Delrin® Components Meet Strict Standards for Life-Saving Automotive Safety Restraint Systems



Project

The Delrin portfolio of polymers—proven for over 60 years to work in demanding safety applications—provides the foundation for collaboration between Delrin and Autoliv, the world's largest automotive safety supplier.

In an auto accident, safety restraint systems must work without exception because lives are at stake. Worldwide each year, 1.2 million people die in traffic accidents. The top lifesaving device? The seatbelt which reduces fatality by 45%. Reliable, robust materials are needed for safety restraints to ensure the safety of children and adults as they make their way to school, work and home each day.

Delrin understands that every component of a safety restraint system must:

- Be tough enough to withstand crash impact even in small dimensions
- Resist fracture and be capable of absorbing more energy
- Resist creep fatigue—parts must maintain overall shape during long exposures to loads and maintain tighter fit in snap-fit applications
- Resist fatigue—durability is key in high-cycle applications such as gears that run continuously or in long-life systems
- Operate thousands of times with low wear across a wide range of temperatures—the materials must not show abrasion and perform for the lifetime of the vehicle

Delrin and Autoliv have joined forces to substantially reduce fatalities and injuries even as the distance driven increases. Together, they're working toward this goal with improved safety restraint systems that use components made with Delrin.

Challenges

Performance requirements

Auto safety systems are subject to stringent standards including:

- Zero manufacturing defects
- Ability of components to withstand temperatures of -40°C to +95°C
- Ability of components to withstand impact specifications
- Reliability within tight dimensions
- Adherence to low FA emission requirements

In addition, standards vary by country and OEM; suppliers of raw materials and components must follow the most stringent standards in order to sell globally.

Design parameters

Smart cars that anticipate crashes and protect people before a crash even happens, rely on electrified systems. Designers need materials that allow for thin parts that function within an electrical system without compromising strength, toughness and stiffness for the lifetime of the vehicle.

Supply capacity

Failure to deliver safety components on time risks stopping an OEM production line. Parts manufacturers must have access to a reliable supply of high-quality homopolymer technologies for on-time delivery.



Autoliv safety belt retractor bearing plate made with Delrin® 300TE

Solution

In response to OEM demand for improved safety restraint systems and lightweighting, Delrin's development team works with Autoliv and their suppliers to finetune formulas for push buttons, pillar loops, retractor mechanisms, gears and height adjusters. The result? New products formulated with low-emission Delrin acetal polymer that reduce the noise and weight of safety restraint systems without compromising safety, quality or reliability.

For over six decades, suppliers have found that Delrin results in better mold processing of parts that meet the highest performance standards of Tier 1 suppliers as well as OEM standards. They have also counted on steady and timely supplies of consistently high-quality homopolymer because of Delrin's global distribution network.

Delrin components make it possible for Autoliv to produce safety restraint systems that are more resistant to fracture and capable of absorbing more energy in a crash. These components simply must work every time for the life of the vehicle in order to protect what matters most: people.

Autoliv and Delrin have collaborated for almost 40 years to develop components for safety restraint systems that save lives. Most recently they have:

- Reduced part size to enable space efficiency and lower total system cost
- Reduced noise from seatbelt retractor parts to enhance driver experience
- Increased safety with a high-impact gear in the seatbelt pre-pretensioner that limits restraint in preparation for impact and reduces injuries.

Plus, more people make it safely home each day!

Delrin E-grades for low emissions bridge the gap between metals and ordinary plastics

Delrin acetal resin, the world's first acetal polymer, commercialized in 1959, is the stiffest unreinforced polymer available. It's highly versatile and bridges the gap between metals and ordinary plastics.

The new low emission grades of Delrin acetal resins combine high impact resistance with high stiffness, strength and elongation—even at low temperatures. They also provide high surface hardness, very low wear and friction, resiliency and high resistance to chemicals and solvents.

SGS Institut Fresenius GmbH in Germany confirms that all E-grades of Delrin meet the demanding emission requirements of all major automotive manufacturers. Their testing revealed emissions 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.

Delrin is the acetal polymer of choice for:

- Fasteners
- Seatbelt components
- Headrest adjusters
- Levers
- Gears

Delrin® E-grades for low emissions are available in three basic melt flow series that vary in their melt viscosity: 100 (most viscous), 300, and 500 (the most fluid).

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

Delrin®

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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