



Delrin[®]

acetal resin

The low wear/low friction resin guide for Delrin[®]

The tribological aspects of many applications can seem complex, but there are a number of grades of Delrin[®] which are designed to solve your problems. This guide helps in splitting the tribological aspects into their essential components and provides a quick approach to selecting a Delrin[®] grade to match an application.

Wear is the progressive loss of material due to interacting surfaces (countersurface) in relative motion. It is quantitatively measured as the *specific wear rate* w_s of a material. Numerous distinct and independent mechanisms are involved in the wear of a polymer. These include abrasive wear, fatigue wear, and adhesive wear.

Friction is a measure of the resistance to motion (loss of energy) of two interacting surfaces (countersurface). The friction is quantitatively described by the *coefficient of friction* μ (dynamic/static).

The energy lost due to the friction can lead to an increase in temperature and emission of noise. In almost all cases, a lower coefficient of friction will lead to a lower wear rate.

Environmental Effects—The wear rate and friction forces are typically influenced by:

- contact pressure (P) and contact force (load) at the surfaces

- relative velocity of the surfaces (V)
- ambient temperature of the surfaces
- geometry and nature of the motion
- composition and finish of the countersurface
- lubrication (external)

Noise—Squeaking is directly generated by friction as it is linked to the coefficient of friction, and can be reduced or eliminated by lubrication either externally or internally (using a special lubricated grade).

Mechanical noise (typically low frequency) is not related to friction, but to impacts between moving parts. Toughened grades may dampen this type of noise.

Standard grades of Delrin[®]—The intrinsically good wear resistance and frictional behavior of Delrin[®] acetal resins allows in some applications the use of a standard grade of Delrin[®] without any internal or external lubrication.

This is especially true for applications against steel, where, in general, specific wear rates are very low. However, the moderate coefficient of friction of the standard grades against steel may make the use of a special grade necessary.

In applications against itself or other plastic materials, much lower wear rates and/or coefficient of friction can be achieved by using the appropriate low wear/low friction grade of Delrin[®].

The data listed here fall within the normal range of product properties but they should not be used to establish specification limits nor used alone as the basis of design. The DuPont Company assumes no obligation or liability for any advice furnished by it or for results obtained with respect to this information. All such advice is given and accepted at the buyer's risk. The disclosure of information herein is not a license to operate under, or a recommendation to infringe, any patent of DuPont or others. DuPont warrants the use or sale of any material which is described herein and offered for sale by DuPont does not infringe any patent covering the material itself, but does not warrant against infringement by reason of the use thereof in combination with other materials or in the operation of any process. **CAUTION:** Do not use in medical applications involving permanent implantation in the human body. For other medical applications, see "DuPont Medical Caution Statement, H-50102."

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Dial DuPont First 800-441-0575

Product Information

DuPont Use Only

The low wear/low friction grades of Delrin[®]—the grades of Delrin[®] for friction and wear applications can be classified according to the different lubricant technologies:

Teflon[®] PTFE fluoropolymer resin

Delrin[®] 500TL: medium viscosity grade, 1.5% Teflon[®] PTFE Micropowder

Delrin[®] 510MP: medium viscosity grade, 10% Teflon[®] PTFE Micropowder

Delrin[®] 520MP: medium viscosity grade, 20% Teflon[®] PTFE Micropowder

Delrin[®] 500AF: medium viscosity grade, 20% Teflon[®] PTFE Fibers

Delrin[®] 100AF: high viscosity grade, 20% Teflon[®] PTFE Fibers

Internal Lubrication

Delrin[®] 500CL: medium viscosity, chemical lubricant

Delrin[®] 500AL: medium viscosity, advanced lubricant system

Delrin[®] 900SP: "special polymer;" containing proprietary lubricant

Silicone Lubrication

Delrin[®] 500SC: ("silicone concentrate") masterbatch containing high viscosity silicone oil; designed to be cube-blended with standard grades to provide desired level of properties.

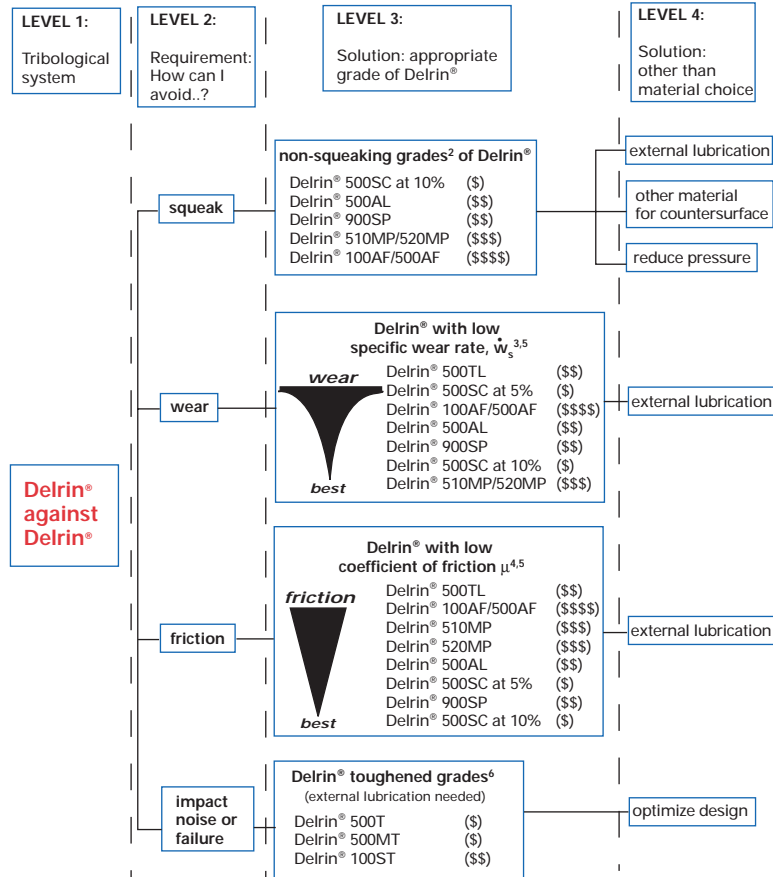
Kevlar[®] aramid fiber

Delrin[®] 100KM: modified with Kevlar[®] aramid fiber

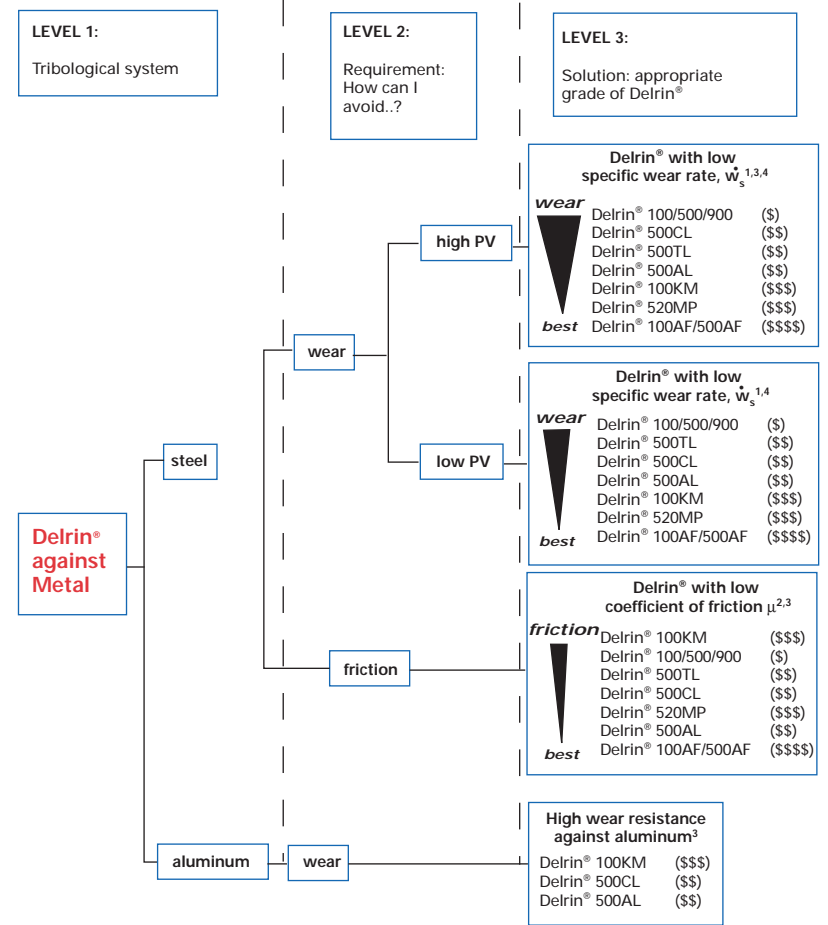
Automotive Inquiries 800-533-1313



DuPont Engineering Polymers



1) Surface and countersurface are consisting of the same grade of Delrin®.
 2) The noise emitted at 16 kHz is below 60 dB(A) (audible limit) at a sliding speed of 0.084 m/s and a pressure of 0.624 MPa in a reciprocating movement.
 3) Resins are ranked by decreasing wear rate based on results from different text geometries and test conditions.
 4) Resins are ranked by decreasing coefficient of friction based on results from different test geometries and test conditions.
 5) Price categorizations by \$-signs.
 6) Resins ranked by increasing toughness (ISO179:1993(E) 1eA: notched charpy impact strength).



1) Resins are ranked by decreasing wear rate based on results from different test geometries and test conditions.
 2) Resins are ranked by decreasing coefficient of friction based on results from different test geometries and test conditions.
 3) Price categorizations by \$-signs.
 4) Relationship holds for all standard grades: classic, P, Eleven series.

