# TPE 2650 LSZH

## Low Smoke Zero Halogen Flame Retardant Thermoplastic Elastomer (TPE)

## Description

**TPE 2650 LSZH** is a natural, olefin-based thermoplastic elastomer (TPE) intended for wire and cable insulation and jacketing applications where flexibility, good physical properties and excellent flame resistance are required. **TPE 2650 LSZH** has a very low and slow heat release when measured in the cone calorimeter per ASTM E 1354-11b. Smoke k(1/m) measurements are very low when compared to halogen or conventional metal hydrate compounds.

**TPE 2650 LSZH** contains a novel non-halogen intumescent flame retardant additive package designed to reduce normal flame spread characteristics and achieve a VW-1 flame resistant rating on 18 AWG wires and larger. It also offers good extrusion processing characteristics on either conventional polyethylene or PVC extrusion lines. In addition, **TPE 2650 LSZH** contains a UV stabilization additive package that provides effective long-term UV weather resistance.

**TPE 2650 LSZH** is readily pigmented to a variety of colors using standard wire and cable color concentrates designed for thermoplastic or crosslinked polyolefins.

## Application

**TPE 2650 LSZH** is intended for use as a tray cable or riser cable jacket. This product is rated a V-0 by UL Standard 94 at a minimum thickness of 0.062 inches. **TPE 2650 LSZH** is expected to achieve a VW-1 flame resistance on 18 AWG or larger conductors as per UL Standard 1581.

## Specifications

Cables manufactured using **TPE 2650 LSZH** in accordance with standard industry practices are expected to meet the following industry cable specifications:

- Underwriters Laboratories Standard 444 CMR
- Underwriters Laboratories Standard 1277 Tray Cable
- Underwriters Laboratories Standard 1666 Test for Flame Propagation Height of Electrical & Fiber Optic Cables Installed Vertically
- Underwriters Laboratories Standard 94 V-0
- Underwriters Laboratories Standard 758 Style 1722 Appliance Wire

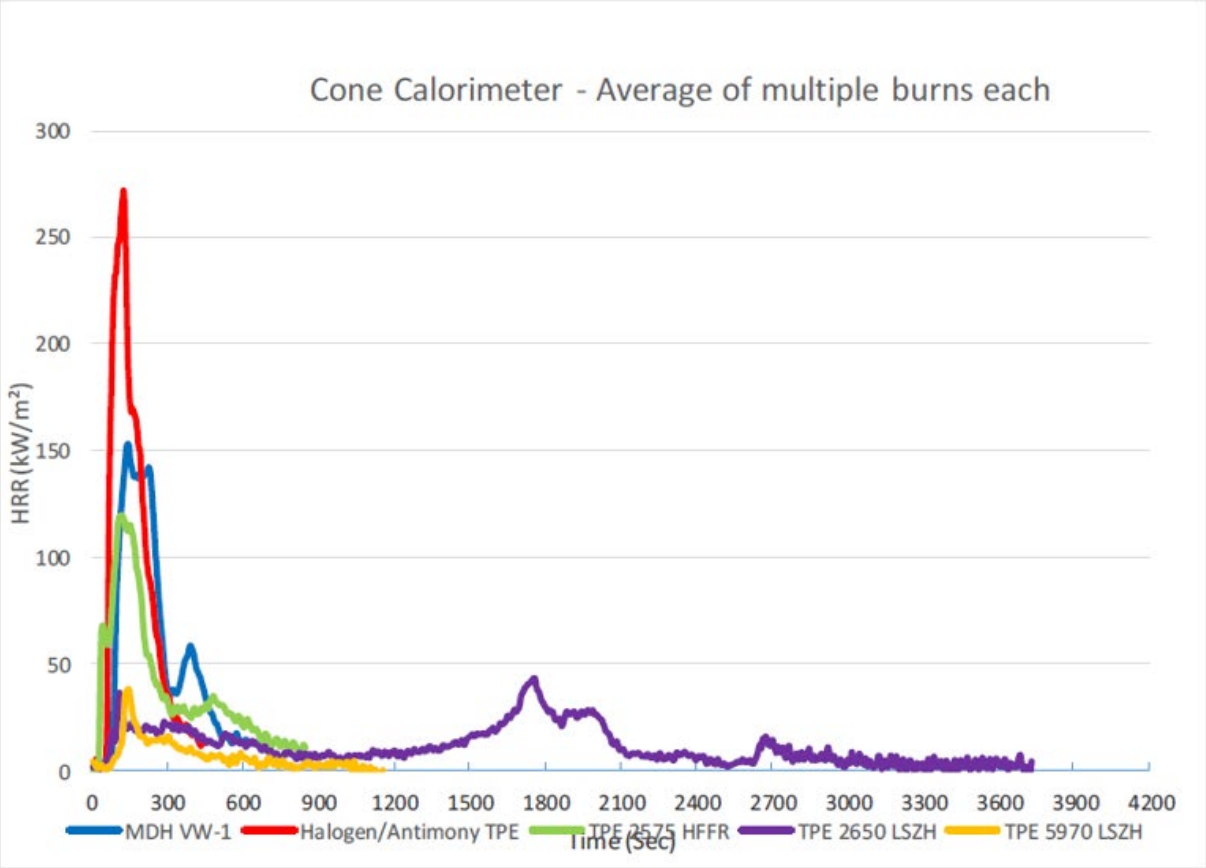
## General Processing Guidelines

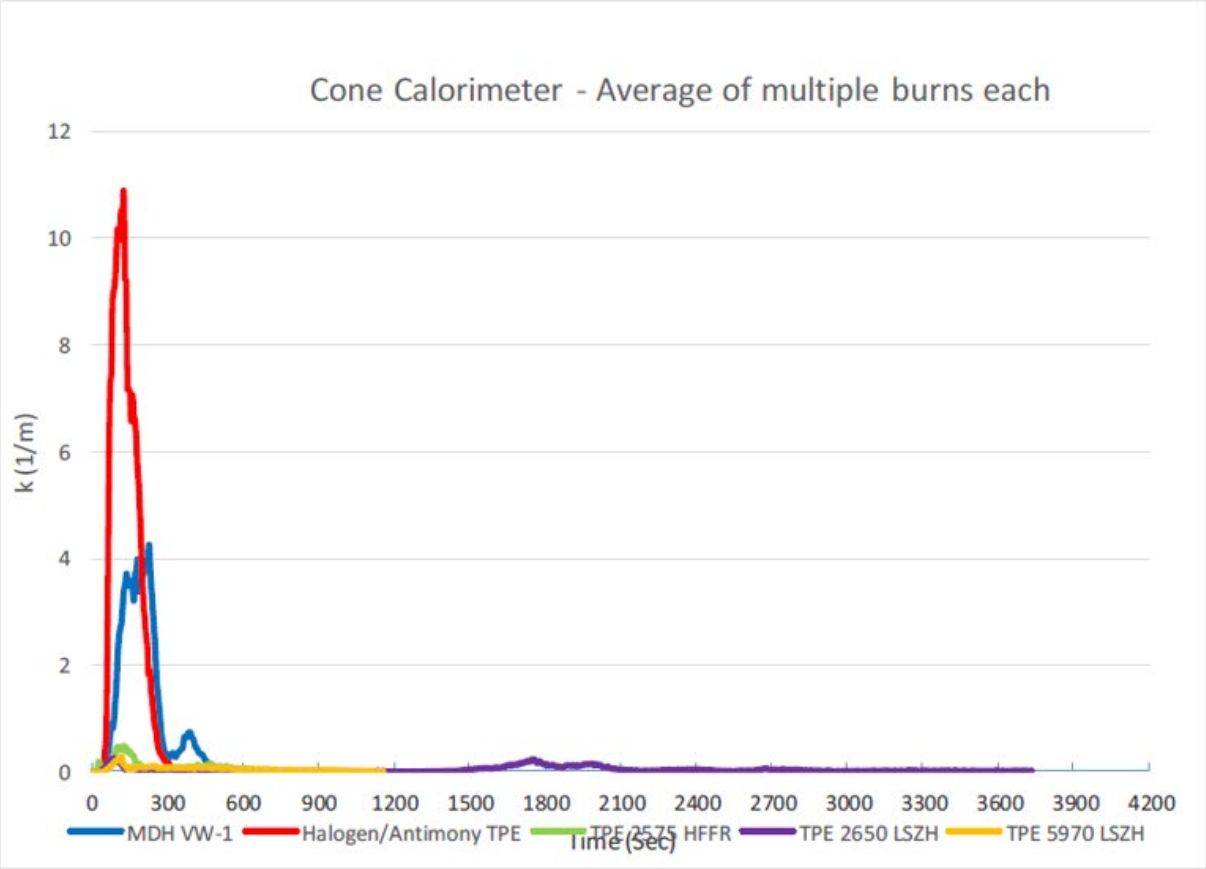
Extrusion start-up and shut-down procedures are similar to those of polyethylene. Since these materials are non-corrosive or abrasive, no special recommendations are made for barrel and screw materials of construction. A suggested melt temperature of 390ºF (199ºC) should provide a good quality product. Exposure of these materials to elevated temperatures >450ºF (230ºC) for prolonged periods of time has been shown to decrease long-term stability. Preheating the conductor to 125-150ºC is recommended during insulation extrusion to minimize orientation and internal stress that could result in poorer physical properties.

| Physical Properties | Typical Value (2)(4) | Unit | Test Method (1) |
|---|---|---|---|
| Density | 1.15 | g / $cm_3$ | ASTM D 792 |
| Tensile Strength | 1,555 (10.7) | psi (Mpa) | ASTM D 412 |
| Ultimate Elongation | 620 | % | ASTM D 412 |
| Chord Modulus (0.5% to 1.0%) | 26,053 (180) | psi (Mpa) | ASTM D 790 |
| Heat Aging, 7 days at 136°C | | | UL 1581 |
| Tensile Strength Retention | 90 | % | ASTM D 412 |
| Ultimate Elongation Retention | 87 | % | ASTM D 412 |
| Hardness, Shore A (15s delay) | 96 | - | ASTM D 2240 |
| Limiting Oxygen Index | 50 | % | ASTM D 2863 |
| Flammability | V-0 | - | UL 94 |
| Heat Deformation, 150°C, 2,000 g | 6.0 | % | UL 2556 |
| Low Temperature Brittle Point | -35 | °C | UL 2556 |

| Suggested Extrusion Equipment | | Suggested Extrusion Conditions | |
|---|---|---|---|
| Extruder L/D: | 20:1 (minimum) | Throat: | Water-cooled |
| Extruder L/D: | 24:1 (preferred) | Zone 1: | 370°F (188°C) |
| Screw: | Barrier or Single Flight | Zone 2: | 385°F (196°C) |
| Compression Ratio: | 2.7 to 3.5:1 | Zone 3: | 390°F (199°C) |
| Die: | Smooth transition, With >= 1/8 in. land Die & Tip include angle: 22-35° | Zone 4: | 390°F (199°C) |
| | | Head / Die: | 395°F (202°C) |

(1) Tested in accordance with the latest issue of the designated Test Methods.
(2) Data represents typical values and should not be used for specification work.
(3) All electrical properties tested on a 0.075 inch thick molded plaque.
(4) All physical properties tested on a 0.030 inch thick extruded tape.


Cone Calorimeter - Average of multiple burns each
HRR (kW/m²)
300
250
200
150
100
50
0
0 300 600 900 1200 1500 1800 2100 2400 2700 3000 3300 3600 3900 4200
Time (Sec)
MDH VW-1
Halogen/Antimony TPE
TPE 2575 HFFR
TPE 2650 LSZH
TPE 5970 LSZH


Cone Calorimeter - Average of multiple burns each
k (1/m)
12
10
8
6
4
2
0
0 300 600 900 1200 1500 1800 2100 2400 2700 3000 3300 3600 3900 4200
Time (Sec)
MDH VW-1
Halogen/Antimony TPE
TPE 2575 HFFR
TPE 2650 LSZH
TPE 5970 LSZH

## BombardierSMP 800C Toxicity

**Maximum Concentrations (ppm)**

| | Flaming | Non-flaming |
|---|---|---|
| CO | 189 | 28 |
| CO2 | 2777 | 606 |
| NO2 | Not Detected | Not Detected |
| SO2 | Not Detected | Not Detected |
| HCl | Not Detected | Not Detected |
| HF | Not Detected | Not Detected |
| HBr | Not Detected | Not Detected |
| HCN | Not Detected | Not Detected |

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