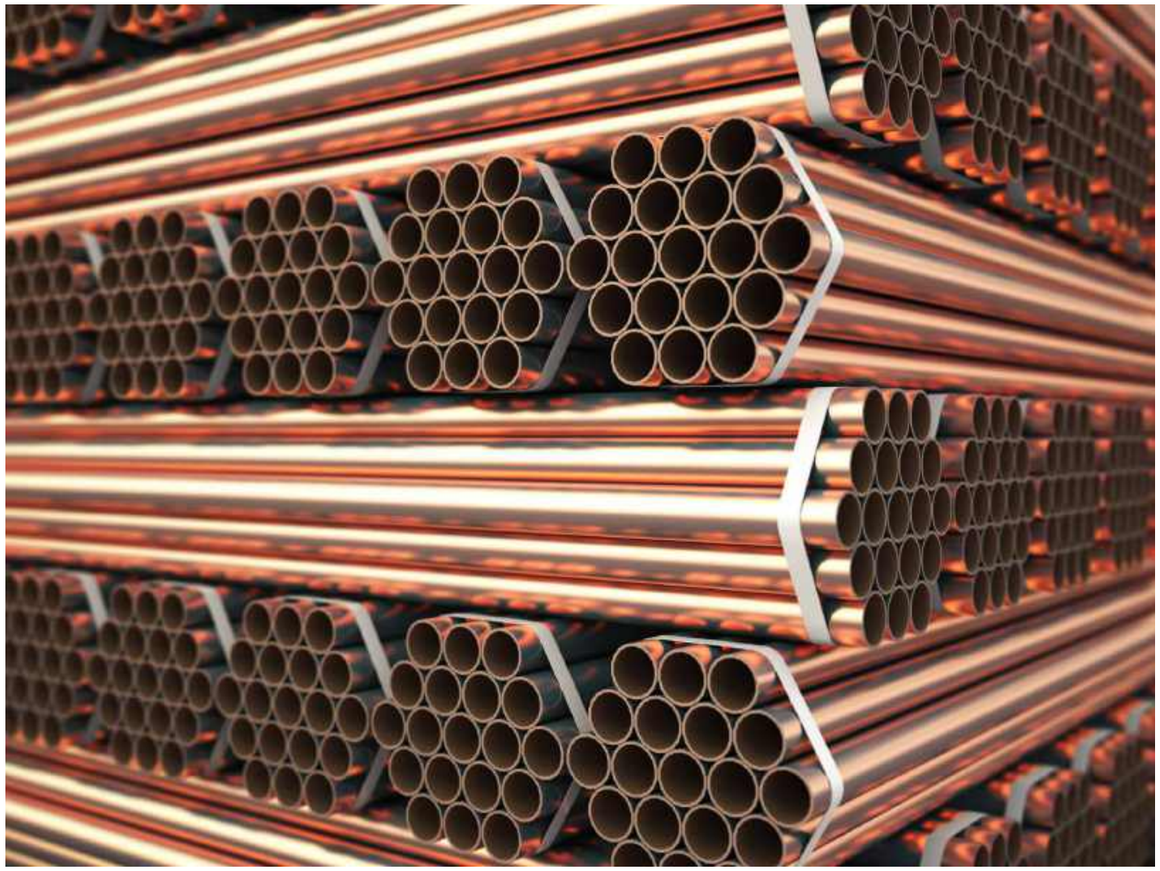
High performance lubricants for copper tube drawing processes

BECHEM
LUBRICATION
TECHNOLOGY



Copper tube drawing challenges

The copper tube drawing process has many important factors such as die angle, drawing speeds, reduction ratios, effective lubrication etc., that can affect the quality and precision of formed tubes. Precise operational parameters can reduce uneven deformation and excessive residual stress, preventing intrinsic defects, surface cracks and wrinkles.

During the drawing process, as the copper tube passes through draw die and over the ‘internal diameter (ID)’ mandrel, the surface of the tube stretches to a great extent. Lubrication plays a critical role in minimizing friction and temperature rise at the work surface in order to achieve higher process efficiencies and product quality.

The lubricant needs to reduce both, friction and temperature by forming a resilient film that can withstand high surface pressures between the workpiece and draw tool.

Impact of ineffective lubrication on tube drawing

- Drawing oil that cannot endure surface pressures can lead to friction, rise in temperature, die wear and ultimately result in poor surface finish and defective cracked tubes
- Lack of lubrication can result in breakage of the mother tube during the interim drawing processes of pilgering, spinner block and straightening, leading to line stoppage and affecting operational productivity
- The lubricant quality can affect surface blackening and result in tarnish on the drawn tube. Removal of undesired residues on the ID and OD of the tube is a tedious process
- Increase in temperature due to friction and overheating between the tool and workpiece can accelerate oxidation rate and drain out the lubricity additives from the lubricant, further deteriorating its quality and life

» Lubrication plays a critical role in minimizing friction and temperature rise at the work surface «

BECHEM Masterdraw Series for Process Productivity

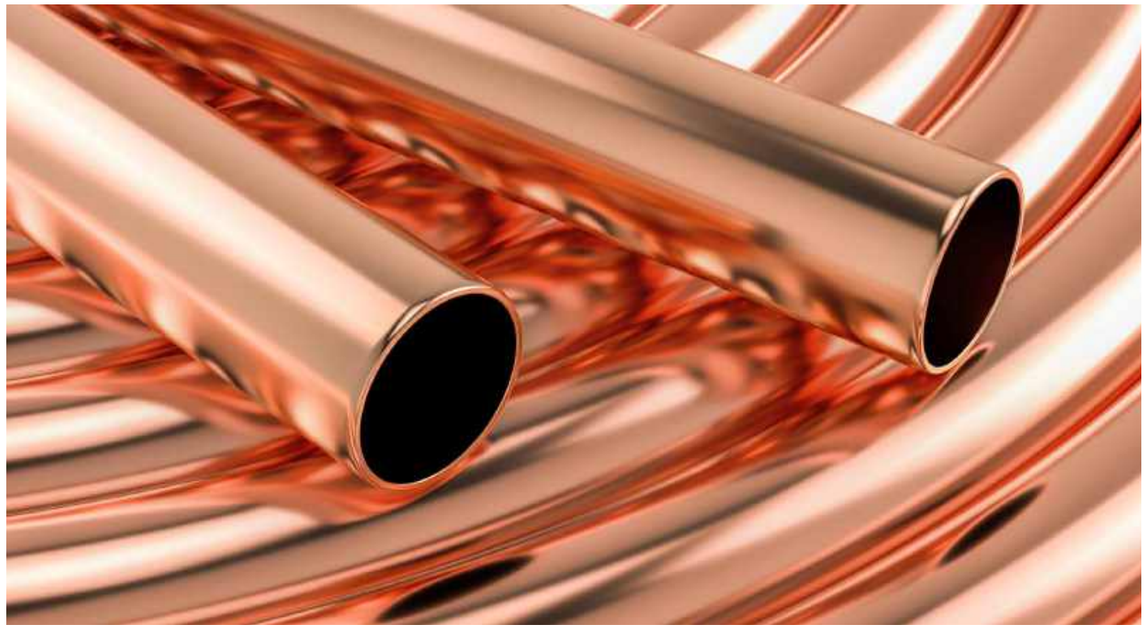
With an objective to increase process productivity with seamless drawing and high-quality surface finish, BECHEM’s Masterdraw series of high-performance tube drawing lubricants for copper and alloys are designed to provide effective lubricity consistently for extended duration. Recommended by leading tube and equipment manufacturers across the globe, BECHEM’s Masterdraw range covers the lubricant requirement for multiple stages involved in the copper tube drawing process.

BECHEM tube drawing products are used for forming of tubes, hollow profiles or round bars, no matter whether blasted, annealed or pickled materials are involved.

	Product	Viscosity at 40°C (mm^2/S)	Flash Point (°C)	Application	Properties
Mother Tube & Cascade	**Masterdraw EBE 350**	550	> 250	• Drawing oil for tubes, rods and profiles • For ID and OD drawing of Brass and Copper tubes • Draw bench and spinner blocks • Can draw upto speeds of 1500 m/min	• Reduces presence of carbon on inner pipe surfaces • Chlorine, phosphor and sulphur free • Can be easily cleaned by vapour degreasing or solvent washing methods
Cascade ID & Spinner block OD/ID drawing	**Masterdraw EBE 5111**	4150	≥ 200	• Drawing of Copper and non- ferrous tubes with • high to low wall thickness • For drawing speeds of 1000 m/min	• Low tendency for residue formation • Ensures longer tool life • Possesses excellent viscosity index Can be easily cleaned by vapour degreasing or solvent washing methods
Spinner Block OD/ID drawing	**Masterdraw EBE 470**	120	≥ 200	• For final ID draw with minimum residues of Copper and other non-ferrous tubes • For OD in annealing draws (without plug inside)	• Free from Chlorine, phosphor and sulphur compounds • Residues provide a bright anneal given a bright annealing atmosphere and can be easily removed by suitable solvents.
Inner Grooving Tube (IGT)	**Masterdraw IGT 1**	22, 5	180	• For finish draws on light and medium wall copper and copper alloy tubing • Non-ferrous capillary tubing, fine ferrous wire (0.070" smaller) • Specially designed for inner grooving (IGT) of copper tube.	• Excellent finishing lubricant that produces superior surface finish on drawn parts. • Highly fortified additive package prolongs tool life • Residues from bright annealing provide a bright annealing atmosphere, potentially eliminating the need for a cleaning step prior to annealing, thereby improving productivity.

	Product	pH Value at 5%	Refracto-meter Index	Properties & Application
Cold Rolling Pilgering & Surface Milling	**Kubitrac P 50**	9.1 - 9.3	1	• Water miscible semi synthetic lubricant designed for cold pilgering of copper, brass, bronze and copper-nickel tubes • Ensures clean tube surface and restricts residues on tool and machine • Emulsion with high thermal stability ensures high pilgering speeds and long tool life.

	Product	Viscosity at 40°C (mm^2/S)	Flash Point(°C)	Application	Properties
Straightening & Cleaning - LWC, Pancake coil	**Berculean Eco**	1.8	≥ 65	• Cleans both ID and OD leaving no residues • Can accommodate large coils	• No ozone depleting agents • Universal cold cleaning agent, free of aromatic hydrocarbons • Colourless, almost no smell and easily biodegradable according to OECD 301 F • Also, NSF-H1 approved. Gives temporary rust protection. Suitable for ultrasonic, dip and manual cleaning.
Gear Oil	**BECHEM Staroil G 100-680**	100-680 (100, 150, 220, 320, 460, 680)	≥ 235 - 260	• High performance gear oil recommended for spur, bevel, planetary and worm gears of Cold pilgering, Milling machine, Cascade drawing and Spinner block	• Excellent wear protection • Very good resistance to ageing • Good load carrying capacity



The BECHEM Masterdraw Advantage

- Enables efficient production: Developed on superior quality synthetic additives and highly refined base oil, the BECHEM Masterdraw range provides excellent lubricity for higher drawing speeds of up to 1500 m/min

  - The Masterdraw range provides high sheer stability, ensures consistent drawing of long length tubes
- Bright surface finish with low carbon residue: The BECHEM Masterdraw range generates lower carbon content residue on the ID compared to other conventional lubricants. Additionally, the tubes drawn with Masterdraw range have better finish and eliminate the need for cleaning prior to the 'annealing' process.

  - Synthetic and semi synthetic range of lubricants to ensure superior and bright surface finish of the drawn tube after annealing.
- For longer die life: The BECHEM Masterdraw range possesses high viscosity indices ensuring optimum lubricating film between the frictional partners even at elevated temperatures thereby extending tool life and lesser probability of tube cracking

  - For optimum consumption: The optimum yet resilient film by BECHEM Masterdraw allows for consistent drawing without overheating and temperature rise
- Non-hazardous: Free from sulphur, chlorine, and other phosphorous compounds, hence easily disposable. Also, compatible with R134A refrigerant.

  - Exhibits low-fume characteristics even at a very high temperature and high-speed drawing
- Versatile tube drawing lubricant: The Masterdraw EBE 350 is recommended for both the processes of 'Inside Diameter (ID) and Outside Diameter (OD)' drawing

  - The BECHEM Masterdraw range is suitable for both 'total loss lubrication' and 'recirculation methods'

For more information on Bechem's tube drawing lubricants, technical comparison, case studies and references, write back to us at **sales@bechemindia.com** or visit our **website www.bechemindia.com**

Applications

- Drilling
- Grinding
- Honing
- Tube drawing
- Turning

Properties

- Biodegradable
- Chlorine free
- Corrosion Protection
- Extends Tool Life
- Good rinsing performance
- Low foaming
- Low residue level

Lubrication Solutions for Industry

CARL BECHEM LUBRICANTS (INDIA) PVT LTD
28D, Bidadi Industrial Area, Bidadi - Harohalli Road, Bangalore 562109, India
Ph: +91 80 66900800/01/02 • Fax: +91 80 66900803 • Call +91 93799 17484 or mail to sales@bechemindia.com • www.bechemindia.com

CARL BECHEM GMBH
Weststr. 120 58089 Hagen, Germany • Phone +49 2331 935-0 • Fax +49 2331 935-1199 • bechem@bechem.de • www.bechem.com

7902811095/1609/163059