National Institute of Standards and Technology
U.S. Department of Commerce

Date of Issue:
11 February 2022

Standard Reference Material® 1476a
Branched Polyethylene Resin
CERTIFICATE

Purpose: The certified values delivered by this Standard Reference Material (SRM) are intended for use in calibration and performance evaluation of instruments used in polymer technology and science for the determination of the Melt Flow Rate using ASTM D1238-13 [1].

Description: A unit of SRM 1476a consists of one bottle containing approximately 12 g of white polyethylene pellets.

Certified Value: This material is certified for Melt Flow Rate using ASTM D1238-13 condition 190/2.16 [1] Under this condition the melt flow rate is 1.23 g/10 min with a standard deviation of 0.036 g/10 min and with 29 degrees of freedom. The certified measurement uncertainty is found to be 0.110 g/10 min and is expressed as a combined expanded uncertainty with a coverage factor $k = 2$, calculated in accordance with ISO Guides [2]. Type A and Type B contributions to the expanded uncertainty include the standard deviation of the Melt Flow measurement, instrument–to–instrument variation as discussed in ASTM D1238-13, operator dependence of the measurement, and temperature gradients in the apparatus. These values are traceable to the International System of Units (SI) unit for mass [3].

Period of Validity: The certified values delivered by **SRM 1476a** are valid within the measurement uncertainty specified until **01 January 2027**. The certified values are nullified if the material is stored or used improperly, damaged, contaminated, or otherwise modified.

Maintenance of Certified Values: NIST will monitor this SRM over the period of its validity. If substantive technical changes occur that affect the certification, NIST will issue an amended certificate through the NIST SRM website (https://www.nist.gov/srm) and notify registered users. SRM users can register online from a link available on the NIST SRM website or fill out the user registration form that is supplied with the SRM at the time of purchase. Before making use of any of the values delivered by this material, users should verify they have the most recent version of this documentation, available free of charge through the NIST SRM website.

Mark VanLandingham, Chief
Materials Science and Engineering Division

Steven J. Choquette, Director
Office of Reference Materials

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Storage: The SRM should be stored in the original bottle with the lid tightly closed and under normal laboratory conditions.

Homogeneity: The homogeneity of SRM 1476a was tested by melt flow measurements using ASTM D1238-13.

REFERENCES

[1] ASTM D1238-13; *Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer*; Annual Book of ASTM Standards, Vol. 08.01 (2013); ASTM: West Conshohocken, PA.

[2] JCGM 100:2008; *Evaluation of Measurement Data — Guide to the Expression of Uncertainty in Measurement* (ISO GUM 1995 with Minor Corrections); Joint Committee for Guides in Metrology (JCGM) (2008); available at https://www.bipm.org/en/publications/guides (accessed Feb 2022); see also Taylor, B.N.; Kuyatt, C.E.; *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*; NIST Technical Note 1297; U.S. Government Printing Office: Washington, DC (1994); available at https://www.nist.gov/pml/nist-technical-note-1297 (accessed Feb 2022).

[3] Beauchamp, C.R.; Camara, J.E.; Carney, J.; Choquette, S.J.; Cole, K.D.; DeRose, P.C.; Duewer, D.L.; Epstein, M.S.; Kline, M.C.; Lippa, K.A.; Lucon, E.; Molloy, J.; Nelson, M.A.; Phinney, K.W.; Polakoski, M.; Possolo, A.; Sander, L.C.; Schiel, J.E.; Sharpless, K.E.; Toman, B.; Winchester, M.R.; Windover, D.; *Metrological Tools for the Reference Materials and Reference Instruments of the NIST Material Measurement Laboratory*; NIST Special Publication (NIST SP) 260-136, 2021 edition; U.S. Government Printing Office: Washington, DC (2021); available at https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.260-136-2021.pdf (accessed Feb 2022).

Certificate Revision History: 11 February 2022 (Change of expiration date; updated format; editorial changes); 28 September 2011 (Extension of certification period; editorial changes); 29 November 2007 (Update of certification period); 19 May 2006 (Original certificate date).

Certain commercial equipment, instruments, or materials may be identified in this Certificate to adequately specify the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the materials or equipment identified are necessarily the best available for the purpose.

Users of this SRM should ensure that the Certificate in their possession is current. This can be accomplished by contacting the Office of Reference Materials 100 Bureau Drive, Stop 2300, Gaithersburg, MD 20899-2300; telephone (301) 975-2200; e-mail srminfo@nist.gov; or the Internet at https://www.nist.gov/srm.

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