

#238 SOLID FILM LUBRICANT AIR DRYING

SERIES E735 and E635

APPROVED UNDER MIL-L-23398D AMENDMENT 2

SANDSTROM
PRODUCTS COMPANY

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DESCRIPTION

Sandstrom #238 Solid Film Lubricant is a lacquer-like coating containing molybdenum disulfide and corrosion inhibiting pigments. This **Air Curing** material prevents corrosion, galling, seizing and fretting. It is a low-friction coating which exhibits long wear life when operated at -320°F to +300°F under loads exceeding 100,000 psi.

The air-drying **#238** should be applied on surfaces where it is not desirable or possible to use the longer wearing, heat-cured 9A or heat-cured LC-300.

Once **Sandstrom #238** has been applied to a properly prepared surface and allowed to cure, it is virtually unaffected by atmospheric and fretting corrosion, solvents, acids, oils and degreasers.

#238 may be applied to all metallic and nonmetallic surfaces by spray or dip application.

SANDSTROM #238 CONTAINS NO GRAPHITE

TYPICAL USES

- Where application of a baked-on lubricant is not possible
- Which may be operated in corrosive atmospheres
- That may be stored for long periods
- Which are seldom lubricated once they leave the factory and where permanent lubrication is desired
- Where operating pressures exceed the load-bearing capacities of ordinary oils and greases
- Where "clean operation" is desired (**#238** will not collect dirt and debris as do grease and oils)
- Where parts may be subjected to frequent disassembly
- Where a protective coating and sacrificial break-in lubricant is needed
- Where fretting and galling is a problem (such as splines, universal joints and keyed bearings)
- Where easy release is desired (such as threads of all kinds)
- No viscosity change at varying temperatures

COMPOSITION AND PHYSICAL PROPERTIES

NET WEIGHT PER GALLON	9.04 ±.2lbs/gal	LUBRICATIVE PIGMENT	Molybdenum Disulfide
SOLIDS CONTENT (By weight)	24% Minimum-Bulk 30 grams Minimum-Aerosol	STORAGE CONDITIONS	40°F to 100°F
VISCOSITY	30-40 sec (#1 Zahn) @ 77°F	SPECIFICATIONS	QPL: 23398-16
FLASH POINT	45°F ± 2°F Setaflash - Bulk 12°F ± 2°F Setaflash - Aerosol	WEAR LIFE	130 - 160 Minutes Average ASTM D2625A
OPERATING TEMP. RANGE	-320°F to +300°F	LOAD CARRYING CAPACITY	2500 lbs Average ASTM D2625B
COLOR	FLAT DARK GRAY	CORROSION PROTECTION	OVER 500 hours* (ASTM B117 @ 0.5 mil on MIL-DTL-16232 Type M Class 3)
SHELF LIFE	1 year from date of shipment	*Test halted before failure occurred	
VEHICLE TYPE	100% Epoxy		

NOTICE

Before using this product, read all warnings and safety information printed on the label, the Material Safety Data Sheet, and the Technical Info-Guide.

GENERAL

For maximum service, the **APPLICATION INSTRUCTIONS MUST BE CLOSELY FOLLOWED**. The lubricant is flammable and the safety precautions usually followed when using flammable materials must be observed.

FILM THICKNESS AND ENGINEERING TOLERANCES

As supplied, **Sandstrom #238** will yield a film thickness of about .0003 inches without interference. If excess build-up does occur and a force fit is necessary, burnishing lightly will assist in mating the parts. The remaining excess will be worn away in the first few cycles of operation. Whenever possible, the proper tolerances should be designed into the part.

COVERAGE

One gallon of this material will theoretically cover 530 sq.ft. with a dry film thickness of .0005 inches. Coverage depends upon methods of application and other variables; such as, overspray and type of surface to be coated. Above coverage rates are based on 100% efficiency.

SURFACE PREPARATION

The following surface preparations are recommended for the individual metals listed to develop maximum adhesion, wear life, and corrosion protection. Please contact Sandstrom Products Company for substitute surface preparations if recommended steps cannot be followed.

STEEL - Degrease using naphtha meeting the requirements of FED Spec TT-N-95; grit blast (25-50 rms optimum); remove grit blast debris from surface; phosphatize according to MIL-DTL-16232 type M, Class 3 or Type Z Class 3.

STAINLESS STEEL - Degrease using naphtha meeting the requirements of FED spec TT-N-95; grit blast (25-50 rms optimum); remove grit blast debris from surface; passivate.

ALUMINUM - Degrease using naphtha meeting the requirements of FED spec TT-N-95; anodize according to MIL-A-8625 Type I, II or III Class 1.

TITANIUM - Solvent wash (non-chlorinated) and alkaline anodize; (Tiodize Type I or II).

COPPER ALLOYS - Degrease using naphtha meeting the requirements of FED spec TT-N-95; then pretreat using one of the following methods (in order of preference).

- a) Black oxide treat (according to MIL. Spec. MIL-F495C)
- b) Bright dip, or grit blast (25-50 rms optimum)

IMPORTANT! AVOID TOUCHING THE SURFACES TO BE COATED WITH THE FINGERS - OIL FROM THE HANDS WILL INTERFERE WITH PROPER COATING. Whenever possible treat both contact surfaces (i.e., the shaft and the bearing).

IMPORTANT NOTICE TO BUYER / WARRANTY AND LIMITATIONS ON OUR LIABILITY

We warrant our products to be free of manufacturing defects, and that they meet our current published physical properties and specifications. All information and suggestions presented are rendered gratis and is accurate to the best of our knowledge. They are based on technical data which we believe to be reliable, and are intended for use by persons having skill and "know-how," at their own discretion and risk. Prior to use, customers are cautioned to determine the suitability of our products for any given application through their own testing. **NO WARRANTY IS MADE, EXPRESS OR IMPLIED, REGARDING SUCH INFORMATION, THE DATA ON WHICH IT IS BASED, OR THE RESULTS OBTAINED FROM ITS USE OR THAT OUR PRODUCT SHALL BE MERCHANTABLE OR FIT FOR ANY PARTICULAR PURPOSE. SUCH STATEMENTS ARE NOT INTENDED TO SUGGEST INFRINGEMENT OF ANY PATENT.** Since conditions of use of our products are beyond our control, all suggestions and statements are made without guarantee, warranty or other responsibility, express or implied, on our part. We assume no responsibility for results obtained, or damages incurred, from their use beyond replacing material proved to be defective or refunding the purchase price of such material at our option. Acceptance of delivery of our product means you have accepted the terms of this warranty, whether or not purchase orders or other documents state terms that vary from this warning. No seller is authorized to make any representations or warranty or assume any other liability on our behalf with any sales of our products. © 2/1/98 SANDSTROM PRODUCTS COMPANY 8/09/05

STIRRING

IMPORTANT! THIS LUBRICANT CONTAINS HEAVY PIGMENTS WHICH SETTLE RAPIDLY. THEREFORE, IT SHOULD BE STIRRED THOROUGHLY BEFORE USE AND CONTINUOUSLY DURING APPLICATION.

THINNING

For Spraying - Start with 2 parts **#238** to 1 part **D185 Thinner Blend**. More Thinner Blend can be added if necessary, but do not exceed the ratio of 1 part **#238** to 1 part Thinner Blend.
For Dipping - No thinning required.

APPLICATION

Sandstrom #238 should be sprayed or dipped to the desired film thickness (usually .0003 to .0007 inches). Allow the surface to dry at least 30 minutes to 1 hour before doing light assembly work. If applied at higher film thickness increase the initial dry time to 90 minutes.

Note: All instructions are based on product and part temperatures of 77°F and 50% relative humidity. Should product need temperature adjustments use a hot or cold water bath.

DRYING

This lubricant, although intended for air-cure application, may be heat-cured at temperatures up to 200°F. Air drying 18 hours will yield maximum hardness. After a flash off time of 30 minutes, **#238** can be force-cured according to the following schedule:

- 90 minutes @ 150°F or
- 45 minutes @ 175°F or
- 25 minutes @ 200°F.

NOTE: Start time when parts reach temperature.

Keep container of #238 closed when not in use to keep loss of solvents at a minimum and avoid change in volume solids.

CLEANUP

Use the same solvents for cleaning tools as are recommended for thinning or use MEK.

REMOVAL OF SANDSTROM #238

In the event it is necessary to remove **#238**, physical removal is best (such as grit blasting, sanding or grinding). Also, selected epoxy cold strippers.

THE FINISHED SURFACE

This material can be honed, lapped or burnished to a smooth surface of about 7 micro inches with a coefficient of friction of .08 or less.

****Strict compliance to the instructions given in Surface Treatment, Stirring and Baking is essential to obtain optimum results.**

WARNINGS: Constant stirring is imperative for best results. Caution: Flammable. Keep away from heat, sparks and open flame. Use with adequate ventilation. Avoid prolonged breathing of vapors. If swallowed--DO NOT INDUCE VOMITING. Contains Methyl Ethyl Ketone. Call physician immediately.