

MARKING SYSTEMS, INC

EST 1971 / OEM S ONLY

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I

DURABLE LABEL &
PRECISION DIE CUTTING
DESIGN GUIDE



3M Preferred
Converter *P*
Preferred



"The only true source of knowledge is experience."

ALBERT EINSTEIN

1
9
7
1

Family owned and operated since 1971

1
9
9
0

Exclusive to OEM Durable Label market (1990)

2
0
1
0

ISO Certified (2010)

2
0
1
5

Founded MSDIECUT

2
0
2
0

\$30M+ Revenues, 225 Employees, 40K sqft of Manufacturing



WHY MSI.

OEMS ONLY - SINCE 1990



Panasonic

FUJITSU



Raytheon

TOSHIBA



SIEMENS



Thermo Fisher
SCIENTIFIC



3M

ABB

AIRBUS

Gulfstream



RAPID PROTOTYPING SERVICE



3M Preferred Converter
Preferred



EXTREME EXPEDITING



ISO 9001:2015
AS9100:2016
CERTIFIED

"THE BOOK"

SHOWCASES OUR FULL
RANGE OF CAPABILITIES

DURABLE LABEL &
PRECISION DIE CUTTING
DESIGN GUIDE

EXCELLENT TOOL FOR ENGINEERS
AND LABEL DESIGNERS

PUTS THE QUALITY OF OUR PRODUCTS
IN YOUR HANDS

WE SOLVE PROBLEMS WITH...



INCONSISTENT QUALITY

HIGH PRICING

SLOW DELIVERIES

PROTOTYPING NEW LABELS

NEW LABEL DESIGN AND IDEAS

COLOR MATCHING

TIGHT TOLERANCES (+ OR - .010)

ADHESION

PRINTING FINE DETAIL

DURABILITY

Why Screenprint:

- Exact Color Matching
- Opacity (LED/LCD windows)
- Outdoor durability
- Flat Colors
- Dead Front/Back Lighting

Why MSI:

- 6 Color Carousel Press
- Color Matching Expertise
- Consistency (order to order)



6 Color carousel screen printing press.



Klem roll-to-roll screen printing press.

The Science of Screen Printing

Screen Making: Every variable in this process is tightly controlled, measured and monitored:



a. Screen Tension: Ensures print to print registration between colors/images remains accurate for perfect registration.

b. Screen Dryness: Coated screens are dried and then measured for moisture with a digital moisture meter before being released to the printing department to prevent screens from breaking down during the printing process.



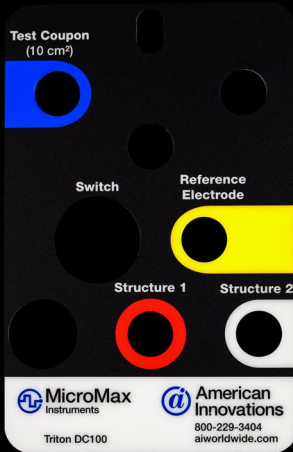
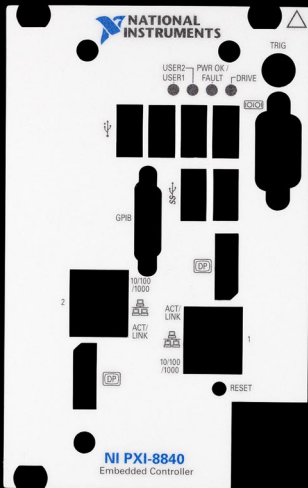
c. Tracking screen life: Ensures screens are removed from service before they become a quality problem.

d. Exposure: MSI measures the amount of light source needed to burn an image into the screen. This is more accurate than relying on time as light sources can weaken over time and create print quality issues.

- Under exposure will result in weak emulsion, pinholes and emulsion breakdown in areas supposed to be covered by emulsion.
- Over exposure: will result in loss of detail and emulsion hard to wash out from the open areas.

Press Settings:

- Each job is started with the press at the "0.0" or optimal press setting. These settings include: off contact, squeegee pressure, angle, type and quality, flood bar height, screen peel, print/flood cycle speed, UV lamp setting and Dryer belt speed.
- The operators must get manager approval to adjust the optimal settings to ensure repeatability from job to job.



GARRETT
PROformance
ACE

MicroMax[®] GPS360
Instruments

Support
800-229-3404
aiworldwide.com

Quick Start

1. Connect antenna. Acquire GPS lock.
2. Press and hold **4** or **1** to adjust display contrast.
3. Press **3** to interrupt or **5** to refresh for status.
4. Use **↔** to change interrupt schedule and press **ENTER** (if).

Close and lock lid when unit is exposed to the elements.
Power using the internal battery, charge with a USB cable, or power with coarse AC taps 8-24V AC or 10-60V DC.

AC/DC Solid | 100 V peak DC / 70 V peak AC / 100 A maximum
Starts Relay | See specifications for derating information.

TOSHIBA

Why Digital Printing:

1. 4 color process
2. Gradients
3. High number of colors
4. Lower cost for small runs
5. Group orders
6. Can print directly on plastic/metal bezels

Why MSI:

The Power of G7
 Maintaining Brand Color Consistency

The G7 method is a set of industry practices and procedures for implementing ISO printing standards and additional metrics to ensure digital files are printed correctly and consistently no matter what press they are printed on.


- G7 Master qualification is a global identifier/standard (similar to ISO) of expertise in color management, press control, process-control and helping customers achieve consistency from proof-to-print.
- G7 Master qualification is a commitment to continued training and education.
- G7 gives all printing systems/presses a shared neutral, common visual appearance helping to consistently hit desired color targets.
- G7 has a proven toolkit behind it, based on internationally recognized standards.
- G7 means reprints will always look the same.
- G7 aligns all devices, substrates and inks to a common standard of gray balance and tonality
- G7 is an ANSI/CGATS specification for targeting gray balance

WHAT IT MEANS TO BE A G7 MASTER PRINTER:

G7 Master Qualification is granted to a physical facility. G7 Master Status indicates that the facility has calibrated certain equipment and systems to G7 gray balance and neutral tone curves and is capable of delivering G7 proofs and print products.









DIGITAL PRINT



SmartLink™ 
Wireless Landscape Network


SmartLine ProLine compatible **FLOW**

STATUS

- 1ST BLINK   **PANEL**
- 2ND BLINK   **TOWER**
- 3RD BLINK   **SIGNAL**
- 4TH BLINK   **ACTIVATION**

LTE

To activate, download SmartLink mobile app and scan QR code.



Weathermatic
Water with Purpose



Specifications:

Embossing Information:

- Cold emboss: 1.5X material thickness
- Heat/forming: 3-4X material thickness

Types of Emboss:

- Pillow
- Rail
- Polyester Snap Dome

Polycarbonate: .005, .007, .010, .015, .020, .030
200,000 Actuations

Polyester: .006, .008, .010
2,000,000 Actuations

Uses:

- Decorative Nameplates
- Overlays and lenses with LCD displays

EMBOSSSED



MSI's custom texture is UV screen printed clear coat cured with nitrogen gas. The nitrogen gas gives the texture clear a more chemical and scratch resistant finish than standard UV textured clears.

Printing a textured clear coat on a clear glossy polycarbonate will give you a better more durable nameplate/overlay than printing a clear coat over a velvet textured material.

Custom texture is a wonderful way to enhance the look of any nameplate or overlay.

SELECTIVE TEXTURE



GARRETT
ALL TERRAIN GOLD



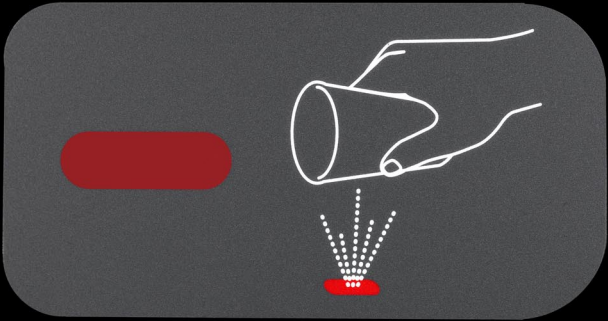
Transparent Inks are typically used for functional and aesthetic purposes. On nameplates, the transparent ink is typically printed over a metallic material to allow the metallic finish to bleed through the color.

On overlays, the transparent ink is typically used to color a LED or LCD display window.

TRANSPARENT INKS



miniDAWN



Polycarbonate Specifications:

Finishes:

- Velvet/Matte
- Velvet/Gloss
- Gloss/Gloss
- UV-1 Velvet/Matte (7 Year Outdoor Life)

Polycarbonate Thickness: .005, .007, .010, .015, .020, .030

Temperature Rating: -40°F -275°F

Chemical Resistance: Resistant to most household chemicals.

Actuations: 200,000

Adhesives: 3M 467, 468, 3M300LSE, 3M350

Cutting: Die cut or digital cut to ± 0.010 tolerances

UL: MSI 3000

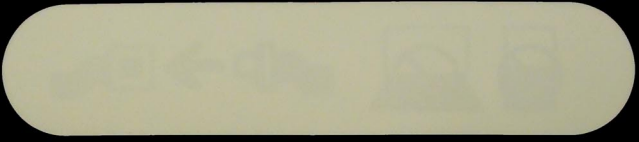
Uses:

- Decorative Nameplates,
- Graphic Overlays
- Warning/Caution Labels.
- Hide graphics while not in use
- Used in Aerospace - Military - Automotive applications

Why MSI:

- Our R&D can help develop your specific application

DEADFRONT OVERLAYS



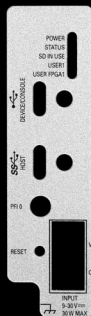
Design technique to give plastic Nameplates and Overlays a metallic appearance and finish. Typically done by laminating .002 metallic polyesters to the underside of polycarbonate material. By laminating the polyester on the underside of the polycarbonate the product remains very chemical and scratch resistant.

These products can be screen printed and digitally printed providing maximum flexibility with regards to design. In many cases this technique provides a much more durable product than top printing on metal which can be scratched quite easily.

The use of transparent inks over metallic materials is an excellent way to enhance the appearance of your Nameplate/Overlay. These inks allow the metallic material to shine through the ink giving the ink a metallic flavor. Let us help you improve the look of your Namplates/Overlays with this and other stunning design effects.

METALLIC

HD



GARRETT

Ice-O-Matic

Specifications:

Doming Material: Approximately .075 thick polyurethane.
Can be applied at thicknesses ranging from approximately .045-.075

Temperature Rating: -40°F -170°F

Outdoor: 7-10 year outdoor life

Chemical Resistance: Excellent chemical resistance to household cleaners and gasoline.

Base Material: Typical .002 polyester.

Uses:

- Decorative Nameplates
- Badging

POLY DOMES



Materials: Vinyl

Thickness: .002, .004, .006

Premask: .006 paper pre-spacing tape

Cutting: Uses a heat die that is photographically etched so most designs can be accommodated.

Benefits: The design looks painted on rather than a square or rectangular decal.

Die Cost: \$125.00 - \$275.00 (typical)

Uses:

- Logos on outdoor equipment (expected life: 5-7 years outdoor)
- Can replace printing directly on products.



THERMAL DIE CUT

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SERIES[®]
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JACOBSEN[®]
A Textron Company

 **UNIPOWER**
POWERING TECHNOLOGY

This is a very easy and cost effective design technique to give mostly Nameplates an enhanced look. This effect can be very effective with just a small amount of preparation. By designing a recess area in the metal or plastic bezel the Nameplate no longer looks like an addition to the product but appears to be part of the product. This can be a very easy and inexpensive design technique to make the Nameplate look like it has been molded into the product.

CONTOUR CUT

A4™



ORIGINS

C150

 **Phreesia**

2 mil Polyester:**Colors:**

- White
- Clear
- Shiny Silver
- Matte Silver
- Brushed Silver

Thickness: .002**Permanent Acrylic Adhesives:**

- V-344 (.001): Standard adhesive used for metals and low surface energy plastics
- V-606 (.002): Designed specifically for Powder Coated Surfaces
- 3M350 (.002): Designed specifically for low surface energy plastics
- Removable Adhesive

Laminates:

- .001 Gloss polyester
- .001 Matte polyester
- .003/.005 Velvet polycarbonate (simulates the look and durability of .010 sub-surfaced printed polycarbonate)
- .001 matte/gloss thermal polyester
- .001 UV gloss polyester (5 year outdoor durability)

Temperature Rating: -40°F -275°F**Chemical Resistant:** Excellent for most chemicals including gasoline.**UL/CSA:** Both UL/CSA approved**Typical Uses:**

- UL labeling
- Warning/Caution labels
- Wiring diagrams

| Metals | Surface Energy Dynes/cm |
|----------|----------------------------|
| Copper | 1103 |
| Aluminum | 840 |
| Zinc | 753 |
| Tin | 526 |
| Lead | 543 |

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

| HSE Plastics | Surface Energy Dynes/cm |
|---------------|----------------------------|
| Kapton® | 50 |
| Phenolic | 47 |
| Nylon | 46 |
| Alkyd Enamel | 45 |
| Polyester | 43 |
| Epoxy Paint | 43 |
| Polyurethane | 43 |
| ABS | 42 |
| Polycarbonate | 42 |
| PVC | 39 |
| Noryl | 38 |
| Acrylic | 38 |

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

| LSE Plastics | Surface Energy Dynes/cm |
|-----------------|----------------------------|
| PVA | 37 |
| Polystyrene | 36 |
| Acetal | 36 |
| EVA | 33 |
| Polyethylene | 31 |
| Polypropylene | 29 |
| Tedlar® | 28 |
| PTFE | 18 |
| Powder Coatings | ** |

**Broad range of surface energy.
Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

2 mil Polyesters & 4 mil Vinyl:

| Features | Where to Use | Material Numbers |
|---|---|---|
| V-344 9 <p>V-344 (.001) Permanent Acrylic Adhesive:</p> <ul style="list-style-type: none"> • Has high tack and high shear properties. • Designed for metals and high surface energy plastics. • Good chemical resistance and resist cold flow and ooze • Heat Resistance: -40F-302F | V-344 7 <ul style="list-style-type: none"> • Use on bare metals, painted metals and high surface energy plastics | V-344 5 <p>Materials this adhesive is available on:</p> <ul style="list-style-type: none"> • .004 White Vinyl • .002 White Polyester • .002 Shiny Silver • .002 Matte Silver • .002 Brushed Silver |
| V-606 6 <p>V-606 (.002) Permanent Acrylic Adhesive:</p> <ul style="list-style-type: none"> • Has medium tack and high shear properties • Designed for metals, high surface energy and low surface energy plastics • Good chemical resistance and resist cold flow and ooze • Designed specifically for "Powder Coated" paints • Heat Resistance: -40F-302F | V-606 8 <ul style="list-style-type: none"> • Use for Powder Coat paints | V-606 5 <p>Materials this adhesive is available on:</p> <ul style="list-style-type: none"> • .002 White Polyester • .002 Shiny Silver • .002 Matte Silver • .002 Brushed Silver |
| 3M 350 9 <p>350 High Performance Acrylic: (heat all-around adhesive)</p> <ul style="list-style-type: none"> • Up to 450F short-term heat resistance. • Excellent solvent resistance and adhesion to LSE materials. • Heat Resistance: -40F-450F | 3M 350 10 <ul style="list-style-type: none"> • 3M's best all-around adhesive and can be used on all surfaces but is best for low surface energy plastics. | 3M 350 10 <p>Use these Product Numbers to specify on your blueprints:</p> <ul style="list-style-type: none"> • 3M7868 .002 white polyester (.001) • 3M7871 .002 white polyester (.002) • 3M7051 .004 white vinyl (.001) • 3M7904 .004 white vinyl (.002) |

Note: .001 thick adhesives are designed for smooth or slightly textured surfaces.
 .002 thick adhesives are designed for medium to heavily textured surfaces.

2MIL POLYESTER



CS



Bledsoe
Brace
Systems.

SHOPPA'S



JOHN DEERE

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Thick Lenses:

Material: .040 - .25 thick Hard coat Polycarbonate
(MSI can in most cases steel rule die cut up to .040 polycarbonate. Anything over .040 must be laser cut.) Polycarbonate is typically the best choice for these types of lens applications for several reasons:

- Velvet/Matte
- Hard coat finish
- Available in many different thicknesses from .005 - .500
- Easy to process (printing and cutting)
- Shatter resistant

Finish: 100% Gloss

Temperature Rating: -40°F - 275°F

Chemical Resistance: Enhanced chemical and scratch resistance because of the hard coat coating.

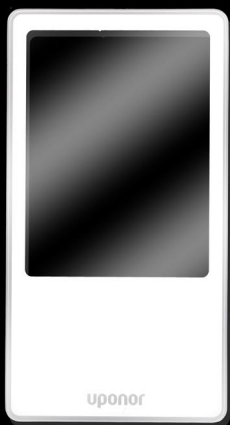
Adhesives: All 3M laminating adhesives and VHB foam tapes.
Note VHB foam tapes can provide a water tight seal in many applications.

Cutting: Typically cut with a laser to ± 0.10 tolerances.

Uses: Flat and Molded lenses

Hard Coatings:

- Marnot XL: Gloss levels: 100%, 90%, 75%, 55% and 35%
- HPW: Sabics line of "Weatherable" hard coated polycarbonates
- TSP Duravue 1000: Gloss hard coat used on polycarbonates above 40 mil.
- TSP Duravue 2000: Anti-glare version of Duravue 1000.



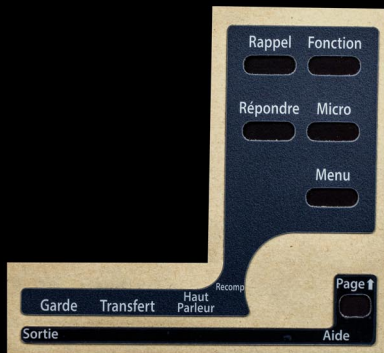
Material: A group of labels made from the same material and adhesive that have been kiss cut on a common liner.

Advantages: Reduces label handling by reducing the number of part numbers. With Label Sets purchasing has fewer orders to place, receiving receives in fewer orders, inventory has less parts to inventory, and the manufacturing process is greatly simplified.

Benefits: Label Sets typically save 20-30% on the cost of the labels compared to buying the labels individually. There is also a considerable time savings in all the aspects of the label buying and handling process. The quality of the labels is also improved because the colors are guaranteed to be a perfect match between labels.

Label sets can be manufactured using all material including Polycarbonate, Polyester, Vinyl and Paper.

| mmWave Instrument 3 | | | | | | mmWave Instrument 0 | | | | | | | |
|---------------------|-------|-------|--|--------|-------|---------------------|--------|-------|-------|--|--------|-------|-------|
| R4 | | | | R3 | | | R2 | | | | R1 | | |
| IF OUT | LO IN | IF IN | | IF OUT | LO IN | IF IN | IF OUT | LO IN | IF IN | | IF OUT | LO IN | IF IN |
| mmWave Instrument 1 | | | | | | mmWave Instrument 2 | | | | | | | |
| L1 | | | | L2 | | | L3 | | | | L4 | | |
| IF OUT | LO IN | IF IN | | IF OUT | LO IN | IF IN | IF OUT | LO IN | IF IN | | IF OUT | LO IN | IF IN |



Features: A small “tab” is kiss cut on the outer perimeter of a label

Advantages: This “tab” serves two purposes:

- Makes removal of the liner quicker and easier.
- Printing a part number on the “tab” makes identifying the label much easier.

Benefits: Label tabs reduce mistakes while adding no additional cost to the part itself

This is a great design technique to help make things run much smoother in your manufacturing process.

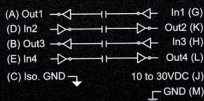
P/N 20BB6175



734-746-5900

Model ICD103A

RS-232 Optical Isolator/Repeater



20BB250-10797-00

Current Loop

RS-232 To Current Loop Converter

Model 232CLR

BB SMARTWORX

Powered by **ADAMTECH**
adamtech-us.com

RS-232

20B-00

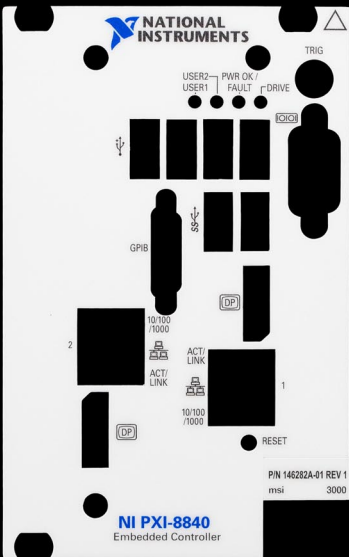


www.bb-efc.com

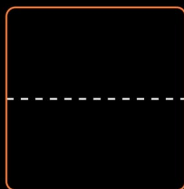
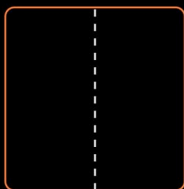
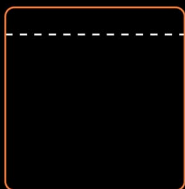
RS-422 Converter

Model 422-P2BR

RS-232



Backscoring is used to make the application (positioning) of the label quicker and more precise. Backscoring also makes the removal of the label liner quicker and easier. Typically labels are backscored in the middle of the but can be scored in specific locations if needed. Below are some examples:

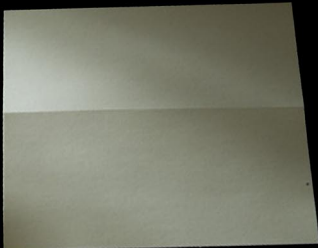


**⚠ CAUTION - NOTICE TO RIGGERS:
ALL PANELS MUST BE IN PLACE WHEN RIGGING.**

- Avoid rigging structures through holes in base mat, as shown in detail "A".
- Follow the order in which panels are attached around the full perimeter of structure.
- Use caution for safety when rigging, to prevent rigging straps from snagging with.

DETAIL A

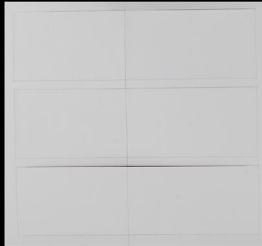
| Part No. | Qty | Part No. | Qty | Part No. | Qty | Part No. | Qty | Part No. | Qty |
|----------|-----|----------|-----|----------|-----|----------|-----|----------|-----|
| 201-1001 | 1 | 201-1002 | 1 | 201-1003 | 1 | 201-1004 | 1 | 201-1005 | 1 |
| 201-1006 | 1 | 201-1007 | 1 | 201-1008 | 1 | 201-1009 | 1 | 201-1010 | 1 |
| 201-1011 | 1 | 201-1012 | 1 | 201-1013 | 1 | 201-1014 | 1 | 201-1015 | 1 |
| 201-1016 | 1 | 201-1017 | 1 | 201-1018 | 1 | 201-1019 | 1 | 201-1020 | 1 |
| 201-1021 | 1 | 201-1022 | 1 | 201-1023 | 1 | 201-1024 | 1 | 201-1025 | 1 |
| 201-1026 | 1 | 201-1027 | 1 | 201-1028 | 1 | 201-1029 | 1 | 201-1030 | 1 |
| 201-1031 | 1 | 201-1032 | 1 | 201-1033 | 1 | 201-1034 | 1 | 201-1035 | 1 |
| 201-1036 | 1 | 201-1037 | 1 | 201-1038 | 1 | 201-1039 | 1 | 201-1040 | 1 |
| 201-1041 | 1 | 201-1042 | 1 | 201-1043 | 1 | 201-1044 | 1 | 201-1045 | 1 |
| 201-1046 | 1 | 201-1047 | 1 | 201-1048 | 1 | 201-1049 | 1 | 201-1050 | 1 |
| 201-1051 | 1 | 201-1052 | 1 | 201-1053 | 1 | 201-1054 | 1 | 201-1055 | 1 |
| 201-1056 | 1 | 201-1057 | 1 | 201-1058 | 1 | 201-1059 | 1 | 201-1060 | 1 |
| 201-1061 | 1 | 201-1062 | 1 | 201-1063 | 1 | 201-1064 | 1 | 201-1065 | 1 |
| 201-1066 | 1 | 201-1067 | 1 | 201-1068 | 1 | 201-1069 | 1 | 201-1070 | 1 |
| 201-1071 | 1 | 201-1072 | 1 | 201-1073 | 1 | 201-1074 | 1 | 201-1075 | 1 |
| 201-1076 | 1 | 201-1077 | 1 | 201-1078 | 1 | 201-1079 | 1 | 201-1080 | 1 |
| 201-1081 | 1 | 201-1082 | 1 | 201-1083 | 1 | 201-1084 | 1 | 201-1085 | 1 |
| 201-1086 | 1 | 201-1087 | 1 | 201-1088 | 1 | 201-1089 | 1 | 201-1090 | 1 |
| 201-1091 | 1 | 201-1092 | 1 | 201-1093 | 1 | 201-1094 | 1 | 201-1095 | 1 |
| 201-1096 | 1 | 201-1097 | 1 | 201-1098 | 1 | 201-1099 | 1 | 201-1100 | 1 |
| 201-1101 | 1 | 201-1102 | 1 | 201-1103 | 1 | 201-1104 | 1 | 201-1105 | 1 |
| 201-1106 | 1 | 201-1107 | 1 | 201-1108 | 1 | 201-1109 | 1 | 201-1110 | 1 |
| 201-1111 | 1 | 201-1112 | 1 | 201-1113 | 1 | 201-1114 | 1 | 201-1115 | 1 |
| 201-1116 | 1 | 201-1117 | 1 | 201-1118 | 1 | 201-1119 | 1 | 201-1120 | 1 |
| 201-1121 | 1 | 201-1122 | 1 | 201-1123 | 1 | 201-1124 | 1 | 201-1125 | 1 |
| 201-1126 | 1 | 201-1127 | 1 | 201-1128 | 1 | 201-1129 | 1 | 201-1130 | 1 |
| 201-1131 | 1 | 201-1132 | 1 | 201-1133 | 1 | 201-1134 | 1 | 201-1135 | 1 |
| 201-1136 | 1 | 201-1137 | 1 | 201-1138 | 1 | 201-1139 | 1 | 201-1140 | 1 |
| 201-1141 | 1 | 201-1142 | 1 | 201-1143 | 1 | 201-1144 | 1 | 201-1145 | 1 |
| 201-1146 | 1 | 201-1147 | 1 | 201-1148 | 1 | 201-1149 | 1 | 201-1150 | 1 |
| 201-1151 | 1 | 201-1152 | 1 | 201-1153 | 1 | 201-1154 | 1 | 201-1155 | 1 |
| 201-1156 | 1 | 201-1157 | 1 | 201-1158 | 1 | 201-1159 | 1 | 201-1160 | 1 |
| 201-1161 | 1 | 201-1162 | 1 | 201-1163 | 1 | 201-1164 | 1 | 201-1165 | 1 |
| 201-1166 | 1 | 201-1167 | 1 | 201-1168 | 1 | 201-1169 | 1 | 201-1170 | 1 |
| 201-1171 | 1 | 201-1172 | 1 | 201-1173 | 1 | 201-1174 | 1 | 201-1175 | 1 |
| 201-1176 | 1 | 201-1177 | 1 | 201-1178 | 1 | 201-1179 | 1 | 201-1180 | 1 |
| 201-1181 | 1 | 201-1182 | 1 | 201-1183 | 1 | 201-1184 | 1 | 201-1185 | 1 |
| 201-1186 | 1 | 201-1187 | 1 | 201-1188 | 1 | 201-1189 | 1 | 201-1190 | 1 |
| 201-1191 | 1 | 201-1192 | 1 | 201-1193 | 1 | 201-1194 | 1 | 201-1195 | 1 |
| 201-1196 | 1 | 201-1197 | 1 | 201-1198 | 1 | 201-1199 | 1 | 201-1200 | 1 |




⚠ WARNING
USE CAUTION WHEN REMOVING BANDING!
PART IS UNDER TENSION.
A008008 1RevD

⚠ WARNING
USE CAUTION WHEN REMOVING BANDING!
PART IS UNDER TENSION.
A008008 1RevD

⚠ WARNING
USE CAUTION WHEN REMOVING BANDING!
PART IS UNDER TENSION.
A008008 1RevD



NOTICE

 = 50℔

Lube grease fitting with NLGI #1 every 50 hours. Grease cavity is full when grease escapes relief valve.

273232-3



AVERY
FINISON

WARNING & CAUTION LABELS

As the voice of the U.S standards and conformity assessment system, the American National Standards Institute (ANSI) empowers its members and constituents to strengthen the U.S marketplace position in the global economy while helping to assure the safety and health of consumers and the protection of the environment.

Safety Signs and Labels standards serve to reduce safety risk throughout commercial, industrial, public, and residential areas by means of specifying internationally agreed upon optimal design principles for safety signs and labels, including the specification of colors, signal words, photometric properties, fixing methods and surfaces, proper illumination, graphical symbols, and much more.

Better designed warning and caution labels can help to ensure that your equipment and machines are used correctly with the least amount of chance for injury by the user. Product liability is an important issue and one that can cost your company millions of dollars. Make sure that each of your warning and caution labels are designed using the latest in ANSI design techniques.

MSI can help make sure that your warning and caution labels are the best in the industry.


Reference specifications on back of (PS) Polyester Nameplates for additional material information.



ANSI Standard Safety Colors:

- Red = PMS 485C
- Orange = PMS 152C
- Yellow = PMS 109C
- Blue = PMS 2945C
- Green = PMS 3415C

WARNING & CAUTION LABELS

WARNING



| | |
|---|---|
|  |  |
|---|---|

Compressed air supplies should be regularly tested to ensure that they meet Grade D requirements. AirGuard will not remove carbon monoxide, carbon dioxide, nitrogen or other toxic gases or fumes. AirGuard will not increase oxygen content of supplied air.

Do not use AirGuard in oxygen deficient areas. AirGuard must be operated in upright position to allow drains to properly operate. Read and follow all labels and the instruction manual carefully. Failure to comply may result in injury or death.

FAN STATUS





CAUTION: ALLOW FAN BLADES TO SLOW BEFORE HANDLING FAN TRAY.

WARNING

AMPLIFIER IS PRE-CONFIGURED FOR PUSHCORP MOTORS. MODIFYING ANY PARAMETERS MAY CAUSE NON-WARRANTY DAMAGE. CONTACT PUSHCORP BEFORE MODIFYING ANY PARAMETERS.

CAUTION-HIGH VOLTAGE! HAZARD OF ELECTRICAL SHOCK. LAMP WIRING IS LIVE. DISCONNECT INPUT POWER BEFORE SERVICING. NEVER OPERATE WITHOUT SECURE GROUND CONNECTION.

PATENTS - USA: 4717863, 4937470
CAN: 1319735; EUR: 0-233-605




12345

msi logo



DANGER

**HIGH VOLTAGE
REPLACE BARRIER
AFTER SERVICING**

**HAUTE TENSION
REPLACER LA BARRIÈRE
APRÈS L'ENTRETIEN**


PC901600P002 REV.3


Marking Systems is an expert in working with UL/CSA Labeling. We have been an approved UL/CSA label manufacturer for over 40 years. In that time will have built up a library of over 200 individual certifications using polycarbonate, polyester, vinyl and paper. Our certifications cover indoor/outdoor, chemical exposure, temperature range and hundreds of application surfaces.

- **PGDQ2:** *Marking & Labeling Systems: covers adhesive, base material, printing method, laminate and environmental conditions such as temperature range, chemical exposure etc.*
- **PGJI2:** *Marking & Labeling Systems: covers customers thermal printing in house. Material and thermal ribbons must be matched and approved by UL.*
- **PGIM2:** *Marking & Labeling Systems-In-Mold:*
- **PGGU2:** *Marking & Labeling Systems – This means that the materials used must be UL certified by the material manufacturer.*
- **PGIS2:** *Marking & Labeling Systems – Limited Use:*

CSA: *Canadian Standards Association: This is the Canadian version of UL. Labels are tested for adhesive, base material, laminate, chemical exposure and surface application.*

CUL: *Is when UL test for Canadian Standards. It is not the same thing as CSA.*

| | |
|---|---|
| Cat. No. EOT16 | ⚠ DANGER |
| 16 A, 600 VAC Type 4, 4X, 12 E63822 | HAZARDOUS VOLTAGE Will cause death, burn or serious injury. |
|  Listed 3E73 Ind. Cont. Equip. | Turn off power before working on this equipment. |
| Suitable as motor disconnect. | |



CERTIFIED

File # MH60960

CERTIFIED TO

NSF/ANSI 61
NSF/ANSI 372
ASTM 1998



LABORATORY
EQUIPMENT
1N97

ALSO CLASSIFIED IN ACCORDANCE WITH
IEC 61010-1 AND/OR EN 61010-1

(204436-102)

Type 1 Enclosure. For Use in Dry Locations 50° C Max Ambient
Pour utilisation dans des endroits secs 50° C Max Ambient

For Use in Areas Not Readily Accessible by the General Public
Pour utilisation dans les zones difficilement accessibles
par le grand public.

FOR USE BY QUALIFIED PERSONNEL ONLY POUR LE
PERSONNEL QUALIFIÉ. AVERTISSEMENT - Risque de
choc électrique. WARNING - Risk of Electric Shock.

Production Resource Group, L.L.C. 3110 Roy Orr Blvd., Suite 200
Grand Prairie, Texas 75050 Made in USA

Conforms to:
UL STD 1640

Certified to:
CAN/CSA
STD C22.2
No. 29



Intertek
307774

18 498 '5000-1012' 'N/A' '138Y1



REF 1101-0002



SN [White rectangular box]

Manufactured For:

Theragen Inc.
11220 Asselt Loop, Ste. 101
Nappanee, VA 20109



BATTERY PACK MARKINGS

Rechargeable Li-Polymer battery pack
3.2V 1500mAh 5.9Wh
VX2: 56435 501 055

Caution:
This product is designed to be used as instructed.
Do not disassemble or expose to high
temperature above 90°C.
Do not short circuit.
Only use specified charger.
Must be recycled or otherwise disposed of properly.

Max. Charge Voltage: 4.2V
Max. Charge Current: 1.4A

11CP542/61



LISTED
PP161707



Li-ion

Why MSI:

- Custom colors
- Custom shapes
- Special Adhesives
- Preprinted

Thermal Printable Labels:**Colors:**

- Gloss and matte white
- Gloss and matte clear
- Gloss and matte silver

Thickness: .002**Permanent Acrylic Adhesives:**

- V-344 (.001): Standard adhesive used for metals and low surface energy plastics.
- V-606 (.002): Designed specifically for Powder Coated Surfaces
- 3M350 (.002): Designed specifically for low surface energy plastics.

Laminates: None, you do not typically laminate these materials since they have a special thermal printable coating. (Note: for additional chemical resistance and outdoor durability MSI advises that you cover the printed label with an additional piece of .001 clear UV polyester over-laminate.)

Temperature Rating: -40°F - 275°F

Chemical Resistant: Excellent for most chemicals including gasoline

UL/CSA: UL/CSA approved

Typical Uses:

- Serial number/bar code labels/Variable data
- In plant printed labeling
- UL labeling

PCA® 400 Portable Combustion & Emissions Analyzer

Bacharach, Inc.
 New Kensington, PA 15088 USA
 TELEPHONE: 1-724-334-5000
www.mybacharach.com

Made in the U.S.A.

POWER: 3.7V Li-Ion Battery, 4-AA or 5V USB

Contains FCC ID: T79PANT10
 Contains IC: 216Q-PAN10
 TDV APPROVED: EN 50379-1 / EN 50379-2



P/N:

S/N:

CONTROL

MODEL **85535** SERIES **C**

24VDC VOLTS **3** HERTZ **3** VA

2A CAPACITY **30** MINUTE RUNTIME **.5** MINUTE RECHARGE

LINCOLN

An SKF Group Brand

Negative Pressure Wound Therapy Unit

Manufactured for:
 KCI USA, Inc.
 12930 IH 10 West
 San Antonio, TX 78249 USA
www.aclelty.com

OKCI™
 AN ACCELITY COMPANY

Type BF Applied Part MR MR Unsafe IPX1 Ingress Protection

Refer to User Manual Rx Only ETL CLASSIFIED
 Confirms to ANSI STD E560601-1, IEC STD 60601-1-6 and IEC STD 60601-1-8

Model: 60510 Intertek 5014857 Certified to CSA STD C22.2#60601-1

Input 15Vdc 4.8A 72W

Trademarks of KCI Licensing Inc. Copyright 2019 KCI Licensing, Inc. All rights reserved.
 Patent(s): aclelty.com/patents 420074 Rev A

PART NAME

PART NO.

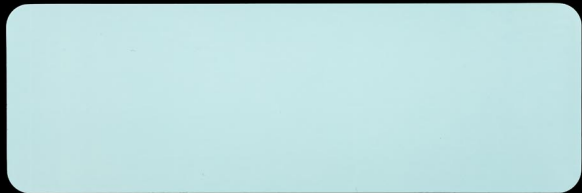
SERIAL NO.

SATLOC
 Designed & Assembled in the USA

Phone: 940-687-1100

FOGG SYSTEM COMPANY, INC.
 Denver, Colorado 80011
 United States of America

| Model | Serial Number |
|-------|---------------|
| | |
| | |



Photosensitive anodized aluminum allows you to capture rich, photographic quality images inside of metal - providing unmatched longevity and the durable, modern look of anodized aluminum. Because it is a photographic process its image resolution, clarity and durability are superior to printed or etched signs. The image is cleanable, graffiti proof and impervious to sunlight and abrasion.

It is designed for permanency – it will not fade or need to be replaced. If replacement is desired, it is 100% recyclable.

EXCEPTIONALLY DURABLE:

- UV-stable image is permanently sealed within the anodized aluminum
- Virtually impervious to chemicals, heat, abrasion , salt spray and sunlight.
- Certified for 20 year+ outdoor applications.
- Earned more top scores than any other IUID barcode label material tested by the U.S. Navy.
- (NSWC, Corona Division, IUID Center; August 2011.)

WIDELY SPECIFIED:

- Meets a wide array of commercial, government and military specifications
- Notable certifications include: MIL-STD-130N, STANAG 2290, GGP-455B(3) Type I, MIL-DTL-15024F, MIL-P-19834B and A-A-50271 (several others listed on metalphoto.com)

PHOTOGRAPHIC RESOLUTION:

- Photographic image affords extreme detail and contrast at any size
- Anti-counterfeit security printing is available.

PERFORMANCE CHARACTERISTICS

Because of its ability to perform across a range of challenging environments, photo anodized aluminum meets and array of government, industrial and military specifications

| CHARACTERISTIC | RESULT |
|--|--|
| Abrasion Resistance | No pronounced image loss, degradation or reduced readability after 7,000 cycles on an abrading wheel. |
| Acid Corrosion | No deterioration or image degradation after 24 hours in 3% nitric acid |
| Heat Resistance | No legibility loss or degradation when subjected to 1,000°F |
| Salt Spray Corrosion | No deleterious effect after a 720-hr salt spray (fog) test 2.6 "Very Good" corrosion resistance after 113 days seawater exposure. |
| Accelerated Light and Weather Resistance | No pronounced deterioration of legibility after 400-hr carbon arc weathermeter exposure. (+ 20+ year outdoor life) |
| Accelerated Oxygen Aging | No discoloration or fading after 96-hr/300 psi/70°C oxygen bomb aging |
| Stain Resistance | No black fading when plates are exposed to flocure of iodine |
| Cleaning Resistance | No deleterious effects when tested with alkaline cleaners (MIL-C-87937 or equivalent) for aircraft surfaces. |
| Low Temperature Resistance | No deleterious effects or image fade after 1 hour at -50°F. No impairment of legibility upon exposure at -47°F. |
| Organic Solvent Resistance | No softening, staining or noticeable fade after 24-hr exposure to: JP-4 fuel, Gasoline, Mineral Spirits, Methyl Ethyl Ketone, Turpentine, Turbine & Jet Fuel, Kerosene, Xylol, Acetone, Toluol, Heptane, Trichloroethylene, MIL-H-5604 Hydraulic Fluid and MIL-L-7808 Jet Engine Oil. |
| Fungus Resistance | Visual reading of "0" per ASTM-G21. |
| Thermal Shock | No deterioration after 3 cycles between -65°C & 125°C |
| Moisture Resistance | No deterioration after 10 humidity cycles per MIL-STD-202 |

PHOTO ANODIZED

TIRER AVANT DE LEVER SUR VÉRIN :
- DISJONCTEUR D'ENTRETIEN DE SECOURS
- DISJONCTEUR D'HOROMETRE
- DISJONCTEUR GD DE CHAUFFAGE STATIQUE DE PITOT
- DISJONCTEUR DE CHAUFFAGE DE SONDE D'INCIDENCE
- DISJONCTEUR DE CHAUFFAGE DE SONDE SATVV
SUR OHP

LIGHT SWITCH

צ'ול'ק משהב"ס/מנהל'ק

| | | |
|-----------------|---|----------|
| Fuel Valve | / | ברז פדפר |
| P/N: 0414-19032 | | מק"ט |

ע'דכו'ו/חומרה-HW: 4 7
 5 8 3
 6 9

S/N: מס'ד:
Series: סדרה
MFR: ת.ייצור:

अधिकतम कोट रॉड
लोड 50 पाउंड (22.7 कि.ग्रा.)
एकसमान वितरित

OTWART

Tamper Evident:

Void Polyester:

- Gloss Silver
- Gloss White

Destructible Vinyl: White

Thickness: .002

Permanent Acrylic Adhesives:

Laminates for Void Polyester:

- .001 Gloss polyester
- .001 Matte polyester
- .003/.005 Velvet polycarbonate (simulates the look and durability of .010 sub-surface printed polycarbonate.
- .001 Matte/gloss thermal polyester (5 year outdoor durability)
- .001 UV gloss

None: Cannot laminate destructible vinyl

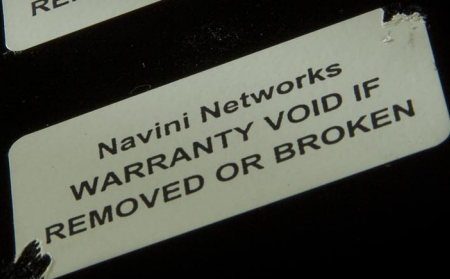
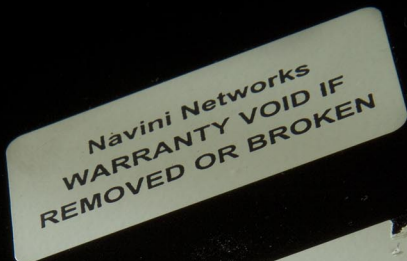
Temperature Rating: -40°F - 275°F (Void Polyester)

Temperature Rating: -40°F - 175°F (Destructible Vinyl)

Chemical Resistant: Excellent for most chemicals including gasoline (Void Polyester)

Typical Uses: Security labeling

TAMPER EVIDENT



White/Clear (PS) Polyester:

Colors:

- White
- Clear

Thickness: .002

Permanent Acrylic Adhesives:

- DPM (.001): Standard adhesive used for metals and low surface energy plastics
- RTS (.002): Designed specifically for Powder Coated Surfaces
- 3M350 (.002): Designed specifically for low surface energy plastics.

Laminates:

- .001 Gloss polyester
- .001 Matte polyester
- .003/.005 Velvet polycarbonate (simulates the look and durability of .010 sub-surface printed polycarbonate)
- .001 Matte/gloss thermal polyester
- .001 UV gloss polyester (5 year outdoor durability)

Temperature Rating: -40°F - 275°F

Chemical Resistant: Excellent for most chemicals including gasoline

UL/CSA: Both UL/CSA approved

Typical Uses:

- Serial Number Labels
- Bar Code Labels
- QR Codes
- Random numbering (MSI can pull information from an Excel spreadsheet)

SmartLinkSM
Residential WiFi

Thank you for
your purchase!

For setup instructions and
support, please scan the
QR code below.



DO NOT REMOVE

FCC: Contains FCC ID 2AC72-ESPWROOM32D
IC: Contains IC ID 21098-ESPWROOM32D



THIS DEVICE COMPLIES WITH
PART OF THE FCC RULES.
OPERATION IS SUBJECT TO THE
FOLLOWING TWO CONDITIONS:
(1) THIS DEVICE MAY NOT CAUSE
HARMFUL INTERFERENCE, AND
(2) THIS DEVICE MUST ACCEPT
ANY INTERFERENCE RECEIVED,
INCLUDING INTERFERENCE
THAT MAY CAUSE UNDESIRABLE
OPERATION.

591-002-A



MIRROR



Mirror
Assembled in Mexico

M150-22551

Product Resources
Access the latest manuals,
software, how-to videos and more
at **thermofisher.com**



In honor of our mission to enable our customers to make the
world cleaner, healthier and safer, our user manual has gone
digital! You can now choose to access a digital version or print
a copy of the manual at thermofisher.com.



thermo scientific



REF 01N06-01 **UNIT** 1

LOT 129266

**Reagent Vessel
Carrier Assembly**

50-602525/R2



(01) 0 0864999 00041 4
(10) 129266
(240) 01N06-01



Abbott GmbH & Co. KG
Max-Planck-Ring 2
65205 Wiesbaden, Germany



Abbott Molecular Inc.
1300 East Touhy Avenue
Des Plaines, IL 60018 USA



Abbott

Materials for Plastic Tags:

- Rigid vinyl
- Polystyrene

Typical Application: Plastic Tags

Features/Benefits:

- Gauges: .007 - .125
- Substrate of choice for credit cards, security cards, signs, displays, and a myriad of other applications.
- Dimensionally stable.
- Comes in Clear and White
- Polished matte finishes

Note: Rigid Vinyl is more durable and slightly more expensive than polystyrene.

Tyvek:

Typical Application: "Sew in" labels for fabric type products as well as indoor/outdoor banners.

Features/Benefits:

- Non-tear material
- Can be sewn into fabric type products.
- Can be run through a washing machine many times
- Breathable material is water proof.
- Excellent for outdoor banners.
- Medical applications.

Flexible PVC (Banner Material):

Typical Application: "Sew in" labels for fabric type products as well as indoor/outdoor banners.

Features/Benefits:

- Excellent for long-term aging outdoor applications.
- Can be Sewn into many types of products
- Can be run through a washing machine many times
- Excellent for outdoor banners.


WARNING

**HIGH SPRING TENSION CAN CAUSE
SERIOUS INJURY OR DEATH.**



DO NOT adjust, repair or remove springs or parts to which springs are connected, such as steel brackets, cables, wood blocks, red colored fasteners or other parts of the counterbalance system.

Adjustments or repairs must **ONLY** be made by a trained door systems technician using proper tools and instructions.

DO NOT remove, cover or paint over this tag. Product user should inspect this tag periodically for legibility and should order a replacement tag from the door manufacturer, as needed.

The Genuine. The Original.



10/01/2008

408622-0001

END PAD

Seitliches Polster / Pad aan uiteinde
Coussin d'extrémité / Cuscino lato piedi
Endepude / Fotódyna

REF ES2200E



ARJOHUNTLEIGH
GETINGE GROUP

LA2XS08-AH Rev A

MSI manufactures a fully 100% opaque Double Sided Window decal. We do this by using a barrier material between the front and back side. While these decals are typically applied on the inside of a glass window they can be designed for an exterior application as well.

Because these decals are made using polyester materials and are screen printed they will typically have a life of 5+ years.

IMPORTANT INFORMATION ABOUT PORTABLE ELECTRIC VEHICLE CHARGING

- Charging an electric vehicle can stress a building's electrical system more than a typical household appliance.
- Before plugging in to any electrical outlet, have a qualified electrician inspect and verify the electrical system (electrical outlet, wiring, fuses and protective devices) for heavy duty service at a 12 amp continuous load.
- Electrical outlets may wear out with normal usage or be damaged over time, making them unsuitable for electric vehicle charging.
- Check the electrical outlet(s) while charging and discontinue use if the electrical outlet(s) is hot, then have the electrical outlet serviced by a qualified electrician.
- When outdoors, plug into an electrical outlet that is weather-proof while in use.
- Mount the charging cord to reduce strain on the electrical outlet(s).

WARNING

Improper use of portable electric vehicle charge cables may cause fire, electrical shock or heavy load may result in damage to property, serious injury or death.

- Do not use extension cords, multi-wire power leads, splitters, grounding adapters, surge protectors, or other similar devices.
- Do not use an electrical outlet that is worn or damaged, or one that will not hold the plug firmly in place.
- Do not use an electrical outlet that is not grounded or grounded.
- Do not use an electrical outlet that is on a circuit with other electrical loads.

See the vehicle Owner Manual and Charge Cord User Guide for more information.

IMPORTANT INFORMATION ABOUT PORTABLE ELECTRIC VEHICLE CHARGING

Improper use of portable electric vehicle charge cables may cause fire, electrical shock or heavy load may result in damage to property, serious injury or death.

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DO NOT remove, cover or paint over this tag. Product user should inspect this tag periodically for legibility and should order a replacement tag from the door manufacturer, as needed.

The Genuine. The Original.

159510008 408622-0001

**AUTOMATIC DOOR
KEEP MOVING**

HORTON AUTOMATICS

**DO NOT
ENTER**

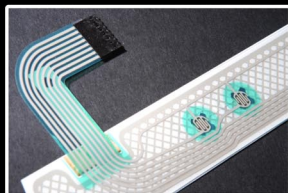
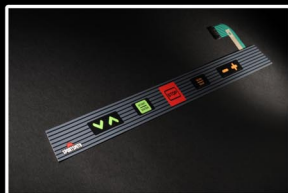
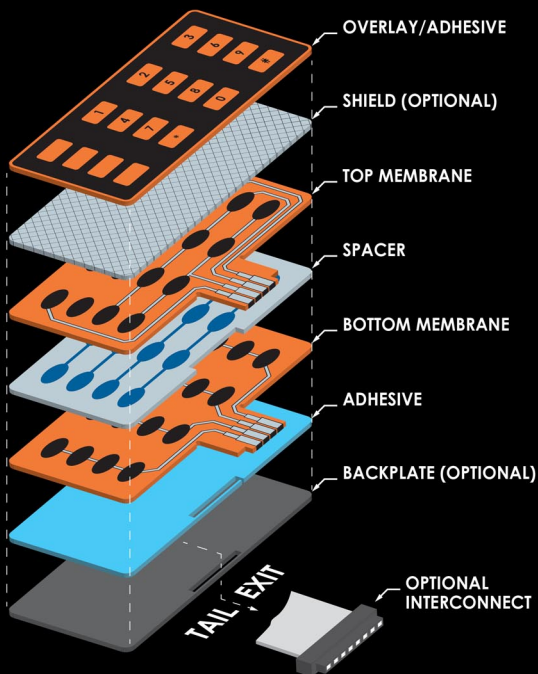
**STAND CLEAR
AUTOMATIC DOOR
CAN SWING OPEN AT ANY TIME**

HORTON AUTOMATICS

MEMBRANE SWITCHES

- Full product line
- Engineers: 20+ years experience
- New Membranes: 1 week for drawings, 4 weeks for 5 FAI's
- Once approved 4-5 weeks for production

MEMBRANE SWITCHES



Membrane Switch Design Services:

Over 20 years experience with the design and production of membranes switches means MSI can support your engineering teams with:

- Circuit and functionality features
- Performance in the field
- Graphic Design
- Added features such as water ingress, back lighting, dead fronting, shielding.
- Tactile feedback
- Special environmental considerations such as UV and high/low temperatures.

MEMBRANE SWITCHES PROTOTYPES



Over 20 years experience with the design and production of membranes switches means MSI can support your engineering teams with fast high quality membrane switch **prototypes**. This includes design services and 5-10 **prototypes** in as little as 2 weeks. Like Durable Product Labels MSI wants to be your partner in helping you design the best products and getting these products to market before the competition. We understand the pressures our OEM's face in a fast moving global world.



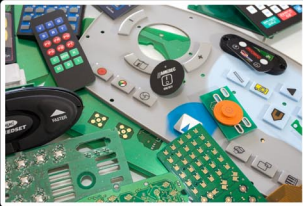
Silver Flex

- Offer a variety of design options
- Extremely thin construction saves the all-important design space
- Low cost, especially when compared to electromechanical switch assemblies
- Sealed construction is resistant to moisture and contaminants
- Low-profile surface is cleaned easily
- An easy, one-piece, one-operation assembly

Copper Flex

- Lower electrical resistance and higher conductivity vs. traditional Silver Flex membrane switches
- Tight trace routing capabilities
- Same thin profile and flexibility as Silver Flex Membranes
- Plating options can be tin-lead, nickel, or gold
- Tactile/non-tactile with metal/polyester tactiledomes
- Pillow or rim-embossed graphic overlays





Rigid PCB

- The most common printed circuit board manufactured
- Medical devices
- Industrial machinery
- Lighting
- Automotive & aerospace industries
- Substrate material prevents the board from twisting
- Least expensive circuit board option

Back-lit

- MaxFilm proprietary back-lighting
 - Lights Large Areas
 - Durable Construction
 - Multiple Colors Available
 - Low Energy Needs
 - Greater Luminous Output Than Fiber Optics
 - Typically Lower Cost
- LED back-lighting
- Electroluminescent back-lighting
- Fiber optic back-lighting





Dead Front Membrane Switches

- Cost effective dead front display
- Simplified user interface
- Less disruptive interface
- Multiple LED light colors
- Haptic feedback capable
- Easy to shield
- Thin format applications are possible
- Silver or copper PCB solutions
- Full color graphic overlays

Sealed Membrane Switch

- Higher reliability in harsh environments
- Superior lamination strength
- No external venting
- Protection of switch back-lights
- Easy to shield
- Thin format applications are possible
- Utilizes polyester or metal dome contacts
- Silver or copper PCB solutions
- Full color graphic overlays
- Hardcoats available for graphic overlays



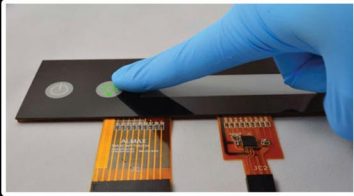
Rubber Keypads

- 20 years of rubber keypad design expertise
- 20 years design expertise of electronics
- Full rubber keypad product line
- Backlit rubber keypads
- Rubber keypad prototyping
- Single source supplier
- Graphic design and engineering support
- Screened Full color graphics
- Laser etching



Capacitive Switches

- Water immune solutions
- Non-conductive glove touch
- Ability to be backlit
- Can incorporate haptic feedback
- Line noise elimination
- Surface touch or proximity
- Multiple keys or sliders
- Thin form factor even when backlit
- Extremely fast touch response -160 milliseconds
- Very low current requirements
- Single or multiple cells – touch screens
- An excellent solution for product upgrades or retrofitting
- Configurable: I2C, SPI, TTL Serial UART, USB HID, RS232, RS485
- Affordable technology



Capacitive Touch Screens

- Higher durability touch screen gives longer product life
- Ability to specify a large range of design features
- Multiple surface treatments
- Easily combined with membrane switches and rubber keypads to make fully integrated assemblies

Resistive Touch Screens

- Optimum cost flexibility
- Ability to specify a large range of design features
- Multiple surface treatments
- 5 wire screens ensure long product life
- Ease of operation
- Easily combined with membrane switches and rubber keypads to make fully integrated assemblies

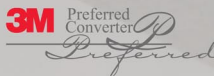




MSDIECUT was established in 2015 as a partnership between Marking Systems, Inc. and Lee Wilson, a 30 year veteran in the Die Cut industry, This unique partnership offers OEM's the advantage of sourcing both Durable Labels and Die Cutting from a single manufacturer who only serves OEM's

The MSD/MSI tandem is the only Die Cut and Durable Label supply chain in the USA where both companies are 3M Preferred Converters.

This top level rating from 3M results in lower prices to our customers and provides access to 3M Labs and on-site Lunch and Learn training sessions with both 3M and MSD/MSI technical staff.



YOUR MATERIAL SPECIALIST

Anyone can buy some equipment and call themselves a die cutter. But the process begins with knowing what to cut, and understanding why. That's a whole different skillset that only comes with experience.

OEM'S ONLY

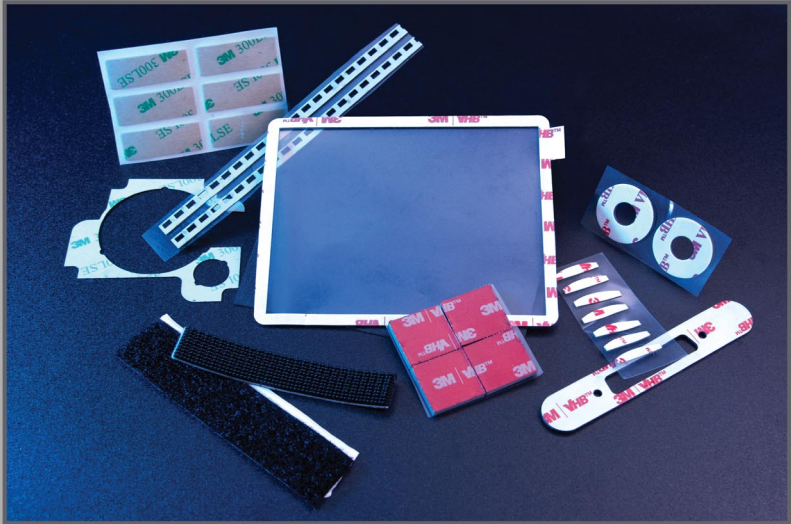
- MATERIAL EXPERTISE
- 3M PREFERRED CONVERTER
- RAPID PROTOTYPING
- ALL TYPES OF PRECISION DIE CUTTING ●



GASKETS

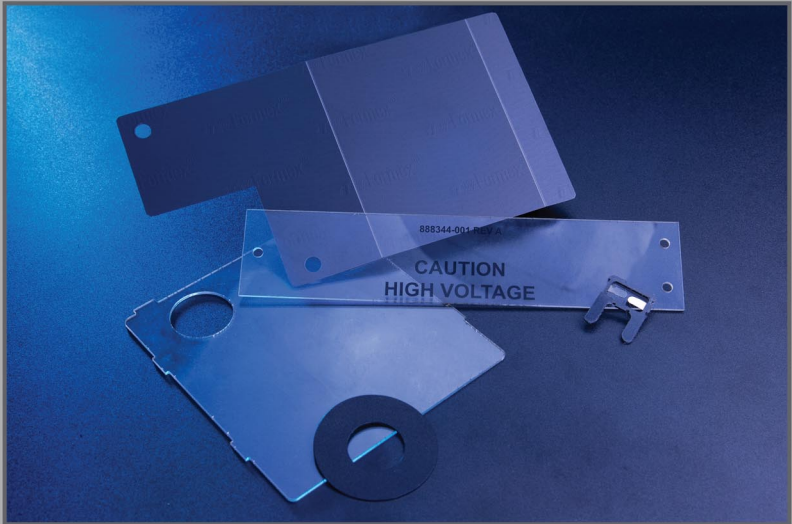


- Poron
- Neoprene
- Silicon
- Rubber
- Foam
- Conductive Rubber
- Conductive Foam



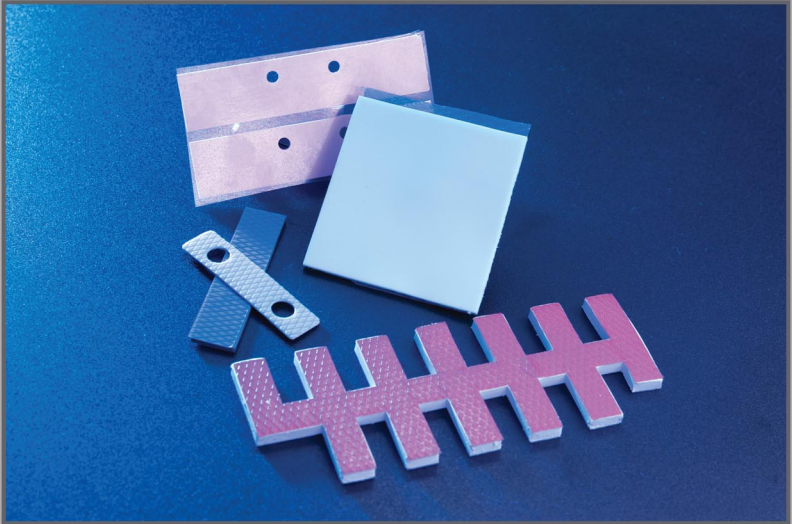
- Hook and Loop
- Dual Lock
- VHB
- Various 3M Laminating Adhesives

INSULATORS

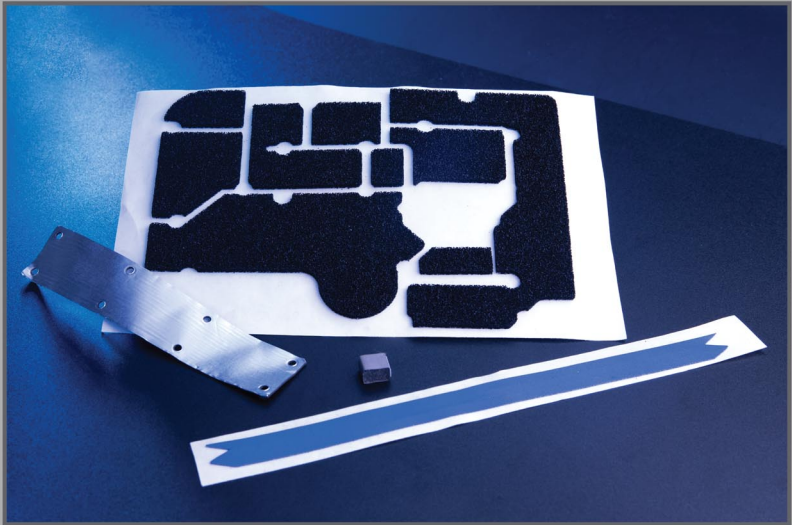


- Polyester
- Polycarbonate
- Polyimide (Kapton)
- Polypropylene

THERMAL MANAGEMENT

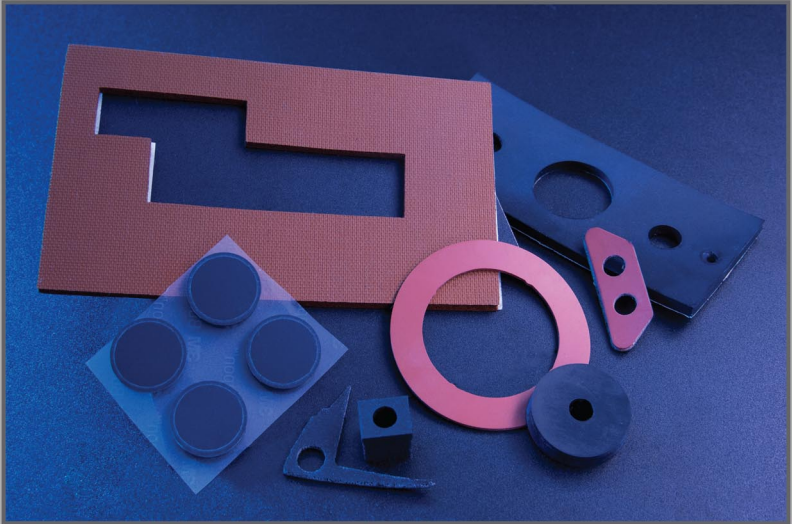


- Interface Materials
- Gap Fillers
- Gap Pads
- Phase Changer
- Heat Spreader
- Bonding Tapes
- Bonding Foams
- Conductive Tapes
- Conductive Foils



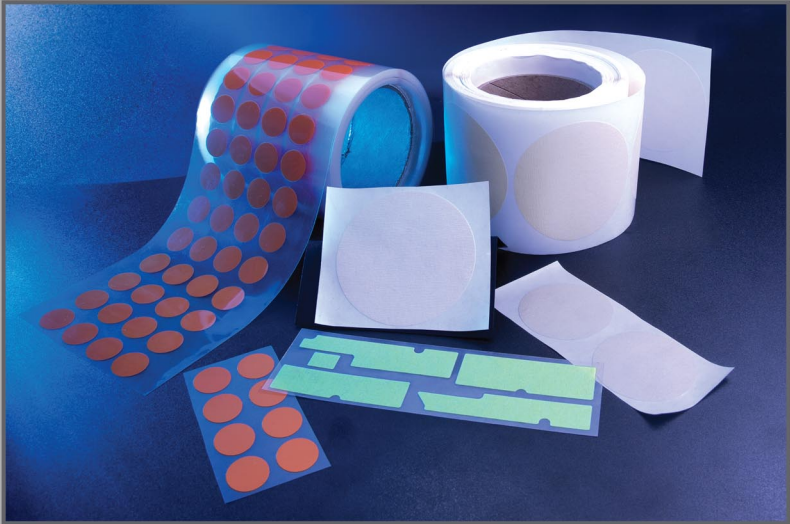
- Conductive Fabric
- Conductive Silicones
- Conductive Adhesives
- Copper Aluminum
- Flexible Fabric
- Bonding Foams

VIBRATION & CUSHIONING



- Open & Closed Cell Foam
- Sponge
- Tapes
- 3M Bumpon
- Cellular Polyurethane
- Silicone Rubber and Sponge

MASKING



- Wet Paint Masking
- Powder Coat Masking
- Sand Blast Masking
- Masking Kits



- Polycarbonate
- Acrylic
- Printed Lens
- Non-Printed Lens
- Selectively Applied Adhesive

KEY SUPPLIERS

Laird
TECHNOLOGIES

سابک
sabic

THE
BERGQUIST
COMPANY

3M Preferred
Converter
Preferred

WARCO
BILTRITE

ROGERS
CORPORATION

ANR
American National Rubber



6 Color carousel screen printing press:

- Prints up to 6 colors in one pass
- Very cost effective
- Can see finished product immediately rather than just putting on one color at a time.



Klem roll to roll screen printing:

- Prints 2 colors per pass
- Prints, laminates and die cuts all in one pass.



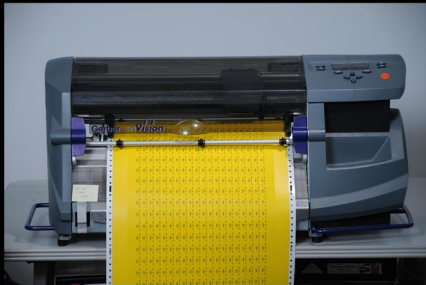
Digital Offset printing:

High speed digital printing in roll form for smaller high quantity labels.
Can print sub-surface polycarbonate and top print 2/4 mil vinyl and 2 mil polyester.



UV or Solvent based wide format Digital Printing:

- Used for printing larger labels in smaller quantities.
- Prints only 2/4 mil vinyl.



Digital Thermal Printing:

- Used for printing and cutting low quantity/low color vinyl , 2 mil polyester in basic colors.
- Great for simple warning/caution type labels.



LAMINATING

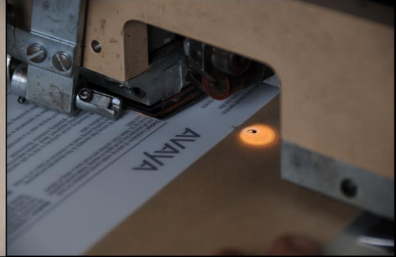


Hand laminating of adhesive for sub-surface printed polycarbonate overlays and nameplates.

Clamshell: Die cutting with hole punch registration



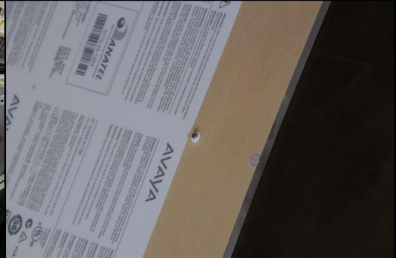
Specially printed registration mark.



Optically registered hole punching.



Part pinned on die press for accurate registration on every part.



Preco roll die cutting using camera registration ensuring every part is cut accurately within ± 0.10

LABEL CUTTING



Zund: digital blade cutting using camera registration ensuring every part is cut accurately within $\pm .010$



Laser: cutting using camera registration ensuring every part is cut accurately within $\pm .010$.
Laser cutting is typically used for thicker materials and to cut hand applied adhesive.



Clicker: press used for small run die cutting that does not need registration.
Typically used to cut small runs of blank materials.

Why MSI.

MR. R&D



Razvan Datcu

Director of Research and Development

Welcome.

I am your dedicated factory resource ready to help research and develop your next Durable Label or Die Cut project.

I work closely with our suppliers like 3M (Preferred Partner), Flexcon, Sabic, Autotype, Rogers, Laird and Bergquist to find the most cost-effective solution for your application. I am also happy to explain our production processes and how to best take advantage of them to solve any issues you may currently have.

I am available to come to your facility to work hands-on to get the best answers and solutions.

25 years of working exclusively with OEM'S gives me a wide range of experience, able to address your toughest challenges.

Contact me to get **Low Cost Rapid Prototyping** with multiple versions or just good answers & direction on....

- Design Enhancements
- New Technologies
- Problematic Labels
- On-Site Assistance

Direct Line - 972.895.4259
rdatcu@markingsystems.com



Multiple Versions
Production Quality Prototypes
Quick Turns
Low Cost

ADHESIVE CHART

| Metals | Surface Energy Dynes/cm |
|----------|----------------------------|
| Copper | 1103 |
| Aluminum | 840 |
| Zinc | 753 |
| Tin | 526 |
| Lead | 543 |

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

| HSE Plastics | Surface Energy Dynes/cm |
|-----------------|----------------------------|
| Kapton® | 50 |
| Phenolic | 47 |
| Nylon | 46 |
| Akyl Etamel | 45 |
| Polyester | 43 |
| Epoxy Paint | 43 |
| Polyurethane | 43 |
| ABS | 42 |
| Polycarbonate | 42 |
| PVC | 39 |
| Noryl | 38 |
| Acrylic | 38 |

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

| LSE Plastics | Surface Energy Dynes/cm |
|-----------------|----------------------------|
| PVA | 37 |
| Polystyrene | 36 |
| Acetal | 36 |
| EVA | 33 |
| Polyethylene | 31 |
| Polypropylene | 29 |
| Tedlar® | 28 |
| PTFE | 18 |
| Powder Coatings | ** |

**Broad range of surface energy.

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

2 mil Polyesters & 4 mil Vinyl:

| Features | Where to Use | Material Numbers |
|--|---|---|
| V-344 1 2 3 4 5 6 7 8 9 10 <p>V-344 (.001) Permanent Acrylic Adhesive:</p> <ul style="list-style-type: none"> Has high tack and high shear properties Designed for metals and high surface energy plastics Good chemical resistance and resist cold flow and ooze Heat Resistance: -40F-302F | V-344 1 2 3 4 5 6 7 8 9 10 <ul style="list-style-type: none"> Use on bare metals, painted metals and high surface energy plastics. | V-344 1 2 3 4 5 6 7 8 9 10 <p>Materials this adhesive is available on:</p> <ul style="list-style-type: none"> .004 White Vinyl .002 White Polyester .002 Shiny Silver .002 Matte Silver .002 Brushed Silver |
| V-606 1 2 3 4 5 6 7 8 9 10 <p>V-606 (.002) Permanent Acrylic Adhesive:</p> <ul style="list-style-type: none"> Has medium tack and high shear properties Designed for metals, high surface energy and low surface energy plastics Good chemical resistance and resist cold flow and ooze Designed specifically for "Powder Coated" paints Heat Resistance: -40F-302F | V-606 1 2 3 4 5 6 7 8 9 10 <ul style="list-style-type: none"> Use for Powder Coat paints | V-606 1 2 3 4 5 6 7 8 9 10 <p>Materials this adhesive is available on:</p> <ul style="list-style-type: none"> .002 White Polyester .002 Shiny Silver .002 Matte Silver .002 Brushed Silver |
| 3M 350 1 2 3 4 5 6 7 8 9 10 <p>350 High Performance Acrylic (uses all-around adhesive)</p> <ul style="list-style-type: none"> Up to 450°F short-term heat resistance. Excellent solvent resistance and adhesion to LSE materials. Heat Resistance: -40F-450F | 3M 350 1 2 3 4 5 6 7 8 9 10 <ul style="list-style-type: none"> 3M's best all-around adhesive and can be used on all surfaces but is best for low surface energy plastics. | 3M 350 1 2 3 4 5 6 7 8 9 10 <p>Use these Product Numbers to specify on your blueprints:</p> <ul style="list-style-type: none"> 3M7868 .002 white polyester (.001) 3M7871 .002 white polyester (.002) 3M7051 .004 white vinyl (.001) 3M7004 .004 white vinyl (.002) |

Note: .001 thick adhesives are designed for smooth or slightly textured surfaces.
.002 thick adhesives are designed for medium to heavily textured surfaces.

2 MIL POLYESTER



#220 GLOSS
WHITE



#208 GLOSS
CLEAR



#326 GLOSS
SILVER



#774 BRUSHED
SILVER



#1771 SILVER
MATTE

| Metals | Surface Energy Dynes/cm |
|----------|----------------------------|
| Copper | 1103 |
| Aluminum | 840 |
| Zinc | 753 |
| Tin | 526 |
| Lead | 543 |

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

| HSE Plastics | Surface Energy Dynes/cm |
|-----------------|----------------------------|
| Kapton® | 50 |
| Phenolic | 47 |
| Nylon | 46 |
| Akyl Etnamel | 45 |
| Polyester | 43 |
| Epoxy Paint | 43 |
| Polyurethane | 43 |
| ABS | 42 |
| Polycarbonate | 42 |
| PVC | 39 |
| Noryl | 38 |
| Acrylic | 38 |

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

| LSE Plastics | Surface Energy Dynes/cm |
|-----------------|----------------------------|
| PVA | 37 |
| Polystyrene | 36 |
| Acetal | 36 |
| EVA | 33 |
| Polyethylene | 31 |
| Polypropylene | 29 |
| Tedlar® | 28 |
| PTFE | 18 |
| Powder Coatings | ** |

**Broad range of surface energy.

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

2 mil Polyesters & 4 mil Vinyl:

| Features | Where to Use | Material Numbers |
|---|--|--|
| V-344 | V-344 | V-344 |
| V-344 (.001) Permanent Acrylic Adhesive: <ul style="list-style-type: none"> Has high tack and high shear properties Designed for metals and high surface energy plastics Good chemical resistance and resist cold flow and ooze Heat Resistance: -40F-302F | <ul style="list-style-type: none"> Use on bare metals, painted metals and high surface energy plastics. | Materials this adhesive is available on: <ul style="list-style-type: none"> .004 White Vinyl .002 White Polyester .002 Shiny Silver .002 Matte Silver .002 Brushed Silver |
| V-606 | V-606 | V-606 |
| V-606 (.002) Permanent Acrylic Adhesive: <ul style="list-style-type: none"> Has medium tack and high shear properties Designed for metals, high surface energy and low surface energy plastics Good chemical resistance and resist cold flow and ooze Designed specifically for "Powder Coated" paints Heat Resistance: -40F-302F | <ul style="list-style-type: none"> Use for Powder Coat paints | Materials this adhesive is available on: <ul style="list-style-type: none"> .002 White Polyester .002 Shiny Silver .002 Matte Silver .002 Brushed Silver |
| 3M 350 | 3M 350 | 3M 350 |
| 350 High Performance Acrylic (uses all-around adhesive) <ul style="list-style-type: none"> Up to 450°F short-term heat resistance. Excellent solvent resistance and adhesion to LSE materials. Heat Resistance: -40F-450F | <ul style="list-style-type: none"> 3M's best all-around adhesive and can be used on all surfaces but is best for low surface energy plastics. | Use these Product Numbers to specify on your blueprints: <ul style="list-style-type: none"> 3M7868 .002 white polyester (.001) 3M7871 .002 white polyester (.002) 3M7051 .004 white vinyl (.001) 3M7304 .004 white vinyl (.002) |

Note: .001 thick adhesives are designed for smooth or slightly textured surfaces.
 .002 thick adhesives are designed for medium to heavily textured surfaces.

4 MIL VINYL



4MIL WHITE



4MIL FROSTY
CLEAR



3MIL BLACK



4MIL YELLOW



Colors:

- Gloss White
- Frosty Clear
- Silver

Thickness: .002

Adhesive: Comply adhesives for "Bubble Free" applications.

Durability: 7-year outdoors

Uses:

- Large equipment logos
- Thermal Die Cut Decals
- Warning/Caution Decals
- Wiring Diagrams

2 MIL VINYL



3M 180 .022
WHITE



3M 180 .022
CLEAR



3M 180 .002
SILVER



Need help finding the right laminate for your label application? On the following page are the standard over-laminates that MSI offers. Over-laminates can enhance the appearance of your label while also providing chemical and cleaner resistance.

Don't see what you are looking for? Don't hesitate to call us. Our R&D team will find you exactly what you are looking for.

OVER-LAMINATES



| Metals | Surface Energy Dynes/cm |
|----------|----------------------------|
| Copper | 1103 |
| Aluminum | 840 |
| Zinc | 753 |
| Tin | 526 |
| Lead | 543 |

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

| HSE Plastics | Surface Energy Dynes/cm |
|-----------------|----------------------------|
| Kapton® | 50 |
| Phenolic | 47 |
| Nylon | 46 |
| Alkyd Enamel | 45 |
| Polyester | 43 |
| Epoxy Paint | 43 |
| Polyurethane | 43 |
| ABS | 42 |
| Polycarbonate | 42 |
| PVC | 39 |
| Noryl | 38 |
| Acrylic | 38 |

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

| LSE Plastics | Surface Energy Dynes/cm |
|-----------------|----------------------------|
| PVA | 37 |
| Polystyrene | 36 |
| Acetal | 36 |
| EVA | 33 |
| Polyethylene | 31 |
| Polypropylene | 29 |
| Tedlar® | 28 |
| PTFE | 18 |
| Powder Coatings | ** |

**Broad range of surface energy.

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

Subsurface Polycarbonates:

| Features | Where to Use | Material Numbers |
|---|---|---|
| <p>200MP 467, 468 1 2 3 4 5 6 7 8 9 10</p> <p>200MP High Performance Acrylic: (3M's work horse adhesive)</p> <ul style="list-style-type: none"> • Excellent solvent resistance. • Adheres well to Metal and High Surface Energy Plastics • Outstanding adhesion to metal and high surface energy plastics • Excellent shear strength to resist slippage and edge lifting. • Short term repositionability for placement accuracy. • Heat Resistance: -40°-400° | <p>200MP 40, 48 1 2 3 4 5 6 7 8 9 10</p> <ul style="list-style-type: none"> • Use on bare metals, painted metals and high surface energy plastics | <p>200MP 467, 468 1 2 3 4 5 6 7 8 9 10</p> <p>Use these Product Numbers to specify on your blueprints:</p> <ul style="list-style-type: none"> • 3M467MP (.002) • 3M468MP (.005) |
| <p>300LSE 9471LE, 9472LE 1 2 3 4 5 6 7 8 9 10</p> <p>300LSE Low Surface Energy Acrylic: (upgraded version of the 8300 family)</p> <ul style="list-style-type: none"> • Has higher heat rating than 8300 family • Good chemical and humidity resistance • Outstanding adhesion to low surface energy plastics, powder coated parts, and lightly oiled metals. • Heat Resistance: -40°-300° | <p>300LSE 9471LE, 9472LE 1 2 3 4 5 6 7 8 9 10</p> <ul style="list-style-type: none"> • Use for low surface energy plastics and powder coat parts | <p>300LSE 9471LE, 9472LE 1 2 3 4 5 6 7 8 9 10</p> <p>Use these Product Numbers to specify on your blueprints:</p> <ul style="list-style-type: none"> • 9671LE (.002) • 9672 (.005) |
| <p>350 9442, 9485 1 2 3 4 5 6 7 8 9 10</p> <p>350 High Performance Acrylic: (Sticks to everything, but is not gooey or messy like the 8300. Performs more like the 4000 family)</p> <ul style="list-style-type: none"> • Up to 450° F short-term heat resistance • Excellent solvent resistance and adhesion to LSE materials. • Heat Resistance: -40°-450° | <p>350 9442, 9485 1 2 3 4 5 6 7 8 9 10</p> <ul style="list-style-type: none"> • Same as 300LSE with higher heat resistance up to 450° F | <p>350 9442, 9485 1 2 3 4 5 6 7 8 9 10</p> <p>Use these Product Numbers to specify on your blueprints:</p> <ul style="list-style-type: none"> • 9442 (.002) • 9485 (.005) |

Note: .002 thick adhesives are designed for smooth or slightly textured surfaces.
 .005 thick adhesives are designed for medium to heavily textured surfaces.

POLYCARBONATE

GLOSS POLYCARBONATE



VELVET/GLOSS
POLYCARBONATE



VELVET/MATTE
POLYCARBONATE



100% GLOSS MARNOT



96% GLOSS MARNOT



75% GLOSS MARNOT



35% GLOSS MARNOT



| Metals | Surface Energy Dynes/cm |
|----------|----------------------------|
| Copper | 1103 |
| Aluminum | 840 |
| Zinc | 753 |
| Tin | 526 |
| Lead | 543 |

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

| HSE Plastics | Surface Energy Dynes/cm |
|-----------------|----------------------------|
| Kapton® | 50 |
| Phenolic | 47 |
| Nylon | 46 |
| Alkyd Enamel | 45 |
| Polyester | 43 |
| Epoxy Paint | 43 |
| Polyurethane | 43 |
| ABS | 42 |
| Polycarbonate | 42 |
| PVC | 39 |
| Noryl | 38 |
| Acrylic | 38 |

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

| LSE Plastics | Surface Energy Dynes/cm |
|-----------------|----------------------------|
| PVA | 37 |
| Polystyrene | 36 |
| Acetal | 36 |
| EVA | 33 |
| Polyethylene | 31 |
| Polypropylene | 29 |
| Tedlar® | 28 |
| PTFE | 18 |
| Powder Coatings | ** |

**Broad range of surface energy.

Adhesive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

Subsurface Autotype Polyesters:

| Features | Where to Use | Material Numbers |
|--|---|---|
| 200MP High Performance Acrylic (3M's work horse adhesive) <ul style="list-style-type: none"> • Excellent solvent resistance. • Adheres well to Metal and High Surface Energy Plastics • Outstanding adhesion to metal and high surface energy plastics • Excellent shear strength to resist slippage and edge lifting. • Short term repositionability for placement accuracy. • Heat Resistance: 40F-400F | <ul style="list-style-type: none"> • Use on bare metals, painted metals and high surface energy plastics | Use these Product Numbers to specify on your blueprints: <ul style="list-style-type: none"> • 3M467MP (.002) • 3M468MP (.005) |
| 300LSE Low Surface Energy Acrylic (weakest version of the 300 family) <ul style="list-style-type: none"> • Has higher heat rating than #300 family • Good chemical and humidity resistance • Outstanding adhesion to low surface energy plastics, powder coated paints, and lightly oiled metals. • Heat Resistance: 40F-300F | <ul style="list-style-type: none"> • Use for low surface energy plastics and powder coat paints | Use these Product Numbers to specify on your blueprints: <ul style="list-style-type: none"> • 9671LE (.002) • 9672 (.005) |
| 350 High Performance Acrylic (sticks to everything, but is not gummy or messy like the #300. Properties are more like the #200 family) <ul style="list-style-type: none"> • Up to 450° F short-term heat resistance • Excellent solvent resistance and adhesion to LSE materials. • Heat Resistance: 40F-450F | <ul style="list-style-type: none"> • Same as 300LSE with higher heat resistance up to 450°F | Use these Product Numbers to specify on your blueprints: <ul style="list-style-type: none"> • 9442 (.002) • 9485 (.005) |

Note: .002 thick adhesives are designed for smooth or slightly textured surfaces.
 .005 thick adhesives are designed for medium to heavily textured surfaces.

AUTOTYPE POLYESTER

AUTOFLEX: GLOSS



AUTOFLEX: ANTIGLARE



AUTOFLEX: TEXTURE FINE



AUTOFLEX: TEXTURE VELVET



AUTOFLEX: SOFT TOUCH



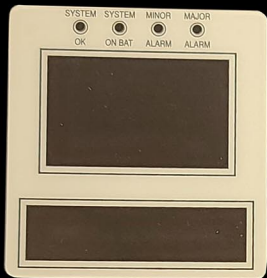
AUTOFLEX: STEEL



Outdoor label products

- **UV-1 Velvet/Matte Polycarbonate (.010)**
Outdoor life: 7 years
Application: Warning labels, smaller logos
- **HP92W Gloss/Gloss Lexan:**
Outdoor life: 7 years
Application: Warning labels, smaller logos
- **3M 2mil Premium Vinyl**
Outdoor life: 7 years
Application: Large logos, warning labels
- **Doming**
Outdoor Life: 10 years
Application: Small to medium sized logos
- **1&2 Mil UVCG Polyester clear gloss or matte polyester over-laminate**
Outdoor Life: 5 years
Application: Makes any material you laminate it to a 5 year outdoor product. Excellent for warning/info labels.

OUTDOOR LABEL PRODUCTS



HP92W



DOMING



3M 2 MIL PREMIUM VINYL



1 MIL UVCG POLYESTER





3M™ VHB™ Tapes Product Information

July 2013

Product Description

3M™ VHB™ Tapes are a family of double-sided foam tapes made from high performance acrylic adhesives. These tapes are able to form bonds of exceptional strength and have greater durability and elasticity than conventional double-sided foam tapes. The VHB Tape product range includes tapes with different core constructions and a variety of adhesives. All 3M VHB Tapes use closed cell technology, and provide outstanding environmental resistance and durability. The superior performance of 3M VHB Tapes means they can often be used to replace mechanical fasteners for joining a wide range of materials.

3M™ VHB™ Tapes Product Range

| | Adhesive type | Product Number | Tape Thickness | Colour | Temperature Resistance | | Relative Adhesion | | Liner Type | Application Ideas |
|--|--|----------------|----------------|---------------------------|------------------------|------------|-------------------|--------------|--|---|
| | | | | | Minutes Hours | Days Weeks | HSE Material | LSE Material | | |
| General Purpose VHB Tapes | Modified adhesive on both sides of a soft foam | 5925 | 0.64mm | Black adhesive, grey core | 149 °C | 121 °C | High | Medium | Red Film | Excellent adhesion to the widest variety of surfaces, including most powder coated paints and plastics. |
| | | 5952 | 1.1mm | Black adhesive, grey core | 149 °C | 121 °C | High | Medium | Red Film | |
| | | 5962 | 1.55mm | Black adhesive, grey core | 149 °C | 121 °C | High | Medium | Red Film | |
| | Firm adhesive on one side and a soft adhesive on the other side of a medium foam | 4618 | 0.64mm | White | 121 °C | 93 °C | High | Low | Green Film | Good adhesion to a wide range of surfaces. |
| | | 4622 | 1.1mm | White | 121 °C | 93 °C | High | Low | Green Film | |
| | | 4624 | 1.55mm | White | 121 °C | 93 °C | High | Low | Green Film | |
| Special Feature VHB Tapes | Firm adhesive on both sides of a firm foam | 4930 | 0.64mm | White | 149 °C | 93 °C | High | Low | Paper | Use with metals where high dynamic stresses are involved. |
| | | 4950 | 1.1mm | White | 149 °C | 93 °C | High | Low | Paper | |
| | | 4959 | 3.0mm | White | 204 °C | 149 °C | High | Low | Clear Film | |
| | Soft adhesive on both sides of a firm foam | 4945 | 1.1mm | White | 149 °C | 93 °C | High | Low | Paper | Use with metals and HSE plastics where high dynamic stresses are involved. |
| | | 4936 | 0.64mm | Grey | 149 °C | 93 °C | High | Medium | Paper | |
| | | 4941 | 1.1mm | Grey | 149 °C | 93 °C | High | Medium | Paper | |
| | Clear firm adhesive | 4991 | 2.3mm | Grey | 121 °C | 93 °C | High | Medium | Red Film | Excellent adhesion to a wide range of materials including plasticised vinyl. |
| | | 4905 | 0.5mm | Clear | 149 °C | 93 °C | High | Low | Red Film | |
| | | 4910 | 1.0mm | Clear | 149 °C | 93 °C | High | Low | Red Film | |
| | | 4915 | 1.5mm | Clear | 149 °C | 93 °C | High | Low | Red Film | |
| | Low temperature adhesive on both sides of a firm foam | 4918 | 2.0mm | Clear | 149 °C | 93 °C | High | Low | Red Film | For high surface energy materials where a clear adhesive is required. |
| | | 4951 | 1.1mm | White | 149 °C | 93 °C | High | Low | Clear Film | |
| High temperature firm foam adhesive | 4957 | 1.55mm | Grey | 149 °C | 93 °C | High | Low | Clear Film | For HSE substrates where tape is applied at temperatures down to 0 °C. | |
| | 4611 | 1.1mm | Dark grey | 232 °C | 149 °C | High | Low | Red Film | | |
| High temperature firm adhesive transfer tape | 9473 | 0.25mm | Clear | 260 °C | 149 °C | High | Low | Paper | High temperature resistance. Thin laminating adhesive. | |

Selecting the proper adhesives for a nameplate, label or membrane switch application requires consideration of environmental, surface, appearance and other performance requirements. Our purpose here is to cover some of the principles of adhesion.

Surface contact is fundamental to adhesive performance. To maximize adhesive contact on a surface:

- It must be dry and free of contaminants.
- Firm pressure must be applied to increase the flow and contact of the adhesive with the substrate.
- Time and temperature will increase the surface contact and adhesion values.
- Oil contaminated materials may be addressed with the 3M™ Adhesive 300LSE or 350 families.

Adhesion is the molecular force of attraction between unlike materials. The strength of attraction is determined by the surface energy of the material. The higher the surface energy, the greater the molecular attraction. The lower the surface energy, the weaker the attractive forces.

Greater molecular attraction results in increased contact between an adhesive and substrate. In other words, for a high surface energy material, the adhesive can flow (or "wet-out") to assure a stronger bond.

Consider an automobile that has not been waxed for a long time. When water contacts the surface, it spreads in large puddles. The unwaxed car surface exhibits high surface energy — the molecular attraction allows the water to flow.

In comparison, water beads up into small spheres on a freshly waxed car. It is an example of low surface energy — the liquid (or adhesive) does not flow out.

Surface energy is measured by dynes per centimeter. The dyne level is the actual reading of the critical surface tension.

Modified acrylic and synthetic adhesives with better flow (or "wet-out") characteristics have been developed to adhere to low surface energy substrates. The Surface Energy Chart below compares the relative surface energy of commonly used substrates.

3M™ High Performance Acrylic Adhesive 200MP will not readily adhere to substrates categorized as having "low surface energy." However, 3M acrylic adhesives have been designed to adhere to low surface energy plastics, and should be considered for those applications.

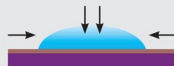
Surface Energy Chart

Metal Surfaces (High Surface Energy)



| mJ/m ² | Surfaces |
|-------------------|-----------------|
| 1103 | Copper |
| 840 | Aluminum |
| 753 | Zinc |
| 526 | Tin |
| 458 | Lead |
| 700-1100 | Stainless Steel |
| 250-500 | Glass Porcelain |

High Surface Energy Plastics (HSE)



| mJ/m ² | Surfaces | mJ/m ² | Surfaces |
|-------------------|---------------------------|-------------------|--------------------|
| 50 | Polyimide Industrial Film | 43 | Polyurethane Paint |
| 47 | Phenolic | 42 | ABS |
| 46 | Nylon | 39 | Polycarbonate |
| 45 | Alkyd Enamel | 38 | PVC Rigid |
| 43 | Polyester | 38 | Modified PPE Resin |
| 43 | Epoxy Paint | 38 | Acrylic |

Low Surface Energy Plastics (LSE)



| mJ/m ² | Surfaces |
|-------------------|-------------------------|
| 37 | PVA |
| 36 | Polystyrene |
| 36 | Acetal |
| 33 | EVA |
| 31 | Polyethylene |
| 29 | Polypropylene |
| 28 | Polyvinyl Fluoride Film |
| 18 | PTFE |
| Broad Range | Powder Coated Paints |

Note: These values are provided as a guide. Formulation modifications can substantially alter surface energies.

CLEANING INSTRUCTIONS

Clean

In most cases, simply clean substrate with an IPA/water mixture.

Pressure



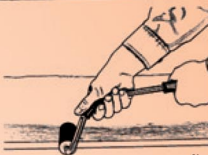
Apply 15 psi at the bond line.

Temperature

Typically apply at 50-90°F (10-32°C).

Instant tack at room temperature.

Time

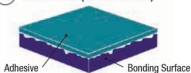
| Time | Bond strength |
|---------|---------------|
| 20 min. | 50% |
| 60 min. | 75% |
| 24 hrs. | 90% |
| 3 days | 100% |

NOTE: The technical information and data provided here should be considered representative or typical only and should not be used for specification purposes. User should evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for user's method of application.

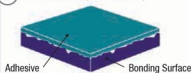
Adhesive Surface Contact

Applying firm pressure to the bond increases adhesive flow and contact for more secure bonding. Time and temperature will typically further increase contact and adhesion values.

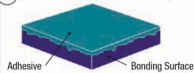
1 Initial Contact (Minimal Contact)



2 After Rubdown (More Contact)



3 After Dwell Time (Excellent Contact)



Marking Systems, Inc. is a global leader in color management for Nameplates, Overlays, Labels and Membrane Switches. The world's leading OEM's have used MSI's innovative solutions to consistently achieve the right color for over 40 years. MSI's complete computerized systems for color measuring, matching and quality control let our customers rest easy knowing that every order is consistent and correct. In digital printing, MSI provides leading-edge G-7 certified color management to ensure every digital file is printed correctly and accurately. To avoid "color creep" MSI only matches color to the customer's original "color standard" These standards are file in light blocking envelopes and stored in a color standard file cabinet to ensure no color degradation. Every order is then compared to the color standard to ensure long term consistent color matching.



STEP 1 COLOR STANDARD

It all starts with the customer sending us a color standard to be matched. This can be virtually any type of material but is usually either a plastic or metal bezel.



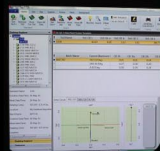
STEP 2 THE FORMULA

MSI uses the latest high tech tools from DataColor to determine the formula for the color match. The bucket is then marked for future identification.



STEP 3 COLOR MATCH APPROVAL

Once the correct color match is achieved, MSI prepares a 2 part card to send the customer. If the customer approves the color, they tear the card into two halves. One is signed and sent back to MSI and the other is kept by the customer for their future reference. MSI will file both the original color standard and the approval card in a light blocking envelope which is then put in the color standard file.



STEP 4 PRINTING AND QC

When the order is run MSI's quality department will take the first print and use the spectrophotometer to ensure the color is within both visual tolerance and within ± 1 Delta.



STEP 5 THE PRINTED PRODUCT

A high quality nameplate that almost appears to be molded into the surface of the product. Our quality department will ensure that each future run looks just the same as the first.

MATERIALS

| Mat# | Description |
|------|---|
| 0173 | 10 Mil FR65 Clear Lexan Velvet/Matte |
| 0203 | 2 Mil 3M7952MP sheet adhesive (3M467) # |

COLORS

| Bucket | Color Description | Ink Series |
|--------|-------------------------|------------|
| 4491 | BOEING BAC1060 RED | MSK |
| 4492 | BOEING BAC 70961 GRAY | MSK |
| 4493 | PEC 70913 WHITE | MSK |
| 1 | OPAQUE WHITE | MSK |
| 1 | OPAQUE WHITE | MSK |
| 1 | OPAQUE WHITE | MSK |
| 1 | OPAQUE WHITE | MSK |
| 5876 | LIGHT BLOCK/FOR OPACITY | MSK |
| 6 | OPAQUE BLACK | MSK |
| 4494 | TRANS. BOEING GREEN | MSK |
| 4494 | TRANS. BOEING GREEN | MSK |
| 4494 | TRANS. BOEING GREEN | MSK |
| 4495 | BOEING BAC 70961 GRAY | MSK |
| 4495 | BOEING BAC 70961 GRAY | MSK |
| 5 | WHITE 50/50 MSK | MSK |

DIES

| DieNumber | DieNumberUp |
|-----------|-------------|
| 4231P | 4 |

PRESS PROCESSES AND INSTRUCTIONS

Press 2 Standard Print

speed 125

PRINT THE FIRST PASS OF TRANS. BOEING GREEN WITH A PINK SQUEEGEE AND THE SECOND PASS WITH A RED SQUEEGEE PRINT THE 3 PASSES OF OPAQUE WHITE AFTER THE BOEING BAC 70961 GRAY WITH A WHITE SQUEEGEE

DATE CODE CHANGES EACH RUN "MMYY", MM= MONTH SHIPPED

CHECK 1:1 REQUIRED - DATE: _____
PRINTER# _____

POSTPRESS PROCESSES AND INSTRUCTIONS

Spartanics Hole Punch

Laser Cut - Adhesive

THRUCUT

Y:\LASER\PC\MADHESIVE\PC\M (1.257 X 4.790) 71819 REV 01 (DWG 2330-8024 REV 14).dwg

Hand Apply Selective Adhesive - Tolerance +/-

Clamshell Cut - Printed

Through Cut

SHIPPING PROCESSES AND INSTRUCTIONS

Inspect S0,IN,SJ,HP,R0

Inspect parts for trash in the symbols while they are still in sheets

This is per note 11, 5 secs per part for backlit inspection and ambient light inspection

speed 250

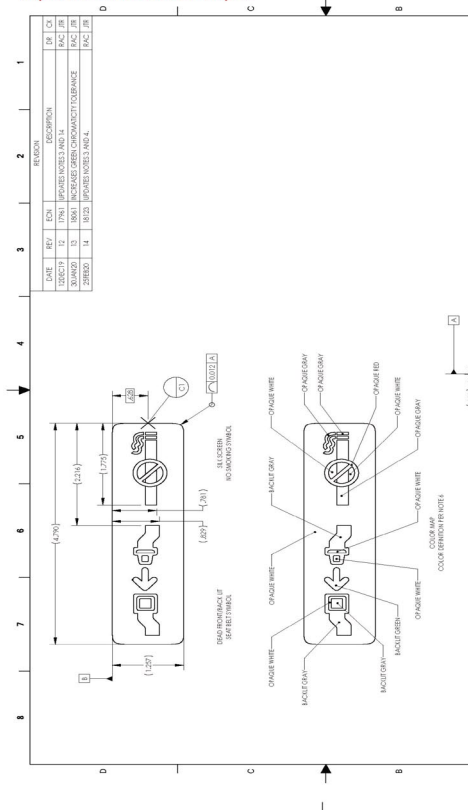
Pack Label Size 12x12 (1sq ft or less)

speed 5000

Shipping Jobs

PN: 71819 REV 01 (DWG 2330-8024 Rev
v:\pfd\2330-8024 Rev 14.pdf

This job requires Level 3



SPECIAL INSTRUCTIONS

CD

CD FINISH

Approved _____

By: _____

Date: _____

UNLESS OTHERWISE SPECIFIED, ST

COLOR 10 ONE PASS WITH PINK MO
COLOR 11 AND 12 - RED MOLDED SO
COLOR 13 - PINK MOLDED SQUEEG
COLOR 14 - WHITE MOLDED SQUEE

This pricing is based on a log term price

Label Sets:**Label Tabs:****Back Score:**

Blanket Orders: Customers place 6-12 month order quantities upfront, MSI builds all at once and puts on the shelf for future shipments to be determined by the customer.

VMI (Vendor managed inventory): Label supplier manages the label inventory at the customer's facility

SMI (Supplier managed inventory): Like VMI only the inventory is held at MSI and managed by MSI

Scheduled shipments: Like blanket orders except P.O. has each release scheduled out.

Consignment: Like VMI with Inventory being held at the customers but in this case they do not pay for the labels until they use them.

1. Decal: a label that goes outdoors called?
2. Label: a sticker used indoors is called?
3. Lexan: GE/Sabic's trade name for polycarbonate?
4. Sub-surface printing: printing that is done on the underside of a material?
5. A "flat color" is also a "solid" color, as compared to a process color?
6. Process color: are colors that are not solid and are referred to as gradients.
7. Label set: multiple labels kiss cut on a common liner.
8. Kiss cut: cutting through the label material but not through the label liner.
9. CYMK: Cyan, yellow, magenta and black.
10. DPI: Dots per square inch.
11. Selective texture: this refers to printing a velvet texture on the top of polycarbonate.
12. Embossing: means to raise a certain area. Typically used on overlays and membrane switches to give the buttons a tactile feel.
13. What 3 types of emboss are there: rail, pillow and polyester snap dome
14. UV ink: Ultra-violet ink.
15. Dead front: the hiding of graphics until they are lit up by LED lights.
16. Discreet order: typically refers to an order that is placed for a certain qty and has one ship date.
17. Blanket order: typically refers to an order for a certain qty that will be shipped over a period of time (usually one year) as the customer needs the parts.
18. VMI: Vendor managed inventory
19. Blanket orders, VMI or consignment orders are non-cancellable because all of the parts are build at one time upfront.
20. Dome/bubble label: A label that has an approximately .070 polyurethane coating



Purchasing the correct UL label can often seem daunting and complicated. There is really no such thing as a simple “UL label”.

Marking Systems, Inc. has been an approved UL label supplier for over 40 years. Our experts on staff will be happy to walk you through the label design process or help you obtain additional label approvals directly from UL.

MSI offers hundreds of UL and CSA certified labels using materials such as polycarbonate, polyester, thermal polyester, vinyl and paper. Many of the certifications are good for both indoor and outdoor applications.



Certification Label



Elevator Certification Label



Power Module Certification Label



Circuit Transformer Certification Label

UL 969 Marking & Labeling Systems Program:

The Marking and Labeling Systems program covers labels (nameplates or markers) and label materials that have been submitted to UL for evaluation in accordance with prescribed permanence of marking performance requirements so they can be used to display information on products. Most products are required to be permanently marked with specific safety-related information such as hazards, warnings, cautionary markings, installation instructions, electrical ratings, etc. Labels and label materials that comply with the Marking and Labeling System requirements fall under UL's Component Recognition Program which provides a convenient way for manufacturers to acquire labels that meet performance of marking requirements applicable to their UL certified product. Marking and Labeling Systems are covered under the following five categories based on the type of product and end-use application.

- PGDQ2: Marking & Labeling Systems
- PGJ12: Marking & Labeling Systems – Printing Materials
- PGIM2: Marking & Labeling Systems -In-Mold
- PGGU2: Marking & Labeling Systems – Materials
- PGIS2: Marking & Labeling Systems – Limited Use

Labels and label materials Recognized under the first four category codes – PGDQ2, PGJ12, PGIM2 and PGGU2 – are tested in accordance with the test methods in ANSI/UL 969, "Marking & Labeling Systems". They are suitable for use on a wide variety of UL Certified products.

Labels Recognized under the category code PGIS2 are evaluated in accordance with unique label requirements in a specific UL end-product Standard and are thus "limited in use" to the products covered under that Standard.

The evaluation for Marking and Labeling Systems includes a construction examination and testing for permanency. Environmental conditioning of labels typically includes testing for exposure to high humidity or occasional exposure to water, elevated temperatures, sunlight resistance, or exposure to chemical agents. After the environmental conditioning, the labels are visually examined for curling, wrinkling, shrinkage or loss of adhesion around the perimeter. Testing also typically includes evaluation of legibility, resistance to defacement, and adhesion.

RoHS/REACH

The Directives mandates that anything within the end product which can be identified as a homogeneous material (ex. paper, wood, glue, etc) must be tested. As such, if the labels are part of the packaging that will be discarded before use, they don't fall within the scope. However, if the labels are permanently affixed to the product, they may be subject to compliance certification.

MSI offers a wide variety of RoHS-2/REACH compliant materials and labels.



The Power of G7
Maintaining Brand Color Consistency

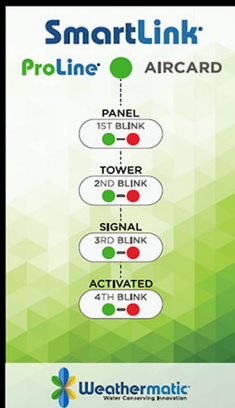
The G7 method is a set of industry practices and procedures for implementing ISO printing standards and additional metrics to ensure digital files are printed correctly and consistently no matter what press they are printed on.

- G7 Master qualification is a global identifier/standard (similar to ISO) of expertise in color management, press control, process-control and helping customers achieve consistency from proof-to-print.
- G7 Master qualification is a commitment to continued training and education.
- G7 gives all printing systems/presses a shared neutral, common visual appearance helping to consistently hit desired color targets.
- G7 has a proven toolkit behind it, based on internationally recognized standards.
- G7 means reprints will always look the same.
- G7 aligns all devices, substrates and links to a common standard of gray balance and tonal
- G7 is an ANSI/CGATS specification for targeting gray balance

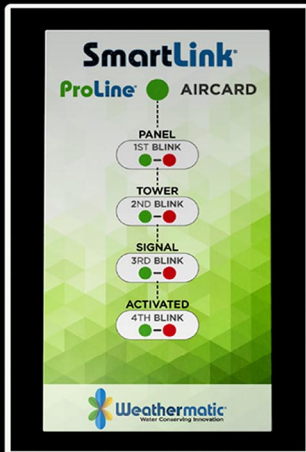
WHAT IT MEANS TO BE A G7 MASTER PRINTER:

G7 Master Qualification is granted to a physical facility. G7 Master Status indicates that the facility has calibrated certain equipment and systems to G7 gray balance and neutral tone curves and is capable of delivering G7 proofs and print products.

CUSTOMER ART



FINAL PRODUCT



DMI

Direct Machine Interface

WHY MSI.



Score Trends

T-Put YTD **114%**

MR YTD **110%**

YTD **113%**

T-Put Last Wk **95%**

MR Last Week **116%**

Last Week **100%**

Date
L 1 Years
4/10/2019 - 4/9/2020

Area
Finishing

Operator
All

Equipment
All

PlantID
All

By All

By Operators

By Equipment

4/10/2019 to 4/3/2020
Date Range Selection

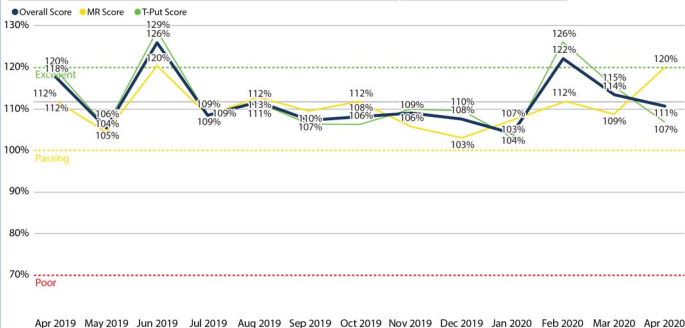
DIE CUT

Multiple Selection
Operator Selection

All Presses
Equipment Selection

Both Plants
Plant Selection

Score Over Time - Single Line



These 2 charts show how we track press (make ready/set-up) and through put/run speeds.



Score Trends

T-Put YTD **143%**

MR YTD **94%**

YTD **123%**

T-Put Last Wk **168%**

MR Last Week **88%**

Last Week **135%**

Date
L 1 Years
4/10/2019 - 4/9/2020

Area
Press

Operator
All

Equipment
All

PlantID
All

By All

By Operators

By Equipment

4/10/2019 to 4/3/2020
Date Range Selection

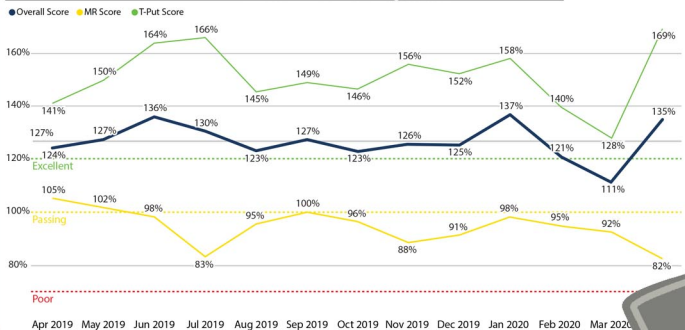
**PRINTING
PRESSES**

Multiple Selection
Operator Selection

All Presses
Equipment Selection

Both Plants
Plant Selection

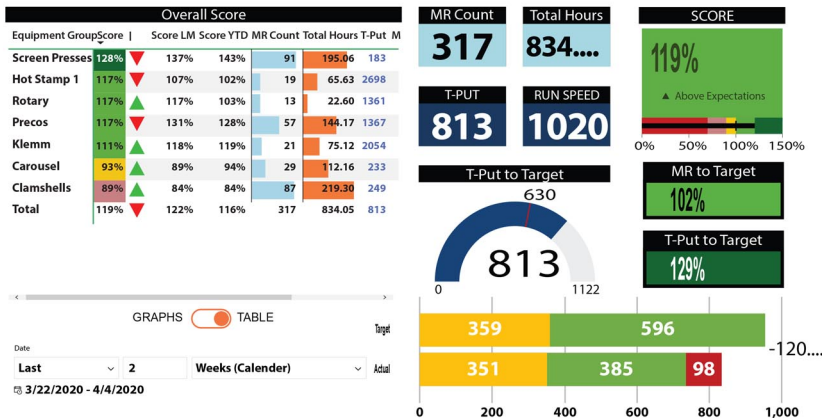
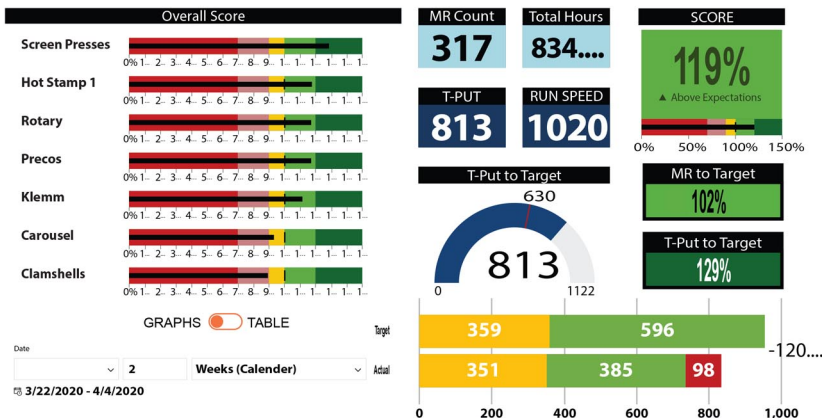
Score Over Time - Single Line



DMI

Direct Machine Interface

WHY MSI.

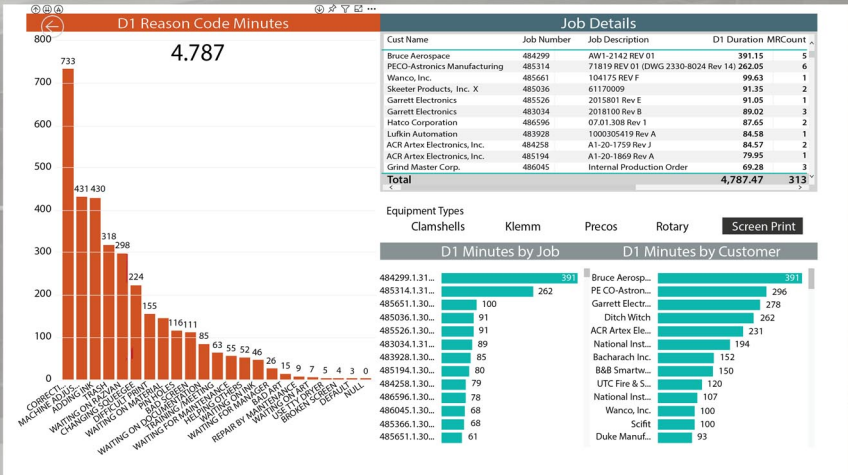


This Chart shows weekly trends going up (green arrows) and down (red arrows).

DMI

Direct Machine Interface

WHY MSI.



This chart shows where the time is going when the down is stopped.

MARKINGSYSTEMS.COM



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972-475-9770

