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TDS: GMHS31E
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Technical Data Sheet

Heat Shrink Labels

This specification is intended to outline the physical and chemical properties of *PANDUIT*'s GMHS31E tubing material for wire identification and insulation purposes and include the following part numbers and printable material identifiers:

Part Number Prefixes	

Printable Material Suffixes	
H000X025H1M	
H000X025H2M	
H000X044H1M	
H000X044H2M	

PRODUCT SPECIFICATIONS:

Description:	Material is RoHS compliant (European Union directive 2011/65/EU and Annex II (EU) 2015/863). GMHS31E is a crosslinked, flexible, heat shrinkable thermal transfer printable polyolefin. This product meets the material requirements and physical properties of AMS-DTL-23053/5 (Class 1). This tubing has been evaluated in accordance to UL224. When printed with MP100/MP300 printers it will also meet SAE-AS5942, MIL-STD-883F Method 2015.13, Solutions A, B and D, and MIL-STD-202G Method 215K, Solutions A,C and D.
Recommended Ribbons:	This material is recommended for thermal transfer printing
Standard Colors:	White, Yellow
Shrink Ratio:	3 to 1
Service Temperature Range:	Minus 55^0F to 257^0F (Minus 40^0C to 125^0C)
Storage Conditions:	Store at 70F (21C) and 50% Relative Humidity For cassette products do not exceed 95°F.

PROPERTIES:	PERFORMANCE:
Tensile Strength:	10.4 MPa minimum(ASTM D638)
Elongation Ultimate:	200% minimum (ASTM D 638)
Dielectric Strength:	500 volts/mil minimum(ASTM D2671, Sections 20-25)
Total Longitudinal Change:	Minus 15% to +5% (ASTM D2671, Sections 8-13)
Water Absorption:	0.5% maximum (ASTM D2671, Sections 79-80)
Low Temperature Flexibility:	No cracking (ASTM D2671, Section 36-43)
Printability:	Product meets print performance of 100 rubs(Taber abraser, CS-10 wheels, 100 cycles/250 gm wt.)
Flammability:	Product meets UL 224, VW-1 requirements for flammability
Shrink Temperature:	194^0F to 248^0F(90^0C to 120^0C)
Corrosion:	Non-corrosive (ASTM D2671, Sections 93-95, Procedure A)
UV Resistance:	The samples were tested in a QUV weather tester as per test procedure ASTM G-154. Observations made at *3000 hours exposure showed no loss in legend or change in material.

*3000 hours equates to 5 years of assimilated outdoor UV exposure.

Fluid Resistance:

Tubings tested in the following fluids per ASTM D2671 Sections 63-67

Hydraulic Fluid MIL-H-5606
JP8 - MIL-T-5624
OIL - MIL-L-7808
OIL - MIL-L-23699
5% NaCl - A-A-694
Deicing Fluids – MIL-A-8243

After immersion test:
Tensile Strength - 8 MPa minimum per ASTM D2671 Sections 44-48
Ultimate Elongation - 200% minimum per ASTM D2671 Sections 44-48

PROPERTIES FOR SOLAR APPLICATION: **PERFORMANCE:**

Short term low temperature exposure:	30 days at -40^{0}C, no visible change observed
Short Term high temperature exposure:	30 days at 90^{0}C, no visible change observed
Relative Lightfastness and weatherability:	1000 hours, slight fade in color observed (ASTM D3424, Method 4)
Tensile Strength:	MD: 7.3 MPa minimum (ASTM D3759)
Elongation:	MD: 100% minimum (ASTM D3759)

Marking Performance:

SAE-AS5942:	Samples were tested heat shrunk. Print still legible after 20 eraser rubs with hard hand pressure.
MIL-STD-202G:	Method 215K, Solution A, C, and D: 3 cycles of 3 minute immersions in specified fluids followed by toothbrush rub after each immersion. Print still legible in all test fluids.
MIL-STD-883F:	Method 2015.13, Solution A, B and D: 3 cycles of 1 minute immersion in specified fluids followed by toothbrush rub after each immersion. Print still legible in all test fluids.

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CHEMICAL/SOLVENT RESISTANCE:

Samples were thermal transfer printed on MP100/MP300 printers. Test was conducted at room temperature. The samples were immersed in the specified chemical reagents for 5 immersions using the following cycle: a 10 minute immersion time followed by a 30 minute recovery time.

Chemical Reagent	Visual Observation
Distilled water	No effect
Mineral Spirits	No effect
ASTM #3 Oil	No effect
Isopropyl Alcohol	No effect
Methanol	No effect
3% Alconox Detergent	No effect
10% Sodium Hydroxide Solution	No effect
10% Sulfuric Acid Solution	No effect
5% Sodium Chloride Solution	No effect
Freon TF	No effect
Super Agitene	No effect
Jet A Fuel	No effect
Arco Truslide 68	No effect
SAE 30 Motor Oil	No effect