

NANODIAMOND LUBRICANT

FOR COPPER FORMING PROCESSING



COPPER-PLAST
TECHNICAL DATA SHEET

GENERAL INFORMATION



- ✘ **Product name:** Copper-Plast
- ✘ **Product code:** 514305671-316
- ✘ **Manufacturer:** Ray Techniques Ltd.
P.O.B. 39162, Jerusalem, 91391, Israel
www.nanodiamond.co.il
- ✘ **Product description:** hydrodynamic lubricating fluid for forming copper parts by pressure
- ✘ **Applications:**
 - forging
 - extrusion
 - rolling
 - sheet metal processing
 - rotary swaging

FEATURES

- ✘ Hydrodynamic lubrication of high performance
- ✘ Admirable plasticizing of copper
- ✘ Excellent wetting of copper surfaces
- ✘ Forming homogeneous lubricating layer of low thickness
- ✘ Effective load distribution on the surface of copper
- ✘ Low friction
- ✘ Solubility in water
- ✘ Significant increase in the efficiency of processing
- ✘ Forming protective diamond nano-layer on the worksurface of tools
- ✘ Providing improvement of copper micro-structure

COMPOSITION & PROPERTIES

Composition

- × Polyhydric alcohol ester
- × Functionalized nanodiamonds
- × Wettability additive
- × Anti-oxidant additive



Properties

- × **Color:** light yellow transparent
- × **Odor:** odorless
- × **Specific gravity (25 °C):** 1,1 g/cm³
- × **Consistency (25 °C):** 460 mm/10
- × **Service Temperature:** -40 ÷ +150 °C
- × **Effect on Copper Strip:** no discoloration after 2 hours at 100 °C
- × **Flash point:** 230 °C
- × **Solubility:** insoluble in cold water
- × **Filler:** nanodiamonds with size of 3-6 nm

STORAGE AND USAGE

- ✘ **Storage:** in tightly closed container in a cool and well-ventilated area, keep away from heat, sparks and open flame
Some sediment may occur, shake well before use.

- ✘ **Usable life:** 60 months from date of manufacture when stored at the temperature less than 24 °C

- ✘ **How to use:** apply in a thin film to clean cooper surface by either of the following methods:
 - Dip a workpiece into the lubricant, pull out and let the liquid drain out to form a uniform film
 - Brush on, preferably using a brush with short, stiff bristles
 - Apply the lubricant with a clean lint-free cloth
 - Spraying

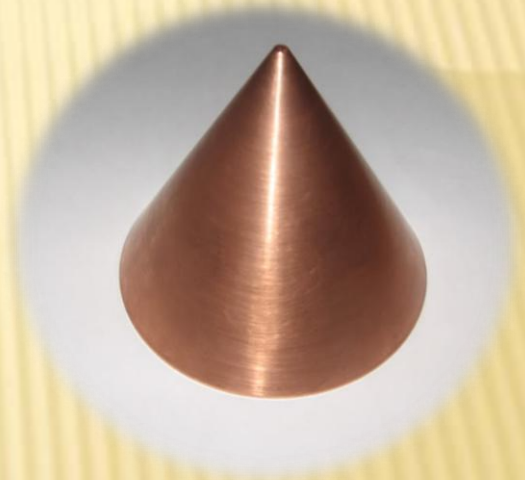
- After forming process the lubricant can be removed with cold water. There is no need in the cleaning before annealing.

HEALTH, SAFETY, SHIPPING

- × **Health:** non-toxic. Negative impact on health has not been detected. Repeated or prolonged exposure is not known to cause irritation. However, irritation (but no corneal damage) is possible in the case of special sensitivity. Contact with eyes and skin should be avoided, as well as inhalation and injection.
- × **Safety:** may be combustible at high temperature, keep far from fire, possible sources of ignition and oxidizing agents. Find more information in Material Safety Data Sheet. The product itself and its products of degradation are not toxic. Splash goggles, full suit, boots and gloves are recommended.
- × **Shipping:** not a DOT controlled material. The product is not classified according to the ES and US regulations.

PERFORMANCE

- ✘ Performance testing was conducted by comparing Copper-Plast with Molykote, highly efficient special lubricant for forging produced by Dow Corning the leading manufacturer of functional lubricants
- ✘ Processing: forging of copper liners
- ✘ Results of comparison:



Characteristic	Molykote	Copper-Plast
Pressing force, ton	62	41
Number of cycles for the liner forming	3-4	2-3
Copper surface appearance, color, tool marks	Uneven, stains, tool marks	Uniform, shiny, no tool marks
Copper structure	Inhomogeneous	Homogeneous

ADVANTAGES

- × Significant increase in **productivity** of forming processes
- × Considerable increase in wear resistance & **durability of tools** (dies and matrixes)
- × Improvement of **copper structure**: decrease of internal stresses and structural defects in copper
- × In the case of further annealing there is **no need to clean** the item
- × Better **performance** of copper items