



# Joining forces

Dymax Corporation evaluated its light-curable medical device adhesives using various formulations of Eastman Tritan™ copolyester as substrates.

- Lap shear studies were conducted on clear formulations of Tritan (MX711, MX731, MX811) as well as opaque Tritan (MXF121).
- Lipid resistance testing was performed only with the clear formulations of Tritan.

## Summary

The results summarized in the table show that Dymax adhesives provide good to excellent adhesion with application-matched formulations of Tritan:

- Aging samples generally had a positive impact on bond strength of the adhesives.
- Submersion in the Intralipid solution did not significantly impact the bond strength.

## Lap shear testing

Clear and opaque samples were bonded with application-matched adhesives and bond strength was measured following (1) conditioning at room temperature; (2) 20-day dry heat conditioning to simulate  $\geq 6$  months aging.

## Lipid resistance study

For random bonded clear samples, bond strength was tested after soaking in Intralipid® 20% (20% IV fat emulsion) for 48 and 96 hours. A control set was also tested.

Adhesion testing with formulations of Eastman Tritan™ copolyester

|  |               | LAP SHEAR TESTING   |                      | LIPID RESISTANCE    |            |            |
|--|---------------|---------------------|----------------------|---------------------|------------|------------|
|  |               | Room temp.          | 20-day aging at 55°C | Control             | 48 hr soak | 96 hr soak |
| Category   | Adhesive      | Avg max. load (lbf) |                      | Avg max. load (lbf) |            |            |
| Eastman Tritan™ copolyester MX711 adhesion study       |               |                     |                      |                     |            |            |
| Needle bonding   | 1161-M        | 106.66              | 120.77               | —                   | —          | —          |
|  | 1402-M        | 105.30              | 112.94               | —                   | —          | —          |
|  | 1403-M        | 117.21              | 121.20               | —                   | —          | —          |
|  | 1405M-T-UR-SC | 105.48              | 107.29               | —                   | —          | —          |
| Catheter bonding                                       | 209-CTH       | 112.60              | 114.57               | —                   | —          | —          |
|  | 215-CTH-UR-SC | 100.90              | 188.03               | —                   | —          | —          |
| Plastic assembly                                       | 1121-M        | 129.83              | 140.42               | 130.24              | 133.38     | 126.83     |
|  | 1161-M        | 106.66              | 120.77               | 120.51              | 108.70     | 101.53     |
|  | 1180-M        | 120.14              | 112.43               | 106.34              | 103.18     | 110.51     |
| Eastman Tritan™ copolyester MX731 adhesion study       |               |                     |                      |                     |            |            |
| Needle bonding   | 1161-M        | 97.33               | 123.44               | —                   | —          | —          |
|  | 1402-M        | 100.33              | 91.87                | —                   | —          | —          |
|  | 1403-M        | 105.16              | 104.87               | —                   | —          | —          |
|  | 1405M-T-UR-SC | 92.71               | 92.86                | —                   | —          | —          |
| Catheter bonding                                       | 209-CTH       | 87.86               | 90.95                | —                   | —          | —          |
|  | 215-CTH-UR-SC | 129.59              | 180.22               | —                   | —          | —          |
| Plastic assembly                                       | 1121-M        | 132.79              | 129.16               | 98.42               | 100.89     | 86.02      |
|  | 1161-M        | 97.33               | 123.44               | 100.54              | 93.33      | 88.59      |
|  | 1180-M        | 84.38               | 90.53                | 95.70               | 100.03     | 94.42      |
| Eastman Tritan™ copolyester MX811 adhesion study       |               |                     |                      |                     |            |            |
| Needle bonding   | 1161-M        | 106.33              | 114.37               | —                   | —          | —          |
|  | 1402-M        | 99.06               | 109.89               | —                   | —          | —          |
|  | 1403-M        | 114.04              | 131.91               | —                   | —          | —          |
|  | 1405M-T-UR-SC | 113.68              | 113.16               | —                   | —          | —          |
| Catheter bonding                                       | 209-CTH       | 114.20              | 124.45               | —                   | —          | —          |
|  | 215-CTH-UR-SC | 140.71              | 177.48               | —                   | —          | —          |
| Plastic assembly                                       | 1121-M        | 117.51              | 133.33               | 129.56              | 115.24     | 89.89      |
|  | 1161-M        | 106.33              | 114.37               | 123.43              | 102.06     | 105.30     |
|  | 1180-M        | 104.04              | 99.92                | 110.65              | 104.64     | 103.81     |
| Eastman Tritan™ copolyester MXF121 adhesion evaluation |               |                     |                      |                     |            |            |
| Needle bonding   | 1161-M        | 141.12              | 139.91               | —                   | —          | —          |
|  | 1402-M        | 128.92              | 135.74               | —                   | —          | —          |
|  | 1403-M        | 142.81              | 150.31               | —                   | —          | —          |
|  | 1405M-T-UR-SC | 123.22              | 121.64               | —                   | —          | —          |
| Catheter bonding                                       | 209-CTH       | 152.55              | 150.46               | —                   | —          | —          |
|  | 215-CTH-UR-SC | 189.41              | 196.41               | —                   | —          | —          |
| Plastic assembly                                       | 1121-M        | 131.36              | 150.83               |                     |            |            |
|  | 1161-M        | 141.12              | 139.91               | —                   | —          | —          |
|  | 1180-M        | 123.44              | 125.39               | —                   | —          | —          |
| Airway management                                      | 112-MSK-UR-SC | 128.83              | 138.31               | —                   | —          | —          |

# Eastman TRITAN™

copolyester

| CLEAR TRITAN ADVANTAGES  | OPAQUE TRITAN ADVANTAGES  |
|--|---|
| <p>For clear fluid management components and blood contact devices, clear formulations of Tritan offer:</p> <ul style="list-style-type: none"> <li>• Reduced cracking and breaking because of exceptional chemical resistance to oncology drugs and carriers, hospital disinfectants, plasticizers, bonding solvents, and adhesives</li> <li>• No annealing required</li> <li>• No color shift after gamma/e-beam sterilization</li> <li>• Free of BPA, halogens, and other chemicals of concern</li> <li>• No black specks</li> </ul> | <p>For housings and enclosures for electronic medical devices, opaque formulations of Tritan offer:</p> <ul style="list-style-type: none"> <li>• Durability (less cracking and breaking) after disinfection with a wide variety of hospital disinfectants</li> <li>• Free of BPA, halogens, and other chemicals of concern</li> <li>• True color match and retention</li> <li>• UL 94 FR V-2 flammability rating</li> </ul> |

For details on these studies or complete information about clear and opaque formulations of Eastman Tritan™ copolyester, contact your Eastman representative.



Dymax provides system solutions in which chemistry, material, and equipment work seamlessly together with maximum efficiency, giving our customers a competitive advantage they can't get anywhere else.



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