

DuPont™ Delrin® 511DP NC010

ACETAL RESIN

Product Information

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® 511DP is a medium viscosity acetal homopolymer with enhanced crystallization for faster cycle times and excellent creep and fatigue resistance. It has improved thermal stability, excellent dimensional stability, low warpage and fewer voids.

| General information | Value | Unit | Test Standard | |
|---|-------|------------------------|-----------------|----|
| Resin Identification | POM | - | ISO 1043 | |
| Part Marking Code | POM | - | ISO 11469 | |
| Rheological properties | Value | Unit | Test Standard | |
| Melt volume-flow rate | 13 | cm ³ /10min | ISO 1133 | |
| Temperature | 190 | °C | ISO 1133 | |
| Load | 2.16 | kg | ISO 1133 | |
| Melt mass-flow rate | 14 | g/10min | 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 | |
| Mechanical properties | Value | Unit | Test Standard | |
| Tensile Modulus | 3400 | MPa | ISO 527-1/-2 | |
| Yield stress | 74 | MPa | ISO 527-1/-2 | |
| Yield strain | 12 | % | ISO 527-1/-2 | |
| Nominal strain at break | 25 | % | ISO 527-1/-2 | |
| Flexural Modulus | 3200 | MPa | ISO 178 | |
| Flexural Stress at 3.5% | 87 | MPa | ISO 178 | |
| Charpy impact strength | | | ISO 179/1eU | |
| 23°C | 220 | kJ/m ² | | |
| -30°C | 200 | kJ/m ² | | |
| Charpy notched impact strength | | | ISO 179/1eA | |
| 23°C | 7 | kJ/m ² | | |
| -30°C | 6.5 | kJ/m ² | | |
| Ball indentation hardness, H 961/30 | 175 | MPa | ISO 2039-1 | DS |
| DS: Derived from similar grade | | | | |
| Thermal properties | Value | Unit | Test Standard | |
| Melting temperature, 10°C/min | 178 | °C | ISO 11357-1/-3 | |
| Temp. of deflection under load | | | ISO 75-1/-2 | |
| 1.8 MPa | 107 | °C | | |
| 0.45 MPa | 163 | °C | | |
| Vicat softening temperature, 50°C/h, 50N | 160 | °C | ISO 306 | |
| Coeff. of linear therm. expansion, parallel | 100 | E-6/K | ISO 11359-1/-2 | |
| Coeff. of linear therm. expansion, normal | 110 | E-6/K | ISO 11359-1/-2 | |
| RTI, electrical | | | UL 746B | |
| 0.75mm | 50 | °C | | |
| 1.5mm | 110 | °C | | |
| 3mm | 110 | °C | | |
| RTI, impact | | | UL 746B | |
| 0.75mm | 50 | °C | | |
| 1.5mm | 85 | °C | | |
| 3mm | 90 | °C | | |

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

Asia Pacific

Tel: +81 3 5521 8600

Europe/Middle East/Africa

Tel: +41 22 717 51 11



DuPont™ Delrin® 511DP NC010

ACETAL RESIN

| | | | | UL 746B |
|--------------------------------------|-----------|-------------------|------|----------------------|
| RTI, strength | | | | |
| 0.75mm | 50 | °C | | |
| 1.5mm | 90 | °C | | |
| 3mm | 95 | °C | | |
| Flammability | | Value | Unit | Test Standard |
| 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 | 0.8 | mm | | IEC 60695-11-10 |
| UL recognition | yes | - | | UL 94 |
| FMVSS Class | B | - | | ISO 3795 (FMVSS 302) |
| Burning rate, Thickness 1 mm | 25 | mm/min | | ISO 3795 (FMVSS 302) |
| DS: Derived from similar grade | | | | |
| Other properties | | Value | Unit | Test Standard |
| Humidity absorption, 2mm | 0.3 | % | | Sim. to ISO 62 |
| Water absorption, 2mm | 0.9 | % | | Sim. to ISO 62 |
| Density | 1420 | kg/m ³ | | ISO 1183 |
| Water Absorption, Immersion 24h | 0.3 | % | | Sim. to ISO 62 |
| VDA Properties | | Value | Unit | Test Standard |
| Emissions | <8 | mg/kg | | VDA 275 |
| Fogging, F-value (refraction) | 97 | % | | ISO 6452 |
| Fogging, G-value (condensate) | 0.1 | mg | | ISO 6452 |
| Injection | | Value | Unit | Test Standard |
| Drying Recommended | yes | - | | - |
| Drying Temperature | ≥80 | °C | | - |
| Drying Time, Dehumidified Dryer | 2 - 4 | h | | - |
| Processing Moisture Content | ≤0.2 | % | | - |
| Melt Temperature Optimum | 215 | °C | | - |
| Min. melt temperature | 210 | °C | | - |
| Max. melt temperature | 220 | °C | | - |
| 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 | | Value | Unit | Test Standard |
| 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

| | | |
|-----------------------|---|---|
| Processing | <ul style="list-style-type: none"> • Injection Moulding • Profile Extrusion | <ul style="list-style-type: none"> • Sheet Extrusion • Other Extrusion |
| Delivery form | <ul style="list-style-type: none"> • Pellets | |
| Additives | <ul style="list-style-type: none"> • Lubricants | <ul style="list-style-type: none"> • Release agent |
| Regional Availability | <ul style="list-style-type: none"> • North America • Europe | <ul style="list-style-type: none"> • Asia Pacific • South and Central America • Near East/Africa • Global |

Processing Texts

Injection molding

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

Revised: 2018-01-09

Page: 2 of 7

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

Asia Pacific

Tel: +81 3 5521 8600

Europe/Middle East/Africa

Tel: +41 22 717 51 11



Copyright 2017 DuPont. The DuPont Oval Logo is a trademark or registered trademark of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

DuPont™ Delrin® 511DP NC010

ACETAL RESIN

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.

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

Asia Pacific

Tel: +81 3 5521 8600

Europe/Middle East/Africa

Tel: +41 22 717 51 11

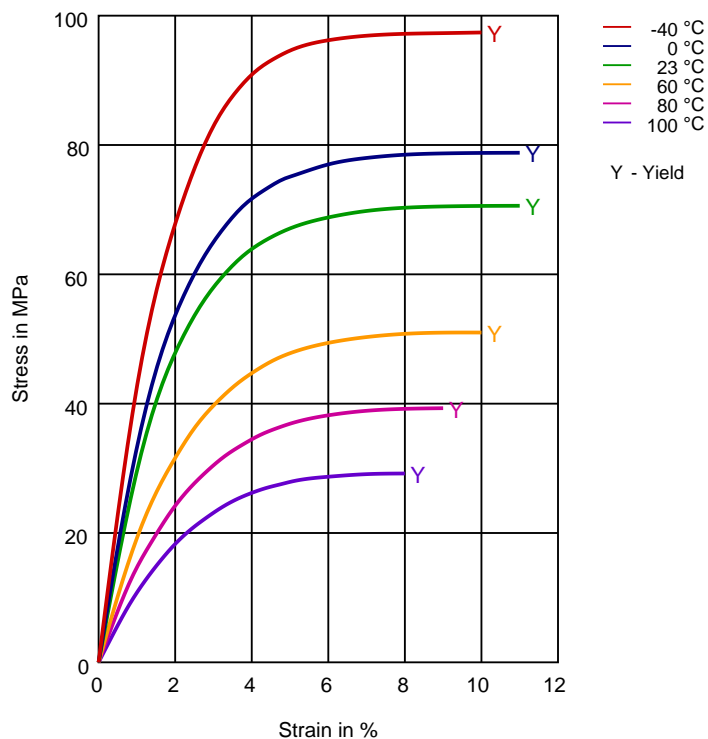


DuPont™ Delrin® 511DP NC010

ACETAL RESIN

Diagrams

Stress-strain



Revised: 2018-01-09

Page: 4 of 7

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

Asia Pacific

Tel: +81 3 5521 8600

Europe/Middle East/Africa

Tel: +41 22 717 51 11

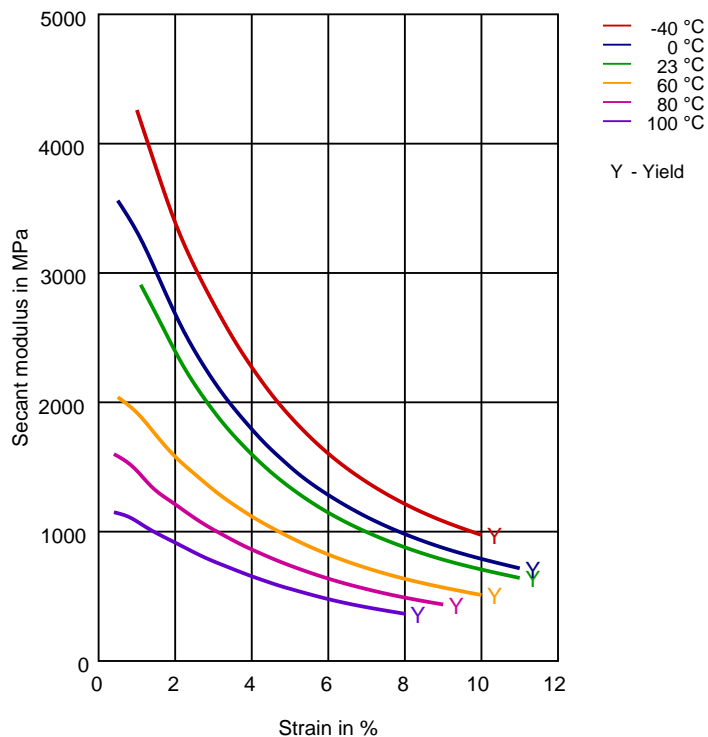
Copyright 2017 DuPont. The DuPont Oval Logo is a trademark or registered trademark of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.



DuPont™ Delrin® 511DP NC010

ACETAL RESIN

Secant modulus-strain



To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

Asia Pacific

Tel: +81 3 5521 8600

Europe/Middle East/Africa

Tel: +41 22 717 51 11



DuPont™ Delrin® 511DP NC010

ACETAL RESIN

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)

Revised: 2018-01-09

Page: 6 of 7

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

Asia Pacific

Tel: +81 3 5521 8600

Europe/Middle East/Africa

Tel: +41 22 717 51 11



Copyright 2017 DuPont. The DuPont Oval Logo is a trademark or registered trademark of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

DuPont™ Delrin® 511DP NC010

ACETAL RESIN

- ✓ 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)

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).

Contact DuPont for Material Safety Data Sheet, general guides and/or additional information about ventilation, handling, purging, drying, etc. ISO Mechanical properties measured at 4mm (Hytrel® measured at 2 mm), IEC Electrical properties measured at 2mm, all ASTM properties measured at 3.2mm, and test temperatures are 23°C unless otherwise stated.

The information set forth herein is furnished free of charge and is based on technical data that DuPont believes to be reliable and falls within the normal range of properties. It is intended for use by persons having technical skill, at their own discretion and risk. This data should not be used to establish specification limits nor used alone as the basis of design. Handling precaution information is given with the understanding that those using it will satisfy themselves that their particular conditions of use present no health or safety hazards. Since conditions of product use and disposal are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. As with any product, evaluation under end-use conditions prior to specification is essential. Nothing herein is to be taken as a license to operate or a recommendation to infringe on patents. Caution: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, discuss with your DuPont customer representative and read Medical Caution H-50103-5.

Copyright © 2017 DuPont or its affiliates. All Rights Reserved. The DuPont Oval Logo, DuPont™, The miracles of science™ and all products denoted with ® or ™ are registered trademarks or trademarks of E.I. du Pont de Nemours and Company or its affiliates.

Revised: 2018-01-09

Page: 7 of 7

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

Asia Pacific

Tel: +81 3 5521 8600

Europe/Middle East/Africa

Tel: +41 22 717 51 11



Copyright 2017 DuPont. The DuPont Oval Logo is a trademark or registered trademark of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.