

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°F to 257°F (Minus 40°C to 125°C)
Storage Conditions:	Store at 70F (21C) and 50% Relative Humidity For cassette products do not exceed 95°F.

PROPERTIES:

Tensile Strength:
Elongation Ultimate:
Dielectric Strength:
Total Longitudinal Change:
Water Absorption:
Low Temperature Flexibility:
Printability:
Flammability:

Shrink Temperature:
Corrosion:
UV Resistance:

PERFORMANCE:

10.4 MPa minimum (ASTM D638)
200% minimum (ASTM D 638)
500 volts/mil minimum (ASTM D2671, Sections 20-25)
Minus 15% to +5% (ASTM D2671, Sections 8-13)
0.5% maximum (ASTM D2671, Sections 79-80)
No cracking (ASTM D2671, Section 36-43)
Product meets print performance of 100 rubs (Taber abraser, CS-10 wheels, 100 cycles/250 gm wt.)
Product meets UL 224, VW-1 requirements for flammability

194°F to 248°F (90°C to 120°C)
Non-corrosive (ASTM D2671, Sections 93-95, Procedure A)
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.

Technical Data Sheet

*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°C, no visible change observed
Short Term high temperature exposure:	30 days at 90°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.

Technical Data Sheet

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

LIMITED WARRANTY

All *PANDUIT* Identification Solution Products (except for Software programs) are warranted to be free from defects in material and workmanship at the time of sale but our obligation under this warranty is limited to replacement of the product proved to be defective within 6 months from the date of sale, or in the case of printers, within 90 days from the date of sale. This warranty is void if the products or printers are modified, altered or misused in any way. Use of *PANDUIT* printers with any product other than the specified *PANDUIT* products for which the printer was designed constitutes misuse. Before using, the user shall determine the suitability of the product for its intended use and user assumes all risk and liability whatsoever in connection therewith. The foregoing may not be altered except by an agreement signed by officers or seller and manufacturer.

NEITHER *PANDUIT* OR SELLER SHALL BE LIABLE FOR ANY OTHER INJURY, LOSS OR DAMAGE, WHETHER DIRECT OR CONSEQUENTIAL, ARISING OUT OF THE USE OF, OR THE INABILITY TO USE THE PRODUCT OR THE PRINTER.

THIS WARRANTY IS MADE IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OF PARTICULAR USE ARE SPECIFICALLY EXCLUDED.

The information contained in this literature is based on our experience to date and is believed to be reliable. It is intended as a guide or use by persons having technical skill at their own discretion and risk. We do not guarantee favorable results or assume any liability in connection with its use. Dimensions contained herein are for reference purposes only. This publication is not to be taken as a license to operate under, or a recommendation to infringe any existing patents. This supersedes and voids all previous literature, etc.