BRADY B-342 PERMASLEEVE MARKER

TDS No. B-342
Effective Date: 10/27/2017

Description:
GENERAL
Print Technology: Thermal transfer and dot matrix
Material Type: Irradiated polyolefin heat shrink tubing (3:1 shrink ratio)

APPLICATIONS
Wire identification and insulation purposes

RECOMMENDED RIBBONS
Brady R6600 Series for thermal transfer printing best smear and chemical resistance
Brady R4300 Series for thermal transfer printing general purpose ribbon
Brady R4502S for thermal transfer printing silver on dark colored markers
Brady R6700 for thermal transfer printing white on dark colored markers
Brady R5000 Series for dot matrix printing

REGULATORY/AGENCY APPROVALS
UL: B-342 is a UL Recognized Component to UL224 Extruded Insulated Tubing. See UL file E333786 for specific details. UL information can be accessed on line at *UL.com*. Search in *Certifications* area.
RoHS 2005/618/EC: As of January 2009, Brady began the transition to full RoHS compliant B-342 to 2005/618/EC MCV amendment to RoHS Directive 2002/95/EC. To determine if you have RoHS compliant product please contact customer service.

SPECIAL FEATURES
B-342 PermaSleeve™ Markers meet the material and physical property requirements of SAE AS23053/5 (Class 1) for Insulation Sleeving and SAE AS-81531 for Marking of Electrical Insulating Materials when printed with R6600,R4300, R4502S, R6700 Series thermal transfer ribbons, R5000 Series dot matrix ribbon, and with laser marking.

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

B-342 is available in white, yellow, black, red, orange, green, blue, violet, pink, gray, and brown.

B-342 can also be printed using laser marking method. Laser marking has very good environmental, abrasion, and chemical resistance.

Details:

MARKER SIZE		RANGE OF WIRE DIAMETER ((in)	RANGE OF WIRE DIAMETER ((mm)
3/32"	3PS-094	0.023 - 0.080	0.58 - 2.03
1/8"	3PS-125	0.046 - 0.110	1.17 - 2.79
3/16"	3PS-187	0.062 - 0.150	1.57 - 3.81
1/4"	3PS-250	0.094 - 0.215	2.39 - 5.46
3/8"	3PS-375	0.125 - 0.320	3.18 - 8.13
1/2"	3PS-500	0.187 - 0.450	4.75 - 11.43
3/4"	3PS-750	0.250 - 0.700	6.35 - 17.78
1"	3PS-1000	0.375 - 0.950	9.53 - 24.13
1 1/2"	3PS-1500	0.500 - 1.450	12.7 - 36.83

Shrink Method: Any industrial grade heat gun may be used to shrink B-342 PermaSleeve® Markers.

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

	minutes – 100 Flaming and Nonflaming Mode at 4.0 minutes – 200	Flaming Mode at 1.5 minutes – 76 Flaming Mode at 4.0 minutes – 155 Nonflaming Mode at 1.5 minutes – 2 Nonflaming Mode at 4.0 minutes – 13 Black: Flaming Mode at 1.5 minutes – 92 Flaming Mode at 4.0 minutes – 155 Nonflaming Mode at 1.5 minutes – 4 Nonflaming Mode at 4.0 minutes – 41

B-342 white, yellow and other colors tested/printed with R5000 Series dot matrix and R4300 and R6600 Series thermal transfer ribbons. B-342 black samples tested printed with R4502S silver and R6700 white thermal transfer ribbon. B-342 white samples were also laser marked with a 10 watt fiber laser. Results are the same with all processes and ribbons unless stated otherwise. White, yellow, and black data listed below, other color data available upon request.

PERFORMANCE PROPERTIES	TEST METHODS	AVERAGE RESULTS
High Service Temperatures	5 minutes at 500°F (260°C) 24 hours at 350°F (180°C) 1000 hours at 267°F (130°C)	White: Slight tube darkening and yellowing Yellow: Moderate tube darkening. Black: No visible effect to tubing, slight print yellowing (R6700). White and yellow: Slight tube darkening. White and yellow: Moderate tube darkening. No visible change to printing in above conditions (R4300, R6600, and laser marking)
Low Service Temperature	1000 hours at -94°F (-70°C)	No visible effect
Weatherability	ASTM G155 Cycle 1 1000 hours in Xenon Arc Weatherometer	White: Slight tube yellowing Yellow: No visible effect No visible change to printing
UV Light Resistance	ASTM G155 Cycle 1 dry 1000 hours	White: Moderate tube yellowing Yellow: No visible effect No visible change to printing
Humidity Resistance	1000 hours at 100°F/95% R.H.	No visible effect
Salt Fog	1000 hours in 5% Salt Fog Chamber per ASTM B117	Moderate print fade (R4502S on black marker). No visible effect to all other color/ribbon combinations and laser marking.
Dielectric Strength	ASTM D2671 (after unrestricted shrink)	500 volts/mil minimum
Flammability	ASTM D2671, Procedure B	Self-extinguishing within 60 seconds
Print Adherence per SAE-AS81531 (Sec 3.4.2)	Samples tested after unrestricted shrink at 200°C for 3 minutes 20 eraser rubs with hard hand pressure	Print is still easily legible on sleeves printed with all ribbons and laser marking.
Solvent Resistance per SAE-AS81531 (Sec 3.4.3) Solution A Solution C Solution D	Samples tested after unrestricted shrink at 200°C for 3 minutes MIL-STD-202, Method 215K 3 cycles of 3 minute immersions in specified fluids followed by toothbrush rub after each immersion	Print still easily legible on sleeves printed with all ribbons and laser marking in all three test fluids

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

PERFORMANCE PROPERTY	CHEMICAL RESISTANCE

B-342 white, yellow and other colors were dot matrix printed using Brady R5000 Series ribbon and shrunk on appropriate size wires. Test 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 cotton swab after final immersion.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Methyl Ethyl Ketone	No visible effect	Severe print fade, print legible

Isopropyl Alcohol	No visible effect	Severe print fade, print legible
JP-8 Jet Fuel	No visible effect	Severe print fade, print legible
Kerosene	No visible effect	Severe print fade, print legible
Mil 5606 Oil	White and yellow tubing stained red on edges, no visible effect on printing	Severe print fade, print legible
Mil 7808 Oil	No visible effect	Severe print fade, print legible
Speedi Kut Cutting Oil 332	No visible effect	Moderate print fade, print legible
Gasoline	No visible effect	Severe print fade, print legible
Rust Veto® 377	Tubing stained orange, no visible effect on printing	Severe print fade, print legible
Skydrol® 500B-4	No visible effect	Severe print fade, print legible
Propylene Glycol	No visible effect	Moderate print fade, print legible
Super Agitene®	No visible effect	Severe print fade, print legible
BIOACT® EC-7R™ Terpene Cleaner	No visible effect	Severe print fade, print legible
Deionized Water	No visible effect	No visible effect
3% Alconox® Detergent	No visible effect	No visible effect
5% Salt Water Solution	No visible effect	No visible effect

B-342 white, yellow and other colors were thermal transfer printed using R4300 Series ribbon and shrunk on appropriate size wires. Test 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 cotton swab after final immersion.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Methyl Ethyl Ketone	No visible effect	Severe print fade, print legible
Isopropyl Alcohol	No visible effect	Severe print fade, print legible
JP-8 Jet Fuel	No visible effect	Severe print fade, print legible
Kerosene	No visible effect	Severe print fade, print legible
Mil 5606 Oil	Tubing stained red, no visible effect on printing	Severe print fade, print legible
Mil 7808 Oil	No visible effect	Severe print fade, print legible
Speedi Kut Cutting Oil 332	No visible effect	Moderate print fade, print legible
Gasoline	No visible effect	Severe print fade, print legible
Rust Veto® 377	Tubing stained orange, no visible effect on printing	Severe print fade, print legible
Skydrol® 500B-4	No visible effect	Severe print fade, print legible
Propylene Glycol	No visible effect	Slight print fade, print legible
Super Agitene®	No visible effect	Severe print fade, print legible
BIOACT® EC-7R™ Terpene Cleaner	No visible effect	Severe print fade, print legible
Deionized Water	No visible effect	No visible effect
3% Alconox® Detergent	No visible effect	Slight print fade, print legible
5% Salt Water Solution	No visible effect	Slight print fade, print legible

B-342 white and yellow were thermal transfer printed using Brady R6600 Series ribbon and shrunk on appropriate size wires. Test 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 cotton swab after final immersion.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Methyl Ethyl Ketone	No visible effect	Moderate print fade, print legible
Isopropyl Alcohol	No visible effect	No visible effect
JP-8 Jet Fuel	No visible effect	Moderate print fade, print legible
Kerosene	No visible effect	Moderate print fade, print legible
Mil 5606 Oil	Tubing stained red on edges, no visible effect on printing	Slight print fade, print legible
Mil 7808 Oil	No visible effect	No visible effect
Speedi Kut Cutting Oil 332	No visible effect	No visible effect
Gasoline	No visible effect	Moderate print fade, print legible
Rust Veto® 377	Tubing stained orange, no visible effect on printing	Slight print fade, print legible

Skydrol® 500B-4	No visible effect	Slight print fade, print legible
Propylene Glycol	No visible effect	No visible effect
Super Agitene®	No visible effect	Moderate print fade, print legible
BIOACT® EC-7R™ Terpene Cleaner	No visible effect	Severe print fade, print just legible
Deionized Water	No visible effect	No visible effect
3% Alconox® Detergent	No visible effect	No visible effect
5% Salt Water Solution	No visible effect	No visible effect

B-342 black samples were thermal transfer printed using R4502S silver ribbon and shrunk on appropriate size wires. Test 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 cotton swab after final immersion.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Methyl Ethyl Ketone	No visible effect	Severe print fade, print legible
Isopropyl Alcohol	No visible effect	No visible effect
JP-8 Jet Fuel	No visible effect	Severe print fade, print legible
Kerosene	No visible effect	Severe print fade, print legible
Mil 5606 Oil	No visible effect	Severe print fade, print legible
Mil 7808 Oil	No visible effect	Severe print fade, print legible
Speedi Kut Cutting Oil 332	No visible effect	No visible effect
Gasoline	No visible effect	Severe print fade, print legible
Rust Veto® 377	No visible effect	Severe print fade, print legible
Skydrol® 500B-4	No visible effect	Severe print fade, print legible
Propylene Glycol	No visible effect	Moderate print fade
Super Agitene®	No visible effect	Severe print fade, print legible
BIOACT® EC-7R™ Terpene Cleaner	No visible effect	Severe print fade, print legible
Deionized Water	No visible effect	No visible effect
3% Alconox® Detergent	No visible effect	Slight print fade
5% Salt Water Solution	No visible effect	Slight print fade

B-342 black samples were thermal transfer printed using R6700 white ribbon and shrunk on appropriate size wires. Test 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 cotton swab after final immersion.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Methyl Ethyl Ketone	No visible effect	Severe print fade, print legible
Isopropyl Alcohol	No visible effect	Severe print fade, print legible
JP-8 Jet Fuel	No visible effect	Severe print fade, print legible
Kerosene	No visible effect	Severe print fade, print legible
Mil 5606 Oil	No visible effect	Complete print removal
Mil 7808 Oil	No visible effect	Severe print fade, print legible
Speedi Kut Cutting Oil 332	No visible effect	Moderate print fade
Gasoline	No visible effect	Severe print fade, print legible
Rust Veto® 377	No visible effect	Severe print fade, print legible
Skydrol® 500B-4	No visible effect	Severe print fade, print legible
Propylene Glycol	No visible effect	Moderate print fade
Super Agitene®	No visible effect	Severe print fade, print legible
BIOACT® EC-7R™ Terpene Cleaner	No visible effect	Severe print fade, print legible
Deionized Water	No visible effect	No visible effect
3% Alconox® Detergent	No visible effect	Slight print fade
5% Salt Water Solution	No visible effect	Slight print fade

B-342 white samples were laser marked with a 10 watt fiber laser and shrunk on appropriate size wires. Test 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 cotton swab after final immersion.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Methyl Ethyl Ketone	No visible effect	No visible effect

Isopropyl Alcohol	No visible effect	No visible effect
JP-8 Jet Fuel	No visible effect	No visible effect
Kerosene	No visible effect	No visible effect
Mil 5606 Oil	Tubing stained red, no visible effect on laser marking	No visible effect
Mil 7808 Oil	No visible effect	No visible effect
Speedi Kut Cutting Oil 332	No visible effect	No visible effect
Gasoline	No visible effect	No visible effect
Rust Veto® 377	Tubing stained orange, no visible effect on laser marking	No visible effect
Skydrol® 500B-4	No visible effect	No visible effect
Propylene Glycol	No visible effect	No visible effect
Super Agitene®	No visible effect	No visible effect
BIOACT® EC-7R™ Terpene Cleaner	No visible effect	No visible effect
Deionized Water	No visible effect	No visible effect
3% Alconox® Detergent	No visible effect	No visible effect
5% Salt Water Solution	No visible effect	No visible effect

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 at 32-95 degrees F (0-35 degrees C) per SAE AS23053/5. 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 applications.

Trademarks:
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Alconox® is a registered trademark of Alconox Co.
All S.I. Units (metric) are mathematically derived from the U.S. Conventional
BIOACT® is a registered trademark of Petroferm, Inc.
EC-7R™ is a trademark of Petroferm Inc.
PermaSleeve® is a registered trademark of Brady Worldwide, Inc.
Rust Veto® is a registered trademark of the E.F. Houghton & Co.
SAE: Society of Automotive Engineers (U.S.A.)
Skydrol® is a registered trademark of the Monsanto Company
Super Agitene® is a registered trademark of Graymills Corporation

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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BRADY B-342 PERMASLEEVE MARKER

TDS No. B-342
Effective Date: 10/27/2017

Description:
GENERAL
Print Technology: Thermal transfer and dot matrix
Material Type: Irradiated polyolefin heat shrink tubing (3:1 shrink ratio)

APPLICATIONS
Wire identification and insulation purposes

RECOMMENDED RIBBONS
Brady R6600 Series for thermal transfer printing best smear and chemical resistance
Brady R4300 Series for thermal transfer printing general purpose ribbon
Brady R4502S for thermal transfer printing silver on dark colored markers
Brady R6700 for thermal transfer printing white on dark colored markers
Brady R5000 Series for dot matrix printing

REGULATORY/AGENCY APPROVALS
UL: B-342 is a UL Recognized Component to UL224 Extruded Insulated Tubing. See UL file E333786 for specific details. UL information can be accessed on line at *UL.com*. Search in *Certifications* area.
RoHS 2005/618/EC: As of January 2009, Brady began the transition to full RoHS compliant B-342 to 2005/618/EC MCV amendment to RoHS Directive 2002/95/EC. To determine if you have RoHS compliant product please contact customer service.

SPECIAL FEATURES
B-342 PermaSleeve™ Markers meet the material and physical property requirements of SAE AS23053/5 (Class 1) for Insulation Sleeving and SAE AS-81531 for Marking of Electrical Insulating Materials when printed with R6600,R4300, R4502S, R6700 Series thermal transfer ribbons, R5000 Series dot matrix ribbon, and with laser marking.

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

B-342 is available in white, yellow, black, red, orange, green, blue, violet, pink, gray, and brown.

B-342 can also be printed using laser marking method. Laser marking has very good environmental, abrasion, and chemical resistance.

Details:

MARKER SIZE		RANGE OF WIRE DIAMETER ((in)	RANGE OF WIRE DIAMETER ((mm)
3/32"	3PS-094	0.023 - 0.080	0.58 - 2.03
1/8"	3PS-125	0.046 - 0.110	1.17 - 2.79
3/16"	3PS-187	0.062 - 0.150	1.57 - 3.81
1/4"	3PS-250	0.094 - 0.215	2.39 - 5.46
3/8"	3PS-375	0.125 - 0.320	3.18 - 8.13
1/2"	3PS-500	0.187 - 0.450	4.75 - 11.43
3/4"	3PS-750	0.250 - 0.700	6.35 - 17.78
1"	3PS-1000	0.375 - 0.950	9.53 - 24.13
1 1/2"	3PS-1500	0.500 - 1.450	12.7 - 36.83

Shrink Method: Any industrial grade heat gun may be used to shrink B-342 PermaSleeve® Markers.

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

	minutes – 100 Flaming and Nonflaming Mode at 4.0 minutes – 200	Flaming Mode at 1.5 minutes – 76 Flaming Mode at 4.0 minutes – 155 Nonflaming Mode at 1.5 minutes – 2 Nonflaming Mode at 4.0 minutes – 13 Black: Flaming Mode at 1.5 minutes – 92 Flaming Mode at 4.0 minutes – 155 Nonflaming Mode at 1.5 minutes – 4 Nonflaming Mode at 4.0 minutes – 41

B-342 white, yellow and other colors tested/printed with R5000 Series dot matrix and R4300 and R6600 Series thermal transfer ribbons. B-342 black samples tested printed with R4502S silver and R6700 white thermal transfer ribbon. B-342 white samples were also laser marked with a 10 watt fiber laser. Results are the same with all processes and ribbons unless stated otherwise. White, yellow, and black data listed below, other color data available upon request.

PERFORMANCE PROPERTIES	TEST METHODS	AVERAGE RESULTS
High Service Temperatures	5 minutes at 500°F (260°C) 24 hours at 350°F (180°C) 1000 hours at 267°F (130°C)	White: Slight tube darkening and yellowing Yellow: Moderate tube darkening. Black: No visible effect to tubing, slight print yellowing (R6700). White and yellow: Slight tube darkening. White and yellow: Moderate tube darkening. No visible change to printing in above conditions (R4300, R6600, and laser marking)
Low Service Temperature	1000 hours at -94°F (-70°C)	No visible effect
Weatherability	ASTM G155 Cycle 1 1000 hours in Xenon Arc Weatherometer	White: Slight tube yellowing Yellow: No visible effect No visible change to printing
UV Light Resistance	ASTM G155 Cycle 1 dry 1000 hours	White: Moderate tube yellowing Yellow: No visible effect No visible change to printing
Humidity Resistance	1000 hours at 100°F/95% R.H.	No visible effect
Salt Fog	1000 hours in 5% Salt Fog Chamber per ASTM B117	Moderate print fade (R4502S on black marker). No visible effect to all other color/ribbon combinations and laser marking.
Dielectric Strength	ASTM D2671 (after unrestricted shrink)	500 volts/mil minimum
Flammability	ASTM D2671, Procedure B	Self-extinguishing within 60 seconds
Print Adherence per SAE-AS81531 (Sec 3.4.2)	Samples tested after unrestricted shrink at 200°C for 3 minutes 20 eraser rubs with hard hand pressure	Print is still easily legible on sleeves printed with all ribbons and laser marking.
Solvent Resistance per SAE-AS81531 (Sec 3.4.3) Solution A Solution C Solution D	Samples tested after unrestricted shrink at 200°C for 3 minutes MIL-STD-202, Method 215K 3 cycles of 3 minute immersions in specified fluids followed by toothbrush rub after each immersion	Print still easily legible on sleeves printed with all ribbons and laser marking in all three test fluids

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

PERFORMANCE PROPERTY	CHEMICAL RESISTANCE

B-342 white, yellow and other colors were dot matrix printed using Brady R5000 Series ribbon and shrunk on appropriate size wires. Test 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 cotton swab after final immersion.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Methyl Ethyl Ketone	No visible effect	Severe print fade, print legible

Isopropyl Alcohol	No visible effect	Severe print fade, print legible
JP-8 Jet Fuel	No visible effect	Severe print fade, print legible
Kerosene	No visible effect	Severe print fade, print legible
Mil 5606 Oil	White and yellow tubing stained red on edges, no visible effect on printing	Severe print fade, print legible
Mil 7808 Oil	No visible effect	Severe print fade, print legible
Speedi Kut Cutting Oil 332	No visible effect	Moderate print fade, print legible
Gasoline	No visible effect	Severe print fade, print legible
Rust Veto® 377	Tubing stained orange, no visible effect on printing	Severe print fade, print legible
Skydrol® 500B-4	No visible effect	Severe print fade, print legible
Propylene Glycol	No visible effect	Moderate print fade, print legible
Super Agitene®	No visible effect	Severe print fade, print legible
BIOACT® EC-7R™ Terpene Cleaner	No visible effect	Severe print fade, print legible
Deionized Water	No visible effect	No visible effect
3% Alconox® Detergent	No visible effect	No visible effect
5% Salt Water Solution	No visible effect	No visible effect

B-342 white, yellow and other colors were thermal transfer printed using R4300 Series ribbon and shrunk on appropriate size wires. Test 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 cotton swab after final immersion.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Methyl Ethyl Ketone	No visible effect	Severe print fade, print legible
Isopropyl Alcohol	No visible effect	Severe print fade, print legible
JP-8 Jet Fuel	No visible effect	Severe print fade, print legible
Kerosene	No visible effect	Severe print fade, print legible
Mil 5606 Oil	Tubing stained red, no visible effect on printing	Severe print fade, print legible
Mil 7808 Oil	No visible effect	Severe print fade, print legible
Speedi Kut Cutting Oil 332	No visible effect	Moderate print fade, print legible
Gasoline	No visible effect	Severe print fade, print legible
Rust Veto® 377	Tubing stained orange, no visible effect on printing	Severe print fade, print legible
Skydrol® 500B-4	No visible effect	Severe print fade, print legible
Propylene Glycol	No visible effect	Slight print fade, print legible
Super Agitene®	No visible effect	Severe print fade, print legible
BIOACT® EC-7R™ Terpene Cleaner	No visible effect	Severe print fade, print legible
Deionized Water	No visible effect	No visible effect
3% Alconox® Detergent	No visible effect	Slight print fade, print legible
5% Salt Water Solution	No visible effect	Slight print fade, print legible

B-342 white and yellow were thermal transfer printed using Brady R6600 Series ribbon and shrunk on appropriate size wires. Test 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 cotton swab after final immersion.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Methyl Ethyl Ketone	No visible effect	Moderate print fade, print legible
Isopropyl Alcohol	No visible effect	No visible effect
JP-8 Jet Fuel	No visible effect	Moderate print fade, print legible
Kerosene	No visible effect	Moderate print fade, print legible
Mil 5606 Oil	Tubing stained red on edges, no visible effect on printing	Slight print fade, print legible
Mil 7808 Oil	No visible effect	No visible effect
Speedi Kut Cutting Oil 332	No visible effect	No visible effect
Gasoline	No visible effect	Moderate print fade, print legible
Rust Veto® 377	Tubing stained orange, no visible effect on printing	Slight print fade, print legible

Skydrol® 500B-4	No visible effect	Slight print fade, print legible
Propylene Glycol	No visible effect	No visible effect
Super Agitene®	No visible effect	Moderate print fade, print legible
BIOACT® EC-7R™ Terpene Cleaner	No visible effect	Severe print fade, print just legible
Deionized Water	No visible effect	No visible effect
3% Alconox® Detergent	No visible effect	No visible effect
5% Salt Water Solution	No visible effect	No visible effect

B-342 black samples were thermal transfer printed using R4502S silver ribbon and shrunk on appropriate size wires. Test 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 cotton swab after final immersion.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Methyl Ethyl Ketone	No visible effect	Severe print fade, print legible
Isopropyl Alcohol	No visible effect	No visible effect
JP-8 Jet Fuel	No visible effect	Severe print fade, print legible
Kerosene	No visible effect	Severe print fade, print legible
Mil 5606 Oil	No visible effect	Severe print fade, print legible
Mil 7808 Oil	No visible effect	Severe print fade, print legible
Speedi Kut Cutting Oil 332	No visible effect	No visible effect
Gasoline	No visible effect	Severe print fade, print legible
Rust Veto® 377	No visible effect	Severe print fade, print legible
Skydrol® 500B-4	No visible effect	Severe print fade, print legible
Propylene Glycol	No visible effect	Moderate print fade
Super Agitene®	No visible effect	Severe print fade, print legible
BIOACT® EC-7R™ Terpene Cleaner	No visible effect	Severe print fade, print legible
Deionized Water	No visible effect	No visible effect
3% Alconox® Detergent	No visible effect	Slight print fade
5% Salt Water Solution	No visible effect	Slight print fade

B-342 black samples were thermal transfer printed using R6700 white ribbon and shrunk on appropriate size wires. Test 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 cotton swab after final immersion.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Methyl Ethyl Ketone	No visible effect	Severe print fade, print legible
Isopropyl Alcohol	No visible effect	Severe print fade, print legible
JP-8 Jet Fuel	No visible effect	Severe print fade, print legible
Kerosene	No visible effect	Severe print fade, print legible
Mil 5606 Oil	No visible effect	Complete print removal
Mil 7808 Oil	No visible effect	Severe print fade, print legible
Speedi Kut Cutting Oil 332	No visible effect	Moderate print fade
Gasoline	No visible effect	Severe print fade, print legible
Rust Veto® 377	No visible effect	Severe print fade, print legible
Skydrol® 500B-4	No visible effect	Severe print fade, print legible
Propylene Glycol	No visible effect	Moderate print fade
Super Agitene®	No visible effect	Severe print fade, print legible
BIOACT® EC-7R™ Terpene Cleaner	No visible effect	Severe print fade, print legible
Deionized Water	No visible effect	No visible effect
3% Alconox® Detergent	No visible effect	Slight print fade
5% Salt Water Solution	No visible effect	Slight print fade

B-342 white samples were laser marked with a 10 watt fiber laser and shrunk on appropriate size wires. Test 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 cotton swab after final immersion.

CHEMICAL REAGENT	SUBJECTIVE OBSERVATION OF VISUAL CHANGE	
	TUBING AND PRINTING WITHOUT SWAB RUB	PRINTING WITH SWAB RUB
Methyl Ethyl Ketone	No visible effect	No visible effect

Isopropyl Alcohol	No visible effect	No visible effect
JP-8 Jet Fuel	No visible effect	No visible effect
Kerosene	No visible effect	No visible effect
Mil 5606 Oil	Tubing stained red, no visible effect on laser marking	No visible effect
Mil 7808 Oil	No visible effect	No visible effect
Speedi Kut Cutting Oil 332	No visible effect	No visible effect
Gasoline	No visible effect	No visible effect
Rust Veto® 377	Tubing stained orange, no visible effect on laser marking	No visible effect
Skydrol® 500B-4	No visible effect	No visible effect
Propylene Glycol	No visible effect	No visible effect
Super Agitene®	No visible effect	No visible effect
BIOACT® EC-7R™ Terpene Cleaner	No visible effect	No visible effect
Deionized Water	No visible effect	No visible effect
3% Alconox® Detergent	No visible effect	No visible effect
5% Salt Water Solution	No visible effect	No visible effect

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 at 32-95 degrees F (0-35 degrees C) per SAE AS23053/5. 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 applications.

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