



Putting science to work
HIGH PERFORMANCE MATERIALS

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Working in the oil and gas industry – upstream as well as downstream environments proves environmentally and operationally challenging. DuPont recognizes the needs for highly specialized products and services. Whether you are looking for stimulation additives or lubricants, surface tension reduction or bacterial control, let DuPont work with you to understand your application, operational needs, critical issues, and your definition of success.



Krytox®

Lubricants for extreme environments

DuPont™ Krytox® oil and grease products can exceed your most challenging needs, from the aggressive world of chemical processing, to the high temperatures in state-of-the-art automotive, paper corrugating, and textile applications, to the critical tolerances of aerospace military specifications. Krytox® oils and greases offer a unique combination of properties that extend the life of components, allowing manufacturers to extend warranties and manufacturing plants to reduce costly maintenance and downtime due to component failure. This is especially true in downhole operations, which place the most severe service demands on your equipment.



Downhole Challenges

- High safety risk as well as accelerated corrosion due to presence of oxygen
- High corrosion/erosion of bearings, pumps, cylinders due to steam, water, gasses
- Downhole operations routinely run above temperature limits of mineral or semi-synthetic lubes
- Presence of chemicals and corrosion inhibition agents
- Costly downtime due to premature pump, bearing, or component failures
- High abrasive and fretting wear degrades metal surfaces

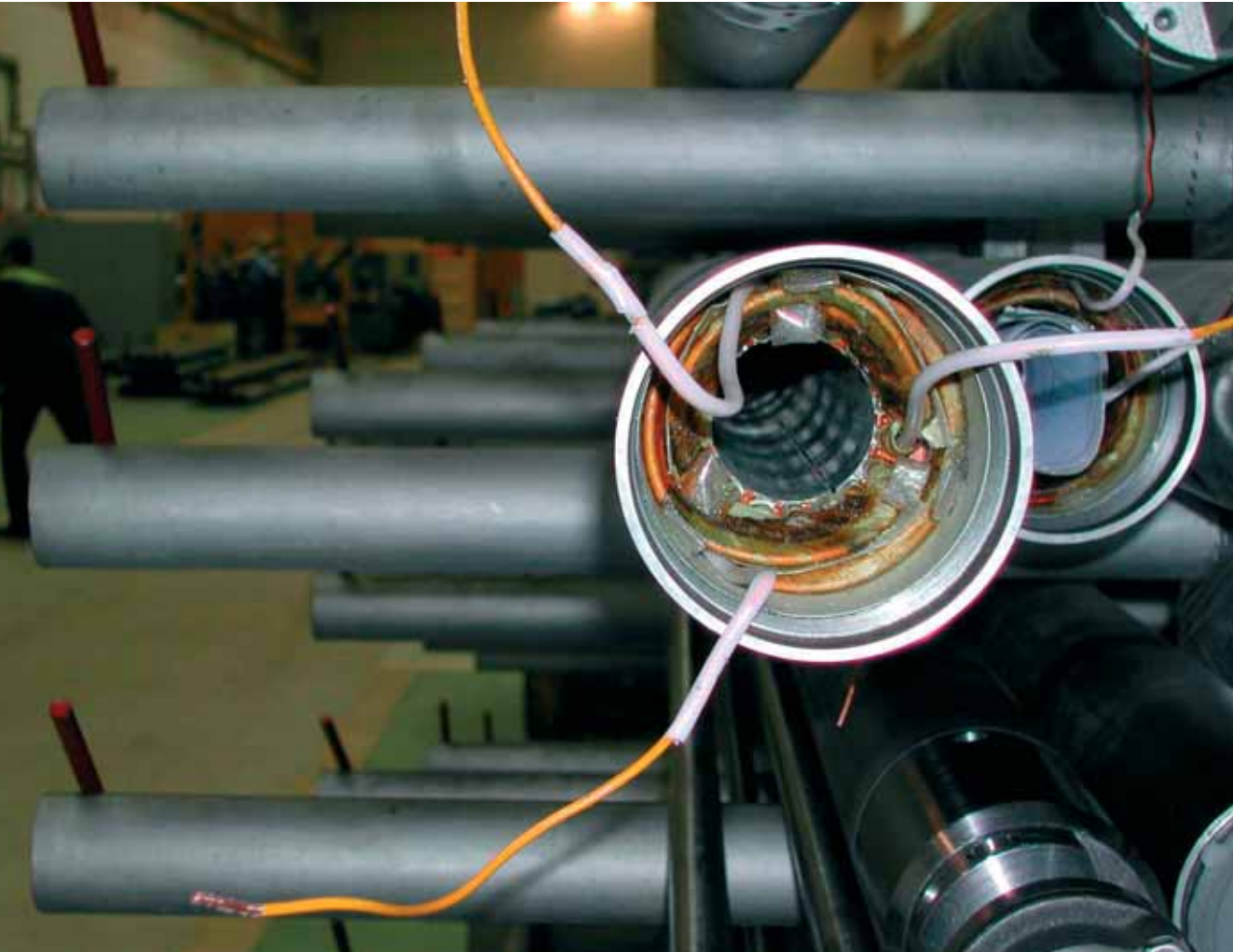
DuPont Solutions

- DuPont™ Krytox® high performance lubricants totally oxygen safe, non-flammable
- Completely stable in water, steam, molten or aqueous caustics, acids and oxidizers
- DuPont™ Krytox® routinely handles temperatures in excess of 360°C/600°F
- Totally impervious to corrosive chemicals
- Increase your insurance and peace-of-mind that you have the most complete protection for your operations and capital investment
- Dramatically reduce operational downtime – maximize production
- Highest film thickness and advanced anti-corrosion additives provide superior protection

Kapton® and Oasis® Polyimide Film

High Performance Materials manufactures and supplies worldwide the DuPont™ Kapton® polyimide film and DuPont™ Oasis® composite film used in a wide variety of electrical and electronic applications. Kapton® has been used for over 40 years as the insulation of choice with proven performance for applications at very high (up to 400°C) or very low (-269°C) temperature extremes.

Kapton® polyimide film is widely used in applications such as the insulation for electric submersible pump motors, in traction motors for railways and tram cars, insulation in transformers, wires and cables insulation for aircraft, sensors and switches for automotive, high temperature labels and as a base material for flexible printed circuits. Applications which all demand the highest material performance.



Applications:

Insulation in Electric Submersible Pumps (ESP) units for artificial lift

- Motor Magnet Wire Insulation - thin high temperature heat-sealable Kapton® FN or FWA with high dielectric and mechanical strength and resistance to aggressive environment
- Motor Slot Liners- High temperature Kapton® HN and Kapton® FN
- Motor Lead Cables - High temperature heat-sealable Kapton® FN as the 1st layer conductor insulation

Insulation in transformers of Gas - Turbine Stations (GTS) to produce electrical and heat energy

- High Voltage Coils Windings Insulation - heat-sealable, high temperature and resistant to corona discharge thin Kapton® FCR with excellent voltage durability
- Low Voltage Coils Windings Insulation Heat-sealable and high temperature thin Kapton® FWA

New Development Programs:

Kapton® 150PRCR411 for ESP Motor Magnet Wire Insulation

- With adhesive of higher thermal performance (>230°C)
- High thermal conductivity
- High reliability in variable frequency and high voltage applications

Oasis® T for ESP Motor Lead Cable

- High resistance to aggressive chemical environment: water, oil, solvents, gas
- Thin and reliable at high temperatures
- Insulation development to reduce cable weight from existing technology by 2/3rd's

Hytrel® and DuPont™ ETPV Flexible thermoplastic solutions

Hytrel® Thermoplastic Elastomers and DuPont™ ETPV Engineering Thermoplastic Vulcanizates offer new solutions for many parts and components in the oil and gas and processing industries. They give the flexibility of rubbers, the performance of high strength polymers and the processability of thermoplastics. In particular, they both have excellent resistance to a wide range of chemicals, hydrocarbons and solvents, even at elevated temperatures. They can be moulded into complex shapes and dimensional tolerances beyond that which can be achieved with conventional elastomers. Both are ideal for parts which require excellent flex fatigue resistance and stability of performance over a wide temperature range.

Hytrel® is available in a wide range of grades for different applications, from 30 shore D to 82 shore D hardness. Special grades are available with improved hydrolytic stability and lower permeability.

DuPont™ ETPV is available in grades from a hardness of 60 shore A to 95 shore A. Additives are available for both grades to further improve factors such as hydrolytic stability, heat stability, UV resistance, and reduction of friction and wear.



Viton®

Fluoroelastomers for harsh environments

Proven over decades of service Viton® has delivered a combination of high-temperature performance and exceptional chemical resistance for almost 50 years. Its dynamic characteristics give critical seals and parts exceptional performance and longer life in aggressive environments.

Viton® made with Advanced Polymer Architecture

When an application demands even higher levels of performance, you can choose specialty types of Viton® made with Advanced Polymer Architecture (APA). APA polymers deliver improved resistance to bases as well as processing and performance benefits across a broad range of chemicals and fluids.

Reduce lifetime costs and cut unscheduled downtime

Viton® far outlasts nitrile rubber and other general purpose elastomers. It allows you to extend service intervals and stretch maintenance budgets because the increased reliability of Viton® reduces unscheduled downtime.

Increase temperature capability

In many applications, rubber parts are stressed by accidental temperature excursions as well as increases in operating temperatures designed to increase production. In some situations, Viton® can serve continuously at 204°C, even after excursions to 315°C. Certain types of Viton® can perform equally well at temperatures as low as -40°C.

Stand up to aggressive fluids

Viton® performs well in a wide range of aggressive fluid environments. Systems using Viton® can tolerate changes in fluids and have more versatility for broader application.

Comply with tougher regulations

Environmental regulations have raised the stakes for leaks, spills and emissions. The reliable sealing performance of Viton® helps guard against these problems to improve plant and automotive operations.

Proven performance

Since its introduction in 1957, Viton® has solved sealing and other problems in:

- Oil and Gas Exploration and Production
- Petroleum Refining and Transportation

Major uses include bonded seals, radial lip seals, caulks, coatings, vibration dampeners, expansion joints, gaskets, O-rings, piston seals, custom shapes, and stock rod and sheets.

Kalrez®

High performance perfluoroelastomer parts
for reliable, long-term sealing



The Kalrez® perfluoroelastomers sealing product line has been specifically designed to deliver outstanding performance in aggressive process environments, ranging from chemical to oil and gas applications.

Kalrez® perfluoroelastomers parts have virtually universal chemical resistance. They withstand attack from more than 1,800 chemicals solvents and plasmas. Even after long-term exposure to temperatures up to 327°C (620°F), Kalrez® parts retain their elasticity and recovery properties better than other high-temperature elastomers.

Because of its exceptional chemical and temperature resistance, Kalrez® was first used in aerospace and downhole applications. Its outstanding resistance to fuels, additives, lubricating oils and corrosive chemicals has made Kalrez® the product of choice in the most aggressive environments where seal failure is unacceptable.

Kalrez® compounds for oil and gas applications are available as V-rings, O-rings and custom parts. They offer excellent explosive decompression resistance, provide resistance to extrusion in high-pressure applications and excellent chemical resistance to drill fluids, sour gas, amines.

Field-proven across the Oil&Gas industry in applications such as:

- Tubing-to-packer seals
- Subsurface safety valves
- Logging boots
- Casing tie-back seals
- Survey tool seals
- Slip-joint seals

Reduce maintenance costs

Kalrez® parts help stretch your mean time between repair (MTBR) and lower your maintenance costs. Their durability minimizes unscheduled downtime while letting you extend time between routine inspections and replacement cycles for critical components.

Increase productivity

By reducing the frequency of seal changes, repairs and inspections, you can increase process and equipment uptime for greater productivity and yield.

Increase safety

Lasting longer and performing better than other elastomers, Kalrez® helps reduce the risk of chemical exposure from seal failure.

Reduce fugitive emissions

Kalrez® and Kalrez® Valve Stem Packing Systems can help you reduce leaks and fugitive emissions for improved compliance with environmental regulations. Because Kalrez® parts maintain their sealing integrity, you reduce your risk of environmental non-conformance.

Kalrez® and Viton® are registered trademarks of DuPont Performance Elastomers LLC.





Teflon® and Tefzel®

Fluoropolymer solutions

Industrial products made with Teflon® fluoropolymer resins have exceptional resistance to high temperatures, chemical reaction, corrosion, and stress-cracking. The properties of Teflon® make it the preferred plastic for a host of industrial applications.

Outstanding properties offered by our fluoropolymers product ranges known as Teflon® PTFE, Teflon® FEP, Teflon® PFA and Tefzel® ETFE:

Nonstick

Very few solid substances will permanently adhere to Teflon® surfaces. Although tacky materials may show some adhesion, almost all substances release easily.

Low Coefficient of Friction

The coefficient of friction of Teflon® is generally in the range of 0.05 to 0.20, depending on the load, sliding speed, and particular Teflon® coating used.

Nonwetting

Since surfaces coated with Teflon® are both oleophobic and hydrophobic, they are not readily wetted. Cleanup is easier and more thorough—in many cases, surfaces are self-cleaning.

Heat Resistance

Teflon® and Tefzel® industrial coatings and polymers can operate continuously at temperature from respectively 155°C to 260°C.

Unique Electrical Properties

Over a wide range of frequencies, Teflon® has high dielectric strength, low dissipation factor, and very high surface resistivity. By special techniques, it can be made electroconductive to be used as an anti-static polymer. Teflon® electrical coatings are widely used in ESP electrical motors, because of their high dielectric strength and temperature resistance. Downhole data logging cables as well as extension power cables are currently produced with fluoropolymers.

Cryogenic Stability

Many Teflon® industrial coatings withstand severe temperature extremes without loss of physical properties. Teflon® industrial coatings may be used at temperatures as low as -270°C/-454°F.

Chemical Resistance

Teflon® is normally unaffected by chemical environments.

Based on these properties, fluoropolymers bring solutions to the Oil & Gas Industry, but also to other highly demanding industries like CPI (Chemical Processing Industry), automotive, food, pharmaceutical, aerospace and appliance.

Disclaimer:

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