



**FLUID FILM**®

TECHNICAL DATA SHEET

10/1997

CORROSION PREVENTIVE SYSTEMS
for preservation of metal parts in protected shed
storage, unprotected storage and for corrosion
protection during sea transport and in tropics

Corrosion of metals is perhaps the most continual destructiveness confronting industry, causing a heavy outlay of capital for which there is no return. It is the gradual disintegration of metal, particularly of iron or steel, in the presence of moisture, ions and oxygen, as the metal atoms become ions in solution and form soluble and insoluble compounds of the metal, such as rust and scale.

An overall corrosion program is a necessary part of maintenance. It will repay the operator with sound metal structures and consequently extended life of the equipment.

To provide an effective corrosion protection, a soft coating must exclude the corrosive environment such as air, water, ions, microorganisms, atmospheric fumes etc. from contact with the metal surface. It must be flexible to compensate for metal expansion and contraction; it must be highly polar to permit penetration to base metal; it must possess strong adhesion properties to prevent removal by water motion; it must be stable under temperature extremes; it must not evaporate and be durable enough to provide a reasonable period of protection.

These basic properties are essential characteristics of **FLUID FILM**, which provides a continuous fluid reservoir of active, mobile, corrosion protection constituents constantly available to the metal surface for the exclusion of oxygen, ions and moisture.

FLUID FILM consists of a wide diversity of different product variants. Each user can be certain to find the appropriate non-drying protection material for his needs. It may be employed to stop rust on almost any surface not subject to mechanical damage.

All types of **FLUID FILM** carrying a liquid corrosion control system have been highly successful under a wide variety of operating conditions. They have been used for 50 years in operating deep sea vessels and offshore drill rigs as well as been employed to treat onshore and offshore structures where extreme environmental conditions demand outstanding performances in corrosion control.

FLUID FILM does not contain solvents or thinners, has a high flash point and is non-gas forming at ambient temperatures. It possesses exceptionally high water displacement action. For water submerged moving parts such as joints, splines and valves, **FLUID FILM** coatings will provide excellent lubrication as well as corrosion control. Because of the natural wool wax compounds, forming the basis of **FLUID FILM**, all types of these products have extremely low oral toxicity, minimal skin irritation and negative eye irritation.

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FLUID FILM CORROSION PROTECTION LIQUIDS

FLUID FILM Liquid A & AS-R (in spray cans)

Recommended for internal surfaces. Also recommended for external surfaces held in protected shed storage for periods up to one year. For all surfaces for indefinite periods when protected by barrier material.

For use on polished, machined, rough or rusty surfaces.

FLUID FILM AS-R in the handy spray can is quickly applied to tools, machine parts and less accessible areas of mechanical equipment.

The liquid form of **FLUID FILM** is also an effective penetrant and lubricant where sliding or rubbing action between two metal surfaces are involved. It may be used to free frozen hinges, nuts, linkages etc. It provides excellent lubrication for chains and other moving metal parts. Containing no solvent, **FLUID FILM** does not dry out - it remains to provide long lasting service.

FLUID FILM Liquid A may be applied by spray (air and airless), roller or brush to a thickness of 25-50 µm. For internal parts of engines etc., application may be made by filling and emptying. The drained material may be reused. For non-accessible areas, too shallow to permit entry for spray application, **FLUID FILM** in liquid form may be applied by floatation with water, where it will form a firm gel.

FLUID FILM FG

Is a food grade protective coating and lubricant. It is acceptable in such establishments where incidental food contact may occur, and can be used as a lubricant or antirust film on equipment and machine parts in locations in which there is exposure of the lubricated parts to edible products. The product is packed in recyclable cans (354 ml) with adjustable nozzle. It has no volatile organic content.

FLUID FILM Liquid AR

Is a semi-liquid of which the viscosity can be lowered by agitation. After approximate 10 minutes the material regains its original viscosity. Recommended uses are the same as for **Liquid A** or **AS-R**, where a thicker coat and longer life expectancy is desired. Can be applied in one coat up to 800 microns.

Liquid AR is not suitable for application by filling as **Liquid A**. **FLUID FILM Liquid AR** rejuvenates asphaltic type undercoatings of automobiles - seals and protects exposed metal where undercoating has cracked, fallen or chipped off surfaces.

The primary utilization of **FLUID FILM Liquid AR** soft coating was specifically directed towards ballast water tanks and other shipboard confined spaces. These areas of vessels are prime targets for the corrosive action of the salt air and the high salinity of water in contact with them during normal marine operations. The application can be accomplished successfully over damp or wet surfaces as well. Another unique aspect of the **Liquid AR** coating formulation is that it does not have to be applied to specially prepared surfaces, as do many of the other types of coatings. The removal of all loose sheet scale, paints or oxides, which have been dislodged, is all that is required in most instances. Loose material should be removed from the tank since it acts like a sponge to absorb and waste the coating.

| PROPERTIES | FLUID FILM Liquid | | | |
|--|--|---|---|---|
| | A | AS-R (aerosol) | FG | AR |
| Description | It is corrosion protection oil based on lanolin. Forms a transparent, dense, self-healing rust preventive barrier coating. Penetrates into existing rust. Can be applied either by spraying or floatation. | It is corrosion protection oil based on lanolin in handy aerosol spray cans. Forms a transparent, dense, self-healing rust preventive barrier coating. Penetrates into existing rust. The percentage of non-volatile contained in the can is 73 %. Extremely flammable during application, caused by the isobutene propellant. | It is an oily, clear coating and lubricant manufactured as authorized by the United States Department of Agriculture (USDA) for applications in Federally inspected meat and poultry plans. | One-component, solvent-free, lanolin based, thixotropic semi-liquid. Recommended uses are the same as for Liquid A and AS-R, but where a thicker coat and longer life expectancy is desired. |
| Specific gravity 20 °C g/cm ³ | 0,905 | 0,881 *) | 0,89 | 0,92 |
| Flash point °C ASTM D 1298 | 157 | 207 *) | 150 | 157 |
| Viscosity Brookfield HBF Spindle 3 RPM 2 | 64,5 | 78,3 *) | 58,5 | 900 |
| Solids by weight % | 100 | 100 *) | 100 | 100 |
| Method of applying | Spray, roller, brush, floatation, filling and emptying, pouring, etc. | Spray on metal surfaces to be protected. Where applied to surface that may be touched or in contact with clothing, allow FLUID FILM to remain on the surface for a brief period, then wipe off with a soft cloth to remove excess. | | Spray, roller, brush. |
| Method of removing | Seldom necessary, but if, mechanically using rags and consecutively with solvents or alkaline washing products. Contains no silicones. Can be painted after cleaning. | | | |
| Description of the protective/lubrication film | light oily, non polymerizing film | | | |
| Film thickness | Non dropping up to 20 µm | Non dropping up to 40 µm | Non dropping up to 20 µm | Non dropping up to 800 µm |
| Corrosion resistance tests Humidity Cabinet ASTM D-1735 | 600 h / 20 µm | 1200 h / 40 µm | 600 h / 20 µm | 4560 h / 200 µm |
| | (Meets MIL-C-16173, Grade 2 corrosion requirement) | | | |
| Salt Spray Test 20 % Federal Test Method Std. 141, Method 6061 | 80 h / 20 µm | 100 h / 40 µm | 80 h / 20 µm | > 750 h / 200 µm |
| Water displacement | Displaces water from metal surfaces (MIL-C-23411, Paragraph 3.6) | | | |

*) only for pure product without the propellant

FLUID FILM CORROSION PROTECTION GELS

The thixotropic, colloidal gels, carrying a liquid corrosion control system, are highly successful under a wide variety of operating conditions. They can be applied at very high thickness (up to 2 mm) and therefore they have an extremely long service life and will remain active as long as they are allowed to remain on the metal surfaces. Since they are non-conductive, they will not interfere with any electrical system. The gel forms are supplied in natural amber, white (or any desired colour upon special order). **FLUID FILM Gel (BN & BEW)** surpasses military specifications MIL-C-23050 (Ships) issued by the Department of Navy, Bureau of Ships, Washington, D.C.

FLUID FILM Gel BN

It is a one-component, solvent-free, lanolin based, permanently soft gel coating, applied in one coat on dry surfaces prepared to St2 according to SIS Preparation Standard. Film thickness for long-term protection: > 500 µm. Used to preserve machinery parts for indefinite periods in protected storage and for long-term protection for all metals subjected to extreme weathering.

FLUID FILM Gel BEW

This product is a white-pigmented variation of **Gel BN**. The primary functions of the pigment are to give the FLUID FILM base its colour and hiding power, and to protect the coating against degradation by the UV rays in sunlight. Furthermore the white colour of the coating indicates clearly the possible corrosion of the substrate in case of mechanical damage of the coating or the access of corrosion producing elements to the base metal when the appropriate film thickness was not obtained. The thickness of FLUID FILM Gel BEW on under-water surfaces should be at least 500 microns and over the water (topsides and decks on ships as well as in industrial atmosphere or in mine air) should be at least 150 microns.

Remark: For application at low temperature and to achieve a smooth coating when applied by brush, the viscosity of FLUID FILM Gel BN and Gel BEW may be adjusted by warming up to not more than 40 °C. The products are ready for use and adding of solvents is not allowed.

FLUID FILM WRN-EP

Is an approved conservation product for cables, wire ropes, machinery and parts in unprotected storage. This unique special purpose lanolin base fluid with very high viscosity, viscosity index, oxidation and thermal stability provides good film formation at low and high temperature as well as enhanced resistance to water spray off, evaporation and deposits. The combination of this **FLUID FILM** with EP compounds results in a grease, not only superior in high pressure gliding properties but also in resistance to water washout, high temperature separation and deterioration, and structural breakdown.

This product is widely used for corrosion protection of rescue and fire fighting equipment on board of vessels because this equipment must be ready to go in service instantaneously often under harshest conditions, after remaining idle for long periods of time. The long years experience has shown, that **FLUID FILM WRN-EP** provides superior start-up, even in coldest weather.

| PROPERTIES | FLUID FILM Gel | | |
|--|---|--|---|
| | BN | BEW | WRN-EP |
| Description | <p>FLUID FILM Gel rust preventive products are highly effective, unique soft coatings. They are a combination of lanolin with wetting agents and water displacing surfactants. The lanolin, which is polar in nature, produces a dense, tight coating providing an effective barrier to corrosion. Tests and experience in the marine field have shown that the FLUID FILM Gel rust preventive coatings have outstanding rust retarding qualities. They meet the United States Military Specification MIL-C-23050 (ships) and American Society for Testing Materials (ASTM) Specification Designation D-1654.</p> | | |
| Specific Gravity 20 °C g/cm ³ Flashpoint °C ASTM D 1298 Viscosity (worked penetration at 20 °C) Solids by weight % Dropping point °C | 0,89 207 205 100 95 | 0,919 182 205 100 95 | 0,916 180 250 100 non fusible |
| Method of applying | airless spraying, brush or gloves | | rigid brushes or spatulas |
| Method of removing | Mechanically using rags and consecutively with solvents or alkaline washing products. Contains no silicones. Can be painted after cleaning. | | |
| Description of the protective film | greasy, non polymerizing film | | |
| Film thickness | Variable - depends from the expected corrosion protection. Non dropping up to 1.500 µm. | | Variable - depends from the expected corrosion protection. Non dropping up to 3 mm. |
| Corrosion resistance tests Humidity Cabinet ASTM D 1735 Salt Spray test 20% Federal Test Method Std. 141, Method 6061 | 4600/400 µm > 3000 h/400 µm | 4600/400 µm > 3000 h/400 µm | > 10000/400 µm > 5000 h/400 µm |