

TECHNICAL INFORMATION GUIDE

**#099 SOLID FILM LUBRICANT
HEAT CURING**

**SERIES E199 and E195
WHICH CONFORMS TO MIL-PRF-46010G**



DESCRIPTION

Sandstrom #099 Dry Film Lubricant is a paint-like coating containing molybdenum disulfide and corrosion inhibiting pigments. This **Heat 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 +500°F under loads exceeding 100,000 psi.

#099 should be applied where maximum wear life and corrosion protection from a dry film lubricant are required. Once **Sandstrom #099** has been heat cured, it is virtually unaffected by atmospheric and fretting corrosion, solvents, acids, oils, degreasers, and is not resoftened again at elevated temperatures.

#099 can be applied to a wide variety of surfaces by spraying or dipping. Complete application instructions are on the reverse of this sheet.

OUTSTANDING FEATURES/BENEFITS

Excellent Corrosion Protection, Chemical Resistance, and Long Wear Life are its outstanding characteristics. Cured product exceeds the screening requirements for use in spacecraft materials.

TYPICAL USES

Sandstrom #099 is an excellent solution to the problem of lubricating parts:

- That will 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 parts may be subjected to frequent disassembly
- Where "clean operation" is desired (**#099** will not collect dirt and debris like grease and oils)
- 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 fasteners and PVC molds)

**SANDSTROM #099 CONTAINS
NO GRAPHITE OR LEAD**

COMPOSITION AND PHYSICAL PROPERTIES

Net Wt./ Gallon	11.0 lbs. ± .3 lb	Coefficient of Friction	0.0286 (Falex Test)
Solids Content	40% minimum (By Wt.)	Load Carrying Capacity	2750 lbs* ASTM D2625B
Viscosity	60 KU ± 10 @ 77°F	Corrosion Protection	750 hours* ASTM B117 @ 0.0005 inches DFT on MIL-DTL-16232 Type M Class 3 phosphated steel
Operating Temperature Range	-320°F to +500°F	Freeze/Thaw Stability	DO NOT FREEZE
Vehicle Type	Epoxy	Theoretical Coverage	800 sq. ft./gal. @ 0.5 Mil DFT
VOC	less than 250 g/L	ASTM E595 Vacuum Outgassing	Total Mass Loss 0.31%
Specifications	QPL: MIL-PRF-46010G / E199-G75	Collected Volatile Condensable Materials	0.01%
Wear Life	495 minutes average ASTM D2625A	Water Vapor Regain	0.12%
Flash Point	216°F ± 2°F Setaflash		
Lubricative Pigment	Molybdenum Disulfide		
Color	Flat Dark Gray (Burnishes upon handling)		*Test halted before failure occurred.
Shelf Life	1 year from date of Manufacture when stored at 77°F		

NOTICE

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

GENERAL

Sandstrom #099 is a paint-like material consisting of lubricative pigments dispersed in a thermosetting resin system. For maximum service, the **APPLICATION INSTRUCTIONS MUST BE FOLLOWED CLOSELY.**

FILM THICKNESS AND ENGINEERING TOLERANCES

As supplied, **Sandstrom #099** will yield a film thickness of about .0005 inches per dip coat. Usually engineering tolerances will permit necessary minimum film buildup of .0002 to .0003 inches without interference. If excess buildup 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.

SURFACE PREPARATION

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

Application on steel. Preclean the steel surface with aliphatic naphtha or any other EPA compliant cleaner that sufficiently cleans surfaces to pass ASTM F22. Sandblast the surfaces with 180-220 grit aluminum oxide, Phosphate IAW MIL-DTL-16232 (weight should be 11-22 g/m²), type M, class 3 or type Z, class 3.

Application on stainless steels. Preclean the steel surface with aliphatic naphtha or any other EPA compliant cleaner that sufficiently cleans surfaces to pass ASTM F22. Sandblast the surfaces with 120 grit aluminum oxide. Passivate the surfaces with ASTM A967, types nitric 1, nitric 2 or nitric 3, as applicable.

Application on aluminum and aluminum alloys. Preclean the aluminum surface with aliphatic naphtha or any other EPA compliant cleaner that sufficiently cleans surfaces to pass ASTM F22. Sulfuric acid anodize IAW MIL-A-8625 and seal the surface.

Application on titanium and titanium alloys. Degrease the surfaces to be coated with aliphatic naphtha or any other EPA compliant cleaner that sufficiently cleans surfaces to pass ASTM F22. Sandblast the surface with 180-220 grit aluminum oxide and alkaline anodize.

Application on copper and copper alloys. Preclean the copper surface with aliphatic naphtha or any other EPA compliant cleaner that sufficiently cleans surfaces to pass ASTM F22. Sandblast the surfaces with 180-220 grit aluminum oxide. Form a black oxide finish on the surfaces.

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).

COVERAGE

One gallon of this material will cover 800 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.

STIRRING

IMPORTANT! THIS LUBRICANT CONTAINS HEAVY PIGMENTS WHICH SETTLE RAPIDLY. THEREFORE, IT SHOULD BE STIRRED THOROUGHLY BEFORE USE AND CONTINUOUSLY DURING APPLICATION. DO NOT SHAKE ON A PAINT SHAKER AS EXCESS AIR CAN BE ENTRAPPED.

THINNING

For spraying - Use Series E199.
Reduce sparingly with **deionized** water or D151 Thinner
For dipping - Use Series E195.
Use D151 Thinner if needed.

APPLICATION

Sandstrom #099 should be sprayed or dipped to the desired film thickness (usually .0003 to .0007 inches). Allow the surface to dry **at least 30 minutes** before baking at 77°F ± 5°F and ≤70% relative humidity before baking. Lower temperatures and/or higher humidity may require a longer dry time to prevent film defects.

A flash cure at 150° - 160° F for 10 - 30 minutes is an acceptable alternative to the air drying method.

BAKING

BAKING 400°F (204°C) FOR ONE (1) HOUR in a **forced draft oven** will yield optimum corrosion protection and wear life.

IMPORTANT! The hour begins when the part has reached 400°F (204°C), NOT when it is placed in the oven. In cases of very thick metals, an extra hour may be required to bring the part up to the proper temperature. Thermocouples may be used to determine the true temperature of the metal. However, if the metallurgical properties are adversely affected by baking at this temperature (i.e., ALUMINUM, in some cases), the coating may be cured for ONE HOUR AT 300°F (149°C).

CLEANUP

Use soap and water for cleanup.

REMOVAL OF SANDSTROM #099

In the event it is necessary to remove **Sandstrom #099**, physical removal is best (such as grit blasting, sanding, or grinding). Also, selected epoxy cold strippers will remove **#099**.

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

CAUTION: Contains epoxy resin. If swallowed, call physician immediately. Avoid contact with skin and eyes. If contact with skin occurs, wash with soap and water. If splashed in eyes, flush with clean water for 15 minutes and consult physician. Avoid prolonged breathing of vapor or spray mist.

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 MERCHANTABILITY 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 9/11/09