March 10, 2016

To: Subscribers to UL's Certification Services for:
Service Entrance Cable (TYLZ)
Thermoset Insulated Wire (ZKST)
Photovoltaic Wire (ZKLA)

Subject: Conversion of compounds from listing on the subject on-line resource to Recognition under the category 'Polymeric Materials for Use in Wire, Cable and Flexible Lighting Products – Component' (QMTT2)

Conversion of Proprietary Thermoset Compounds Used in the Manufacture of Service Entrance Cable, Thermoset Insulated Wire and Photovoltaic Wire to Unlisted Component Coverage under QMTT3

UL's bulletin dated April 3, 2015 announced the conversion of compounds from listing on the subject on-line resource to Recognition under the category 'Polymeric Materials for Use in Wire, Cable and Flexible Lighting Products – Component' (QMTT2). ULs bulletin dated June 4, 2015 announced the conversion of proprietary compounds used in the manufacture of Service Entrance Cable, Thermoset Insulated Wire and Photovoltaic Wire to Unlisted Component Coverage under QMTT3.

This bulletin clarifies the generic material types of the proprietary compounds being converted and clarifies the requirements used to compare the identification scans.

Scope of conversion of proprietary compounds

UL received NEMA's feedback on the scope of the review for proprietary compounds, reviewed the position, and subsequently supported NEMA's perspective. As a result, the scope of the IFR has been modified to only include XL and EPCV insulation compounds. UL Engineering and Sales will work with customers on any industry file review (IFR) projects in process to adjust their scope if compounds other than XL or EPCV insulation have been requested to be tested.

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Comparison Methodology

Compounds being converted to QMTT2 and QMTT3 will have qualitative infrared analysis (QIA), thermogravimetry (TGA) and differential scanning calorimeter (DSC) testing performed on each compound during the initial submittal. These scans will be stored. When samples are selected during Follow-Up Service sample selection, the scans of the selected samples will be compared to the original scans. The methodology is defined in the Standardized Appendix Pages (SAPs) for QMTT2 and reproduced below for convenience.

QUALITATIVE INFRARED ANALYSIS (QIA)

Method

An infrared spectrum of the material is to be obtained by means of an infrared spectrophotometer. Instrument settings used in obtaining the spectrum are to be identical to those used in obtaining the original spectrum of the material referenced in this Procedure.

Basis For Acceptability

The IR spectrum obtained from the current sample shall not indicate any significant differences in comparison to the reference spectrum obtained under the original investigation, in accordance with Appendix A of UL 746A. The sample shall be considered non-conforming if it's IR spectrum:

(a) Exhibits one or more transmittance bands which are not evident in the reference spectrum.
(b) Does not exhibit one or more transmittance bands which are evident in the reference spectrum.
(c) Exhibits one or more transmittance bands having shape or transmittance (%T) differences which indicate a qualitative variation in comparison to the corresponding transmittance band(s) in the reference spectrum.

Spectral differences associated with sample concentration, i.e. the transmittance level of the prepared sample, or other effects unrelated to pertinent sample composition shall not be considered as a conformance criterion.

THERMOGRAVIMETRY (TGA)

Method

A thermal curve of each material is obtained by means of a thermal analyzer with a thermogravimetric module. The test method is described in the Standard Test Method for Rapid Thermal Degradation of Solid Electrical Insulating Materials by Thermogravimetric Method, ASTM D 3850, except that the specimen is to be heated at 20°C (36°F) per minute in a nitrogen atmosphere. The upper temperature limit is material dependent, with 650°C as the minimum. The purge gas is not changed to air for the percent ash determination. This analysis is further described in the Thermogravimetry sections of the Reference Standard for Electrical Wires, Cables, and Flexible Cords, UL 1581, or the Standard for Polymeric Materials - Short Term Property Evaluations, UL 746A.

Basis For Acceptability

The TGA curve obtained from the current sample shall not indicate any significant differences in comparison to the reference curve obtained under the original investigation in accordance with Appendix B of UL 746A. The sample shall be considered non-conforming if it's TGA curve exhibits:

a) A different number of degradations (distinct areas of weight loss) than the reference sample curve.
b) Degradation weight losses corresponding to that of the related degradation of the reference sample curve that differ by more than 8%.
c) Extrapolated onset offset and inflection temperatures of each degradation corresponding to related events on the reference sample curve that differ by more than 25° centigrade.
d) Residual weight corresponding to that of the reference sample curve that differs by more than 8%.
e) Overall curve shape that differs from the reference sample curve.

DIFFERENTIAL SCANNING CALORIMETRY (DSC)

Method

A thermal curve is to be obtained by means a Differential Scanning Calorimeter (DSC). The test method is described in the Standard Test Method for Transition Temperatures of Polymers by Differential Scanning Calorimetry, ASTM D 3418, except that the specimen is to be heated at 20°C (36°F) per minute in a nitrogen atmosphere without a preliminary thermal cycle. The upper temperature limit is typically 300°C, but may be adjusted depending on the material degradation and melt temperatures. This analysis is further described in the Differential Scanning Calorimetry sections of the Reference Standard for Electrical Wires, Cables, and Flexible Cords, UL 1581, and the Standard for Polymeric Materials - Short Term Property Evaluations, UL 746A.

Basis For Acceptability

The DSC curve obtained from the current sample shall not indicate any significant differences in comparison to the reference curve obtained under the original investigation in accordance with Appendix C of UL 746A. The sample shall be considered non-conforming if it's DSC curve exhibits:

a) A different number and type of significant thermal events as observed in the cited reference thermal curve when using the same test method (e.g. temperature program). Generally, the types of thermal events include melting points, glass transitions, crystallizations, and cures.
b) Shifts in corresponding endothermic melt events and glass transition temperatures between the current Thermal Curve and the corresponding reference curve greater than 5°C.
c) The qualitative presence or absence of crystallizations and or cures that are not consistent with those observed on the reference curve.

Note: Endotherms known to be related to water loss in amorphous nylon, annealing endotherms (stress relaxations) associated with glass transitions and mold history induced thermal event differences shall not be cause for nonconformance.

If you have any further questions, please do not hesitate to contact the undersigned.

Regards,

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