DISCUSSION

E. Stern[1] (*written discussion*)—Exclusion of "bad laboratory" results is not statistically valid unless a reason is known as to why they are bad. The penalty for exclusion is that in future situations discrepancies may arise that will not be explainable.

It appears that control of all important test parameters is important. Your group may want to consider a ruggedness test, to be carried out by one laboratory to determine the effects of such parameters as, for example, relative humidity, atmospheric pressure, temperature, pinholes in the wax, etc.

Our experience was that heating the wax on the cup with a small flame sealed a lot of the pores and eliminated visible leaks. This could be standardized to a reproducible method.

M. Toas (*author's closure*)—It is difficult to determine the reason for a "bad" result if a test laboratory or operator does not in the first place recognize the result as "bad" or very different from the expected result. The round-robin protocol did not provide the expected results for the test materials, and the participating laboratories were asked to report all test results.

Control of all test parameters is important, but it does appear that the wax seal is the most important and critical portion of the test procedure. A ruggedness test would however be very worthwhile.

As a result of this round robin, the ASTM E 96 task force did recommend that ASTM E 96 be revised to include heating the test cup as an aid in promoting the wax to flow and close any pores or leaks.

[1] BPCO Inc., LaSalle, Quebec, Canada H8R 1R8.