

**FRIANYL® B3 W GF30 V0E - PA6**
**Description**

Polyamide 6 compound, 30% glass fiber reinforced, heat resistant, based on flame retardants halogen and red phosphorous free. UL classified V0@1.5mm.

*Designed for Electrical applications requiring self-extinguishing properties combined with good mechanical performances, this grade meets the most stringent safety requirements for insulating materials. Good surface quality. Ideal for thick walled parts.*

Preliminary Data Sheet

| Physical properties                        | Value         | Unit                  | Test Standard                          |
|--------------------------------------------|---------------|-----------------------|----------------------------------------|
| Density                                    | 87.4          | lb/ft <sup>3</sup>    | ISO 1183                               |
| Molding shrinkage, parallel (flow)         | 0.2 - 0.5     | %                     | ISO 294-4, 2577                        |
| Molding shrinkage, transverse normal       | 0.5 - 0.8     | %                     | ISO 294-4, 2577                        |
| Water absorption, 23°C-sat                 | 5.2           | %                     | Sim. to ISO 62                         |
| Humidity absorption, 23°C/50%RH            | 1.5           | %                     | ISO 62                                 |
| Mechanical properties                      | Value         | Unit                  | Test Standard                          |
| Tensile modulus                            | 1.52E6/913739 | psi                   | ISO 527-1, -2                          |
| Tensile stress at break, 5mm/min           | 21800/14500   | psi                   | ISO 527-1, -2                          |
| Tensile strain at break, 5mm/min           | 3/6           | %                     | ISO 527-1, -2                          |
| Flexural modulus, 23°C                     | 1.58E6/-      | psi                   | ISO 178                                |
| Flexural strength, 23°C                    | 34100/-       | psi                   | ISO 178                                |
| Charpy impact strength, 23°C               | 33.3/38.1     | ft-lb/in <sup>2</sup> | ISO 179/1eU                            |
| Charpy impact strength, -30°C              | 28.5/-        | ft-lb/in <sup>2</sup> | ISO 179/1eU                            |
| Charpy notched impact strength, 23°C       | 5.71/9.04     | ft-lb/in <sup>2</sup> | ISO 179/1eA                            |
| Charpy notched impact strength, -30°C      | 4.99/-        | ft-lb/in <sup>2</sup> | ISO 179/1eA                            |
| Ball indentation hardness, 30s             | 30500         | psi                   | ISO 2039-1                             |
| Thermal properties                         | Value         | Unit                  | Test Standard                          |
| Melting temperature, 20°C/min              | 437           | °F                    | ISO 11357-1/-3                         |
| DTUL at 1.8 MPa                            | 401           | °F                    | ISO 75-1, -2                           |
| DTUL at 0.45 MPa                           | 428           | °F                    | ISO 75-1, -2                           |
| Coeff. of linear therm expansion, parallel | 0.122         | E-4/°F                | ISO 11359-2                            |
| Start Temp                                 | 30            | °C                    | ISO 11359-2                            |
| End Temp                                   | 70            | °C                    | ISO 11359-2                            |
| Coeff. of linear therm expansion, normal   | 0.711         | E-4/°F                | ISO 11359-2                            |
| Start Temp                                 | 30            | °C                    | ISO 11359-2                            |
| End Temp                                   | 70            | °C                    | ISO 11359-2                            |
| FMVSS                                      | SE            | -                     | ISO 3795                               |
| FMVSS thickness                            | 0.0394        | in                    | (FMVSS 302)<br>ISO 3795<br>(FMVSS 302) |
| Flammability @3.2mm nom. thickn.           | V-0           | class                 | UL 94                                  |
| Flammability @1.6mm nom. thickn.           | V-0           | class                 | UL 94                                  |
| CLTE below Tg, parallel                    | 0.139         | E-4/°F                | ISO 11359-2                            |
| Start Temp                                 | -22           | °F                    | ISO 11359-2                            |
| End Temp                                   | 86            | °F                    | ISO 11359-2                            |
| CLTE above Tg, parallel                    | 0.106         | E-4/°F                | ISO 11359-2                            |
| Start Temp                                 | 158           | °F                    | ISO 11359-2                            |
| End Temp                                   | 320           | °F                    | ISO 11359-2                            |
| CLTE below Tg, normal                      | 0.439         | E-4/°F                | ISO 11359-2                            |
| Start Temp                                 | -22           | °F                    | ISO 11359-2                            |
| End Temp                                   | 86            | °F                    | ISO 11359-2                            |
| CLTE above Tg, normal                      | 0.744         | E-4/°F                | ISO 11359-2                            |
| Start Temp                                 | 158           | °F                    | ISO 11359-2                            |
| End Temp                                   | 320           | °F                    | ISO 11359-2                            |
| Continuous service temperature             | 120           | °C                    | DIN/IEC 60216-1                        |
| Glow wire flammability index, 0.8 mm       | 1760          | °F                    | IEC 60695-2-12                         |
| Glow wire flammability index, 3.2 mm       | 1760          | °F                    | IEC 60695-2-12                         |

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|                                 |          |            |             |
|---------------------------------|----------|------------|-------------|
| Thermal conductivity, flow      | 0.5      | W/(m K)    | ISO 22007-4 |
| Thermal conductivity, crossflow | 0.46     | W/(m K)    | ISO 22007-4 |
| Thermal conductivity, thruplane | 0.46     | W/(m K)    | ISO 22007-4 |
| Thermal diffusivity, flow       | 0.24     | mm²/s      | ISO 22007-4 |
| Thermal diffusivity, crossflow  | 0.22     | mm²/s      | ISO 22007-4 |
| Thermal diffusivity, thruplane  | 0.22     | mm²/s      | ISO 22007-4 |
| Specific heat capacity          | 0.000549 | BTU/(lb·F) | ISO 22007-4 |

| Electrical properties         | Value   | Unit  | Test Standard |
|-------------------------------|---------|-------|---------------|
| Volume resistivity, 23 °C     | >1E14/- | Ohm*m | IEC 62631-3-1 |
| Surface resistivity, 23 °C    | >1E13/- | Ohm   | IEC 62631-3-2 |
| Electric strength, 23 °C (AC) | 1140/-  | kV/in | IEC 60243-1   |
| Comparative tracking index    | PLC 0/- | -     | UL 746        |
| Comparative tracking index    | Group I | -     | IEC 60112     |
| CTI 50 drops                  | 600     | V     | IEC 60112     |
| CTI 100 drops                 | 600     | V     | IEC 60112     |

| VDA Properties | Value  | Unit | Test Standard |
|----------------|--------|------|---------------|
| FMVSS          | SE     | -    | ISO 3795      |
| FMVSS          | 0.0394 | in   | (FMVSS 302)   |
|                |        |      | ISO 3795      |
|                |        |      | (FMVSS 302)   |

## Typical injection molding processing conditions

| Temperature      | Value | Unit |
|------------------|-------|------|
| Melt temperature | ≤518  | °F   |

## Other text information

### Injection Molding Preprocessing

PA materials, stocked in a moisture-proof packaging, can be processed without drying; however, it is always recommended drying the product that comes from a large package (e.g. Octabin). The moisture content suggested for the injection molding process should be lower than 0.15%, according to the grade and to the molded part characteristics. The materials containing flame retardants should have moisture content below 0.10%. Red phosphorous containing grades must always be dried below 0.08%. The drying time depends on the moisture content and the drying conditions. Typically, 4-8 hours at 80-90 °C using dehumidified air (dew point of -20 °C) are suitable conditions for a starting moisture content of 0.20%-0.40%.

### Injection molding

The following conditions apply to a standard injection molding process. Machine temperatures: barrel 265-290 °C (PA66), 235-270 °C (PA6), nozzle and hot runners up to 300 °C (up to 290 °C products with flame retardants). Mold temperatures: 60-80 °C, (80-100 °C highly reinforced grades). Back pressure: typically, 5-10 bar (hydraulic pressure). Temperatures exceeding 300 °C and long residence time could lead to additives degradation and brittleness of the material. In case of gas generation in the melt, please verify moisture content and processing temperatures. Usage of regrind is possible depending on the molded part characteristics. For further details, please refer to the document 'Instructions for injection molding' or contact our technical support team.

### Injection Molding Postprocessing

PA materials reach their final performance with a water content of about 1.5 to 3.5% by weight, depending on the type. This percentage corresponds to the point of equilibrium between the rates of absorption and desorption of moisture. After molding, in favorable environmental conditions, a part can quickly absorb moisture up to 0.5-1.0%, while the equilibrium will be reached during its life. A conditioning treatment can accelerate further the initial water absorption of the molded parts. Conditioning is usually carried out in hot and humid environment (for example 50 °C, 100% RH), inside climatic chambers. Slight dimensional variations (increase in volume due to the water absorbed) must be considered, especially in unfilled grades. Post-treatments of parts may also include the annealing (60-80 °C in oven, up to four hours). This procedure can be useful to relax any internal stresses.

## Characteristics

**Special Characteristics** Flame retardant, Heat resistant

**Product Categories** Glass reinforced

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|                      |                       |
|----------------------|-----------------------|
| <b>Processing</b>    | Injection molding     |
| <b>Delivery Form</b> | Granules              |
| <b>Additives</b>     | Flame retarding agent |

#### **Other Approvals**

| <b>OEM</b> | <b>Specification</b> | <b>Additional Information</b>                            |
|------------|----------------------|----------------------------------------------------------|
| VW Group*  | VW50134              | * best fitting grade to PA6-7-A, not officially approved |