



Designation: E1159 – 15 (Reapproved 2020)<sup>ε1</sup>

# Standard Specification for Thermocouple Materials, Platinum-Rhodium Alloys, and Platinum<sup>1</sup>

This standard is issued under the fixed designation E1159; 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. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

<sup>ε1</sup> NOTE—Added units statement to Section 1 and updated language of 4.1.6, 5.2, 5.3 – 5.8, 5.8.2, 5.8.3.2, 6.2, and 7.2 editorially in November 2020.

## 1. Scope

1.1 This specification covers non-insulated platinum-rhodium alloys (weight percent composition), and platinum thermoelements that meet the requirement of Specification E230/E230M and NIST Monograph 175.<sup>2</sup>

1.2 This specification does not cover platinum and platinum-rhodium materials, that require a higher purity than specified in 5.1, such as used for temperature coefficient of resistance (TCR) measurements or standards type calibration. For requirements of this superior quality, it is suggested that suppliers of precious metals be contacted.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered standard.

1.4 *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.*

1.5 *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 Recom-*

*mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

2.1 The following documents of the issue in force on the date of material purchase form a part of this specification to the extent referenced herein.

2.2 *ASTM Standards:*<sup>3</sup>

B561 Specification for Refined Platinum

B616 Specification for Refined Rhodium

E207 Test Method for Thermal EMF Test of Single Thermoelement Materials by Comparison with a Reference Thermoelement of Similar EMF-Temperature Properties

E220 Test Method for Calibration of Thermocouples By Comparison Techniques

E230/E230M Specification for Temperature-Electromotive Force (emf) Tables for Standardized Thermocouples

E344 Terminology Relating to Thermometry and Hydrometry

## 3. Terminology

3.1 *Definitions:*

3.1.1 The definitions given in Terminology E344 apply to terms used in this specification.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *thermocouple type, n*—a nominal thermoelectric class of thermoelement materials that, used as a pair, have a standardized relationship and tolerance between relative Seebeck EMF and temperature, physical characteristics, and an assigned type letter designator and color code.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee E20 on Temperature Measurement and is the direct responsibility of Subcommittee E20.13 on Thermocouples - Materials and Accessories Specifications.

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<sup>2</sup> “Temperature-Electromotive Force Reference Functions and Tables for the Letter-Designated Thermocouple Types Based on the ITS-90,” *NIST Monograph 175 and Supplement 1*. Available from NIST, U.S. Dept. of Commerce, Gaithersburg, MD 20899.

<sup>3</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.