

BRADY B-344 FLUID RESISTANT PERMASLEEVE® MARKER

TDS No. B-344
Effective Date: 01/08/2014

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).

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 1/2"	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	White: No visible effect to printing Yellow: No visible effect to printing Black: Some print fade, print still legible

fluids followed by toothbrush rub after each immersion

- 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 monomethylether, 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

B344 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

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 at 65 to 95 degrees F (18 to 35 degrees C) per SAE-AMS-DTL 23053/6. We are confident that our products will perform well beyond this time frame. However it remains the responsibility of the user to assess the risk of using such product. We encourage customers to develop functional testing protocols that will qualify a product's fitness for use in their actual applications.

Trademarks:

- ASTM: American Society for Testing and Materials (U.S.A.)
- BIOACT® is a registered trademark of Petroferm, Inc.
- Bradyprinter™ PR+ Printer
- EC-7R™ is a trademark of Petroferm Inc.
- Formula 409® is a registered trademark of the Clorox Company
- PermaSleeve® is a registered trademark of Brady Worldwide, Inc.
- Rust Veto® is a registered trademark of Houghton Technical Corp.
- S. I.: International System of Units
- SAE: Society of Automotive Engineers (U.S.A.)
- Skydrol® is a registered trademark of Solutia Inc.
- Super Agitene® is a registered trademark of Graymills Corporation
- Weather-Ometer® is a registered trademark of Atlas Material Testing Technology LLC

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.

Product compliance information is based upon information provided by suppliers of the raw materials used by Brady to manufacture this product or based on results of testing using recognized analytical methods performed by a third party, independent laboratory. As such, Brady makes no independent representations or warranties, express or implied, and assumes no liability in connection with the use of this information.

WARRANTY

Brady products are sold with the understanding that the buyers will test them in actual use and determine for themselves their adaptability to their intended uses. Brady warrants to the buyers that its products are free from defects in material and workmanship, but limits its obligation under this warranty to replacement of the product shown to Brady's satisfaction to have been defective at the time Brady sold it. This warranty does not extend to any persons obtaining the product from the buyers. This warranty is in lieu of any other warranty, express or implied, including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose, and of any other obligations or liability on Brady's part. Under no circumstances will Brady be liable for any loss, damage, expense, or consequential damages of any kind arising in connection with the use, or inability to use, Brady's products.

Copyright 2016 Brady Worldwide, Inc. | All Rights Reserved
 Material may not be reproduced or distributed in any form without written permission.

