Reply by Authors to A.H. Flax

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WE would like to thank Mr. Flax for his keen interest in our paper. In his work he points out, from mathematical reasoning, that for the case of a linearly varying edge temperature, the heat flux, in general must be corrected by a factor $\rho c \delta \epsilon$. His analysis for the linear edge case is an extension of part of our generalized analysis of any edge temperature function where Duhamel's principle was utilized. The linear case has been of particular interest because it has been found to provide the best fit to test data.

In our original paper, we concluded that the gage output need not be corrected as long as the gage was responding as fast as the edge temperature was varying. For any particular physical gage size, A_0 and ϵ tend to increase or decrease together, with the term $A_0 - \rho c \delta \epsilon$ tending towards a constant value. The implication is that ϵ is actually a measure of the effect of varying edge temperature on gage response. With the center and edge temperature difference as the important parameter, the correction becomes negligible for a fast responding gage. The correction would not be negligible for slow responding gages. For the transient case, then, the physical size (thickness) and heat sink design must be correctly chosen in relation to the value of heat flux being measured.

In closing, the conclusions reached by Flax do not appear contrary to those we reached. The actural value of ϵ is dependent on and a relative measure of the effect of varying edge temperature on gage response speed.

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