

**Lowest
coefficient of
friction on any
critical substrate**

We reduce friction!



DICRONITE in Europe

Since 1996, when the first facility was opened in Iserlohn, Germany, we reduce friction - not only but also for Formula 1 teams

Especially on critical surfaces like titanium, aluminum or stainless steel, but also on other coatings like TiN, CrN, CrC, NiP

We reduce the c.o.f. to $\mu=0,030$ (inclined plane method)





Coatings



DICRONITE[®] DL-5



DICRONITE[®] Plus



DICRONITE[®] Doppelplus



Technical Data





The main function of Dicronite DL-5 is to reduce friction (and consequently heat). The below are several important features of Dicronite.

1. Applied at ambient temperature without heat cure, binders or adhesives.
2. Applied to any metallic substrate and will not flake, chip, crack, or migrate from the substrate (Implantation of molecules).
3. Low coefficient of friction ($\mu = 0.030$ coefficient of friction).
4. "Maximum" deposition of **0.5 μm** (0.000020 inch).
5. No stripping required for re-application or repair.
6. Operating temperature **-188C** to +1000F(+538C), +2400F(+1316C) in a vacuum.
7. Inert and non-toxic, non-corrosive, and resistant to most fuels, solvents and acids.
8. Compatible with and enhances the performance of oils and greases.
9. Non-magnetic.
10. Can be applied as a co-deposit over chrome, CrC (DICRONITE PLUS), CrN (DICRONITE ++), nickel, TiN, and anodized aluminum.
11. Load capacity is same as substrate, to 350,000 psi (approx. 2,450 MPa).
12. Will not cause distortive stress relief, additional stresses or degradation to any surface.
13. Approvals – ISO-10993 medical, DOD-L-85645A Type 1.

The origin of Dicronite began in cooperation with NASA in investigating the need for a dry film lubricant to handle the extreme requirements in outer space. Over the years Dicronite has been used from space programs such as the Mariner 6 and 7 missions, Stanford Universities SLAC project, to being applied on moving parts of the Rover on Mars that is functional today. DICRONITE is being used today in a variety of industries and applications. This includes the motorsport industry in US and Europe since many years.

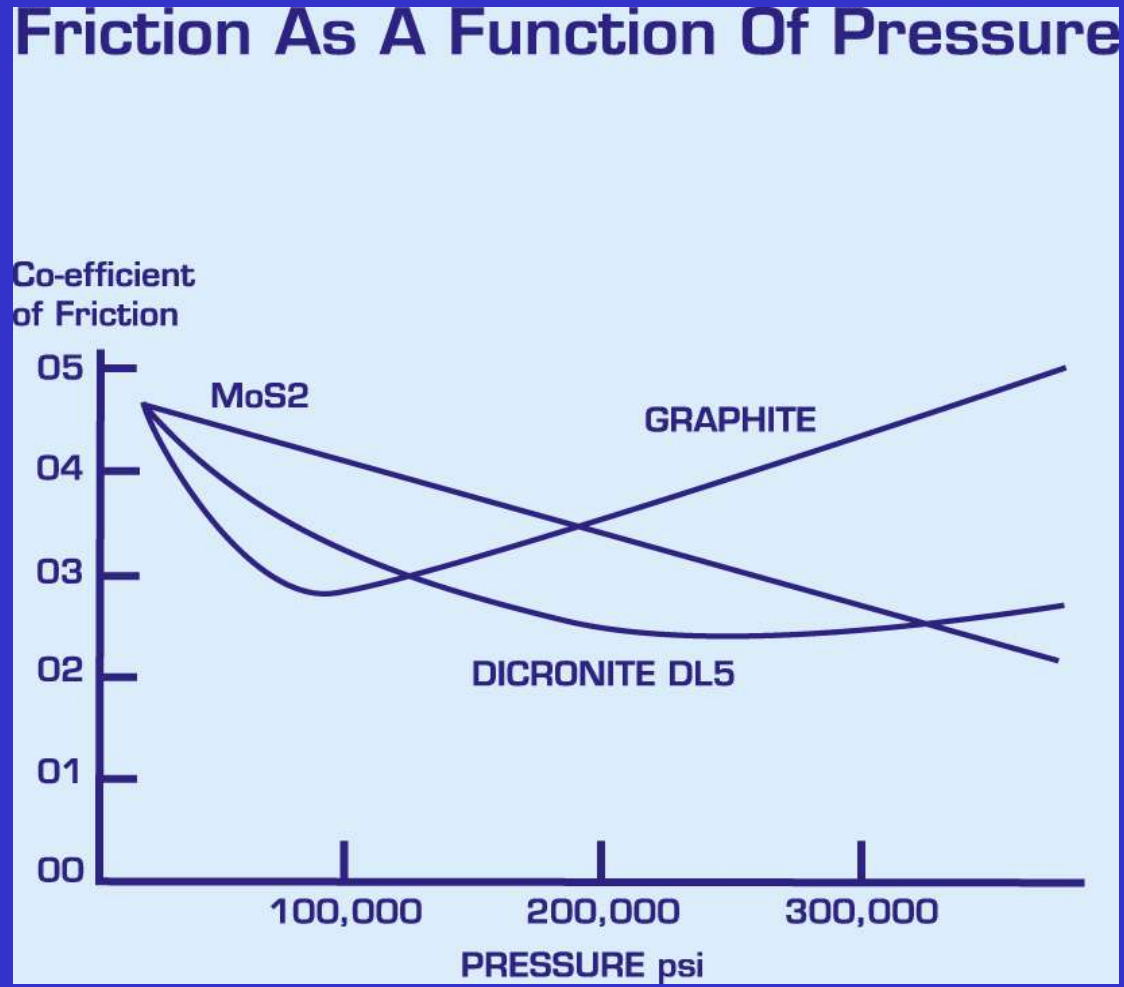


DICRONITE[®] DL-5

- **0,5 μ m thick**
- **Temperature range -188°C bis +538°C**
- **Load capacity: same as substrate to 2400MPa**
- **Processed at room temperature**
- **Inert, non toxic, corrosion resistant**
- **Adhesion: mechanical-molecular interlock**



Low friction boundary lubrication process



DICRONITE[®] DL-5

May solve problems with

- seizing**
- galling**
- fretting**
- excessive wear**
- lifetime**

by reducing friction





DICRONITE® - Application



DICRONITE® - Application

Oilpump



DICRONITE® - Application

Bearing



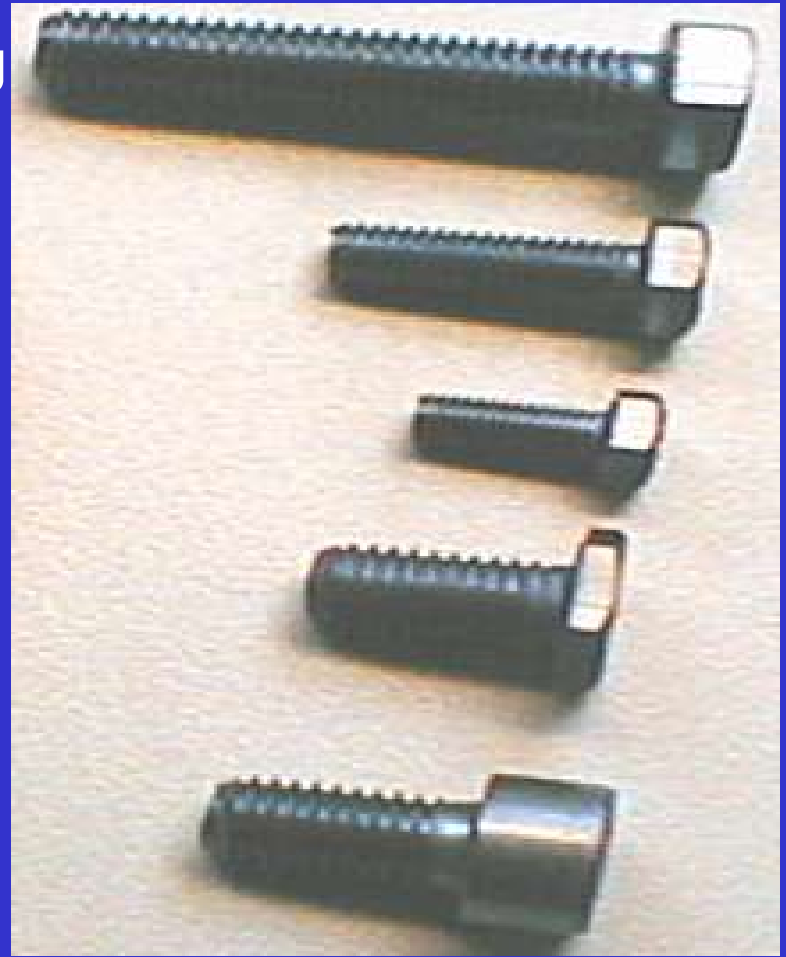
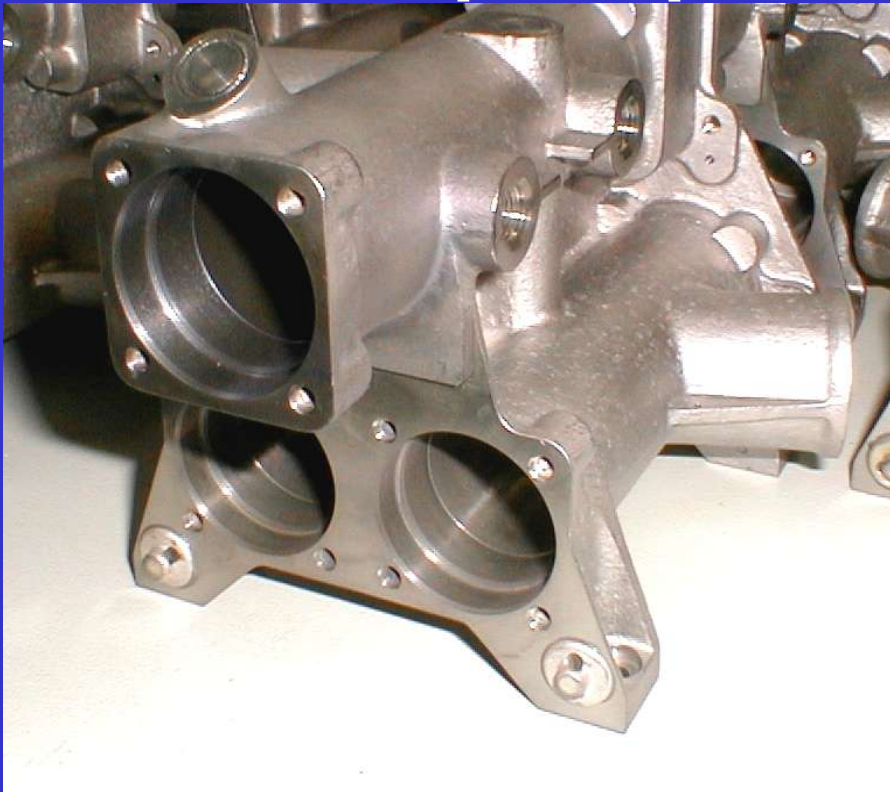
DICRONITE® - Application

Piston



DICRONITE® - Application

- **Aerospace and demanding military systems**
- **Unlubricated operation**
- **Prevention of cold welding**
- **Smaller torque dispersion**



DICRONITE® - Application

Piston



DICRONITE® - Application

Shift fork



DICRONITE® - Application

Toolparts



DICRONITE® DL-5

Technical data:

- **Material :** Modifiziertes Wolfram Disulfid in lamellarer Form in einem patentierten Prozess
- **Hardness:** 1-1,5 Moh's Skala
- **Molecular Weight:** 248,02
- **Appearance:** Metallisch silbergrau bis Anthrazit
- **Coeffizient of Friction:** $\mu = 0,030$ (gegen sich selbst /schiefe Ebene)
- **Adhesion:** mechanische, molekulare Bindung
- **Carrier:** konditionierte Luft **bei Raumtemperatur**
- **Cure time:** keine, da ohne Bindemittel
- **Thickness:** max. 0,0005mm, **0,5 μ m**
- **Density:** 7,4 GMS per CC
- **Substrates:** **alle (auch beschichtete) Metalle**, Glas, Gummi, Kunststoff,
- **Temperature range:** **-188°C bis +538°C**
- **Chemical stability:** Innert, nicht toxisch, nicht korrosiv
- **Corrosion resistance:** Hemmt nicht wesentlich die Korrosion des Trägermaterials
- **Load capacity:** Wie das Grundmaterial, bis 350.000 psi = **2400 MPa**
- **Vacuum Environment:** Stabil bis 10⁻¹⁴ Torr
- **Surface:** **Keine Veränderung** der Oberflächenstruktur des Trägermaterials (Glanz/Rauhigkeit), kein Kantenaufbau, kein Verrunden / Entschärfen
- **Compatibility:** Verträglich mit allen Ölen, Fetten, Lösungsmitteln, Benzin und Alkohol, nicht mit stark alkalischen Säuren, Schwefel- oder Flusssäure



Multilayer Coating

- **DICRONITE+Plus**
- a thin dense chromium combined with DICRONITE® DL-5 an efficient thin-layer
- **Material: electroplated chromcarbide + 0,5 µm Tungsten disulfide**
- **Hardness: > 1250 to 1400HV0,03 = 70-72HRc**
- **Process temperature: max. ca.60-70°**
- **Thickness: 3-5µ (up to 100)**
- **DICRONITE++Doppelplus**
- a thin chrom nitride coating (CrN-PVD process) combined with DICRONITE® DL-5 an efficient thin-layer
- **Material: CrN applied in a PVD process with a deposition of 0,5µm Tungsten Disulfide**
- **Hardness: > 2100 HV0,03**
- **Process temperature: 200°C altern. 450°C**
- **Thickness: 2-3µm**



DICRONITE[®] DRY LUBE of Germany



Universal Tungsten Engineering

DicroniteDryLube



DicroniteDryLube



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