+135-3858-6433 (GuangDong)
+188-1699-6168 (ShangHai)
+852-6957-5415 (HongKong)

# Delrin® FG311DP NC010

## ACETAL RESIN

Common features of Delrin® acetal resins include mechanical and physical properties such as high mechanical strength and rigidity, excellent fatigue and impact resistance, as well as resistance to moisture, gasoline, lubricants, solvents, and many other neutral chemicals. Delrin® acetal resins also have excellent dimensional stability and good electrical insulating characteristics. They are naturally resilient, self-lubricating, and available in a variety of colors and speciality grades.

Delrin® acetal resin typically is used in demanding applications in the automotive, domestic appliances, sports, industrial engineering, electronics, and consumer goods industries.

Delrin® FG311DP is a medium-high viscosity acetal homopolymer with enhanced crystallisation for faster cycle times and excellent creep and fatigue resistance. It has improved thermal stability, excellent dimensional stability, low warpage and fewer voids.  It has been developed for applications in contact with food.

## FOOD CONTACT

This product is manufactured according to Good Manufacturing Practice (GMP) principles and generally accepted in food contact applications in Europe and the USA when meeting applicable use conditions. For details, individual compliance statements are available from your Delrin representative.

## Product information

| | | |
|---|---|---|
| Resin Identification | POM | ISO 1043 |
| Part Marking Code | >POM< | ISO 11469 |

## Rheological properties

| | | | |
|---|---|---|---|
| Melt volume-flow rate | 6 | cm³/10min | ISO 1133 |
| Melt mass-flow rate | 7 | g/10min | ISO 1133 |
| Temperature | 190 | °C | ISO 1133 |
| Load | 2.16 | kg | ISO 1133 |
| Melt mass-flow rate, Temperature | 190 | °C | ISO 1133 |
| Melt mass-flow rate, Load | 2.16 | kg | ISO 1133 |
| Moulding shrinkage, parallel | 1.9 | % | ISO 294-4, 2577 |
| Moulding shrinkage, normal | 1.8 | % | ISO 294-4, 2577 |

## Typical mechanical properties

| | | | |
|---|---|---|---|
| Tensile Modulus | 3300 | MPa | ISO 527-1/-2 |
| Yield stress | 74 | MPa | ISO 527-1/-2 |
| Yield strain | 15 | % | ISO 527-1/-2 |
| Nominal strain at break | 35 | % | ISO 527-1/-2 |
| Flexural Modulus | 3100 | MPa | ISO 178 |
| Flexural Stress at 3.5% | 86 | MPa | ISO 178 |
| Charpy impact strength, 23°C | 300 | kJ/m² | ISO 179/1eU |
| Charpy impact strength, -30°C | 250 | kJ/m² | ISO 179/1eU |
| Charpy notched impact strength, 23°C | 9 | kJ/m² | ISO 179/1eA |
| Charpy notched impact strength, -30°C | 8 | kJ/m² | ISO 179/1eA |
| Izod notched impact strength, 23°C | 10 | kJ/m² | ISO 180/1A |

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| | | | |
|---|---|---|---|
| Izod notched impact strength, -40°C | 8 | kJ/m² | ISO 180/1A |
| Poisson's ratio | 0.37 | | |

## Thermal properties

| | | | |
|---|---|---|---|
| Melting temperature, 10°C/min | 178 | °C | ISO 11357-1/-3 |
| Temp. of deflection under load, 1.8 MPa | 103 | °C | ISO 75-1/-2 |
| Temp. of deflection under load, 0.45 MPa | 165 | °C | ISO 75-1/-2 |
| Vicat softening temperature, 50°C/h, 50N | 160 | °C | ISO 306 |
| Coeff. of linear therm. expansion, parallel | 110 | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal | 110 | E-6/K | ISO 11359-1/-2 |
| RTI, electrical, 0.75mm | 50 | °C | UL 746B |
| RTI, electrical, 1.5mm | 110 | °C | UL 746B |
| RTI, electrical, 3mm | 110 | °C | UL 746B |
| RTI, impact, 0.75mm | 50 | °C | UL 746B |
| RTI, impact, 1.5mm | 85 | °C | UL 746B |
| RTI, impact, 3mm | 90 | °C | UL 746B |
| RTI, strength, 0.75mm | 50 | °C | UL 746B |
| RTI, strength, 1.5mm | 90 | °C | UL 746B |
| RTI, strength, 3mm | 95 | °C | UL 746B |

## Flammability

| | | | |
|---|---|---|---|
| Burning Behav. at 1.5mm nom. thickn. | HB | class | IEC 60695-11-10 |
| Thickness tested | 1.5 | mm | IEC 60695-11-10 |
| UL recognition | yes | | UL 94 |
| Burning Behav. at thickness h | HB | class | IEC 60695-11-10 |
| Thickness tested | 0.75 | mm | IEC 60695-11-10 |
| UL recognition | yes | | UL 94 |

## Other properties

| | | | |
|---|---|---|---|
| Humidity absorption, 2mm | 0.2 | % | Sim. to ISO 62 |
| Water absorption, 2mm | 0.9 | % | Sim. to ISO 62 |
| Density | 1420 | kg/m³ | ISO 1183 |

## VDA Properties

| | | | |
|---|---|---|---|
| Emissions | <8 | mg/kg | VDA 275 |
| Fogging, G-value (condensate) | 0.4 | mg | ISO 6452 |

## Injection

| | | |
|---|---|---|
| Drying Recommended | yes | |
| Drying Temperature | 80 | °C |
| Drying Time, Dehumidified Dryer | 2 - 4 | h |
| Processing Moisture Content | ≤0.2 | % |
| Melt Temperature Optimum | 215 | °C |

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| | | |
|---|---|---|
| Min. melt temperature | 210 | °C |
| Max. melt temperature | 220 | °C |
| Max. screw tangential speed | 0.2 | m/s |
| Mold Temperature Optimum | 90 | °C |
| Min. mould temperature | 80 | °C |
| Max. mould temperature | 100 | °C |
| Hold pressure range | 80 - 100 | MPa |
| Hold pressure time | 7.5 | s/mm |
| Annealing time, optional | 30 | min/mm |
| Annealing temperature | 160 | °C |

## Extrusion

| | | |
|---|---|---|
| Drying Temperature | 75 - 85 | °C |
| Drying Time, Dehumidified Dryer | 2 - 4 | h |
| Processing Moisture Content | ≤0.2 | % |
| Melt Temperature Optimum | 200 | °C |
| Melt Temperature Range | 195 - 205 | °C |

## Characteristics

| | |
|---|---|
| Additives | Release agent |

## Additional information

Injection molding

Drying is recommended, but not necessary for newly opened packaging stored in a dry location.

Follow the drying guidelines above in the following cases:

- If moisture is above the Processing Moisture Content recommendation,
- When a resin container is damaged,
- When the material is not properly stored in a dry place at room temperature, or
- When packaging stays open for a significant time.

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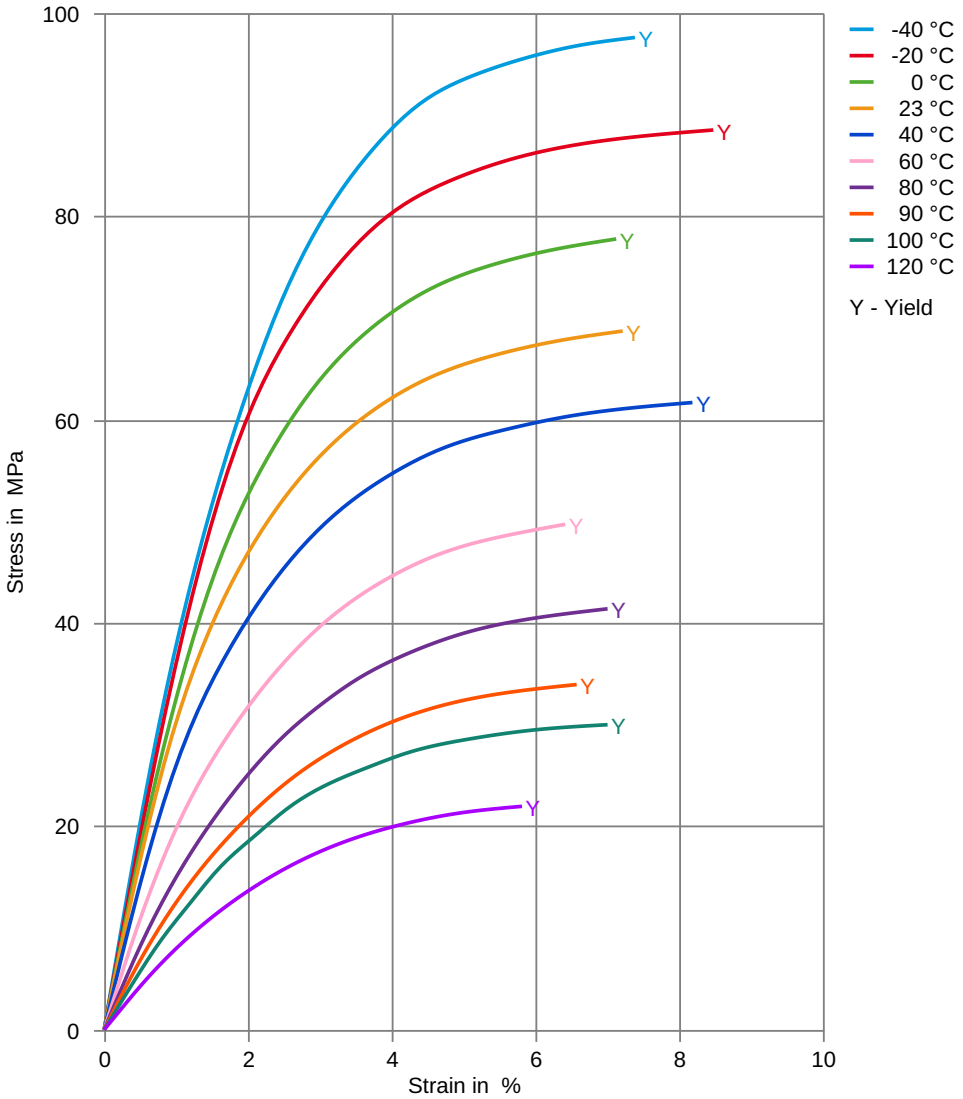
## Stress-strain



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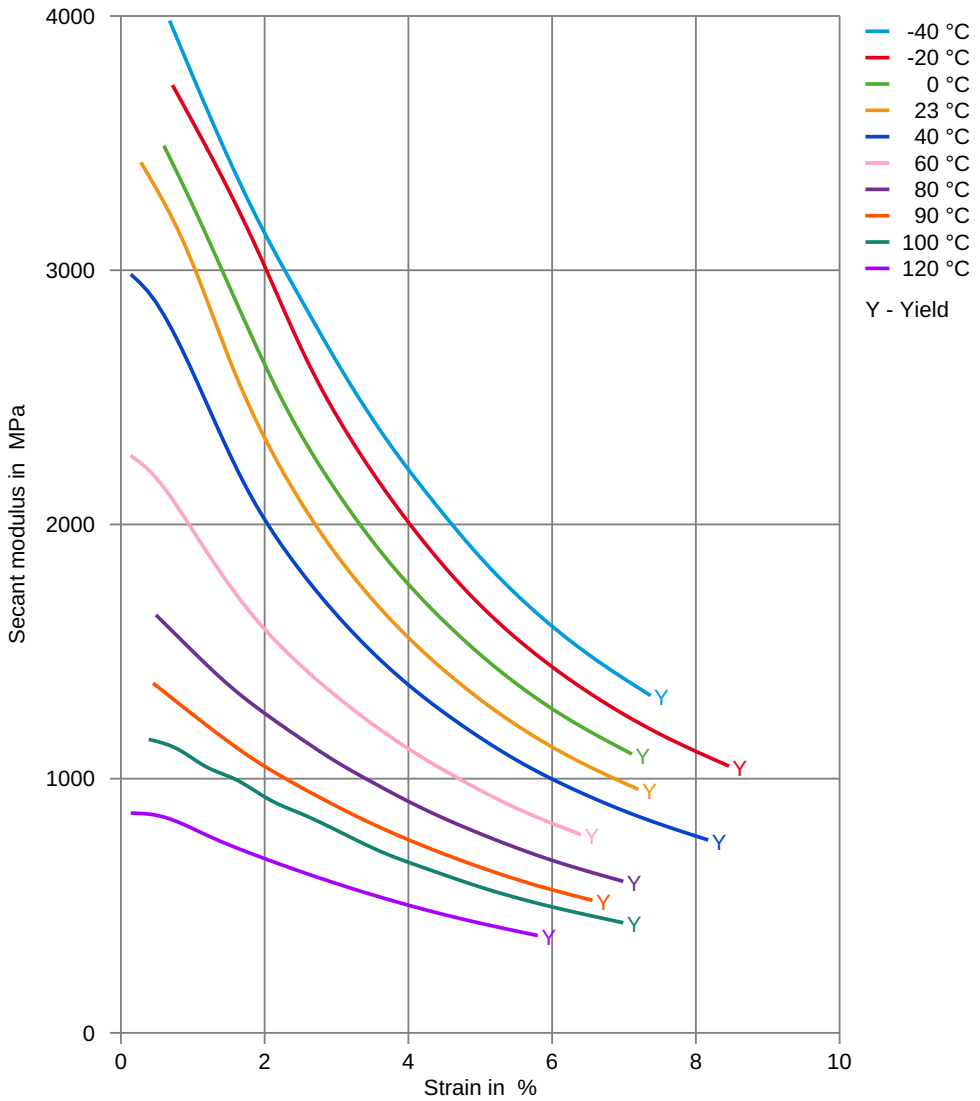
## Secant modulus-strain



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## Chemical Media Resistance

### Acids

- ✔ Acetic Acid (5% by mass), 23°C
- ✘ Citric Acid solution (10% by mass), 23°C
- ✘ Lactic Acid (10% by mass), 23°C
- ✘ Hydrochloric Acid (36% by mass), 23°C
- ✘ Nitric Acid (40% by mass), 23°C
- ✘ Sulfuric Acid (38% by mass), 23°C
- ✘ Sulfuric Acid (5% by mass), 23°C
- ✘ Chromic Acid solution (40% by mass), 23°C

### Bases

- ✘ Sodium Hydroxide solution (35% by mass), 23°C
- ✘ Sodium Hydroxide solution (1% by mass), 23°C
- ✘ Ammonium Hydroxide solution (10% by mass), 23°C

### Alcohols

- ✔ Isopropyl alcohol, 23°C
- ✔ Methanol, 23°C
- ✔ Ethanol, 23°C

### Hydrocarbons

- ✔ n-Hexane, 23°C
- ✔ Toluene, 23°C
- ✔ iso-Octane, 23°C

### Ketones

- ✔ Acetone, 23°C

### Ethers

- ✔ Diethyl ether, 23°C

### Mineral oils

- ✔ SAE 10W40 multigrade motor oil, 23°C
- ✘ SAE 10W40 multigrade motor oil, 130°C
- ✘ SAE 80/90 hypoid-gear oil, 130°C
- ✔ Insulating Oil, 23°C

### Standard Fuels

- ✔ ISO 1817 Liquid 1 - E5, 60°C
- ✔ ISO 1817 Liquid 2 - M15E4, 60°C
- ✔ ISO 1817 Liquid 3 - M3E7, 60°C
- ✔ ISO 1817 Liquid 4 - M15, 60°C
- ✔ Standard fuel without alcohol (pref. ISO 1817 Liquid C), 23°C
- ✔ Standard fuel with alcohol (pref. ISO 1817 Liquid 4), 23°C
- ✔ Diesel fuel (pref. ISO 1817 Liquid F), 23°C
- ✘ Diesel fuel (pref. ISO 1817 Liquid F), 90°C
- ✘ Diesel fuel (pref. ISO 1817 Liquid F), >90°C

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## Salt solutions

- ✔ Sodium Chloride solution (10% by mass), 23°C
- ✘ Sodium Hypochlorite solution (10% by mass), 23°C
- ✘ Sodium Carbonate solution (20% by mass), 23°C
- ✘ Sodium Carbonate solution (2% by mass), 23°C
- ✘ Zinc Chloride solution (50% by mass), 23°C

## Other

- ✔ Ethyl Acetate, 23°C
- ✘ Hydrogen peroxide, 23°C
- ✘ DOT No. 4 Brake fluid, 130°C
- ✘ Ethylene Glycol (50% by mass) in water, 108°C
- ✔ 1% nonylphenoxy-polyethyleneoxy ethanol in water, 23°C
- ✔ 50% Oleic acid + 50% Olive Oil, 23°C
- ✔ Water, 23°C
- ✘ Water, 90°C
- ✘ Phenol solution (5% by mass), 23°C

**Symbols used:**

✔ possibly resistant
Defined as: Supplier has sufficient indication that contact with chemical can be potentially accepted under the intended use conditions and expected service life. Criteria for assessment have to be indicated (e.g. surface aspect, volume change, property change).

✘ not recommended - see explanation
Defined as: Not recommended for general use. However, short-term exposure under certain restricted conditions could be acceptable (e.g. fast cleaning with thorough rinsing, spills, wiping, vapor exposure).