



## Specialty Lubricants for the Wind Energy Industry

*Proper tightening and corrosion prevention help to avoid bolt failure on wind turbines*

Help improve assembly quality, safety and reliability with proper tightening. Prevent corrosion, avoid bolt failure and reduce service costs. Use *Molykote*<sup>®</sup> brand *Smart Lubrication*<sup>™</sup> solutions for strong threaded connections on:

- Nacelle frame joints
- Front and rear main journal bearings
- Pitch bearing fasten bolts
- Gearbox, drives and cooler units
- Yaw bearing fasten bolts
- Tower segment flange bolts
- Foundation anchor bolts

### Safe, reliable wind turbines depend on strong threaded connections

#### Frequent problems with threaded connections:

- Tightening difficulties and thread damage
- Inconsistent or loose clamping force
- Broken bolts and base parts, such as flanges or plates
- Difficult disassembly and destroyed threads

Good lubricants for bolts and fasteners can help solve problems and increase reliability by reducing the effects of root causes, including:

- Seizure and abrasive wear
- Uneven coefficient of friction
- Fretting corrosion
- Embrittlement failures of substrates due to use of low-melting-point metals, such as lead, tin and copper
- Stress corrosion cracking



Good lubrication can help reduce torque resistance, prevent damage and improve clamping force on thousands of different-sized threaded connections on wind turbines

### Investigate our solutions for threaded connections

#### *Molykote*<sup>®</sup> 1000 and *Molykote*<sup>®</sup> G-Rapid Plus pastes

**Tighten all assembly bolts to required tension with correct torque:** Thread roughness creates uneven friction and incorrect bolt tightening during installation. Lubricate threads with *Molykote* brand pastes to achieve a low and consistent coefficient of friction, thus helping to ensure proper tightening and tension on all wind turbine assembly bolts.

**Protect threaded connections for longer service life:** Bolts and fasteners on equipment joints must stay invulnerable in heat, cold, pollution, rain, snow and even salt fog. Apply *Molykote* brand pastes to help provide threaded bolts with increased, long-lasting protection from corrosion and seizure.

**Help to allow easier disassembly of threaded connections:** Corrosion, adhesion and seizure make disassembly difficult after long outdoor service. Use *Molykote* brand pastes for bolt lubrication, protection from fretting corrosion and easy disassembly without damage.



## Typical Properties

Specification Writers: Please contact your local Dow Corning Sales Application Engineer or Dow Corning Customer Service before writing specifications on these products.

Standard*	Test	Unit	Molykote® brand pastes	
			1000	G-Rapid Plus
	Color		Brown	Black
	Composition		Solid lubricants, powdered metal in mineral oil	Solid lubricants in mineral oil
ISO 2137	Unworked penetration	mm/10	280-310	255-275
ISO 2811	Density at 20°C (68°F)	g/mL	1.26	1.40
	Service temperature <sup>1</sup>	°C	-30 to +650	-35 to +450
		°F	-22 to +1,202	-31 to +842
DIN 51 350 pt. 4	Four-ball tester welding load	N	4,800	5,300
	Almen-Weiland machine OK load	N	20,000	>20,000
	Screw test – $\mu$ head <sup>2</sup>	Coefficient of friction	0.13	0.10
	Screw test – $\mu$ head <sup>2</sup>	Coefficient of friction	0.08	0.06

\*ISO: International Standardization Organization; DIN: Deutsche Industrie Norm

<sup>1</sup>Temperature resistance of solid lubricants.

<sup>2</sup>Coefficient of friction in bolted connection, M12, 8.8, on blackened surface.



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## Proper Lubricant Use

Molykote 1000 and Molykote G-Rapid Plus pastes are easy to use:

1. Clean the thread and bolt with a brush, if needed.
2. Stir the paste before applying.
3. Spread an adequate amount of paste on the thread and up to its root to obtain a good seal. Cover all surfaces, including washers, without waste.
4. Do not mix with other greases or oils; this can alter the paste's properties.

## Product Packaging

Molykote 1000 and Molykote G-Rapid Plus pastes are available in different standard container sizes. Contact Dow Corning for details.



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## Learn More: Contact Us

For expert advice on how to use Molykote brand pastes on threaded connections for wind energy equipment, contact your Dow Corning Representative or e-mail us at [wind.energy@dowcorning.com](mailto:wind.energy@dowcorning.com).

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