

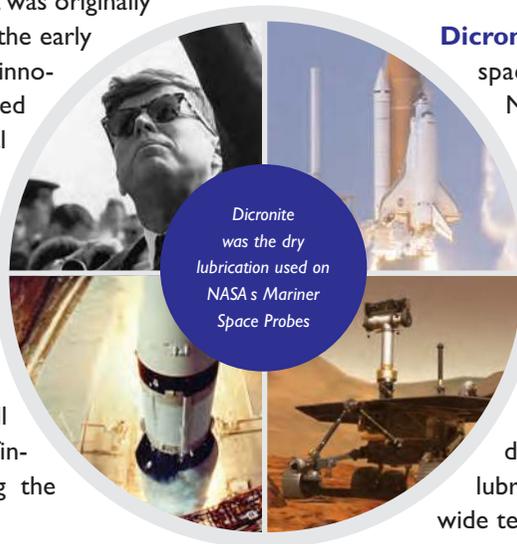


“we choose to  
go to the moon”

[www.dicronite.com](http://www.dicronite.com)

With those simple words, United States President John F. Kennedy ushered in the space era. But reaching this exciting new frontier proved challenging to existing technology. Space, with its wide temperature swings and extreme vacuum, rendered traditional lubrication technology obsolete. **Dicronite**® dry lubrication was first developed to meet the new challenge and played a key role in realizing President Kennedy's vision of reaching the moon.

**Dicronite** dry lubrication technology, a proprietary modified form of tungsten disulfide, was originally developed by Robert D. Nelson in the early 1960s. To develop and market his innovative technology, Nelson founded Lubrication Sciences International (LSI) in 1965. Given its success in space, Nelson recognized the impact **Dicronite** could have on a wide range of industries, including aerospace, food processing, mechanical equipment, medical, plastics and semiconductors. LSI continues to fulfill its founder's goal by constantly refining the technology and increasing the range of applications worldwide.



of planetary exploration vehicles; the first to return locally collected data on the planets Mercury, Venus and Mars. The United States National Aeronautic and Space Administration (NASA) used **Dicronite** during the Mariner program for lubrication on sliding and rotating surfaces. **Dicronite**'s unique ability to deliver reliable lubrication across a temperature range of  $-188^{\circ}\text{C}$  to  $+1316^{\circ}\text{C}$  in up to  $10^{-14}$  torr vacuum, while not interfering with precision tolerances due to its 0.5 micron (0.000020 inches) maximum thickness, were key to NASA's selection.

**Dicronite** continues to be used in multiple space-based applications, including NASA's currently operating Mars Explorer Rovers and the Space Shuttle. **Dicronite** has also been applied in ground-based space exploration. Germany's Max Planck Institute for Astronomy selected **Dicronite** for both linear and rotational cryogenic ( $-190^{\circ}\text{C}$ ) actuators in ground-based infrared detectors due to **Dicronite**'s unique ability to lubricate precision tolerances over a wide temperature range.

## DICRONITE IN SPACE

The Mariner Space Probes were an early application of **Dicronite** dry lubrication. The Mariner's were a series

The same proven characteristics that fueled **Dicronite**'s selection for space exploration have driven its widespread application across many industries.

**What is Dicronite dry lubrication?** Dicronite dry lubrication is dry air applied at ambient temperatures, requiring no cure time, binders, adhesives or carriers. It provides extremely low friction (coefficient of friction 0.030), and with a maximum thickness of 0.5 microns will not affect precision tolerances. Dicronite dry lubricant bonds to metallic, ceramic and resin substrates. It does not require removal prior to repairs, facilitating onsite or in-field repairs and can be reapplied over itself without expensive stripping.

# INDUSTRY APPLICATIONS

## AVIATION

In today's civilian and military aircraft industry, **Dicronite** is used to maintain and extend the boundaries demanded by increasing daily use. Industry leaders including the Boeing Corporation, Parker-Hannifin, General Dynamics, United Technologies, EADS and Lockheed value **Dicronite's** lubricity, anti-seize properties and DOD-L-85645A conformance. Applications range from hydraulic connectors and valves to rotating components and fasteners.

## AUTOMOTIVE

**Dicronite** is used to reduce friction and heat and increase performance in a broad range of automotive applications, including gears, valves, camshafts, crankshafts, bearings and drivetrain components, by several leading Formula 1 teams. Team FH-Trier Fachbereich Technik Eco-Team Trier relied on **Dicronite** for the bearings and gears in their vehicle for the 2007 Shell Europe Eco-Marathon, which achieved an astounding 1800km/l (4233 mpg).

## MECHANICAL EQUIPMENT

Used in mechanical applications where reducing friction and heat and improving performance are critical, **Dicronite** serves as a top dry lubrication technology for Timken, New Hampshire Ball Bearing, General Electric and Tyco International. These companies and more rely on **Dicronite** for rotating and linear bearings (steel and ceramic), gears and pump applications.

## MEDICAL & PHARMACEUTICAL

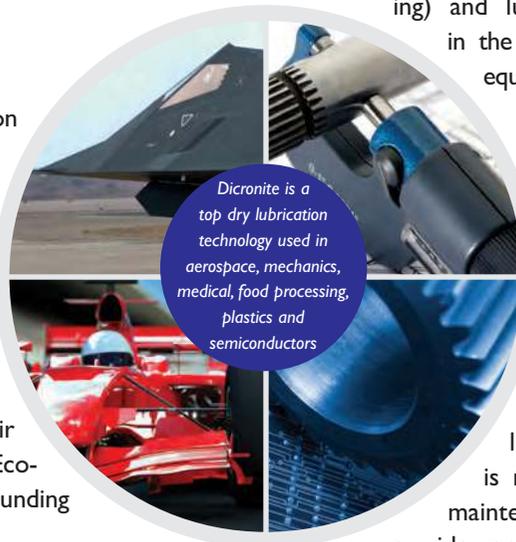
Meeting the International Standards Organization (ISO) 10993 criteria for biocompatibility, **Dicronite** provides reliable, biocompatible lubrication for artificial joints and devices for in-body surgery. **Dicronite** has also received United States Food and Drug Administration (FDA) and Department of Agriculture (USDA) approval, which coupled with its strong adherence (non-contaminating) and lubricity, has led to its application in the pharmaceutical and food processing equipment industries.

## PLASTICS

Industry leaders including Sterilite, GE Plastics and Bemis have used **Dicronite** to reduce cycle times and improve production. **Dicronite** reduces friction, improves melt flow and release and provides contaminant free lubrication for sliding surfaces. It also is relied upon as part of preventative maintenance systems and is effective across a wide range of plastics including polycarbonates, polyethylene, polypropylene, ABS and more.

## SEMICONDUCTOR

**Dicronite** is used in the semiconductor equipment industry on linear bearings, micro-gears and vacuum pump equipment. **Dicronite's** ability to lubricate precision tolerances combined with superior performance under vacuum conditions and strong adherence (non-contaminating), are key to meeting the stringent performance requirements of the semiconductor equipment industry.



# Lubrication Sciences International

For more information on Dicronite Dry Lubrication technology visit:

[www.dicronite.com](http://www.dicronite.com)

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