# **AGY Advanced Materials**

# For Demanding Automotive Applications We Offer High Performance Glass Fibre Products As Easy As 1..2..3









## S-Series<sup>™</sup> High Performance Materials

- S-1 Glass™ Industrial Grade Product
  - High Volume Applications where E-Glass performance does not deliver
  - S-1 Glass™ Benefits vs E-Glass
    - Higher Tensile Strength
    - Higher Temperature

- Higher Tensile Modulus
- Lower Weight
- S-2 Glass® High Performance Grade Product

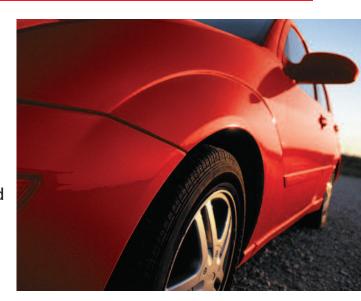
Higher performance grade product than S-1 Glass™ with a broad range of properties for specification driven applications

• S-3 Glass™ – Special Grade Product

Special grade product with properties tailored for high performance niche applications

### S-Series<sup>™</sup> Added Benefits

- Sizing chemistries that are tailored to a range of thermoplastic and thermoset composite applications
- Ability to be texturised
- Wide range of product forms, sizes and filament diameters available
- Boron Free environmentally friendly
- AGY multi-site manufacturing capabilities based in the USA
- Global sales and application development support



## **AGY Advanced Materials**

# For Demanding Automotive Applications We Offer High Performance Glass Fibre Products As Easy As 1..2..3

## S-Series<sup>™</sup> High Performance Materials

| Physical Properties             |       |         |            |            |  |  |  |  |  |
|---------------------------------|-------|---------|------------|------------|--|--|--|--|--|
|                                 |       | E-Glass | S-1 Glass™ | S-2 Glass® |  |  |  |  |  |
| Density                         | g/cc  | 2.58    | 2.54       | 2.46       |  |  |  |  |  |
| Softening Point                 | °C    | 846     | 996        | 1056       |  |  |  |  |  |
| Annealing Point                 | °C    | 657     |            | 816        |  |  |  |  |  |
| Strain Point                    | °C    | 615     | 746        | 766        |  |  |  |  |  |
| Tensile Strength                |       |         |            |            |  |  |  |  |  |
| -196°C                          | MPa   | 5310    | -          | 8275       |  |  |  |  |  |
| 23°C                            | MPa   | 3445    | 4135       | 4890       |  |  |  |  |  |
| 371°C                           | MPa   | 2620    | 2930       | 4445       |  |  |  |  |  |
| 538°C                           | MPa   | 1725    | 2140       | 2415       |  |  |  |  |  |
| Specific Heat Cap.              |       |         |            |            |  |  |  |  |  |
| 23°C                            | J/g°C | 0.81    | 0.73       | 0.74       |  |  |  |  |  |
| 200°C                           | J/g°C | 1.03    | 0.94       | 0.94       |  |  |  |  |  |
| Thermal Expansion               | °C    | 54      | 32         | 16         |  |  |  |  |  |
| Coefficient (x10 <sup>7</sup> ) |       | 54      | 32         | 10         |  |  |  |  |  |
| Young's Modulus                 |       |         |            |            |  |  |  |  |  |
| 23°C                            | GPa   | 72.3    | 85.5       | 86.9       |  |  |  |  |  |
| Elongation                      | %     | 4.8     | 4.8        | 5.7        |  |  |  |  |  |

| Chemical Properties |                                 |        |           |         |            |            |  |  |
|---------------------|---------------------------------|--------|-----------|---------|------------|------------|--|--|
| Strength            | Chemical                        | Period |           | E-Glass | S-1 Glass™ | S-2 Glass® |  |  |
|                     | H <sub>2</sub> O                | 24 hr  | % wt loss | 0.7     | 0.4        | 0.5        |  |  |
|                     | H <sub>2</sub> O                | 168 hr | % wt loss | 0.9     | 0.6        | 0.7        |  |  |
| 10%                 | HCI                             | 24 hr  | % wt loss | 42.0    | 9.5        | 3.8        |  |  |
| 10%                 | HCI                             | 168 hr | % wt loss | 43.0    | 10.2       | 5.1        |  |  |
| 10%                 | H <sub>2</sub> SO <sub>4</sub>  | 24 hr  | % wt loss | 39.0    | 9.9        | 4.1        |  |  |
| 10%                 | H <sub>2</sub> SO <sub>4</sub>  | 168 hr | % wt loss | 42.0    | 10.9       | 5.7        |  |  |
| 10%                 | Na <sub>2</sub> CO <sub>3</sub> | 24 hr  | % wt loss | 2.1     | 3.0        | 2.0        |  |  |
| 10%                 | Na <sub>2</sub> CO <sub>3</sub> | 168 hr | % wt loss | 2.1     | -          | 2.1        |  |  |



#### **AGY World Headquarters**

2556 Wagener Road • Aiken, SC 29801 • USA Tel: + (1) 803.648.8351 • Fax + (1) 803.643.1180

Email: asktheexpert@agy.com

AGY Europe

Le Gemellyon Nord • 57 Boulevard Marius Vivier Merle 69003 Lyon • France

Tel: + (33) 4727 81775 • Fax: + (33) 4727 81780

www.agy.com

#### DISCLAIMER OF LIABILITY

This data is offered solely as a guide in the selection of a reinforcement. The information contained in this publication is based on actual laboratory data and field test experience. We believe this information to be reliable, but do not guarantee its applicability to the user's process or assume any liability arising out of its use or performance. The user, by accepting the products described herein, agrees to be responsible for thoroughly testing any application to determine its suitability before committing to production. It is important for the user to determine the properties of its own commercial compounds when using this or any other reinforcement.

BECAUSE OF NUMEROUS FACTORS AFFECTING RESULTS, WE MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. STATEMENTS IN THIS DOCUMENT SHALL NOT BE CONSTRUED AS REPRESENTATIONS OR WARRANTIES OR AS INDUCEMENTS TO INFRINGE ANY PATENT OR VIOLATE ANY LAW, SAFETY CODE OR INSURANCE REGULATION.