Delrin® Acetal Resin E-grades for Low VOC Automotive Applications



Delrin® acetal resin, the world's first acetal polymer, is a highly versatile engineering polymer that offers an excellent balance of desirable properties as well as bridges the gap between metals and ordinary plastics.

Acetal polymers are commonly referred to as polyoxymethylene or POM and parts are commonly identified with the part marking code >POM< for recycling purposes. All POM Delrin® E-grades for low emissions meet the automotive industry's demanding requirements for the use of plastics in vehicle interiors. This extends the scope of application for Delrin® acetal resins in vehicles to include plastic components in interiors where high resistance to impact load is required.

Product line

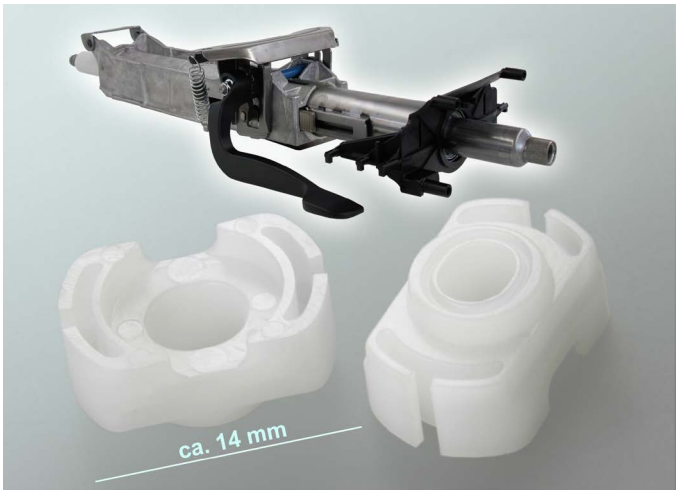
Delrin® E-grades for low emissions are available in several basic melt flow series: 100, 300, and 500. These differ primarily in melt viscosity with 100 being the most viscous and 500 being the most fluid.

A wide range of Delrin® acetal resin E-grades are available to meet specific customer needs for demanding applications:

- Unreinforced resins (CPE-grades)
- Toughened and super tough resins (TE-grades)
- UV-stabilized grades (UVE-grades)
- Low wear low friction resins (ALE-grades)



Bearing plate of safety belt retractor from Autoliv made of Delrin® 300TE



Spring element made of low emission Delrin for steering column

As is typical for all Delrin® acetal resins, the new low emission grades combine high impact resistance—even at low temperatures—with high stiffness, strength and elongation. They provide high surface hardness, very low wear and friction, resiliency and a high resistance to chemicals and solvents.

Testing by SGS Institut Fresenius GmbH in Germany, in accordance with the VDA 275 standard, confirms that all Delrin® E-grades meet the demanding emission requirements of the world's major automotive manufacturers. The SGS testing revealed emissions of below 2 mg/kg for all grades, while internal testing showed their strength, stiffness and impact resistance to be similar or better than the standard grades.

Applications

Delrin® E-grades for low emissions are suitable for:

- fasteners
- seatbelt components
- headrest adjusters
- levers
- brackets
- gears
- switches
- buckles
- latches
- components with snap-in joints

Delrin® e-grades for low emissions

Unreinforced family

Delrin® CPE grades for low emissions are unreinforced grades. They are very suitable for applications within the vehicle's interior because they offer less than 2 mg/kg emission of volatile particles per VDA 275, meeting the requirements of the global automotive industry and performing as well as standard Delrin® products.

Delrin® 100CPE
- high viscosity
- highest impact performance
- low mold deposit for high productivity

Delrin® 111CPE
- high viscosity
- high stiffness and impact performance
- crystallization technology

Delrin® 300CPE
- medium-high viscosity
- greater design flexibility and freedom
- high mechanical properties with ease of process in mind
- enables wall thicknesses reduction with good resin flow in complex parts
- improved weld line strength

Delrin® 511CPE
- medium viscosity
- crystallization technology
- high stiffness with ease of processing

Delrin® 500CPE
- medium viscosity
- enhanced version of Delrin® 500P with very low emissions
- improved processing thermal stability
- good balance of melt flow vs. mechanical properties

A more sustainable option

Delrin® Renewable Attributed base polymer is produced using 100% bio-feedstock from waste according to ISCC (International Sustainability and Carbon Certification) mass balance certification. It is manufactured with 100% certified renewable electricity and has the potential to be 100% recycled.

This new material shows the same quality, identical performance, reliability, and sensory experience as Delrin, which enables easy adoption at very low risk. It's 50% lighter than aluminum and six times lighter than steel, making it ideal for many applications.

A number of the Delrin CPE grades are available as Renewable Attributed with the same performance and benefits as the standard grades:

- Delrin® RA100CPE
- Delrin® RA300CPE
- Delrin® RA500CPE
- Delrin® RA511CPE

Specialty family (UV stabilized and low wear, low friction grades)

Delrin® UVE grades for low emissions are UV stabilized acetal resins and are available in 3 different viscosities:

- Delrin® 127UVE–high viscosity
- Delrin® 327UVE–medium-high viscosity
- Delrin® 527UVE–medium viscosity

Delrin® 100ALE

A high viscosity acetal containing advanced system of lubrication. It provides:

- good yield and impact strength
- low wear and friction against itself and steel
- low noise/squeak

Delrin® 500ALE

A medium viscosity acetal containing advanced system of lubrication. It provides:

- good balance of melt flow vs. mechanical properties
- low wear and friction against itself and steel
- low noise/squeak

As Delrin® CPE grades, UVE and ALE grades offer less than 2 ppm emission of volatile particles according to VDA 275.

Property	Test Method	Units	Delrin® 100CPE RA100CPE	Delrin® 300CPE RA300CPE	Delrin® 500CPE RA500CPE	Delrin® 511CPE RA511CPE	Delrin® 127UVE	Delrin® 327UVE	Delrin® 527UVE	Delrin® 100ALE
Yield stress	ISO 527	MPa	71	71	72	7 7	71	71	72	70
Yield strain	SO 527	%	28	25	18	13	25	20	15	18
Nominal strain at break	ISO 527	%	45	40	27	25	45	40	25	40
Tensile modulus	ISO 527	MPa	2900	3100	3100	3400	2900	3000	3100	3000
Charpy notched impact strength, -30°C	ISO 179/1eA	kJ/m^2	13	10	8	6.5	10	9	8	7.5
Charpy notched impact strength, 23°C	ISO 179/1eA	kJ/m^2	16	10.5	9	7	14	10	9	10.5
Charpy unnotched impact strength, 23°C	ISO 179/1eU	kJ/m^2	No break	No break	230	235	390	350	280	No break
Deflection temperature, 1.8 MPa	ISO 75-1/-2	°C	95	94	97	108	91	91	93	96
Melt flow rate, 2.16 kg/190°C	ISO 1133	g/10min	2.3	7	15	14	2.5	7	15	2.5
Density	ISO 1183	kg/m^3	1420	1420	1420	1420	1420	1420	1420	1400
VOC emissions	VDA 275	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2

Property data is for natural color.

Toughened family

Delrin® TE grades for low emissions are toughened grades offering less than 2 mg/kg emission of volatile particles. They are available in three viscosities and different levels of toughener, while keeping the same performance as standard toughened Delrin® grades. All Delrin TE grades also deliver on excellent low noise properties in addition to the following characteristics:

Delrin® 100TE

- toughened, high viscosity resin
- improved impact resistance and good moldability
- good friction partner in gear applications
- designed for highly stressed parts where outstanding toughness is required

Delrin® 300TE

- toughened, medium-high viscosity
- very good balance of melt flow and impact properties

Delrin® 100STE

- super tough, high viscosity
- superior impact resistance
- best combination of stiffness and impact resistance at very low temperature
- use in easy-to-fill molds

Delrin® 100MTE

- medium toughened, high viscosity
- excellent impact resistance
- best combination of stiffness and impact

Property	Test Method	Units	Delrin® 100STE	Delrin® 100MTE	Delrin® 100TE	Delrin® 300TE
Yield stress	ISO 527	MPa	43	47	54	54
Yield strain	ISO 527	%	35	30	25	20
Nominal strain at break	ISO 527	%	>50	>50	>50	35
Tensile modulus	ISO 527	MPa	1300	1500	1850	2000
Charpy notched impact strength, -30°C	ISO 179/1eA	kJ/m^2	17	16	14	10
Charpy notched impact strength, 23°C	ISO 179/1eA	kJ/m^2	90	40	25	16
Unnotched charpy impact strength, 23°C	ISO 179/1eU	kJ/m^2	No break	No break	No break	No break
Deflection temperature, 1.8 MPa	ISO 75-1/-2	°C	64	68	71	71
Melt flow rate, 2.16 kg/190°C	ISO 1133	g/10min	2.3	2.3	2.2	6
Density	ISO 1183	kg/m^3	1330	1350	1370	1380
VOC emissions	VDA 275	mg/kg	<2	<2	<2	<2

Property data is for natural color.

To learn more, contact your Delrin representative or visit Delrin.com.

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Delrin is an industry-leading premium industrial polymer business. Grounded in strong innovation, Delrin is a category creator with a longstanding reputation for quality, reliability, supply and product performance. The iconic Delrin brand, coupled with proprietary technology and deep application expertise make us a leader in the high-end engineering polymer market. Delrin has exciting growth prospects from exposure to automation, actuation, healthcare, mobility and consumer applications.

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