Technical Data Sheet

BRADY B-593 RAISED PANEL LABEL

TDS No. B-593
Effective Date: 07/09/2010

Description:
GENERAL
Print Technology: Thermal Transfer
Material Type: Polyester
Finish: White, Black, Yellow, Metallized, Red, Green
Adhesive: Permanent Acrylic, Foam Backed

APPLICATIONS
B-593 Raised Panel labels are designed for patch panel identification in identifying external push-buttons, switches, and internal connection points. B-593 is also used as rating and serial plates using alphanumerics that require name plate quality.

RECOMMENDED RIBBONS
Brady Series R6000
Brady Series R6000HF (low halogen)
Brady Series R4400 white

REGULATORY/AGENCY APPROVALS
UL: B-593 (white, metallized, yellow, red and green) is a UL Recognized Component when printed with the Brady R6000 Series and R6000HF Series black ribbons. B-593 (red, green and black) is a UL Recognized Component when printed with the Brady R4400 Series white ribbon. See UL file PGJI2.MH17154 for specific details. UL information can be accessed on line at *UL.com*. Search in *Certifications* area.
cUL: B-593 (white, metallized, yellow, red and green) is a cUL Recognized Component when printed with the Brady R6000 Series black ribbon. B-593 (red, green and black) is a cUL Recognized Component when printed with the Brady R4400 Series white ribbon. See UL file PGJI8.MH17154 for specific details. UL information can be accessed on line at *UL.com*. Search in *Certifications* area.

Brady B-593 is RoHS compliant to 2005/618/EC MCV amendment to RoHS Directive 2002/95/EC.

SPECIAL FEATURES
Brady B-593 Raised Panel Labels have been found to be functional for the following outdoor durations based on long term accelerated weathering tests:

Brady B-593 Label Color/Ribbon	Estimated Outdoor Durability
White/R6000 Black	10 years
Yellow/R6000 Black	5 years
Silver/R6000 Black	5 years
Green/R6000 Black	5 years
Red/R6000 Black	5 years
Red/R4400 White	3 years
Black/R4400 White	3 years
Green/R4400 White	3 years

Details regarding label and print appearance are given in the Performance Properties - Environmental section below.

Details:

PHYSICAL PROPERTIES	TEST METHODS	AVERAGE RESULTS
Thickness	ASTM D 1000 - Substrate - Foam backed adhesive - Total	 0.0079 inch (0.200 mm) 0.0177 inch (0.450 mm) 0.0256 inch (0.650 mm)
Adhesion to: - Stainless Steel - Smooth ABS	ASTM D 1000 20 minute dwell 24 hour dwell 20 minute dwell	 32 oz/inch (35 N/100 mm) 90 oz/inch (98 N/100 mm) 88 oz/inch (96 N/100mm)

	24 hour dwell	134 oz/inch (147 N/100 mm)
- Powdercoated surface	20 minute dwell 24 hour dwell	109 oz/inch (120 N/100mm) 166 oz/inch (182 N/100 mm)
- Polyethylene	20 minute dwell 24 hour dwell	130 oz/inch (142 N/100mm) > 200 oz/inch (> 200 N/100 mm)
Drop Shear	PSTC-7 (except use 1/2" x 1" sample)	35 hours
Tack	ASTM D2979 Polyken™ Probe Tack (1 second dwell)	16.5 oz (469 g)

PERFORMANCE PROPERTIES	ENVIRONMENTAL

B-593 white, silver, yellow, red and green label samples were printed with the R6000 Series and R6000HF Series ribbons and B-593 black, red and green label samples were printed with the R4400W series ribbon and dwelled for 24 hours prior to test.

PERFORMANCE PROPERTIES	TEST METHODS	TYPICAL RESULTS White B-593/R-6000 and B-593/R6000HF	TYPICAL RESULTS Black B-593/R-4400W	TYPICAL RESULTS Metallized B-593/R-6000
High Service Temperature	1000 hours at 100°C (212°F)	No visible effect	No visible effect	No visible effect
Low Service Temperature	1000 hours at -20°C (-4°F)	No visible effect	No visible effect	No visible effect
Humidity Resistance	1000 hours at 37°C (100°F), 95% R.H.	No visible effect	No visible effect	No visible effect
Salt fog	1000 hours at 5% Salt Spray	No visible effect	No visible effect	No visible effect
Abrasion Resistance	Taber Abraser, CS-10 wheels, 500 g/arm (Fed. Std. 191A, Method 5306)	Number of cycles until print is illegible 175 cycles	Number of cycles until print is illegible 75 cycles	Numbers of cycles until print is illegible 175 cycles

Brady B-593 labels underwent accelerated weathering testing (ASTM G155, Cycle 1) over the course of one year. Observations regarding the appearance of the B-593 labels and print on the labels were made at 4 intervals during the one year and are given in the table below.

Weatherometer Duration	Label Color	Effect to Label and Print		
		Effect to Label Color	Effect To R6000 Series Printing	Effect to R4400W Series Printing
1000 hours	White Red Green Yellow Silver Black	No visible effect Slight discoloration Slight discoloration No visible effect No visible effect No visible effect	No visible effect for all label colors. n/a	n/a No visible effect No visible effect n/a n/a No visible effect
2400 hours	White Red Green Yellow Silver Black	No visible effect Severe discoloration, retains a trace of red Moderate discoloration Slight discoloration Slight discoloration Slight loss of gloss	No visible effect Slight print fade No visible effect No visible effect No visible effect n/a`	n/a Slight print fade No visible effect n/a n/a no visible effect
4800 hours	White Red Green Yellow Silver Black	No visible effect Severe discoloration, retains a trace of red Moderate discoloration Slight discoloration Moderate discoloration Slight loss of gloss	No visible effect Slight print fade No visible effect No visible effect No visible effect n/a	n/a slight print discoloration slight print discoloration n/a n/a no visible effect
9100 hours	White Red Green	Slight discoloration Severe discoloration, retains a trace of red	No visible effect Slight print fade Slight print fade	n/a Severe print removal, print is barely legible*

	Yellow Silver Black	Moderate discoloration Moderate discoloration Severe discoloration Slight loss of gloss	Slight print fade Slight print fade n/a	Severe print removal, print is barely legible* n/a n/a no visible effect

Based on internal testing results, 800 hours in the Weatherometer is *approximately* equivalent to one year of outdoor exposure in Wisconsin.
*print can be rubbed off with finger

PERFORMANCE PROPERTY	CHEMICAL RESISTANCE

B-593 white printed with the R6000 Series and R6000HF Series ribbons and B-593 black printed with the R4400 white series ribbon, and dwelled 24 hours prior to test. Testing consisted of 5 cycles of 10 minute immersions in the specified chemical reagent followed by 30 minute recovery periods. After final immersion, samples rubbed 10 times with cotton swab saturated with test fluid.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE - B-593 White			
	EFFECTS TO THE PRINTED IMAGE			
	R6000		R6000HF	
	Without Rub	With Rub	Without Rub	With Rub
Isopropyl alcohol	1	1	1	1
Methyl ethyl ketone	NP	NP	1	5
Alcohol mix*	1	1	1	1
Gasoline	1	5	1	1
Diesel	1	1	1	1
Skydrol® 500B-4	1	5	1	2-3
Mil 5606 Oil	1	1	1	1
1,1,1-Trichloroethane	1	5	Fluid obsolete	
5% Sodium hydroxide	1	1	1	1
10% Sulfuric acid solution	1	1	1	1
Deionized water	1	1	1	1
10% Salt water solution	1	1	1	1
n-Hexane	1	1	Not tested	
Iso-octane	1	1	Not tested	
Ethanol	1	1	1	1
ASTM #3 oil	1	1	1	1
Acetone	1	5	1	5

* Alcohol mix is 50% ethanol, 30% methanol, and 20% water by volume.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE – B-593 Black	
	EFFECTS TO THE PRINTED IMAGE	
	R4400W	
	Without Rub	With Rub
Isopropyl alcohol	1	5
Methyl ethyl ketone	NP	NP
Alcohol mix*	1	1
Gasoline	1	5
Diesel	1	1
Skydrol® 500B-4	NP	NP
Mil 5606 Oil	1	1
1,1,1-Trichloroethane	1	5
5% Sodium hydroxide	1	1
10% Sulfuric acid solution	1	1
Deionized water	1	1
10% Salt water solution	1	1
n-Hexane	1	1
Iso-octane	1	1
Ethanol	1	4
ASTM #3 oil	1	4
Acetone	NP	NP

* Alcohol mix is 50% ethanol, 30% methanol, and 20% water by volume.
Rating Scale:
1=no visible effect
2=slight print smear, fade or removal

3=moderate smear, fade or print removal (print is still legible)
4=severe smear, fade or print removal
5=complete print and/or topcoat removal
NP=print removed during immersion

Product testing and history of similar products, support a customer performance expectation of at least ***two 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. We are confident that our product 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:
Polyken™ is a trademark of Testing Machines Inc.
Skydrol® is a registered trademark of the Monsanto Company
ASTM: American Association for Testing and Materials (U.S.A.)
S. I.: International System of Units

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