



DEPARTMENT OF COMMERCE

National Institute of Standards and Technology

Service Life Prediction Methodologies and Metrologies for Commercial Polymers Consortium

AGENCY: National Institute of Standards and Technology

ACTION: Notice; Request for Information

SUMMARY: The National Institute of Standards and Technology (NIST) is establishing the Service Life Prediction Methodologies and Metrologies for Commercial Polymers Consortium (Consortium) and invites organizations to join the Consortium. The Consortium will develop the science necessary to support the modification of standards for the testing and the certification of commercial polymeric materials. This notice is the initial step for the Consortium in collaborating with organizations to develop reliability-based service life prediction methodology for commercial polymers. The prediction methods will be used to update testing standards for polymeric materials in order to better assess the level of protection for the consumer while reducing the time for evaluation and certification of polymeric materials. Participation in the Consortium is open to all eligible organizations as described below.

DATES: NIST will begin accepting responses from interested parties on [Date of Publication].

The collaborative activities under this Consortium will begin on March 20, 2016.

ADDRESSES: Information in response to this notice and request for additional information can be directed to NIST's Consortium Manager, Christopher C. White, NIST's Engineering Laboratory, Polymeric Materials Group. Information may be sent by mail to 100 Bureau Drive, Mail Stop 8615, Gaithersburg, Maryland 20899, or by electronic mail to christopher.white@nist.gov.

FOR FURTHER INFORMATION CONTACT: For further information about partnership opportunities or about terms and conditions of NIST's Cooperative Research and Development Agreement (CRADA), please contact NIST's CRADA and License Officer, Honeyeh Zube, Technology Partnerships Office, by mail to 100 Bureau Drive, Mail Stop 2200, Gaithersburg, Maryland 20899, or by electronic mail to honeyeh.zube@nist.gov.

SUPPLEMENTARY INFORMATION: The objective of this Consortium is to develop the science necessary to support the modification of UL Standards for testing and certification of polymeric materials (UL Standard Subject Numbers 746A-F), which are under the direction of the Standard Technical Panel (STP). More information about UL Standards is available at <http://ulstandards.ul.com>. The activities of NIST's Consortium will align the latest knowledge on polymer science with the UL Standards that relate to the retention of performance properties after long term thermal aging (UL 746B, Safety of Polymeric Materials - Long Term Property Evaluations) and after exposure to ultraviolet radiation and moisture (UL 746C, Standard for Polymeric Materials - Use in Electrical Equipment Evaluations). By working with industry, and leveraging NIST's existing reliability-based service life prediction methodology for commercial polymers, the UL Standards for polymeric materials can provide better assessment of the level of protection for the consumer and potentially reduce the time for evaluation and certification. A better understanding of the effect of thermal, radiation, and humidity exposures on polymeric material will allow a more expedited process for standards updating, ensure that the standards remain current with the advancement of polymers, and drive innovation in applications where such environmental conditions exist. The STP for UL 746 will have the ultimate responsibility to modify UL Standards and introduce new test methods in the polymeric materials standards.

Long-term Thermal Aging: Thermal Indices (TIs) and/or Relative Thermal Indices (RTIs): The UL certification program for polymeric materials has been very successful at increasing the safety of plastic products. The UL certification program relating to thermal performance of polymeric materials is based on Dr. Thomas Dakin's proposal in 1948 to treat electrical insulation deterioration as a chemical rate phenomenon. This resulted in the Arrhenius analysis of data from the degradation of polymeric materials exposed to multiple temperatures and extrapolation to obtain an estimated use temperature. This method, while increasing the safety, has also required significant investment of time and other resources. For example, a simple formulation change to a polymeric compound may require up to eighteen months for recertification. This Consortium's first goal is to identify and provide the latest available scientific knowledge for methods that reduce the time required to obtain a temperature rating while maintaining the highest level of safety.

Exposure to Ultraviolet Radiation and Moisture: UV and Humidity Ratings (f1 and f2):

This Consortium's second goal is to evaluate polymeric materials when simultaneously exposed to UV radiation and humidity. Such evaluation techniques attempt to simulate the outdoor conditions where these polymeric materials could be used. Currently, exposure of polymeric materials to UV and humidity are evaluated separately by introducing specimens in a xenon chamber and in a water bath to determine the permanence of certain properties (typically mechanical and flammability) after these exposures. The specimens are not exposed in a manner that simulates simultaneous exposure to thermal, radiation and humidity. This Consortium will bring together expertise and experimental capabilities to evaluate the practicality of existing methods in determining the (f1) and (f2) ratings. NIST intends to work with participants of the

Consortium in several stages: The first stage will focus on thermal-only exposures to support TI and/or RTI testing and round robin evaluation of accelerated techniques; the second stage will focus on UV and humidity exposures to support (f1) and (f2) ratings; and the third stage will include simultaneous exposure to UV light, temperature, and humidity. To accomplish these stages, NIST and participants intend to perform the following tasks:

1. Identify critical polymeric materials and important chemistries;
2. Establish the characterization methods for performance tracking;
3. Generate thermal decomposition data and weathering data indoor and outdoor;
4. Develop thermal decomposition models; and
5. Develop weathering models based on the indoor data and validate the model against the outdoor data.

Leveraging previous accelerated weathering efforts at NIST allows for the use of standardized characterization methods for photo-oxidation and mechanical performance. Performance characterization methods that will be used in this Consortium will be selected based on consultation with the participants. The most time consuming aspect of this project is generating the validation data from outdoor exposures. Outdoor exposure of polymeric materials will occur as soon the materials are identified. NIST's Consortium Manager will work with the Consortium Members to select outdoor locations. A larger number of exposure sites increases the validation of the model predictions for the entire United States. The indoor exposure testing using NIST's existing weathering devices (i.e., SPHERE) will continue throughout the life of the project.

Participation Process: NIST is soliciting responses from all sources, including State or local governments, industrial organizations (including corporations, partnerships, and limited

partnerships, and industrial development organizations), public and private foundations, and nonprofit organizations (including universities). Interested parties should provide the following information to the NIST Consortium Manager:

- (1) What is your opinion about the objectives of the Consortium and the proposed involvement of your organization in this Consortium?
- (2) Will your organization be capable of contributing the polymeric materials necessary to accomplish the research anticipated by this Consortium?
- (3) What is your opinion on the needs and interest of your organization in participating in this Consortium?
- (4) What technical expertise is your organization capable of providing to the research anticipated by this Consortium (i.e., what are the technical capabilities of the individuals on your organization's project team)?

A responding organization should not include any confidential information in its response to this request for information. NIST will not treat any such information as proprietary.

Based on the response received, NIST will decide whether the responding organization is eligible to participate in this Consortium. The eligibility to participate will be based on the following criteria: (1) the rationality and feasibility of the responding organization's proposed involvement in this Consortium; (2) the extent to which the responding organization is capable of contributing its polymer materials and other contributions needed from each member of this Consortium; and (3) the extent to which the responding organization has personnel that has adequate expertise and technical merit to contribute expertise to this Consortium.

NIST has the sole discretion to determine the eligibility of a responding organization to participate in this Consortium. Any responding organization that is debarred from working with the U.S. Government will not be eligible to participate in this Consortium. NIST may contact the responding organization for additional information to determine eligibility. NIST's Technology Partnerships Office will provide eligible parties with the Cooperative Research and Development Agreement (CRADA) for this Consortium. Each eligible party will be required to execute the Consortium's CRADA prior to participation. Each CRADA will have terms that are identical to the terms of other participants' CRADAs for this Consortium. NIST will require each participant to contribute \$15,000 in annual membership fees for funding the activities under this Consortium. NIST intends to establish the Consortium for a five (5) year period. The terms of the CRADA shall be consistent with the requirements of Title 15, United States Code, Chapter 63, Section 3710a (Cooperative Research and Development Agreements). Although NIST does not guarantee participation in this Consortium or future collaboration, any member of the public is welcome to contact the Technology Partnerships Office with information about NIST-led Consortia or other potential collaborations.

Kevin A. Kimball
Chief of Staff

[FR Doc. 2016-04385 Filed: 2/29/2016 8:45 am; Publication Date: 3/1/2016]