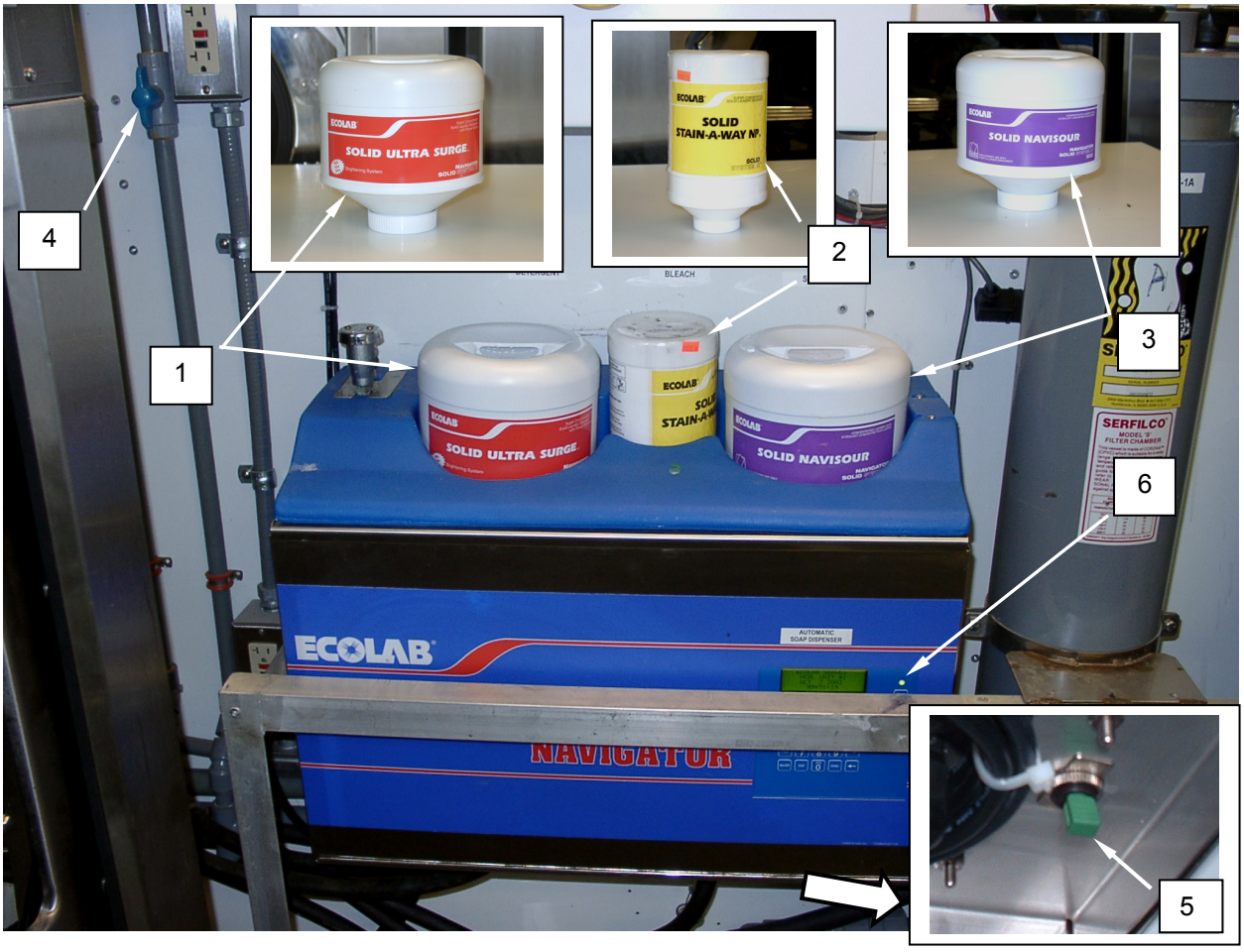


Figure 27. Prepare the Automatic Soap Dispenser for Use.

PREPARE THE EXHAUST RAINHOODS FOR USE

1. Open the exhaust vent rainhoods **(Figure 28, Item 91)** by first releasing the two locking pins **(Figure 28, Item 92)**.

2. Pull the rainhood **(Figure 28, Item 91)** out far enough to let the two side flaps **(Figure 28, Item 93)** unfold.

3. Lower the rainhood **(Figure 28, Item 91)** and secure the side flaps **(Figure 28, Item 93)** in place with the two locking pins **(Figure 28, Item 92)**.

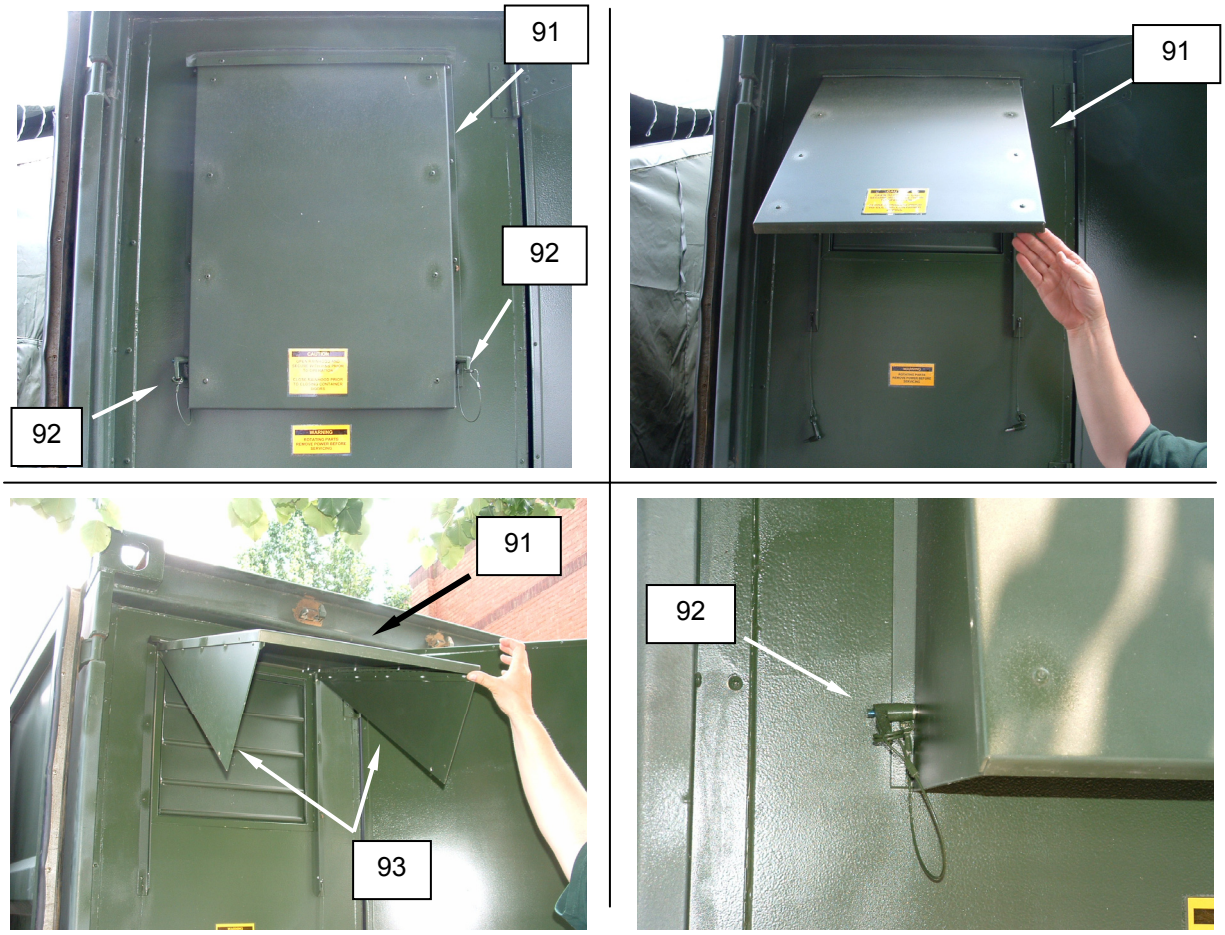


Figure 28. Prepare the Exhaust Rainhoods for Use.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER USUAL CONDITIONS – OPERATING PROCEDURES

OPERATING PROCEDURES

Use the following procedures to operate CBL components. Reference plates have been placed on the washers to provide quick reference for washer operating cycles. Always do BEFORE PMCS before operating CBL component machinery.

NOTE

If this is the first time the CBL is being deployed, the procedures outlined in TM 10-3510-226-23, “Service Upon Receipt” must be carried out prior to system startup.

Emergency Shutdown Switch



WARNING

The Emergency Shutdown Switch will not operate if the PLC is inoperative. Failure to observe safety precautions in this event may result in serious injury or death to personnel as well as severe damage to the CBL and associated equipment.

CAUTION

Do not pull out on the emergency shutdown switch or it may be damaged. The emergency shutdown switch is a momentary switch that will spring back when pressed.

In the event of an emergency where it is necessary to shut down all systems within the CBL, an emergency shutdown switch **(Figure 1, Item 1)** is provided. To activate the emergency shutdown switch, push the switch in. The emergency switch is a momentary switch that will spring out after being pressed in.

NOTE

This switch is for emergency use only and should never be used to affect a normal system shutdown.

Activating the emergency shutdown switch will immediately trip the main circuit breaker in the main power panel and the two main circuit breakers for the dryers. First, correct the problem that created the emergency and then reset the main circuit breakers at the main power panel and the dryer breaker panel.

OPERATING PROCEDURES-CONTINUED



Figure 1. Emergency Shutdown Switch.

SYSTEM START-UP

Operate the Lighting

NOTE

Refer to WP 0009 00, PLC Operation, before attempting to operate the CBL.

Before system start-up, the assembly procedures outlined in WP 0006 00 and WP 0007 00 must be completed. Power must be supplied to the CBL, a source water fabric bag or pressurized water supply must be connected, and a graywater fabric bag must be connected.

1. Switch ON the battery backup switch **(Figure 2, Item 2)** for emergency lighting.

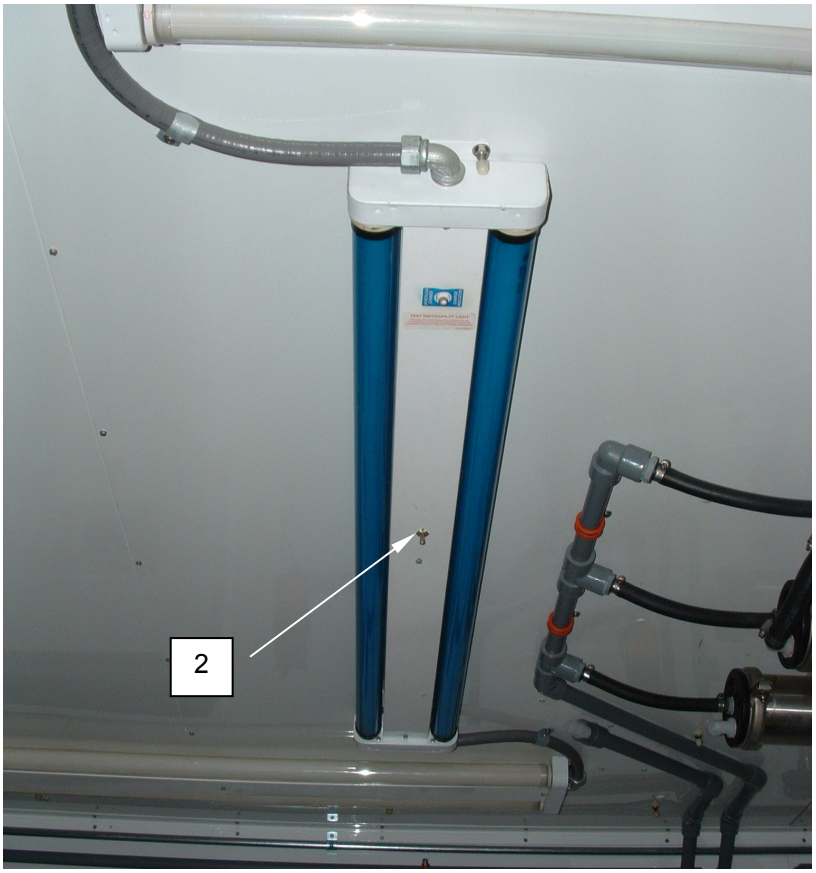


Figure 2. Switch ON the Battery Backup for Emergency Lighting.

SYSTEM START-UP-CONTINUED

2. Use the PLC control screen **(Figure 3, Item 3)** to switch the interior lighting or blackout lighting ON, as required.

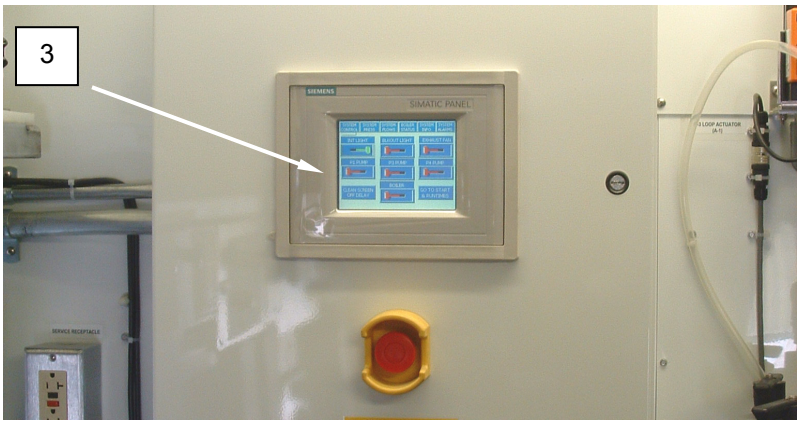


Figure 3. PLC Control Panel.

3. Locate the drain valve manifolds **(Figure 4, Item 4)** inside the container.

4. Ensure the drain valves on both manifolds (V-21 through V-31) **(Figure 4, Item 4)** are all closed.

5. Ensure the Automatic Soap Dispenser overflow valve V-61 **(Figure 4, Item 5)** is open.

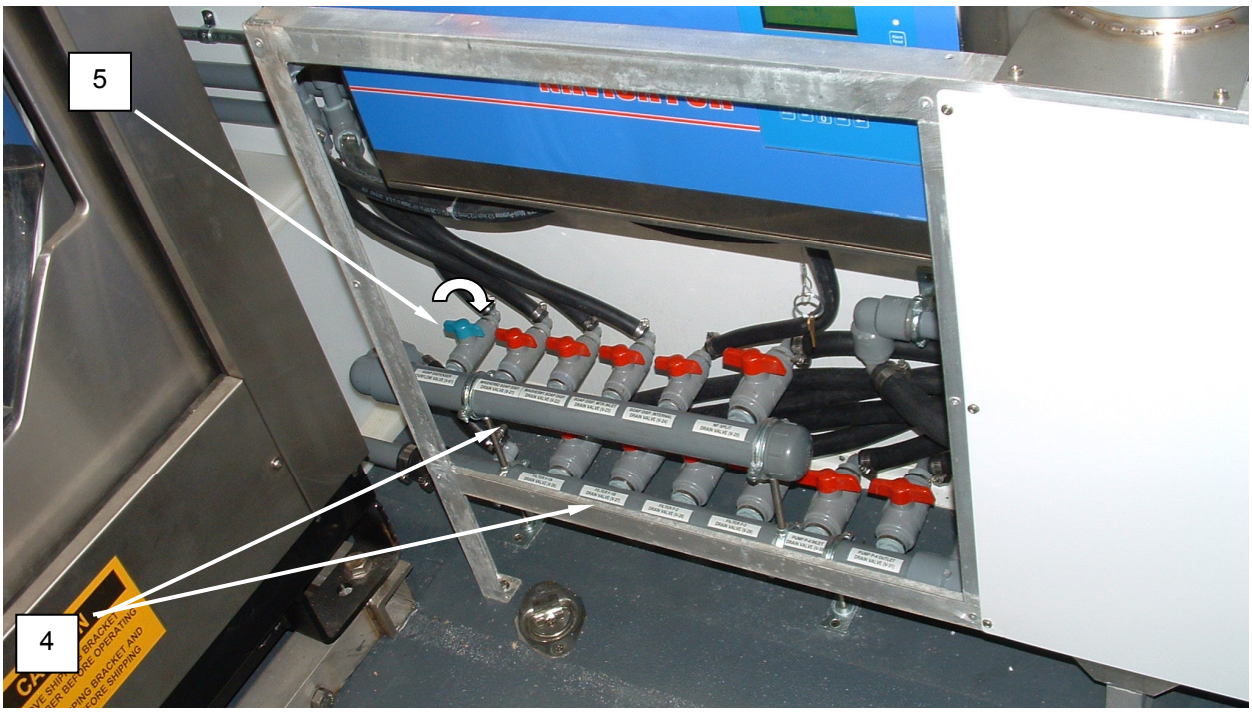


Figure 4. Location of Drain Manifolds.

SYSTEM START-UP-CONTINUED

Valve Setup

CAUTION

Valve V-15 **(Figure 5, Item 6)** is shown throttled to a midway position. It is inadvisable to open V-15 fully, as this may cause the WTS Hold Tank to overflow.

NOTE

Additional valve settings may be found in WP 0018 00, “Operation Under Unusual Conditions – Manual Operation of CBL Systems”.

1. Locate the water reuse selection valves V-15 **(Figure 5, Item 6)** and V-16 **(Figure 5, Item 7)** located behind the washers, and set the valves as shown in Figure 6.

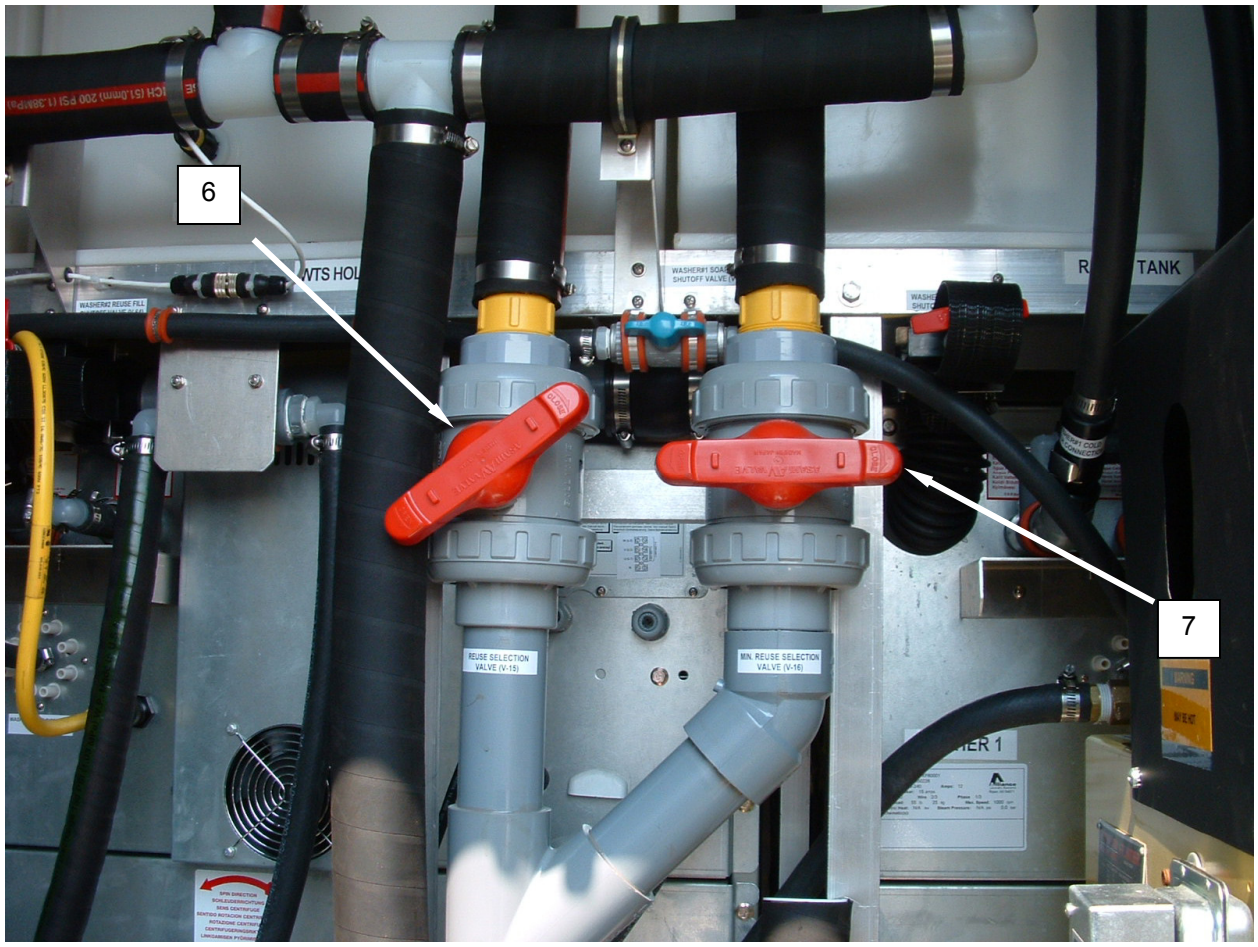


Figure 5. Valves V-15 and V-16.

SYSTEM START-UP-CONTINUED

2. Close the tank drain valves V-32 **(Figure 6, Item 8)**, V-33 **(Figure 6, Item 9)**, and V-34 **(Figure 6, Item 10)**.

3. Close the pump drain valves V-53 **(Figure 6, Item 11)** and V-54 **(Figure 6, Item 12)**.

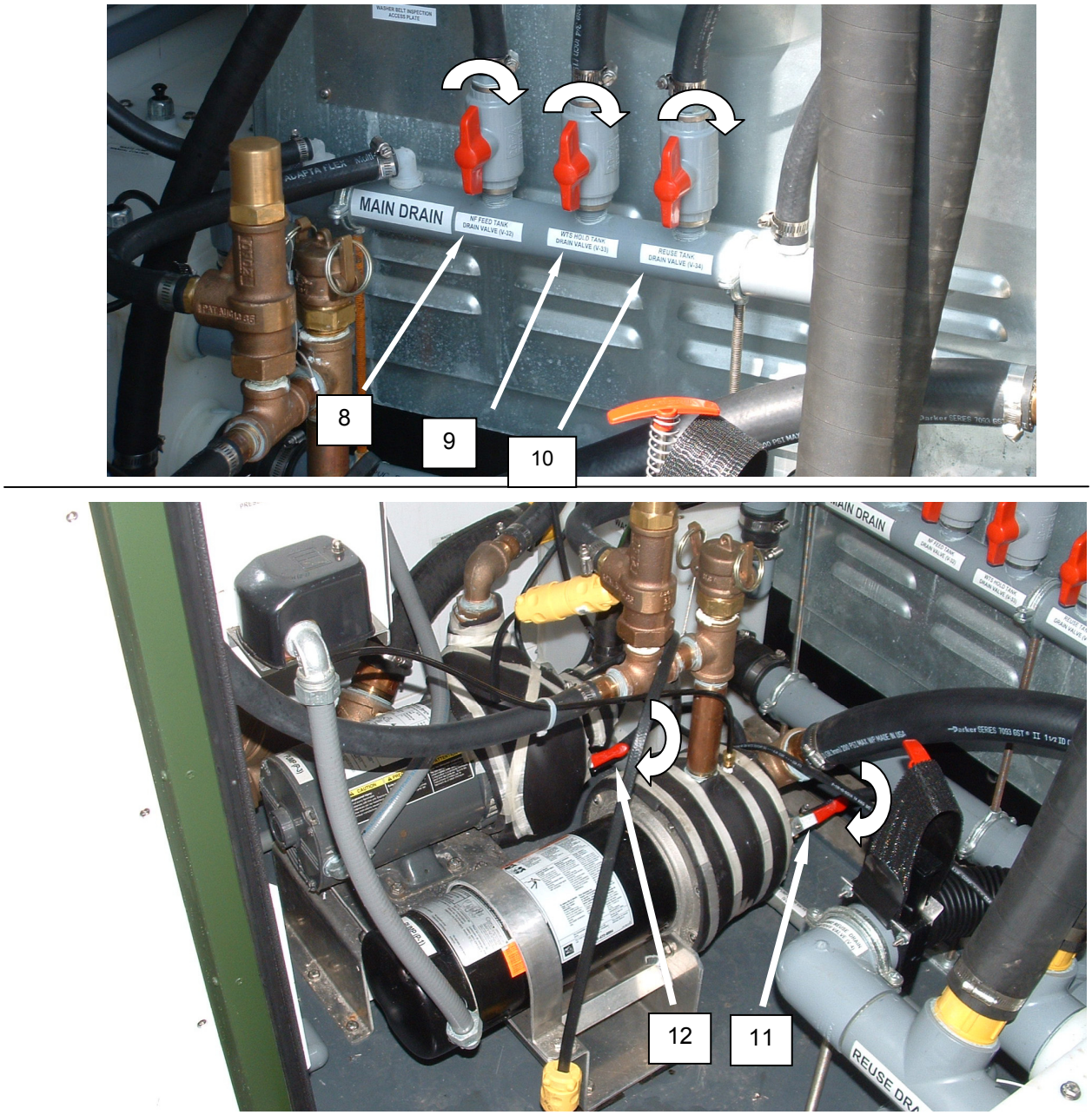


Figure 6. Drain Valves.

SYSTEM START-UP-CONTINUED

4. Close the waste tank drain valve V-36 **(Figure 7, Item 13)**.

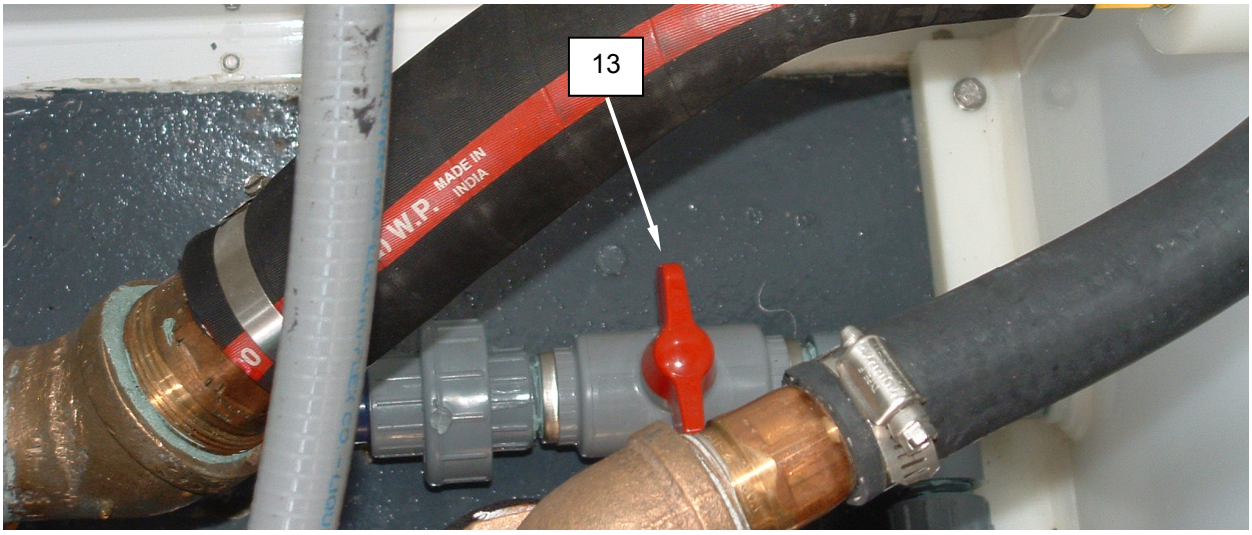


Figure 7. Waste Tank Drain Valve.

5. Close the WTS transfer tank drain valve V-35 **(Figure 8, Item 14)**.

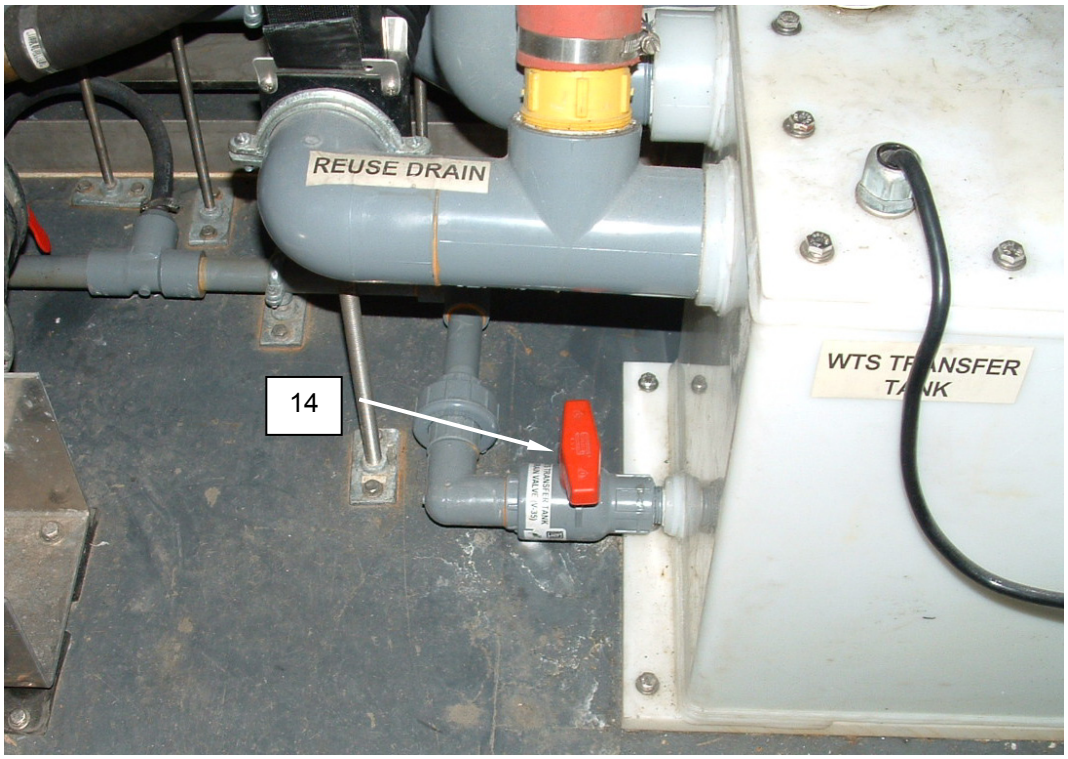


Figure 8. WTS Transfer Tank Drain Valve.

SYSTEM START-UP-CONTINUED

6. Close the boiler water outlet drain valve V-37 **(Figure 9, Item 15)**.



Figure 9. Boiler Water Outlet Drain Valve.

7. Open the boiler water inlet drain valve V-38 **(Figure 10, Item 16)**.

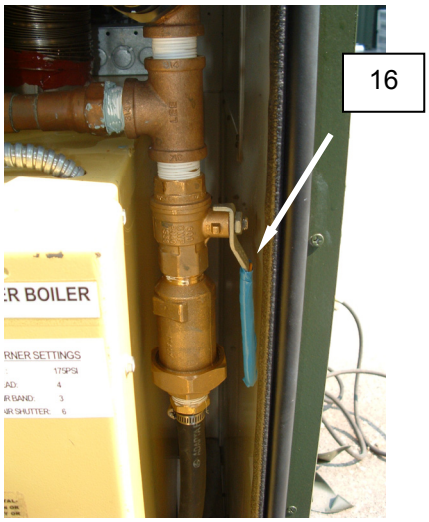


Figure 10. Boiler Water Inlet Drain Valve.

SYSTEM START-UP-CONTINUED

8. Open the hot water shutoff valves V-5 **(Figure 11, Item 17)** and V-7 **(Figure 12, Item 18)**, and cold water shutoff valves V-6 **(Figure 11, Item 19),** and V-8 **(Figure 12, Item 20)** to both washers.

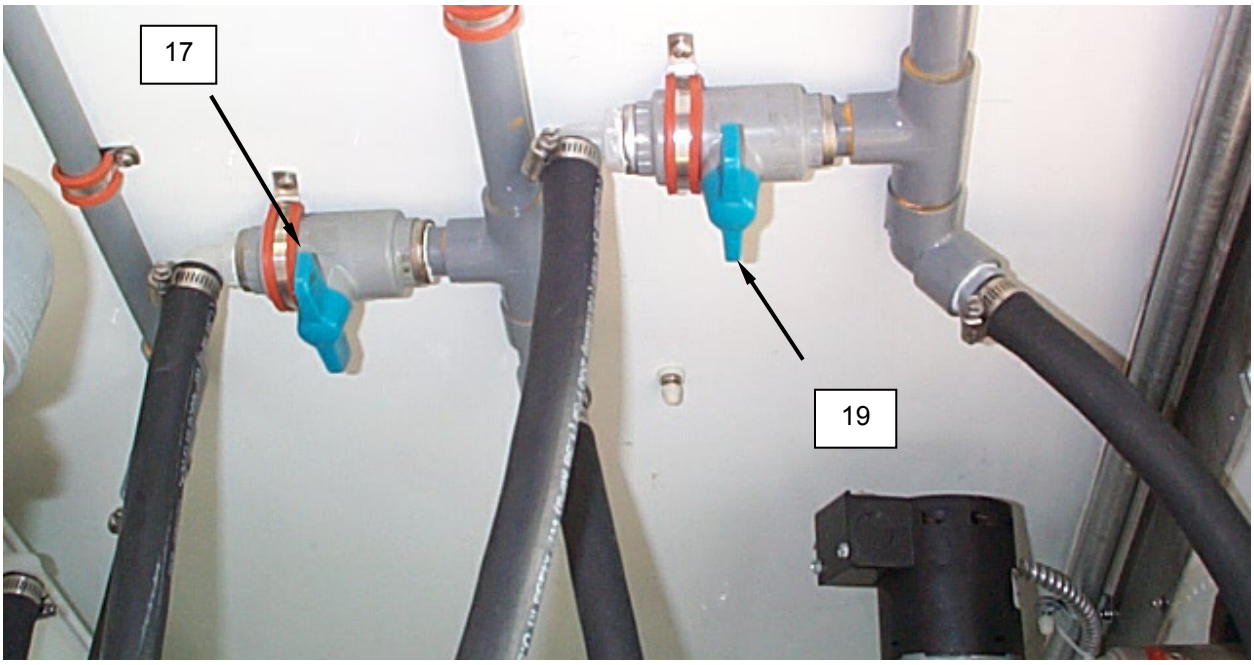


Figure 11. Hot and Cold Water Shutoff Valves (V-5 and V-6) for Washer No. 1.

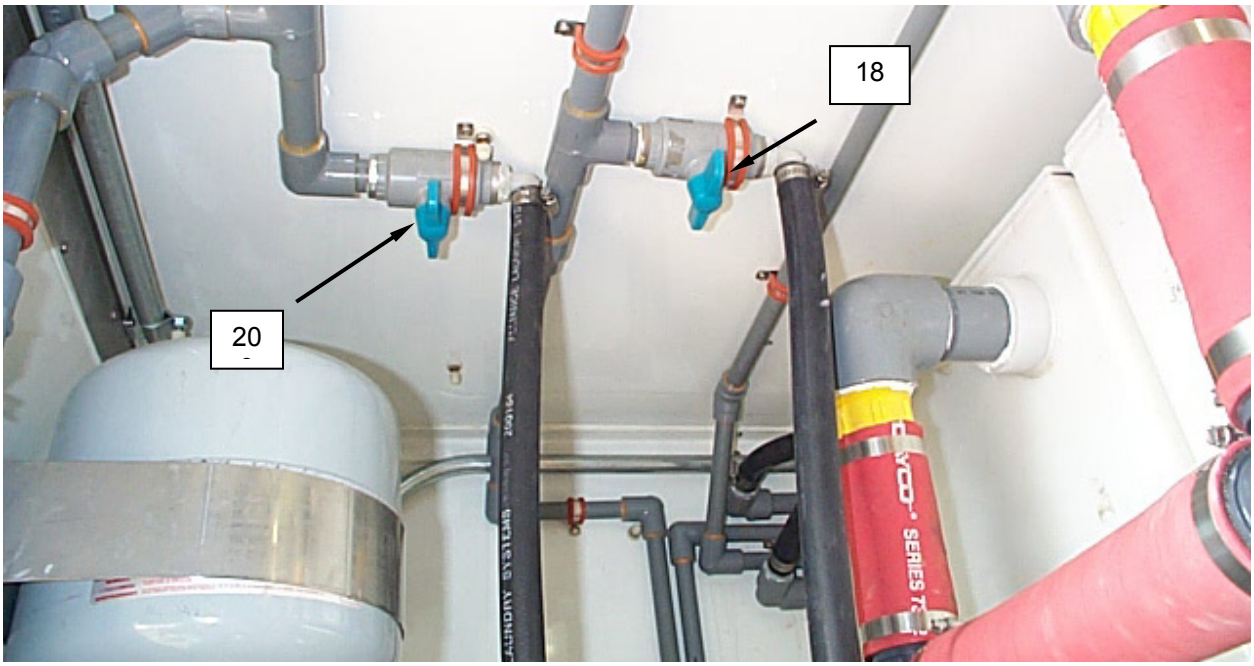


Figure 12. Hot and Cold Water Shutoff Valves (V-7 and V-8) for Washer No. 2.

SYSTEM START-UP-CONTINUED

9. Close the nanofilter drain valves (V-46, V-47, V-48, V-50, V-51) **(Figure 13, Item 21)** located behind the dryers.

10. Close the drain vent valve V-52 **(Figure 13, Item 22)**.

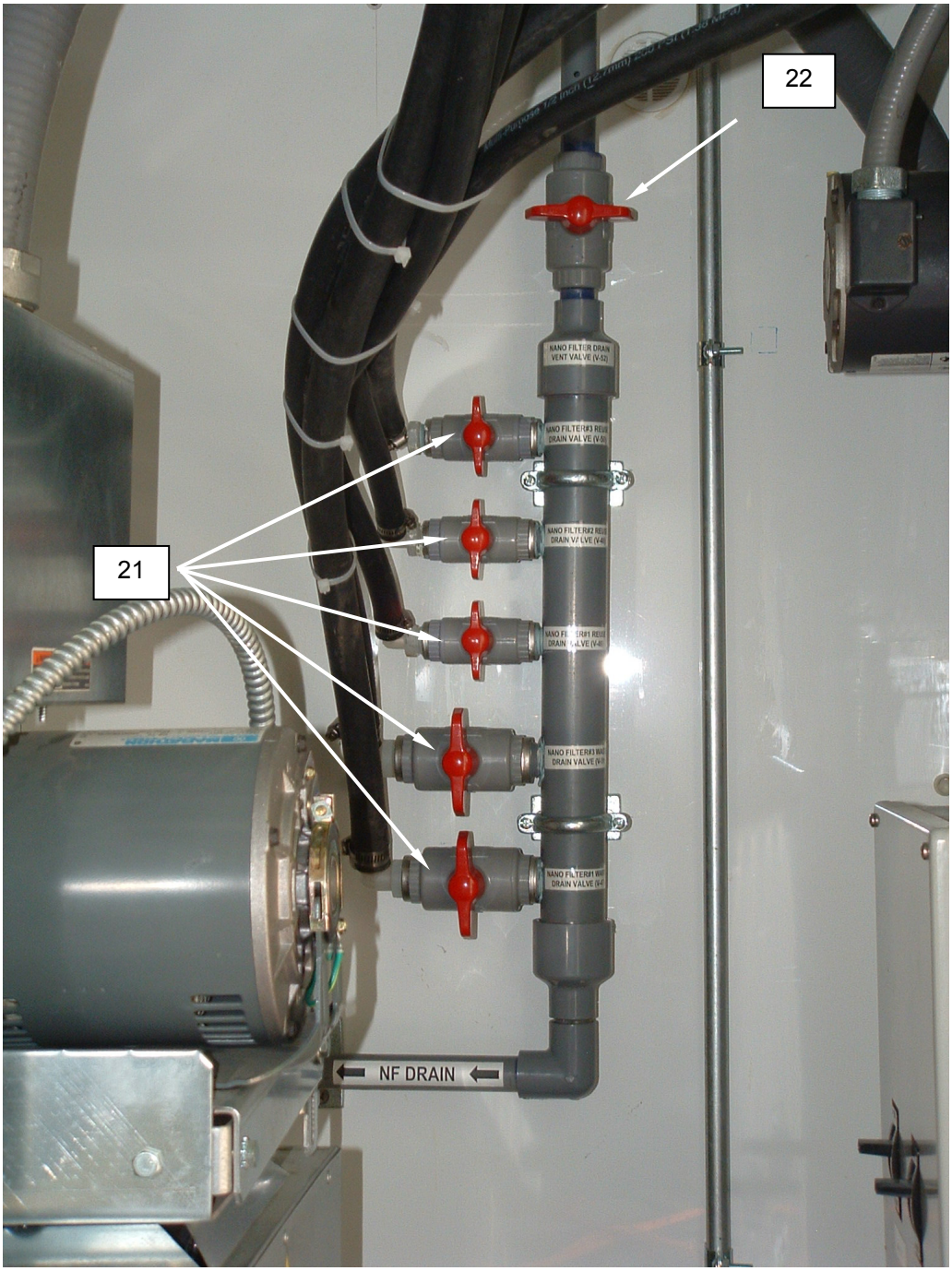


Figure 13. Vent Valves and Nanofilter Drains.

SYSTEM START-UP-CONTINUED

11. Ensure the vent valves (V-10 through V-14) **(Figure 14, Item 23)** on the vent valve manifold **(Figure 14, Item 24)** are closed.

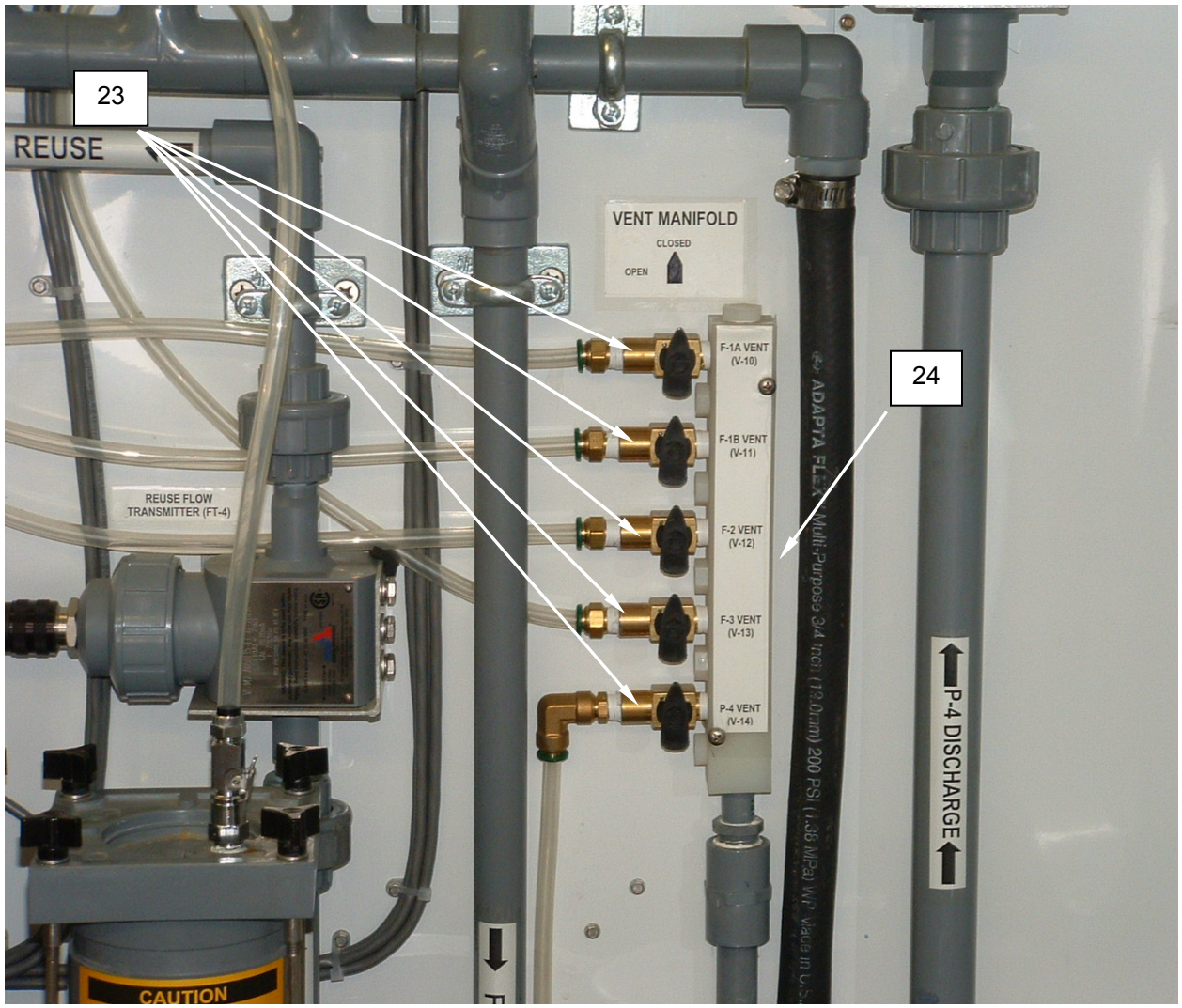


Figure 14. Vent Valve Manifold.

SYSTEM START-UP-CONTINUED

NOTE

A step aid such as a ladder may be required to perform this task.

12. Ensure the sight glass isolation valves **(Figure 15, Item 25)** are open and the sight glass drain petcocks **(Figure 15, Item 26)** are closed.

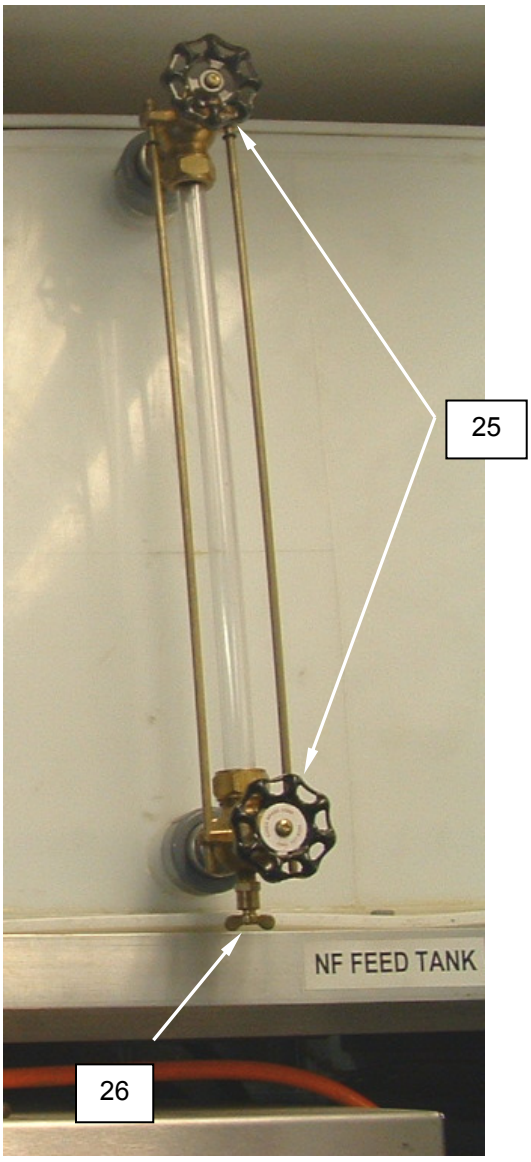


Figure 15. Sight Glass Valves.

SYSTEM START-UP-CONTINUED

Prime the P-1 Pump



WARNING

If a municipal water supply is used, do not prime the P-1 pump. Attempts to prime the pump under these circumstances will result in a discharge of water to the CBL interior. Injury or death by electrocution may result from water contact with electrical components. Standing water on the deck of the CBL may cause injury or death due to slips and falls.

1. Ensure the water supply is set up as described in WP 0007 00. Ensure source water valve is open. Ensure the pump is not operating. Look at PLC and ensure system pressure is at zero.
2. Ensure exterior service water spigot is closed.
3. Remove the QD cap **(Figure 16, Item 27)** from the priming standpipe **(Figure 16, Item 28)**.
4. Pour approximately 1/2 gallon of source water into the open standpipe **(Figure 16, Item 28)**.
5. Install the QD cap **(Figure 16, Item 27)** onto the standpipe **(Figure 16, Item 28)**, and lock in place.

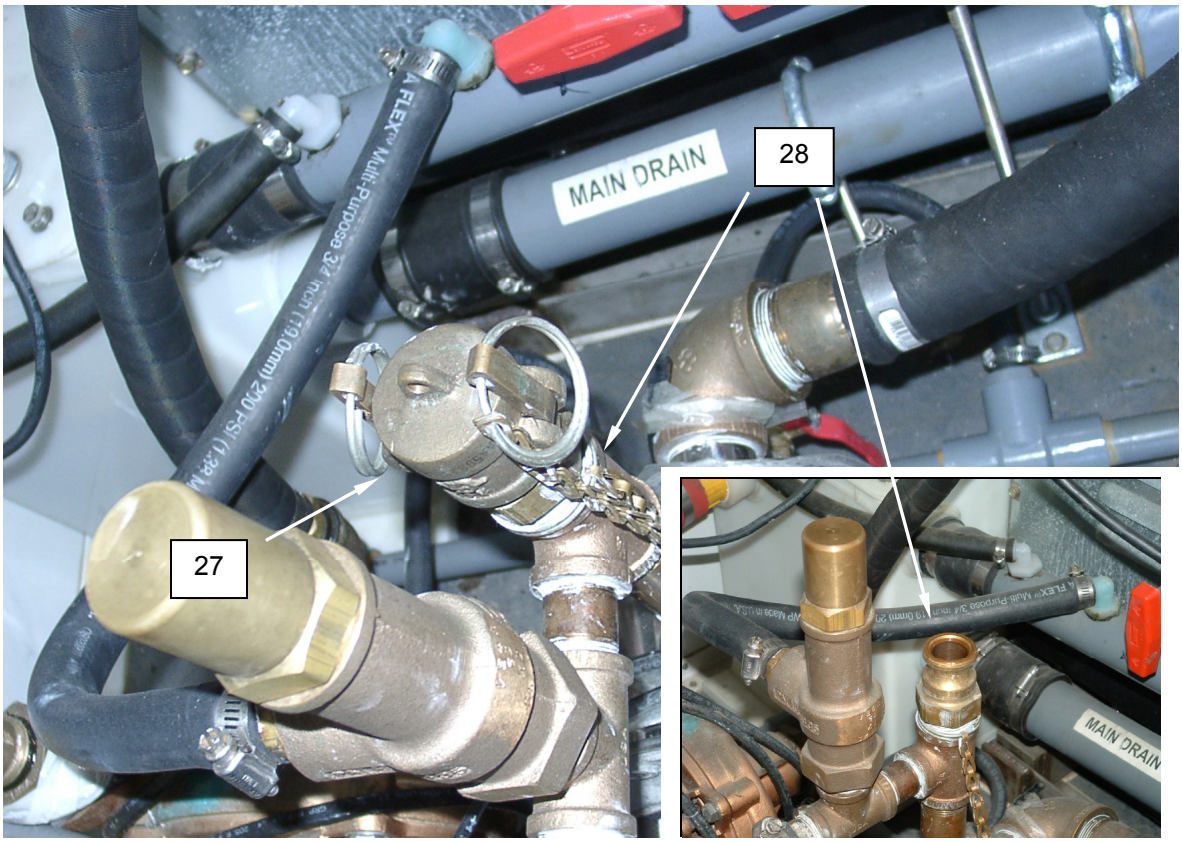


Figure 16. P1 Pump Priming Standpipe.

SYSTEM START-UP-CONTINUED

NOTE

The following steps are more easily accomplished with an assistant. Be sure to become familiar with system pressure screen so that P1 pump does not run continuously.

6. Switch the P-1 pump ON at the PLC **(Figure 17, Item 29)** and monitor system pressure **(Figure 17, Item 30)** by pressing button on PLC labeled “System Press” after getting steady stream of water.

7. Go to system pressure menu screen **(Figure 17, Item 30)**.

8. As system pressure rises to approximately 25 PSI, relieve air from the system by slowly opening the external service water spigot **(Figure 17, Item 31)** and closing spigot after receiving steady stream of water. Listen for pumping action and wait for water pressure to rise to operating range of 30-60 PSI.

CAUTION

Allowing P-1 pump to run more than one minute without water may cause damage to the P-1 pump.

9. If pump fails to prime after one minute, shut off P-1 pump at the PLC. If there is any system pressure, relieve pressure on the system by opening the external service water spigot **(Figure 17, Item 31)**, check water supply valves on source water tank, and repeat steps 2 through 6. If pump fails to prime after a second attempt, close spigot and notify unit maintenance.

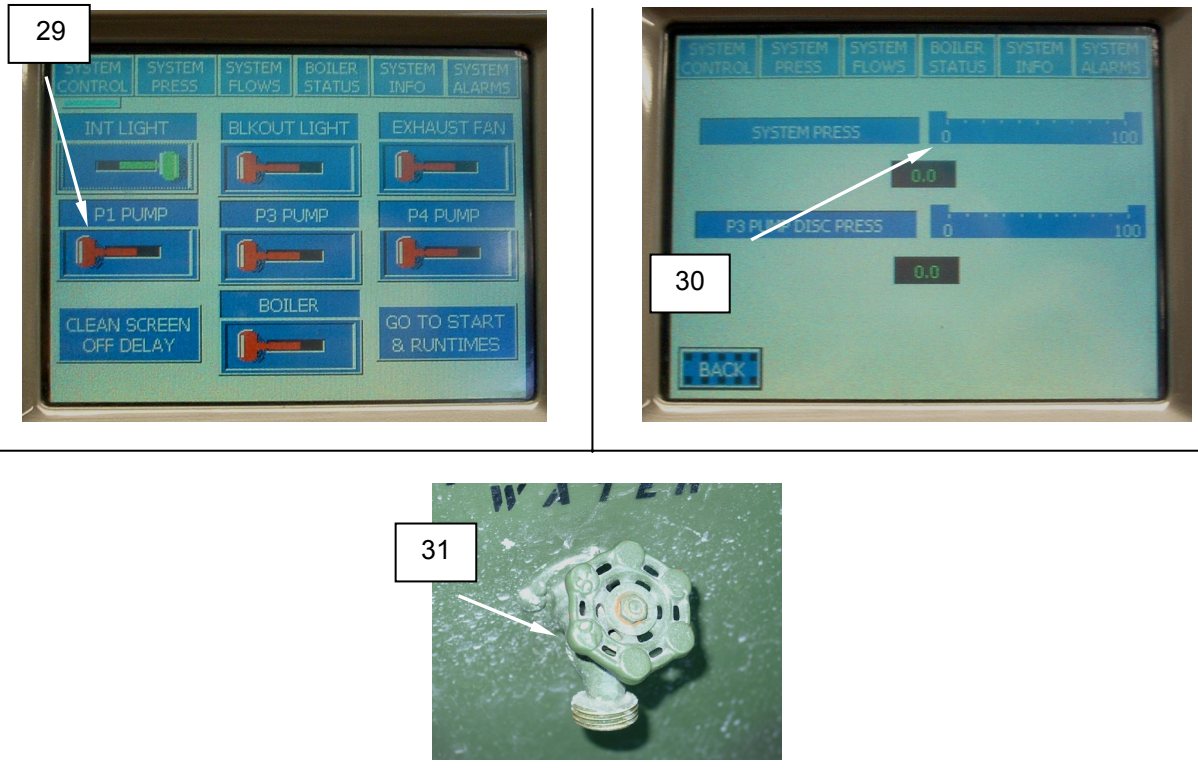


Figure 17. Priming P-1 Pump.

SYSTEM START-UP-CONTINUED

Operate the Automatic Soap Dispenser

The Automatic Soap Dispenser normally requires no operator attention other than replacement of laundry chemicals. If a chemical is depleted, an alarm will sound and a signal light on either or both of the control modules **(Figure 18, Item 32)** will indicate which chemical needs to be replenished.

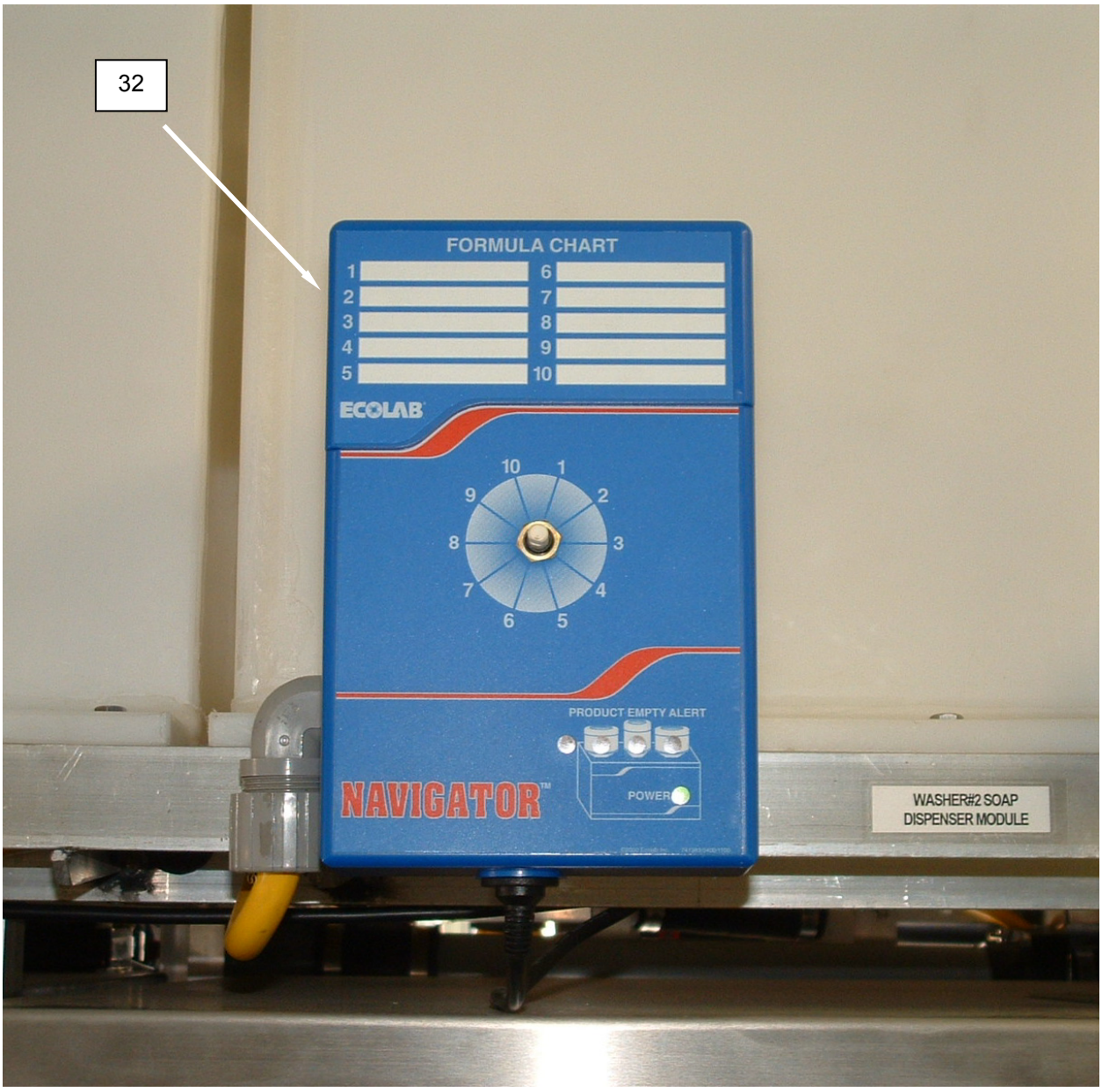


Figure 18. Automatic Soap Dispenser Control Module.

SYSTEM START-UP-CONTINUED



WARNING

Laundry chemicals pose serious hazards of chemical burns to skin from direct contact and to respiratory system from inhalation. Wear protective clothing to prevent contact of skin and clothing to laundry chemicals. Do not breathe in vapors from laundry chemicals. If laundry chemicals contact skin or eyes, flush immediately with clean water and seek medical attention. If vapors from laundry chemicals are inhaled, seek immediate medical attention. Failure to observe safety precautions in this event may result in serious injury or death to personnel.

1. To replace laundry chemicals, first ensure the correct laundry chemicals are available before proceeding. Replace only the chemical which is indicated as being depleted.

2. Remove the lid from the detergent canister **(Figure 19, Item 33)**. Invert the detergent canister **(Figure 19, Item 33)** and quickly place the canister in the recess closest to washer No.1.

3. Remove the lid from the bleach canister **(Figure 19, Item 34)**. Invert the bleach canister **(Figure 19, Item 34)** and quickly insert the canister into the center recess.

4. Remove the lid from the laundry sour canister **(Figure 19, Item 35)**. Invert the laundry sour canister **(Figure 19, Item 35)** and quickly insert the canister into the remaining recess.

SYSTEM START-UP-CONTINUED

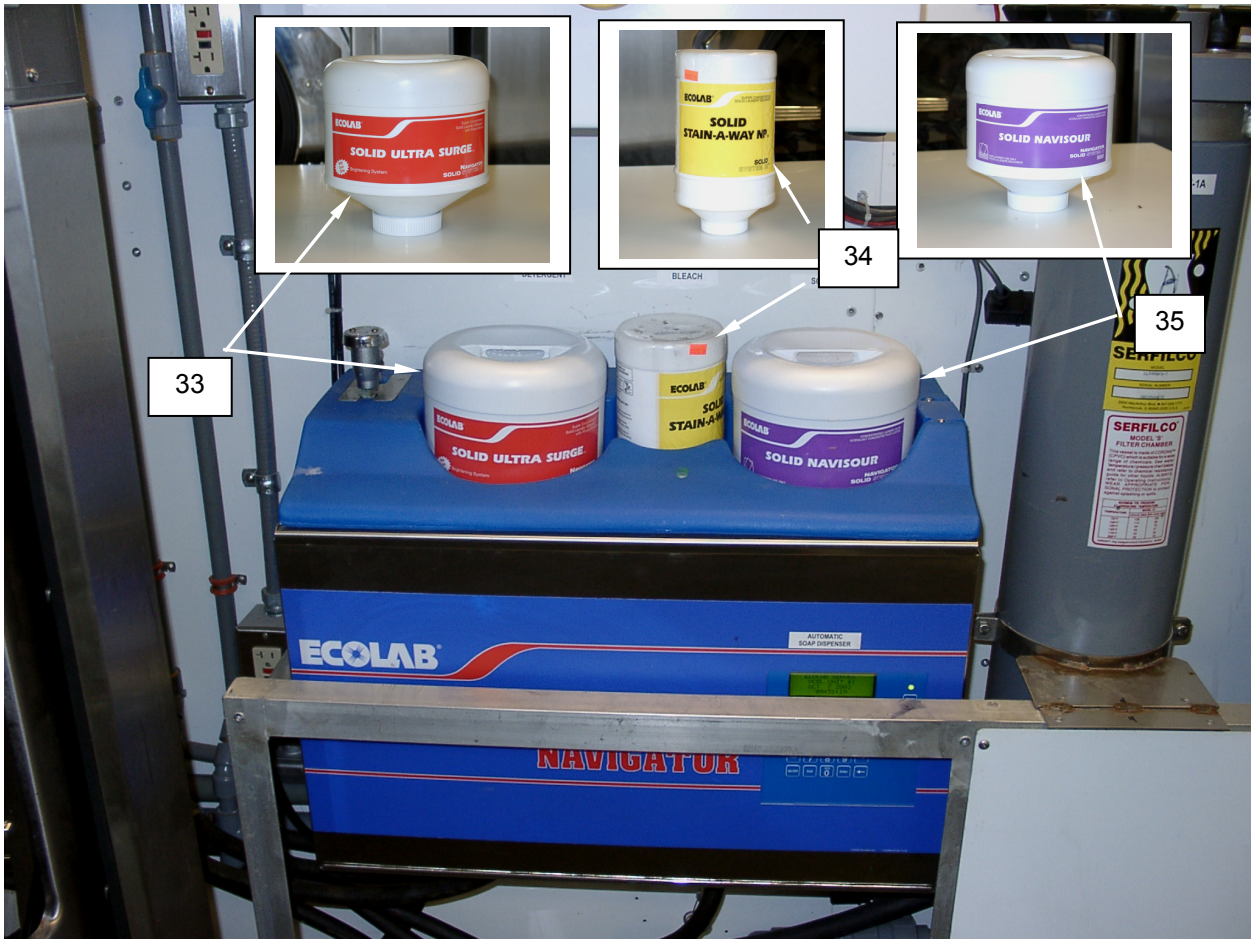


Figure 19. Automatic Soap Dispenser.

SYSTEM START-UP-CONTINUED

Operate the Boiler

1. Ensure the boiler glycol level is above the minimum level and does not exceed the maximum levels. Add a 50/50 mix of glycol as necessary into the reservoir **(Figure 20, Item 36)**.

2. Ensure the boiler has an adequate supply of fuel and the hoses have been connected IAW procedures in WP 0007 00.

3. Switch the boiler **(Figure 20, Item 37)** ON at the PLC. You should hear the boiler come on immediately.



WARNING

Do not reset the boiler controller more than once. In the event of an ignition malfunction, the burner cavity may receive excess fuel, creating the risk of fire or explosion. Failure to observe safety precautions may result in serious injury or death to personnel.

NOTE

In many cases when the boiler is first started, the low glycol alarm will sound. If this happens, press the ACK button on the PLC to acknowledge the alarm and follow troubleshooting procedures low glycol alarm in WP 0027 00.

4. Monitor the boiler for at least five minutes to ensure proper operation. If the boiler shuts down within this amount of time, press the reset button **(Figure 20, Item 38)** on the controller for at least three seconds and continue to monitor for at least five minutes.

5. If the boiler shuts down again, shut the boiler off at the PLC **(Figure 20, Item 37)** and notify unit maintenance. Do not attempt a second restart.



WARNING

Observe safety precautions when refueling. Do not attempt to refuel when the boiler is running. Ensure fuel is carefully dispensed into the fuel can, without splashing or drips. Fuels are toxic and flammable. Do not refuel near open flame or other ignition source. Do not refuel within the container, and do not refuel in any space that is not adequately ventilated. Wear all necessary protective clothing, and avoid fuel contact with skin and clothing. Do not breathe in fuel vapors. If fuel contacts skin or eyes, flush immediately with clean water and seek medical attention. Do not allow fuel to spill; fuel can make traffic areas slippery. Failure to observe safety precautions may result in chemical injuries to eyes, skin, and respiratory system; tripping or falling injuries or death; or burn injuries or death.

6. Monitor the fuel supply during CBL operation. To replenish, shut down the boiler at the PLC **(Figure 20, Item 37)**, remove the fuel can adapter **(Figure 20, Item 39)**, and refill the can **(Figure 20, Item 40)**.

7. Replace the fuel can adapter and restart the boiler at the PLC. Do not allow the boiler to run out of fuel – if this occurs, the boiler fuel system must be bled of air by unit maintenance personnel.

SYSTEM START-UP-CONTINUED

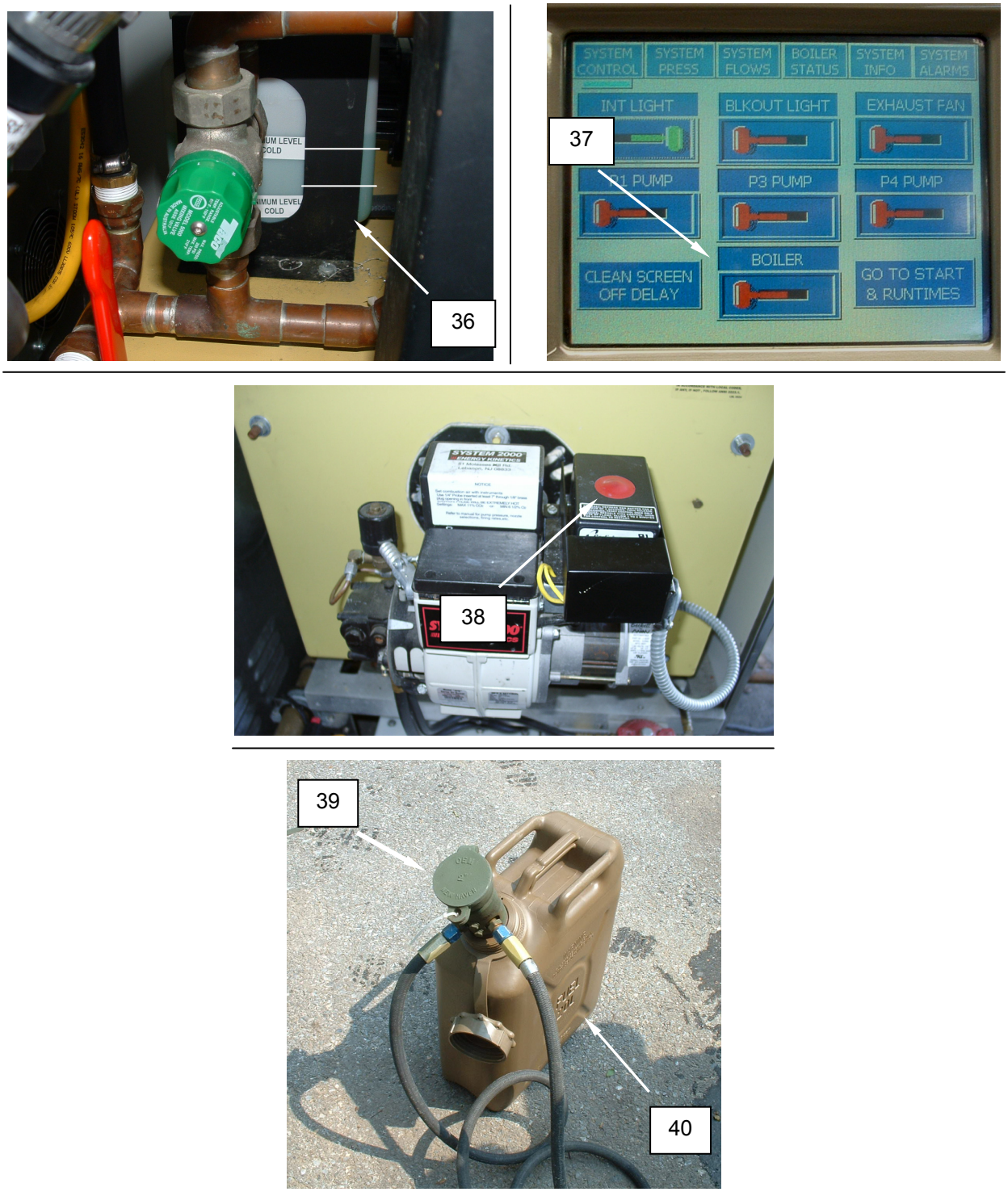


Figure 20. Operate the Boiler.

INITIAL FILL CYCLE FOR WATER TREATMENT SYSTEM

CAUTION

Run the initial fill from only one washer. Either washer may be used, but running an initial fill from both may overflow the WTS HOLD tank.

In order to fill the system with water for recycling, one washer must be run through an initial fill cycle. Both washers are preprogrammed with Cycle 01 for this purpose, and either may be used – do not run an initial fill with both at the same time. The procedure requires approximately 15 minutes to complete.

1. Ensure the P-1 Pump switch **(Figure 21, Item 41)** on the PLC Control Panel **(Figure 12, Item 42)** is in the ON position. The indicator will flip to the right and turn green when the switch is ON.

2. Switch the P-3 Pump **(Figure 21, Item 43)** and P-4 Pump **(Figure 21, Item 44)** on the PLC Control Panel **(Figure 21, Item 42)** to the ON position. The indicator will flip to the right and turn green when the switch is ON.

NOTE

The WTS will remain OFF until water flows into the WTS Hold Tank to the low set point of the level sensors.

NOTE

The P-3 or P-4 pump alarm may go off during this procedure due to low flow while air is being purged from the system. This is normal. Monitor the pump operation during this procedure and ensure the alarm resets when the procedure is complete. Refer to WP 0009 00 for PLC operation.

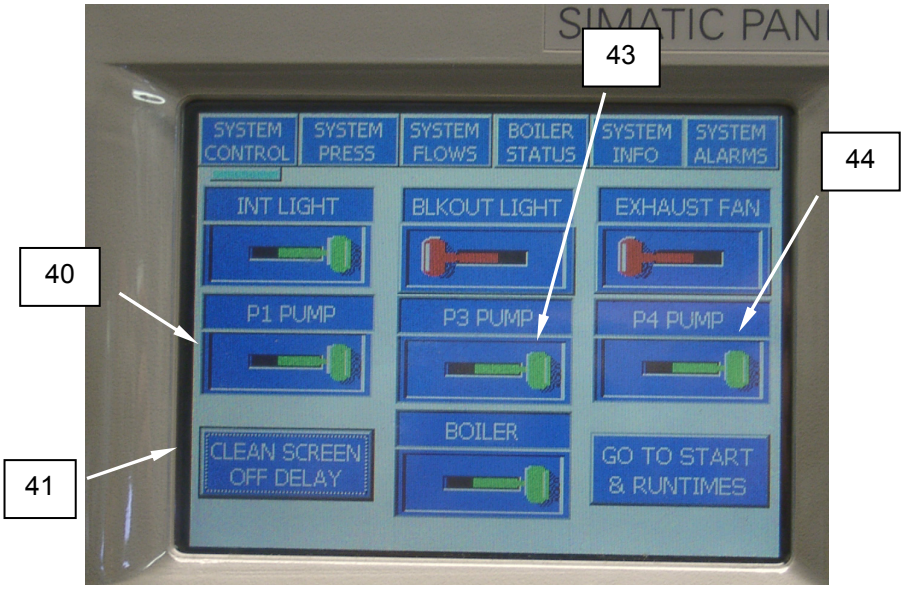


Figure 21. Switching the Pumps ON.

INITIAL FILL CYCLE FOR WATER TREATMENT SYSTEM-CONTINUED

3. Ensure that the bypass valves V-15 **(Figure 22, Item 6)** and V-16 **(Figure 22, Item 7)** are in the positions shown so that the water reuse system is engaged.

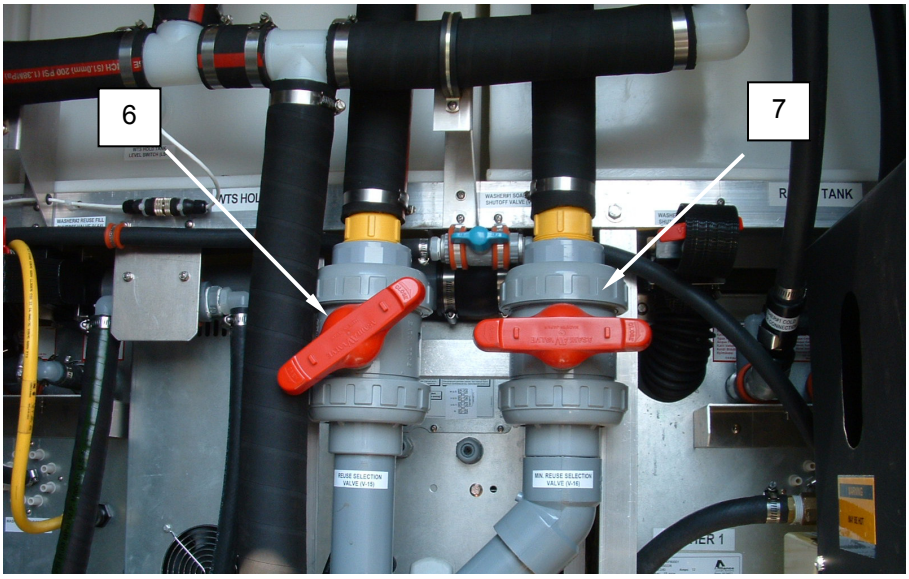


Figure 22. Valve Setting for Initial Fill.

NOTE

The washer emergency stop should be not be used for routine shutdown of the washer.

4. Power is enabled by twisting out the emergency stop switch **(Figure 23, Item 45)** clockwise on the washer control panel.



Figure 23. Emergency Stop Settings.

INITIAL FILL CYCLE FOR WATER TREATMENT SYSTEM-CONTINUED

5. The front panel display **(Figure 24, Item 46)** on the washer should be lit and displaying the last cycle that was run; Example: (Cycle 03). - This display will be on at all times that power is ON indicating the machine is ready for loading and unloading.

6. Enter cycle 01 by pressing (do not punch) the numbers on the keyboard **(Figure 24, Item 47)** and note that this number is shown on the display **(Figure 24, Item 48)** as “Cycle 01”. When keys are pressed on the keyboard, a beep will be heard. If an error is made, simply press the numbers again.

7. To start the cycle that has been selected, press the “START” key **(Figure 24, Item 48)**. As the cycle proceeds, the display will show the function being executed, step number, program number, and time remaining in each step and function (drain, high warm, etc....).



Figure 24. Washer Control Panel.

8. Use valve V-9 **(Figure 25, Item 49)** to select either filter F-1A **(Figure 25, Item 50)** or F-1B **(Figure 25, Item 51)**.

9. Open the vent valves on the vent valve manifold **(Figure 25, Item 24)** for Filter F-1A **(Figure 25, Item 50)** or F-1B **(Figure 25, Item 51)**(whichever is selected) and Filter F-2 **(Figure 25, Item 52)**. As the Water Treatment System Hold Tank (WTS) **(Figure 25, Item 46)** fills, a level sensor will activate causing pump P-3 to run.

NOTE

Water will not flow through vent hoses until pump P-3 starts.

10. Monitor water flow and ensure most of the air is evacuated from the line on Filter F-1A **(Figure 25, Item 50)** or F-1B **(Figure 25, Item 51)** (whichever is selected) and Filter F-2 **(Figure 25, Item 52)**, close the vent valves.

INITIAL FILL CYCLE FOR WATER TREATMENT SYSTEM-CONTINUED

NOTE

Water may spray out of filter canisters F-1A and F-1B due to an improperly seated O-ring. If this occurs, stop procedure, close valve, and refer to WP 0020 00 for troubleshooting procedures.

11. Open the vent valves on the vent manifold of Filter F-3 **(Figure 25, Item 53)** and P-4 Pump **(Figure 25, Item 44)**.

12. As the Nano Feed Tank **(Figure 25, Item 54)** fills, a level sensor will activate causing pump P-4 to run.

13. Once water is observed flowing through the clear vent hoses on F-3 **(Figure 25, Item 53)** and P-4 pump **(Figure 25, Item 44)**, close the vent valves.

14. As the initial fill continues, the Reuse Tank **(Figure 25, Item 55)** will fill. Initial fill is completed when the washer cycle is complete. Monitor the Reuse Tank thermometer **(Figure 25, Item 56)** to ensure the water is 110 ^{0}F minimum.

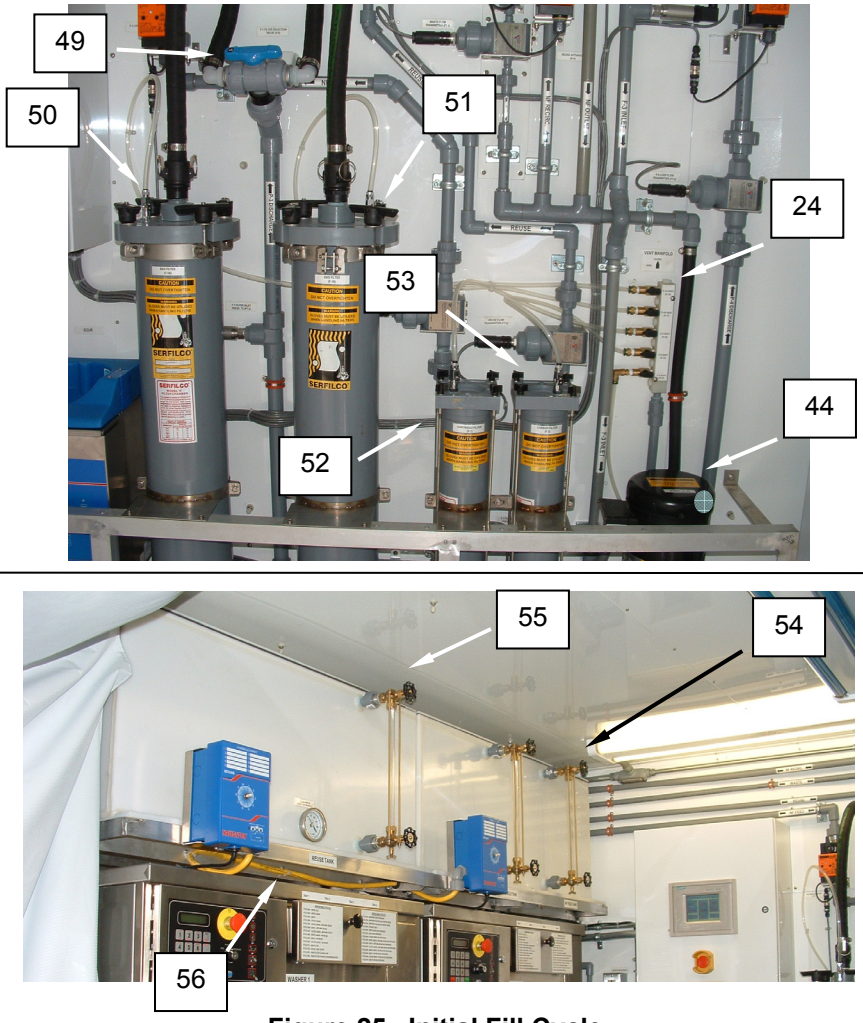


Figure 25. Initial Fill Cycle.

INITIAL FILL CYCLE FOR WATER TREATMENT SYSTEM-CONTINUED

Adjusting Water Temperature

The temperature of the water used for the wash and rinse operation is controlled by mixing valves installed on the top of the water boiler. One mixing valve **(Figure 26, Item 57)** controls the temperature of the incoming water being supplied to the washer while the second mixing valve **(Figure 26, Item 58)** controls the temperature of the reuse water being sent to the water reuse tank. The mixing valves are preset and should be acceptable for most applications in average temperatures; however, they may require adjustment should the outside ambient temperatures be colder and therefore the temperature of the source water be colder than normal.



WARNING

Use caution when setting the mixing valves. The valve bodies and adjacent heat exchangers and boiler exhaust are extremely hot during operation. Failure to observe safety precautions may result in serious injury or death to personnel.

CAUTION

Heating reuse water over 120 ^{o}F may result in damage to WTS filters.

1. To adjust the temperature of the incoming heated water, turn the knob on the side of the source water mixing valve **(Figure 26, Item 57)** counterclockwise to increase temperature and clockwise to decrease temperature.

2. To adjust the temperature of the water in the water reuse tank, turn the knob on the side of the reuse water mixing valve **(Figure 26, Item 58)** counterclockwise to increase temperature and clockwise to decrease temperature.

3. Turn the knob **(Figure 26, Item 59)** in the direction of MAX to increase the temperature and in the direction of MIN to decrease the temperature.

4. Monitor the temperature using the gauge **(Figure 26, Item 60)** installed on the front of the water recycle tank and maintain a temperature of approximately 110 ^{o}F.

NOTE

Do not expect immediate changes in temperature after a mixing valve adjustment. Turn the valve in the desired direction one increment at a time and monitor the water temperature for at least 45 minutes to determine if the water is now at the desired temperature.

5. Continue this process until the desired temperature is reached.

INITIAL FILL CYCLE FOR WATER TREATMENT SYSTEM-CONTINUED

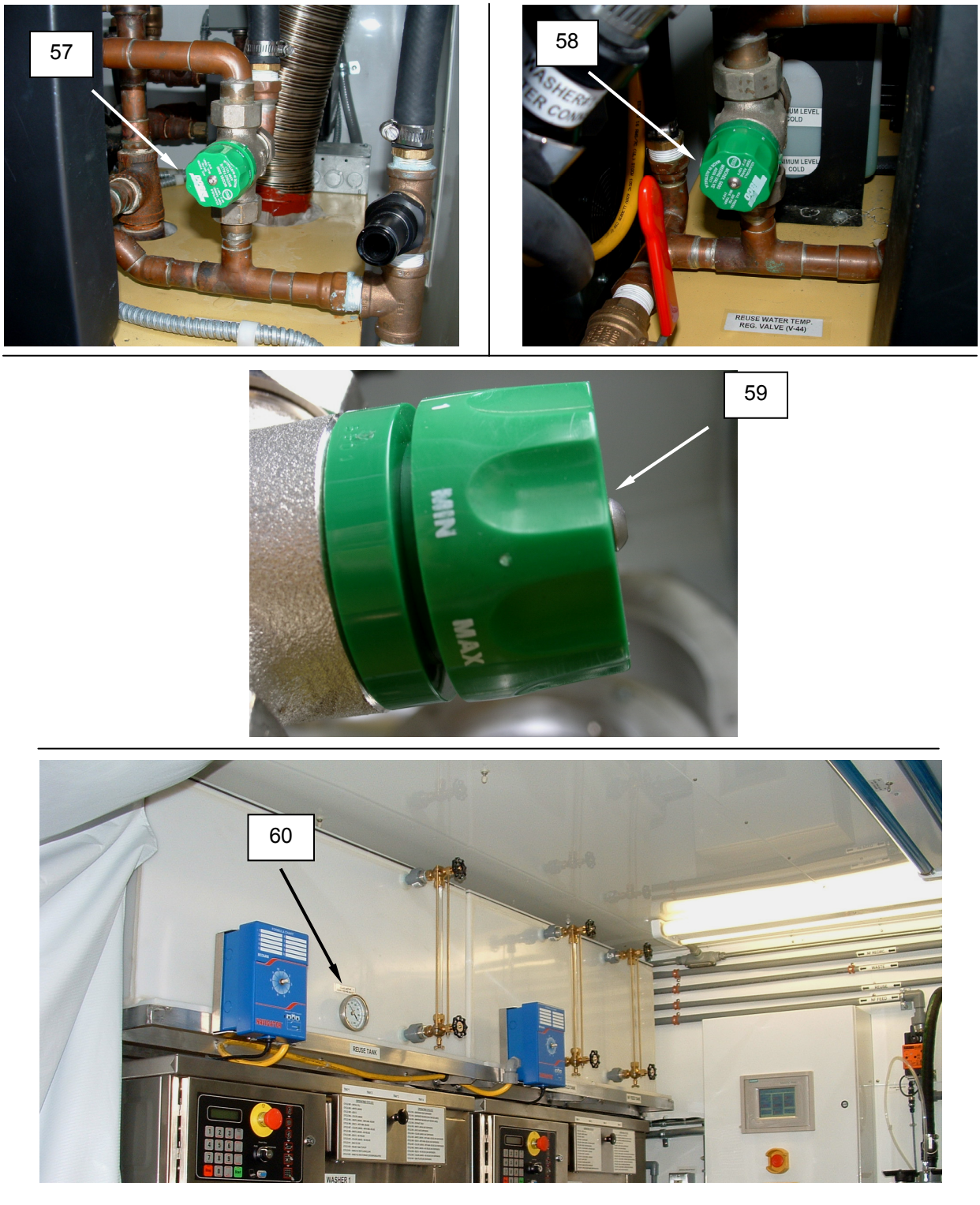


Figure 26. Adjusting Water Temperature.

OPERATE WASHER



WARNING

Use extreme caution when handling soiled laundry. The CBL is designed to service hospital units and the chance of exposure to blood and other body fluids is high. Soiled laundry items may contaminate clean laundry and operator clothing if not handled with adequate precautions. Always wash hands after handling soiled laundry. Failure to wear supplied safety equipment such as gloves, apron, and mask may result in serious illness or death to personnel.



WARNING

Use extreme caution when handling soiled laundry. The CBL is designed to service hospital units and the chance of exposure to sharp objects such as needles, knives, or medical instruments is likely. Sharp objects of this nature may be contaminated with body fluids such as blood, and may carry the chance of infection with disease as well. Use extreme caution when handling hospital laundry items, and inspect each and every item for the presence of sharp objects. Failure to observe safety precautions and to wear supplied safety equipment such as gloves, apron, and mask may result in serious injury, illness, or death to personnel.



WARNING

Use caution when operating the washers. The washers are equipped with a suspension to dampen vibration, and the washer drum may be observed to move in the washer cabinet. Injury to personnel may occur if fingers are slipped between the washer drum and the washer cabinet.

NOTE

Use the emergency stop only if the washer needs to be stopped immediately; that is, in the event of an equipment malfunction, leak, or any situation that might endanger personnel or equipment. The emergency stop shuts down all power to the washer and drains the washer to the waste tank. Do not use the emergency stop for routine shutdown.

1. Ensure that the emergency stop switch **(Figure 27, Item 45)** on the washer control panel has been turned out and is in the operational position.

OPERATE WASHER-CONTINUED

CAUTION

Any TA-50 with buckles, metal tips, or metal frames shall not be washed in the CBL. Items such as gortex, sleeping bags, and other fabric can be washed and dried using appropriate cycles and temperatures. Refer to garment care tags on these items for proper washing and drying instructions.

NOTE

Laundry must be sorted as to type; for example, linens and BDU's require different wash cycles. Hospital garments and any items contaminated with blood should be washed as white linens.

2. Press the release button **(Figure 27, Item 61)** on the latch **(Figure 27, Item 62)** and open the washer door **(Figure 27, Item 63)**. The washer may be filled with up to 50 pounds of laundry – for example, this would come to 18 complete sets of BDU's (blouse and trousers).

3. Close the washer door **(Figure 27, Item 63)**. Ensure the door has latched securely.

4. The front panel display **(Figure 27, Item 46)** on the washer should be lit. This display will be on at all times that power is ON indicating the machine is ready for loading and unloading.

NOTE

Some cycles in Table 1 are only used in certain conditions. Do not use cycles labeled "min reuse" or "no reuse" unless the reuse tank has been disabled or is not functioning.

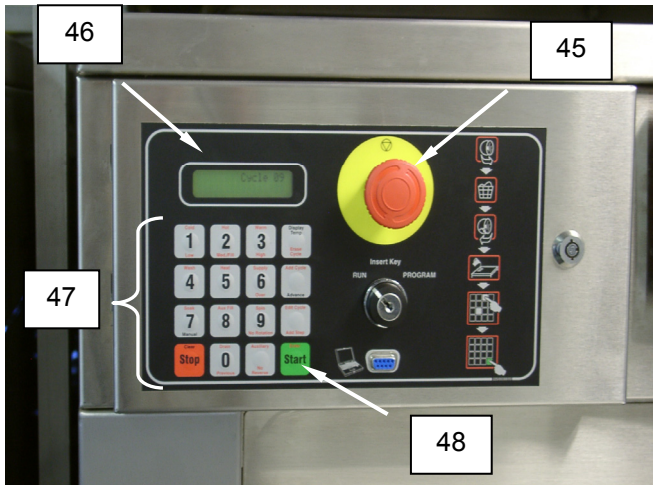
5. Refer to Table 1 to determine the cycle number for the clothes being laundered. Identify conditions for use or no reuse for BDU.

6. Enter the desired cycle number by pressing (do not punch) with your finger the numbers on the keyboard **(Figure 27, Item 47)** and note that this number is displayed. When keys are pressed on the keyboard, a beep will be heard. If an error is made, simply press the numbers again. As numbers are entered, they move from right to left on the display.

7. To start the cycle that has been selected, press the "START" key **(Figure 27, Item 48)**. As the cycle proceeds, the display **(Figure 27, Item 46)** will show the function being executed, step number and the cycle number selected.

8. The front panel display **(Figure 27, Item 46)** will indicate when the cycle is complete. At that time, the washer may be unloaded by pressing the release button **(Figure 27, Item 61)** on the latch **(Figure 27, Item 62)** and using the latch to open the washer door **(Figure 27, Item 63)**. The washer door will not open while the washer is in an operating cycle.

OPERATE WASHER-CONTINUED



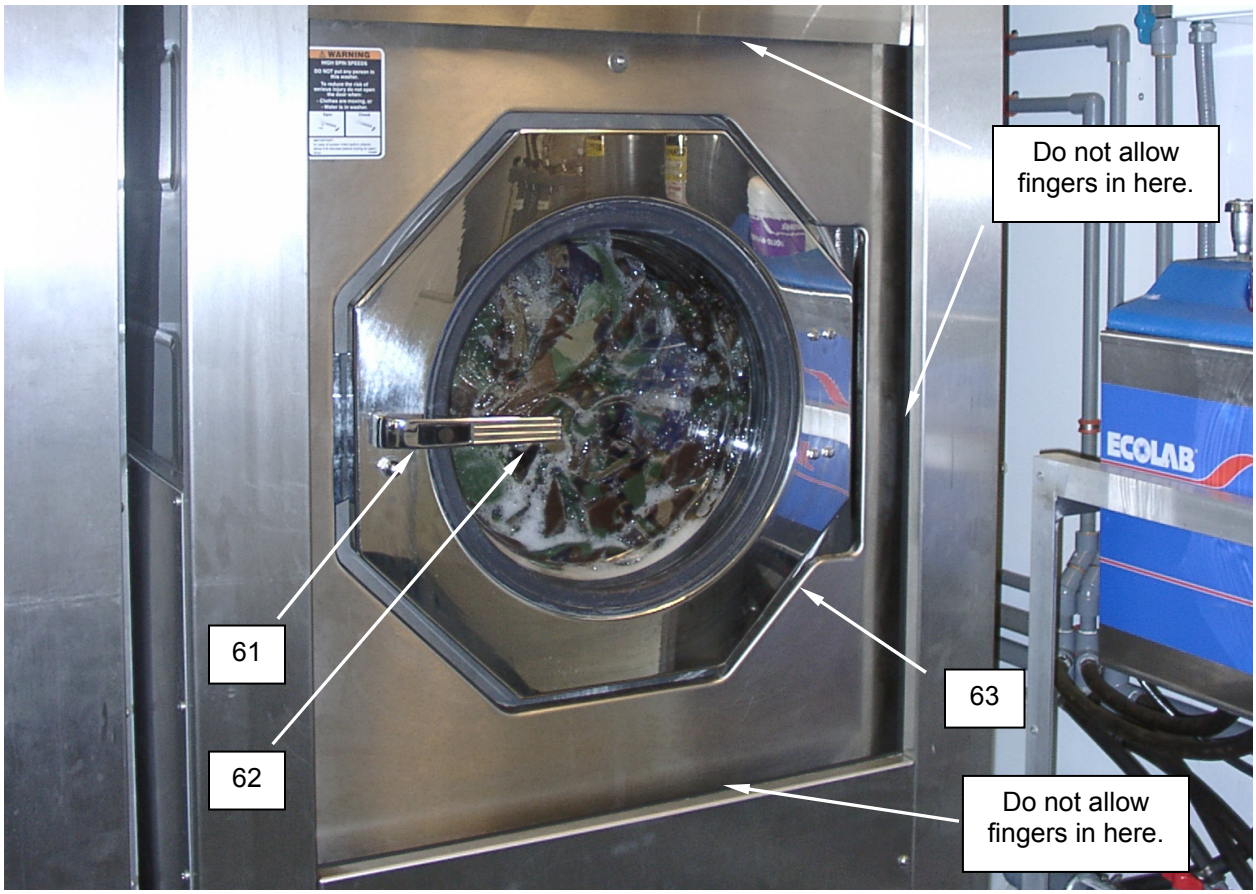


Figure 27. Operate the Washer.

OPERATE WASHER-CONTINUED

Pre-Programmed Wash Cycles and Laundry Additives

Table 1 lists the washer operating cycles that are pre-programmed into the washer control panel. This table replaces any pre-programmed cycles that may be listed in the commercial washer technical manual. If additional cycle programs are required that are not specified in table 1, contact the local LARs.

For example, Cycle #1 is the initial fill cycle and is used to fill the water reuse tanks before laundering clothes. Cycle #3 would be used when laundering BDU's.

Some cycles such as Cycle #5 list the phrase "WITH MIN REUSE". These cycles are used when valves V-15 and V-16 at the rear of the washers have been set to send washer reuse water directly into the reuse tank, bypassing the water filtration system. Refer to WP 0018 00 for additional information.

Some cycles, such as Cycle #8, list the phrase "NO REUSE". Only if the water reuse system fails to work properly, should wash cycles be used which do not use the water reuse system (wash cycles 08, 09, and 10). Refer to WP 0018 00 for additional information.

Special cycles have been included to aide with system operation and maintenance. Cycle 01, INITIAL FILL, is used to prepare the water treatment system for use. Cycle 11, BAG FILTER is used when filters F-1A or F-1B are washed. Cycle 31, NANO FILTER FLUSH/CLEAN, is used daily to purge contaminants from the nanofilters. Cycle 32, NANO FILTER STORAGE (SODIUM BISULPHITE) is used to prevent bacterial growth in the nanofilters. Cycle 33, WINTERIZE SOAP DISPENSER, is used to evacuate water from the soap dispenser prior to storage; cycles 34 and 35 do the same for the washer hot and cold water lines.

Cycle 11, BAG FILTER, is used to wash the F-1A and F-1B filters, preparing the filter bags for reuse.

Cycle 30, REUSE TANK TOPOFF, is used to raise the reuse tank level if necessary. This will reduce the time necessary to fill the reuse tank, as the WTS system is bypassed and the tank is filled directly with source water. Do not run this cycle more than once every four hours, and only when no water is visible in the reuse tank sight glass.

Cycle 36, EXTRACT ONLY, provides an additional extract cycle in the event one is desired. This allows the washer to spin out excess moisture without having to go through an additional wash cycle.

Additional cycles have been provided in the event the Automatic Soap Dispenser is inoperable.

NOTE

Cycles 1 through 31 and 33 through 36 do not require any additional chemicals listed in Table 2.

Table 2 lists the laundry additives for a given washer cycle. The first column of the table lists the items to be laundered while column 2 shows the cycles appropriate for those items. The columns labeled S1 through S4 indicate the supply trays of the washer. The type and quantity of additive are listed in these columns. For example, if it was desired to launder BDU's using washer operating Cycle 53, supply tray S4 would be filled with 2.0 oz. of detergent and supply tray S2 filled with 0.3 oz. of sour. Similarly, if it was desired to launder white linens using Cycle 52, supply tray S4 would be filled with 2.0 oz. of detergent, supply tray S2 would be filled with 0.3 oz. of sour, supply tray S3 would be filled with 0.3 oz. of bleach, and supply tray S1 filled with 9 oz. of Sodium Bisulphite.

OPERATE WASHER-CONTINUED

NOTE

Use BDU cycle for sleeping bags.

Table 1. Washer Operating Cycles.

DESCRIPTION	TIME
CYCLE #01 - INITIAL FILL CYCLE	68:00
CYCLE #02 - WHITE LINENS	68:03
CYCLE #03 - BDU'S	51:05
CYCLE #04 - COLOR LINENS	61:07
CYCLE #05 - WHITE LINENS – WITH MIN REUSE	65:03
CYCLE #06 - BDU'S – WITH MIN REUSE	49:35
CYCLE #07 - COLOR LINENS – WITH MIN REUSE	58:07
CYCLE #08 - WHITE LINENS – NO REUSE	63:33
CYCLE #09 - BDU'S – NO REUSE	48:05
CYCLE #10 - COLOR LINENS – NO REUSE	56:37
CYCLE #11 - BAG FILTER	27:44
CYCLE #30 - REUSE TANK TOPOFF	7:30
CYCLE #31 - NANOFILTER FLUSH/CLEAN	36:00
CYCLE #32 - NANOFILTER STORAGE (SODIUM BISULFITE)	85:00
CYCLE #33 - WINTERIZE SOAP DISPENSER	9:03
CYCLE #34 - WINTERIZE WASHER (COLD WATER LINES)	11:00
CYCLE #35 - WINTERIZE WASHER (HOT WATER LINES)	7:00
CYCLE #36 - EXTRACT ONLY	4:30
CYCLE #52 - WHITE LINENS (NO DISPENSER)	68:00
CYCLE #53 - BDU'S (NO DISPENSER)	51:00
CYCLE #54 - COLOR LINENS (NO DISPENSER)	61:00
CYCLE #55 - WHITE LINENS – WITH MIN REUSE (NO DISPENSER)	65:00
CYCLE #56 - BDU'S – WITH MIN REUSE (NO DISPENSER)	49:30
CYCLE #57 - COLOR LINENS – WITH MIN REUSE (NO DISPENSER)	58:00
CYCLE #58 - WHITE LINENS – NO REUSE (NO DISPENSER)	63:30
CYCLE #59 - BDU'S – NO REUSE (NO DISPENSER)	48:00
CYCLE #60 - COLOR LINENS – NO REUSE (NO DISPENSER)	56:30
CYCLE #61 - BAG FILTER (NO DISPENSER)	27:30
CYCLE #70 - NANOFILTER CLEANING	10:30

Table 2. Laundry Additives.

	CYCLE	Tray 1	Tray 2	Tray 3	Tray 4
White Linens	52, 55, 58	SODIUM BISULFITE 9.0 oz	SOUR 0.3 oz	BLEACH 0.3 oz	DETERGENT 2.0 oz
BDU's	53, 56, 59		SOUR 0.3 oz		DETERGENT 2.0 oz
Colored Linens	54, 57, 60		SOUR 0.3 oz		DETERGENT 2.0 oz
Filter Bag	61				DETERGENT 2.0 oz
Sodium Bisulfite	32			SODIUM BISULFITE 18.0 oz	SODIUM BISULFITE 18.0 oz

OPERATE THE DRYER

NOTE

Ensure the lint screen is clean and in place before proceeding.

NOTE

For maximum efficiency of dryer, do not fill basket with more than 50 pounds or one washer load of wet clothing.

Pre-programmed Drying cycles

Pull the emergency stop **(Figure 28, Item 64)** out to allow the dryer to function. The dryer display **(Figure 28, Item 65)** will still be lit if the emergency stop is pushed in. If the dryer display is not lit, pull out on the emergency stop and select a drying temperature. This will cause the display to light.

There are two available pre-programmed drying cycles:

Medium - BDU's
High - Linens or Colored Linens

1. To activate a preprogrammed drying cycle, open the dryer door **(Figure 28, Item 66)** and fill the dryer with no more than 50 lbs. of wet clothing (approximately 18 complete sets of BDU's). Ensure that the clothes do not prevent the door from closing. Use the door handle **(Figure 28, Item 67)** to close the dryer door securely, but do not slam. Do not press on the dryer door glass.

2. To dry BDU's, press the Medium key **(Figure 28, Item 68)** twice, then press the START key **(Figure 28, Item 69)**. The dryer will start, run for the pre-programmed amount of time, and stop automatically. The remaining drying time and cool down time will be shown in the display **(Figure 28, Item 65)**.

3. To dry Linens or Colored Linens, press the HIGH key **(Figure 28, Item 70)** twice, then press the START key **(Figure 28, Item 69)**. The remaining drying time will be shown in the display **(Figure 28, Item 65)**.

4. Do not open the dryer door **(Figure 28, Item 66)** when the dryer is running. To pause a drying cycle, use the STOP key **(Figure 28, Item 71)**. Press the START key **(Figure 28, Item 69)** to resume the cycle.

5. Use the exhaust fans as necessary to dissipate heat from the dryers.

6. When the cycle is complete, an alarm will sound and LR will show in the display **(Figure 28, Item 65)**. Remove the clothes and place in a clean laundry basket for folding in the TEMPER work area.

OPERATE THE DRYER-CONTINUED

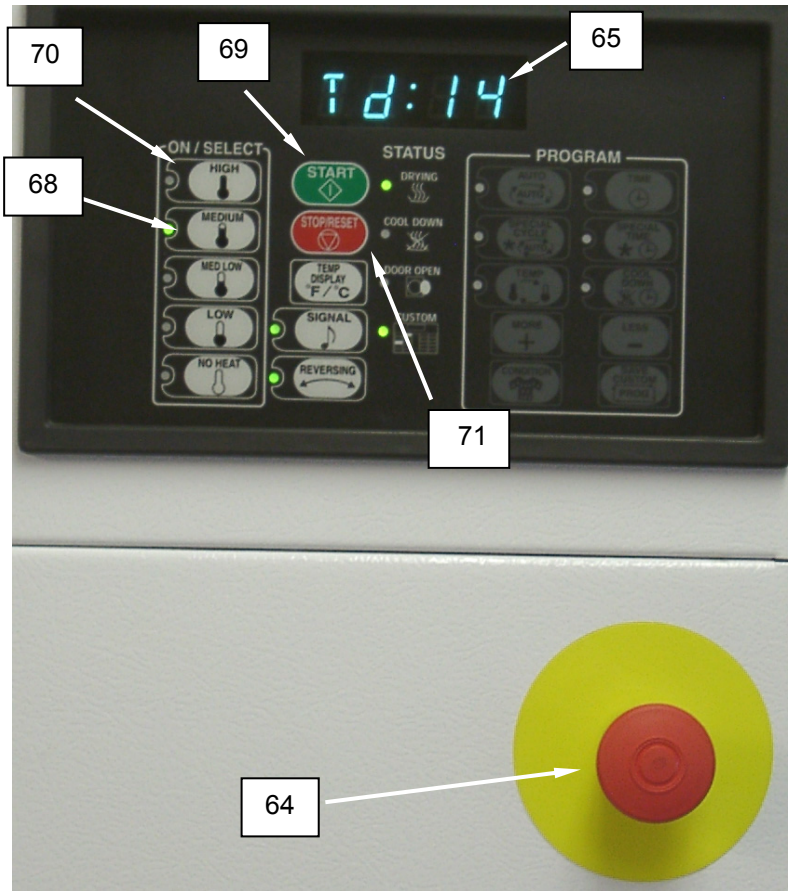




Figure 28. Operate the Dryer.

OPERATE THE DRYER-CONTINUED

Operate the Exhaust Fans

CAUTION

Operating the exhaust fans with the rainhoods closed may overheat the fan motors, causing either a temporary shutdown or permanent damage. Refer to WP 0007 00 for correct setup of the rainhoods.

Operate fans with EXHAUST FAN switch **(Figure 29, Item 72)** located on the PLC touchscreen as required.



Figure 29. Operate the Exhaust Fans.

OPERATE THE DRYER-CONTINUED

Operate the Blackout Lighting

NOTE

The blackout lighting will not operate unless the interior lighting is already on.

The Blackout Lighting is normally controlled at the PLC. Ensure the INT LIGHT switch is ON, and then touch the BLKOUT LIGHT switch **(Figure 30, Item 73)** to activate blackout lighting.

During a power outage situation, the emergency lighting will come on and remain on for as long as the battery backup has sufficient charge.

If the power in the CBL is turned off purposely as in a system shutdown situation, the blackout lighting must be turned off by switching the Emergency Lighting Override Switch **(Figure 30, Item 74)** to the OFF position. This will prevent the battery backup from being drawn down unnecessarily.

The battery backup recharge status can be monitored using the Recharge Status indicator light **(Figure 30, Item 75)**. The charge indicator will light if the battery is being charged.

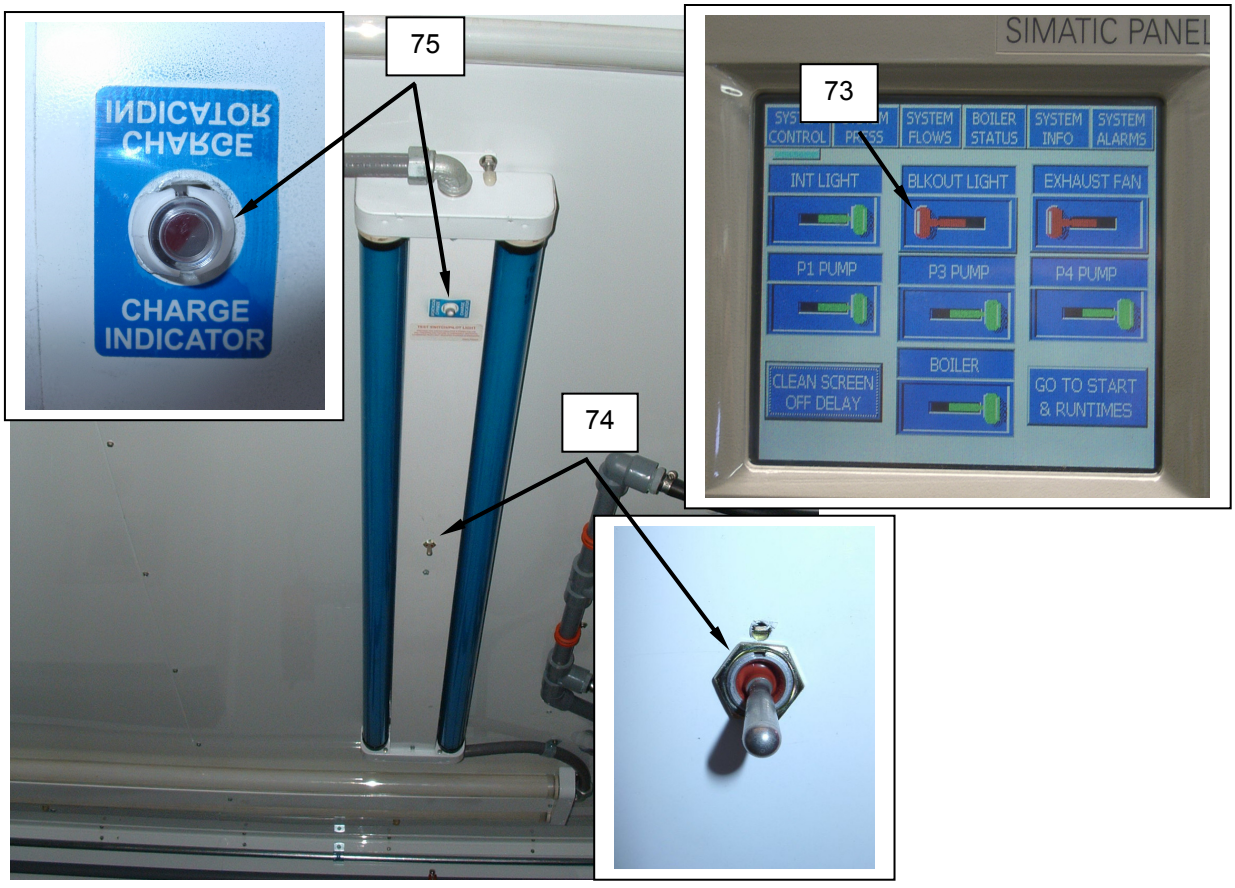


Figure 30. Operate the Blackout Lighting.

OPERATE THE DRYER-CONTINUED

Operate the Dryer Door Vents

1. To adjust the door vents, first remove the filters.

CAUTION

The louver adjustment is one-half turn of the control shaft from fully open to fully closed. Do not turn the shaft more than one-half turn. Failure to observe precautions will result in damage to the louver adjustment mechanism.

2. Loosen the two screws **(Figure 31, Item 76)** securing the control shaft **(Figure 31, Item 77)** in place.

3. The vent louvers may be closed or adjusted open to any position by turning the vent louver control shaft **(Figure 31, Item 76)** with an adjustable wrench.

4. When the vent louvers have been adjusted as desired, secure the control shaft **(Figure 31, Item 77)** in position by tightening the two screws **(Figure 31, Item 76)**.

5. Replace the filters.

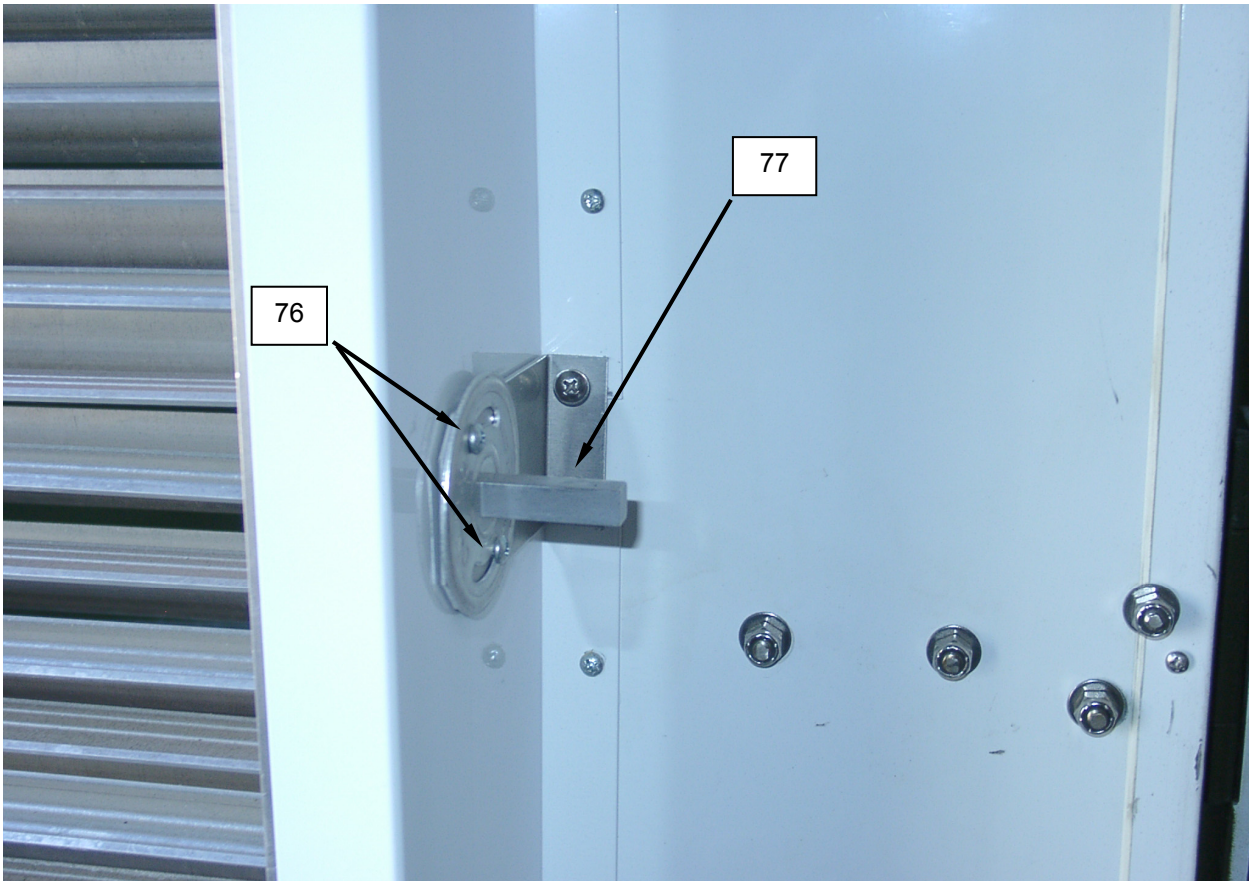


Figure 31. Operate the Door Vents.

OPERATE THE LAUNDRY CARTS



WARNING

Use extreme caution when handling soiled laundry. The CBL is designed to service hospital units, and the chance of exposure to sharp objects such as needles, knives, or medical instruments is likely. Sharp objects of this nature may be contaminated with body fluids such as blood, and may carry the chance of infection with disease as well. Use extreme caution when handling hospital laundry items, and inspect each and every item for the presence of sharp objects. Always wash hands after handling soiled laundry. Failure to observe safety precautions and to wear supplied safety equipment such as gloves, apron, and mask may result in serious injury, illness, or death to personnel.

NOTE

Laundry must be sorted as to type; for example, linens and BDU's require different wash cycles. Hospital garments and any items contaminated with blood should be washed as white linens.

1. Laundry should be sorted and placed into the laundry cart **(Figure 32, Item 78)** designated for soiled materials for delivery to the washers.

2. Washed articles should be placed on the transfer top **(Figure 32, Item 79)** for transfer to the dryers.

3. Cleaned and dried materials should be placed in the laundry cart **(Figure 32, Item 78)** designated for clean materials and processed in the TEMPER workspace. Ensure there is no contamination of outgoing cleaned and dried materials by soiled incoming materials.

4. Clean and sanitize the laundry carts **(Figure 32, Item 78)** and transfer top **(Figure 32, Item 79)** daily IAW TB MED 577.

OPERATE THE LAUNDRY CARTS-CONTINUED



Figure 32. Operate the Laundry Carts.

END OF WORK PACKAGE

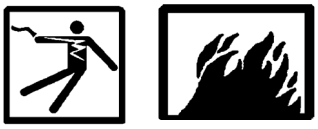
OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER USUAL CONDITIONS - OPERATING PROCEDURES-CONTINUED

OPERATING PROCEDURES

Programmable Logic Control (PLC)

Ensure the CBL has been set up IAW procedures given in WP 0006 00 and WP 0007 00. Ensure that the CBL is properly grounded, and has the correct graywater, water, and electrical connections. Ensure the main breaker, dryer breakers, and all subsidiary breakers have been switched to the ON position. When the CBL is properly set up, the PLC control panel will be lit and showing the display **(Figure 1, Item 1)** presented in Figure 1.

Emergency Shutdown Switch



WARNING

The Emergency Shutdown Switch will not operate if the PLC is inoperative. Failure to observe safety precautions in this event may result in serious injury or death to personnel as well as severe damage to the CBL and associated equipment.

CAUTION

Do not pull out on the emergency shutoff switch or it may be damaged. The emergency shutoff switch is a momentary switch that will spring back when pressed.

In the event of an emergency where it is necessary to shut down all systems within the CBL, an emergency shutdown switch **(Figure 1, Item 2)** is provided. To activate the emergency shutdown switch, push the switch in. The emergency switch is a momentary switch that will spring out after being pressed in.

NOTE

This switch is for emergency use only and should never be used for normal system shutdown.

Activating the emergency shutdown switch will immediately trip the main circuit breaker in the main power panel and the two main circuit breakers for the dryers. First, correct the problem that created the emergency and then reset the main circuit breakers at the main power panel and the dryer breaker panel.

OPERATING PROCEDURES-CONTINUED

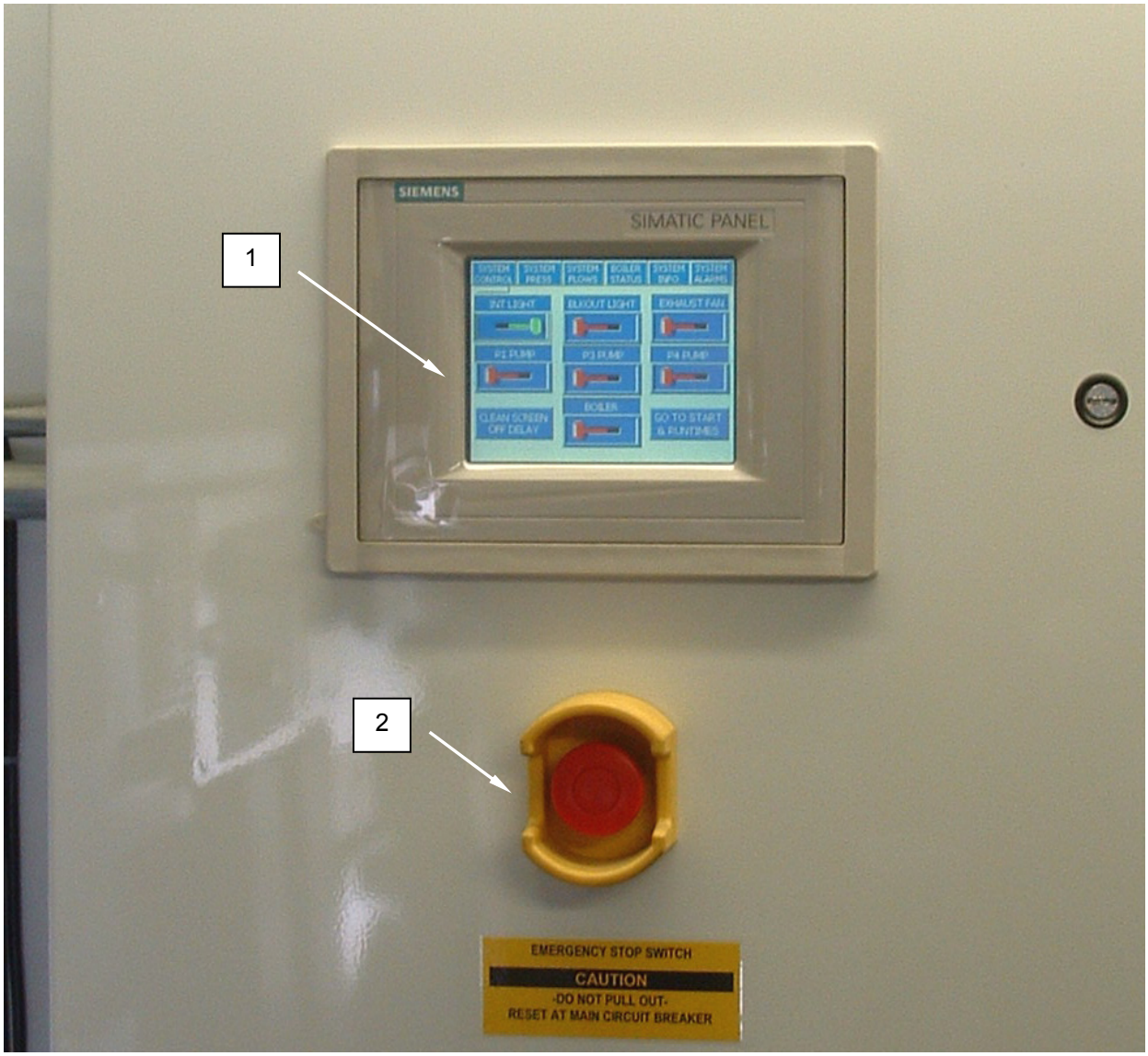


Figure 1. PLC Control Panel.

SYSTEM CONTROLS

Selecting the SYSTEM CONTROL Display

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen, rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

The PLC is programmed to control and monitor the main system controls and reuse filtration system of the CBL. The functions are selected through separate displays presented on the PLC screen. The displays may be selected by touching the tab at the top of the screen.

When the PLC is powered up, the System Control display **(Figure 2, Item 1)** is presented. If a System Control function is desired, and the System Control screen is not displayed, touch the System Control tab to access the screen. An indicator bar or highlight will indicate that the System Control screen is presented.



Figure 2. Selecting the System Control Display.

SYSTEM CONTROLS-CONTINUED

Operate the Interior Lighting

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen, rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

1. Ensure the SYSTEM CONTROL **(Figure 3, Item 1)** screen is displayed.

2. Turn the INT LIGHT switch **(Figure 3, Item 2)** to the ON position. The switch will turn green when the switch is ON and red when the switch is OFF.

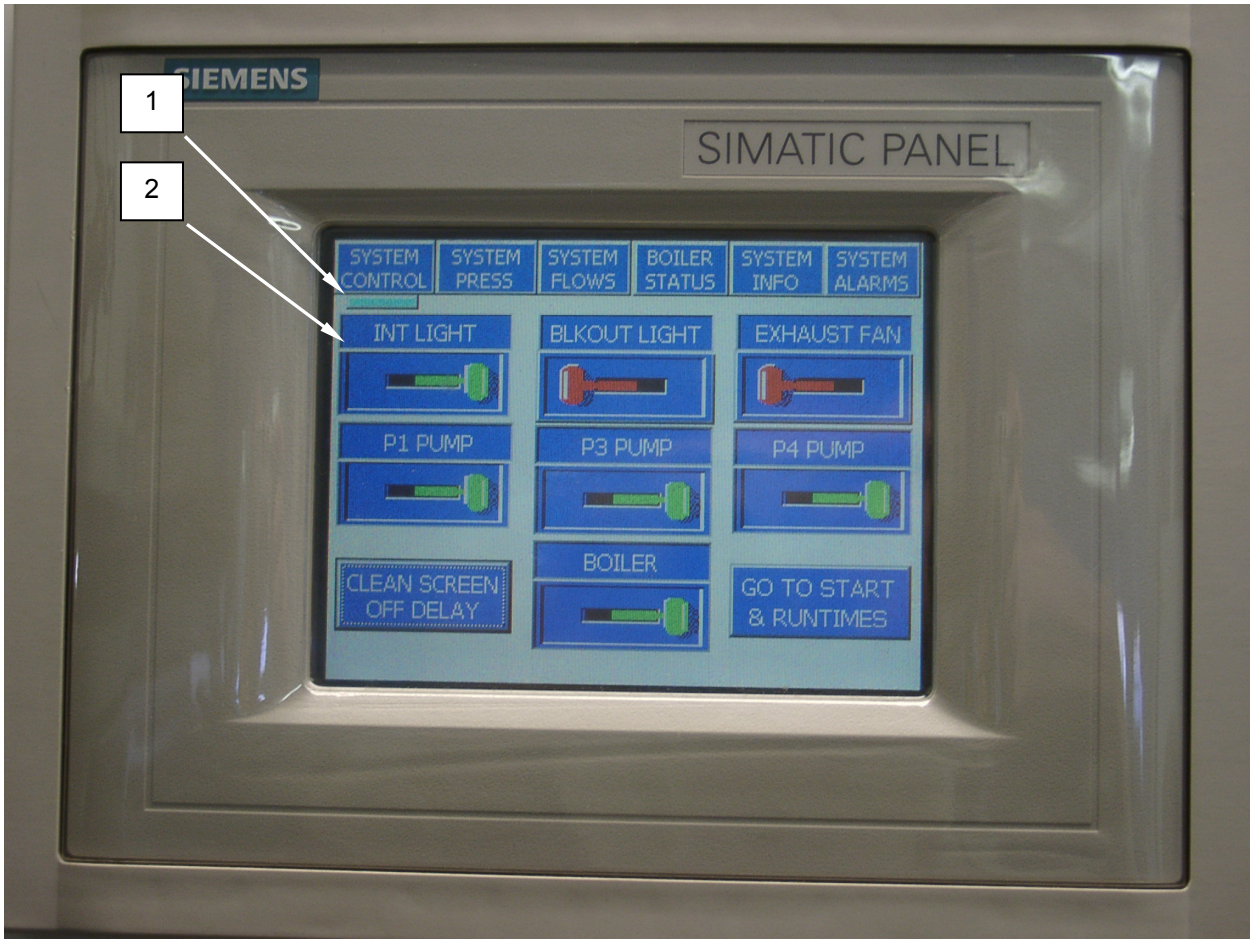


Figure 3. Operate the Interior Lighting.

SYSTEM CONTROLS-CONTINUED

Operate the Blackout Lighting

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen, rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

1. Ensure the System Control **(Figure 4, Item 1)** screen is displayed, and the INT LIGHT **(Figure 4, Item 2)** switch is ON. The blackout lighting will only function if the interior lighting switch is ON.

2. Turn the BLKOUT LIGHT switch **(Figure 4, Item 3)** to the ON position. The switch will turn green when the switch is ON and red when the switch is OFF. The lighting will change from standard interior lighting to blackout lighting.

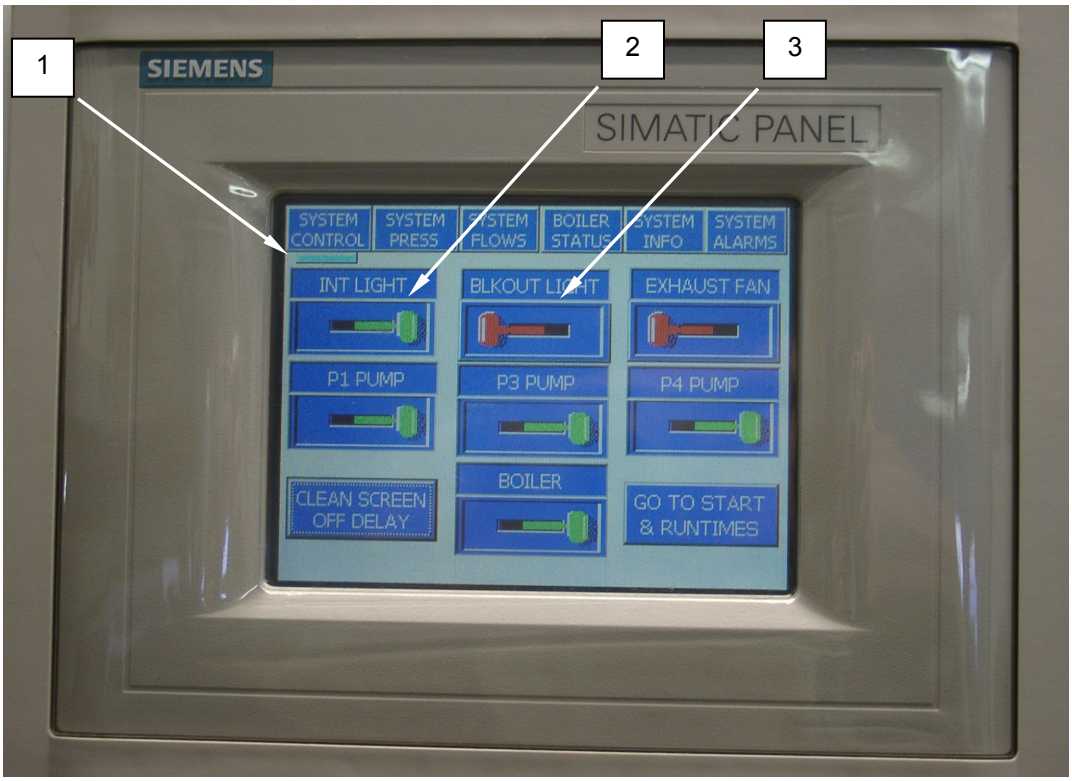


Figure 4. Operate the Blackout Lighting.

SYSTEM CONTROLS-CONTINUED

Operate the Exhaust Fans

CAUTION

Operating the exhaust fans with the rainhoods closed may overheat the fan motors, causing either a temporary shutdown or permanent damage. Refer to WP 0007 00 for correct setup of the rainhoods.

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen, rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

1. Ensure the System Control **(Figure 5, Item 1)** screen is displayed.

2. Turn the exhaust fan switch **(Figure 5, Item 2)** to the ON position. The switch will turn green when the switch is ON and red when the switch is OFF.

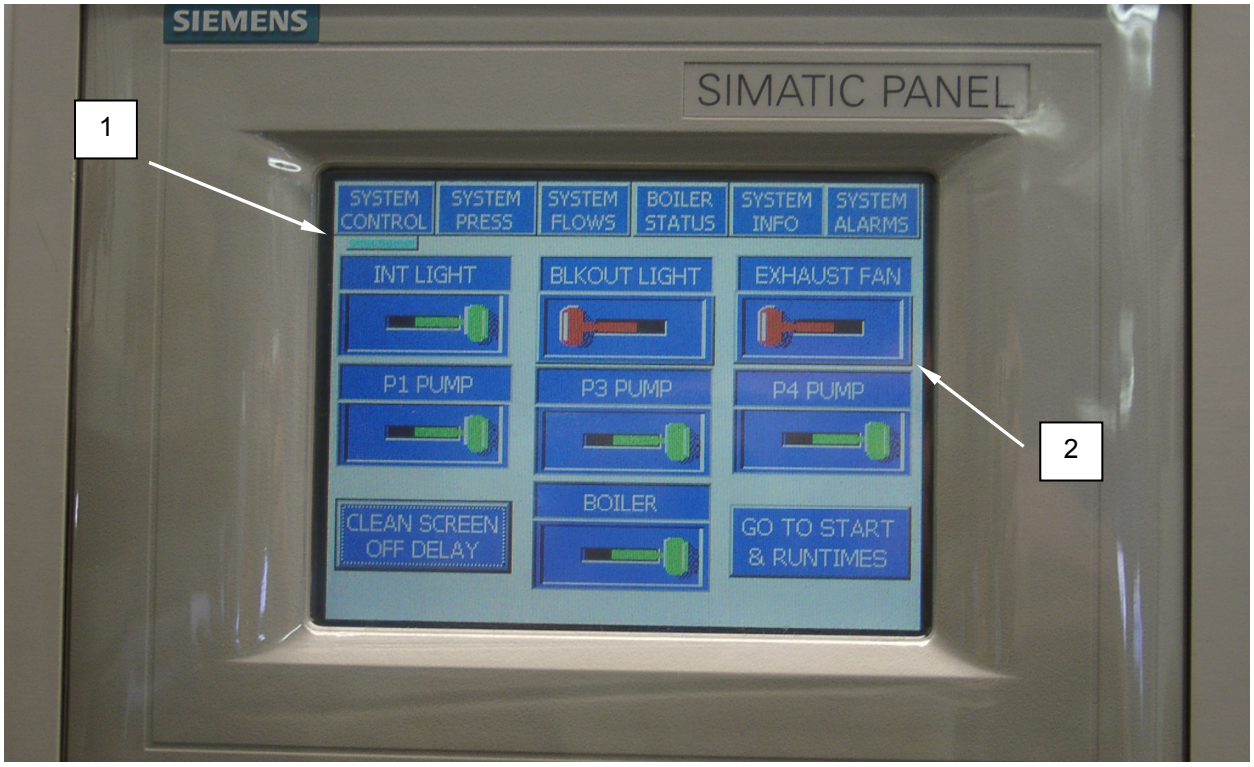


Figure 5. Operate the Exhaust Fans.

SYSTEM CONTROLS-CONTINUED

Operate the P-1, P-3, and P-4 Pumps

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen, rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

1. Ensure the System Control **(Figure 6, Item 1)** screen is displayed.

2. Turn the P-1 PUMP **(Figure 6, Item 2)**, P-3 PUMP **(Figure 6, Item 3)**, and P-4 PUMP switches **(Figure 6, Item 4)** to the ON position. The switches will turn green when the switch is ON and red when the switch is OFF. Each pump may be switched ON and OFF individually, as desired.

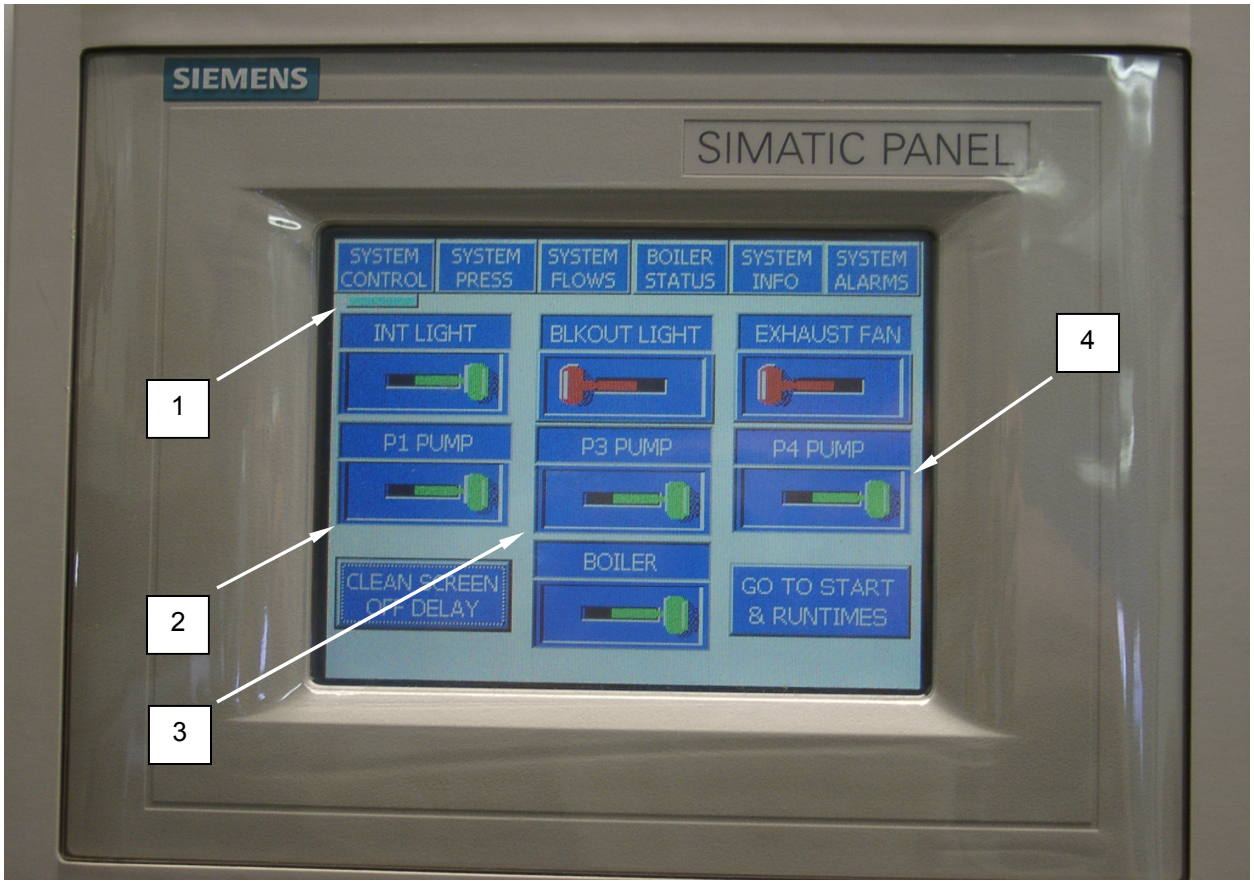


Figure 6. Operate the P-1, P-3, and P-4 Pumps.

SYSTEM CONTROLS-CONTINUED

Operate the Boiler

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen, rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

1. Ensure the System Control **(Figure 7, Item 1)** screen is displayed.

2. Turn the BOILER switch **(Figure 7, Item 2)** to the ON position. The switches will turn green when the switch is ON and red when the switch is OFF.

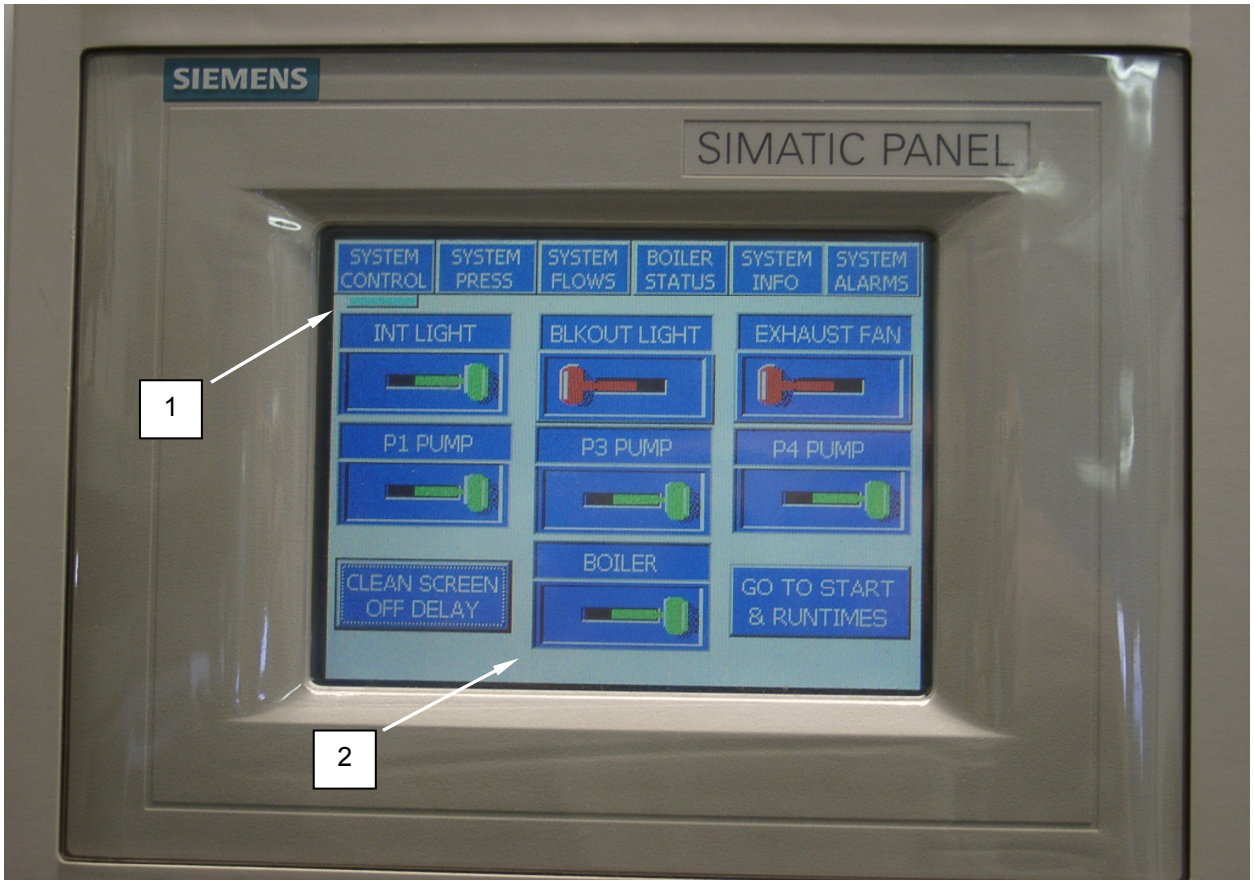


Figure 7. Operate the Boiler.

SYSTEM CONTROLS-CONTINUED

Operate the Clean Screen off Delay

CAUTION

Use a damp cloth with mild detergent as necessary to clean PLC touch screen. Never use a cleaning agent with abrasives. Failure to use proper cleaning agent may damage the touch screen cover.

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

NOTE

Do not attempt to clean the touch screen unless the delay is activated. Cleaning the touch screen with an active display may result in CBL system malfunctions.

1. Ensure the System Control **(Figure 8, Item 1)** screen is displayed.
2. Touch the CLEAN SCREEN OFF DELAY BUTTON **(Figure 8, Item 2)**.
3. The screen displayed in Figure 9 will appear. While this screen is displayed, the touch screen may be cleaned. The bar indicator **(Figure 9, Item 1)** shows the delay time remaining.
4. If additional time is required to clean the touch screen, repeat the procedure starting at Step 1.

SYSTEM CONTROLS-CONTINUED

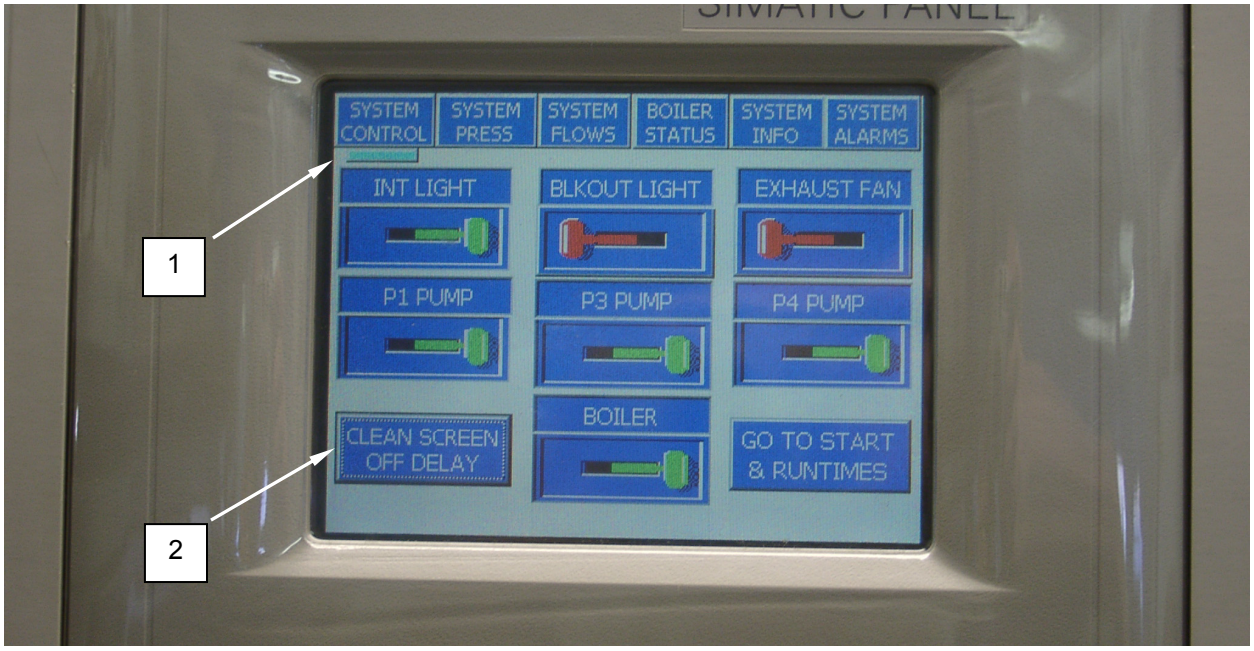


Figure 8. Operate the Clean Screen off Delay.

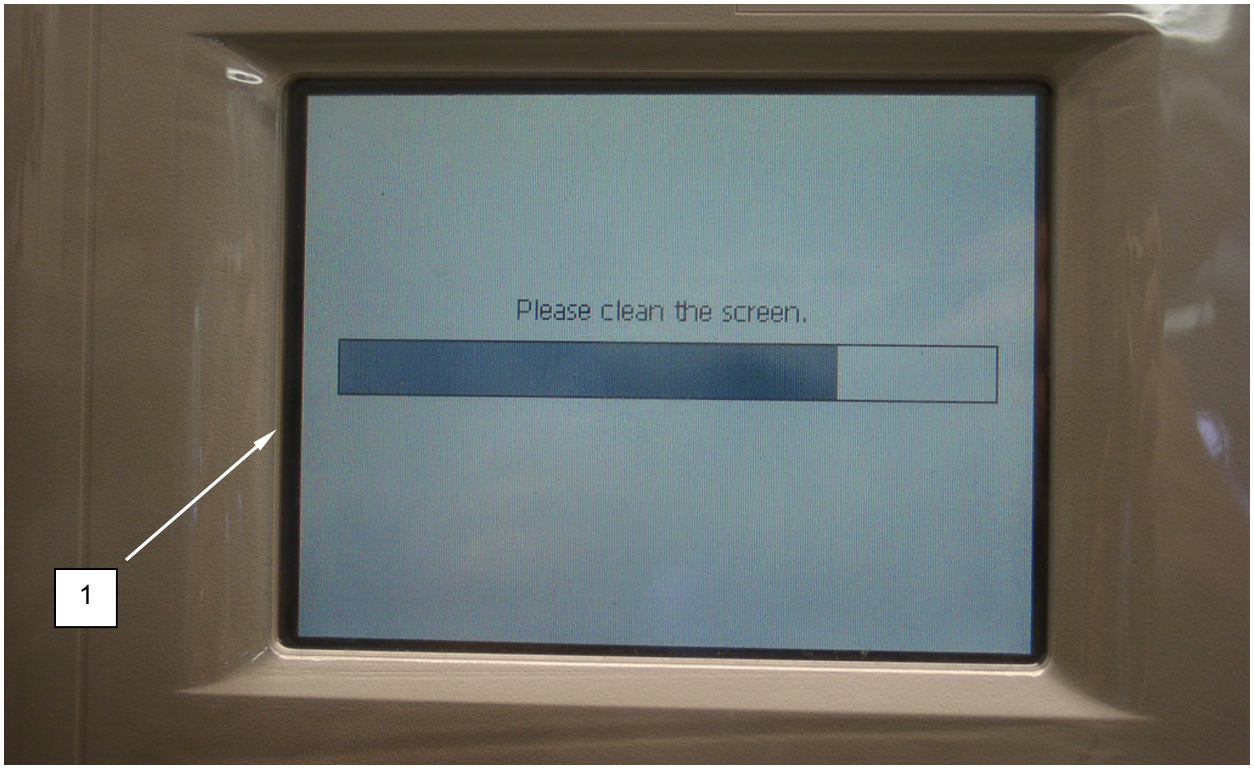


Figure 9. Clean Screen off Delay Display.

SYSTEM CONTROLS-CONTINUED

View the Start and Runtimes

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen, rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

1. Ensure the System Control **(Figure 10, Item 1)** screen is displayed.

2. Touch the GO TO START & RUNTIMES button **(Figure 10, Item 2)**.

The screen displayed in Figure 11 will appear. This display provides information on the runtimes for the P3 pump **(Figure 11, Item 1)**, P4 pump **(Figure 11, Item 2)**, and the boiler **(Figure 11, Item 3)**. The runtime information may be cleared from this screen.

3. If additional runtime information is required, touch the MORE RUNTIMES button **(Figure 11, Item 4)**.

The screen displayed in Figure 12 will appear. This display provides information on the runtimes for the carbon filter **(Figure 12, Item 1)** and the nanofilters **(Figure 12, Item 2)**. The runtime information may be cleared from this screen. To return to the previous runtimes display, touch the RETURN TO RUNTIMES button **(Figure 12, Item 3)**.

4. Press the System Control button **(Figure 10, Item 1)** to return to the System Control display.

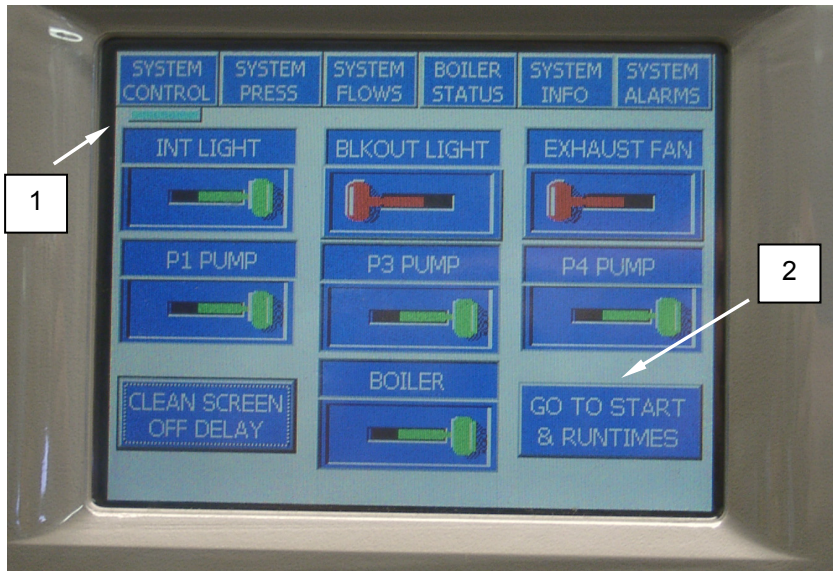


Figure 10. View the Start and Runtimes.

SYSTEM CONTROLS-CONTINUED

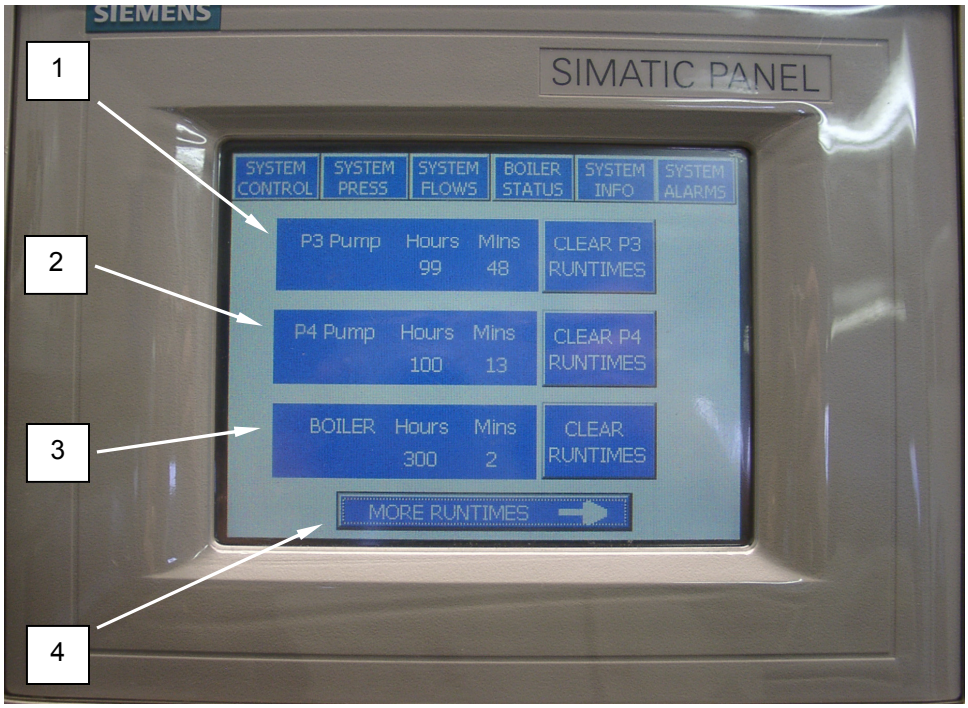


Figure 11. Runtimes Display.

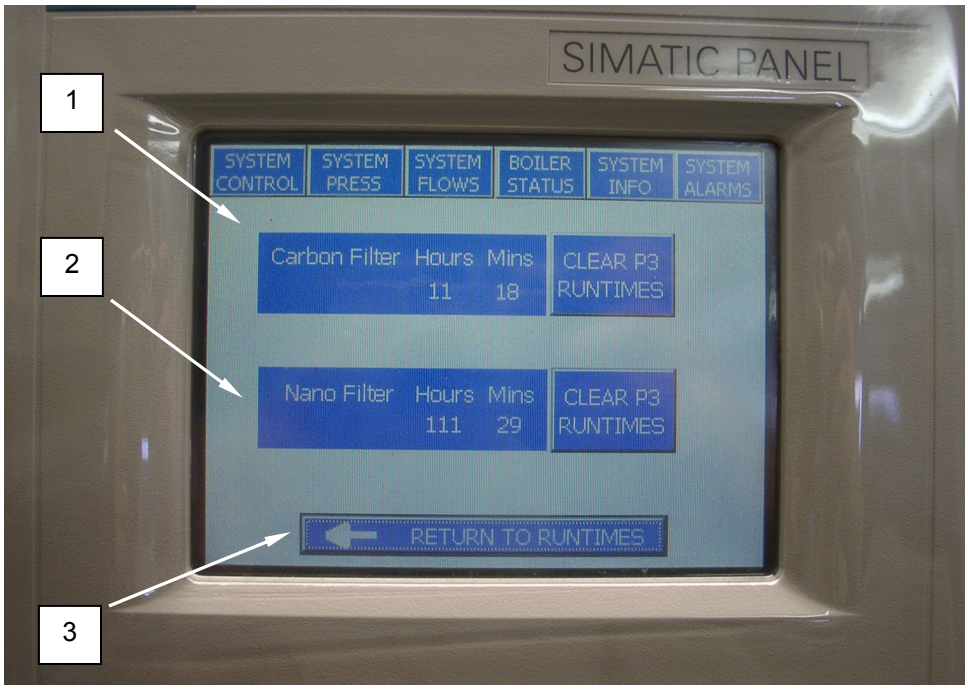


Figure 12. Additional Runtimes Display.

SYSTEM PRESSURES (SYSTEM PRESS MENU)

Selecting the SYSTEM PRESS Display

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen, rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

The PLC is programmed to control and monitor the operation of the CBL. The functions are selected through separate displays presented on the PLC screen. The displays may be selected by touching the tab at the top of the screen.

1. When the PLC is powered up, the System Control display **(Figure 13, Item 1)** is presented. If a system press function is desired, touch the system press tab **(Figure 13, Item 2)** to access the screen. An indicator bar or highlight will indicate that the system press screen is presented.

The PLC will show the display in Figure 14. The bar graphs **(Figure 14, Item 1)** indicate the status of the pressure differentials across the system filters. The differential pressure is the difference between the outlet pressure and the inlet pressure. The PLC displays the differential pressure across the F-1 (bag filter), F-2 filter, F-3 filter, and nanofilters. The bar graph will indicate green when the filter is operating in a normal range. The bar graph will indicate RED when the pressure is HIGH. The PLC will activate an alarm at a preset value for each filter when the pressure is above normal operating limits. See alarm section for further details.

2. Press the NEXT button **(Figure 14, Item 2)** to access additional system pressures for the system and the P-3 pump. Press BACK button **(Figure 15, Item 1)** to return to the previous display, or System Control **(Figure 15, Item 2)** to return to the System Control menu.

SYSTEM PRESSURES (SYSTEM PRESS MENU)-CONTINUED

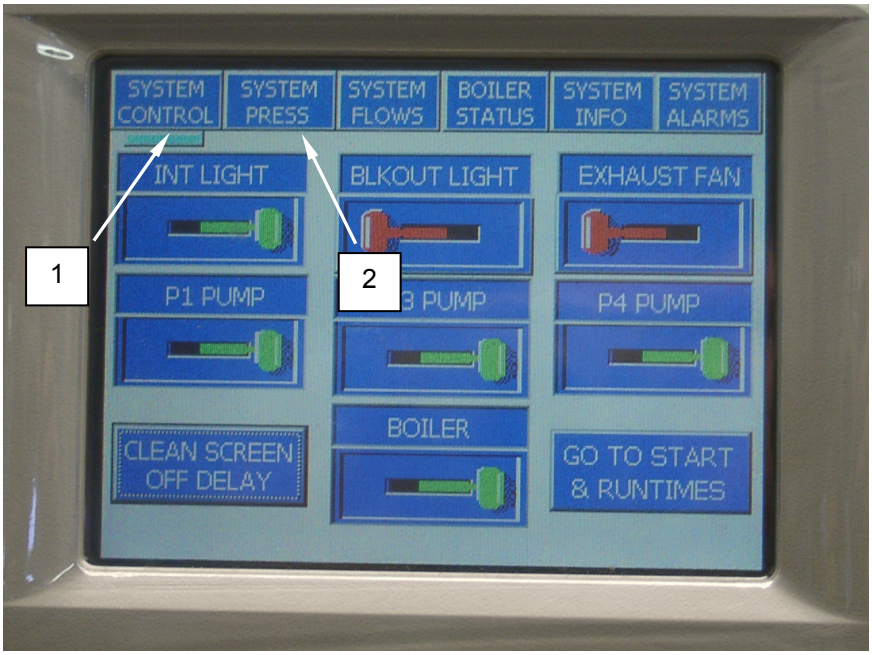


Figure 13. Selecting the System Press Display.

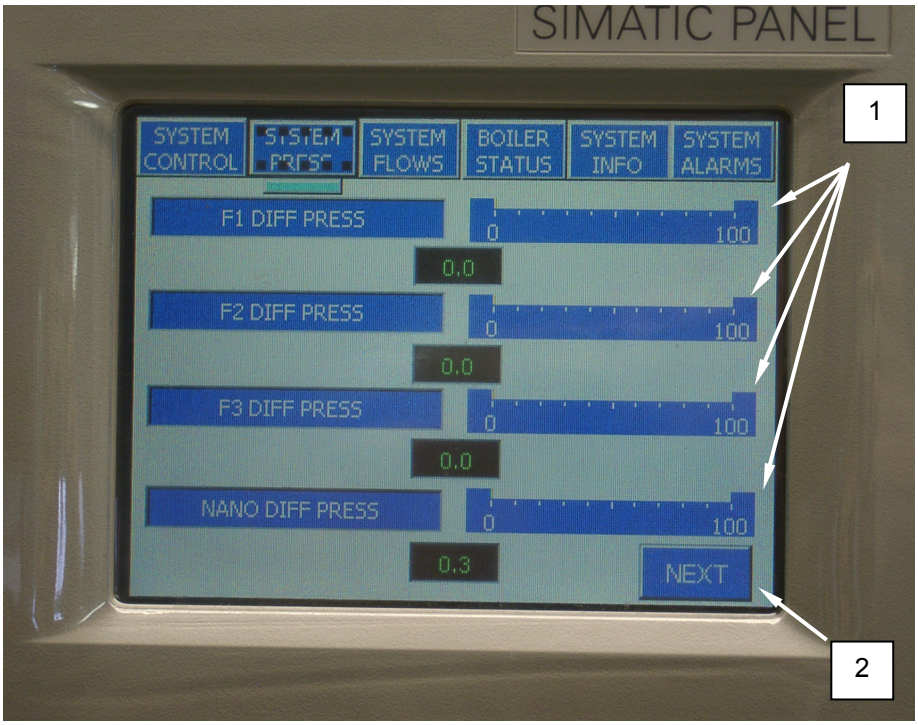


Figure 14. System Press Display.

SYSTEM PRESSURES (SYSTEM PRESS MENU)-CONTINUED

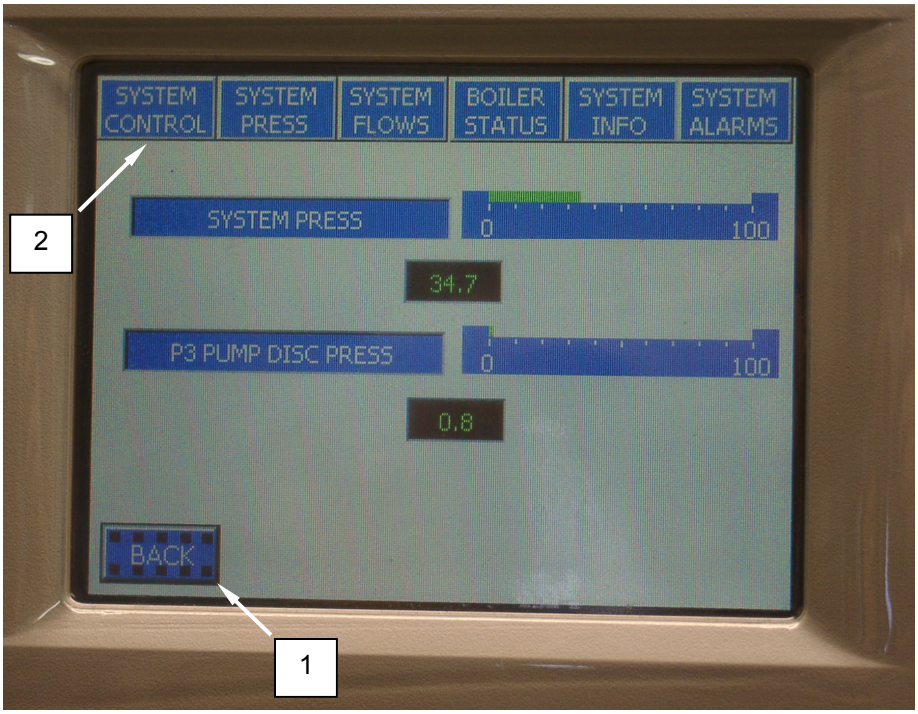


Figure 15. Additional System Press Display.

SYSTEM FLOWS

Selecting the SYSTEM FLOWS Display

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen, rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

The PLC is programmed to control and monitor the operation of the CBL. The functions are selected through separate displays presented on the PLC screen. The displays may be selected by touching the tab at the top of the screen.

1. When the PLC is powered up, the System Control display **(Figure 16, Item 1)** is presented. If a SYSTEM FLOWS function is desired, touch the SYSTEM FLOWS tab **(Figure 16, Item 2)** to access the screen. An indicator bar or highlight will indicate that the SYSTEM FLOWS screen is presented.

The PLC will show the display in Figure 17. The bar graphs **(Figure 17, Item 1)** indicate the flow in various system loops. The PLC will regulate the flow of each water loop to a preset value by monitoring the flow and sending a control signal to the corresponding actuator. The automatic adjusting of the valve actuator will maintain flow within normal operating limits and will display green. The PLC will notify the operator with flow alarm if insufficient flow is present, and display will be RED. See alarm section for further details.

2. Press System Control **(Figure 17, Item 2)** to return to the System Control menu.

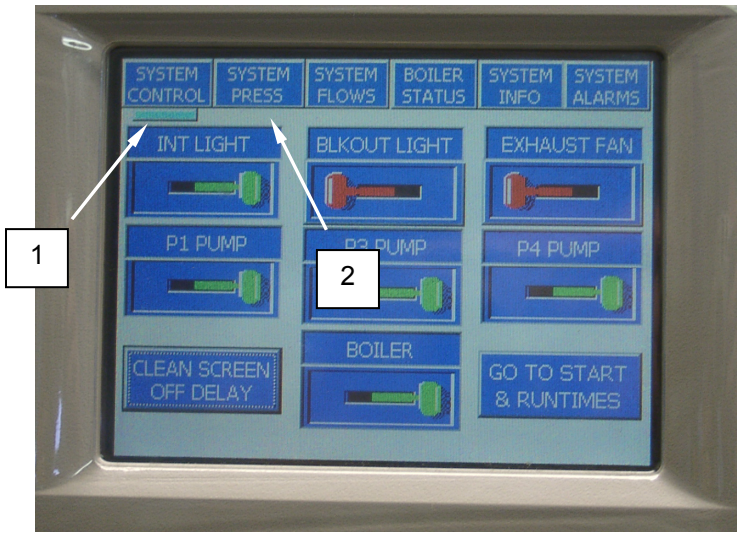


Figure 16. Selecting the System Flows Display.

SYSTEM FLOWS-CONTINUED

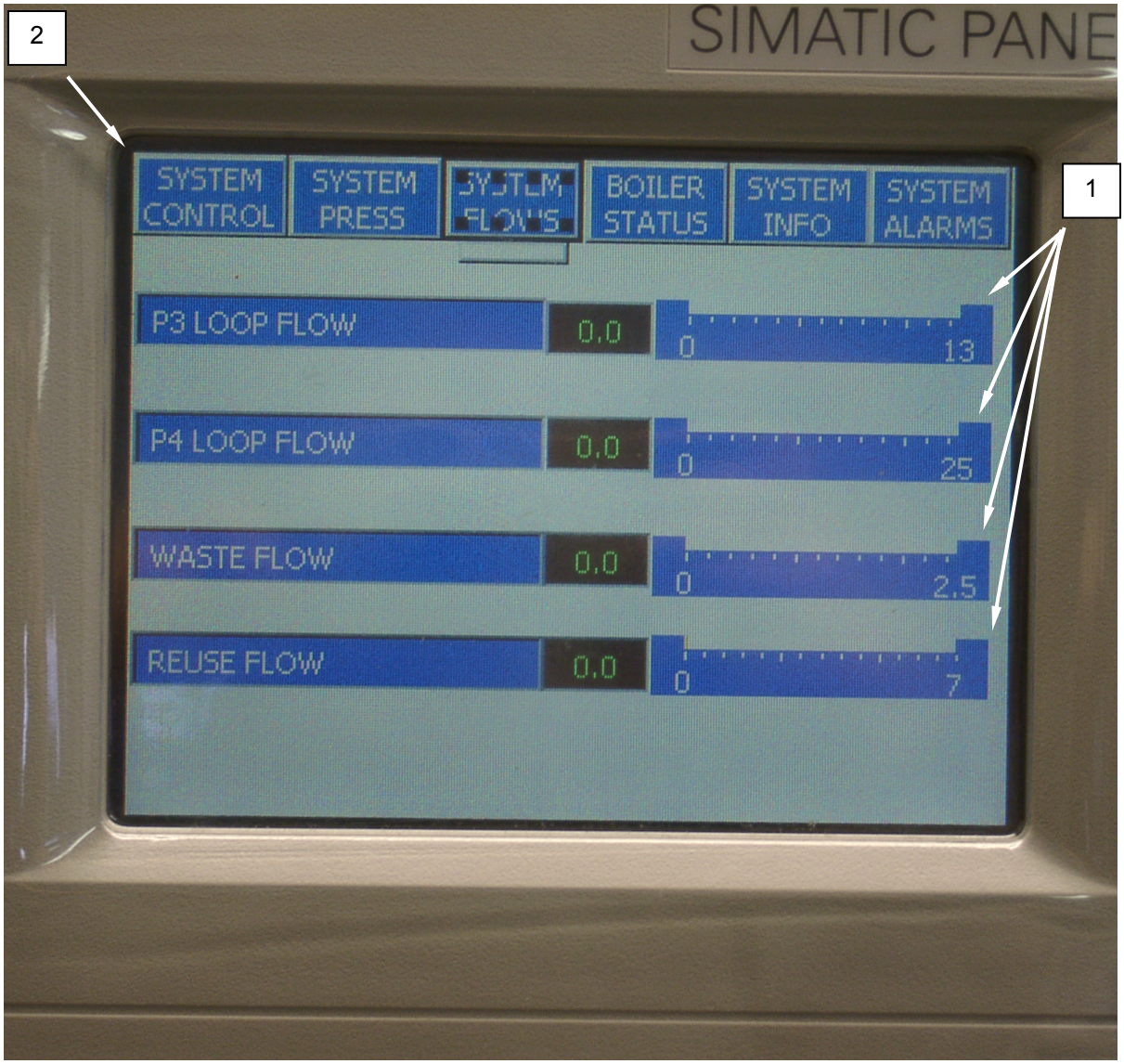


Figure 17. System Flows Display.

BOILER STATUS

Selecting the BOILER STATUS Display

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen, rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

The PLC is programmed to control and monitor the operation of the CBL. The functions are selected through separate displays presented on the PLC screen. The displays may be selected by touching the tab at the top of the screen.

1. When the PLC is powered up, the System Control display **(Figure 18, Item 1)** is presented. If a BOILER STATUS function is desired, touch the BOILER STATUS tab **(Figure 18, Item 2)** to access the screen. An indicator bar or highlight will indicate that the BOILER STATUS screen is presented.

The PLC will show the display in Figure 19. The green bars indicate the status of the boiler electrical power **(Figure 19, Item 1)**, boiler glycol level **(Figure 19, Item 2)**, boiler glycol temperature **(Figure 19, Item 3)**, and burner operation **(Figure 19, Item 4)**. The PLC indicates normal operation by displaying green. The PLC monitors the boiler glycol level, glycol temperature, and burner control module. In the event of an alarm condition the PLC will display this item in RED and generate an alarm. See the alarm section for further details.

2. Press System Control **(Figure 19, Item 5)** to return to the System Control menu.

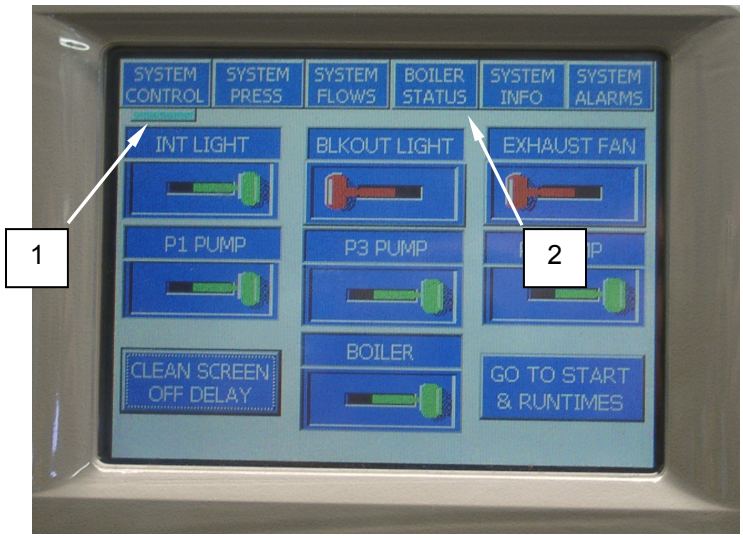


Figure 18. Selecting the Boiler Status Display.

BOILER STATUS-CONTINUED

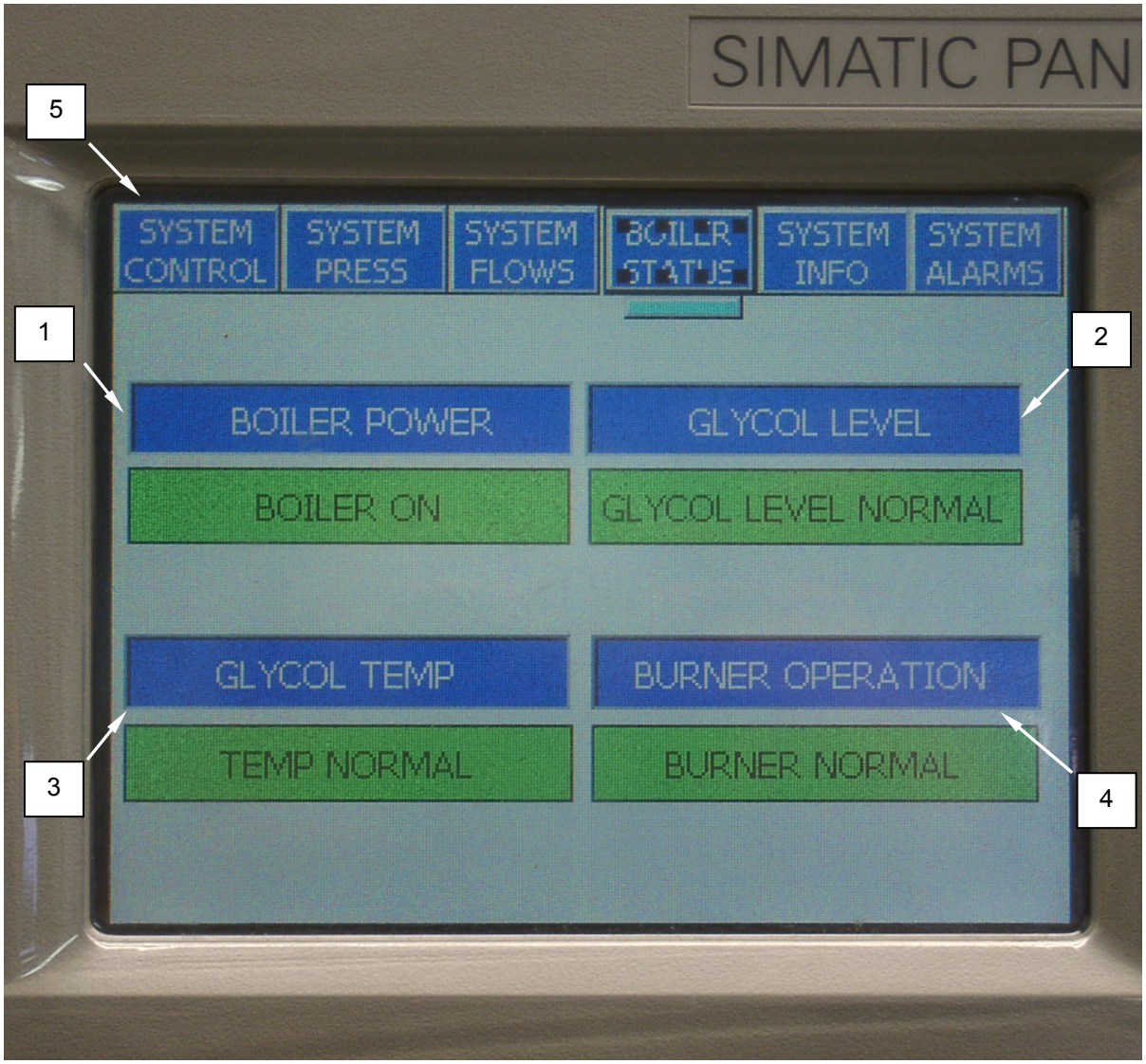


Figure 19. Boiler Status Display.

SYSTEM INFORMATION (SYSTEM INFO MENU)

Selecting the SYSTEM INFO Display

CAUTION

Use extreme caution when accessing SYSTEM INFO functions. Unauthorized or careless use of these functions could render the PLC inoperative. In the event this happens the CBL may still be operated manually.

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen, rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

NOTE

Many SYSTEM INFORMATION screens are password protected. These screens access setup functions for the PLC, and should not be accessed by the operator. Only those screens accessible to the operator are addressed here.

The PLC is programmed to control and monitor the operation of the CBL. The functions are selected through separate displays presented on the PLC screen. The displays may be selected by touching the tab at the top of the screen.

1. When the PLC is powered up, the System Control display **(Figure 20, Item 1)** is presented. If a SYSTEM INFO function is desired, touch the SYSTEM INFO tab **(Figure 20, Item 2)** to access the screen. An indicator bar or highlight will indicate that the SYSTEM INFO screen is presented.

The PLC will show the display in Figure 21. Each button provides access to a menu function.

2. Press System Control **(Figure 21, Item 1)** to return to the System Control menu.

SYSTEM INFORMATION (SYSTEM INFO MENU)-CONTINUED

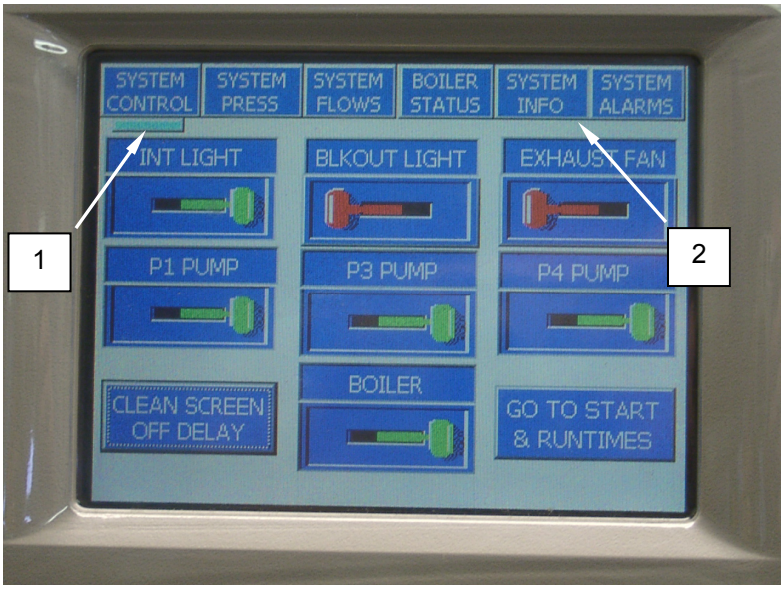


Figure 20. Selecting the System Info Display.

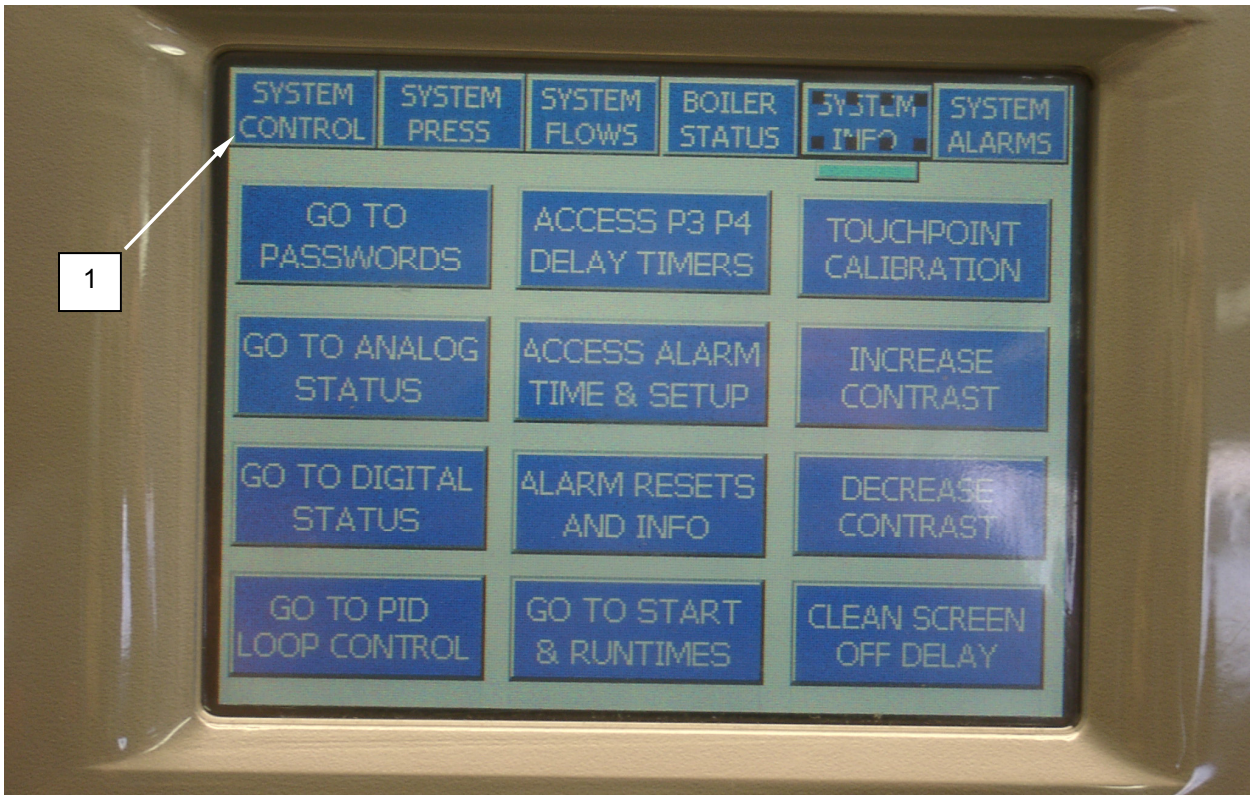


Figure 21. System Info Display.

SYSTEM INFORMATION (SYSTEM INFO MENU)-CONTINUED

Touchpoint Calibration

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen, rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

The Touchpoint Calibration screen is used to align the screen touchpoint locations with the display. Follow the onscreen directions to perform the calibration procedure.

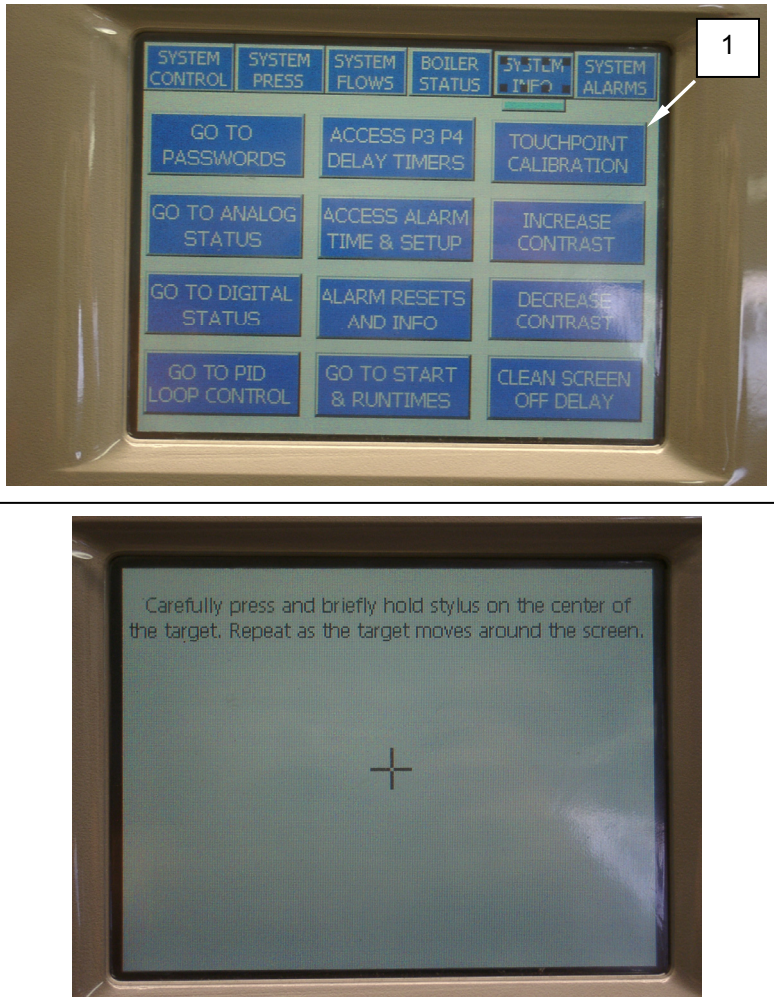


Figure 22. Touchpoint Calibration.

SYSTEM INFORMATION (SYSTEM INFO MENU)-CONTINUED

System Alarms

CAUTION

Unless instructed otherwise in this manual, use a bare or gloved finger to operate the PLC touch screen. Use of writing instruments, screws, nails, or metal tools may damage the touch screen, rendering the PLC inoperative.

NOTE

When operating the touch screens on the PLC, use light finger pressure to operate switches and menus.

The PLC is programmed to control and monitor the operation of the CBL. The functions are selected through separate displays presented on the PLC screen. The displays may be selected by touching the tab at the top of the screen.

When a system alarm is triggered, the following screen will be displayed. Make note of the component which requires service, and press ACK **(Figure 23, Item 1)** to acknowledge and silence the alarm. If a caution flag **(Figure 23, Item 2)** is still displayed on this screen after reset, the alarm has not been properly reset.

For further information about PLC functions press HELP **(Figure 23, Item 3**).

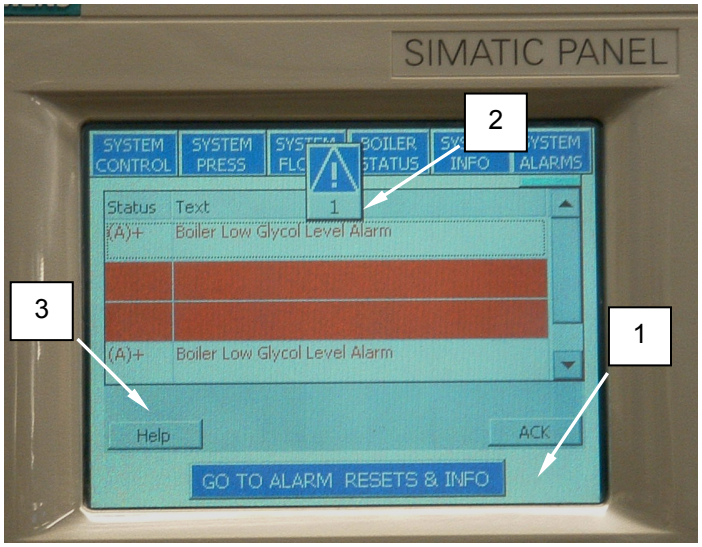


Figure 23. Acknowledging System Alarms.

After the required service has been performed to correct the cause of the alarm, the alarm must be reset. This may be done from the SYSTEM INFO tab. For example, if Filter F-2 had required service, press ACCESS ALARM INFO & RESETS **(Figure 24, Item 2)**. On the screen that follows, press F2 MICRON RESET **(Figure 24, Item 3)**. The boiler must be shut down and restarted to reset its alarm. The menu of available sensor failure alarms is depicted in Figure 30.

SYSTEM INFORMATION (SYSTEM INFO MENU)-CONTINUED

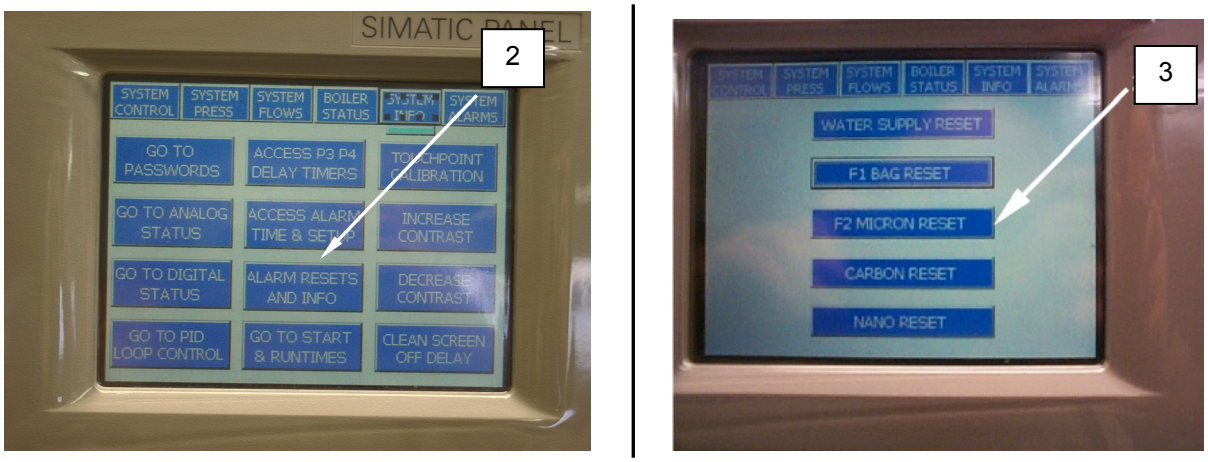


Figure 24. Resetting System Alarms.



Figure 25. System Alarms.

SYSTEM INFORMATION (SYSTEM INFO MENU)-CONTINUED

PLC Emergency Bypass Switches



WARNING

The Emergency Shutdown Switch will not operate if the PLC is inoperative. Failure to observe safety precautions in this event may result in serious injury or death to personnel as well as severe damage to the CBL and associated equipment.

CAUTION

Do not operate the PLC Emergency Bypass switches unless an actual malfunction has been confirmed by unit maintenance personnel. Improper use of the emergency bypass switches may result in damage to CBL systems equipment.

NOTE

No filtration functions are available if the PLC is inoperative. Water use must be taken into consideration when using a CBL with an inoperative PLC.

The PLC Emergency Bypass Switches may be accessed by opening the control panel **(Figure 26, Item 1)**. Do not leave the control panel open unless the switches are being switched ON or OFF.

The P-1 pump **(Figure 27, Item 1)**, the boiler **(Figure 27, Item 2)**, the exhaust fans **(Figure 27, Item 3)**, the interior lights **(Figure 27, Item 4)**, and the blackout lights **(Figure 27, Item 5)** can be manually operated. A 5A circuit breaker **(Figure 27, Item 6)** protects the system. Refer to WP 0018 00, Manual Operation, for information on operating the CBL without a functional PLC.

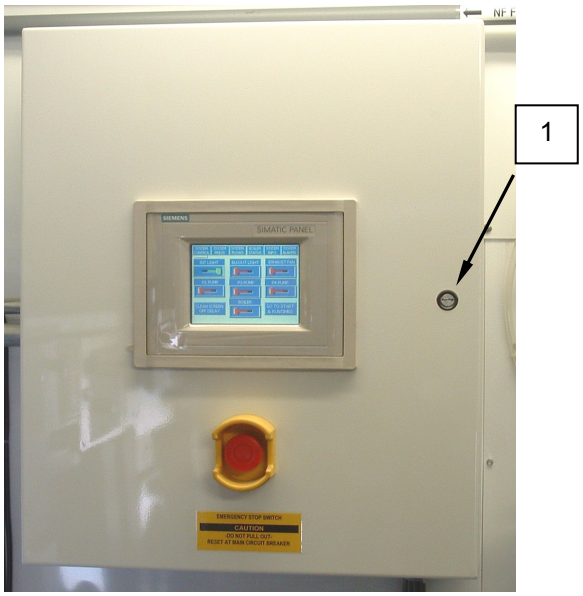


Figure 26. PLC Control Panel.

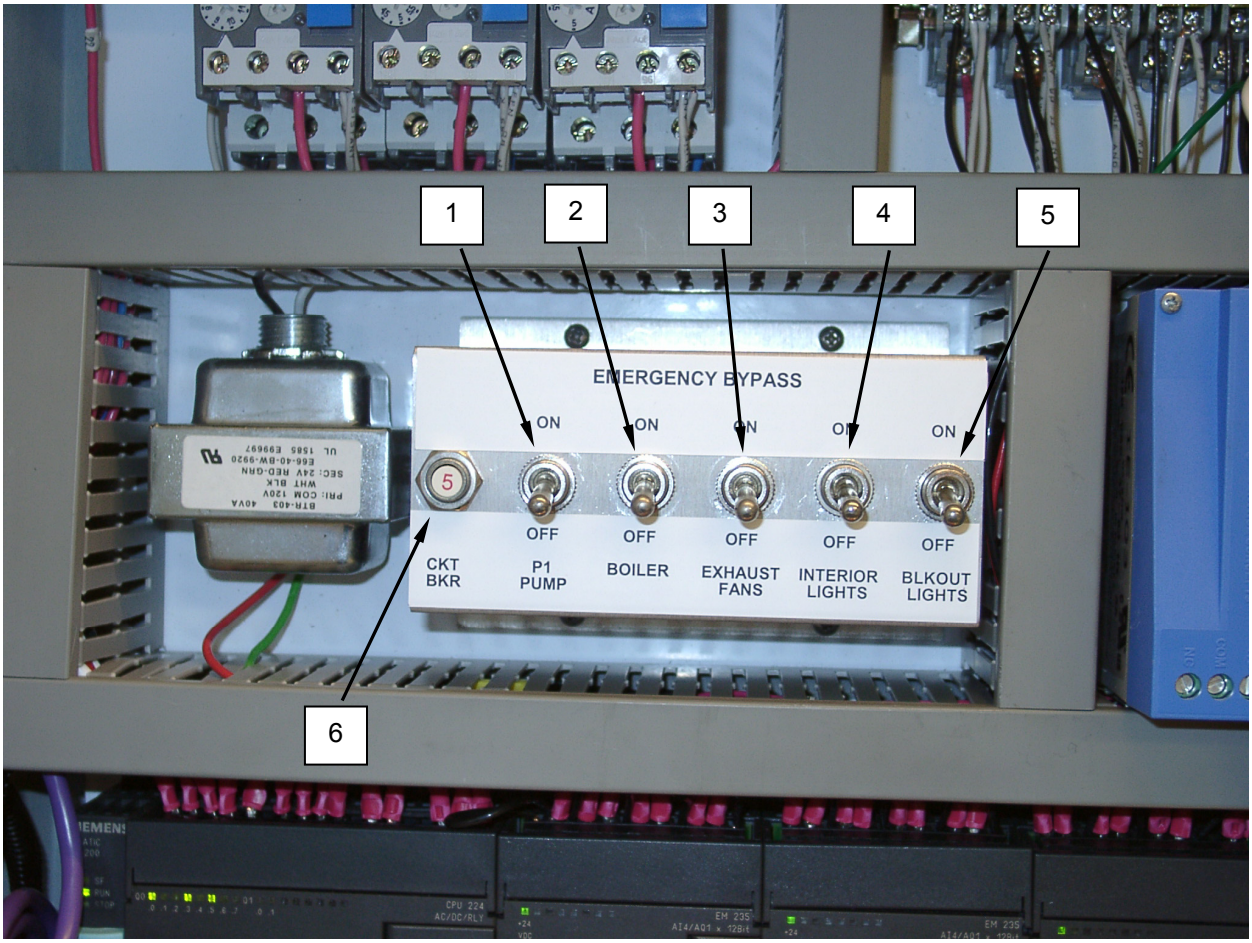


Figure 27. PLC Emergency Bypass Switches.

END OF WORK PACKAGE

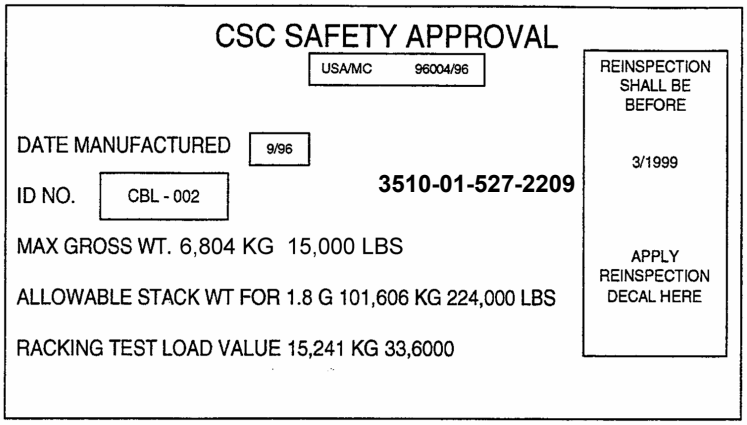
OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER USUAL CONDITIONS - DECALS AND INSTRUCTION PLATES

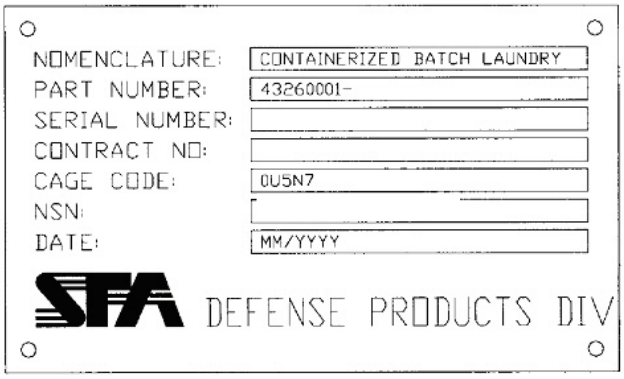
DECALS AND INSTRUCTION PLATES

General

This work package provides a description and location of Containerized Batch Laundry (CBL) controls and indicators. Personnel operating and maintaining the CBL should know the location and proper use of every control and indicator.

U.S. Army data plates, located on the washer double service doors, contain the following information:





DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates.

Decal	Description and Location
AIR COMPRESSOR	Placed on air compressor tank.
AUTOMATIC SOAP DISPENSER	Located on bulkhead, adjacent to Automatic Soap Dispenser.
AUTOMATIC SOAP DISPENSER MAIN POWER RECEPTACLE	Located on bulkhead, adjacent to Automatic Soap Dispenser.
BAG FILTER (F-1A)	Located on Filter F-1A, in center operating area.
BAG FILTER (F-1B)	Located on Filter F-1B, in center operating area.
BLEACH	Located on bulkhead, adjacent to Automatic Soap Dispenser.
BOILER FUEL FILTER	Located on boiler frame.
BOILER RELIEF VALVE	Located on boiler adjacent to relief valve.
BOILER WATER INLET DRAIN VALVE (V-38)	Located adjacent to Valve V-38 behind the washers.
BOILER WATER OUTLET DRAIN VALVE (V-37)	Located adjacent to Valve V-37 behind the washers.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
BURNER SETTINGS OIL: 175PSI HEAD: 4 AIR BAND: 3 AIR SHUTTER: 6	Located on burner.
CARBON FILTER **(F-3)**	Located on Filter F-3, in center operating area.
CARTRIDGE FILTER **(F-2)**	Located on Filter F-2, in center operating area.
CAUTION **DO NOT OPERATE UNLESS LIGHTS ARE LIT**	Located adjacent to the Phase Indicator Lights on dryer side of container.
CAUTION DO NOT OPERATE UNLESS LIGHT IS LIT	Located adjacent to the Phase Indicator Light on washer side of container.
CAUTION DO NOT OPEN DOOR WHILE IN OPERATION DO NOT OVERLOAD DO NOT PUSH DOOR AGAINST CLOTHING WHEN CLOSING	Located on dryer.
CAUTION **DO NOT OVERTIGHTEN**	Located on filter canisters.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
CAUTION KEEP DOOR CLOSED DURING LAUNDRY OPERATIONS	Caution label on washer and dryer end service doors.
CAUTION OPEN RAINHOOD AND SECURE WITH PINS PRIOR TO OPERATION CLOSE RAINHOOD PRIOR TO CLOSING CONTAINER DOORS	Caution label on Rainhoods.
CAUTION PUMP MUST BE PRIMED AND VENTED PRIOR TO OPERATION	Caution label on P-1 Pump.
CAUTION REMOVE SHIPPING BRACKET AND SNUBBER BEFORE OPERATING INSTALL SHIPPING BRACKET AND SNUBBER BEFORE SHIPPING	Placard located on lower front surface of washer.
CAUTION ROTATING PARTS REMOVE POWER BEFORE SERVICING	Caution label on washers and exhaust fans.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
CIRCUIT BREAKER POSITIONS 1 MAIN 2 WASHER#1 RECEP. 3 MAIN 4 WASHER#1 RECEP. 5 MAIN 6 P-2 WTS TRANSFER PUMP 7 P-1 PUMP 8 CONTROL PANEL 9 P-1 PUMP 10 WASHER#2 RECEP. 11 INTERNAL LIGHTS 12 WASHER#2 RECEP. 13 P-5 WASTE PUMP RECEP. 14 P-4 PUMP 15 P-3 PUMP 16 P-4 PUMP 17 P-3 PUMP 18 P-4 PUMP 19 P-3 PUMP 20 SPARE 21 EXHAUST FANS 22 BOILER 23 60AMP SERVICE 24 SERVICE RECEP. 25 60 AMP SERVICE 26 SPARE 27 60 AMP SERVICE 28 SPARE 29 SOAP DISP. 30 SPARE	Located on circuit breaker panel door.
DETERGENT	Located on bulkhead, adjacent to Automatic Soap Dispenser.
DOOR LOUVER OPERATOR	Located on washer personnel door.
DRYER#1 PHASE MONITOR RELAY	Located in panel beneath dryer circuit breakers (not visible externally).
DRYER#1 PHASE MONITOR RELAY FUSE (2A) (KTK-R-2 OR EQUIV.)	Located in panel beneath dryer circuit breakers (not visible externally).
DRYER 1 PHASE STATUS	Located on dryer phase monitor indicator.
DRYER 1	Located on Dryer No. 1 and dryer circuit breaker panel.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
DRYER#2 PHASE MONITOR RELAY	Located in panel beneath dryer circuit breakers (not visible externally).
DRYER#2 PHASE MONITOR RELAY FUSE (2A) (KTK-R-2 OR EQUIV.)	Located in panel beneath dryer circuit breakers (not visible externally).
DRYER 2	Located on Dryer No. 2 and dryer circuit breaker panel.
DRYER 2 PHASE STATUS	Located on dryer phase monitor indicator.
DRYER CYCLES HIGH-HIGH: LINENS MED-MED: BDU'S	Located on dryer.
EMERGENCY BYPASS ON ON ON ON ON OFF OFF OFF OFF OFF CKT BKR: P-1 PUMP; BOILER; EXHAUST FANS; INTERIOR LIGHTS; BLKOUT LIGHTS	Overlay located within the PLC box, over the Emergency Bypass Switches.
EMERGENCY LIGHT BATTERY ENABLE SWITCH ON OFF	Located on emergency light fixture.
EMERGENCY STOP SWITCH CAUTION -DO NOT PULL OUT- RESET AT MAIN CIRCUIT BREAKER	Caution label on PLC emergency stop.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
EXHAUST FAN#1	Located adjacent to Exhaust Fan No. 1, behind dryers.
EXHAUST FAN#2	Located adjacent to Exhaust Fan No. 2, behind dryers.
EXPANSION TANK	Located adjacent to the Expansion Tank, behind washers.
F-1 FILTER INLET PRESS. TX (PT-2)	Located adjacent to the F-1 Filter Inlet Pressure Transmitter, in center operating area.
F-1 FILTER OUTLET PRESS. TX (PT-3)	Located adjacent to the F-1 Filter Outlet Pressure Transmitter, in center operating area.
F-1 FILTER SELECTION VALVE (V-9)	Located adjacent to Valve V-9, in the center operating area.
F-1A CHECK VALVE (V-20)	Located adjacent to Check Valve V-20, in the center operating area.
F-1A VENT (V-10)	Located on the vent valve manifold.
F-1B VENT (V-11)	Located on the vent valve manifold.
F-2 VENT (V-12)	Located on the vent valve manifold.
F-2 FILTER OUTLET PRESS. TX (PT-4)	Located adjacent to the F-2 Filter Outlet Pressure Transmitter, in center operating area.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
F-2 INLET ISOLATION VALVE (V-41)	Located adjacent to Valve V-41 in the center operating area.
F-2 OUTLET ISOLATION VALVE (V-42)	Located adjacent to Valve V-42 in the center operating area.
➡ F-3 INLET ➡	Located on plumbing leading to F-3 inlet, showing direction of flow.
F-3 INLET ISOLATION VALVE (V-43)	Located adjacent to Valve V-43 in the center operating area.
F-3 FILTER OUTLET PRESS. TX (PT-7)	Located adjacent to the F-3 Filter Outlet Pressure Transmitter, in center operating area.
F-3 OUTLET ISOLATION VALVE (V-59)	Located adjacent to Valve V-59 in the center operating area.
F-3 VENT (V-13)	Located on the vent valve manifold.
FILTER F-1A DRAIN VALVE (V-26)	Located on the drain manifold in the center operating area.
FILTER F-1B CHECK VALVE (V-55)	Located adjacent to Check Valve V-19, behind the washers.
FILTER F-1B DRAIN VALVE (V-27)	Located on the drain manifold in the center operating area.
FILTER F-2 DRAIN VALVE (V-28)	Located on the drain manifold in the center operating area.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
FILTER F-3 DRAIN VALVE (V-29)	Located on the drain manifold in the center operating area.
GLYCOL FILL	Located on glycol reservoir atop the boiler.
MAIN DRAIN	Located on the Main Drain piping behind the washers.
MAIN SYSTEM CIRCUIT BREAKER PANEL	Located on the Maine System Circuit Breaker Panel, behind the washers.
MAIN SYSTEM PHASE MONITOR RELAY	Located on the power inlet panel on the service wall behind the washers (not visible externally).
MAIN SYSTEM PHASE MONITOR RELAY FUSE (2A) (KTK-R-2 OR EQUIV.)	Located on the power inlet panel on the service wall behind the washers (not visible externally).
MAXIMUM LEVEL COLD	Located on glycol reservoir atop the boiler.
MIN. REUSE SELECTION VALVE (V-16)	Located on Valve V-16, behind the washers.
MINUMUM LEVEL COLD	Located on glycol reservoir atop the boiler.
NANO FILTER DRAIN VENT VALVE (V-52)	Located on the vent manifold behind the dryers.
NANO FILTER INLET PRESS. TX (PT-5)	Located adjacent to the Nanofilter Inlet Pressure Transmitter, in center operating area.
NANO FILTER OUTLET PRESS. TX (PT-6)	Located adjacent to the Nanofilter Outlet Pressure Transmitter, in center operating area.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
NANO FILTER#1 REUSE DRAIN VALVE (V-46)	Located on the vent manifold behind the dryers.
NANO FILTER#2 REUSE DRAIN VALVE (V-48)	Located on the vent manifold behind the dryers.
NANO FILTER#3 REUSE DRAIN VALVE (V-50)	Located on the vent manifold behind the dryers.
NANO FILTER#1 WASTE DRAIN VALVE (V-47)	Located on the vent manifold behind the dryers.
NANO FILTER#3 WASTE DRAIN VALVE (V-51)	Located on the vent manifold behind the dryers.
NANO FILTER VESSEL (NF-1)	Located at either end of Nanofilter Vessel No. 1, over the dryers.
NANO FILTER VESSEL (NF-2)	Located at either end of Nanofilter Vessel No. 2, over the dryers.
NANO FILTER VESSEL (NF-3)	Located at either end of Nanofilter Vessel No. 3, over the dryers.
NANO TANK OVERFLOW	Located on the Nanofilter Feed Tank Overflow piping, behind the washers.
⬅ NF DRAIN ⬅	Located on plumbing coming from the Nanofilter drains, showing direction of flow.
⬅ NF FEED ⬅	Located on plumbing leading to the Nanofilters, showing direction of flow.
NF FEED TANK	Located on the Nanofilter Feed Tank.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
NF FEED TANK DRAIN VALVE (V-32)	Located on the drain manifold behind the washers.
NF FEED TANK LEVEL SWITCH (LS-2)	Located adjacent to the Nanofilter Feed Tank level sensor, behind the washers.
NF OUTLET	Located on plumbing coming from the Nanofilters, showing direction of flow.
NF RECIRC.	Located on plumbing for Nanofilter recirculation, showing direction of flow.
NF SPLIT DRAIN VALVE (V-25)	Located on the drain manifold in the center operating area.
OPERATING CYCLES: CYCLE #01 – INITIAL FILL CYCLE #02 – WHITE LINENS CYCLE #03 – BDU'S CYCLE #04 – COLOR LINENS CYCLE #05 – WHITE LINENS – WITH MIN. REUSE CYCLE #06 – BDU'S – WITH MIN. REUSE CYCLE #07 – COLOR LINENS – WITH MIN. REUSE CYCLE #08 – WHITE LINENS – NO REUSE CYCLE #09 – BDU'S – NO REUSE CYCLE #10 – COLOR LINENS – NO REUSE CYCLE #11 – BAG FILTER CYCLE #30 – REUSE TANK TOPOFF CYCLE #31 – NANO FILTER FLUSH/CLEAN CYCLE #32 – NANO FILTER STORAGE (SODIUM BISULFITE) OPERATING CYCLES: CYCLE #33 – WINTERIZE SOAP DISPENSER CYCLE #34 – WINTERIZE WASHER (COLD WATER LINES) CYCLE #35 – WINTERIZE WASHER (HOT WATER LINES) CYCLE #36 – EXTRACT ONLY CYCLE #52 – WHITE LINENS (NO DISPENSER) CYCLE #53 – BDU'S (NO DISPENSER) CYCLE #54 – COLOR LINENS (NO DISPENSER) CYCLE #55 – WHITE LINENS – WITH MIN. REUSE (NO DISPENSER) CYCLE #56 – BDU'S – WITH MIN. REUSE (NO DISPENSER) CYCLE #57 – COLOR LINENS – WITH MIN. REUSE (NO DISPENSER) CYCLE #58 – WHITE LINENS – NO REUSE (NO DISPENSER) CYCLE #59 – BDU'S – NO REUSE (NO DISPENSER) CYCLE #60 – COLOR LINENS – NO REUSE (NO DISPENSER) CYCLE #61 – BAG FILTER (NO DISPENSER)	Summary of operating cycles placards located over the washers, in front of the water reuse system tanks.
P-3 DISCHARGE	Located on plumbing coming from Pump P-3, showing direction of flow.
P-3 DISCHARGE	Located on plumbing coming from Pump P-3, showing direction of flow.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
P-3 LOOP ACTUATOR (A-1)	Located adjacent to Actuator A-1.
P-3 LOOP FLOW TRANSMITTER (FT-1)	Located on P-3 Loop Flow Transmitter, in center operating area.
⬅ P-4 DISCHARGE ⬅	Located on plumbing coming from Pump P-4, showing direction of flow.
➡ P-4 DISCHARGE ➡	Located on plumbing coming from Pump P-4, showing direction of flow.
P4 LOOP ACTUATOR (A-2)	Located adjacent to Actuator A-2.
P-4 LOOP FLOW TRANSMITTER (FT-2)	Located on P-4 Loop Flow Transmitter, in center operating area.
P-1 PUMP DRAIN VALVE (V-53)	Located adjacent to Valve V-53, behind the washers.
➡ P-4 SUCTION ➡	Located on plumbing leading to Pump P-4, showing direction of flow.
P-4 VENT (V-14)	Located on the vent valve manifold.
PUMP (P-1)	Located on Pump P-1, behind the washers.
PUMP P-1 PRESS. SWITCH (S-1)	Located on the power input panel adjacent to the Pressure Switch, behind the washers.
PUMP (P-3)	Located on Pump P-3, behind the washers.
PUMP (P-4)	Located on Pump P-4, in the center operating area.
PUMP P-4 INLET DRAIN VALVE (V-30)	Located on the drain manifold in the center operating area.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
PUMP P-4 OUTLET DRAIN VALVE (V-31)	Located on the drain manifold in the center operating area.
REMOVE PANEL DURING OPERATION	Located on panels in work area.
⬅ REUSE ⬅	Located on reuse water plumbing, showing direction of flow.
➡ REUSE ➡	Located on reuse water plumbing, showing direction of flow.
REUSE ACTUATOR (A-4)	Located adjacent to Actuator A-4.
REUSE DRAIN	Located on reuse drain.
REUSE FLOW TRANSMITTER (FT-4)	Located on Reuse Flow Transmitter, in center operating area.
REUSE SELECTION VALVE (V-15)	Located on Valve V-15, behind the washers.
REUSE TANK	Located on the Reuse Tank.
REUSE TANK DRAIN VALVE (V-34)	Located on the drain manifold behind the washers.
REUSE TANK OVERFLOW	Located on the Reuse Tank Overflow, located behind the washers.
REUSE WATER TEMPERATURE GAUGE	Located on the Reuse Tank, in the center operating area.
REUSE WATER TEMP. REG. VALVE (V-44)	Located adjacent to Mixing Valve V-44 above the boiler.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
SERVICE RECEPTACLE	Located adjacent to service receptacles throughout the CBL.
SERVICE WATER BACKFLOW PREVENTION VALVE (V-58)	Located adjacent to Backflow Preventer V-58 on service wall behind washers.
SOAP DISP. INTERNAL DRAIN VALVE (V-24)	Located on the drain manifold in the center operating area.
SOAP DISP. WTR INLET DRAIN VALVE (V-23)	Located on the drain manifold in the center operating area.
SOAP DISPENSER WTR INLET VALVE (V-60)	Located adjacent to Valve V-60 in the center operating area.
SOAP DISPENSER OVRFLOW VALVE (V-61)	Located on the drain manifold in the center operating area.
SOUR	Located in the center operating area, above the laundry sour in the Automatic Soap Dispenser.
SUPPLY WATER CHECK VALVE (V-17)	Located adjacent to Check Valve V-17, behind the washers.
SUPPLY WATER PRESS. TX (PT-1)	Located adjacent to the Supply Water Pressure Transmitter, behind washers.
SUPPLY WATER SHUTOFF VALVE (V-18)	Located adjacent to Valve V-18, behind the washers.
SUPPLY WATER TEMP. REG. VALVE (V-45)	Located adjacent to Mixing Valve V-45 above the boiler.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
TRAY 1	Located over washer soup dispenser tray 1.
TRAY 2	Located over washer soup dispenser tray 2.
TRAY 3	Located over washer soup dispenser tray 3.
TRAY 4	Located over washer soup dispenser tray 4.
TWO MAN LIFT	Located on air compressor.
VENT MANIFOLD CLOSED OPEN	Located above the vent manifold in the center operating area.
WARNING GLOVES MUST BE UTILIZED WHEN HANDLING FILTERS	Warning label located on canisters.
WARNING MAY BE HOT	Warning label on water boiler heat shield panel and water boiler exhaust.
WASHER 1	Located on Washer No. 1, on front and back of washer No. 1.
WASHER 2	Located on Washer No. 2, on front and back of washer No. 2.
WASHER BELT INSPECTION ACCESS PLATE	Located on washer belt inspection access plate on rear of washer.
WASHER#1 COLD WTR SHUTOFF VALVE (V-6)	Located adjacent to Valve V-6, on the overhead behind the washers.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
WASHER#1 HOT WTR SHUTOFF VALVE (V-5)	Located adjacent to Valve V-5, on the overhead behind the washers.
WASHER#1 REUSE FILL SHUTOFF VALVE (V-63)	Located adjacent to Valve V-63, behind the washers.
WASHER#1 COLD WATER CONNECTION	Located adjacent to the Washer No. 1 Cold Water Connection QD fitting, behind the washers and on washer No. 1 cold water hose QD fitting.
WASHER#1 HOT WATER CONNECTION	Located adjacent to the Washer No. 1 Hot Water Connection QD fitting, behind the washers and on washer No. 1 hot water on the QD fitting.
WASHER#1 LINE REACTOR	Located inside the power connection panel, behind the washers (not visible externally).
WASHER#1 MAIN POWER RECEPTACLE	Located adjacent to the Washer No. 1 Power receptacle, behind the washers.
WASHER#1 SOAP DISPENSER CONNECTION	Located on the back of Washer No. 1.
WASHER#1 SOAP DISPENSER MODULE	Located adjacent to Washer No. 1 Soap Dispenser Control Module, in the center operating area.
WASHER#1 SOAP DISP. DRAIN VALVE (V-22)	Located on the drain manifold in the center operating area.
WASHER#1 SOAP DISP. SHUTOFF VALVE (V-39)	Located adjacent to Valve V-39 behind the washers.
WASHER#2 COLD WATER CONNECTION	Located adjacent to the Washer No. 2 Cold Water Connection QD fitting, behind the washers and on washer No. 2 cold water hose QD fitting.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
WASHER#2 COLD WTR SHUTOFF VALVE (V-8)	Located adjacent to Valve V-8, on the overhead behind the washers.
WASHER#2 LINE REACTOR	Located inside the power connection panel, behind the washers (not visible externally).
WASHER#2 MAIN POWER RECEPTACLE	Located adjacent to the Washer No. 2 Power receptacle, behind the washers.
WASHER#2 HOT WATER CONNECTION	Located adjacent to the Washer No. 2 Hot Water Connection QD fitting, behind the washers and on washer No. 2 hot water hose QD fitting.
WASHER#2 HOT WTR SHUTOFF VALVE (V-7)	Located adjacent to Valve V-7, on the overhead behind the washers.
WASHER#2 REUSE FILL SHUTOFF VALVE (V-64)	Located adjacent to Valve V-64, behind the washers.
WASHER#2 SOAP DISP. SHUTOFF VALVE (V-40)	Located adjacent to Valve V-40 behind the washers.
WASHER#2 SOAP DISP. DRAIN VALVE (V-21)	Located on the drain manifold in the center operating area.
WASHER#2 SOAP DISPENSER CONNECTION	Located on the back of Washer No. 2.
WASHER#2 SOAP DISPENSER MODULE	Located adjacent to Washer No. 2 Soap Dispenser Control Module, in the center operating area.
WASHER PANEL PHASE STATUS	Located on the power connection panel, adjacent to the phase indicator lights behind the washers.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
⬅ WASTE ⬅	Located on waste water plumbing, showing direction of flow.
WASTE ACTUATOR (A-3)	Located adjacent to Actuator A-3.
WASTE DRAIN	Located on Waste Drain piping behind the washers.
WASTE FLOW TRANSMITTER (FT-3)	Located on Waste Flow Transmitter, in center operating area.
WASTE LINE VACUUM BREAK	Located adjacent to the vacuum break, in the center operating area.
WASTE PUMP MAIN POWER RECEPTACLE	Located adjacent to the Waste Pump Power Receptacle, behind the washers.
WASTE PUMP MANUAL CONTROL	Located on the Waste Tank.
WASTE TANK	Located on the Waste Tank.
WASTE TANK DRAIN VALVE (V-36)	Located on the Drain Tank behind the washers.
WASTE WATER CHECK VALVE (V-19)	Located adjacent to Check Valve V-19, behind the washers.
WATER BOILER	Located on the Water Boiler.
WINTERIZATION AIR PURGE CONNECTION	Located on interior of washer side service bulkhead, adjacent to boiler.
WSHR#1 WASTE DRAIN SHUTOFF VALVE (V-1)	Located adjacent to Valve V-1, behind the washers.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Decal	Description and Location
WSHR#2 WASTE DRAIN SHUTOFF VALVE (V-2)	Located adjacent to Valve V-2, behind the washers.
WSHR#1 REUSE DRAIN SHUTOFF VALVE (V-3)	Located adjacent to Valve V-3, behind the washers.
WSHR#2 REUSE DRAIN SHUTOFF VALVE (V-4)	Located adjacent to Valve V-4, behind the washers.
WTS HOLD TANK DRAIN VALVE (V-33)	Located on the drain manifold behind the washers.
WTS TRANSFER TANK DRAIN VALVE (V-35)	Located on the WTS Transfer Tank behind the washers.
WTS HOLD TANK	Located on the WTS Hold Tank, in the center operating area.
WTS HOLD TANK LEVEL SWITCH (LS-1)	Located adjacent to the WTS Hold Tank Level sensor, behind the washers.
WTS TANK OVERFLOW	Located on the WTS Tank Overflow piping, behind the washers.
WTS TRANSFER PUMP MAIN POWER RECEPTACLE	Located adjacent to the WTS Transfer Pump Power Receptacle, behind the washers.
WTS TRANSFER TANK	Located on the WTS Transfer Tank, behind the washers.

DECALS AND INSTRUCTION PLATES-CONTINUED

Table 1. Decals and Instruction Plates – Continued.

Packaged Sodium Metabisulfite
P/N: 43265033

Laundry Antichlor & Nano-Filter Preservative

DANGER: Avoid contact with eyes and skin. Wear impervious gloves and chemical safety goggles. Do not wear contact lenses. Wear dust mask when handling broken packets.
STORAGE: Store in a cool, dry, well-ventilated area away from water, ice, acids and oxidizing agents. Releases sulfur dioxide gas slowly at ambient temperatures and when mixed with water.
FIRST AID
Skin: Immediately wash with plenty of soap and water. Remove contaminated clothing and wash before reuse. Get medical attention if irritation persists.
Eyes: Flush eyes immediately with water for at least 15 minutes. Get medical attention.
Inhalation: Promptly remove to fresh air. Get immediate medical attention if signs of suffocation, irritation or other symptoms develop.
Ingestion: If conscious, immediately give a large quantity of water or milk and induce vomiting by touching finger to back of throat. Get immediate medical attention. Never give anything by mouth to an unconscious person.

Contains: Sodium Metabisulfite
Net Contents: 13 bags containing 15 (3 oz. Packets)
Total quantity: 195 packets
Weight: 36.5lbs

SFA Defense Products Division
20 S. Wisner St.
Frederick, MD 21701

READ MATERIAL SAFETY DATA SHEET BEFORE USING PRODUCT.

Packaged Sodium Metabisulfite
P/N: 43265033

Laundry Antichlor & Nano-Filter Preservative

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Contains: Sodium Metabisulfite
Net Contents: 13 bags containing 15 (3 oz. Packets)
Total quantity: 195 packets
Weight: 36.5lbs

SFA Defense Products Division
20 S. Wisner St.
Frederick, MD 21701

TEMPER

The controls and indicators specific to the 16 ft x 20 ft, TEMPER are detailed in TM 10-8340-22-13.

FDECU

The controls and indicators specific to the FDECU are detailed in TM 10-4120-411-14.

ASH

The controls and indicators specific to the ASH are detailed in TM 9-4520-258-14.

100KW Diesel Generator

The controls and indicators specific to the MEP-007A 100KW Diesel Generator are detailed in TM 5-6115-457-12.

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER USUAL CONDITIONS - WATER TREATMENT SYSTEM PRESERVATION

WATER TREATMENT SYSTEM PRESERVATION

WARNING

While the system is deployed, steps must be taken to ensure that no biological growth occurs in the water treatment system or other components of the CBL. Failure to observe adequate precautions may result in water contamination, with resulting serious illness or death to personnel.

If the CBL is to be shut down for periods of less than 4 hours, turn the P-3 Pump **(Figure 1, Item 1)** and P-4 Pump **(Figure 1, Item 2)** OFF by touching the display screen. For longer periods of system shutdown while on deployment, run the bisulfite preservation cycle as described in the next section.

The system flush alone should be performed if the proposed period of inactivity greater than 4 hours but less than 24 hours.

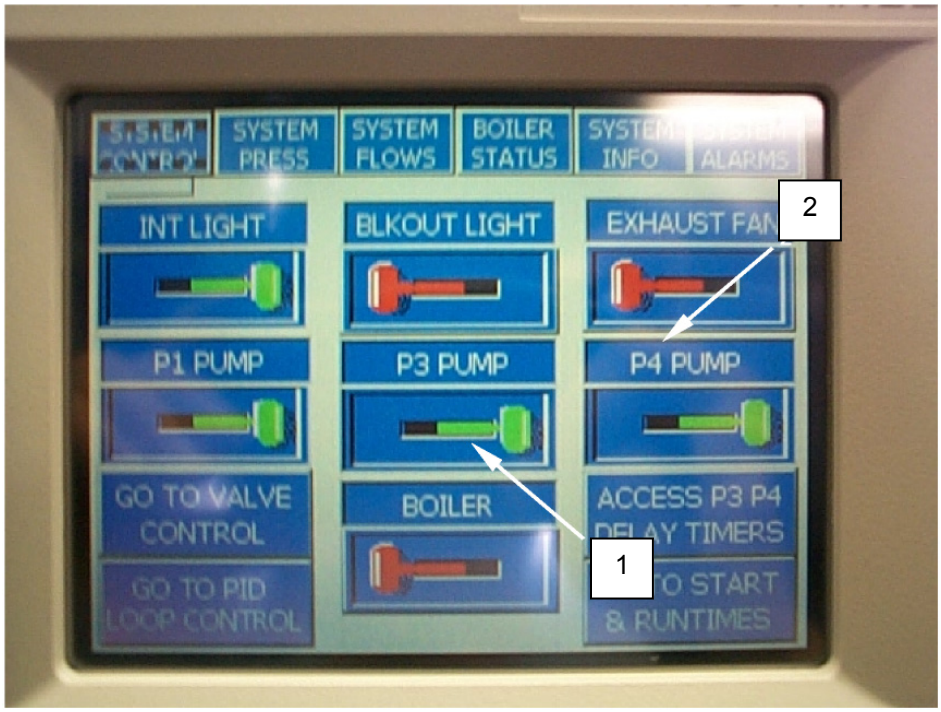


Figure 1. System Inactivity for less than 4 Hours.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

Water Treatment System Flush

1. Switch Pump P-4 to OFF at the PLC **(Figure 2, Item 1)**. Turn Pump P-3 ON at the PLC **(Figure 2, Item 1)**.

2. Open the WTS Hold Tank drain V-33 **(Figure 2, Item 2)** and Nano Feed Tank Drain V-32 **(Figure 2, Item 3)** and allow at least 15 minutes for tanks to drain. Ensure no water is present in the sight glass. Close V-33 and V-32.

3. Open the Nanofilter split drain valve V-25 **(Figure 2, Item 4)**.

4. Close the Automatic Soap Dispenser overflow valve V-61 **(Figure 2, Item 5)**.

5. Disconnect Actuators A-3 **(Figure 2, Item 6)** and A-4 **(Figure 2, Item 7)**.

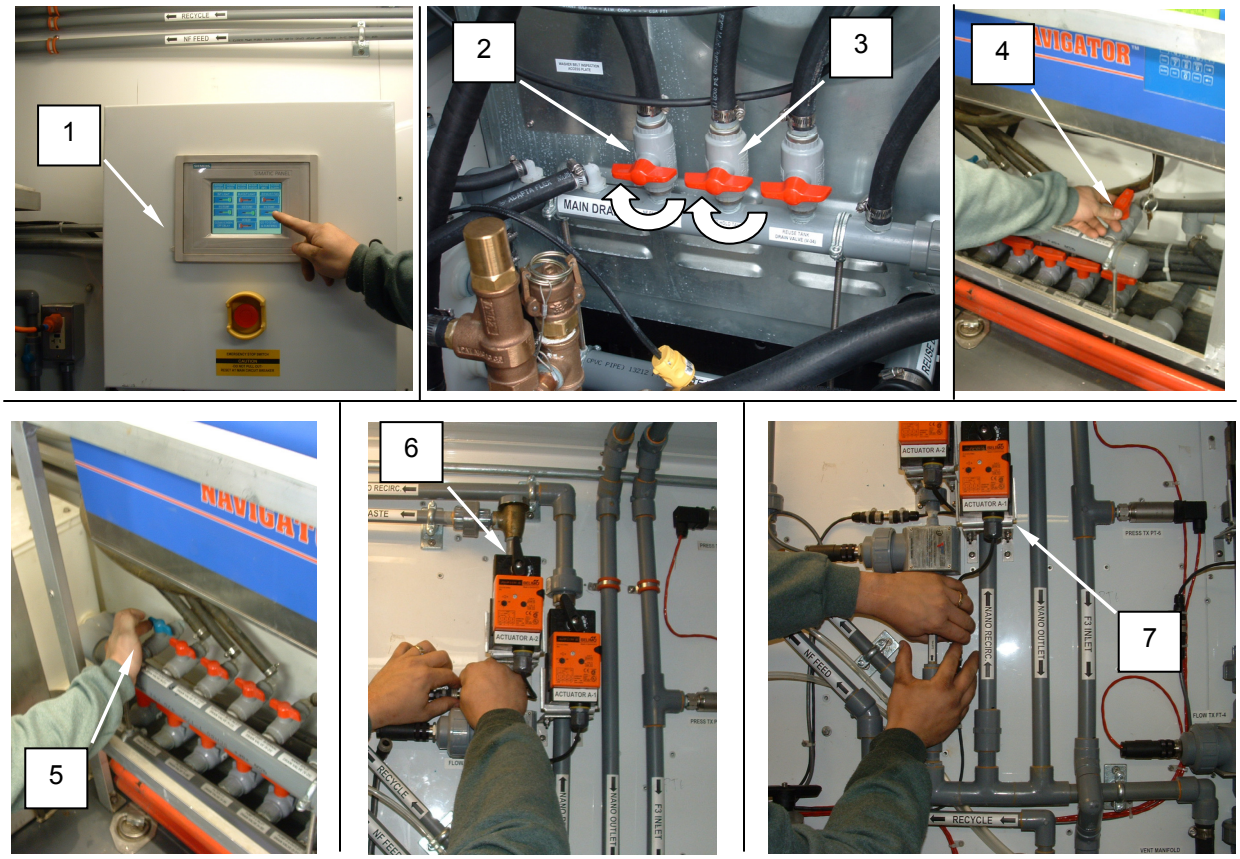


Figure 2. Water Treatment System Flush.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

6. Press the valve release and manually open Actuator A-3 **(Figure 3, Item 6)**.

7. Press the valve release and manually close Actuator A-4 **(Figure 3, Item 7)**.

8. Enter cycle 31 on either one of the washers and press Start **(Figure 3, Item 8)**.

9. Monitor the P-3 loop flow at the PLC **(Figure 3, Item 1)** as it runs through the cycle. When Pump P-3 stops or sight glass on Nanofilter Feed tank is full, switch Pump P-4 ON at the PLC. Pump P-4 will start after a two-minute delay. (The entire cycle will require approximately 15-20 minutes)

10. Monitor system as it continues to run through the cycle. When Pump P-4 stops, switch pump P-4 OFF at the PLC **(Figure 3, Item 1)**.

11. Repeat steps 8, 9, and 10 once more when cycle is complete.

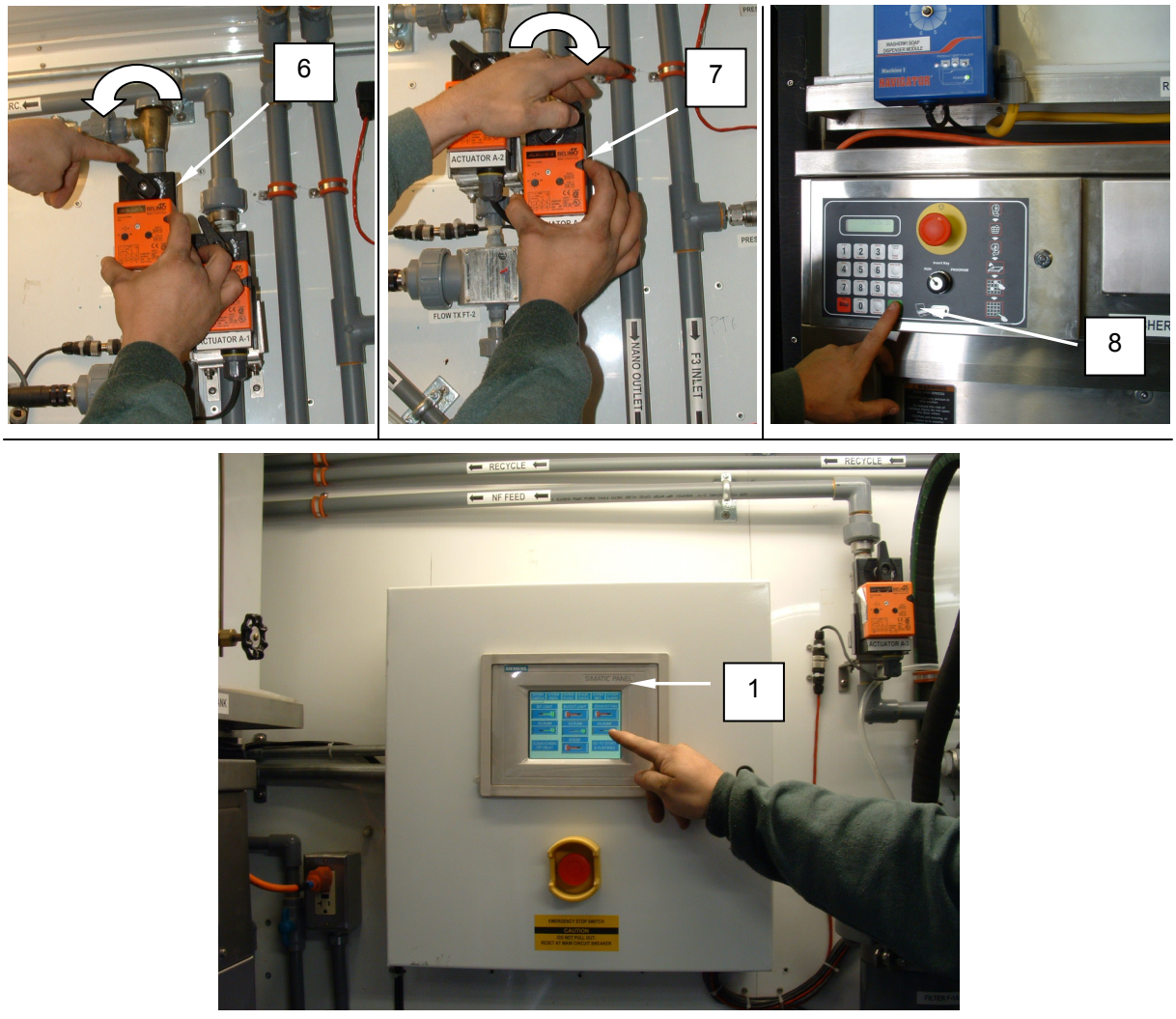


Figure 3. Water Treatment System Flush.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

12. Reconnect Actuators A-3 **(Figure 4, Item 6)** and A-4 **(Figure 4, Item 7)**.

13. Open the Automatic Soap Dispenser overflow valve V-61 **(Figure 4, Item 5)**.

14. Close the Nanofilter split drain valve V-25 **(Figure 4, Item 4)**.

15. Water treatment system flush is complete. Operate the water treatment system IAW procedures given in WP 0008 00.

NOTE

There is no need to reset the actuator valve settings. The PLC will automatically adjust the actuators as needed.

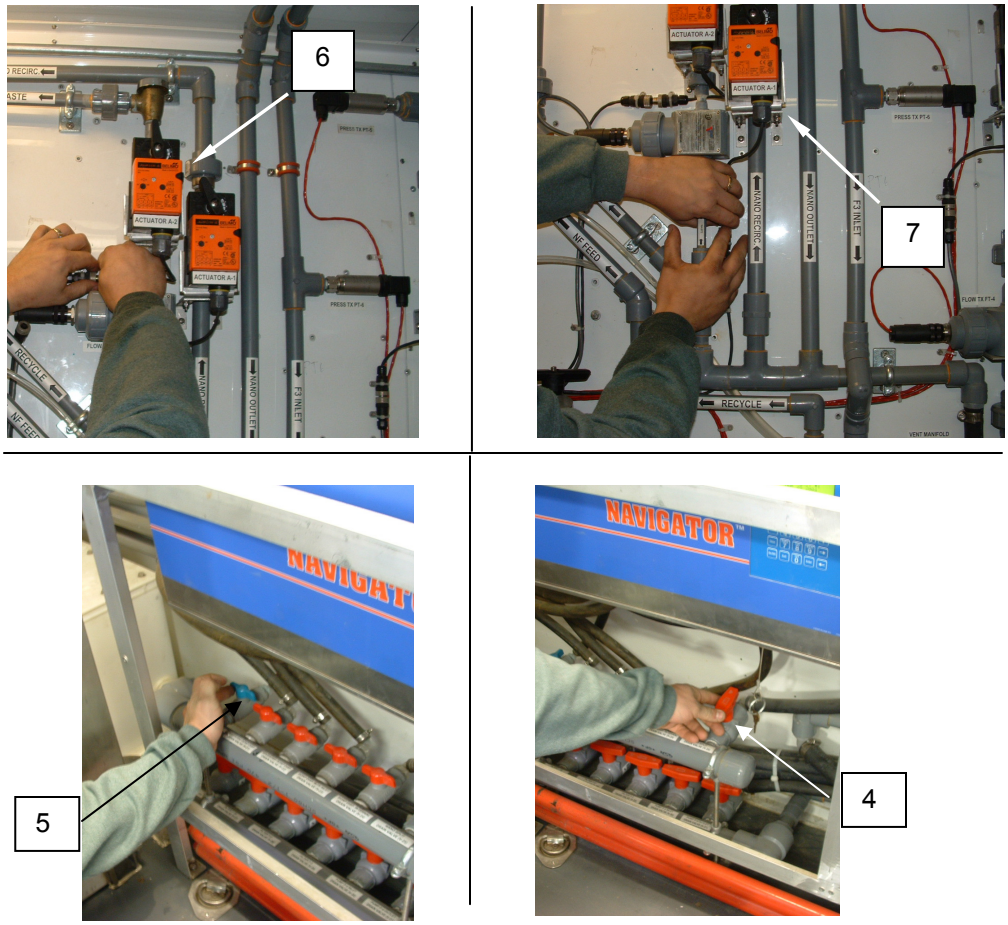


Figure 4. Water Treatment System Flush.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

Sodium Bisulfite Preservation Procedure



WARNING

Rubber gloves, face and eye protection, and dust masks must be worn when handling sodium bisulphite. Failure to wear proper safety equipment may result in serious skin irritation, eye injury, or respiratory damage. If sodium bisulphite contacts eyes or skin, flush with clean water and seek immediate medical attention. If sodium bisulphite vapors are inhaled, relocate immediately to a well ventilated area and seek immediate medical attention.

Sodium bisulfite is used to preserve the Nanofilter elements during shut down periods in excess of 24 hours while on deployment. This is required to prevent biological growth on the membrane surfaces.

CAUTION

Monitor the temperature of the reuse water using the gauge installed on the front of the water recycle tank. Turn off the boiler if reuse water temperature exceeds 120 °F. Heating reuse water above 120 °F may result in damage to the WTS filters.

1. Switch Pumps P-3 **(Figure 5, Item 1)** and P-4 **(Figure 5, Item 2)** OFF at the PLC.
2. Open Reuse Tank drain V-34 **(Figure 5, Item 3)** on the drain manifold and allow the Reuse Tank to drain completely.
3. Close Reuse Tank drain V-34 **(Figure 5, Item 3)** when the tank has completely drained.



Figure 5. Sodium Bisulfite Preservation Procedure.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

4. Switch the P-3 pump **(Figure 6, Item 1)** and P-4 Pump **(Figure 6, Item 2)** ON by touching the display screen.

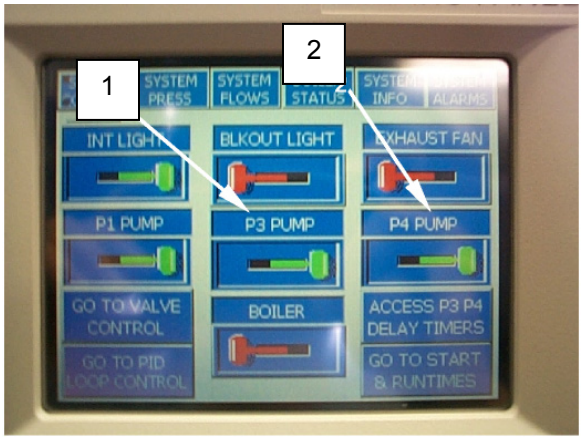


Figure 6. Sodium Bisulfite Preservation Procedure – Pump Settings.

5. Leave all water reuse system valves in their normal operating positions IAW 0008 00.

6. Ensure that the bypass valves V-15 **(Figure 7, Item 4)** and V-16 **(Figure 7, Item 5)** are in the positions shown so that the water reuse system is engaged.

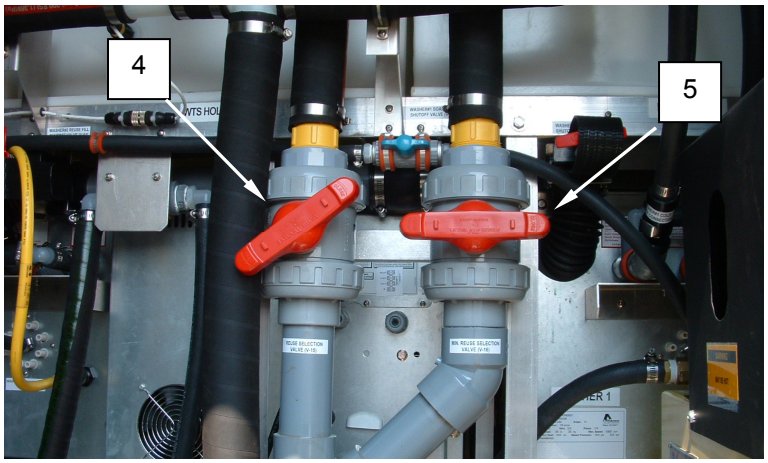


Figure 7. Sodium Bisulfite Preservation Procedure – Valve Settings

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

7. Open the soap supply tray door **(Figure 8, Item 6)**.



WARNING

Rubber gloves, face and eye protection, and dust masks must be worn when handling sodium bisulphite. Failure to wear proper safety equipment may result in serious skin irritation, eye injury, or respiratory damage. If sodium bisulphite contacts eyes or skin, flush with clean water and seek immediate medical attention. If sodium bisulphite vapors are inhaled, relocate immediately to a well ventilated area and seek immediate medical attention.

8. Fill tray 3 **(Figure 8, Item 7)** and tray 4 **(Figure 8, Item 8)** with six sealed prepackaged 3-oz. packets of sodium bisulfite packets per tray if available, or measure out 18-ounce quantities in a measuring cup and put 18-ounces each in tray 3 and tray 4.

9. Close the soap supply tray door **(Figure 8, Item 6)**.



Figure 8. Sodium Bisulfite Preservation Procedure – Washer Trays.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

10. Enter cycle 32 by pressing (do not punch) the numbers on the keyboard **(Figure 9, Item 9)** and note that this number is displayed as “Cycle 32”.



WARNING

Do not open the washer supply tray door while this cycle is proceeding. Failure to observe safety precautions may result in injury to personnel through skin, eye, or respiratory irritation.

11. To start the cycle that has been selected, simply press the “START” key **(Figure 9, Item 10)**.



Figure 9. Sodium Bisulfite Preservation Procedure – Settings.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

The washer will fill and take sodium bisulfite from Tray 4. When it empties, it will empty into the WTS transfer tank, which will then pump into the WTS Hold Tank **(Figure 10, Item 11)**.



Figure 10. Sodium Bisulfite Preservation Procedure – Tank Discharge.

The reuse system will operate normally as water is supplied throughout the reuse system. The washer will repeat the cycle and take the sodium bisulfite from Tray 3. When the washer cycle ends, and after the P-3 pump and P-4 pump stop running, switch OFF the P-3 pump **(Figure 11, Item 1)** and P-4 pump **(Figure 11, Item 2)**.

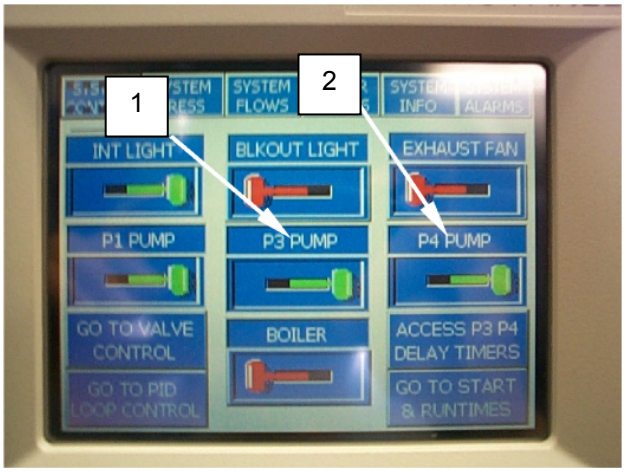


Figure 11. Sodium Bisulfite Preservation Procedure – Reset Pumps.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

12. Open Reuse Tank drain V-34 **(Figure 12, Item 3)** on the drain manifold, and allow the Reuse Tank to drain completely.

13. Close Reuse Tank drain V-34 **(Figure 12, Item 3)** when the tank has completely drained.

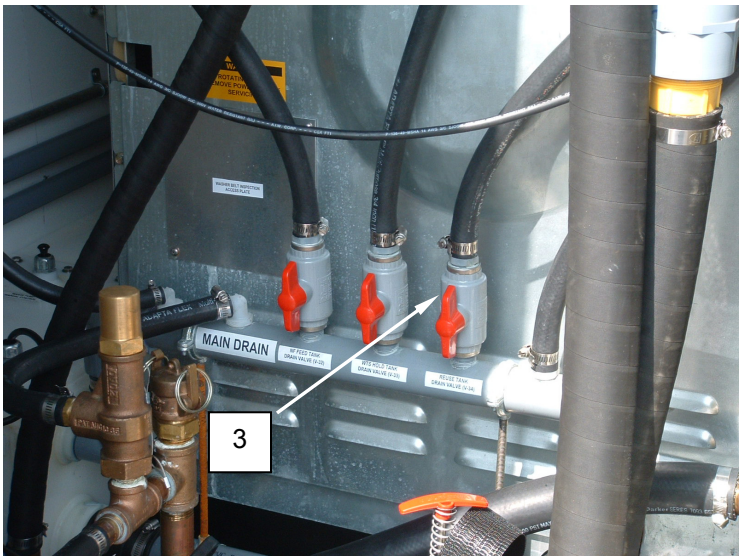


Figure 12. Sodium Bisulfite Preservation Procedure.

14. Switch P-1 pump **(Figure 13, Item 12)** OFF at the PLC unless operating from municipal water source.

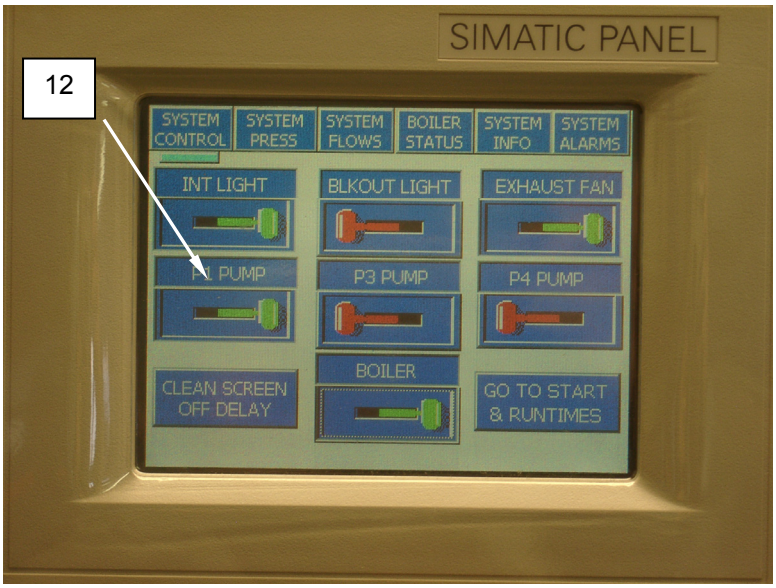


Figure 13. Sodium Bisulfite Preservation Procedure.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

15. Shut off water supply, open P-1 pump drain **(Figure 14, Item 13)** to relieve water pressure, and disconnect water supply hose **(Figure 14, Item 14)**. Ensure QD cap is reinstalled.

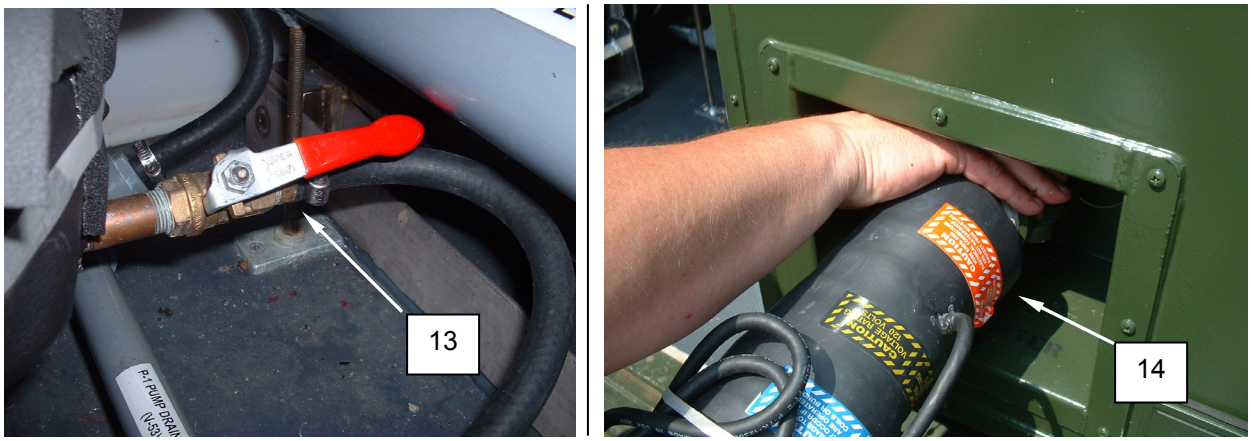


Figure 14. Sodium Bisulfite Preservation Procedure.

16. Open all valves on the drain manifolds **(Figure 15, Item 15)**.

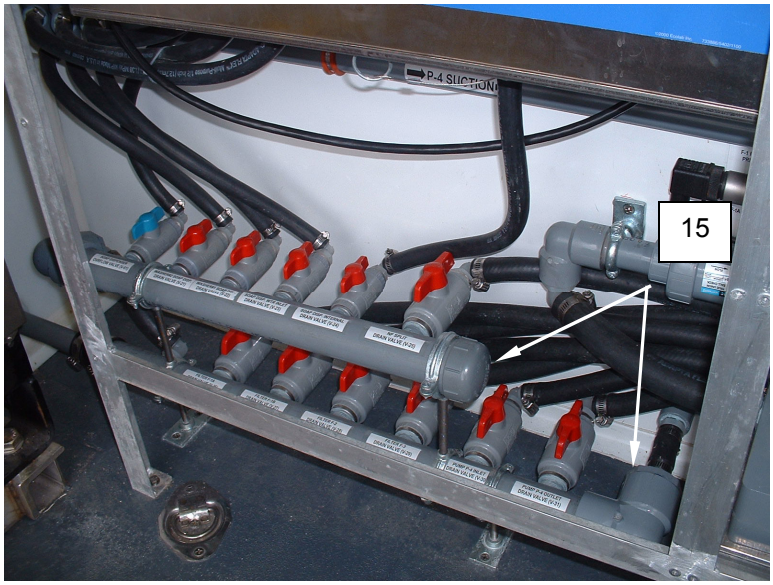


Figure 15. Sodium Bisulfite Preservation Procedure.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

17. Open all valves on the vent manifold **(Figure 16, Item 16)**.

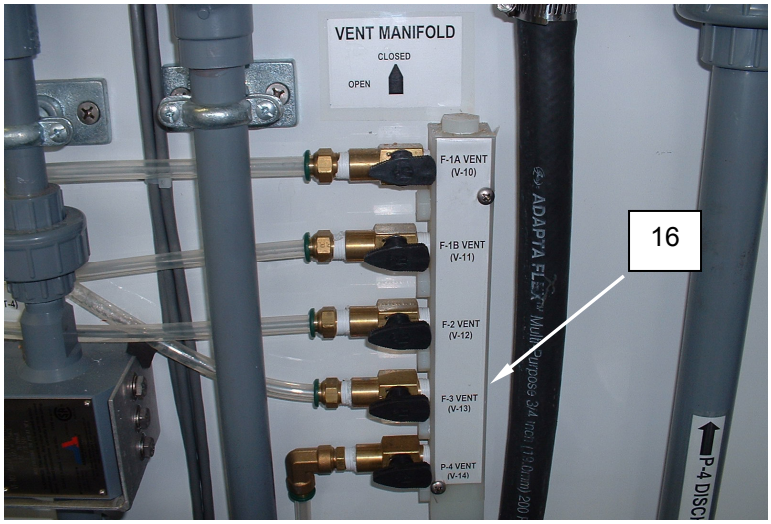


Figure 16. Sodium Bisulfite Preservation Procedure.

18. Open the nanofilter drain valves **(Figure 17, Item 17)**.

19. Ensure the vent shutoff valve **(Figure 17, Item 18)** is open.

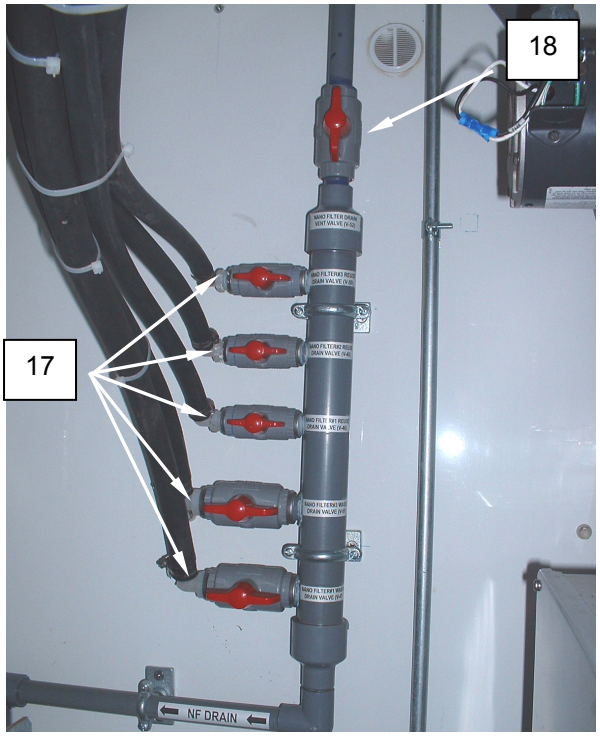
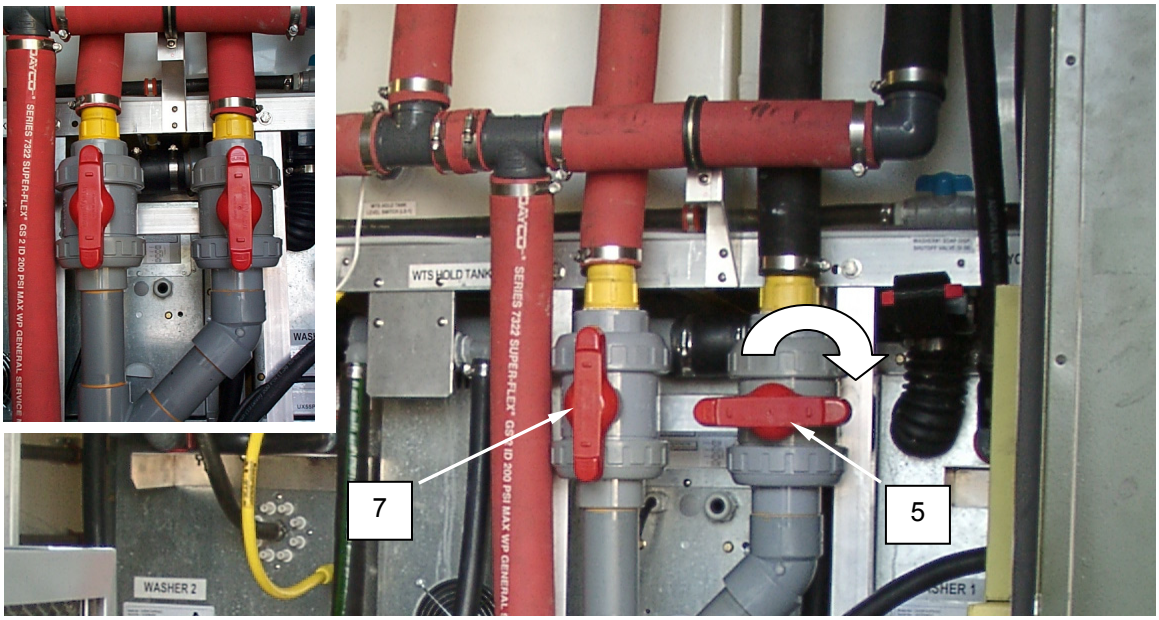


Figure 17. Sodium Bisulfite Preservation Procedure.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

20. Open valves V-15 **(Figure 18, Item 7)** and V-16 **(Figure 318, Item 5)**.

21. Open valves V-32 **(Figure 18, Item 19)**, V-33 **(Figure 18, Item 20)**, and V-34 **(Figure 18, Item 3)**.



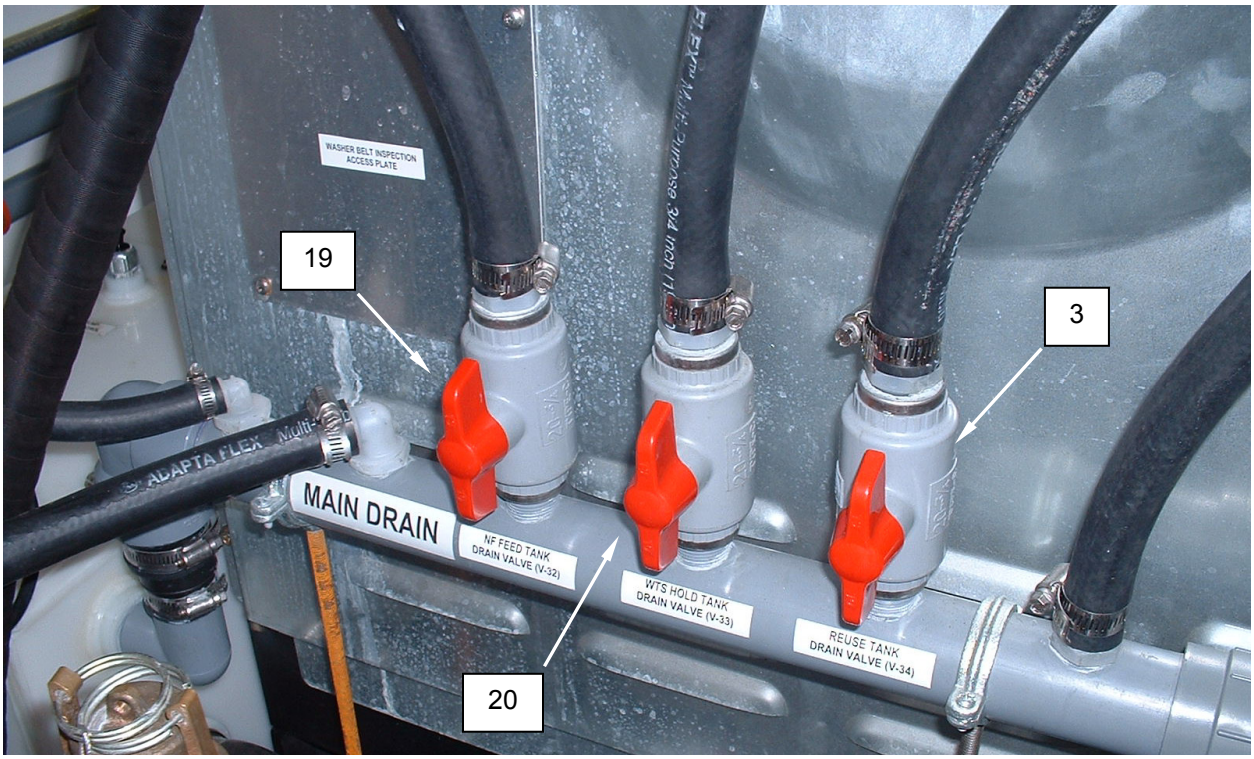


Figure 18. Drain System.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

22. Open the boiler water outlet drain valve V-37 **(Figure 19, Item 21)**, the P-3 Pump drain V-54 **(Figure 19, Item 22)** and the water spigot **(Figure 19, Item 23)**.

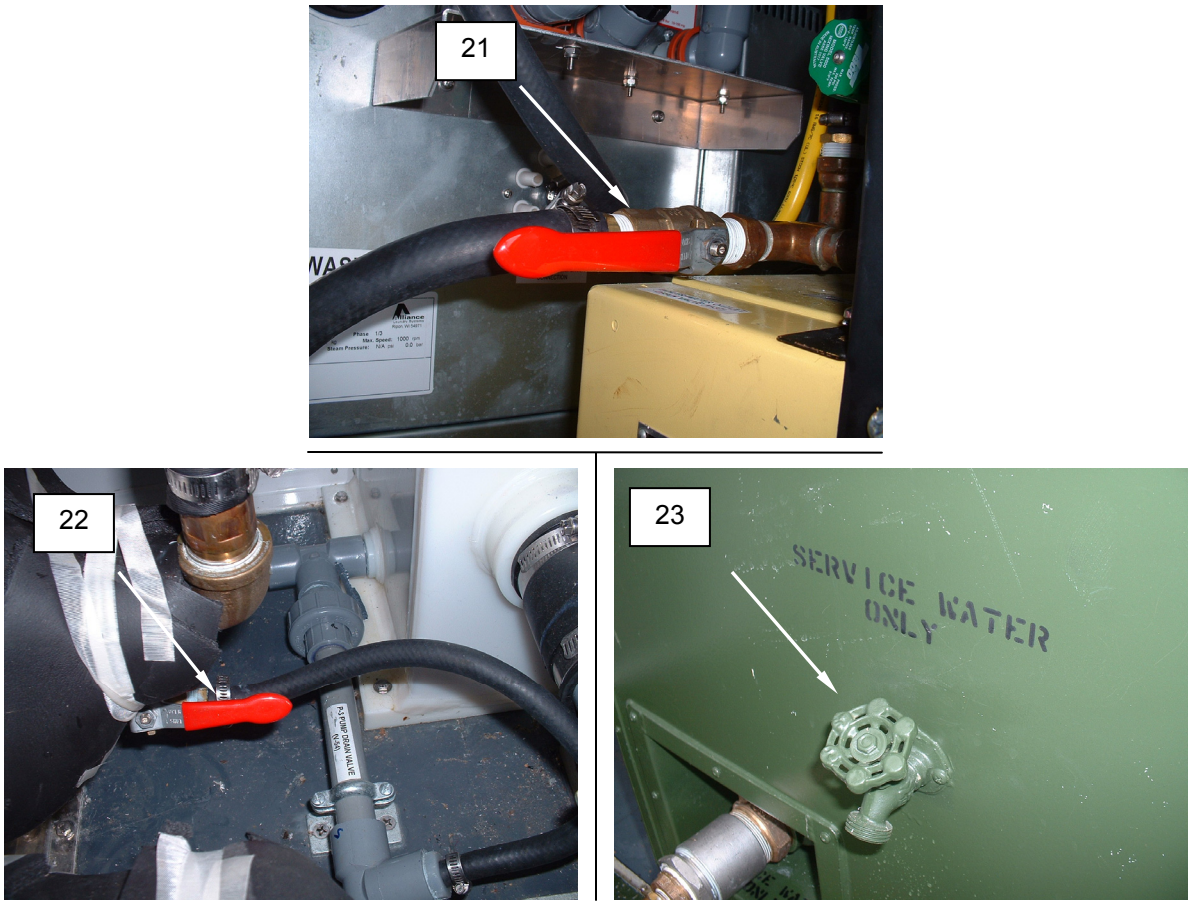


Figure 19. Drain System.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

23. Monitor the sight glasses **(Figure 20, Item 24)** on the reuse, WTS, and nanofilter holding tanks. When the tanks have drained, open the drain petcocks **(Figure 20, Item 25)** on the sight glasses.

24. Manually pump the waste tank **(Figure 20, Item 26)** by pulling up and holding the knob until tank is completely empty (approximately 30-45 sec). The knob is on top of the waste tank. Ensure the knob is returned to original position after use.



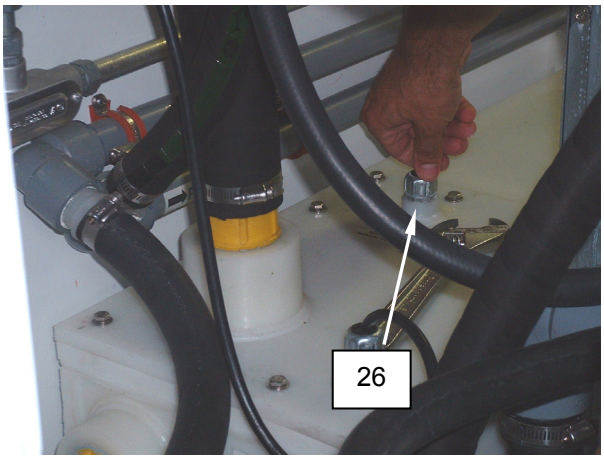


Figure 20. Drain System.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

25. Open the WTS transfer tank drain valve V-35 **(Figure 21, Item 27)**.

26. Wait at least 5 minutes, and then manually operate waste tank drain pump **(Figure 21, Item 26)** by pulling up on knob and holding for approximately 30-45 seconds or until empty.

27. Remove waste tank drain cap and install waste tank drain hose onto waste tank drain fitting **(Figure 21, Item 28)**.

28. Wait at least 5 minutes, and then manually operate waste tank drain pump by pulling up on knob **(Figure 21, Item 26)** and hold in position for 30-45 seconds or until empty.

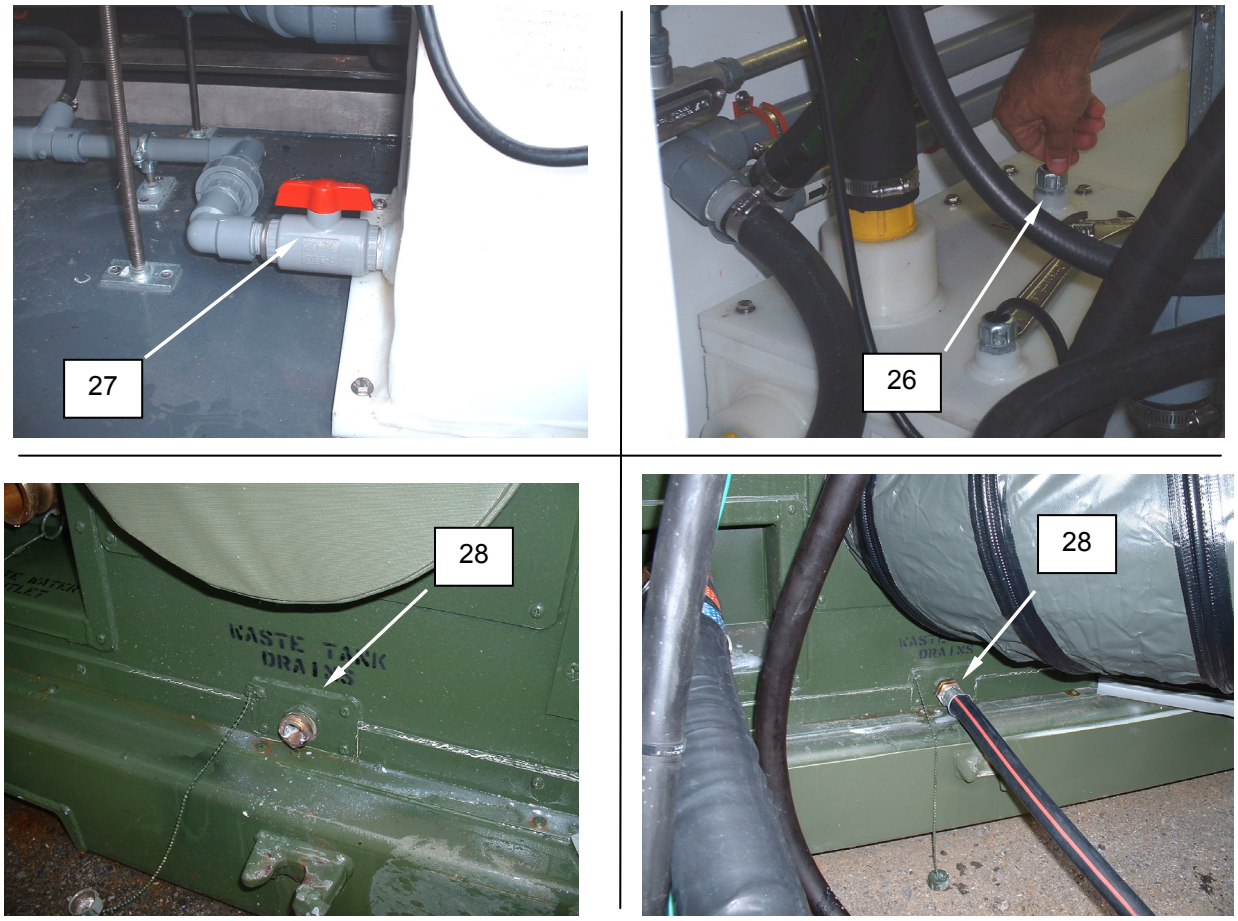


Figure 21. Drain System.

WATER TREATMENT SYSTEM PRESERVATION-CONTINUED

29. Open main waste valve V-36 **(Figure 22, Item 29)**. Close valve V-36 after valve has drained.

30. Close valve V-24 **(Figure 22, Item 31)**, P-1 Pump drain V-53 **(Figure 22, Item 21)**, and spigot **(Figure 22, Item 23)**. Close valve V-23 **(Figure 22, Item 30)** after valve has drained.

31. If the CBL is to be prepared for movement, continue with the complete system propylene glycol freeze protection/anti-bacterial instructions as detailed in WP 0012 00. Remove water tank drain hose and install cap.

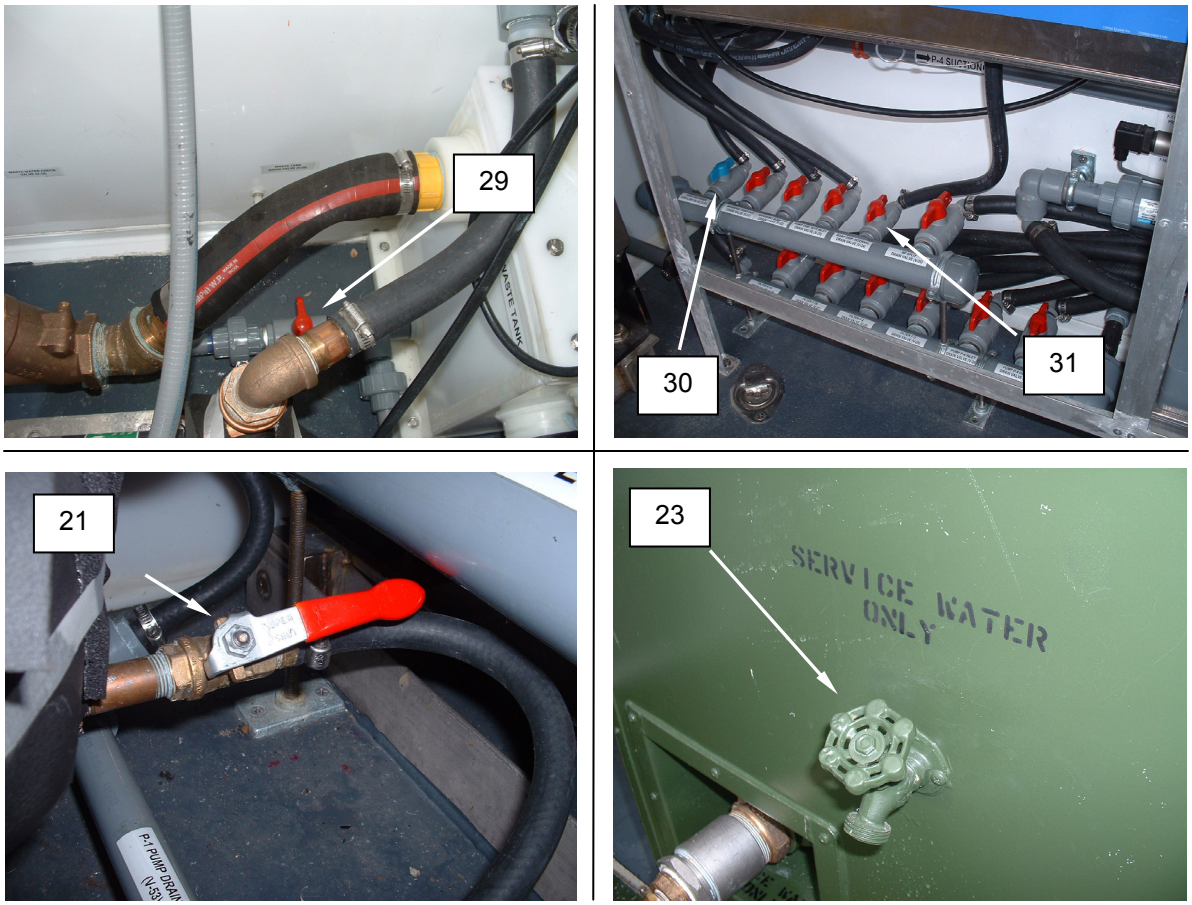


Figure 22. Drain System.

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER USUAL CONDITIONS- PREPARE WASHERS AND WTS FOR MOVEMENT

PREPARE WASHERS AND WTS FOR MOVEMENT

Flush Water Treatment System (WTS) and run Sodium Bisulfite preservation procedure as detailed in WP 0011 00.

NOTE

The following procedures are meant for long-term storage only (7 days or more). If moving base of operation, the filters and cartridges do not need to be removed.

Remove filters F-1A and F-1B

1. Disconnect the filter vent hose **(Figure 1, item 1)**.
2. Disconnect the QD fitting **(Figure 1, item 2)** and hose **(Figure 1, item 3)** from the filter cap **(Figure 1, item 4)**.
3. Use a strap wrench **(Figure 1, item 5)** to loosen the QD male fitting **(Figure 1, item 6)** from the filter cap **(Figure 1, item 4)**.
4. Loosen and remove the knobs **(Figure 2, item 7)** securing the filter cap **(Figure 2, item 4)** to the filter housing **(Figure 2, item 8)**, and remove the filter cap, with filter **(Figure 2, item 9)**, from the filter housing.

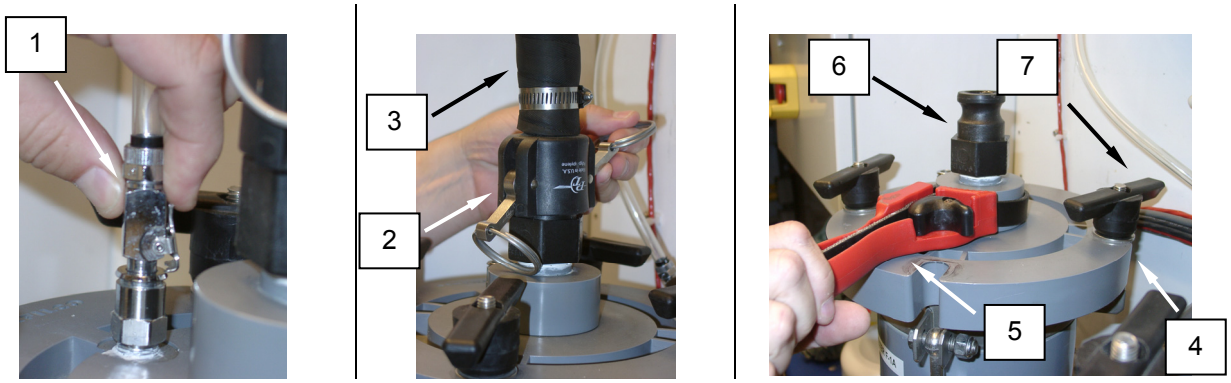


Figure 1. Replace the F-1A or F-1B Filter Elements (Socks).

PREPARE WASHERS AND WTS FOR MOVEMENT-CONTINUED

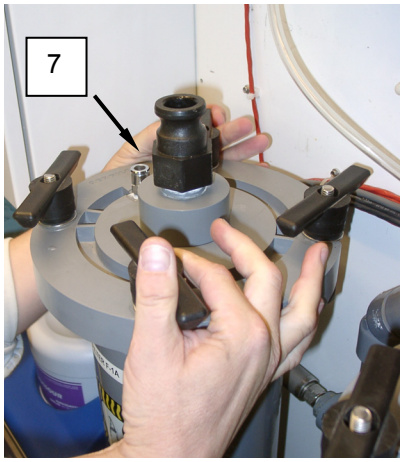
NOTE

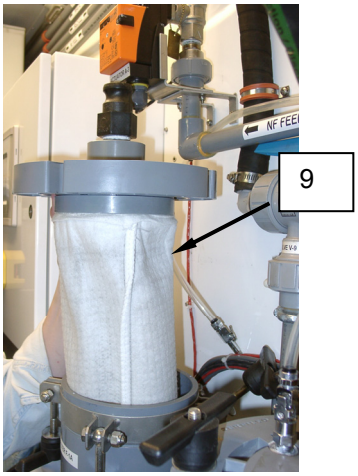
Spent filter socks need to be disposed in accordance with local, state, and federal requirements. Contact your local authorities (i.e. Facility Environmental Office) to ensure that you are following proper disposal procedures.

5. Loosen the QD male fitting **(Figure 2, item 6)** enough to remove the filter sock **(Figure 2, item 9)** from the filter retainer plate **(Figure 2, item 10)**.

6. Ensure the filter cap **(Figure 2, item 4)** is clean of all residues.

7. Tighten the filter retainer hand tight using the QD male fitting **(Figure 2, item 6)**.





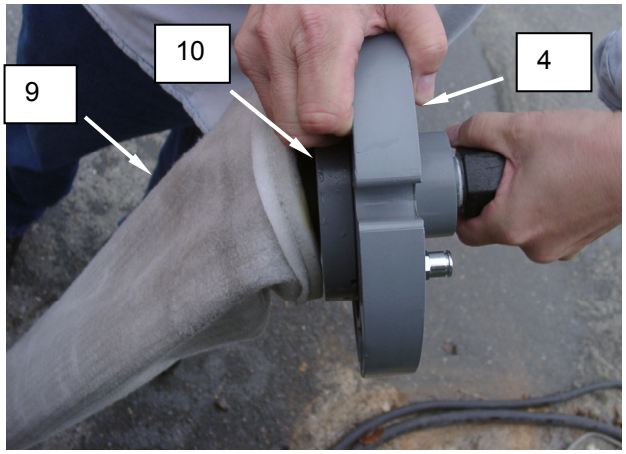


Figure 2. Replace the F-1A Or F-1B Filter Elements.

PREPARE WASHERS AND WTS FOR MOVEMENT-CONTINUED

Remove Air Compressor



WARNING

The air compressor assembly weighs approximately 40 pounds (approximately 17 kilograms). Two persons must carry the unit. When lifting the air compressor, lift with your legs, not with your back, to prevent injury. Failure to do so may result in back injury.



WARNING

Do not drill into, weld, or make any modifications to the compressor. Never make adjustments or part substitutions for the compressor. Do not operate the compressor when guards or cover are damaged or removed. This could result in an explosion. Failure to comply may result in serious injury or death to personnel.

Before beginning procedure, remove air compressor **(Figure 3, Item 11)** from stowage area behind the dryer service wall. The air compressor is retained by two machine screws **(Figure 3, Item 12)** which must be removed before the air compressor assembly can be slid to the door way. Bring compressor to center of the main compartment of the CBL.

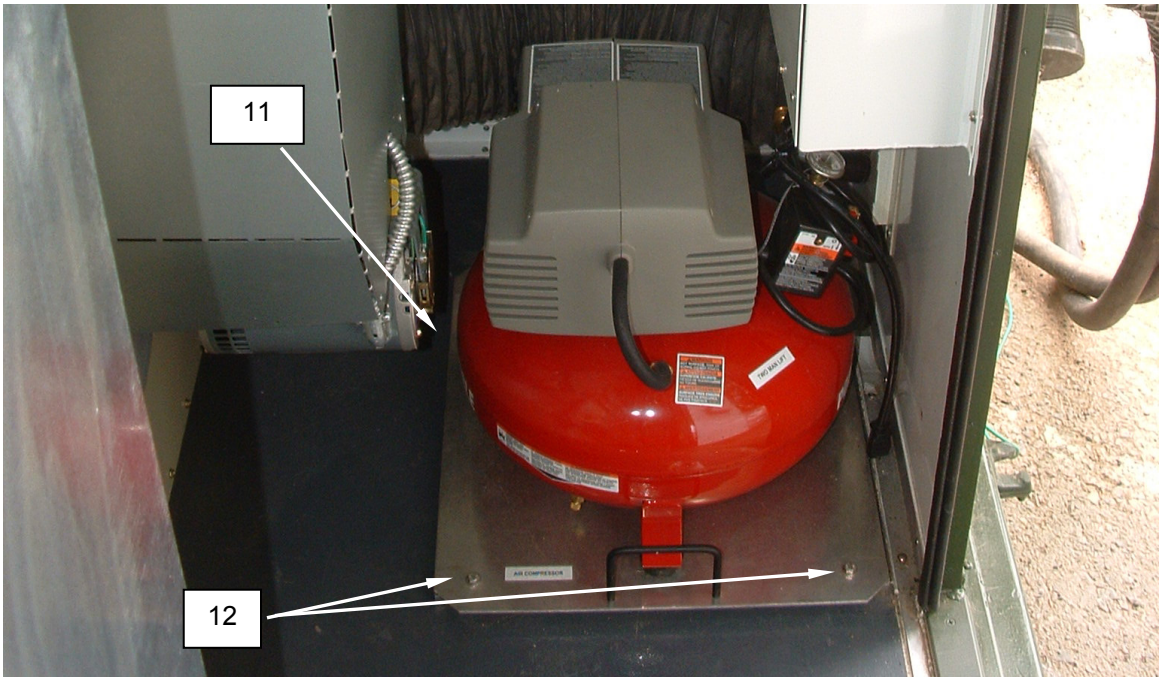


Figure 3. Remove Air Compressor.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM

1. Verify soap containers (Detergent **(Figure 4, Item 13)**, Bleach **(Figure 4, Item 14)**, Sour **(Figure 4, Item 15)** are installed in the automatic soap dispenser **(Figure 4, Item 16)**.

2. Open soap dispenser water inlet **(Figure 4, Item 17)**.

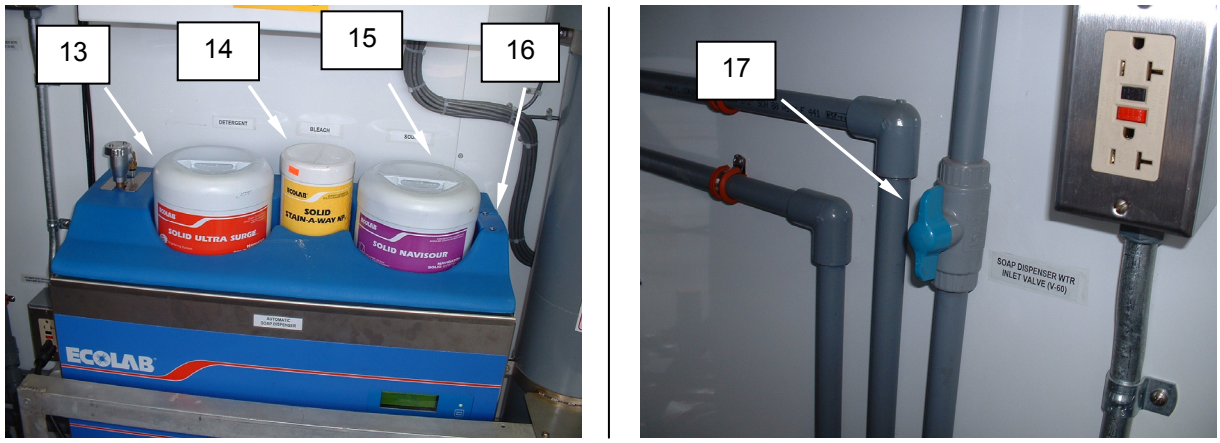


Figure 4. Purge Automatic Soap Dispenser.

3. Close soap dispenser water inlet drain valve **(Figure 5, Item 18)**.

4. Close washer No.1 cold water inlet valve V-6 (on ceiling) **(Figure 5, Item 19)**.

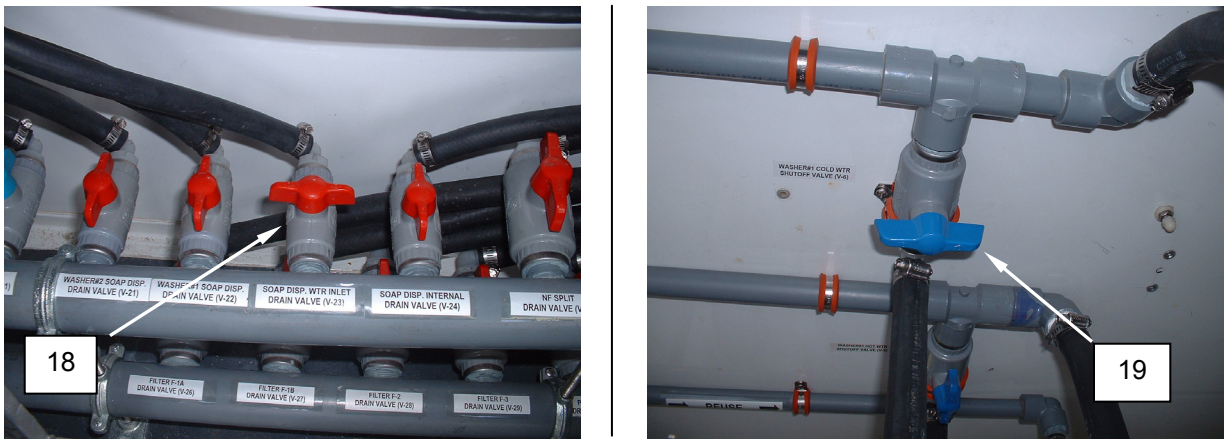
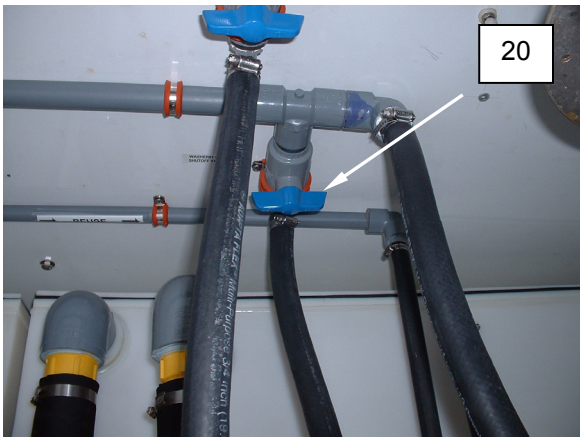


Figure 5. Purge Automatic Soap Dispenser.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

5. Close washer No. 1 hot water inlet V-5 **(Figure 6, Item 20)**.

6. Close washer No. 2 cold water inlet V-8 **(Figure 6, Item 21)**.



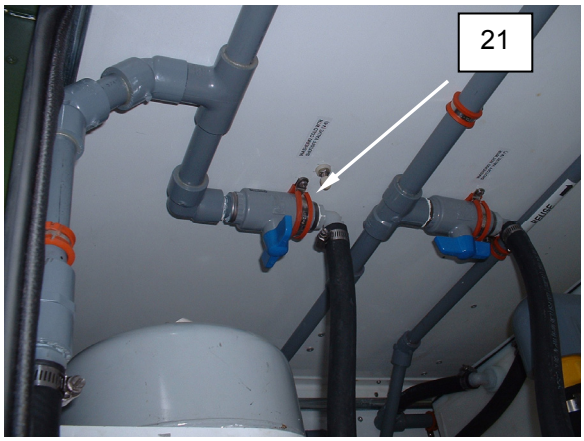


Figure 6. Purge Automatic Soap Dispenser.

7. Close washer No. 2 hot water inlet V-7 **(Figure 7, Item 22)**.

8. Close water spigot **(Figure 7, Item 23)**.





Figure 7. Purge Automatic Soap Dispenser.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

9. Close water shutoff valve V-57 **(Figure 8, Item 12)**.



WARNING

Drain the compressor daily or after each use. If the tank develops a leak, replace it immediately with a new tank or replace the entire compressor. The tank could burst if there is a leak. Failure to comply may result in serious injury or death to personnel.



WARNING

Always wear appropriate protection for your eyes. The compressor can propel dirt, chips, and loose particles at high speed. Failure to comply may result in serious injury to personnel.

Always turn the compressor off and bleed the pressure from the hose and tank before performing maintenance or attaching tools and accessories. The compressor can propel dirt, chips, and loose particles at high speed. Failure to comply may result in serious injury to personnel.



WARNING

Do not breathe air from the compressor. Never inhale air from the compressor or through any device connected to the compressor. The air stream may contain toxic vapors or solid particles. Failure to comply may result in serious injury to personnel.

10. Connect one end of air compressor hose **(Figure 8, Item 24)** to air compressor **(Figure 8, Item 11)** and the other end to the air purge connector **(Figure 8, Item 25)**. Slide hose over the top of washer 1.

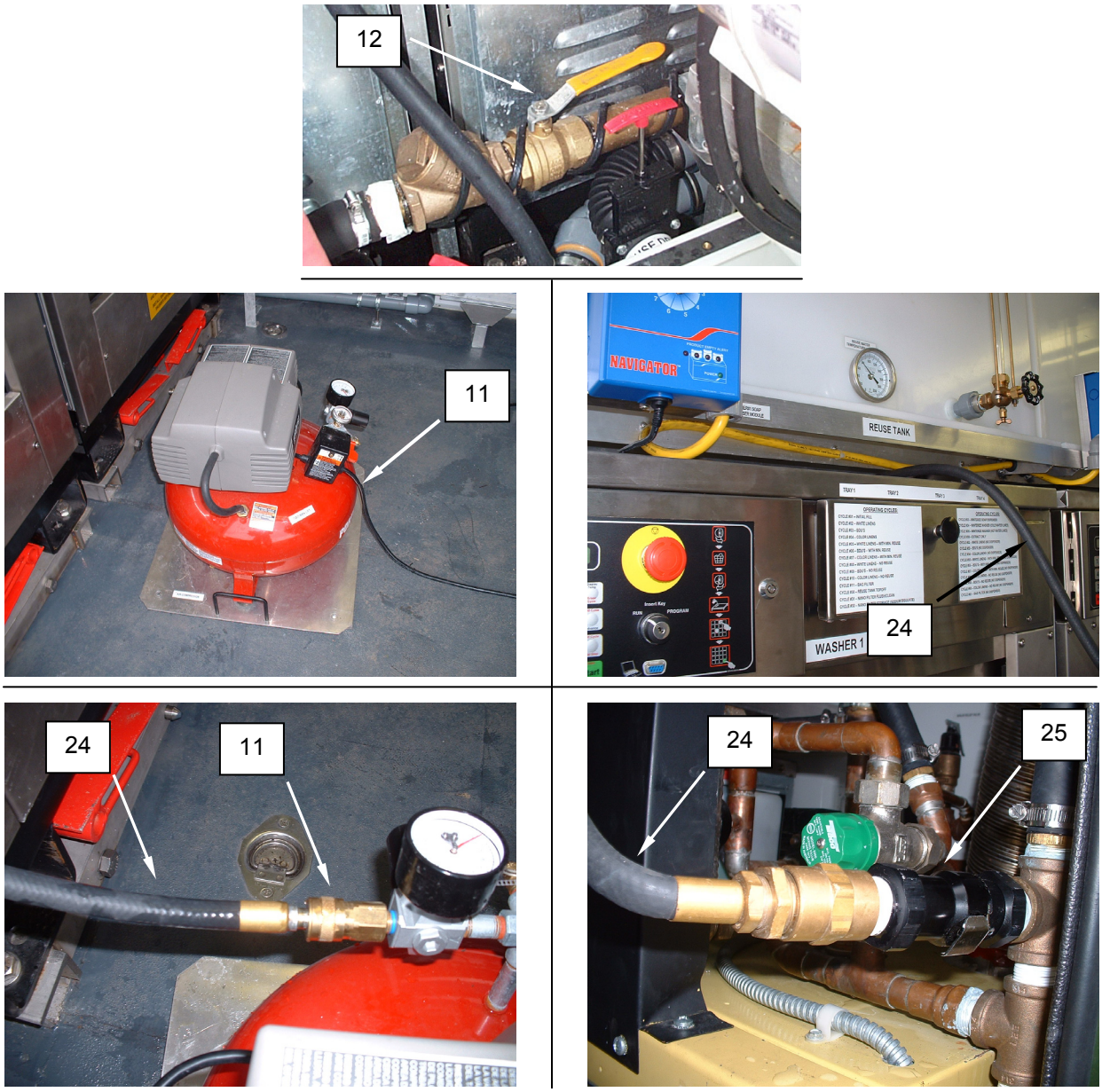


Figure 8. Purge Automatic Soap Dispenser.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

11. Close P-1 pump drain valve V-53 **(Figure 9, Item 26)** and boiler outlet drain valve V-37.

12. Connect the air compressor power cord **(Figure 9, Item 27)** to the service receptacle **(Figure 9, Item 28)**.

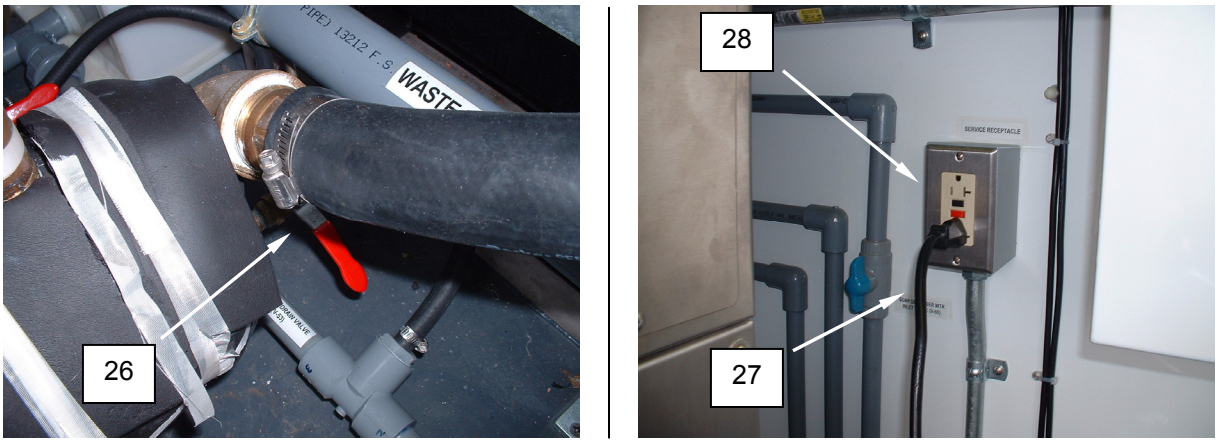


Figure 9. Purge Automatic Soap Dispenser.

13. Turn on air compressor **(Figure 10, Item 11)**.

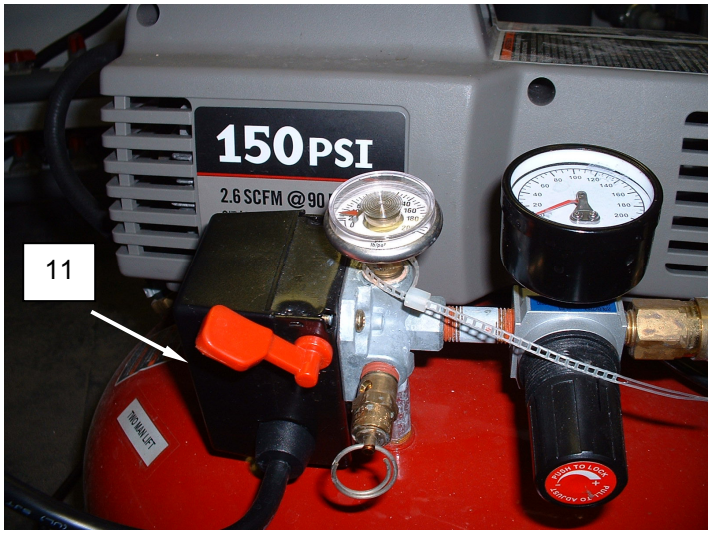


Figure 10. Air Compressor.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

14. Monitor the PLC **(Figure 11, Item 29)** system pressure while the air compressor **(Figure 11, Item 11)** builds up pressure in the system. The system pressure should be maintained at 50 psig.

15. If the system pressure is above or below 50 psig, adjust the air compressor regulator **(Figure 11, Item 30)** in order to achieve a 50 psig system pressure. Once the system is fully pressurized, the air compressor will turn off.

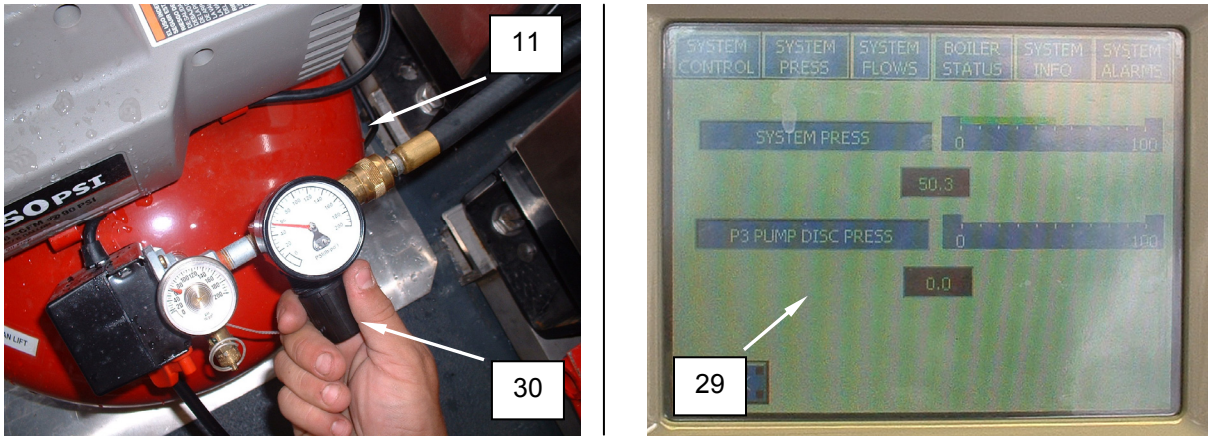


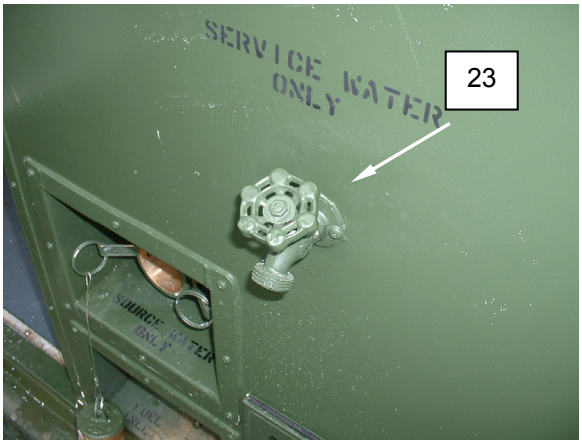
Figure 11. Purge Automatic Soap Dispenser.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

16. Open the water spigot **(Figure 12, Item 23)** and allow all water and pressurized air to be expelled. If water is still observed draining, close spigot and allow system pressure to again build to 50 psig on the PLC **(Figure 12, Item 29)**.

17. Repeat procedure as needed until all water has been expelled from the system (may be required 2-3 times).

18. Close spigot **(Figure 12, Item 11)** and allow system pressure to once again build to 50 psig.



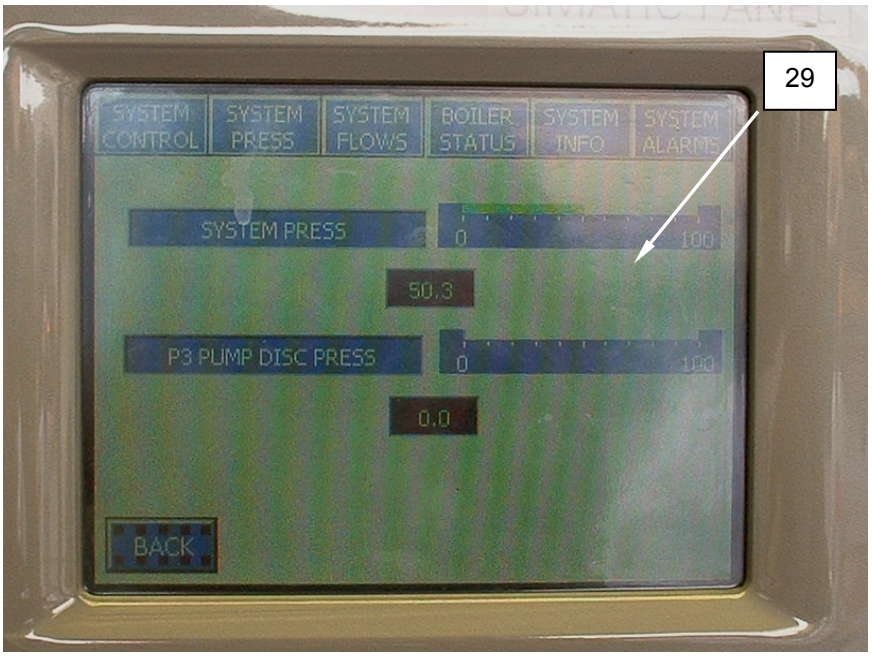


Figure 12. Purge Automatic Soap Dispenser.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

NOTE

Ensure soap dispenser is turned ON.

NOTE

As the system detects that all water has been eliminated from the detergent, bleach, and sour, an alarm will be displayed on the soap dispenser module **(Figure 13, Item 30)** above washer as well as on the display **(Figure 13, Item 31)** on the front of the automatic soap dispenser.

19. Run cycle 33 on washer No.1 **(Figure 13, Item 32)** to evacuate water from the automatic soap dispenser.

20. Press the reset button **(Figure 13, Item 33)** on the front of the automatic soap dispenser as each alarm is displayed. If the washer completes cycle 33 and no alarms have been displayed, restart cycle 33 on washer No.1. Do not proceed to the next step until all three alarms have been displayed.



Figure 13. Purge Automatic Soap Dispenser.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

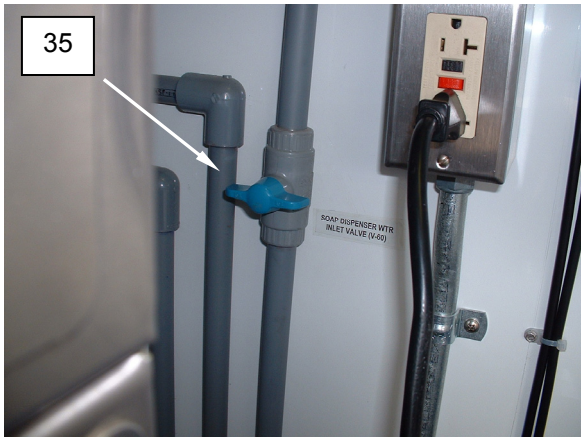
21. Upon completion of cycle 33 on washer No.1, open the washer door **(Figure 14, Item 34)**.

22. Repeat the above cycle 33 procedure for washer No. 2.

23. Close the automatic soap dispenser water inlet valve V-60 **(Figure 14 Item 35)**.

24. Open the automatic soap dispenser water inlet drain valve V-23 **(Figure 14, Item 36)**.





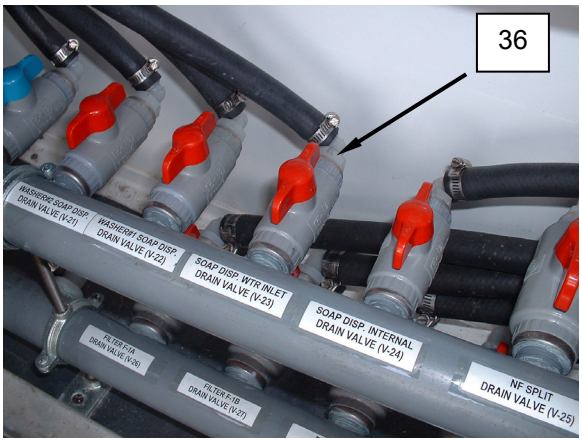


Figure 14. Purge Automatic Soap Dispenser.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

Purge Washer No. 1

1. Open the washer No.1 cold water inlet valve V-6 **(Figure 15, Item 19)**.

2. Run cycle 34 on washer No.1 **(Figure 15, Item 32)** to evacuate water from the washer supply and detergent lines.

3. Press ENTER followed by ADVANCE when washer No.1 indicates a "DIDN'T FILL WITHIN TIME" alarm.

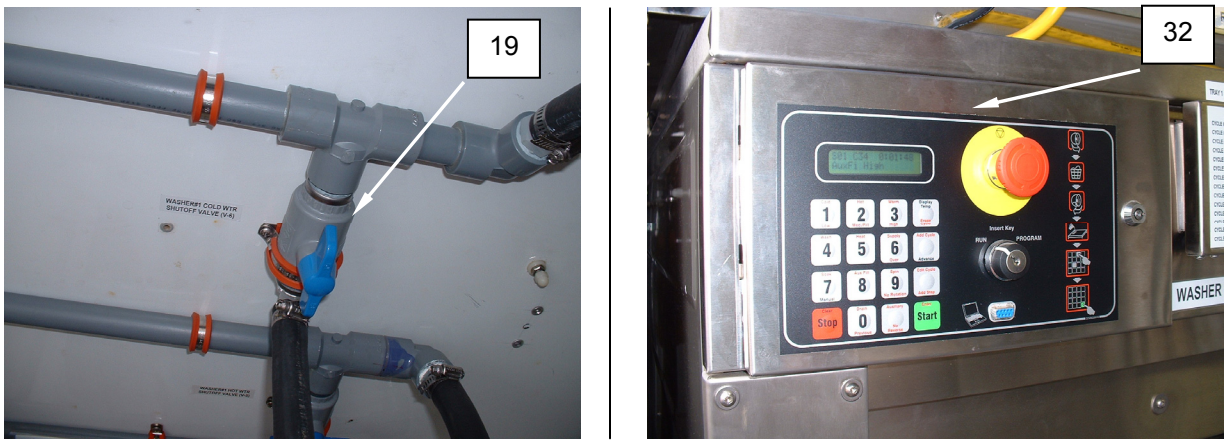


Figure 15. Purge Washer No. 1.

4 . Wait until washer No.1 **(Figure 16, Item 32)** displays DONE.

5. Close the washer No.1 cold water inlet valve V-6 **(Figure 16, Item 19)**.

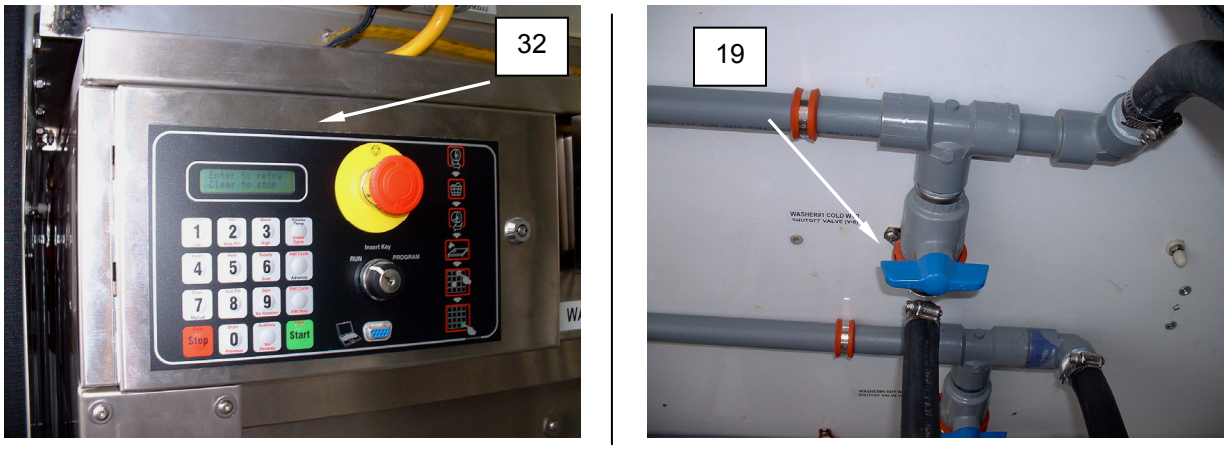


Figure 16. Purge Washer No. 1.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

6. Open the washer No.1 hot water inlet valve V-5 **(Figure 17, Item 20)**.
7. Run cycle 35 on washer No.1 **(Figure 17, Item 32)** to evacuate water from the washer supply and detergent lines.
8. Press ENTER then ADVANCE when the washer indicates a "DIDN'T FILL WITHIN TIME" alarm.
9. Wait until washer No.1 **(Figure 17, Item 32)** displays DONE.
10. Close the washer No.1 hot water inlet valve V-5 **(Figure 17, Item 20)**.

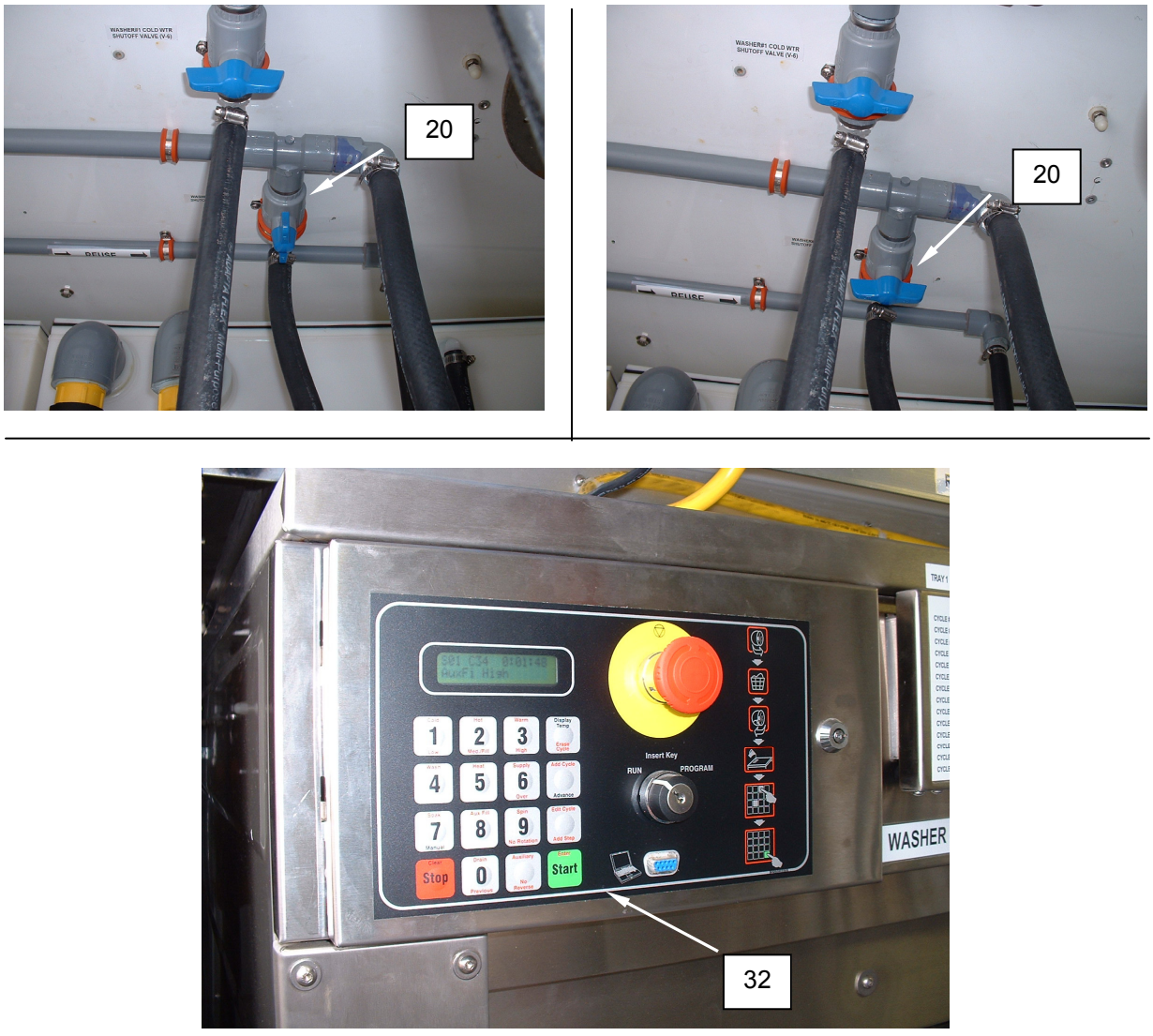


Figure 17. Purge Washer No. 1.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

Purge Washer No. 2

1. Open the washer No. 2 cold water inlet valve V-8 **(Figure 18, Item 9)**.

2. Run cycle 34 on washer No. 2 **(Figure 18, Item 26)** to evacuate water from the washer supply and detergent lines.

3. Press ENTER followed by ADVANCE when washer No. 2 **(Figure 18, Item 26)** indicates a "DIDN'T FILL WITHIN TIME" alarm.

4. Wait until washer No. 2 **(Figure 18, Item 26)** displays DONE.

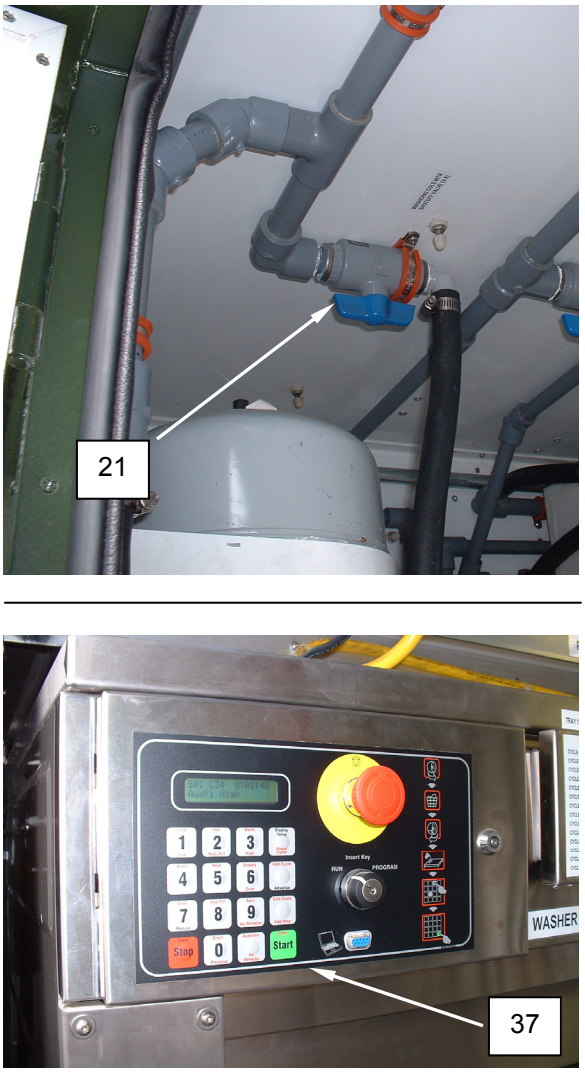


Figure 18. Purge Washer No. 2.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

5. Close the washer No. 2 cold water inlet valve V-8 **(Figure 19, Item 21)**.

6. Open the washer No. 2 hot water inlet valve V-7 **(Figure 19, Item 22)**.

7. Run cycle 35 on washer No. 2 **(Figure 19, Item 37)** to evacuate water from the washer supply and detergent lines. (NOTE:

8. Press ENTER then ADVANCE when the washer indicates a “DIDN’T FILL WITHIN TIME” alarm.

9. Wait until washer No. 2 **(Figure 19, Item 37)** displays DONE.

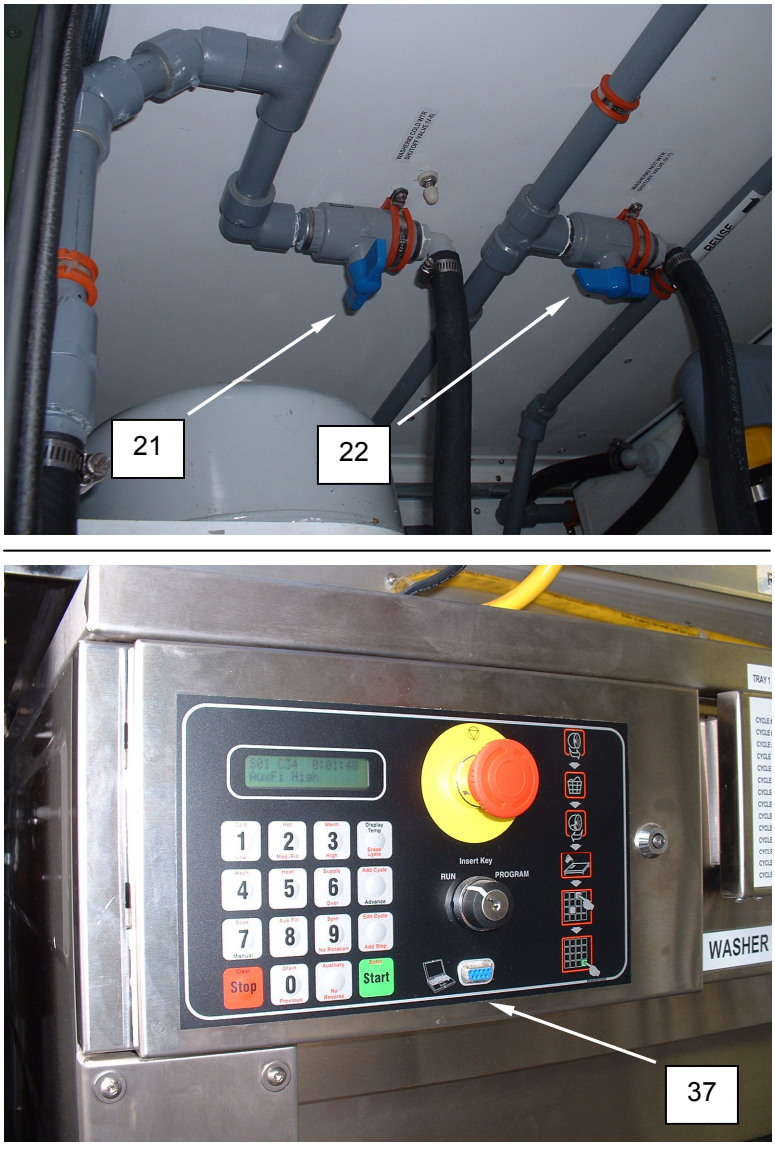


Figure 19. Purge Washer No. 2.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

Complete Air Purge



WARNING

Always turn the compressor off and bleed the pressure from the hose and tank before performing maintenance or attaching tools and accessories. The compressor can propel dirt, chips, and loose particles at high speed. Failure to comply may result in serious injury to personnel.

1. Turn off the air compressor **(Figure 20, Item 11)**.
2. Open the P-1 pump drain valve V-53 **(Figure 20, Item 26)**.
3. Open the washer No.1 cold water inlet valve V-6 **(Figure 20, Item 19)**.
4. Open the washer No.1 hot water inlet valve V-5 **(Figure 20, Item 20)**.
5. Open the washer No. 2 cold water inlet valve V-8 **(Figure 20, Item 21)**.
6. Ensure washer No. 2 hot water inlet valve V-7 is still open **(Figure 20, Item 22)**.

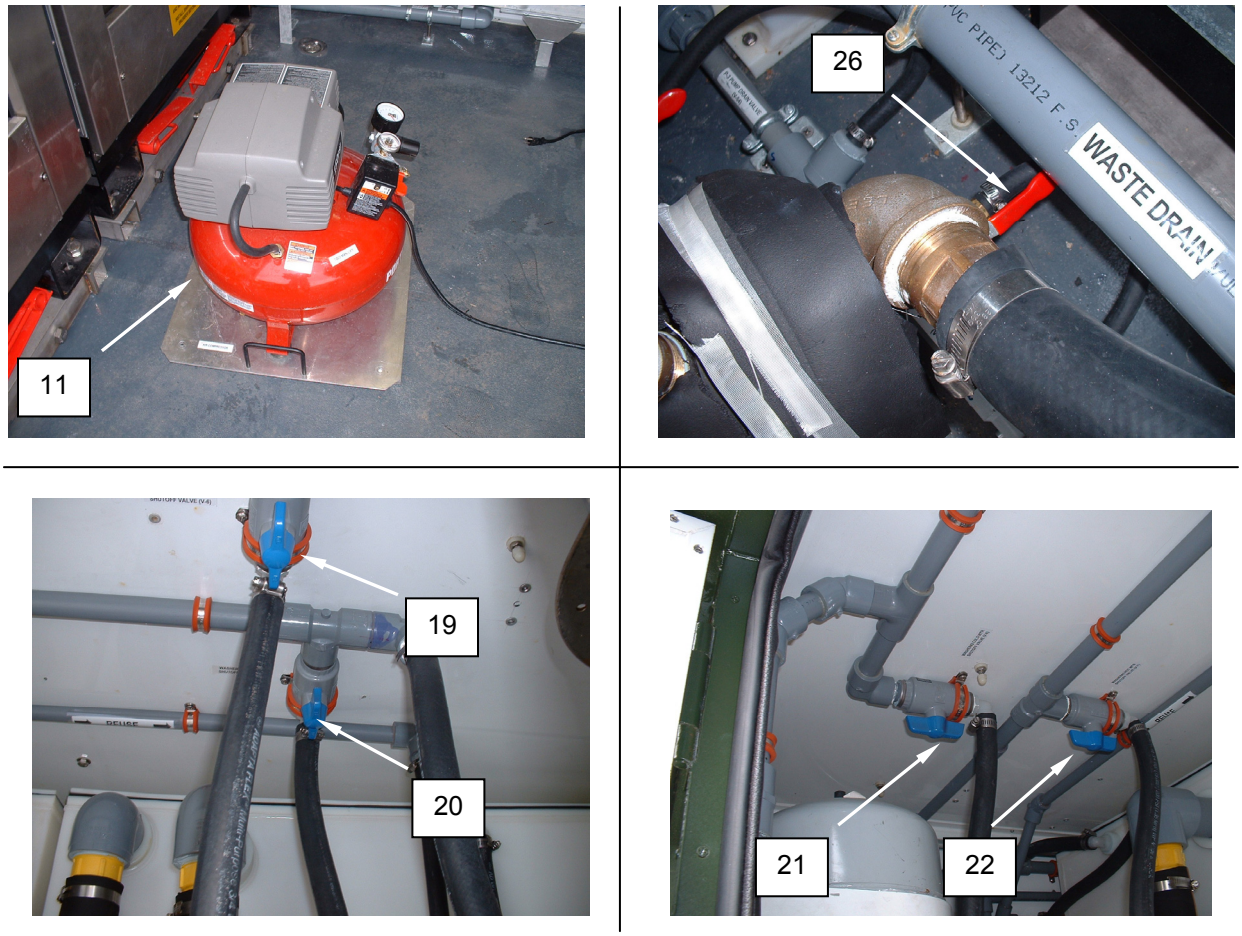


Figure 20. Complete Air Purge.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

7. Open soap dispenser water inlet V-60 **(Figure 21, Item 35)**.

8. Wait for system pressure to read “0” at PLC **(Figure 21, Item 29)**.

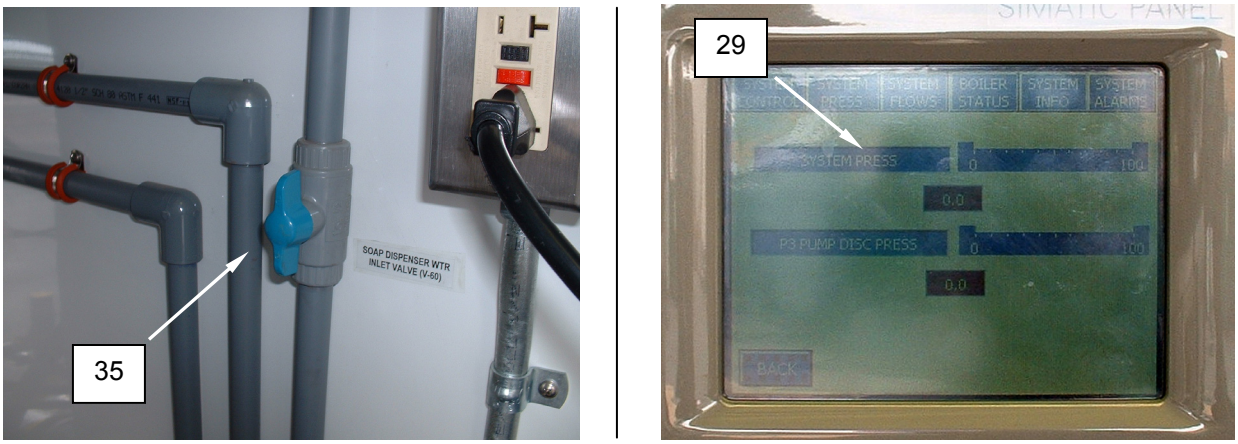


Figure 21. Complete Air Purge.

9. Verify that the air compressor pressure gauge **(Figure 22, Item 38)** reads “0”.

10. Disconnect air compressor hose **(Figure 22, Item 24)** from air purge connector **(Figure 22, Item 25)**.

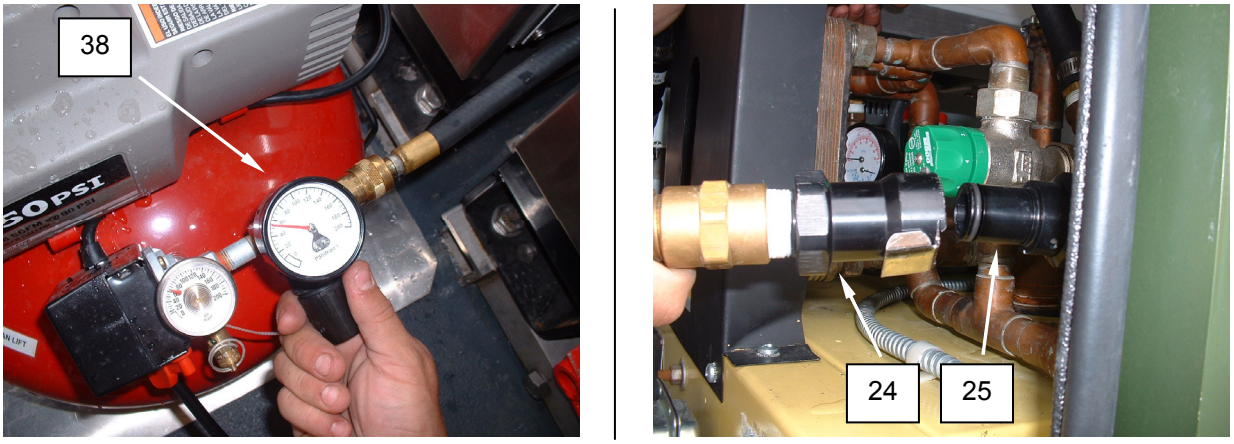


Figure 22. Complete Air Purge.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM - CONTINUED

11. Disconnect air compressor hose **(Figure 23, Item 24)** from air compressor quick disconnect **(Figure 23, Item 39)**.

12. Disconnect the air compressor power cord **(Figure 23, Item 27)** from the service receptacle **(Figure 23, Item 28)**. Return air compressor to its storage place behind dryers and secure it to mounting bracket.

13. Open air compressor drain valve **(Figure 23, Item 40)**.

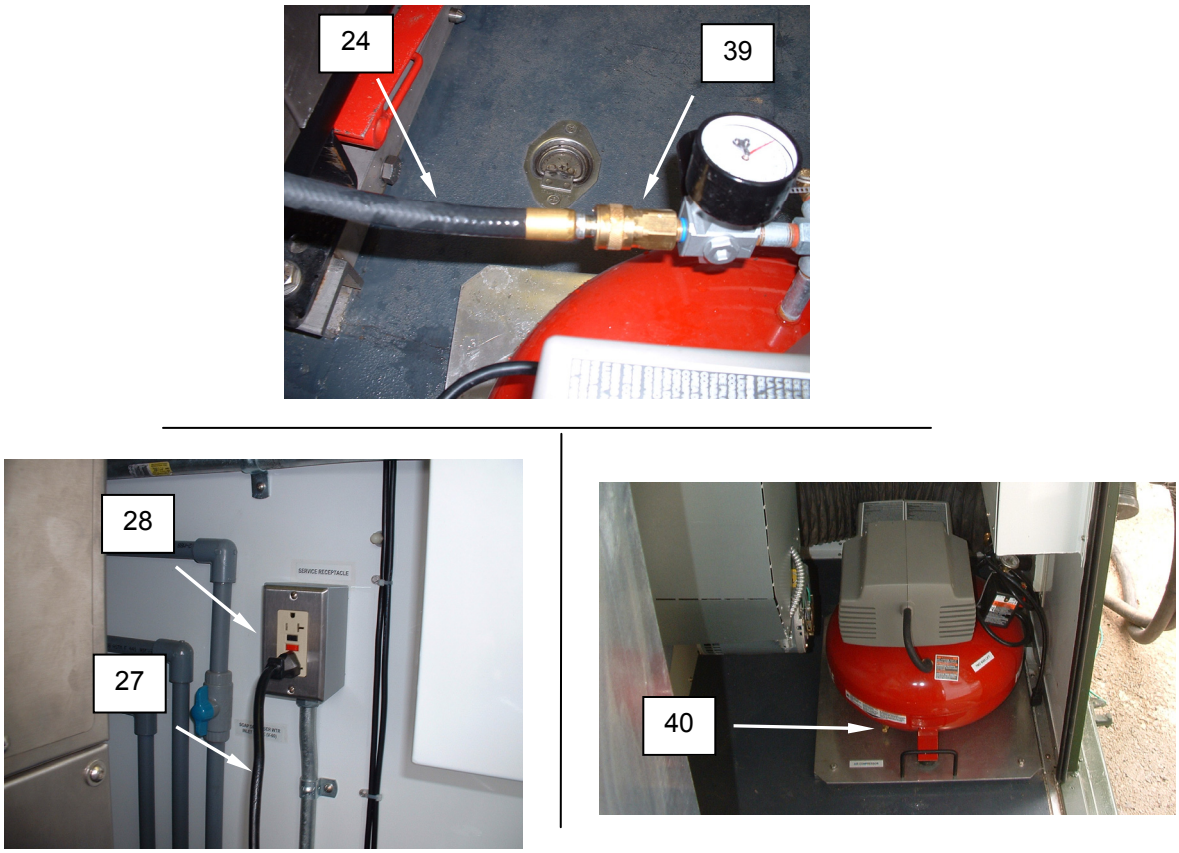


Figure 23. Complete Air Purge.

AIR PURGE WASHERS AND WATER TREATMENT SYSTEM – CONTINUED



WARNING

Wear appropriate protective clothing. Use gloves and mask protection when cleaning washer components. Failure to comply may result in serious injury to personnel.

14. Empty and clean with paper towel washer No.1 soap trays **(Figure 24, Item 41)**.

15. Empty and clean washer No. 2 soap trays **(Figure 24, Item 42)**.

16. Wipe out residual water in washer No.1 **(Figure 24, Item 32**.

17. Wipe out residual water in washer No. 2 **(Figure 24, Item 37)**.

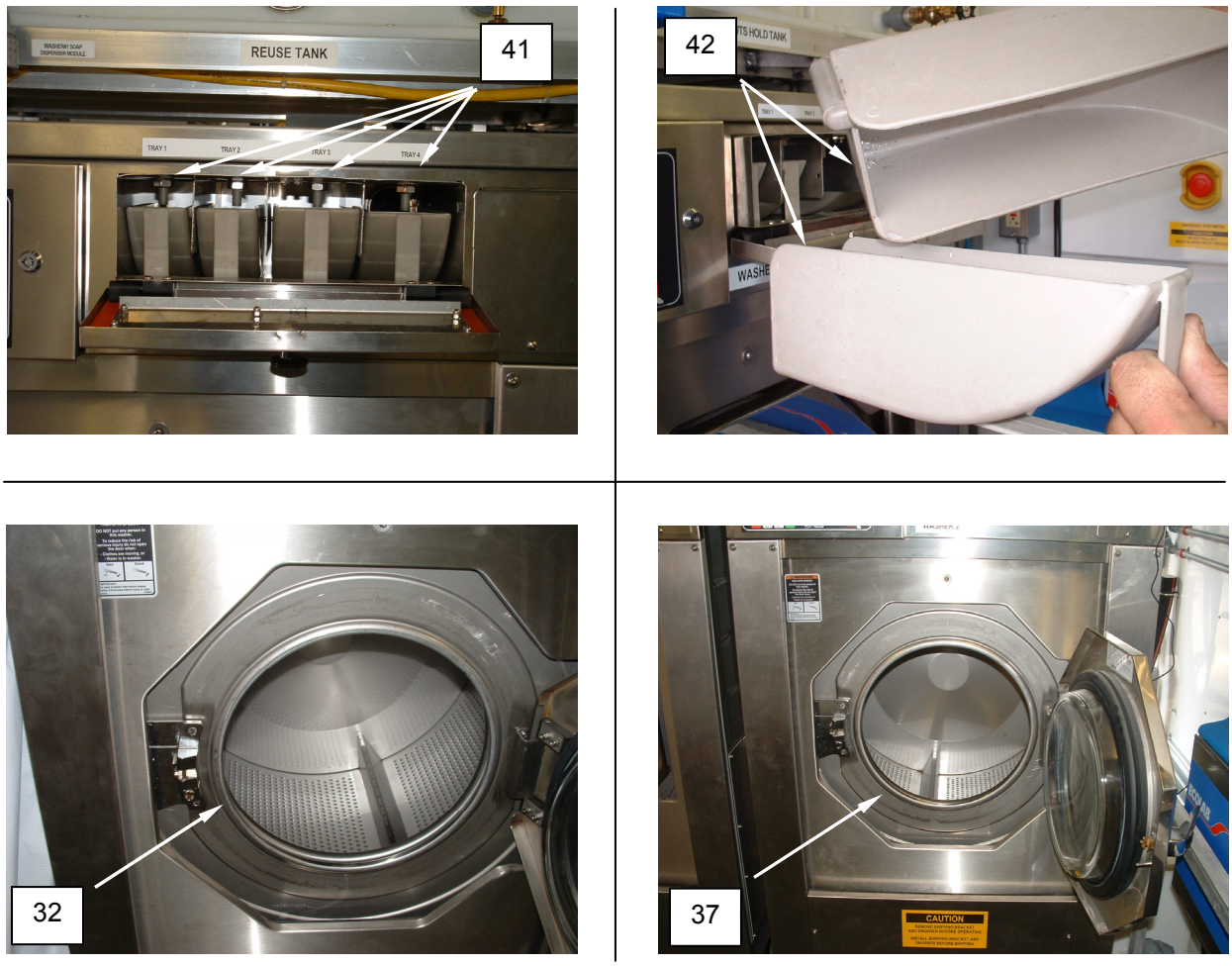


Figure 24. Complete Air Purge.

APPLY ANTIFREEZE PROTECTION TO WASHERS AND WATER TREATMENT SYSTEM

WARNING

Antifreeze used in the following procedure is highly toxic. Wear appropriate protective clothing when handling antifreeze. If antifreeze contacts eyes or skin, flush the affected area immediately with clean water and seek medical attention.

Add Antifreeze

1. Close waste tank drain V-36 **(Figure 25, Item 43)**.

1. Remove hose from the waste tank drain and reinstall the outside drain cap **(Figure 25, Item 44)**.

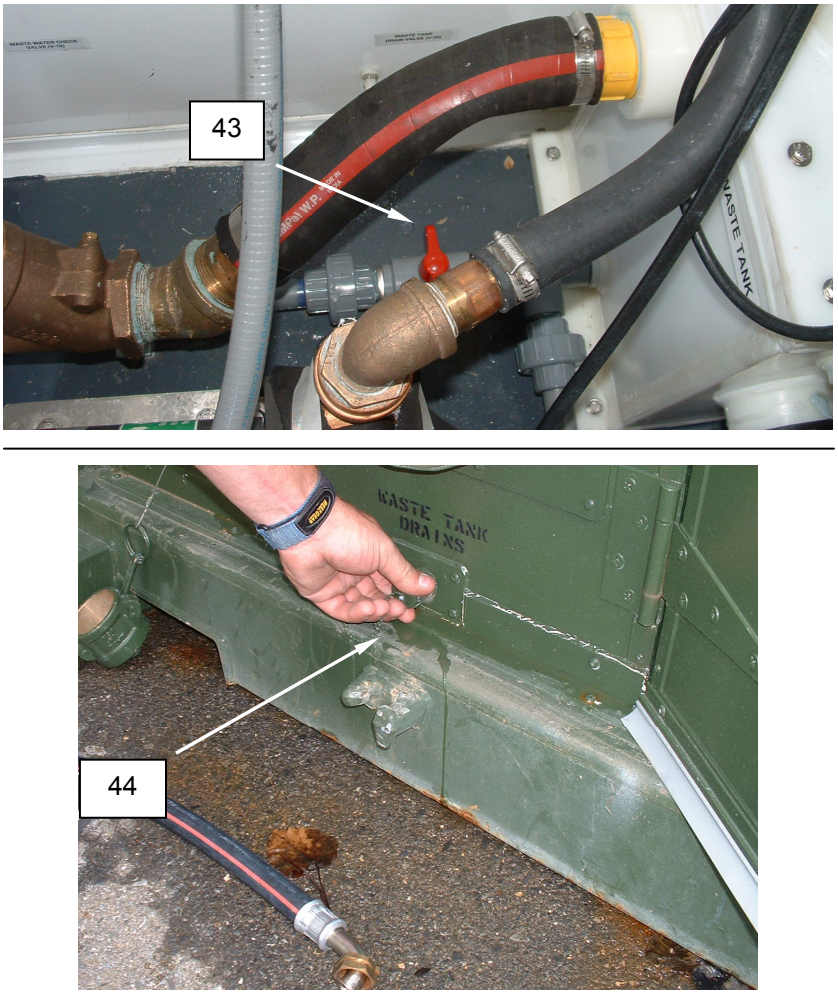
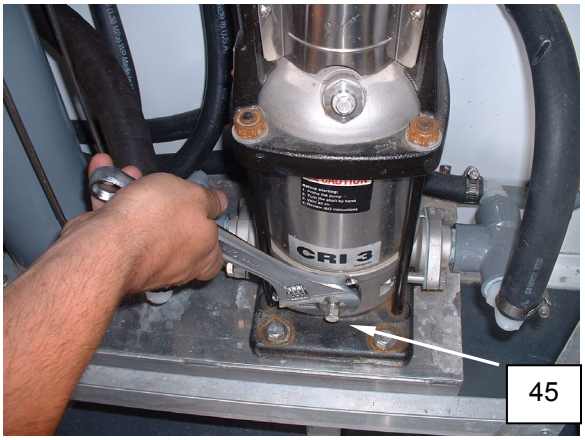


Figure 25. Add Antifreeze - Close Drain.

APPLY ANTIFREEZE PROTECTION TO WASHERS AND WATER TREATMENT SYSTEM – CONTINUED

P-4 Pump

1. Remove bottom drain port **(Figure 26, Item 45)** on P4 and allow any residual water to drain.
2. Reinstall bottom drain port **(Figure 26, Item 45)**.
3. Remove top fill port **(Figure 26, Item 46)**.
4. Using supplied funnel **(Figure 26, Item 47)**, add 16 oz. of antifreeze.
5. Reinstall top fill port **(Figure 26, Item 46)**.



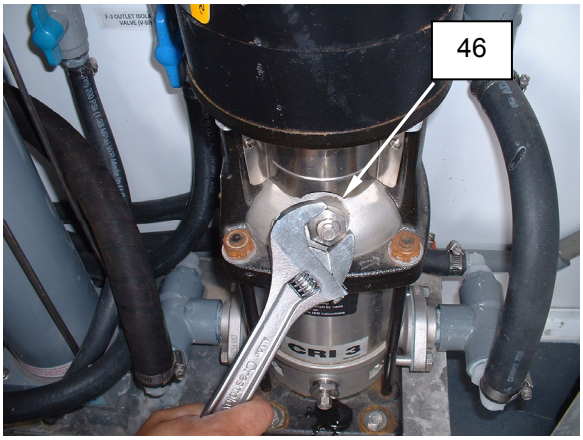




Figure 26. Add Antifreeze - Pump P-4.

APPLY ANTIFREEZE PROTECTION TO WASHERS AND WATER TREATMENT SYSTEM – CONTINUED

Filter F-3

1. Disconnect air bleed quick disconnect **(Figure 27, Item 48)**.
2. Remove F-3 canister lid **(Figure 27, Item 49)**.
3. Remove filter cartridge **(Figure 27, Item 50)**.
4. Add 10 oz. of antifreeze.
5. Reinstall F-3 canister lid **(Figure 27, Item 49)** and secure.
6. Reconnect air bleed quick disconnect **(Figure 27, Item 48)**.

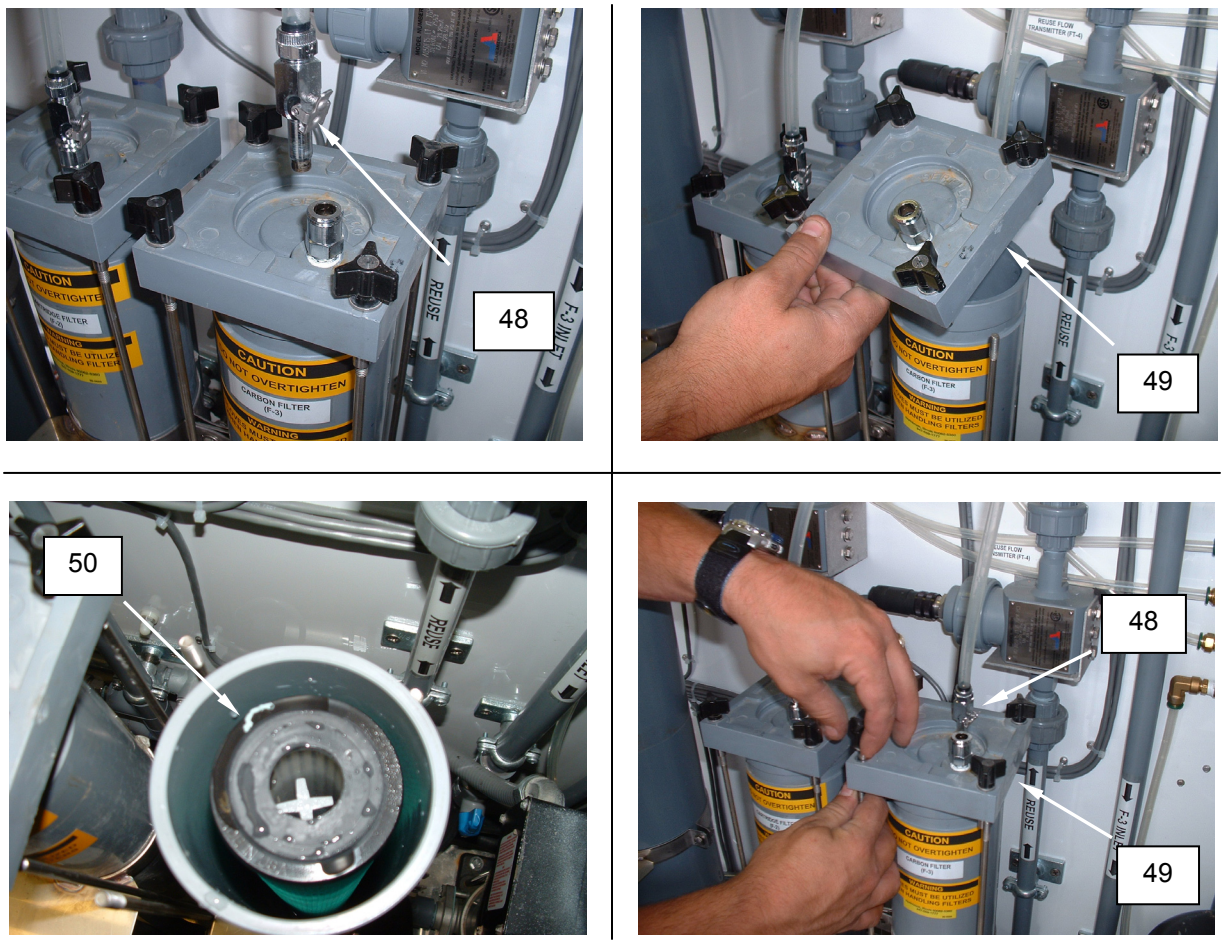


Figure 27. Add Antifreeze - Filter F-3.

APPLY ANTIFREEZE PROTECTION TO WASHERS AND WATER TREATMENT SYSTEM – CONTINUED

Filter F-3

1. Disconnect air bleed quick disconnect on filter F-2 **(Figure 28, Item 51)**.
2. Remove F-2 canister lid **(Figure 28, Item 52)**.
3. Remove filter cartridge **(Figure 28, Item 53)**.
4. Add 10 oz. of antifreeze.
5. Reinstall canister lid **(Figure 28, Item 52)** and secure.
6. Reconnect air bleed quick disconnect **(Figure 28, Item 51)**.

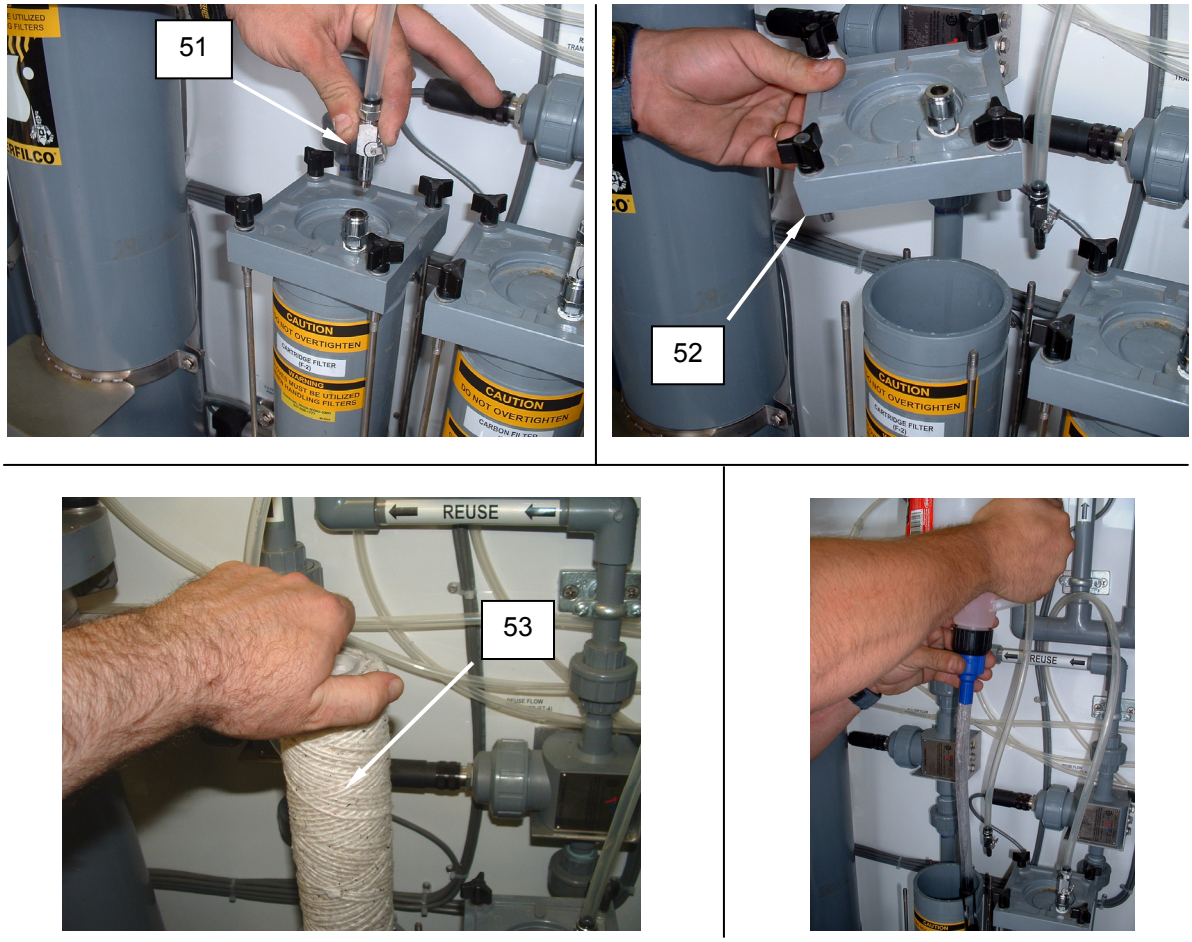


Figure 28. Add Antifreeze - Filter F-2.

APPLY ANTIFREEZE PROTECTION TO WASHERS AND WATER TREATMENT SYSTEM – CONTINUED

Filter F-1A and F-1B

1. Remove air bleed quick disconnect for F1-A **(Figure 29, Item 54)**.
2. Remove supply hose **(Figure 29, Item 55)**.
3. Loosen QD connection **(Figure 29, Item 56)**. Do not remove.
4. Remove lid **(Figure 29, Item 57)**.
5. Remove filter sock **(Figure 29, Item 58)**.
6. Add 16 oz of antifreeze.
7. Install lid **(Figure 29, Item 57)**.
8. Install the supply hose **(Figure 29, Item 55)**, and then install the air bleed quick disconnect **(Figure 29, Item 54)**.
9. Repeat Steps 21 through 29 for filter F-1B **(Figure 29, Item 59)**.

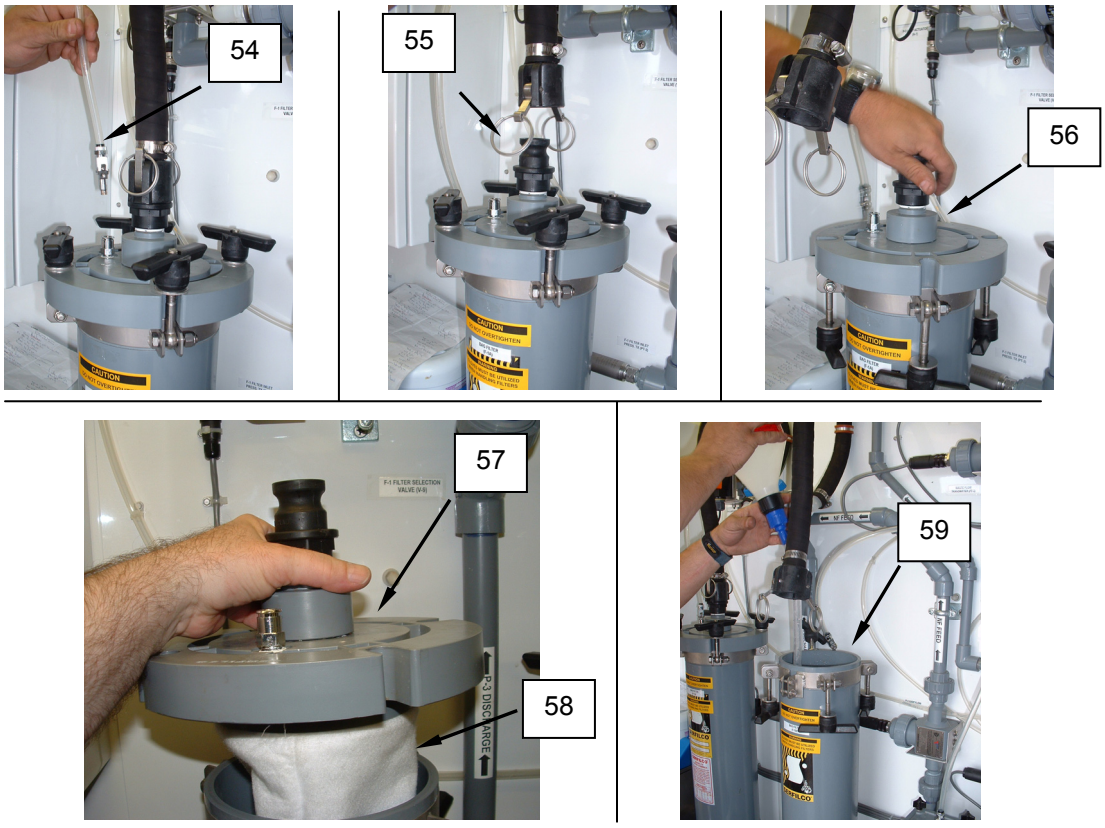


Figure 29. Add Antifreeze - Filters F1-A and F-1B.

APPLY ANTIFREEZE PROTECTION TO WASHERS AND WATER TREATMENT SYSTEM – CONTINUED

Automatic Soap Dispenser

1. Close soap dispenser internal drain valve V-24 **(Figure 30, Item 60)**.
2. Remove laundry chemical canisters **(Figure 30, Item 61)** for the Automatic Soap Dispenser and cover canisters.
3. Add 12 oz. of antifreeze to bleach drain **(Figure 30, Item 62)**.
4. Keep soap dispenser internal drain valve V-24 closed **(Figure 30, Item 60)**.

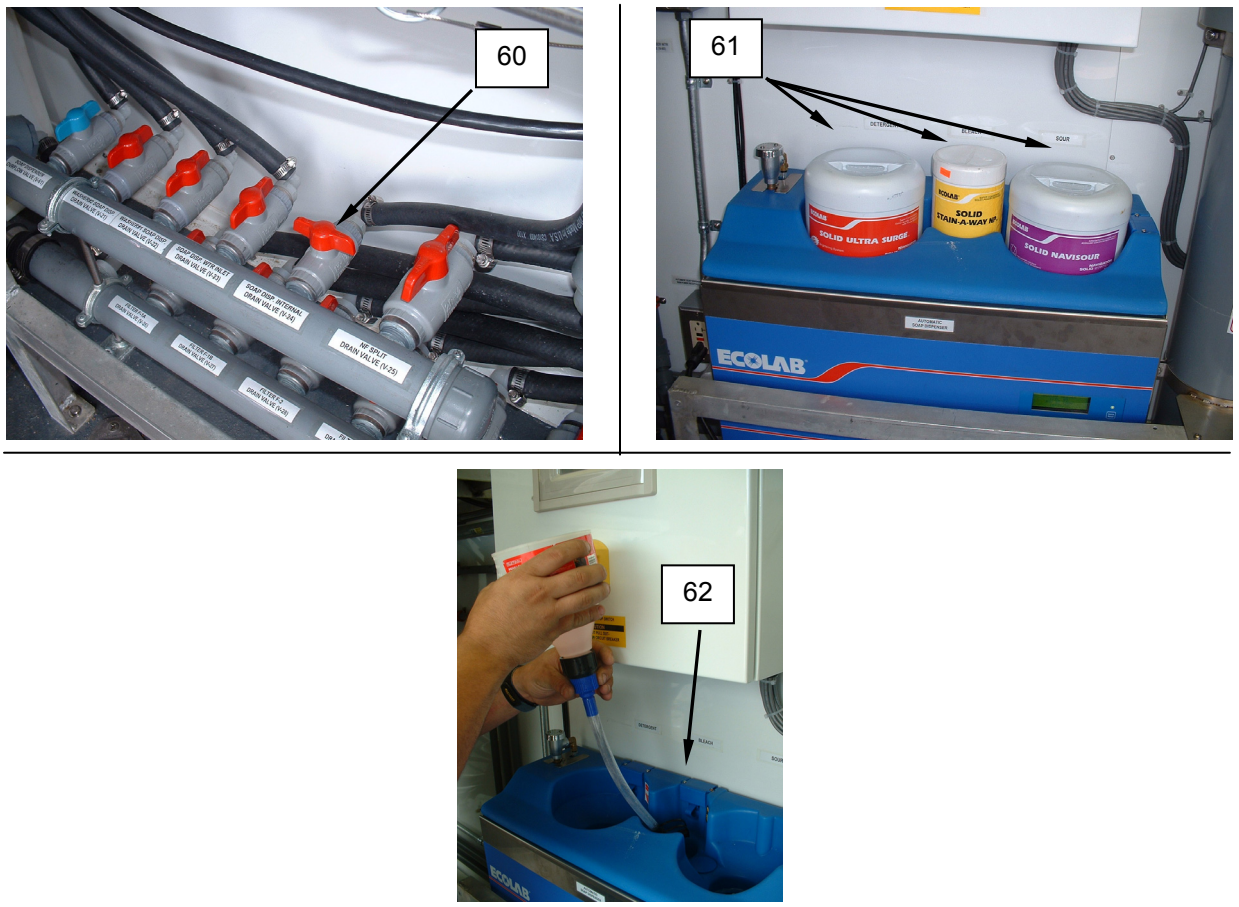


Figure 30. Add Antifreeze - Automatic Soap Dispenser.

APPLY ANTIFREEZE PROTECTION TO WASHERS AND WATER TREATMENT SYSTEM – CONTINUED

P1 Pump

1. Close P1 pump drain valve V-53 **(Figure 31, Item 26)**.
2. Remove QD cap **(Figure 31, Item 63)** on priming port **(Figure 31, Item 64)**.
3. Add 32 oz. of antifreeze to priming port **(Figure 31, Item 64)**.
4. Open the P1 pump drain valveV-53 **(Figure 31, Item 26)** for a 1 second count and then close.
5. Install and lock QD cap **(Figure 31, Item 63)** onto priming port **(Figure 31, Item 64)**.

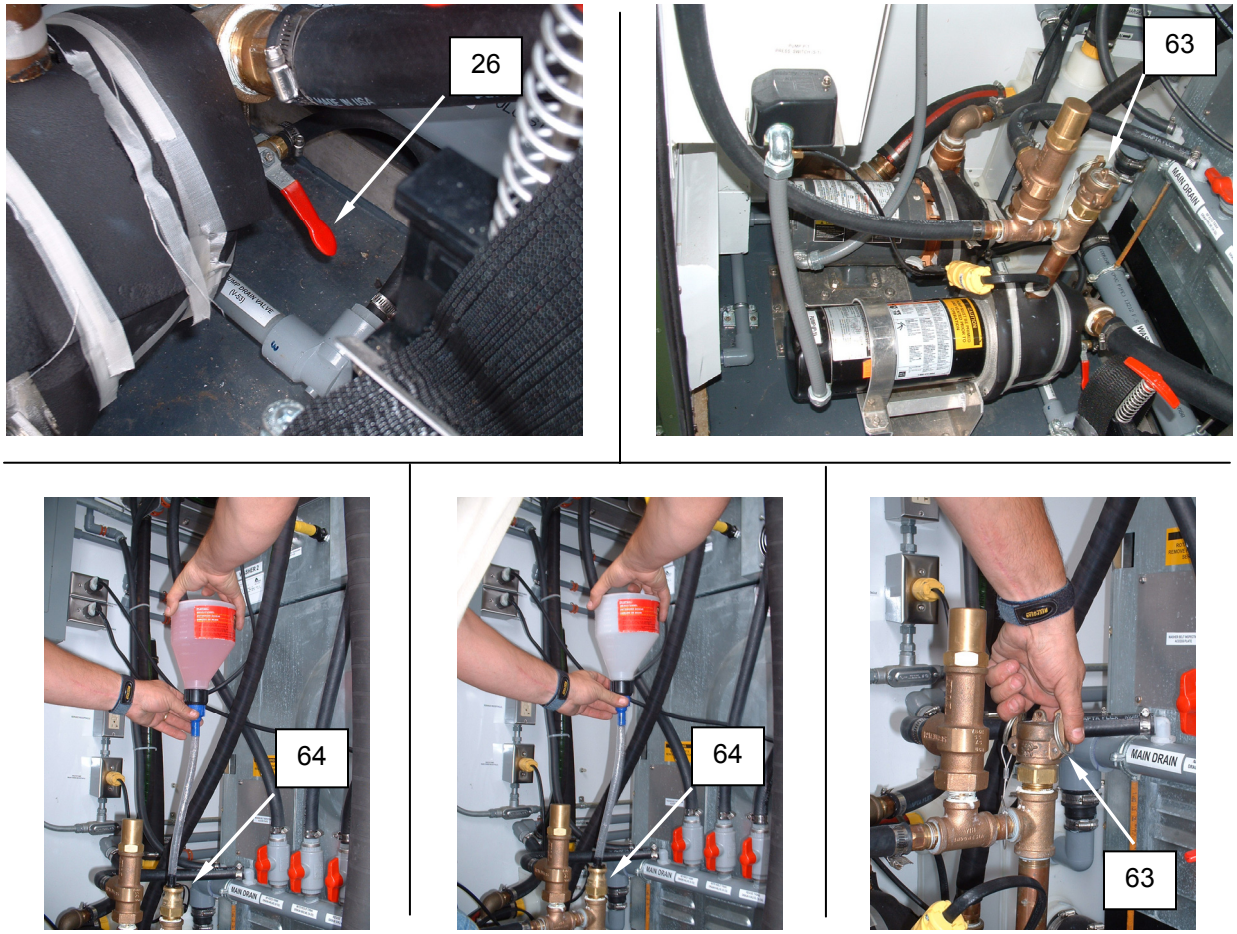


Figure 31. Add Antifreeze - P1 Pump.

APPLY ANTIFREEZE PROTECTION TO WASHERS AND WATER TREATMENT SYSTEM – CONTINUED

Washer No. 1

1. Remove tray No.1 **(Figure 32, Item 65)**.
2. Pour 5 oz. of antifreeze into tray No.1 drain.
3. Install tray No.1 **(Figure 32, Item 65)**.

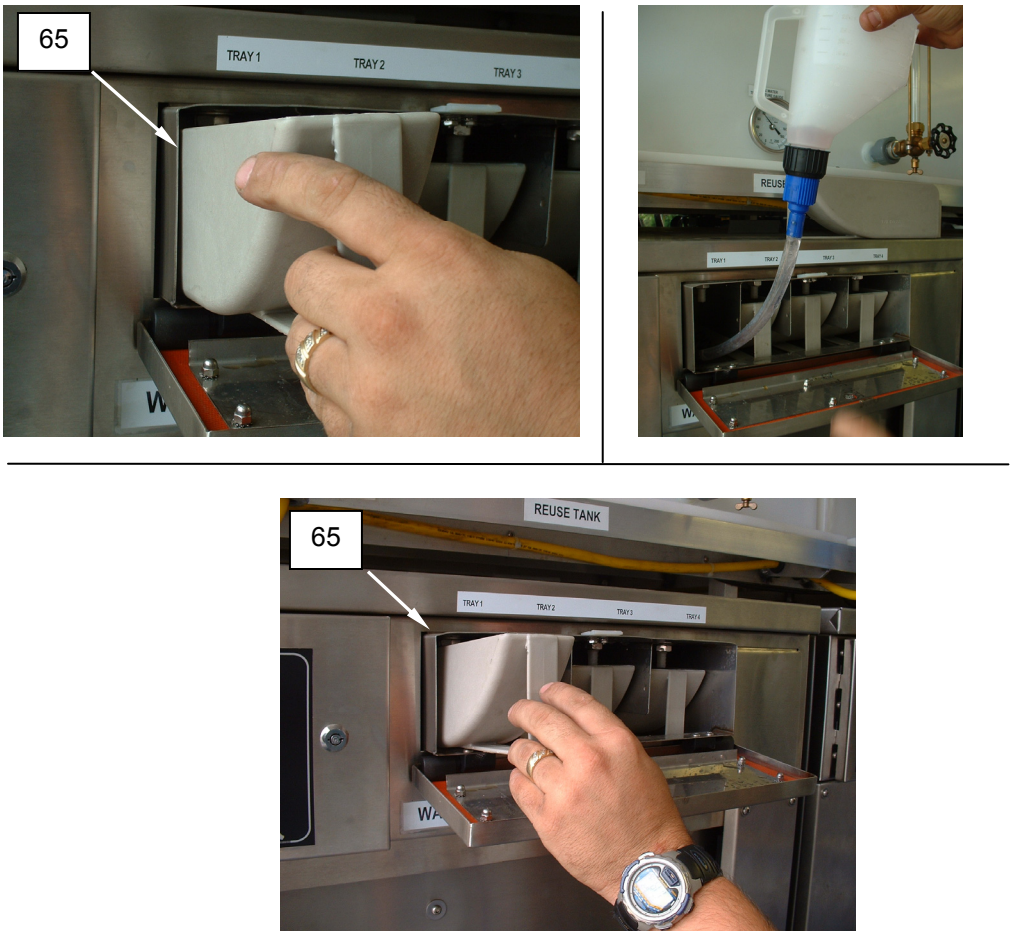


Figure 32. Add Antifreeze - Washer No. 1.

APPLY ANTIFREEZE PROTECTION TO WASHERS AND WATER TREATMENT SYSTEM – CONTINUED

Washer No. 2

1. Remove tray No. 1 **(Figure 33, Item 66)**.
2. Pour 5 oz. of antifreeze into tray No.1 drain.
3. Install tray No. 1 **(Figure 33, Item 66)**.

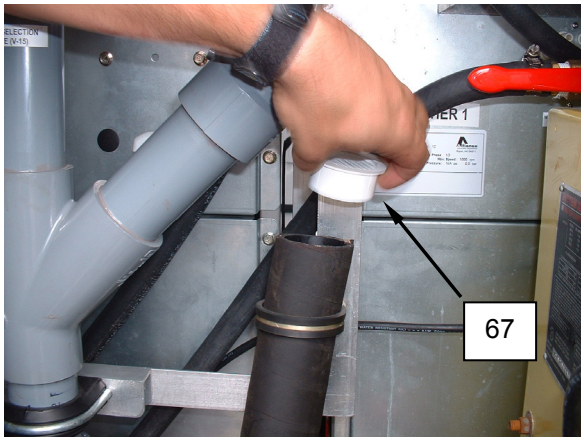


Figure 33. Add Antifreeze - Washer No. 2.

APPLY ANTIFREEZE PROTECTION TO WASHERS AND WATER TREATMENT SYSTEM – CONTINUED

Waste Water Tank

1. Remove stand pipe cover **(Figure 34, Item 67)** on waste water tank.
2. Pour any remaining antifreeze into stand pipe.
3. Install stand pipe cover **(Figure 34, Item 67)**.





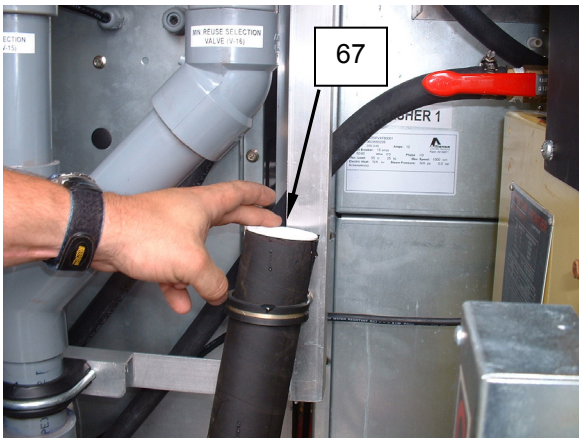


Figure 34. Add Antifreeze - Waste Water Tank.

APPLY ANTIFREEZE PROTECTION TO WASHERS AND WATER TREATMENT SYSTEM – CONTINUED

Install Panels

Install panels **(Figure 35, Item 68)** on filter wall and secure with captive screws.



Figure 35. Install Panels.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER USUAL CONDITIONS - PREPARE CBL AND COMPONENTS FOR MOVEMENT

PREPARE CBL AND COMPONENTS FOR MOVEMENT

GENERAL

Follow the procedures in this work package to prepare Containerized Batch Laundry (CBL) and its components for movement or storage.

Refer to TM 10-8340-224-13 as necessary for additional information on the TEMPER tent system.

Refer to TM 9-4120-411-14 as necessary for additional information on the FDECU.

Refer to TM 9-4520-258-14 as necessary for additional information on the Army Space Heater (ASH).

Install Shipping Brackets on Washers

CAUTION

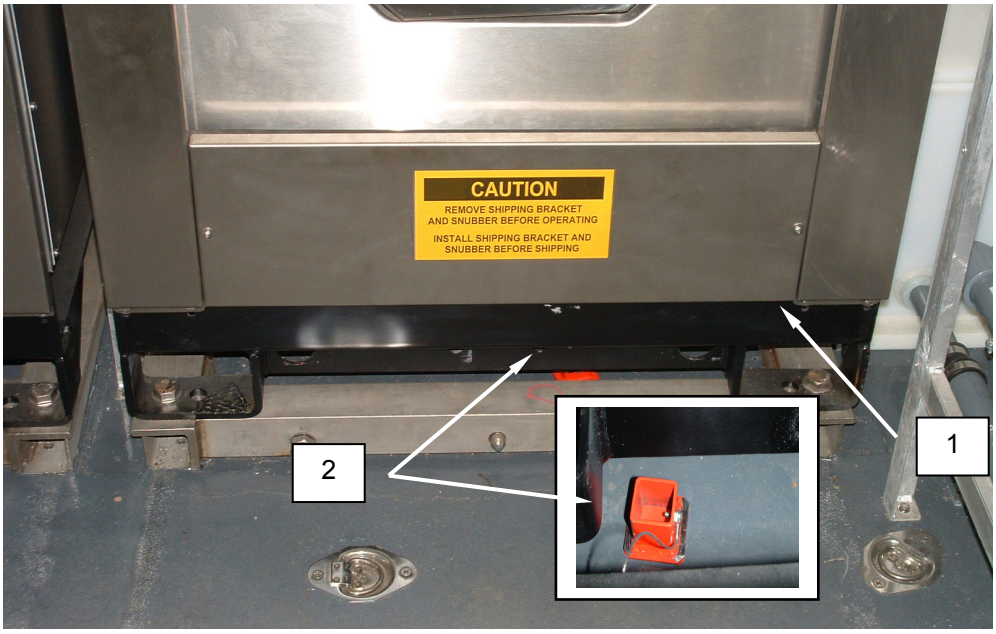
Shipping brackets and snubbers must be installed prior to any movement of the CBL container. The Serious damage to equipment may result from unsecured washers.

NOTE

The shipping brackets for stored between the CBL container wall and the dryer.

1. Remove the screws retaining the washer kick panel **(Figure 1, Item 1)**, and remove the panel.
2. Locate the snubber **(Figure 1, Item 2)** hanging from the washer frame. Place the snubber into the slot in the washer frame.
3. Install the washer kick panel **(Figure 1, Item 1)**, and retain with screws.
4. Install the shipping brackets **(Figure 1, Item 3)**. Twisting the brackets may make installation easier.
5. Install the two bracket securing bolts **(Figure 1, Item 4)**.
6. Repeat steps 1 through 5 for the remaining washer.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED



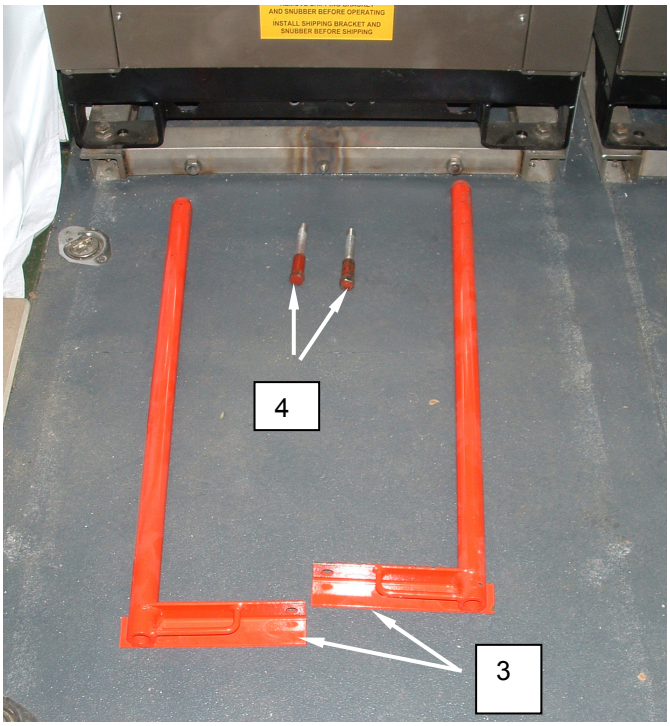


Figure 1. Install Shipping Brackets on Washers.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED

Prepare Dryer and Drying System for Movement

1. Switch both dryer circuit breakers to OFF.

2. Remove the lint compartment doors on both dryers, and clean the lint screens **(Figure 2, Item 5)**. Do not reinstall the lint compartment doors.



Figure 2. Clean Dryer Lint Screens.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED

Prepare the 3000-Gallon Supply Water Tank for Movement

NOTE

For long term storage, the 3000-gallon water tank must be turned inside out and hung from a forklift or other raised location to dry before folding and storing. Refer to TM 10-5430-237-12&P for maintenance and operating instructions for the 3000-gallon water tank.

1. If a pond heater is used, disconnect power plug.
2. Wait 15 minutes before removing pond heater.
3. Remove pond heater from supply water bag.
4. Close water shutoff valve **(Figure 3, Item 6)** supplying water at the water shutoff valve.
5. Remove any excess water from top of the supply water bag, if necessary.
6. Disconnect supply water hose **(Figure 3, Item 7)** from water inlet panel and install dust cap on water inlet connection.
7. Route supply water hose **(Figure 3, Item 7)** downgrade from CBL and water tank **(Figure 3, Item 8)** and drain all remaining water from bag.
8. Disconnect supply water hose **(Figure 3, Item 7)** from water shutoff valve **(Figure 3, Item 6)**.
9. Close valve and disconnect water shutoff valve **(Figure 3, Item 6)** from 3000-gallon supply water tank **(Figure 3, Item 8)**.
10. Remove all water from hose.
11. Install dust caps and plugs **(Figure 3, Item 9)** and coil the hose **(Figure 3, Item 7)** neatly.
12. If insulated tank cover is fitted as shown in Figure 3, remove at this time.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED

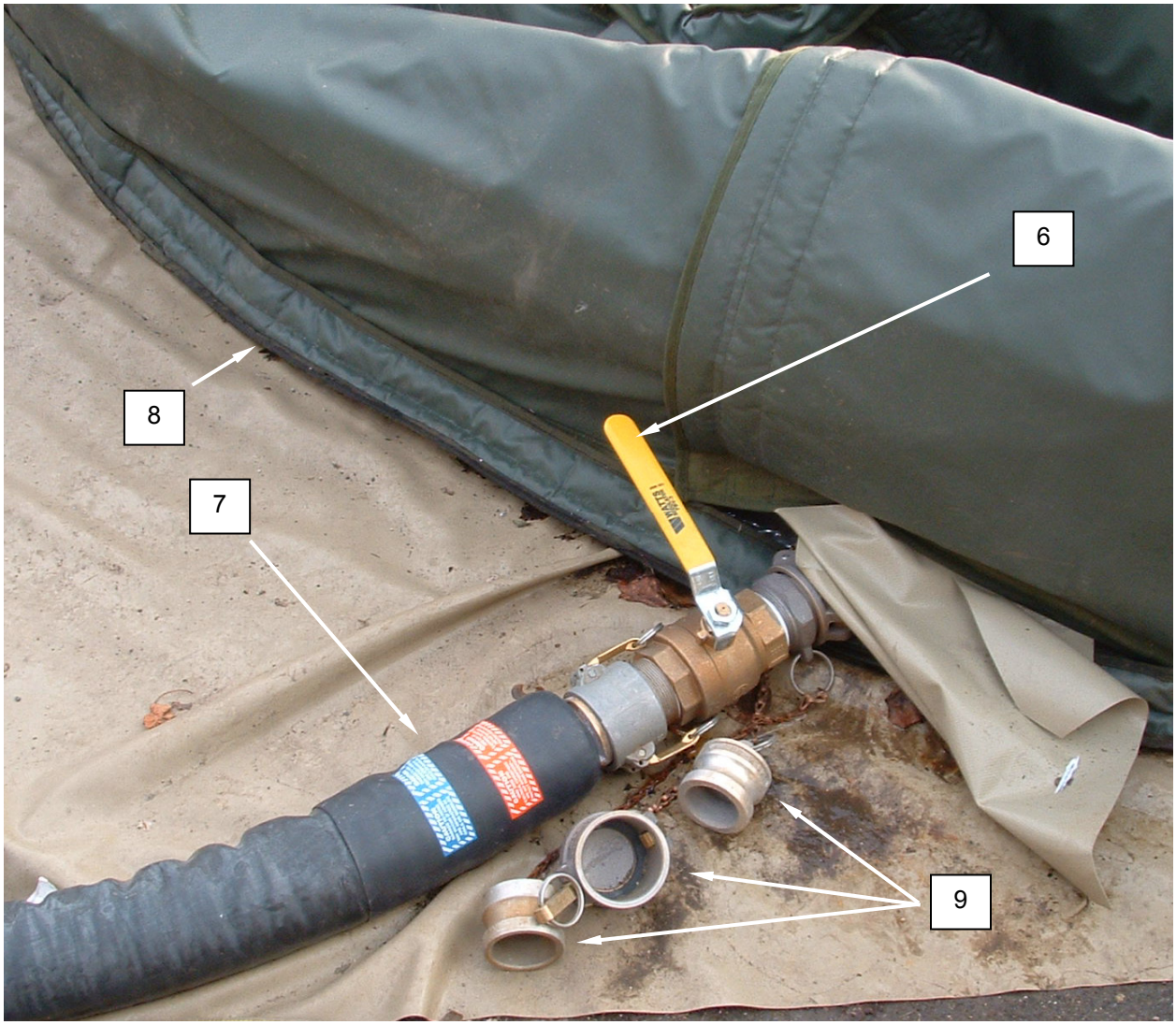


Figure 3. Prepare the 3000 Supply Water Tank for Movement.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED

NOTE

Ground cloth may be different from the ground cloth shown.

13. After the tank **(Figure 4, Item 8)** has been dried, lay out the tank ground cloth **(Figure 4, Item 10)** with the ties down, and then lay out the tank in the center of the ground cloth. Fold the sides of the tank to touch as shown in Figure 4.

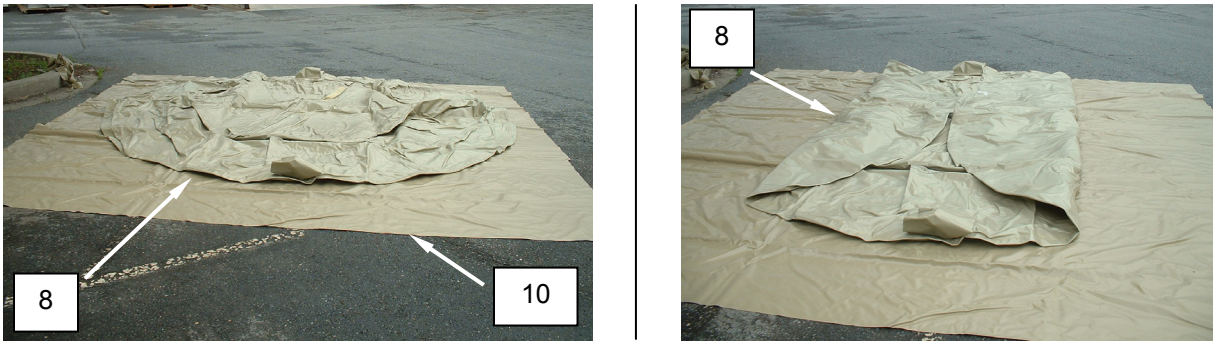


Figure 4. Prepare the 3000 Supply Water Tank for Movement.

14. Fold the tank **(Figure 5, Item 8)** in half again, and recenter on the ground cloth **(Figure 5, Item 10)**. The tank should be approximately 4 feet wide. Start from one end and fold over approximately 18 inches of tank fabric.

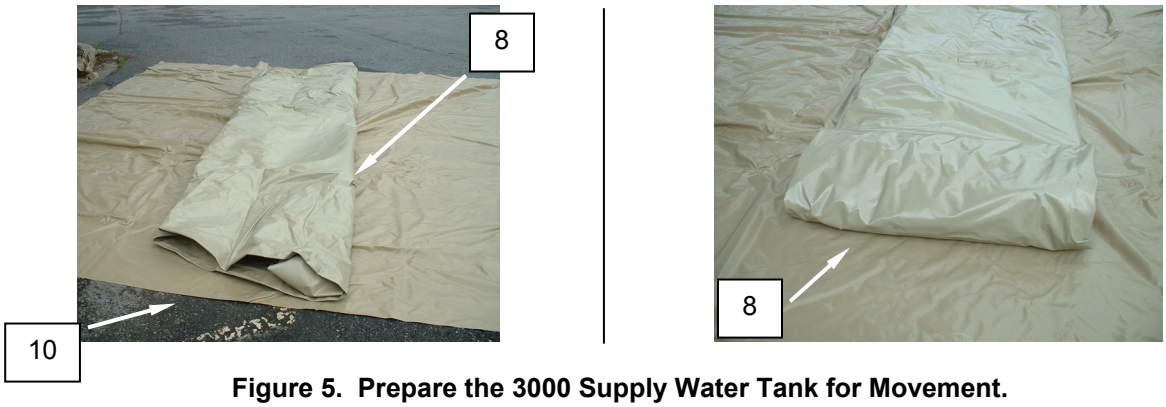


Figure 5. Prepare the 3000 Supply Water Tank for Movement.

15. Roll the tank **(Figure 6, Item 8)** tightly until two feet of tank fabric is left. Fold the remaining tank fabric over the tank.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED



Figure 6. Prepare the 3000 Supply Water Tank for Movement.

16. Recenter water bag on cover.

17. Fold the ground cloth **(Figure 7, Item 10)** from one side to cover the tank **(Figure 7, Item 8)**.

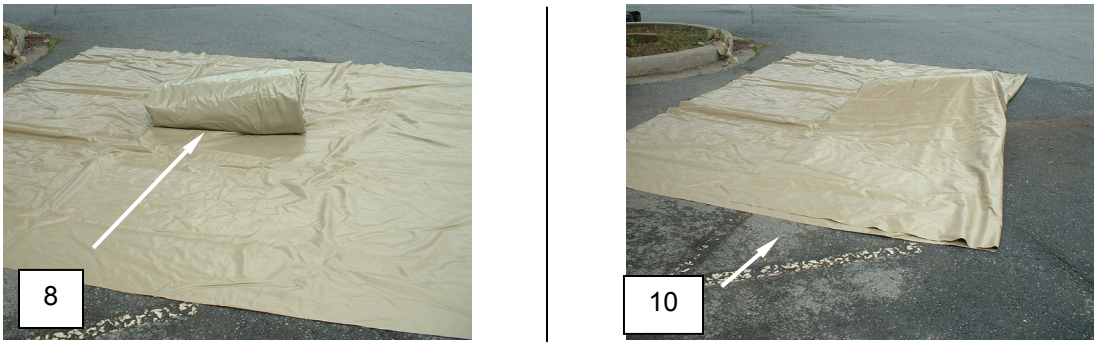


Figure 7. Prepare the 3000 Supply Water Tank for Movement.

18. Fold the ground cloth **(Figure 8, Item 5)** from the remaining side to cover the tank. Then fold the ground cover again to approximately two feet wide at both ends. Fold the ends of the ground cover to touch the tank.

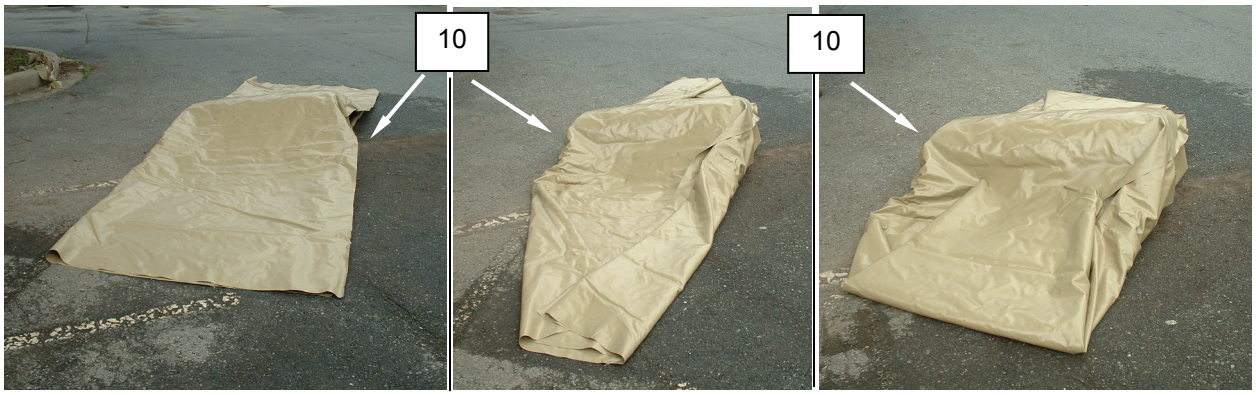


Figure 8. Prepare the 3000 Supply Water Tank for Movement.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED

19. Roll the tank and ground cloth **(Figure 9, Item 10)** into a 2-ft by 4-ft cylinder.

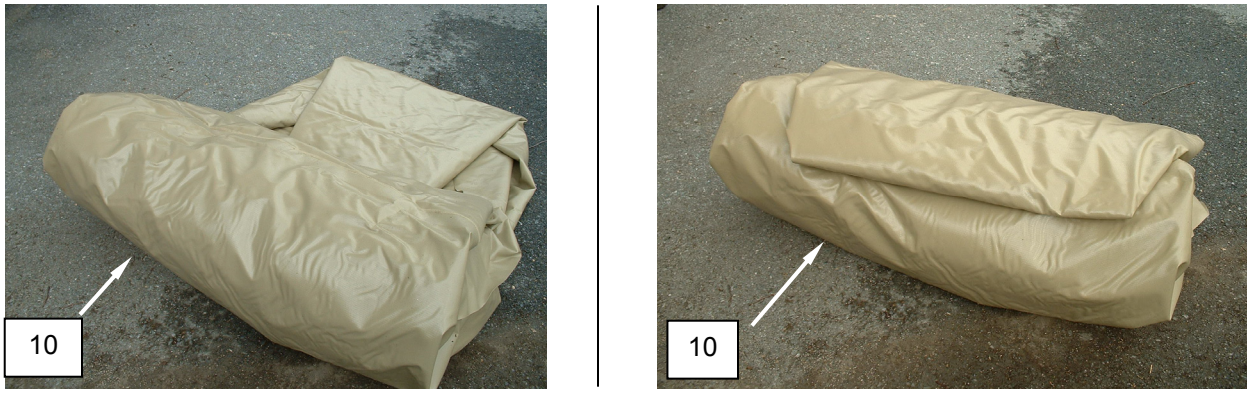


Figure 9. Prepare the 3000 Supply Water Tank for Movement.

20. Tie the ground cloth ties **(Figure 10, Item 11)** together to secure the tank.



Figure 10. Prepare the 3000 Supply Water Tank for Movement.



Figure 11. Prepare the 3000 Supply Water Tank for Movement.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED

Prepare the 3000-Gallon Graywater Collection Tank for Movement

WARNING

Use extreme caution when working with the graywater tank and components. Always wear supplied safety equipment such as gloves, apron, and mask. Always wash hands after handling soiled laundry. Failure to comply may result in serious illness or death to personnel.

NOTE

For long term storage, the 3000-gallon water tank must be turned inside out and hung from a forklift or raised location to dry before folding and storing. Refer to TM 10-5430-237-12&P for maintenance and operating instructions for the 3000-gallon water tank.

1. If a pond heater is used, disconnect power plug.
2. Wait 15 minutes before removing pond heater.
3. Remove pond heater from graywater collection bag.
4. Close valve at graywater collection bag shutoff valve **(Figure 12, Item 12)**.
5. Disconnect graywater hose **(Figure 12, Item 13)** from water service panel.
6. Pump graywater into approved collection vehicle in accordance with unit standard operating procedure.
7. Disconnect graywater hose **(Figure 12, Item 13)** from shutoff valve **(Figure 12, Item 12)**.
8. Disconnect graywater collection bag shutoff valve **(Figure 12, Item 12)** from connection on graywater collection tank **(Figure 12, Item 14)** and set aside.
9. Install dust caps and plugs **(Figure 12, Item 15)** and coil hose neatly.
10. If insulated tank cover is fitted as shown in Figure 12, remove at this time.

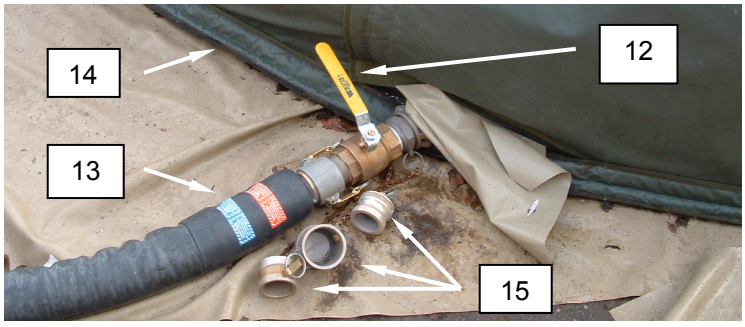


Figure 12. Prepare the 3000 Graywater Tank for Movement.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED

11. After the tank **(Figure 13, Item 14)** has been dried, lay out the tank ground cloth **(Figure 13, Item 16)** with the ties down, and then lay out the tank in the center of the ground cloth. Fold the sides of the tank to touch as shown in Figure 4.

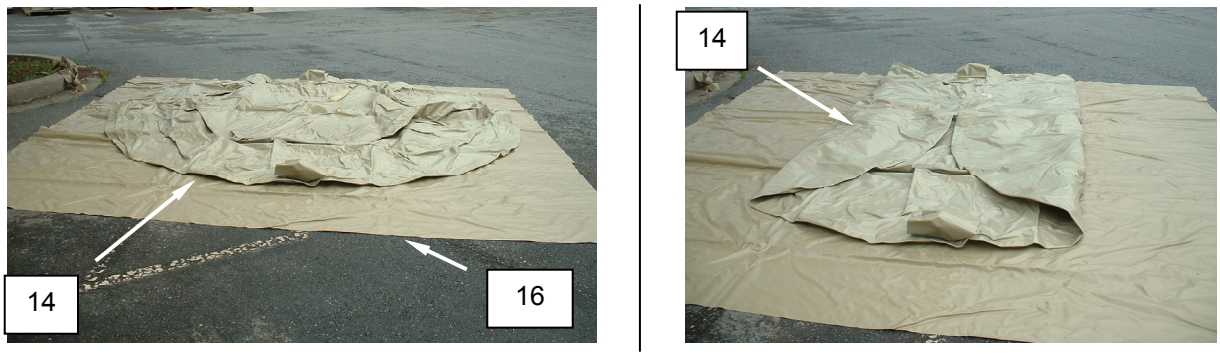


Figure 13. Prepare the 3000 Graywater Tank for Movement.

12. Fold the tank **(Figure 14, Item 14)** in half again, and recenter on the ground cloth **(Figure 14, Item 16)**. The tank should be approximately 4 feet wide. Start from one end and fold over approximately 18 inches of tank fabric.

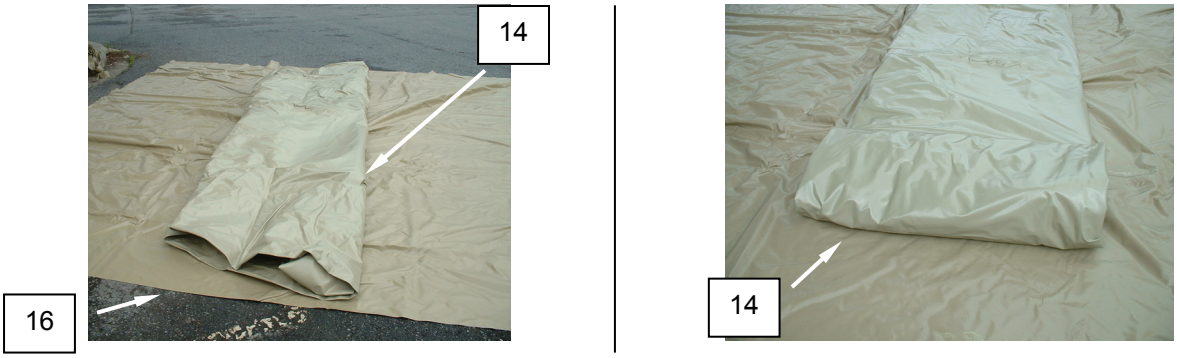


Figure 14. Prepare the 3000 Graywater Tank for Movement.

13. Roll the tank **(Figure 15, Item 14)** tightly until two feet of tank fabric is left. Fold the remaining tank fabric over the tank.



Figure 15. Prepare the 3000 Graywater Tank for Movement.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED

14. Fold the ground cloth **(Figure 16, Item 16)** from one side to cover the tank **(Figure 16, Item 14)**.

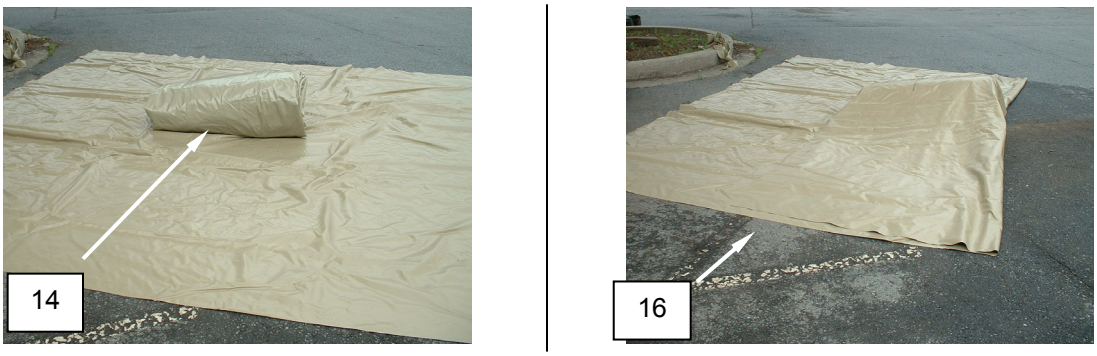


Figure 16. 3000 Graywater Tank.

15. Fold the ground cloth **(Figure 17, Item 165)** from the remaining side to cover the tank. Then fold the ground cover again to approximately two feet wide at both ends. Fold the ends of the ground cover to touch the tank.

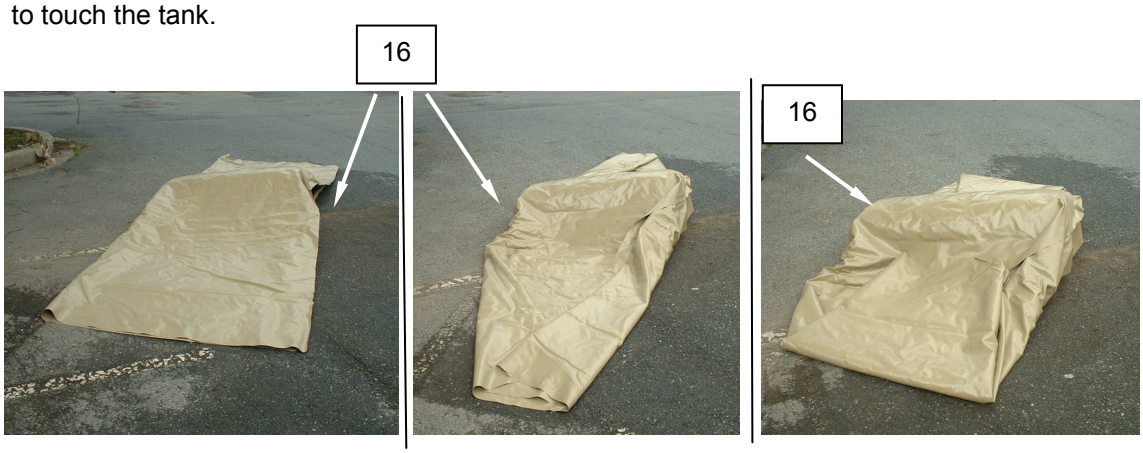


Figure 17. Prepare the 3000 Graywater Tank for Movement.

16. Roll the tank and ground cover **(Figure 18, Item 16)** into a 2-ft by 4-ft cylinder.

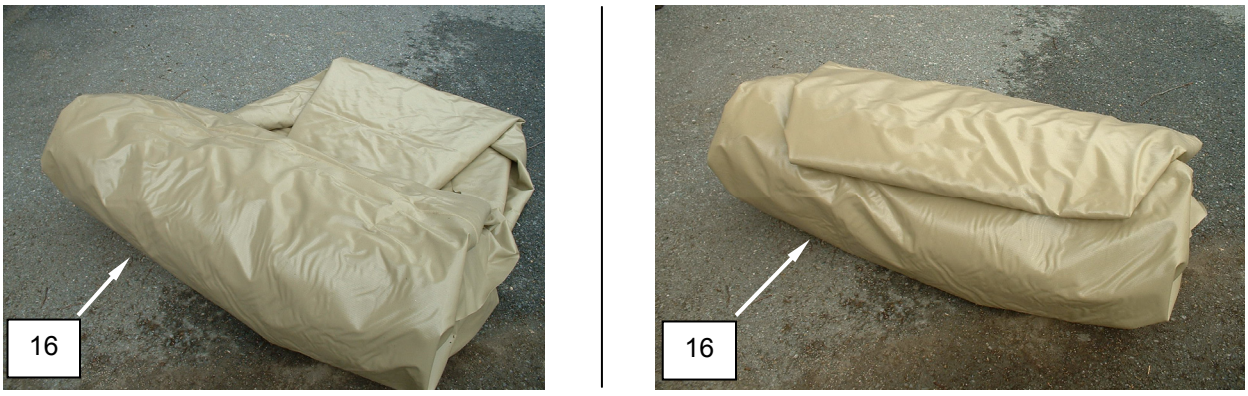


Figure 18. Prepare the 3000 Graywater Tank for Movement.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED

17. Tie the ground cloth ties **(Figure 19, Item 17)** together to secure the tank.



Figure 19. Prepare the 3000 Graywater Tank for Movement.



Figure 20. Prepare the 3000 Graywater Tank for Movement.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED

Prepare Power Distribution System for Movement



WARNING

This equipment operates at high voltages. Use extreme caution, observe all warnings, and follow all safety procedures. Do not disconnect any cables unless directed to do so by MOS qualified personnel. Failure to observe safety precautions may result in injury or death to personnel.

NOTE

Washer cold weather preparation must be performed while utilities are connected to CBL.

1. Set all breakers on main circuit breaker panel and dryer breaker panel to OFF; ensure that the power source has been shut down and secured.

2. Disconnect the two 100 A cables **(Figure 21, Item 18)** from the dryer power service panel **(Figure 21, Item 19)**. Install dust caps **(Figure 21, Item 20)** on cables and service panel. Coil cables and set aside for packout.

3. Disconnect the 100 A cable **(Figure 21, Item 21)** from the main power service panel **(Figure 21, Item 22)**. Install dust caps **(Figure 21, Item 20)** on cable and service panel. Coil cables and set aside for packout.

4. Disconnect the 60 A cable **(Figure 21, Item 22)** from the main power service panel. Install dust caps **(Figure 21, Item 20)** on cable and service panel. Coil cables and set aside for packout.

5. Disconnect three pigtail connectors **(Figure 21, Item 23)** from generator or municipal power source. Coil cables and set aside for packout.

6. Remove ground rods **(Figure 21, Item 24)** and disconnect ground wires **(Figure 21, Item 25)** from both electrical service panel grounding studs **(Figure 21, Item 26)**.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED

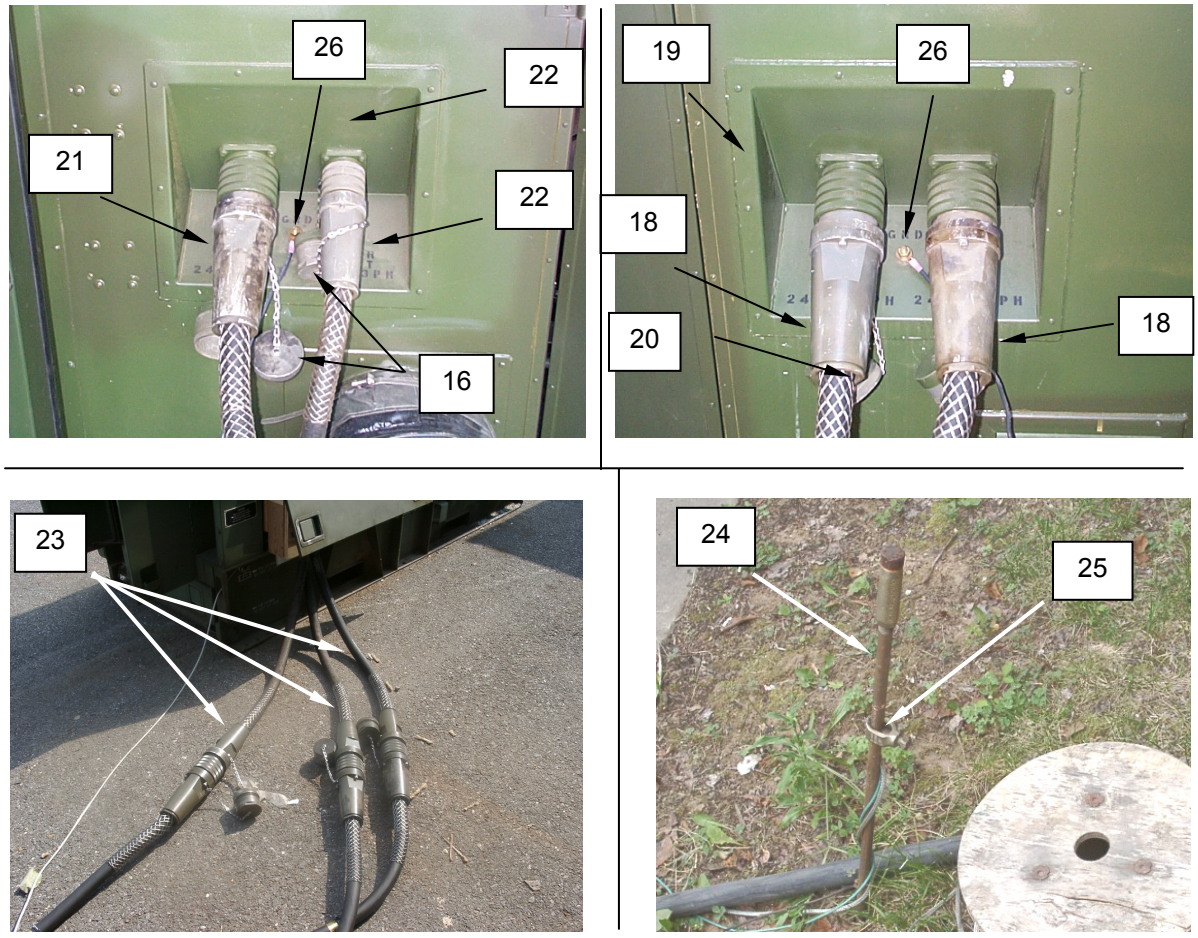


Figure 21. Prepare Power Distribution System for Movement.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED

Disconnect Fuel Supply



WARNING

Do not stow fuel cans with fuel in the CBL. Fuel remaining in the fuel cans must be returned to the bulk supply or otherwise disposed of in accordance with unit standard operating procedure. Stowing full or partially full fuel cans in the CBL may result in explosion causing severe injury or death.



WARNING

Fuel left in drip pan/drip cloth must disposed of in accordance with local regulations. Failure to properly dispose of fuel may cause environmental hazards, illness, or death.

1. Disconnect fuel can supply hose **(Figure 22, Item 27)** and vent hose **(Figure 22, Item 28)** from fuel connector service panel **(Figure 22, Item 29)**. Drain fuel back into fuel can.
2. Disconnect hoses from fuel can adapter **(Figure 22, Item 30).** Drain fuel in drip pan. Remove and stow fuel can adapter.
3. Dispose of fuel or return to bulk fuel supply in accordance with unit standard operating procedure. Replace fuel can cap. Set empty fuel can **(Figure 22, Item 31)** aside for packout.

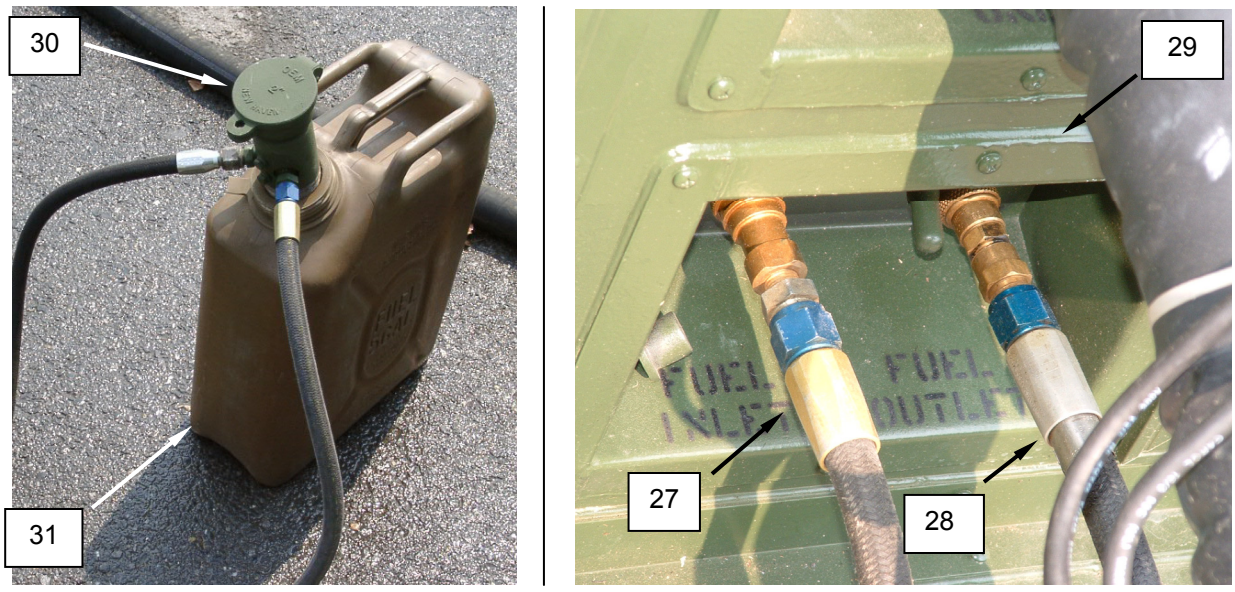


Figure 22. Disconnect Fuel Supply.

PREPARE CBL AND COMPONENTS FOR MOVEMENT-CONTINUED

Prepare FDECU for movement IAW TM 10-4120-411-14.

Prepare ASH for movement IAW TM 9-4520-258-14.

Remove CBL ramp from entrance of CBL and set aside for packout.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER USUAL CONDITIONS – PREPARE TEMPER FOR MOVEMENT

PREPARE TEMPER FOR MOVEMENT

To prepare the TEMPER section for movement, follow the procedures outlined below. Refer to TM 10-8340-224-13 as necessary.

Remove all items from inside TEMPER including tables, trash cans and laundry carts. The TEMPER electrical distribution system must also be disconnected and removed.

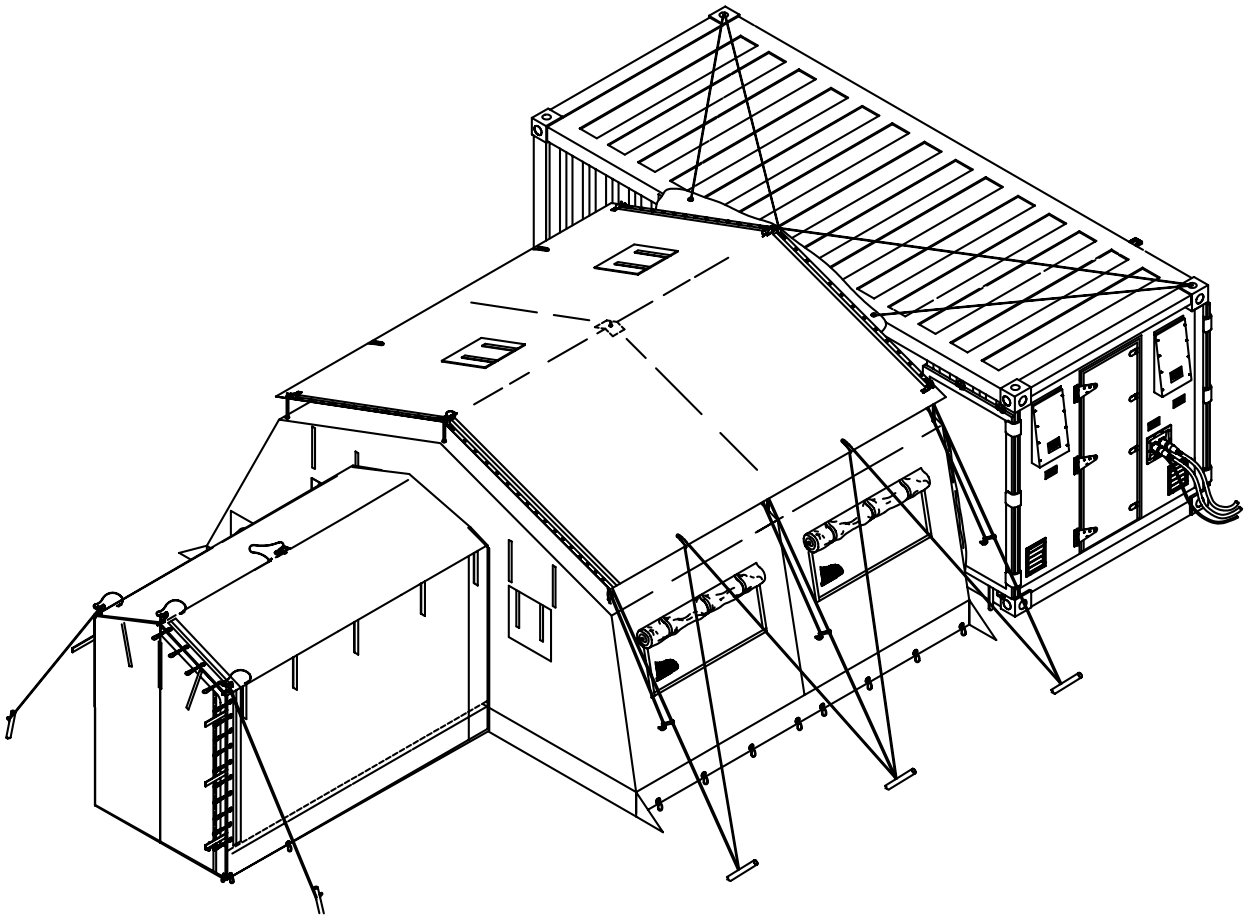


Figure 1. CBL TEMPER.

PREPARE TEMPER FOR MOVEMENT-CONTINUED

Striking Procedure for Vestibule

1. Locate the frame section cover and the light set storage container.
2. Remove single ply floors **(Figure 2, Item 1)** in vestibule.
3. Release tension on vestibule guy lines **(Figure 2, Item 2)** and remove stakes **(Figure 2, Item 3)**.
4. Unlace vestibule door **(Figure 2, Item 4)** sides from vestibule **(Figure 2, Item 5)**.
5. Untie vestibule tie tapes **(Figure 2, Item 6)**.
6. Remove steel pins **(Figure 2, Item 7)** in vestibule footstops and frame base plates.
7. Collapse vestibule and position frames **(Figure 2, Item 8)** against endwall.
8. Remove hitch pins **(Figure 2, Item 9)** and complete door removal.
9. Remove frames and disassemble.
10. Open weather seal flap **(Figure 2, Item 10)**, unlace vestibule, remove and fold.

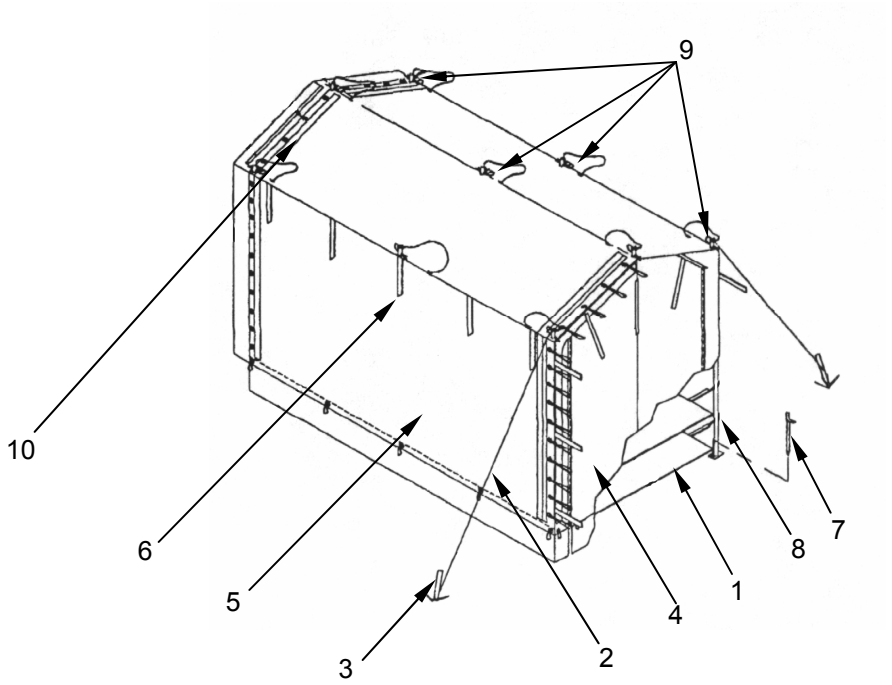


Figure 2. Striking Procedure for Vestibule.

PREPARE TEMPER FOR MOVEMENT-CONTINUED

Striking Procedure for TEMPER

NOTE

Ensure all laundry equipment has been removed from TEMPER. Do NOT pool or mix TEMPER components. Keep all components in the area where TEMPER was erected.

1. Close the personnel double doors.
2. Loosen the bootwall lines **(Figure 3, Item 11)** at the cleats on the opposite side of the container.
3. Remove the tent stakes **(Figure 3, Item 12)** from the lower end of the bootwall **(Figure 3, Item 13)**.
4. Fold bootwall back towards TEMPER section and coil bootwall lines **(Figure 3, Item 11).**

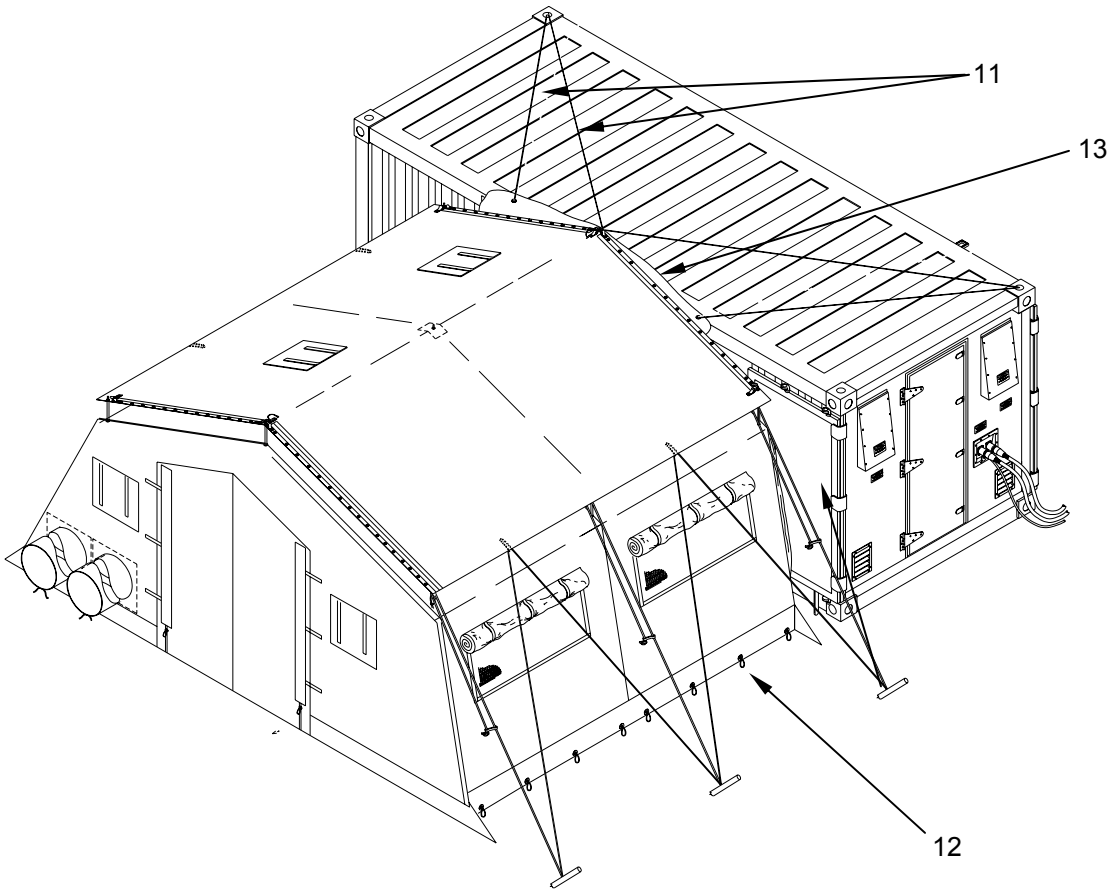


Figure 3. Striking Procedure for TEMPER.

PREPARE TEMPER FOR MOVEMENT-CONTINUED

5. Remove the stakes from rear of TEMPER section **(Figure 4, Item 14)** and remove footstop tent pins **(Figure 4, Item 7)**.

6. Disconnect all becket laces **(Figure 4, Item 15)** up to eave.

7. Close all windows and doors on all fabric sections.

8. Remove frame foot tent pins.

9. Lift fabric from side of tent and roll up onto roof section.

10. Release tension from guy lines **(Figure 4, Item 16)** at eaves and disconnect from wooden stakes **(Figure 4, Item 3)**.

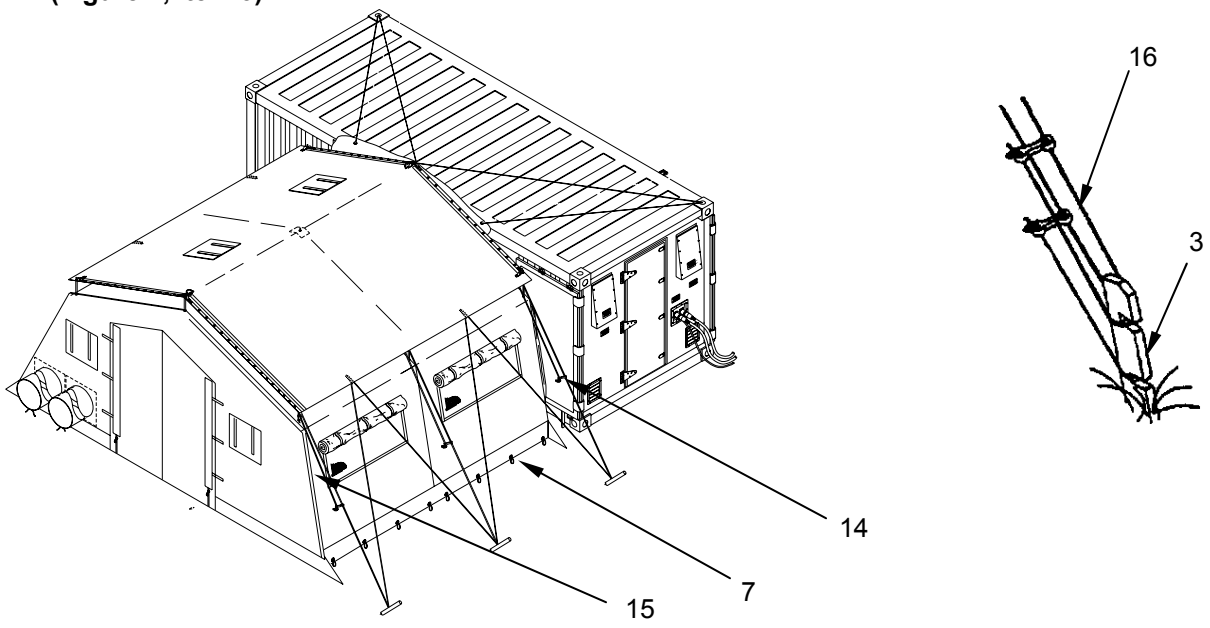


Figure 4. Remove Stakes and Tent Pins.



WARNING

At least twelve soldiers are required to move the 16-foot TEMPER away from the laundry container. To avoid injuries, ensure personnel are available before attempting to lift the TEMPER Section.

CAUTION

Do not attempt to move TEMPER sections until the TEMPER interior has been cleared.

11. Using two soldiers at each arch assembly leg, move the TEMPER section away from the laundry container approximately six feet to be clear of the container.

PREPARE TEMPER FOR MOVEMENT-CONTINUED

Lowering the Frame



WARNING

Frame assembly hinges can pinch or crush hands and fingers. Keep hands and fingers away from frame assembly ridges and eaves. Failure to comply may result in serious injury to personnel.

CAUTION

Avoid folding wall fabric into joints. Material may rip if caught in joint.

1. Place two soldiers at each arch **(Figure 5, Item 17)** on side of tent being lowered.
2. On command, remove quick release pins **(Figure 5, Item 18)** holding arches erect.

CAUTION

Do not twist or turn frame components when handling. Damage to equipment may occur.

3. Keeping clear of tent section, place one hand below eave joint of arch **(Figure 5, Item 17)** and one on the eave purlin **(Figure 5, Item 19)**.
4. Swing out side frame and lower side. Extra soldiers may assist in lowering frame.
5. Disconnect eave purlin flaps.
6. Repeat these steps to lower other side of tent section.

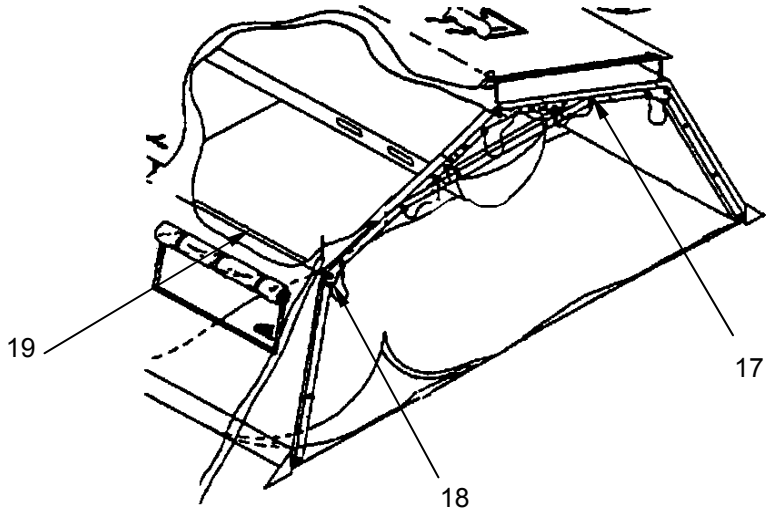


Figure 5. Lowering the Frame.

PREPARE TEMPER FOR MOVEMENT-CONTINUED

Removing the Fabric

1. Disconnect hitch clip pins **(Figure 6, Item 9)** from eave extenders **(Figure 6, Item 20)**.
2. Remove eave extenders **(Figure 6, Item 20)**.
3. Untie tie off point and disconnect becket lacing of roof section.
4. Remove hitch clip pin from ridge extender **(Figure 6, Item 21)**.
5. Remove ridge extender **(Figure 6, Item 21)**.
6. Remove modified end section **(Figure 6, Item 22)** and regular end section on opposite side of frame.

NOTE

Fold fabric label side out to allow for easy identification of endwall sections. Refer to TM 10-8340-224-13 for proper cleaning of TEMPER parts and fabric.

7. Remove window section **(Figure 6, Item 23)** from frame.

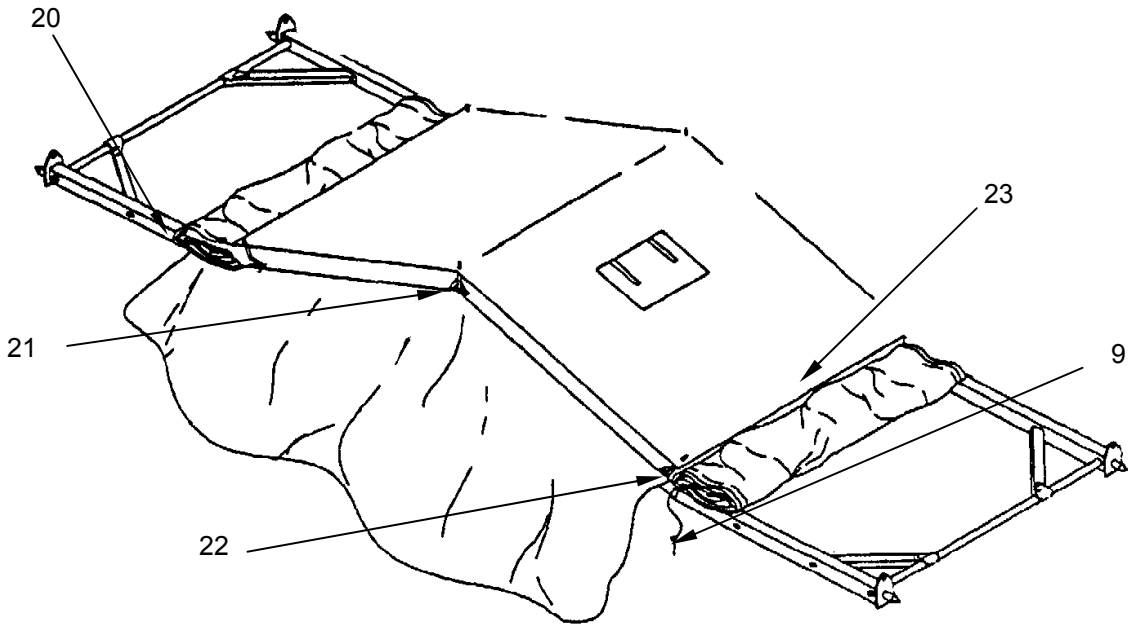


Figure 6. Removing the Fabric.

PREPARE TEMPER FOR MOVEMENT-CONTINUED

Frame Disassembly

NOTE

Disassembly sequence is from base to ridge.

1. Disconnect each purlin diagonal brace **(Figure 7, Item 24)**, fold, and secure.



WARNING

Position one soldier at each ridge arch to hold arch upright during frame disassembly. Failure to hold frame upright may allow frame to fall and cause injury to personnel.

2. Rotate purlins **(Figure 7, Item 25)** and remove.
3. Remove headers **(Figure 7, Item 26)**.
4. Disassemble roof arch **(Figure 7, Item 27)** and side arch assembly **(Figure 7, Item 28)** and fold.
5. Pack frame components in TEMPER frame section cover assembly.

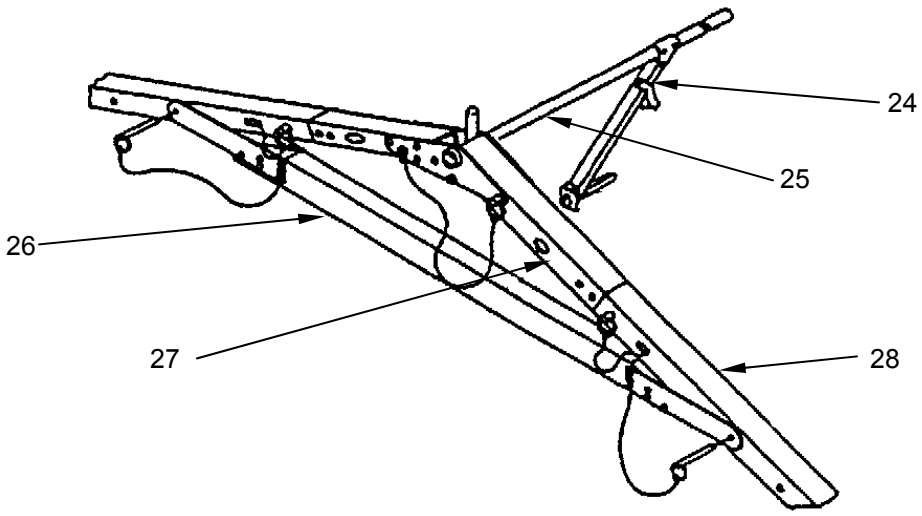


Figure 7. Frame Disassembly.

CLEANING TEMPER COMPONENTS

All TEMPER components must be internally and externally cleaned of dirt, debris, and corrosion, and then allowed to completely air dry.

Exterior fabric components and vinyl liners. Sweep loose dirt from both sides of each fabric section and clean with a scrub brush and warm soapy water. Rinse with clean water and allow fabric to completely air dry.

Cloth liners. Do not launder liners. Sweep loose dirt from both sides of each liner. Allow liners to completely air dry.

Frame Components. Clean with steam cleaner or pressurized washer, and scrub brush. Allow frame sections to completely air dry.

Electrical Cable Assemblies. Clean with rag and scrub brush soaked in a warm detergent solution. Wipe surfaces with a clean, damp rag and allow cables to completely air dry.

TEMPER Power Control. Clean external surfaces with a clean, damp rag. Ensure all dust caps are installed and secure.

FOLDING TEMPER COMPONENTS

Fold the Endwall Liners

Begin by folding the endwall liners as shown below in Figure 8, Figure 9, and Figure 10. The finished size should be approximately 2 ft by 4 ft.



Figure 8. Fold the Endwall Liners.

FOLDING TEMPER COMPONENTS-CONTINUED





Figure 9. Fold the Endwall Liners.

FOLDING TEMPER COMPONENTS-CONTINUED



Figure 10. Fold the Endwall Liners.

FOLDING TEMPER COMPONENTS-CONTINUED

Fold the Intermediate Window Section Liners

Fold the intermediate window section liners as shown below in Figure 11 and Figure 12. The finished size should be approximately 2 ft by 4 ft.





Figure 11. Fold the Intermediate Window Section Liners.

FOLDING TEMPER COMPONENTS-CONTINUED









Figure 12. Fold the Intermediate Window Section Liners.

FOLDING TEMPER COMPONENTS-CONTINUED

Fold the Window Sections

Fold the window sections as shown below in Figure 13. The finished size should be approximately 2 ft by 4 ft. Ensure that the guy ropes are folded inside the section.

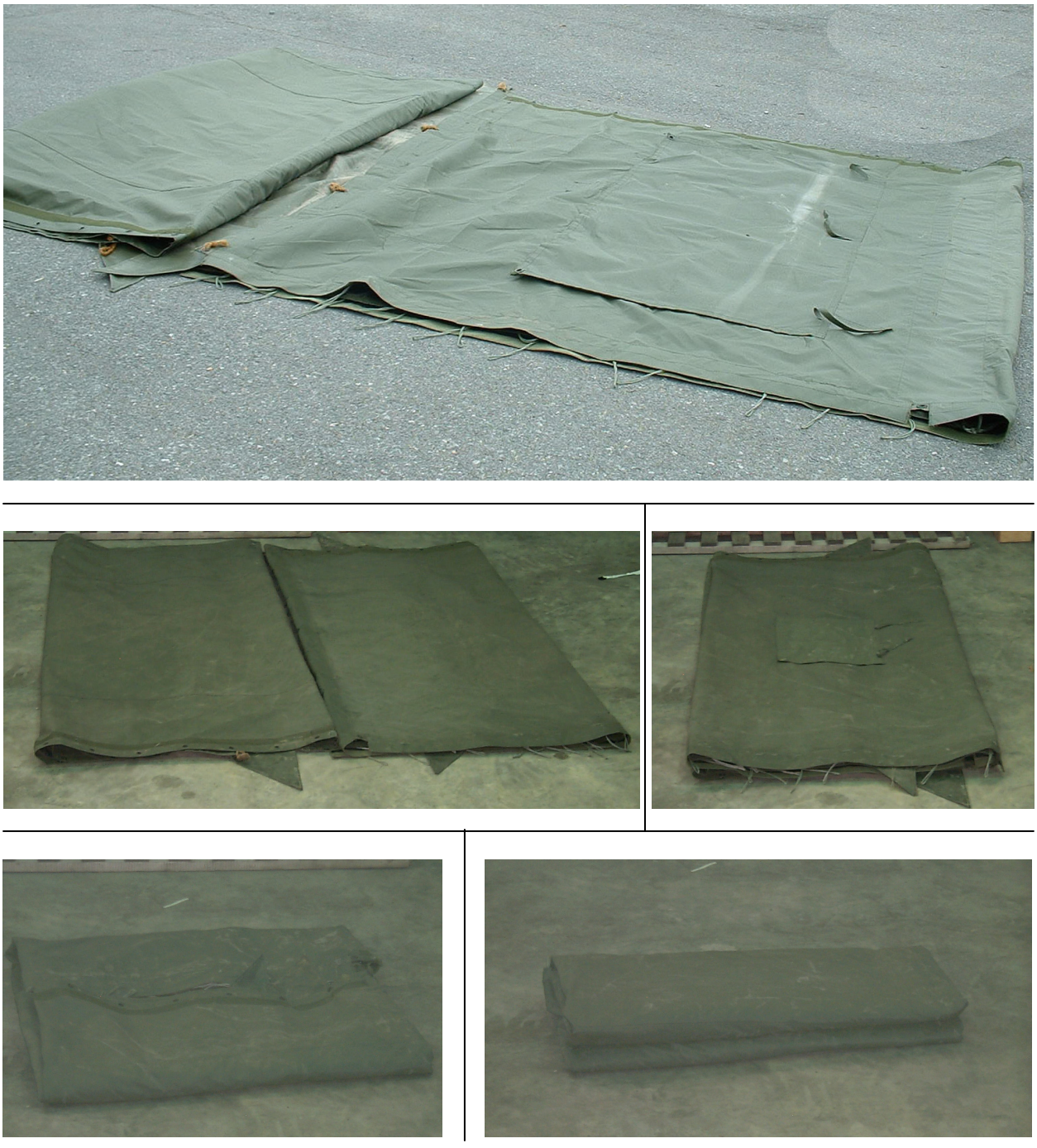


Figure 13. Fold the Window Sections.

FOLDING TEMPER COMPONENTS-CONTINUED

Fold the Tent Fly

Starting with outside surface facing down, fold the tent fly section as shown below in Figure 14. The finished size should be approximately 2 ft by 4 ft.



Figure 14. Fold the Tent Fly.

FOLDING TEMPER COMPONENTS-CONTINUED

Fold the Endwall

Fold the endwall as shown below in Figure 15. The finished size should be approximately 2 ft by 4 ft.



Figure 15. Fold the Endwall.

FOLDING TEMPER COMPONENTS-CONTINUED

Fold the Bootwall (Modified Endwall)

Fold the bootwall (modified endwall) as shown below in Figure 16. The finished size should be approximately 2 ft by 4 ft.

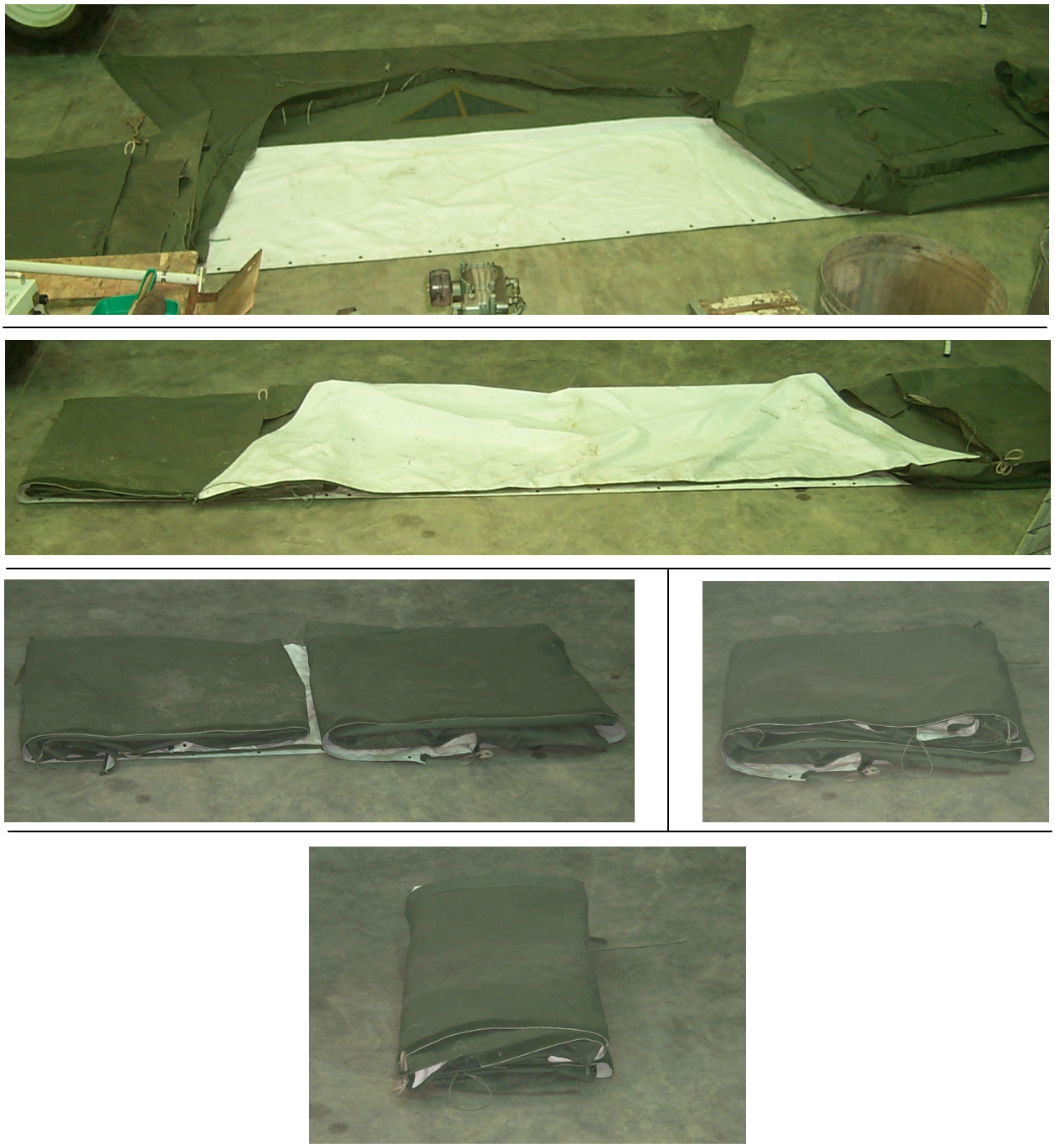


Figure 16. Fold the Bootwall (Modified Endwall).

FOLDING TEMPER COMPONENTS-CONTINUED

Fold the Vestibule Components

1. Fold the vestibule as shown in Figure 17 and Figure 18. The finished size should be approximately 2 ft by 4 ft.







Figure 17. Fold the Vestibule.

FOLDING TEMPER COMPONENTS-CONTINUED









Figure 18. Fold the Vestibule.

2. Fold the vestibule floor to a 2-ft by 2-ft rectangle. TEMPER section foldout is complete.

3. Store the frame sections and tent pins in the bags provided.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER USUAL CONDITIONS - PREPARATION FOR PACKOUT

PREPARATION FOR PACKOUT

General



WARNING

Do not pack any laundry chemicals in the CBL. The CBL may be exposed to high temperatures during transport, and interior temperatures may exceed 120 ^{0}F (48.9 ^{0}C). Laundry chemicals stored in excess of 120 ^{0}F (48.9 ^{0}C) may degrade and produce harmful gases. Failure to observe safety precautions may create a hazard resulting in serious injury or death to personnel.



WARNING

Do not pack fuel in the CBL. The CBL may be exposed to high temperatures during transport, and interior temperatures may exceed 120 ^{0}F (48.9 ^{0}C), exceeding the flash point of JP-8 and DF-1 fuels. Failure to observe safety precautions may create an explosion and fire hazard resulting in serious injury or death to personnel.

NOTE

On initial fielding of the CBL, the footlocker will be packed with a Service Support Package containing spare repair parts in addition to the items listed in Table 1. These parts are not included in the inventory, and are not COEI or BII items.

The CBL is supplied with all the equipment necessary to operate in normal and adverse environments. The only equipment not supplied with the CBL is the power source, as this is organic to the unit the CBL services; and the laundry chemicals, for safety considerations. The packout procedure given in this work package must be strictly followed in order to pack all supplied equipment and allow for safe transport of the container. Failure to follow this procedure will prevent movement of the CBL.

There are two packout configurations: Full Packout, which is described in WP 0016 00, and Minimum Packout, which is described in WP 0017 00. The inventoried items for both are identical; the packout configurations differ only in items packed within the container. The Full Packout ships all supplied equipment within the CBL container. The Minimum Packout ships designated items separately in order to meet container weight constraints. Items shipped separately in the Minimum Packout configuration are identified in Table 1 as "(shipped separately in Minimum Packout Configuration)".

Before proceeding with packout, inventory all equipment and ensure each piece is clean and serviceable. The inventory list (Table 1) on the next page may be reproduced and used as checklists. In the event items are missing or damaged, report the discrepancies to a supervisor.

PREPARATION FOR PACKOUT-CONTINUED

Table 1. CBL Support Equipment Inventory.

Item	Quantity	Check
TEMPER, 16-ft	1 ea	
TEMPER Frame Sections	1 Set (in 2 bag assemblies)	
Arch Assembly	3 ea	
Header Assembly	3 ea	
Purlin Assembly	10 ea	
Eave Extender Assembly	6 ea	
Ridge Extender Assembly	3 ea	
Frame Sections Covers	2 ea	
Intermediate Window Section	2 ea	
TEMPER Fly, 16-ft	1 ea	
*End Liner (Temperate)	1 ea	
*End Liner Modified	1 ea	
Tent Floor (8 ft) Single Ply	2 ea	
Tent Floor (8 ft) Insulated	2 ea	
Vestibule Assembly w/Door	1 ea	
Vestibule Floor Single Ply	1 ea	
Vestibule Floor Insulated	1 ea	
Vestibule Container	1 ea	
Vestibule Frame Assemblies	3 ea	
Vestibule Tent Line (19 ft)	4 ea	
Tent Pins (12 in) Type II Steel	30 ea	
Tent Pins (24 in) Wood Size 2	15 ea	
Tent Pin Container	1 ea	
Plenum Side Entrance (16 ft)	1 ea	
End Section	1 ea	
End Section, Bootwall	1 ea	
Endwall Tent Line (19 ft)	4 ea	
Window Section Tent Line (19 ft)	8 ea	
Tent Fly Tent Line (19 ft)	6 ea	
50-ft 100-Amp Cable	3 ea	
50-ft 60-Amp Cable	1 ea	
4-ft 100-Amp Pigtail	3 ea	
Fuel Drum Adapter	1 ea	
Fuel Hoses (1 supply, 1 return)	2 ea	
Lights	4 ea (in 1 cased set)	
5-Gallon Fuel Can (empty upon transport)	1 ea	
TEMPER Electric Distribution Box	1 ea	
TEMPER Electrical Distribution Stand	1 ea	
TEMPER Convenience Outlet, Duplex w/GFCI	4 ea	
3000-Gallon Water Tank (shipped separately in Minimum Packout Configuration)	2 ea	

* End liner may come in two pieces.

PREPARATION FOR PACKOUT-CONTINUED

Table 1. CBL Support Equipment Inventory – Continued.

Item	Quantity	Check
Bottom - Insulated Liner for 3000-Gallon Water Tank	2 ea	
Sides - Insulated Liner for 3000-Gallon Water Tank	4 ea	
Top - Insulated Liner for 3000-Gallon Water Tank	2 ea	
Ground Rod	2 Sets	
MSDS Book	1 ea	
10-lb Fire Extinguisher	1 ea	
Water Hoses, 20-ft length, 2-in diameter (1 source water supply, 1 waste water drain)	2 ea	
Ramp Sections	2 ea	
FDECU (shipped separately in Minimum Packout Configuration)	1 ea	
H120 ASH Heater (shipped separately in Minimum Packout Configuration)	1 ea	
FDECU/ASH Stacking Fixture Assembly (shipped separately in Minimum Packout Configuration)	1 ea	
FDECU Tie Down Side Clamp (shipped separately in Minimum Packout Configuration)	1 ea	
FDECU Tie Down Anchor Clamp (shipped separately in Minimum Packout Configuration)	1 ea	
FDECU Mounting Bolt (shipped separately in Minimum Packout Configuration)	8 ea	
FDECU Mounting Bolt Washer (shipped separately in Minimum Packout Configuration)	8 ea	
Foot Locker (Located behind dryers)	1 ea	
Tow Strap, 15-ft (shipped separately in Minimum Packout Configuration)	1 ea	
Extension Cord, 50-ft	4 ea	
Tent Pin Alignment Tool, 8” Length	3 ea	
3000-Gallon Water Tank Valve Assemblies	4 ea	
3000-Gallon Water Tank Repair Kit	2 ea	
Screwdriver, Standard Tip 7 ¾” Long	1 ea	
Screwdriver, Phillips Tip, Size #1, 7 ¾” Long	1 ea	
Screwdriver, Jewelers	1 ea	
Wrench, Adjustable, 10”, Chrome, Crescent, 15/16” Capacity	1 ea	
Wrench, Strap, Large Size (6 3/8” dia)	1 ea	
Nut Driver, Solid Shaft, 5/16”	1 ea	
Air Compressor Adapter Hose.	1 ea	
Funnel, 32 ounce	1 ea	
Measuring Cup	1 ea	
Spoon, Stainless Steel, 11 inch	1 ea	
Brush, Lab Cleaning	1 ea	
Drop Light	2 ea	

PREPARATION FOR PACKOUT-CONTINUED

Table 1. CBL Support Equipment Inventory – Continued.

Item	Quantity	Check
Safety components including:	1 ea	
Goggles, Clear Lens	4 ea	
Replacement Lens	4 ea	
Face Shield, Double Matrix	1 ea	
Replacement Window, Face Shield, Double Matrix	1 ea	
Gloves, Rubber, Size 9	2 ea	
Gloves, Rubber, Size 10	2 ea	
Gloves, Rubber, Size 11	2 ea	
Apron, Wash, Rubber	2 ea	
Mask, Dust (expendable)	1 box	
Gloves, Natural Rubber, Size SM/MED (expendable)	1 box	
Gloves, Natural Rubber, Size MED/LG (expendable)	1 box	
END OF FOOTLOCKER		
Cargo Strap Large	5 ea	
Cargo Strap Small	9 ea	
Tables	4 ea	
30 gallon Trash Can, with lid	1 ea	
Spare water filters and water heater fuel filter	1 box	
Sinking Deicer with Guard	1 ea	
Air Compressor	1 ea	
Filter, Bag, Polypropylene, EPDM Seal Ring, 5 micron Used on F-1A and F-1B Filter Chamber	8 ea	
Cartridge, Filter, Powered Carbon, 30” Used on F-3 Filter Chamber	2 ea	
Ethylene Glycol	1 gal	
Propylene Glycol	1 gal	
Broom	1 ea	
Dust pan	1 ea	
Laundry Cart	2 ea	
Laundry Cart Transfer Top	1 ea	
Detergent Solid Ultra (expendable)	8 cases	
Sour Navisour Solid (expendable)	3 cases	
Bleach Solid Stainaway (expendable)	1 case	
Packaged Sodium Bisulfite (expendable)	2 cases	
TM 10-3510-226-10	1 ea	
TM 10-3510-226-23	1 ea	
TM 10-3510-226-10HR	1 ea	
TM 10-3510-226-23P	1 ea	
Washer Key Set	1 ea	
Dryer Key Set	1 ea	
Cartridge, Filter, Used on F-2 Filter Chamber	6 ea	
Waste Tank Hose	1 ea	

Any spare parts expended from the Service Support Package must be reordered and replaced.

CBL PREPARATION FOR PACKOUT

Pack the Footlocker

1. Place the extension cords in the bottom of the footlocker as shown in Figure 1.
2. Place the aprons in the bottom of the footlocker as shown in Figure 1.



Figure 1. Placing the Extension Cords in the Footlocker.

CBL PREPARATION FOR PACKOUT-CONTINUED

3. Pack Service Support Package items, disposable gloves, and dust masks as shown in Figure 2.



Figure 2. Pack the Support Package Items.

4. Pack the trouble lights and protective gloves (Butyl) and safety components as shown in Figure 3.



Figure 3. Pack the Footlocker.

CBL PREPARATION FOR PACKOUT-CONTINUED

5. Pack the air hose, spare belts, funnel, air hose, and spare washer valves as shown in Figure 4.



Figure 4. Packing Spare Belts, Hoses, and Valves.

6. Pack two water tank ball valve assemblies, spare straps, and remaining loose Service Support Package components as shown in Figure 5.



Figure 5. Packing the Remaining Loose Items in the Footlocker.

CBL PREPARATION FOR PACKOUT-CONTINUED

7. Install the two trays into the footlocker, and place the water tank repair kit components, assorted tools and the remaining two water tank ball valves into the trays as shown in Figure 6.



Figure 6. Pack the Footlocker.

8. Close and latch the footlocker. Do not pack the footlocker into the CBL container at this time.



Figure 7. Pack the Footlocker.

CBL PREPARATION FOR PACKOUT-CONTINUED

Pack the Trash Can

1. Place the TEMPER power distribution electrical cables in the bottom of the trash can.
2. Place the TEMPER electrical distribution box and convenience outlet boxes in the trash can.



Figure 8. Pack the Trash Can.

CBL PREPARATION FOR PACKOUT-CONTINUED

3. Place the fire extinguisher and folded vestibule floor in the trash can.

4. Place the TEMPER guy lines and ropes in the trash can. Use two to four pieces of duct tape to close the trash can top.



Figure 9. Pack the Trash Can.

CBL PREPARATION FOR PACKOUT-CONTINUED

Pack the Air Compressor

1. Open the dryer side service access door.

2. Locate the air compressor retaining bracket **(Figure 10, Item 1)**.



WARNING

The air compressor assembly weighs approximately 40 pounds (approximately 17 kilograms). Two persons must carry the unit. When lifting the air compressor, lift with your legs, not with your back, to prevent injury. Failure to do so may result in back injury.



WARNING

Always turn the compressor off and bleed the pressure from the hose and tank before performing maintenance or attaching tools and accessories. The compressor can propel dirt, chips, and loose particles at high speed. Failure to comply may result in serious injury to personnel.

NOTE

Place the compressor so the air pressure gauge faces outboard.

3. Slide the air compressor **(Figure 11, Item 2)** into place, so that the air compressor base is securely locked under the retaining bracket. Retain in place with machine screws **(Figure 11, Item 3)**.

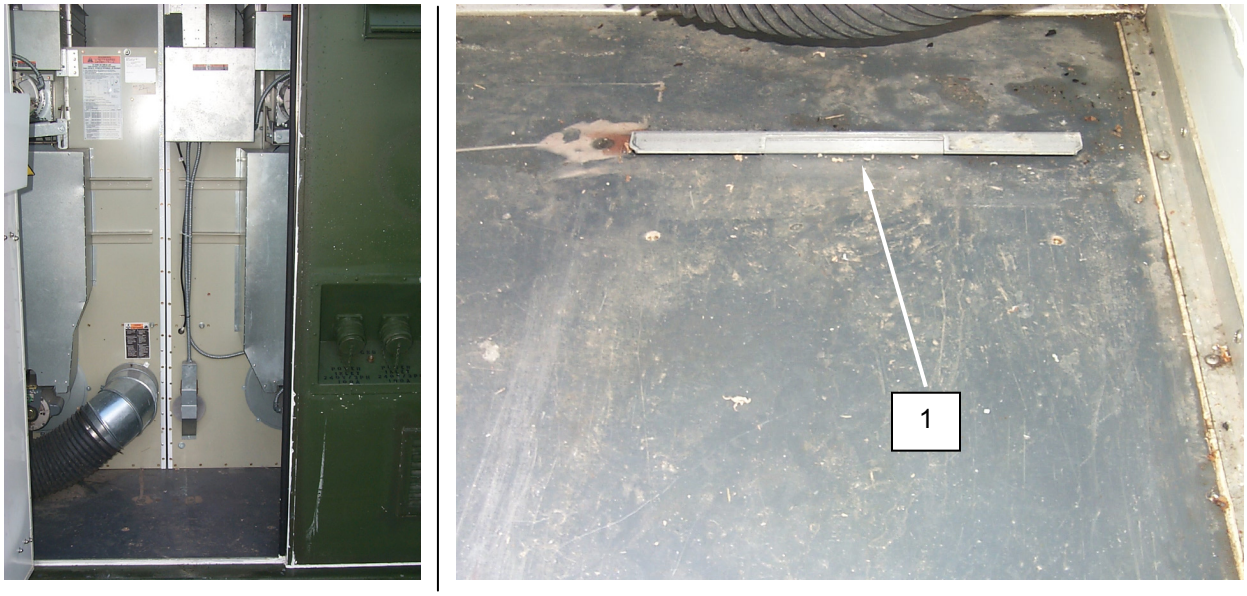


Figure 10. Slide the Air Compressor into Place.

CBL PREPARATION FOR PACKOUT-CONTINUED



Figure 11. Pack the Air Compressor.

CBL PREPARATION FOR PACKOUT-CONTINUED

Pack the Footlocker in the CBL

WARNING

Two persons must carry the footlocker. When lifting the footlocker, lift with your legs, not with your back, to prevent injury. Failure to do so may result in back injury.

1. Locate the four D-rings **(Figure 12, Item 4)** in the dryer side CBL deck. Flip the inside D-rings up.

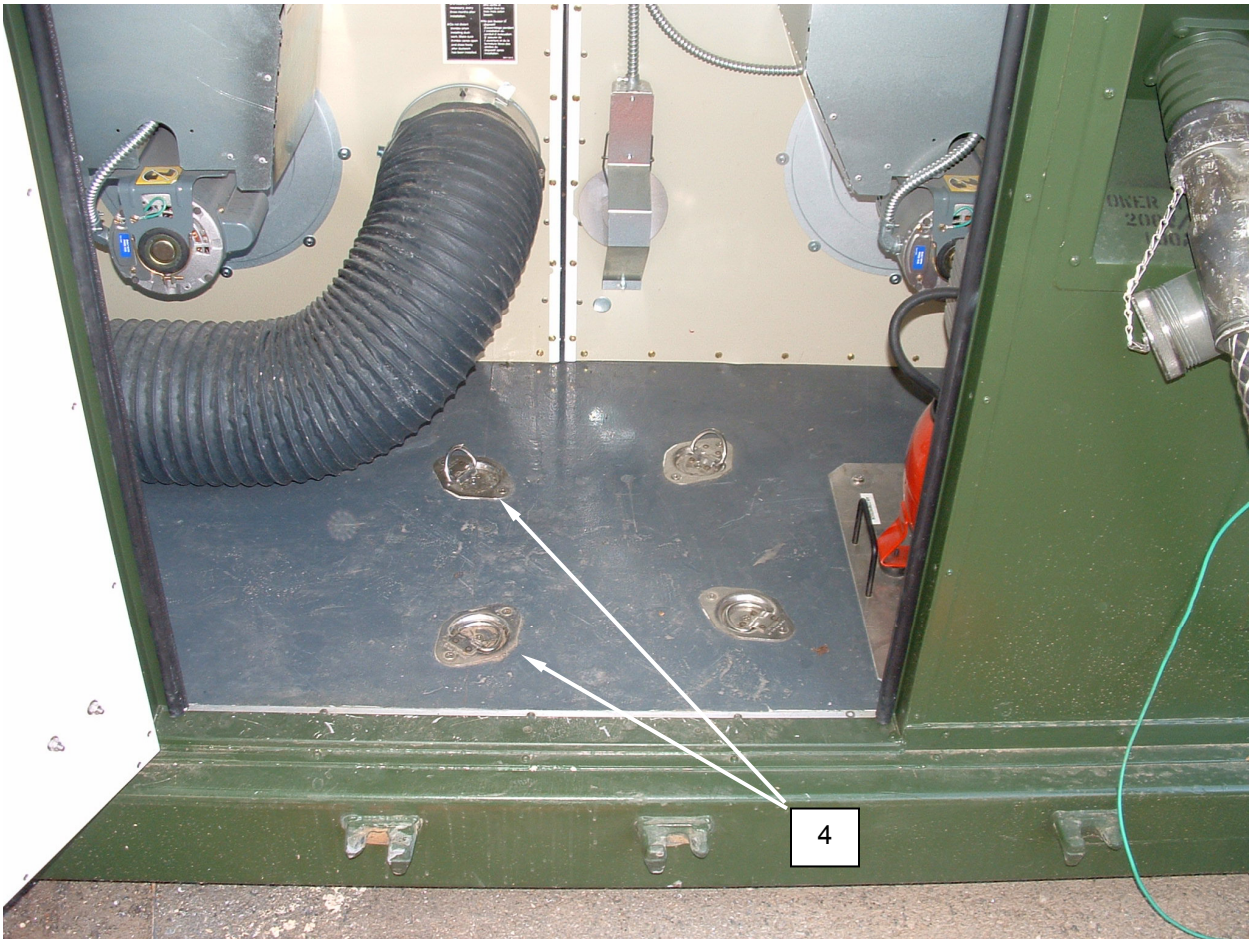


Figure 12. Pack the Footlocker in the CBL.

CBL PREPARATION FOR PACKOUT-CONTINUED

2. Attach two 1-inch straps **(Figure 13, Item 5)** to the inside D-rings **(Figure 13, Item 4)** and drape the straps up and out of the way.

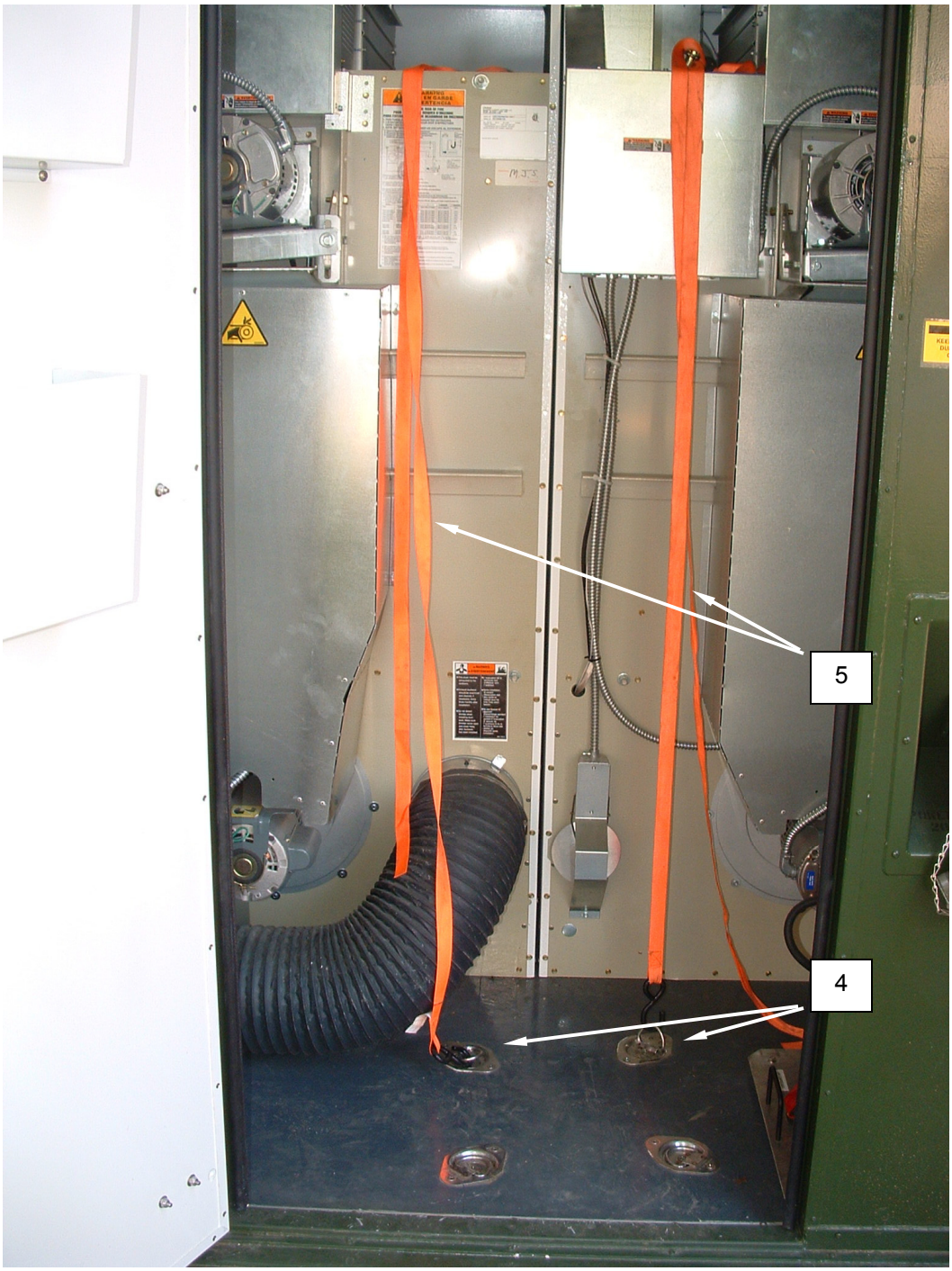


Figure 13. Pack the Footlocker in the CBL.

CBL PREPARATION FOR PACKOUT-CONTINUED

3. Move footlocker towards the end so that tools are accessible, as needed. Place the footlocker **(Figure 14, Item 6)** as shown.



Figure 14. Pack the Footlocker in the CBL.

CBL PREPARATION FOR PACKOUT-CONTINUED

4. Cross the straps **(Figure 15, Item 5)** and attach to the remaining D-rings **(Figure 15, Item 4)**. Tighten the straps until the footlocker **(Figure 15, Item 6)** is secure.

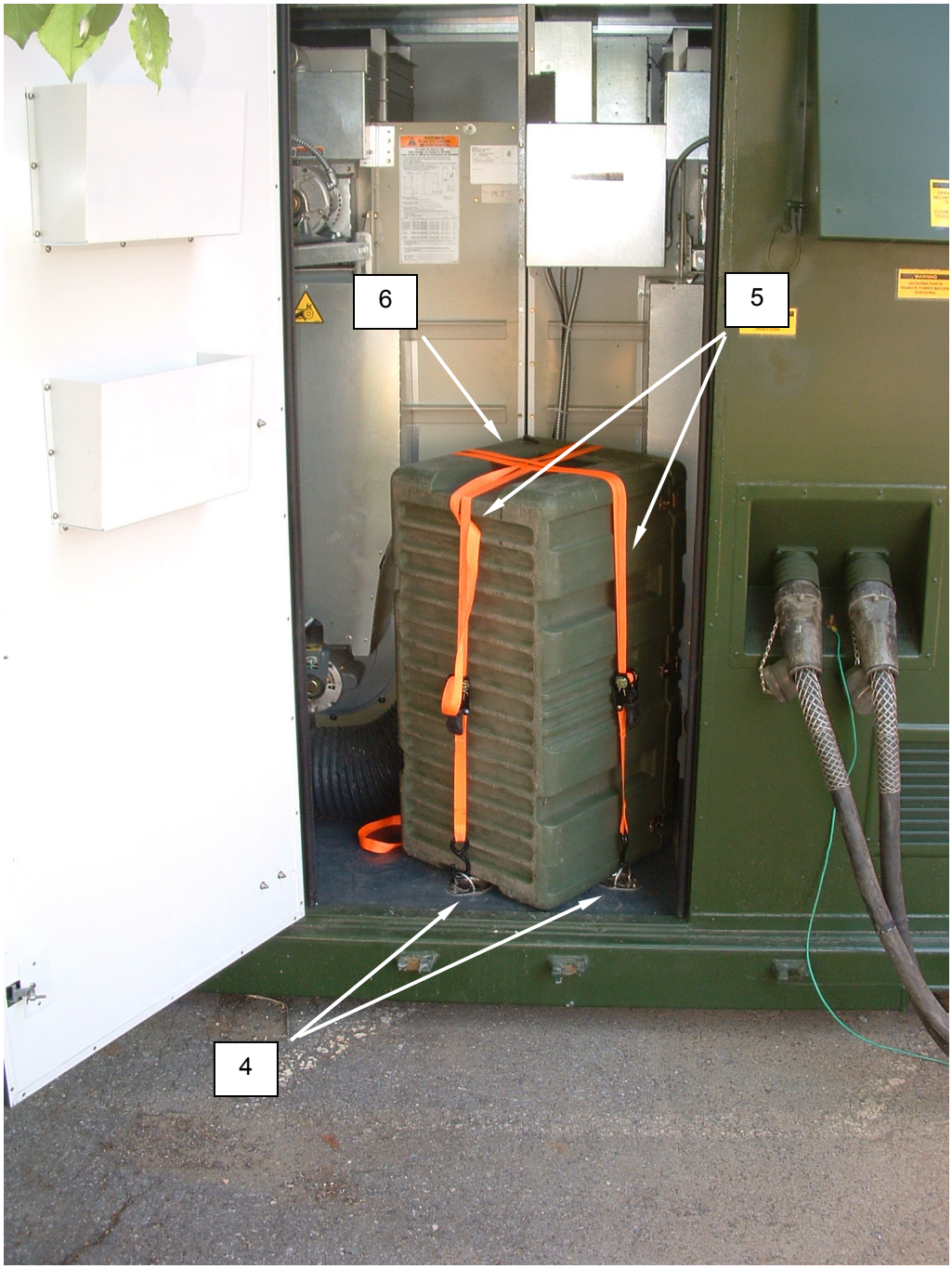


Figure 15. Pack the Footlocker in the CBL.

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER USUAL CONDITIONS – FULL PACKOUT

FULL PACKOUT

GENERAL



WARNING

The CBL components are heavy, awkward and difficult to maneuver. To prevent injury, three persons are required to remove and install these components. To avoid serious injury, lift with your legs, and not your back, and never attempt to lift an item alone if it requires more than one person. The FDECU and ASH must be removed from the CBL with a forklift or other equipment rated for at least 1500 pounds. The FDECU and ASH must not be moved using manpower.

The CBL is shipped with all the equipment necessary to operate in normal and adverse environments. There are two packout configurations: Full Packout and Minimum Packout, which is described in WP 0017 00. The Full Packout ships all supplied equipment within the CBL container. The Minimum Packout ships designated items separately in order to meet container weight constraints. The packout procedure given in this work package must be strictly followed in order to pack all supplied equipment and allow for safe transport of the container. Failure to follow this procedure will prevent movement of the CBL.

FULL PACKOUT-CONTINUED



WARNING

Do not pack any laundry chemicals in the CBL. The CBL may be exposed to high temperatures during transport, and interior temperatures may exceed 120 ^{0}F (48.9 ^{0}C). Laundry chemicals stored in excess of 120 ^{0}F (48.9 ^{0}C) may degrade and produce harmful gases. Failure to observe safety precautions may create a hazard resulting in serious injury or death to personnel.



WARNING

Do not pack fuel cans or hoses in the CBL. Store these items IAW unit SOP. The CBL may be exposed to high temperatures during transport, and interior temperatures may exceed 120 ^{0}F (48.9 ^{0}C), exceeding the flash point of JP-8 and DF-1 fuels. Failure to observe safety precautions may create an explosion and fire hazard resulting in serious injury or death to personnel.



WARNING

CBL and TEMPER components require two or more personnel to lift/move. Use the appropriate number of personnel when moving large, bulky, or heavy items. To avoid serious injury, lift with your legs, and not your back, and never attempt to lift an item alone if it requires more than one person. Failure to observe safety precautions may result in serious back injury.

Before proceeding with the Full Packout, ensure the following has been accomplished:

1. Preparation for movement has been carried out IAW WP 0012 00 and WP 0013 00.
2. The TEMPER components have been folded IAW WP 0014 00.
3. The packing steps detailed in WP 0015 00 have been completed.
4. Ensure the space between dryer No. 2 and the container wall is clear.
5. Slide the four folding tables **(Figure 1, Item 1)** and the laundry transfer top into the space between dryer No. 2 and the container wall. The folding tables will extend into the space behind the dryers.

FULL PACKOUT-CONTINUED

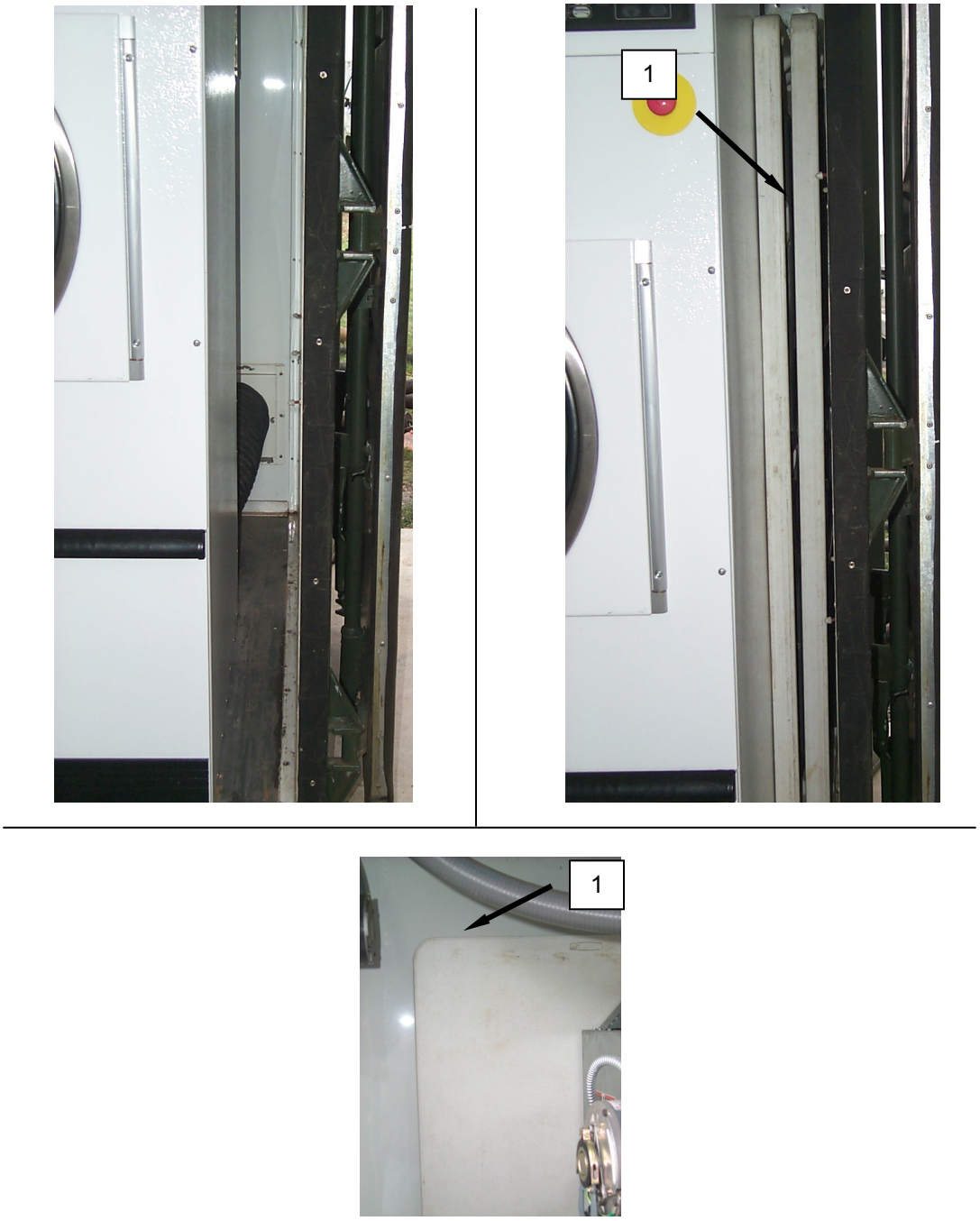


Figure 1. Packing the Tables for Full Packout.

FULL PACKOUT-CONTINUED

6. Remove dryer lint compartment doors **(Figure 2, Item 2)**.

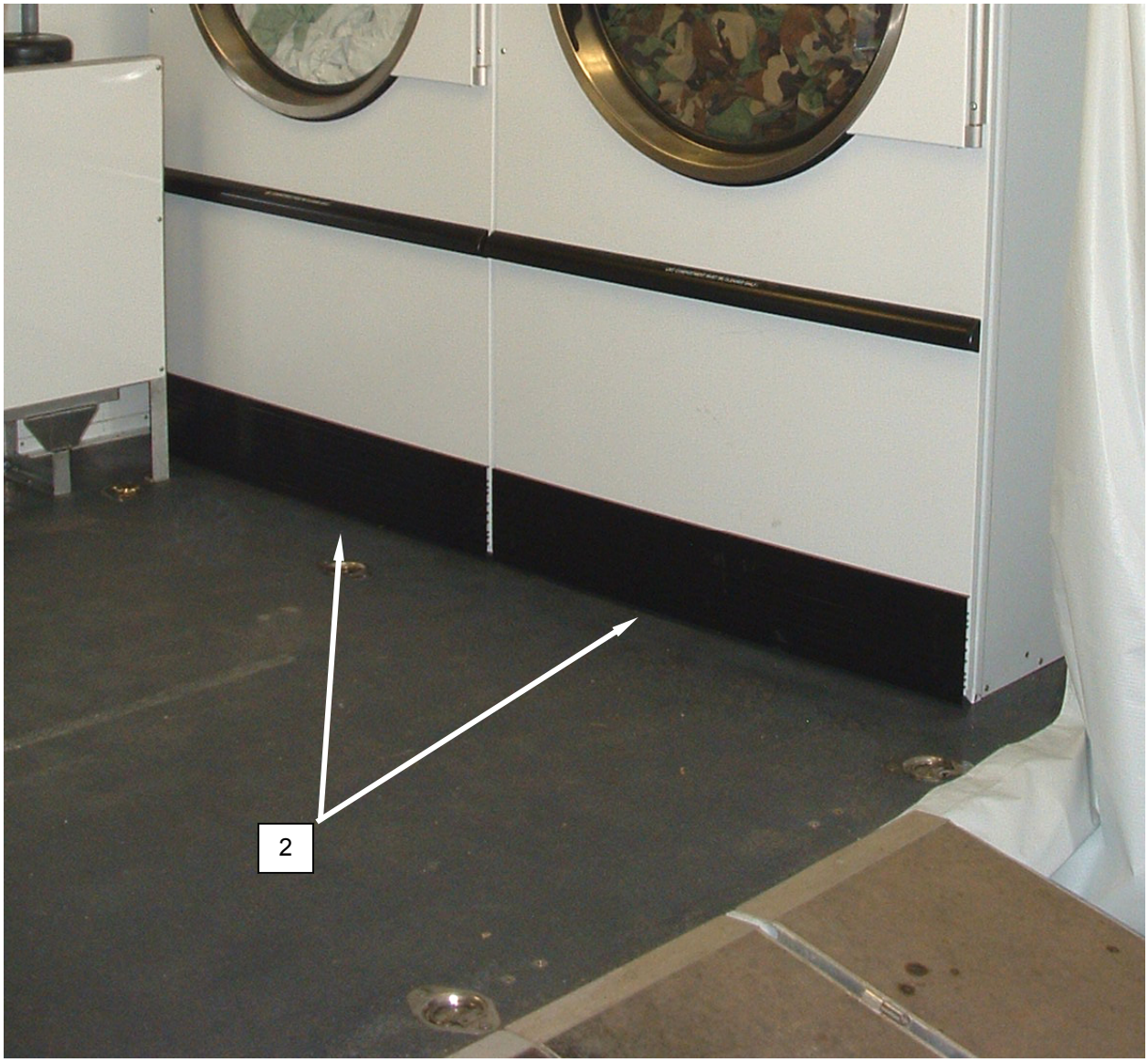


Figure 2. CBL Full Packout.

FULL PACKOUT-CONTINUED

7. Remove lint screens (including spare lint screens) **(Figure 3, Item 3)** and lay flat underneath the dryer.

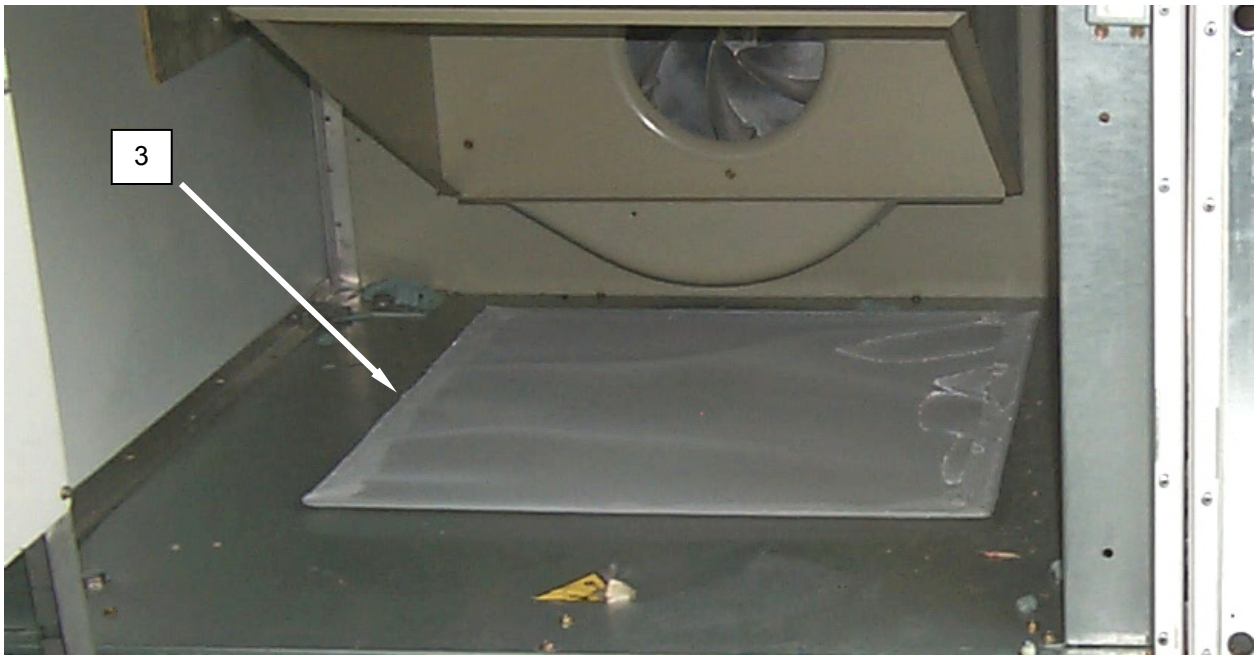


Figure 3. Placing the Lint Screens for Full Packout.

8. Apply tape to the lint compartment switches **(Figure 4, Item 4)** on the dryers in order to prevent damage to the switch plungers.

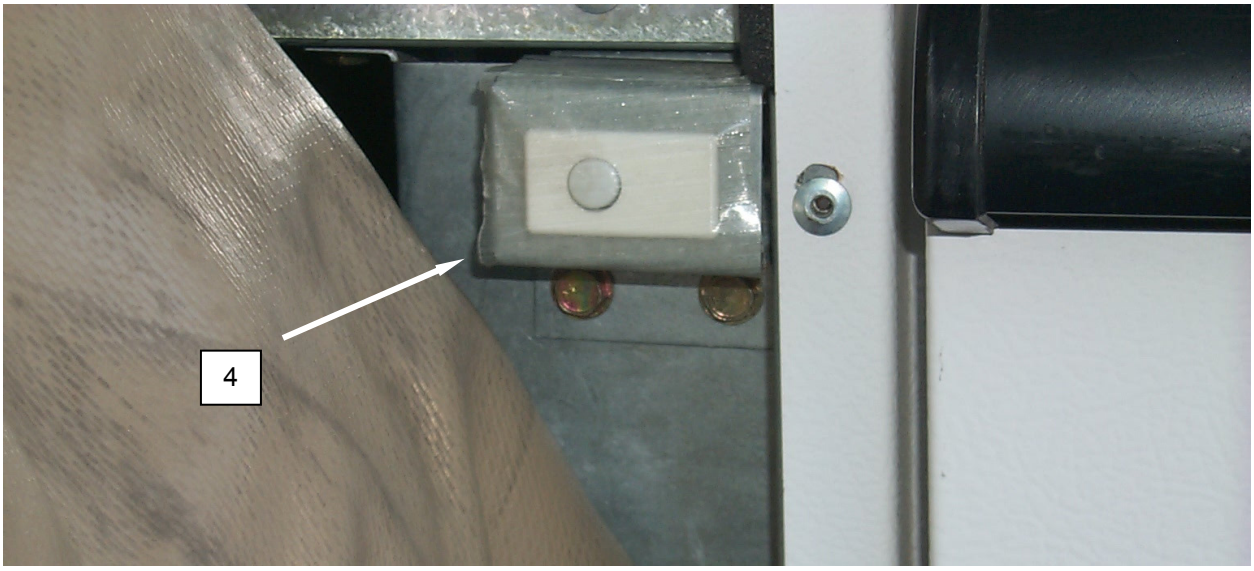


Figure 4. Tape the Switches for Full Packout.

FULL PACKOUT-CONTINUED

9. Lift the three D-rings **(Figure 5, Item 5)** closest to the reuse filters.

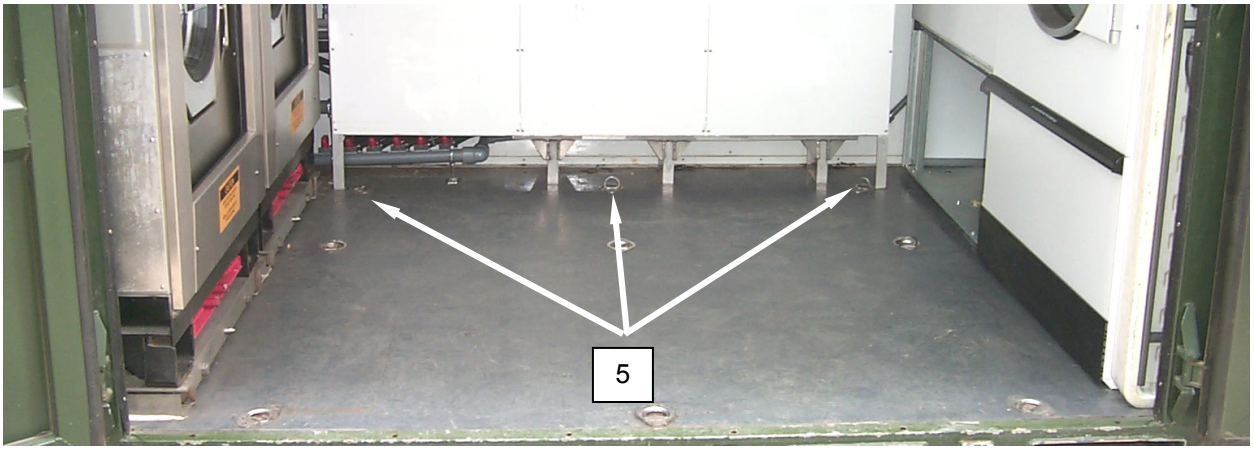


Figure 5. Lift the Three D-Rings.

10. Attach six 1-inch straps **(Figure 6, Item 6)** and three 3-inch straps **(Figure 6, Item 7)** to the D-rings, and place the straps off the floor. Ensure the straps are accessible.

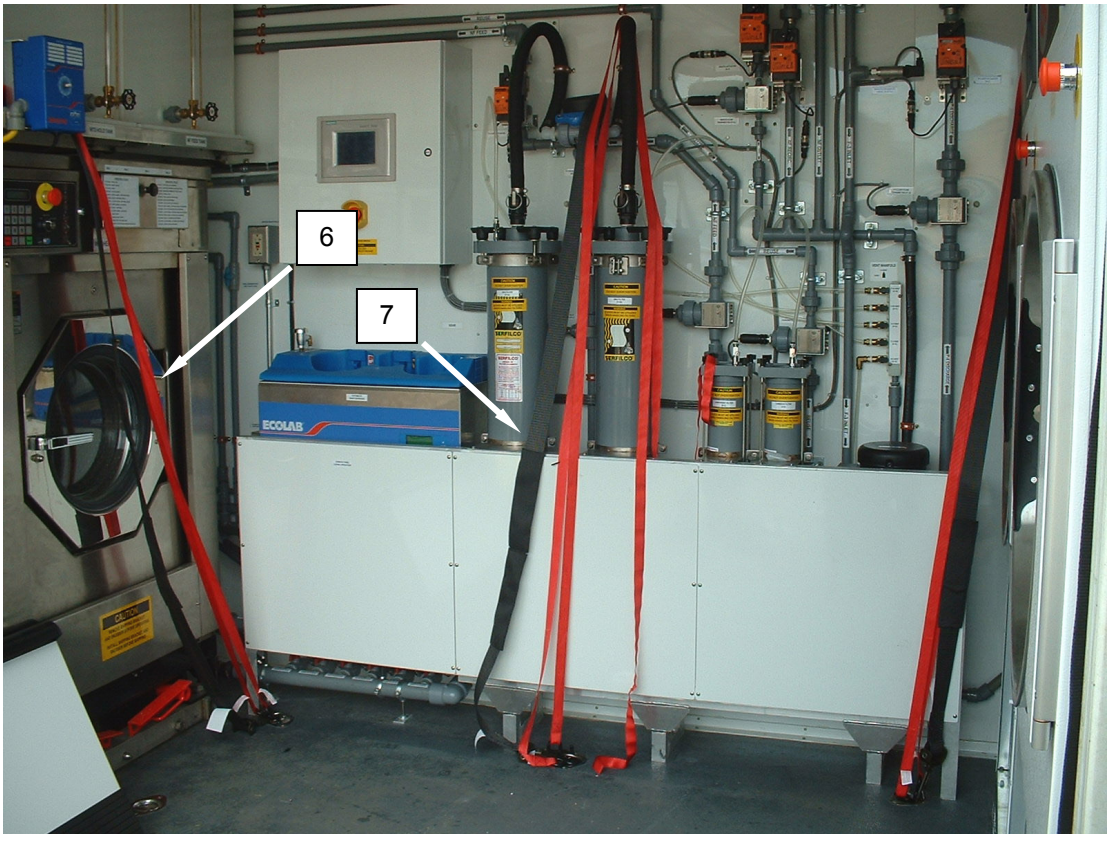


Figure 6. Attach Straps to D-rings.

FULL PACKOUT-CONTINUED

11. Remove the two cross-point screws **(Figure 7, Item 7)** from the centerline and the front of the CBL interior to prepare for later installation of packing bracket.

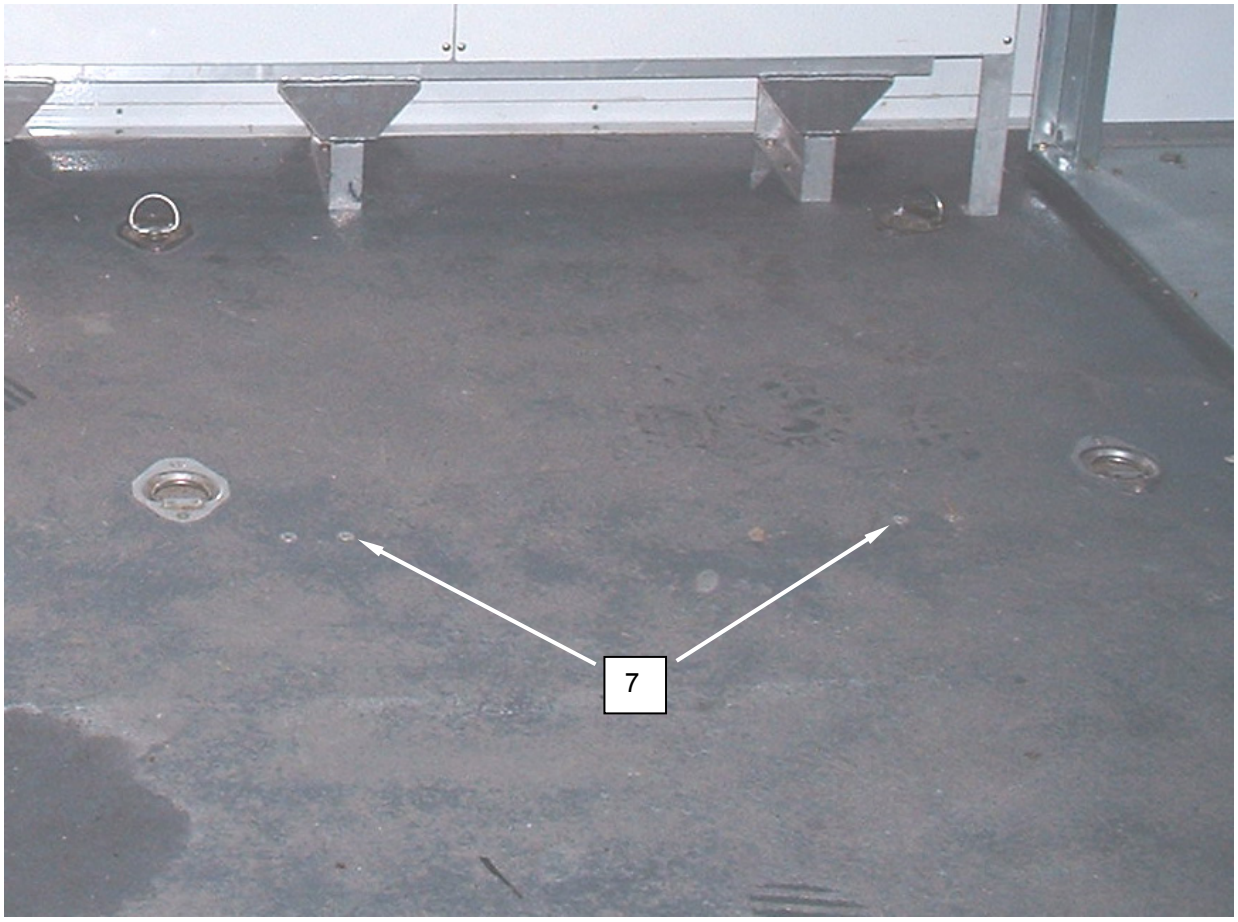


Figure 7. Remove the Two Cross-Point Screws.

FULL PACKOUT-CONTINUED

12. Place folded TEMPER flooring **(Figure 8, Item 8)** into container. Do not allow TEMPER flooring to cover center D-rings. If TEMPER flooring will not fit freely into the designated area, it must be refolded.





Figure 8. Packing TEMPER Components.

FULL PACKOUT-CONTINUED

CAUTION

Use care when placing TEMPER frame sections to avoid damage to dryer components.

13. Place the largest TEMPER frame section (arch and header sections) bag **(Figure 9, Item 9)** on top of the TEMPER flooring **(Figure 9, Item 8)**, and extending into the lint compartment of dryer No 1.





Figure 9. Packing Frame Section Bags.

FULL PACKOUT-CONTINUED

CAUTION

Use care when placing TEMPER frame sections to avoid damage to dryer components.

14. Place the remaining TEMPER frame section bag (purlins) **(Figure 10, Item 9)** and vestibule bag atop the larger frame section bag, extending into the lint compartment of dryer No. 1.

15. Wrap the three 1-in. straps **(Figure 10, Item 10)** over the packed TEMPER components and attach to the center D-rings **(Figure 10, Item 11)**. Tighten straps so there is no movement of the packed TEMPER components. Straps may require retightening as the packed floor sections compress.

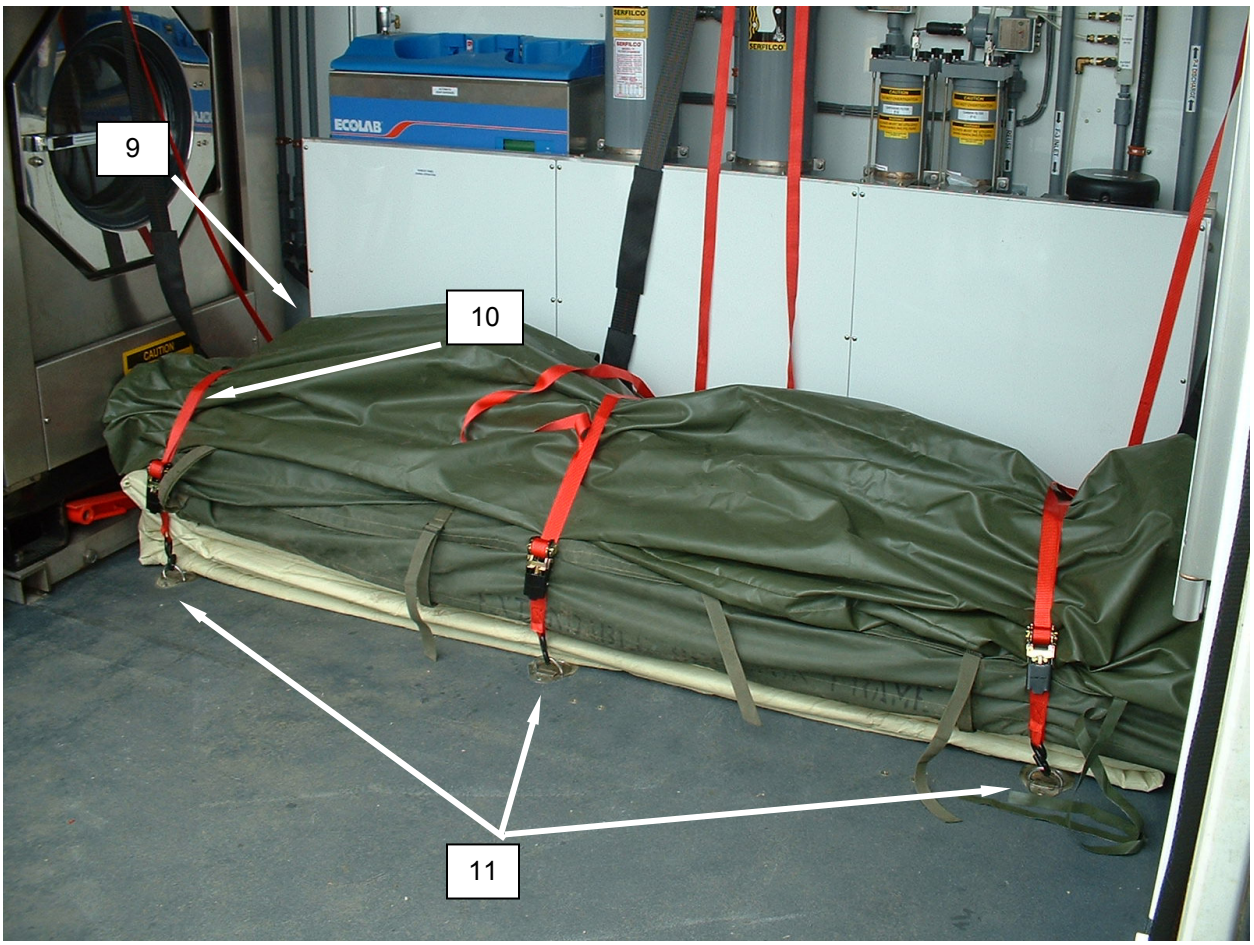


Figure 10. Securing with Straps.

FULL PACKOUT-CONTINUED

16. Place the vestibule floor linings **(Figure 11, Item 12)** as shown to provide protection to the washers, pumps, and dryers.

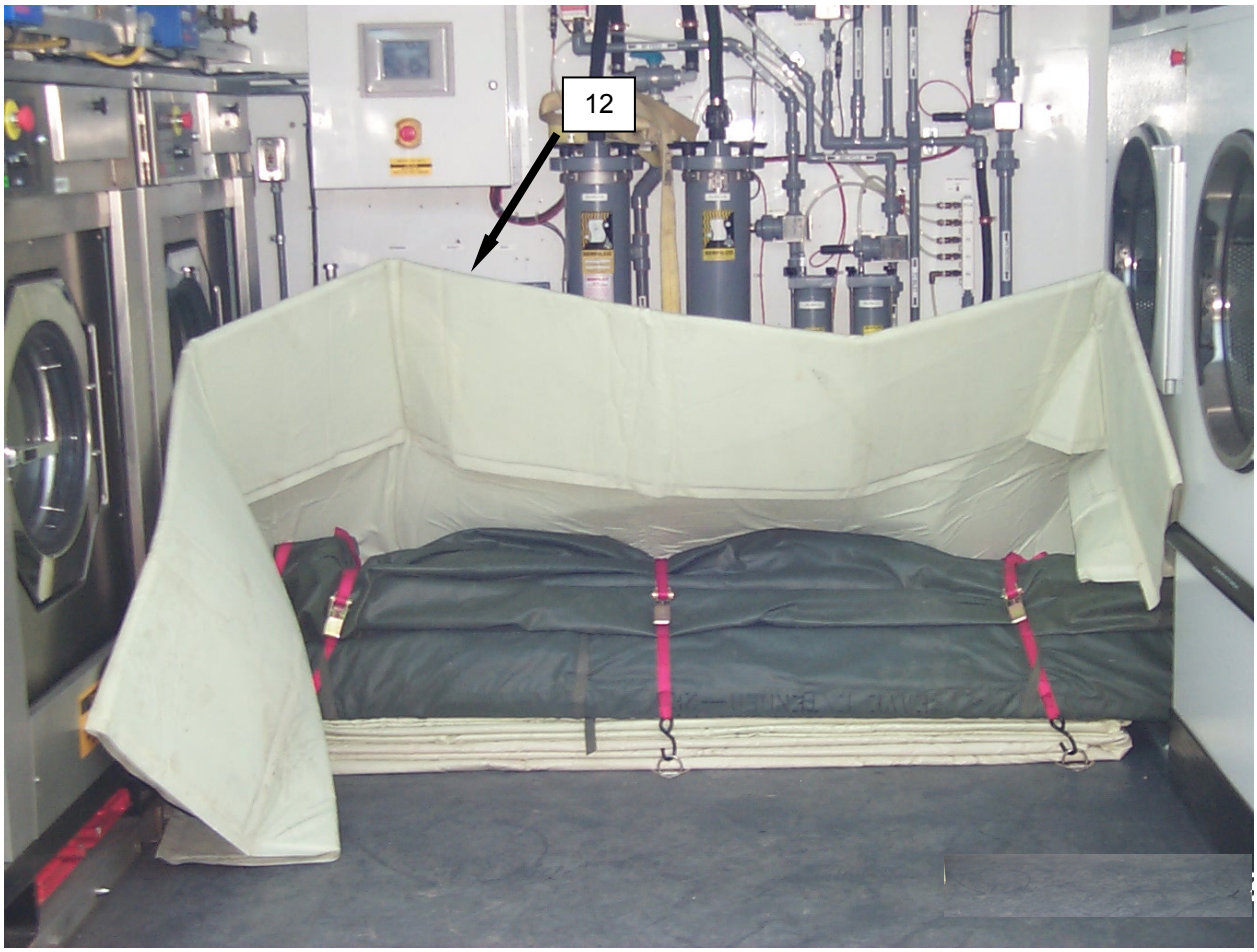


Figure 11. Placing the Vestibule Floor Liners in CBL for Full Packout.

FULL PACKOUT-CONTINUED

17. Place the 100 A cables **(Figure 12, Item 13)** atop the packed TEMPER frame sections.

18. Place the 60 A **(Figure 12, Item 14)** cables on top of the 100 A cables **(Figure 12, Item 13)**. If possible, try to coil the 60 A cable within the 100 A cables.

19. Place pigtails on top of the 100 A and 60 A cables.



Figure 12. Placing the Cables for Full Packout.

FULL PACKOUT-CONTINUED

NOTE

Due to variations in the manufacture of the liners for the TEMPER, a different number of liners may be supplied.

20. Place the folded intermediate window section liner (s) **(Figure 13, Item 15)** as shown to provide protection to the washers.

21. Place the water bags **(Figure 13, Item 16)** on top of the cables.



Figure 13. CBL Full Packout.

FULL PACKOUT-CONTINUED

22. Place TEMPER light case **(Figure 14, Item 17)** on top of water bags, and retain in place with three remaining 1-inch straps. When placing straps, run them through the case handle as shown to secure the case in place. The TEMPER light case should be approximately level with top of the filter guard panels.



Figure 14. Placing the Light Case for Full Packout.

FULL PACKOUT-CONTINUED

23. Place half of the outer TEMPER fabric components **(Figure 15, Item 18)** on top of light case **(Figure 15, Item 17)**. Ensure the fabric sections fold down against the dryer door.

24. Place ramps **(Figure 15, Item 19)** on top of outer fabric components **(Figure 15, Item 18)**.

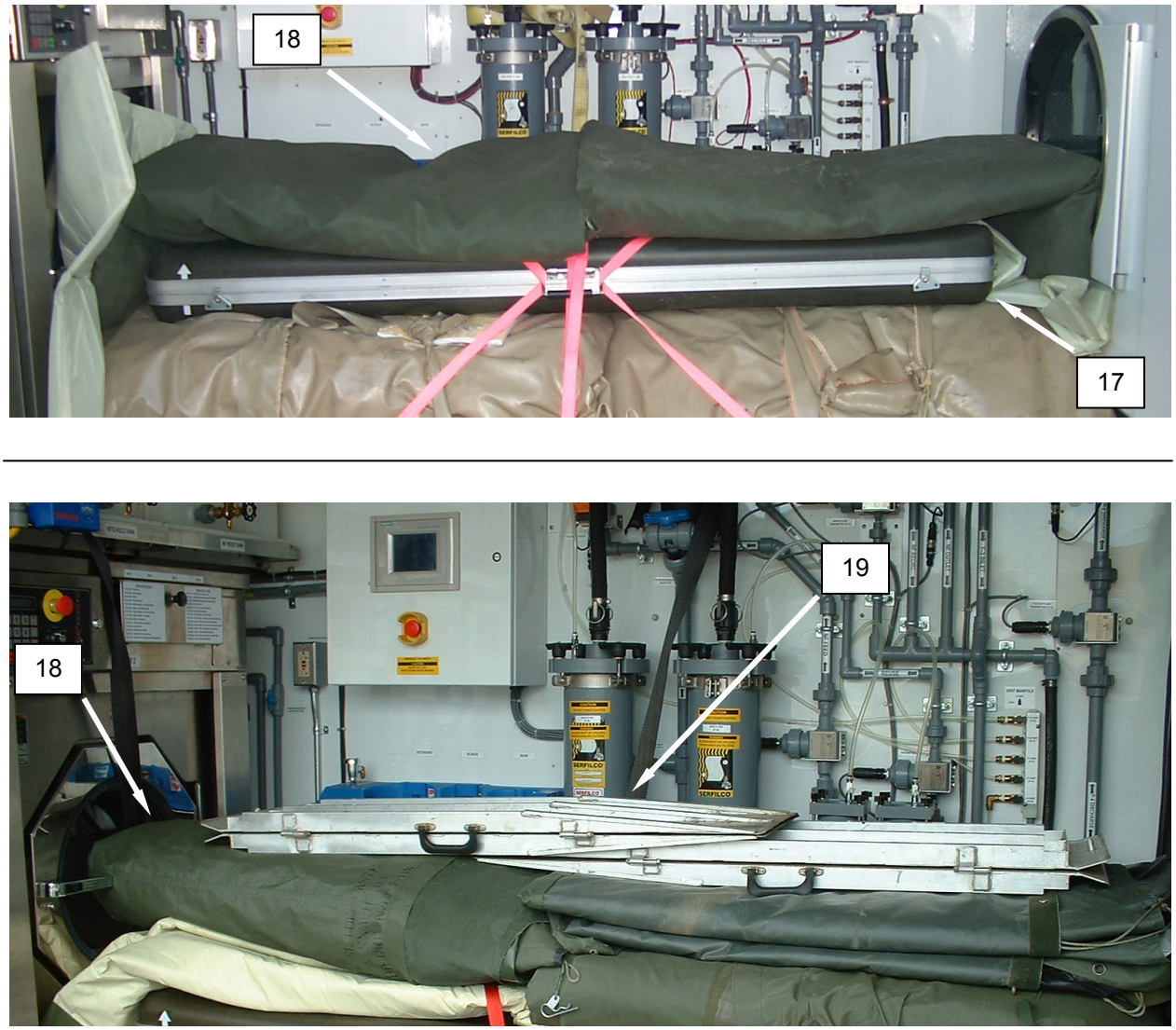


Figure 15. CBL Full Packout.

FULL PACKOUT-CONTINUED

25. Place outer TEMPER fabric sections and fly **(Figure 16, Item 18)** on top of ramps.

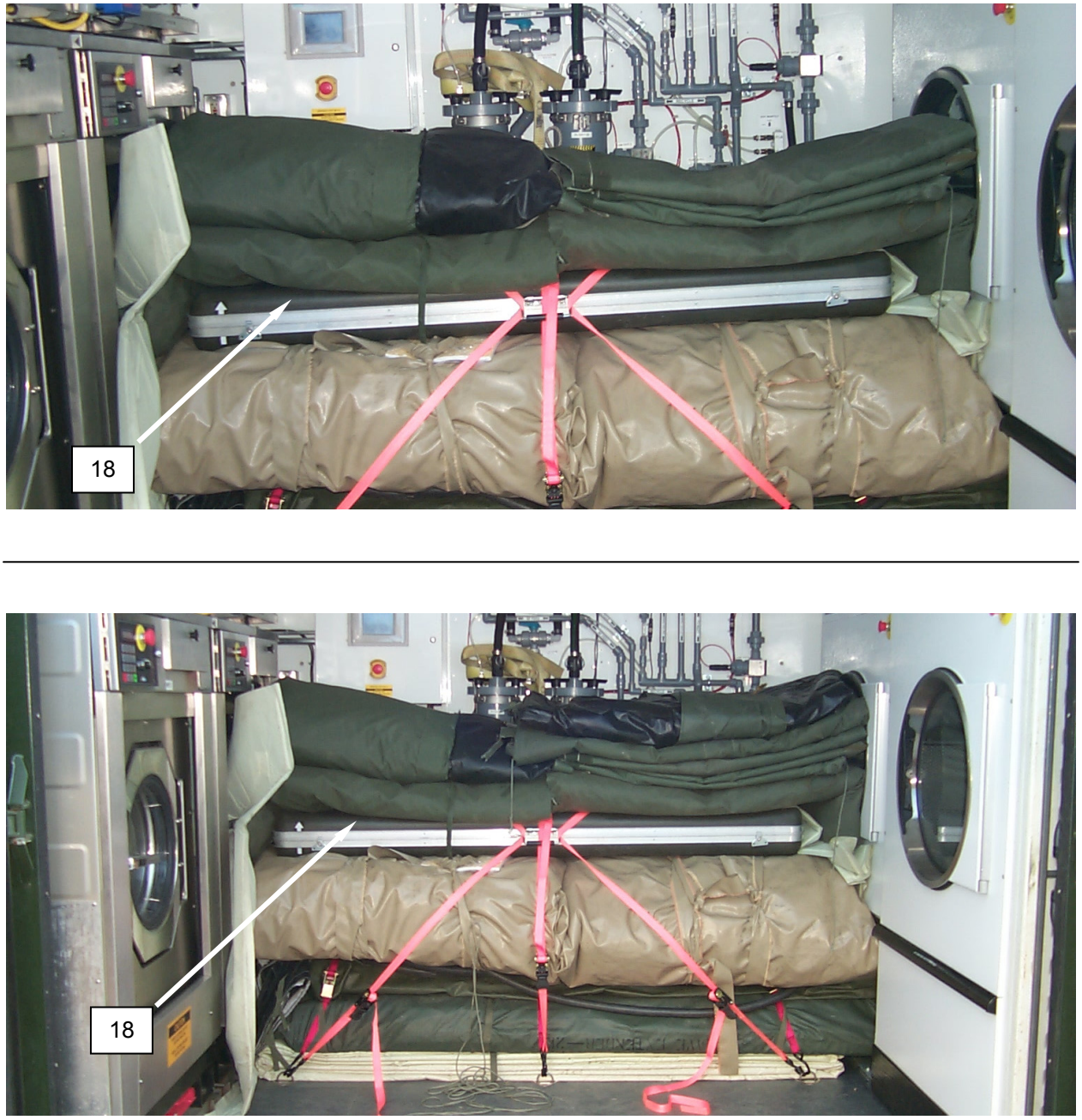


Figure 16. Placing the Fabric Sections.

FULL PACKOUT-CONTINUED

26. Place Dryer No. 1 lint compartment door **(Figure 17, Item 20)** on top of TEMPER fabric.

27. Place the vestibule fabric sections **(Figure 17, Item 21)** on top of dryer lint compartment door.

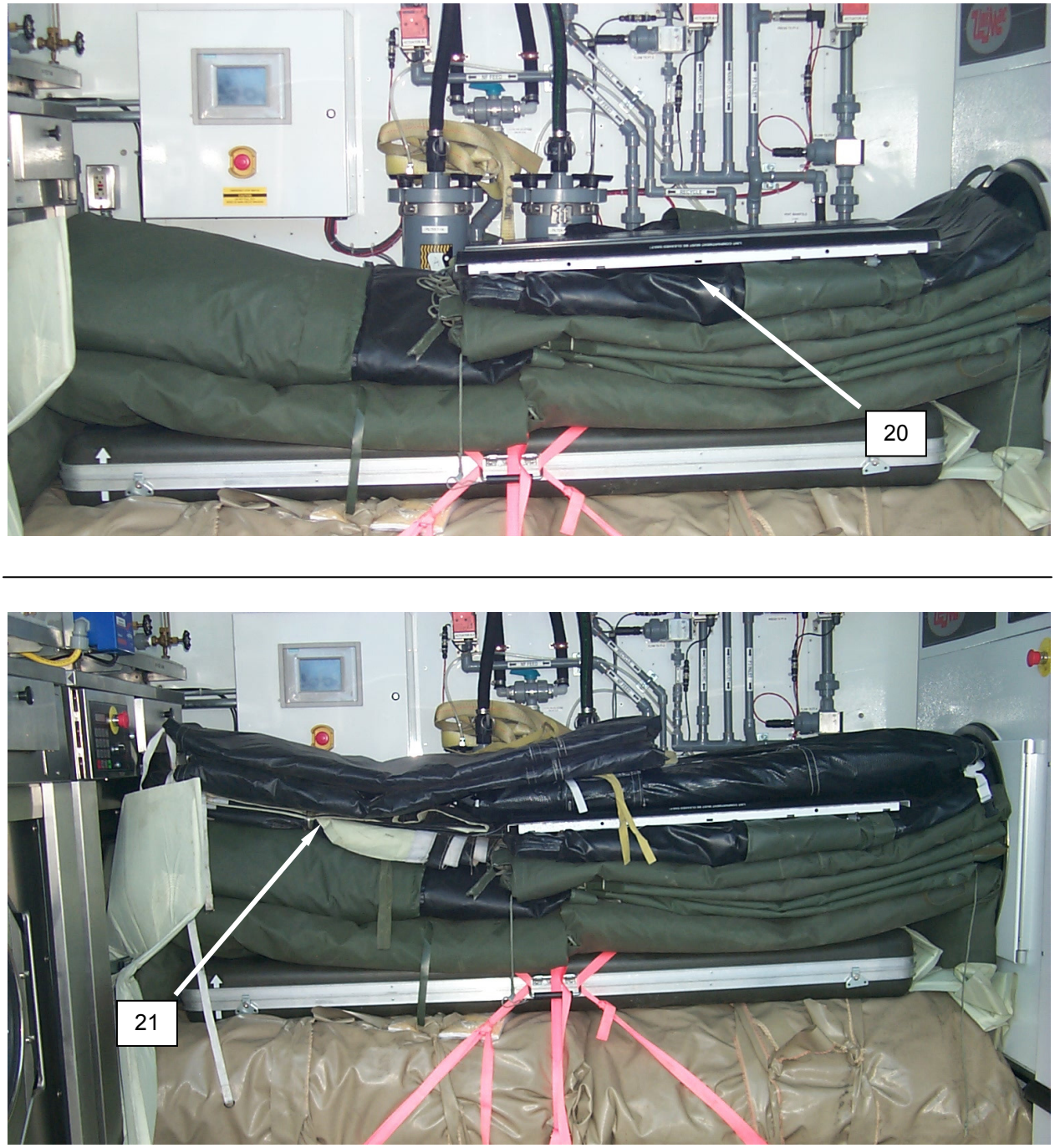


Figure 17. CBL Full Packout.

FULL PACKOUT-CONTINUED

28. Place boxed water bag (pond) heaters **(Figure 18, Item 22)** on either side of lint screen support.

29. Place filter elements **(Figure 18, Item 23)** inside the compartment.



Figure 18. Placing the Pond Heater and the Filter Elements.

FULL PACKOUT-CONTINUED

30. Place the water tank floats **(Figure 19, Item 24)** on top of the lint screen support.

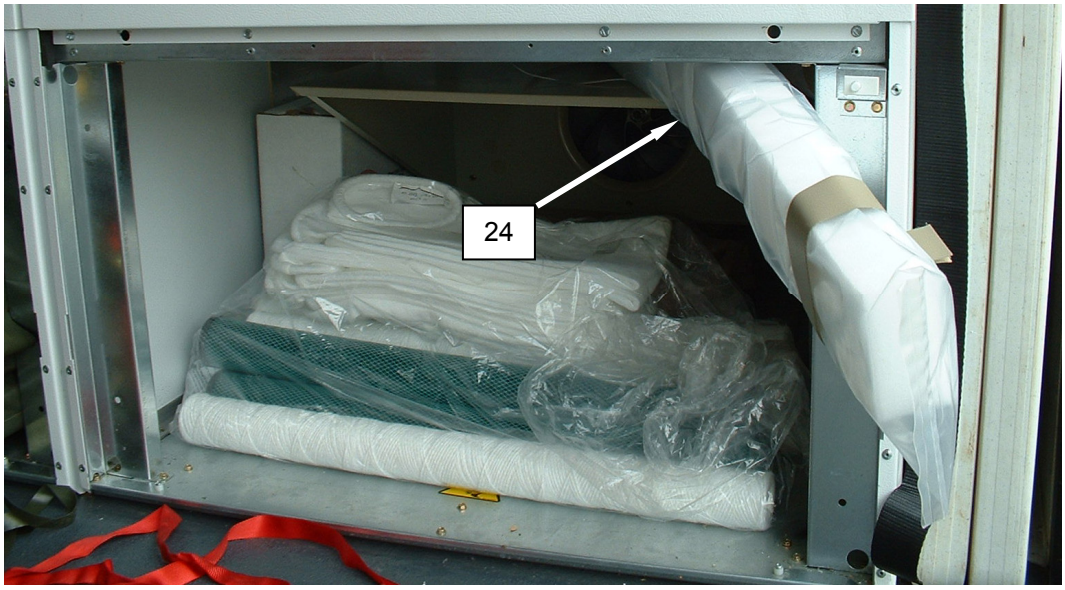


Figure 19. Placing the Water Tank Floats for Full Packout.

31. Place dustpan **(Figure 20, Item 25)** in the space between the filters and the dryer cabinet.



Figure 20. Placing the Dust Pan for Full Packout.

FULL PACKOUT-CONTINUED

32. Install lint compartment door **(Figure 21, Item 2)** on dryer #2.



Figure 21. Installing Lint Compartment Door for Full Packout.

33. Place the folded TEMPER plenum **(Figure 22, Item 26)** inside dryer No. 2.



Figure 22. CBL Full Packout.

FULL PACKOUT-CONTINUED

34. Install the retaining brackets **(Figure 23, Item 27)** into the centerline CBL interior floor.

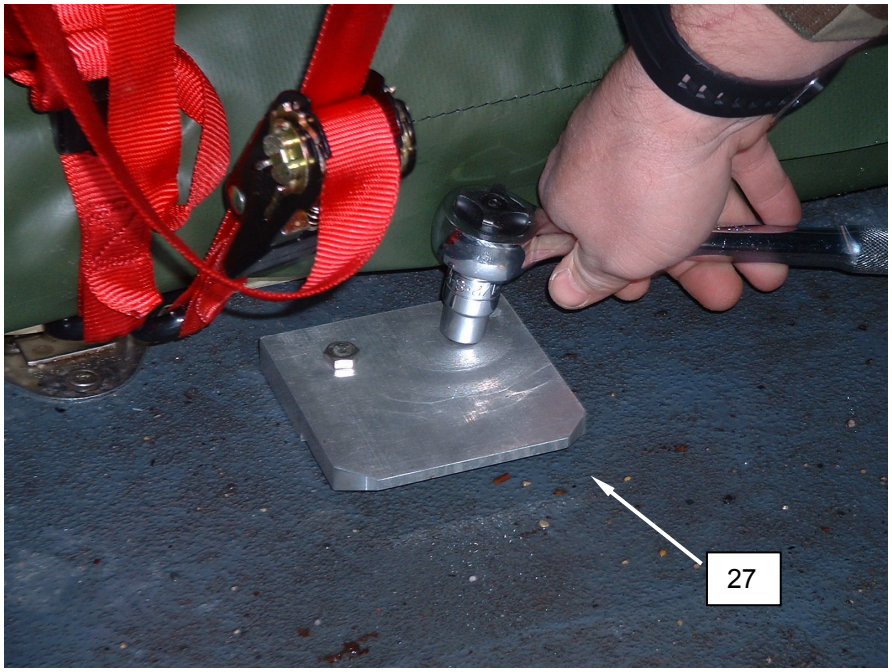


Figure 23. Install Retaining Brackets.

35. Locate the stacking adapter **(Figure 24, Item 28)** and the overhang plates **(Figure 24, Item 29)**.

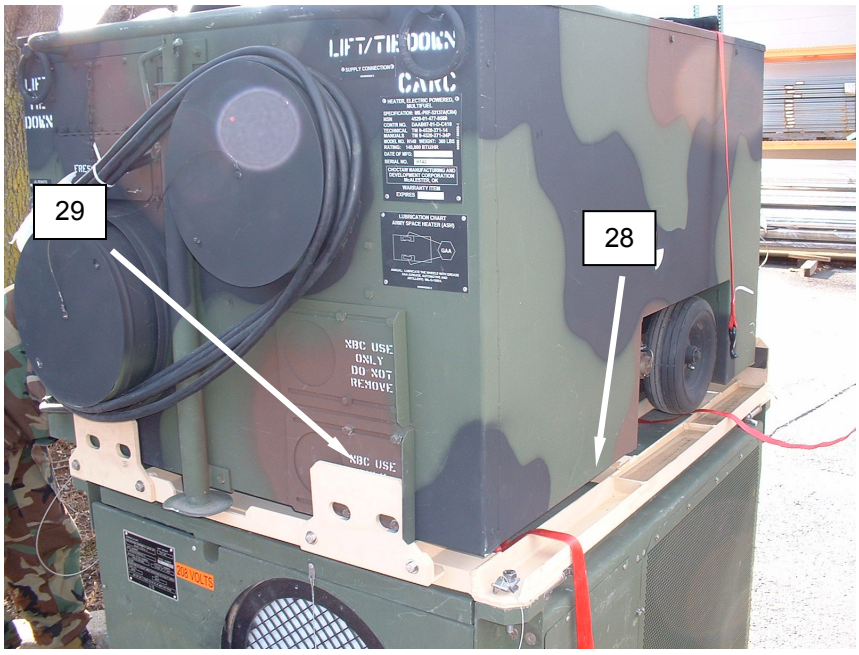


Figure 24. Stacking Adapter and Overhang Plates.

FULL PACKOUT-CONTINUED

36. Drape two 1-in. straps over the FDECU to secure the ASH **(Figure 25, Item 30)** to the stacking adapter **(Figure 25, Item 28)**. Run the strap completely under the base of the stacking adapter.

CAUTION

Ensure straps are secured toward the outer end of the forklift pocket. Forklift prongs may damage straps.

37. Install the stacking adapter **(Figure 25, Item 28)** onto the FDECU **(Figure 25, Item 31)**.

38. Use a forklift to place the ASH **(Figure 25, Item 30)** on top of the stacking adapter **(Figure 25, Item 28)**. Ensure the ASH is flush with the FDECU **(Figure 25, Item 31)** on the side which will go up against the dryer – this will make the ASH overhang the FDECU on the side facing the washers.

39. Install the aluminum overhang plates **(Figure 25, Item 29)** onto the stacking adapter **(Figure 25, Item 28)**.

40. Drape two 3-in. straps over the ASH **(Figure 25, Item 30)** and through forklift pockets, and use a forklift to place the assembled ASH **(Figure 25, Item 30)** and FDECU **(Figure 25, Item 31)** into the CBL operating area, and within 3 in. of dryer No. 2.

41. Push the assembled ASH **(Figure 25, Item 30)** and FDECU **(Figure 25, Item 31)** back at this time – leave enough room to access the interior side of the assembled ASH and FDECU.

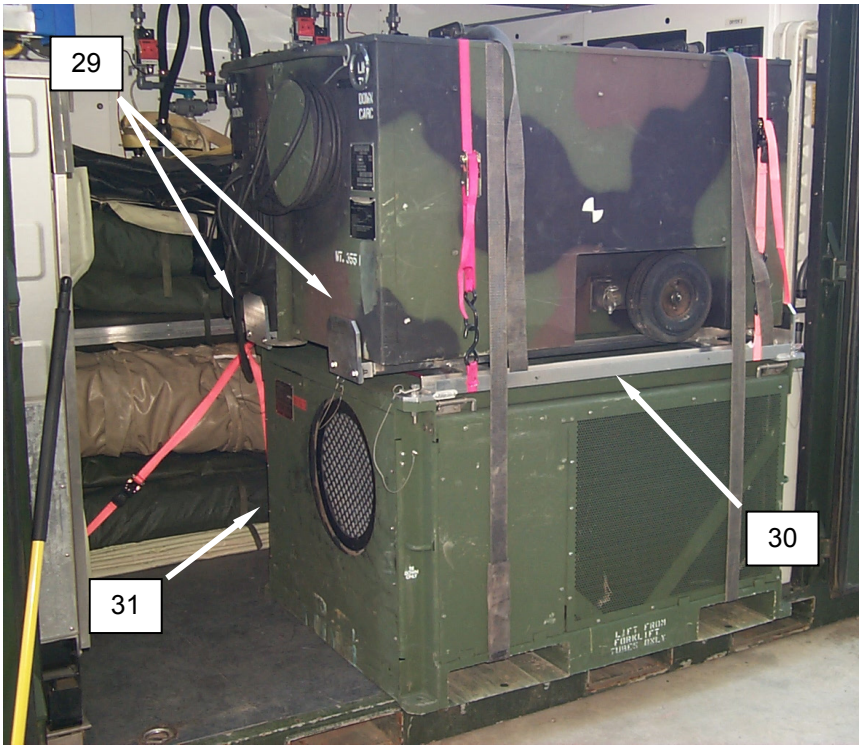


Figure 25. Placing the ASH and the FDECU.

FULL PACKOUT-CONTINUED

42. Ensure the forklift pockets on the FDECU **(Figure 26, Item 31)** are centered over the retaining bracket positions, and install the two flat retaining brackets **(Figure 26, Item 32)** in place in the CBL floor, clamping the forklift pockets.

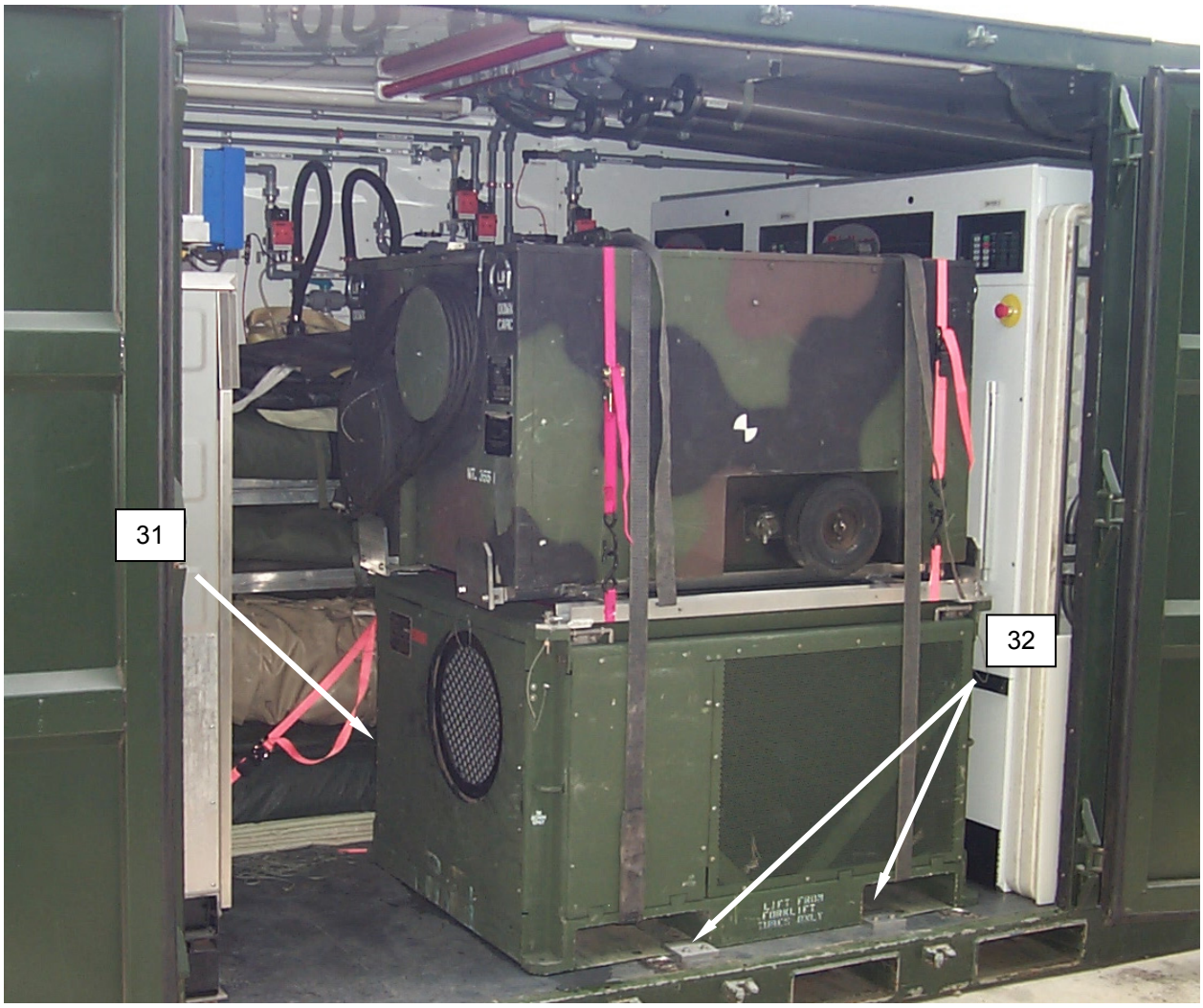


Figure 26. Centering the Fork Lift Pockets.

FULL PACKOUT-CONTINUED

43. Place the heat traced hoses **(Figure 27, Item 33)** and the waste tank drain hose in the space between the assembled ASH and FDECU and the secured TEMPER components.

CAUTION

Secure all dust caps. This will aid in having them bang around and damaging other CBL components. Failure to comply may result in damage to the equipment.

NOTE

Another option is to store one hose behind FDECU and ASH and one behind the dryer.

44. Place one section of the water tank insulation **(Figure 27, Item 34)** in the space between the assembled ASH and FDECU and Dryer No. 2.

45. Retrieve the three 3-in. straps and place as to be accessible.

46. Place remaining seven sections of the water tank insulation **(Figure 27, Item 34)** on top of the secured TEMPER components and on top of the ASH.

47. Seal the trash can **(Figure 27, Item 35)** (if not done already) and invert the trash can to place it in the space between the FDECU and the washer.

48. Place tent pin bags vertical next to the trash can.

49. Drape the three 3-in. straps over the ASH.



Figure 27. CBL Full Packout.

FULL PACKOUT-CONTINUED

WARNING

Sanitize the laundry cart, prior to packing it in the CBL. The laundry cart may contain bacteria or viruses. Failure to comply may result a danger to life or health.

50. Invert one laundry cart **(Figure 29, Item 36)** and place over the trash can.

51. Invert the second and place over the first.

52. Push the laundry carts **(Figure 29, Item 36)** back into the container as far as they will go.



Figure 29. Inverting the Laundry Carts.

FULL PACKOUT-CONTINUED

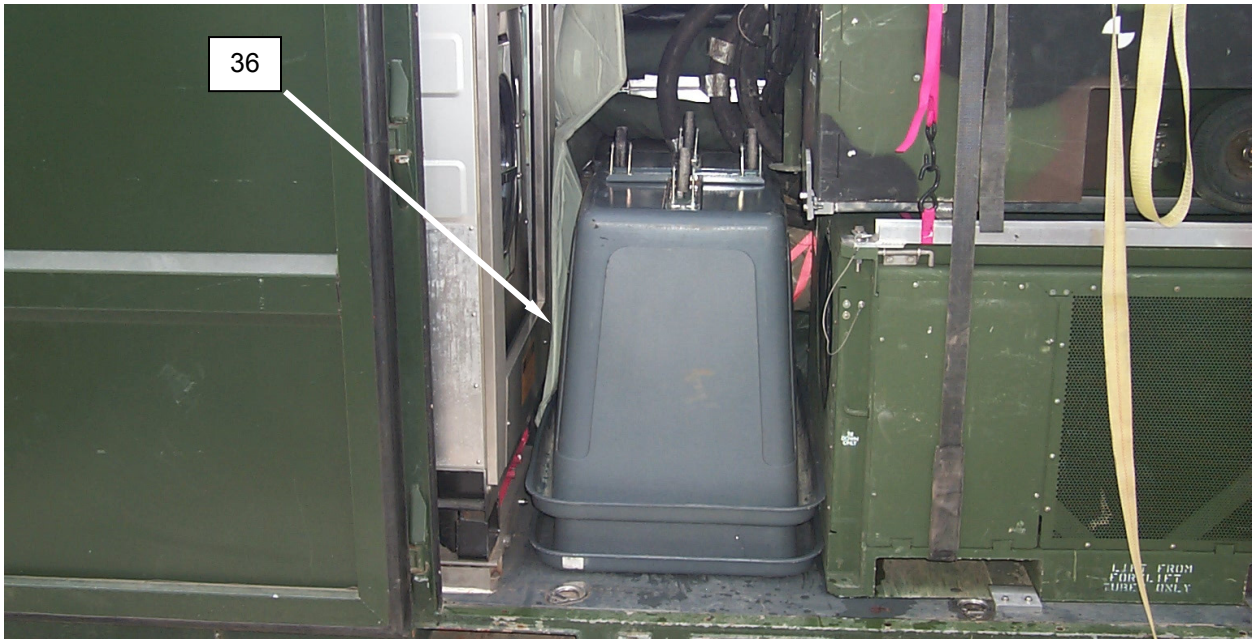


Figure 30. CBL Full Packout.

53. Place the TEMPER distribution box stand **(Figure 31, Item 37)** and the broom **(Figure 31, Item 38)** in the space between the washer and the container wall.

FULL PACKOUT-CONTINUED

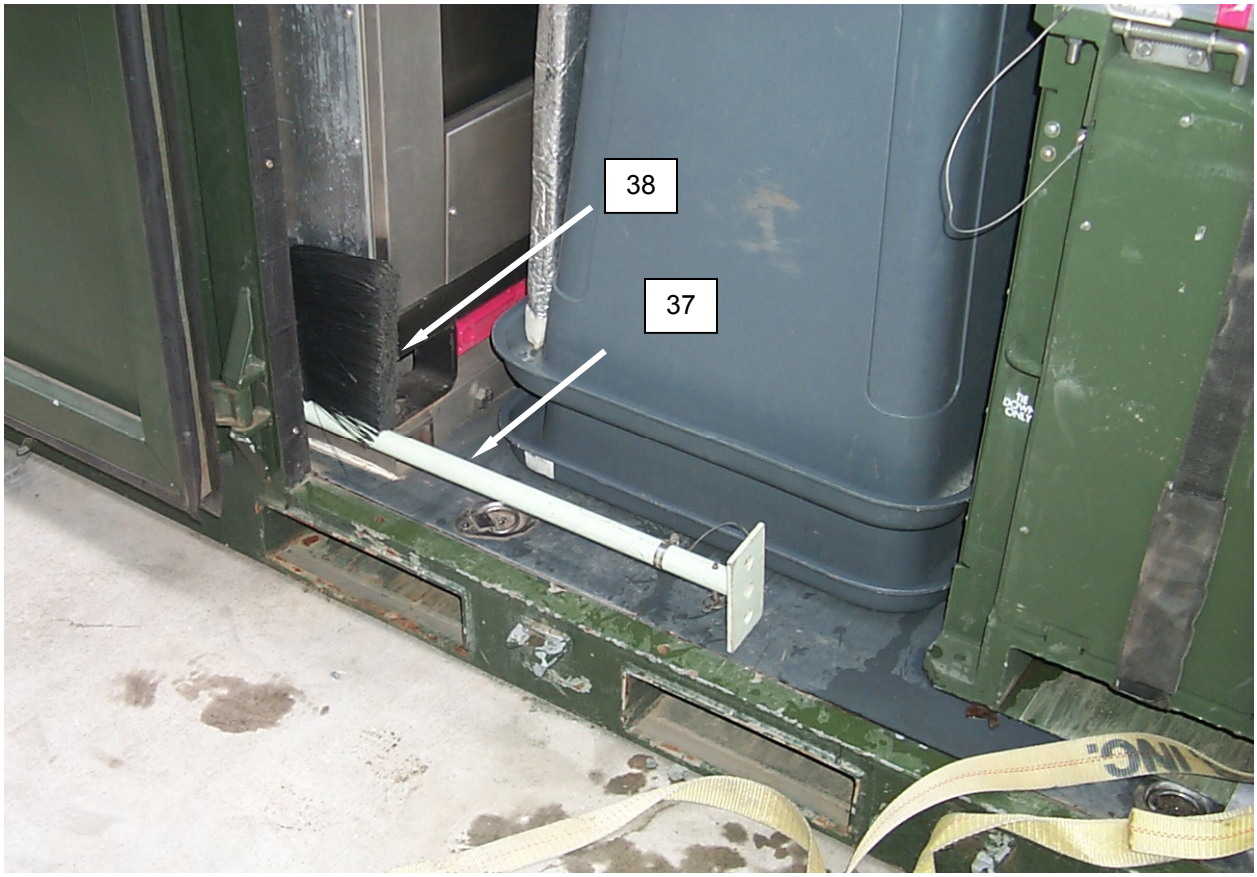


Figure 31. CBL Full Packout.

FULL PACKOUT-CONTINUED

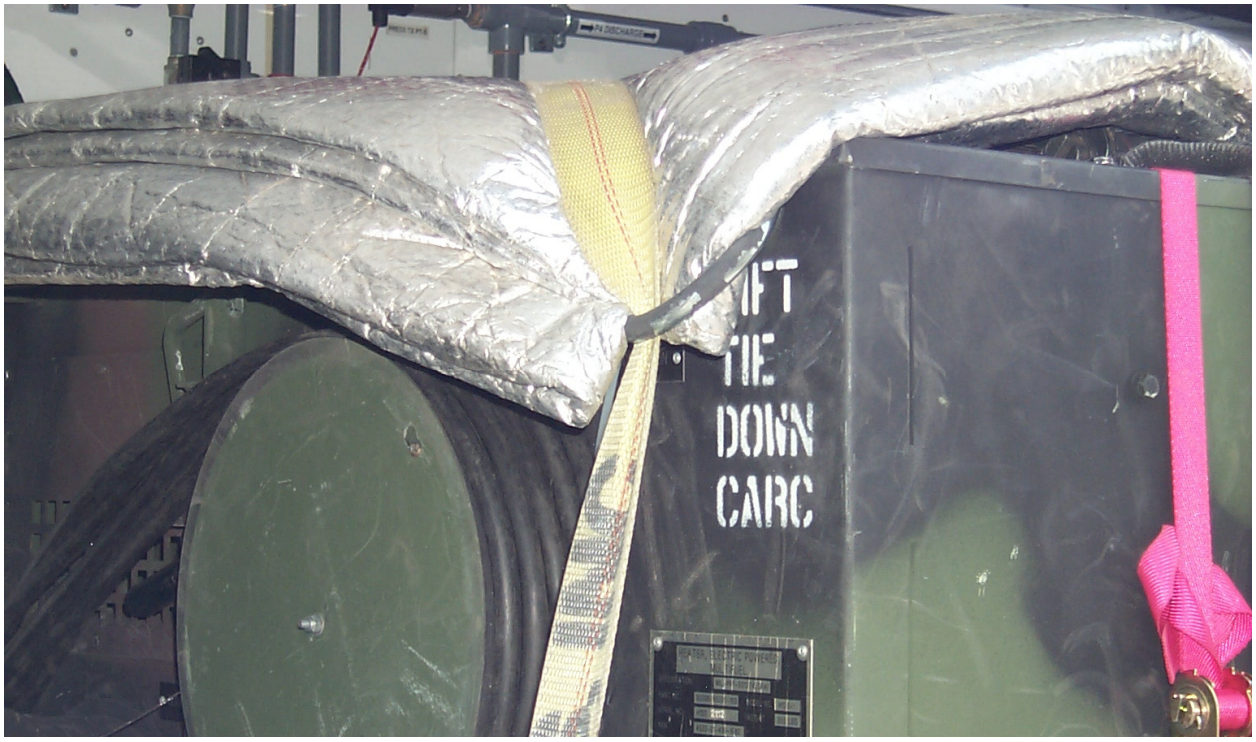
54. Cross the straps and attach to the outer D-rings. Ensure that a strap passes through the lifting eye of the ASH. Ensure straps are tight.

55. Place the grounding rods **(Figure 32, Item 39)** in the forklift pockets of the FDECU.



Figure 32. Placing the Grounding Rods.

FULL PACKOUT-CONTINUED



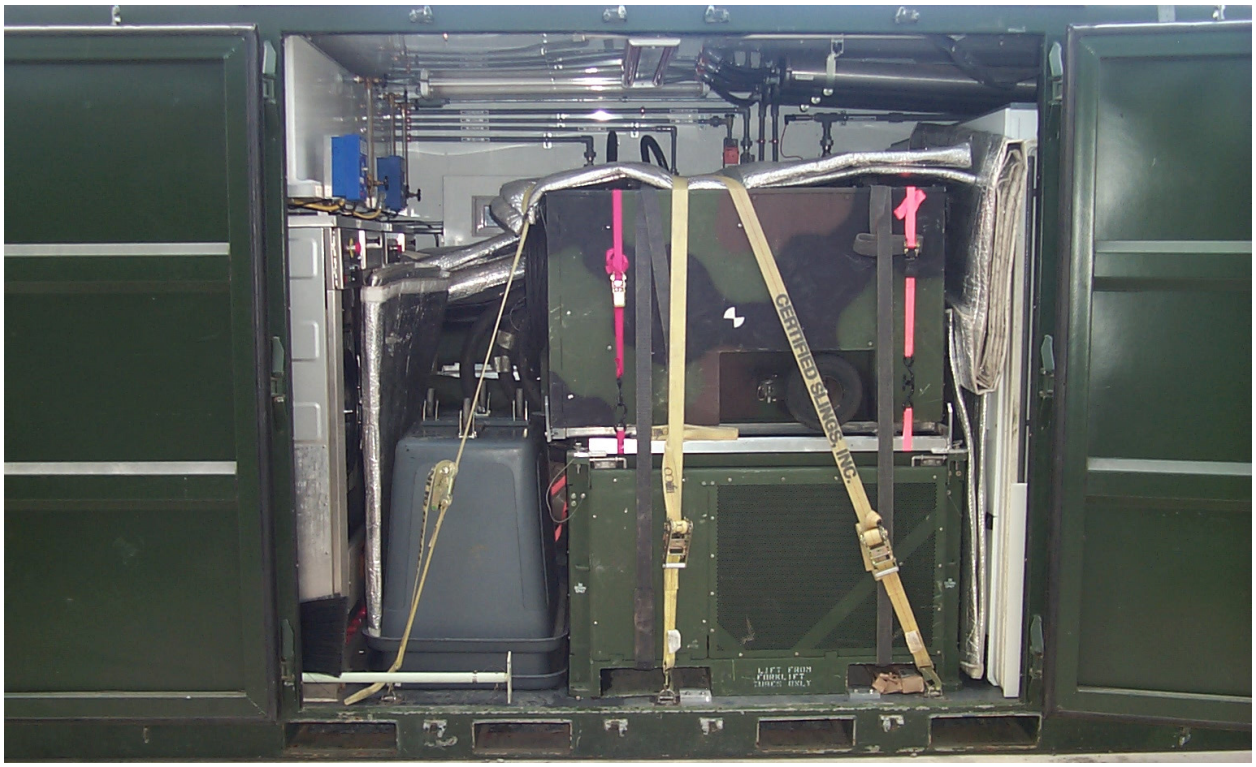


Figure 33. Securing the Components with Straps.

FULL PACKOUT-CONTINUED

56. Place the ASH ducts in the space behind dryer No. 2.

57. Place the keys and TM's in the bins **(Figure 34, Item 40)** fitted to the personnel door.

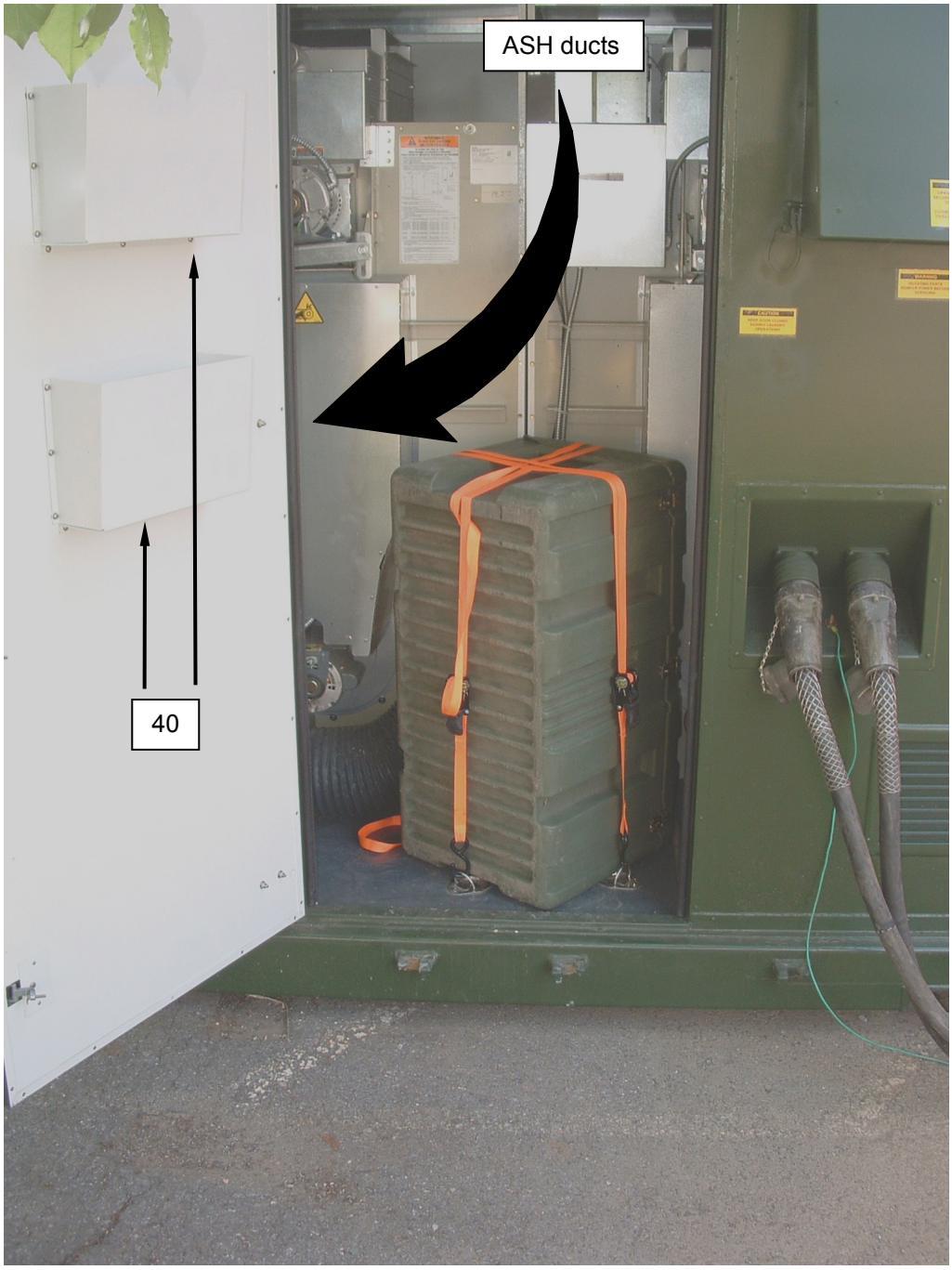


Figure 34. Securing the Footlocker.

FULL PACKOUT-CONTINUED

58. Recheck all packed components for security, and ensure rainhoods and personnel doors are closed and secured.

59. Close and latch all container doors.



Figure 35. Close and Latch the Container.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER USUAL CONDITIONS – MINIMUM PACKOUT

MINIMUM PACKOUT

General

The CBL is shipped with all the equipment necessary to operate in normal and adverse environments. There are two packout configurations: Full Packout, which is described in WP 0016 00, and Minimum Packout. The Full Packout ships all supplied equipment within the CBL container. The Minimum Packout ships designated items separately in order to meet container weight constraints. The packout procedure given in this work package must be strictly followed in order to pack all supplied equipment and allow for safe transport of the container. Failure to follow this procedure will prevent movement of the CBL.



WARNING

Do not pack any laundry chemicals in the CBL. The CBL may be exposed to high temperatures during transport, and interior temperatures may exceed 120 ^{0}F (48.9 ^{0}C). Laundry chemicals stored in excess of 120 ^{0}F (48.9 ^{0}C) may degrade and produce harmful gases. Failure to observe safety precautions may create a hazard resulting in serious injury or death to personnel.



WARNING

Do not pack fuel in the CBL. The CBL may be exposed to high temperatures during transport, and interior temperatures may exceed 120 ^{0}F (48.9 ^{0}C), exceeding the flash point of JP-8 and DF-1 fuels. Pack laundry chemicals IAW with Unit SOP. Failure to observe safety precautions may create an explosion and fire hazard resulting in serious injury or death to personnel.



WARNING

CBL and TEMPER components require two or more personnel to lift/move. Use the appropriate number of personnel when moving large, bulky, or heavy items. To avoid serious injury, lift with your legs, and not your back, and never attempt to lift an item alone if it requires more than one person. Failure to observe safety precautions may result in serious back injury.

CBL MINIMUM PACKOUT

1. Ensure preparation for movement has been carried out IAW WP 0012 00 and WP 0013 00.

CBL MINIMUM PACKOUT-CONTINUED

2. The TEMPER components have been folded IAW WP 0014 00.
3. The packing steps detailed in WP 0015 00 have been completed.
4. Ensure the space between dryer No. 2 and the container wall is clear.
5. Slide the four folding tables **(Figure 1, Item 1)** and the laundry transfer top into the space between dryer No. 2 and the container wall. The folding tables will extend into the space behind the dryers.

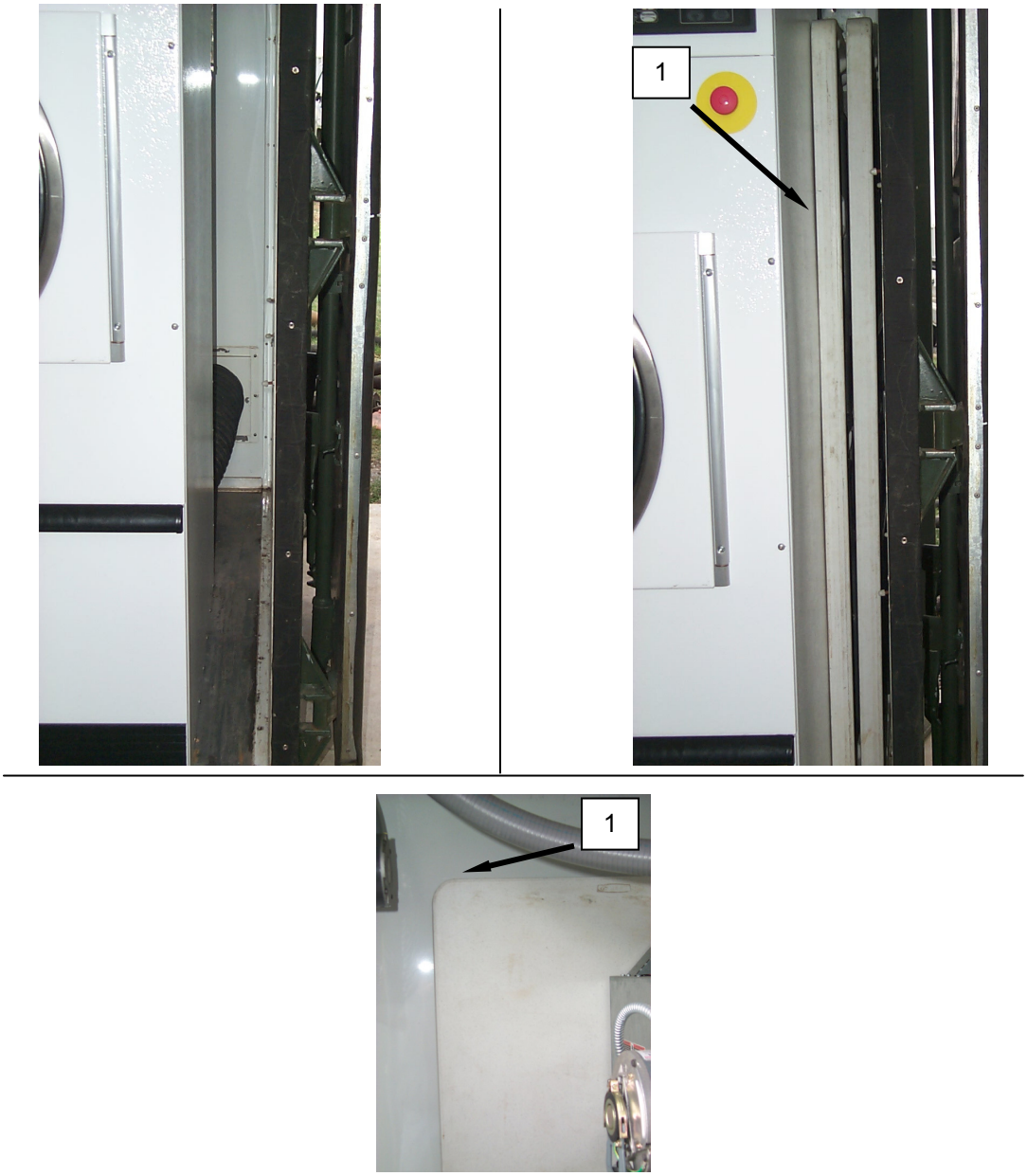


Figure 1. CBL Minimum Packout.

CBL MINIMUM PACKOUT-CONTINUED

6. Remove dryer lint compartment doors **(Figure 2, Item 2)**.

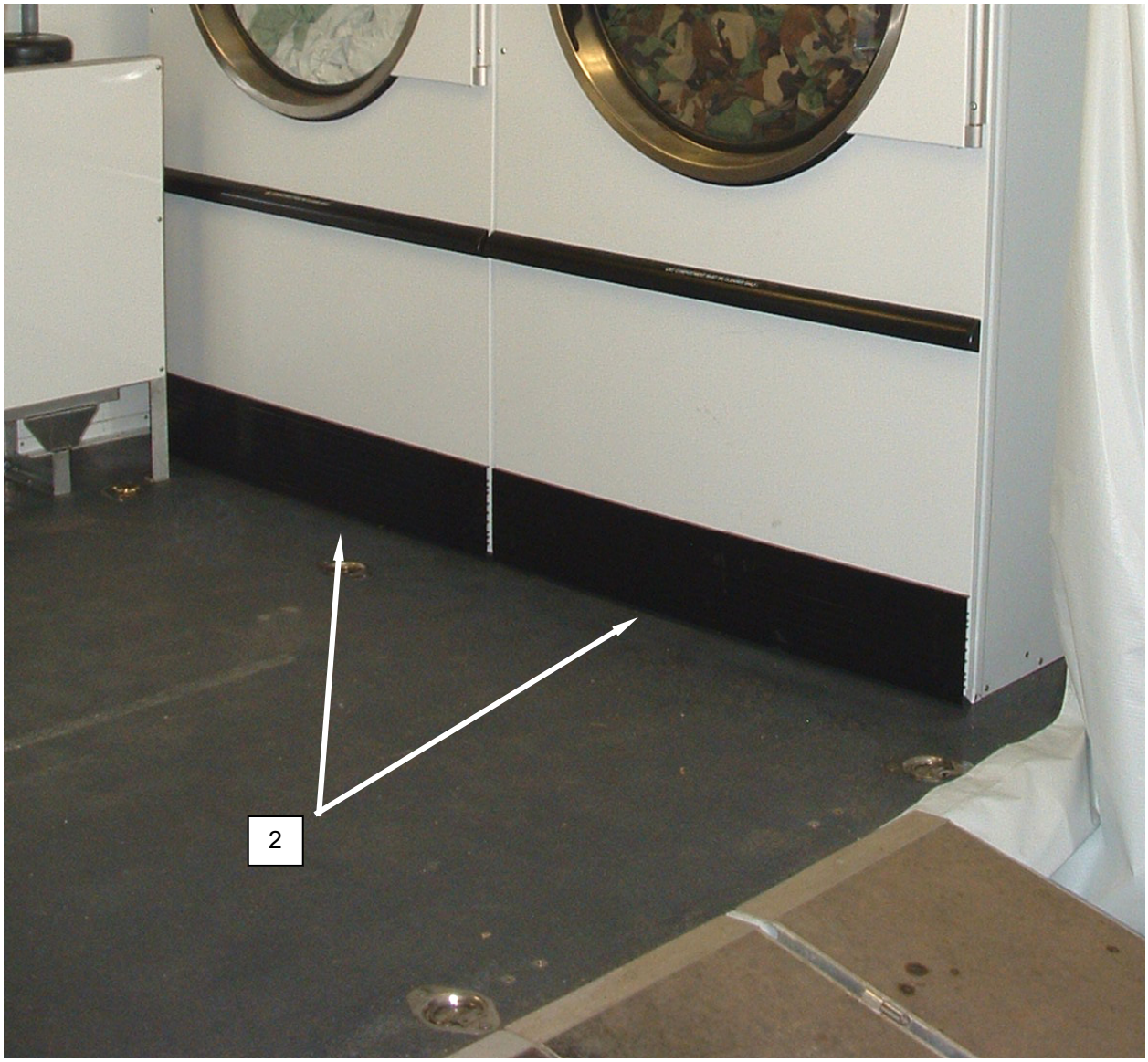


Figure 2. Removing Lint Compartment Doors.

CBL MINIMUM PACKOUT-CONTINUED

7. Remove lint screens **(Figure 3, Item 3)** and lay flat.

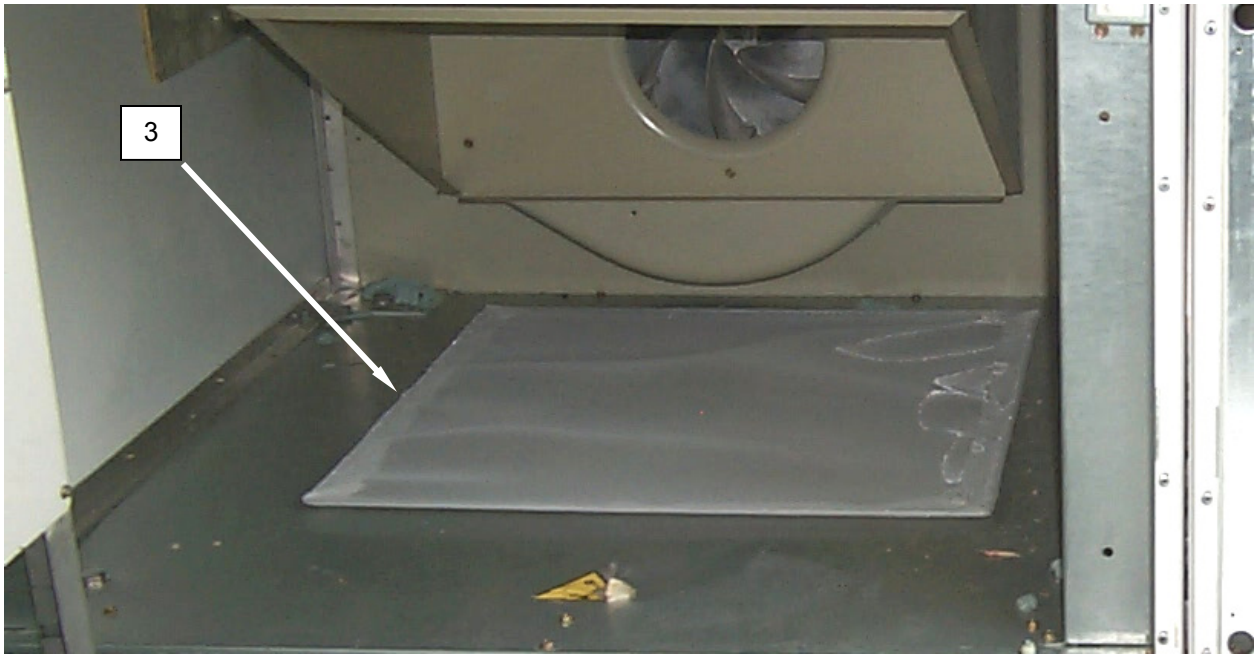


Figure 3. Remove Lint Screens.

8. Apply tape to the lint compartment switches **(Figure 4, Item 4)** on the dryers in order to prevent damage to the switch plungers.

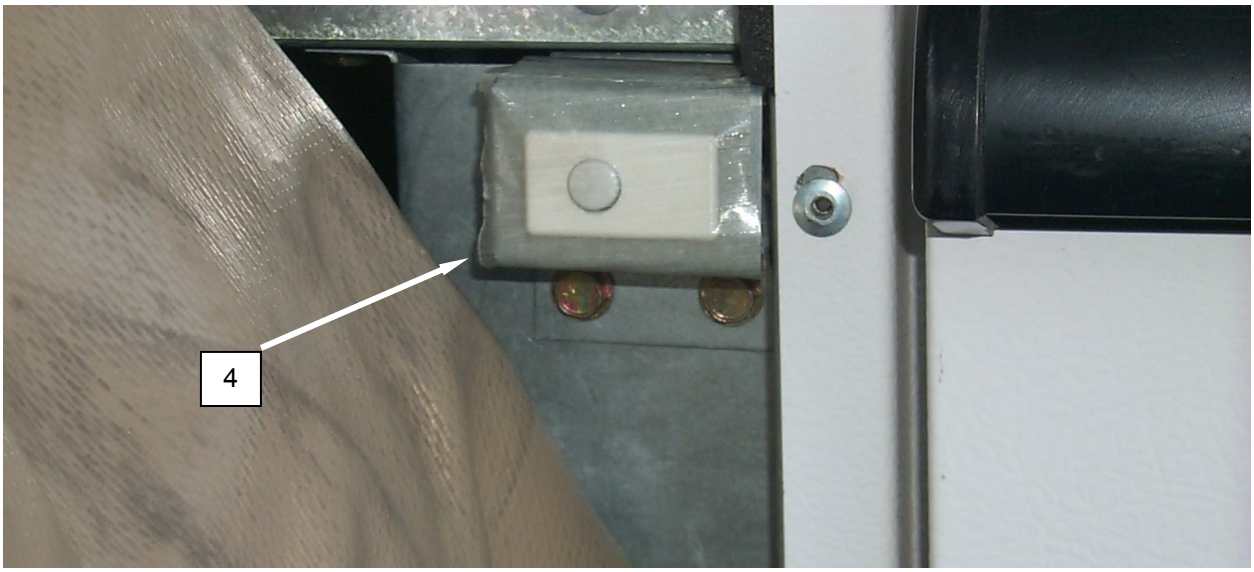


Figure 4. Apply Tape to Lint Compartment Switches.

CBL MINIMUM PACKOUT-CONTINUED

9. Lift the three D-rings **(Figure 5, Item 5)** closest to the reuse filters.

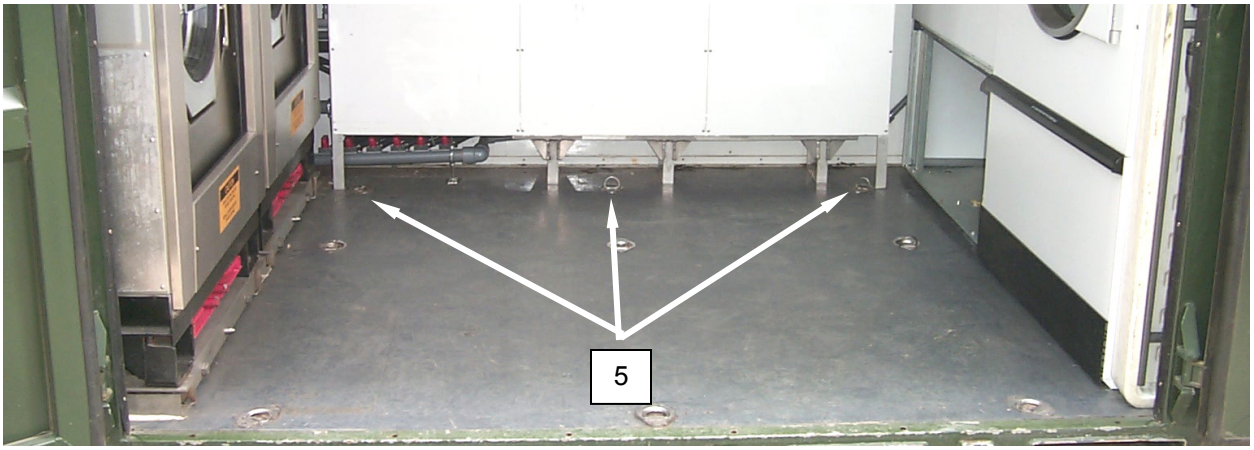


Figure 5. Three D-Rings.

10. Attach six 1-in. straps **(Figure 6, Item 6)** and three 3-in. straps **(Figure 6, Item 7)** to the D-rings, and place the straps off the floor, but accessible.

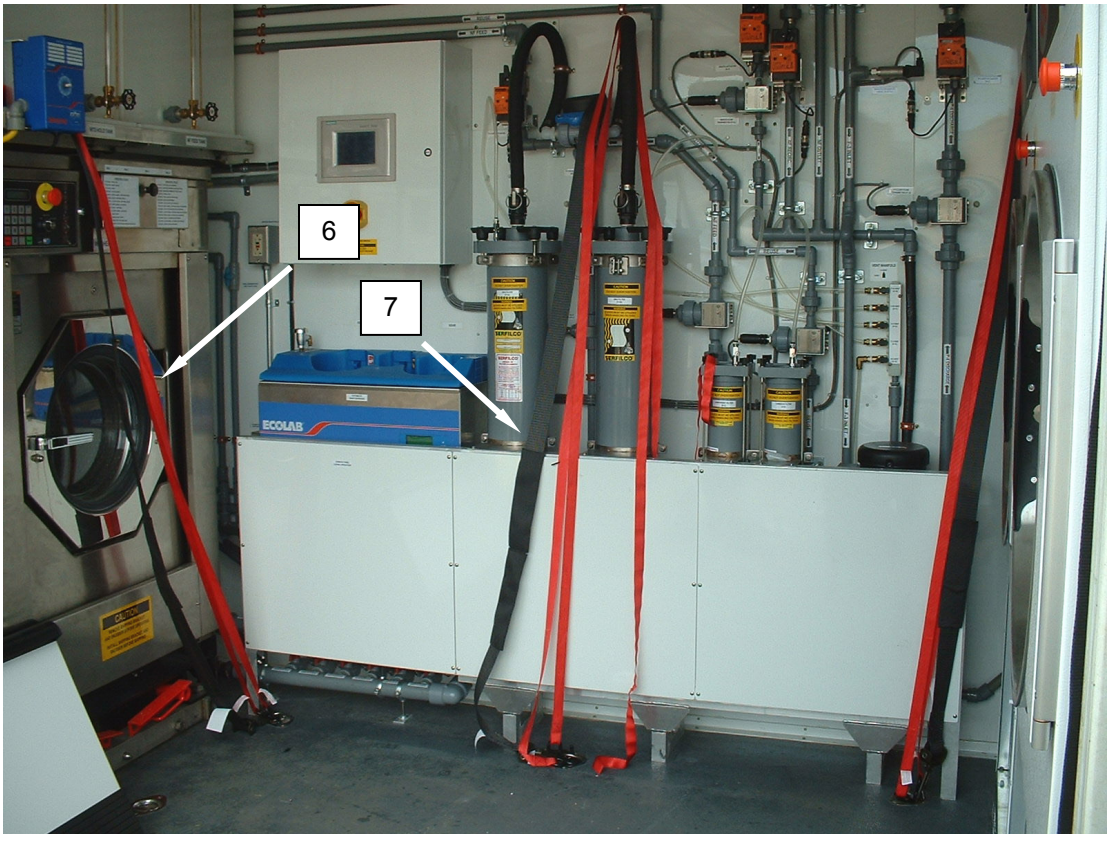


Figure 6. Attach Straps to D-Rings.

CBL MINIMUM PACKOUT-CONTINUED

11. Place folded TEMPER flooring **(Figure 7, Item 8)** into container. Do not allow TEMPER flooring to cover center D-rings. If TEMPER flooring will not fit freely into the designated area, it must be refolded.





Figure 7. Folded TEMPER Flooring.

CBL MINIMUM PACKOUT-CONTINUED

CAUTION

Use care when placing TEMPER frame sections Dryer components could become damaged. Failure to comply may result in damage to equipment.

12. Place the largest TEMPER frame section (arch and header sections) bag **(Figure 8, Item 9)** on top of the TEMPER flooring **(Figure 8, Item 8)**, and extending into the lint compartment of dryer No 1.





Figure 8. CBL Minimum Packout.

CBL MINIMUM PACKOUT-CONTINUED

CAUTION

Use care when placing TEMPER frame sections to avoid damage to dryer components.

13. Place the remaining TEMPER frame section bag (purlins) **(Figure 9, Item 10)** atop the larger frame section bag, extending into the lint compartment of dryer No. 1.

14. Wrap the three 1-inch straps **(Figure 9, Item 6)** over the packed TEMPER components and attach to the center D-rings **(Figure 9, Item 11)**. Tighten straps so there is no movement of the packed TEMPER components. Straps may require retightening as the packed floor sections compress.

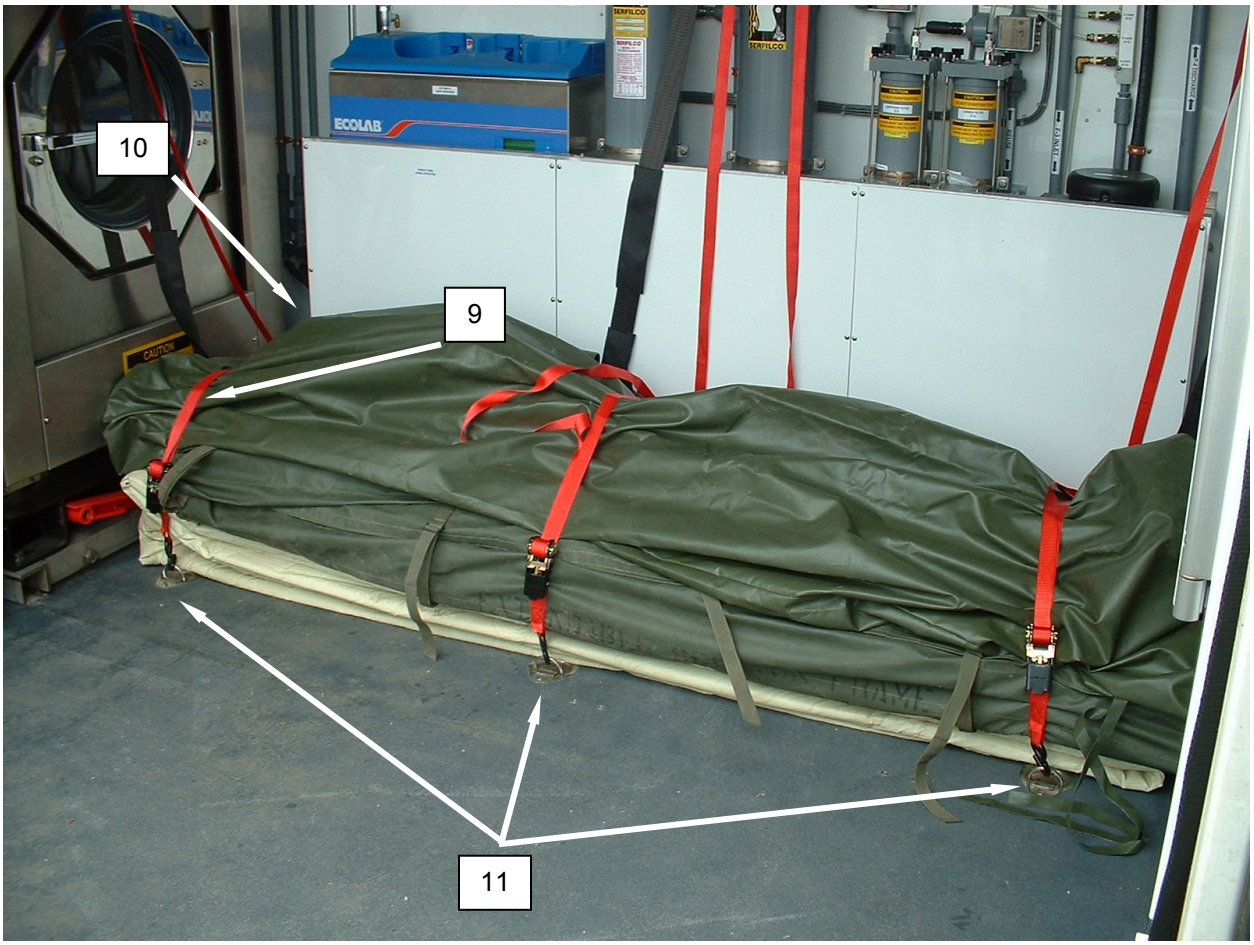


Figure 9. Securing the Straps for Minimum Packout.

CBL MINIMUM PACKOUT-CONTINUED

15. Place the vestibule floor linings **(Figure 10, Item 12)** as shown to provide protection to the washers and dryers.

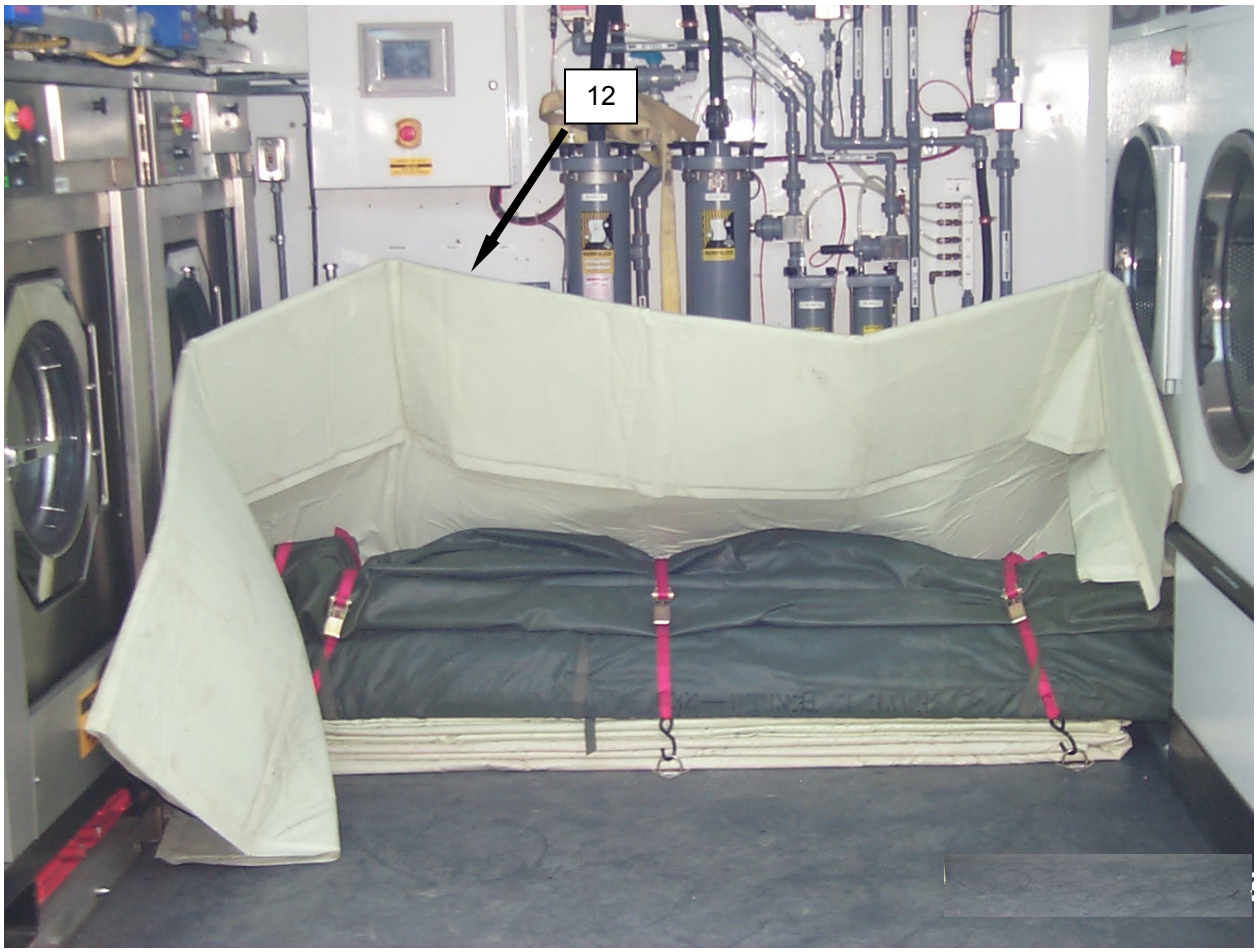


Figure 10. Placing the Vestibule Floor Linings.

CBL MINIMUM PACKOUT-CONTINUED

16. Place the 100 A cables **(Figure 11, Item 13)** atop the packed TEMPER frame sections.

17. Place the 60 A **(Figure 11, Item 14)** cables on top of the 100 A cables **(Figure 11, Item 13)**. If possible, try to coil the 60 A cable within the 100 A cables. Place pigtails in the center of the coiled 100 A and 6 0A cables.



Figure 11. Placing the Cable.

CBL MINIMUM PACKOUT-CONTINUED

18. Place the folded window section liner **(Figure 12, Item 15)** as shown to provide protection to the washers.



Figure 12. Folded Window Section Liner.

19. Place TEMPER light case **(Figure 13, Item 16)** on top of power cables **(Figure 13, Item 14)**, and retain in place with three remaining 1-inch straps **(Figure 14, Item 17)**. When placing straps, run them through the case handle as shown to secure the case in place.

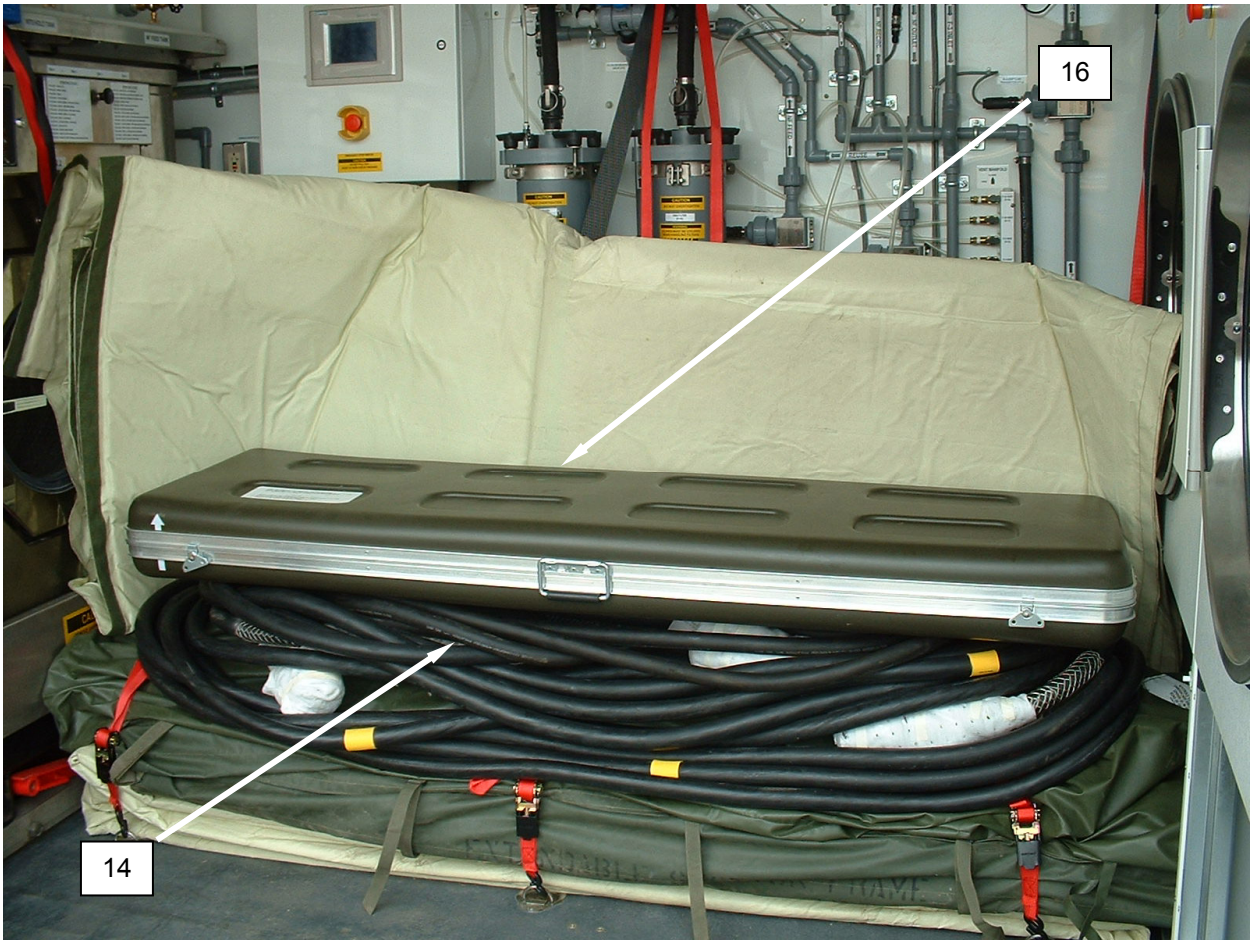


Figure 13. TEMPER light case on top of power cables.

CBL MINIMUM PACKOUT-CONTINUED



Figure 14. CBL Minimum Packout.

CBL MINIMUM PACKOUT-CONTINUED

20. Place half the outer TEMPER fabric components **(Figure 15, Item 18)** on top of light case **(Figure 15, Item 16)**. Ensure the fabric sections fold down against the dryer door.

21. Place ramps **(Figure 15, Item 19)** on top of outer fabric components **(Figure 15, Item 18)**.

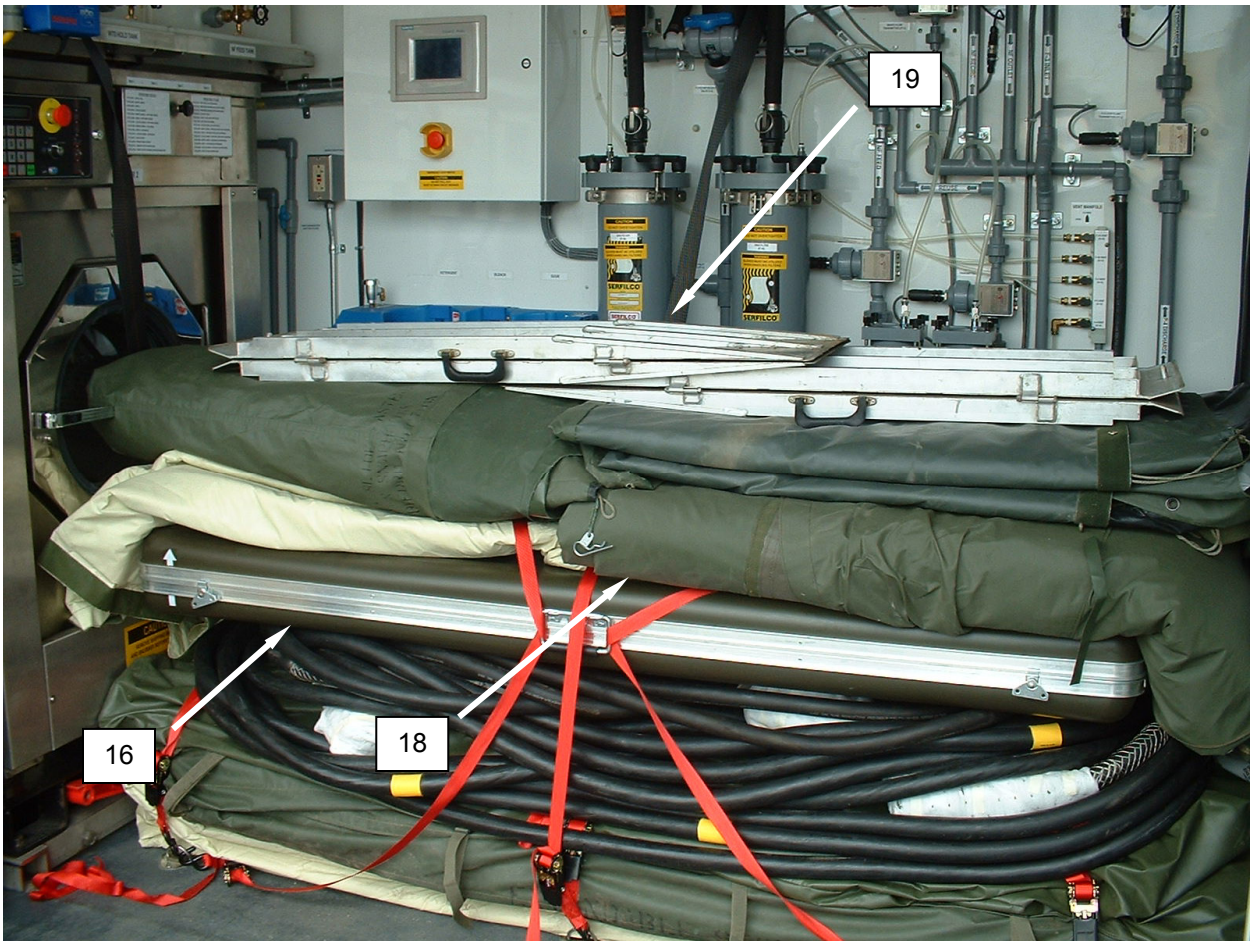


Figure 15. Placing the Ramps for Minimum Packout.

CBL MINIMUM PACKOUT-CONTINUED

22. Place remaining outer TEMPER fabric sections **(Figure 16, Item 18)** on top of ramps.



Figure 16. Outer TEMPER Fabric Sections on Top of Ramps.

CBL MINIMUM PACKOUT-CONTINUED

23. Place Dryer No. 1 lint compartment door **(Figure 17, Item 2)** on top of outer TEMPER fabric **(Figure 17, Item 18)**.

24. Place the inner liner fabric sections **(Figure 17, Item 20)** on top of dryer lint compartment door **(Figure 17, Item 2)**.



Figure 17. Placing the Inner Liner Fabric Sections.

CBL MINIMUM PACKOUT-CONTINUED

25. Place boxed water bag heaters **(Figure 18, Item 21)** on either side of lint screen support.

26. Place fuel can **(Figure 18, Item 22)** on its side in the center of the lint compartment, and as far back as it will go.

27. Place filter elements **(Figure 18, Item 23)** in front of fuel can.

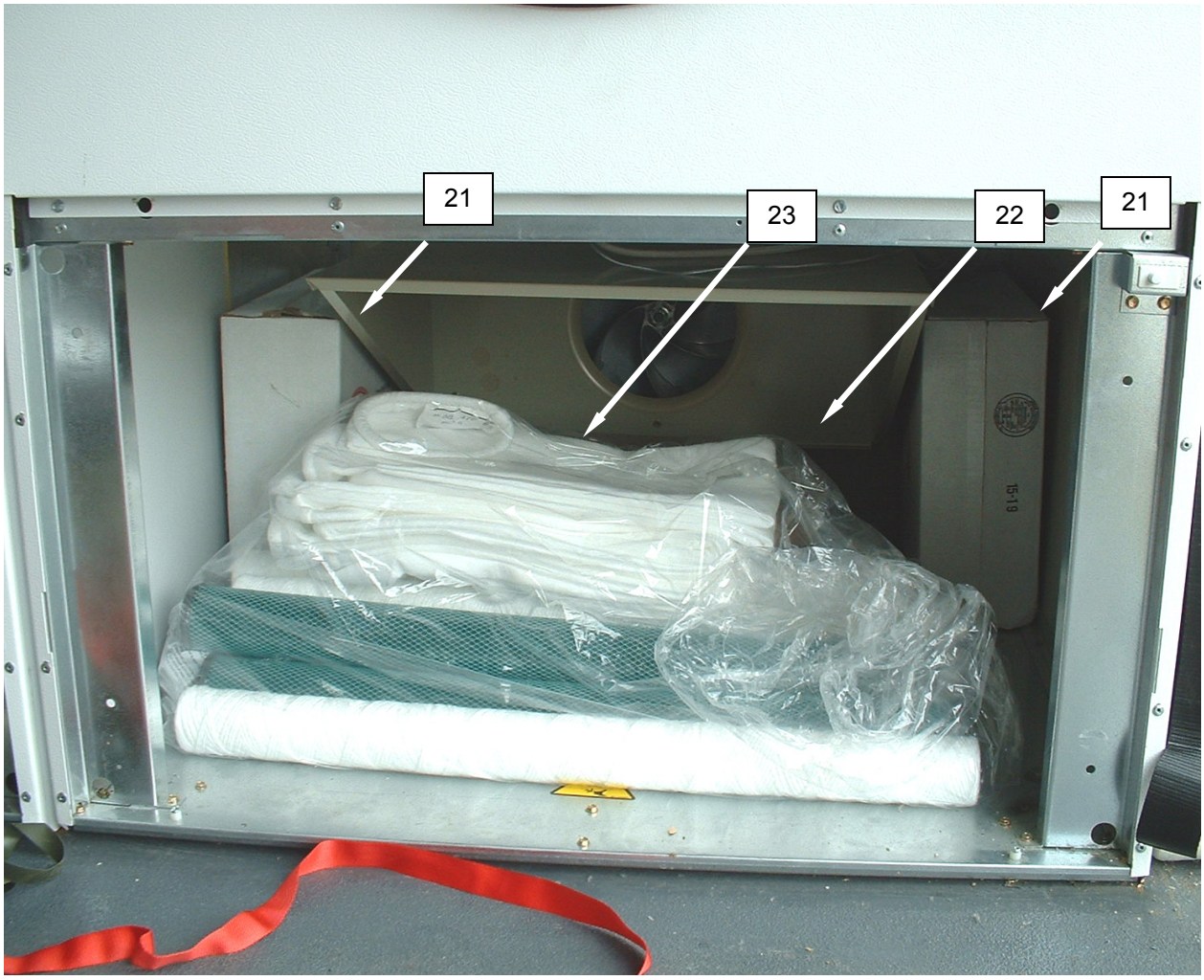


Figure 18. Place Pond Heaters, Fuel Can, and Filter Elements in Lint Compartment.

CBL MINIMUM PACKOUT-CONTINUED

28. Place the water tank floats **(Figure 19, Item 24)** on top of the lint screen support.

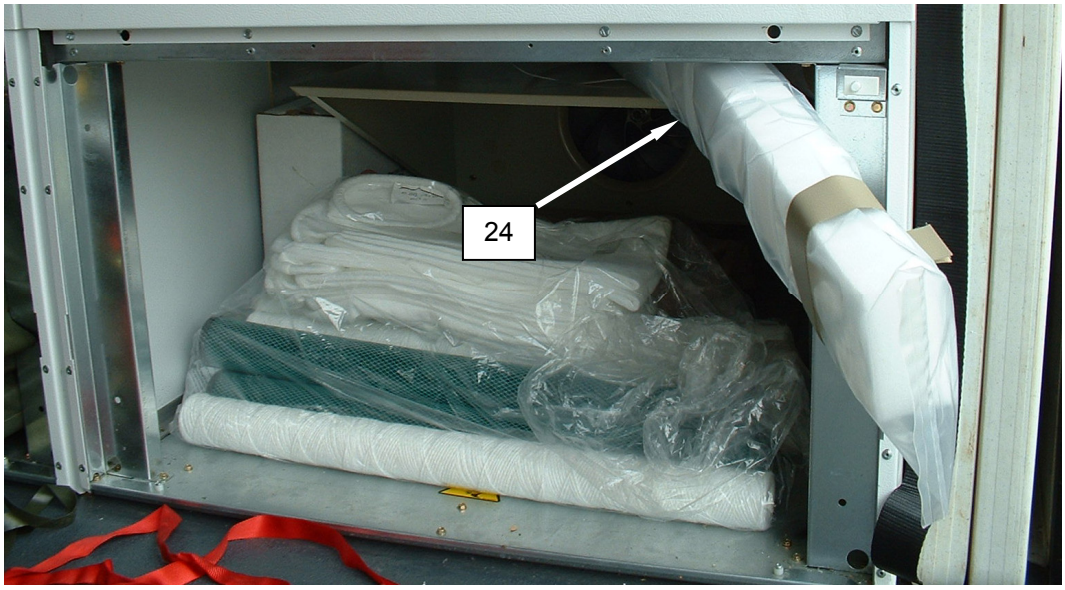


Figure 19. Water Tank Floats on Top of Lint Screen.

29. Place fuel hoses **(Figure 20, Item 25)** on top of fuel can.

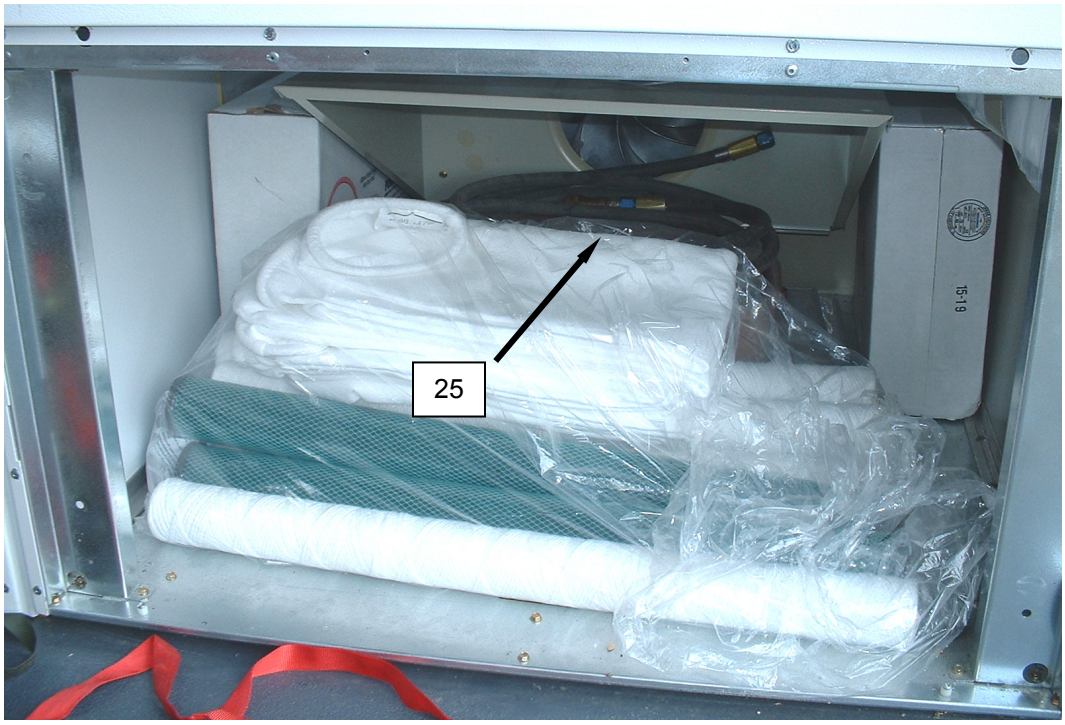


Figure 20. Fuel Hoses on Top of Fuel Can.

CBL MINIMUM PACKOUT-CONTINUED

30. Place the fuel can adapter **(Figure 21, Item 26)** in the space between the filters and the dryer cabinet.



Figure 21. Fuel Can Adapter between Filters and the Dryer Cabinet.

31. Place dustpan **(Figure 22, Item 27)** in the space between the filters and the dryer cabinet.



Figure 22. Dustpan between the Filters and the Dryer Cabinet.

CBL MINIMUM PACKOUT-CONTINUED

32. Install lint compartment door **(Figure 23, Item 2)** on dryer #2.

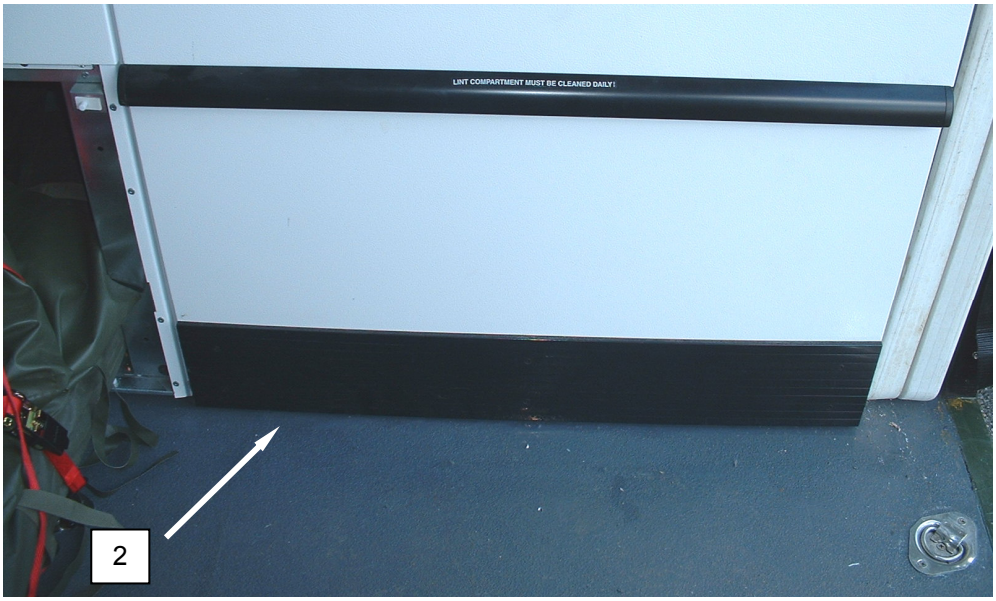


Figure 23. Install Lint Compartment Door on Dryer #2.

33. Place the folded TEMPER plenum **(Figure 24, Item 28)** inside dryer No. 2. Stow unused TEMPER travel covers inside drum of dryer #2.



Figure 24. Folded TEMPER Plenum inside Dryer No. 2.

CBL MINIMUM PACKOUT-CONTINUED

NOTE

Do not pack the trash can unless it has been packed with CBL components IAW WP 0015 00.

34. Invert packed trash can **(Figure 25, Item 29)** in center of floor behind front D-ring.



Figure 25. Packed Trash Can.

CBL MINIMUM PACKOUT-CONTINUED

35. Place TEMPER tent pin bag on floor in front of inverted trash can.

36. Invert and place both laundry bins **(Figure 26, Item 30)** over the inverted trash can. The TEMPER tent pin bag will be under the laundry bins.



Figure 26. Both Inverted Laundry Bins over Inverted Trash Can.

CBL MINIMUM PACKOUT-CONTINUED

37. Coil and place one heat trace hose **(Figure 27, Item 31)** on floor to right of laundry bins.



Figure 27. Heat Trace Hose on Floor.

CBL MINIMUM PACKOUT-CONTINUED

38. Place grounding rods **(Figure 28, Item 32)** on floor to left of laundry bins.

39. Coil and place second heat trace hose **(Figure 28, Item 31)** and the waste tank drain hose on floor to left of laundry bins.



Figure 28. Placing the Hoses.

CBL MINIMUM PACKOUT-CONTINUED

40. Place one set of water tank insulation (for one tank) **(Figure 29, Item 33)** over heat trace hose on right side of laundry bins.



Figure 29. Place One Set of Water Tank Insulation.

CBL MINIMUM PACKOUT-CONTINUED

41. Place second set of water tank insulation **(Figure 30, Item 33)** over heat trace hose on left side of laundry bins.



Figure 30. Place Second Set of Water Tank Insulation.

CBL MINIMUM PACKOUT-CONTINUED

42. Place TEMPER distribution box stand and broom in space between washer #1 and container wall.

43. Retrieve 3-inch straps **(Figure 31, Item 7)** installed at beginning of packout procedure.

44. Cross the left and right straps over the center of the inverted laundry bins and secure to left and right D-rings just inside container door.

45. Secure center strap over the laundry bins and secure to center D-ring just inside container door.



Figure 31. Secure Center Strap.

CBL MINIMUM PACKOUT-CONTINUED

46. Place the ASH ducts in the space behind dryer No. 2.

47. Place the keys and TM's in the bins **(Figure 32, Item 34)** fitted to the personnel door.

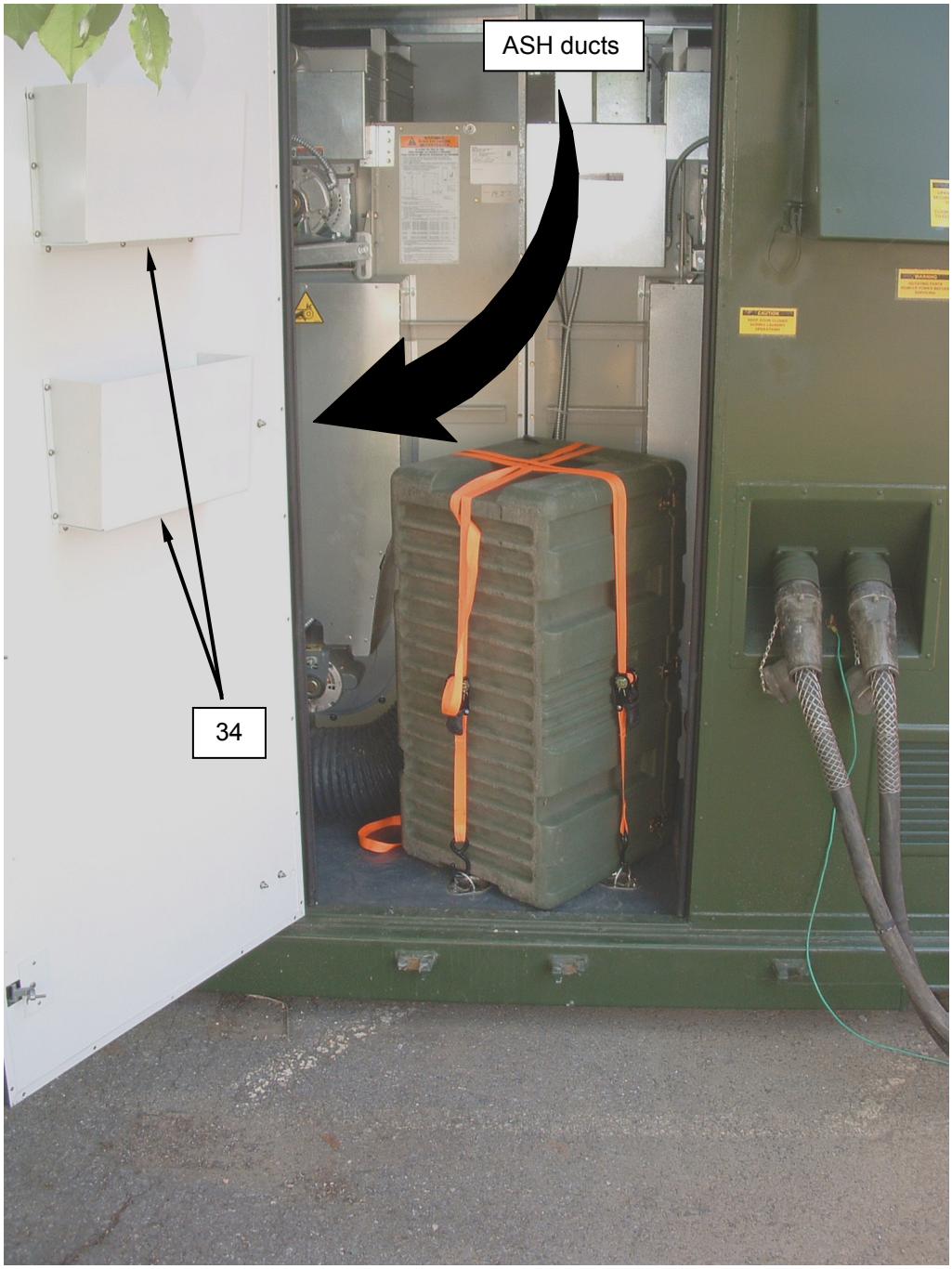


Figure 32. Placing the ASH Ducts and Technical Manuals.

CBL MINIMUM PACKOUT-CONTINUED

48. Recheck all packed components for security, and ensure rainhoods and personnel doors are closed and secured.

49. Close and latch all container doors.

The remaining inventoried components are stored and shipped with organic unit transportation.



Figure 33. Close and Latch the CBL Container.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER UNUSUAL CONDITIONS - MANUAL OPERATION OF CBL SYSTEMS

MANUAL OPERATION OF CBL SYSTEMS

General

Refer to WP 0008 00 entitled “Operation Under Usual Conditions – Operating Instructions”, for specific operating procedures under everyday conditions, and use this Work Package for supplemental information for operating the CBL in the event of the failure of the Programmable Logic Control.

The Programmable Logic Control (PLC) is designed to directly control and monitor all CBL systems with the exception of the washers and dryers. In the event of a failure or damage to the PLC, manual controls have been included to allow the CBL to continue to operate.

Two scenarios may be enacted in the event of a PLC failure:

1. The CBL may be operated without any reuse of water. This is the preferred mode of manual operation, allowing ease of operation and limited chance for contamination.

2. The CBL may be operated with minimal reuse of water. This mode bypasses the filtration system and sends reuse water directly to the reuse tank. This method should be used only if water usage is critical. It does not provide any filtration.

PLC Emergency Bypass Switches

CAUTION

Do not operate the PLC Emergency Bypass switches unless an actual malfunction has been confirmed by unit maintenance personnel. Improper use of the emergency bypass switches may result in damage to CBL systems equipment.

NOTE

No water reuse or filtration functions are available if the PLC is inoperative. Water use must be taken into consideration when using a CBL with an inoperative PLC.

NOTE

Ensure switches are reset after repairs have been made.

1. In the event of a PLC malfunction, open the PLC control panel **(Figure 1, Item 1)**.

MANUAL OPERATION OF CBL SYSTEMS-CONTINUED

NOTE

The P-1 pump **(Figure 2, Item 2)**, the boiler **(Figure 2, Item 3)**, the exhaust fans **(Figure 2, Item 4)**, the interior lights **(Figure 2, Item 5)**, and the blackout lights **(Figure 2, Item 6)** can be manually operated. A 5 A circuit breaker **(Figure 2, Item 7)** protects the system.

2. Operate the CBL lighting by switching the interior lights switch **(Figure 2, Item 5)** to ON.
3. If necessary, operate the exhaust fans by switching the exhaust fans switch **(Figure 2, Item 4)** to ON.
4. Turn the P-1 pump **(Figure 2, Item 2)** on.
5. Turn boiler **(Figure 2, Item 3)** on.
6. Close PLC control panel **(Figure 1, Item 1)**.



Figure 1. PLC Control Panel.

MANUAL OPERATION OF CBL SYSTEMS-CONTINUED

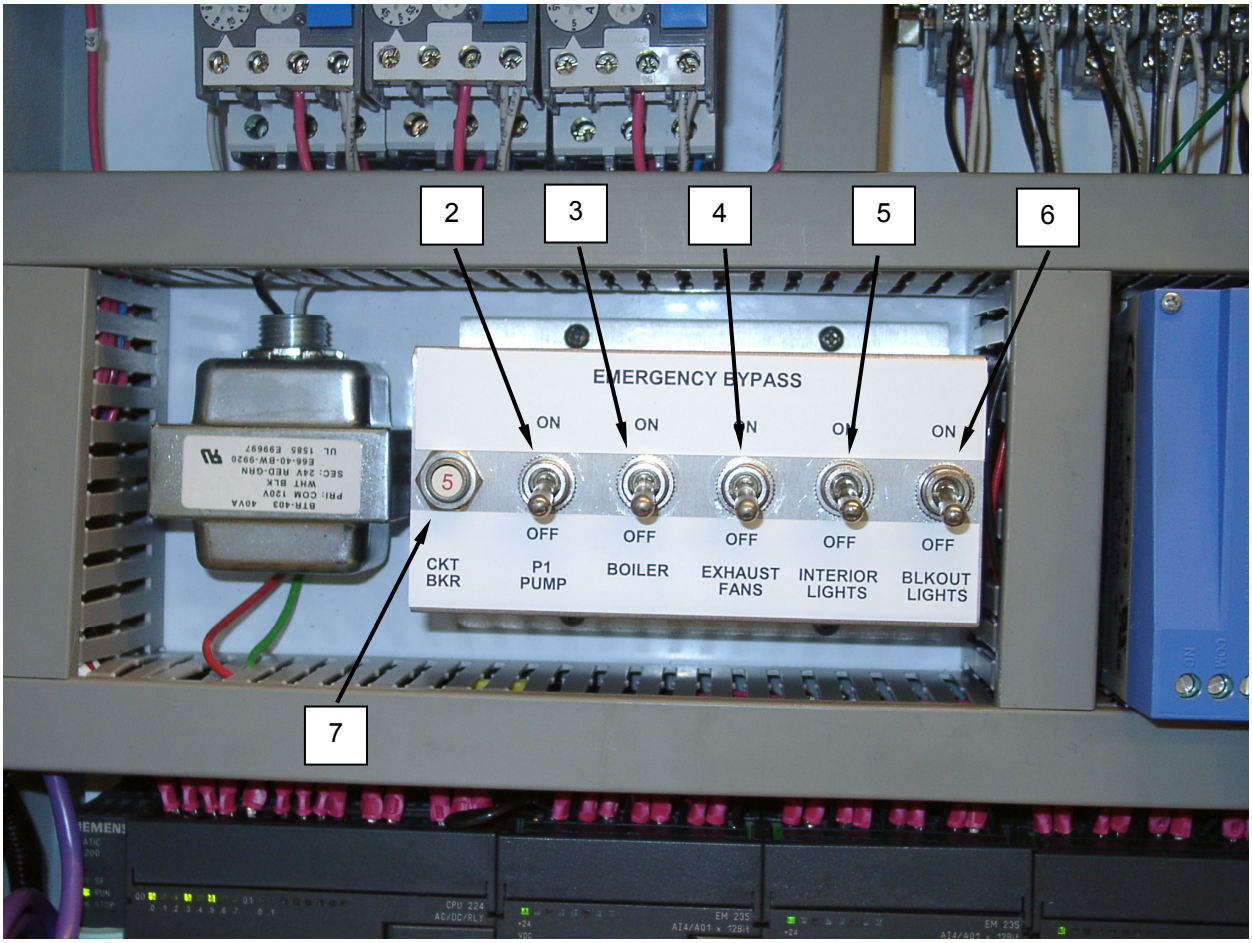


Figure 2. PLC Emergency Bypass Switches.

MANUAL OPERATION OF CBL SYSTEMS-CONTINUED

Valve Setup

1. Before system start-up, the assembly procedures outlined in WP 0006 00 and WP 0007 00 must be completed. Power must be supplied to the CBL, a source water fabric bag must be connected, and a graywater fabric bag must be connected.

2. Locate the water reuse selection valves V-15 **(Figure 3, Item 8)** and V-16 **(Figure 3, Item 9)** located behind the washers.

3. For no water reuse, set the valves as shown in Figure 4.

4. For minimum water reuse, set the valves as shown in Figure 5.

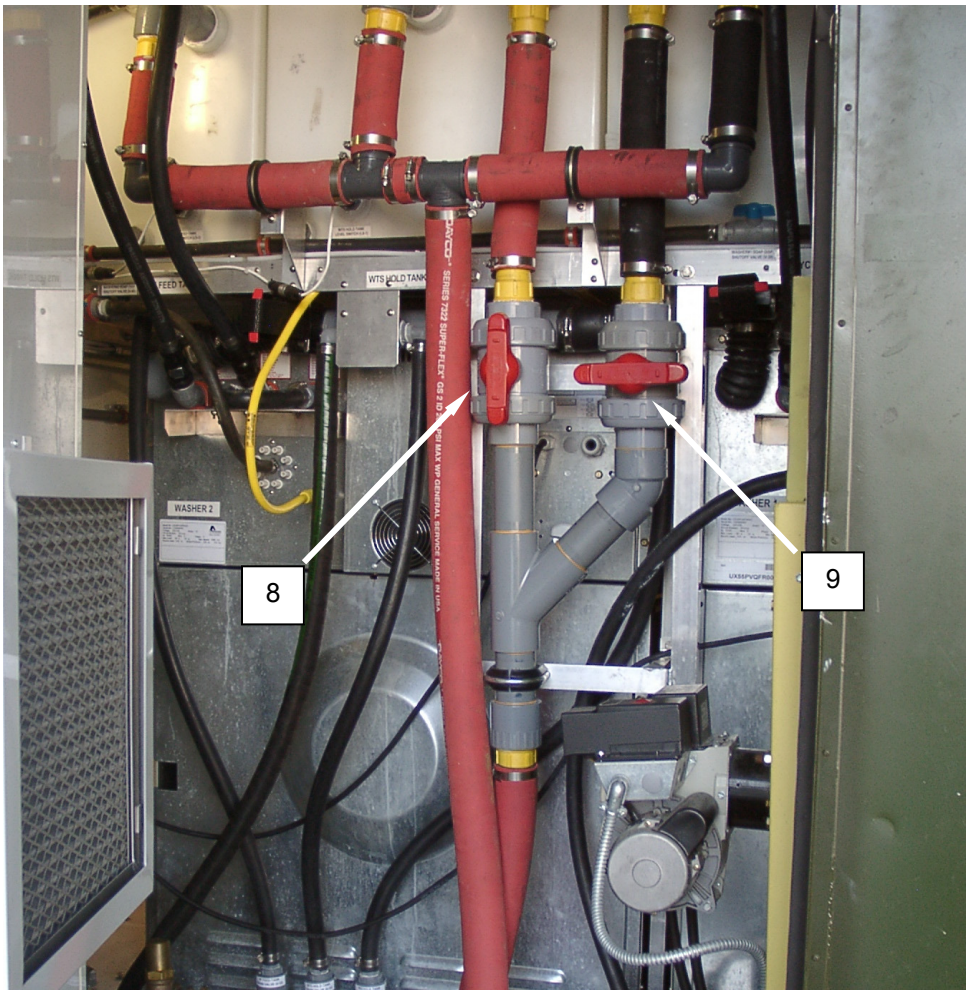


Figure 3. Valves V-15 and V-16.

MANUAL OPERATION OF CBL SYSTEMS-CONTINUED

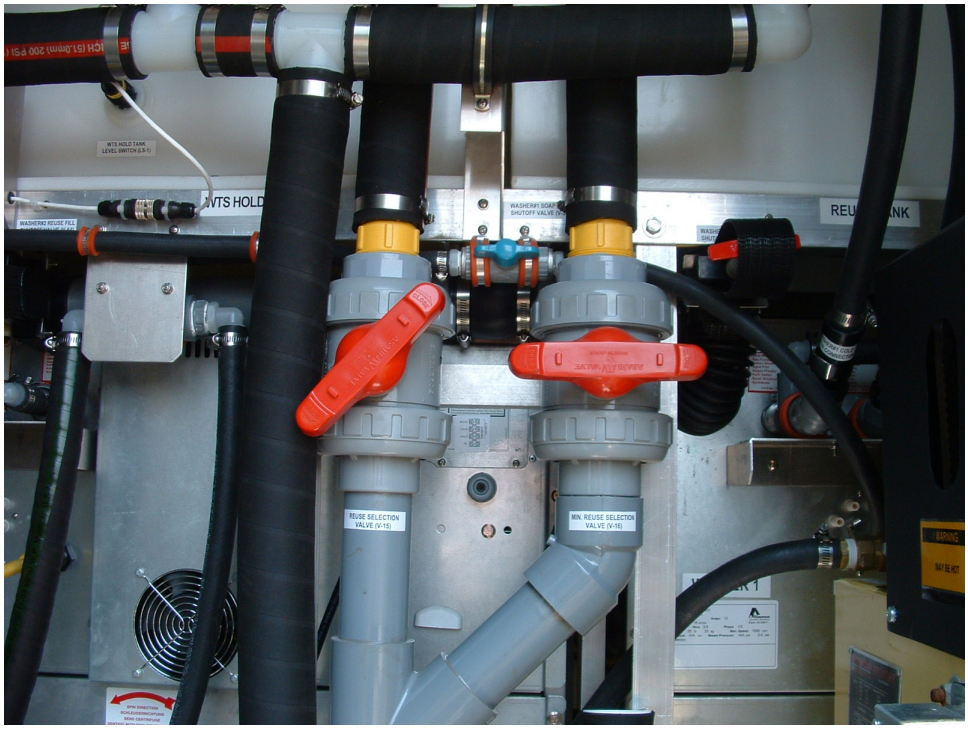


Figure 4. Valve Setting for Full Water Reuse or No Water Reuse.

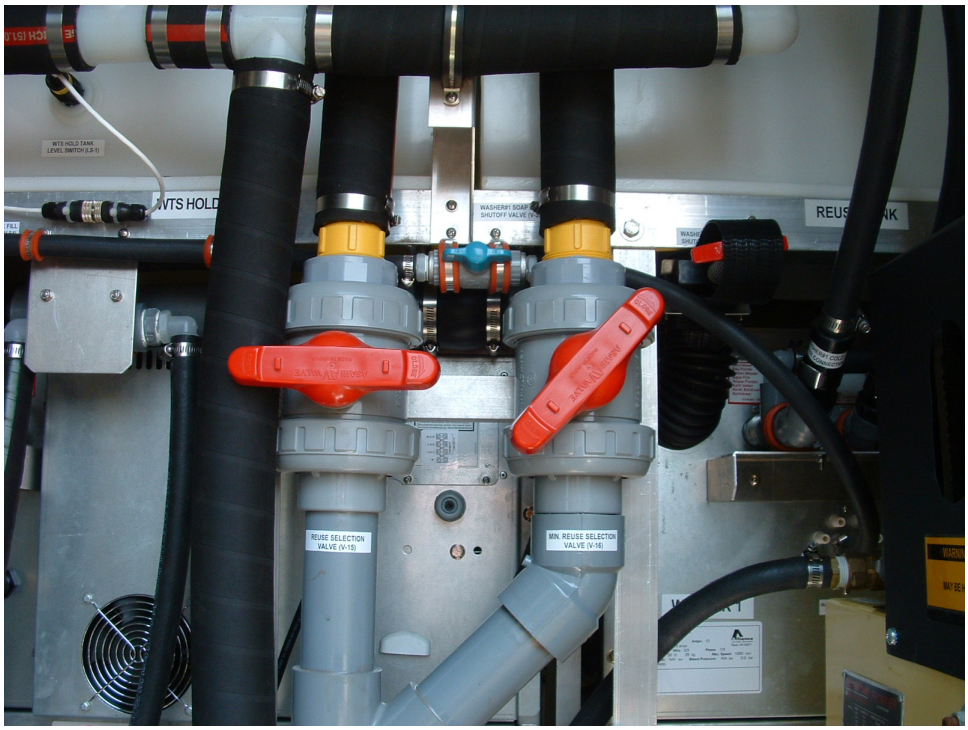


Figure 5. Valve Setting for Minimum Water Reuse.

MANUAL OPERATION OF CBL SYSTEMS-CONTINUED

NOTE

If system has been operational and there is water in the system, bypass steps 5 through 14 and proceed to section entitled OPERATE BOILER.

5. Close the tank drain valves **(Figure 6, Item 10)**.

6. Close the pump drain valves **(Figure 7, Item 4) (Figure 8, Item 11)**.

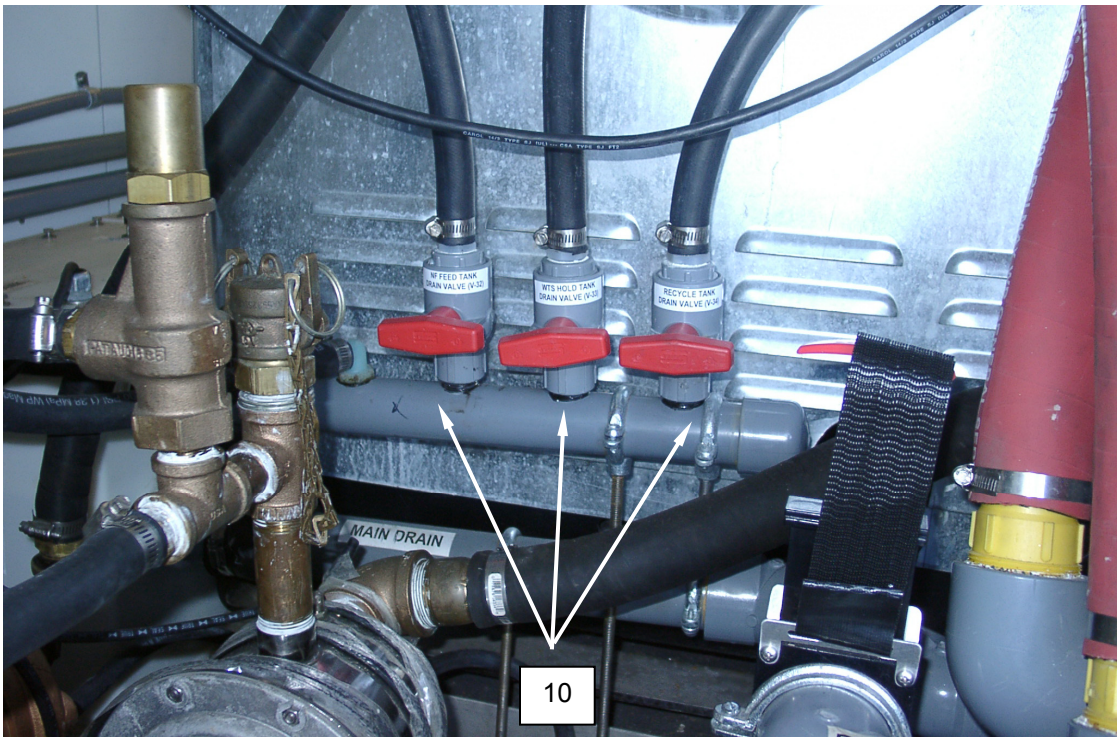


Figure 6. Tank Drain Valves.

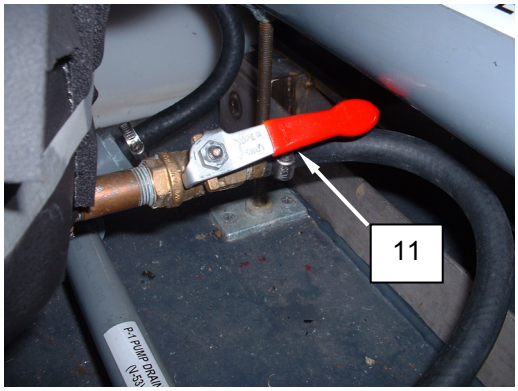


Figure 7. P-1 Pump Drain Valve.

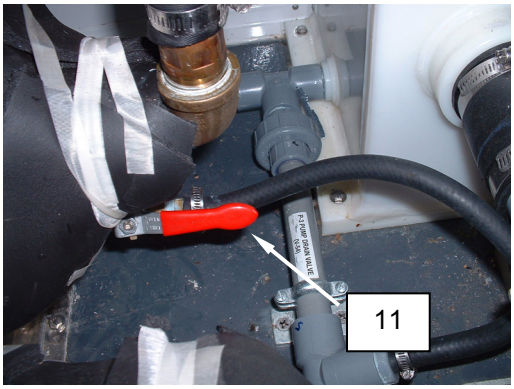


Figure 8. P-3 Pump Drain Valve.

MANUAL OPERATION OF CBL SYSTEMS-CONTINUED

7. Close the drain tank drain valve **(Figure 9, Item 12)**.

8. Close the boiler drain valve **(Figure 9, Item 13)**.

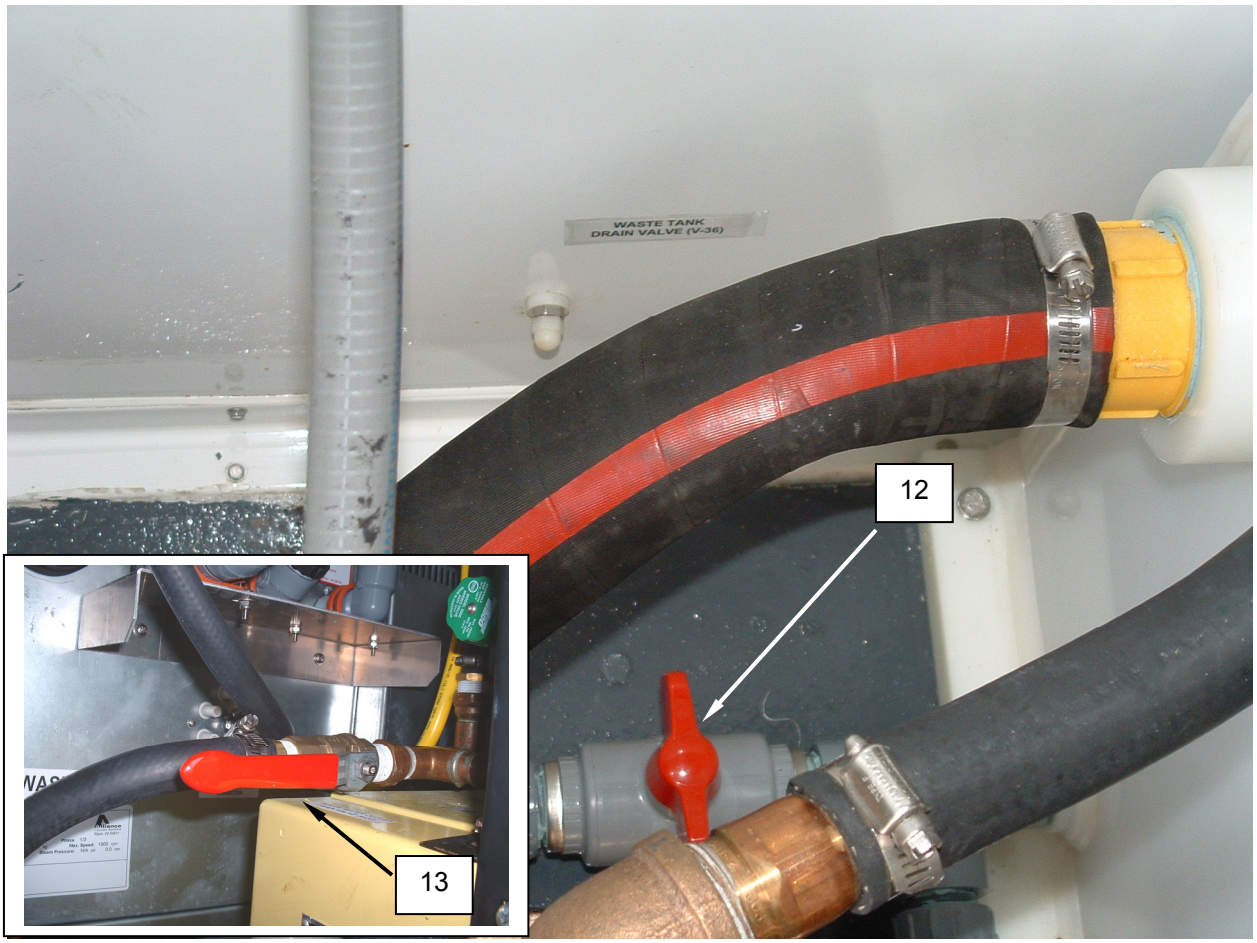


Figure 9. Close the Drain Tank Drain Valve.

MANUAL OPERATION OF CBL SYSTEMS-CONTINUED

9. Open the hot **(Figure 10, Item 14), (Figure 11, Item 14)** and cold **(Figure 10, Item 15), (Figure 11, Item 15)** water supply valves to both washers.

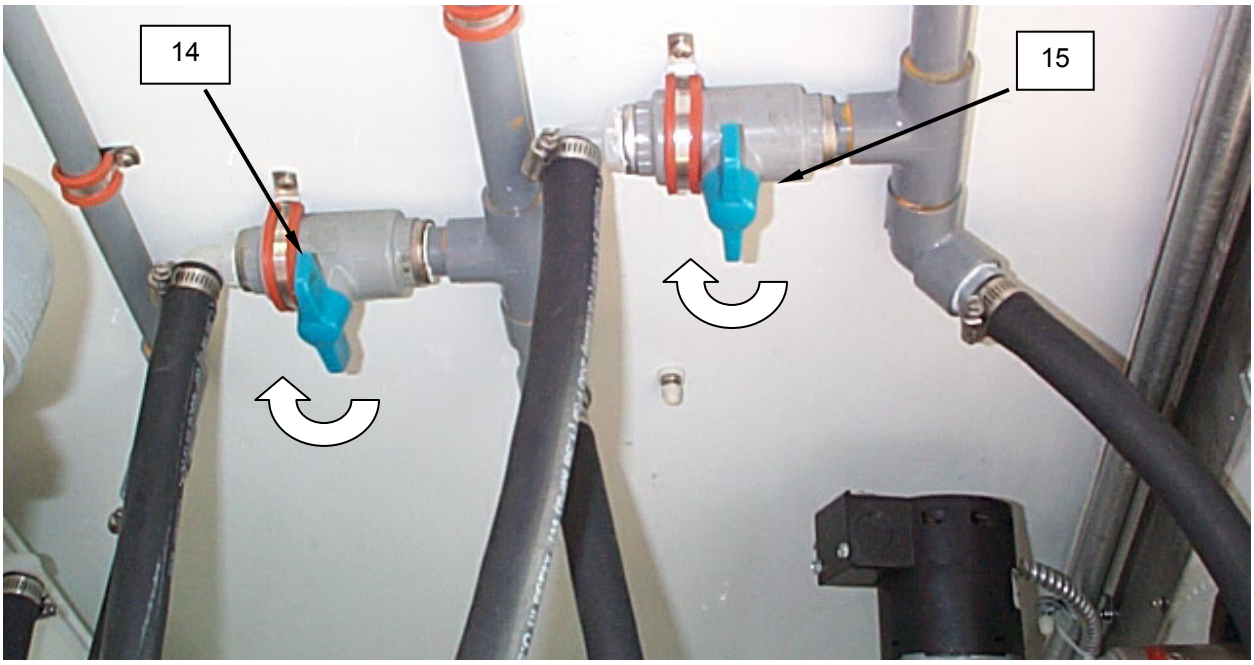


Figure 10. Hot and Cold Water Supply Valves for Washer No. 1.

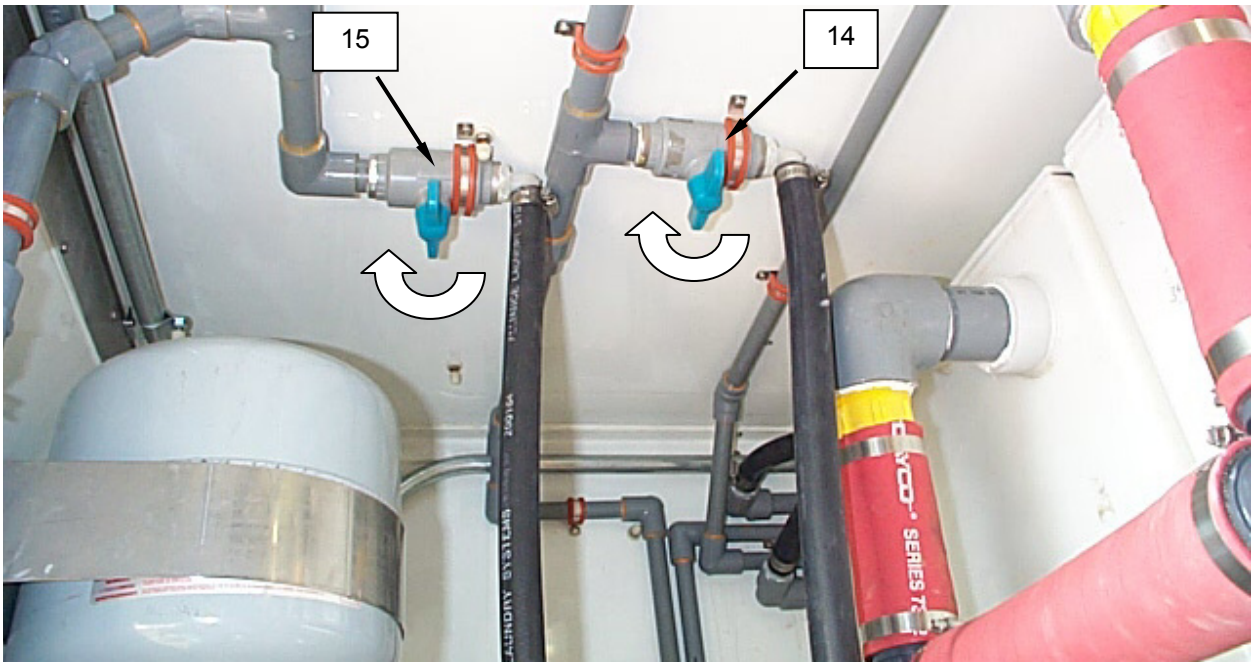


Figure 11. Hot and Cold Water Supply Valves for Washer No. 2.

MANUAL OPERATION OF CBL SYSTEMS-CONTINUED

10. Locate the drain valve manifolds **(Figure 12, Item 16)** inside the container.
11. Ensure the drain valves on both manifolds **(Figure 12, Item 16)** are all closed.
12. Ensure the Automatic Soap Dispenser Drain valve **(Figure 12, Item 17)** is open.



Figure 12. Location of Drain Manifolds.

MANUAL OPERATION OF CBL SYSTEMS-CONTINUED

13. Close the WTS transfer tank drain valve **(Figure 13, Item 18)**.

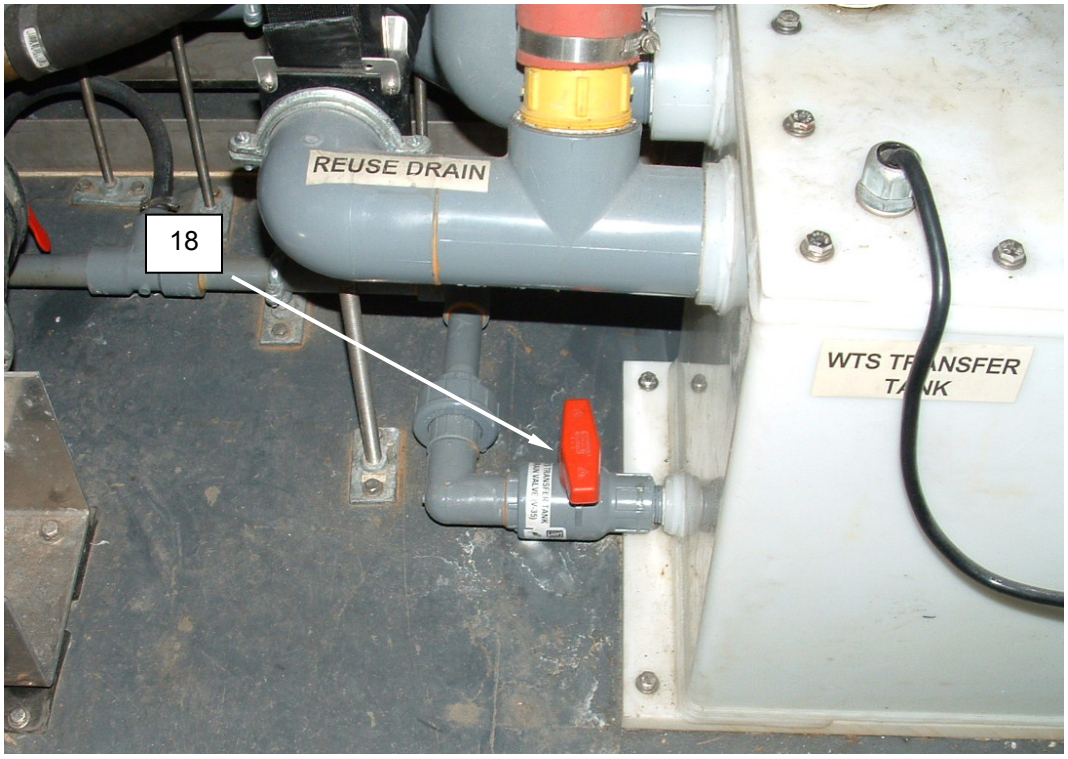


Figure 13. WTS Transfer Tank Drain Valve.

14. Open the boiler water inlet drain valve V-38 **(Figure 14, Item 19)**.

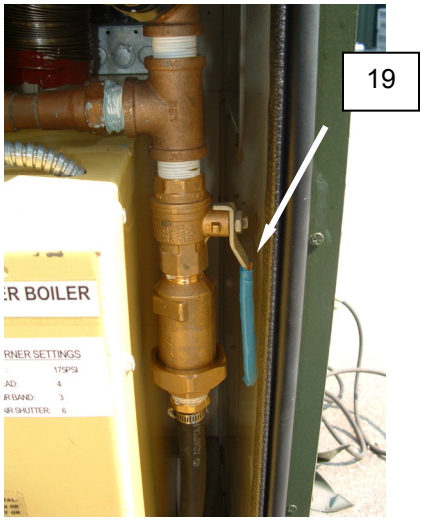


Figure 14. Boiler Water Inlet Drain Valve (V-38).

MANUAL OPERATION OF CBL SYSTEMS-CONTINUED

15. Close all valves on the nanofilter drain valve manifold **(Figure 15, Item 20)**.

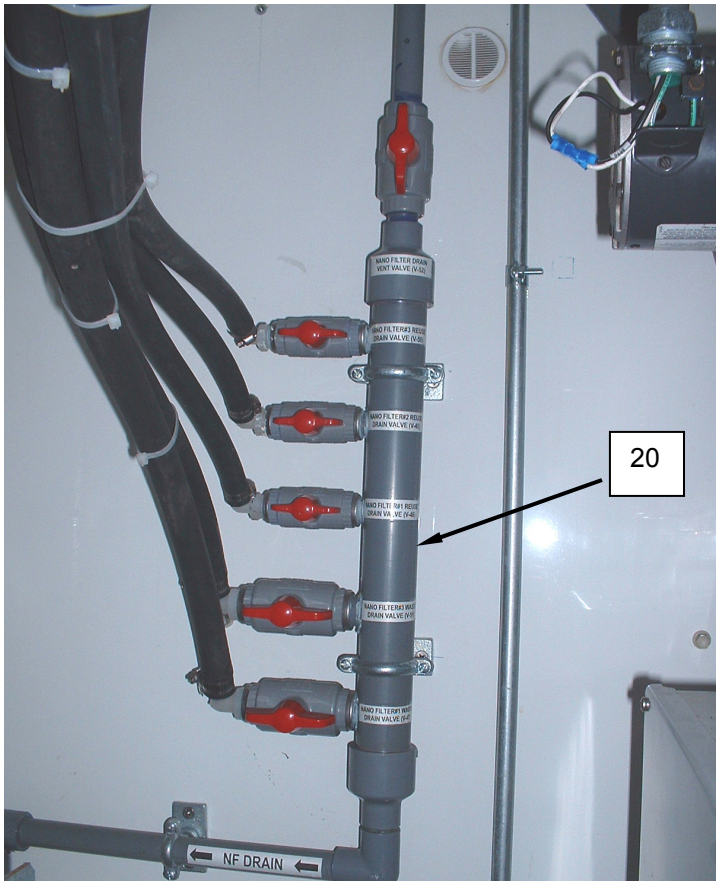


Figure 15. Nanofilter Drain Valve Manifold.

MANUAL OPERATION OF CBL SYSTEMS-CONTINUED

Prime the P-1 Pump



WARNING

If a municipal water supply is used, do not prime the P-1 pump. Attempts to prime the pump under these circumstances will result in a discharge of water to the CBL interior. Injury or death by electrocution may result from water contact with electrical components.

NOTE

If system has been operational and there is water in the system, prime the P-1 Pump section and operate the boiler. See WP 0008 00 to operate the boiler.

1. Ensure the water supply is set up as described in WP 0007 00. Ensure the pump is not operating.
2. Remove the QD cap **(Figure 16, Item 21)** from the priming standpipe **(Figure 16, Item 22)**.
3. Pour approximately 1/2 gallon of supply water into the open standpipe **(Figure 16, Item 22)**.
4. Install the QD cap **(Figure 16, Item 21)** into the standpipe **(Figure 16, Item 22)**, and lock in place.
5. Monitor pump operation. If pump continues to run for more than five minutes, repeat steps 2-4.

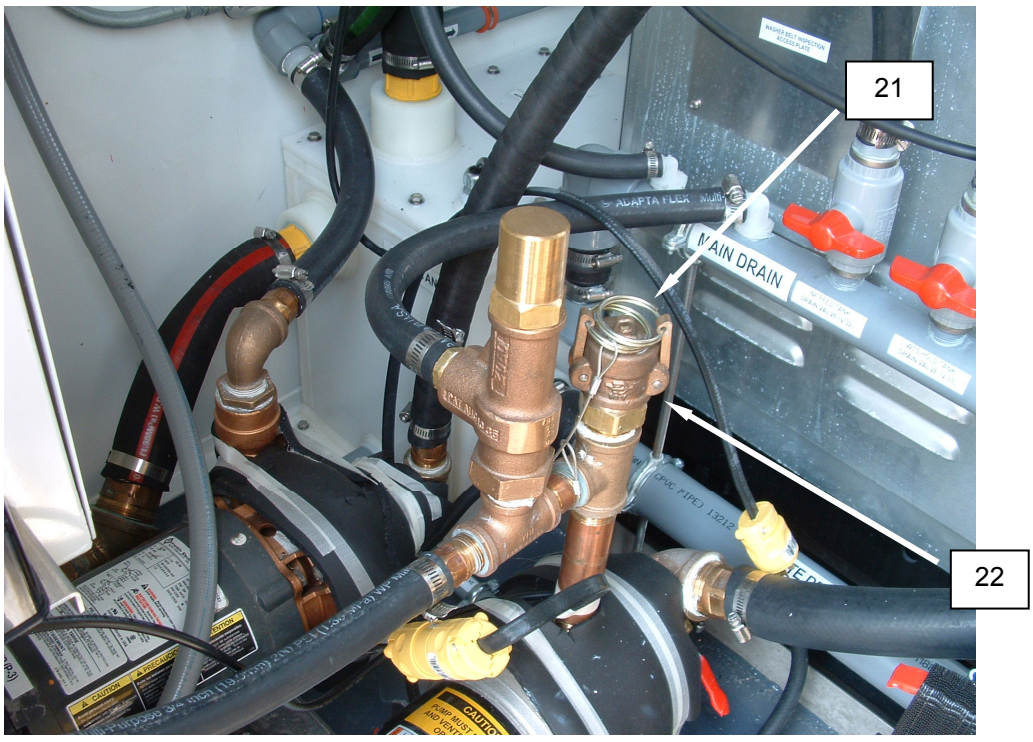


Figure 16. P-1 Pump Priming Standpipe.

INITIAL FILL CYCLE FOR WATER TREATMENT SYSTEM

No initial fill is required for manual operation of the system.

OPERATE BOILER

Operate the boiler IAW instructions given in WP 0008 00.

OPERATE WASHER



WARNING

Use caution when operating the washers. The washers are equipped with a suspension to dampen vibration, and the washer drum may be observed to move in the washer cabinet. Injury to personnel may occur if fingers are slipped between the washer drum and the washer cabinet.

NOTE

Use the emergency stop only if the washer needs to be stopped immediately; that is, in the event of an equipment malfunction, leak, or any situation that might endanger personnel or equipment. The emergency stop shuts down all power to the washer and drains the washer to the waste tank. Do not use the emergency stop for routine shutdown.

1. Ensure that the emergency stop switch **(Figure 17, Item 23)** on the washer control panel has been turned out and is in the operational position.

2. Press the release button **(Figure 17, Item 24)** on the latch **(Figure 17, Item 25)** and open the washer door **(Figure 17, Item 26)**. The washer may be filled with up to 50 pounds of laundry – for example, this would come to 18 complete sets of BDU's (blouse and trousers).

3. Close the washer door **(Figure 17, Item 26)**. Ensure the door has latched securely.

4. The front panel display **(Figure 17, Item 27)** on the washer should be lit. This display will be on at all times that power is ON indicating the machine is ready for loading and unloading.

5. Refer to Table 1 to determine the cycle number for the clothes being laundered. Enter the desired cycle number by pressing (do not punch) with your finger the numbers on the keyboard **(Figure 17, Item 28)** and note that this number is displayed.

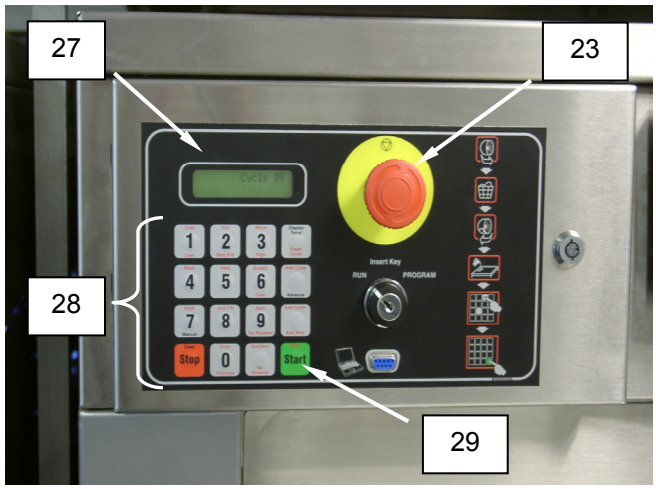
NOTE

When keys are pressed on the keyboard, a beep will be heard. If an error is made, simply press the numbers again. As numbers are entered, they move from right to left on the display.

6. To start the cycle that has been selected, press the "START" key **(Figure 17, Item 29)**. As the cycle proceeds, the display **(Figure 17, Item 27)** will show the function being executed, step number and the cycle number selected.

INITIAL FILL CYCLE FOR WATER TREATMENT SYSTEM-CONTINUED

7. The front panel display **(Figure 17, Item 27)** will indicate when the cycle is complete. At that time, the washer may be unloaded by pressing the release button **(Figure 17, Item 24)** on the latch **(Figure 17, Item 25)** and using the latch to open the washer door **(Figure 17, Item 26)**. The washer door will not open while the washer is in an operating cycle.



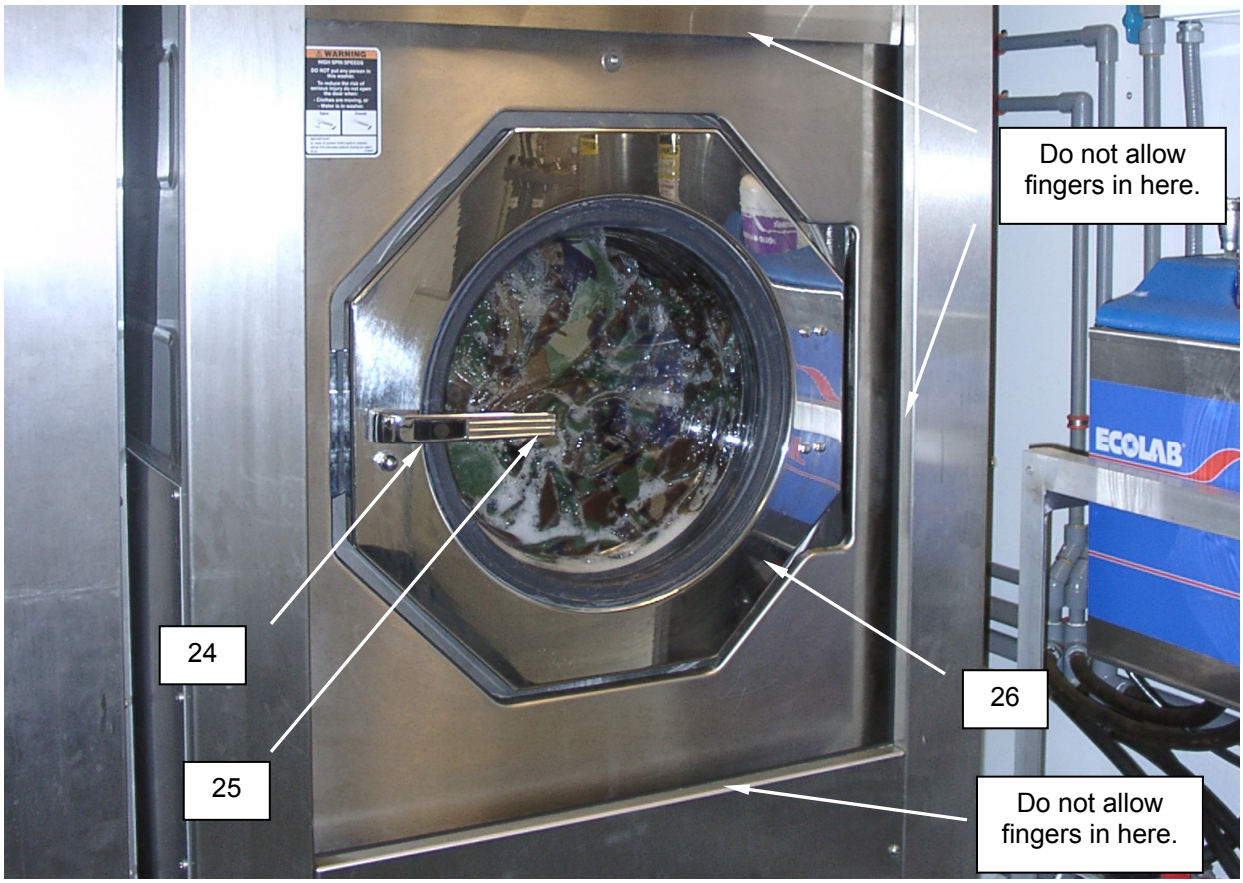


Figure 17. Operate Washer.

INITIAL FILL CYCLE FOR WATER TREATMENT SYSTEM-CONTINUED

Pre-Programmed Wash Cycles and Laundry Additives

Table 1 lists the washer operating cycles that are pre-programmed into the washer control panel. This table replaces any pre-programmed cycles that may be listed in the commercial washer technical manual.

NOTE

Cycles 1 – 4, 11, 31, 32, and 52 – 54 cannot be used without full water reuse.

Some cycles such as Cycle #5 list the phrase “WITH MIN REUSE”. These cycles are used when valves V-15 and V-16 at the rear of the washers have been set to send washer reuse water directly into the reuse tank, bypassing the water filtration system as shown in Figure 5.

Some cycles, such as Cycle #8, list the phrase “NO REUSE”. Only if the water reuse system fails to work properly, should wash cycles be used which do not use the water reuse system (wash cycles 08, 09, and 10).

Cycle 36 provided an additional extract cycle in the event one is desired. This allows the washer to spin out excess moisture without having to go through an additional wash cycle.

Additional cycles have been provided in the event the Automatic Soap Dispenser is inoperable.

Table 2 lists the laundry additives for a given washer cycle. The first column of the table lists the items to be laundered while column 2 shows the cycles appropriate for those items. The columns labeled S1 through S4 indicate the supply trays of the washer. The type and quantity of additive are listed in these columns. For example, if it was desired to launder BDU’s using washer operating Cycle 53, supply tray S4 would be filled with 2.0 oz. of detergent and supply tray S2 filled with 0.3 oz. of sour. Similarly, if it was desired to launder white linens using Cycle 52, supply tray S4 would be filled with 2.0 oz. of detergent, supply tray S2 would be filled with 0.3 oz. of sour, supply tray S3 would be filled with 0.3 oz. of bleach, and supply tray S1 filled with 9 oz. of Sodium Bisulphite.

INITIAL FILL CYCLE FOR WATER TREATMENT SYSTEM-CONTINUED

Table 1. Washer Operating Cycles.

CYCLE #01 – INITIAL FILL CYCLE – not available
CYCLE #02 – WHITE LINENS – not available
CYCLE #03 – BDU'S – not available
CYCLE #04 – COLOR LINENS– not available
CYCLE #05 – WHITE LINENS – WITH MIN REUSE
CYCLE #06 – BDU'S – WITH MIN REUSE
CYCLE #07 – COLOR LINENS – WITH MIN REUSE
CYCLE #08 – WHITE LINENS – NO REUSE
CYCLE #09 – BDU'S – NO REUSE
CYCLE #10 – COLOR LINENS – NO REUSE
CYCLE #11 – BAG FILTER – not required
CYCLE #30 – REUSE TANK TOPOFF
CYCLE #31 – NANOFILTER FLUSH/CLEAN– not available
CYCLE #32 – NANOFILTER STORAGE (SODIUM BISULFITE)– not available
CYCLE #33 – WINTERIZE SOAP DISPENSER
CYCLE #34 – WINTERIZE WASHER (COLD WATER LINES)
CYCLE #35 – WINTERIZE WASHER (HOT WATER LINES)
CYCLE #36 – EXTRACT ONLY
CYCLE #52 – WHITE LINENS (NO DISPENSER)– not available
CYCLE #53 – BDU'S (NO DISPENSER)– not available
CYCLE #54 – COLOR LINENS (NO DISPENSER)– not available
CYCLE #55 – WHITE LINENS – WITH MIN REUSE (NO DISPENSER)
CYCLE #56 – BDU'S – WITH MIN REUSE (NO DISPENSER)
CYCLE #57 – COLOR LINENS – WITH MIN REUSE (NO DISPENSER)
CYCLE #58 – WHITE LINENS – NO REUSE (NO DISPENSER)
CYCLE #59 – BDU'S – NO REUSE (NO DISPENSER)
CYCLE #60 – COLOR LINENS – NO REUSE (NO DISPENSER)
CYCLE #61 – BAG FILTER (NO DISPENSER)
CYCLE #70 - NANOFILTER CLEANING

Table 2. Laundry Additives.

	CYCLE	Tray 1	Tray 2	Tray 3	Tray 4
White Linens	52, 55, 58	SODIUM BISULFITE 9.0 oz	SOUR 0.3 oz	BLEACH 0.3 oz	DETERGENT 2.0 oz
BDU's	53, 56, 59		SOUR 0.3 oz		DETERGENT 2.0 oz
Colored Linens	54, 57, 60		SOUR 0.3 oz		DETERGENT 2.0 oz
Filter Bag	61				DETERGENT 2.0 oz
Sodium Bisulfite	32			SODIUM BISULFITE 18.0 oz	SODIUM BISULFITE 18.0 oz

INITIAL FILL CYCLE FOR WATER TREATMENT SYSTEM-CONTINUED

OPERATE DRYERS

Operate the dryers IAW instructions given in WP 0008 00.

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
OPERATION UNDER UNUSUAL CONDITIONS

General

Refer to WP 0008 00, “Operation Under Usual Conditions – Operate the CBL”, for specific operating procedures, and use this WP for supplemental information for operating the CBL in unusual conditions.

SECURITY MEASURES FOR ELECTRONIC DATA

There is no volatile electronic data associated with the CBL.

UNUSUAL ENVIRONMENTS/WEATHER

Unusual conditions include severe weather, such as 90 to 100 percent humidity for a week or more; 32° Fahrenheit (0° Celsius) or below temperatures for a week or more; 100° Fahrenheit (38° Celsius) or above temperatures for a week or more; blowing sand, dust, heavy rain or snow.

Operation in Snowy or Muddy Conditions

Ensure TEMPER and CBL are placed on firm foundations.
Check water tank and ASH foundations. Ensure equipment cannot displace or slide.

Operation in High Winds

Check TEMPER stakes and lines frequently. Add additional guy lines if available.
Do not attempt to erect or move the TEMPER in high winds.
Ensure container doors are not free to move.
Close door vents.
Ensure fuel can is adequately supported. Shore up with dunnage, stones, etc.

Operation in Salt Air or Sea Spray Conditions

Wash exterior of CBL frequently with fresh water, as available.

Operation in Dusty or Sandy Conditions

Keep container and TEMPER doors shut when system is not in use.
Keep service doors closed while system is in use.
Close door vents.
Inspect and clean door filters as needed.
Clean dryer lint filters frequently.

Operation in Rainy and/or Humid Conditions

Run exhaust fan as needed to provide a comfortable working environment. Do not open service doors.
Close door vents as required to prevent water form entering CBL interior.

UNUSUAL ENVIRONMENTS/WEATHER

Operation in High Altitude Conditions

The only piece of equipment which could be effected by high altitude operation is the internal water boiler. Unless the CBL has been set up for operation at high altitudes by the issuing authority, expect increased fuel consumption and exhaust smoke.

Operation in Severe Cold Conditions

NOTE

The 3000-gallon source water tank should always be placed on the bottom reflective jacket, regardless of ambient temperature. If the cold weather conditions exist prior to initial setup, insert the 3000-gallon source water tank after placing the pond heater in the bag.

1. Verify that the bag is centered on the cover and center of the insulating jacket.
2. Ensure the source water tank has been filled to capacity.
3. Place the tank heater **(Figure 1, Item 1)** in the center 3000-gallon water tanks and connect extension cords once the TEMPER is set up.

NOTE

After TEMPER is set up, connect the extension cord to a GFCI in the TEMPER (not the CBL).



Figure 1. Tank Heater for 3000-Gallon Water Bag.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

NOTE

Installing the jacket on the bag may be awkward. It is suggested that at least two soldiers install the jacket. Ensure hook and pile fasteners aren't gathered and lay flat when installing the insulating jackets on the 3000 gallon water tank.

Take care that there is no bunching at the base of the jacket that would prevent it from mating properly at the valve end.

Ensure the hook and pile fasteners are secure and the tank is completely covered. Ensure the valve remains accessible outside the insulating jacket.

4. Wrap each 3000-Gallon water tank with the insulating jackets (4 pieces-bottom, top, and 2 sides) **(Figure 2, Item 2)** provided.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED



Figure 2. Operation in Severe Cold Conditions.

5. Setup the TEMPER and TEMPER electrical distribution system IAW WP 0006 00.

6. Prepare CBL power distribution system for use IAW WP 0007 00.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

CAUTION

Do not connect the ASH hot air discharge to the service wall connection on the CBL. The discharge air from the ASH is sufficiently hot enough to damage internal CBL components.

7. Connect the ASH to a 120 VAC connection **(Figure 3, Item 3)** on the TEMPER electrical distribution box. Ensure the ASH return is drawn from the false wall connection **(Figure 3, Item 4)** on the CBL, and the ASH air discharges to the TEMPER.

8. Operate the ASH IAW instructions given in TM 9-4520-258-14.

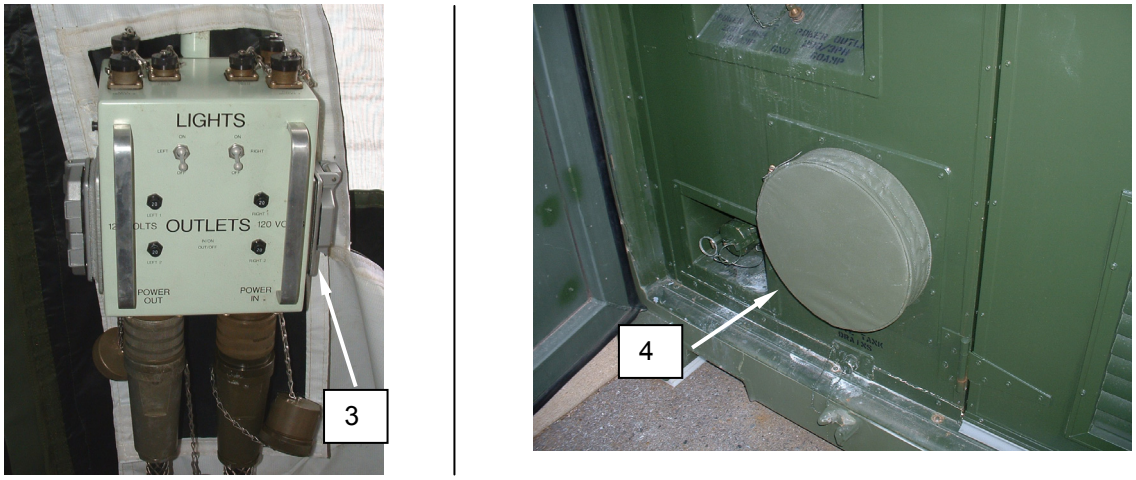


Figure 3. ASH Connections.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

9. Ensure door vents **(Figure 4, Item 5)** are closed.

CAUTION

Do not attempt to close or open door vent louvers past the range of operation. Failure to observe precautions may result in damage to the louver mechanism, rendering the mechanism inoperative.



Figure 4. Operation in Severe Cold Conditions – Close Door Vents.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

10. Connect the water supply hose **(Figure 5, Item 6)**, waste hose **(Figure 5, Item 7)** and pump heat trace connections **(Figure 5, Item 8)** for the water supply line to the GFCI to the right of the washer service door.

11. Connect pump P-1 and P-3 together **(Figure 5, Item 9)** and connect the opposite end into the GFCI on the back wall of the CBL container.

12. Connect four extension cords power supply in TEMPER: two for pond heaters and two for heat trace connection for water supply hose and waste hose.

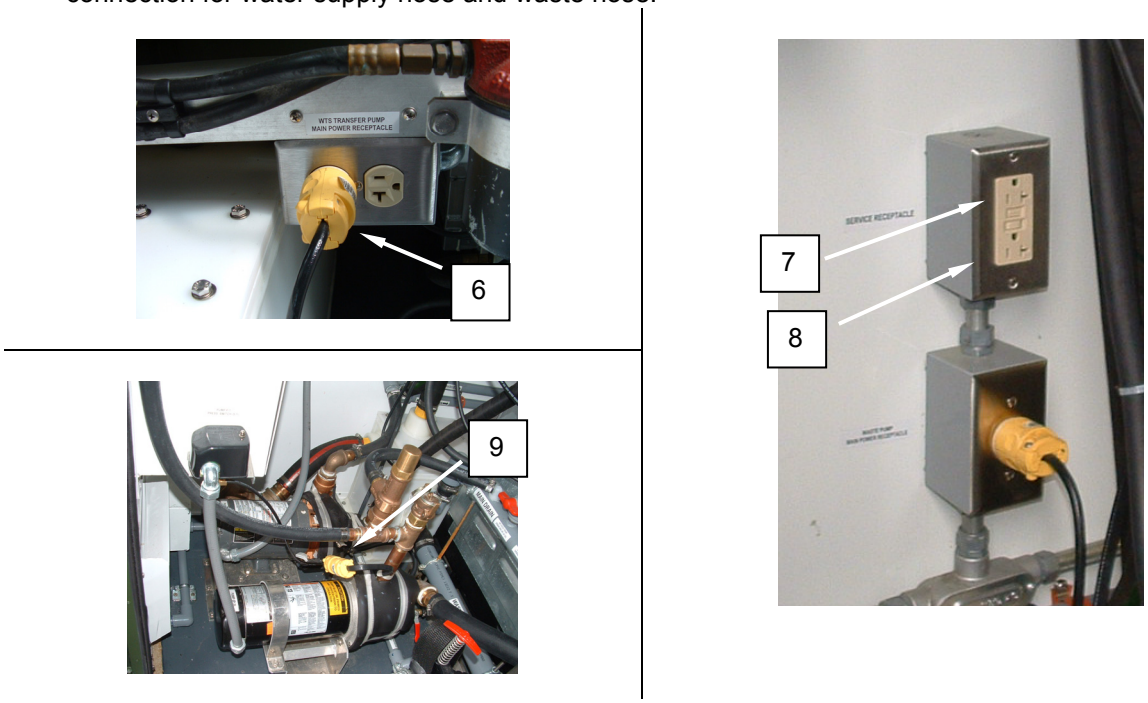


Figure 5. Operation in Severe Cold Conditions – Connect Heat Traces.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

NOTE

If CBL is already in operation, stop here.

13. Switch main breaker No. 1, 3, 5 **(Figure 6, Item 10)**, 60 A service breakers No. 23, 25, 27 **(Figure 6, Item 11)**, and internal lighting breaker No. 11 **(Figure 6, Item 12)** ON in order to provide internal lighting.

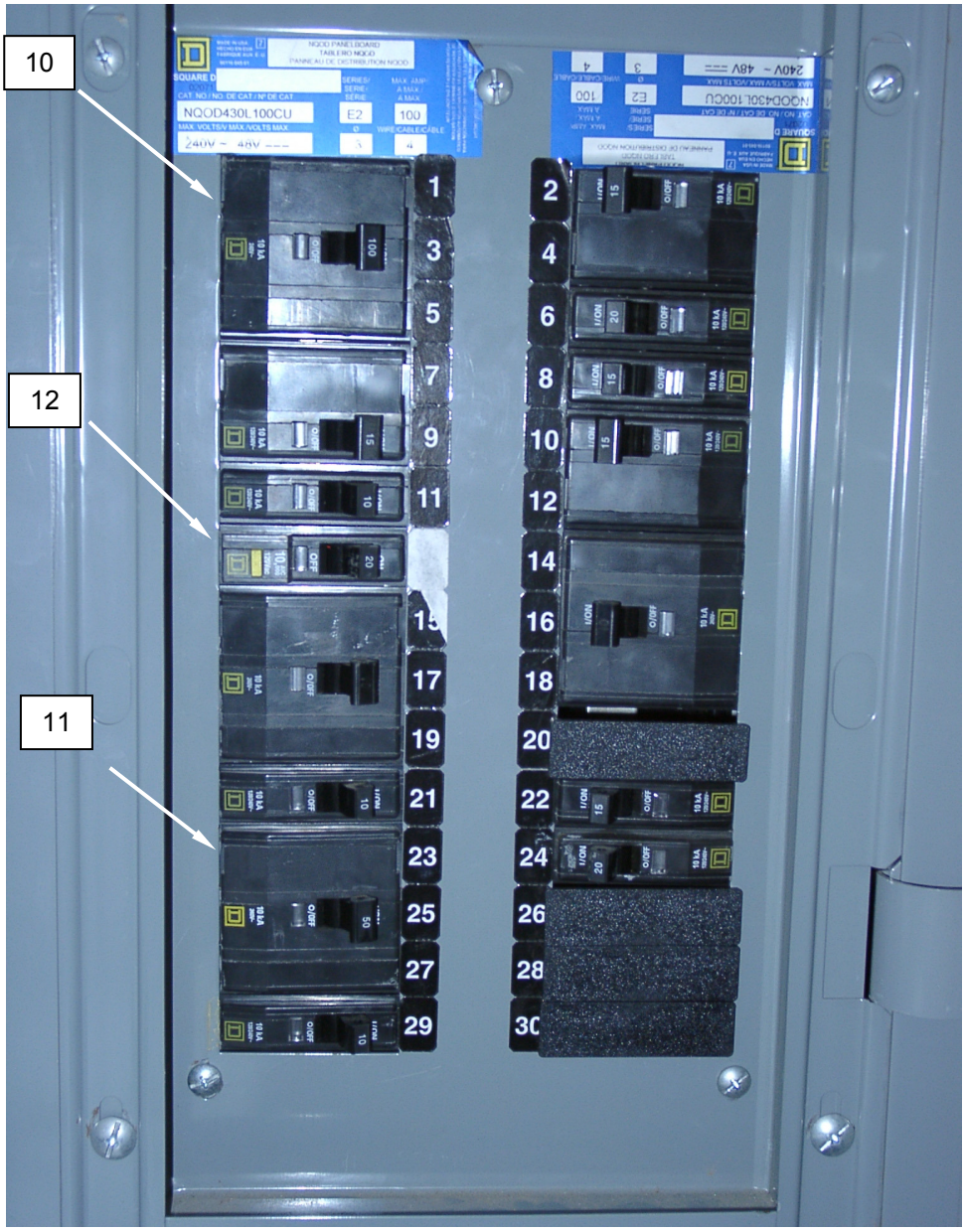


Figure 6. Operation in Severe Cold Conditions – Circuit Breakers.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

14. Open the soap trays **(Figure 7, Item 13)** on both washers.

15. Have unit maintenance remove the kick panel **(Figure 7, Item 14)** from both washers.

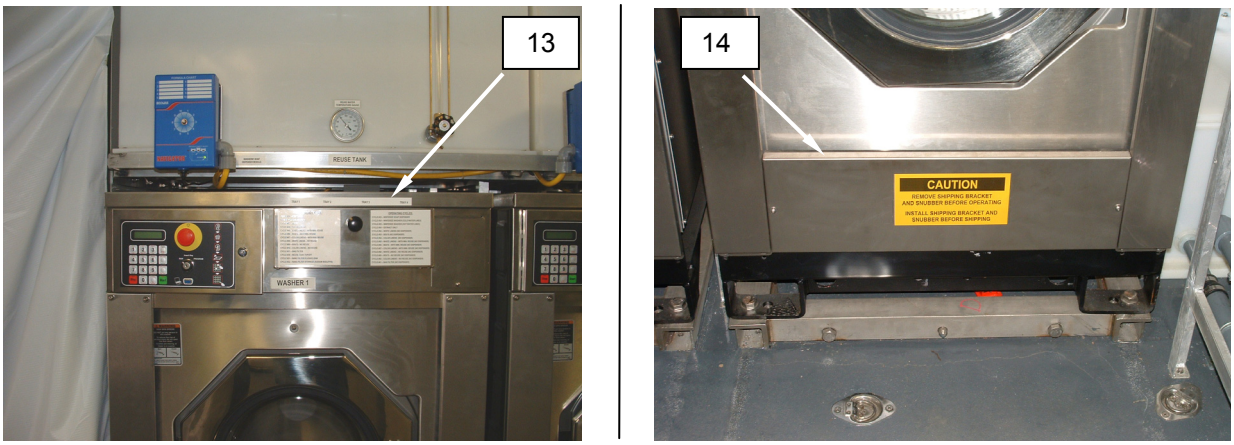


Figure 7. Open Soap Trays and Remove Kick Panels.

16. Open doors **(Figure 8, Item 15)** on both washers and both dryers.

17. Remove lint compartment panels **(Figure 8, Item 16)** from both dryers.

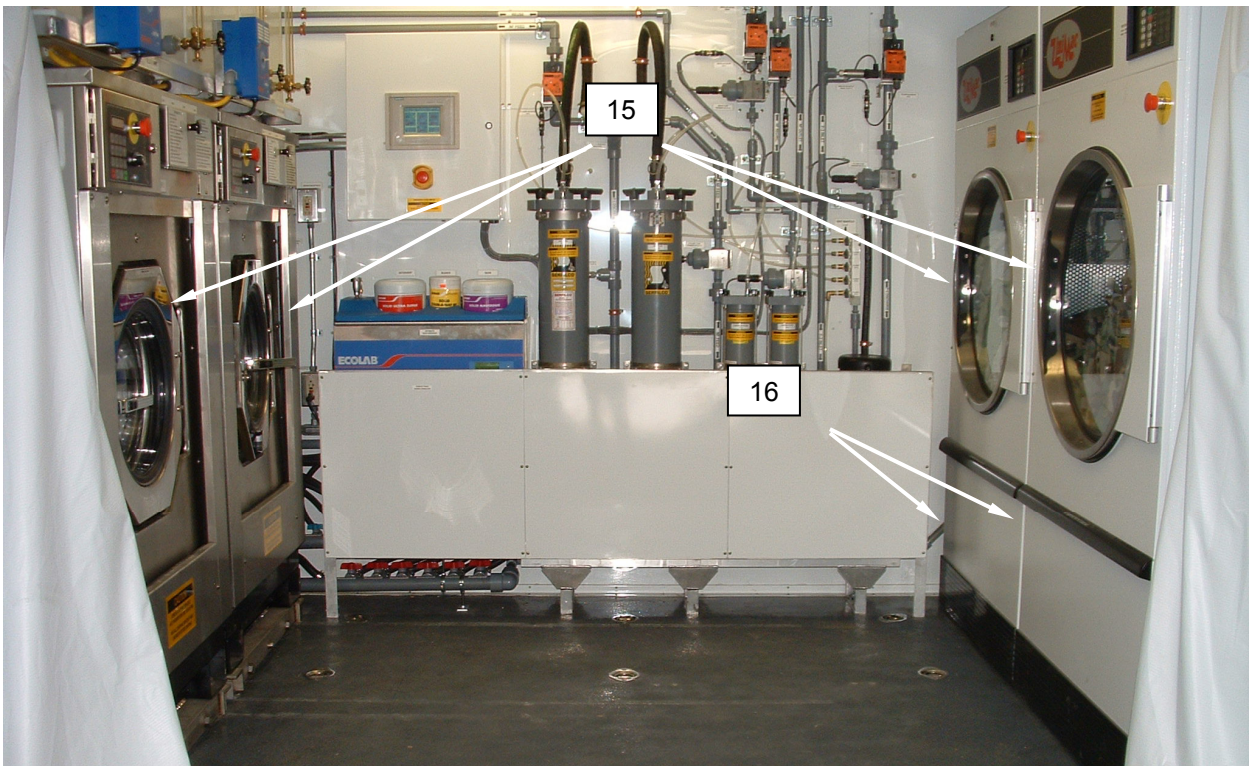


Figure 8. Operation in Severe Cold Conditions.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

18. Monitor temperature on thermometer **(Figure 9, Item 17)** on the reuse tank.



Figure 9. Monitor Temperatures on the Reuse Tank during Severe Cold Conditions.

NOTE

The CBL interior may require as long as three hours to come up to temperature.

19. Keep rainhoods **(Figure 10, Item 18)** closed until internal temperature reaches at least 32 °F.

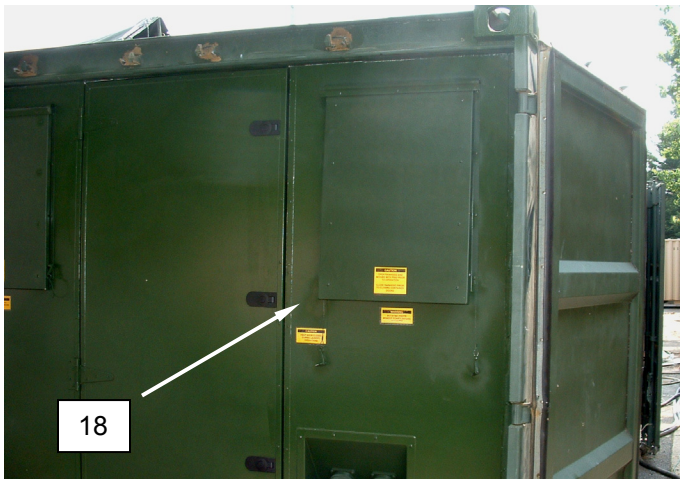


Figure 10. Operation in Severe Cold Conditions.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

20. Switch breaker No. 8 (Control Panel) **(Figure 11, Item 2)** to the ON position.

CAUTION

Be certain that all phase indicators are illuminated when power is being supplied to the CBL. If one or more indicators are not illuminated, the incoming power is not in phase. Failure to correct the problem immediately may cause damage to the equipment.

NOTE

Observe the Phase Indicator light **(Figure 11, Item 3)**. The indicator light should be illuminated. If not, switch breaker No. 8 (Control Panel) **(Figure 11, Item 2)** to the OFF position and immediately contact Facilities Support Section Power-Generation Personnel, Prime Power team, or Utilities team as necessary. A condition where the phase indicator is not illuminated indicates that the incoming power is not in proper phase and must be corrected before the CBL can be operated.

21. After verifying that the Phase Indicator light **(Figure 11, Item 3)** is illuminated, place each of the remaining breakers in the ON position. For a complete description of the function of each breaker, refer to WP 0004 00, “Controls and Indicators”.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

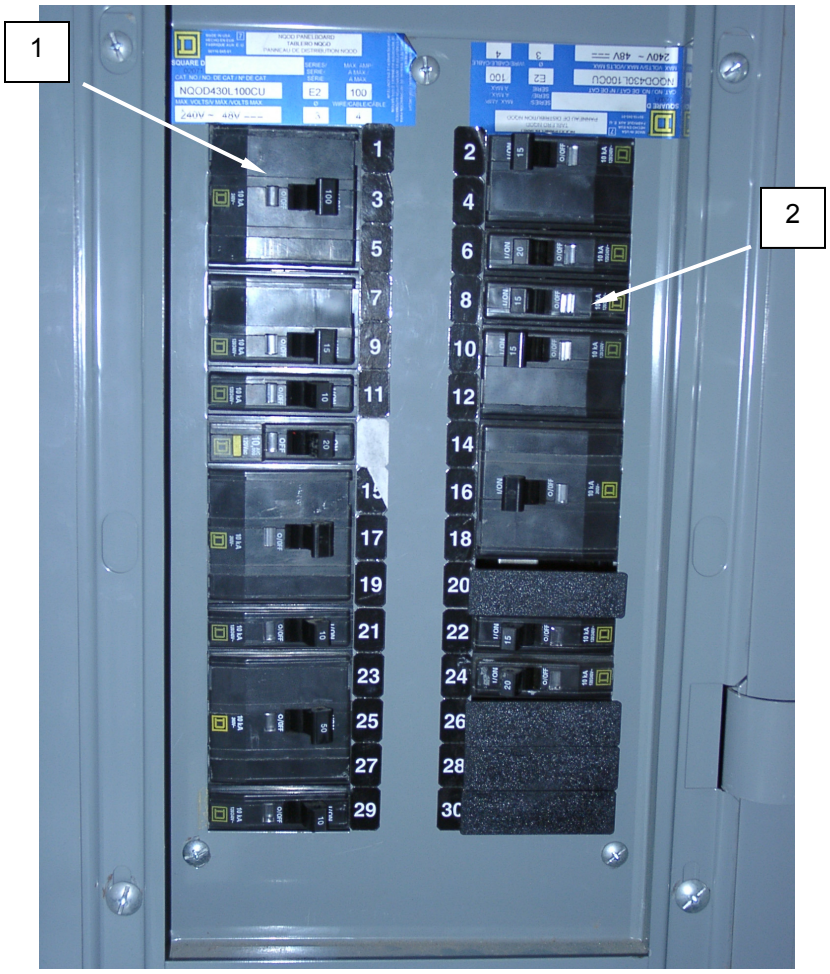


Figure 11. Check Phase Indicators.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

22. Observe the Phase Indicator lights **(Figure 12, Item 4)**. The indicator lights should be illuminated.

23. If the indicator lights are not illuminated, immediately contact Facilities Support Section Power-Generation Personnel, Prime Power team, or a Utilities team as necessary. A condition where all the phase indicators are not illuminated indicates that the incoming power is not in proper phase and must be corrected before the CBL can be operated.

24. Switch the dryer circuit breakers **(Figure 12, Item 5)** ON. The dryer breaker panel is behind the dryers and can be accessed through the service entry door at the dryer end of the CBL.

CAUTION

Be certain that all phase indicators are illuminated when power is being supplied to the CBL. If one or more indicators are not illuminated, the incoming power is not in phase. Failure to correct the problem immediately may cause damage to the equipment.



Figure 12. Ensure Phase Indicators are Illuminated.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

25. Switch the remaining breakers **(Figure 13, Item 20)** ON when temperature reaches at least 32 °F at the thermometer (**Figure 13, Item 17**).

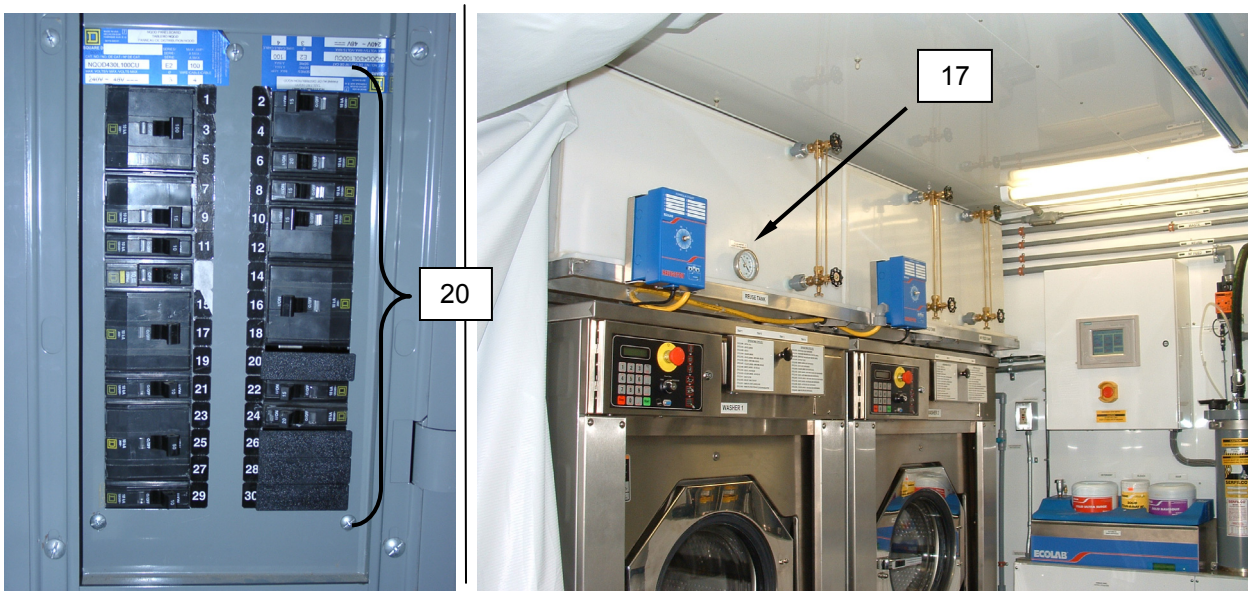


Figure 13. Switching the remaining breakers ON when temperature reaches at least 32 °F.

26. Close soap tray doors **(Figure 14, Item 13)** on washers.

27. Install kick panels **(Figure 14, Item 14)** on washers.

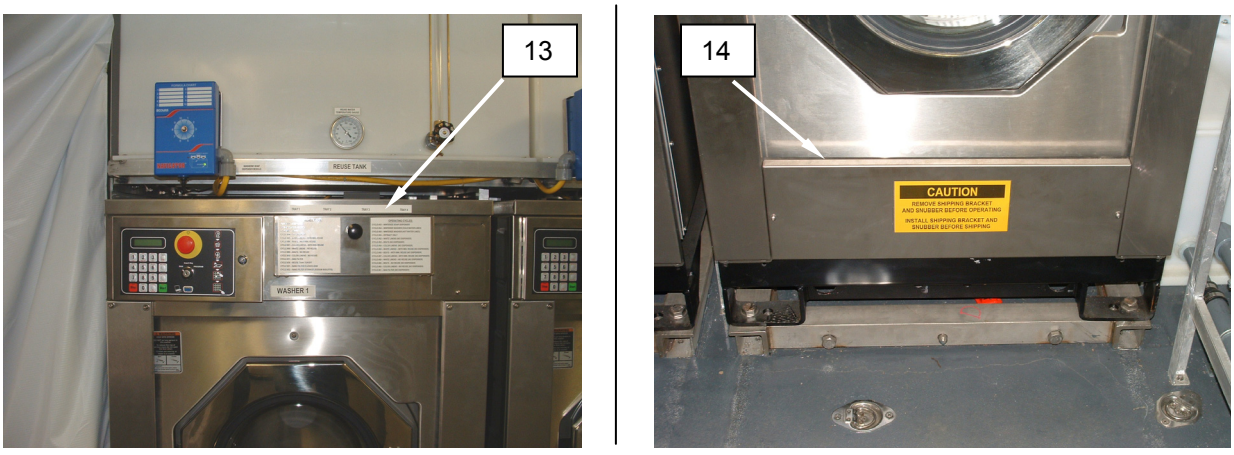


Figure 14. Install Kick Panel on Washers.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

28. Install lint compartment panels **(Figure 15, Item 16)** on dryers.

29. Inspect filters and water lines for any signs of ice.

NOTE

Dryer belts may squeal for a time until the CBL is fully warmed.

30. Prepare the dryers for use IAW WP 0007 00, and operate the dryers IAW WP 0008 00.

31. Run an initial fill cycle IAW WP 0008 00. Monitor the reuse tank level. When the level reaches approximately ¼ full, operate the boiler IAW WP 0008 00.

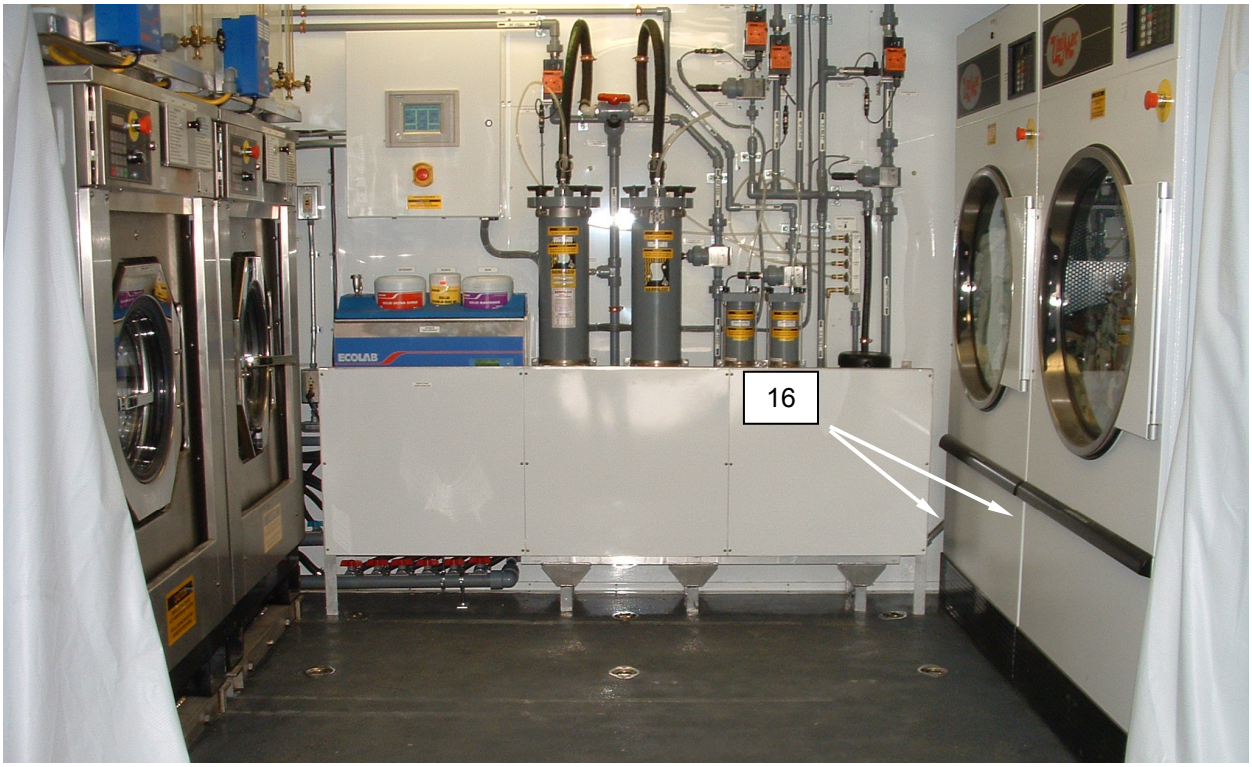
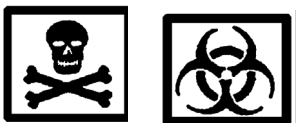


Figure 15. Prepare Dryers and Run Initial Fill.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

Interim Nuclear, Biological, and Chemical (NBC) Decontamination Procedures



WARNING



Ensure personal protective measures have been taken before proceeding with any measure to protect or decontaminate equipment. Failure to observe this precaution may result in serious illness, injury, or death to personnel by NBC agents.

The CBL container must be detached from the TEMPER and sealed in the event of an NBC attack. The CBL should be packed for movement if time allows; otherwise, as much equipment as possible should be placed within the CBL before sealing the container.

Perform immediate operational or thorough decontamination procedures in accordance with FM 3-5 as the mission, resources, and tactical situation permit.

NBC NCO should test for contamination after CBL shutdown procedure.



WARNING

For immediate decontaminating procedures use only hot soapy water for spot decontamination of hot surfaces of the water heater and stack. Shut down and cool the heater for any additional decontamination procedures. Do not spray DS2 or any other combustible decontamination solutions or compounds on an operating heater or stack. Do not spray DS2 or any other combustible decontamination solutions or compounds on any equipment surfaces or components where the operating temperatures reach or exceed the flashpoint of DS2 (160° Fahrenheit or 71.1° Celsius).

CBL Shut Down Procedure during NBC Imminent or Actual Attack

1. Push emergency stop button **(Figure 16, Item 1)** on PLC control box **(Figure 16, Item 2).**

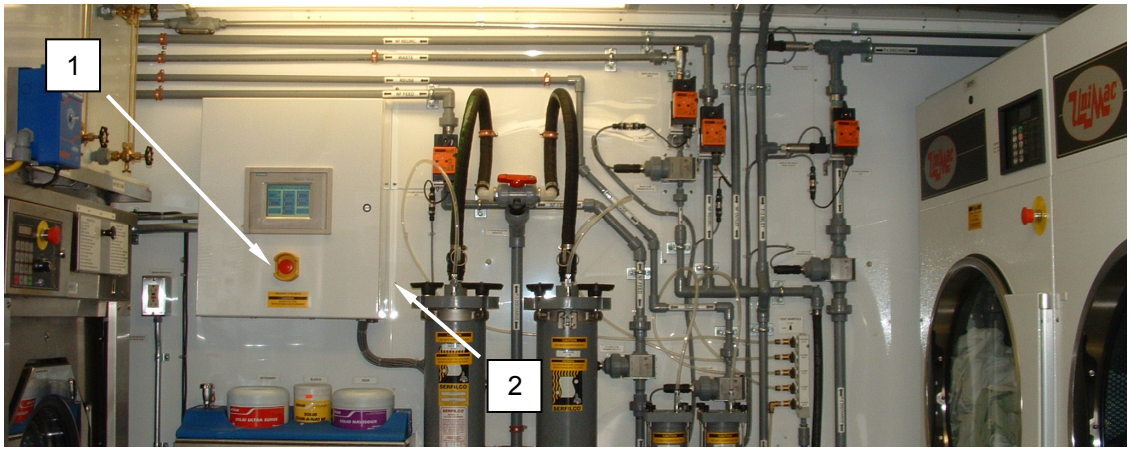


Figure 16. CBL Shut Down Procedure during NBC Imminent or Actual Attack.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

2. If using a generator, press emergency stop button **(Figure 17, Item 3)**, then disconnect. If using municipal power, disconnect.

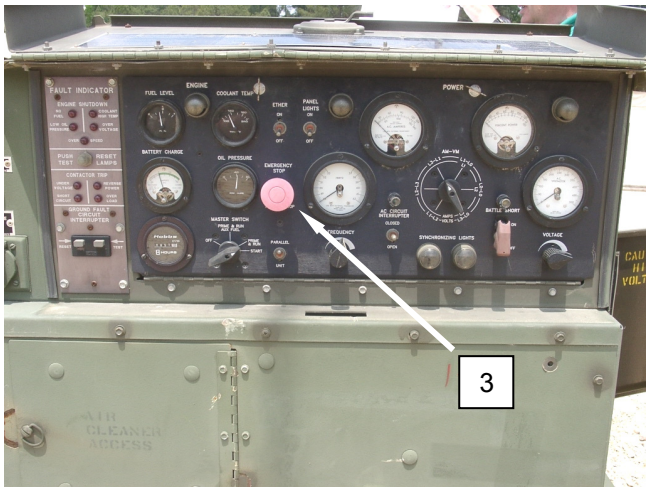


Figure 17. CBL Shut Down Procedure during NBC Imminent or Actual Attack.

3. Disconnect two 100 A cables **(Figure 18, Item 3)** and ground wire **(Figure 18, Item 4)** at dryer service end of container.

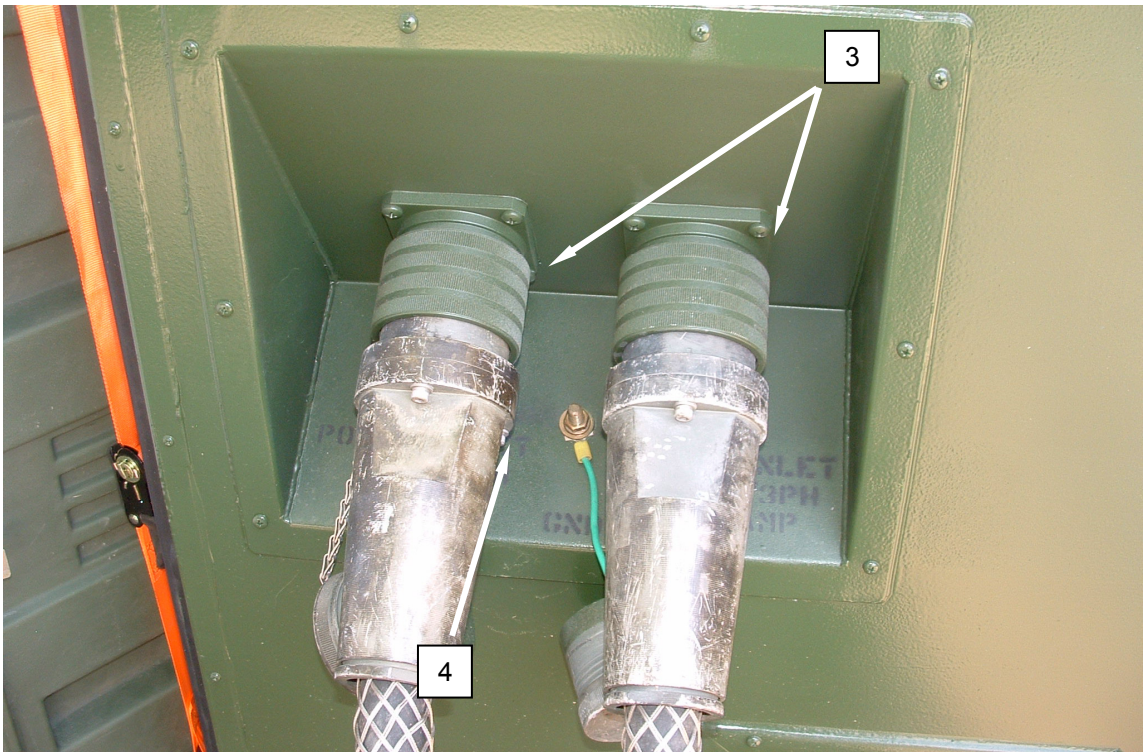


Figure 18. CBL Shut Down Procedure during NBC Imminent or Actual Attack.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

4. Close rain hoods **(Figure 19, Item 5)** and dryer access door **(Figure 19, Item 6)**.



Figure 19. CBL Shut Down Procedure during NBC Imminent or Actual Attack.

5. Close the supply water and waste water 3000-Gallon bags water valves **(Figure 20, Item 7)**.



Figure 20. CBL Shut Down Procedure during NBC Imminent or Actual Attack.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

6. Disconnect the 100 A cable **(Figure 21, Item 8),** 60 A cable **(Figure 21, Item 9)** and the ground wire **(Figure 21, Item 10)** from the main power service panel **(Figure 21, Item 11).**

7. Install dust caps.

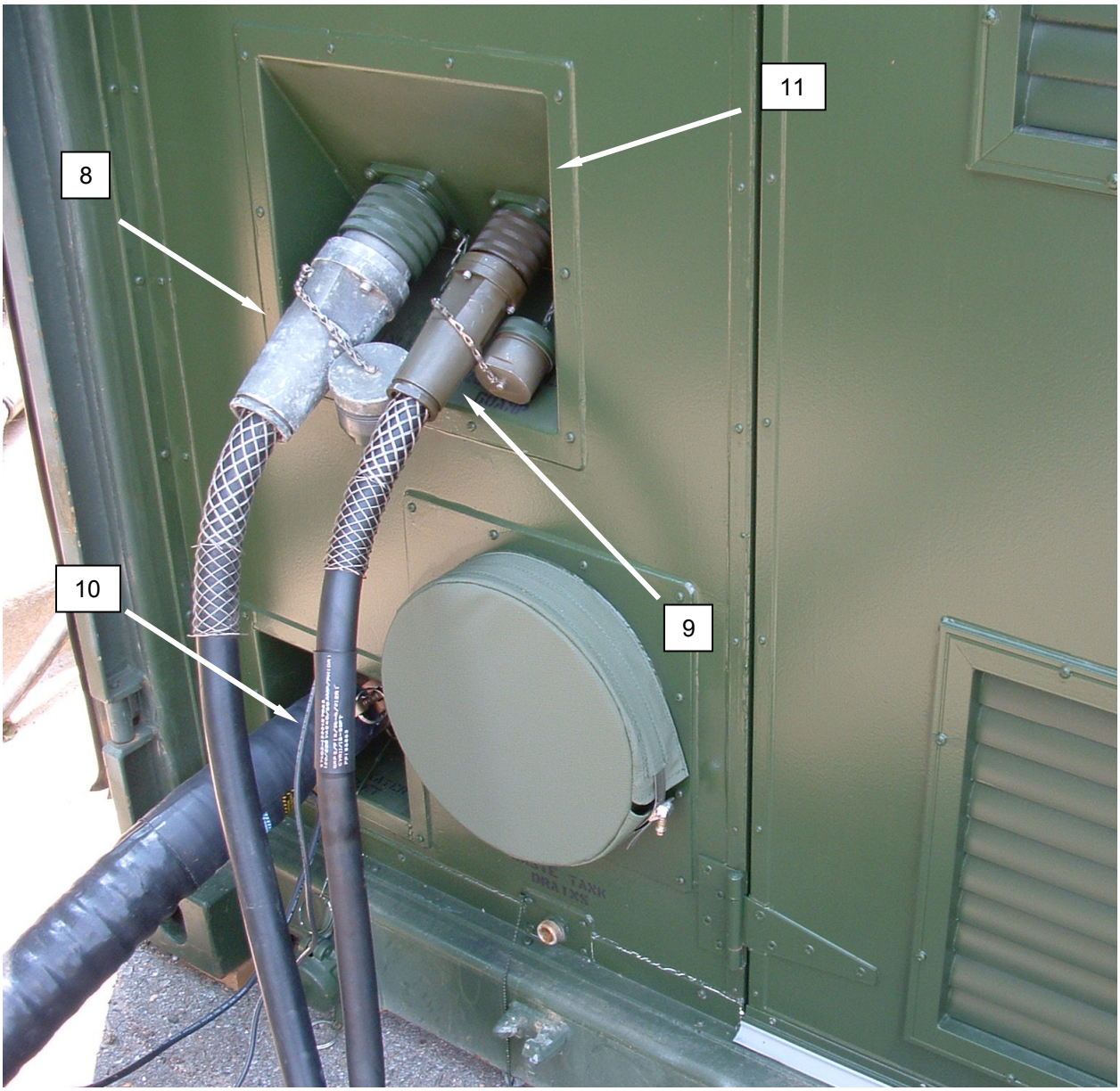


Figure 21. Disconnect Cables and Install Dust Caps during NBC Imminent or Actual Attack.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

8. Disconnect the fuel supply line **(Figure 22, Item 12)** and the fuel return line **(Figure 22, Item 13)** from the fuel service panel **(Figure 22, Item 14).**

9. Install dust caps.

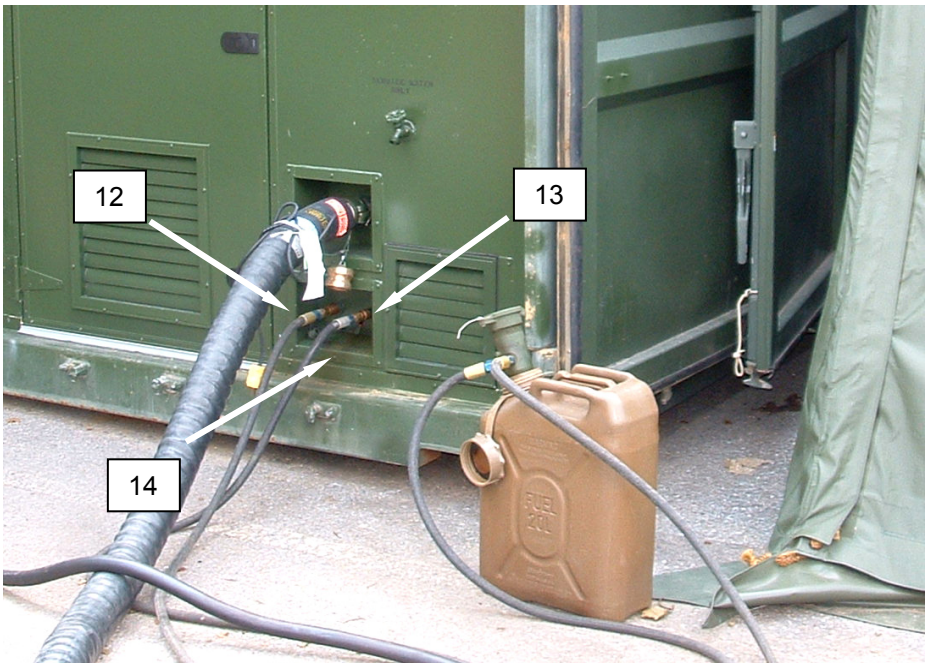


Figure 22. Disconnect Fuel Lines and Install Dust Caps during NBC Imminent or Actual Attack.

10. Disconnect the waste water hose **(Figure 23, Item 15)** and water supply hose **(Figure 23, Item 16)** from the service wall.

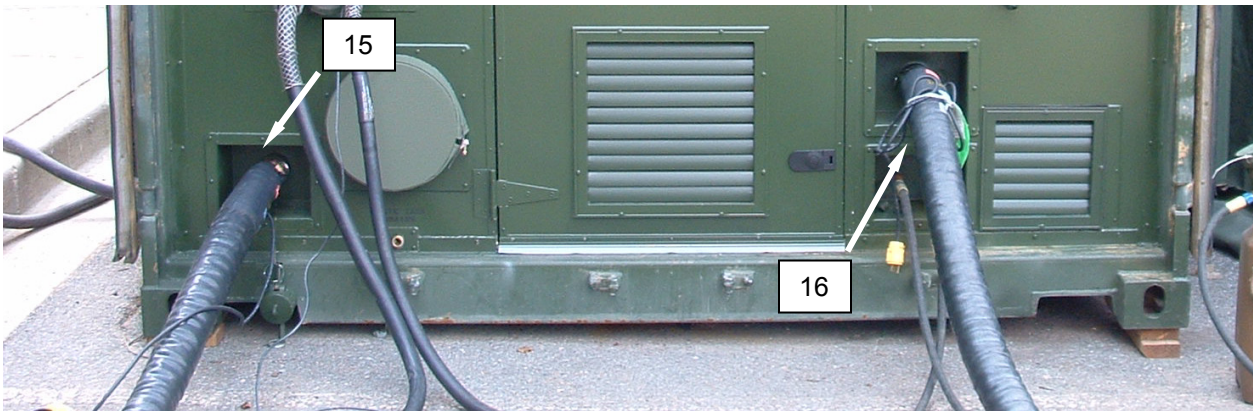


Figure 23. Disconnect Hoses during NBC Imminent or Actual Attack.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

11. Disconnect ASH duct, if fitted.

12. Close washer service door **(Figure 24, Item 17)**.



Figure 24. Close CBL Container Service Door during NBC Imminent or Actual Attack.

13. Untie the bootwall fly lines **(Figure 25, Item 18)** from two cleats **(Figure 25, Item 19)** on back side of container.

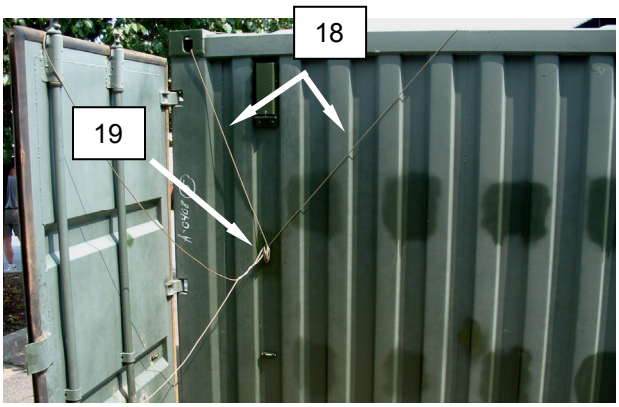


Figure 25. CBL Shut Down Procedure during NBC Imminent or Actual Attack.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

14. Remove ramps **(Figure 26, Item 20)** and place inside container.

15. Release bootwall **(Figure 26, Item 21)** from the entrance of container.

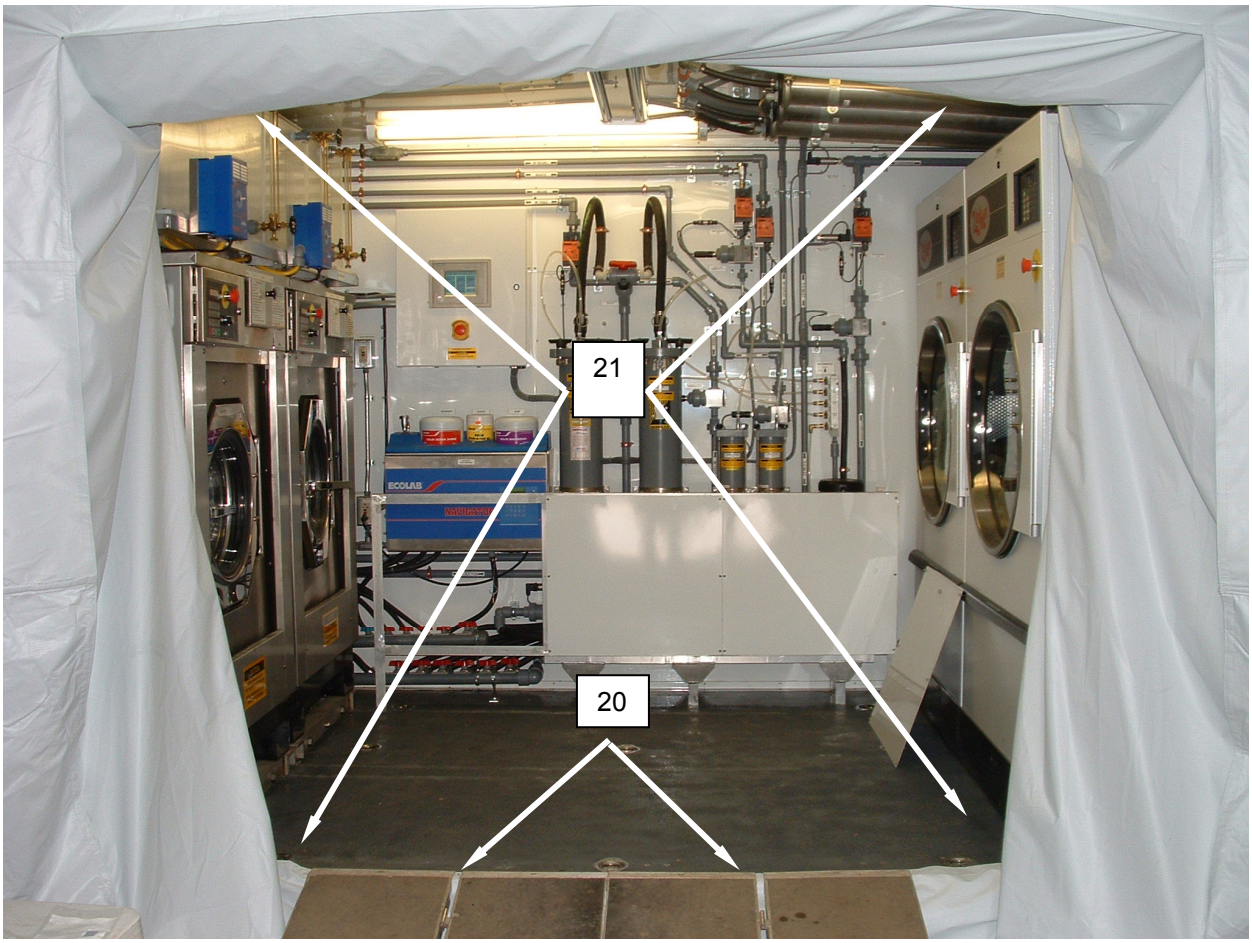


Figure 26. Remove Ramps and Release Bootwall during NBC Imminent or Actual Attack.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

16. Remove the TEMPER distribution box **(Figure 27, Item 22)** from the distribution stand **(Figure 27, Item 23)**. Remove the distribution stand from the TEMPER tent. Do not disconnect any cables.



Figure 27. Remove Distribution Box and Stand during NBC Imminent or Actual Attack.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

17. Cut (only during imminent attack) TEMPER foot loops **(Figure 28, Item 24)** and guy lines **(Figure 28, Item 25)**.

18. Ensure tables and carts are moved to TEMPER endwall and to center in TEMPER interior, and move TEMPER tent **(Figure 28, Item 26)** away from the CBL a minimum of 6 ft.

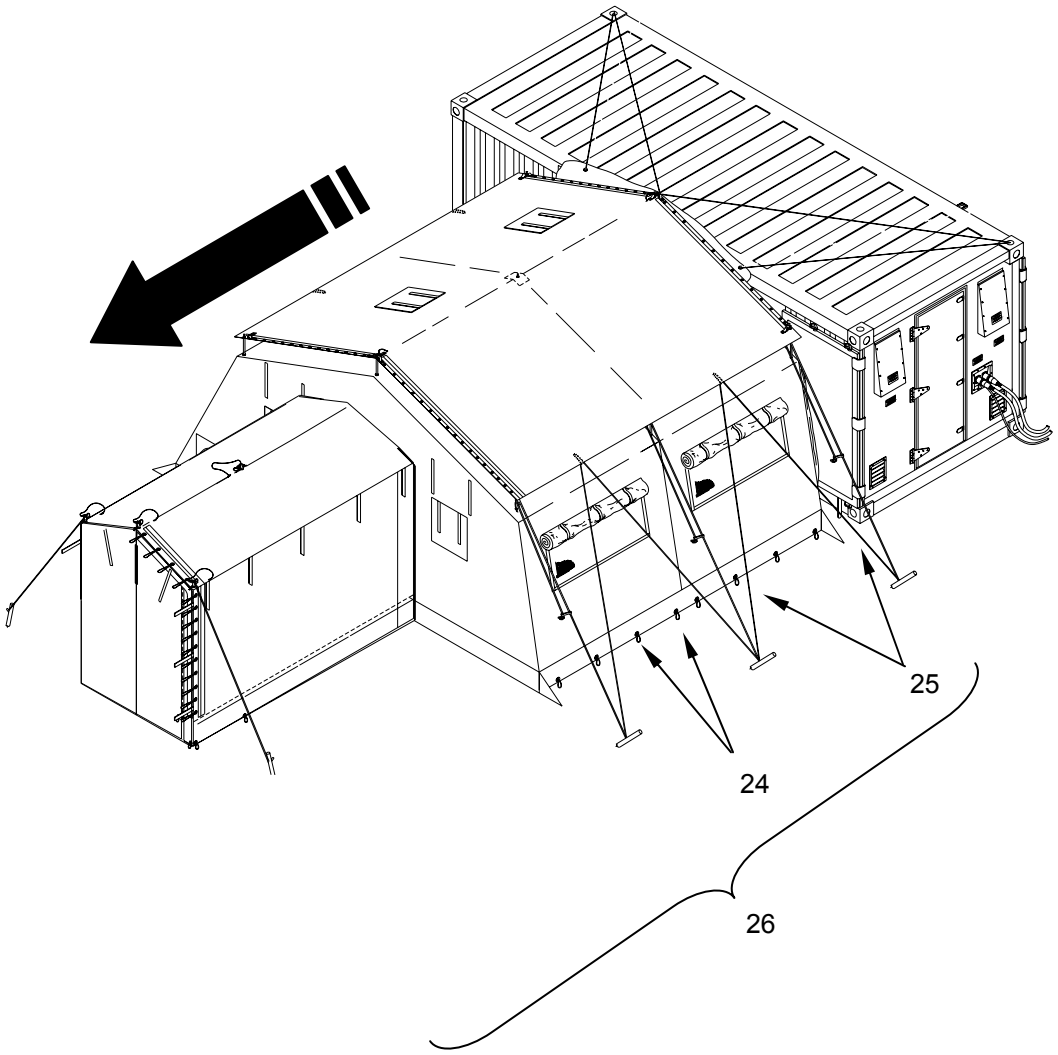


Figure 28. Move TEMPER during NBC Imminent or Actual Attack.

UNUSUAL ENVIRONMENTS/WEATHER-CONTINUED

19. Close center doors **(Figure 29, Item 27)** first, then end doors **(Figure 29, Item 28)**.

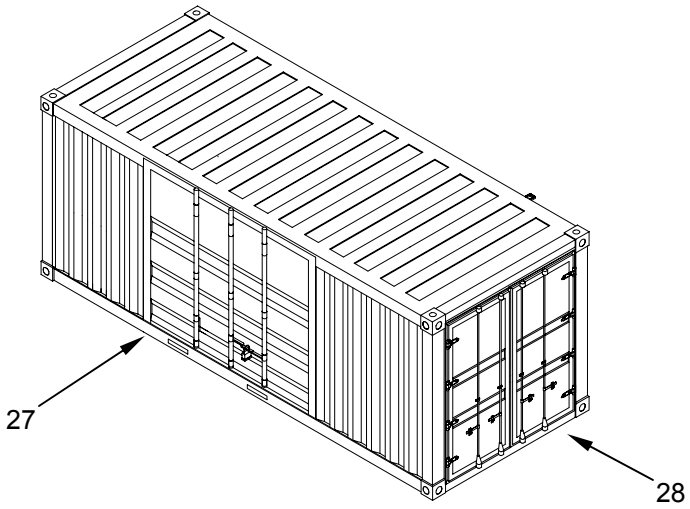


Figure 29. CBL Shut Down Procedure During NBC Imminent or Actual Attack.

20. Loosen two wingnuts **(Figure 30, Item 29)**.

21. Close container vents **(Figure 30, Item 29)**.

22. Tighten wingnuts **(Figure 30, Item 29).**

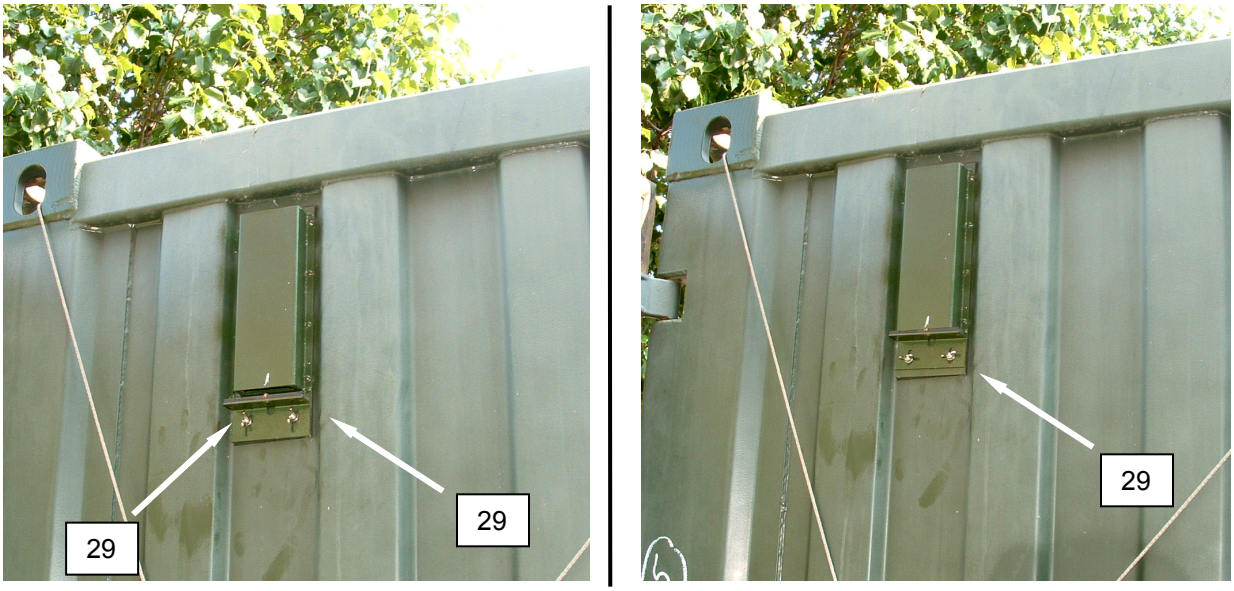


Figure 30. Close Container Vents during NBC Imminent or Actual Attack.

EMERGENCY PROCEDURES

In the event of Water Treatment System failure, the CBL may be operated in either Minimum Reuse or No Reuse IAW WP 0018 00.

In the event of a reduction of electrical supply, one washer and one dryer may be secured from operation.

In the event of a PLC malfunction, water supply, lights, ventilation, and the boiler may be bypassed IAW WP 0009 00.

TEMPER
Refer to TM 10-8340-224-13 as necessary for additional information on operating the TEMPER tent system under unusual conditions.

FDECU
Refer to TM 10-4120-411-14 as necessary for additional information on operating the FDECU Model-4 under unusual conditions.

ASH
Refer to TM 9-4520-258-14 as necessary for additional information on operating the Army Space Heater (ASH) under unusual conditions.

END OF WORK PACKAGE

CHAPTER 3

OPERATOR TROUBLESHOOTING PROCEDURES

CONTAINERIZED BATCH LAUNDRY (CBL)

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
TROUBLESHOOTING INDEX

GENERAL

This chapter provides operator maintenance information and includes troubleshooting and general maintenance procedures. Refer to appropriate technical manuals for associated equipment maintenance instructions and item-specific troubleshooting instructions (See Work Package 0042 00 for References). Troubleshooting instructions covered in this section are unique to the Containerized Batch Laundry (CBL).

The troubleshooting procedures contain tables listing the malfunctions, tests or inspections, and corrective action required to return the CBL to normal operation. Perform the steps in the order they appear in the tables. Each procedure is headed by an initial setup. This setup outlines what is needed as well as certain conditions which must be met before starting the task.

DO NOT START THE TASK UNTIL:

- You understand the task.
- You understand what you are to do.
- You understand what is needed to do the work.
- You have the things you need.

MALFUNCTION SYMPTOM INDEX

The malfunction symptom index lists common malfunctions that may occur during CBL inspection and operation. Find the malfunction to be eliminated and go to the indicated troubleshooting paragraph that follows. The index cannot list all malfunctions that may occur, all tests or inspections needed to find the fault, nor all actions required to correct the fault. If the existing malfunction is not listed, or cannot be corrected through this troubleshooting index, notify unit maintenance.

Table 1. Malfunction Symptom Indexes.

Symptom	Page No.
Malfunction Symptom Index - Electrical	WP 0020 00-2
Malfunction Symptom Index - Plumbing	WP 0020 00-3
Malfunction Symptom Index – Programmable Logic Control (PLC)	WP 0020 00-4
Malfunction Symptom Index – Washers	WP 0020 00-5
Malfunction Symptom Index – Automatic Soap Dispenser	WP 0020 00-6
Malfunction Symptom Index – Dryers	WP 0020 00-7
Malfunction Symptom Index – Boiler	WP 0020 00-8

MALFUNCTION SYMPTOM INDEX-CONTINUED

Table 2. Malfunction Symptom Index - Electrical.

Symptom	Work Package/Page No.
1. Phase Sequencing light not lit.	WP 0021 00-2
2. Interior lighting inoperative	WP 0021 00-3
3. Blackout lighting inoperative	WP 0021 00-4

Table 3. Malfunction Symptom Index - Plumbing.

Symptom	Work Package/Page No.
1. Reuse water by-passes filtration system directly to re-use tank during reuse cycle or initial fill cycle.	WP 0022 00-2
2. Waste tank overflows	WP 0022 00-3
3. WTS Transfer tank overflows	WP 0022 00-5
4. P-1 Pump not operating.	WP 0022 00-6
5. WTS Hold Tank overflows.	WP 0022 00-8

MALFUNCTION SYMPTOM INDEX-CONTINUED

Table 4. Malfunction Symptom Index – Programmable Logic Control (PLC).

Symptom	Work Package/Page No.
1. “System Pressure Sensor Failure” on PLC Display	WP 0023 00-2
2. “Water Supply High Pressure” on PLC Display	WP 0023 00-3
3. “F1 Bag Differential Pressure High” on PLC Display	WP 0023 00-5
4. “F1 Bag Filter is Clogged – P3 Pump is Stopped” on PLC Display	WP 0023 00-7
5. “F2 Micron Differential Pressure High” alarm on PLC Display	WP 0023 00-9
6. “Carbon Filter Outlet Pressure Sensor” alarm on PLC Display	WP 0023 00-11
7. “F3 Carbon Filter Differential Pressure High” alarm on PLC Display	WP 0023 00-12
8. “Reuse Loop Flow Sensor Failure” alarm on PLC Display	WP 0023 00-14
9. “P3 Loop Flow Sensor Failure” alarm	WP 0023 00-16
10. “P4 Loop Flow Sensor Failure” alarm on PLC Display	WP 0023 00-17
11. “Waste Loop Flow Sensor Failure” alarm on PLC Display	WP 0023 00-18
12. “Nano Outlet Pressure Sensor Failure” alarm on PLC Display	WP 0023 00-19
13. “Nano Inlet Pressure Sensor Failure” alarm on PLC Display	WP 0023 00-20
14. “Nano Filter Differential Pressure High” alarm on PLC Display	WP 0023 00-21
15. P3 Pump alarm at PLC	WP 0023 00-25
16. P4 Pump alarm at PLC	WP 0023 00-27
17. “Boiler Failure Alarm” on PLC Display	WP 0023 00-29
18. “Boiler Burner Cutout Alarm” on PLC Display	WP 0023 00-31
19. “Boiler High Temperature Alarm” on PLC Display	WP 0023 00-33
20. “Boiler Low Glycol Alarm” on PLC Display	WP 0023 00-35

MALFUNCTION SYMPTOM INDEX-CONTINUED

Table 5. Malfunction Symptom Index – Washers.

Symptom	Work Package/Page No.
1. “Didn’t fill within time” Error message on Washer Display	WP 0024 00-2
2. “EMPTY” Error on Washer Display	WP 0024 00-4
3. “Door” Error on Washer Display	WP 0024 00-6
4. “Rotation Sensor” Error on Washer Display	WP 0024 00-7
5. “Speed Detection ” Error on Washer Display	WP 0024 00-8

Table 6. Malfunction Symptom Index – Automatic Soap Dispenser.

Symptom	Work Package/Page No.
1. Laundry Chemical Alarm	WP 0025 00-2
2. Automatic Soap Dispenser Inoperative	WP 0025 00-3
3. Clothes not clean	WP 0025 00-5

Table 7. Malfunction Symptom Index – Dryers.

Symptom	Work Package/Page No.
1. Dryer will not start	WP 0026 00-2
2. Dryer drum doesn’t turn	WP 0026 00-3
3. “Door Open” indicator	WP 0026 00-4
4. Dryer squeals	WP 0026 00-5
5. Increased drying time	WP 0026 00-6
6. Water in dryer or dryer leaking water	WP 0026 00-8

MALFUNCTION SYMPTOM INDEX-CONTINUED

Table 8. Malfunction Symptom Index – Boiler.

Symptom	Work Package/Page No.
1. Boiler will not light or loss of hot water	WP 0027 00-2
2. “Boiler Failure Alarm” on PLC Display	WP 0027 00-4
3. “Boiler Burner Cutout Alarm” on PLC Display	WP 0027 00-6
4. “Boiler High Temperature Alarm” on PLC Display	WP 0027 00-8
5. “Boiler Low Glycol Alarm” on PLC Display	WP 0027 00-10
6. Boiler operating, doesn’t heat washer/soap dispenser water.	WP 0027 00-12
7. Boiler operating, doesn’t heat reuse water.	WP 0027 00-13

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
TROUBLESHOOTING PROCEDURES- ELECTRICAL

ELECTRICAL TROUBLESHOOTING

The troubleshooting procedures contain tables listing the malfunctions, tests or inspections, and corrective action required to return the CBL to normal operation. Perform the steps in the order they appear in the tables. Each procedure is headed by an initial setup. This setup outlines what is needed as well as certain conditions which must be met before starting the task.

DO NOT START THE TASK UNTIL:

- You understand the task.
- You understand what you are to do.
- You understand what is needed to do the work.
- You have the things you need.

ELECTRICAL TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Phase Sequencing light not lit	Inspect all phase sequence lights **(Figure 1, Item 1)** for visible damage.	Notify unit maintenance.





Figure 1. Phase Sequence Indicator Lights.

ELECTRICAL TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Interior lighting inoperative	Check lighting switch **(Figure 2, Item 1)** on PLC. Check circuit breaker No. 11 **(Figure 2, Item 2)**.	Switch lights on. Reset circuit breaker and notify unit maintenance. If malfunction continues, notify unit maintenance.

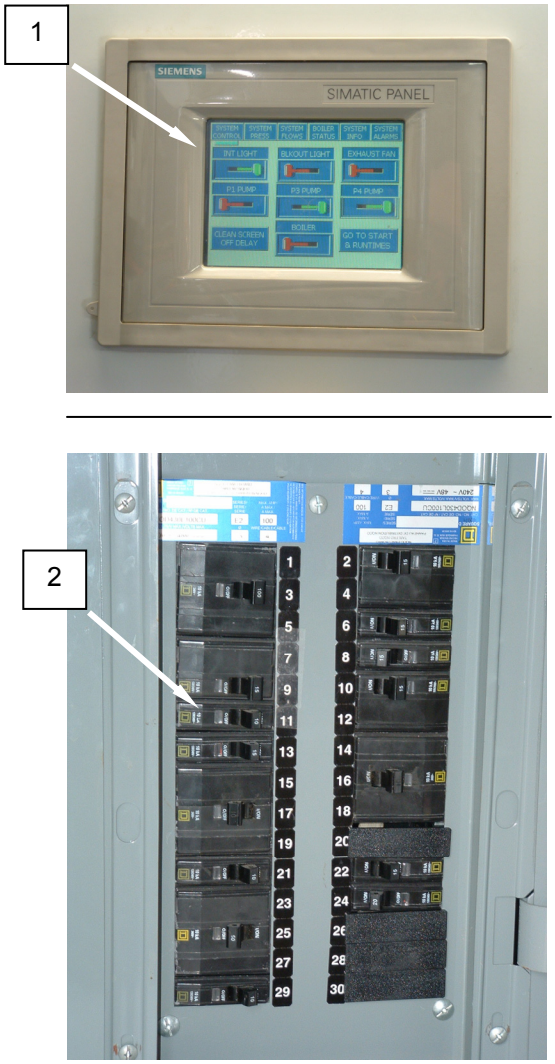


Figure 2. Interior Lighting Inoperative.

ELECTRICAL TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Blackout lighting inoperative	Check lighting switches on PLC.	Switch lights on – ensure both INT LIGHTING **(Figure 3, Item 1)** and BLKOUT **(Figure 3, Item 2)** are switched ON.
	Check circuit breaker No. 11 **(Figure 3, Item 3)**.	Reset circuit breaker and notify unit maintenance. If malfunction continues, notify unit maintenance.

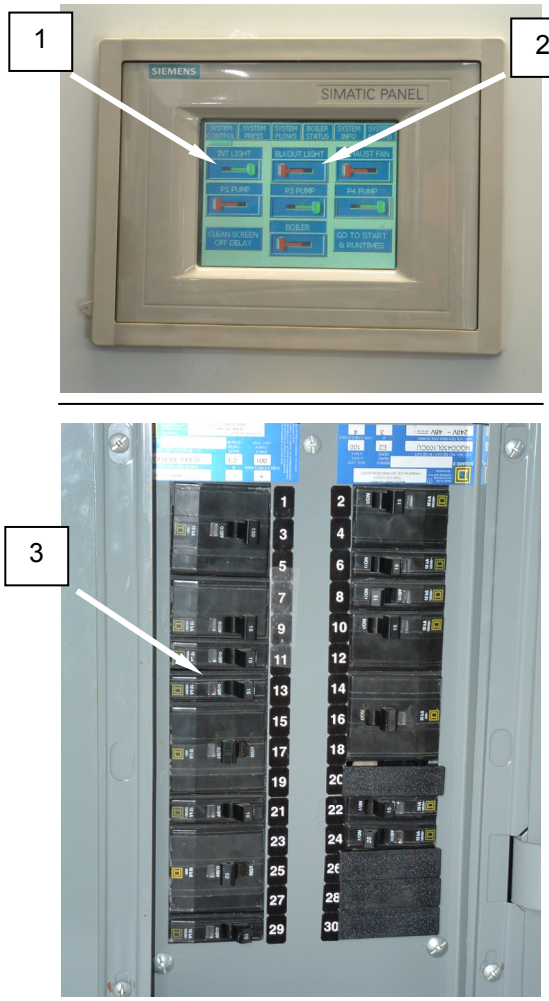


Figure 3. Blackout Lighting Inoperative.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
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TROUBLESHOOTING PROCEDURES- PLUMBING

PLUMBING TROUBLESHOOTING

The troubleshooting procedures contain tables listing the malfunctions, tests or inspections, and corrective action required to return the CBL to normal operation. Perform the steps in the order they appear in the tables. Each procedure is headed by an initial setup. This setup outlines what is needed as well as certain conditions which must be met before starting the task.

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- You understand what is needed to do the work.
- You have the things you need.

PLUMBING TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Reuse water by-passes filtration system directly to re-use tank during reuse cycle or initial fill cycle	Inspect settings for valves V-15 **(Figure 1, Item 1)** and V-16 **(Figure 1, Item 2)**.	Position valves as shown for the applicable cycle IAW WP 0008 00 and WP 0018 00. If malfunction continues, notify unit maintenance.

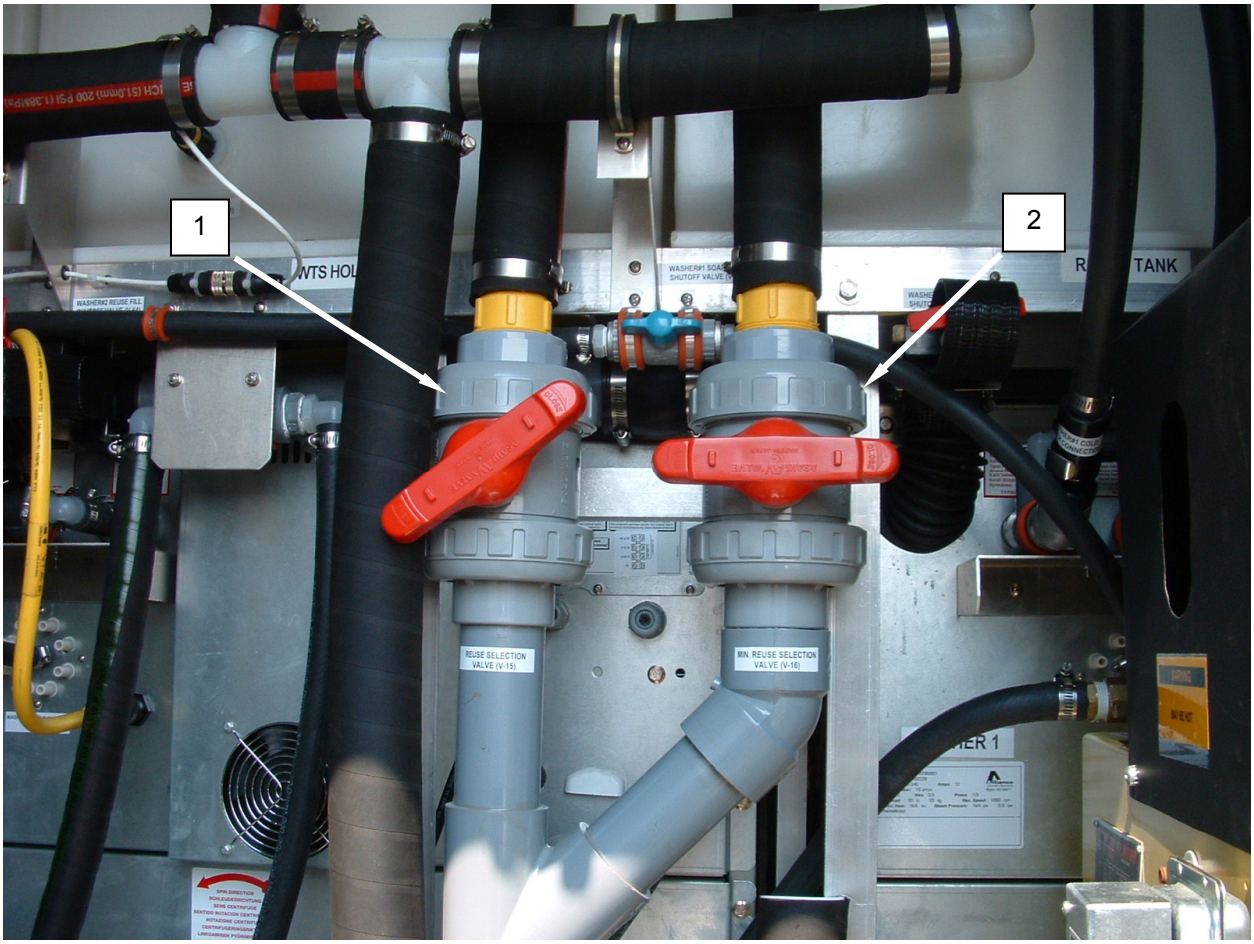


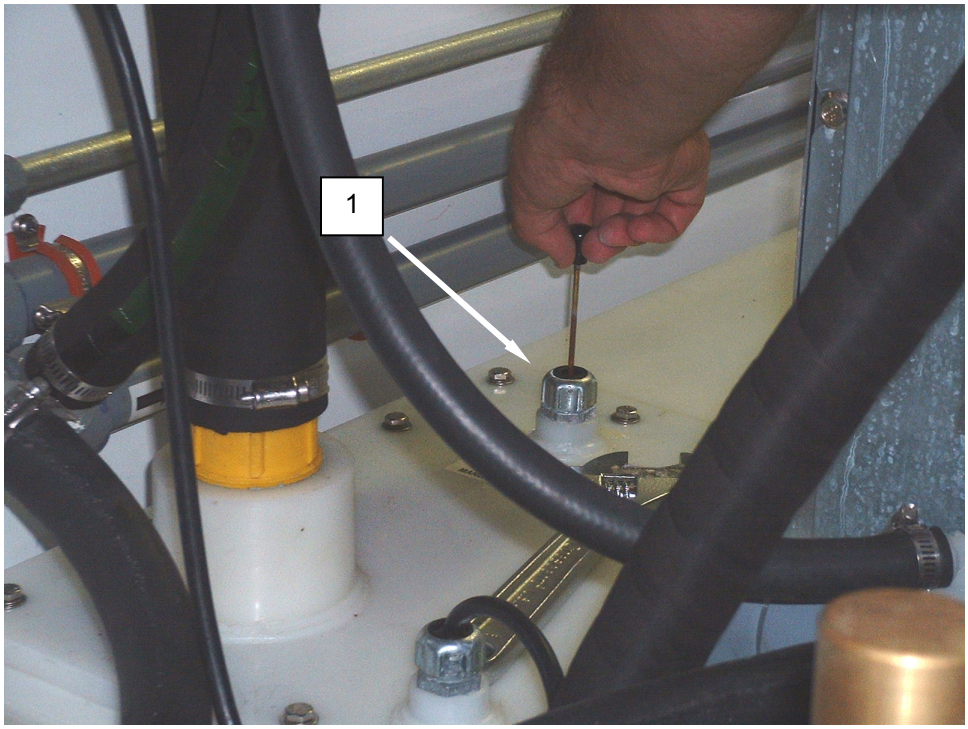
Figure 1. Reuse Water By-Passes Filtration System directly to Re-Use Tank during Reuse Cycle or Initial Fill Cycle.

PLUMBING TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Waste tank overflows	 **WARNING** Wear protective gloves, face shield, and apron when maintaining equipment which may have been contaminated by graywater. Wash hands immediately after performing tasks, and shower if possible. Failure to observe safety precaution may result in serious illness or death.	
	Ensure pump is operating.	Manually pump tank **(Figure 2, Item 1)**.
	Ensure pump plug **(Figure 2, Item 2)** is connected.	Reconnect pump plug.
	Check circuit breaker No. 13 **(Figure 3, Item 3)**.	Reset circuit breaker and notify unit maintenance.
	Check discharge hose **(Figure 3, Item 4)** connections.	Connect discharge hose.
	Check 3k tank valve **(Figure 3, Item 5)**.	Open valve.
	Check 3k tank **(Figure 3, Item 6)**.	Have 3k tank emptied IAW unit SOP. If malfunction continues, notify unit maintenance.

PLUMBING TROUBLESHOOTING-CONTINUED



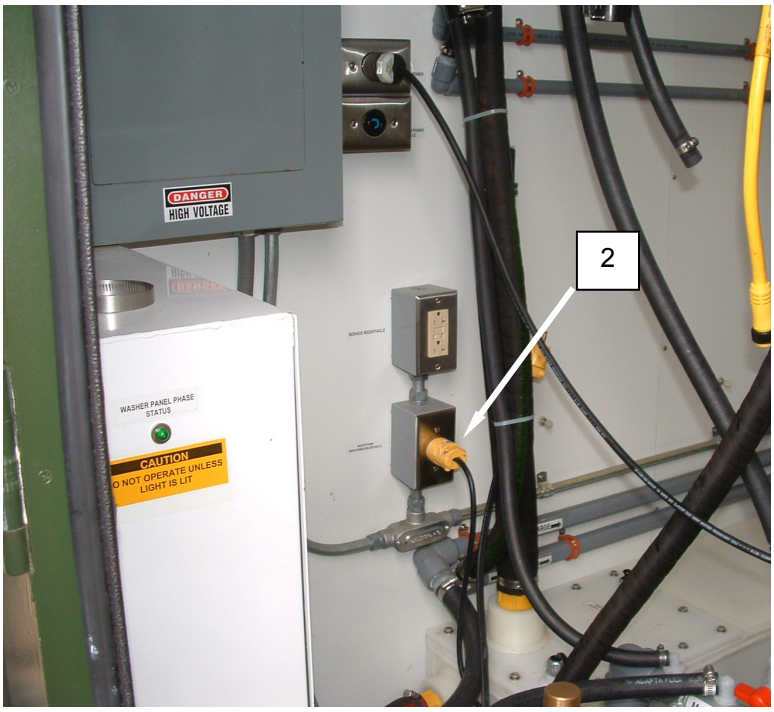


Figure 2. Waste Tank Overflows.

PLUMBING TROUBLESHOOTING-CONTINUED

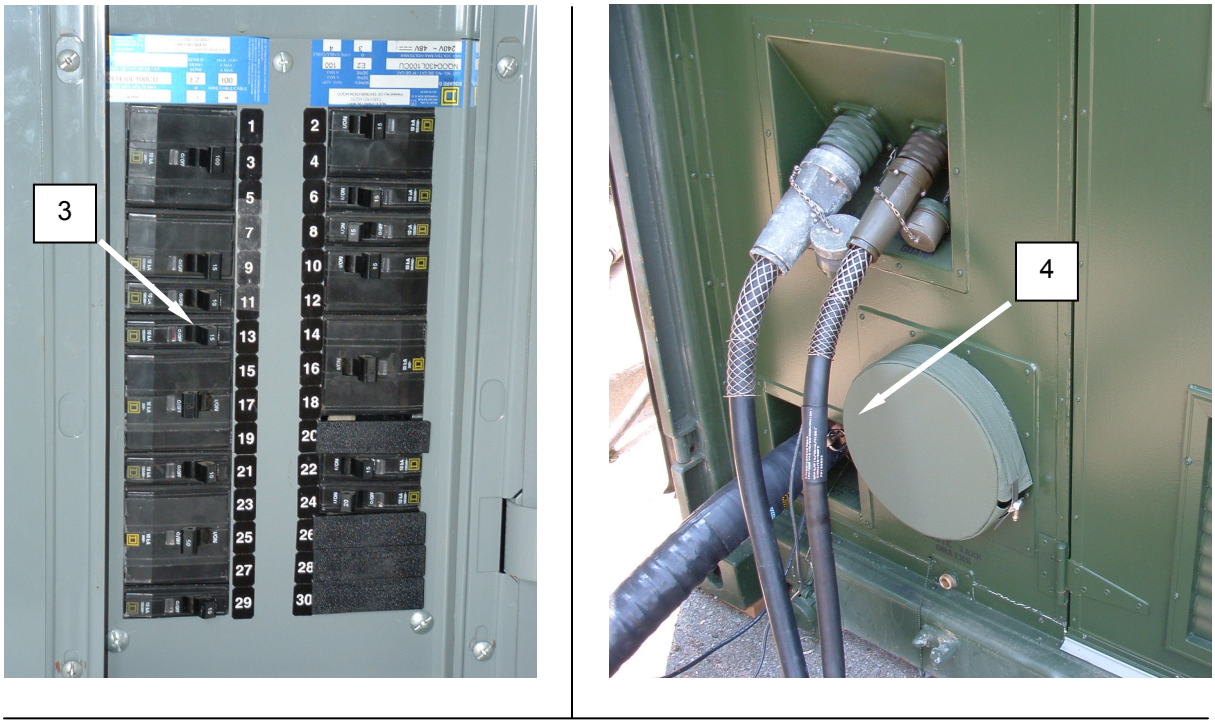


Figure 3. Waste Tank Overflows.

PLUMBING TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. WTS Transfer tank overflows	Ensure pump plug **(Figure 4, Item 1)** is connected. Check circuit breaker No. 6 **(Figure 4, Item 2)**.	Reconnect pump plug. Reset circuit breaker and notify unit maintenance. If malfunction continues, notify unit maintenance.

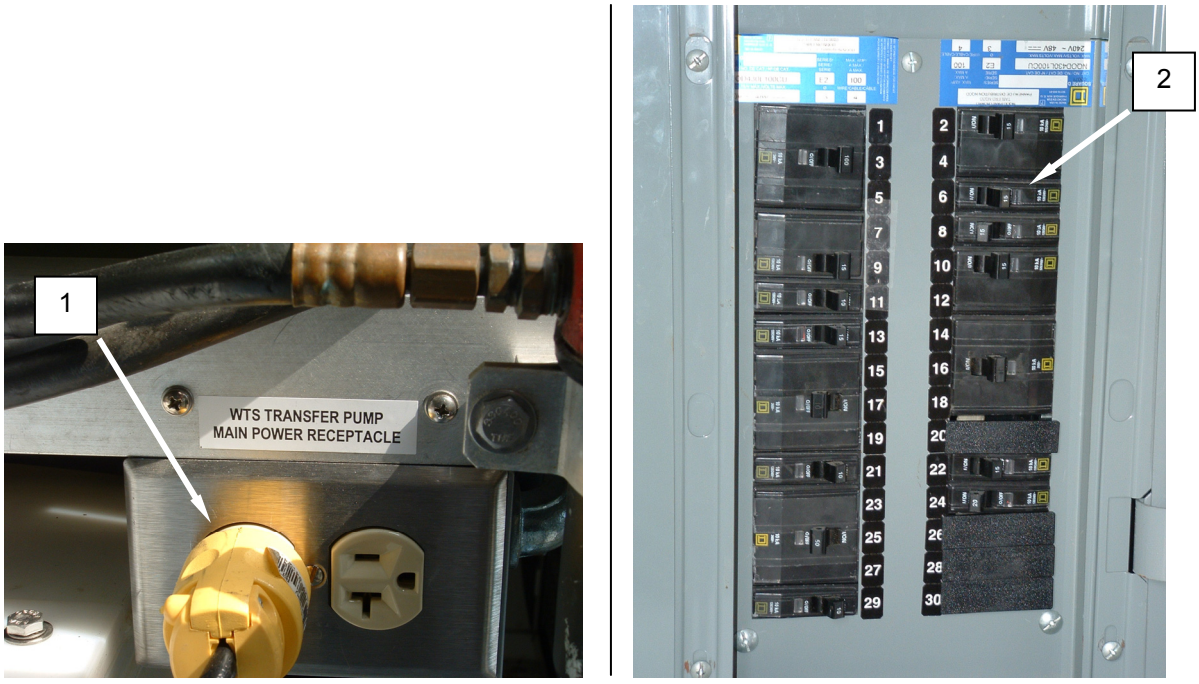


Figure 4. WTS Transfer Tank Overflows.

PLUMBING TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. P-1 Pump not operating	Ensure P-1 pump is ON at PLC **(Figure 5, Item 1)**. Check circuit breakers No. 7 and 9 **(Figure 5, Item 2)**. Check overload relay **(Figure 6, Item 3)**.	Switch pump ON. Reset circuit breaker and notify unit Maintenance. Reset overload relay and notify unit maintenance. If malfunction continues, notify unit maintenance.



Figure 5. P-1 Pump not Operating.

PLUMBING TROUBLESHOOTING-CONTINUED

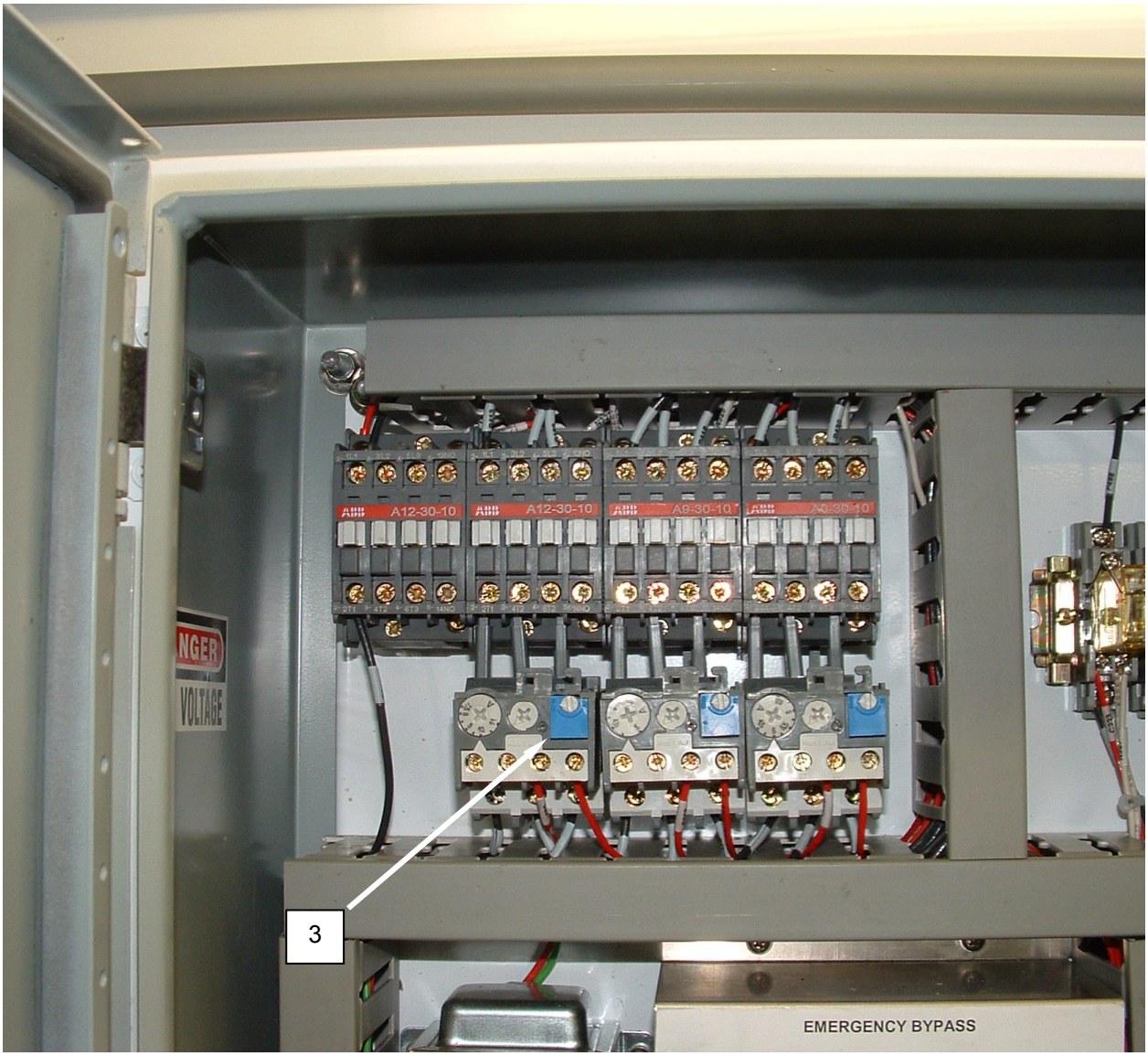


Figure 6. P-1 Pump not Operating.

PLUMBING TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. WTS Hold Tank overflows	If operating in Full Reuse or No Reuse modes, ensure Valve V-16 **(Figure 7, Item 1)** is completely closed as shown in Figure 7. If operating in Min Reuse mode, ensure Valve V-16 **(Figure 8, Item 1)** is throttled halfway as shown in Figure 8. Ensure pump P-3 **(Figure 8, Item 2)** is on and operating.	Stop washer operation, and allow level to drop. Monitor tank level during drainage, and during operation. Reset circuit breaker 15, 17, 19 **(Figure 8, Item 3)**, and switch pump P-3 ON at the PLC **(Figure 8, Item 4)**. If malfunction continues, notify unit maintenance.

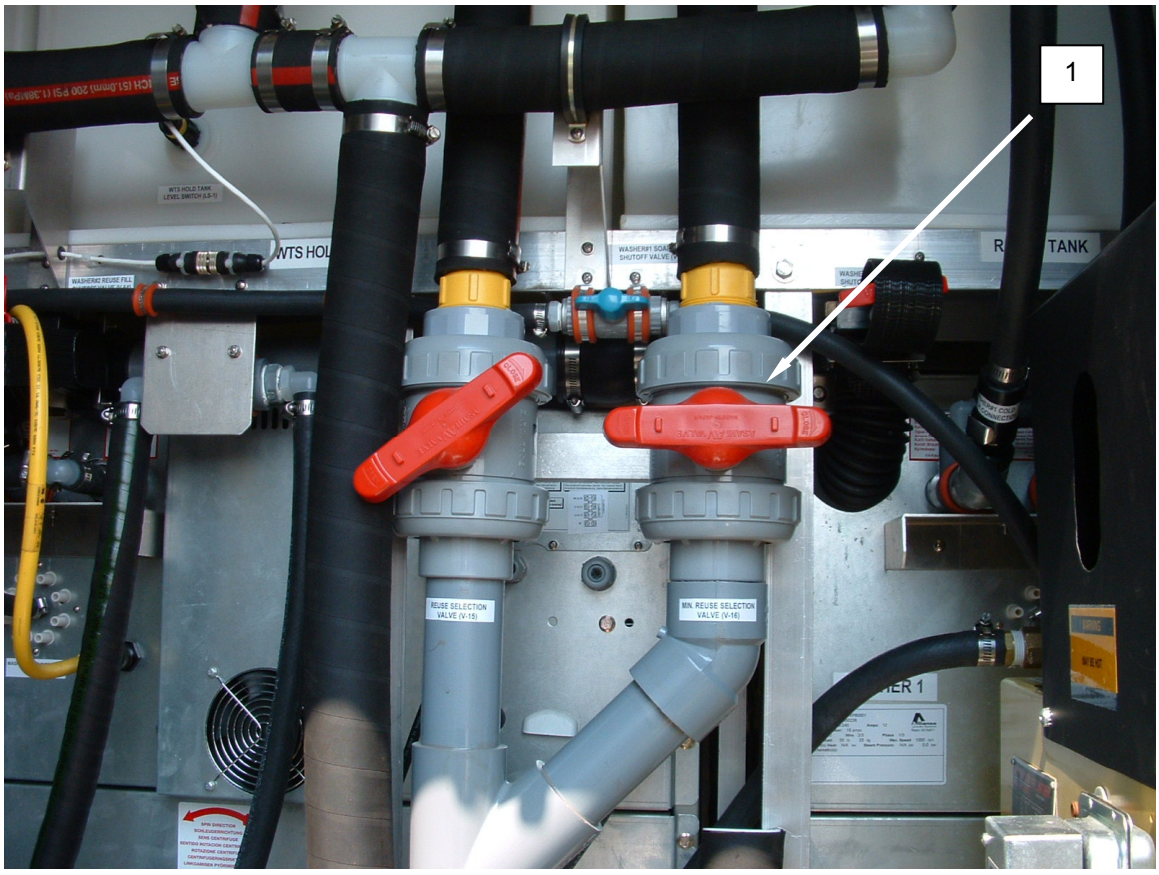
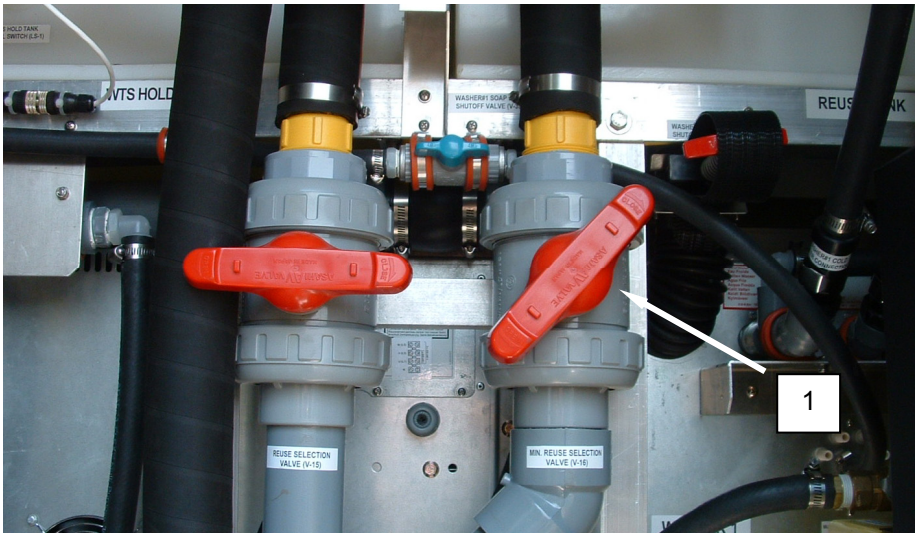
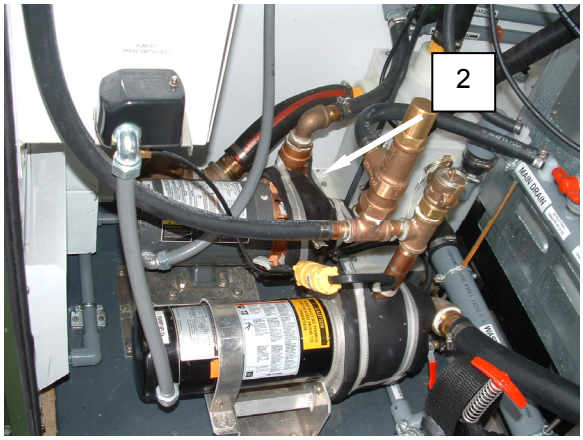
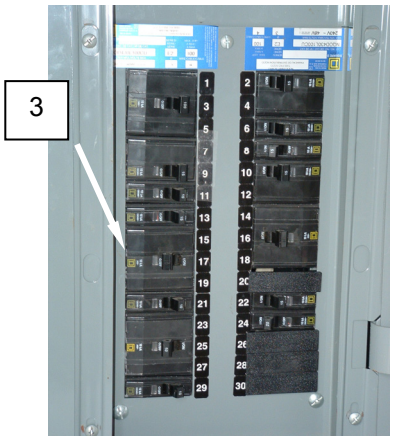


Figure 7. WTS Hold Tank Overflows.

PLUMBING TROUBLESHOOTING-CONTINUED







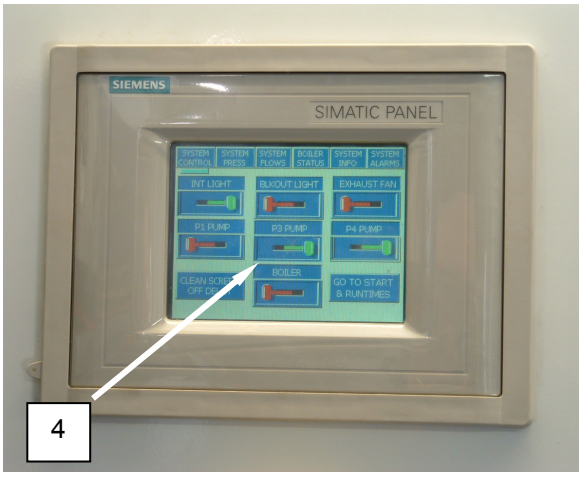


Figure 8. WTS Hold Tank Overflows.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
TROUBLESHOOTING PROCEDURES-PLC

PLC TROUBLESHOOTING

The troubleshooting procedures contain tables listing the malfunctions, tests or inspections, and corrective action required to return the CBL to normal operation. Perform the steps in the order they appear in the tables. Each procedure is headed by an initial setup. This setup outlines what is needed as well as certain conditions which must be met before starting the task.

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PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. “System Pressure Sensor Failure” on PLC Display		Acknowledge alarm. **(Figure 1, Item 1)** Notify unit maintenance.



Figure 1. System Pressure Sensor Failure on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. “Water Supply High Pressure” on PLC Display	Verify supply valve (V-18) setup is correct. **(Figure 2, Item 1)**	Shut down P-1 Pump at PLC **(Figure 3, Item 1)**, and notify unit maintenance. Ensure supply valve is set up correctly as shown in illustration. If malfunction continues, notify unit maintenance.



Figure 2. Water Supply High Pressure on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

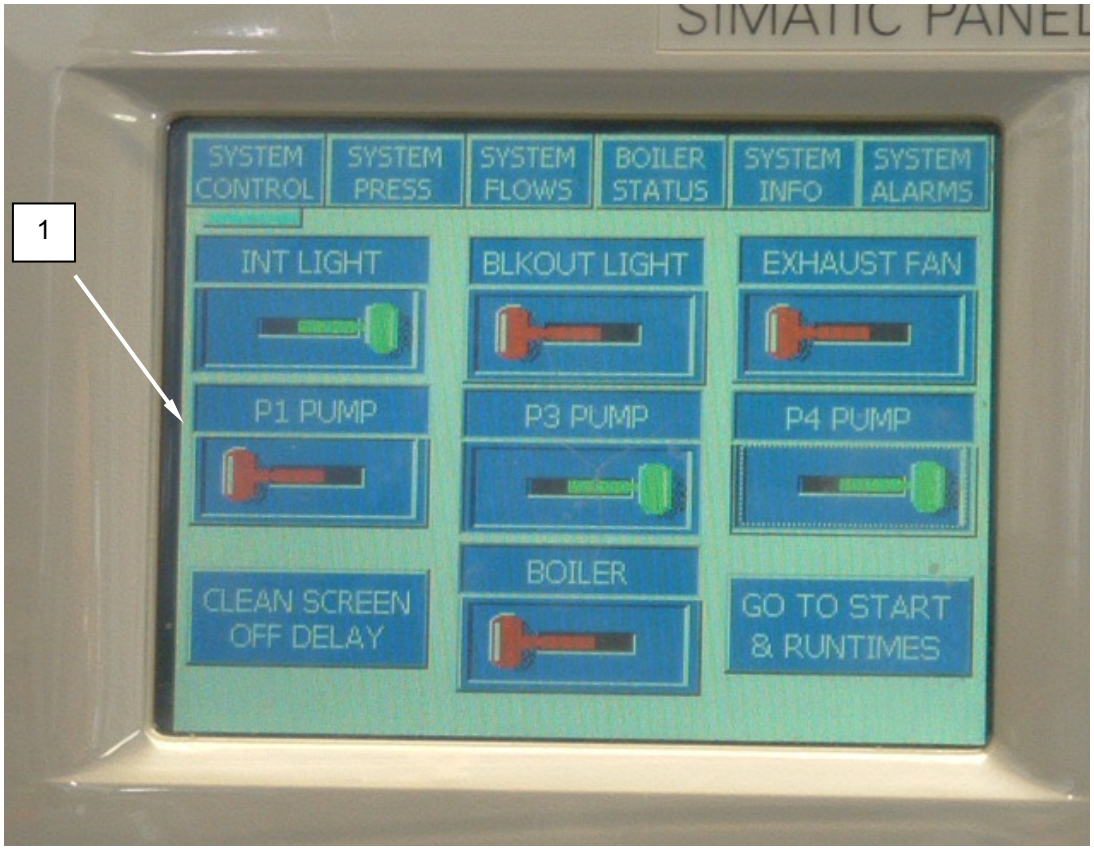


Figure 3. Water Supply High Pressure on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. “F1 Bag Differential Pressure High” on PLC Display **(Figure 4, Item 1)**	Inspect bag filters **(Figure 5, Item 2)** for lint and dirt. Ensure there is no air in the system and there is a steady stream of water. Then close F-1A or F-1B vent. Reset alarm on the PLC. Go to System Control menu turn P-3 pump off. Turn P-3 pump on.	Press “ACK” alarm. Shift F-1 filters at valve V-9 **(Figure 5, Item 3)**. Replace clogged filters as necessary IAW procedures in WP 0036 00. Vent system by opening either F-1A or F-1B vent. Ensure dirty bag is replaced within 1 hour. If malfunction continues, notify unit maintenance.

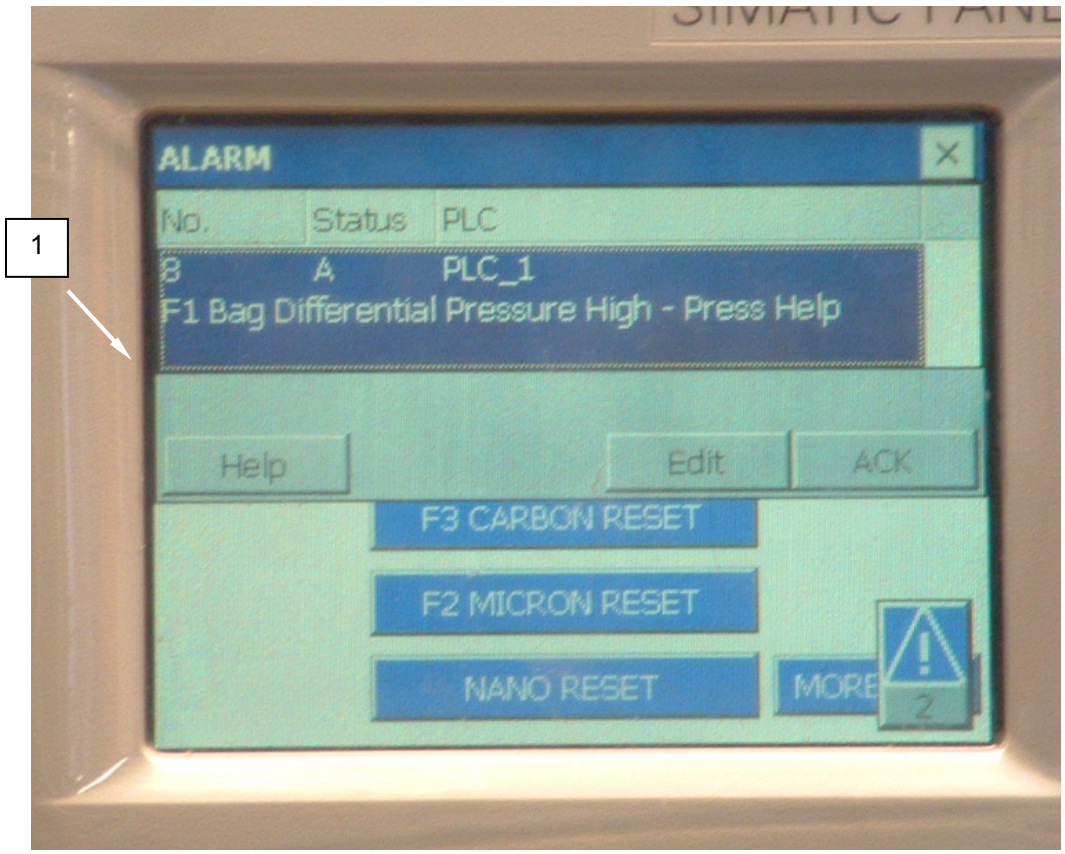


Figure 4. F1 Bag Differential Pressure High on PLC Display.

PLC TROUBLESHOOTING-CONTINUED



Figure 5. F1 Bag Differential Pressure High on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. “F1 Bag Filter is Clogged – P3 Pump is Stopped” on PLC Display **(Figure 6, Item 1)**	Inspect bag filters **(Figure 7, Item 2)** for lint and dirt. Ensure there is no air in the system and there is a steady stream of water, then close F-1A or F-1B vent. Reset alarm on the PLC. Go to System Control menu turn P-3 pump off. Turn P-3 pump on.	Press “ACK” alarm. Shift F-1 filters at valve V-9 **(Figure 7, Item 3)**. Replace clogged filters as necessary IAW procedures in WP 0036 00. Vent system by opening either F-1A or F-1B vent. Ensure dirty bag is replaced within 1 hour. If malfunction continues, notify unit maintenance.

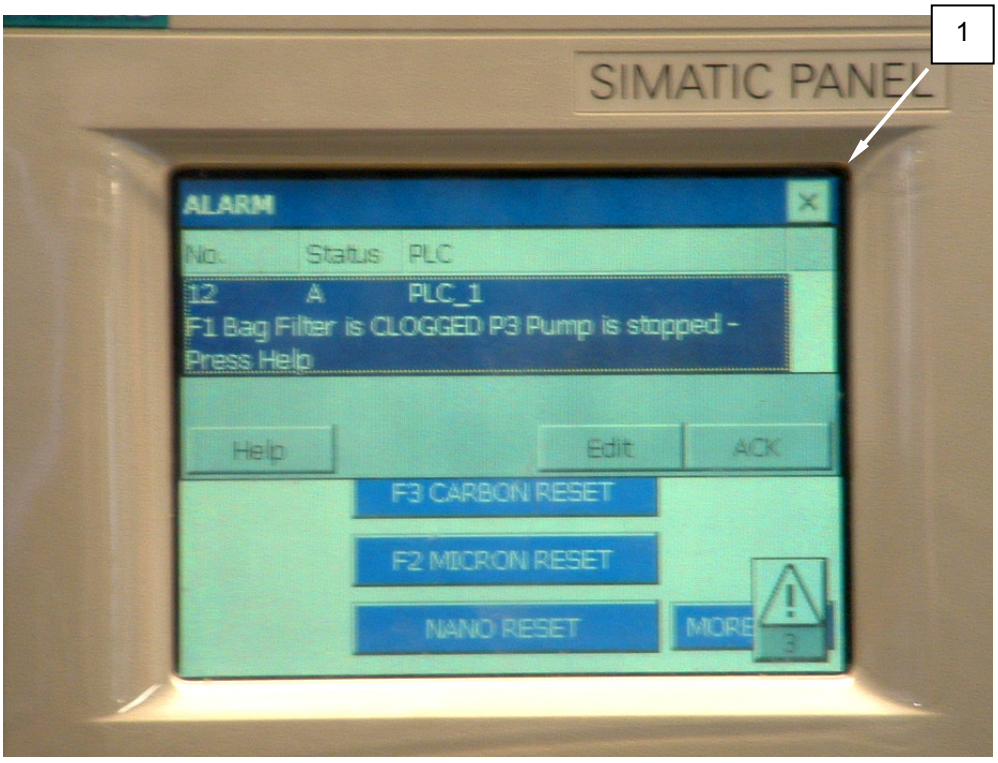


Figure 6. F1 Bag Filter is Clogged – P3 Pump is Stopped Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED



Figure 7. F1 Bag Filter is Clogged – P3 Pump is Stopped Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. “F2 Micron Differential Pressure High” alarm on PLC Display **(Figure 8, Item 1)**	Ensure valves V-41 and V-42 are fully open.	Acknowledge alarm. Replace F-2 filter IAW procedures given in WP 0036 00. Reset alarm IAW WP 0009 00. If malfunction continues, notify unit maintenance.



Figure 8. F2 Micron Differential Pressure High Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED



Figure 9. F2 Micron Differential Pressure High Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. “Carbon Filter Outlet Pressure Sensor” alarm on PLC Display **(Figure 10, Item 1)**		Acknowledge alarm. Change to only non-reuse cycles. Notify unit maintenance.

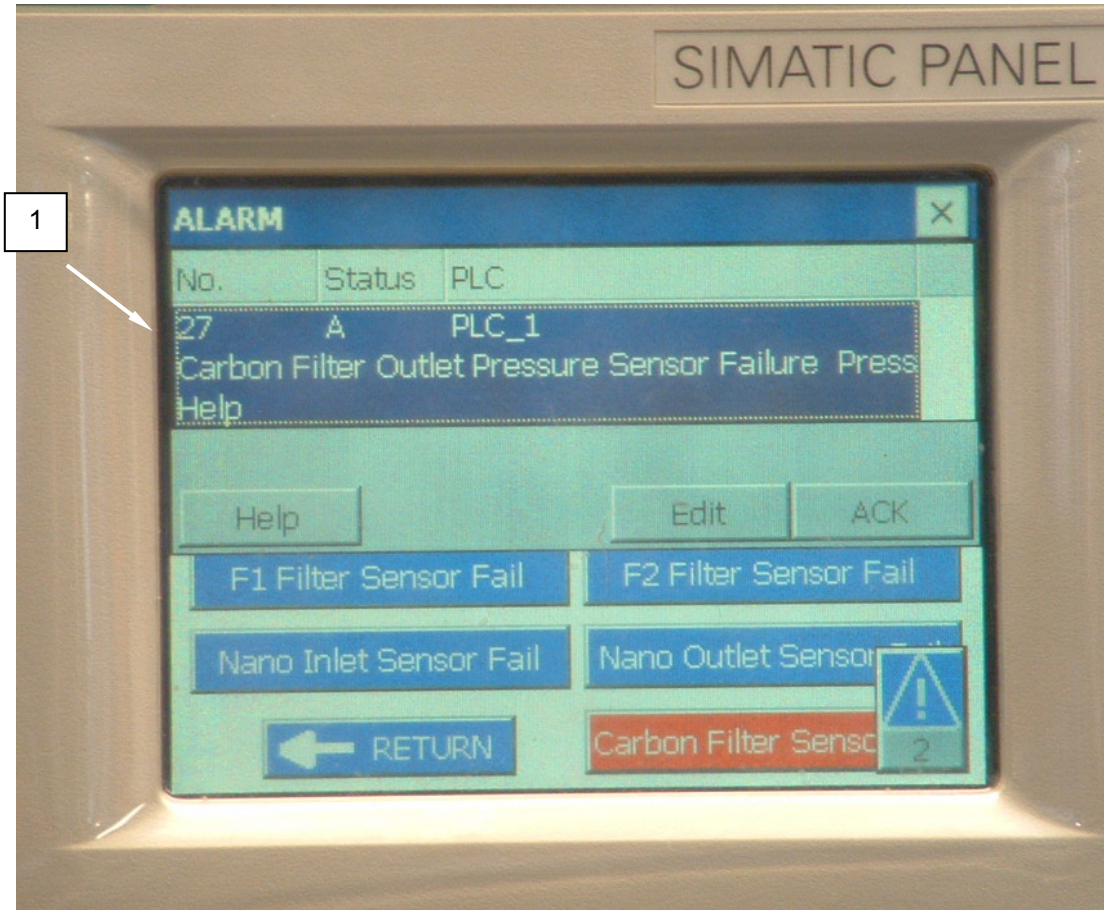


Figure 10. Carbon Filter Outlet Pressure Sensor Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. “F3 Carbon Filter Differential Pressure High” alarm on PLC Display **(Figure 11, Item 1)**		Acknowledge alarm. Replace filter F-3 IAW procedures given in WP 0037 00. Ensure that the isolation valves V-43 and V-59 are fully open. Reset alarm IAW WP 0009 00. If malfunction continues, notify unit maintenance.

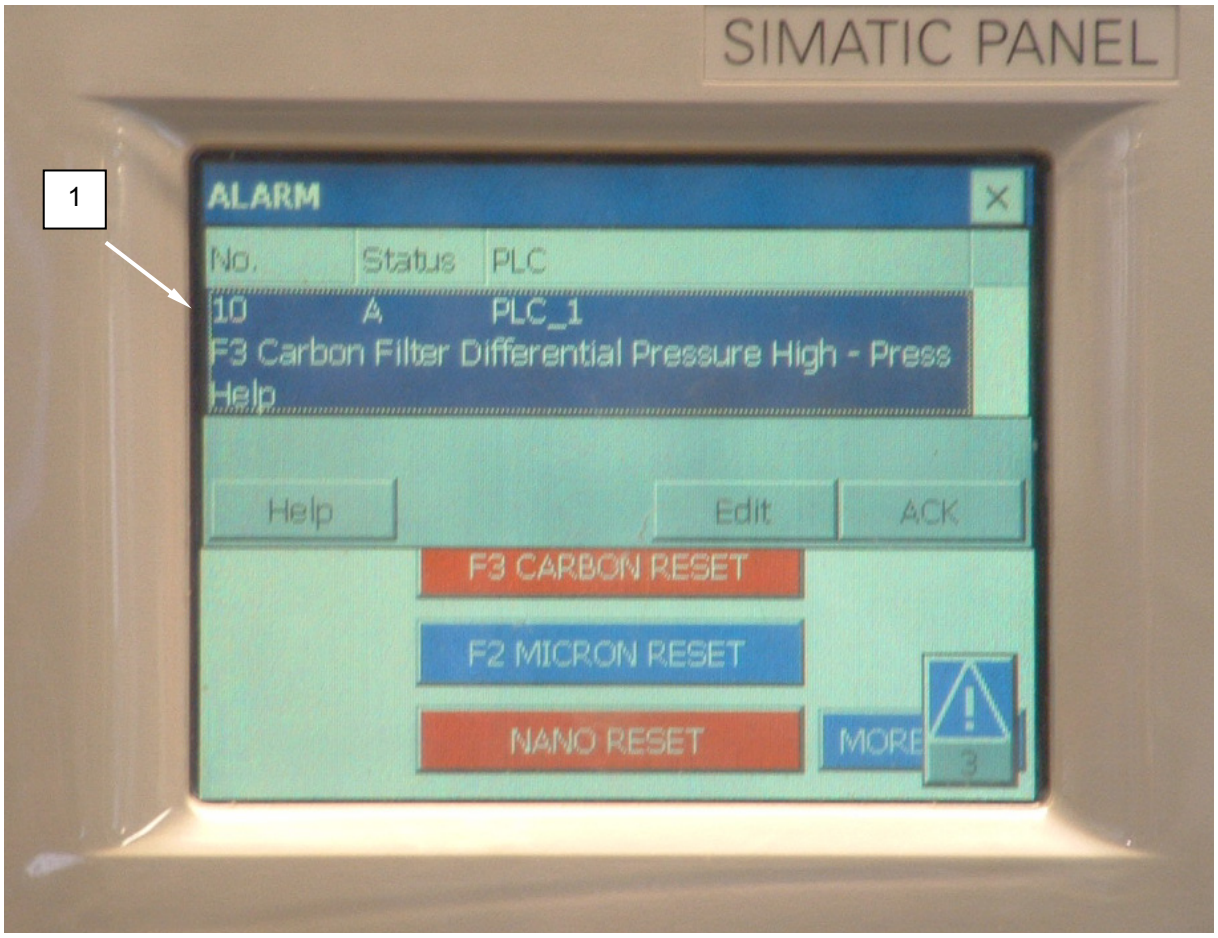


Figure 11. F3 Carbon Filter Differential Pressure High Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED



Figure 12. F-3 Carbon Filter Differential Pressure High Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
8. “Reuse Loop Flow Sensor Failure” alarm on PLC Display **(Figure 13, Item 1)**		Acknowledge alarm. Ensure connector on reuse flow transmitter (FT-4) is connected properly. Press reuse loop sensor fail button on PLC. If malfunction continues shut down pumps P-3 and P-4, operate in non-reuse cycles only, notify unit maintenance.

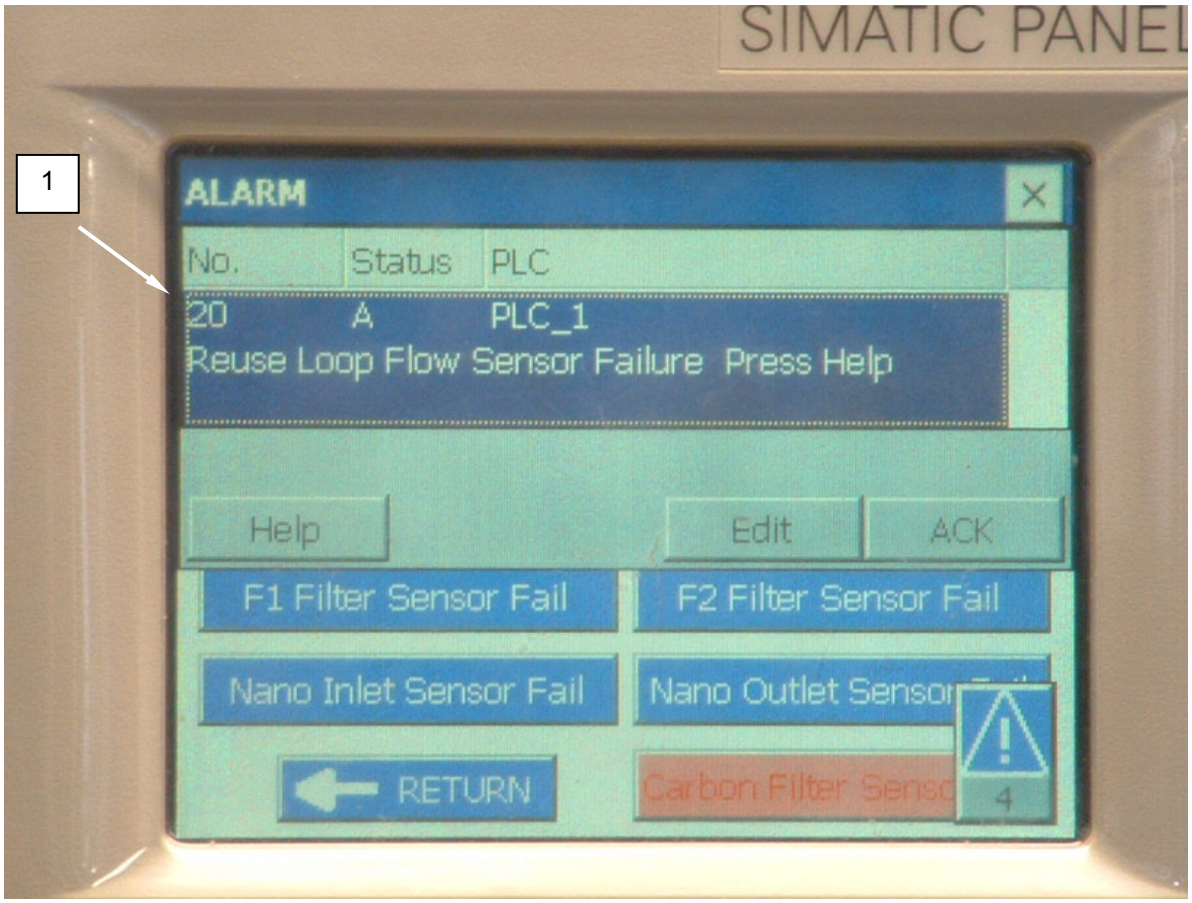


Figure 13. Reuse Loop Flow Sensor Failure Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

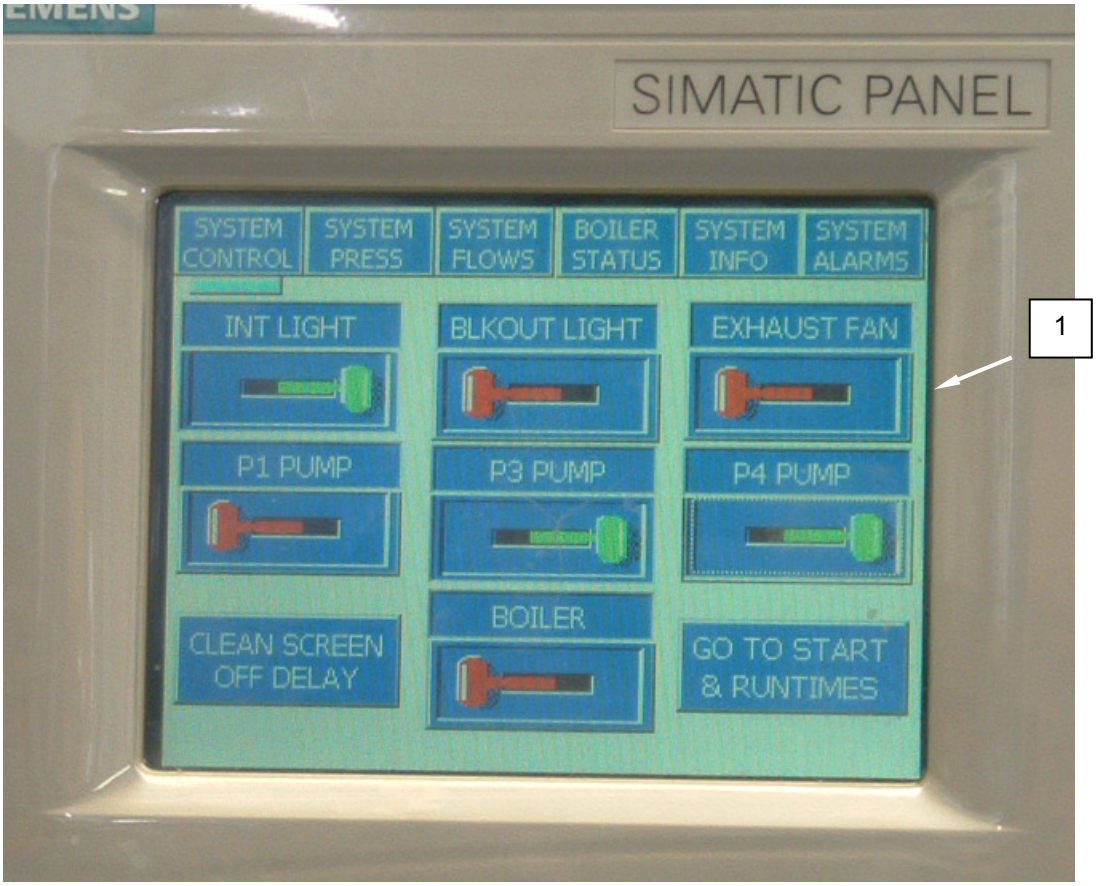


Figure 14. Reuse Loop Flow Sensor Failure Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
9. “P3 Loop Flow Sensor Failure” alarm **(Figure 15, Item 1)**	Ensure connector on reuse flow transmitter (FT-1) is connected properly.	Acknowledge alarm. Press reuse loop sensor fail button on PLC. If malfunction continues shut down pumps P-3 and P-4, operate in non-reuse cycles only, notify unit maintenance.

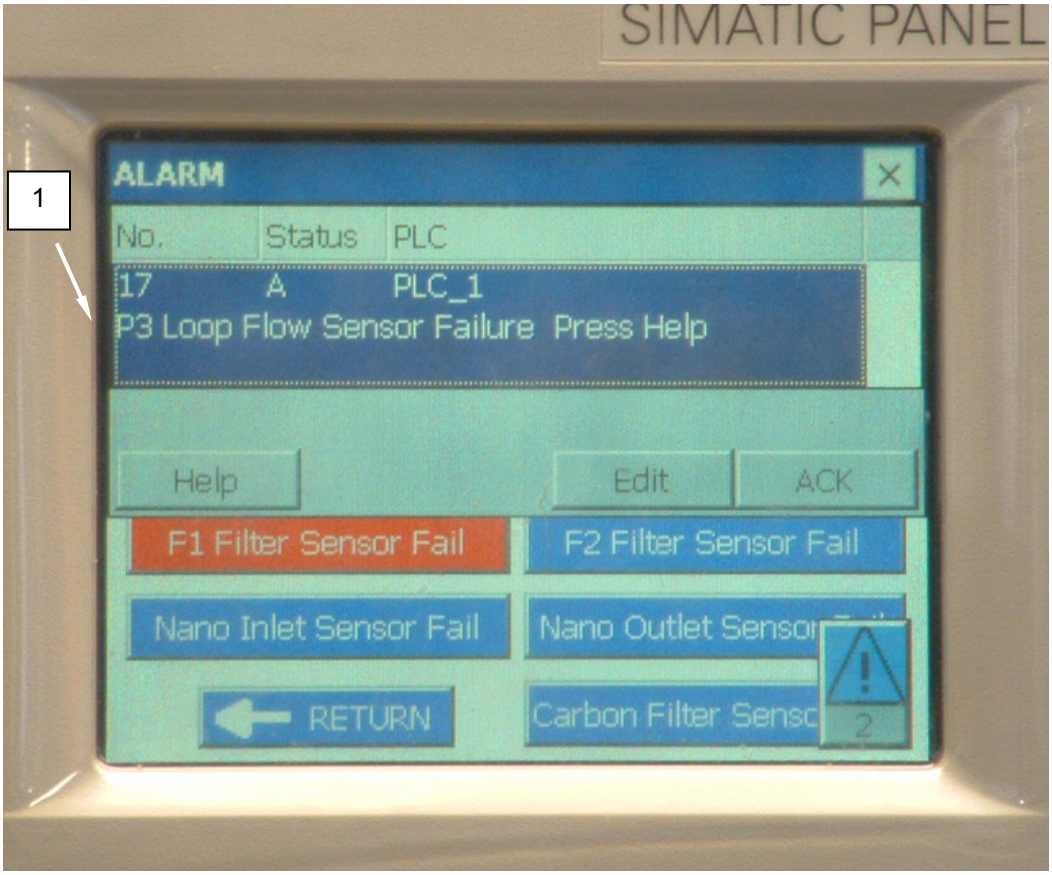


Figure 15. P3 Loop Flow Sensor Failure Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
10. “P4 Loop Flow Sensor Failure” alarm on PLC Display **(Figure 16, Item 1)**	Ensure connector on reuse flow transmitter (FT-4) is connected properly.	Acknowledge alarm. Press reuse loop sensor fail button on PLC. If malfunction continues shut down pumps P-3 and P-4, operate in non-reuse cycles only, notify unit maintenance.

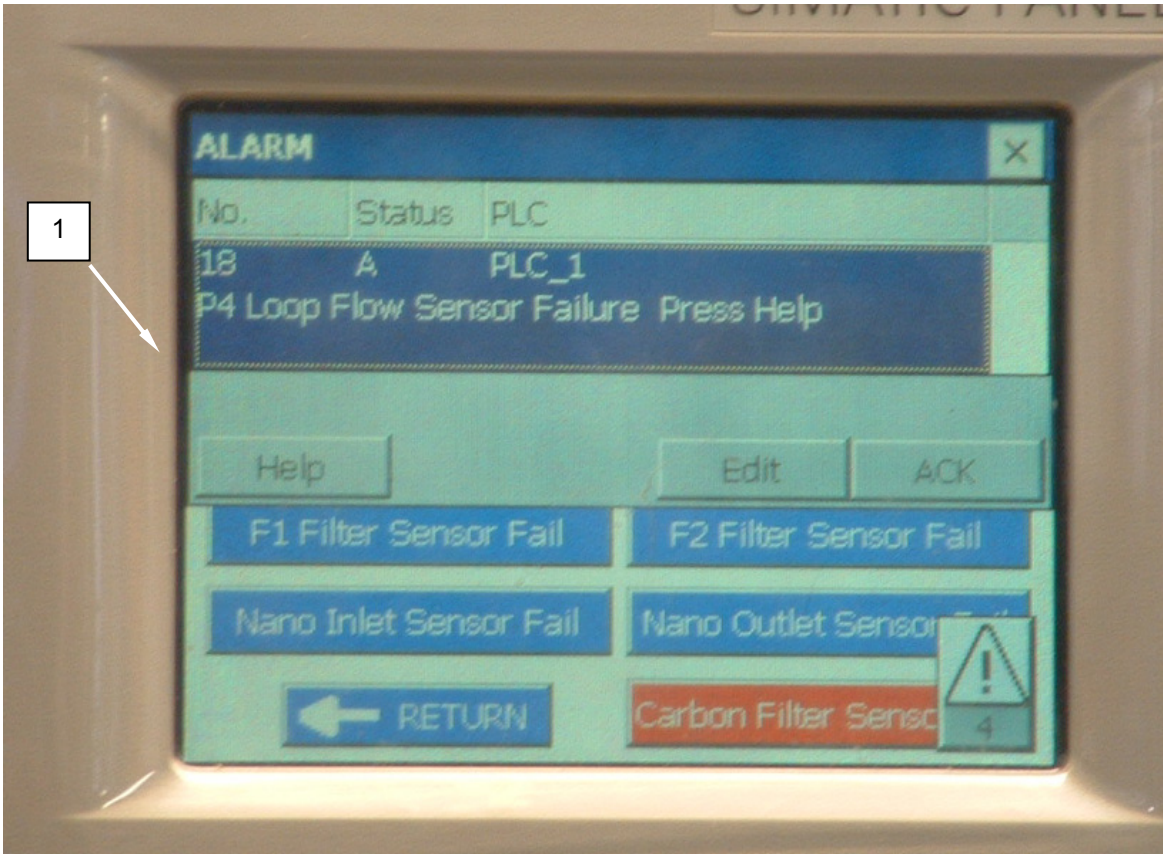


Figure 16. P4 Loop Flow Sensor Failure Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
11. “Waste Loop Flow Sensor Failure” alarm on PLC Display **(Figure 17, Item 1)**	Ensure connector on reuse flow transmitter (FT-3) is connected properly.	Acknowledge alarm. Press reuse loop sensor fail button on PLC. If malfunction continues shut down pumps P-3 and P-4, operate in non-reuse cycles only, notify unit maintenance.

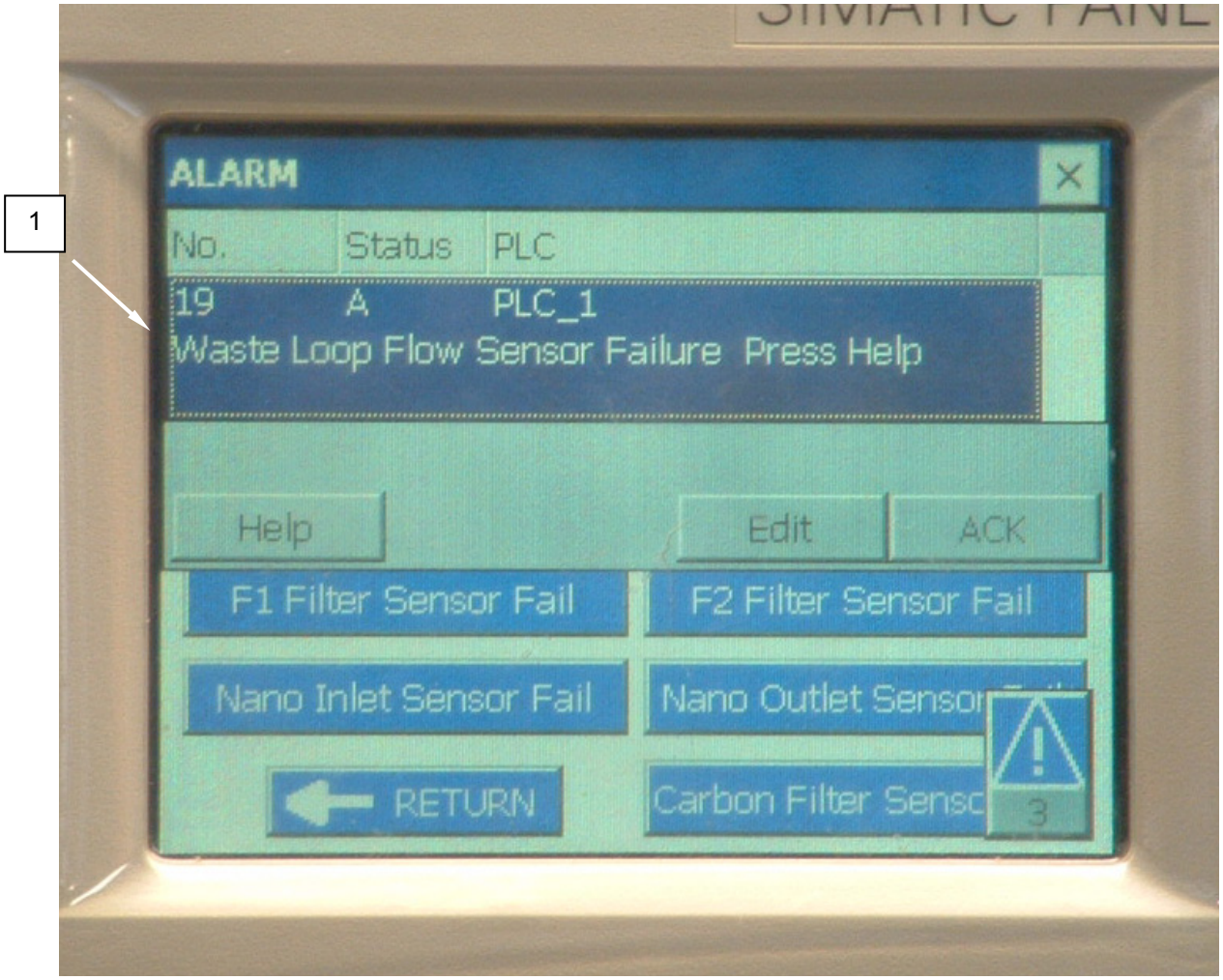


Figure 17. Waste Loop Flow Sensor Failure Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
12. “Nano Outlet Pressure Sensor Failure” alarm on PLC Display **(Figure 18, Item 1)**		Acknowledge alarm. Shut down P-3 and P-4 pump. Run system in non-reuse. Notify unit maintenance.

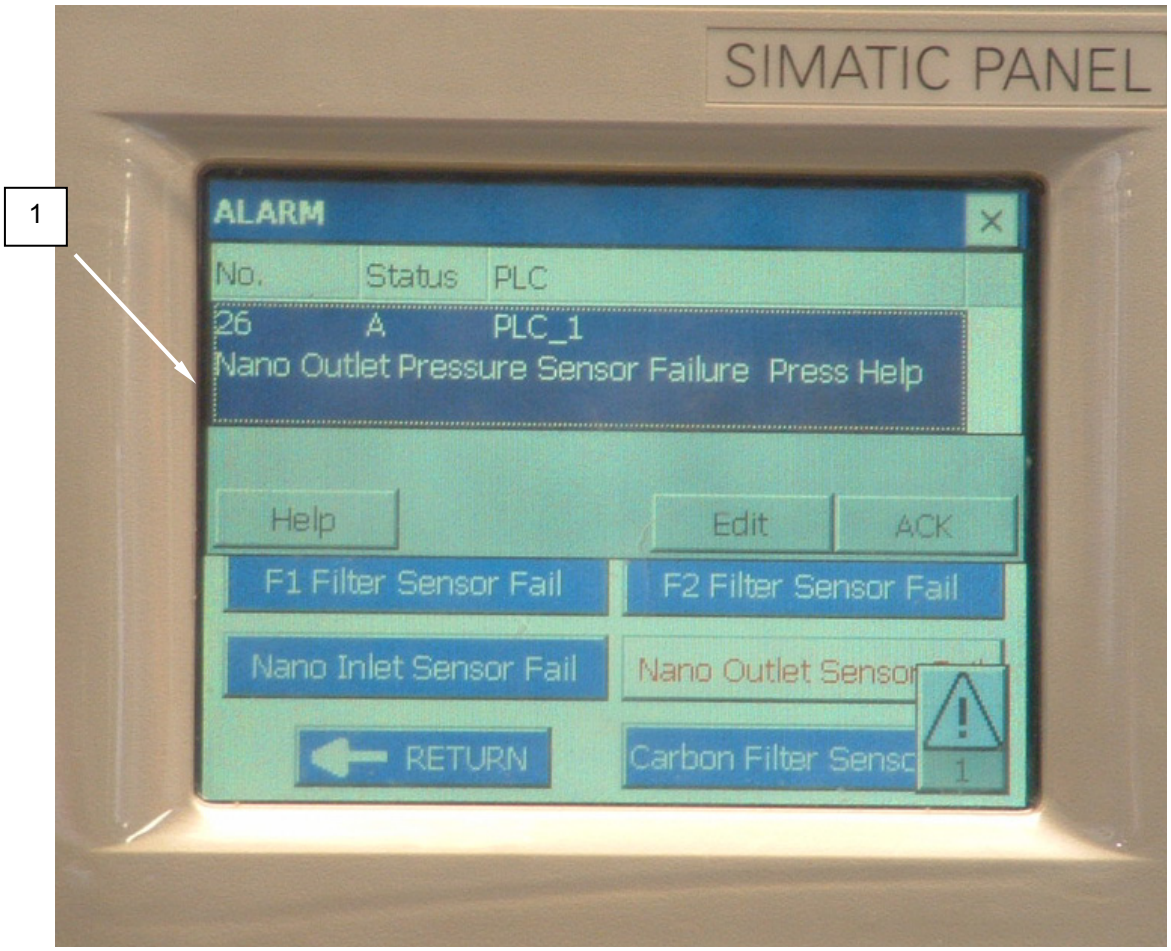


Figure 18. Nano Outlet Pressure Sensor Failure Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
13. “Nano Inlet Pressure Sensor Failure” alarm on PLC Display **(Figure 19, Item 1)**		Acknowledge alarm. Shut down P-3 and P-4 pump. Run system in non-reuse. Notify unit maintenance.



Figure 19. Nano Inlet Pressure Sensor Failure Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

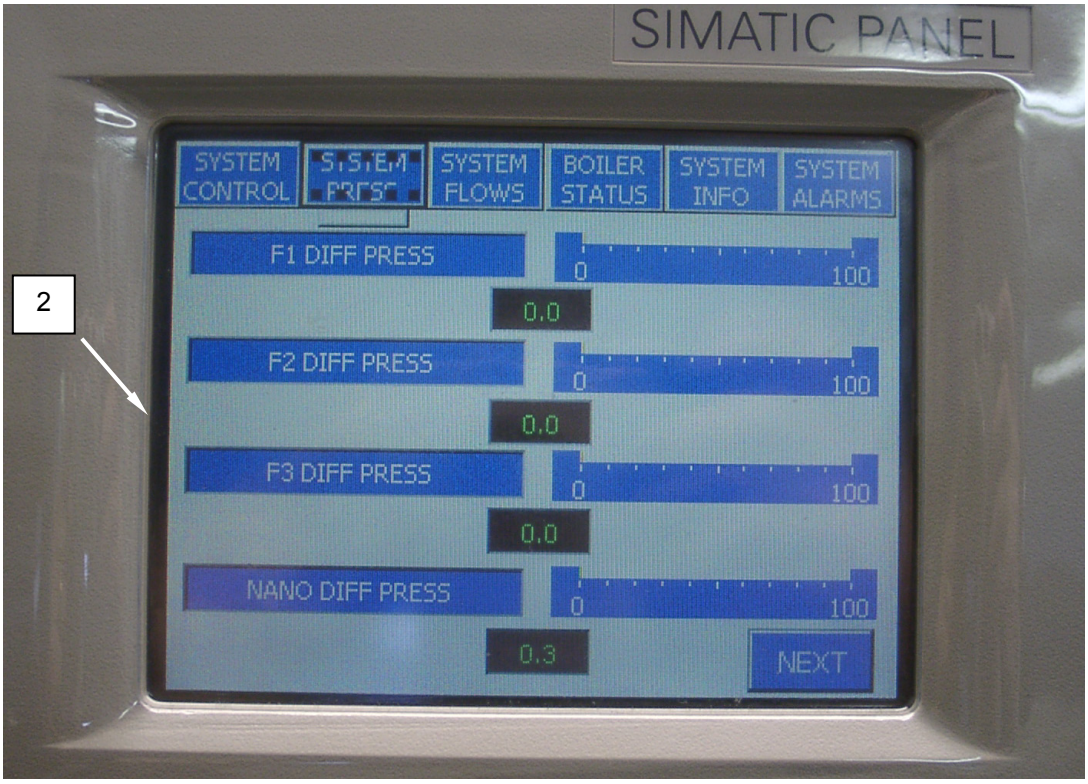
Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
14. “Nano Filter Differential Pressure High” alarm on PLC Display **(Figure 20, Item 1)**		Acknowledge alarm. Clean nanofilters **(Figure 21, Item 3)** IAW procedures given in WP 0038 00. Reset alarm IAW 0009 00. If malfunction continues, notify unit maintenance.



Figure 20. Nano Filter Differential Pressure High Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED



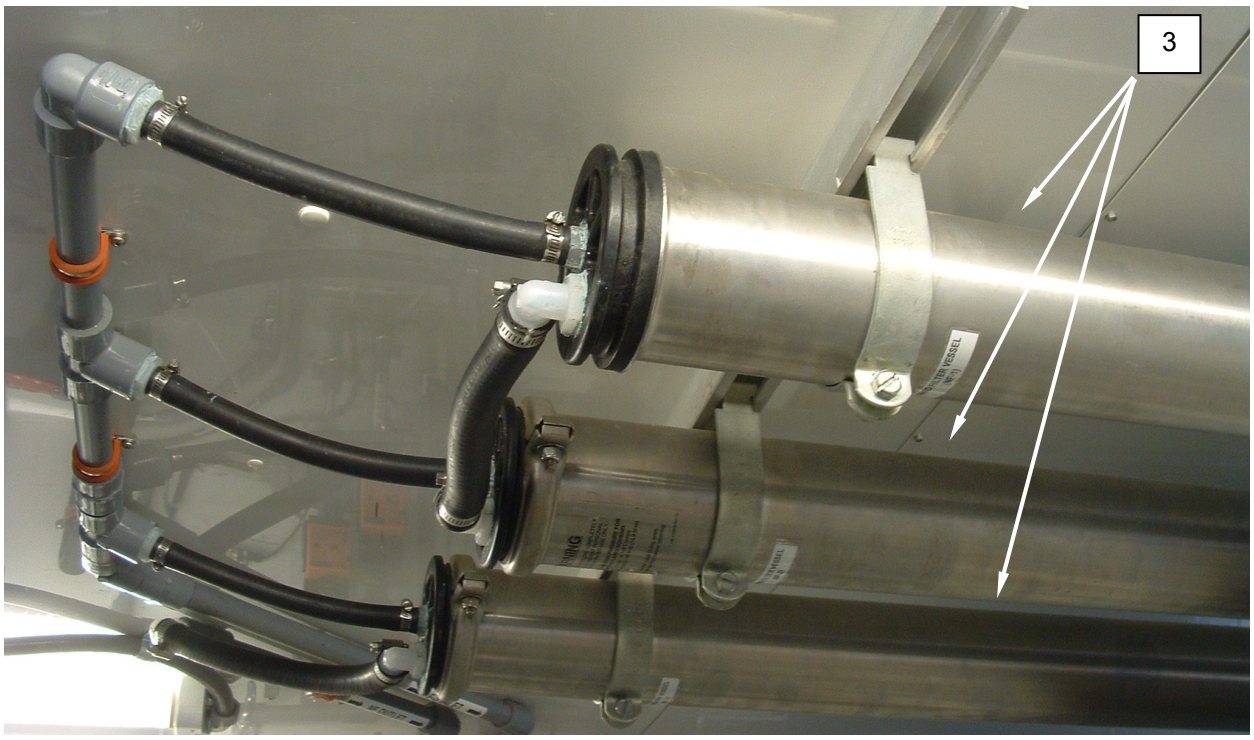


Figure 21. Nano Filter Differential Pressure High Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
16. P3 Pump alarm at PLC **(Figure 22, Item 1)**	Inspect P-3 Pump **(Figure 23, Item 2)**.	Acknowledge alarm.
	Inspect for outward material damage. Check for signs of overheating, such as acrid smell or burnt paint on pump motor.	Notify unit maintenance.
	Check P-3 Pump circuit Breaker that occupies slots No. 15, 17, and 19 **(Figure 23, Item 3)**.	Ensure pump P-3 breaker is reset.
	Check overload reset (in the center) on the starter in the PLC box.	Reset overload reset.
	Ensure isolation valves V-41 and V-42 are fully open.	Reset alarm IAW 0009 00 by turning P-3 pump off then on again. Notify unit maintenance. If malfunction continues, notify unit maintenance.

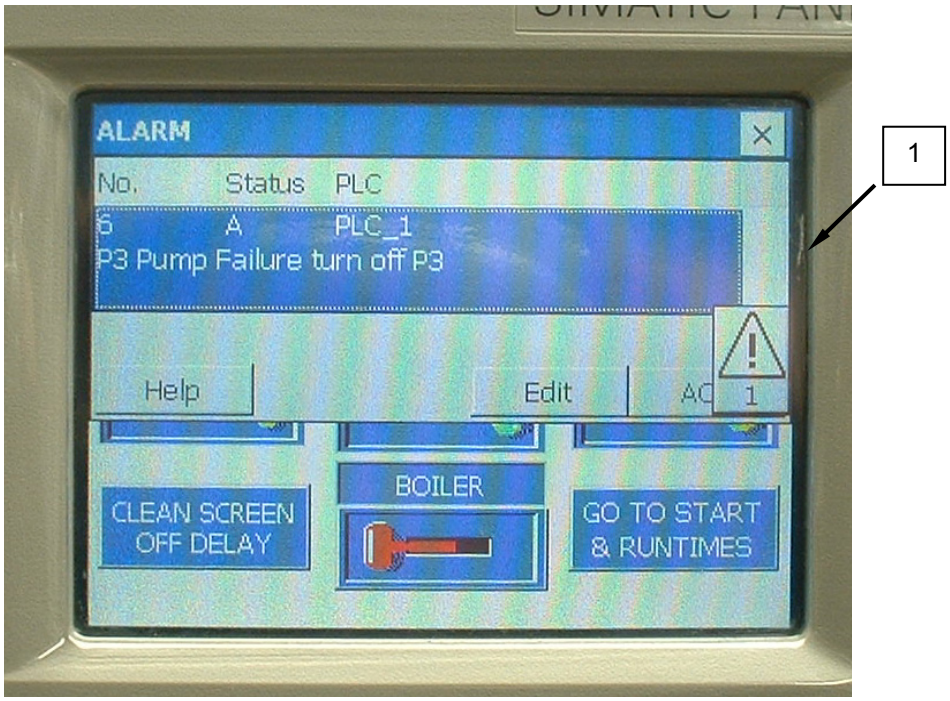


Figure 22. P3 Pump Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

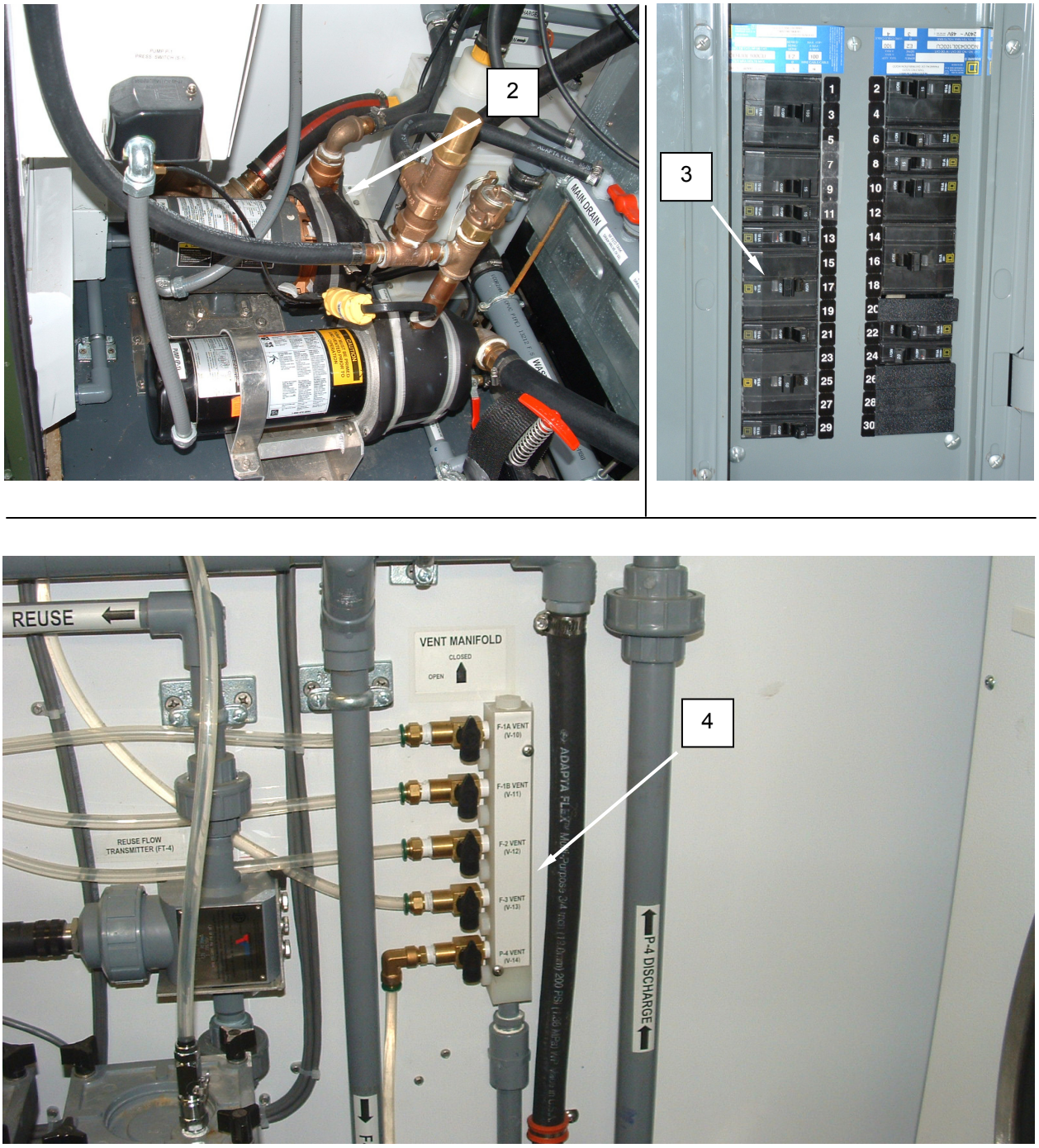


Figure 23. P3 Pump Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

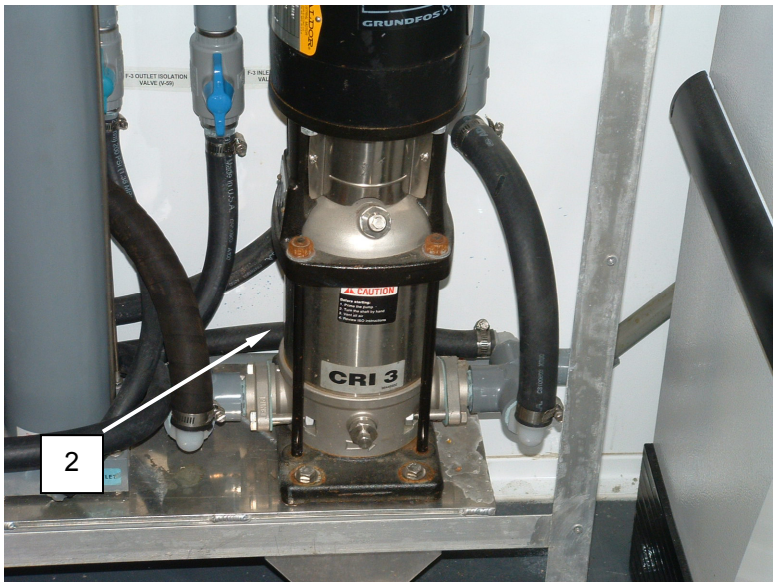
Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

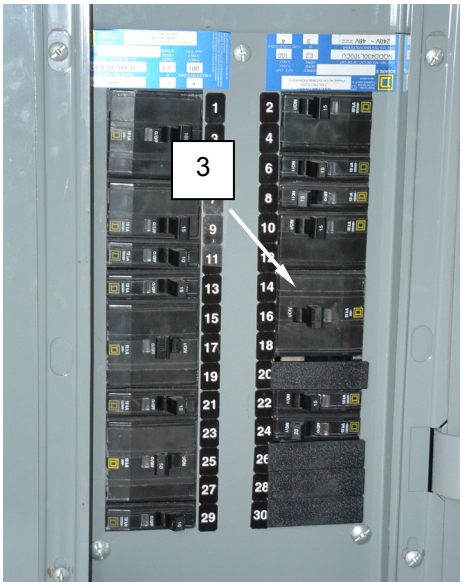
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
17. P4 Pump alarm at PLC **(Figure 24, Item 1)**		Acknowledge alarm.
	Inspect for outward material damage. Check for signs of overheating, such as acrid smell or burnt paint on pump motor.	
	Inspect P-4 Pump **(Figure 25, Item 2)**.	Notify unit maintenance.
	Check P-4 Pump circuit Breaker **(Figure 25, Item 3)** that occupies slots 14, 16, and 18.	Reset pump P-4 circuit breaker No. 14, 16, and 18.
	Check overload reset on the starter in the PLC box.	Reset overload reset on the starter.
	Ensure that isolation valves V-43 and V-59 are fully open.	Reset IAW 0009 00.
		If malfunction continues, notify unit maintenance.



Figure 24. P4 Pump Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED





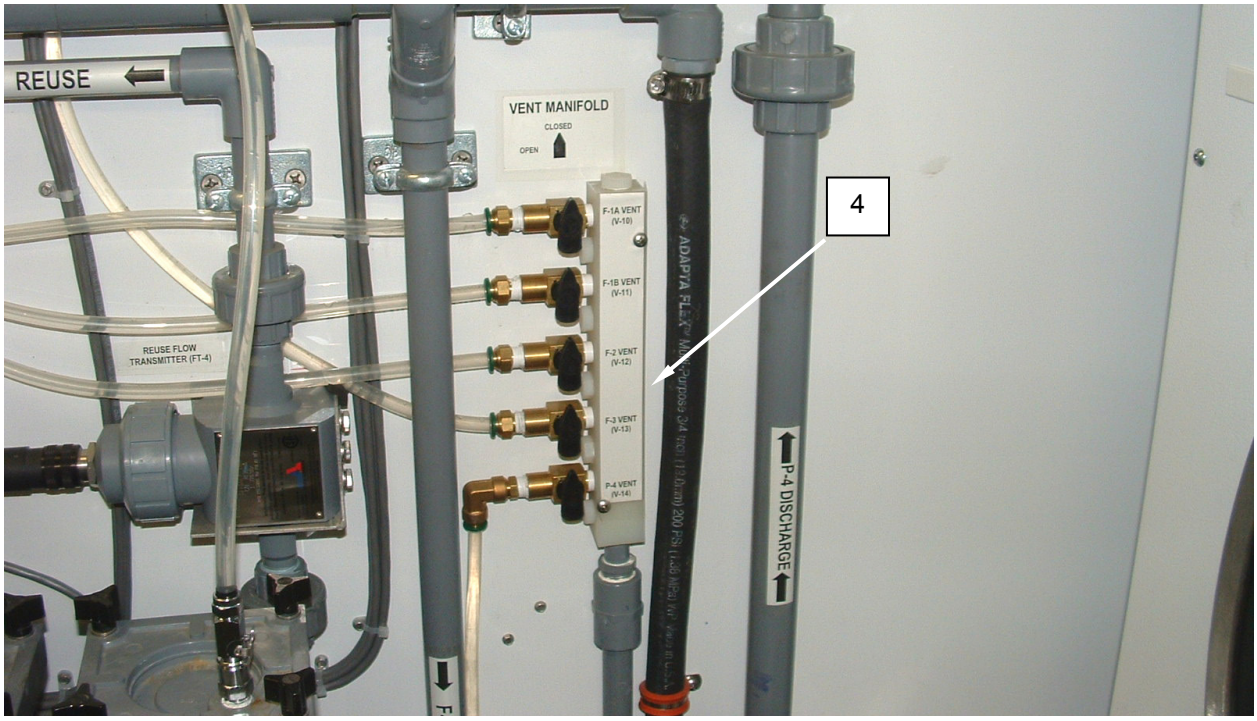


Figure 25. P4 Pump Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
18. “Boiler Failure Alarm” on PLC Display **(Figure 26, Item 1)**		Acknowledge alarm. Shut down boiler at PLC **(Figure 27, Item 2)**. Reset boiler circuit breaker No. 22 **(Figure 27, Item 3)**. Switch boiler back ON at PLC. If malfunction continues, notify unit maintenance.

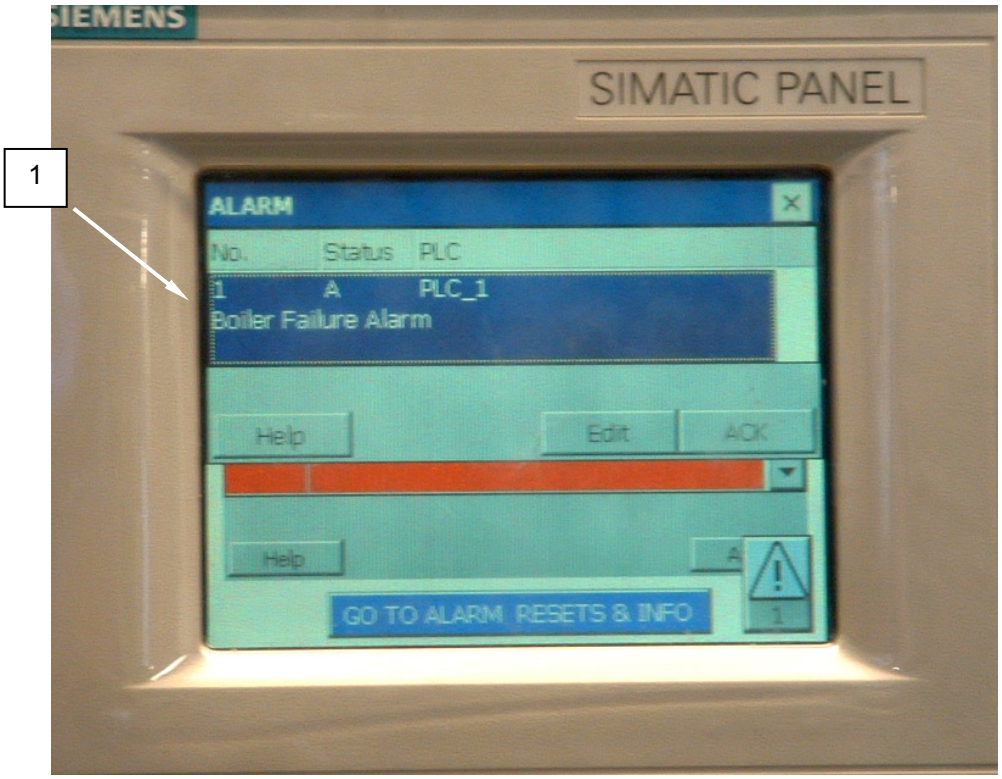


Figure 26. Boiler Failure Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED



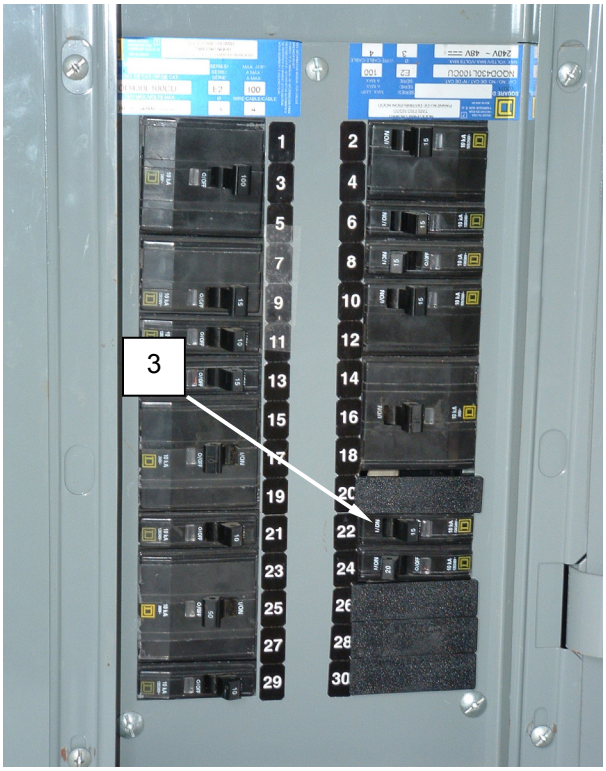


Figure 27. Boiler Failure Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
19. “Boiler Burner Cutout Alarm” on PLC Display **(Figure 28, Item 1)**.		**NOTE** Do not press ACK at this time.
	Inspect boiler to verify operation.	Press controller reset **(Figure 29, Item 2)** ONCE, and monitor for normal operation. Press ACK to acknowledge the alarm.
	Check fuel supply.	Replenish fuel IAW procedures in WP 0008 00. Start boiler at PLC **(Figure 29, Item 3)**. If boiler trips off on this same alarm, press controller reset **(Figure 29, Item 2)** ONCE, and monitor for normal operation. If malfunction continues, notify unit maintenance.

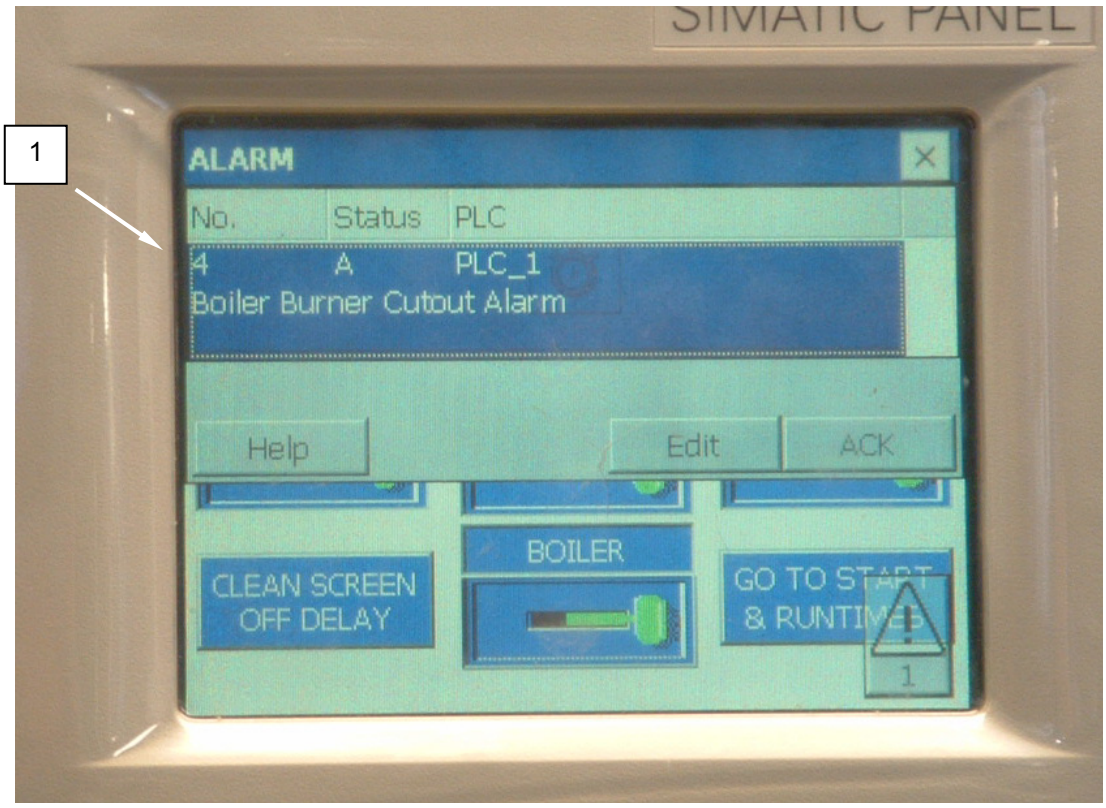
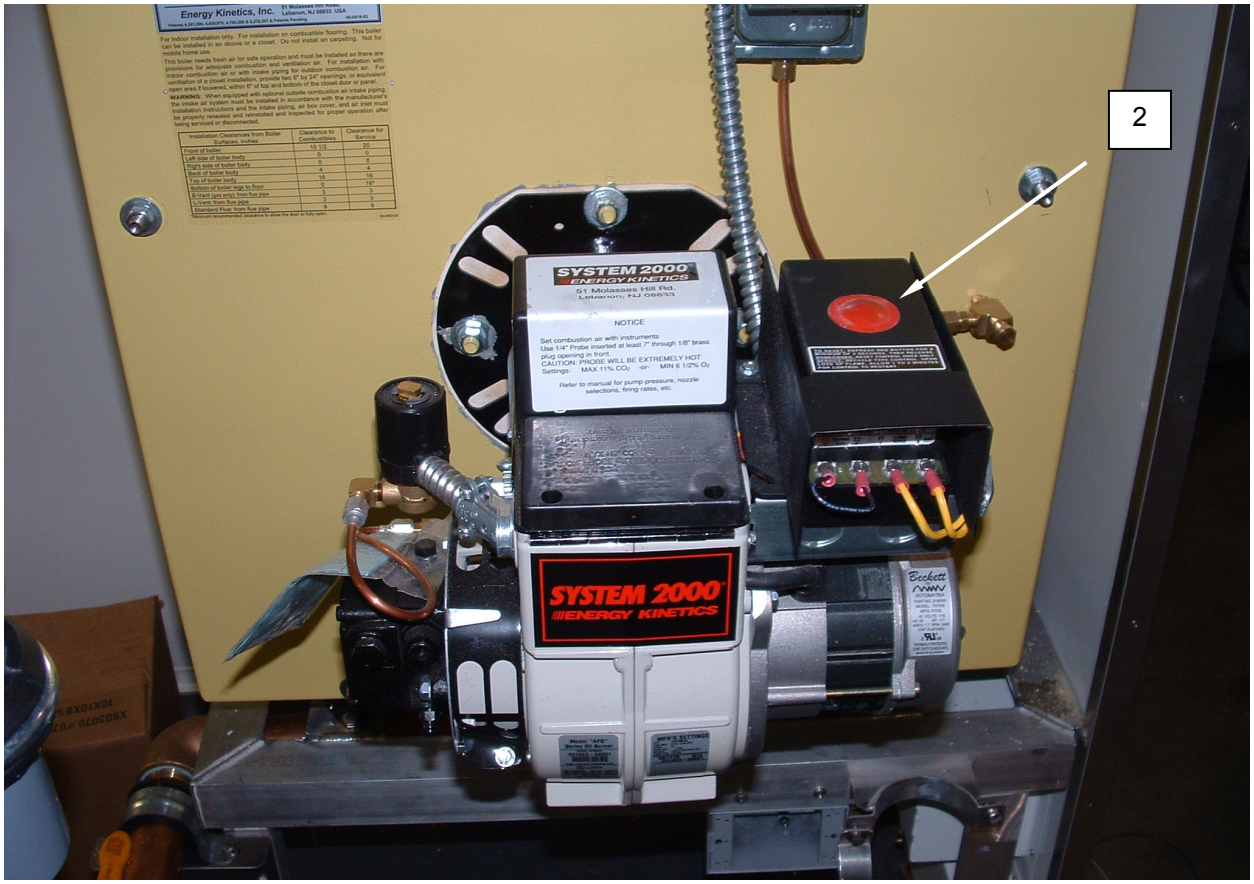


Figure 28. Boiler Burner Cutout Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED



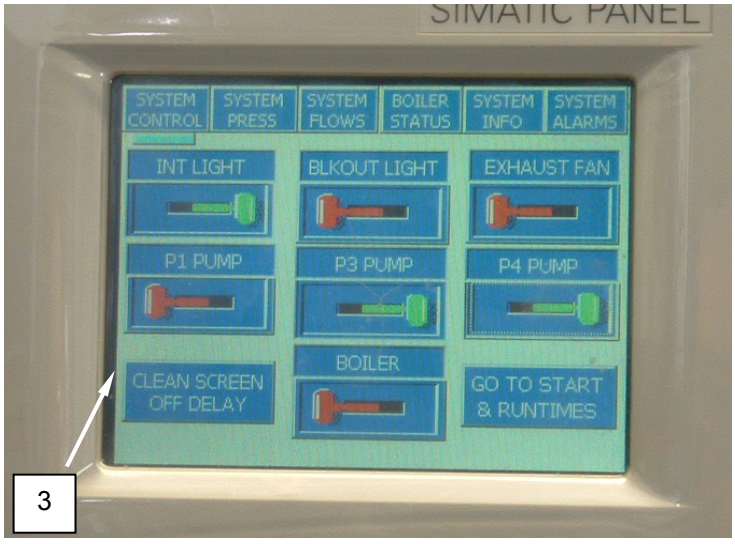


Figure 29. Boiler Burner Cutout Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
20. “Boiler High Temperature Alarm” on PLC Display **(Figure 30, Item 1)**	Verify alarm.	Shut down boiler at circuit breaker No. 22 and notify unit maintenance.

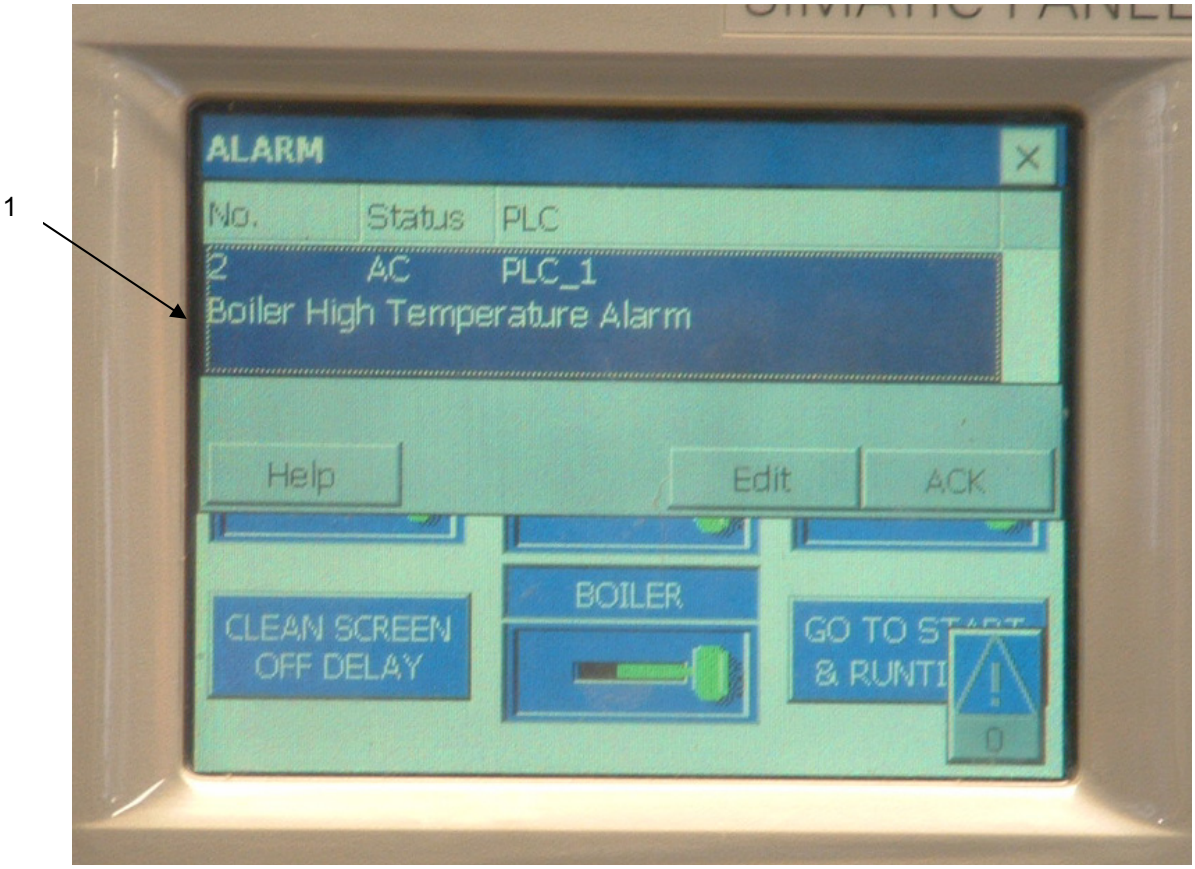


Figure 30. Boiler High Temperature Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
21. “Boiler Low Glycol Alarm” on PLC Display **(Figure 31, Item 1)**	Inspect boiler to verify operation. Check glycol level in reservoir **(Figure 32, Item 2)**. If glycol is in reservoir and alarm is still present. Ensure that glycol is mixed 50/50.	Shut down boiler at PLC **(Figure 32, Item 3)**. Service boiler from radiator cap directly. **WARNING** Allow 30 minutes or until cool to service boiler. Failure to follow warning may cause serious injury to personnel. Wait 30 minutes or until cool then add glycol to the boiler filler neck. Add glycol up to but not exceeding vent line. Reset boiler circuit breaker No. 22 **(Figure 32, Item 4)**. Switch boiler back ON at PLC. If malfunction continues, notify unit maintenance.

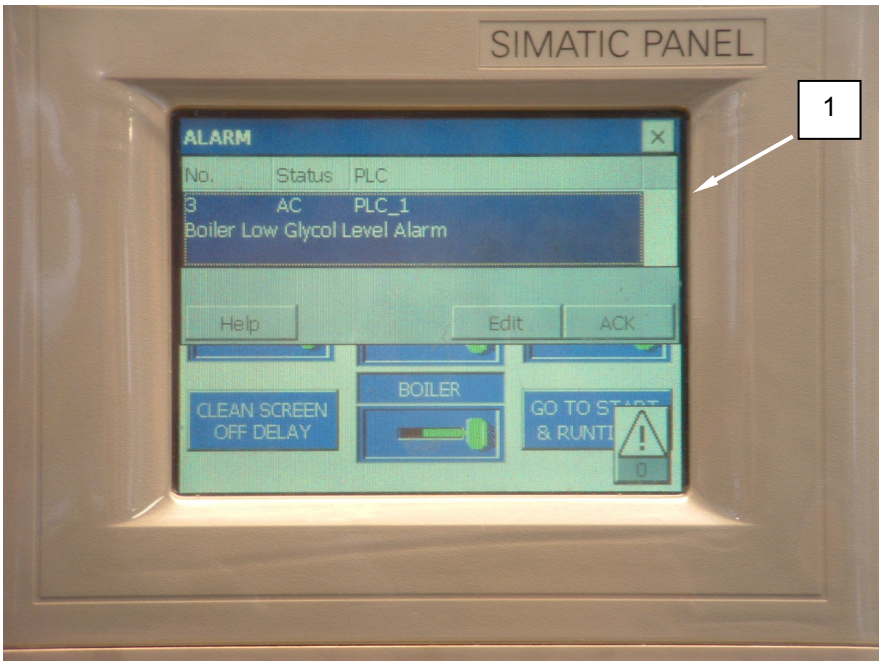
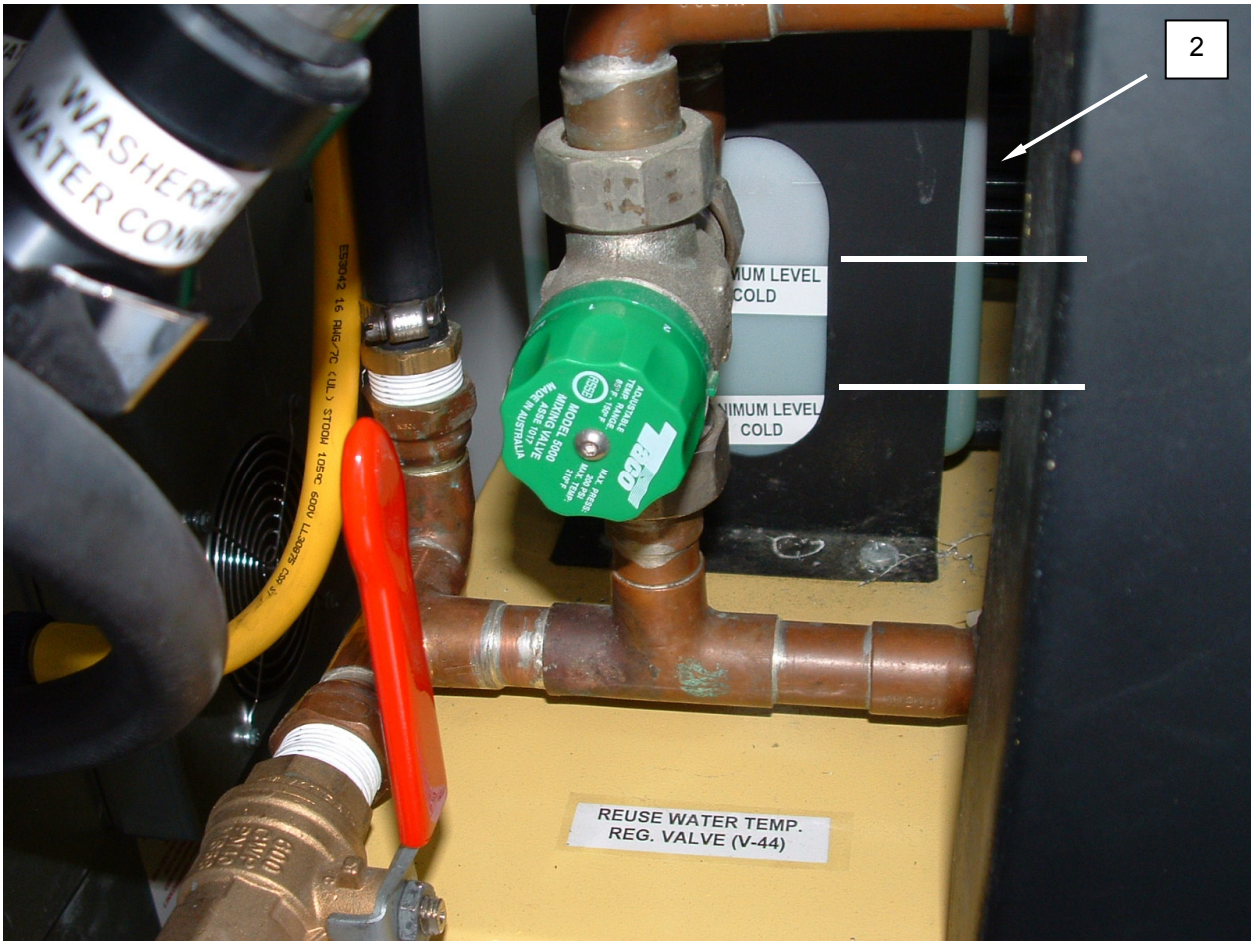
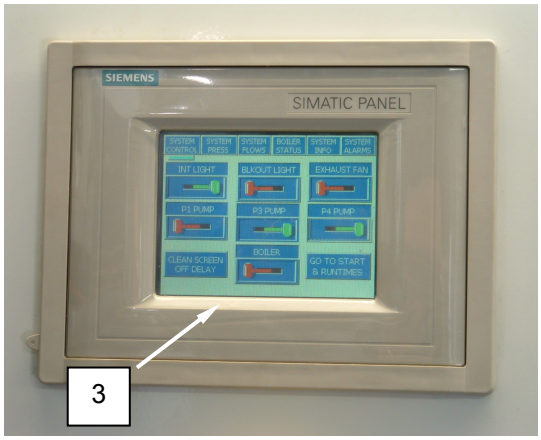


Figure 31. Boiler Low Glycol Alarm on PLC Display.

PLC TROUBLESHOOTING-CONTINUED





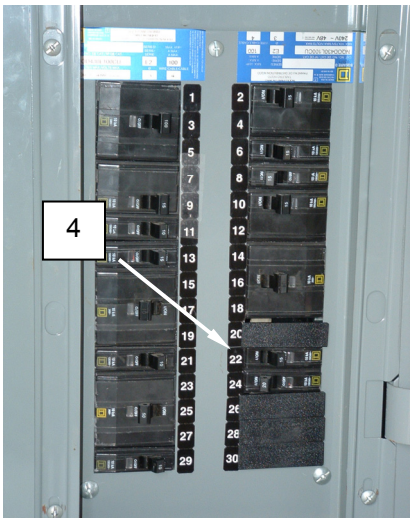


Figure 32. Boiler Low Glycol Alarm on PLC Display.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
TROUBLESHOOTING PROCEDURES-WASHERS

WASHER TROUBLESHOOTING

The troubleshooting procedures contain tables listing the malfunctions, tests or inspections, and corrective action required to return the CBL to normal operation. Perform the steps in the order they appear in the tables. Each procedure is headed by an initial setup. This setup outlines what is needed as well as certain conditions which must be met before starting the task.

DO NOT START THE TASK UNTIL:

- You understand the task.
- You understand what you are to do.
- You understand what is needed to do the work.
- You have the things you need.

WASHER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedures for Containerized Batch Laundry.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. “Didn’t fill within time” Error message on Washer Display **(Figure 1, Item 1)**	Ensure Pump P-1 is switched ON at PLC **(Figure 2, Item 2)**.	Ensure Supply pump P-1 is switched ON at PLC. Refer to WP 0004 00 as necessary.
	Ensure circuit breaker that occupies slots No. 7 and 9 **(Figure 2, Item 3)** for Pump P-1 is ON. Turn P-1 Pump off.	Reset circuit breaker. Refer to WP 0004 00 as necessary.
	Ensure water source is full and available. Turn P-1 Pump off.	Replenish water supply. Turn Pump P-1 on.
	Ensure water supply valve V-18 **(Figure 2, Item 5)** is open. Turn P-1 Pump off.	Open water supply valve. Refer to WP 0004 00 as necessary. Turn Pump P-1 on.
	Ensure hot and cold water supply valves **(Figure 2, Item 4)**, located on supply hoses behind washer are in the open position. Turn P-1 Pump off.	Open valves. Refer to WP 0004 00 as necessary. Turn Pump P-1 on.
	Ensure pump P-1 **(Figure 2, Item 6)** has been primed.	Prime pump IAW WP 0008 00.
		If problem continues, notify unit maintenance.



Figure 1. Didn’t fill within time Error on Washer Display.

WASHER TROUBLESHOOTING-CONTINUED

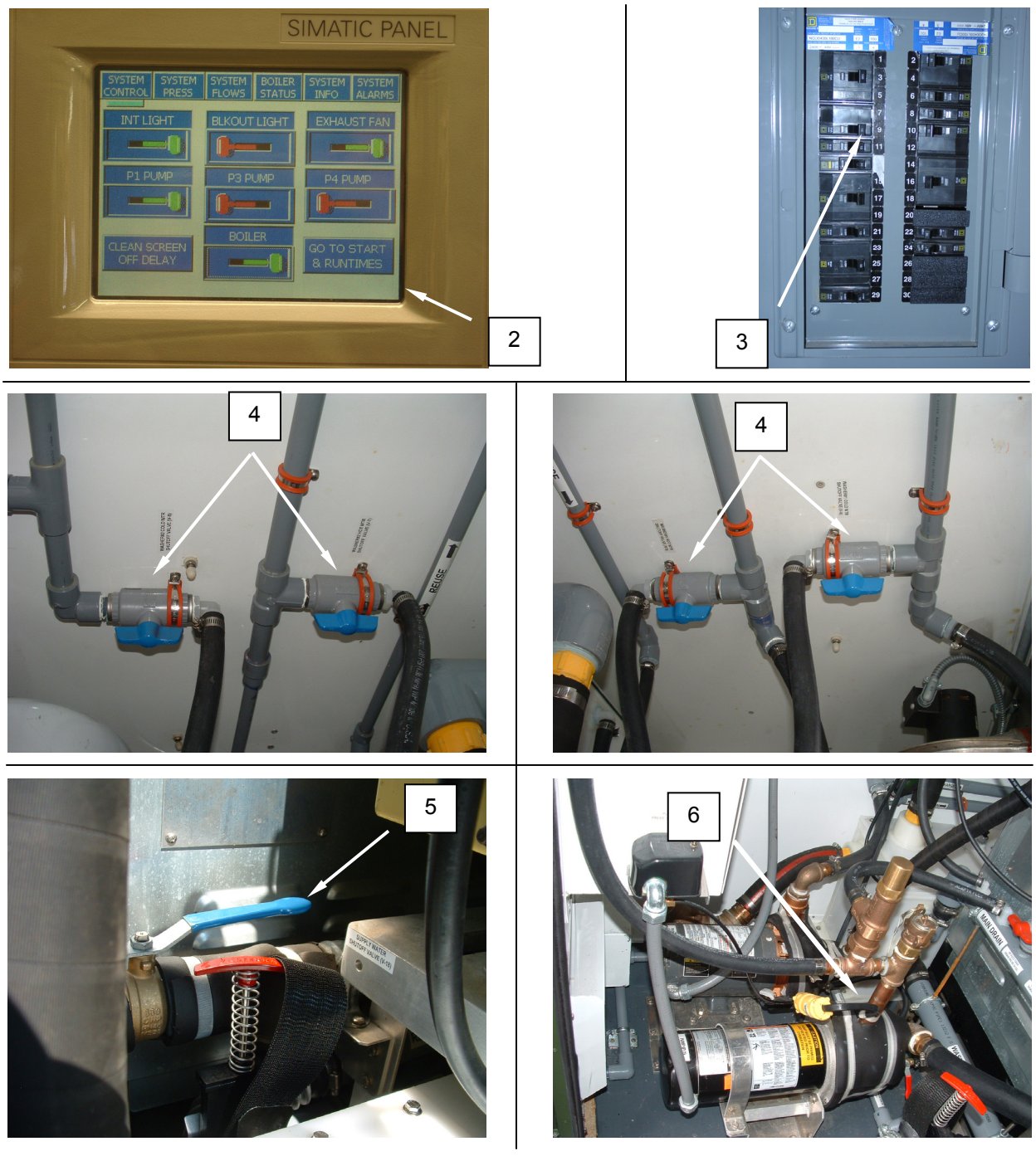


Figure 2. Didn't fill within time Error on Washer Display.

WASHER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. "Didn't drain within time" Error on Washer Display **(Figure 3, Item 1)**	Check that waste pump and WTS transfer pump is plugged in. **(Figure 4, Item 2)**	Reinsert plug **(Figure 4, Item 2)** into outlet.
	Check that waste pump breaker and WTS transfer pump breaker have not tripped.	Reset circuit breaker No. 13 **(Figure 4, Item 3)** and circuit breaker No. 6 **(Figure 4, Item 4)**. Refer to WP 0004 00 as necessary.
	Ensure pump float switch is operating correctly.	Manually operate float **(Figure 4, Item 5)** on waste tank to override. Refer to WP 0004 00 as necessary.
		Notify unit maintenance.
	Ensure valve setup is correct.	
	Check V-1 and V-3 for washer #1. Check V-2 and V-4 for washer #2 (These are gate valves which require pulling to open.)	Refer to WP 0004 00 as needed.
		Notify unit maintenance.



Figure 3. Didn't Drain Within Time Error on Washer Display.

WASHER TROUBLESHOOTING-CONTINUED

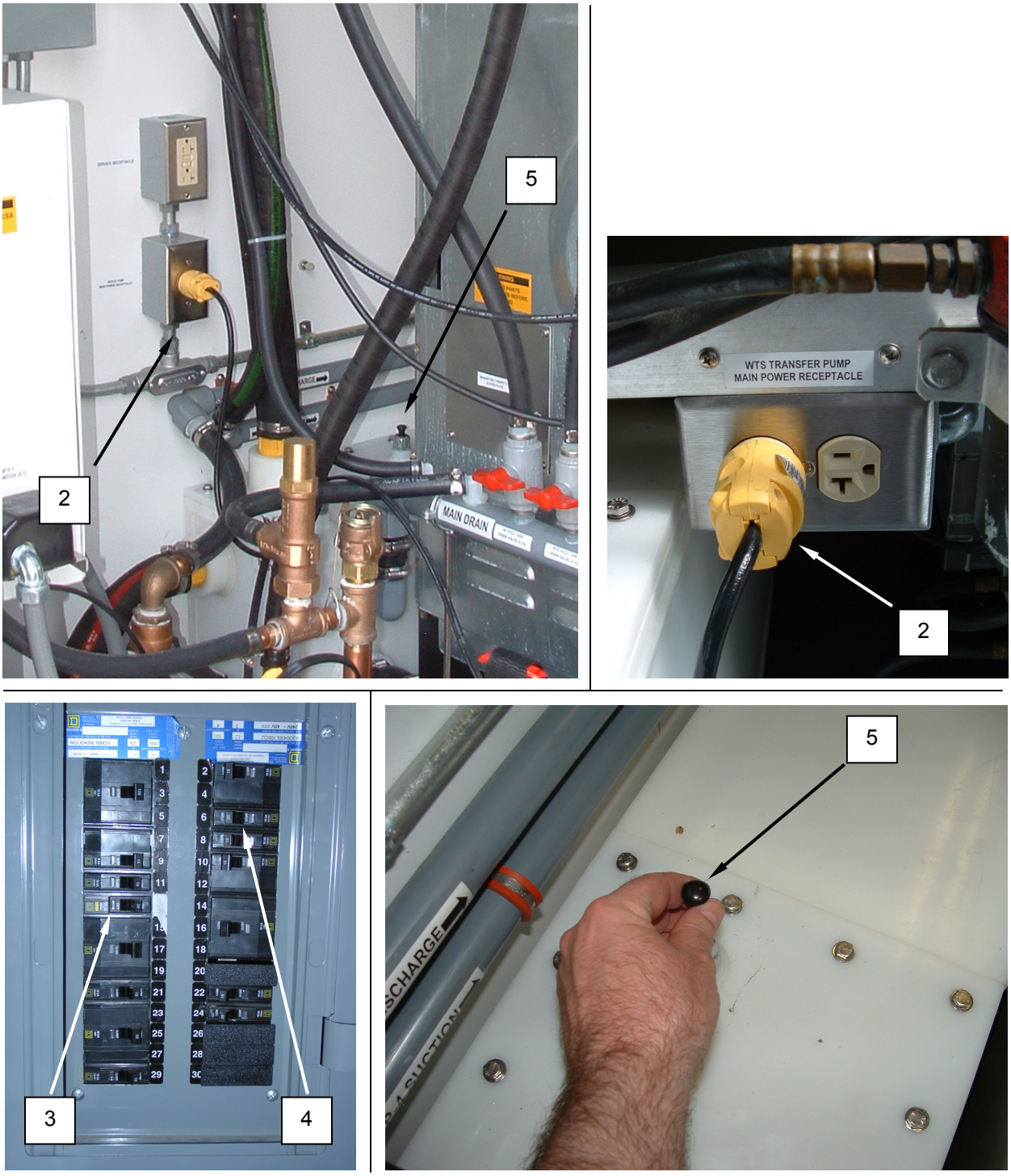


Figure 4. Didn't Drain Within Time Error on Washer Display.

WASHER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. "Door" Error on Washer Display **(Figure 5, Item 1)**	Ensure door **(Figure 5, Item 2)** is closed and securely latched.	Open door and reclose securely. Notify unit maintenance.





Figure 5. Door Error on Washer Display.

WASHER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. "Rotation Sensor" Error on Washer Display **(Figure 6, Item 1)**	Ensure washer drum **(Figure 6, Item 2)** is tumbling.	Notify unit maintenance.





Figure 6. Rotation Sensor Error on Washer Display.

WASHER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. "Speed Detection " Error on Washer Display **(Figure 7, Item 1)**	Ensure washer drum **(Figure 7, Item 2)** is tumbling.	Notify unit maintenance.



Figure 7. Speed Detection Error on Washer Display.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
TROUBLESHOOTING PROCEDURES-AUTOMATIC SOAP DISPENSER

AUTOMATIC SOAP DISPENSER TROUBLESHOOTING

The troubleshooting procedures contain tables listing the malfunctions, tests or inspections, and corrective action required to return the CBL to normal operation. Perform the steps in the order they appear in the tables. Each procedure is headed by an initial setup. This setup outlines what is needed as well as certain conditions which must be met before starting the task.

DO NOT START THE TASK UNTIL:

- You understand the task.
- You understand what you are to do.
- You understand what is needed to do the work.
- You have the things you need.

AUTOMATIC SOAP DISPENSER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Laundry Chemical Alarm **(Figure 1, Item 1)**	Determine which laundry chemical **(Figure 1, Item 2)** is depleted. Ensure the valve V-60 is open. Ensure the drain valve V-23 is closed.	Replenish laundry chemical. Select alarm reset button to reset. If problem continues, notify unit maintenance.

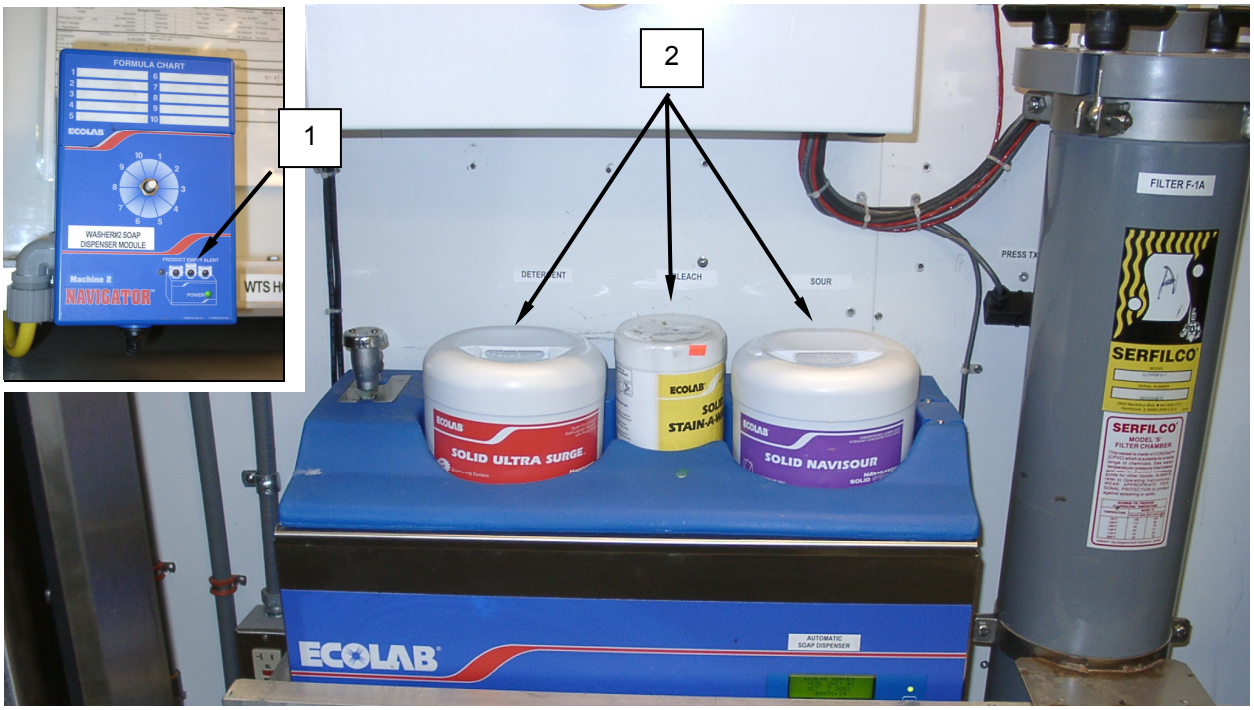


Figure 1. Laundry Chemical Alarm.

AUTOMATIC SOAP DISPENSER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Automatic Soap Dispenser Inoperative	Check for indicator lights **(Figure 2, Item 1)**.	If no indicator lights are present, ensure power cord **(Figure 3, Item 2)** is plugged in; reset GFCI **(Figure 3, Item 3)**; Power switch **(Figure 3, Item 4)** under Automatic Soap Dispenser is ON. Reset circuit breaker 29. If problem continues, notify unit maintenance.

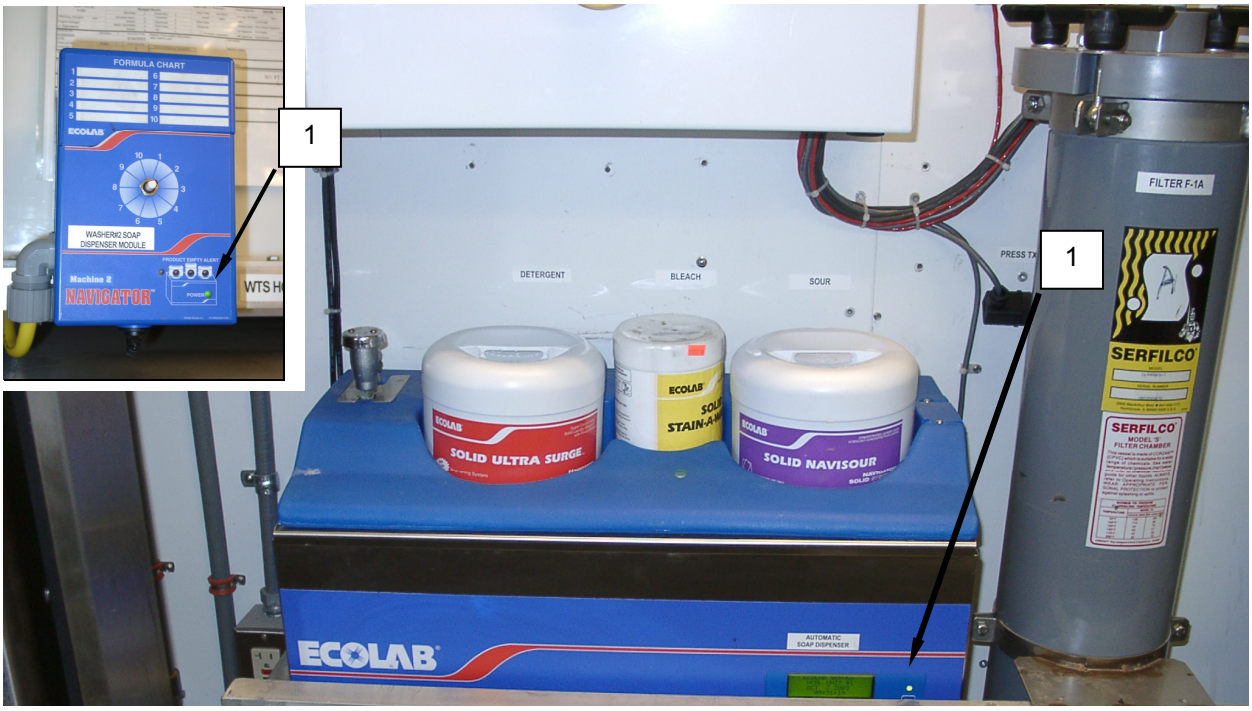


Figure 2. Automatic Soap Dispenser Inoperative.

AUTOMATIC SOAP DISPENSER TROUBLESHOOTING-CONTINUED



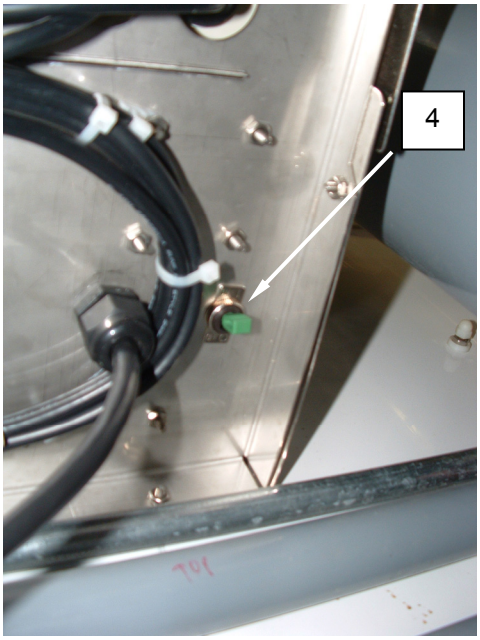


Figure 3. Automatic Soap Dispenser Inoperative.

AUTOMATIC SOAP DISPENSER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Clothes not clean.	Make note if chemicals do not seem to be expended – especially detergent.	Ensure drain valves V-21 **(Figure 4, Item 5)** and V-22 **(Figure 4, Item 6)**, are closed. If problem continues, notify unit maintenance.

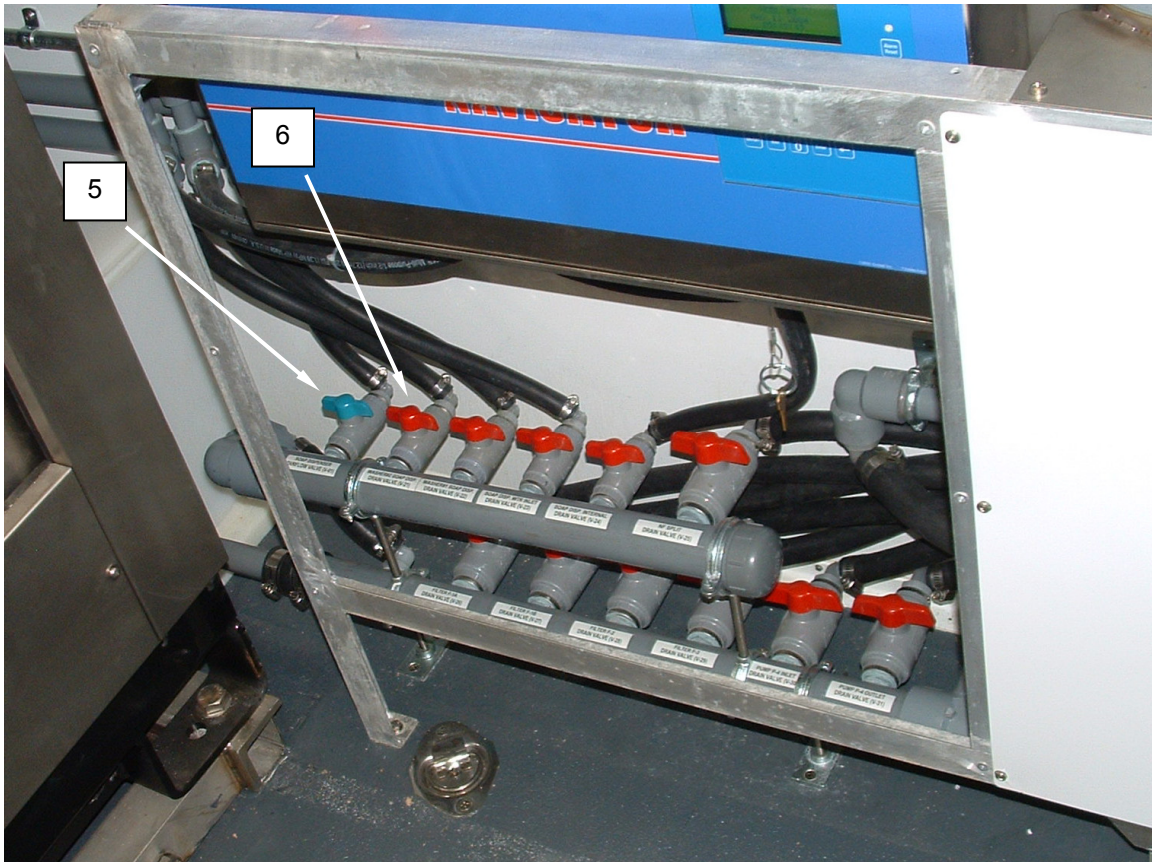


Figure 4. Clothes not Clean.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
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TROUBLESHOOTING PROCEDURES-DRYER

DRYER TROUBLESHOOTING

The troubleshooting procedures contain tables listing the malfunctions, tests or inspections, and corrective action required to return the CBL to normal operation. Perform the steps in the order they appear in the tables. Each procedure is headed by an initial setup. This setup outlines what is needed as well as certain conditions which must be met before starting the task.

DO NOT START THE TASK UNTIL:

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- You understand what is needed to do the work.
- You have the things you need.

DRYER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Dryer will not start	Ensure Emergency Stop **(Figure 1, Item 1)** has been pulled out. Check dryer door **(Figure 1, Item 2)**. Check lint panel **(Figure 1, Item 3)**. Check dryer circuit breakers **(Figure 1, Item 4)**.	Pull Emergency stop out to operating position. Ensure dryer door is closed securely. Ensure lint panel is securely latched. Reset circuit breakers. If malfunction continues, notify unit maintenance.





Figure 1. Dryer will not Start.

DRYER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. Dryer drum doesn't turn	Ensure Emergency Stop **(Figure 2, Item 1)** has been pulled out. Check dryer door **(Figure 2, Item 2)**. Check lint panel **(Figure 2, Item 3)**.	Pull Emergency stop out to operating position. Ensure dryer door is closed securely. Ensure lint panel is securely latched. If malfunction continues, notify unit maintenance.



Figure 2. Dryer Drum doesn't Turn.

DRYER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. “Door Open” indicator	Ensure Emergency Stop **(Figure 3, Item 1)** has been pulled out. Check dryer door **(Figure 3, Item 2)**.	Pull Emergency stop out to operating position. Ensure dryer door is closed securely. If malfunction continues, notify unit maintenance.



Figure 3. Door Open Indicator.

DRYER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. Dryer squeals	Determine if dryer is squealing during initial startup of dryer or all the time.	A cold dryer may squeal when first started due to slipping belts. This is normal. If malfunction continues, notify unit maintenance.



Figure 4. Dryer Squeals.

DRYER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Increased drying time	Inspect lint screen **(Figure 5, Item 1)**.	Clean lint screen.
	Check dryer vents **(Figure 6, Item 2)** for obstruction.	Clear obstructions.
	Ensure laundry has been adequately spun out.	Run laundry through extra extract cycle No. 36, and notify unit maintenance if there is a washer malfunction.
	Inspect dryer vent ducts **(Figure 6, Item 3)**.	Clean dryer vent ducts.
		If malfunction continues, notify unit maintenance.

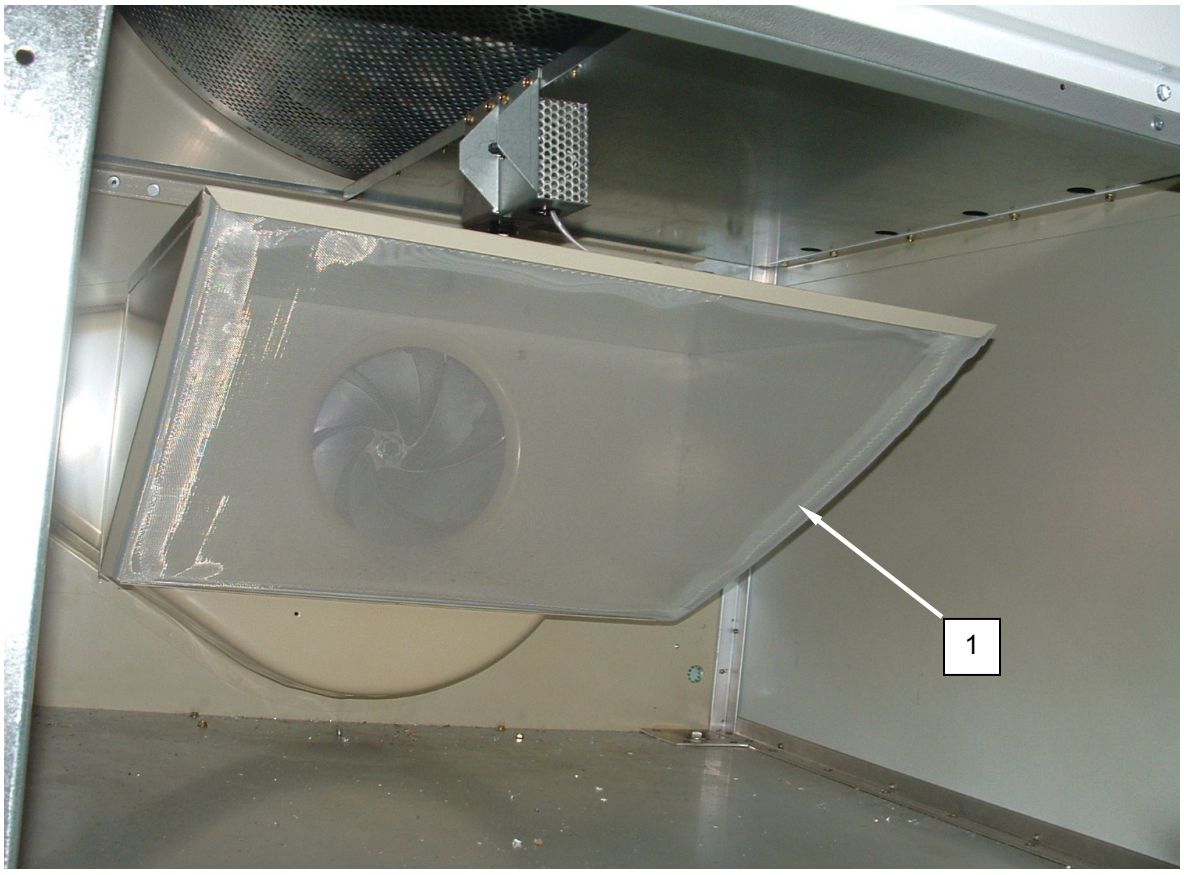


Figure 5. Increased Drying Time.

DRYER TROUBLESHOOTING-CONTINUED



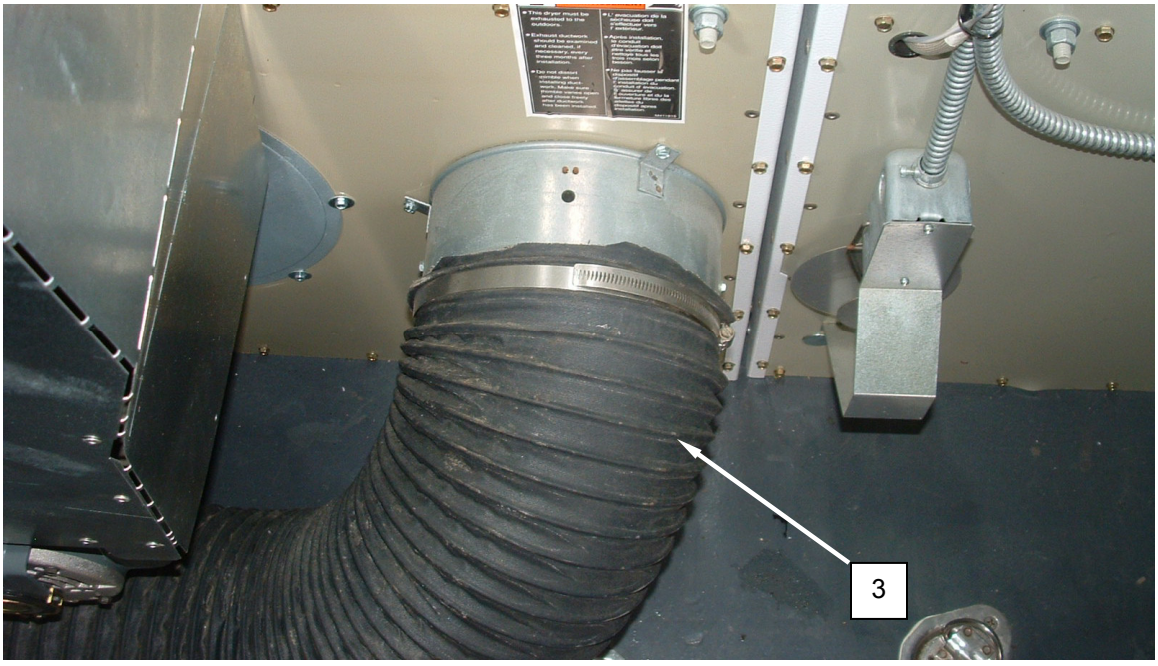


Figure 6. Increased Drying Time.

DRYER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Water in dryer or dryer leaking water	Ensure laundry has been adequately spun out. Ensure vents **(Figure 7, Item 1)** are free from water entry.	Run laundry through extra extract cycle, and notify unit maintenance if there is a washer malfunction. Clear vents. If malfunction continues, notify unit maintenance.



Figure 7. Water in Dryer or Dryer leaking Water.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
TROUBLESHOOTING PROCEDURES-BOILER

BOILER TROUBLESHOOTING

The troubleshooting procedures contain tables listing the malfunctions, tests or inspections, and corrective action required to return the CBL to normal operation. Perform the steps in the order they appear in the tables. Each procedure is headed by an initial setup. This setup outlines what is needed as well as certain conditions which must be met before starting the task.

DO NOT START THE TASK UNTIL:

- You understand the task.
- You understand what you are to do.
- You understand what is needed to do the work.
- You have the things you need.

BOILER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Boiler will not light or loss of hot water	Ensure Boiler is switched ON at PLC **(Figure 1, Item 1)**.	Switch boiler ON. If malfunction continues, notify unit maintenance.

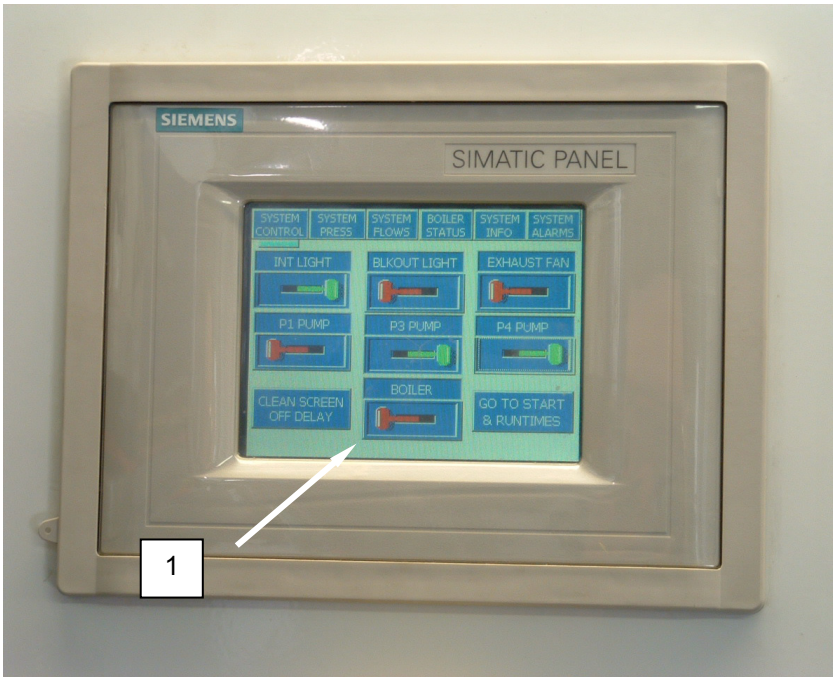


Figure 1. Boiler will not Light or Loss of Hot Water.

BOILER TROUBLESHOOTING-CONTINUED



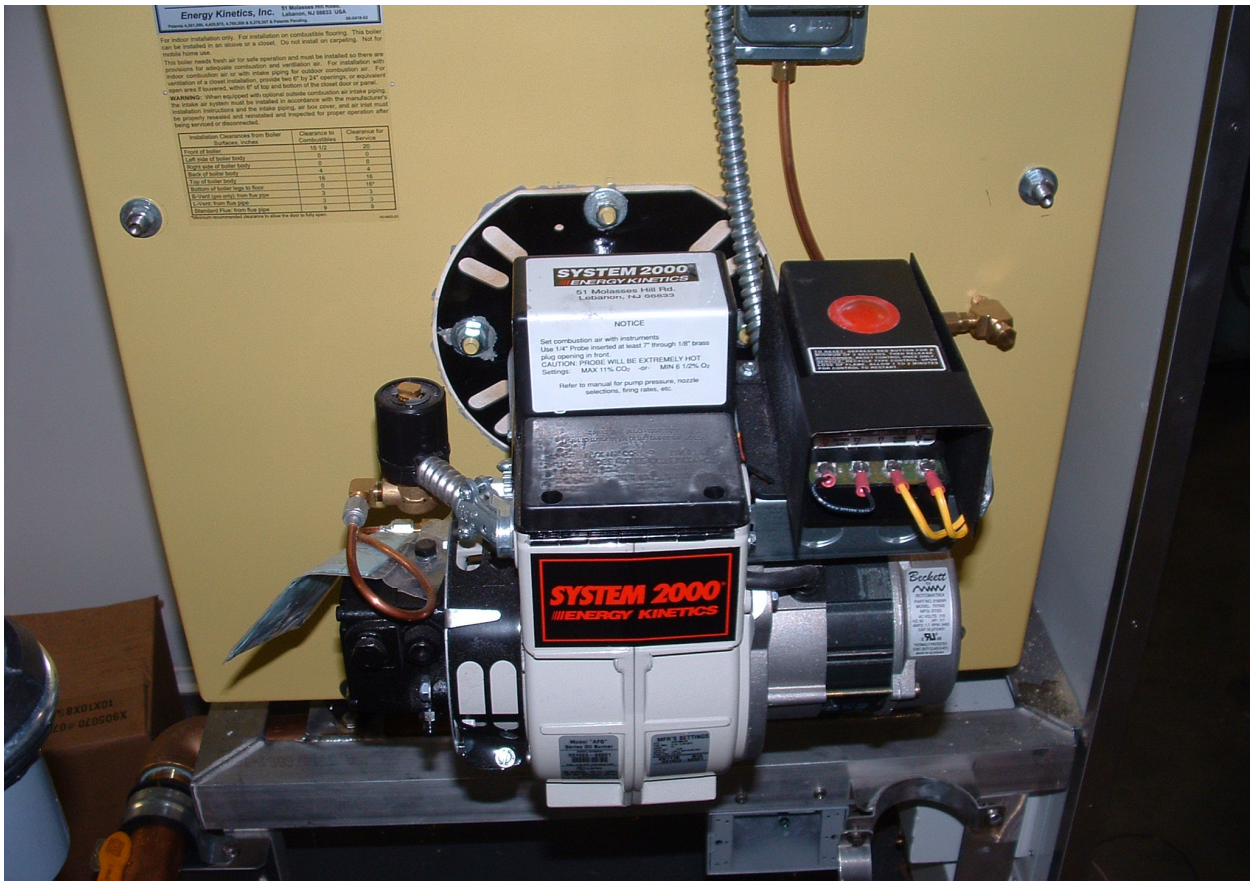


Figure 2. Boiler will not Light or Loss of Hot Water.

BOILER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. “Boiler Failure Alarm” on PLC Display **(Figure 3, Item 1)**		Acknowledge alarm. Shut down boiler at PLC **(Figure 29, Item 2)**. Reset boiler circuit breaker No. 22 **(Figure 29, Item 3)**. Switch boiler back ON at PLC. If malfunction continues, notify unit maintenance.

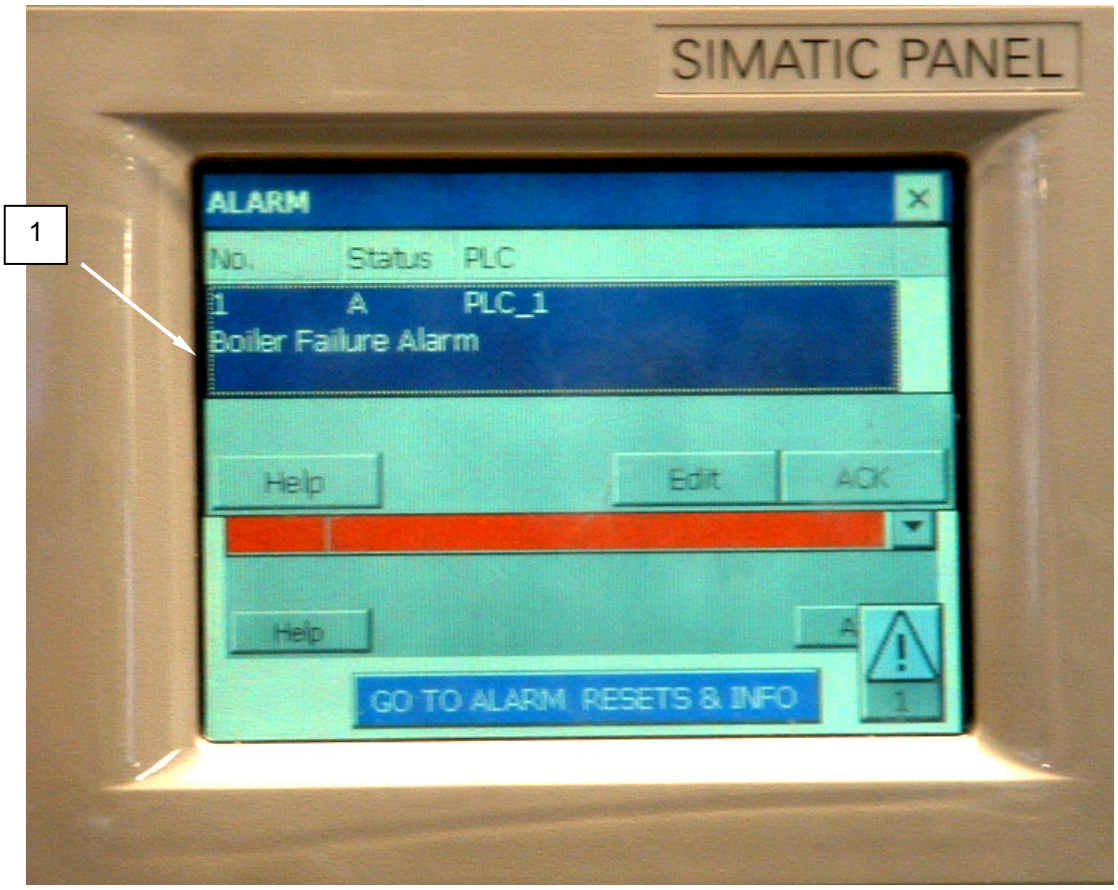
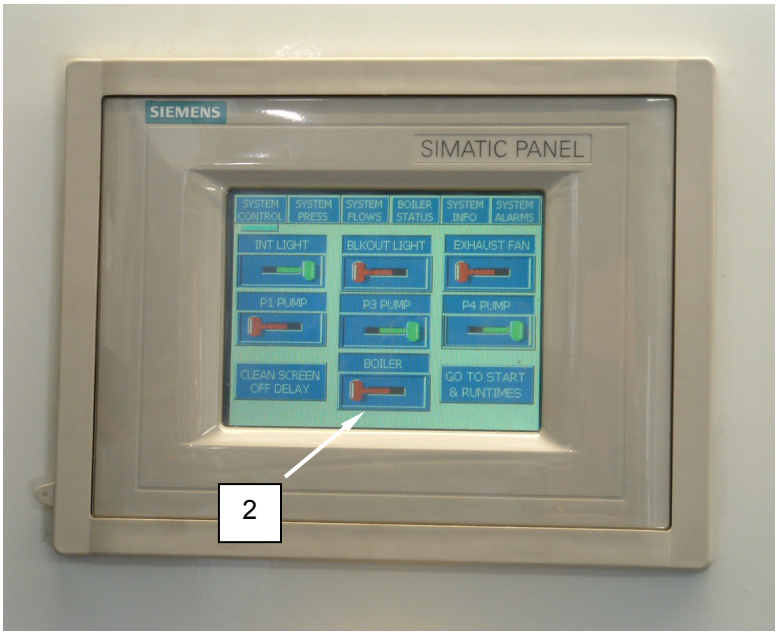


Figure 3. Boiler Failure Alarm on PLC Display.

BOILER TROUBLESHOOTING-CONTINUED



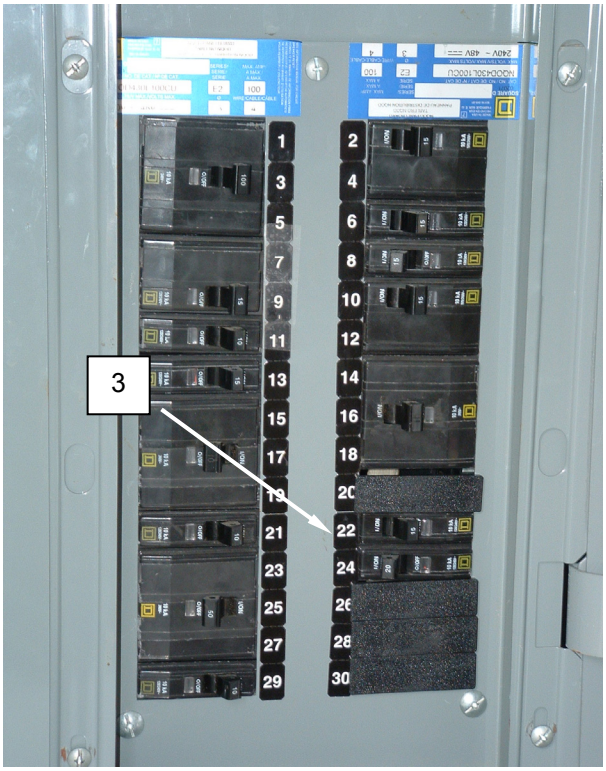


Figure 4. Boiler Failure Alarm on PLC Display.

BOILER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. “Boiler Burner Cutout Alarm” on PLC Display **(Figure 5, Item 1)**	Inspect boiler to verify operation.	**NOTE** Do not press ACK at this time. Press controller reset **(Figure 6, Item 2)** ONCE, and monitor for normal operation. Press ACK to acknowledge the alarm.
	Check fuel supply.	Replenish fuel IAW procedures in WP 0008 00. Start boiler at PLC **(Figure 6, Item 3)**. If boiler trips off on this same alarm, press controller reset **(Figure 6, Item 2)** once, and monitor for normal operation. If malfunction continues, notify unit maintenance.

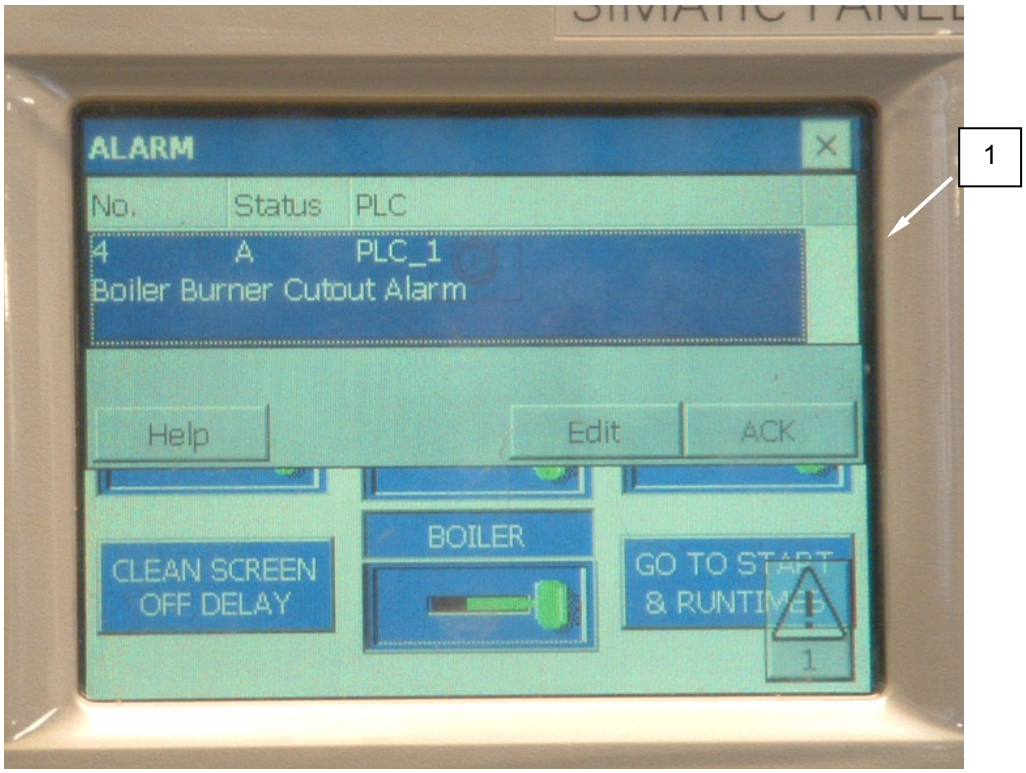
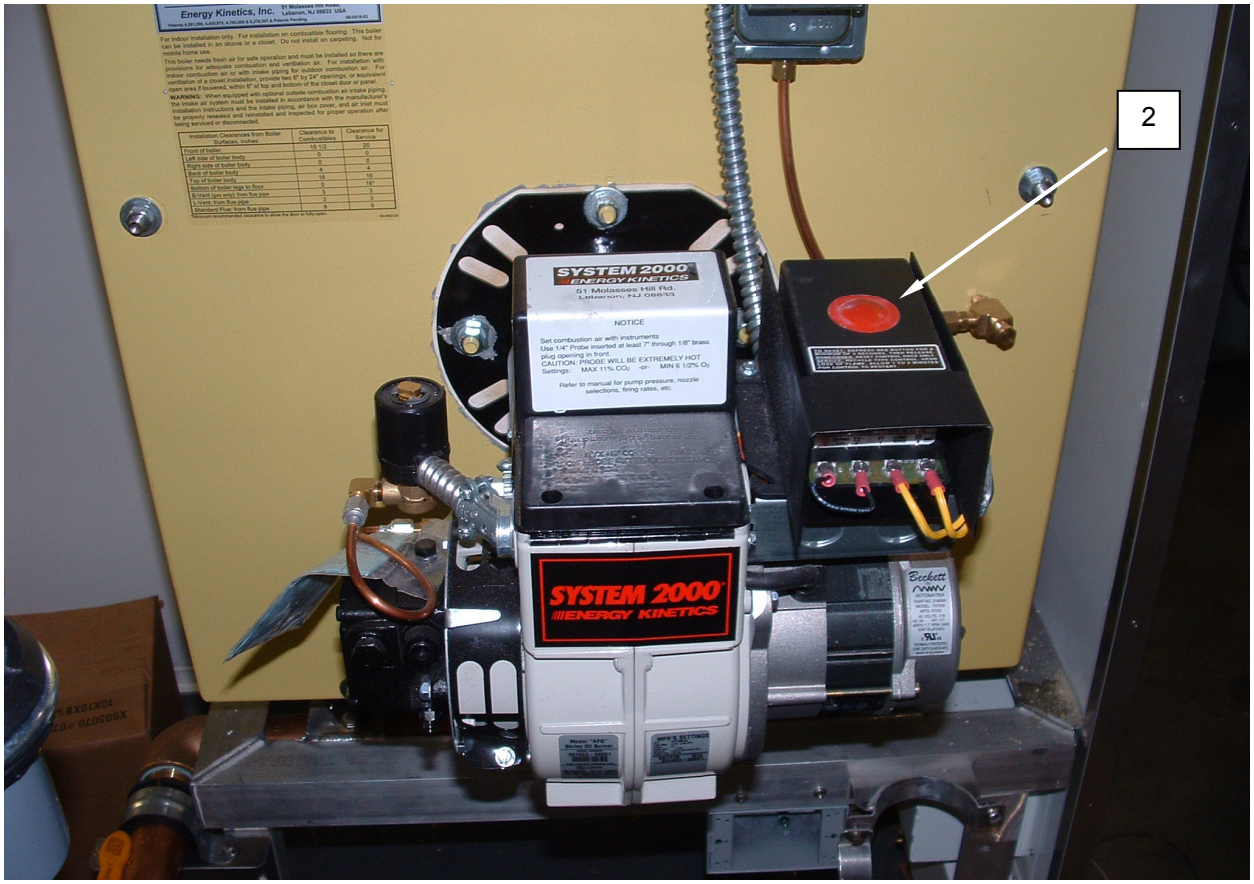


Figure 5. Boiler Burner Cutout Alarm on PLC Display.

BOILER TROUBLESHOOTING-CONTINUED



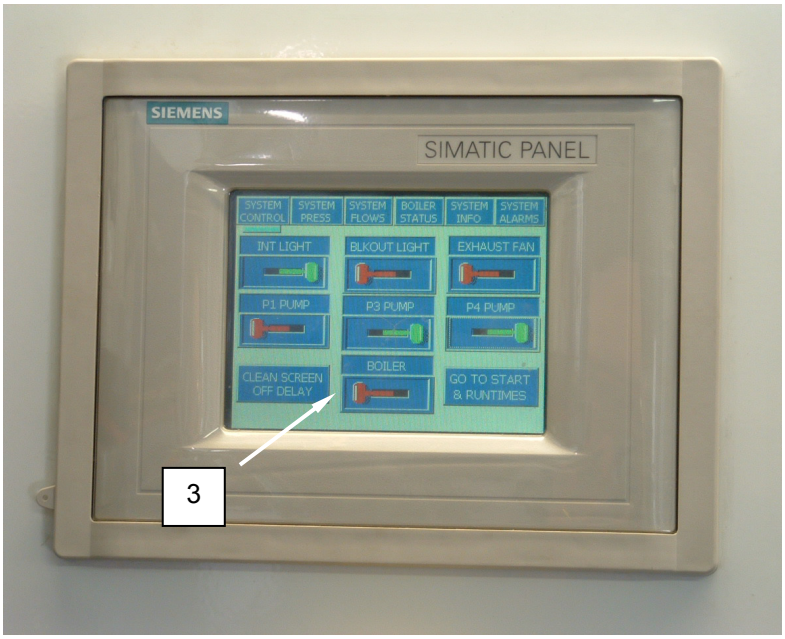


Figure 6. Boiler Burner Cutout Alarm on PLC Display.

BOILER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. “Boiler High Temperature Alarm” on PLC Display **(Figure 7, Item 1)**		If malfunction continues, notify unit maintenance.



Figure 7. Boiler High Temperature Alarm on PLC Display.

BOILER TROUBLESHOOTING-CONTINUED





3 **Figure 8. Boiler High Temperature Alarm on PLC Display.**

BOILER TROUBLESHOOTING-CONTINUED

Table 1. Troubleshooting Procedure for Containerized Batch Laundry - Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. “Boiler Low Glycol Alarm” on PLC Display **(Figure 9, Item 1)**	Inspect boiler to verify operation. Check Glycol level in reservoir **(Figure 10, Item 2)**. If glycol is in reservoir and alarm is still present. Ensure that glycol is mixed 50/50.	Shut down boiler at PLC **(Figure 10, Item 3)**. Service boiler from radiator cap directly. **WARNING** Allow 30 minutes or until cool to service boiler. Failure to follow warning may cause serious injury to personnel. Wait 30 minutes or until cool then add glycol to the boiler filler neck. Add glycol up to but not exceeding vent line. Reset boiler circuit breaker No. 22 **(Figure 10, Item 4)**. Switch boiler back ON at PLC. If malfunction continues, notify unit maintenance.



Figure 9. Boiler Low Glycol Alarm on PLC Display.

BOILER TROUBLESHOOTING-CONTINUED





3

Figure 10. Boiler Low Glycol Alarm on PLC Display.

BOILER TROUBLESHOOTING-CONTINUED

Table 1. Boiler Troubleshooting Procedures for Containerized Batch Laundry – Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Boiler operating, doesn't heat washer/soap dispenser water	Check mixing valve **(Figure 11, Item 1)** setting.	Adjust mixing valve IAW WP 0008 00. If further corrective action is required, notify unit maintenance.



Figure 11. Boiler Operating, doesn't Heat Washer/soap Dispenser Water.

BOILER TROUBLESHOOTING-CONTINUED

Table 1. Boiler Troubleshooting Procedures for Containerized Batch Laundry – Continued.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. Boiler operating, doesn't heat reuse water.	Check mixing valve **(Figure 12, Item 1)** setting.	Adjust mixing valve IAW WP 0008 00. If further corrective action is required, notify unit maintenance.



Figure 12. Boiler Operating, doesn't Heat Reuse Water.

END OF WORK PACKAGE

CHAPTER 4

OPERATOR MAINTENANCE INSTRUCTIONS

CONTAINERIZED BATCH LAUNDRY (CBL)

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS), INTRODUCTION

INTRODUCTION

Preventive Maintenance Checks and Services (PMCS) are performed to keep the Containerized Batch Laundry in good operating condition. The checks are used to find, correct, or report problems. Unit personnel are to do the PMCS jobs as shown in the PMCS table. PMCS are done every day the laundry is operated, using the PMCS table. Pay attention to **WARNING** and **CAUTION** statements. A **WARNING** means someone could be hurt. A **CAUTION** means equipment could be damaged.

- Before you begin using the laundry, do **Before** PMCS.
- During use of the laundry, do **During** PMCS.
- After using the laundry, do **After** PMCS.
- Once a week, do **Weekly** PMCS if the laundry has been in use.
- Do **Monthly** PMCS once a month if the laundry has been in use.
- Do **Annual** PMCS once a year.

If you find something wrong when performing PMCS, fix it using troubleshooting and/or maintenance procedures.

The right-hand column of the PMCS table lists conditions that make the laundry not fully mission capable. Write up the faults not fixed on DA Form 2404 for direct support maintenance. For further information on how to use this form, see DA PAM 738-750.

If tools required to perform PMCS are not listed in procedures, notify your supervisor.

INSPECTION AND COMMON CHECKS

Look for signs of trouble. Senses help here. You can feel, smell, hear, or see many problems that can be eliminated before they get worse. Inspect to see if items are in good condition. Are components correctly installed and secured? Is any damage to the fabric or frame components visible? Correct any faults or notify unit or direct support maintenance.



WARNING

Do not attempt to perform ANY on-site service, however minor, without switching circuit breakers OFF, disconnecting the power cord, draining or relieving system pressure, or otherwise shutting down the equipment to be serviced. Tightening a hose clamp might not appear to demand shutting down the CBL, but the potential electrocution of the operator as well as electrical and fire damage caused by a split water hose is well worth shutting down the CBL systems.

Always keep the equipment clean
Remove dirt, sand, and debris from all water and electrical panel entries and connections.

Bolts, nuts, and screws
Check them for obvious looseness, missing, bent, or broken condition on equipment. If you find a bolt, nut, or screw you think is loose, tighten it or report it to your supervisor.

Hoses
Look for wear, damage, and leaks. Ensure clamps are tight. Wet spots indicate leaks, but a stain around a fitting or connector can also mean a leak. If a leak comes from a loose fitting or coupling, shut down the equipment and tighten it. If something is broken or worn out, report it to your supervisor.

Leakage Definition for Operator PMCS

CAUTION

Equipment operation is allowable with Class I and II leaks. Consideration must be given to fluid capacity in the system. When in doubt, check with your supervisor. When operating with Class I or II leaks, frequently check leak intensity. Report Class III leaks to your supervisor.

Class I - Leakage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

Class II - Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked or inspected.

Class III - Leakage of fluid great enough to form drops that fall from items being checked or inspected.

It is necessary for you to know how fluid leakage affects the status of the equipment. The following are types/classes of leakage an operator needs to know to be able to determine the status of the water system. If you spot a leak and are unsure what class the leak is, notify your supervisor or Unit Maintenance.

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS), INCLUDING LUBRICATION INSTRUCTIONS

Table 1. Preventive Maintenance Checks and Services (PMCS).

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
				TEMPER Components – refer to TM 10-8340-224-13	
				FDECU Components (if used) – refer to TM 10-4120-411-14	
				ASH Components (if used) – refer to TM 9-4520-258-14	
				3000-Gallon Fabric Water Tank – refer to TM 5-5430-237-12&P	
1	Before, Daily		Modified Cargo Container **(Figure 1, Item 1)**	Inspect CBL Container for material damage, proper level and foundation. Ensure level indicators are operable.	Damage is present which might prevent operation of CBL; Container is not leveled or placed on an infirm or unsafe foundation.
2	Before, Daily		Service Doors **(Figure 1, Item2), (Figure 2, Item 2)**	Inspect service doors for material damage and ease of operation. Ensure door latches function properly.	Damage is present which prevents normal operation of doors; Doors do not open or close fully; Doors do not latch or unlatch.
3	Before, Daily		Air Filters **(Figure 1, Item 3), (Figure 2, Item 3)**	Inspect filters for material damage and cleanliness.	Filters damaged, dirty or missing.
4	Before, Daily		Ramp **(Figure 2, Item 4)**	Inspect ramp for material damage and corrosion.	Damage or corrosion is present which prevents use or operation of ramp.

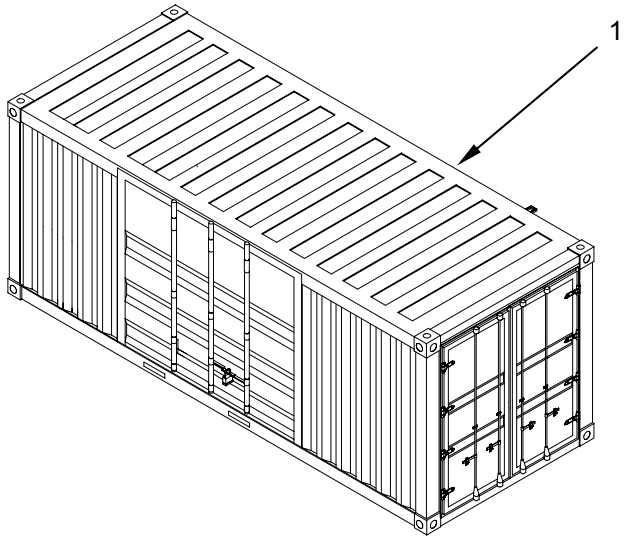




Figure 1. Modified Cargo Container.

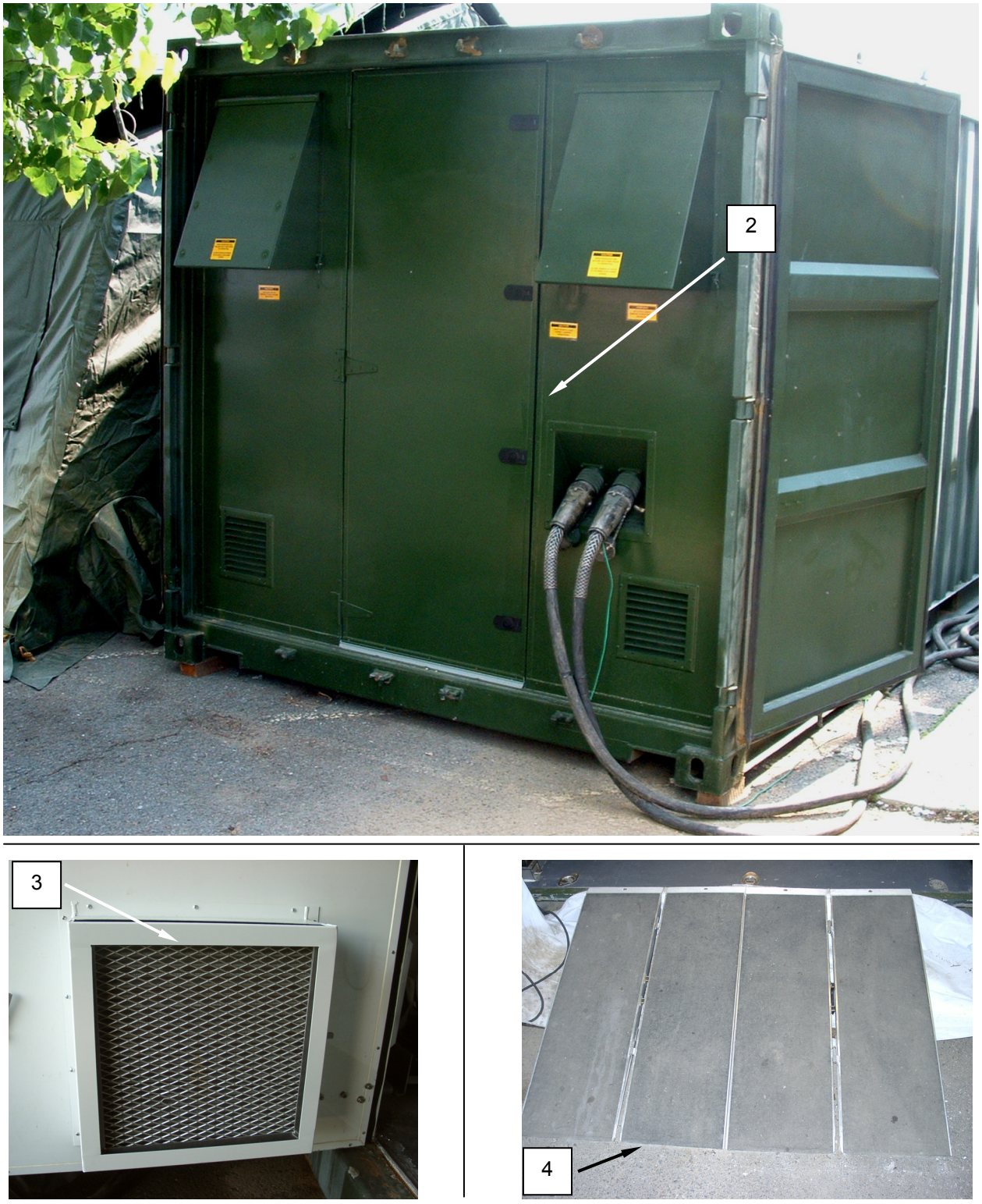


Figure 2. Before PMCS.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
5	Before, Daily		Lighting **(Figure 3, Item 5)**	Ensure lights operate. Inspect light fixture for material damage or missing components.	Bulbs unlit; damage to light fixture; missing components
6	Before, Monthly		Circuit Breakers **(Figure 3, Item 6)**	Inspect circuit breakers for material damage or signs of burning. Test manual tripping of the GFCI breakers (#6 and #13)	Circuit breakers are damaged or inoperative.
7	Before		Power Input Receptacles **(Figure 3, Item 7)**	Inspect receptacles for material damage or signs of burning.	Receptacles are damaged or inoperative.
8	Before, Daily		Phase Indicator **(Figure 3, Item 8)**	Ensure all phase indicator lights are lit, and that lenses are not broken.	Indicator light out; lens broken.
9	Before		Power Output Receptacle **(Figure 3, Item 9)**	Inspect receptacle for material damage or signs of burning.	Receptacle are damaged or inoperative.
10	Before Monthly		GFCI, Pump, and Washer Receptacles **(Figure 3, Item 10)**	Inspect receptacles for material damage or signs of burning. Test manual tripping of GFCI.	Receptacles are damaged or inoperative.
11	Before, Daily		Exhaust Fans **(Figure 3, Item 11)**	Inspect fans for material damage and cleanliness.	Fans are damaged, preventing operation; fans are dirty or clogged.
12	Before, Daily		Programmable Logic Control (PLC) **(Figure 3, Item 12)**	Inspect PLC for material damage. Service PLC screen by cleaning	Damage is present which prevents normal operation. Screen is dirty, preventing normal operation.

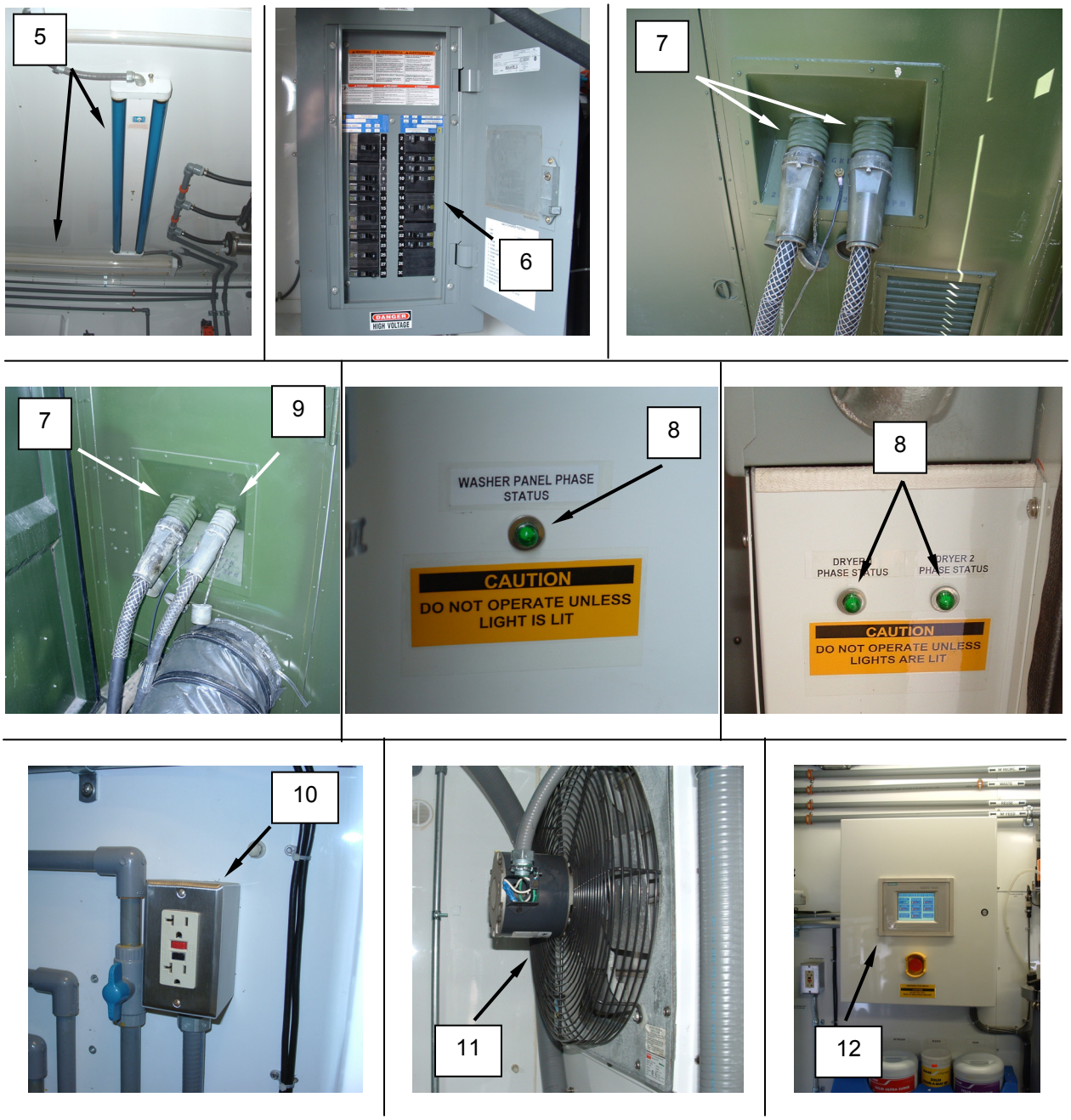


Figure 3. Lighting, Circuit Breakers, Receptacles, and Exhaust Fan.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
13	Before, Daily		Plumbing **(Figure 4, Item 13)**	Inspect all valves, pipes, and pipe fittings for leakage and damage such as cracks.	Class III leakage is present; material damage is observed.
14	Before, Daily		Water Inlet Panel **(Figure 5, Item 14)**	Inspect water inlet panel for leakage and material damage.	Class III leakage is present; material damage is observed.
15	Before, Daily		Hoses **(Figure 5, Item 15)**	Inspect all internal hoses for leakage and damage such as cracks.	Class III leakage is present; material damage is observed.
16	Before, Daily		QD Hoses **(Figure 4, Item 16), (Figure 5, Item 16)**	Inspect all QD hoses for leakage and damage such as cracks.	Class III leakage is present; material damage is observed.
17	Before, Daily		Drainage Tanks **(Figure 5, Item 17)**	Inspect all drainage tanks for leakage and damage such as cracks.	Class III leakage is present; material damage is observed.
18	Before, Daily		Pump P-1 **(Figure 5, Item 18)**	Inspect pump for material damage, corrosion, and leakage. Ensure mounting is secure. Ensure heat tape is in place and shows no material damage. Ensure pressure relief valve is secure and undamaged. Ensure expansion tank is secure and undamaged.	Pump damaged or corrosion is present. Class III leakage is present. Pump is not securely mounted. Heat tape missing or visibly damaged. Pressure relief valve loose, damaged, or leaking. Expansion tank loose, damaged, or leaking.

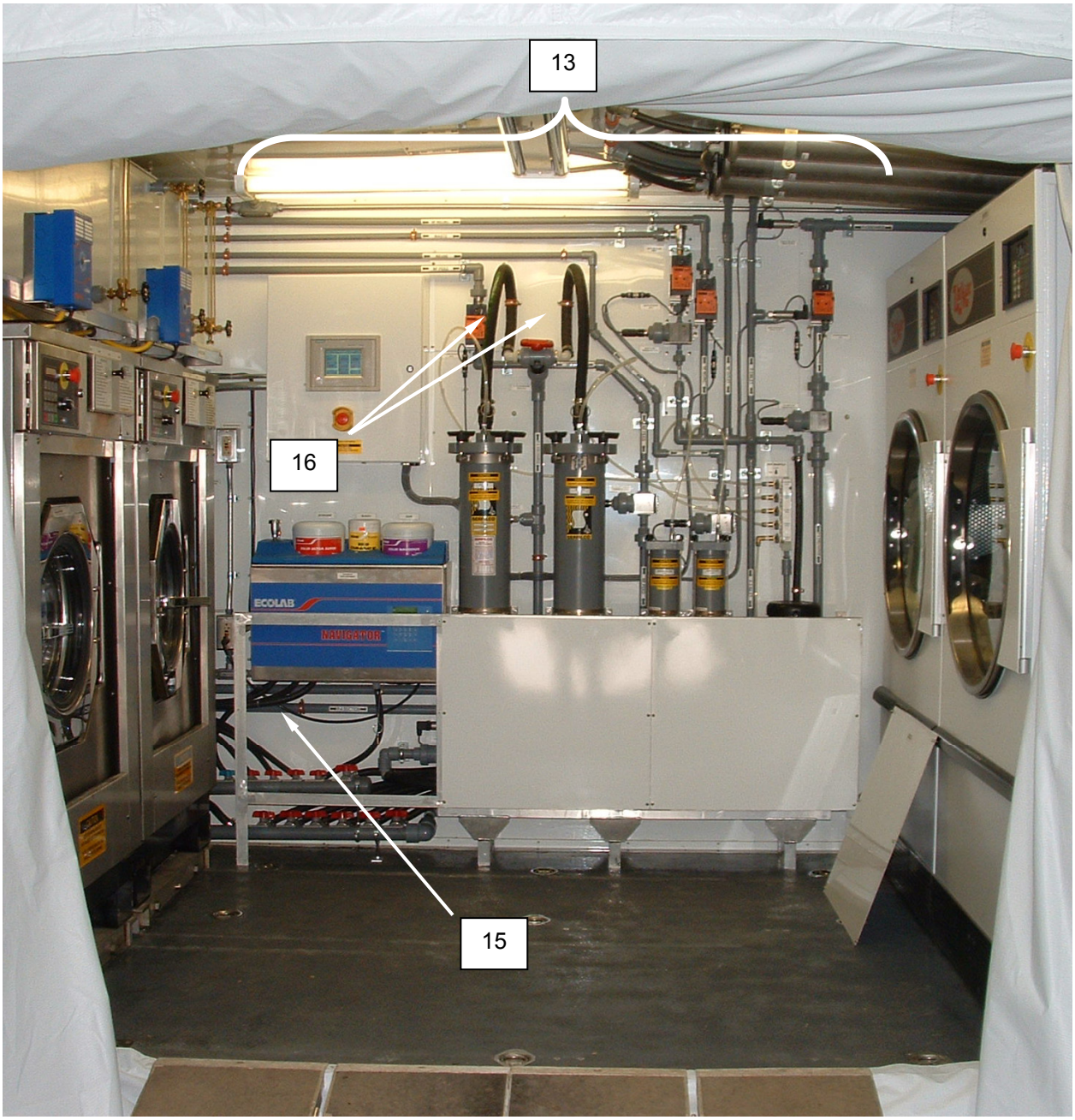
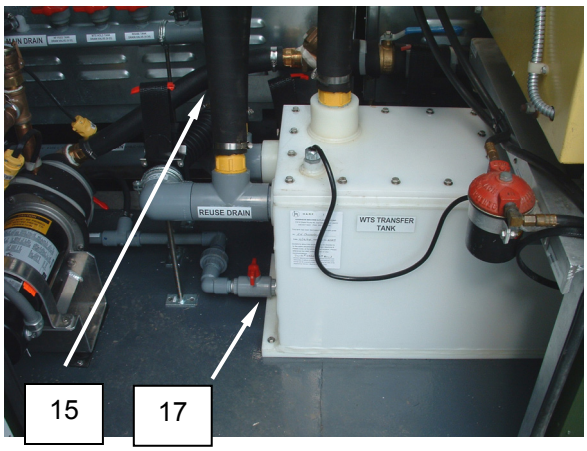


Figure 4. Before PMCS for Plumbing.





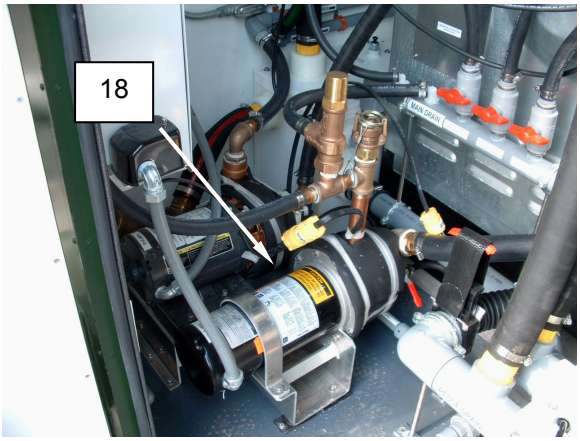


Figure 5. Before PMCS for Washer Panels, Hoses, Tanks, and Pumps.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
19	Before, Daily		Washer **(Figure 6, Item 19)**	Inspect washer for material damage, corrosion, and leakage. Ensure mounting is secure. Ensure emergency stop is undamaged.	Washer damaged or corrosion is present. Class III leakage is present. Washer not securely mounted. Emergency stop visibly damaged.
20	Before, Daily		Washer Door Lock Assembly **(Figure 6, Item 20)**	Test door lock by latching door, initiating wash cycle, and attempt to open door. Do not force door. Shut washer down with emergency stop if door opens during wash cycle.	Door opens during wash cycle.



Figure 6. Before PMCS for Washer.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
21	Before, Daily		Dryer **(Figure 7, Item 21)**	Inspect dryer for material damage and corrosion. Ensure emergency stop is undamaged.	Dryer damaged or corrosion is present. Emergency stop visibly damaged.
22	Before, Daily		Dryer Airflow Switch **(Figure 8, Item 22)**	Inspect dryer airflow switch for cleanliness and obstructions.	Switch diaphragm dirty or obstructed.
23	Before, Daily		Dryer Ducts **(Figure 8, Item 23)**	Inspect dryer ducts for tears, obstruction, material damage, or loose connections.	Dryer ducts damaged or obstructed. Loose connections to dryer or vent.
24	Before, Daily		Dryer Vent **(Figure 8, Item 24)**	Inspect dryer vent for lint or obstructions.	Vents obstructed.
25	Before, Daily		Dryer Loading Door Catch Assembly **(Figure 8, Item 25)**	Inspect door catch for material damage and wear. Ensure door shuts securely, without slamming.	Door catch inoperative or difficult to engage.

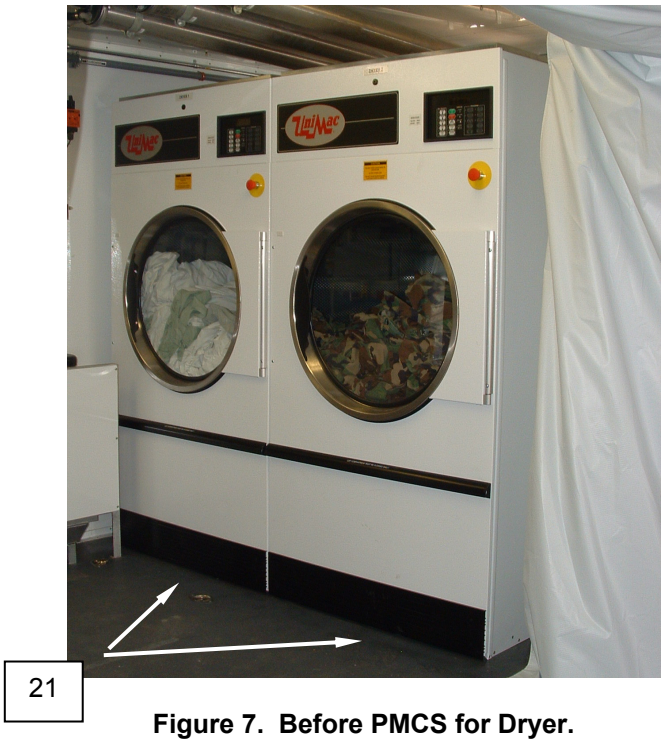


Figure 7. Before PMCS for Dryer.

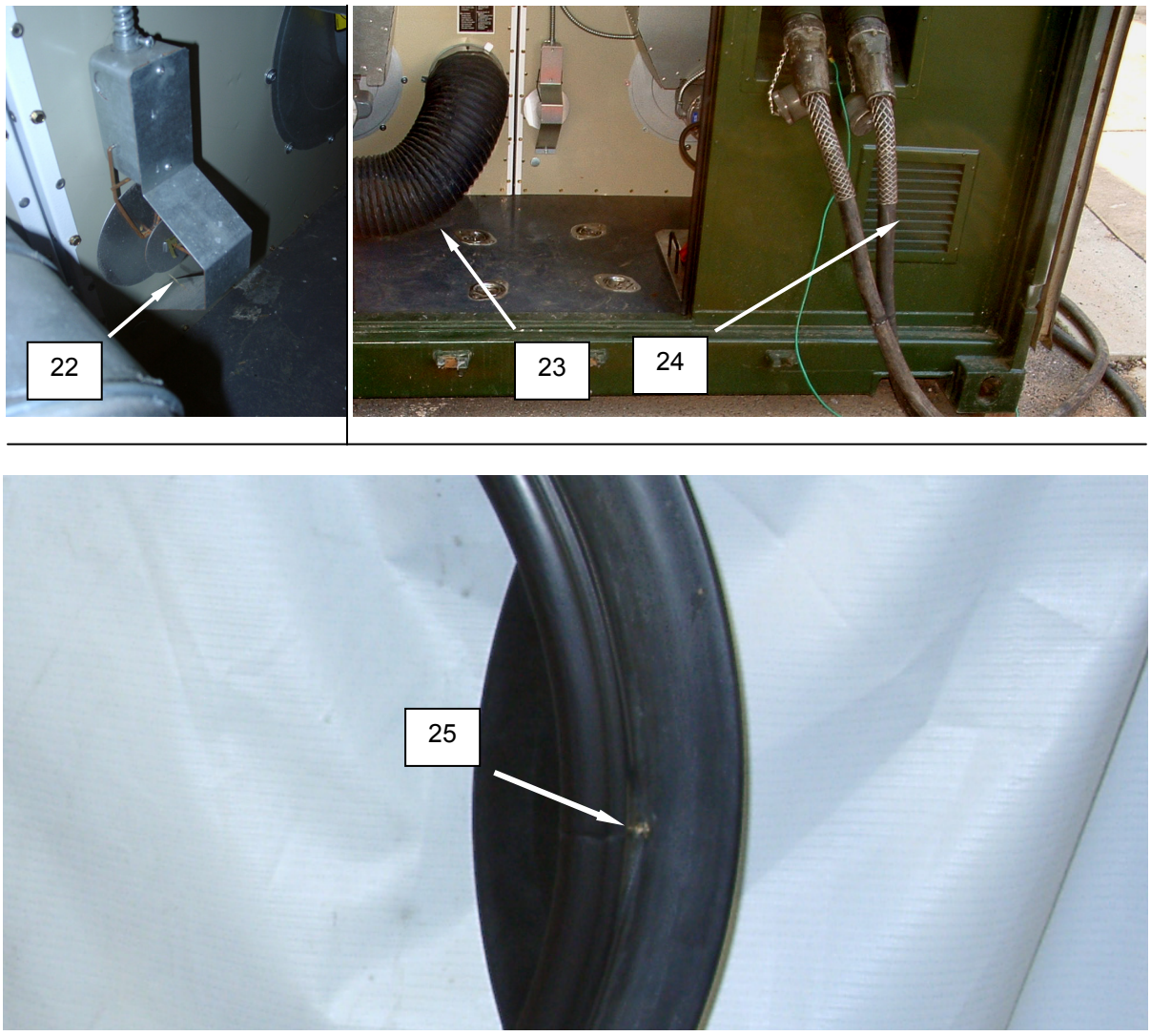


Figure 8. Before PMCS for Dryer Components.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
26	Before, Daily		Pump P-3 **(Figure 9, Item 26)**	Inspect pump for material damage, corrosion, and leakage. Ensure mounting is secure. Ensure heat tape is in place and shows no material damage.	Pump damaged or corrosion is present. Class III leakage is present. Pump is not securely mounted. Heat tape missing or visibly damaged.
27	Before, Daily		Pump P-4 **(Figure 9, Item 27)**	Inspect pump for material damage, corrosion, and leakage. Ensure mounting is secure.	Pump damaged or corrosion is present. Class III leakage is present. Pump is not securely mounted.

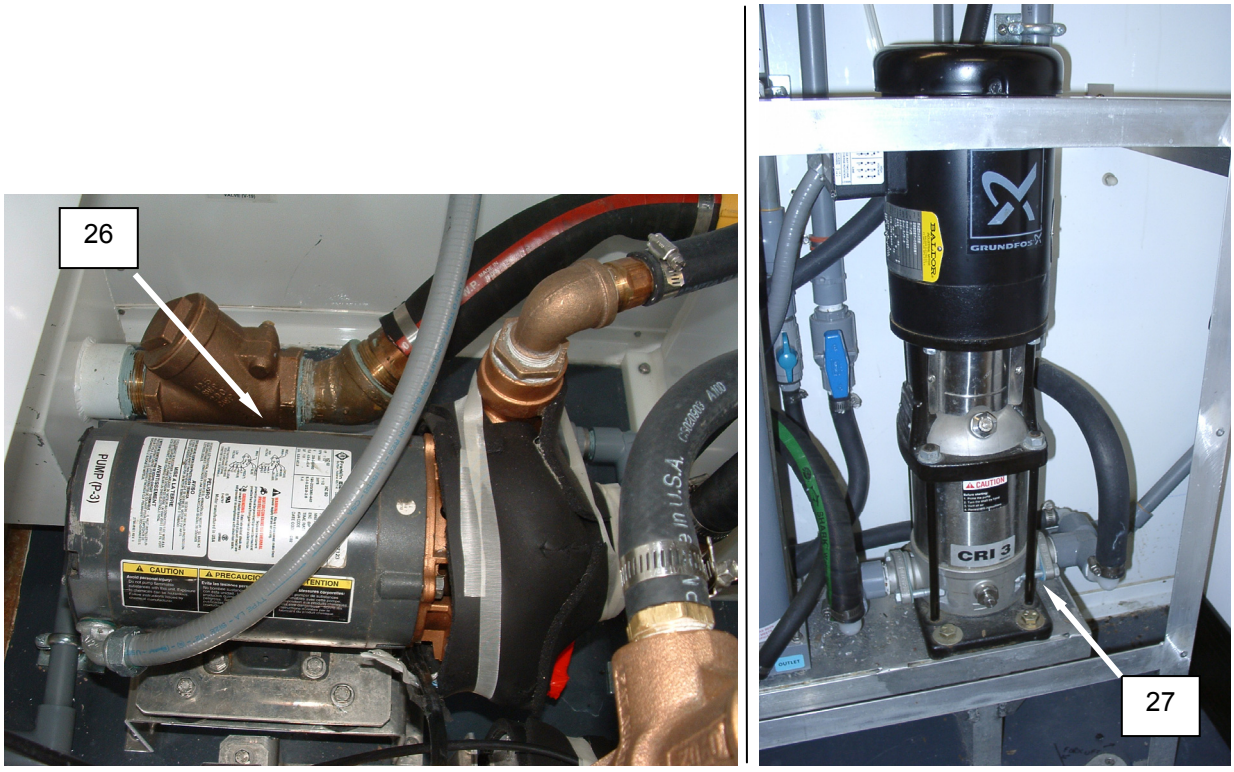


Figure 9. Before PMCS P-3 and P-4 Pump.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
28	Before, Daily		Filters F-1A **(Figure 10, Item 28)** and F-1B **(Figure 10, Item 29)**	Inspect filter housings for material damage and leakage. Ensure mounting is secure.	Filter housings damaged. Class III leakage is present. Filter is not securely mounted.
29	Before, Daily		Filters F-2 and F-3 **(Figure 10, Item 30)**	Inspect filter housing for material damage and leakage. Ensure mounting is secure.	Filter housing damaged. Class III leakage is present. Filter is not securely mounted.
30	Before, Daily		Nanofilters **(Figure 10, Item 31)**	Inspect filter housings for material damage and leakage. Ensure mounting is secure.	Filter housings damaged. Class III leakage is present. Filter is not securely mounted.

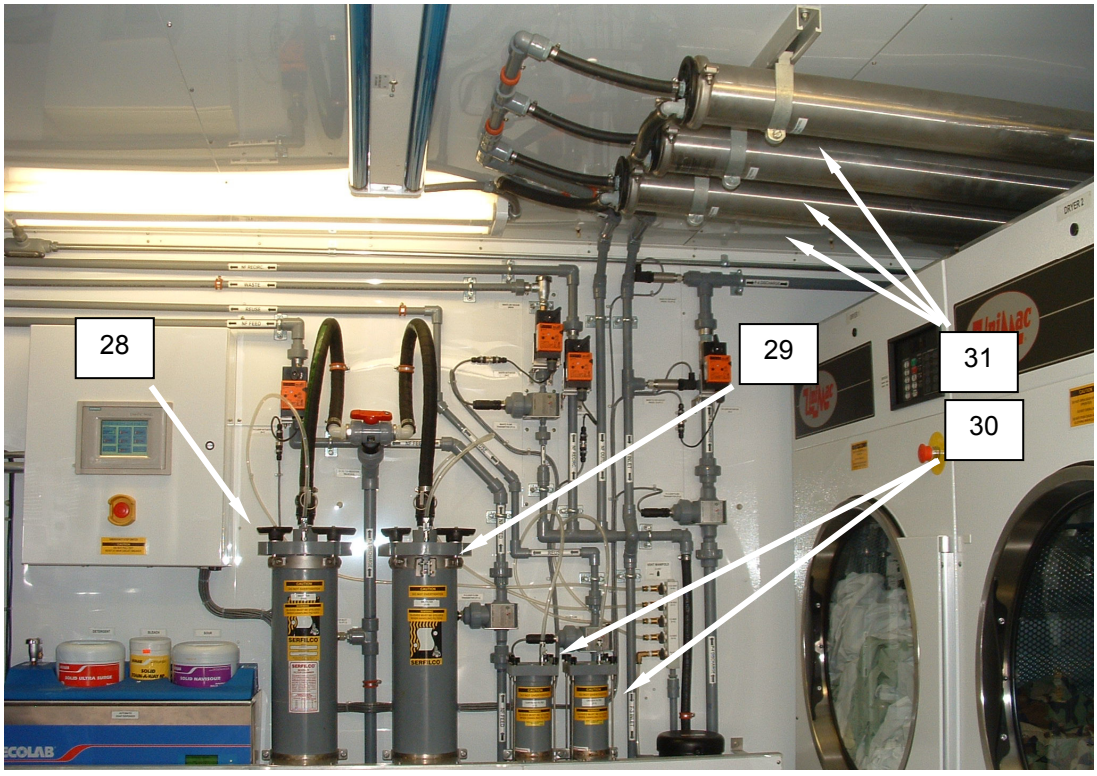


Figure 10. Before PMCS Filters F-1A, F-1B, F-2, and F-3.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
31	Before, Daily		Flow Transmitters **(Figure 11, Item 32)** (FT-1-4); there are 4.	Inspect flow transmitters for material damage and leakage. Ensure mounting is secure.	Flow transmitters damaged. Class III leakage is present. Flow Transmitter is not securely mounted.
32	Before, Daily		Pressure Transmitters **(Figure 11, Item 33)** (PT-1-7); there are 7.	Inspect pressure transmitters for material damage and leakage. Ensure mounting is secure. **NOTE** PT-1 is located behind washers. All others are located on the back wall of the main compartment.	Pressure transmitters damaged. Class III leakage is present. Pressure transmitter is not securely mounted.
33	Before, Daily		Water Reuse Actuator Valves **(Figure 11, Item 34)** (A-1-4); there are 4.	Inspect water reuse actuator valves for material damage and leakage. Ensure mounting is secure.	Water reuse actuator valves damaged. Class III leakage is present. Water reuse actuator valve is not securely mounted.
34	Before, Daily		Water Reuse Holding Tanks **(Figure 12, Item 35)**	Inspect all holding tanks for leakage and material damage such as cracks.	Class III leakage is present; material damage is observed.
35	Before, Daily		Water Reuse Holding Tank Sight Glasses; **(Figure 12, Item 36)** Reuse Tank Temperature Gauge **(Figure 12, Item 37)**	Inspect sight glass for leakage and material damage, such as cracks. Ensure gauge is correctly aligned, legible, and free from internal or external leakage. Ensure lid is secure.	Class III leakage is present; material damage is observed. Lid is not secure.



Figure 11. Before PMCS – Water Treatment System.



Figure 12. Before PMCS – Water Treatment System Holding Tanks.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
36	Before, Daily, During		Boiler **(Figure 13, Item 38)**	Inspect boiler for leakage of water or fuel. Ensure no material damage is present. Ensure no materials are stored in proximity to the boiler. Ensure that there is an adequate supply of 50/50 mix glycol in reservoir.	Class III leakage is present; material damage is observed. Improper storage of materials adjacent to boiler.
37	Before, Daily		Fuel Hoses **(Figure 13, Item 39)**	Inspect fuel hoses for damage or leakage.	Class III leakage is present; material damage is observed.
38	Before, Daily		Fuel Filter **(Figure 13, Item 40)**	Inspect fuel filter for damage or leakage. Ensure filter is securely mounted.	Class III leakage is present; material damage is observed. Filter mounting loose.

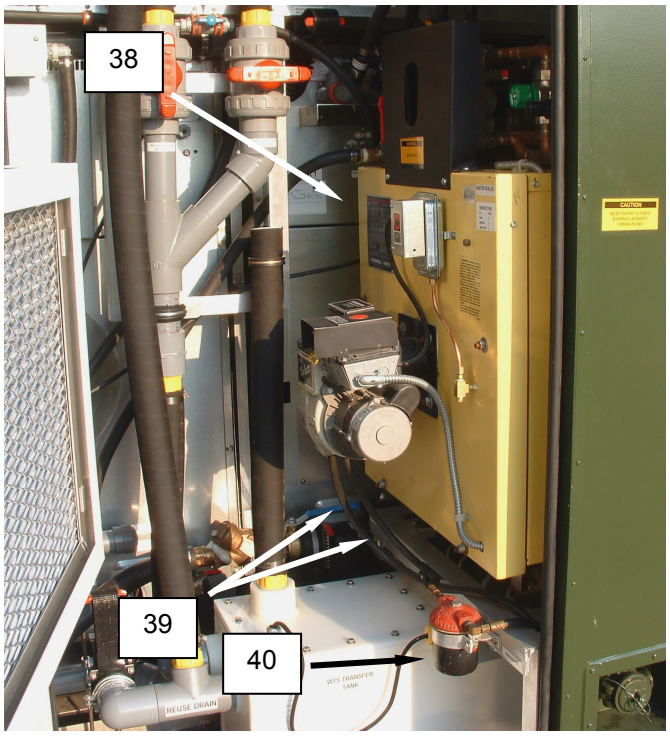


Figure 13. Before PMCS - Boiler.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
39	Before, Daily		Draft Inducer **(Figure 14, Item 41)**	Inspect draft inducer for damage.	Material damage is observed.
40	Before, Daily		Heat Exchanger **(Figure 14, Item 42)**	Inspect heat exchangers for damage or leakage.	Class III leakage is present; material damage is observed.
41	Before, Daily		Mixing Valves **(Figure 14, Item 43)**	Inspect mixing valves for damage or leakage.	Class III leakage is present; material damage is observed.
42	Before, Daily		Boiler Circulation Pump **(Figure 14, Item 44)**	Inspect pump for material damage, corrosion, and leakage. Ensure mounting is secure.	Pump damaged or corrosion is present. Class III leakage is present. Pump is not securely mounted.
43	Before, Daily		Pressure Relief Valve **(Figure 14, Item 45)**	Inspect Pressure Relief Valve for damage or leakage.	Class III leakage is present; material damage is observed.
44	Before, Daily		Pressure – Temperature Gauge **(Figure 14, Item 46)**	Inspect gauge for material damage, legibility, and internal and external leakage.	Class III external leakage is present; Class I internal leakage is present; material damage is observed. Gauge is illegible.

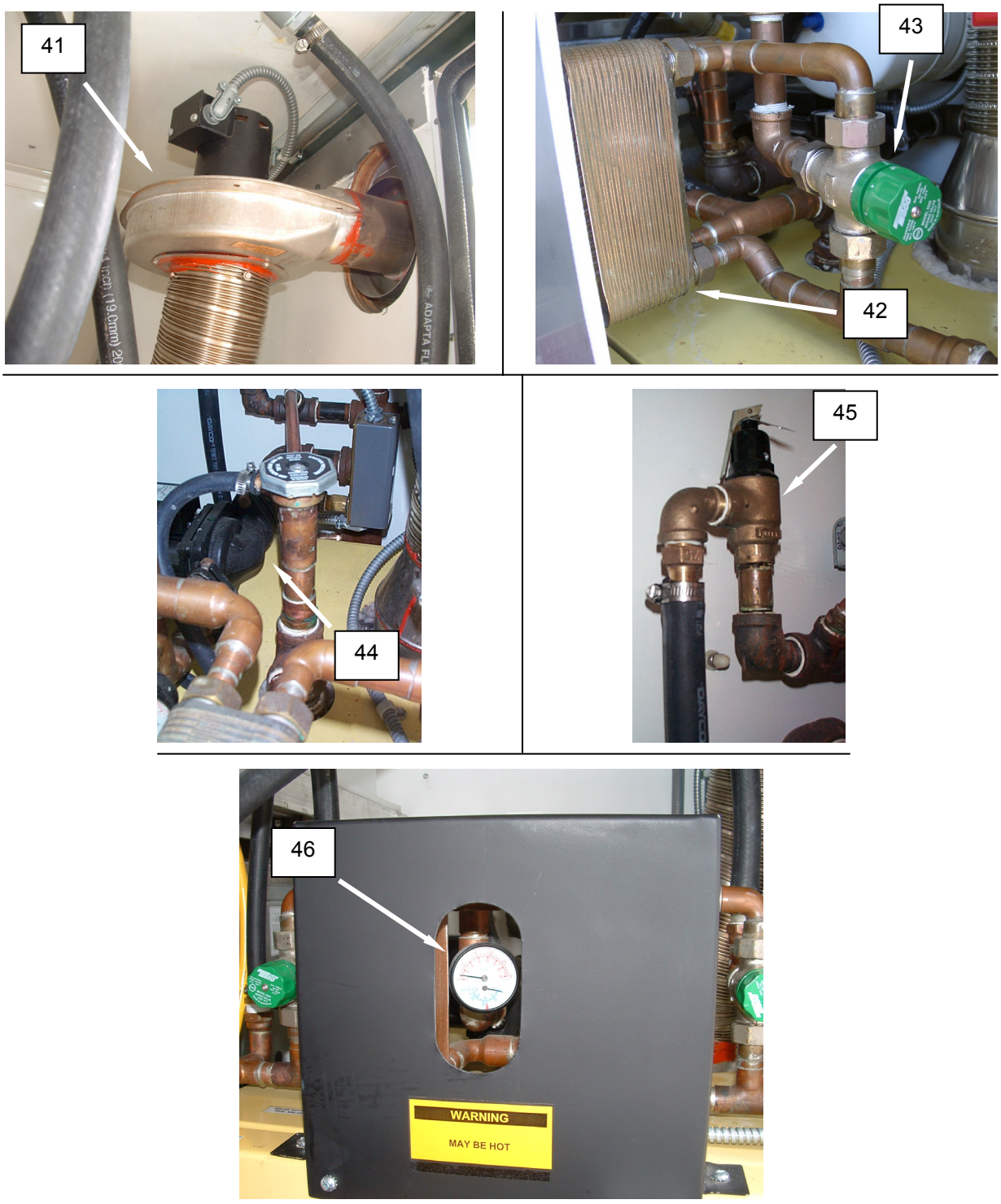


Figure 14. Before PMCS – Boiler Components.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
45	Before, Daily		TEMPER Modified Endwall **(Figure 15, Item 47)**	Inspect modified endwall for improper installation or material damage.	Modified endwall incorrectly installed. Material damage is present.

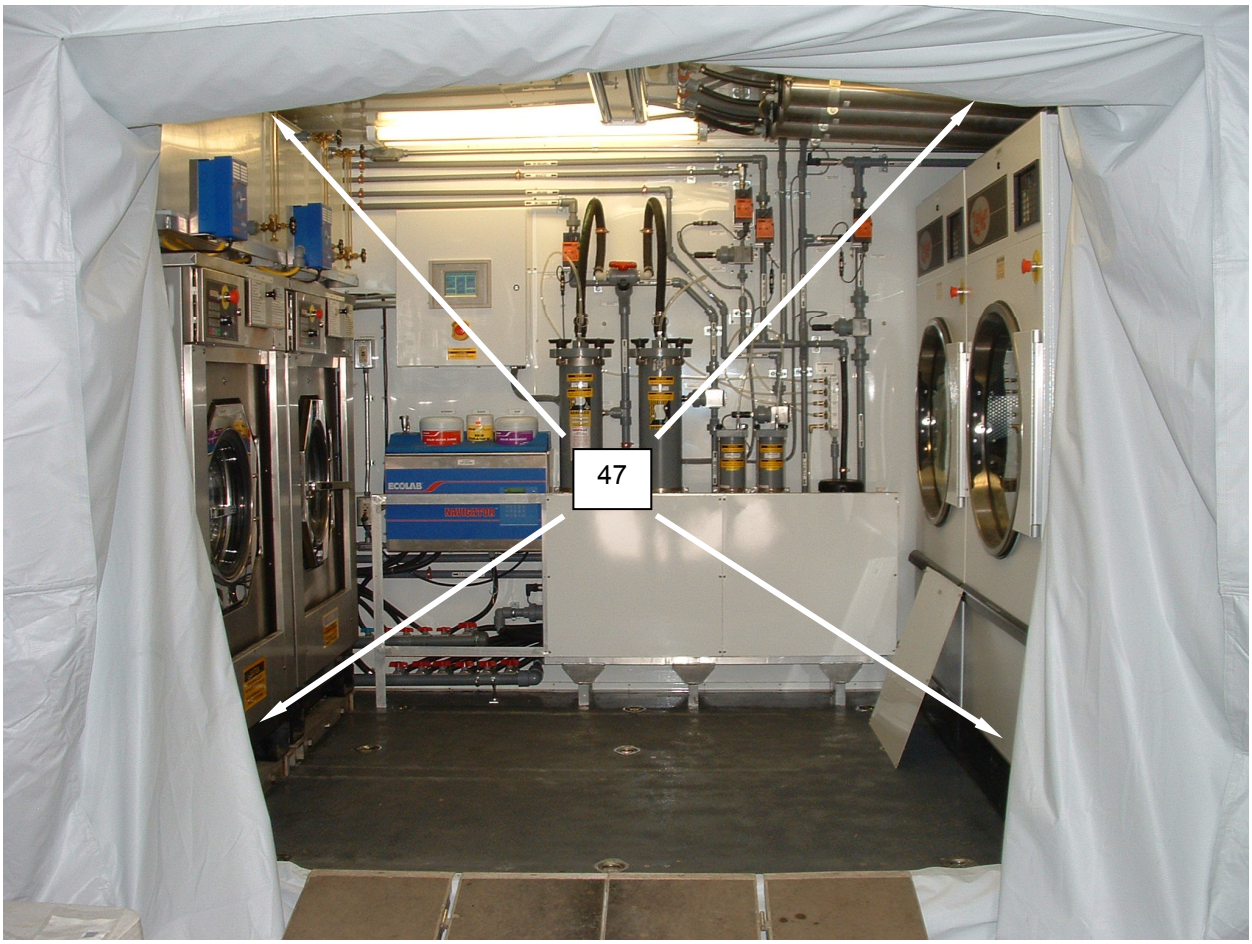


Figure 15. Before PMCS – TEMPER Modified Endwall.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
46	Before, Daily		Insulating Jackets **(Figure 16, Item 48)**	Inspect tank insulating jackets for correct fit and material damage.	Insulating jackets improperly fitted or damaged.
47	Before		Tank Heater **(Figure 16, Item 49)**	Inspect tank heater for material damage such as frayed or burnt power cord, or bent or missing guard.	Tank heater visibly damaged.
48	Before, Daily		Extension Cords **(Figure 16, Item 50)**	Inspect extension cords for material damage such as frayed or burnt insulation or plug ends, or exposed conductor.	Cord visibly damaged; exposed conductors.
49	Before, After		Air Compressor **(Figure 16, Item 51)**	Inspect air compressor for visible damage to compressor, tank, power cord, or air hose.	Air compressor visibly damaged.

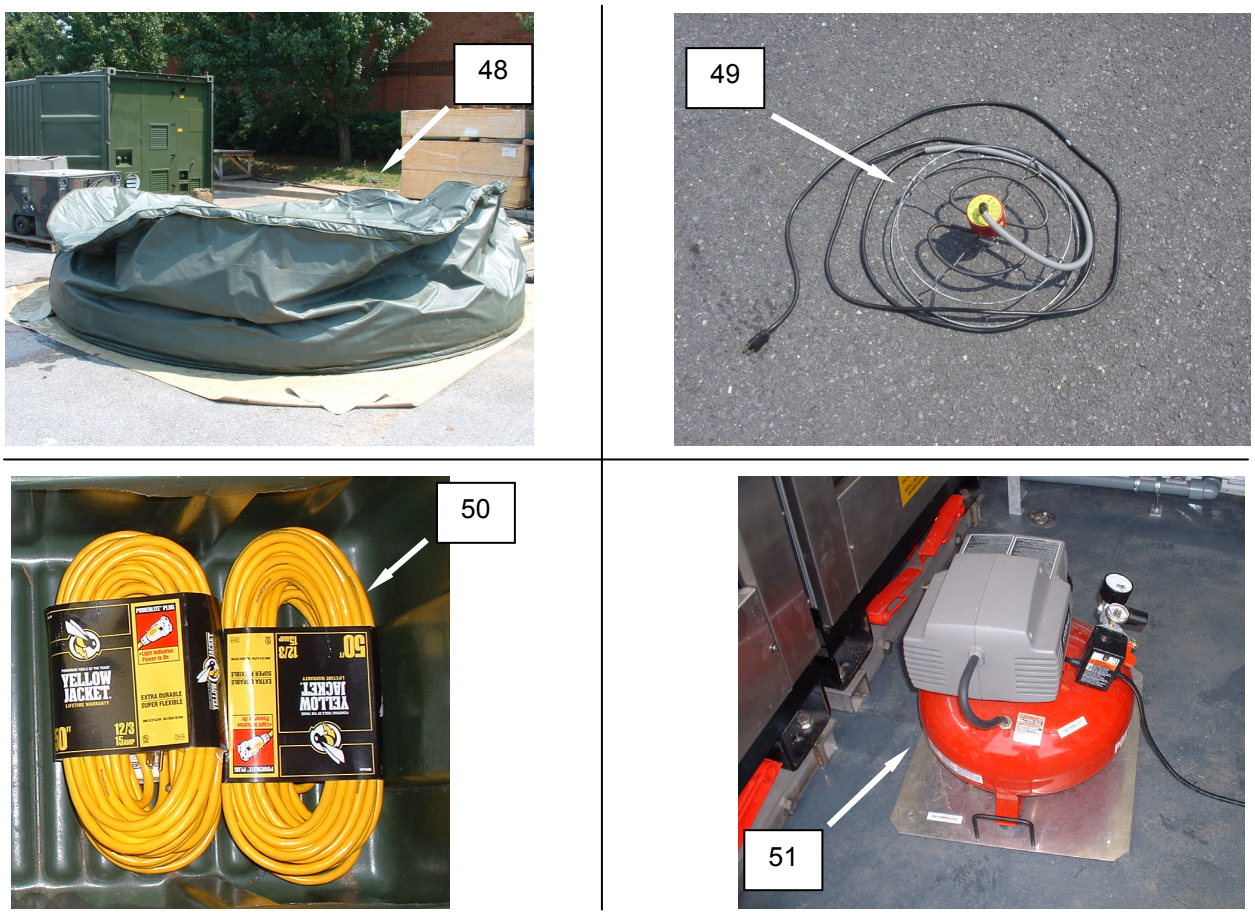
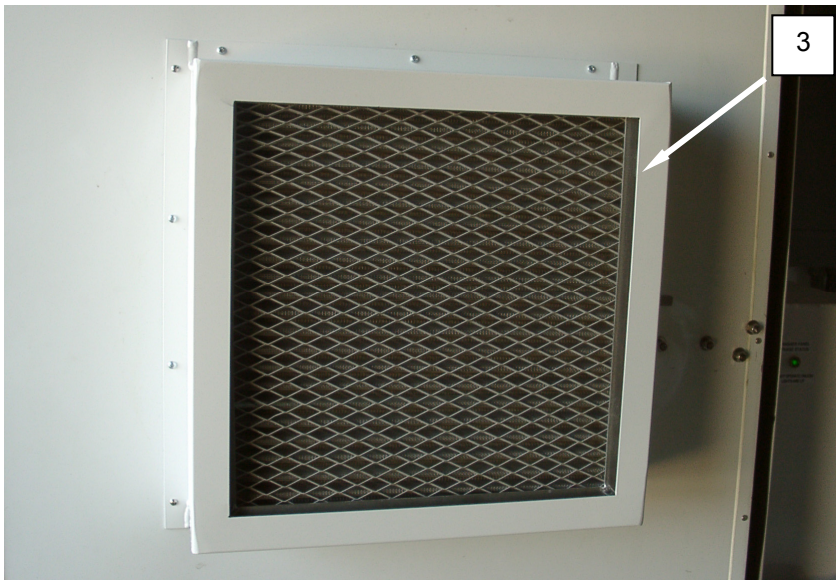


Figure 16. Before PMCS – Cold Weather Equipment.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
50	Weekly		Air Filters **(Figure 17, Item 3)**	Clean filters.	Filters are dirty.



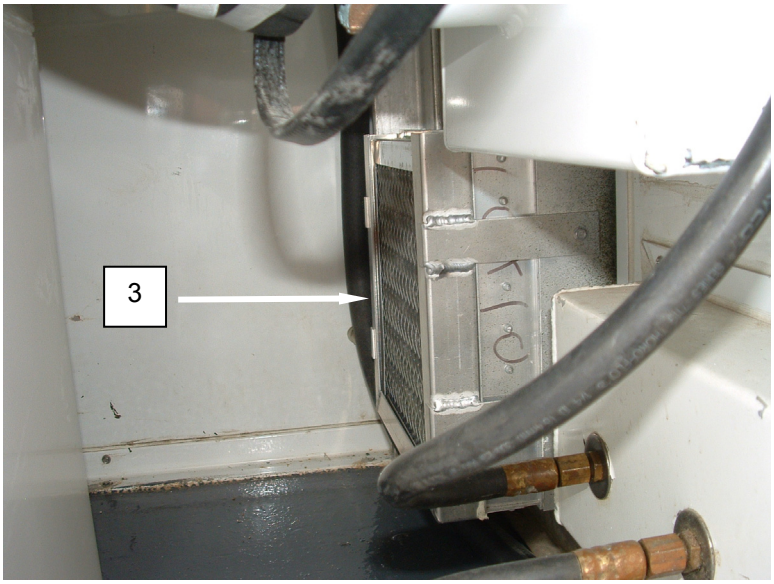


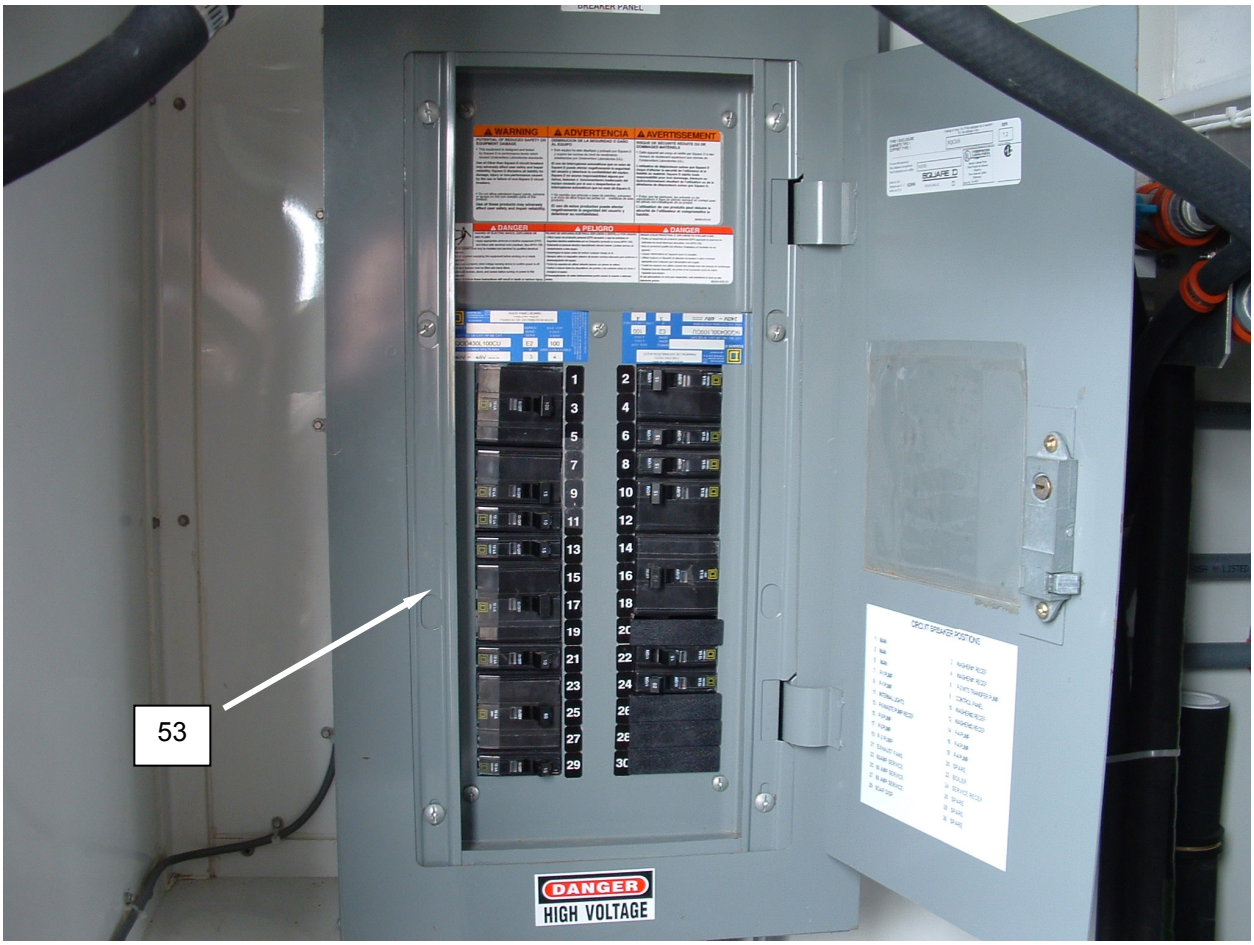
Figure 17. Weekly PMCS for Air Filters.

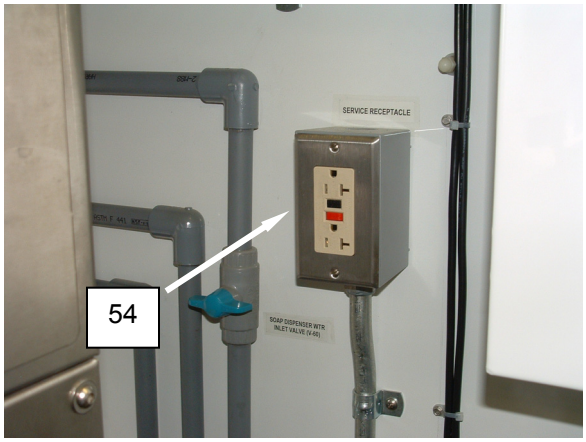
Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
51	Weekly		Lighting Battery	Test battery by pressing test switch **(Figure 18, Item 52)**.	Battery is damaged or inoperative.
52	Before, After		Circuit Breakers **(Figure 19, Item 53)**	Test circuit breakers by switching each OFF, then resetting.	Circuit breaker is inoperative.
53	Before, Monthly		GFCI Receptacles **(Figure 19, Item 54)** There are 4.	Test receptacles using TEST button. Reset receptacles using RESET button.	Receptacles are inoperative.
54	Weekly		Exhaust Fans **(Figure 19, Item 55)**	Operate fans.	Fans Inoperative.



Figure 18. Weekly PMCS for Lighting.





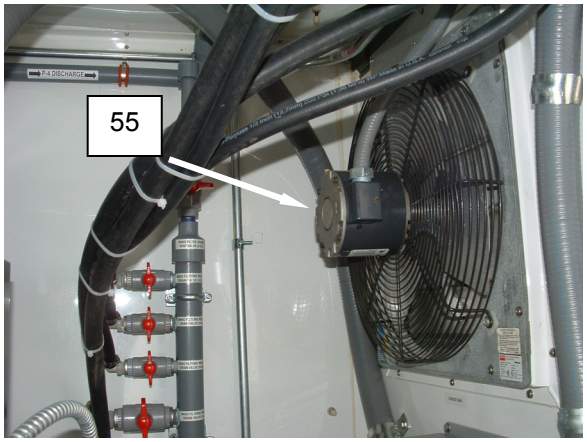
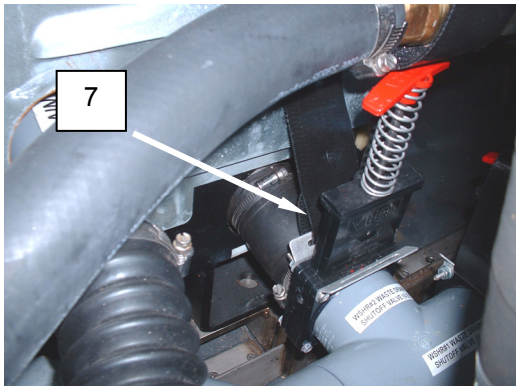
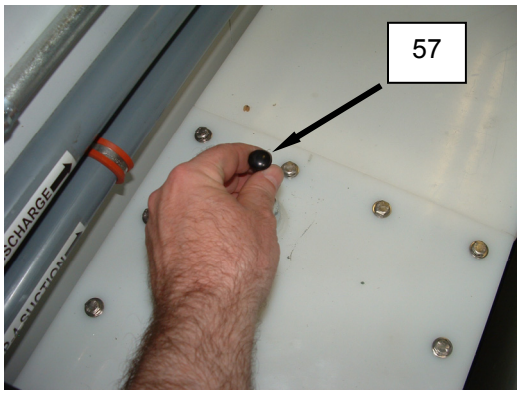


Figure 19. Weekly PMCS for Electrical Components.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
55	Weekly		Gate Valves **(Figure 20, Item 56)**	Secure CBL operation and exercise each gate valve throughout its range. Ensure valves are correctly reset before placing CBL back in operation.	Valves stuck or difficult to operate.
55	Before		Drainage Tank Pumps **(Figure 20, Item 57)**	Test pump operation by manually lifting float.	Pump inoperative.
57	Before		Pump P-1 **(Figure 20, Item 18)**	Operate pump IAW procedures given in WP 0008 00 and WP 0009 00.	Pump inoperative.





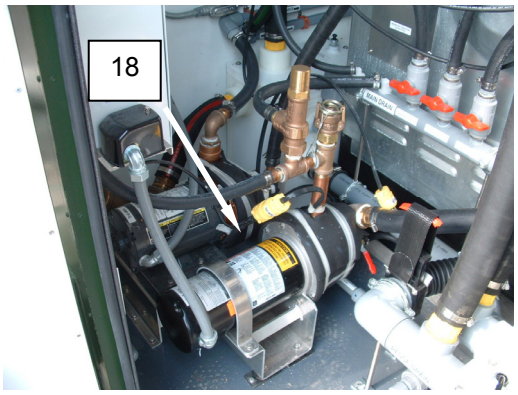


Figure 20. Weekly PMCS - Valves and Pumps.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
58	Weekly		Washer **(Figure 21, Item 19)**	Operate washer IAW procedures given in WP 0008 00. Listen for unusual sounds, such as squealing belts or drum knocking during operation. Use emergency stop switch to shut washer down. Allow reset and place washer back in service.	Washer inoperative. Audible indications of improper load, wear, or mechanical damage. Emergency stop fails to shut down washer. Washer fails to start after reset.

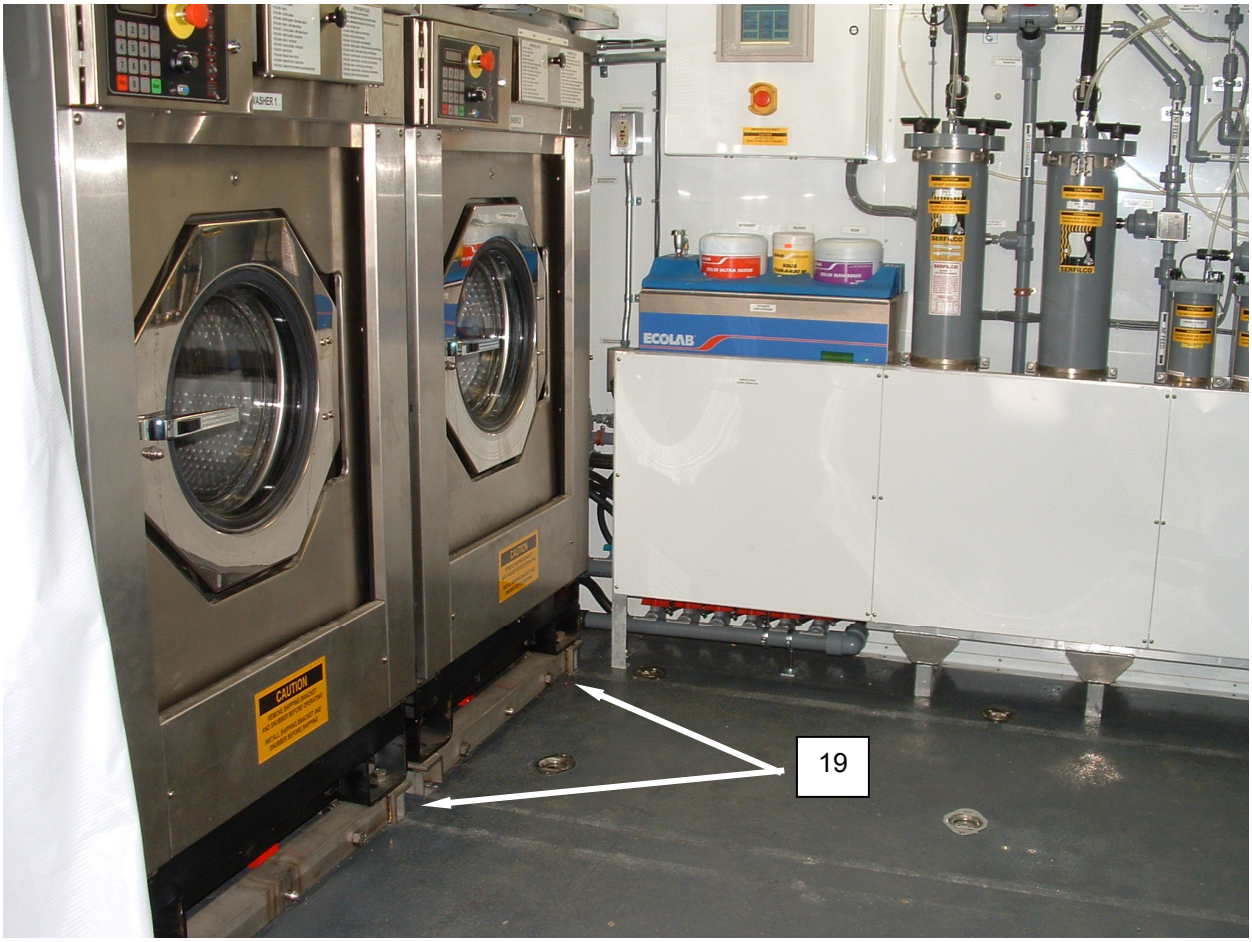


Figure 21. Weekly PMCS for the Washer.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
59	During		Dryer **(Figure 22, Item 21)**	Operate dryer IAW procedures given in WP 0008 00. Listen for unusual sounds, such as squealing belts or drum knocking during operation. Use emergency stop switch to shut dryer down. Allow reset and place dryer back in service.	Dryer inoperative. Audible indications of wear or mechanical damage. Emergency stop fails to shut down dryer. Dryer fails to start after reset.
60	Before, Monthly		Dryer Airflow Switch **(Figure 23, Item 22)**	Test dryer airflow switch by operating dryer IAW procedures given in WP 0008 00. Obstruct dryer exhaust. Dryer should shut down within 30 seconds. Remove obstruction, restart dryer.	Airflow switch inoperative.
61	Before, Monthly		Dryer Lint Panel Switch **(Figure 23, Item 60)**	Test dryer lint panel switch by operating unloaded dryer IAW procedures given in WP 0008 00. Remove lint panel on operating dryer. Dryer should shut down immediately. If dryer does not shut down automatically, shut down dryer with emergency stop before proceeding. Install lint panel. Restart dryer.	Switch inoperative.
62	Before, Monthly		Dryer Door Switch **(Figure 23, Item 61)**	Test dryer door switch by operating unloaded dryer IAW procedures given in WP 0008 00. Open door. Dryer should shut down immediately. If dryer does not shut down automatically, shut down dryer with emergency stop before proceeding. Close door. Restart dryer.	Switch inoperative.
63	Weekly		Dryer Ducts **(Figure 23, Item 23)**	Service dryer ducts by removing ducts from dryer and vent connection and cleaning thoroughly. Reinstall ducts, ensuring tight connections.	Ducts dirty or obstructed.



Figure 22. Weekly PMCS for the Dryer.

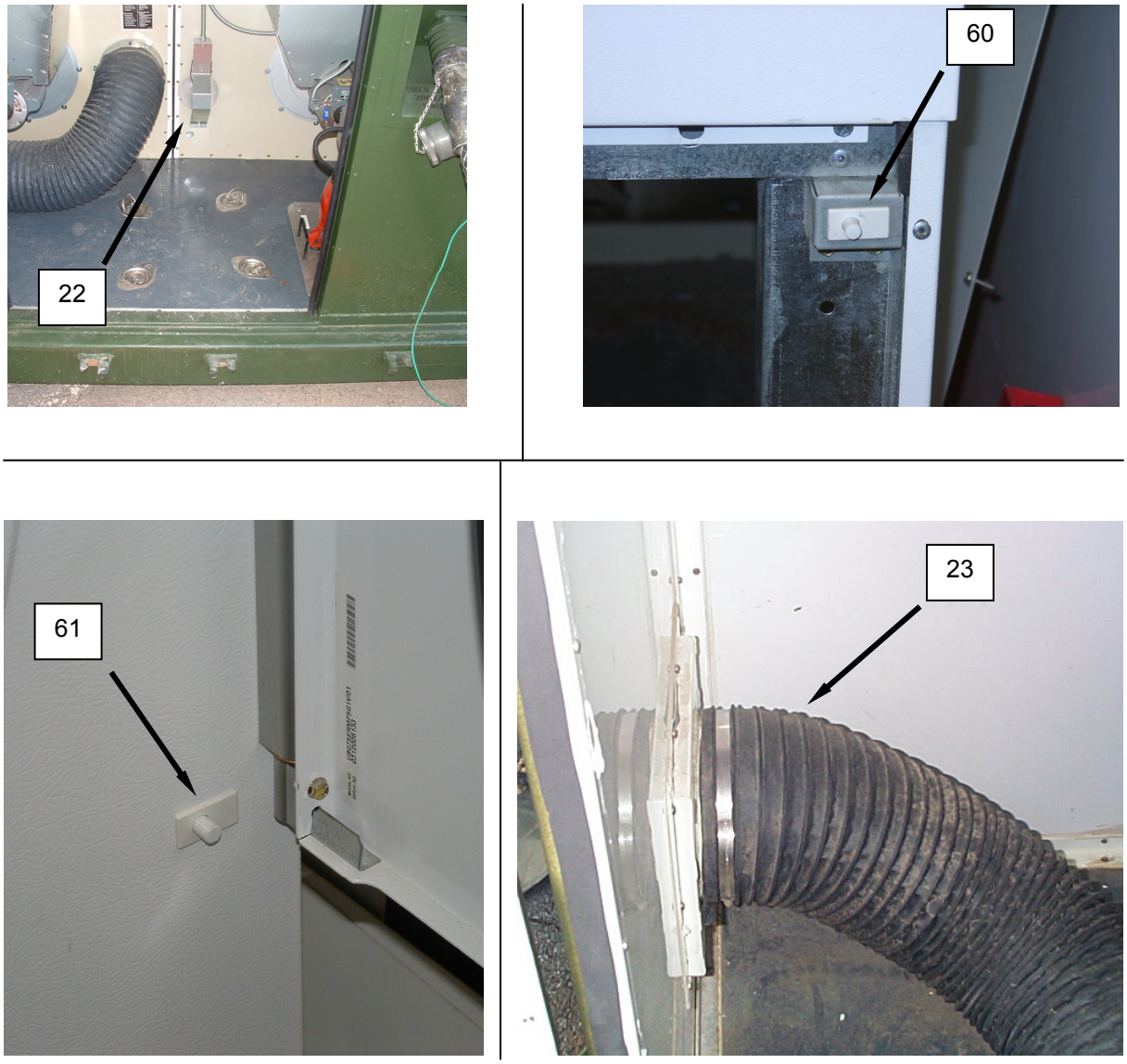


Figure 23. Weekly PMCS Dryer Components.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
64	Weekly		Pump P-3 **(Figure 24, Item 26)**	Operate pump IAW procedures given in WP 0009 00.	Pump inoperative.
65	Weekly		Pump P-4 **(Figure 24, Item 27)**	Operate pump IAW procedures given in WP 0009 00.	Pump inoperative.
66	Weekly		Water Reuse Actuator Valves **(Figure 24, Item 62)**	Operate water reuse system IAW procedures given in WP 0009 00. Observe operation of valves at cycle transitions.	Water Reuse Actuator Valves inoperative.

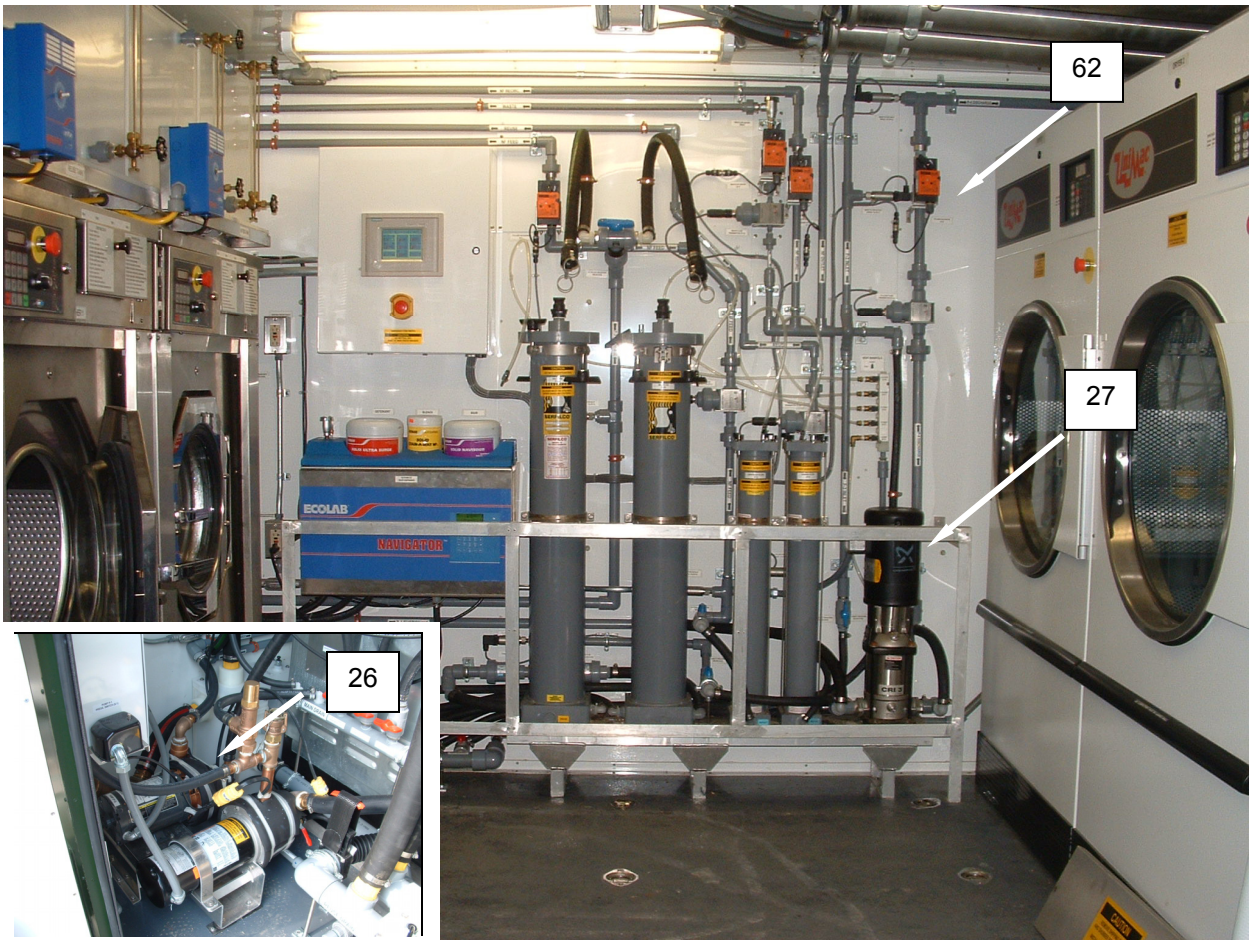


Figure 24. Weekly PMCS – Water Treatment System.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
67	After		Drainage Tanks **(Figure 25, Item 17)**	Remove drainage tank cover and service by cleaning and disinfecting IAW procedures in TB MED 577.	Tanks dirty.

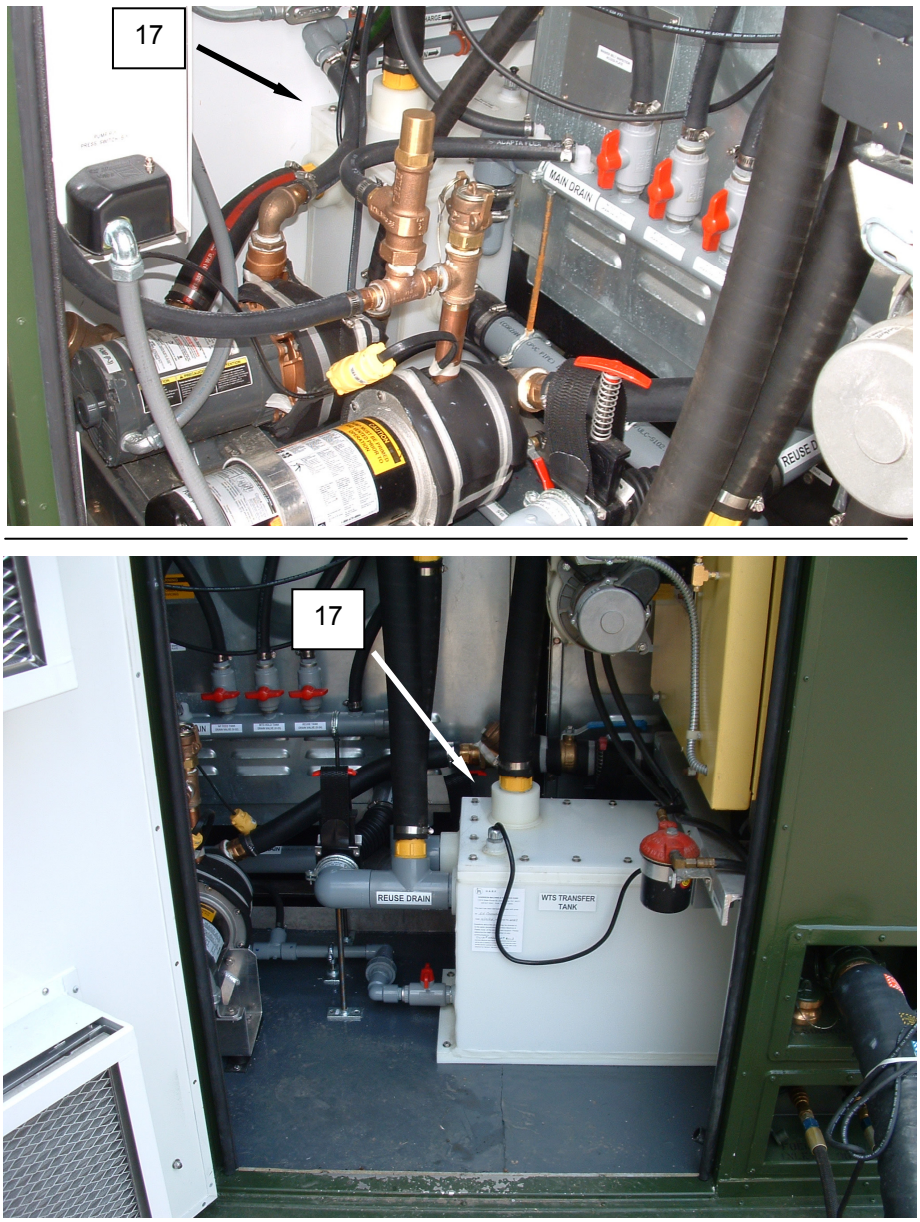


Figure 25. After PMCS for Drainage Tanks.

Table 1. Preventive Maintenance Checks and Services (PMCS) – Continued.

ITEM NO.	INTERVALS	MAN-HOURS	ITEM TO BE CHECKED OR SERVICED	PROCEDURES	EQUIPMENT NOT READY/AVAILABLE IF:
68	Annual		QD Hose Gaskets **(Figure 26, Item 63)**	Replace hose gaskets on all QD hoses.	Class III leakage at hose joints.

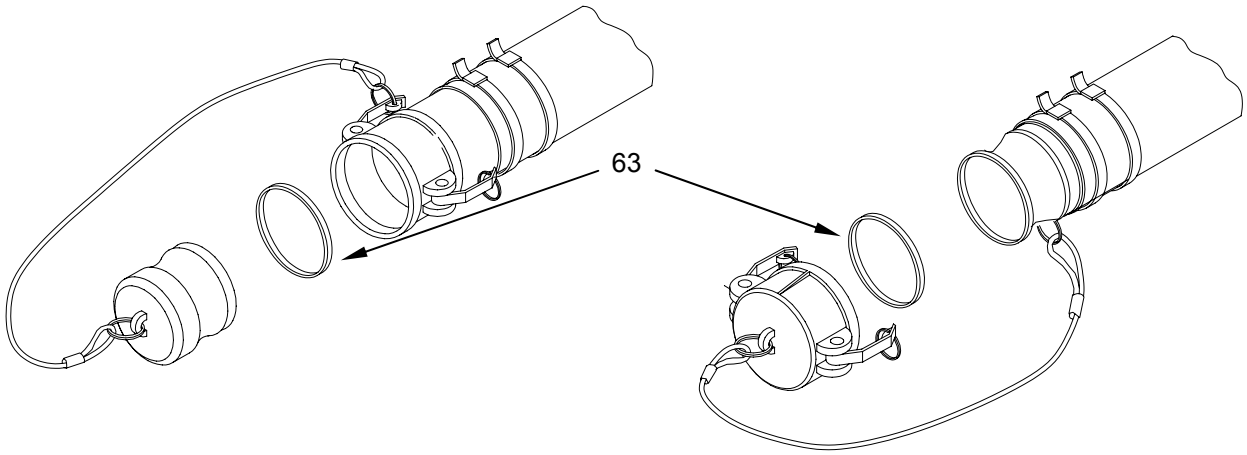


Figure 26. Annual PMCS for QD Hose Gaskets.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
AIR FILTERS
SERVICE, REPLACE

INITIAL SETUP

Tools	**Personnel Required**
None required.	One
Materials/Parts	**Equipment Condition**
None required.	CBL set up and operating normally.

SERVICE

Clean Door Filters

1. Remove door filter **(Figure 1, Item 1)** from filter mount in door.
2. Clean filter with hot soapy water.
3. Install filter **(Figure 1, Item 1)** into filter mount.

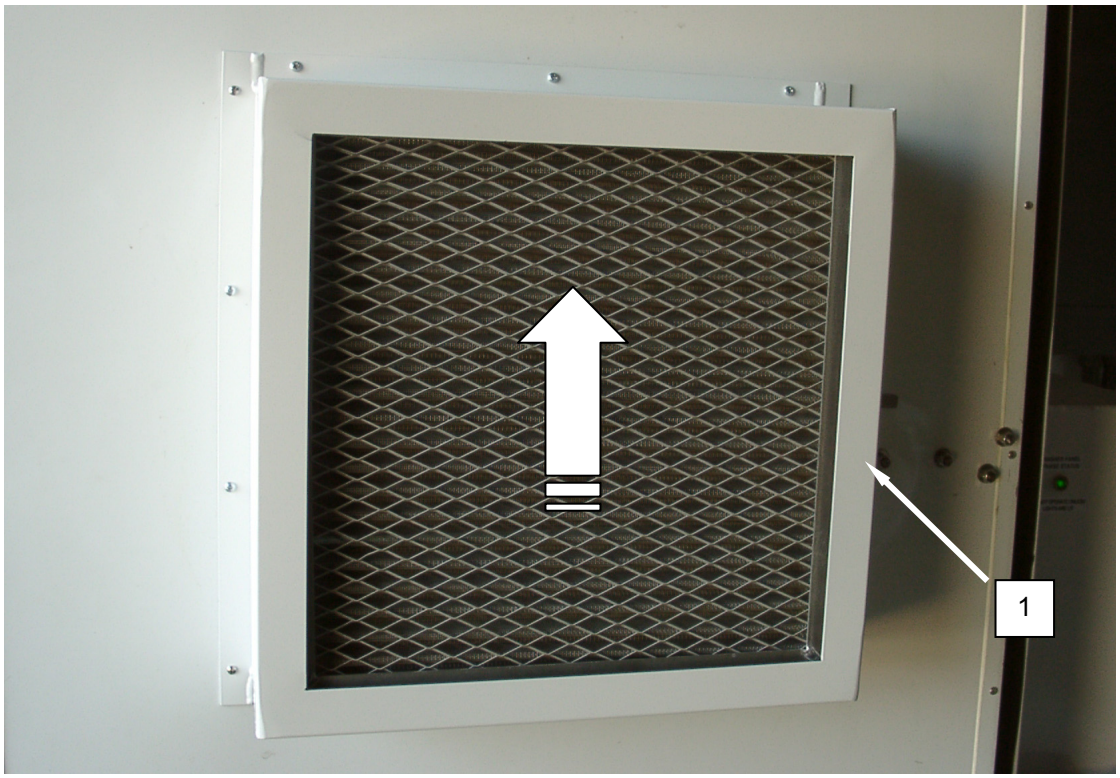


Figure 1. Clean the Door Filters.

SERVICE-CONTINUED

Clean Boiler Air Filter



WARNING

Boiler surface is extremely hot. Allow the boiler to cool for at least 30 minutes before attempting this maintenance procedure. Failure to follow this warning could result in serious injury to personnel from burning.

1. Remove filter **(Figure 2, Item 1)** from filter mount under boiler.
2. Clean filter with hot soapy water or compressed air.
3. Install filter **(Figure 2, Item 1)** into filter mount.

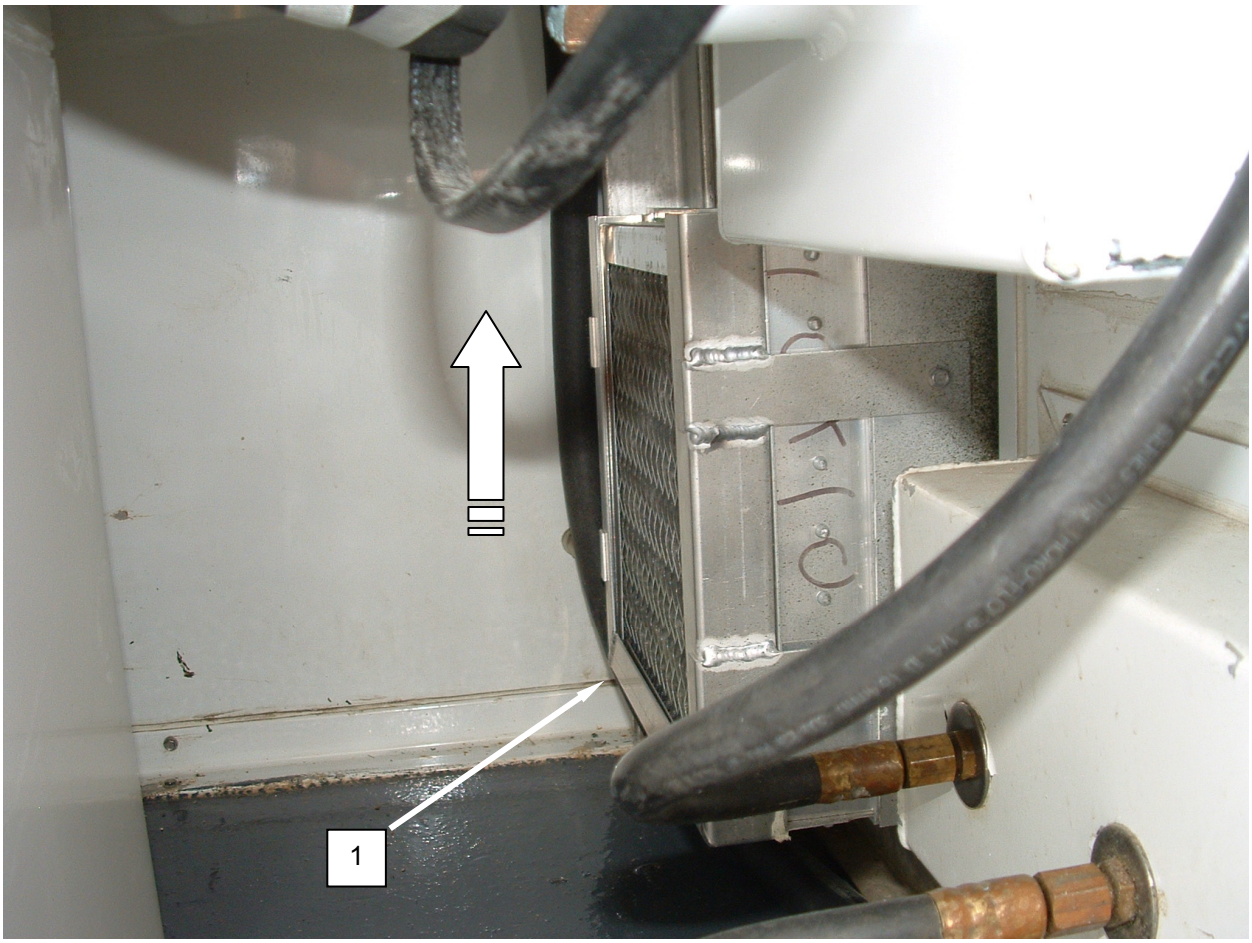


Figure 2. Clean the Boiler Air Filter.

REPLACE

Replace Door Filters

1. Remove door filter **(Figure 3, Item 1)** from filter mount in door.
2. Install replacement filter **(Figure 3, Item 1)** into filter mount.

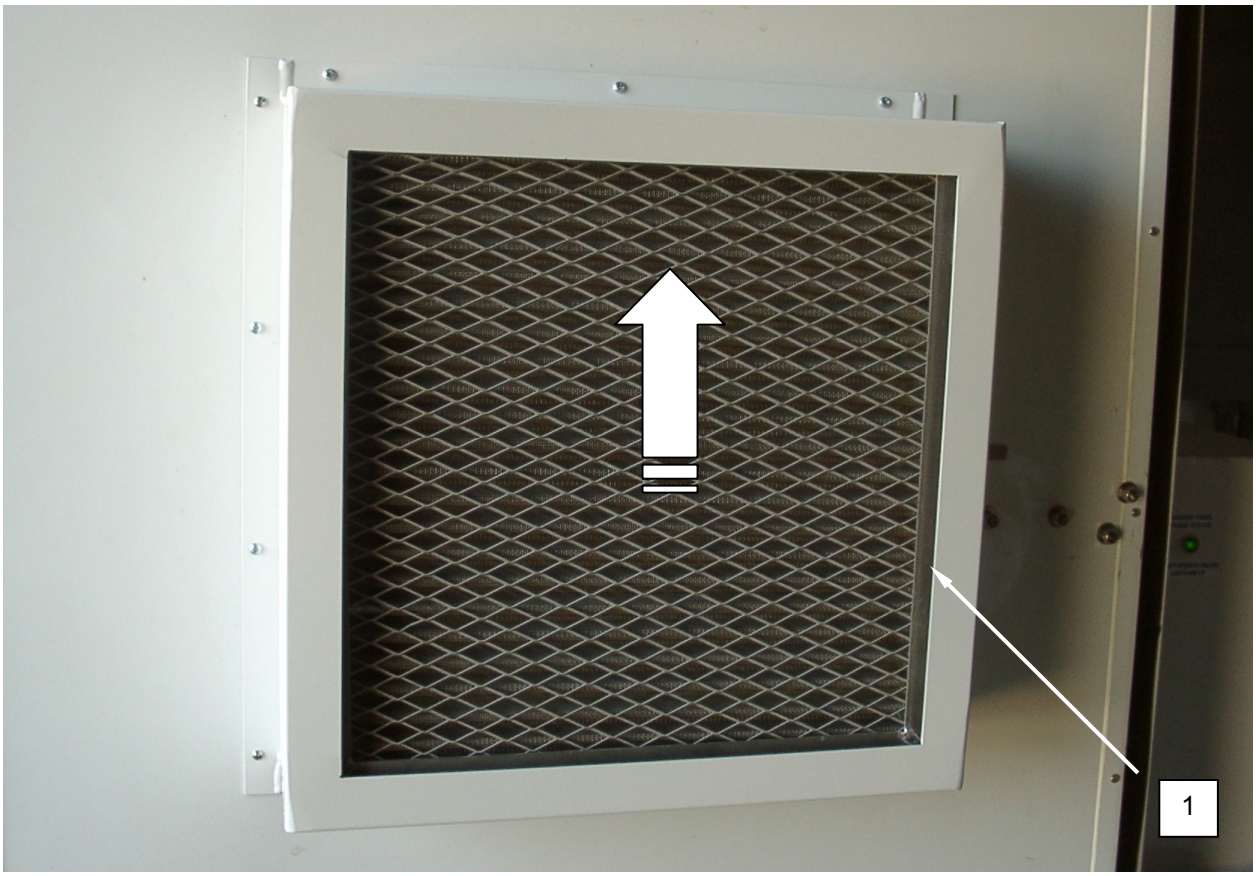


Figure 3. Replace the Door Filter.

REPLACE-CONTINUED

Replace the Boiler Air Filter



WARNING

Boiler surface is extremely hot. Allow the boiler to cool for at least 30 minutes before attempting this maintenance procedure. Failure to follow this warning could result in serious injury to personnel from burning.

1. Remove filter **(Figure 4, Item 1)** from filter mount under boiler.
2. Install replacement filter **(Figure 4, Item 1)** into filter mount.

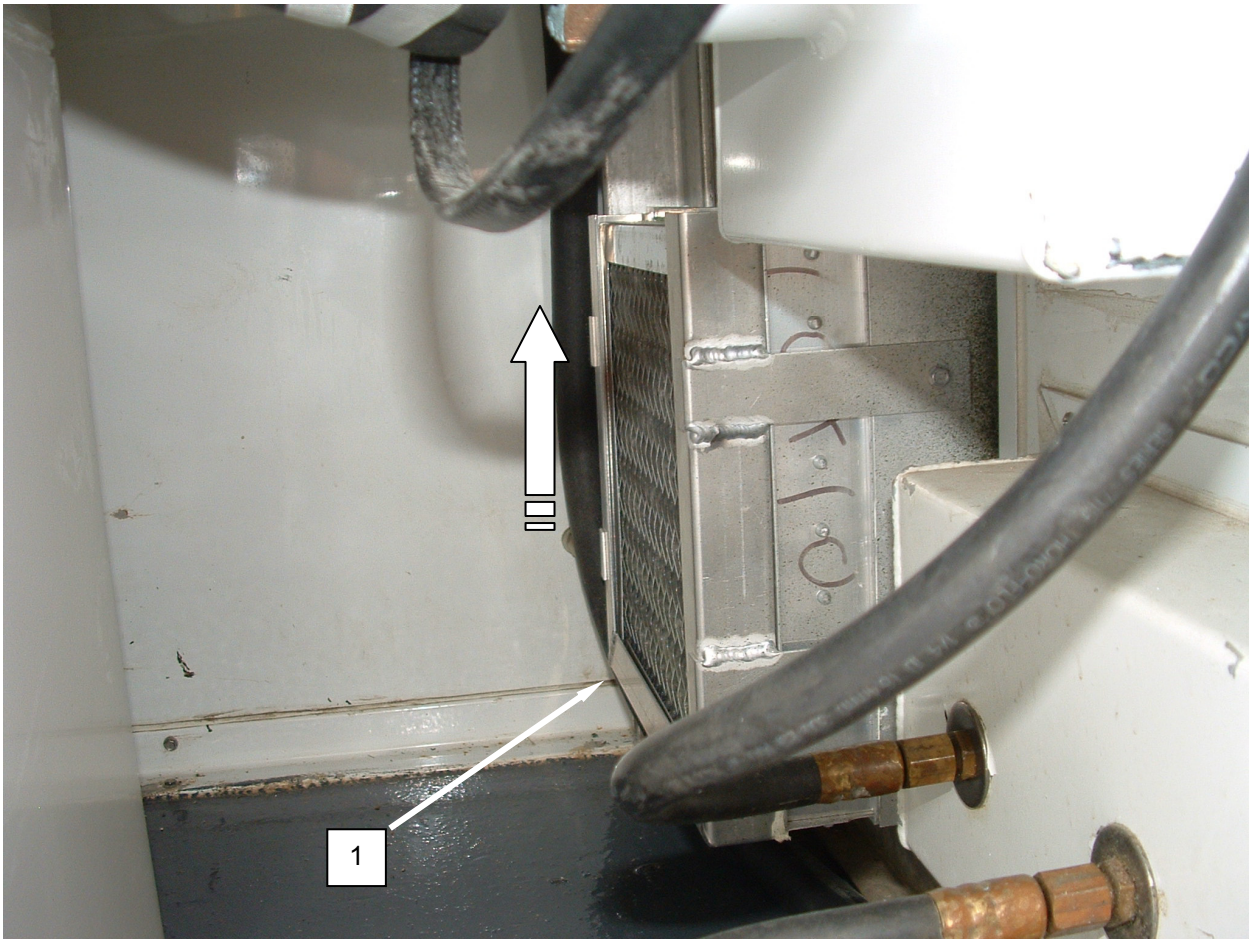


Figure 4. Replace the Boiler Air Filter.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
RAMP
REPLACE

INITIAL SETUP

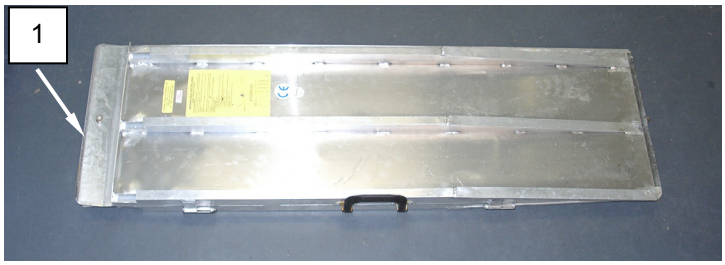
Tools	**Personnel Required**
None required.	One
Materials/Parts	**Equipment Condition**
None required.	CBL set up and operating normally.

REPLACE

Replace the Ramp

1. Remove the ramp **(Figure 1, Item 1)** from the personnel door sill **(Figure 1, Item 2)**.

2. Ensure the modified endwall is correctly positioned, and install the ramp **(Figure 1, Item 1)** onto the personnel door sill **(Figure 1, Item 2)** and over the bootwall fabric. Ensure that the pins **(Figure 1, Item 3)** are correctly aligned with the holes **(Figure 1, Item 4)** in the door sill.



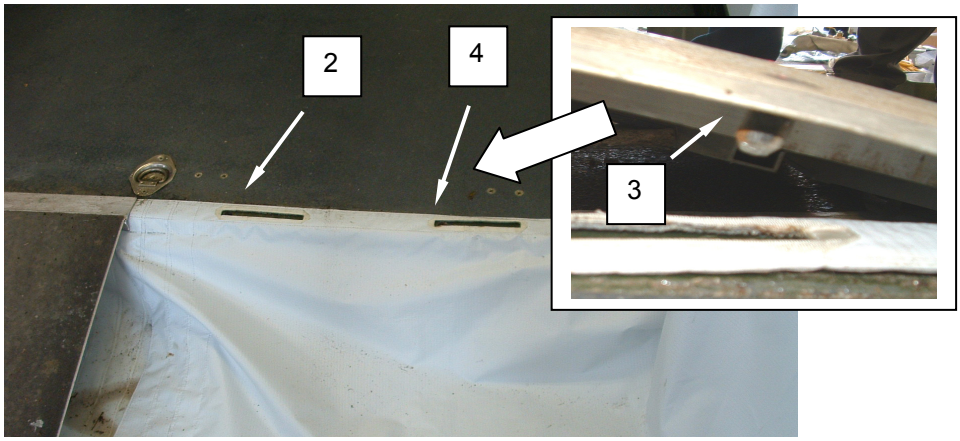


Figure 1. Replace the Ramp.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
INTERIOR LIGHTING
REPLACE

INITIAL SETUP

Tools	**Personnel Required**
None required.	One
Materials/Parts	**Equipment Condition**
None required.	CBL set and operating normally. Turn on blackout lights at the PLC.

REPLACE

Replace the Fluorescent Light Bulbs

NOTE

A step aid may be required to perform this maintenance task.

NOTE

If no light fixtures are working, notify unit maintenance.

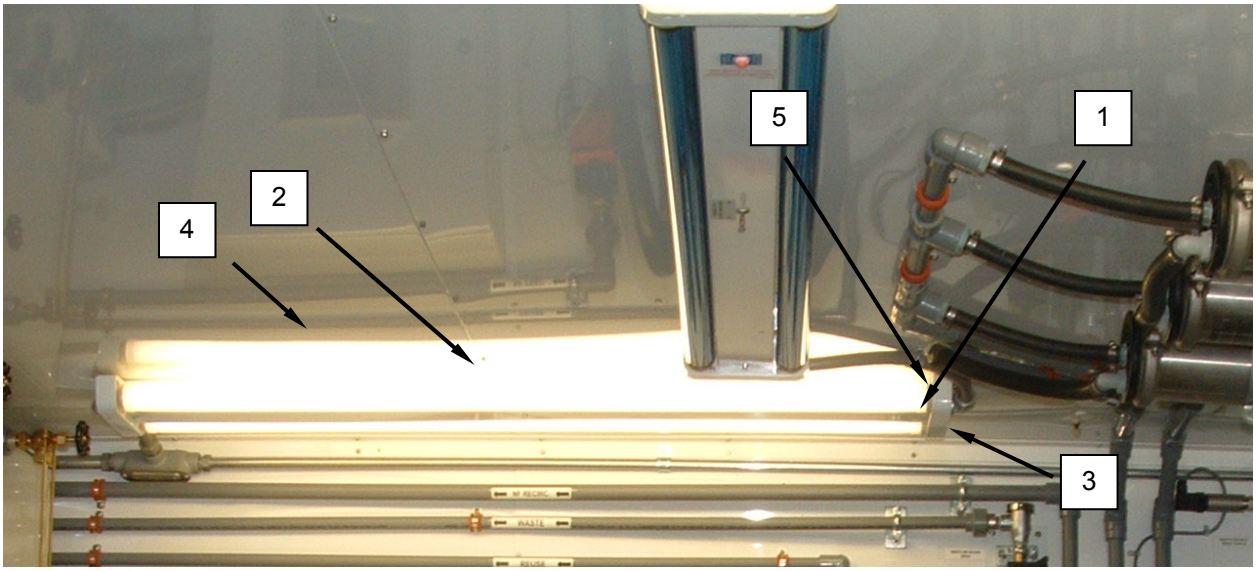
1. Remove tube keeper **(Figure 1, item 1)** (located at the end of tube inserted in movable socket; fixture has a convex pop rivet on this end.)
2. Push the tube **(Figure 1, item 2)** toward the movable end **(Figure 1, item 3)** to remove it from the fixture. Hold the tube as level as possible during removal to prevent it from sliding out of its protective sleeve **(Figure 1, item 4)**.
3. On a level surface, remove the two protective end caps **(Figure 1, item 5)** and slide the tube out of the protective sleeve **(Figure 1, item 4)**.
4. Install new tube into the protective sleeve **(Figure 1, item 4)**.
5. Install end caps **(Figure 1, item 5)** over the protective sleeve **(Figure 1, item 4)**.

NOTE

The end caps **(Figure 1, item 5)** fit semi-loosely in the sleeve **(Figure 1, item 4)** and can fall off if the tube is not held level.

6. Hold the tube as level as possible during installation.
7. Install tube **(Figure 1, item 2)** into the fixture.
8. Reinstall tube keeper **(Figure 1, item 1)**.
9. Turn on black light, and then turn black light off for lights to turn back on. Monitor for normal operation.

REPLACE-CONTINUED



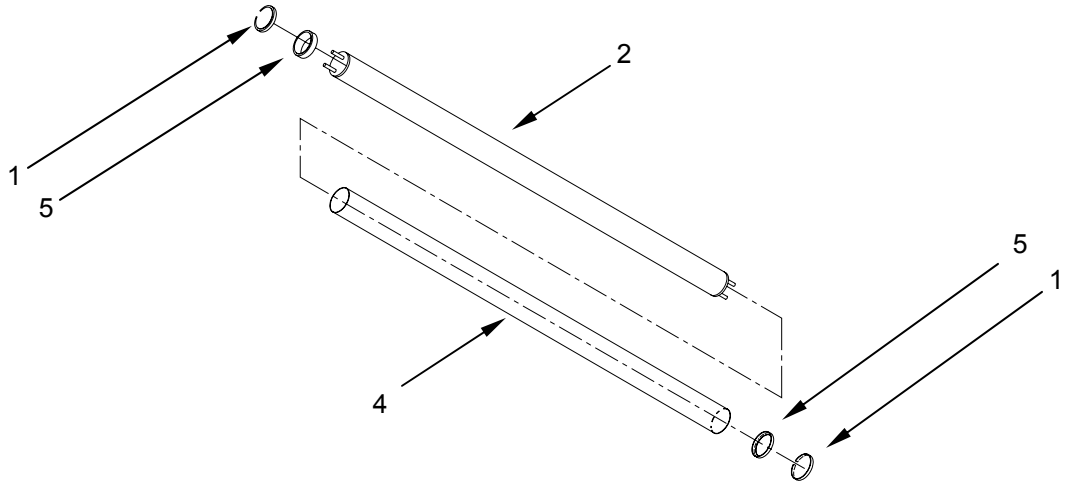


Figure 1. Replace the Fluorescent Light Bulbs.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
BLACKOUT LIGHT ASSEMBLY
REPLACE

INITIAL SETUP

Tools	**Personnel Required**
None required.	One
Materials/Parts	**Equipment Condition**
None required.	Ensure blackout lighting is turned off at the PLC. Battery enabled switch is turned off.

REPLACE

Replace Fluorescent Light Bulbs

NOTE

A step aid may be required to perform this maintenance task.

NOTE

If no light fixtures are working, notify unit maintenance.

1. Remove tube keeper **(Figure 1, Item 1)** (located at the end of tube inserted in movable socket; fixture has a convex pop rivet on this end.)

2. Push the tube **(Figure 1, Item 2)** toward the movable end **(Figure 1, Item 3)** to remove it from the fixture. Hold the tube as level as possible during removal to prevent it from sliding out of it's protective sleeve **(Figure 1, Item 4)**.

3. On a level surface, remove the two protective end caps **(Figure 1, Item 5)** and slide the tube out of the protective sleeve **(Figure 1, Item 4)**.

4. Install new tube into the protective sleeve **(Figure 1, Item 4)**.

5. Install end caps **(Figure 1, Item 5)** over the protective sleeve **(Figure 1, Item 4)**.

NOTE

The end caps **(Figure 1, item 5)** fit semi-loosely in the sleeve **(Figure 1, item 4)** and can fall off if the tube is not held level. Hold the tube as level as possible during installation.

6. Install tube **(Figure 1, Item 2)** into the fixture.

7. Reinstall tube keeper **(Figure 1, Item 1)**.

8. Turn on emergency light battery enabled switch. Turn blackout lighting ON at PLC to ensure proper operation.

REPLACE-CONTINUED

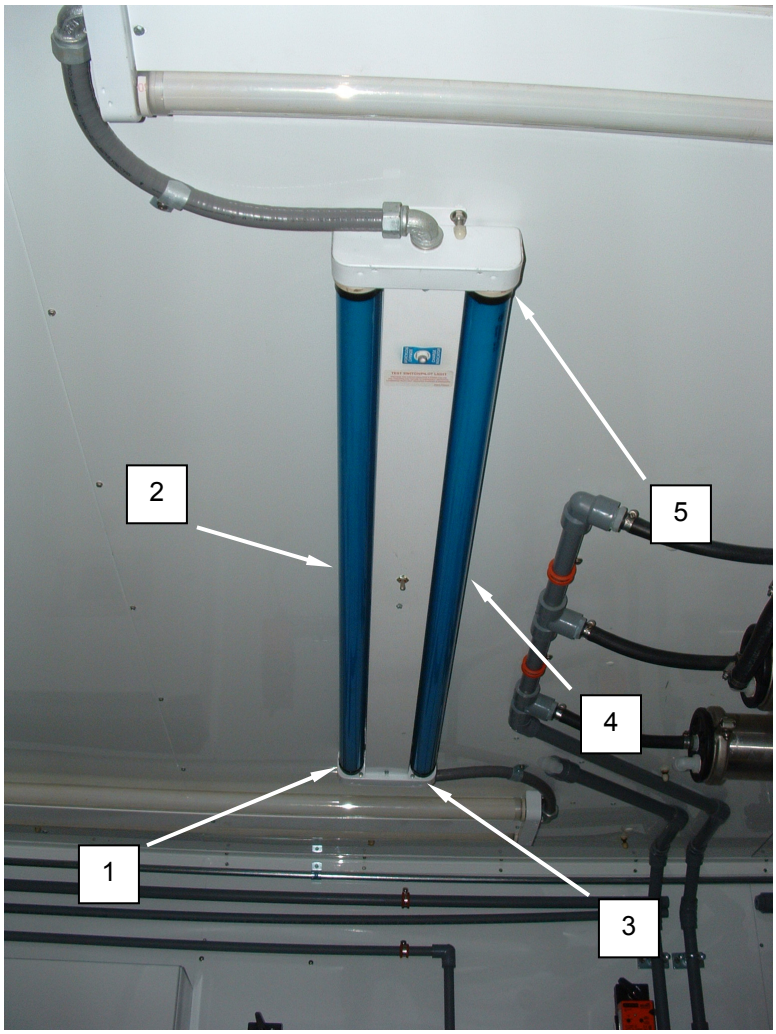


Figure 1. Replace Fluorescent Light Bulbs.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
DRYER
SERVICE, REPLACE

INITIAL SETUP

Tools	**Personnel Required**
None required.	One
Materials/Parts	**Equipment Condition**
No additional materials or parts required.	Dryer power shut down at circuit breaker

SERVICE

Clean Dryer Lint Screens

1. Open the lint compartment access door **(Figure 1, Item 1)**.
2. Remove lint screen **(Figure 1, Item 2)** from tray **(Figure 1, Item 3)**.
3. Remove lint from the screen **(Figure 1, Item 2)** dispose of lint using an approved container.
4. Reinstall screen **(Figure 1, Item 2)** into tray **(Figure 1, Item 3)**.
5. Close the access door **(Figure 1, Item 1)**.
6. Reset circuit breaker and monitor for normal operation.



Figure 1. Clean the Dryer Lint Screen.

REPLACE

Replace the Dryer Lint Screen

1. Open the lint compartment access door **(Figure 1, Item 1)**.
2. Remove lint screen **(Figure 1, Item 2)** from tray **(Figure 1, Item 3)**.
3. Install replacement screen **(Figure 1, Item 2)** into tray **(Figure 1, Item 3)**.
4. Close the access door **(Figure 1, Item 1)**.
5. Reset circuit breaker and monitor for normal operation.



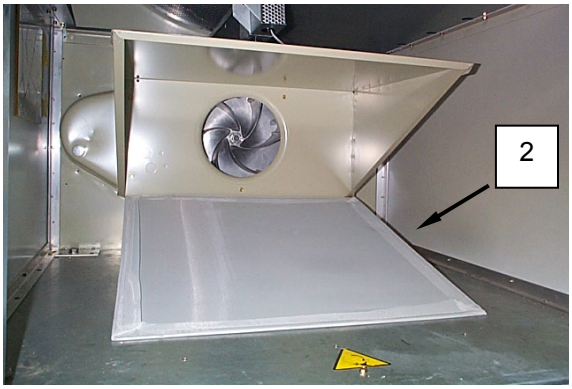


Figure 2. Replace the Dryer Lint Screen.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
FILTER F-1A AND F-1B FILTER BAG
INSPECT, REPLACE

INITIAL SETUP

Tools
Wrench, Strap (WP 0041 00, Item 96)

Materials/Parts
Apron, Impermeable (WP 0041 00, Item 2)
Gloves, Chemical and Oil Protective (WP 0043 00, Item 21)
Goggles, Industrial (WP 0041 00, Item 26)
Grease, Silicone (WP 0043 00, Item 19)

Personnel Required
One

Equipment Condition
CBL set up and operating.

INSPECT



WARNING

Wear protective clothing, gloves, and mask protection when replacing filter components. Failure to observe safety precaution may result in serious illness or death due to exposure to biohazard contamination

Inspect the Filter Elements (Socks)

1. Ensure isolation valve V-9 **(Figure 1, item 1)** is diverted to flow away from filter to be serviced.
2. Open the drain valve **(Figure 1, item 2)** on the filter to be serviced.
3. Open vent valve V-10, or V-11 if F-1B is being serviced.
4. Disconnect the filter vent hose **(Figure 1, item 3)**.
5. Allow to drain for 15 minutes.
6. Disconnect the QD fitting **(Figure 1, item 4)** and hose **(Figure 1, item 5)** from the filter cap **(Figure 1, item 6)**.
7. Loosen and remove the knobs **(Figure 1, item 7)** securing the filter cap **(Figure 1, item 6)** to the filter housing **(Figure 1, item 8)**, and remove the filter cap, with filter **(Figure 1, item 9)**, from the filter housing.
8. Inspect the filter fabric **(Figure 1, item 9)** for unraveling threads at the sock seam, and for thinning or wear of the filter fabric.

NOTE

Spent sock filters can be washed in the washers using Cycle No. 11 or Cycle No. 61.

9. If filter fabric is acceptable, set aside for washing. If filter fabric is damaged, replace with a new filter sock. Refer to replace procedure.

INSPECT-CONTINUED

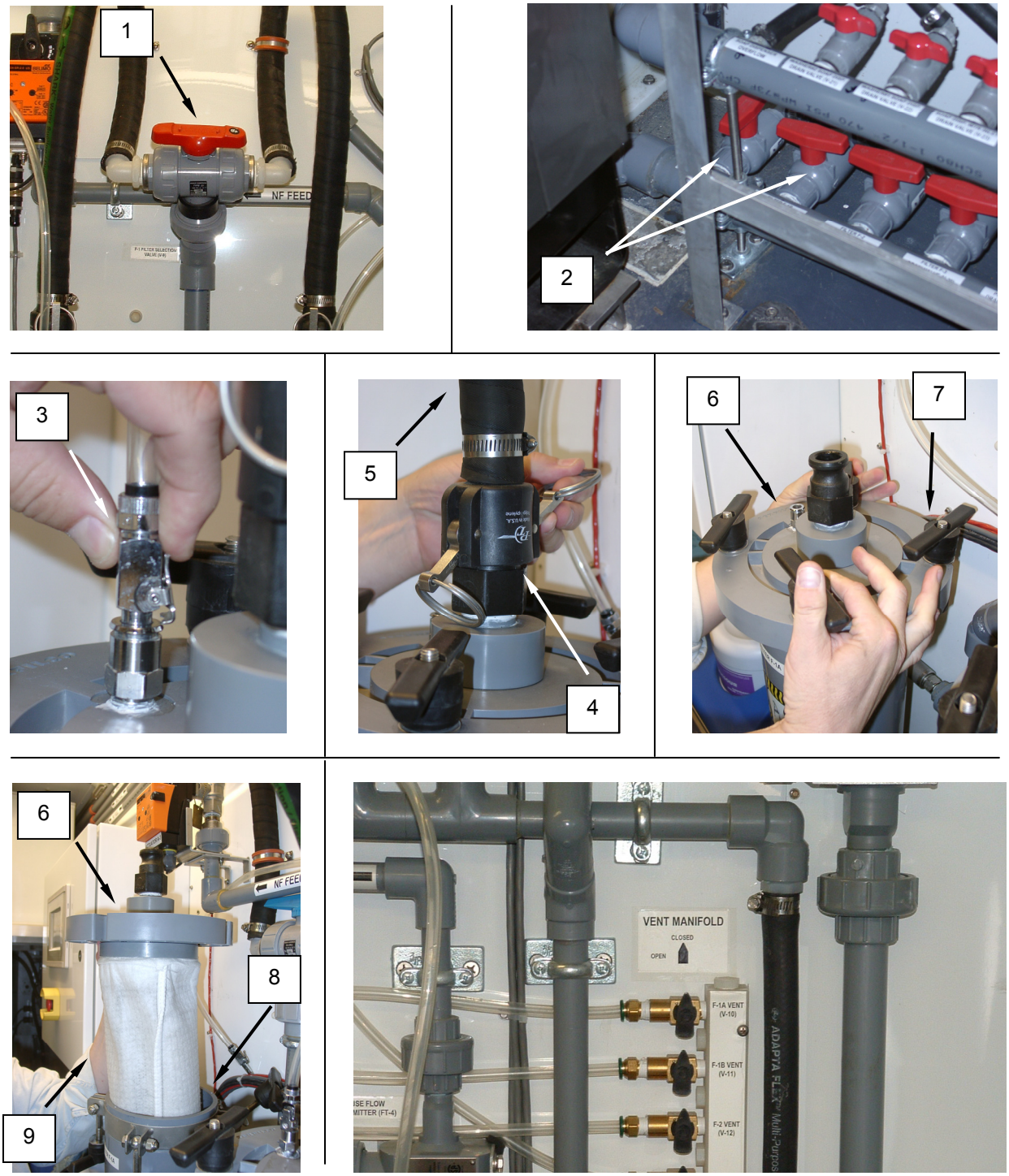


Figure 1. Inspect the Filter Elements (Socks).

REPLACE

Replace the Filter Elements (Socks)

1. Perform steps 1-5 in the inspect procedure.

2. Use a strap wrench **(Figure 2, item 7)** to loosen the QD male fitting **(Figure 2, item 8)** from the filter cap **(Figure 2, item 6)**.

NOTE

Inspect gap between QD male fitting and filter cap and ensure that o-ring has not “rolled” over in its groove.

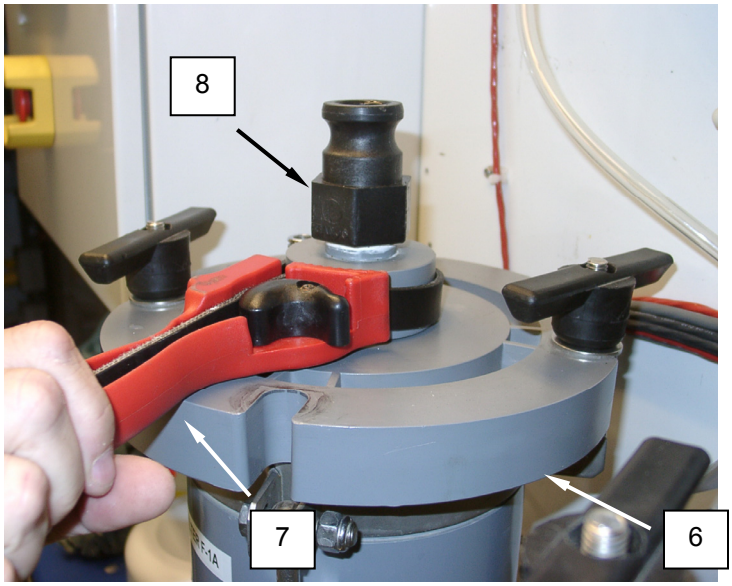


Figure 2. Replace the F-1A or F-1B Filter Elements (Socks).

REPLACE-CONTINUED

3. Loosen and remove the knobs **(Figure 3, item 9)** securing the filter cap **(Figure 3, item 6)** to the filter housing **(Figure 3, item 10)**, and remove the filter cap, with filter **(Figure 3, item 11)**, from the filter housing.

4. Loosen the QD male fitting **(Figure 3, item 8)** enough to remove the filter sock **(Figure 3, item 11)** from the filter retainer plate **(Figure 3, item 12)**.

5. Ensure the filter cap **(Figure 3, item 6)** is clean of all residue.

6. Inspect gap between QD male fitting and filter cap and ensure that O-ring has not “rolled” over in its groove.

NOTE

If the replacement filter sock has a tag fitted, this must be removed before proceeding.

7. Fit the replacement filter sock **(Figure 3, item 11)** to the filter retainer **(Figure 3, item 12)** so that grooved edge (flange) lays against the filter cap. Ensure the seam of the bag opening is thoroughly captured by the filter retainer.

8. Tighten the filter retainer **(Figure 3, item 12)** hand tight using the QD male fitting **(Figure 3, item 8)**.

9. Ensure all O-rings **(Figure 3, item 13)** are clean, serviceable, and in place. O-rings must be coated with a light application of the silicone grease supplied in the service support package.

10. Wet the filter sock **(Figure 3, item 11)** thoroughly with source water.

11. Install the filter cap **(Figure 3, item 6)** with replacement filter **(Figure 3, item 11)** onto the filter housing **(Figure 3, item 10)**. The filter sock may be folded to aid insertion into the filter canister.

12. Hand tighten the QD male fitting **(Figure 3, item 8)**.

13. Use a strap wrench **(Figure 3, item 7)** to tighten the QD male fitting an additional ¼ turn.

14. Secure the filter cap **(Figure 3, item 6)** in place with the two back (3,2) retaining knobs, **(Figure 3, item 9)** tighten until meeting resistance. Balancing the tightening sequence.

15. Secure knobs 1 and 4. Tighten until resistance is met.

16. Secure the filter cap **(Figure 3, item 6)** in place with the two back (3,2) retaining knobs, **(Figure 3, item 9)** tighten until meeting resistance. Balancing the tightening sequence.

17. Install the QD fitting **(Figure 4, item 4)** with hose **(Figure 4, item 5)** onto the QD male fitting **(Figure 3, item 8)**.

18. Install the filter vent hose **(Figure 4, item 3)**.

REPLACE-CONTINUED

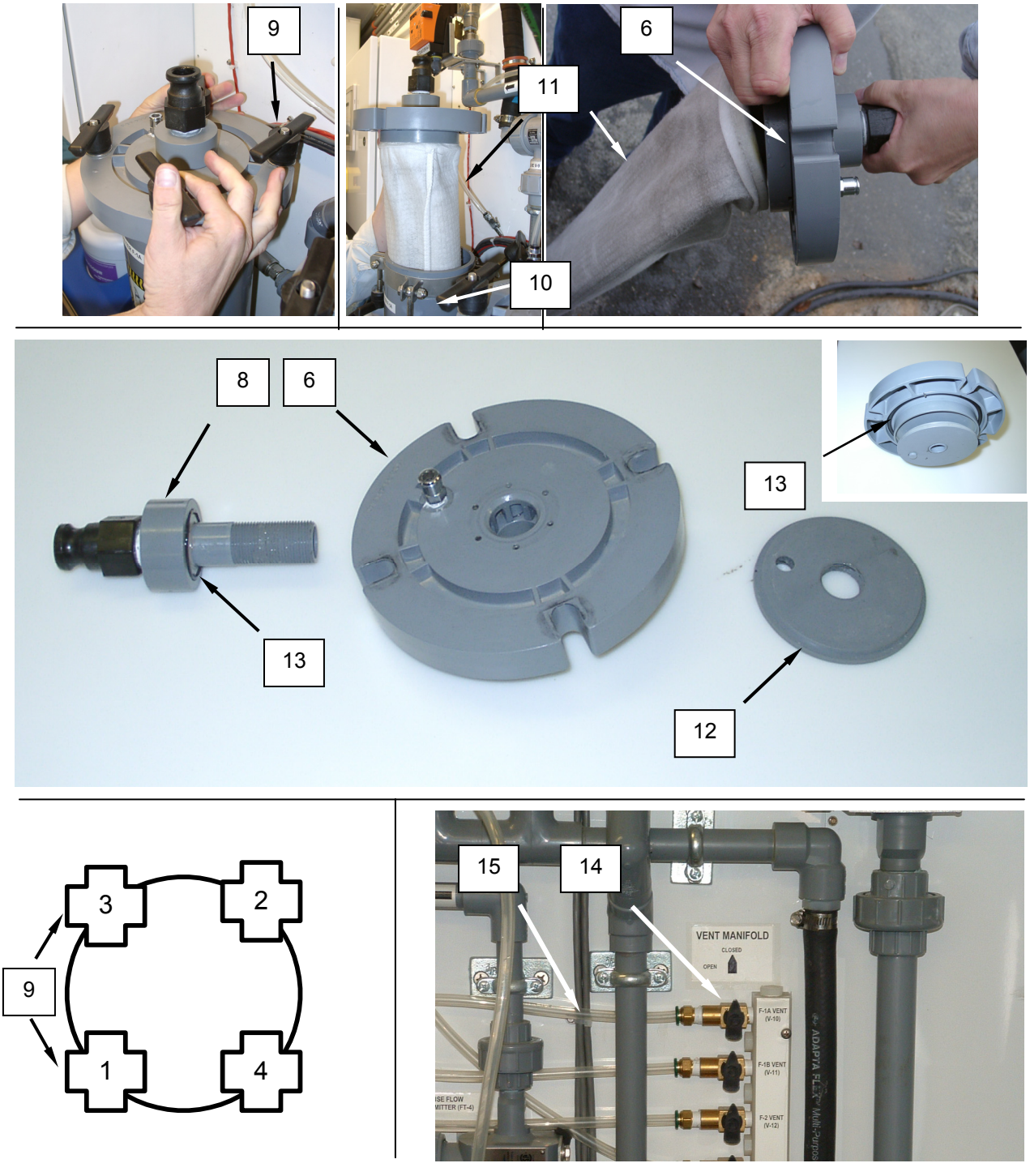


Figure 3. Replace the F-1A or F-1B Filter Elements.

REPLACE-CONTINUED

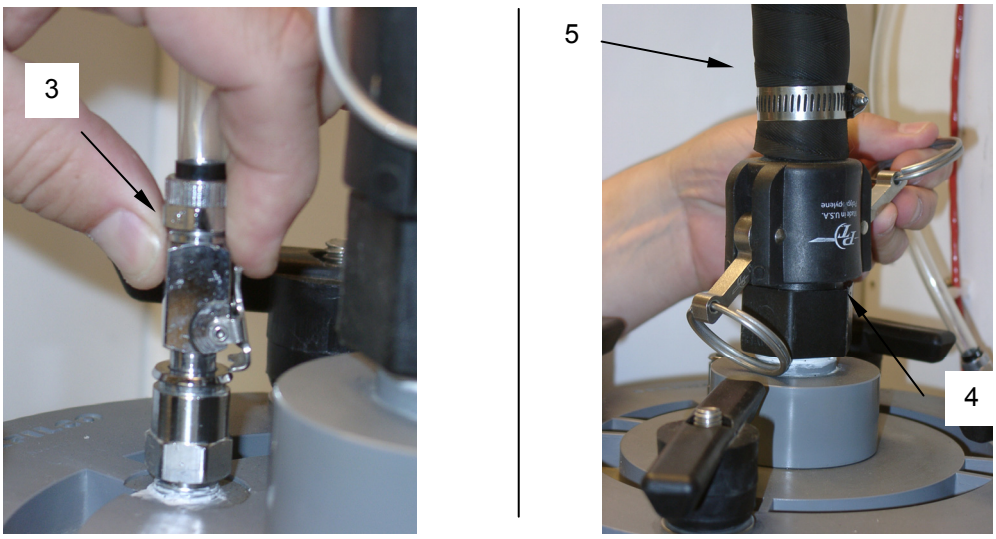


Figure 4. Installing the Filter and hoses.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
F-2 FILTER
REPLACE

INITIAL SETUP

Tools
None Required

Materials/Parts
Apron, Impermeable (WP 0041 00, Table 2, Item 2)
Gloves, Chemical and Oil Protective (WP 0043 00, Item 18)
Goggles, Industrial (WP 0041 00, Table 2, Item 26)
Grease, Silicone (WP 0043 00, Item 19)

Personnel Required
One

Equipment Condition
CBL set up and in operation
Pump P-3 OFF at PLC.

REPLACE



WARNING

Wear protective clothing, gloves, and mask protection when replacing filter components. Failure to observe safety precaution may result in serious illness or death due to exposure to biohazard contamination

Replace Filter F-2 Filter Cartridge

1. Close the filter isolation valves V-41 and V-42 **(Figure 1, item 1)**.
2. Turn P-3 pump off at PLC.
3. Open the filter drain valve V-28 **(Figure 1, item 2)**.
4. Open F-2 vent valve V-12. Wait one minute to drain.
5. Remove the vent hose **(Figure 1, item 3)**.
6. Remove four thumbscrews **(Figure 1, item 4)**, and remove the filter cover **(Figure 1, item 5)**.

NOTE

Spent cartridge filters need to be disposed in accordance with local, state, and federal requirements. Contact your local authorities (i.e. Facility Environmental Office) to ensure that you are following proper disposal procedures

7. Remove old filter cartridge **(Figure 1, item 6)** and discard in an approved container. Retain the filter support **(Figure 1, item 7)**.
8. Install the filter support **(Figure 1, item 7)** into the replacement filter cartridge **(Figure 1, item 6)**.
9. Wet the replacement filter cartridge **(Figure 1, item 6)** at the exterior service spigot.

REPLACE-CONTINUED

CAUTION

Do not drop filter and rod into filter housing. Dropping may chip housing.

10. Carefully, install the filter cartridge and filter support into filter housing allowing filter support to drop down into filter housing.

11. Carefully guide filter cartridge into filter housing.

12. Inspect o-ring and lubricate as necessary.

13. Install access cover **(Figure 1, item 5)**, and fasten access cover with four thumbscrews **(Figure 1, item 4)**. Ensure the access cover is tightened down evenly in the sequence illustrated in Figure

14. Install vent hose **(Figure 1, item 3)**.

15. Close the filter drain valve V-28 **(Figure 1, item 2)** and open the filter isolation valves V-41 and V-42 **(Figure 1, item 1)**.

16. Switch Pump P-3 ON at the PLC. Ensure the PLC filter alarm and data has been reset in accordance with WP 0009 00, System Alarms.

17. Once the system is back into operation processing laundry, monitor the vent tubing **(Figure 1, item 9)**; when clear water with no bubbles is observed, close the F-2 vent valve V-12.

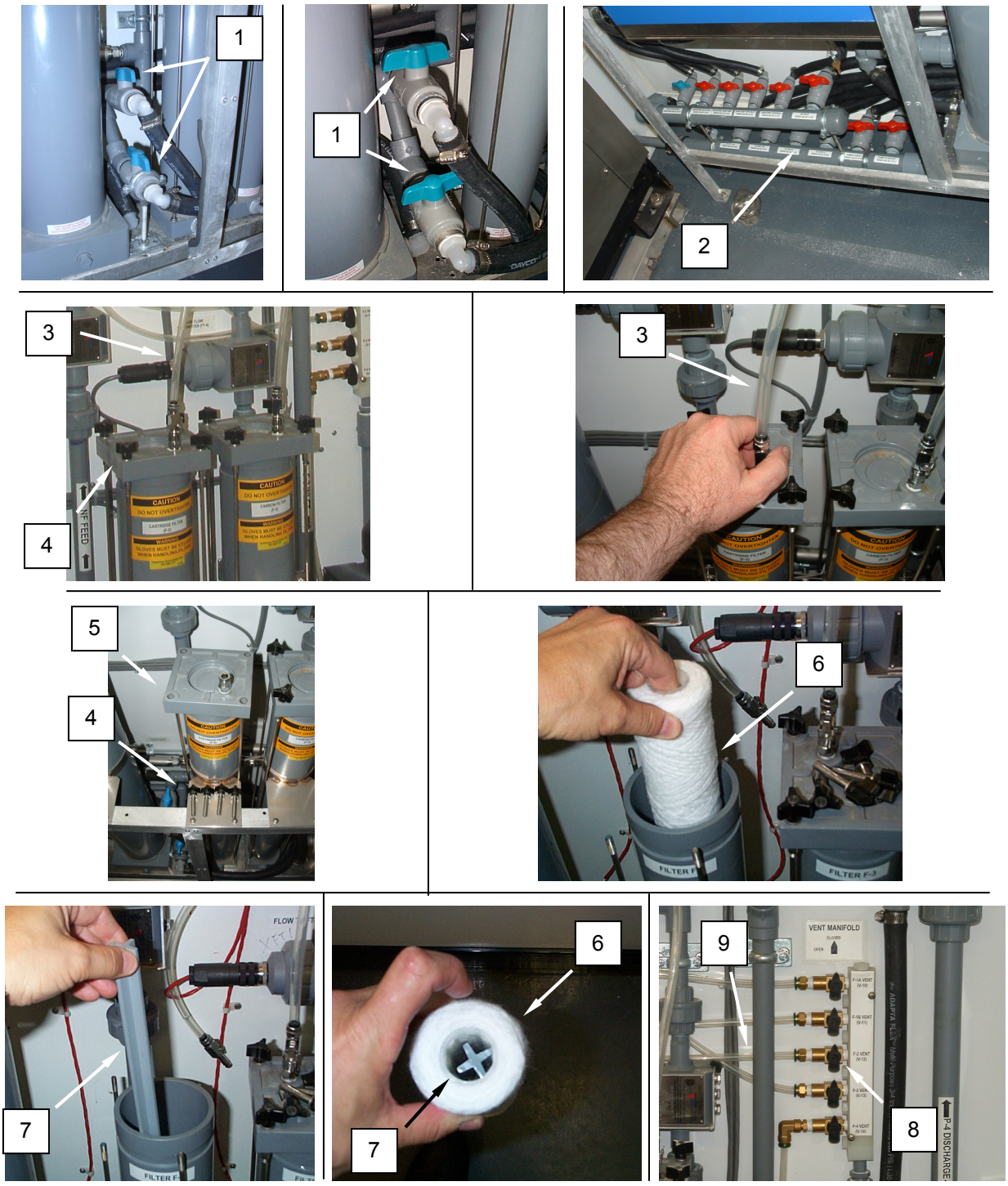


Figure 1. Replace the F-2 Filter Cartridge.

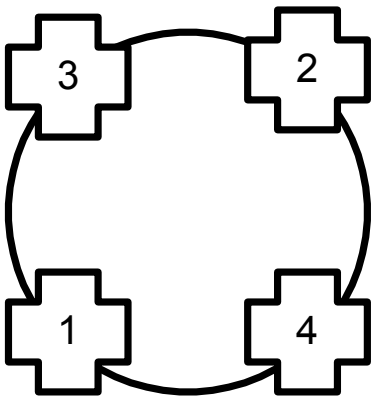


Figure 2. Filter Retaining Knob Tightening Sequence.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
FILTER F-3
REPLACE

INITIAL SETUP

Tools
None Required

Materials/Parts
Apron, Impermeable (WP 0041 00, Table 2, Item 2)
Gloves, Chemical and Oil Protective (WP 0043 00, Item 18)
Goggles, Industrial (WP 0041 00, Table 2, Item 26)
Grease, Silicone (WP 0043 00, Item 19)

Personnel Required
One

Equipment Condition
CBL set up and in operation
Pump P-3 OFF at PLC.

References
WP 0009 00

REPLACE



WARNING

Use appropriate protective clothing. Wear gloves and your mask protection when replacing filter components. Failure to comply may result in serious injury to personnel.

Replace Filter F-3 Filter Cartridge

1. Close the filter isolation valves V-59 and V-43 **(Figure 1, item 1)**.
2. Turn P-4 pump off at PLC.
3. Open the filter drain valve V-29 **(Figure 1, item 2)**.
4. Open F-3 vent valve V-29. Wait one minute to drain.
5. Remove the vent hose **(Figure 1, item 3)**.
6. Remove four thumbscrews **(Figure 1, item 4)**, and remove the filter cover **(Figure 1, item 5)**.

NOTE

Spent cartridge filters need to be disposed in accordance with local, state, and federal requirements. Contact your local authorities (i.e. Facility Environmental Office) to ensure that you are following proper disposal procedures

7. Remove old filter cartridge **(Figure 1, item 6)** and discard in an approved container. Retain the filter support **(Figure 1, item 7)**.
8. Install the filter support **(Figure 1, item 7)** into the replacement filter cartridge **(Figure 1, item 6)**.
9. Wet the replacement filter cartridge **(Figure 1, item 6)**, at the exterior service spigot.

REPLACE-CONTINUED

CAUTION

Do not drop filter and rod into filter housing. Dropping may chip housing.

10. Carefully, install the filter cartridge and filter support into filter housing allowing filter support to drop down into filter housing.

11. Carefully guide filter cartridge into filter housing.

12. Inspect o-ring and lubricate as necessary.

13. Install access cover **(Figure 1, item 5)**, and fasten access cover with four thumbscrews **(Figure 1, item 4)**. Ensure the access cover is tightened down evenly in the sequence illustrated in Figure 2.

14. Install vent hose **(Figure 1, item 3)**.

15. Close the filter drain valve V-29 **(Figure 1, item 2)** and open the filter isolation valves V-59 and V-43 **(Figure 1, item 1)**.

16. Switch Pump P4 ON at the PLC. Ensure the PLC filter alarm and data has been reset in accordance with WP 0009 00, System Alarms.

17. Once the system is back into operation processing laundry, monitor the vent tubing **(Figure 1, item 9)**; when clear water with no bubbles is observed, close the F-3 vent valve V-29.

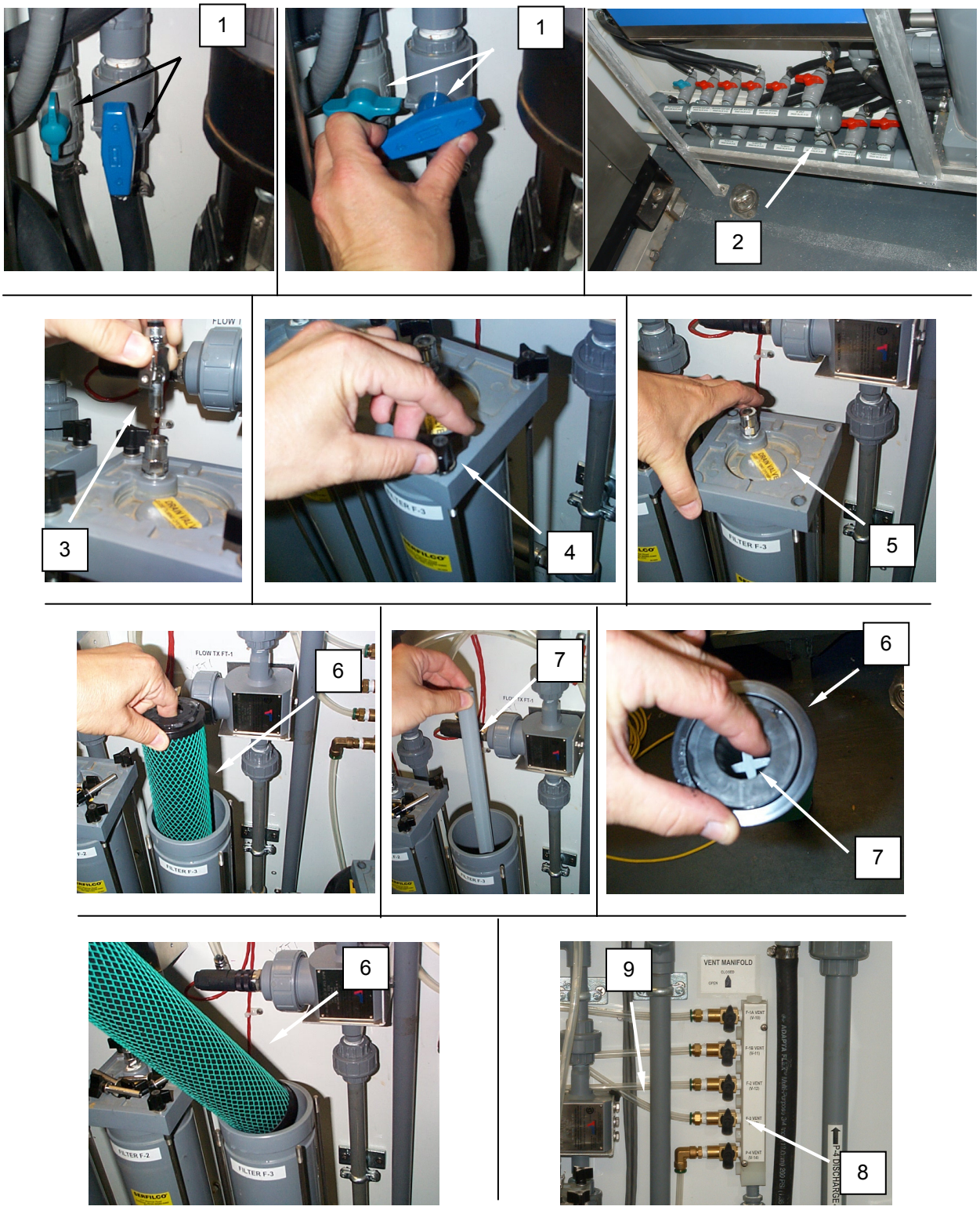


Figure 1. Replace Filter F-3 Filter Cartridge.

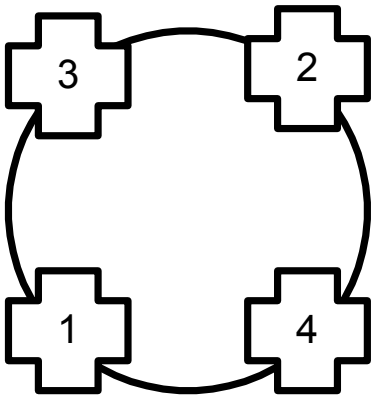


Figure 2. Filter Retaining Knob Tightening Sequence.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
NANOFILTERS
SERVICE

INITIAL SETUP

Tools
None Required

Materials/Parts
Apron, Impermeable (WP 0041 00, Table 2, Item 2)
Gloves, Chemical and Oil Protective (WP 0043 00, Items 18)
Goggles, Industrial (WP 0041 00, Table 2, Item 26)
Membrane Cleaner (WP 0043 00, Item 21)
Spoon, Food Service (WP 0041 00, Table 2, Item 52)

Personnel Required
One

Equipment Condition
CBL set up and operating.

SERVICE

Nanofilter Cleaning Procedures

While the system is deployed, steps must be taken to ensure that no contaminate occurs in the water treatment system or other components of the CBL.

Perform this maintenance if CBL is going to be shut down and in long term storage for more than three months, or if the P-4 loop flow **(Figure 1, Item 1)** falls consistently below 12 GPM when operating from 60hz power source.

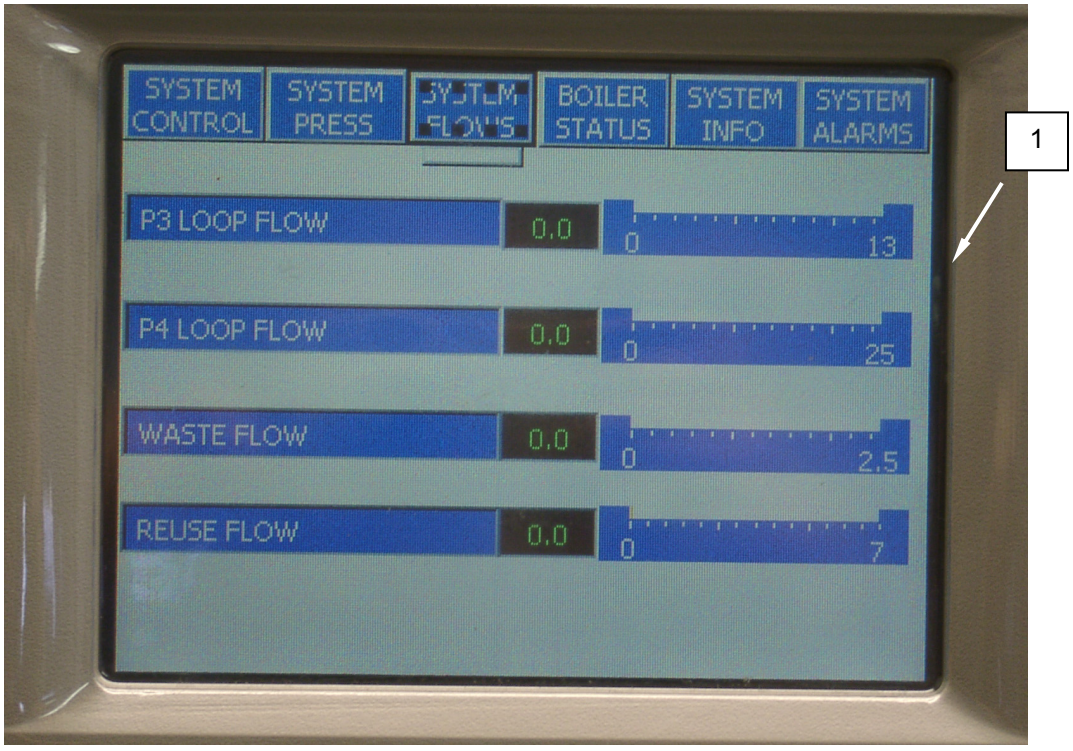


Figure 1. System Flows Display.

SERVICE-CONTINUED

An alkaline-based chemical is used to clean and preserve the nanofilter elements during shut down periods in excess of 3 months or as needed. This is required to remove contaminants from the membrane surfaces.

1. Flush the system IAW procedures given in WP 0011 00. There is no need to run the sodium bisulphite preservation procedures at this time.




WARNING

Do not open the washer supply tray door during this cycle. Failure to observe safety precautions may result in injury to personnel through skin and/or eye irritation.

2. Disconnect Actuators A-3 **(Figure 2, Item 2)** and A-4 **(Figure 2, Item 3)**.

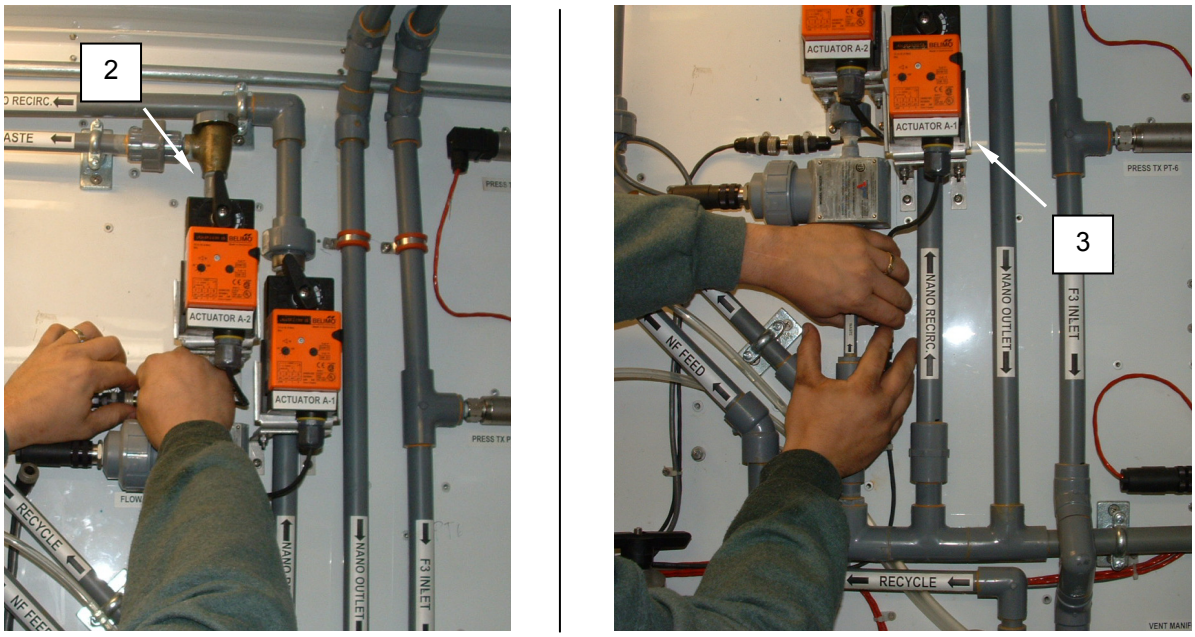


Figure 2. Nanofilter Cleaning Procedure – Disconnect Actuators.

SERVICE-CONTINUED

3. Press the valve release and manually close Actuator A-3 **(Figure 3, Item 2)**.

4. Press the valve release and manually open Actuator A-4 **(Figure 3, Item 3)**.

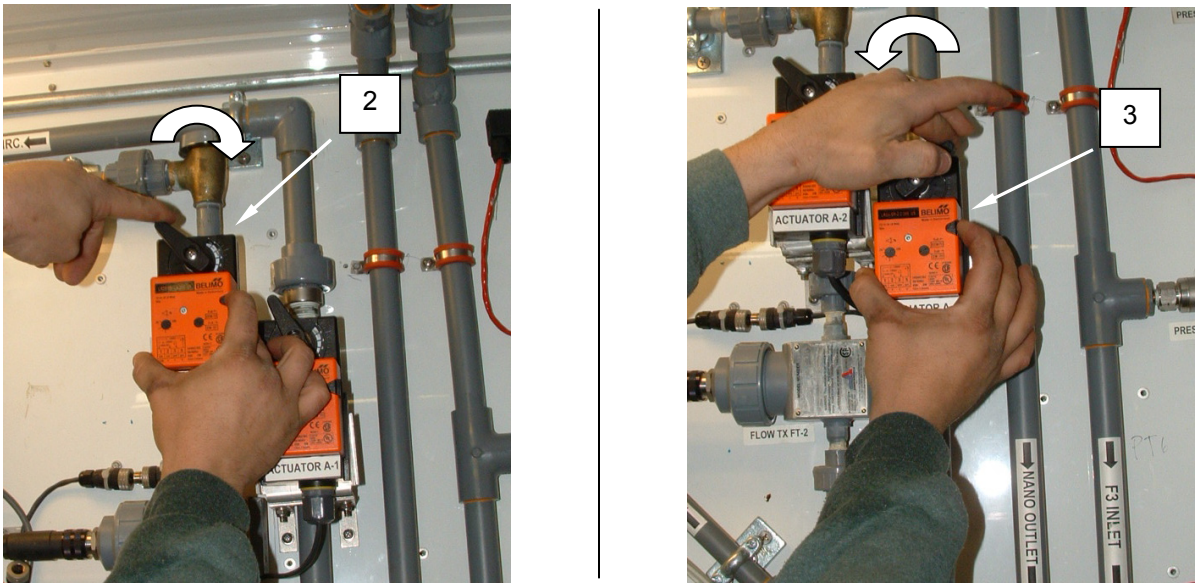


Figure 3. Nanofilter Cleaning Procedure – Manually Set Actuators.

5. Switch Pump P-4 **(Figure 4, Item 4)** OFF at the PLC.

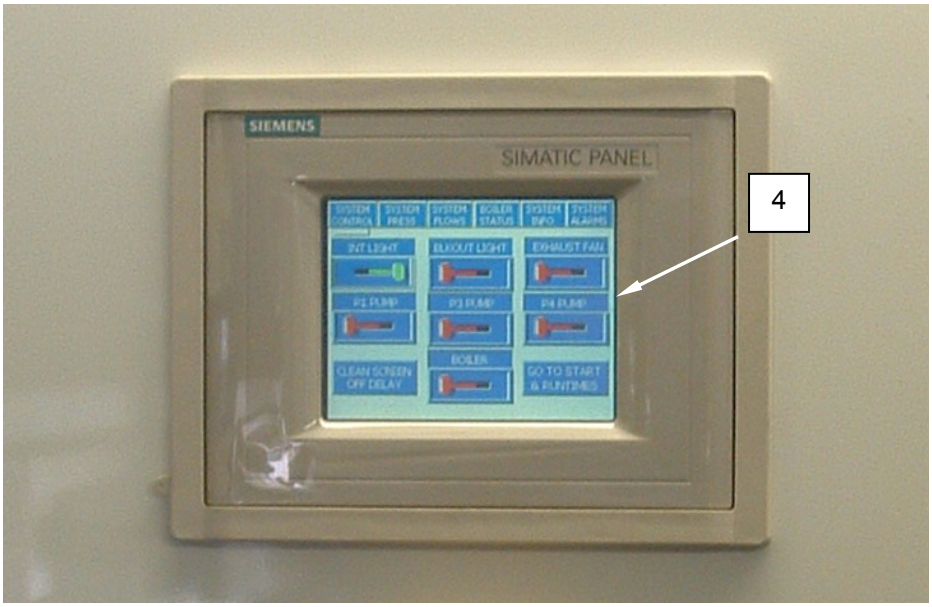


Figure 4. Nanofilter Cleaning Procedure – Switch P-4 Off.

SERVICE-CONTINUED



WARNING



Rubber gloves, face and eye protection, and dust masks must be worn when handling the cleaning agent. Failure to wear proper safety equipment may result in serious skin irritation, eye injury, or respiratory damage. If the cleaning agent contacts eyes or skin, flush with clean water and seek immediate medical attention. If cleaning agent vapors are inhaled, relocate immediately to a well ventilated area and seek immediate medical attention.

6. Add 1 canister (7.5 lbs) of filter cleaner to the drum **(Figure 5, Item 5)** of Washer No. 1. Measure an additional 8 oz. of filter cleaner and add to drum of Washer No. 1, for a total of 8 lbs.

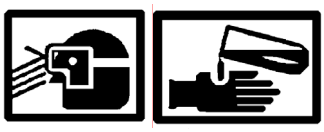
7. Add 1 canister (7.5 lbs) of filter cleaner to the drum **(Figure 5, Item 5)** of Washer No. 2. Measure an additional 8 oz. of filter cleaner and add to drum of Washer No. 2, for a total of 8 lbs.



Figure 5. Nanofilter Cleaning Procedure – Add Chemical to Washer Drum.

SERVICE-CONTINUED

8. Enter cycle 70 on each washer by pressing (do not punch) the numbers on the keyboard **(Figure 6, Item 6)** and note that this number is displayed as “Cycle 70”.



WARNING

Do not open the washer supply tray door during this cycle. Failure to do so may result in injury to personnel through skin and/or eye irritation.

9. Press the “START” key **(Figure 6, Item 7)** on each washer.

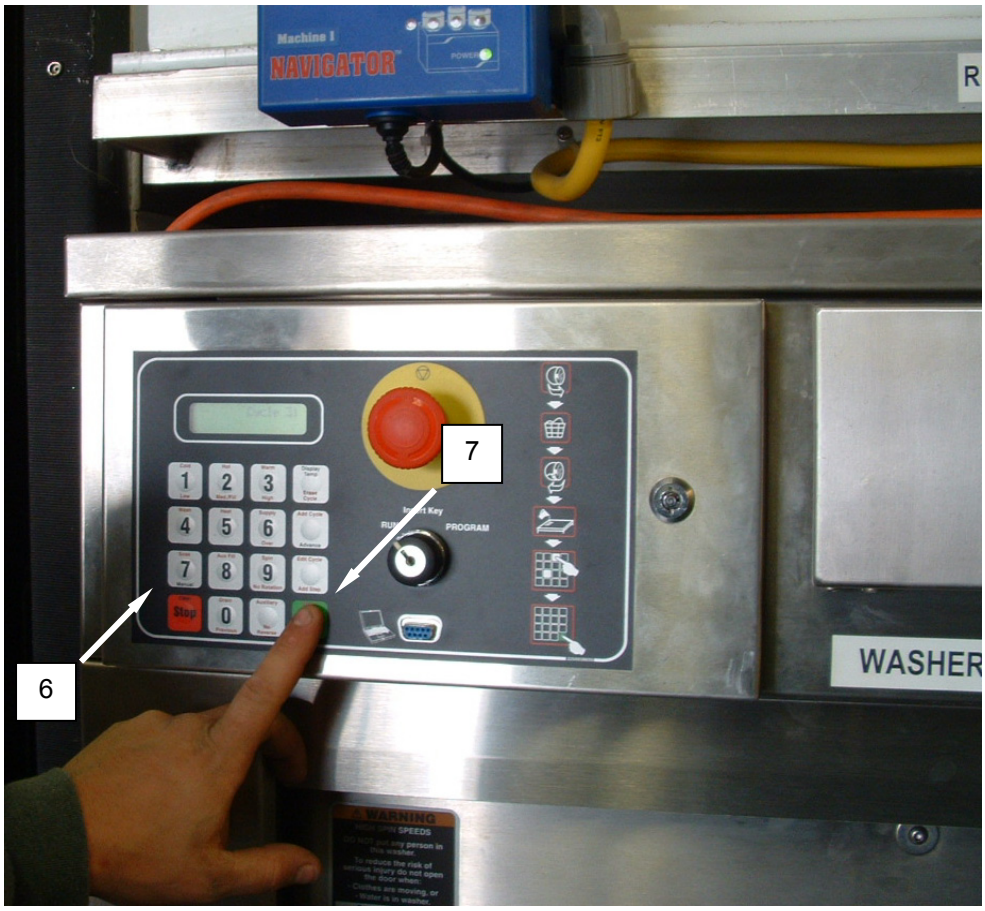


Figure 6. Nanofilter Cleaning Procedure – Start Cycle 70 on Washers.

SERVICE-CONTINUED

10. Monitor the operation of Pump P-3 at the PLC **(Figure 7, Item 8)**. When P-3 has shut off and the WTS Hold Tank is empty, open WTS Hold Tank drain valve V-33 **(Figure 7, Item 9)** and Reuse Tank Drain Valve V-34 **(Figure 7, Item 10)**.

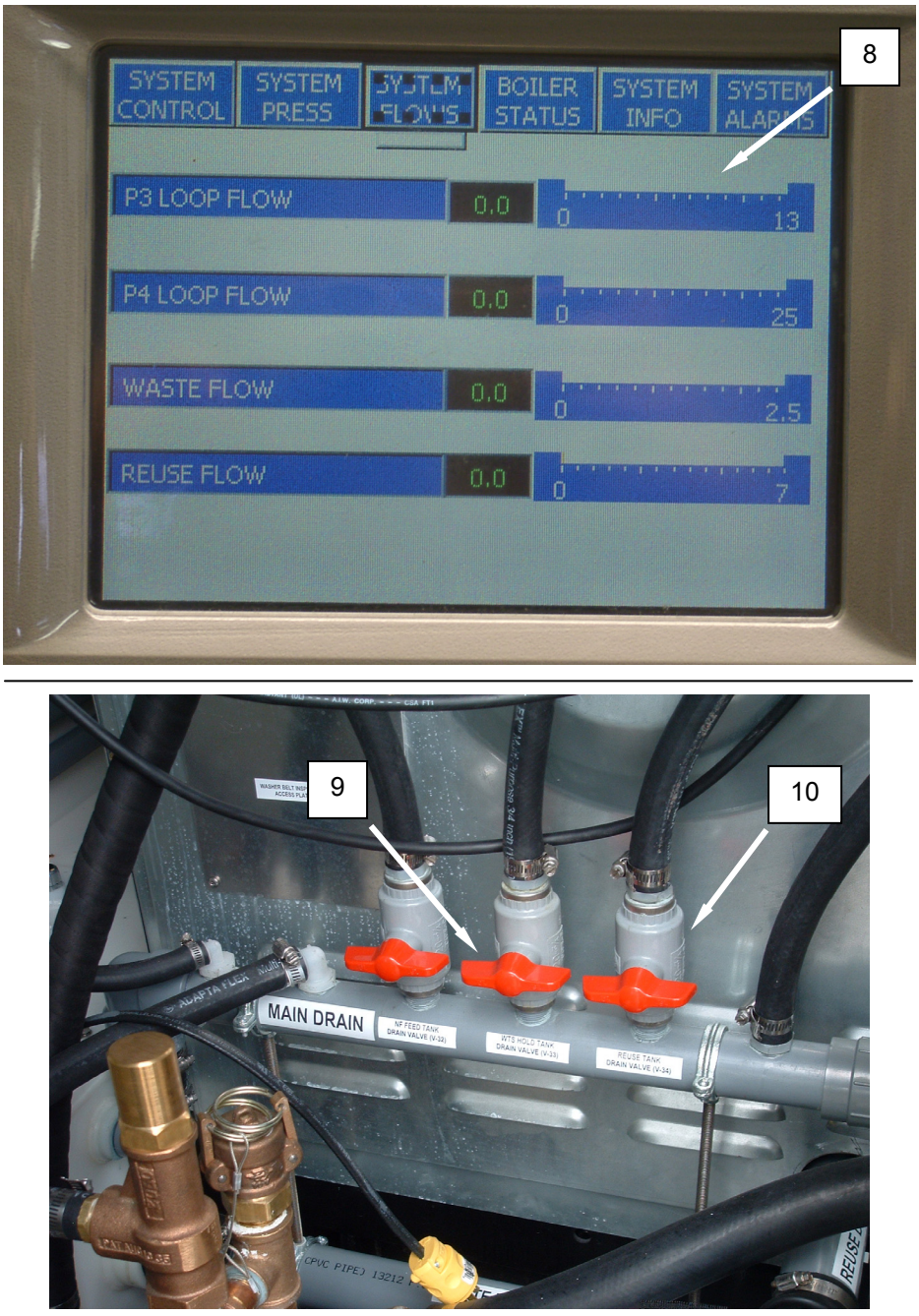
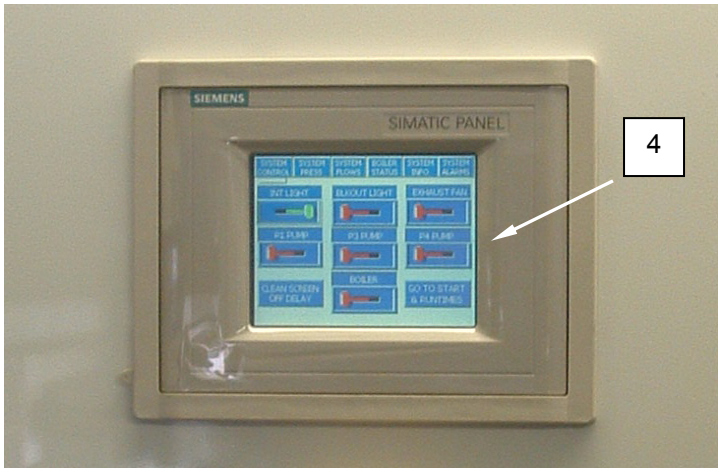


Figure 7. Nanofilter Cleaning Procedure – Drain Tanks.

SERVICE-CONTINUED

11. Switch Pump P-4 **(Figure 8, Item 4)** ON at the PLC and allow it to run for at least 15 minutes.
12. Switch Pump P-4 **(Figure 8, Item 4)** OFF at the PLC.
13. Wait 15 minutes, then switch Pump P-4 **(Figure 8, Item 4)** ON at the PLC and allow it to run for at least 15 minutes.
14. Switch Pump P-4 **(Figure 8, Item 4)** OFF at the PLC.
15. Wait 15 minutes, then open Nano Feed Tank drain valve V-32 **(Figure 8, Item 11)** and allow to drain.
16. When Nano Feed Tank has drained, close Nano Feed Tank drain valve V-32 **(Figure 8, Item 11)**.
17. Close WTS Hold Tank drain valve V-33 **(Figure 8, Item 9)** and Reuse Tank Drain Valve V-34 **(Figure 8, Item 10)**.



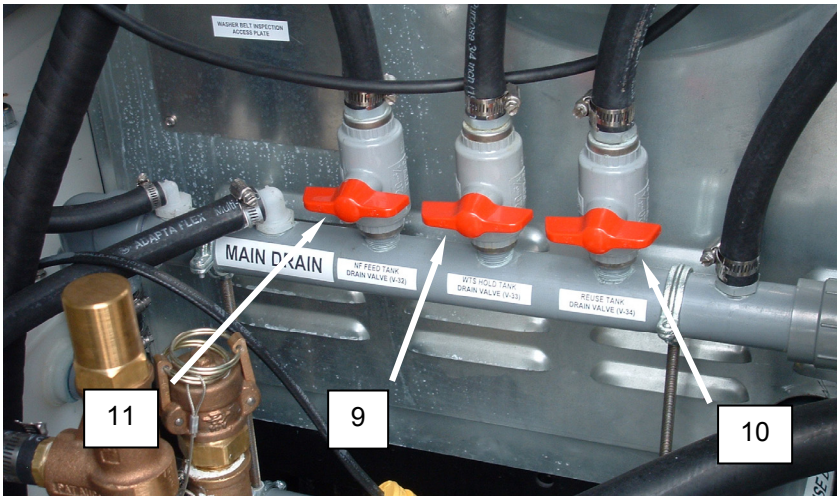
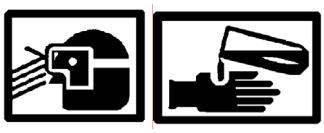


Figure 8. Nanofilter Cleaning Procedure – Cycle Cleaning Agent.

SERVICE-CONTINUED

18. Enter cycle 59 on each washer by pressing (do not punch) the numbers on the keyboard **(Figure 9, Item 6)** and note that this number is displayed as “Cycle 59”.



WARNING

Do not open the washer supply tray door during this cycle. Failure to do so may result in injury to personnel through skin and/or eye irritation.

19. Press the “START” key **(Figure 9, Item 7)** on each washer.

NOTE

There is no need to reconnect the A-3 and A-4 actuators, as they need to remain disconnected for the system flush. They will still need to be manually set IAW procedures given in WP 0011 00.

20. Flush the system IAW procedures given in WP 0011 00 twice.



Figure 9. Nanofilter Cleaning Procedure – Start Cycle 59 on Washers.

END OF WORK PACKAGE

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
DRYER EXHAUST DUCTS AND EXHAUST VENTS
SERVICE

INITIAL SETUP

Tools
Screwdriver, Phillips tip (WP 0041 00, Table 2, Item 46)
Screwdriver, Standard tip (WP 0041 00, Table 2, Item 47)

Materials/Parts
Apron, Impermeable (WP 0041 00, Table 2, Item 2)
Gloves, Chemical and Oil Protective (WP 0041 00, Table 2, Item 21)
Goggles, Industrial (WP 0041 00, Table 2, Item 26)

Personnel Required
One

Equipment Condition
CBL set up

SERVICE

Clean the Dryer Exhaust Vents



WARNING

Ensure that all electrical power is shut off and disconnected before proceeding. The circuit breaker box or individual circuit breaker should be locked and tagged out by personnel following this procedure. Remember that the CBL is a wet environment. Serious injury or death to personnel can result from electrocution if proper safety precautions are not observed.



WARNING

Dryer lint is highly flammable. Ensure all lint is cleaned from the vents and disposed of promptly in an approved receptacle. Failure to observe safety precautions may result in a dryer fire, with the possibility of serious injury or death to personnel.

1. Disconnect power by switching the dryer circuit breaker OFF.
2. Remove clamps retaining duct **(Figure 1, Item 1)** to vent **(Figure 1, Item 2)** and remove duct.
3. Remove lint and residue from vent **(Figure 1, Item 2)**.
4. Install ducts **(Figure 1, Item 1)** and retain with clamps.
5. Switch the dryer circuit breaker ON and monitor for normal operation.

SERVICE-CONTINUED



Figure 1. Dryer Exhaust Vent.

SERVICE-CONTINUED

Clean the Dryer Exhaust Ducts



WARNING

Ensure that all electrical power to the dryers is shut off and disconnected before proceeding. The circuit breaker box or individual circuit breaker should be locked and tagged out by personnel following this procedure. Remember that the CBL is a wet environment. Serious injury or death to personnel can result from electrocution if proper safety precautions are not observed.

1. Disconnect power by switching the dryer circuit breaker OFF.
2. Remove clamps retaining ducts **(Figure 2, Item 1)**, and remove ducts.
3. Flush ducts **(Figure 2, Item 1)** out with hot soapy water.
4. Install ducts **(Figure 2, Item 1)** and retain with clamps.
5. Switch the dryer circuit breaker ON and operate the dryer immediately. Monitor for normal operation.

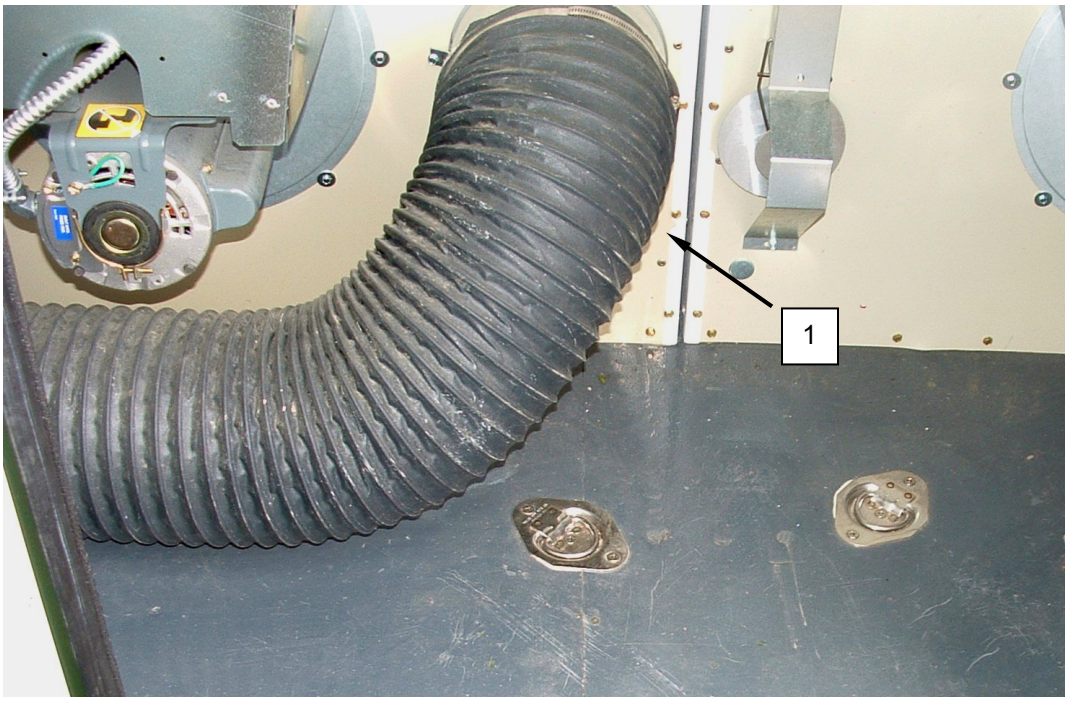


Figure 2. Clean the Dryer Exhaust Ducts.

REPLACE

Replace the Dryer Exhaust Ducts



WARNING

Ensure that all electrical power is shut off and disconnected before proceeding. The circuit breaker box or individual circuit breaker should be locked and tagged out by personnel following this procedure. Remember that the CBL is a wet environment. Serious injury or death to personnel can result from electrocution if proper safety precautions are not observed.

1. Disconnect power by switching the dryer circuit breaker OFF.
2. Remove clamps retaining ducts **(Figure 3, Item 1)**.
3. Install replacement ducts **(Figure 3, Item 1)**, and retain with clamps.
4. Switch the dryer circuit breaker ON and monitor for normal operation.

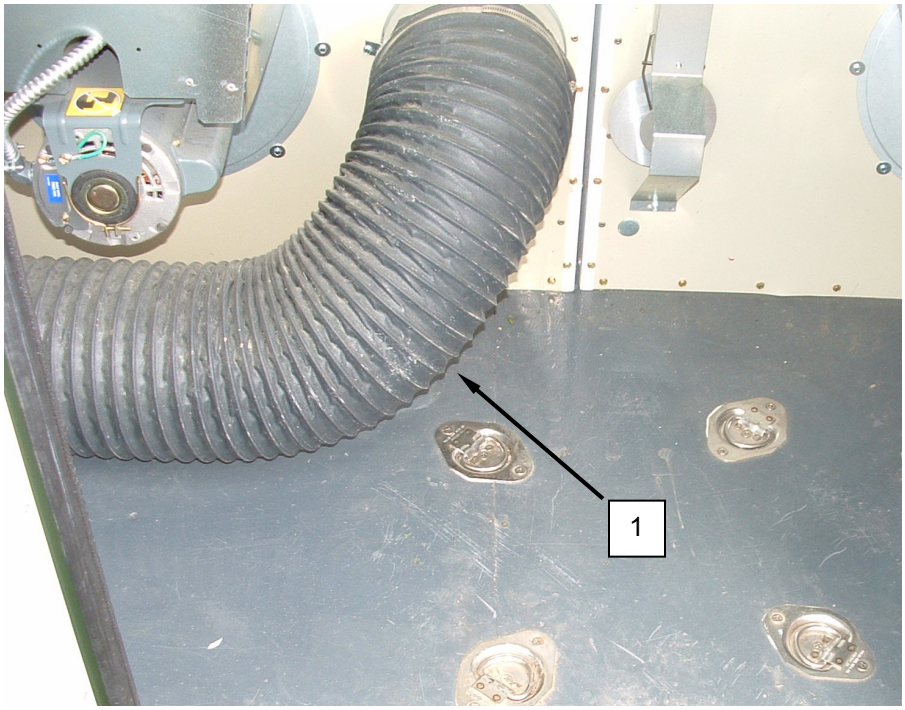


Figure 3. Replace the Dryer Exhaust Ducts.

END OF WORK PACKAGE

CHAPTER 5

SUPPORTING INFORMATION

CONTAINERIZED BATCH LAUNDRY (CBL)

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
REFERENCES

SCOPE

This section lists all field manuals, forms, medical bulletins, technical manuals and miscellaneous publications referenced in this manual.

Field Manuals

FM 21-10	Field Hygiene and Sanitation
FM 21-11	First Aid for Soldiers
FM 3-3	Chemical and Biological Contamination Avoidance
FM 3-5	NBC Decontamination
FM 38-701	Packaging of Materials, Packing
FM 8-10-15	Employment of the Field and General Hospitals, Tactics, Techniques, and Procedures

Forms

DA Form 2028-2	Recommended Changes to Equipment Technical Publications
DA Form 2404	Equipment Inspection and Maintenance Worksheet
SF 361	Discrepancy in Shipment Report
SF 368	Quality Deficiency Report
SF 362	Report of Packaging and Handling Deficiencies
SF 364	Report of Discrepancy

Medical Bulletins

TB MED 576	Sanitary Control and Surveillance of Water Supplies at Fixed Installations
TB MED 577	Sanitary Control and Surveillance of Field Water Supplies

Technical Manuals

TM 38-230-2	Preservation, Packaging, and Packing of Military Supplies and Equipment
TM 10-5430-237-12&P	Operator's and Unit Maintenance Manual (including RPSTL) Tank, Fabric, Self-supporting, 3000 Gallon Water
TM 740-90-1	Administrative Storage of Equipment
TM 750-244-3	Destruction of Army Materiel to Prevent Enemy Use
TM 9-4520-258-14	Operator, Unit, and Direct Support Maintenance Manual for Army Space Heater (ASH)
TM 10-8340-224-13	Operator, Unit, and Direct Support Maintenance Manual for Tent, Extendable, Modular, Personnel (TEMPER)
TM 9-4120-411-14	Operator, Unit, and Direct Support Maintenance Manual for Field Deployable Environmental Control Unit (FDECU)

TM 10-3510-226-23	Unit and Direct Support Maintenance Manual for Containerized Batch Laundry (CBL)
TM 10-3510-226-23P	Unit and Direct Support Maintenance Repair Parts and Special Tools List (RPSTL) for Containerized Batch Laundry (CBL)
TM 10-3510-226-10-HR	Operator Maintenance Manual for Containerized Batch Laundry (CBL)
TM 55-8115-204-23&P	Unit and Direct Support Maintenance Manual (including Repair Parts and Special Tools List), General Cargo Container
TM 5-6115-457-12	Generator, Set, Diesel Engine Driven, Tactical Skid MTD., 100KW, 3 Phase, 4 Wire, 120/208 and 240/416 Volts

Pamphlets

DA PAM 750-8	The Army Maintenance Management System (TAMMS) Users Manual

Common Table of Allowance

CTA 8-100	Army Medical Department Expendable/Durable Items
CTA 50-970	Expendable/Durable Items

Miscellaneous Publications

MIL-HDBK-1857	Grounding, Bonding and Shielding Design Practices

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
3510-01-527-2209
3510-01-527-2210
COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS

COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS INTRODUCTION

Scope

This work package lists COEI and BII for the Containerized Batch Laundry to help you inventory items for safe and efficient operation of the equipment.

General

The COEI and BII information is divided into the following lists:

Components of End Item (COEI). This list is for information purposes only and is not authority to requisition replacements. These items are part of the Containerized Batch Laundry. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Items of COEI are removed and separately packaged for transportation or shipment only when necessary. Illustrations are furnished to help you find and identify the items.

Basic Issue Items (BII). These essential items are required to place the Containerized Batch Laundry in operation, operate it, and to do emergency repairs. Although shipped separately packaged, BII must be with the Containerized Batch Laundry during operation and when it is transferred between property accounts. Listing these items is your authority to request/requisition them for replacement based on authorization of the end item by the TOE/MTOE., Illustrations are furnished to help you find and identify the items.

Explanation of Columns in the COEI List and BII List

Column (1) Illus Number. Gives you the number of the item illustrated.

Column (2) National Stock Number (NSN). Identifies the stock number of the item to be used for requisitioning purposes.

Column (3) Description, CAGEC, and Part Number. Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The stowage location of COEI and BII is also included in this column. The last line below the description is the CAGEC (Commercial and Government Entity Code) (in parentheses) and the part number.

Column (4) Usable On Code. When applicable, gives you a code if the item you need is not the same for different models of equipment. These codes are identified below:

Code	Used on
FVB	Green
FVC	Tan

Column (5) Unit of Issue (U/I). Indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (2).

Column (6) Qty Rqr. Indicates the quantity required.

COMPONENTS OF END ITEM (COEI) LIST

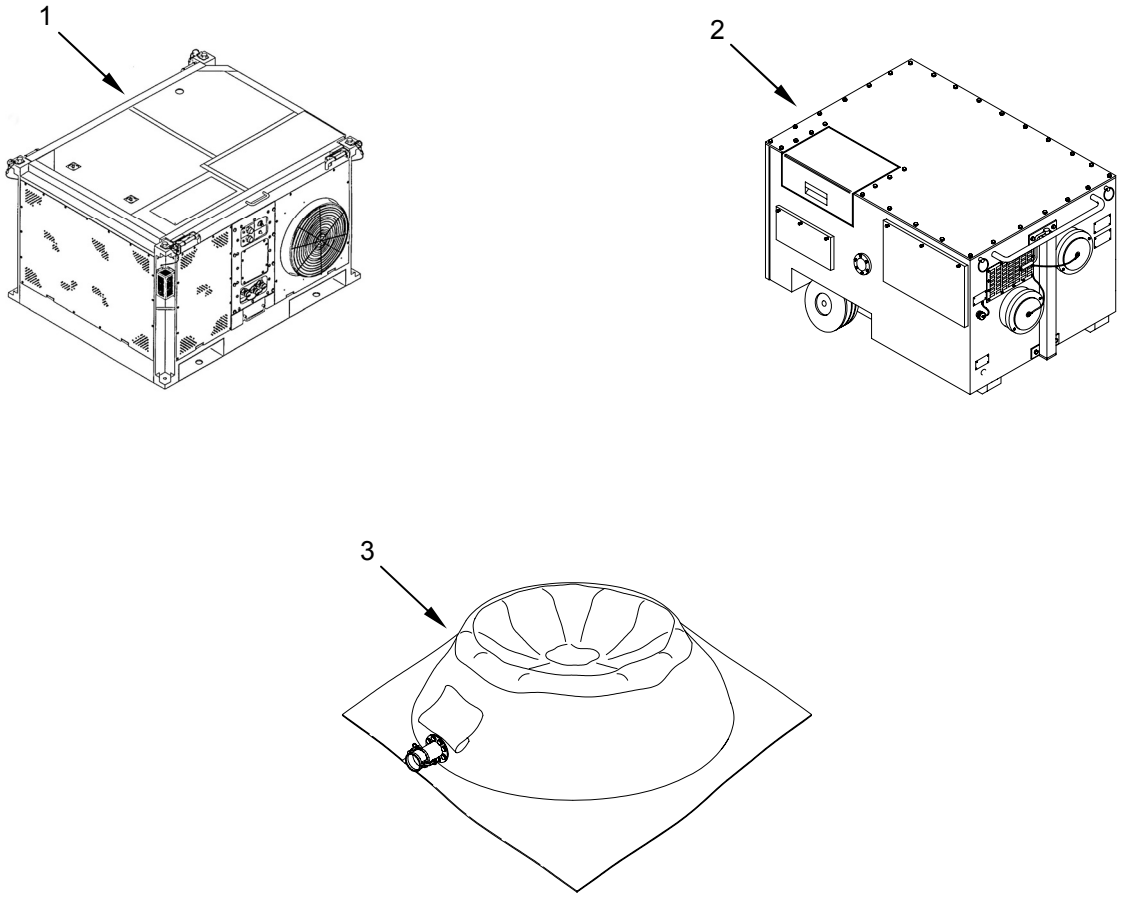


Table 1. Components of End Item (COEI) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
1	4120-01-449-0459	AIR COND 66000 BTU (94833) 9454100		EA	1
2	4520-01-367-2739	HEATER 12000 BTU PORT (90598) H120		EA	1
3	5430-01-470-7380	TANK, FABRIC, COLLAPSIBLE (05YK6) RCF-3K-W-OT		EA	2

BASIC ISSUE ITEMS (BII) LIST

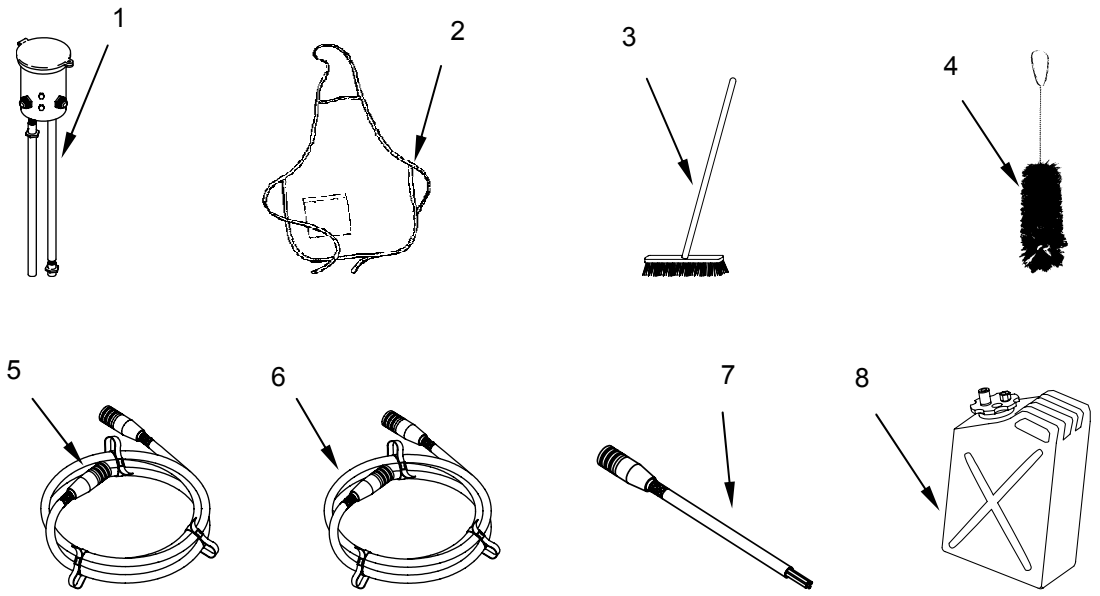


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
1	4510-01-214-9139	ADAPTER ASSEMBLY (Fuel Drum Adapter) (81337) 618285		EA	1
2	8415-00-082-6108	APRON IMPERMEABLE (58536) A-A-55063		EA	2
3	7920-01-503-1671	BROOM, PUSH (83421) 7920-00-NIB-0322		EA	1
4	7920-01-531-0637	BRUSH, SANITARY (39428) 9756T23		EA	1
5	6150-01-247-4781	CABLE ASSEMBLY (50-ft 60-AMP) (97403)13226E7023-2		EA	1
6	6150-01-220-5587	CABLE ASSEMBLY (50-ft 100-Amp) (81349) MIL-C-29184		EA	3
7	6150-01-256-6301	CABLE PIGTAIL (4-ft 100-Amp) (97403)13226E7019		EA	3
8	7240-01-337-5269	CAN, GASOLINE, MILITARY (Olive Drab) (81349) A-A-59592	FVB	EA	1
		or			
	7240-01-337-5268	CAN, GASOLINE, MILITARY (sand) (81349) A-A-59592	FVC	EA	1

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

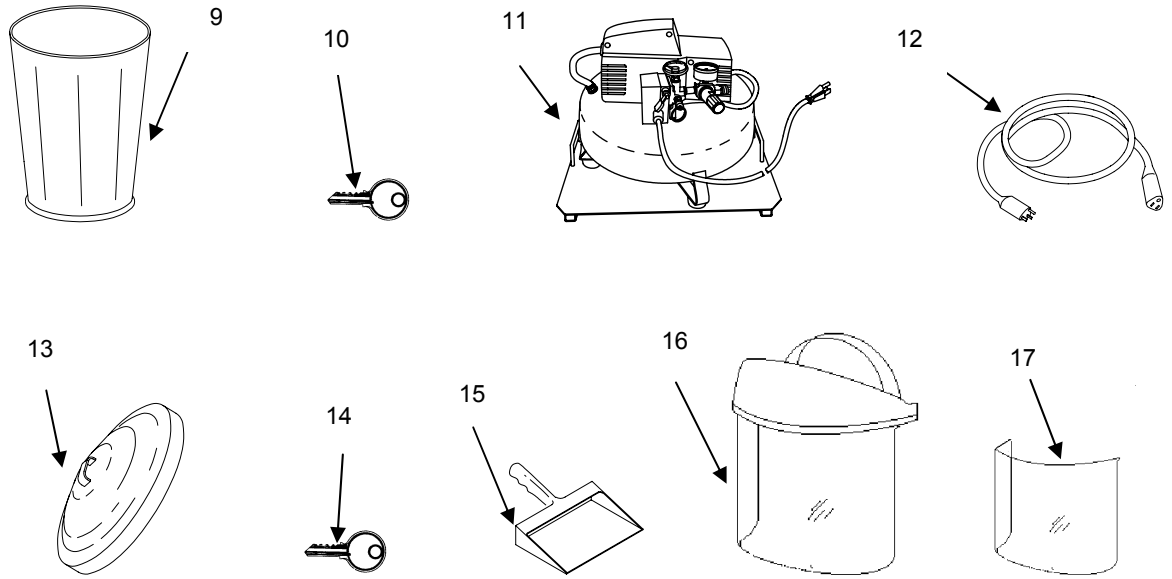


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
9	7240-00-160-0441	CAN, TRASH AND GARBAGE (39428) 9793506		EA	1
10		CIRCUIT BREAKER PANEL ACCESS KEY (56365) LP9618		EA	1
11	4310-01-531-0626	COMPRESSOR, UNIT RECIPROCATING (68821) CPFA2600P		EA	1
12	6150-01-516-2050	CORD EXTENSION (Extension Cord, 50-ft) (45152) 3375000		EA	4
13	7240-00-161-1147	COVER, CAN TRASH AND GARGABE (32 Gallon, Gray) (39428) 9793514		EA	1
14		DRYER KEY (59618) 70155601		EA	1
15	7290-00-616-0109	DUST PAN (58536) A-A-300		EA	1
16	6515-01-457-0631	FACE SHIELD HEAD GEAR (Double Matrix) (39428) 11618		EA	1
17	3510-01-531-0617	FACE SHIELD PROTECTION GUARD (1AG17) 76-1564-11		EA	1

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

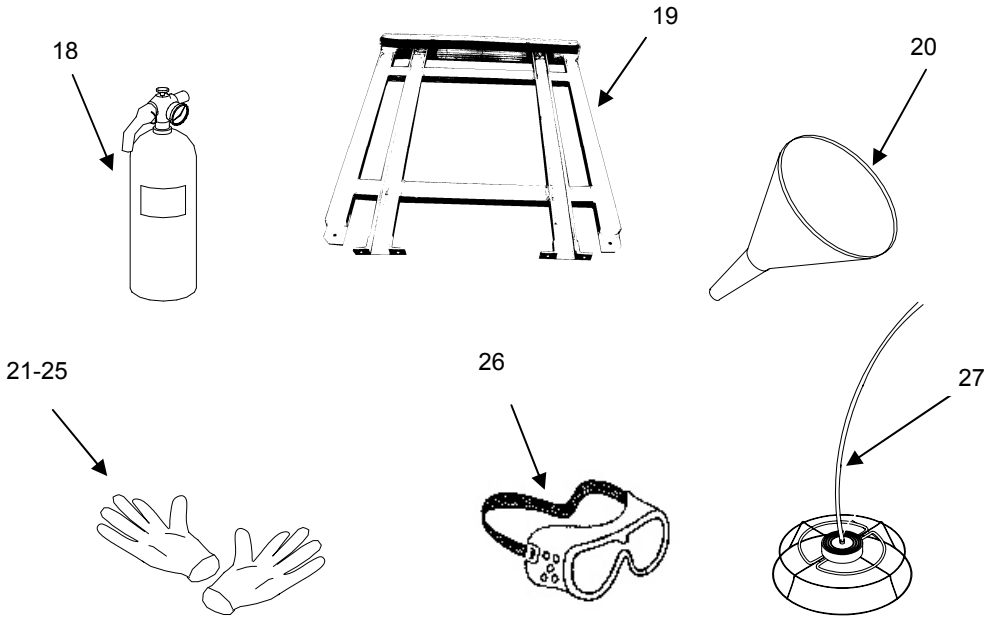


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
18	4210-00-889-2491	FIRE EXTINGUISHER, 10-lb (80244) A-A-393, TY 1, CL 1, SZ10		EA	1
19	3990-01-531-0622	FIXTURE ASSEMBLY, STACKING (0U5N7) 43261127-2	FVC	EA	1
		or			
	3990-01-531-1958	FIXTURE ASSEMBLY, STACKING (0U5N7) 43261127-1	FVB	EA	1
20	7240-00-527-9868	FUNNEL, 32 OUNCE (39428) 89011616		EA	1
21	8415-01-463-5928	GLOVES, NATURAL RUBBER, SIZE MED/LG (39428) 23170ML		BX	1
22	8415-01-463-5922	GLOVES, NATURAL RUBBER, SIZE SM/MED (39428) 23170SM		BX	1
23	8415-00-266-8677	GLOVES, RUBBER, SIZE 10 (39428) 680-10		EA	2
24	8415-00-266-8675	GLOVES, RUBBER, SIZE 11 (39428) 6680-11		EA	2
25	8415-00-266-8679	GLOVES, RUBBER, SIZE 9 (39428) 6680-9		EA	2
26	4240-00-269-7912	GOGGLES, INDUSTRIAL (39428) 6636		EA	4
27	4520-01-530-8693	HEATING ELEMENT ELECTRICAL, IMMERSION TYPE (81337) AP15N		EA	2

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

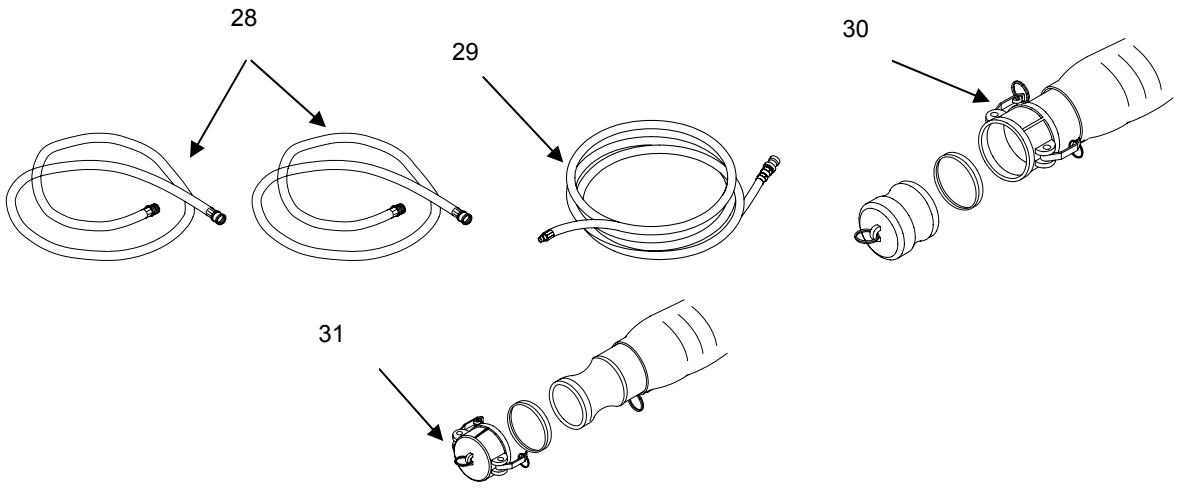


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
28	4720-00-077-0905	HOSE, ASSEMBLY, FUEL (1 Supply, 1 Return) (0U5N7) 43261146		EA	2
29	4720-01-531-0616	HOSE ASSEMBLY, NONMETALLIC (0U5N7) 43261150		EA	1
30	4720-01-531-0620	HOSE ASSEMBLY, NONMETALLIC (0U5N7) 43261151		EA	1
31	4720-01-531-0621	HOSE ASSEMBLY, NONMETALLIC (20-ft length, 2-in. diameter) (0U5N7) 43261152		EA	2

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

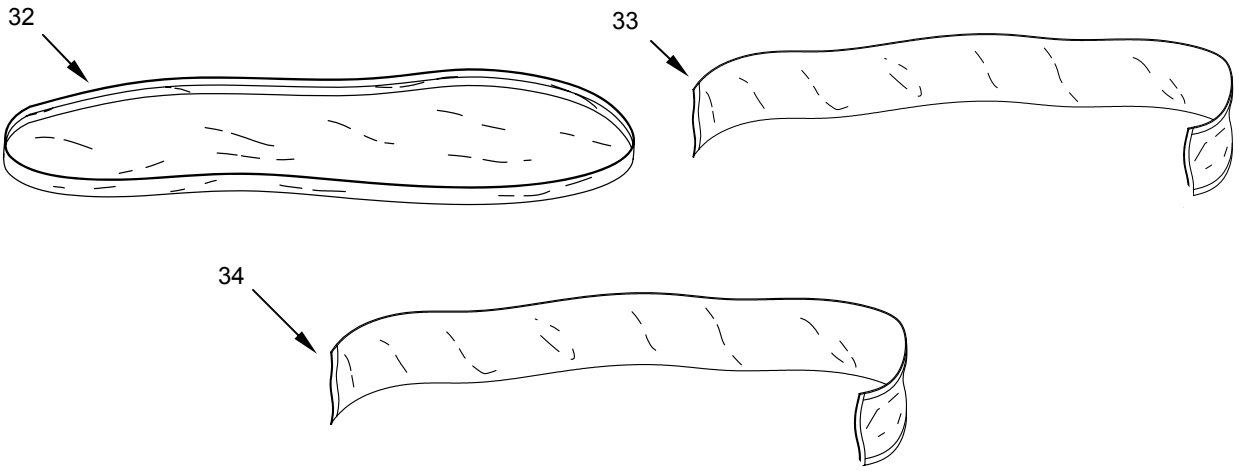


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
32		INSULATED LINER for 3000-GALLON WATER TANK GREEN (Top/Bottom Section) (81337) 9-1-0827-GRN	FVB	EA	1
		or			
		INSULATED LINER for 3000-GALLON WATER TANK (Top/Bottom Section) (81337) 9-1-0827-TAN	FVC	EA	2
33		INSULATED LINER for 3000-GALLON WATER TANK (Left Side Section) (81337) 9-1-0829-GRN	FVB	EA	1
		or			
		INSULATED LINER for 3000-GALLON WATER TANK (Left Side Section) (0U5N7) 9-1-0829-TAN	FVC	EA	1
34		INSULATED LINER for 3000-GALLON WATER TANK (Right Side Section) (81337) 9-1-0828-GRN	FVB	EA	2
		or			
		INSULATED LINER for 3000-GALLON WATER TANK (Right Side Section) (81337) 9-1-0828-TAN	FVC	EA	1

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

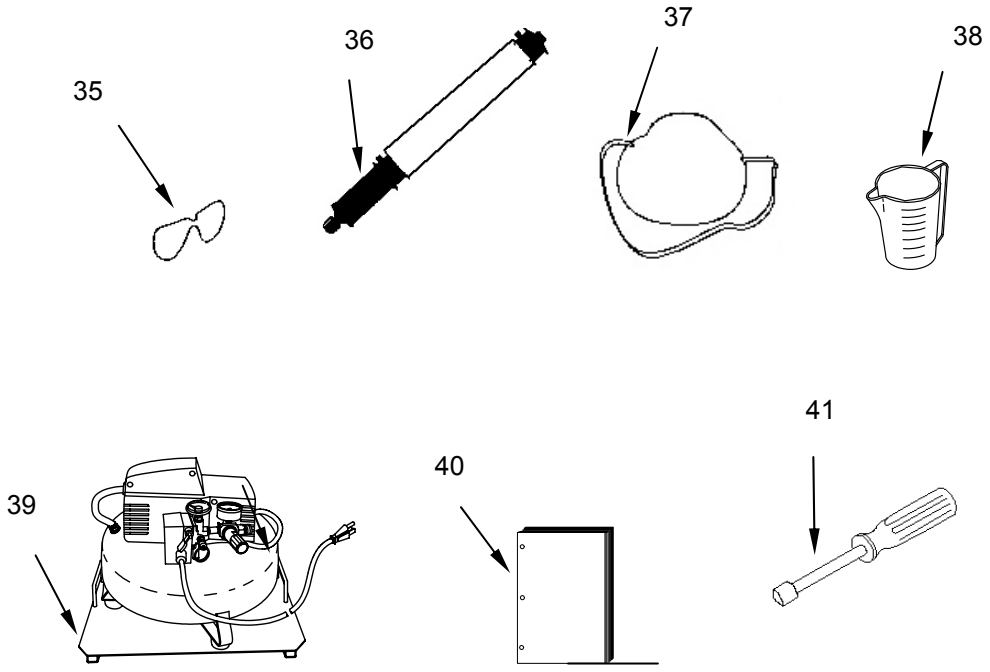


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
35	4240-00-262-7092	LENS, GOGGLES, INDUSTRIAL (80204) ANSI-1		EA	4
36	6230-01-397-1428	LIGHT, EXTENSION (00L99) ACS-2425PL		EA	2
37	4240-01-247-2348	MASK, AIR FILTERING (50378) 8511N95		BX	1
38	7330-00-205-3096	MEASURE, LIQUID (58536) A-A-1751		EA	1
39		MOUNTING BASE PLATE (OU5N7) 43261106		EA	1
40		MSDS BOOK (0U5N7) 43269009		EA	1
41	5120-01-354-2770	NUT DRIVER (Solid Shaft, 5/16 in.) (33287) J-35993-5		EA	1

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

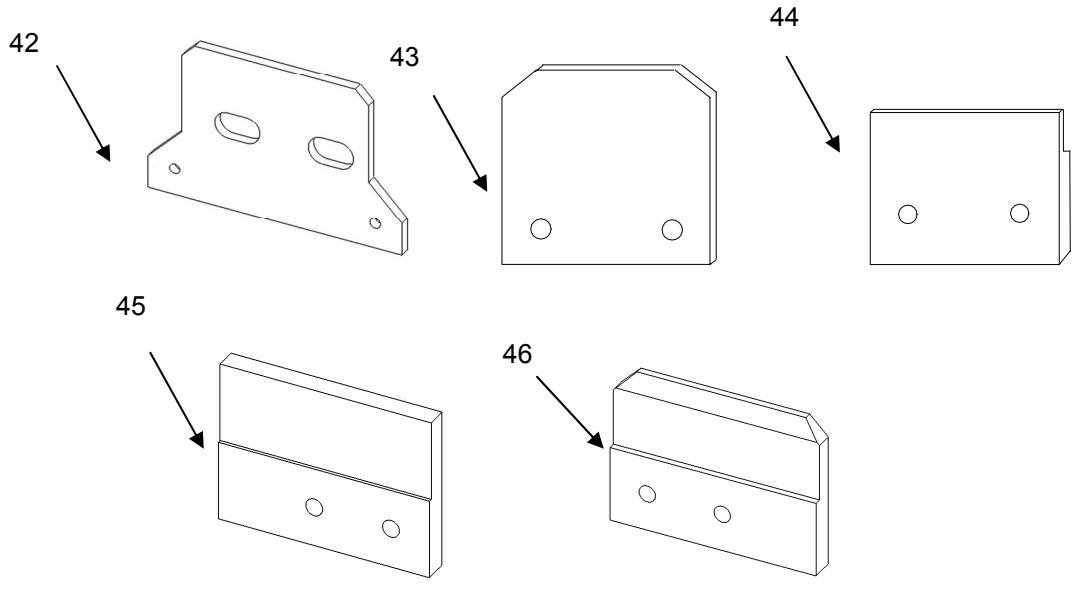


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
42	5340-01-531-1962	PLATE, MOUNTING (End Plate Stacking Feature, Green) (0U5N7) 43262251-1	FVB	EA	1
		or			
	5340-01-531-1963	PLATE, MOUNTING (End Plate Stacking Feature, Tan) (0U5N7) 43262251-2	FVC	EA	1
43	5340-01-531-0618	PLATE MOUNTING (Foot, Interface, FDECU) (0U5N7) 43262117		EA	2
44	5340-01-531-0619	PLATE MOUNTING (Removable End Plate Stacking Fixture, FDECU) (0U5N7) 43262270		EA	2
45	5340-01-531-1959	PLATE, MOUNTING (Tie-Down Offset Anchor Clamp for FDECU) (0U5N7) 43262297		EA	1
46	5340-01-531-1960	PLATE, MOUNTING (Tie-Down Offset Slide Clamp for FDECU) (0U5N7) 43262296		EA	1

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

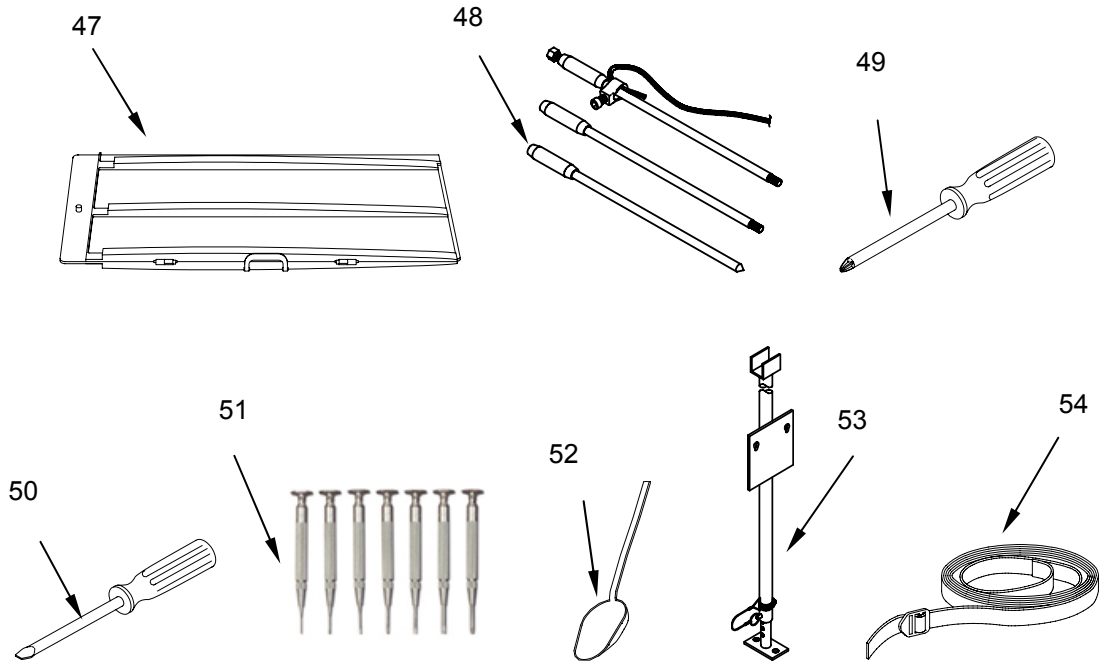


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
47		RAMP SECTIONS (0U5N7) 43262134-3		EA	2
48	5975-00-878-3791	ROD, GROUND (SECT, Type III, Class B) (81348) W-R-550		EA	2
49	5120-00-060-2004	SCREWDRIVER, PHILLIPS Tip, SIZE #1, (39428) 84959329		EA	1
50	5120-00-142-5279	SCREWDRIVER, STANDARD TIP (39428) 84959162		EA	1
51	5120-00-288-8739	SCREWDRIVER SET, JEWELER'S SWIVEL (33164) 250		EA	1
52	7340-00-240-7079	SPOON, FOOD SERVICE (58536) A-A-1082		EA	1
53	6110-01-242-6691	STAND, DISTRIBUTION (BOX, TEMPER) (81337) 1-6-6005		EA	1
54	5430-00-134-3196	STRAP WEBBING (cargo strap small) (19207) 8690494		EA	10

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

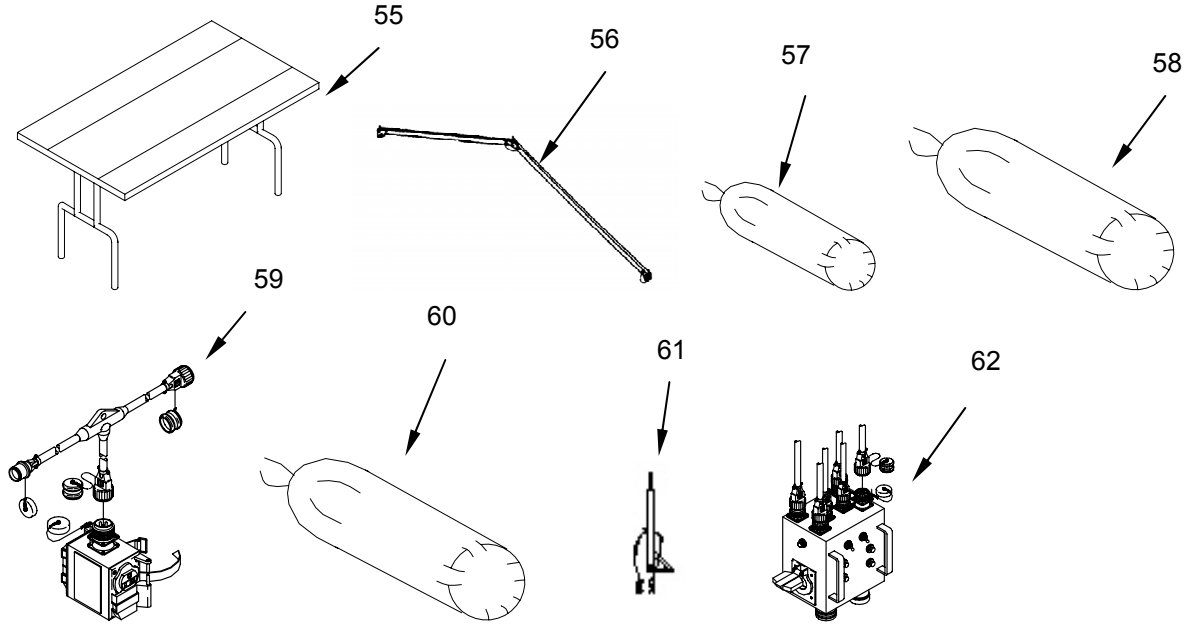


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
55	7110-01-415-6895	TABLE, FOLDING (81337) 623954		EA	4
56	8340-01-240-5854	TEMPER, ARCH ASSEMBLY (81337) 5-4-4006		EA	3
57	8340-01-186-3030	TEMPER, CONTAINER TENT PIN (81337) 5-4-8487-1		EA	1
58	8340-01-186-3029	TEMPER, CONTAINER, VESTIBULE (81337) 5-4-3374-1		EA	1
59	6150-01-470-1916	TEMPER, CONVENIENCE OUTLET, DUPLEX w/GFCI (81337) 9-1-0624-1		EA	4
60	8340-01-186-3013	TEMPER, COVER, TENT FRAME (81337) 5-4-3347-1		EA	1
61	8340-01-186-3009	TEMPER, EAVE EXTENDER (81337) 5-4-3341		EA	6
62	6110-01-251-0402	TEMPER, ELECTRIC DISTRIBUTION BOX (81337) 1-6-6041		EA	1

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

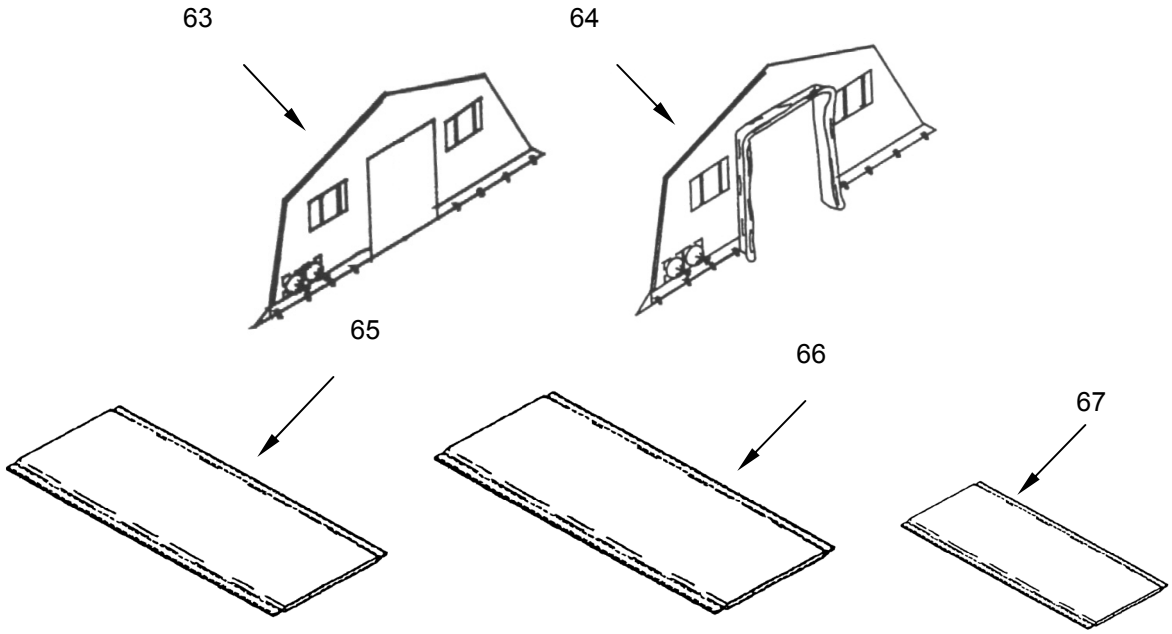
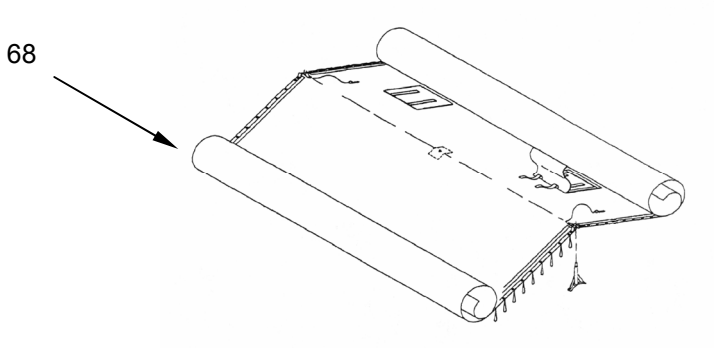
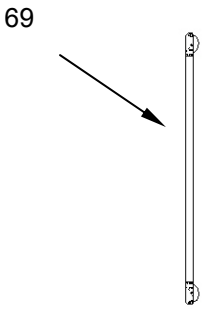


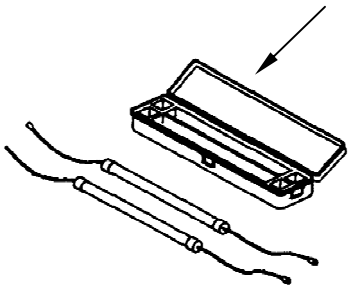
Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
63	8340-01-186-3014	TEMPER, END SECTION, ISO (81337) 5-4-3350-1	FVB	EA	1
		or			
	8340-01-198-7618	TEMPER, END SECTION, ISO (81337) 5-4-3350-2	FVC	EA	1
64		TEMPER, END SECTION, MODIFIED ISO (81337) 9-1-0586	FVB	EA	1
		or			
		TEMPER, END SECTION, MODIFIED ISO (81337) 9-1-0586	FVC	EA	1
65	8340-01-186-3025	TEMPER, FLOOR, INSULATED (81337) 5-4-3369		EA	2
66	8340-01-186-3024	TEMPER, FLOOR, TENT (81337) 5-4-3368-1		EA	2
67	8340-01-186-3027	TEMPER, FLOOR, TENT, VESTIBULE (81337) 5-4-3372-1		EA	1

BASIC ISSUE ITEMS (BII) LIST-CONTINUED







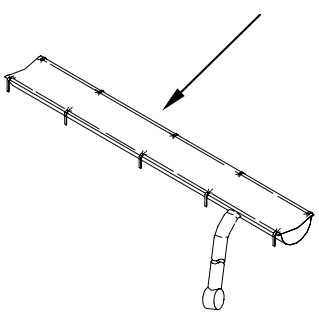


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
68	8340-01-186-3018	TEMPER, FLY, TENT (81337) 5-4-3353-1	FVB	EA	1
		or			
	8340-01-198-5358	TEMPER, FLY, TENT (81337) 5-4-3353-2	FVC	EA	1
69	8340-01-186-3004	TEMPER, HEADER ASSEMBLY (81337) 5-4-3335		EA	3
70	6230-01-465-8931	TEMPER, LIGHT SET, GENERAL ILLUMINATION, ISO (06967) F131-5004M		ST	1
71	8340-01-211-6798	TEMPER, PLENUM, TENT (81337) 5-4-3620		EA	1

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

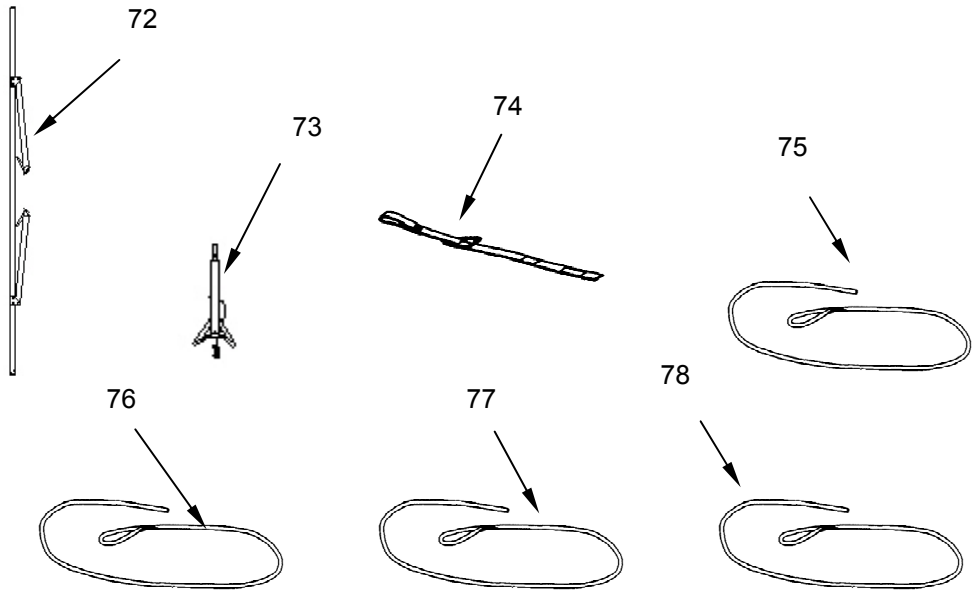


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
72	8340-01-186-3005	TEMPER, PURLIN ASSEMBLY (81337) 5-4-3336		EA	10
73	8340-01-186-3008	TEMPER, RIDGE EXTENDER (81337) 5-4-3340		EA	3
74	8465-01-220-1419	TEMPER, STRAP, LIGHT SUPPORT ASSEMBLY, TYPE I, ISO (81337) 5-4-4005		EA	2
75		TEMPER, TENT LINE, ENDWALL (81337) 5-4-3350-1-36		EA	4
76		TEMPER, TENT LINE, TENT FLY (81337) 5-4-3353-1-26		EA	6
77		TEMPER, TENT LINE, VESTIBULE (81337) 5-4-3370-1-20		EA	4
78		TEMPER, TENT LINE, WINDOW SECTION (81337) 5-4-3363-1-32		EA	8

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

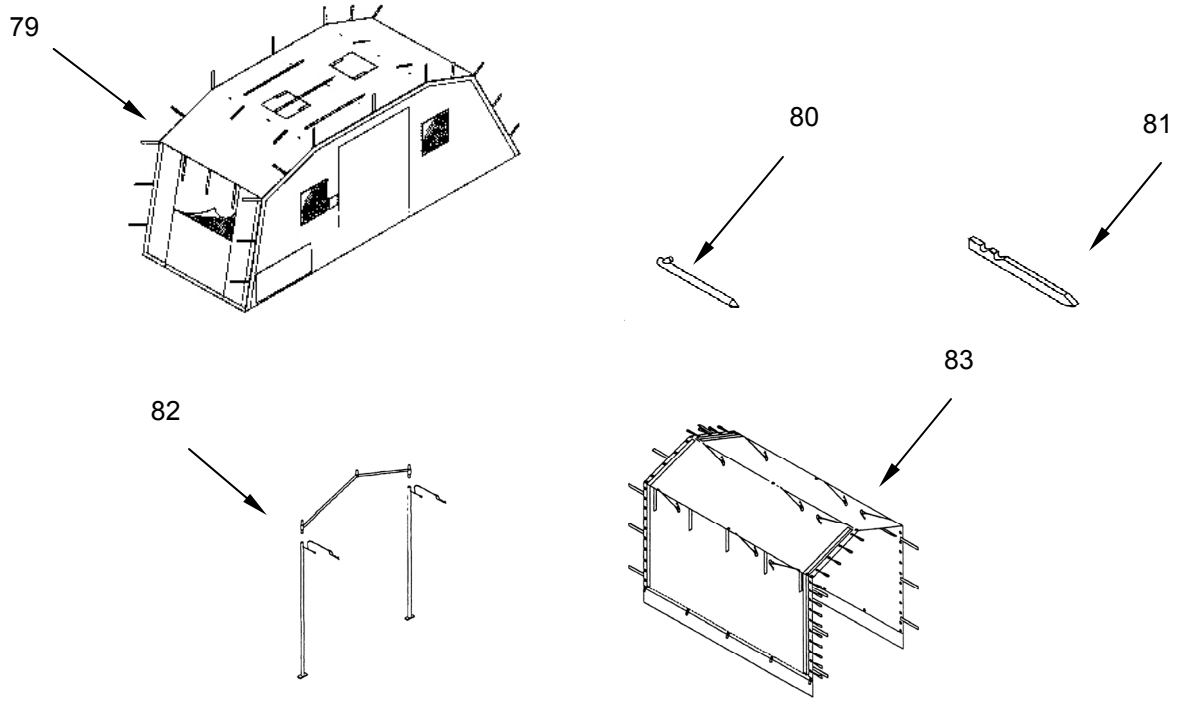


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
79	8340-01-392-0921	TEMPER, TENT LINER, END SECTION TEMPERATE, GREEN (81337) MIL-T-44243	FVB	EA	1
		or			
	8340-01-213-9566	TEMPER, TENT LINER, END SECTION TEMPERATE, TROPICAL DESERT (81337) MIL-T-44243	FVC	EA	1
80	8340-00-823-7451	TEMPER, TENT PIN, STEEL, 12-in., ISO (81337) 5-4-791		EA	30
81	8340-00-261-9751	TEMPER, TENT PIN, Wood, 24-in., ISO (81337) 5-4-1		EA	15
82	8340-01-186-3010	TEMPER, VESTIBULE FRAME ASSEMBLY (81337) 5-4-3343		EA	3
83	8340-01-186-3026	TEMPER, VESTIBULE, TENT (81337) 5-4-3370	FVB	EA	1
		or			
	8340-01-198-7621	TEMPER, VESTIBULE, TENT (81337) 5-4-3371	FVC	EA	1

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

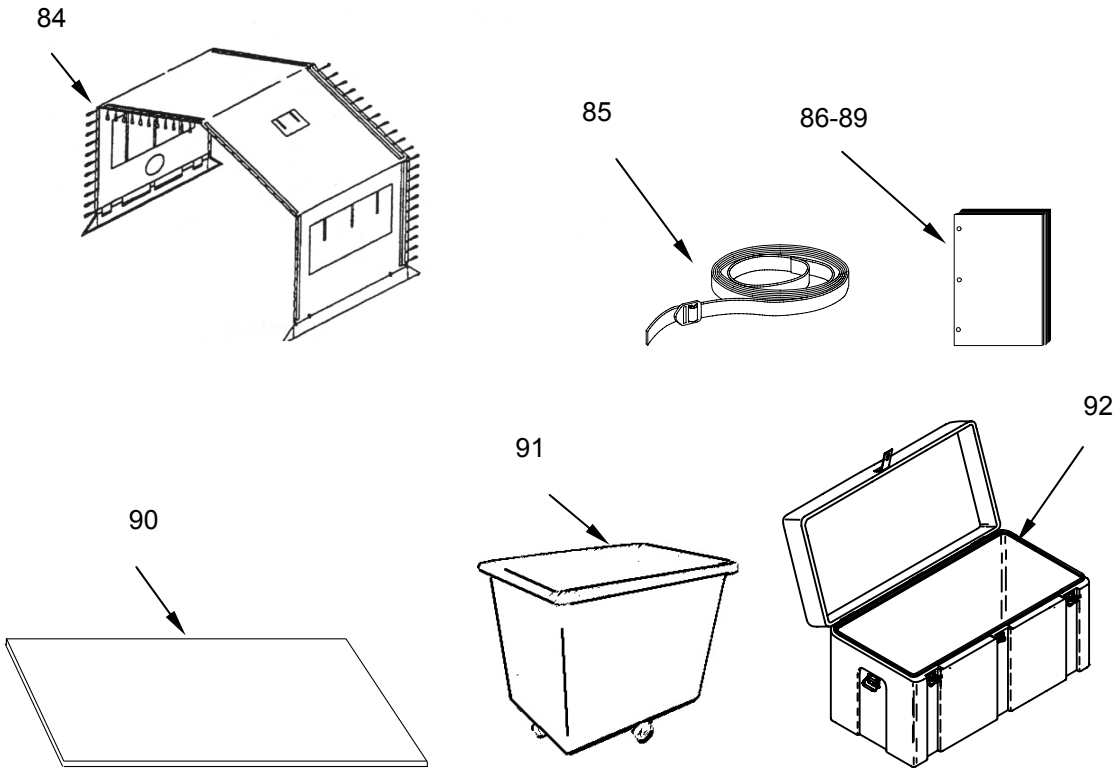


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
84	8340-01-186-3021	TEMPER, WINDOW SECTION, ISO (81337) 5-4-3363-1	FVB	EA	2
		or			
	8340-01-198-7619	TEMPER, WINDOW SECTION, ISO (81337) 5-4-3363-2	FVC	EA	2
85	3990-01-204-3009	TIE DOWN, CARGO (cargo strap large) (98313) FDC5770-5		EA	5
86		TM 10-3510-226-10		EA	1
87		TM 10-3510-226-10-HR		EA	1
88		TM 10-3510-226-23		EA	1
89		TM 10-3510-226-23P		EA	1
90		TRANSFER TOP, LAUNDRY CART (0U5N7) 43262305		EA	1
91	3920-00-929-8588	TRK 37-1/2x26x291/2 (81349) A-A-50025		EA	2
92	8460-01-471-1035	TRUNK, LOCKER TYPE II (58536) A-A-59490		EA	1

BASIC ISSUE ITEMS (BII) LIST-CONTINUED

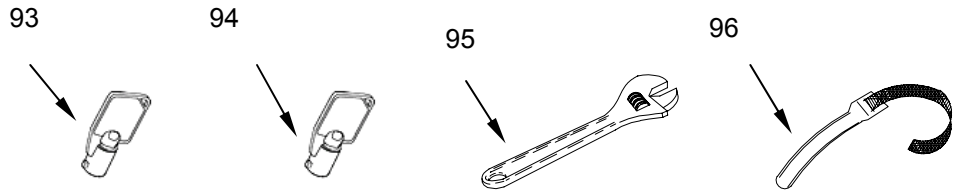


Table 2. Basic Issue Items (BII) List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER (NSN)	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) UNIT OF ISSUE (U/I)	(6) QTY RQR.
93		WASHER CONTROL PANEL ACCESS KEY (59618) F160562		EA	1
94		WASHER PROGRAM KEY (59618) 9001756		EA	1
95	5120-00-278-0341	WRENCH, ADJUSTABLE (10”, CHROME, CRESCENT, 15/16 IN. CAPACITY) (39428) W-72		EA	1
96	5120-01-461-1810	WRENCH, STRAP LARGE SIZE 6 3/8 IN. DIA (39428) 54325A24		EA	1

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
ADDITIONAL AUTHORIZATION LIST (AAL)

INTRODUCTION

Scope
This work package lists additional items you are authorized for the support of the Containerized Batch Laundry.

General
This list identifies items that do not have to accompany the Containerized Batch Laundry and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

Explanation of Columns in the AAL

Column (1) National Stock Number (NSN). Identifies the stock number of the item to be used for requisitioning purposes.

Column (2) Description, Commercial and Government Entity Code (CAGEC), and Part Number (P/N). Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The last line below the description is the CAGEC (in parentheses) and the part number.

Column (3) Usable On Code. When applicable, gives you a code if the item you need is not the same for different models of equipment. These codes are identified below:

Code	Used on
FVB	Green
FVC	Tan

Column (4) Unit of Issue (U/I). Indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (1).

Column (5) Qty Recm. Indicates the quantity recommended.

ADDITIONAL AUTHORIZED LIST

Table 1. Additional Authorization List (AAL).

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION, CAGEC, AND P/N	(3) UOC	(4) U/I	(5) QTY RECM
7920-00-772-5800	BRUSH, SANITARY			
	(58536) A-A-3069		EA	6
8415-00-753-6552	GLOVES, TAP TYPE2 M10			
	(81349) MIL-G-12223		PR	2
4240-00-190-6432	GOGGLES INDUSTRIAL			
	(58536) A-A-1110		EA	2
5120-00-926-7116	MALLET, WOOD (6-in. FACE X 8-in. Long Head			
	(80244) LLL-M-71 TY9		EA	1

OPERATOR MAINTENANCE
CONTAINERIZED BATCH LAUNDRY (CBL)
NSN 3510-01-527-2209
NSN 3510-01-527-2210
EXPENDABLE AND DURABLE ITEMS LIST

INTRODUCTION

Scope

This work package lists expendable and durable items that you will need to operate and maintain the Containerized Batch Laundry. This list is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

Explanation of Columns in the Expendable/Durable Items List

Column (1) Item Number. This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item (e.g., “Use brake fluid (item 5, WP 0098 00).”).

Column (2) Level. This column identifies the lowest level of maintenance that requires the listed item (*include as applicable: C = Operator/Crew, O = Unit/AVUM, F = Direct Support/AVIM, H = General Support, D = Depot*).

Column (3) National Stock Number (NSN). This is the NSN assigned to the item which you can use to requisition it.

Column (4) Item Name, Description, Commercial and Government Entity Code (CAGEC), and Part Number (P/N). This column provides the other information you need to identify the item.

Column (5) Unit of Issue (U/I). Indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (3).

EXPENDABLE AND DURABLE ITEMS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER (NSN)	(4) ITEM NAME, DESCRIPTION, COMMERCIAL AND GOVERNMENT ENTITY CODE (CAGEC), AND PART NUMBER (P/N)	(5) U/I
1	C	7920-01-339-6928	ABSORBENT MATERIAL, SPILL CLEANUP (66735) F91D248	EA
2	C	8105-01-221-3239	BAG, PLASTIC, CONTAMINATED WASTE, SIZE 3 (58536) A-A-2299	RL
3	C	7920-00-148-9666	BALED RAG, GENERAL (58536) A-A-2522	BL
4	C		BLEACH SOLID (85884) 13649	CS
5	C	6810-00-598-7316	BLEACH, LAUNDRY, SODIUM HYPOCHLORITE, (0E7P7)	GL
6	C		CARTRIDGE, FILTER (0MLR3) 10U30U	EA
7	C		CARTRIDGE, FILTER, POWERED CARBON (0MLR3) C30P	EA
8	C	9150-01-054-6453	CLEANER, LUBRICANT, AND PRESERVATIVE, 1 PT. (07950) 634	PT
9	C	6850-00-105-3084	CLEANER, SOLVENT (13873) CLASS I ODS/CFC-113	PT
10	C		DETERGENT SOLID (85884) 13011	CS
11	C	7930-00-929-1220	DETERGENT, LOW-PHOSPHATE (TYPE II), 50 LB (4S923)TYPE 1 LAUNDRY DETERGENT	DR
12	C	7930-00-252-6797	DETERGENT, NONPHOSPHATE (TYPE II), 50 LB (053H7) DETERGENT, LAUNDRY, TYPE II	DR
13	C	7930-00-926-5280	DETERGENT, GENERAL PURPOSE, BOTTLE, SPRAY (0UHH5) DETERGENT, GENERAL PURPOSE (SPRAY)	EA
14	C		ETHYLENE GLYCOL, SOLUTION (1KZJ9) 55786	GL
15	C	4240-00-202-9473	FACE SHIELD, INDUSTRIAL (81348) L-F-36	EA

EXPENDABLE AND DURABLE ITEMS LIST-CONTINUED

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER (NSN)	(4) ITEM NAME, DESCRIPTION, COMMERCIAL AND GOVERNMENT ENTITY CODE (CAGEC), AND PART NUMBER (P/N)	(5) U/I
16	C		FILTER, BAG, POLYPROPYLENE, EPDM SEAL RING, 5 MICRON (0MLR3) FBPP05X5	EA
17	C	6545-00-656-1093	FIRST AID KIT, GENERAL PURPOSE (04024) 6170-008	EA
18	C	8415-00-009-1900	GLOVES, CHEMICAL AND OIL PROTECTIVE (05963)N35	PR
19	C	9150-00-040-3891	GREASE, SILICONE INSULATED ELECTICAL (71984) DC33L	EA
20	C	8520-00-782-2183	HAND CLEANER (58536) A-A-279	CN
21	C		MEMBRANE CLEANER (09647) 803-7884	BT
22	C	7520-01-368-7771	PEN, BALL-POINT (58536) A-A-2905	DZ
23	C	6505-00-619-8874	PROPYLENE GLYCOL, USP	GL
24	C		SODIUM BISULPHITE (85884) 43265033	EA
25	C		SOUR SOLID 2/6# (85884) 16005	CS
26	C	7930-00-291-8321	SOUR, LAUNDRY (58536) A-A-1374	DR
27	C	8030-00-889-3535	TAPE, ANTISIEZE, 1/2 IN WIDE X 260 IN LONG (80244) A-A-58092, SIZE II	EA
28	C	5970-00-644-3167	TAPE, ELECTRICAL INSULATION, ¾ INCH WIDTH (58536) A-A-2094	RO
29	C	5975-00-984-6582	TIE, WIRE, MEDIUM - 6 IN. (81349) MIL-S-23190	PK
30	C	7690-00-689-5212	WIRE MARKERS (56501) WM-A-33	PK

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By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

SANDRA R. RILEY
Administrative Assistant to the
Secretary of the Army
0522401

Distribution: To be distributed in accordance with initial distribution number (IDN) 256845 requirements for TM 10-3510-226-10.

These are the instructions for sending an electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" <whomever@avma27.army.mil>
To: amssbriml@natick.army.mil

Subject: DA Form 2028

1. From: Joe Smith
2. Unit: home
3. Address: 4300 Park
4. City: Hometown
5. St: MO
6. Zip: 77777
7. Date Sent: 19-OCT-93
8. Pub no: 55-2840-229-23
9. Pub Title: TM
10. Publication Date: 04-JUL-85
11. Change Number: 7
12. Submitter Rank: MSG
13. Submitter FName: Joe
14. Submitter MName: T
15. Submitter LName: Smith
16. Submitter Phone: 123-123-1234
17. Problem: 1
18. Page: 2
19. Paragraph: 3
20. Line: 4
21. NSN: 5
22. Reference: 6
23. Figure: 7
24. Table: 8
25. Item: 9
26. Total: 123
27. Text:

This is the text for the problem below line 27.

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	**DATE** *21 October 2003*

TO: *(Forward to proponent of publication or form) (Include ZIP Code)*
COMMANDER
U.S. ARMY TANK-AUTOMOTIVE AND ARMAMENT COMMAND
ATTN: AMSTA LC-CECT
KANSAS STREET
NATICK, MA 01760-5052

FROM: *(Activity and location) (Include ZIP Code)*
PFC Jane Doe
CO A 3rd Engineer BR
Ft. Leonardwood, MO 63108

PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 10-1670-296-23&P	30 October 2002	Unit Manual for Ancillary Equipment for Low Velocity Air Drop Systems

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON *(Provide exact wording of recommended changes, if possible).*
	0036 00-2				*1*	*In table 1, Sewing Machine Code Symbols, the second sewing machine code symbol should be MD ZZ not MD 22.* *Change the manual to show Sewing Machine, Industrial: Zig-Zag; 308 stitch; medium-duty; NSN 3530-01-181-1421 as a MD ZZ code symbol.*

**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Jane Doe, PFC	508-233-4141	Jane Doe *Jane Doe*

SAMPLE

TO: (*Forward direct to addressee listed in publication*)	FROM: (*Activity and location) (Include ZIP Code*)	DATE
COMMANDER U.S. ARMY TANK-AUTOMOTIVE AND ARMAMENT COMMAND ATTN: AMSTA LC-CECT KANSAS STREET NATICK, MA 01760-5052	*PFC Jane Doe* *CO A 3rd Engineer BR* *Ft. Leonardwood, MO 63108*	*21 October 2003*

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
TM 10-1670-296-23&P	30 October 2002	Unit Manual for Ancillary Equipment for Low Velocity Air Drop Systems

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
0066 00-1					*4*			*Callout 16 in figure 4 is pointed to a D-Ring. In the Repair Parts List key for figure 4, item 16 is called a Snap Hook. Please correct one or the other.*

PART III – REMARKS (*Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

UASPPC V3.00

SAMPLE

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
TO: *(Forward to proponent of publication or form) (Include ZIP Code)* Commander U.S. Army Tank-automotive and Armament Command ATTN: AMSTA-LC-CECT Kansas Street, Natick, MA 01760-5052.	**FROM:** *(Activity and location) (Include ZIP Code)*	

PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 10-3510-226-10	31 August 2005	Operator's Maintenance Manual for Containerized Batch Laundry(CBL)

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON *(Provide exact wording of recommended changes, if possible).*

**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

TO: (*Forward direct to addressee listed in publication)*	**FROM:** (*Activity and location) (Include ZIP Code)*	**DATE**
Commander U.S. Army Tank-automotive and Armament Command ATTN: AMSTA-LC-CECT Kansas Street, Natick, MA 01760-5052.		

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

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PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS (*Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

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RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 3 2.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Weights

1 centigram = 10 milligrams = .15 grain
1 decigrarn = 10 centigrams = 1.54 grains
1 gram = 10 decigrams = .035 ounce
1 dekagrarn = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .15 5 sq. inch
1 sq. decimeter =100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	Iiters	.473	milliliters	fluid ounces	.034
quarts	Iiters	.946	liters	pints	2.113
gallons	Iiters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

_F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	_C

PIN: 082610-000