



National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material[®] 1476a

Branched Polyethylene Resin

This Standard Reference Material (SRM) is 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 D1238-00 [1]. The SRM is supplied as white pellets of polyethylene.

Certified Values and Uncertainties: This material is certified for Melt Flow Rate using ASTM D1238-00 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 D1238-00, operator dependence of the measurement, and temperature gradients in the apparatus [3].

Expiration of Certification: The certification of **SRM 1476a** is valid, within the measurement uncertainty specified, until **01 January 2019**, provided the SRM is handled and stored in accordance with the instructions given in this certificate (see "Instructions for Use"). This certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

Maintenance of SRM Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification before the expiration of this certificate, NIST will notify the purchaser. Registration (see attached sheet) will facilitate notification.

The technical coordination leading to certification of this SRM was provided by B.M. Fanconi of the NIST Polymers Division. The technical measurements and data interpretation were provided by C.M. Guttman, K.M. Flynn, S.J. Wetzell, W.R. Blair, and J.R. Maurey of the NIST Polymers Division.

Statistical analysis was provided by S.D. Leigh of the NIST Statistical Engineering Division.

Support aspects involved in the issuance of this SRM were coordinated through the NIST Measurement Services Division.

Eric K. Lin, Chief
Polymers Division

Gaithersburg, MD 20899
Certificate Issue Date: 28 September 2011
Certificate Revision History on Last Page

Robert L. Watters, Jr., Chief
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INSTRUCTIONS FOR USE

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 D1238-00. The characterization of this polymer is described in reference [3].

REFERENCES

- [1] ASTM D1238-00; *Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer*; Annu. Book ASTM Stand., Vol. 08.01 (2001).
- [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 http://www.bipm.org/utls/common/documents/jcgm/JCGM_100_2008_E.pdf (accessed Sep 2011); 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 <http://www.nist.gov/pml/pubs/index.cfm> (accessed Sep 2011).
- [3] Flynn, K.M.; Wetzel, S.J.; Blair, W.R.; Maurey, J.R.; Guttman, C.M.; *Certification of Standard Reference Material 1476a, A Polyethylene Resin*; NISTIR 7191; National Institute of Standards and Technology, U.S. Department of Commerce: Gaithersburg, MD (2007).

Certificate Revision History: 28 September 2011 (Extension of certification period; editorial changes); 29 November 2007 (Update of certification period); 19 May 2006 (original certificate date).
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Users of this SRM should ensure that the Certificate of Analysis in their possession is current. This can be accomplished by contacting the SRM Program at: telephone (301) 975-2200; fax (301) 926-4751; e-mail srminfo@nist.gov; or via the Internet at <http://www.nist.gov/srm>.