Technical Data Sheet

BRADY B-459 THERMAL TRANSFER PRINTABLE MATTE WHITE POLYESTER LABEL STOCK

TDS No. B-459
Effective Date: 12-Jul-2010

Description:

GENERAL
Print Technology: Thermal Transfer
Material Type: White Polyester
Finish: Matte
Adhesive: Permanent Acrylic

APPLICATIONS
Designed for applications such as topside of printed circuit boards and rating plates that utilize high quality/density alphanumericics, barcodes and graphics.

RECOMMENDED RIBBONS
Brady Series R4900 and R6000 black ribbons
Brady Series R6000HF (low halogen)
Brady Series R4400 colored (red, green, blue) ribbons

REGULATORY/AGENCY APPROVALS
UL: B-459 is UL Recognized to UL 969 Labeling and Marking Standard when printed with Brady Series R4900 or R6000 black and R4400 colored ribbons. See UL file MH17154 for specific details.
CSA: B-459 is CSA Accepted to C22.2 No.0.15-95 Adhesive Labels Standard when printed with Brady Series R4900 and R6000 ribbon. See CSA file 041833 for specific details.

Brady B-459 is RoHS compliant to 2005/618/EC MCV amendment to RoHS Directive 2002/95/EC.

Details:

<table>
<thead>
<tr>
<th>PHYSICAL PROPERTIES</th>
<th>TEST METHODS</th>
<th>AVERAGE RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>ASTM D 1000</td>
<td></td>
</tr>
<tr>
<td>-Substrate</td>
<td></td>
<td>0.0023 inch (0.0584 mm)</td>
</tr>
<tr>
<td>-Adhesive</td>
<td></td>
<td>0.0008 inch (0.0203 mm)</td>
</tr>
<tr>
<td>-Total</td>
<td></td>
<td>0.0031 inch (0.0787 mm)</td>
</tr>
<tr>
<td>Adhesion to:</td>
<td>ASTM D 1000</td>
<td></td>
</tr>
<tr>
<td>-Stainless Steel</td>
<td>20 minute dwell</td>
<td>44 oz/in (48 N/100 mm)</td>
</tr>
<tr>
<td></td>
<td>24 hour dwell</td>
<td>49 oz/in (54 N/100 mm)</td>
</tr>
<tr>
<td>-Polypropylene</td>
<td>20 minute dwell</td>
<td>31 oz/in (34 N/100 mm)</td>
</tr>
<tr>
<td></td>
<td>24 hour dwell</td>
<td>43 oz/in (47 N/100 mm)</td>
</tr>
<tr>
<td>Tensile Strength and Elongation</td>
<td>ASTM D 1000</td>
<td></td>
</tr>
<tr>
<td>-Machine</td>
<td></td>
<td>44 lbs/in (765 N/100 mm), 90%</td>
</tr>
<tr>
<td>Tack</td>
<td>ASTM D 2979</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Polyken™ Probe Tack</td>
<td>19 oz (526 g)</td>
</tr>
<tr>
<td></td>
<td>1 second dwell</td>
<td></td>
</tr>
</tbody>
</table>

Performance properties tested on B-459 printed with R4000, R4900, R6000, R6000HF black and R4400 colored ribbons. Printed samples were laminated to aluminum and allowed to dwell 24 hours before exposure to the indicated environments. Unless noted, results the same for all ribbons.
## PERFORMANCE PROPERTIES

<table>
<thead>
<tr>
<th>Short Term High Service Temperature</th>
<th>5 minutes at 356°F (180°C)</th>
<th>No visible effect at 180°C Label shrinkage at 210°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Term High Service Temperature</td>
<td>30 days at 212°F (100°C)</td>
<td>No visible effect at 100°C Label yellowed at 120°C</td>
</tr>
<tr>
<td>Low Service Temperature</td>
<td>30 days at -40°F (-40°C)</td>
<td>No visible effect</td>
</tr>
<tr>
<td>Humidity Resistance</td>
<td>30 days at 100°F (37°C), 95% R.H.</td>
<td>No visible effect</td>
</tr>
<tr>
<td>UV Light Resistance</td>
<td>30 days in UV Sunlighter™ 100</td>
<td>Severe yellowing of topcoat</td>
</tr>
<tr>
<td>Weatherability</td>
<td>ASTM G155, Cycle 1 30 days in Xenon Arc Weatherometer</td>
<td>Slight topcoat discoloration and chalking. R4400 red print removed.</td>
</tr>
<tr>
<td>Salt Fog Resistance</td>
<td>ASTM B 117 30 days in 5% salt fog solution chamber</td>
<td>No visible effect</td>
</tr>
<tr>
<td>Abrasion Resistance</td>
<td>Taber Abraser, CS-10 grinding wheels, 500 g/arm (Fed. Std. 191A, Method 5306)</td>
<td>Print legible to: R4000= 30 cycles R4900= 150 cycles R6000= 300 cycles R6000HF= 100 cycles R4400= 100 cycles</td>
</tr>
</tbody>
</table>

## CHEMICAL RESISTANCE

Samples printed with Series R4000, R4900, R6000 and R6000HF ribbons. Samples laminated to aluminum panels and allowed to dwell 24 hours prior to testing. Test conducted at room temperature. Testing consisted of 5 cycles of 10 minute immersions in the specified test fluid followed by a 30 minute recovery period. After final immersion, samples rubbed 10 times with cotton swab saturated with test fluid.

### CHEMICAL REAGENT

<table>
<thead>
<tr>
<th>EFFECT TO LABEL STOCK</th>
<th>R4000</th>
<th>R4900/R6000</th>
<th>R6000HF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyl Ethyl Ketone</td>
<td>Topcoat degraded</td>
<td>Print removed when immersed</td>
<td>Print removed when immersed</td>
</tr>
<tr>
<td>1,1,1-Trichloroethane</td>
<td>No visible effect</td>
<td>Print removed when immersed</td>
<td>No visible effect w/o rub, print removed after rub</td>
</tr>
<tr>
<td>Isopropyl Alcohol</td>
<td>No visible effect</td>
<td>No visible effect w/o rub, print removal after rub</td>
<td>No visible effect</td>
</tr>
<tr>
<td>Mineral Spirits</td>
<td>No visible effect</td>
<td>No visible effect w/o rub, print removal after rub</td>
<td>No visible effect</td>
</tr>
<tr>
<td>SAE 20 WT Oil @ 70°C</td>
<td>No visible effect</td>
<td>No visible effect w/o rub, print removal after rub</td>
<td>No visible effect</td>
</tr>
<tr>
<td>Mil 5606 Oil</td>
<td>No visible effect</td>
<td>No visible effect</td>
<td>No visible effect</td>
</tr>
<tr>
<td>Speedi Kut Cutting Oil 332</td>
<td>No visible effect</td>
<td>No visible effect</td>
<td>No visible effect</td>
</tr>
<tr>
<td>Gasoline</td>
<td>Slight yellowing</td>
<td>No visible effect w/o rub, print removal after rub</td>
<td>No visible effect w/o rub, slight print removal after rub</td>
</tr>
<tr>
<td>Rust Veto® 342</td>
<td>Slight yellowing</td>
<td>No visible effect w/o rub, print removal after rub</td>
<td>No visible effect</td>
</tr>
<tr>
<td>Northwoods™ Buzz Saw Degreaser</td>
<td>No visible effect</td>
<td>No visible effect w/o rub, print removal after rub</td>
<td>No visible effect</td>
</tr>
<tr>
<td>Deionized Water</td>
<td>No visible effect</td>
<td>No visible effect</td>
<td>No visible effect</td>
</tr>
<tr>
<td>5% Salt Solution</td>
<td>No visible effect</td>
<td>No visible effect</td>
<td>No visible effect</td>
</tr>
</tbody>
</table>
### Trademarks:

- **Alconox®**: A registered trademark of Alconox Co.
- **BradyPrinter™**: A trademark of Brady Worldwide, Inc.
- **Northwoods™**: A trademark of the Superior Chemical Corporation
- **Polyken™**: A trademark of Testing Machines Inc.
- **Rust Veto®**: A registered trademark of the E.F. Houghton & Co.
- **Sunlighter™**: A trademark of the Test Lab Apparatus Company
- **ASTM**: American Society for Testing and Materials (U.S.A.)
- **CSA**: Canadian Standards Association
- **SAE**: Society of Automotive Engineers (U.S.A.)
- **UL**: Underwriters Laboratories Inc. (U.S.A.)

All S.I. Units (metric) are mathematically derived from the U.S. Conventional Units.

### 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.

<table>
<thead>
<tr>
<th>Detergent</th>
<th>No visible effect</th>
<th>No visible effect</th>
<th>No visible effect</th>
<th>No visible effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>3% Alconox®</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10% Sodium Hydroxide Solution</td>
<td></td>
<td>No visible effect</td>
<td>No visible effect</td>
<td>No visible effect</td>
</tr>
<tr>
<td>10% Sulfuric Acid Solution</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results the same with R4900 and R6000 ribbon. Solvent resistance results for R4400 colored ribbons not reported.

Product testing, customer feedback, 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 degrees 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 applications.
**Specification Of Thermal Transfer Printable Labels**

**Application(s):** Circuit Board & Component ID, General Identification, Through Hole - Top

**Agency Approval(s)/Compliance:** CSA Approved, UL Recognized

**Size:** 1.000" W x 0.500" H (25.400 mm W x 12.700 mm H)

**Printable Area:** 1.000" W x 0.500" H (25.400 mm W x 12.700 mm H)

**Web Width:** 3.350" (85.09 mm)

**Label Type/Style:** Label

**Vertical Repeat:** 0.600" (15.24 mm)

**Horizontal Repeat:** 1.075" (27.31 mm)

**Color:** White

**Finish:** Matte

**Qty Per Row:** 3

**Material Type:** Polyester

**Material Description:** Permanent Polyester

**Brady Material #:** B-459

**Recommended Ribbon Series:** 6000

**Suggested Ribbon Series:** R6002

**Acceptable Ribbon Series:** 4900, 4400 (colors)

**After Process:** Yes, this material will work with this application

**Printer Compatibility:** BBP81, Brady 1244, Brady 1344, Brady 200MVP Plus, Brady 2461, Brady 300MVP Plus, Brady 300X-Plus II, Brady 3481, Brady 360X-Plus II, Brady 6441, Brady IP, Tagus T200, Tagus T300, Thermal Transfer Printers

**Surface:** Smooth

**Surface Mount Technology:** No, this material does not work with this application

**Through Hole Technology:** Top: Yes. In extreme high temperatures, testing of this material is recommended, Bottom: No

**RoHS Compatibility:** Compliant with RoHS Directive. NOTE: All statements concerning RoHS Directive compliance refer to 2005/618/EC MCV amendment to RoHS Directive 2002/95/EC. Product compliance is based upon information provided by suppliers of the raw materials used by Brady to manufacture these products, or by independent laboratory testing of these products. As such, Brady makes no independent representations or warranties, express or implied, and assumes no liability in connection with the use of this information.

**QTY/UOM:** 10,000/Roll