Technical Data Sheet

BRADY B-344 FLUID RESISTANT PERMASLEEVE® MARKER

TDS No. B-344
Effective Date: 04/14/2023

Description:
GENERAL
Print Technology: Thermal Transfer
Material Type: Irradiated polyolefin heat shrink tubing (3:1 shrink ratio)

APPLICATIONS:
B-344 PermaSleeve® Markers are designed for wire identification and insulation purposes. These sleeves are suitable for use in applications that require greater resistance to harsh chemicals such as fuels, lubricants and high power cleaning solvents.

RECOMMENDED RIBBONS
Brady R6600 Series black ribbon
Brady R6700 white for printing on dark colored markers

SPECIAL FEATURES
B-344 PermaSleeve® Markers meet the performance requirements of SAE-AMS-DTL-23053/6 (Class 1) for Insulation Sleeving, SAE-AS-81531 Marking of Electrical Insulating Materials and MIL-STD-202G, Method 215K Resistance to Solvents when printed with the recommended ribbons.

The operating temperature range is -55°C (-67°F) to +135°C (275°F).

A minimum recovery temperature of 145°C (293°F) is recommended for B-344 PermaSleeve® markers

B-344 PermaSleeve® markers are supplied in roll form in a flattened format on a carrier designed for use with thermal transfer printers.

B-344 PermaSleeve® is available in white, yellow, black, red, orange, green, blue, violet, pink, gray, and brown.

Details:

MARKER SIZE	RANGE OF WIRE DIAMETERS (in)	RANGE OF WIRE DIAMETERS (mm)	WEIGHT (g/inch)
3/32"	0.031-0.080	0.79-2.03	0.056
1/8"	0.042-0.110	1.07-2.8	0.072
3/16"	0.062-0.150	1.57-3.81	0.115
1/4"	0.083-0.215	2.11-5.46	0.154
3/8"	0.125-0.320	3.18-8.13	0.229
1/2"	0.166-0.450	4.21-11.43	0.280
3/4"	0.250-0.700	6.35-17.78	0.389
1"	0.333-0.950	8.46-24.13	0.558
1 ½"	0.750-1.450	19.05-36.83	1.211

PHYSICAL PROPERTIES	TEST METHODS	AVERAGE RESULTS
Surface Flammability of Materials Using a Radiant Heat Energy Source Tested at an outside laboratory White and black tubing tested	ASTM E162 Common Maximum – 35	Flame Spread Index (Is) (rounded average result of 4 tests) White – 0 Black – 5
Specific Optical Density of Smoke (Ds) Tested at an outside laboratory White and black tubing tested	ASTM E662 Common Maximum Flaming and Nonflaming Mode at 1.5 minutes – 100 Flaming and Nonflaming Mode at 4.0 minutes – 200	Specific Optical Density (Ds) (average of 3 tests) White: Flaming mode at 1.5 minutes : 181 Flaming Mode at 4 minutes : 187 Nonflaming mode at 1.5 minutes : 2

		Nonflaming mode at 4.0 minutes : 19 Black: Flaming mode at 1.5 minutes : 172 Flaming Mode at 4 minutes : 175 Nonflaming mode at 1.5 minutes : 21 Nonflaming mode at 4.0 minutes:: 52

B-344 Permasleeve® white, yellow, and other colors were printed on the Bradyprinter™ PR+ (600 dpi) and with R6600 Series black ribbon. B-344 black samples were printed with the R6700 Series white thermal transfer ribbon on the same printers. The results were the same with all ribbons unless otherwise stated. White, yellow, and black data listed below, other color data available upon request.

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 Black: No visible effect
	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 Black: No visible effect
	1000 hours at 267°F (130°C)	White: Slight discoloration of tubing, no visible effect to printing Yellow: Slight discoloration of tubing, no visible effect to printing Black: No visible effect
Low Service Temperature	1000 hours at -94°F (-70°C)	White: No visible effect Yellow: Slight discoloration of tubing, no visible effect to printing Black: No visible effect
Weatherability	ASTM G155 Cycle 1 1000 hours in Xenon Arc Weather-Ometer®	White: Slight discoloration of tubing, no visible effect to printing Yellow: Slight discoloration of tubing, no visible effect to printing Black: Slight discoloration of tubing, no visible effect to printing
UV Light Resistance	ASTM G155 Cycle 1 dry 1000 hours	White: Slight discoloration of tubing, no visible effect to printing Yellow: Slight discoloration of tubing, no visible effect to printing Black: No visible effect
Humidity Resistance	1000 hours at 100°F/95% RH	White: No visible effect Yellow: Slight discoloration of tubing, no visible effect to printing Black: Slight discoloration of tubing, no visible effect to printing
Salt Fog	1000 hours at 5% Salt Spray	White: No visible effect Yellow: Slight discoloration of tubing, no visible effect to printing Black: No visible effect
Dielectric Strength	ASTM D2671 (after unrestricted shrinkage)	78 KV/mm
Flammability	ASTM D2671,Procedure B	Pass
Print Adherence per SAE-AS81531 (Section 3.4.2)	Samples tested after unrestricted shrinkage at 200°C for 3 minutes 20 eraser rubs with hard hand pressure	White: No visible effect to printing Yellow: No visible effect to printing Black: Some print fade, print still legible
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: No visible effect to printing Yellow: No visible effect to printing Black: Some print fade, print still legible

Solution A: 1 part isopropyl alcohol, 3 parts mineral spirits
Solution B: deleted from MIL-STD-202G, Method 215K
Solution C: BIOACT® EC-7R™ terpene defluxer
Solution D: 42 parts water, 1 part propylene glycol monomethyether, 1 part monoethanolamine at 70°C

PERFORMANCE PROPERTY	CHEMICAL RESISTANCE

B-344 white 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 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.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Isopropyl alcohol	1	1
Toluene	1	1
20 Wt Oil @ 70°C	1	1
MIL 5606 oil	Tubing stained pink, no visible effect on printing	1
MIL 7808 oil	1	1
Rust Veto® 377	1	1
Brake Fluid DOT 3	1	1
JP-8 Jet Fuel	1	1
Gasoline	1	1
Diesel Fuel	1	1
Skydrol® 500B-4	1	1
Super Agitene®	1	1
Propylene Glycol	1	1
Mineral Spirits	1	1
Deionized Water	1	1
Methyl Ethyl Ketone	1	1
Formula 409	1	1
Acetone	1	1
Mil PRF 83282	1	1
Methyl Propyl Ketone	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-344 black samples were thermal transfer printed using the R6700 Series white 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 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.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Isopropyl alcohol	1	2-3
Toluene	1	3-4
20 Wt Oil @ 70°C	1	2-4
MIL 5606 oil	1	2-4
MIL 7808 oil	1	2-4
Rust Veto® 377	1	2-5
Brake Fluid DOT 3	1	2-4
JP-8 Jet Fuel	1	2-4
Gasoline	1	2-4
Diesel Fuel	1	2-4

Skydrol® 500B-4	1	2-4
Super Agitene®	1	2-4
Propylene Glycol	1	1
Mineral Spirits	1	2-4
Deionized Water	1	1
Methyl Ethyl Ketone	1	2-4
Formula 409®	1	1
Acetone	1	2-3
Mil PRF 83282	1	2-4
Methyl Propyl Ketone	1	3-4

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

Shelf life is 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 80° F (27° C) and 60% RH. It remains the responsibility of the user to assess the risk of using this product. We encourage customers to develop testing protocols that will qualify a product's fitness for use in their actual application.

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