

# VALOX™ 4512 resin

Polycarbonate + PBT

SABIC Innovative Plastics Europe

Message:

10% GF FR PBT/PC Blend

| General Information                      |                                  |                        |                     |
|------------------------------------------|----------------------------------|------------------------|---------------------|
| UL YellowCard                            | E45329-236600                    |                        |                     |
| Filler / Reinforcement                   | Glass Fiber,10% Filler by Weight |                        |                     |
| RoHS Compliance                          | RoHS Compliant                   |                        |                     |
| Processing Method                        | Injection Molding                |                        |                     |
| Physical                                 | Nominal Value                    | Unit                   | Test Method         |
| Specific Gravity                         | 1.42                             | g/cm <sup>3</sup>      | ASTM D792, ISO 1183 |
| Melt Mass-Flow Rate (MFR) (266°C/5.0 kg) | 60                               | g/10 min               | ASTM D1238          |
| Melt Volume-Flow Rate (MVR)              |                                  |                        | ISO 1133            |
| 250°C/2.16 kg                            | 8.00                             | cm <sup>3</sup> /10min |                     |
| 250°C/5.0 kg                             | 30.0                             | cm <sup>3</sup> /10min |                     |
| 265°C/5.0 kg                             | 45.0                             | cm <sup>3</sup> /10min |                     |
| Molding Shrinkage <sup>1</sup>           |                                  |                        | Internal Method     |
| Flow                                     | 0.60 to 0.90                     | %                      |                     |
| Across Flow                              | 0.70 to 1.0                      | %                      |                     |
| Water Absorption                         |                                  |                        | ISO 62              |
| Saturation, 23°C                         | 0.20                             | %                      |                     |
| Equilibrium, 23°C, 50% RH                | 0.070                            | %                      |                     |
| Hardness                                 | Nominal Value                    | Unit                   | Test Method         |
| Rockwell Hardness (R-Scale)              | 104                              |                        | ISO 2039-2          |
| Ball Indentation Hardness (H 358/30)     | 114                              | MPa                    | ISO 2039-1          |
| Mechanical                               | Nominal Value                    | Unit                   | Test Method         |
| Tensile Modulus                          |                                  |                        |                     |
| -- <sup>2</sup>                          | 4400                             | MPa                    | ASTM D638           |
| --                                       | 4600                             | MPa                    | ISO 527-2/1         |
| Tensile Strength                         |                                  |                        |                     |
| Yield <sup>3</sup>                       | 70.0                             | MPa                    | ASTM D638           |
| Yield                                    | 70.0                             | MPa                    | ISO 527-2/5         |
| Break <sup>4</sup>                       | 70.0                             | MPa                    | ASTM D638           |
| Break                                    | 70.0                             | MPa                    | ISO 527-2/5         |
| Tensile Elongation                       |                                  |                        |                     |
| Yield <sup>5</sup>                       | 3.0                              | %                      | ASTM D638           |
| Yield                                    | 2.0                              | %                      | ISO 527-2/5         |
| Break <sup>6</sup>                       | 3.0                              | %                      | ASTM D638           |

|                                                  |               |                   |             |
|--------------------------------------------------|---------------|-------------------|-------------|
| Break                                            | 2.0           | %                 | ISO 527-2/5 |
| Flexural Modulus                                 |               |                   |             |
| 50.0 mm Span <sup>7</sup>                        | 3400          | MPa               | ASTM D790   |
| -- <sup>8</sup>                                  | 3500          | MPa               | ISO 178     |
| Flexural Stress                                  |               |                   |             |
| --                                               | 100           | MPa               | ISO 178     |
| Yield, 50.0 mm Span <sup>9</sup>                 | 100           | MPa               | ASTM D790   |
| Break, 50.0 mm Span <sup>10</sup>                | 100           | MPa               | ASTM D790   |
| Flexural Strain at Break <sup>11</sup>           | 4.0           | %                 | ISO 178     |
| Filler Content                                   | 10            | %                 | ASTM D229   |
| Impact                                           | Nominal Value | Unit              | Test Method |
| Charpy Notched Impact Strength                   |               |                   |             |
| -30°C <sup>12</sup>                              | 5.0           | kJ/m <sup>2</sup> | ISO 179/1eA |
| -30°C                                            | 4.0           | kJ/m <sup>2</sup> | ISO 179/2C  |
| 23°C <sup>13</sup>                               | 7.0           | kJ/m <sup>2</sup> | ISO 179/1eA |
| 23°C                                             | 4.0           | kJ/m <sup>2</sup> | ISO 179/2C  |
| Charpy Unnotched Impact Strength                 |               |                   |             |
| -30°C <sup>14</sup>                              | 35            | kJ/m <sup>2</sup> | ISO 179/1eU |
| -30°C                                            | 22            | kJ/m <sup>2</sup> | ISO 179/2U  |
| 23°C <sup>15</sup>                               | 40            | kJ/m <sup>2</sup> | ISO 179/1eU |
| 23°C                                             | 33            | kJ/m <sup>2</sup> | ISO 179/2U  |
| Notched Izod Impact                              |               |                   |             |
| -30°C                                            | 30            | J/m               | ASTM D256   |
| 0°C                                              | 30            | J/m               | ASTM D256   |
| 23°C                                             | 35            | J/m               | ASTM D256   |
| -30°C <sup>16</sup>                              | 3.0           | kJ/m <sup>2</sup> | ISO 180/1A  |
| -30°C <sup>17</sup>                              | 4.0           | kJ/m <sup>2</sup> | ISO 180/1A  |
| 0°C <sup>18</sup>                                | 4.0           | kJ/m <sup>2</sup> | ISO 180/1A  |
| 23°C <sup>19</sup>                               | 6.0           | kJ/m <sup>2</sup> | ISO 180/1A  |
| 23°C <sup>20</sup>                               | 4.0           | kJ/m <sup>2</sup> | ISO 180/1A  |
| Unnotched Izod Impact                            |               |                   |             |
| -30°C                                            | 320           | J/m               | ASTM D4812  |
| 23°C                                             | 430           | J/m               | ASTM D4812  |
| -30°C <sup>21</sup>                              | 20            | kJ/m <sup>2</sup> | ISO 180/1U  |
| 23°C <sup>22</sup>                               | 35            | kJ/m <sup>2</sup> | ISO 180/1U  |
| Thermal                                          | Nominal Value | Unit              | Test Method |
| Deflection Temperature Under Load                |               |                   |             |
| 0.45 MPa, Unannealed, 3.20 mm                    | 190           | °C                | ASTM D648   |
| 0.45 MPa, Unannealed, 100 mm Span <sup>23</sup>  | 170           | °C                | ISO 75-2/Be |
| 0.45 MPa, Unannealed, 64.0 mm Span <sup>24</sup> | 170           | °C                | ISO 75-2/Bf |
| 1.8 MPa, Unannealed, 3.20 mm                     | 120           | °C                | ASTM D648   |
| 1.8 MPa, Unannealed, 100 mm Span <sup>25</sup>   | 95.0          | °C                | ISO 75-2/Ae |

|                                                 |               |           |                                          |
|-------------------------------------------------|---------------|-----------|------------------------------------------|
| 1.8 MPa, Unannealed, 64.0 mm Span <sup>26</sup> | 95.0          | °C        | ISO 75-2/Af                              |
| Vicat Softening Temperature                     |               |           |                                          |
| --                                              | 210           | °C        | ASTM D1525, ISO 306/A50 16 <sup>27</sup> |
| --                                              | 135           | °C        | ASTM D1525, ISO 306/B50 17 <sup>28</sup> |
| --                                              | 140           | °C        | ISO 306/B120                             |
| Ball Pressure Test (125°C)                      | Pass          |           | IEC 60695-10-2                           |
| CLTE                                            |               |           | ISO 11359-2                              |
| Flow : -40 to 40°C                              | 4.9E-5        | cm/cm/°C  |                                          |
| Flow : 23 to 150°C                              | 5.7E-5        | cm/cm/°C  |                                          |
| Transverse : -40 to 40°C                        | 9.4E-5        | cm/cm/°C  |                                          |
| Transverse : 23 to 150°C                        | 1.2E-4        | cm/cm/°C  |                                          |
| RTI Elec                                        | 120           | °C        | UL 746                                   |
| RTI Imp                                         | 120           | °C        | UL 746                                   |
| RTI Str                                         | 140           | °C        | UL 746                                   |
| Electrical                                      | Nominal Value | Unit      | Test Method                              |
| Surface Resistivity                             | > 1.0E+15     | ohms      | IEC 60093                                |
| Volume Resistivity                              | > 1.0E+15     | ohms · cm | ASTM D257, IEC 60093                     |
| Electric Strength                               |               |           | IEC 60243-1                              |
| 1.60 mm, in Oil                                 | 20            | kV/mm     |                                          |
| 3.20 mm, in Oil                                 | 15            | kV/mm     |                                          |
| Relative Permittivity                           |               |           | IEC 60250                                |
| 50 Hz                                           | 3.30          |           |                                          |
| 60 Hz                                           | 3.30          |           |                                          |
| 1 MHz                                           | 3.30          |           |                                          |
| Dissipation Factor                              |               |           | IEC 60250                                |
| 50 Hz                                           | 1.0E-3        |           |                                          |
| 60 Hz                                           | 1.0E-3        |           |                                          |
| 1 MHz                                           | 0.010         |           |                                          |
| Arc Resistance <sup>29</sup>                    | PLC 5         |           | ASTM D495                                |
| Comparative Tracking Index (CTI)                | PLC 3         |           | UL 746                                   |
| Comparative Tracking Index                      | 175           | V         | IEC 60112                                |
| High Amp Arc Ignition (HAI)                     | PLC 0         |           | UL 746                                   |
| High Voltage Arc Tracking Rate (HVTR)           | PLC 3         |           | UL 746                                   |
| Hot-wire Ignition (HWI)                         | PLC 0         |           | UL 746                                   |
| Flammability                                    | Nominal Value | Unit      | Test Method                              |
| Flame Rating (0.750 mm, Testing by SABIC)       | V-0           |           | UL 94                                    |
| Glow Wire Flammability Index (1.60 mm)          | 960           | °C        | IEC 60695-2-12                           |
| Fill Analysis                                   | Nominal Value | Unit      | Test Method                              |
| Melt Viscosity (260°C, 1500 sec <sup>-1</sup> ) | 100           | Pa · s    | ISO 11443                                |
| Injection                                       | Nominal Value | Unit      |                                          |
| Drying Temperature                              | 110 to 120    | °C        |                                          |

|                        |              |    |
|------------------------|--------------|----|
| Drying Time            | 2.0 to 4.0   | hr |
| Suggested Max Moisture | 0.020        | %  |
| Hopper Temperature     | 40.0 to 60.0 | °C |
| Rear Temperature       | 230 to 245   | °C |
| Middle Temperature     | 240 to 255   | °C |
| Front Temperature      | 245 to 265   | °C |
| Nozzle Temperature     | 240 to 260   | °C |
| Processing (Melt) Temp | 250 to 270   | °C |
| Mold Temperature       | 40.0 to 100  | °C |

#### NOTE

|     |                                    |
|-----|------------------------------------|
| 1.  | Tensile Bar                        |
| 2.  | 5.0 mm/min                         |
| 3.  | Type I, 5.0 mm/min                 |
| 4.  | Type I, 5.0 mm/min                 |
| 5.  | Type I, 5.0 mm/min                 |
| 6.  | Type I, 5.0 mm/min                 |
| 7.  | 1.3 mm/min                         |
| 8.  | 2.0 mm/min                         |
| 9.  | 1.3 mm/min                         |
| 10. | 1.3 mm/min                         |
| 11. | 2 mm/min                           |
| 12. | 80*10*4 sp=62mm                    |
| 13. | 80*10*4 sp=62mm                    |
| 14. | 80*10*3 sp=62mm                    |
| 15. | 80*10*4 sp=62mm                    |
| 16. | 80*10*4                            |
| 17. | 80*10*3                            |
| 18. | 80*10*4                            |
| 19. | 80*10*3                            |
| 20. | 80*10*4                            |
| 21. | 80*10*4                            |
| 22. | 80*10*4                            |
| 23. | 120*10*4 mm                        |
| 24. | 80*10*4 mm                         |
| 25. | 120*10*4 mm                        |
| 26. | 80*10*4 mm                         |
| 27. | Rate A (50°C/h), Loading 2 (50 N)  |
| 28. | Rate B (120°C/h), Loading 2 (50 N) |
| 29. | Tungsten Electrode                 |

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## Susheng Import & Export Trading Co.,Ltd.

Tel: +86 21 5895 8519

Phone: +86 13424755533

Email: sales@su-jiao.com

No. 215, Lianhe North Road, Fengxian District, Shanghai, China



WECHAT