

## KYDEX® 6200 LTR Properties

For information applicable to KYDEX® FST please refer to 300 series technical briefs.

### TB - 124-A

#### Introduction

KYDEX® 6200 LTR is a proprietary, high performance thermoplastic sheet designed for use on mass transit vehicles such as subways, vans, buses, and trains. KYDEX® 6200 LTR meets the recommended fire safety practices of both the Federal Transit Administration (FTA) and the Federal Rail Administration (FRA) for smoke emission and flammability as tested under ASTM E-662 and ASTM E-162. Additionally it meets the stringent flame-smoke-toxicity (FST) requirements required by the vehicle manufacturers and transit administrations such as SMP 800C.

#### Property Value Comparison

| Low-Toxicity Materials  |             |   |                              |                            |                         |
|---|-------------|---|------------------------------|----------------------------|-------------------------|
| Property  | Test Method | Unit Standard (Metric)                  | GRP <sub>3</sub> (25-45%)    | Ultem 1668A                | K6200 LTR               |
| <b>PHYSICAL</b>   |             |   |                              |                            |                         |
| Specific Gravity  | ASTM D-792  | --                                      | 1.40-1.90                    | 1.26-1.33                  | 1.57                    |
| Density   |             | g/cm <sup>3</sup> (lb/in <sup>3</sup> ) | 1.40-1.9<br>(0.0506-0.0686)  | 1.40-1.9<br>(0.0455-0.048) | 1.57<br><b>(0.0575)</b> |
| Rockwell Hardness   | ASTM D-785  | --                                      | --                           | --                         | 78                      |
| Water Absorptions 24hrs   | ASTM D-570  | %-24 hrs                                | --                           | 0.70                       | 0.18                    |
| <b>MECHANICAL<sub>1</sub></b>   |             |   |                              |                            |                         |
| Tensile Strength  | ASTM D-638  | MPa (psi)                               | 76-160<br>(11-23ksi)         | 90.4<br>(13,000)           | 23.4<br>(3390)          |
| Tensile Modulus   | ASTM D-638  | MPa (psi)                               | 5600-12000<br>(820-1800ksi)  | 335K<br>(2,312)            | 328K<br>(2261)          |
| Tensile Elongation  | ASTM D-638  | %                                       | 1-2%                         | 35                         | 3.2                     |
| Flexural Strength   | ASTM D-790  | MPa (psi)                               | 140-260<br>(20-38ksi)        | 141<br>(20,400)            | 42.6<br>(6180)          |
| Flexural Modulus  | ASTM D-790  | MPa (psi)                               | 6900-14000<br>(1000-2000ksi) | 3,174<br>(460K)            | 2,710<br>(393K)         |
| Notched Izod Impact Resistance<br>23°C - (73°F)   | ASTM D-256  | J/m (ft-lbs/in)                         | --                           | 74 (1.4)                   | 106 (2.0)               |
| Gardner Impact (Geometry GE)  | ASTM D-5420 | J (in-lbs)                              | --                           | --                         | 8.1 (72)                |
| <b>THERMAL<sub>1</sub></b>  |             |   |                              |                            |                         |
| Heat Deflection Temperature<br>1.82MPa, 264psi (annealed)   | ASTM D-648  | °C (°F)                                 | 190-260<br>(375-500)         | 189 (373)                  | 66.8 (152)              |
| 45MPa, 66psi (annealed)   |             |   | --                           | --                         | 82.3 (180)              |
| <b>FLAMMABILITY<sub>1</sub></b>   |             |   |                              |                            |                         |
| FMVSS 302   | MVSS 302    | --                                      | --                           | --                         | Pass                    |
| Radiant Panel, FS   | ASTM E-162  | --                                      | Pass                         | --                         | Pass <sub>2</sub>       |
| Smoke Generation, DS @ 4min   | ASTM E-662  | --                                      | Pass                         | Pass                       | Pass <sub>2</sub>       |
| <b>Toxicity</b>   | SMP 800-C   | --                                      | Pass                         | Pass                       | Pass <sub>2</sub>       |
| <sup>1</sup> Reported values based on .125" gauge unless noted otherwise<br><sup>2</sup> Tested by an accredited 3rd party lab<br><sup>3</sup> GRP Specs Vary widely according to glass% and type of fiber. They are generally fire resistant and have excellent electrical properties. |             |   |                              |                            |                         |

#### KYDEX, LLC

ISO 9001 and 14001 Certified

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#### Test Results ASTM E 662-03e2

| Flaming Mode | Test                                    | #1  | #2  | #3  | Average | Specified Maxima |
|--------------|---|-----|-----|-----|---------|------------------|
|              | Specific Optical Density at 1.5 minutes | 12  | 12  | 11  | 12      | 100              |
|              | Specific Optical Density at 4.0 minutes | 101 | 81  | 76  | 86      | 200              |
|              | Maximum Specific Optical Density        | 504 | 447 | 413 | 455     | -                |
|              | Maximum Corrected Optical Density       | 492 | 429 | 394 | 438     | -                |

| Non-Flaming Mode | Test                                    | #1  | #2  | #3  | Average | Specified Maxima |
|------------------|---|-----|-----|-----|---------|------------------|
|                  | Specific Optical Density at 1.5 minutes | 0   | 1   | 0   | 0       | 100              |
|                  | Specific Optical Density at 4.0 minutes | 54  | 35  | 52  | 47      | 200              |
|                  | Maximum Specific Optical Density        | 386 | 382 | 385 | 384     | -                |
|                  | Maximum Corrected Optical Density       | 376 | 375 | 375 | 375     | -                |

#### Test Results According to SMP 800-C

Report Number 06-02-036(B)

#### Accreditation:

- Standards Council of Canada, Registration #1

#### Registration:

- ISO 9001:2000, registered by QMI, Registration #001109

#### Specifications of Order:

- Determine rate of smoke generation according to ASTM E 662 and toxic gas production according to Bombardier SMP 800-C

#### Identification:

- Thermoplastic material. approx. 3.2 mm in thickness, identified as "KYDEX® 6200 LTR (Lot No. RB9-72-2)" (BMTc sample identification number 05-02-S0039-2)

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**Bombardier  
SMP 800-C**

| Toxic Gas Generation                       |                  |                  |                  |
|--|------------------|------------------|------------------|
|  | Flaming Mode     | Non-Flaming Mode | Specified Maxima |
| <b>Carbon Monoxide (CO ppm)</b>            |                  |                  |                  |
| at 1.5 minutes                             | 30               | <10              | -                |
| at 4.0 minutes                             | 375              | <10              | -                |
| at maximum                                 | 2003             | 653              | 3500             |
| <b>Carbon Dioxide (CO<sub>2</sub> ppm)</b> |                  |                  |                  |
| at 1.5 minutes                             | 1350             | <50              | -                |
| at 4.0 minutes                             | 6750             | <50              | -                |
| at maximum                                 | 29100            | 5050             | 90000            |
| Nitrogen Oxides (as NO <sub>2</sub> ppm)   | 5                | 6                | 100              |
| Sulfur Dioxide (SO <sub>2</sub> ppm)       | <1               | <1               | 100              |
| Hydrogen Chloride (HCl ppm)                | 210              | 270              | 500              |
| Hydrogen Fluoride (HF ppm)                 | 6                | 4                | 100              |
| Hydrogen Bromide (HBr ppm)                 | 2                | 3                | 100              |
| Hydrogen Cyanide (HCN ppm)                 | <1               | <1               | 100              |
| Original Weight (g)                        | 28.5             | 29.6             | -                |
| Final Weight (g)                           | 11.1             | 14.3             | -                |
| Weight Loss (g)                            | 17.4             | 15.3             | -                |
| Weight Loss (%)                            | 61.01            | 51.77            | -                |
| Time to Ignition (s)                       | 7                | Did not ignite   | -                |
| Burning Duration (s)                       | Not Determinable | -                | -                |

#### Toxic Gas Generation:

- Gases produced for analysis are generated in a specified, calibrated smoke chamber during standard rate of smoke generation testing (ASTM E 662), in both flaming combustion and non-flaming pyrolytic decomposition test modes.

#### Conclusions:

- The thermoplastic material identified in this report, when tested at an approximate thickness of 3.2mm, meets The Federal Railroad Administration requirements as they pertain to rate of smoke generation (ASTM E 662).

The thermoplastic meets Bombardier SMP 800-C requirements as they pertain to toxic gas production (Bombardier SMP 800-C).

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This information supersedes all previously published data.

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