

**CURTISS -  
WRIGHT**

# Coatings Matrix

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**Leader in surface coatings  
for critical components**





## What are Dry Film Lubricants?

Dry Film Lubricants are complex coatings made up of lubricating additives in a continuous matrix of a binder. This tough coating layer provides low frictional resistance between two mating parts. The lubricating additives fit into two main categories; crystalline lattice (lamella) type structures such as Molybdenum Disulphide, Tungsten Disulphide and Graphite or Fluorocarbons such as PTFE. These varying pigments (additives) can be combined with a wide range of resins to achieve different properties, such as: high load bearing, very low coefficient of friction, high temperature, chemical resistance, corrosion resistance, abrasion resistance.

## Why are Dry Film Lubricants used?

Dry Film Lubricants can be used for a number of different reasons. They are often used when liquid lubricants (grease/oil) cannot be used. Liquid lubricants have a relatively narrow band of usable conditions. Once out of this band (due to temperature, load, wear, migration, debris) the liquid can change fluid state and no longer provide protection. In these conditions a Dry Film Lubricant will remain intact and provide continuous lubrication.

## How do 'Crystalline Lattice' (MoS<sub>2</sub>) Dry Film Lubricants work?

Molybdenum Disulphide (MoS<sub>2</sub>) is a good example. The structure of MoS<sub>2</sub> can be seen in Figure 1. Although the bonds between the Molybdenum and the sulphur atoms are strong, the bonding between the crystalline lattice layers (sulphur to sulphur) are weak. This means the shear forces between the layers are very low. This shearing at the weak shear planes, provides the lubricity between sliding surfaces. This lubrication mechanism is the same for Tungsten Disulphide and Graphite.

## How do PTFE coatings work?

There are three key factors that give PTFE its unique 'anti stick' properties. They all derive from its chemical structure, displayed in Figure 2. PTFE is made up of a chain of carbon atoms, with two fluorine atoms on each carbon. The first thing that is noted about the structure in Figure 2, is that the fluorine atoms are far larger than the carbon atoms, effectively shielding them. Therefore, it's almost impossible for any other chemical structure to gain access to the carbon atoms. The second and key factor is the bond strength between the carbon and the fluorine. Even if another atom or substance could gain access, the carbon-to-fluorine bonds have an extremely high bond dissociation energy (BDE) of up to 544 kJ/mol., making them almost unbreakable. The third factor is that fluorine is naturally an 'anti social' atom, which physically wants to repel other atoms. The combination of these factors gives PTFE coatings their ultra low coefficient of friction and excellent chemical resistance.

Figure 1

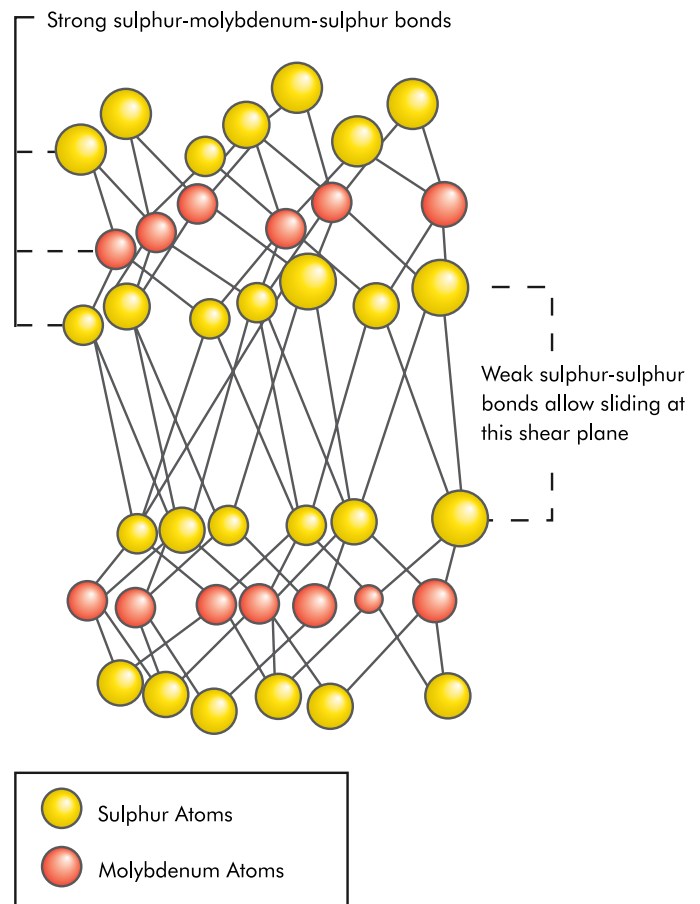
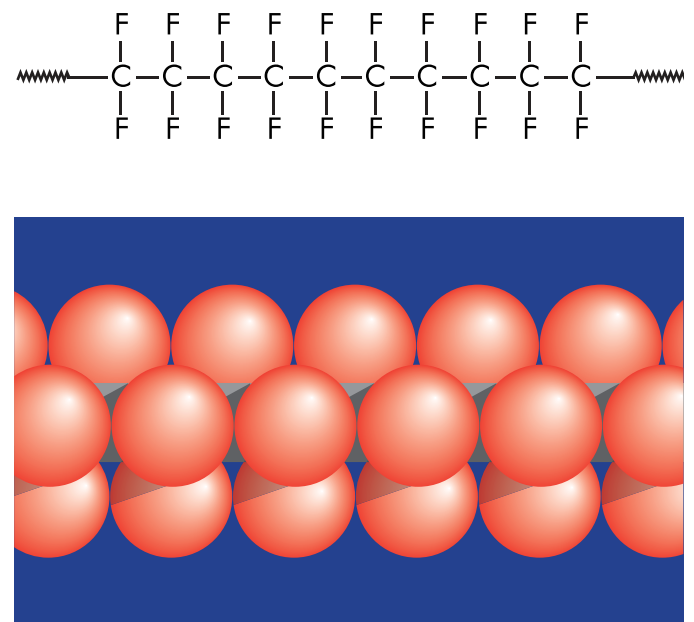


Figure 2



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## MARKETS

- Aerospace
- Agriculture
- Automotive
- Chemical
- Defence
- Electronics
- Food
- Marine
- Medical
- Mining/quarrying
- Motorsport
- Petrochemical
- Power Generation
- Printing
- Rail
- Telecommunications
- Textile

## COATING SERVICES

- **Dry film lubricants** - MoS<sub>2</sub>, PTFE, Graphite, WS<sub>2</sub>
- **Coatings** for corrosion, chemical & environmental protection
- **Titanium anodising**
- **Zinc rich coatings** for corrosion protection
- **Impingement coating processes** for ultra thin solid film lubricants
- **Nonstick/release coatings** for low coefficients of friction
- **Primers** for rubber and plastics for sound absorbing and dampening materials
- **High temperature resistant coatings**
- **Rare earth magnet coatings**
- **Coatings for EMI/RFI shielding** provide highly conductive coatings and platings to control electromagnetic interference
- **Ultra thin conformal parylene coating** to reduce friction and protect against contamination
- **Pre-treatments including** Ti Anodising, Phosphate Conversion Coating and Chilled Iron Blasting, Aluminum Oxide Blasting and Vapour Degreasing

## Everlube Products

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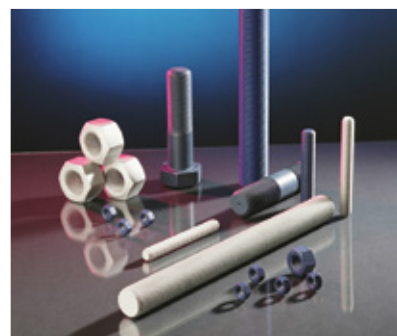
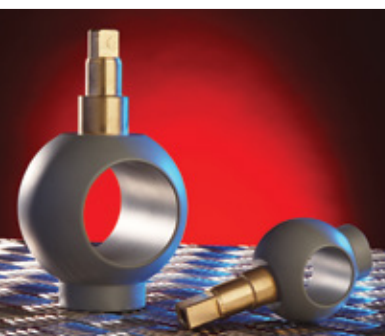
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