



As the world's leading manufacturer of flexible shaft couplings, KOP-FLEX was one of the first companies to develop greases especially for use as shaft coupling lubricants. KOP-FLEX recognized that couplings must use greases with certain special qualities, and as the company most likely to understand these very special needs, KOP-FLEX knew that most commercial grease formulations will not insure adequate performance and are not ideal coupling lubricants.

Coupling grease, unlike bearing or general purpose grease, must withstand the centrifugal forces created by a rotating coupling. Coupling greases from KOP-FLEX® brand couplings are specifically formulated to resist the high centrifugal forces associated with all applications, including slow motor speeds. These forces can cause the all-important base oil to separate from the soap thickeners and additives. Unlike greases with lithium-based thickeners, KHP and KSG greases use polyethylene thickeners, with a density closer to that of oil, and are therefore much less susceptible to separation. Heavier thickeners and additives can separate and migrate into the gear teeth or other working parts, displacing the lubricating oils from where they are most needed.

All of our greases are lead free.

Container	Unit Wt	No. of Units	KSG Grease	KHP Grease	WAVERLY* LUBE - A			
			Part No.	Part No.	Container	Unit Wt	No. of Units	Part No.
Grease Gun Cartridge	14 oz.	1	KSG 14OZ	KHP 14OZ	Pail	40 lb.	1	WAVERLY* LUBE A 40LB PAIL
Grease Gun Cart., Case	14 oz.	25	KSG 14OZ CASE	KHP 14OZ CASE	Keg	120 lb.	1	WAVERLY* LUBE A 120LB KEG
1 lb Can	1 lb.	1	KSG 1LB	KHP 1LB	Drum	400 lb.	1	WAVERLY* LUBE A 400LB DRUM
1 lb Can, Case	1 lb.	24	KSG 1LB CASE	KHP 1LB CASE				
5 lb Can	5 lb.	1	KSG 5LB	KHP 5LB				
5 lb Can, Case	5 lb.	6	KSG 5LB CASE	KHP 5LB CASE				
Pail	35 lb.	1	KSG 35LB	KHP 35LB				
Keg	120 lb.	1	KSG 120LB	KHP 120LB				
Drum	395 lb.	1	KSG 395LB	KHP 395LB				

WAVERLY TORQUE LUBE-A* is available in 40-pound, 120-pound, and 400-pound containers and in bulk tank trailer loads of 12,000-pound minimum. Contact KOP-FLEX to order.

Selection Guide to Coupling Greases

- KSG is excellent for standard and routinely serviced couplings operating at normal motor speeds.
- KHP has both exceptional lubricating and high operating temperature properties. As a general rule, if the coupling is balanced or if very long periods of operation are desired, use KHP.
- WAVERLY TORQUE LUBE-A* is a special purpose grease for relatively slow speed, highly loaded mill spindle couplings. It is not intended for use in other types of couplings.

Notice to Users

All of our grease is manufactured for KOP-FLEX® brand couplings and are for industrial use only. These products should not be ingested and should be properly stored and kept away from children. Read all container labeling and any precautionary statements. Material Safety Data Sheets are available upon request. Use absorbent material to clean up any spill and dispose of the waste in accordance with state and local regulations.

No warranties, expressed or implied, including patent warranties, warranties of merchantability, fitness for use, are made by KOP-FLEX, Inc. with respect to products described on information set forth herein. Nothing contained herein shall constitute a permission or recommendation to practice any invention covered by a patent without a license from the owner of the patent.

KSG Standard Coupling Grease

KSG is an NLGI Grade #1 coupling grease with E.P. additives for use in any grease-packed coupling, such as gear, grid, and chain-type couplings, in standard industrial service. Superior to the commonly available greases adapted to coupling use, KSG was developed specifically as a coupling lubricant.

KHP High Performance Coupling Grease

KHP grease is an NLGI #1 grease with E. P. additives which exceeds the design requirements needed for extended operating and relubrication intervals. KHP grease is recommended for high-speed grease lubricated gear couplings in petrochemical, process, and utility industries.

WAVERLY* TORQUE LUBE 'A' Gear Spindle Grease

Torque Lube 'A' was developed to solve the special lubrication problems of relatively low speed, highly loaded gear spindle couplings used extensively in metal rolling mills. Torque Lube 'A' has consistently provided protection in applications demanding a lubricant with extreme pressure protection, high heat and shock loading, excellent wear protection, and resistance to water washout. This grease is compounded with a concentration of Molybdenum Disulfide and other additives to provide extreme pressure protection. These additives cannot resist the effects of centrifugal forces; therefore, WAVERLY* TORQUE LUBE 'A' should not be used in a standard coupling without consulting KOP-FLEX.

* Waverly and Waverly Torque Lube-A are believed to be the trademarks and/or trade names of Exxon Mobil Corporation and are not owned or controlled by Regal Power Transmission Solutions.

Syn-Tech 3913G Grease

Gear Spindle Grease for High PV Applications

Our Syn-Tech 3913 Grease was developed specifically for gear couplings with high PV (up to 1,500,000 psi-in-sec). This lubricant has been used for over 20 years in problem applications such as high-speed aircraft couplings, high-speed cold mills and high angle hot strip mills. There are several greases that are specifically formulated for gear type couplings but some are specifically formulated for high loads and some for high speed. Syn-Tech is formulated for both (high loads at high speeds). Its special formulation also allows it to run low speed and low loads. It has a wide operating temperature range -65 degrees F to up to 250 degrees F.

In the steel mills the construction of the spindles and couplings is different. The couplings are usually low carbon to alloy with no surface treatment whereas the gear spindles are surface hardened, induction, nitrided or carburized. Gear spindles generally work well with special grease with moly-disulfide additives. These additives can present problems when used in the gear couplings. The softer teeth can prematurely wear due to this additive. Syn-Tech grease works well in both couplings. This allows the maintenance people to grease all couplings with a single grease. In many applications, soap based grease has limited applications for couplings. Now, one synthetic grease can be used for all coupling applications.

Our Syn-Tech 3913G has a very high viscosity index. It exhibits high film strength, good metal wetting, low coefficient of friction, and low wear rates.

The graph below shows the temperature difference measured in a gear coupling that used Molybdenum disulfide spindle grease vs. Syn-tech grease. The graph shows 30-60 degrees different in operating temperature with the use of Syn-Tech 3913G grease. Temperature is critical for successful operation. The higher the temperature the faster the grease breaks down and tooth distress occurs. Operating temperature above 250 degrees F usually present premature tooth distress problems for gear type couplings.

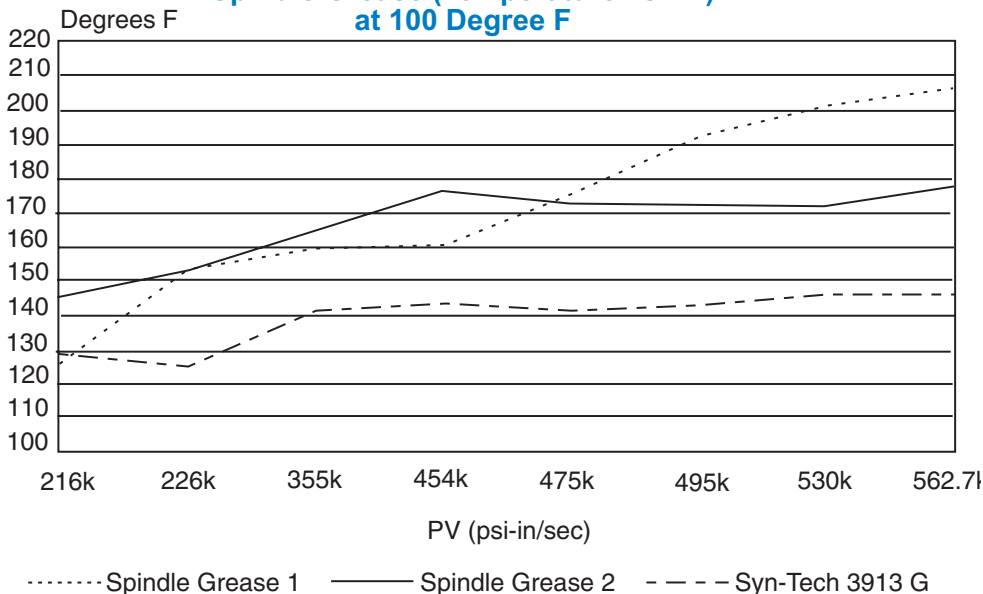


High speed cold mill with typical soap Molybdenum Disulfide after one year.



Same spindle after one year with Syn-Tech grease.

**Spindle Grease (Temperature vs PV)
at 100 Degree F**



Speed 400-800 RPM - Angle 1.5 degree - Nitrided Spindle - Test 2002

Grease Type	Application	Typical Speed	Coupling Type	Operating Range (F°)***
KHP High Performance	Petrochemical, process and critical service	Highest coupling RPM, usually over 3600 RPM	High performance gear Critical standard applications	-40° to +190°
KSG Standard	General purpose industrial	Standard motor speeds	Standard gear, grid and chain	-40° to +190°
WAVERLY TORQUE LUBE -A*	Rolling mill, high torque	Normal rolling mill motor speeds	Gear spindle and slippers	Covers mill temperature range
Syn-Tech 3913G	Rolling mill, high PV High	High speeds	Gear spindle	-65° to +250°

Tests	KHP		KSG		WAVERLY TORQUE LUBE -A	Syn-Tech 3913G
Thickener	Polyethylene		Polyethylene		Lithium 12 Hydroxy Stearat Soap	Synthetic
% Thickner	6-15		6-15		6% Approx	NA
Base Oil Viscosity (Typical)						
@ 100°, F, SSU	1800		1500		2200	840
@ 210°, F, SSU	115		100		150	78
@ 100°, C, CS	24		20		31	15
@ ' 40°, C, CS	360		300		NR	NA
NLGI Grade	1		1		1	1
Molybdenum Disulfide %	NR		NR		2.5-3	N/A
Penetration— 60 strokes (Worked) 10,000 strokes	310-340	320-360	310-340	320-360	310-340 @ 77°F	285-325 400 Max
TIMKEN* O.K. Load, Pound (ASTM D 2509)	50		40		60	50
Four ball EP (ASTM D2596) Load wear index, kg Weld point, kg	35	250	30	200	100 500	60 500
Four ball wear, scar, mm (ASTM D 2266)	0.75		0.85		0.5	0.6
Dropping Point, °F (ASTM D566 or ASTM D 2265)	200		195		340	500
Anti-Rust Properties (ASTM D 1743)	Yes		Yes		Yes	Yes
Oxidation Resistance Mx pressure drop psi in 100 hours	5		5		3	12.5
Water Washout test (ASTM D-1264)	NR		NR		6% Typically	10% typically
Centrifugal separation, (ASTM D 4425)	K36=2/24		K36=8/24		NR	K36 = 10/24
Operating range, °F***	-40° to +190° F		-40° to +190° F		+212° F	-65° to +250° F
ScV (psi-ips) Compressive Stress-Sliding velocity	300,000		150,000		500,000	1,200,000
Good for couplings with a Tooth Hardness	150-750 BHN**		150-330 BHN		420-750 BHN**	150-750 BHN**
Max Speed RPM	>3600		<3600		<1000	6000 Approx
Color	Amber		Blue-Green		Black	Black

NA = Not Available

N/A = Not Applicable

NR = Not Required

** 420 BHN = 45 Rc 750 BHN = 65 Rc

*** Operating temperature is to be considered the surface temperature of the outer surface of the coupling. The ambient temperature should be approx 30-50 degree below this since friction and misalignment generate heat and create a temperature rise in the coupling

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