

# Delrin® AD90 NCo10

## ACETAL RESIN

### Product Description

Delrin®AD90isalowviscosityacetalhomopolymerforinjectionmolding.Ithasimprovedprocessingthermalstability,goodmechanicalproperties, and low volatile emissions.

### General

|                               |                                                                                |                                                      |                                          |
|-------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|------------------------------------------|
| Material Status               | • Commercial: Active                                                           |                                                      |                                          |
| Availability                  | • Asia Pacific                                                                 | • Europe                                             | • North America                          |
| Features                      | • Fatigue Resistant<br>• Good Creep Resistance<br>• Good Dimensional Stability | • High Stiffness<br>• High Strength<br>• Homopolymer | • Low Viscosity<br>• Ultrasonic Weldable |
| Uses                          | • Engineering Parts<br>• Gears                                                 | • General Purpose<br>• Thin-walled Parts             |                                          |
| RoHS Compliance               | • Contact Manufacturer                                                         |                                                      |                                          |
| Appearance                    | • Natural Color                                                                |                                                      |                                          |
| Processing Method             | • Injection Molding                                                            |                                                      |                                          |
| Multi-Point Data              | • Isothermal Stress vs. Strain (ISO 11403-1)                                   | • Shear Modulus vs. Temperature (ISO 11403-2)        | • Viscosity vs. Shear Rate (ISO 11403-2) |
| Part Marking Code (ISO 11469) | • >POM<                                                                        |                                                      |                                          |
| Resin ID (ISO 1043)           | • POM                                                                          |                                                      |                                          |
| Product Category              | • Low Emissions Resins                                                         | • Unreinforced Resins                                |                                          |

| Physical                                    | Nominal Value Unit   | Test Method         |
|---------------------------------------------|----------------------|---------------------|
| Specific Gravity                            |                      |                     |
| --                                          | 1.42                 | ASTM D792           |
| --                                          | 1.42 g/cm³           | ISO 1183            |
| Melt Mass-Flow Rate (MFR)                   |                      |                     |
| 190°C/1.05 kg                               | 11 g/10 min          | ASTM D1238          |
| 190°C/2.16 kg                               | 25 g/10 min          | ISO 1133            |
| Melt Volume-Flow Rate (MVR) (190°C/2.16 kg) | 1.28 in³/10min       | ISO 1133            |
| Molding Shrinkage                           |                      |                     |
| Flow: 24 hr, 0.126 in                       | 0.016 to 0.019 in/in | ASTM D955           |
| Across Flow: 24 hr, 0.126 in                | 0.017 to 0.020 in/in | ASTM D955           |
| Across Flow: 0.0787 in                      | 1.9 %                | ISO 294-4           |
| Flow: 0.0787 in                             | 1.9 %                | ISO 294-4           |
| Water Absorption                            |                      |                     |
| 73°F, 24 hr                                 | 0.43 %               | ASTM D570           |
| 73°F, 24 hr                                 | 0.56 %               | ISO 62              |
| Saturation, 73°F                            | 1.4 %                | ASTM D570<br>ISO 62 |
| Equilibrium, 73°F, 50% RH                   | 0.28 %               | ASTM D570           |
| Equilibrium, 73°F, 50% RH                   | 0.26 %               | ISO 62              |

#### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

#### Asia Pacific

Tel: +81 3 5521 2771

#### Europe/Middle East/Africa

Tel: +41 22 717 51 11



# Delrin® AD90 NCo10

## ACETAL RESIN

| Mechanical                             | Nominal Value Unit        | Test Method             |
|----------------------------------------|---------------------------|-------------------------|
| Tensile Modulus                        |                           |                         |
| -40°F <sup>2</sup>                     | 570000 psi                | ASTM D638               |
| 73°F <sup>2</sup>                      | 505000 psi                | ASTM D638               |
| 212°F <sup>2</sup>                     | 135000 psi                | ASTM D638               |
| 73°F                                   | 479000 psi                | ISO 527-2               |
| Tensile Strength                       |                           |                         |
| Yield, -40°F <sup>2</sup>              | 14100 psi                 | ASTM D638               |
| Yield, 73°F <sup>2</sup>               | 10000 psi                 | ASTM D638               |
| Yield, 212°F <sup>2</sup>              | 4350 psi                  | ASTM D638               |
| Yield, 73°F                            | 10300 psi                 | ISO 527-2               |
| -40°F <sup>2</sup>                     | 14100 psi                 | ASTM D638               |
| 73°F <sup>2</sup>                      | 10000 psi                 | ASTM D638               |
| 212°F <sup>2</sup>                     | 4500 psi                  | ASTM D638               |
| Tensile Elongation                     |                           |                         |
| Yield, -40°F <sup>2</sup>              | 9.0 %                     | ASTM D638               |
| Yield, 73°F <sup>2</sup>               | 11 %                      | ASTM D638               |
| Yield, 212°F <sup>2</sup>              | 9.0 %                     | ASTM D638               |
| Yield, 73°F                            | 12 %                      | ISO 527-2               |
| Break, -40°F <sup>2</sup>              | 12 %                      | ASTM D638               |
| Break, 73°F <sup>2</sup>               | 25 %                      | ASTM D638               |
| Break, 212°F <sup>2</sup>              | > 250 %                   | ASTM D638               |
| Break, 73°F                            | 28 %                      | ISO 527-2/50            |
| Nominal Tensile Strain at Break (73°F) | 23 %                      | ISO 527-2               |
| Tensile Creep Modulus                  |                           | ISO 899-1               |
| 1 hr                                   | 406000 psi                |                         |
| 1000 hr                                | 218000 psi                |                         |
| Flexural Modulus                       |                           |                         |
| -40°F                                  | 580000 psi                | ASTM D790               |
| 73°F                                   | 470000 psi                | ASTM D790               |
| 212°F                                  | 120000 psi                | ASTM D790               |
| 73°F                                   | 435000 psi                | ISO 178                 |
| Flexural Strength (5.0% Strain, 73°F)  | 15200 psi                 | ASTM D790               |
| Shear Strength (73°F)                  | 9570 psi                  | ASTM D732               |
| Impact                                 | Nominal Value Unit        | Test Method             |
| Charpy Notched Impact Strength         |                           | ISO 179/1eA             |
| -40°F                                  | 3.8 ft·lb/in <sup>2</sup> |                         |
| -22°F                                  | 3.3 ft·lb/in <sup>2</sup> |                         |
| 73°F                                   | 3.8 ft·lb/in <sup>2</sup> |                         |
| Charpy Unnotched Impact Strength       |                           | ISO 179/1eU             |
| -22°F                                  | 95 ft·lb/in <sup>2</sup>  |                         |
| 73°F                                   | 95 ft·lb/in <sup>2</sup>  |                         |
| Notched Izod Impact                    |                           |                         |
| 73°F                                   | 1.3 ft·lb/in              | ASTM D256               |
| -40°F                                  | 3.8 ft·lb/in <sup>2</sup> | ISO 180/1A              |
| 73°F                                   | 3.3 ft·lb/in <sup>2</sup> | ISO 180/1A              |
| Unnotched Izod Impact (73°F)           | 31 ft·lb/in               | ASTM D4812              |
| Hardness                               | Nominal Value Unit        | Test Method             |
| Rockwell Hardness                      |                           |                         |
| R-Scale                                | 120                       | ASTM D785<br>ISO 2039-2 |
| M-Scale                                | 92                        | ISO 2039-2              |

Rev: 2011-09-22

Page: 2 of 7

To find out more, visit [plastics.dupont.com](http://plastics.dupont.com) or contact the nearest DuPont location.

### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

### Asia Pacific

Tel: +81 3 5521 2771

### Europe/Middle East/Africa

Tel: +41 22 717 51 11



Copyright © 2011 DuPont. The DuPont Oval Logo, DuPont™, The miracles of science™, and all products denoted with ™ or ® are trademarks or registered trademarks of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

*The miracles of science™*

# Delrin® AD90 NCo10

## ACETAL RESIN

| Thermal                                           | Nominal Value Unit | Test Method               |
|---------------------------------------------------|--------------------|---------------------------|
| Deflection Temperature Under Load                 |                    |                           |
| 66 psi, Unannealed                                | 325 °F             | ASTM D648                 |
| 66 psi, Unannealed                                | 324 °F             | ISO 75-2/B                |
| 264 psi, Unannealed                               | 221 °F             | ASTM D648                 |
| 264 psi, Unannealed                               | 201 °F             | ISO 75-2/A                |
| Melting Temperature <sup>3</sup>                  | 352 °F             | ISO 11357-3<br>ASTM D3418 |
| CLTE                                              |                    |                           |
| Flow: -40 to 86°F                                 | 0.000058 in/in/°F  | ASTM E831<br>ISO 11359-2  |
| Flow: 73 to 131°F                                 | 0.000068 in/in/°F  | ASTM E831                 |
| Flow: 140 to 221°F                                | 0.000076 in/in/°F  | ASTM E831<br>ISO 11359-2  |
| Flow: 221 to 302°F                                | 0.000083 in/in/°F  | ASTM E831<br>ISO 11359-2  |
| Flow: 73 to 131°F                                 | 0.000067 in/in/°F  | ISO 11359-2               |
| Transverse: 73 to 131°F                           | 0.000067 in/in/°F  | ASTM E831<br>ISO 11359-2  |
| Electrical                                        | Nominal Value Unit | Test Method               |
| Surface Resistivity                               |                    |                           |
| --                                                | 5.0E+14 ohms       | ASTM D257                 |
| --                                                | > 1.0E+15 ohms     | IEC 60093                 |
| Volume Resistivity                                |                    |                           |
| 73°F                                              | 2.0E+14 ohm-cm     | ASTM D257                 |
| --                                                | 1.0E+14 ohm-cm     | IEC 60093                 |
| Dielectric Strength <sup>4</sup> (73°F, 0.126 in) | 440 V/mil          | ASTM D149                 |
| Dielectric Constant                               |                    |                           |
| 73°F, 1 MHz                                       | 3.60               | ASTM D150                 |
| 73°F, 100 Hz                                      | 3.80               | IEC 60250                 |
| 73°F, 1 MHz                                       | 3.80               | IEC 60250                 |
| Dissipation Factor                                |                    |                           |
| 73°F, 1 MHz                                       | 0.0060             | ASTM D150                 |
| 73°F, 1 MHz                                       | 0.0050             | IEC 60250                 |
| Comparative Tracking Index                        | 600 V              | IEC 60112                 |
| Flammability                                      | Nominal Value Unit | Test Method               |
| Flame Rating - UL                                 |                    | UL 94                     |
| 0.0295 in                                         | HB                 |                           |
| 0.0591 in                                         | HB                 |                           |
| 0.118 in                                          | HB                 |                           |
| Flammability Classification                       |                    | IEC 60695-11-10, -20      |
| 0.0295 in                                         | HB                 |                           |
| 0.0591 in                                         | HB                 |                           |
| 0.118 in                                          | HB                 |                           |
| Oxygen Index                                      | 23 %               | ISO 4589-2                |



**Delrin® AD90 NCo10**  
**ACETAL RESIN**

| UL                                          | Nominal Value Unit | Test Method |
|---------------------------------------------|--------------------|-------------|
| RTI Str                                     |                    | UL 746      |
| 0.0295 in                                   | 122 °F             |             |
| 0.0591 in                                   | 194 °F             |             |
| 0.118 in                                    | 203 °F             |             |
| RTI Imp                                     |                    | UL 746      |
| 0.0295 in                                   | 122 °F             |             |
| 0.0591 in                                   | 185 °F             |             |
| 0.118 in                                    | 194 °F             |             |
| RTI Elec                                    |                    | UL 746      |
| 0.0295 in                                   | 122 °F             |             |
| 0.0591 in                                   | 230 °F             |             |
| 0.118 in                                    | 230 °F             |             |
| Comparative Tracking Index (CTI) (0.118 in) | 600 V              | UL 746      |

| Injection                 | Nominal Value Unit                                                                     |
|---------------------------|----------------------------------------------------------------------------------------|
| Drying Temperature        | 176 °F                                                                                 |
| Drying Time               | 2.0 to 4.0 hr                                                                          |
| Suggested Max Moisture    | < 0.20 %                                                                               |
| Processing (Melt) Temp    | 410 to 428 °F                                                                          |
| Melt Temperature, Optimum |                                                                                        |
| Injection Molding         | 419 °F                                                                                 |
| Mold Temperature          | 176 to 212 °F                                                                          |
| Mold Temperature, Optimum |                                                                                        |
| Injection Molding         | 194 °F                                                                                 |
| Drying Recommended        | Not normally required unless<br>moisture content of resin exceeds<br>recommended level |

**North America**

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

**Asia Pacific**

Tel: +81 3 5521 2771

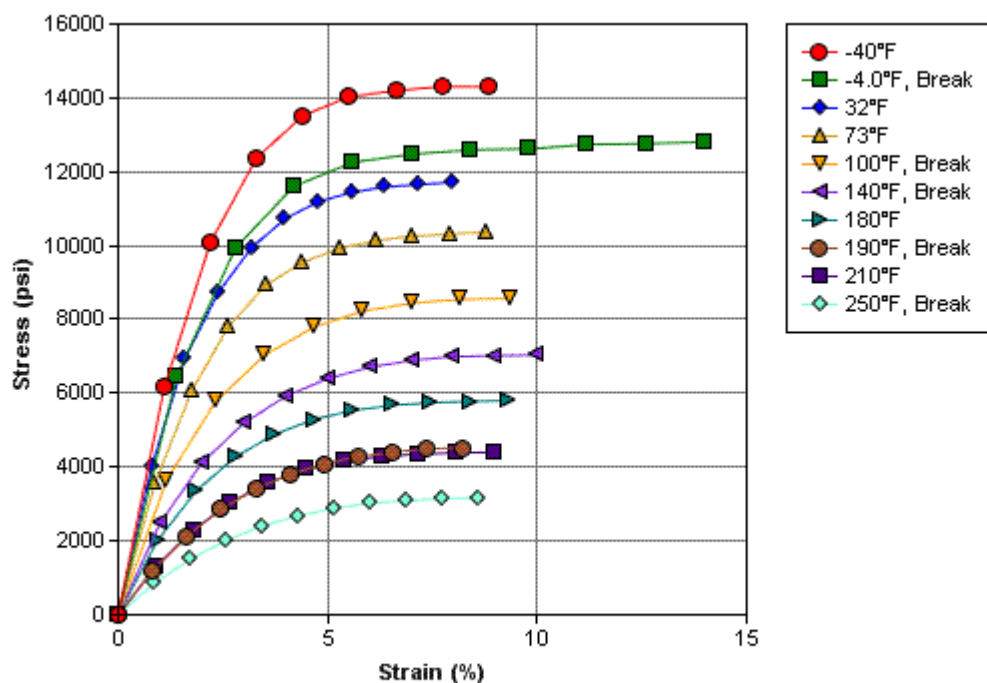
**Europe/Middle East/Africa**

Tel: +41 22 717 51 11



# Delrin® AD90 NCo10 ACETAL RESIN

Isothermal Stress vs. Strain (ISO 11403-1)



Rev: 2011-09-22

Page: 5 of 7

To find out more, visit [plastics.dupont.com](http://plastics.dupont.com) or contact the nearest DuPont location.

## North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

## Asia Pacific

Tel: +81 3 5521 2771

## Europe/Middle East/Africa

Tel: +41 22 717 51 11

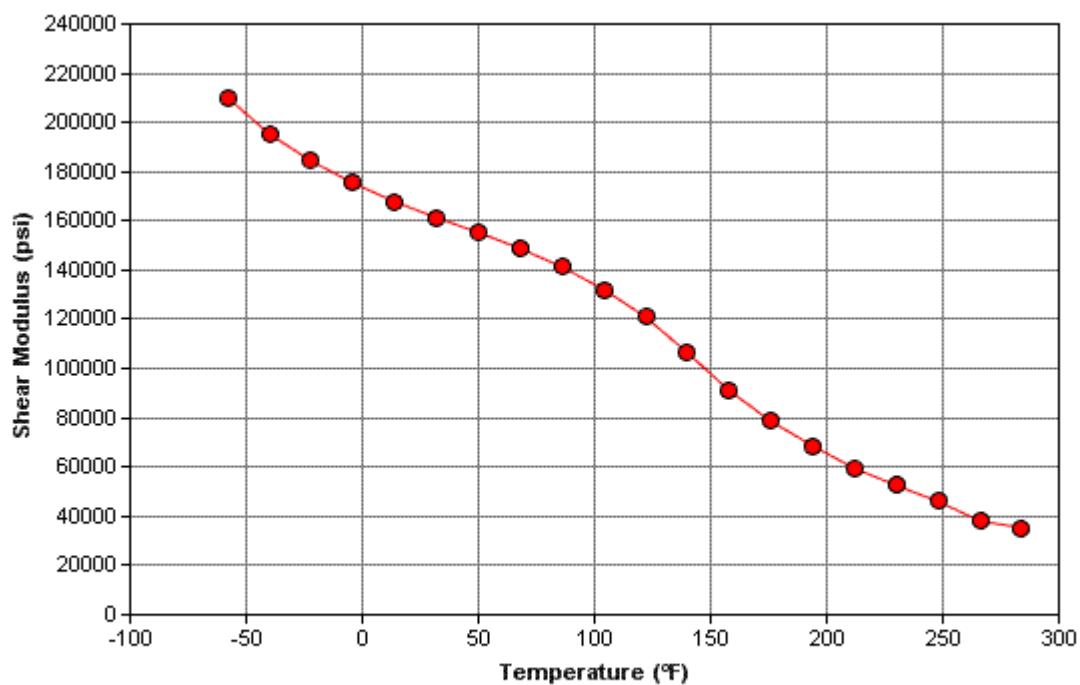


Copyright © 2011 DuPont. The DuPont Oval Logo, DuPont™, The miracles of science™, and all products denoted with ™ or ® are trademarks or registered trademarks of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

*The miracles of science™*

**Delrin® AD90 NCo10**  
**ACETAL RESIN**

Shear Modulus vs. Temperature (ISO 11403-2)



Rev: 2011-09-22

Page: 6 of 7

To find out more, visit [plastics.dupont.com](http://plastics.dupont.com) or contact the nearest DuPont location.

**North America**

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

**Asia Pacific**

Tel: +81 3 5521 2771

**Europe/Middle East/Africa**

Tel: +41 22 717 51 11

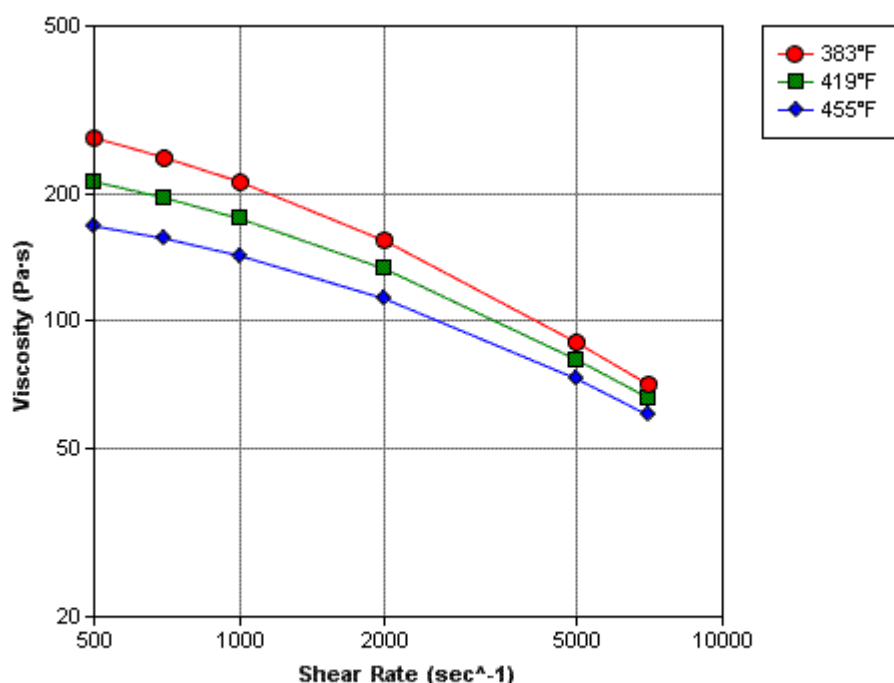


Copyright © 2011 DuPont. The DuPont Oval Logo, DuPont™, The miracles of science™, and all products denoted with ™ or ® are trademarks or registered trademarks of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

*The miracles of science™*

# Delrin® AD90 NCo10 ACETAL RESIN

Viscosity vs. Shear Rate (ISO 11403-2)



## Notes

<sup>1</sup> Typical properties: these are not to be construed as specifications.

<sup>2</sup> 0.20 in/min

<sup>3</sup> 10°C/min

<sup>4</sup> Method A (Short-Time)

Contact DuPont for Material Safety Data Sheet, general guides and/or additional information about ventilation, handling, purging, drying, etc.

ISO Mechanical properties measured at 4.0mm, ISO Electrical properties measured at 2.0mm, and all ASTM properties measured at 3.2mm.

Test temperatures are 23°C unless otherwise stated.

The information provided in this data sheet corresponds to our knowledge on the subject at the date of its publication. This information may be subject to revision as new knowledge and experience becomes available. The data provided fall within the normal range of product properties and relate only to the specific material designated; these data may not be valid for such material used in combination with any other materials, additives or pigments or in any process, unless expressly indicated otherwise. The data provided should not be used to establish specification limits or used alone as the basis of design; they are not intended to substitute for any testing you may need to conduct to determine for yourself the suitability of a specific material for your particular purposes. Since DuPont cannot anticipate all variations in actual end-use conditions DuPont makes no warranties and assumes no liability in connection with any use of this information. Nothing in this publication is to be considered as a license to operate under or a recommendation to infringe any patent rights. DuPont advises you to seek independent counsel for a freedom to practice opinion on the intended application or end-use of our products. CAUTION: Do not use DuPont materials in medical application involving implantation in the human body or contact with internal body fluids or tissues unless the material has been provided from DuPont under a written contract that is consistent with DuPont policy regarding medical applications and expressly acknowledges the contemplated use. For further information, please contact your DuPont representative. You may also request a copy of DuPont POLICY Regarding Medical Applications H-50103-3 and DuPont CAUTION Regarding Medical Applications ... H-50102-3.

Rev: 2011-09-22

Page: 7 of 7

To find out more, visit [plastics.dupont.com](http://plastics.dupont.com) or contact the nearest DuPont location.

### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

### Asia Pacific

Tel: +81 3 5521 2771

### Europe/Middle East/Africa

Tel: +41 22 717 51 11



Copyright © 2011 DuPont. The DuPont Oval Logo, DuPont™, The miracles of science™, and all products denoted with ™ or ® are trademarks or registered trademarks of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

*The miracles of science™*