

YOUR NEXT DESIGN SUCCESS

INCLUDES THE **RIGHT LABEL**

10 Labels That Solve
Engineering
Challenges



 **BRADY**
WHEN PERFORMANCE MATTERS MOST™

INTRODUCTION

When you make thousands of specification decisions in any given design and a label is needed for identification, then your next design success depends on selecting the right label and understanding its performance characteristics. Whether you need barcode labels, electrostatic dissipative labels, equipment identification, rating plates, circuit board labels, product or component identification, this guidebook offers performance testing data and helps you select and begin to specify labels that solve your engineering challenges.

CHAPTER 1

Why Label Construction Matters: Understanding Label Assembly page 3

CHAPTER 2

What Could Happen with the Wrong Label? page 4

CHAPTER 3

10 Labels that Solve Engineering Challenges page 5

CHAPTER 4

Summary & Why Chose Brady? page 16



DID YOU KNOW

Brady supplied name plates to the Gemini Space Program in 1962. Today we provide labels to Space X, Airbus and Boeing.

WHY LABEL CONSTRUCTION MATTERS

When performance matters most, details matter, and that's why each label is built to meet specific application needs. Take a look at the label construction below to see just what goes into a reliable label.

1. Topcoat

Gives the label its color and finish, receives the print and increases resistance against weathering, chemicals and heat.

2. Substrate

Gives the label its form and provides mechanical properties, such as tensile strength and flexibility, and physical properties, such as chemical and temperature resistance.

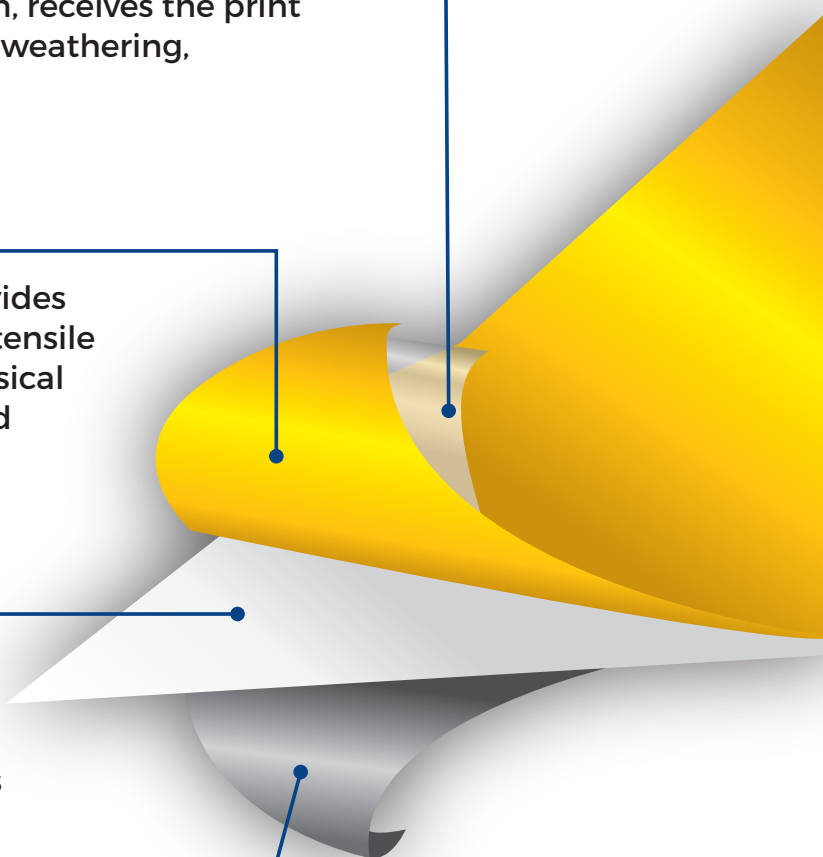
3. Adhesive

Acrylic: Excellent all around adhesion characteristics for general application. Also ideal for high surface energy materials and rough surfaces.

Rubber: Stronger than acrylic for use on low surface energy plastics. This material is sensitive to degradation from elevated temperatures and UV light.

4. Liner

Is a very thin carrier that protects the adhesive and allows for removability of the label.



WHAT COULD HAPPEN WITH THE WRONG LABEL?

Having the wrong label could be a disaster for your identification task – leading to wasted time doing re-work, errors in your processes and unhappy customers. The following examples explain what could go wrong with the wrong type of label in your design:



Text

You need your barcodes and alphanumerics be clear and crisp – and remain that way – to ensure effective identification. With the wrong label, you could face smearing, fading and unreadable text. With the right label, you benefit from durable ink formulas, protective coating options that stand up to your application needs, and legible messages with high resolution printing and a variety of font sizes.



Topcoat

When you have the wrong label with the wrong topcoat for your identification task, you could face the topcoat peeling off the film, leaving the text and label surface unprotected. The right label will align with your environmental needs and withstand the temperatures, chemicals and other elements that are required.



Film

With the wrong label, you could face film that shrinks or becomes discolored when exposed to high heat. Find a durable material that aligns with your application to ensure your label stays intact.



Adhesive

Adhesive is an essential element when it comes to effective identification. The wrong label, with the wrong type or strength of adhesive, means your label could lift, fall off or move around, or leave residue. Whether acrylic or rubber adhesive, permanent or removable, be sure to find the right adhesive that adheres to the surfaces you require.

Keep these elements in mind when considering the labels in the following chapter and which materials solve your challenges.

10 LABELS THAT SOLVE ENGINEERING CHALLENGES

Based on your labeling needs and the engineering challenges you face each day, finding the right label is integral to the success of your design processes and business overall.

To get the right label for your job, take a look at these 10 label materials and the challenges they can help solve in the following pages:

1

Polyimide Material (B-727)

Printed circuit boards and electronic component identification

6

Weather Resistant Label Material (B-8591)

Outdoor labeling for nameplates and asset tracking

2

Polyester Material (B-423)

Component ID, barcoding, asset and inventory tracking

7

Metalphoto® Photosensitive Anodized Aluminum (B-510)

Aluminum labeling for nameplates, schematics and control panels

3

Metallized Polyester (B-428)

Serial and rating plate applications with name-plate quality

8

Reversible Temperature Indicating Labels (B-7518)

Visual indication of heat exposure for components and equipment

4

Polypropylene Material (B-425)

Solvent resistance and print performance

9

Durable Black Polyester Labels (B-8117)

Regulatory labels for electrical components and finished goods

5

Polyester Material (B-490)

Laboratory ID for cold and frozen surfaces

10

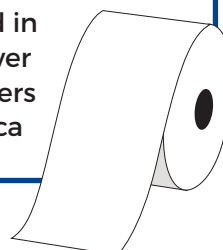
Raised Panel Labels (B-593)

Push-buttons, switches, internal connection points, rating and serial plates



DID YOU KNOW

Brady materials are developed in house, by our experts - with over 600 patents and **150** B-Numbers for Product ID in North America

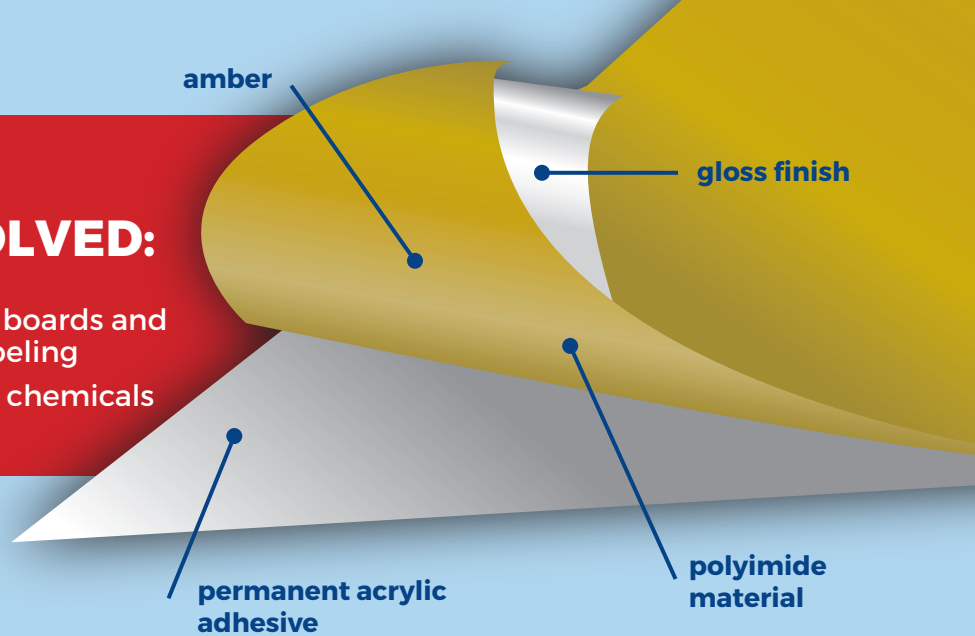


1

LABELING CHALLENGES SOLVED:

- Wave solder environments for circuit boards and electrical component pre-process labeling
- Extreme wash protocol and cleaning chemicals
- Auto apply equipment

Withstands extreme environments for barcode or alphanumeric identification of printed circuit boards or related electronic components.



BRADY POLYIMIDE MATERIAL (B-727)

PERFORMANCE ATTRIBUTES:



ABRASION RESISTANCE

Resistance proven with testing on Taber Abraser equipment with CS-10 grinding wheels and weighted arms. Print is still legible after 100 cycles.



HIGH HEAT RESISTANCE

Resistance to 212°F (100°C). Labels subjected to a range of temperatures for 1,000 hours with no visible effect and label remaining functional.



LOW TEMPERATURE RESISTANCE

Labels subjected to -40°F and -94°F (-40°C and -70°C) for 1,000 hours with no visible effect and label remaining functional.



ADHERES TO

Stainless steel, epoxy PC board

REGULATORY / AGENCY APPROVALS:

- UL Recognized to UL969 Labeling and Marking Standard when printed with the Brady Series R6000 halogen free ribbon
- RoHS compliant to RoHS Directive 2011/65/EU
- Dibutyl and dioctyl tin free

COMMON VARIATIONS INCLUDE:

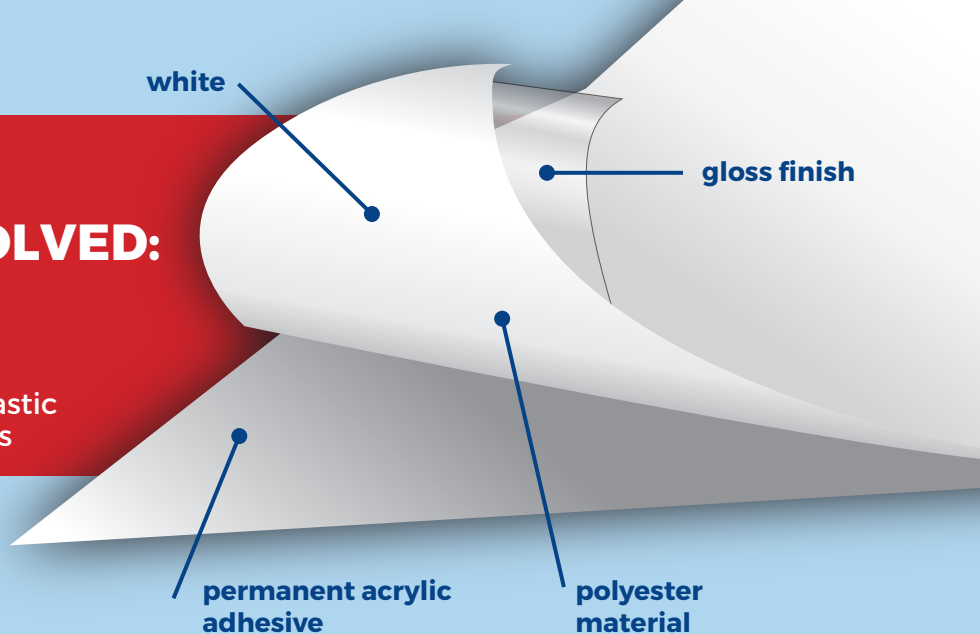
- Auto-Dispense: B-7727
- Matte: B-728, B-729
- ESD Gloss: B-717, B-718
- ESD Matte: B-719
- No re-flow required: B-777

2

LABELING CHALLENGES SOLVED:

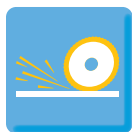
- Component identification
- Bar code labels and rating plates
- Use on glass, thermoset polyester plastic and polyvinyl fluoride plastic surfaces

This Brady WorkHorse™ series label is a great all around label material, for identification, barcoding, asset and inventory tracking.



BRADY POLYESTER MATERIAL (B-423)

PERFORMANCE ATTRIBUTES:



ABRASION RESISTANCE

Resistance proven with testing on Taber Abraser equipment with CS-10 grinding wheels and weighted arms. Print is still legible after 100 cycles.



HIGH HEAT RESISTANCE

Resistance to 230°F (110°C). Labels subjected to a range of temperatures for 30 days with no visible effect and label remaining functional.



LOW TEMPERATURE RESISTANCE

Labels subjected to -40°F and -94°F (-40°C and -70°C) for 30 days with no visible effect and label remaining functional.



ADHERES TO

Stainless steel, painted enamel, polyester powder coated paint



FUEL / OIL RESISTANCE

Resistance proven with immersion test in gasoline, SAE 20wt oil, JP-8 jet fuel and MIL-H-5606 oil. One 30 minute immersion, followed by a rub test with a cotton swab, showed no visible effect or slight print removal.

REGULATORY / AGENCY APPROVALS:

- UL Recognized Component to UL969 Labeling and Marking Standard when printed with Brady Series R6000 halogen free ribbon
- Meets requirements of a halogen free material per DIN VDE 0472 part 815

COMMON VARIATIONS INCLUDE:

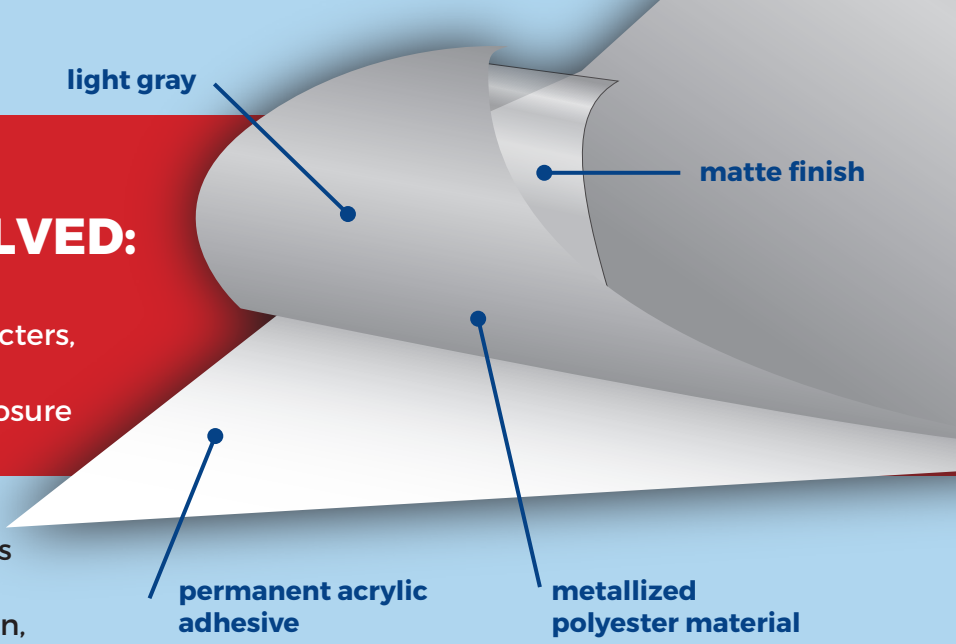
- Low Cost: B-8423
- Matte: B-488
- Metallized: B-428
- Rubber Adhesive: B-483
- Metallized Rubber Adhesive: B-486

3

LABELING CHALLENGES SOLVED:

- Nameplate-quality identification that utilizes barcodes, alphanumeric characters, graphic symbols and logos
- Solvent and variable temperature exposure

This material is designed for applications such as rating and serial plates that require durable and quality identification, along with versatility in using characters, graphics and barcodes.



BRADY METALLIZED POLYESTER (B-428)

PERFORMANCE ATTRIBUTES:



SOLVENT/CHEMICAL RESISTANCE

Resistance proven with MEK and toluene immersion test. 5 cycles, 10 minute immersions, 30 minute recovery between immersions and followed by a rub test with a cotton swab showed no visible effect or print removal.



HIGH HEAT RESISTANCE

Resistance to 248°F (120°C). Labels subjected to a range of temperatures for 30 days with no visible effect and label remaining functional.



LOW TEMPERATURE RESISTANCE

Labels subjected to -40°F and -94°F (-40°C and -70°C) for 30 days with no visible effect and label remaining functional.



ADHERES TO

Stainless steel, polypropylene



FUEL/OIL RESISTANCE

Resistance proven with immersion test in brake fluid, SAE 20wt oil, JP-8 jet fuel and MIL-H-5606 oil. One 30 minute immersion followed by a rub test with a cotton swab showed no visible effect or slight print removal.

REGULATORY / AGENCY APPROVALS:

- UL Recognized Component when printed with the Brady Series R4300 Ribbon
- Meets the requirements of a halogen free material per DIN VDE 0472 part 815
- RoHS compliant to RoHS Directive 2002/95/EC

COMMON VARIATIONS INCLUDE:

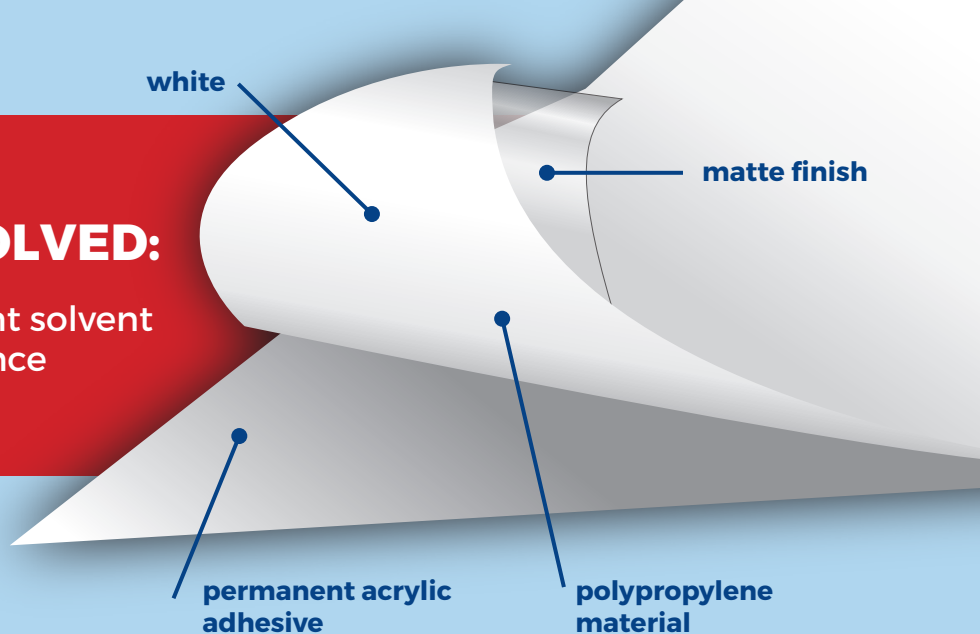
- Metallized Gloss: B-434, B-435
- Metallized Matte: B-486
- Metallic Colored Polyester: B-413, B-480

4

LABELING CHALLENGES SOLVED:

- Applications requiring excellent solvent resistance and print performance

This Brady WorkHorse™ series label is ideal for applications that require solvent resistance and print performance.



BRADY POLYPROPYLENE MATERIAL (B-425)

PERFORMANCE ATTRIBUTES:



SOLVENT/CHEMICAL RESISTANCE

Resistance proven with MEK, acetone, toluene and xylene immersion test. One 30 minute immersion followed by a rub test with a cotton swab showed no visible effect or print removal.



FUEL / OIL RESISTANCE

Resistance proven with immersion test in brake fluid, SAE 20wt oil, JP-8 jet fuel and MIL-H-5606 oil. One 30 minute immersion followed by a rub test with a cotton swab showed no visible effect or slight print removal.



LOW TEMPERATURE RESISTANCE

Labels subjected to -40°F and -94°F (-40°C and -70°C) for 30 days with no visible effect and label remaining functional.



ADHERES TO

Stainless Steel, Textured ABS, Polypropylene

REGULATORY / AGENCY APPROVALS:

- UL Recognized Component to UL969 Labeling and Marking Standard when printed with Brady Series R4300, R6200, R6400 and R7961 ribbons.
- CSA Accepted to C22.2 No.0.15-95 Adhesive Labels Standards when printed with the Brady Series R4300, R6200, R6400 and R7961 ribbons. B425 is approved to Type A.
- Meets the requirements of a halogen free material per DIN VDE 0472 part 815.
- RoHS compliant to RoHS Directive 2011/65/EU.

COMMON VARIATIONS INCLUDE:

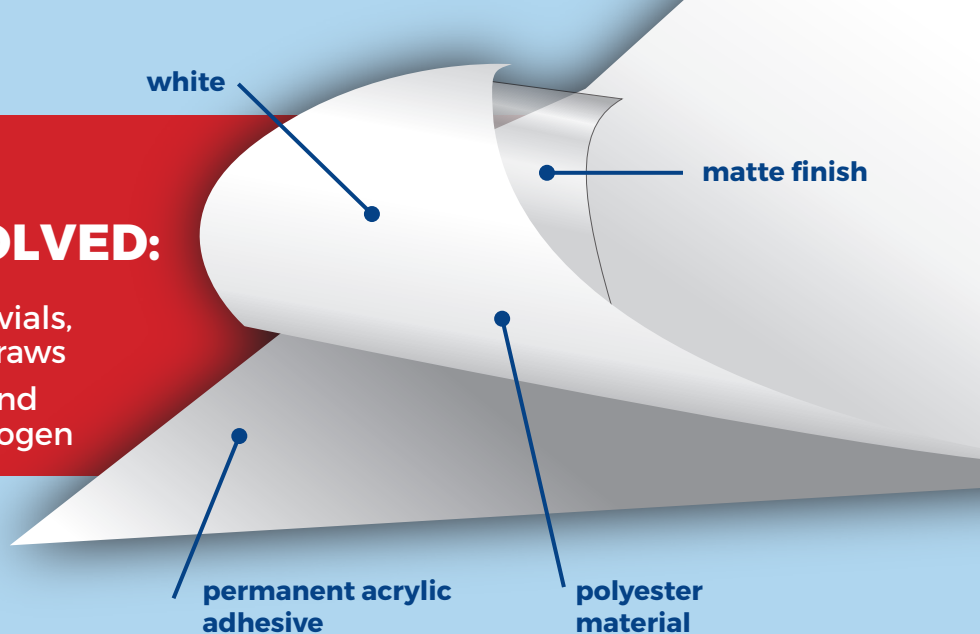
- Low Cost: B-8425

5

LABELING CHALLENGES SOLVED:

- Laboratory identification such as vials, centrifuge tubes, test tubes and straws
- Frozen surfaces, including glass and polypropylene stored in liquid nitrogen

This Freezerbondz™ label material is ideal for laboratory identification for frozen surfaces, or high temperatures. For tube/vial applications, the label material must be wrapped upon itself with at least 1/8 inch overlap.



BRADY POLYESTER MATERIAL (B-490)

PERFORMANCE ATTRIBUTES:



SOLVENT/CHEMICAL RESISTANCE

Moderate chemical resistance proven with toluene and xylene immersion test. One 15 minute immersion followed by a rub test with a cotton swab, showed no visible effect or print removal.



HIGH HEAT RESISTANCE

Resistance to 266°F (130°C). Labels subjected to a range of temperatures for 30 days with no visible effect and label remaining functional.



LOW TEMPERATURE RESISTANCE

Low temperature and thermal cycling resistant. Liquid nitrogen to boiling water: 1 hour at -320°F (-196°C) then placed in boiling water 212°F (100°C) for 10 minutes with no visible effect.



ADHERES TO

Glass, Polypropylene

REGULATORY:

- RoHS compliant to RoHS Directive 2011/65/EU.

COMMON VARIATIONS INCLUDE:

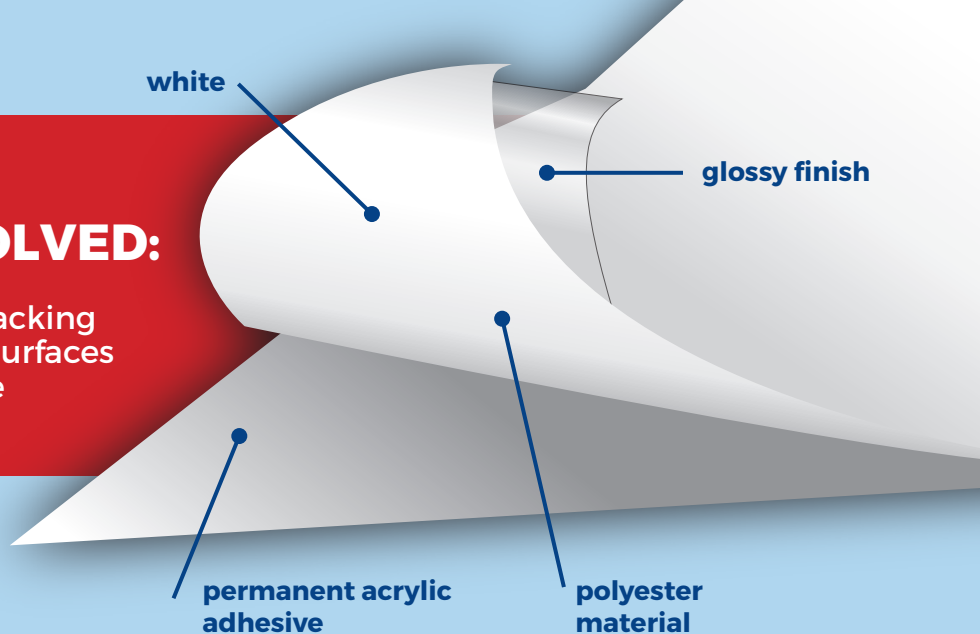
- Non Wrap Around: B-492

6

LABELING CHALLENGES SOLVED:

- Nameplate identification, asset tracking and general purpose labeling on surfaces that are constantly exposed to the outdoor environment

This material features up to 12+ year outdoor durability to protect against damaging UV rays, enabling superior performance without the overlamine.



WEATHER RESISTANT MATERIAL (B-8591)

PERFORMANCE ATTRIBUTES:



OUTDOOR DURABILITY

Favorable UV and weatherability testing equating up to 12 years or greater outdoor durability.*



HIGH HEAT RESISTANCE

Resistance to 230°F (110°C). Labels subjected to a range of temperatures for 30 days with no visible effect and label remaining functional.



LOW TEMPERATURE RESISTANCE

Labels subjected to -40°F and -94°F (-40°C and -70°C) for 30 days with no visible effect and label remaining functional.



ADHERES TO

Stainless Steel

REGULATORY / AGENCY APPROVALS:

- UL Pending
- RoHS compliant to RoHS Directive 2011/65/EU

COMMON VARIATIONS INCLUDE:

- Additional color options coming soon

* Outdoor performance statements are based on test results from accelerated weathering per ASTM G155, Cycle 1 and do not constitute a guarantee or warranty. Actual outdoor life of the product will depend on user definition of failure, climatic conditions, pollution, and label positioning. See Technical Data Sheet for more information and warranty.

7

LABELING CHALLENGES SOLVED:

- Durable labels, nameplates, schematics and control panels installed in harsh operating environments

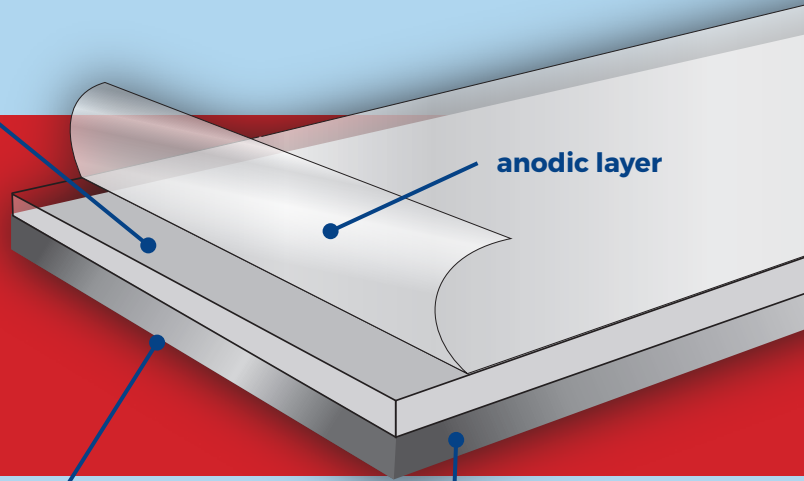
This Metalphoto label permanently seals a UV-stable image inside of anodized aluminum for unparalleled durability, image resolution and barcode readability.

metallic sealed image

anodic layer

permanent acrylic adhesive

photosensitive anodized aluminum material



METALPHOTO® PHOTSENSITIVE ANODIZED ALUMINUM (B-510)

PERFORMANCE ATTRIBUTES:



OUTDOOR DURABILITY

Favorable UV and weatherability testing equating to up to 20-year outdoor durability.



HIGH HEAT RESISTANCE

Resistance to 650°F (343°C) with no visible effect and label remaining functional.



ABRASION RESISTANCE

Resistance proven with testing on Taber Abraser equipment with CS-17 grinding wheels and weighted arms. Print is still legible after 100 cycles.



ADHERES TO

Stainless Steel



SOLVENT/CHEMICAL RESISTANCE

Organic solvent resistance with no softening, staining or noticeable fade after 24-hour exposure to: JP-4 fuel, hydrocarbon fluid, ethyl acetate, methyl ethyl ketone, turbine & jet fuel, kerosene, xylol and heptane.

REGULATORY:

- Widely specified: MIL-STD-130N, STANAG 2290, GG-P-455b(3) Type I, MIL-DTL- 15024F, MIL-P-19834B and A-A-50271
- Meets a wide array of commercial, government and military specifications

COMMON VARIATIONS INCLUDE:

- Matte: B-510
- Satin: B-510

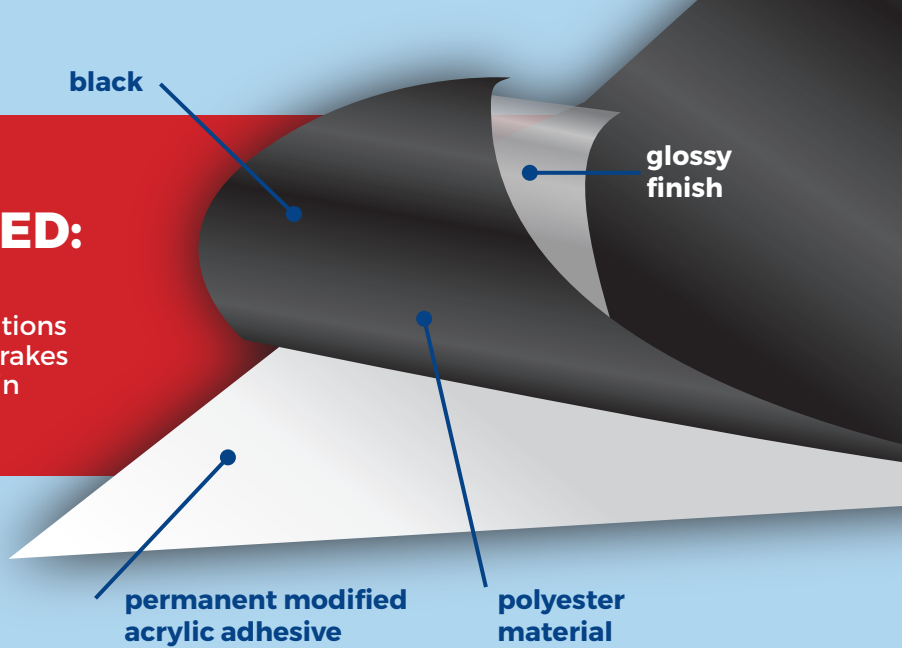
* Outdoor performance statements are based on test results from accelerated weathering per ASTM G155, Cycle 1 and do not constitute a guarantee or warranty. Actual outdoor life of the product will depend on user definition of failure, climatic conditions, pollution, and label positioning. See Technical Data Sheet for more information and warranty.

8

LABELING CHALLENGES SOLVED:

- Immediate visual indication of heat exposure
- Components, industrial and household applications (such as electric pumps, rotating equipment, brakes and refrigerators) in cold chains, hot spaces or in areas where measuring temperature becomes difficult or impractical

This VisAlert™ Series label provides visual indication of heat exposure to the indicated levels for temperature checks or trouble spotting.



REVERSIBLE TEMPERATURE INDICATING (B-7518)

PERFORMANCE ATTRIBUTES:



HIGH HEAT RESISTANCE

Resistance to 212°F (100°C). Labels subjected to a range of temperatures for 30 days with no visible effect and label remaining functional.



ADHERES TO

Stainless Steel, Smooth ABS, Polypropylene, Polyester Powder Coated Paint



REVERSIBLE TEMPERATURE INDICATING

Labels change in color at designated temperature. Temperature range covered is 32°F (0°C) to 212°F (100°C).

REGULATORY / AGENCY APPROVALS:

- RoHS compliant to RoHS Directive 2011/65/EU

COMMON VARIATIONS INCLUDE:

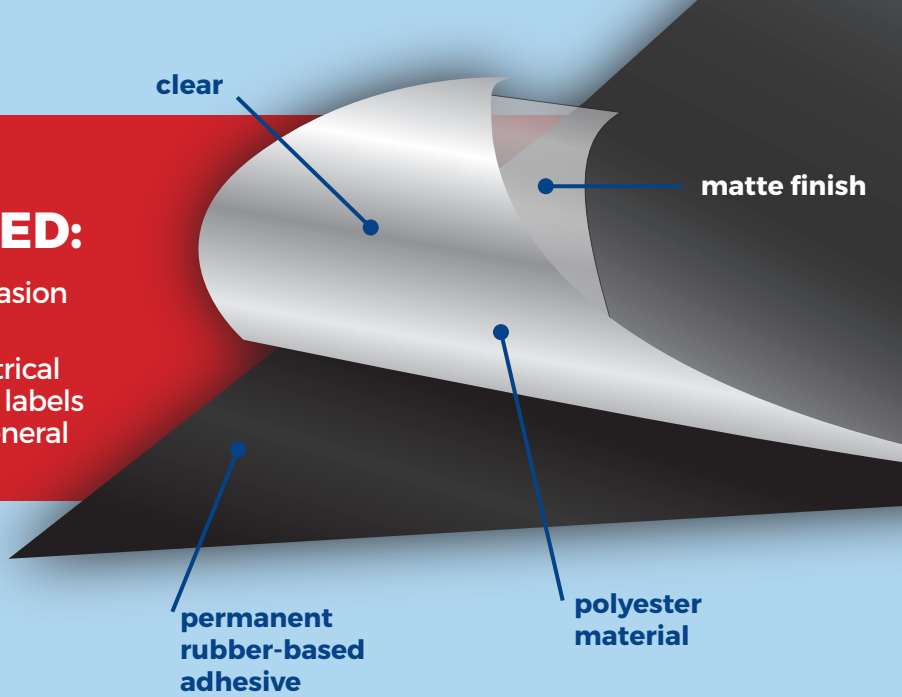
- Water Indicating: B-350
- Temperature Indicating: B-7511

9

LABELING CHALLENGES SOLVED:

- Color permanence and durability against abrasion and harsh fluids
- Regulatory and/or compliance labels on electrical components and finished goods, automotive labels found inside the passenger compartment, general identification and asset tracking

Features print durability, barcode readability and improved aesthetics with the color is sealed inside the label construction.



BRADY DURABLE POLYESTER LABELS (B-8117)

PERFORMANCE ATTRIBUTES:



OUTDOOR DURABILITY

Favorable UV and weatherability testing equating to 3 years or greater outdoor durability.



HIGH HEAT RESISTANCE

Resistance to 248°F (120°C). Labels subjected to a range of temperatures for 30 days with no visible effect and label remaining functional.



LOW TEMPERATURE RESISTANCE

Labels subjected to -40°F and -94°F (-40°C and -70°C) for 30 days with no visible effect and label remaining functional.



ADHERES TO

Stainless Steel, ABS, Polycarbonate, Acrylic (PMMA)

REGULATORY / AGENCY APPROVALS:

- UL Recognized Component to UL969 Labeling and Marking Standard when printed with Brady Series R6800 ribbon.

10

LABELING CHALLENGES SOLVED:

- Identifying external push-buttons, switches and internal connection points
- Rating and serial plates using alphanumeric that require name plate quality

This label is a cost-effective alternative to engraved phenolic legend plates with a thicker, more durable structure and foam-backed aggressive adhesive.

white, black, yellow,
silver, red, green

gloss finish

permanent acrylic,
foam backed adhesive

polyester
material

BRADY POLYESTER MATERIAL (B-593)

PERFORMANCE ATTRIBUTES:



ABRASION RESISTANCE

Resistance proven with testing on Taber Abraser equipment with CS-10 grinding wheels and weighted arms. Print is still legible after 100 cycles. White print on black abrasion resistance material is illegible after 75 cycles.



HIGH HEAT RESISTANCE

Resistance to 212°F (100°C). Labels subjected to a range of temperatures for 1,000 hours with no visible effect and label remaining functional.



OUTDOOR DURABILITY

Favorable UV and weatherability testing equating to 3 years or greater outdoor durability.



ADHERES TO

Stainless Steel, Smooth ABS, Powder Coated Surface, Polyethylene



FUEL / OIL RESISTANCE

Resistance proven with immersion test in Isopropyl alcohol, diesel fuel and alcohol mix, and MIL-H-5606 oil. Five cycles of 10 minute immersions, followed by a rub test with a cotton swab, showed no visible effect or slight print removal.

REGULATORY / AGENCY APPROVALS:

- White, silver, yellow, red and green versions are a UL Recognized Component when printed with the Brady R6000 halogen free series black ribbon.
- Red, green and black versions are UL Recognized Component when printed with the Brady R4400 Series white ribbon.
- White, silver, yellow, red and green versions are a cUL Recognized Component when printed with the Brady R6000 halogen free series black ribbon.
- Red, green and black versions are a cUL Recognized Component when printed with the Brady R4400 Series white ribbon.

SUMMARY

With the right material type, finish and adhesive, your labels can stand up to the exact labeling environment you need them for – and that means better performance and better results for you. For an overview of the labels in chapter 3 and some of their key characteristics, take a look at the below chart:

Label	Material	Color	Finish	Adhesive	Adheres to	Ideal for
B-727	Polyimide	White	Gloss	Ultra-durable permanent acrylic	Stainless steel, epoxy PC board	Wash environments & auto apply
B-423	Polyester	White	Gloss	Permanent acrylic	Stainless steel, painted enamel, polyester powder coated paint	Component identification, barcode labels and rating plates
B-428	Metallized Polyester	Light Gray	Matte	Permanent acrylic	Stainless steel, polypropylene	Rating and serial plates along with versatility in characters, graphics and barcodes.
B-425	Polypropylene	White	Matte	Permanent acrylic	Stainless steel, textured ABS, polypropylene	Solvent resistance
B-490	Polyester	White	Matte	Permanent acrylic	Glass, polypropylene	Frozen surfaces & lab environments
B-8591	Polyester	White	Glossy	Permanent acrylic	Stainless steel	Long term outdoor environments, nameplates and asset tracking
B-510	Photosensitive anodized aluminum	Metallic	Glossy	Permanent acrylic	Stainless steel	Nameplates, schematics & control panels in harsh environments
B-7518	Polyester	Multi-color	Glossy	Permanent modified acrylic	Stainless steel, smooth ABS, polypropylene, polyester powder coated paint	Immediate indication of heat exposure
B-8117	Polyester	Black	Matte	Permanent rubber based adhesive	Stainless steel, ABS, polycarbonate, acrylic (PMMA)	Regulatory labels on electrical components & finished goods
B-593	Polyester	White, black, yellow, silver, red & green	Glossy	Permanent acrylic, foam backed	Stainless steel, smooth ABS, powder coated surface, polyethylene	External push-buttons, switches & internal connection points

WHY CHOOSE BRADY?

Brady materials are developed in house by our R&D team and label design experts. They are put through rigorous tests and trials to ensure label reliability in the conditions that you need them to perform in. Brady labels are designed to last and engineered to perform. While we featured 10 labels in this guidebook, we have over 150 label materials to choose from to meet your exact needs when it comes to product identification.

Learn more about label materials with our Technical Data Sheets and test label performance in your own environment with sample packs.