

BRADY B-346 HIGH TEMPERATURE PERMASLEEVE(TM) MARKER

TDS No. B-346
Effective Date: 07/08/2016

Description:

GENERAL

Print Technology: Thermal Transfer

Material Type: Irradiated polyvinylidene fluoride heat shrink tubing (2:1 shrink ratio)

APPLICATIONS:

B-346 PermaSleeve® Markers are designed for wire identification and insulation purposes. These sleeves are suitable for many high temperature and/or low outgassing applications. The sleeves can also be used in applications that require greater resistance to harsh chemicals such as fuels, lubricants and high power cleaning solvents as well as typical aviation hydraulic fluids.

RECOMMENDED RIBBONS

Brady Series R6800 white
Brady Series R4500 silver

SPECIAL FEATURES

B-346 PermaSleeve® Markers are suitable for use in high temperature and other demanding aerospace applications.

The operating temperature range is -55°C (-67°F) to +175°C (347°F).

B-346 PermaSleeve® Markers meet the requirements of NASA Vacuum Outgassing Specification SP-R-0022A.

B-346 PermaSleeve® markers are supplied in roll form in a flattened format on a carrier designed for use with thermal transfer printers.

B-346 PermaSleeve® is available in black.

Details:

MARKER SIZE		RANGE OF WIRE DIAMETERS (in)	RANGE OF WIRE DIAMETERS (mm)	WEIGHT (g/inch)
3/32" *	3HTLG-094	0.031-0.080	0.6-2.0	0.070
1/8"	2HTLG-125	0.063-0.110	1.2-2.8	0.096
3/16"	2HTLG-187	0.094-0.150	1.6-3.8	0.151
1/4"	2HTLG-250	0.125-0.215	2.4-5.5	0.196
3/8"	2HTLG-375	0.187-0.320	3.2-8.1	0.263
1/2"	2HTLG-500	0.250-0.450	4.8-11.4	0.355
3/4"	2HTLG-750	0.375-0.700	6.6-17.8	0.530
1"	2HTLG-1000	0.500-0.950	12.7-24.1	0.885
1 1/2"	2HTLG-1500	0.750-1.450	19.05-36.8	1.691

* 3/32 shrink ratio is 3:1

PHYSICAL PROPERTIES	TEST METHODS	AVERAGE RESULTS
Vacuum Outgassing Tested at an outside laboratory	NASA-SP-R-022A Specification Limits % Total Mass Loss (TML) – 1.0% maximum % Collected Volatile Condensable Material (CVCM) – 0.10 maximum % Water Vapor Recovered (WVR) – Report	Black: %TML – 0.10 %CVCM - <0.01 %WVR – 0.04
Specific Optical Density of Smoke (Ds) Tested at an outside laboratory	ASTM E662 Common Maximum Flaming Mode at 4.0 minutes - 200	Specific Optical Density (Ds) (average of Black: Flaming mode at 4.0 minutes – <200

B-346 PermaSleeve® black samples were printed on the Brady BP PR Plus (300 dpi) printer with the R6800 white and R4500

Silver Series ribbon.

PERFORMANCE PROPERTY	TEST METHOD	AVERAGE RESULTS	
		R6800 White	R4500 Silver
High Service Temperature	5 minutes at 500°F (260°C)	No visible effect to tubing, slight yellowing of print when compared to unexposed sample	No visible effect to tubing, slight yellowing of print when compared to unexposed sample
	24 hours at 350°F (180°C)	No visible effect to tubing, slight yellowing of print when compared to unexposed sample	No visible effect to tubing, slight yellowing of print when compared to unexposed sample
	1000 hours at 267°F (130°C)	Slight yellowing of print, print remains legible	No visible effect
Low Service Temperature	1000 hours at -94°F (-70°C)	No visible effect	No visible effect
Weatherability	ASTM G155 Cycle 1 1000 hours in Xenon Arc Weather-Ometer®	Slight yellowing of print, print remains legible	No visible effect
UV Light Resistance	1000 hours ASTM G155 Cycle 1 dry	Slight yellowing of print, print remains legible	No visible effect
Humidity Resistance	1000 hours at 100°F/95% RH	No visible effect	No visible effect
Salt Fog	1000 hours at 5% salt spray	No visible effect	No visible effect
Dielectric Strength	ASTM D2671 (after unrestricted shrinkage)	Pass	Pass
Flammability	ASTM D2671, Procedure A and C	Pass	Pass
Basic Print Adherence per SAE AS5942 (section 3.4.1)	Samples tested after unrestricted shrinkage at 200°C for 3 minutes. 20 eraser rubs with 2 pounds +/- 0.5 pounds on rubbing arm	Pass	Pass
Solvent Resistance per SAE-AS5942 (section 3.4.2) 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	Pass	Pass

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
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B-346 PermaSleeve® black samples were printed on the Brady BP PR Plus (300 dpi) printer with the R6800 white and R4500 Silver Series ribbon. Samples were 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 specified chemical reagent followed by 30 minute recovery periods. Samples were rubbed 10 times with a cotton swab saturated with the chemical reagent after final immersion.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE		
	TUBING AND PRINTING WITH OUT SWAB RUB	PRINTING WITH SWAB RUB	
		R6800 WHITE	R4500 SILVER
Acetone	No visible effect	Severe print removal	Complete print removal
Brake Fluid, DOT 3	No visible effect	No visible effect	Severe print removal
Deionized water	No visible effect	No visible effect	No visible effect
Diesel Fuell	No visible effect	No visible effect	No visible effect
Gasoline	No visible effect	No visible effect	Moderate print removal
IPA	No visible effect	No visible effect	No visible effect
JP-8	No visible effect	No visible effect	No visible effect
Kerosene	No visible effect	No visible effect	No visible effect
Methyl Ethyl Ketone	No visible effect	Moderate print removal	Complete print removal
MIL-5606 oil	No visible effect	No visible effect	No visible effect
MIL-7808 oil	No visible effect	No visible effect	No visible effect

Mineral Spirits	No visible effect	No visible effect	Slight print removal
Propylene Glycol	No visible effect	No visible effect	No visible effect
Skydrol® 500B-4	No visible effect	Slight print Removal	Complete print removal
Toluene	No visible effect	Slight print Removal	Complete print removal
10% NaCl solution	No visible effect	No visible effect	No visible effect
20 wt oil @ 70°C	No visible effect	No visible effect	No visible effect

Product testing, customer feedback and history of similar products support a customer performance expectation of at least 5 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°F to 95°F (18°C to 35°C) per SAE-AMS-DTL-23053/8. 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 application.

Trademarks:

PermaSleeve® is a registered trademark of Brady Worldwide, Inc.
 Skydrol® is a registered trademark of Solutia Inc.
 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.

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