

## TECHNICAL DATA

PFKT50-66

### LUBRICATION AID FOR FORMING METALS MOLD RELEASE FOR DIE CASTING

**Scope** - T-50-66 is a lubricating coating intended for use in the hot forming of titanium or titanium alloys to prevent galling in the forming operation. This product is also excellent for die casting aluminum and zinc metals. It has been used in stretch forming, brake forming, hot sizing or draw forming. It has also been found to be of considerable value when used in tube bending or extruding. The product is designed to function as a boundary lubricant in cold forming operations and in hot forming at temperatures up to and exceeding 1500°F.

**Physical Characteristics** - The coating is a composition of lubricating pigments suspended in a modified high temperature resin binder with a special non photo-reactive solvent as the carrier. It is dull black in color and will not blister, crack or peel.

**Temperature** - This material may be used in a temperature range of -65°F to above 1500°F.

**Use** - The coating should be applied a short period of time before the mechanical operation to allow evaporation of the solvent carrier. This will allow a clean release from the mold and will prevent galling and damage to the materials in the mechanical operation.

**Application** - Four easy steps are involved in the use of Formkote®.

- a) The surface of the metal should be cleaned, the methods used will vary depending upon the mechanical operation to be performed. In the hot forming of titanium, standard practice is to cold form followed by various rinses in water, methyl ethyl ketone, solvent cleaning, alkaline cleaning and pickling. This ensures an adequately clean surface

prior to the application of Formkote and the hot forming operation. In die casting, extruding, tube fending, etc., the surface to be coated must be cleaned by a solvent to ensure the removal of any contamination.

- b) Apply the coating by spray, brush, dip or swab application. The product is available in aerosol or quart, gallon and 5-gallon containers. The material is supplied ready for application, but additional thinning may be accomplished with the use of special solvents as required. Best results are usually obtained with a coating thickness of .0005 to .0015 inches (.0013 to .0038 cm).
- c) Perform required operation hot forming, die casting, extruding etc.
- d) After the mechanical operation, Formkote T-50-66 is removed by various methods. During a hot forming operation, the majority of the lubricating film is burned off leaving a slight residue. This is removed by solvent washes, alkaline cleaning, pickling, or vapor honing, followed by various demineralized water baths and drying. After a cold operation, the coating has not been subjected to temperatures, which will cause polymerization and can be removed by simple solvent cleaning, leaving no trace of lubricant film.

This product is approved and is being currently used by major fabricators of titanium and titanium alloys and various other metals.

**SOURCE** - Formkote T-50-66 is available from E/M or its authorized distributor.

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1. Formkote T-50-66 is a suspension of lubricating solids in a binder and solvent system. Weight - 7.3 lbs/gal.
2. Recommended shelf life - 6 months.  
Storage - at a maximum temperature of 110°F.
3. Flash Point - 78°F (Cleveland Open Cup)
4. Formkote T-50-66 antidote:  
Internal - induce vomiting  
External - flush with water  
Eyes - wash with water and if excessive irritation persists, report to doctor.
5. Chemical and physical properties:  
Viscosity - 13 to 17 seconds  
#2 Zahn Cup at 77°F

Reducer or thinner-special T-66 solvent.  
 Freezing point - less than -50°C.  
 Boiling point - greater than 110°C.

"Lubricants perform three main functions in titanium forming operations: (1) They minimize the energy of pressure required to overcome friction between the blank and the tooling. (2) They reduce the possibility of galling or seizing between the blank and the tooling, and (3) in hot-working, they control the rate of heat transfer between the hot blank and tooling. In general, friction is undesirable in metal forming operations. Friction often increases tool forces and accentuates the difficulty of securing uniform movement of material over the tooling. However, in some operations, such as stretch forming, friction is necessary between the grips and the blank."

Forming Operation	Forming Temp.	Lubricants Used
Stretch forming skins	Hot	Formkote T-50-66
Stretch forming extrusion	Hot	Formkote T-50-66
Brake forming	Cold	Formkote T-50-66
Roll Forming	Hot	Formkote T-50-66
Hot Sizing	Hot	Formkote T-50-66
Draw forming (matched dies)	Hot	Formkote T-50-66
Hammer forming	Hot	Formkote T-50-66
Hydropress forming	Hot	Formkote T-50-66