BRADY B-7641 LOW SMOKE ZERO HALOGEN PERMASLEEVE™ MARKER

TDS No. B-7641
Effective Date: 4/14/2023

Description:

GENERAL
Print Technology: Thermal Transfer
Material Type: Heat shrink tubing (2:1), low smoke zero halogen, flame retardant, polyolefin sleeves

APPLICATIONS:
B-7641 PermaSleeve™ Markers are designed for wire identification and insulation purposes. These sleeves are suitable for use in applications that require low smoke, halogen free, flame retardant markers.

RECOMMENDED RIBBONS
Brady R6000 halogen free series black ribbon
Brady R6600 series black ribbon

REGULATORY APPROVALS
Brady B-7641 PermaSleeve™ is RoHS 2011/65/EU compliant

SPECIAL FEATURES
B-7641 PermaSleeve™ Markers meet industry standard BS6853 (1999) vehicle category 1a

B-7641 PermaSleeve™ Markers meet European standard EN 45545-2, requirement sets R22 and R23, vehicle category HL3.

B-7641 PermaSleeve™ Markers are supplied in roll form in a flattened format on a carrier designed for use with thermal transfer printers.

A minimum recovery temperature of 145°C (293°F) is recommended for B-7641 PermaSleeve® markers.

B-7641 PermaSleeve™ is available in white and yellow. Other non stock colors are available.

Details:

MARKER SIZE (inch)	MARKER SIZE (mm)	RANGE OF WIRE DIAMETERS (in)	RANGE OF WIRE DIAMETERS (mm)	WEIGHT (g/inch)
3/32	2.4	0.047-0.080	1.19-2.03	0.088
1/8	3.2	0.062-0.110	1.57-2.8	0.128
3/16	4.8	0.094-0.150	2.39-3.81	0.176
1/4	6.4	0.125-0.215	3.18-5.46	0.277
3/8	9.5	0.188-0.320	4.78-8.13	0.401
1/2	12.7	0.250-0.450	6.35-11.43	0.568

3/4	19.1	0.375-0.700	9.53-17.78	1.008
1	25.4	0.500-0.950	12.7-24.13	1.245
1 1/2	38.1	0.750-1.450	19.05-36.83	2.211
2	50.8	1.000-1.950	25.4-49.53	3.058

PHYSICAL PROPERTIES	TEST METHODS	AVERAGE RESULTS
Ultimate elongation	ASTM D638	200%
Longitudinal change	ASTM D2671	-10% to +5
Specific gravity	ASTM D792	1.4 g/cm^3
Water absorption	ASTM D570	≤ 0.15%
Flammability	ASTM D635-HB	Pass
Surface Flammability	ASTM E162	<35 I_s, no flaming or dripping
Oxygen Index	EN 45545-2, BS EN ISO 4589-2: 1999	>34%
Smoke Density	EN 45545-2, T10.03 EN ISO 5659-2 25 kWm-2	<150 (D_s max)
Smoke Density	BS6853: 1999 Annex D8.3	<0.017
Smoke Density	ASTM E662 Non-Flaming Mode	<100 D_s 1.5 <200 D_s 4.0
Smoke Density	ASTM E662 Flaming Mode	<100 D_s 1.5 <200 D_s 4.0
Toxic fume	EN 45545-2, T12 NF X 70-100-1 and NF X 70-100 2 600°C	< 0.75 (C.I.T $_{NLP}$)
Toxic fume	BS6853:1999 Annex B	< 1.0 (R value)
Toxic Gas Generation Carbon Monoxide (CO) Nitrogen Oxides (NO_2) Sulphur Dioxide (SO_2) Hydrogen Chloride (HCl) Hydrogen Fluoride (HF) Hydrogen Cyanide (HCN)	BSS 7239	Typical Maximum ppm <3500 <100 <100 <500 <200 <150

ELECTRICAL PROPERTIES	TEST METHODS	AVERAGE RESULTS
Dielectric Strength	ASTM D2671	20kV/mm
Volume resistivity	ASTM D257	10^{14} Ohm.cm

TEMPERATURE PROPERTIES	TEST METHODS	AVERAGE RESULTS
Heat shock	ASTM D2671 4 hours at 175°C	No dripping, cracking, or flowing
Heat ageing	ASTM D638 168 hours 150°C	Elongation ≥100%
Low temperature flexibility	IEC 60684-2 -55°C	No cracking, no breaking
Operating temperature		-55°C to +105°C
Minimum shrink temperature		90°C

B-7641 Permasleeve™ white and yellow were printed on the Brady PR Plus (600 dpi) with R6000 halogen free and with R6600 Series black ribbon. The results were the same with all ribbons unless otherwise stated.

PERFORMANCE PROPERTY	TEST METHODS	AVERAGE RESULTS
High Service Temperature	5 minutes at 500°F (260°C)	White: Slight discoloration of tubing, no visible effect to printing Yellow: Slight discoloration of tubing, no visible effect to printing
	24 hours at 350°F (180°C)	White: Slight discoloration of tubing, no visible effect to printing Yellow: Slight discoloration of tubing, no visible effect to printing
	1000 hours at 221°F (110°C)	White: No visible effect Yellow: No visible effect
Low Service Temperature	1000 hours at -94°F (-70°C)	White: No visible effect Yellow: No visible effect
Weatherability	ASTM G155 Cycle 1 1000 hours in Xenon Arc Weatherometer	White: No visible effect to tubing or printing Yellow: No visible effect to tubing or printing
UV Light Resistance	ASTM G155 Cycle 1 dry 1000 hours	White: No visible effect to tubing or printing Yellow: No visible effect to tubing or printing
Humidity Resistance	1000 hours at 100°F/95% RH	White: No visible effect Yellow: No visible effect
Print Adherence per SAE-AS5942 (sec.4.1)	20 eraser rubs with 2 lb pressure	White: Pass Yellow: Pass
Solvent Resistance per SAE-AS81531 (Sec. 3.4.3) Solution A Solution C Solution D	Samples tested after unrestricted shrinkage at 200°C for 3 minutes MIL-STD-202G, Method 215K 3 cycles of 3 minute immersions in specified fluids followed by toothbrush rub after each immersion	White: Pass Yellow: Pass

Solution A: 1 part isopropyl alcohol, 3 parts mineral spirits

Solution C: BIOACT® EC-7RTM terpene defluxer
Solution D: 42 parts water, 1 part propylene glycol monomethylether, 1 part monoethanolamine at 70°C

PERFORMANCE PROPERTY	CHEMICAL RESISTANCE

B-7641 white and yellow samples were thermal transfer printed using the R6600 Series thermal transfer ribbon and shrunk on appropriate sized wires. Test was conducted at room temperature after 24+ hour dwell. Testing consisted of 5 cycles of 10 minute immersions in the specified chemical reagent followed by 30 minute recovery periods. Samples rubbed 10 times with a cotton swab saturated with the chemical reagent after final immersion. The rating scale below shows the effect to the quality of the print for each sample. Results are the same for each color unless otherwise noted.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Isopropyl alcohol	1	1
Toluene	1	1
SAE 15W20 Oil	1	1
MIL 5606 oil	White tubing stained by oil, no visible effect on printing	1
MIL 7808 oil	1	1
10% NaCl solution	1	1
Brake Fluid DOT 3	1	1
JP-8 Jet Fuel	1	1
Gasoline	1	1
Diesel Fuel	White tubing stained by fluid, no visible effect on printing	1
Skydrol® 500B-4	1	1
Kerosene	1	1
Propylene Glycol	1	1
Mineral Spirits	1	1
Deionized Water	1	1
Methyl Ethyl Ketone	1	1
Acetone	1	1

Rating scale:
1=no visible effect
2=slight print fade or removal
3=moderate print fade or removal (print still legible)
4=severe print fade or removal (print illegible or just barely legible)

5=complete print fade or removal
NP=print removed prior to rub

B-7641 white and yellow sample were thermal transfer printed using the R6000 halogen free Series thermal transfer ribbons and shrunk on appropriate sized wires. Test was conducted at room temperature after 24+ hour dwell. Testing consisted of 5 cycles of 10 minute immersions in the specified chemical reagent followed by 30 minute recovery periods. Samples rubbed 10 times with a cotton swab saturated with the chemical reagent after final immersion. The rating scale below shows the effect to the quality of the print for each sample. Results are the same for each color unless otherwise noted.

CHEMICAL REAGENT	**SUBJECTIVE OBSERVATION OF VISUAL CHANGE**	
	TUBING AND PRINTING WITHOUT SWAB RUB	**PRINTING WITH SWAB RUB**
Isopropyl alcohol	1	1
Toluene	1	5
SAE 15W20 Oil	1	1
MIL 5606 oil	White tubing stained by oil, no visible effect on printing	1
MIL 7808 oil	1	1
10% NaCl solution	1	1
Brake Fluid DOT 3	1	1
JP-8 Jet Fuel	1	1
Gasoline	1	5
Diesel Fuel	White tubing stained by fluid, no visible effect on printing	1
Skydrol® 500B-4	1	1
Kerosene	1	1
Propylene Glycol	1	1
Mineral Spirits	1	1
Deionized Water	1	1
Methyl Ethyl Ketone	1	4
Acetone	1	3

Rating scale:
1=no visible effect
2=slight print fade or removal
3=moderate print fade or removal (print still legible)
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Shelf Life:
Product testing, customer feedback, and history of similar products, support a customer performance expectation of at least ***five years from the date of receipt*** for this product as long as this product is stored in its original packaging in an

environment *below 27°C (80°F) and 60% RH*. We encourage customers to develop functional testing protocols that will qualify a product's fitness for use, in their actual applications.

Trademarks:
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EC-7R™ is a trademark of Petroferm, Inc.
PermaSleeve™ is a trademark of Brady Worldwide, Inc.
S.I.: International System of Units
Skydrol® is a registered trademark of Solutia Inc.

Note: All values shown are averages and should not be used for specification purposes.

Test data and test results contained in this document are for general information only and shall not be relied upon by Brady customers for designs and specifications, or be relied on as meeting specified performance criteria. Customers desiring to develop specifications or performance criteria for specific product applications should contact Brady for further information.

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