STANDARD OVERHAUL PRACTICES MANUAL

APPLICATION AND FINISHING OF THERMAL SPRAY COATINGS

PART NUMBER NONE

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STANDARD OVERHAUL PRACTICES MANUAL

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To: All holders of APPLICATION AND FINISHING OF THERMAL SPRAY COATINGS 20-10-05.

Attached is the current revision to this STANDARD OVERHAUL PRACTICES MANUAL

The STANDARD OVERHAUL PRACTICES MANUAL is furnished either as a printed manual, on microfilm, or digital products, or any combination of the three. This revision replaces all previous microfilm cartridges or digital products. All microfilm and digital products are reissued with all obsolete data deleted and all updated pages added.

For printed manuals, changes are indicated on the List of Effective Pages (LEP). The pages which are revised will be identified on the LEP by an R (Revised), A (Added), O (Overflow, i.e. changes to the document structure and/or page layout), or D (Deleted). Each page in the LEP is identified by Chapter-Section-Subject number, page number and page date.

Pages replaced or made obsolete by this revision should be removed and destroyed.

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Location of Change	Description of Change
	NO HIGHLIGHTS

STANDARD OVERHAUL PRACTICES MANUAL

A = Added, R = Revised, D = Deleted, O = Overflow

TABLE OF CONTENTS

All revisions to this manual will be accompanied by transmittal sheet bearing the revision number. Enter the revision number in numerical order, together with the revision date, the date filed and the initials of the person filing.

Revision		Filed		Revision		Filed	
Number	Date	Date	Initials	Number	Date	Date	Initials

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STANDARD OVERHAUL PRACTICES MANUAL

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Temporary Revision		Inserted		Removed	
Number	Date	Date	Initials	Date	Initials

Temporary Revision		Inserted		Removed	
Date	Initials	Number	Date	Date	Initials

Temporary Revision		Inserted		Removed	
Number	Date	Date	Initials	Date	Initials

Temporary Revision		Inserted		Removed	
Date	Initials	Number	Date	Date	Initials

INTRODUCTION

1. General

A. The instructions in this manual tell how to do standard shop procedures during maintenance functions from simple checks and replacement to complete shop-type repair.

B. This manual is divided into separate sections:

(1) Title Page

(2) Transmittal Letter

(3) Highlights

(4) Effective Pages

(5) Contents

(6) Revision Record

(7) Record of Temporary Revisions

(8) Introduction

(9) Procedures

C. Refer to SOPM 20-00-00 for a definition of standard industry practices, vendor names and addresses, and an explanation of the True Position Dimensioning symbols used.

D. The data is general. It is not about all situations or specific installations. Use it as a guide to help you write minimum standards.

E. If the component overhaul instructions are different from the data in this subject, use the component overhaul instructions.

APPLICATION AND FINISHING OF THERMAL SPRAY COATINGS

1. INTRODUCTION

A. The data in this subject comes from Boeing Process Specifications BAC 5851 and BAC 5855. The airline has a copy of the Boeing Process Specification manual.

B. The data is general. It is not about all situations or specific installations. Use this data as a guide to help you write minimum standards.

C. BAC5851 coatings have these classes. If the overhaul instructions specify Class 1 or do not give the class, you can use any class.

(1) Class 1 uses the usual plasma spray equipment.

(2) Class 2 uses high velocity oxy-fuel (HVOF) equipment, which gives a coating with smaller pores.

(3) Class 3 uses a D-Gun and a proprietary procedure

(4) Class 4 uses a Super D-Gun and a proprietary procedure.

D. Refer to SOPM 20-00-00 for a list of all the vendor names and addresses.

2. EQUIPMENT

A. Guns

(1) For Class 1 coatings, plasma gun (40 kw minimum capability) such as the Metco 3MB-II (V39918).

(2) For Class 2 coatings, HVOF equipment, such as the Jet Kote II (V1C774).

(3) For Class 3 coatings, a Praxair D-Gun (V33870).

(4) For Class 4 coatings, a Praxair Super D-Gun (V33870).

B. Fixtures to hold the part and gun at a constant distance and move it at controlled speeds and depths of feeds.

C. Fixtures to hold the part during grinding or honing.

D. Grit blasting equipment to supply 16 to 60 mesh particles at air pressures up to 60 psi, with a desiccant air dryer or draining separator and an oil removal filter.

E. Auxiliary cooling system such as nitrogen, carbon dioxide or air spray, with something to monitor temperature, such as surface pyrometer or temperature sensitive crayons.

F. Carbide tipped machining tools (C-2 grade or better) such as Carboloy 883 or Vascoloy-Ramet 2A7. Do not use milling tools to machine flame sprayed coatings. This includes end mills and face mills.

G. Grinding wheel – Resin bonded diamond, silicon carbide or aluminum oxide (as applicable), 100-400 grit; hardness L, M, or N.

H. Honing stones – Diamond, aluminum oxide or silicon carbide (as applicable).

3. MATERIALS

A. Test panel of the same material as the part to be coated or per Table 1. Refer to BAC5851 for more details.

Table 1: Test Panel Materials

PART MATERIAL	PANEL MATERIAL
Low Carbon or Alloy Steel	AISI 4130 or 1020
Corrosion Resistant Steel	AISI 4130 or 1020
Titanium or its Alloys	Ti-6Al-4V

Table 1: Test Panel Materials (Continued)

PART MATERIAL	PANEL MATERIAL
Aluminum or its Alloys	7075-T6
Nickel or Cobalt Alloys	625 or 718

B. Primers (Ref SOPM 20-60-02)
   (1) BMS 10-11, Type 1
   (2) BMS 10-97, Type 1

C. Sealers
   (1) Metcoseal AP, V39918 (new supply not available)
   (2) Metcoseal URS (replaces Metcoseal AP), V39981
   (3) UCAR 100, V33870

D. Silicon carbide stick, for dressing the grinding wheel.

E. Abrasive grit, aluminum oxide or silicon carbide, 16-60 mesh, maximum free silica 0.75% by weight – V2U971, V39918.

F. Grit blast resistant tape, rubber backed – Scotch 507, V76381 or Mystik 9710, V88301.

G. Heat reflective tape, aluminum foil backed, glass cloth laminated – Scotch Y-9050, V76381.

H. Thermal spray powders – See Table 2.

Table 2: Thermal Spray Powders

POWDER MATERIAL	SPECIFICATION	RECOMMENDED MATERIALS
Tungsten Carbide with Cobalt	BMS 10-67, Type 1	AI-1001, V06677 Amperit 515.400, V4D776 Amperit 526.062, V4D776 Dimalloy 2005, V39918 JK117, V1C774 Metco 71 VF-NS, V39918 WC101, V33870 WC102, V33870 WC106, V33870 WC540, V33870 1343VM, V33870
Aluminum Bronze	BMS 10-67, Type 2	CU-104, V33870 Metco 51 F-NS, V39918
Aluminum Oxide	BMS 10-67, Type 3	AI-1011-F, V06677 Metco 101, V39918
Chromium Oxide	BMS 10-67, Type 4	AI-1025-F, V06677 CRO-131, V33870 325, V2U971
Zirconium Oxide	BMS 10-67, Type 5	AI-1012, V06677

Table 2: Thermal Spray Powders (Continued)

POWDER MATERIAL	SPECIFICATION	RECOMMENDED MATERIALS
Nickel Chrome Alloy	BMS 10-67, Type 6	AI-1015, V06677 Metco 43C-NS, V39918
Aluminum	BMS 10-67, Type 7	AI-1020, V06677 Metco 54-NS, V39918
Stainless Steel, AISI 316	BMS 10-67, Type 8	AI-1082, V06677
Cobalt-Chrome-Nickel-Tungsten Alloy	BMS 10-67, Type 9	CO-105, V33870
Aluminum Alloy, 7000 Series	BMS 10-67, Type 10	Cerac A2022, V1V724
Low Alloy Steel, AISI 4600	BMS 10-67, Type 11	Cerac 1537 (Formerly 4600), V67027
Nickel-Aluminum	BMS 10-67, Type 12	Metco 450-NS, V39918
Nickel-Aluminum	BMS 10-67, Type 13	Thermo Tec 18995, V1V724
Copper-Nickel-Indium	BMS 10-67, Type 14	Amdry 500C/F, V53654 CU-101, V33870 CU-102, V33870 Metco 58-NS, V39918
Cobalt-Molybdenum-Chromium-Silicon-	BMS 10-67, Type 15	CO-109, V33870 T-400, V0K209
Chromium Carbide	BMS 10-67, Type 16	CRC-102, V33870
Tungsten Carbide-Cobalt-Chrome	BMS 10-67, Type 17	LA-3386, V06677 or V1DMQ3 Metco 5847, V39918 WC-436-1 (AI-1186), V33870 WC-517, V33870 1350 VM, V33870

4. GENERAL

A. In some applications, thermal spray coatings can be an alternative to more usual procedures, such as chrome or nickel plate buildup, to put back to design dimensions steel parts which are undersize as a result of wear or defect removal. Thermal spray coatings could also be specified for parts of aluminum, stainless steel, bronze, or titanium.

B. The decision to repair with thermal spray coating must include these precautions:

(1) The configuration of the past must let you apply the coating. Refer to Paragraph 4.C. for more details.

(2) The coating must have good wear resistance, galvanic compatibility, thickness, and fatigue qualities.

(3) Surface preparation will be necessary. Refer to Paragraph 6. for details.

(4) Heat treatment, stress relief, or shot peening must be done first.

(5) The spray application and the grind must be carefully controlled.

(6) Operations will be necessary to put back protection from corrosion, such as paint or equivalent finishes.

C. Because the spray gun is free to be moved, the configuration of parts which can be coated is a function of available tools and fixtures to move the work or the torch. Here are some examples of part geometries that can be coated by most thermal spray shops:

(1) Outside diameters of long cylindrical parts, 0.2 to 36 inches diameter up to 276 inches long.

(2) Outside diameters of short cylindrical parts, 0.2 to 90 inches diameter up to 12 inches long.

(3) Inside diameters (blind holes) 0.5 to 7 inches, to a depth equal to the diameter.

(4) Inside diameters (open holes) 0.5 to 7 inches, to a depth from both ends equal to 2 times the diameter.

(5) Inside diameters as small as 2 inches can be coated 36 inches long by Union Carbide, Linde Division (V6D181).

(6) Rectangular flat surfaces up to 5 feet by 23 feet.

(7) Circular flat surfaces 0.10 to 90 inches in diameter.

(8) Installed parts, if you can get at the surfaces.

5. COATING MATERIAL SELECTION

A. Wear Resistance

(1) For most situations, Type 1 (tungsten carbide cobalt) and Type 17 (tungsten-carbide cobalt chrome) coatings have good wear resistance.

(2) When the material of the mating part is softer than the tungsten carbide coating (Rc 65), the mating part will wear faster.

B. Galvanic Compatibility

(1) If corrosion resistance is more important than wear resistance, the coating must be compatible with the base metal. Unless the overhaul instructions are different, make the selection within compatibility groups as shown in Table 3.

NOTE: Oxide coatings are inert and thus can be used on all base metals.

(2) If corrosion resistance and wear resistance are equally important, Types 1 and 17 coating can be used with satisfactory results if the coating is sealed with BMS 10-11, Type 1 primer before grinding, and if the coating porosity is within the specified limits (Paragraph 8.).

Table 3: Compatibility Groups

BASE METAL	THERMAL SPRAY COATING MATERIAL	BMS 10-67 TYPE
Aluminum or alloys Magnesium or alloys	Aluminum	7
Aluminum or alloys	Aluminum alloy	10
Iron or low or medium alloy steels	Low alloy steel	11
Copper, brass, bronze	Tungsten carbide	1
Nickel-base alloys	Aluminum bronze	2
Cres (200, 300 or 400- series), all PH CRES, or titanium	Stainless steel	8

C. Fatigue Properties

(1) BMS 10-67, Type 1 and 17 (tungsten carbide) and Type 8 (stainless steel) coatings could decrease the fatigue life of a part if the coating is incorrectly applied. Ask Boeing for a list of applicators which are approved for production. You can use these applicators until you get your own HVOF system.

(2) As an alternative to a Boeing approved applicator, you can apply these coatings yourself if you are sure your materials and processes agree with the related Boeing specifications as indicated below. Boeing will help you with more data and advice as necessary. This can be used to get approval from the local regulatory agency for a new HVOF facility.

(a) Be sure to use the correct thermal spray powders, as specified in the BMS 10-67 Qualified Products List, and also as shown in SOPM 20-10-05, Table 2. The Roman numerals in the specifications are equivalent to the Arabic numerals in the SOPM.

(b) Be sure to apply the coating to agree with the BAC5851 specification. Make sure your facilities, procedures, and documentation can be qualified to BAC5851. This includes metallurgical evaluations and fatigue tests of coated specimens.

(c) After you have adjusted your parameters that apply the coating to give results that agree with the specifications, think of these as fixed process control requirements and be sure to use these each time you apply this type and class of coating in the future. If you change any of the parameters, you must do tests to make sure your changes give results that also agree with the specifications. We recommend that you make a record of the parameters on a form equivalent to the form in BAC5851, Table 5. Also, we recommend that you make and keep a certification and test report for each coating type and class you become qualified to apply.

(3) Measure the residual stresses in the thermal spray coating before and after you spray it on a component. To do this, coat one side of an Almen N shot peening test strip. The test strip will bend after it is coated. If the coated side of the strip is convex, measure the deflection as positive. The deflection of a coated test strip must be +0.003 to 0.015 inches, which indicates that the stress is compressive.

6. PREPARATION OF THE SURFACE

A. Machine the surface as specified by the overhaul instructions, and Figure 1, to remove defects or corrosion.

B. Magnetic particle examine the surface on steel parts per SOPM 20-20-01. Penetrant examine the surface on nonmagnetic parts per SOPM 20-20-02.

C. Shot peen the machined surface per SOPM 20-10-03 as necessary.

D. Vapor degrease, or solvent clean, or emulsion clean the surface per SOPM 20-30-03.

E. Do not touch the cleaned surfaces before you apply the thermal spray coating unless you put on synthetic fiber or cotton gloves.

F. Mask all areas not to get the coating. Use heat reflective or grit blast resistant tape.

G. To get a good bond with the coating, grit blast the area with 16 to 60 mesh silicon carbide or aluminum oxide grit and clean dry air, argon or nitrogen. The grit blasted surfaces must have a continuous matte texture without shiny areas, and have a surface roughness of 150-300 microinches. The grit blast must remove machining grooves. Examine the grit blasted areas for full treatment and grit blast again as necessary.

H. Remove grit from the surface with dry compressed air or nitrogen.

l. Give protection to the grit blasted parts to prevent contamination. Continue with the procedure to apply the thermal spray application within 4 hours.

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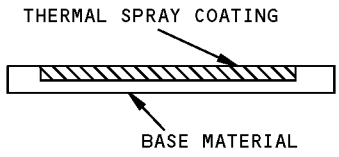
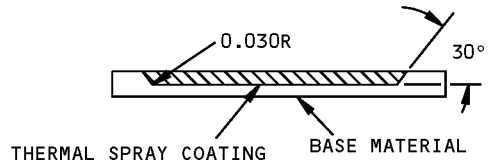
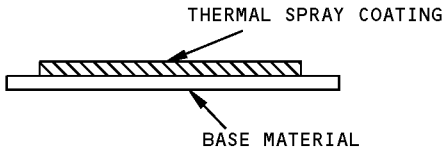
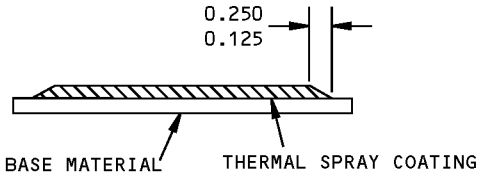
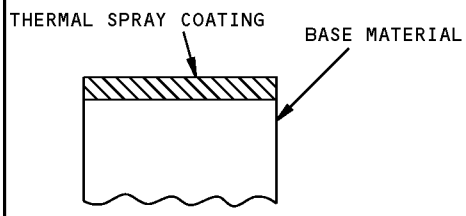
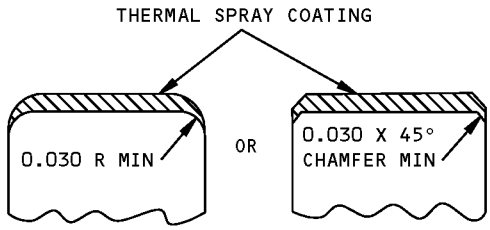
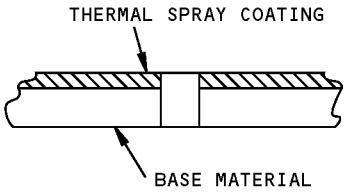
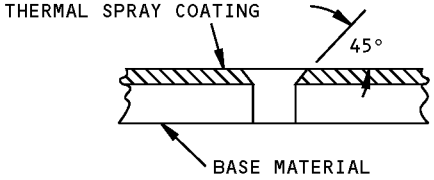
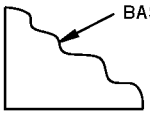
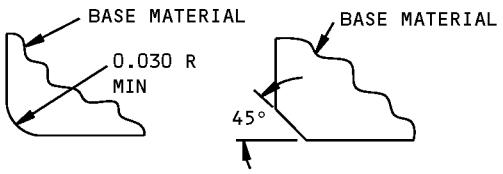
FLATS OR ID		
		
CYLINDER OD		
BOLT HOLES		
CORNERS		

ALL DIMENSIONS ARE IN INCHES

Base Metal Preparation and Thermal Spray Coating Runout Data
Figure 1

7. APPLICATION OF THERMAL SPRAY COATING

A. Coating Thickness – Use the data given by the overhaul instructions. If the overhaul instructions do not give the thickness, use the data given in Table 4 as a guide. Coatings thicker than these limits could have decreased quality or give less satisfactory results. The maximum thickness changes with the part configuration and the coating material.

Table 4: Thermal Spray Coating Thickness Data

Coating Material	BMS 10-67 Type	Maximum Coating Thickness (inch) *[1]		
		Flat	ID	OD
Tungsten Carbide	1	0.010	0.008	0.010
Aluminum-Bronze	2	0.014	0.012	0.024
Aluminum Oxide	3	0.010	0.008	0.012
Chromium Oxide	4	0.010	0.008	0.012
Aluminum	7	0.014	0.012	0.015
Stainless Steel	8	0.014	0.012	0.025
Aluminum Alloy	10	0.015	0.013	0.024
Low Alloy Steel	11	0.030	0.020	0.035
Tungsten Carbide	17	0.010	0.008	0.010

*[1] Final coating thickness after machining or grinding. When you apply the coating, you can make the coating 0.002-0.005 inch thicker to make allowance for material removal during finishing (Paragraph 9.).

B. Application of Coating

(1) Before you spray, heat the surface to approximately 150°F to be sure of full condensate removal. You could use the heat blast from the gun with the powder feed turned off.

(2) Spray the part with a constant gun-to-work distance, a constant traverse rate and a spray angle of 90 degrees if possible. Do not let the spray angle become less than 45 degrees.

(3) Spray a test panel before you spray the part.

(4) Spray continuously, but you can stop to measure the coating thickness and let the surface cool.

(5) For coatings to be machined or ground to design dimensions, make the coating 0.002-0.005 inch thicker than the design dimensions given by the overhaul instructions or Table 4.

(6) Do not let heat-treated steel, corrosion resistant steel, titanium or titanium alloy get hotter than 350°F (300°F if shot peened). Do not let aluminum alloy get hotter than 250°F (200°F if shot peened). For aluminum, the total time above 200°F must not be more than one hour.

(7) If you cool the surfaces with air, carbon dioxide or nitrogen jet, make sure the blast does not change or blow away the spray pattern from the gun.

(8) After the sprayed part is cool, remove protective masking material. Remove adhesive with a wiper and solvent. Wipe off the remaining solvent and let the surface dry.

(9) Examine the coating for defects per Paragraph 8.

(10) Unless the overhaul instructions are different, seal the BMS 10-67 coatings (other than Types 7 and 10) on low-alloy steels, aluminum or its alloys, or copper or its alloys. Use one of these procedures, now or after you machine or grind the surface to design dimensions.

(a) Wipe the surface with wet primer.

1) If the parts have grease or oil on them, vapor degrease or solvent clean them per SOPM 20-30-03.

2) Rub the surface with a gauze pad wet with BMS 10-11, Type 1 primer, or BMS 10-97, Type 1 primer, or with the primer specified for the adjacent surfaces.

3) Before the primer dries, gently remove excess primer with a dry gauze pad. Do not use a solvent.

4) Cure the BMS 10-11, Type 1 primer as specified in SOPM 20-41-02. Use an equivalent procedure for other primers.

(b) Metcoseal Sealer

1) If the parts have grease or oil on them, vapor degrease or solvent clean them per SOPM 20-30-03.

2) Apply the sealer with a brush or spray it on. If you spray it, thin the sealer with one part Metcoseal APT thinner to 2-3 parts sealer.

3) Before the sealer dries, gently remove the excess with a dry gauze pad. Do not use a solvent.

4) Cure the sealer for 30-60 minutes at room temperature.

(c) UCAR 100 Sealer – Apply the sealer by the vendor's instructions.

8. EXAMINATION OF SURFACE AFTER THERMAL SPRAY COATING

A. All coatings must agree with the requirements of BAC5851 Section 11.

9. FINISHING OF THERMAL SPRAY-COATED SURFACES

A. Selection of Procedure

(1) These coating materials must be ground:

(a) BMS 10-67, Type 1 (tungsten carbide)

(b) BMS 10-67, Type 3 (aluminum oxide)

(c) BMS 10-67, Type 4 (chromium oxide)

(d) BMS 10-67, Type 5 (zirconium oxide)

(e) BMS 10-67, Type 6 (nickel-chrome)

(f) BMS 10-67, Type 9 (cobalt-chrome-nickel-tungsten)

(g) BMS 10-67, Type 15 (cobalt-molybdenum-chromium-silicon)

(h) BMS 10-67, Type 16 (chromium carbide-nickel-chrome)

(i) BMS 10-67, Type 17 (tungsten carbide-cobalt-chrome)

(2) Machining is recommended for these coating materials:

(a) BMS 10-67, Type 2 (aluminum-bronze)

(b) BMS 10-67, Type 7 (aluminum)

(c) BMS 10-67, Type 8 (stainless steel)

(d) BMS 10-67, Type 10 (aluminum alloy)

(e) BMS 10-67, Type 11 (low alloy steel)

(f) BMS 10-67, Type 12 (nickel-aluminum)

(g) BMS 10-67, Type 13 (nickel-aluminum)

(h) BMS 10-67, Type 14 (copper-nickel-indium)

(3) Honing can be used to finish all coatings except BMS 10-67, Types 5, 12, 13. If more than 0.002-inch coating removal is necessary, grind or machine, as applicable, before you hone.

B. Grinding of Thermal Sprayed Surfaces

(1) Before you grind the surfaces, vapor grease or solvent clean them per SOPM 20-30-03.

(2) Use the diamond wheel for Types 1, 3, 4, 5, 16 and 17. The silicon carbide or aluminium oxide wheel is recommended for Types 6, 8, 9, and 15.

(3) Clean and make the grinding wheel true. Balance the wheel until it does not turn by itself.

NOTE: A different wheel mount for each wheel will decrease the time necessary to install, balance, and clean a wheel each time you use it.

(4) Clean the grinding wheel frequently with a silicon carbide stick to let the wheel cut correctly.

(5) Grind these coated surfaces with a wheel speed at the outer edge of 4800-6500 surface feet per minute.

(6) As you grind, give the wheel-work-interface area a good flow of continuously-filtered cutting fluid.

CAUTION: DO NOT TRY TO GET A SMOOTHER FINISH THAN THE GRIT SIZE IS DESIGNED TO GIVE. YOU CAN GET FINISHES OF APPROXIMATELY 20 MICROINCH WITH 100 GRIT, 10 MICROINCH WITH 220 GRIT, AND 6 MICROINCH WITH 400 GRIT WHEN A DIAMOND WHEEL IS USED.

(7) For cylindrical, internal, and surface grinding, infeeds must not be more than 0.0003 inch for 100 grit, 0.0002 inch for 220 grit or 0.0001 inch for 400 grit for each pass.

(8) Cross-feed must not be more than 0.080 inch per pass when surface grinding.

NOTE: Traverse speeds of not more than 4 to 6 inches per minute are recommended on cylindrical surfaces.

CAUTION: FASTER SURFACE SPEEDS CAN PULL PIECES OUT OF THE COATING AND CAUSE HEAT DAMAGE TO THE BASE MATERIAL.

(9) When you grind ID and OD surfaces, give the work a surface speed of 18-25 feet per minute. When you grind other surfaces, give the work a speed of 40-50 surface feet per minute.

(10) Cure all parts to remove moisture by one of these two steps:

(a) Bake the parts for 2 hours at 125-175°F, or

(b) Oven dry the parts at 100°-200°F until the parts are fully dry.

C. Machining of Thermal Sprayed Surfaces

(1) Machine with carbide-tipped tools. Do not use milling tools.

(2) The depth of each individual cut must not be more than 0.005 inch.

(3) Machine the surface per Table 5 to the dimensions and the surface finish specified by the overhaul instructions.

Table 5: Machining Feeds and Speeds

BMS 10-67 Type	Coating Material	Surface Speed (ft./min.)	Cross Feed (in./rev.)
2	Aluminum-bronze	250-300	0.004-0.008
7	Aluminum	250-300	0.004-0.008
8	Stainless Steel	250-300	0.004-0.008
10	Aluminum Alloy	125-175	0.004-0.008
11	Low Alloy Steel	50-100	0.004-0.008
14	Copper-Nickel-Indium	250-300	0.004-0.008
15	Cobalt-Molybdenum-Chromium-Silicon	250-300	0.004-0.008

(4) Cure all parts to remove moisture by one of these two steps:

(a) Bake the parts for 2 hours at 125-175°F, or

(b) Oven dry the parts at 100-200°F until the parts are fully dry.

D. Honing of Thermal Sprayed Surfaces

(1) Honing can be used to finish all coatings but BMS 10-67, Types 5, 12, 13. If more than 0.002 inch removal is necessary, grind or machine, as applicable, before you hone.

(2) Use diamond stones to hone BMS 10-67, Type 1, 3, 4, 5, 16 and 17 coatings. Silicon carbide or aluminum oxide stones can be used to hone the other coating materials.

(3) Make sure the edges of the stones have a chamfer or radius. Make sure the work is rigid in the tool or fixture.

(4) Grind down or paper hone down all high spots or coating projections before the final hone.

(5) Hone surfaces with speeds as shown in Table 6.

(6) Cure all parts to remove moisture by one of these two steps:

(a) Bake the parts for 2 hours at 125-175°F, or

(b) Oven dry the parts at 100-200°F until the parts are fully dry.

Table 6: Honing Speeds

BMS 10-67 Type	Coating Material	Speed (sfm)	
		Rotation	Reciprocation (max.)
1	Tungsten Carbide	80-150	60
2	Aluminum Bronze	160-210	80
3	Aluminum Oxide	80-150	60
4	Chromium Oxide	80-150	60
5	Zirconium Oxide	Do not hone	–
6	Nickel-Chrome	80-180	70
7	Aluminum	160-210	80
8	Stainless Steel	80-180	70

Table 6: Honing Speeds (Continued)

BMS 10-67 Type	Coating Material	Speed (sfm)	
		Rotation	Reciprocation (max.)
9	Cobalt-Chrome-Nickel-Tungsten	80-130	60
10	Aluminum Alloy	160-210	80
11	Low Alloy Steel	160-210	80
12	Nickel-Aluminum	Do not hone	–
13	Nickel-Aluminum	Do not hone	–
14	Copper-Nickel-Indium	160-210	80
15	Cobalt-Molybdenum-Chromium-Silicon	80-150	60
16	Chromium Carbide	80-150	60
17	Tungsten Carbide-Cobalt-Chromium	80-150	60

10. EXAMINATION OF THE FINISHED SURFACE

A. Visually examine the finished (machined and ground) coating with a maximum of 40-power magnification for heat checks, burnishing, and pull-outs.

B. Examine for cracks and separation from the base metal by penetrant inspection per SOPM 20-20-02. The etch before the penetrant inspection is not necessary. As an alternative on Type 11 material, you can use magnetic particle inspection per SOPM 20-20-01.

C. The finished surface must be as smooth as specified by overhaul instructions. Surface finishes that are smoother are acceptable.

D. Reject parts which have changed color (such as temper colors on steel) as a result of the grinding or machining operation. Barkhausen inspection (BAC5653) can be used on ferromagnetic parts.

11. POST SPRAY PROCEDURES

A. We recommend that the thermal spray coating be the last finish applied to a part unless the adjacent finish is paint.

B. If the adjacent finish is paint, make an 1/8 inch wide overlap of the paint onto the thermal spray coating.

C. If the part will go through a wet chemical procedure after the thermal spray coating is applied, mask the coating to give it protection from all solutions of that procedure.

12. SPECIAL MARKING

A. To help you identify a Type 1 or 17 thermal coating compared with chrome plating, we recommend that you paint an area of the part with yellow BMS 10-60, Type 2 enamel, and stencil or mark in black on the yellow area WC1 or WC17 for a Type 1 or Type 17 coating. This will also help during coating removal, because a much stronger agent is necessary to remove Type 17 coating.