



Designation: D957 – 21

## Standard Practice for Determining Surface Temperature of Molds for Plastics<sup>1</sup>

This standard is issued under the fixed designation D957; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

### 1. Scope\*

1.1 This practice is intended for determining the temperature at a specified point or points on the surface of the cavity and base of a mold for plastics. By determining the temperature at as many points as deemed necessary, the overall temperature condition of the surface can be determined.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—There is no known ISO equivalent to this standard.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

### 2. Summary of Practice

2.1 With the use of a calibrated surface or radiation (infrared) non-contact pyrometer, the overall temperature condition of a mold for plastics can be determined by taking readings at a specified point or many points on the mold surface.

### 3. Significance and Use

3.1 The properties of molded parts and the ease of producing satisfactory specimens are influenced by the temperature of the mold. It is desirable to know the actual mold temperature, which can differ from the mold temperature control medium.

3.2 The user needs to be aware of temperature differences across the mold/thermocouple interface and at leads, and take appropriate precautions to minimize such differences.

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.09 on Specimen Preparation.

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### 4. Apparatus

4.1 *Surface Pyrometer*—A calibrated temperature device designed to measure surface temperatures that is traceable to the international system of units (SI) through a national metrology institute (NMI)<sup>2</sup> accurate to within  $\pm 1.5^\circ\text{C}$  shall be used.

4.2 *Non-Contact Pyrometer*—A Radiation (infrared) Thermometer that is traceable to the international system of units (SI) through a national metrology institute (NMI)<sup>2</sup> accurate to within  $\pm 1.5^\circ\text{C}$  shall be used. Radiation Thermometers with selectable emissivity shall be set to the estimated emissivity of the surface to be measured. An emissivity correction shall be made when using Radiation Thermometers with a preset emissivity.

4.3 *Calibration and Emissivity Corrections of Pyrometers*—Follow manufacturer's recommendations for calibration of and making emissivity corrections to pyrometers.

### 5. Procedure

5.1 The size, shape, and contours of a mold determine the location and number of points at which temperature readings are observed. Take temperature readings at as many points as deemed necessary to determine the temperature condition of the mold surface. At a minimum, it is suggested that temperatures be measured at the mold center, near the edge, and at least two different but intermediate points between the center and edge.

5.2 Place the thermocouple of the pyrometer at any specified point on the surface of the cavity and base of the mold, making certain that good contact is maintained between the two (see Note 2). Maintain contact until the scale reaches equilibrium. Record the temperature reading on the scale at this point.

NOTE 2—Wax, or any suitable material with a low melting temperature, can be used to ensure intimate contact between the mold surface and the thermocouple of the pyrometer. This is accomplished by allowing a small portion of the material to melt at the point where the temperature reading is to be taken. The thermocouple is then placed in the puddle of molten material.

<sup>2</sup> NMI includes such organizations as the National Institute of Standards and Technology.

\*A Summary of Changes section appears at the end of this standard

## 6. Keywords

6.1 base; cavity; mold temperature; pyrometer

### SUMMARY OF CHANGES

Committee D20 has identified the location of selected changes to this standard since the last issue (D957 - 12 that may impact the use of this standard. (January 1, 2021)

(1) Added recommendation for manufacturers recommendations as 4.3.

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