



Designation: E 474 – 80

Standard Method for EVALUATION OF TEMPERATURE SCALE FOR DIFFERENTIAL THERMAL ANALYSIS¹

This standard is issued under the fixed designation E 474; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval.

1. Scope

1.1 This method for evaluation of the temperature scale is for general use in differential thermal analysis. It provides a way of relating temperatures of events observed in different laboratories and with different instruments.

1.2 The method is applicable to all commercial and custom-built apparatus. It can also be used for instruments classed as differential scanning calorimeters.

1.3 The purpose of this method is to determine the agreement in temperature under the specific conditions of the principal experiment, and not to determine the transition temperature of the ICTA Certified Reference Material. It is necessary to use the same sample holder assembly and heating rate in obtaining the peak(s) whose temperature(s) is to be related to other determinations.

2. Summary of Method

2.1 The method consists of obtaining the differential thermal analysis peak of one or more of the ICTS Certified Reference Materials under the normal operating conditions of the instrument, determining the extrapolated onset and peak temperatures, and comparing these temperatures with those established for the material. The difference provides an adjustment which may be applied in relating data on test substances to data obtained on other instruments.

2.2 In correlating measurements, it will be necessary only to use ICTA Certified Reference Materials whose peak temperatures are in the range of those of the test substance. However, use of ICTA Certified Reference Materials over

the useful range of the instrument and at two or more heating rates will be an aid in determining the characteristics of the operator's instrument.

3. Definitions of Terms and Abbreviations

3.1 This list includes definitions that agree with those adopted by the International Confederation for Thermal Analysis (1977).

3.1.1 *differential thermal analysis (DTA)*—a technique in which the temperature difference between a substance and a reference material is measured as a function of temperature while the substance and the reference material are subjected to a controlled temperature program. The record is the differential thermal or DTA curve; the temperature difference (ΔT) should be plotted on the ordinate with endothermic reactions downwards and t or T on the abscissa increasing from left to right.

3.1.2 *quantitative differential thermal analysis (quantitative DTA)*—this term covers those uses of DTA where the equipment is designed to produce quantitative results in terms of energy and/or other physical parameters. The record should be plotted in the same manner as a normal DTA curve.

3.1.3 *differential scanning calorimetry (DSC)*—a technique in which the difference in energy inputs into a substance and a reference material is measured as a function of tempera-

¹ This method is under the jurisdiction of ASTM Committee E-37 on Thermal Measurements and is the direct responsibility of Subcommittee E37.01 on Test Methods and Recommended Practices.

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