

# ENGINEERING SPECIFICATION HC-405

## I. OBJECTIVE

To provide a dry film lubricant coating for parts requiring corrosion resistance and a lubricating surface film to provide good wear characteristics when normal lubrication may not be provided.

## II. REQUIREMENTS

### A. BASE COATING

The base zinc phosphate coating shall be applied to the parts per MIL-DTL-16232 for Heavy Zinc Phosphate Coating.

#### a. Coating System

Type Z Class III

#### b. Coating Weight

1000 mg/ft<sup>2</sup> (1.1 mg/cm<sup>2</sup>) minimum

### B. SUPPLEMENTARY COATING

The dry film lubricant coating shall be applied to the zinc phosphate coated parts per MIL-PRF-46010 for dry film coatings.

- a. The coating shall be applied using either the spray or dip method qualified under MIL-PRF-46010 as meeting the requirement of the specification. Sources and product designations commonly available worldwide include:

Sandstrom Products Company

Sandstrom 9A

Ackerson Colloids Company

Molydog 254

Dow Corning

Molykote 3400A

### C. FILM THICKNESS (Total)

0.0002 - 0.0005 inch (0.005 - 0.013 mm) after curing.

## III. ENGINEERING INFORMATION (Not Part of Requirements)

This coating process is to be applied primarily to pins and sleeves when there is a requirement for corrosion protection and wear resistance. It is especially applicable if (1) the assembly is difficult to lubricate during normal maintenance, (2) where dust and dirt contamination on lubricated surfaces is harmful, or (3) mechanisms need lubrication for life.

The zinc phosphate base coating provides the corrosion protection and serves as a base to hold the dry film lubricant coating. It is important that the steel surface be free of any contaminants from the prior machining operations or oxidation products during storage. Prior to applying the zinc phosphate, the parts shall be cleaned using the normal alkaline cleaning solutions and chromic rinses. Grit blasting to approximately 30 to 60 uin. (0.75 to 1.5 um) surface finish prior to cleaning is required if rust or scale has formed on the machined surface.

The parts should not be touched after applying the zinc phosphate and before applying the dry film lubricant by spraying or dipping. Contamination of the phosphate surface will prevent adequate adherence of the dry film.

The parts are to be heated to 400° ± 5°F (204° ± 3°C) for one hour and cooled in air to cure the dry film lubricant which is a thermosetting resin which contains a minimum of 40% by weight of the solid lubricative pigment.

THIS SPECIFICATION CONTAINS CONFIDENTIAL INFORMATION WHICH IS THE PROPERTY OF HYSTER COMPANY. BY ACCEPTING THIS INFORMATION THE BORROWER AGREES THAT IT WILL NOT BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS LOANED.

EFFECTIVE DATE(YR/MON.)	SUBJECT	SPECIFICATION NUMBER	REV. No.
2002-12	DRY FILM LUBRICANT COATING	HC-405	0
REVISED FROM (YR/MON.) 82/09		Page 1 of 2	

# ENGINEERING SPECIFICATION

HC-405

This coating is generally suitable for sliding motion applications, such as plain or spherical bearing surfaces, cams, hinges, threads, etc.

The coating MAY be used where the following conditions exist:

- a. Conventional lubricants are difficult to apply or retain.
- b. Dust or dirt on conventional lubricated surfaces can be harmful.
- c. Mechanisms are operated at infrequent intervals.
- d. Mechanisms are lubricated for life.
- e. Long time corrosion protection is required.
- f. A coating resistant to every known solvent is required.
- g. A sacrificial lubricant is necessary to carry extremely heavy loads developed in the initial start-up of heavily loaded mechanisms designed for fluid lubrication.
- h. Where operating pressures exceed the load bearing capacity of ordinary oils and greases.

The coating should NOT be used under the following conditions:

- a. In materials adversely affected by the curing temperature.
- b. In operations consisting of rotary motion above 100 RPM under heavy loads where the possibility of conventional fluid lubrication exists. The cured film is highly resistant to fluid lubricants, but the high fluid pressures developed in heavily loaded sleeve type bearings reduces the wear life provided by the dry film.
- c. In bearings containing rolling elements.

The finished appearance of the treated parts is a uniform dull, dark gray color.

Wear life, load carrying capacity and corrosion protection are measured by standard laboratory procedures. The relationship of these values to specific applications is difficult, but for specification purposes the following values apply:

## Wear Life

Method 3807 of FED-STD-791

Falex wear life of 450 minutes with no single test result less than 390 minutes.

## Load Carrying Capacity

Method 3812 of FED-STD-791

Falex load carrying capacity shall be 2000 lbs (8.90 kN) minimum average with no single test result less than 1750 lbs (7.78 kN).

## Corrosion Protection

Method 4001 of FED-STD-791

No more than three rust spots per panel, none of which exceed one mm in length, width or diameter after 100 hours exposure to a 5% salt spray solution in a Salt Fog cabinet.

## Method of Specifying

HC-405 Dry Lubricant Coating

THIS SPECIFICATION CONTAINS CONFIDENTIAL INFORMATION WHICH IS THE PROPERTY OF HYSTER COMPANY. BY ACCEPTING THIS INFORMATION THE BORROWER AGREES THAT IT WILL NOT BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS LOANED.

EFFECTIVE DATE(YR/MON.)	SUBJECT	SPECIFICATION NUMBER	REV. No.
2002-12	DRY FILM LUBRICANT COATING	HC-405	0
REVISED FROM (YR/MON.) 82/09		Page 2 of 2	