

# CYCOLAC™ X11 resin

Acrylonitrile Butadiene Styrene

SABIC Innovative Plastics

Message:

Automotive: High heat resistance. Excellent flow/impact balance. UL94 HB rated. High gloss. NH designation indicates typically improved flow over legacy X11.

| General Information                |                                 |                   |                 |
|------------------------------------|---------------------------------|-------------------|-----------------|
| Features                           | Highlight                       |                   |                 |
|                                    | Heat resistance, high           |                   |                 |
| Uses                               | Application in Automobile Field |                   |                 |
| Processing Method                  | Injection molding               |                   |                 |
| Physical                           | Nominal Value                   | Unit              | Test Method     |
| Specific Gravity                   | 1.04                            | g/cm <sup>3</sup> | ASTM D792       |
| Melt Mass-Flow Rate (MFR)          |                                 |                   |                 |
| 230°C/3.8 kg                       | 3.5                             | g/10 min          | ASTM D1238      |
| 260°C/5.0 kg                       | 18                              | g/10 min          | ASTM D1238      |
| 220°C/10.0 kg                      | 10                              | g/10 min          | ISO 1133        |
| Molding Shrinkage - Flow (3.20 mm) | 0.50 - 0.80                     | %                 | Internal method |
| Hardness                           | Nominal Value                   | Unit              | Test Method     |
| Rockwell Hardness (R-Scale)        | 104                             |                   | ASTM D785       |
| Mechanical                         | Nominal Value                   | Unit              | Test Method     |
| Tensile Modulus                    |                                 |                   |                 |
| -- <sup>1</sup>                    | 2380                            | MPa               | ASTM D638       |
| --                                 | 2350                            | MPa               | ISO 527-2/1     |
| Tensile Strength                   |                                 |                   |                 |
| Yield <sup>2</sup>                 | 42.0                            | MPa               | ASTM D638       |
| Yield                              | 46.0                            | MPa               | ISO 527-2/50    |
| Fracture <sup>3</sup>              | 33.0                            | MPa               | ASTM D638       |
| Fracture                           | 35.0                            | MPa               | ISO 527-2/50    |
| Tensile Elongation                 |                                 |                   |                 |
| Yield <sup>4</sup>                 | 2.6                             | %                 | ASTM D638       |
| Yield                              | 2.6                             | %                 | ISO 527-2/50    |
| Fracture <sup>5</sup>              | 27                              | %                 | ASTM D638       |
| Fracture                           | 18                              | %                 | ISO 527-2/50    |
| Flexural Modulus                   |                                 |                   |                 |
| 50.0mm span <sup>6</sup>           | 2300                            | MPa               | ASTM D790       |
| -- <sup>7</sup>                    | 2170                            | MPa               | ISO 178         |
| Flexural Stress                    |                                 |                   |                 |

|                                                 |                      |                   |                    |
|-------------------------------------------------|----------------------|-------------------|--------------------|
| --                                              | 69.0                 | MPa               | ISO 178            |
| Yield, 50.0mm span <sup>8</sup>                 | 71.0                 | MPa               | ASTM D790          |
| <b>Impact</b>                                   | <b>Nominal Value</b> | <b>Unit</b>       | <b>Test Method</b> |
| Charpy Notched Impact Strength <sup>9</sup>     |                      |                   | ISO 179/1eA        |
| -30°C                                           | 11                   | kJ/m <sup>2</sup> | ISO 179/1eA        |
| 23°C                                            | 25                   | kJ/m <sup>2</sup> | ISO 179/1eA        |
| Notched Izod Impact                             |                      |                   |                    |
| 23°C                                            | 300                  | J/m               | ASTM D256          |
| 23°C, 6.40 mm                                   | 240                  | J/m               | ASTM D256          |
| -40°C <sup>10</sup>                             | 9.0                  | kJ/m <sup>2</sup> | ISO 180/1A         |
| -30°C <sup>11</sup>                             | 10                   | kJ/m <sup>2</sup> | ISO 180/1A         |
| 23°C <sup>12</sup>                              | 25                   | kJ/m <sup>2</sup> | ISO 180/1A         |
| <b>Thermal</b>                                  | <b>Nominal Value</b> | <b>Unit</b>       | <b>Test Method</b> |
| Deflection Temperature Under Load               |                      |                   |                    |
| 0.45 MPa, unannealed, 3.20mm                    | 99.0                 | °C                | ASTM D648          |
| 0.45 MPa, unannealed, 64.0mm span <sup>13</sup> | 99.0                 | °C                | ISO 75-2/Bf        |
| 1.8 MPa, unannealed, 3.20mm                     | 86.0                 | °C                | ASTM D648          |
| 1.8 MPa, unannealed, 6.40mm                     | 93.0                 | °C                | ASTM D648          |
| 1.8 MPa, unannealed, 64.0mm span <sup>14</sup>  | 85.0                 | °C                | ISO 75-2/Af        |
| Vicat Softening Temperature                     |                      |                   |                    |
| --                                              | 104                  | °C                | ISO 306/B50        |
| --                                              | 106                  | °C                | ISO 306/B120       |
| RTI Elec                                        | 60.0                 | °C                | UL 746             |
| RTI Imp                                         | 60.0                 | °C                | UL 746             |
| RTI                                             | 60.0                 | °C                | UL 746             |
| <b>Flammability</b>                             | <b>Nominal Value</b> |                   | <b>Test Method</b> |
| Flame Rating (1.50 mm)                          | HB                   |                   | UL 94              |
| <b>Injection</b>                                | <b>Nominal Value</b> | <b>Unit</b>       |                    |
| Drying Temperature                              | 87.8 - 93.3          | °C                |                    |
| Drying Time                                     | 2.0 - 4.0            | hr                |                    |
| Drying Time, Maximum                            | 8.0                  | hr                |                    |
| Suggested Max Moisture                          | 0.010                | %                 |                    |
| Suggested Shot Size                             | 50 - 70              | %                 |                    |
| Rear Temperature                                | 193 - 210            | °C                |                    |
| Middle Temperature                              | 210 - 227            | °C                |                    |
| Front Temperature                               | 232 - 254            | °C                |                    |
| Nozzle Temperature                              | 232 - 274            | °C                |                    |
| Processing (Melt) Temp                          | 232 - 274            | °C                |                    |
| Mold Temperature                                | 48.9 - 82.2          | °C                |                    |
| Back Pressure                                   | 0.345 - 0.689        | MPa               |                    |
| Screw Speed                                     | 30 - 60              | rpm               |                    |
| Vent Depth                                      | 0.038 - 0.051        | mm                |                    |

| NOTE |                    |
|------|--------------------|
| 1.   | 5.0 mm/min         |
| 2.   | Type 1, 5.0 mm/min |
| 3.   | Type 1, 5.0 mm/min |
| 4.   | Type 1, 5.0 mm/min |
| 5.   | Type 1, 5.0 mm/min |
| 6.   | 1.3 mm/min         |
| 7.   | 2.0 mm/min         |
| 8.   | 1.3 mm/min         |
| 9.   | 80*10*4 sp=62mm    |
| 10.  | 80*10*4            |
| 11.  | 80*10*4            |
| 12.  | 80*10*4            |
| 13.  | 80*10*4 mm         |
| 14.  | 80*10*4 mm         |

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