STARPLEX® SYN EP 1 M5
STARPLEX® HD M5
STARPLEX® HD M3
STARPLEX® HD
1, 2
(formerly: Delo® Syn-Grease SXD 220 Moly 5% EP 1
Delo® Grease ESI HD Moly 5%
Delo® Grease ESI HD Moly 3%
Delo® Grease ESI HD EP)

PRODUCT DESCRIPTION

Starplex® HD is a comprehensive line of greases that are available with or without molybdenum disulfide. These greases are designed for plain and anti-friction bearing applications operating under high stress/high load conditions, coupled with high ambient temperatures typically found in heavy duty off-road applications.

CUSTOMER BENEFITS

Starplex Syn EP 1 M5, Starplex HD M5, Starplex HD M3, and Starplex HD greases deliver value for the off-road construction and mining industries by offering:

- **Corrosion and wear protection**
- **Water resistance** in both submerged and direct pressure spray situations
- **Shock load protection**
- **Performance across a wide temperature range** from extremely hot to extremely cold conditions, this unique heavy duty EP product line delivers when needed most

FEATURES

Starplex HD greases are multipurpose, high performance products specially formulated for plain and anti-friction bearing applications operating under high stress/high load conditions, coupled with high ambient temperatures typically found in heavy duty off-road applications. Developed as a true contractors product, this line of grease was specifically designed to lubricate and protect equipment that is subjected to demanding conditions.

STARPLEX SYN EP 1 M5

Our product to use in the most demanding applications. This product features synthetic base oil in a lithium complex thickener system. Provides excellent corrosion protection, water resistance, and shock loading capability. This product also provides excellent performance throughout a wide temperature range. It is especially effective in very cold climates or where temperature ranges vary dramatically in a short period of time. It contains 5% moly, which is desired by many OEMs for off-road applications.

Product(s) manufactured in the USA, Colombia and El Salvador.
Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

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STARPLEX® HD M5 AND M3

This tier of products features 5% or 3% moly sought after by many OEMs in off-road applications. These products are formulated using highly refined base oils in a lithium complex thickener system. They also feature better corrosion resistance, wear control, and shock loading than our basic Starplex HD products. They provide very good protection over a wide temperature range.

STARPLEX HD

Our basic product which works in many applications and provides good protection from wear, shock loading, and fairly effective operating temperature range. This product features high viscosity index conventional oil in a lithium complex thickener system. The product also provides excellent corrosion protection. This product does not contain moly.

Starplex HD greases are manufactured using select, highly refined base oils using a lithium complex thickener system that includes excellent rust and oxidation inhibitors coupled with extreme pressure and tackiness additives. The non-moly version is red in color and stringy in texture. Additionally, this comprehensive line includes 5% and 3% moly versions to meet the demands of OEM manufacturers who require molybdenum disulfide in the grease to meet required warranty specifications. These moly-containing products are grey/black in color and stringy in texture.

The lithium complex thickener in Starplex HD greases elevates the dropping point to approximately 265°C (510°F) making them excellent for use in applications where sustained high operating temperatures are common. Additionally, since they are all comprised of the same base formulation, they are compatible with one another.

APPLICATIONS

These greases are recommended for applications operating over wide temperature ranges.

Starplex HD greases are not intended for use in high-speed bearing applications such as those found in electric motors due to the greases' high viscosity base stocks formulation. When in doubt, please consult your Chevron representative or OEM maintenance manual for application parameters when considering a switch to these greases.

Starplex HD greases are ideal for a wide variety of Off-Road Construction applications across several industries:

- **Off-Road Construction** — These greases display outstanding water washout and spray-off resistance properties in wet, off-road environments and offer excellent shock load extreme pressure (EP) protection. Unique additive technology of these products makes them tenacious at adhering to metal surfaces found in this industry while protecting these vital components from rust and corrosion. Applications for the product include most types of heavy-duty earth moving machinery, including tractors (dozers), excavators, backhoes, shovels, high lifts, articulated loaders, haul trucks, tri-axle dumps and more. They are excellent for heavily loaded machine implement pins and bushings, and other applications operating in severe, high shock-load environments where metal to metal contact wear often occurs. Since Starplex HD greases are offered in 5% and 3% moly containing versions, they are also able to meet wide off-road OEM application ranges using one common product line, thus reducing field inventory. Because they are lithium complex thickened, the non-moly version is also excellent for mixed fleet applications where disc brake lubrication is required, such as pick-up trucks.
- **Surface and Underground Mining and Quarry** — Applications appropriate for these greases include those found above plus pins and bushings on buckets, loaders, shovels and continuous miners, shaker screens, crushers, and conveyors.

- **Agriculture** — Will serve as an excellent multi-purpose heavy duty lubricant for both general and industrial farm and agricultural use, from medium to heavy duty front steer and articulated tractors and loaders to larger new rubber tracked units. These products will work well in many applications including three point hitches, high lift pins and bushings and other heavy duty farm related industrial machinery.
- **Heavy Duty On/Off Highway Road Construction and Maintenance Vehicles** — These products are well suited for greasing on/off road heavy duty tri-axle dump trucks and cement mixers that also find their way off road as much as on. Starplex® HD greases are an excellent choice for king pins, bushing and bucket pins, 5th wheels and other severe duty applications found on these types of vehicles. They are also ideally suited for on highway heavy duty applications as well as airport fixed ground operation snow and ice removal equipment, such as plows, blowers and salt spreaders when the preferred method of lubrication is by manual application. These products were formulated using a new rust inhibitor package tested with 0.5% mixtures of magnesium chloride and calcium chloride road de-icers and were proven to reduce rust and corrosion when these corrosive materials were present. In colder climates, where moly is required, the Starplex Syn EP M5 1 grade would be the preferred product of choice.

Starplex HD greases meet the requirements of the Mack MG-C grease specification. They also meet Caterpillar recommendations for greases containing 5% and 3% molybdenum disulfide.

Note 1: Starplex HD greases are designed using high viscosity base oils. These oils offer excellent protection in severe duty, high shock load conditions where typical ambient temperatures are above freezing. For extreme cold weather climate conditions, Chevron recommends using Starplex Syn EP 1 M5 for equipment that requires the product to be used in centralized automatic grease dispensing systems.

Because each application varies, you should consult your equipment OEM or Chevron Lubrication Specialist before switching over to these products.

Note 2: In cases where centralized automatic dispensing systems or long manual grease runs are the preferred method of lubrication and normal operating temperatures are consistently well below 20°F, Starplex HD would offer better pumpability. They would also be the preferred choice for onboard vehicle lubrication systems operating in severe cold weather service. Starplex Syn EP 1 M5 and Starplex HD are fully compatible. Please consult your local Chevron Lubrication Specialist for more information.

TYPICAL TEST DATA

	Test Method	Starplex Syn EP 1 M5	Starplex HD 1 M5	Starplex HD 2 M5	Starplex HD 1 M3	Starplex HD 2 M3
Product Number		*259115*	*259121*	*259120*	*259123*	*259122*
SDS/MSDS Number *USA* *Colombia* *El Salvador*		*44839* — —	44831 44834 —	*44831* *44834* —	*44825* *44830* *44826*	*44825* *44830* *44826*
Molybdenum Disulfide content %		5	5	5	3	3
Operating Temperature, °C(°F) Minimum[a] Maximum[b]		-40(-40) 235(450)	-26(-15) 177(350)	-26(-15) 177(350)	-26(-15) 177(350)	-26(-15) 177(350)
Penetration, at 25°C (77°F) Worked (60 strokes)	ASTM D217	325	325	280	325	280
Dropping Point, °C(°F)	ASTM D2265	265(509)	266(509)	267(509)	268(509)	269(509)
Four Ball Weld Point, kg Load Wear Index, kg	ASTM D2596	800+ 135	500 75	500 75	500 75	500 75
Four Ball Wear Scar, mm	ASTM D2266	0.48	0.43	0.43	0.43	0.43
Timken OK Load, lb	ASTM D2509	40	70	70	70	70
Bearing Water Washout, wt % Loss at 175°F	ASTM D1264	1.5	5	4	5	4
Water Spray-off, % at 100°F	ASTM D4049	N/A	25	15	25	15
EMCOR Dynamic Bearing Rust, 10% Synthetic Sea Water	ASTM D6138	0,1	0,0	0,0	0,0	0,0
Lincoln Ventmeter, psig at 30 s, at 75°F 30°F 0°F -22°F	K95400	 260 400 775 1675	 250 600 1720 †	 450 1550 1725 †	 250 600 1720 †	 510 1700 1800 †
Flow Pressure, psi 68ºF(20ºC) 32ºF(0ºC) -4ºF(-20ºC) -22ºF(-30ºC)	DIN 51805	 0.9 1.2 2.2 3.1	 0.5 2 10 38	 1 4 20 max pressure	 0.5 2 10 38	 2 4 19 max pressure
Copper Corrosion	ASTM D4048	1b	2b	2b	2b	2b

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

	Test Method	Starplex Syn EP 1 M5	Starplex HD 1 M5	Starplex HD 2 M5	Starplex HD 1 M3	Starplex HD 2 M3
Thickener, % Type		13.0 Lithium Complex	7.0 Lithium Complex	13.0 Lithium Complex	7.0 Lithium Complex	13.0 Lithium Complex
ISO Viscosity Grade Base Oil Equivalent		220	460	460	460	460
Base Oil Viscosity, Kinematic cSt at 40°C cSt at 100°C	ASTM D445	220 25	460 31	460 31	460 31	460 31
Base Oil Viscosity Index	ASTM D2770	143	97	97	97	97
Oil Separation, wt %	ASTM D1742	1.6	2	2	2	2
Flash Point, °C(°F)	ASTM D92	232(450)	274(525)	274(525)	274(525)	274(525)
Texture		Stringy	Stringy	Stringy	Stringy	Stringy
Color		Gray/ Black	Gray/ Black	Gray/ Black	Gray/ Black	Gray/ Black

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.
b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.
† Too stiff at this temperature to pump through device.

Minor variations in product typical test data are to be expected in normal manufacturing.

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TYPICAL TEST DATA

	Test Method	Starplex HD 1	Starplex HD 2
Product Number		*259125*	*259124*
SDS/MSDS Number *USA* *Colombia* *El Salvador*		 *44815* *44818* —	 *44815* *44818* —
Molybdenum Disulfide content %		—	—
Operating Temperature, °C(°F) Minimum[a] Maximum[b]		 -26(-15) 177(350)	 -26(-15) 177(350)
Penetration, at 25°C (77°F) Worked (60 strokes)	ASTM D217	325	280
Dropping Point, °C(°F)	ASTM D2265	270(509)	271(509)
Four Ball Weld Point, kg Load Wear Index, kg	ASTM D2596	 500 75	 500 75
Four Ball Wear Scar, mm		0.43	0.43
Timken OK Load, lb		75	80
Bearing Water Washout, wt % Loss at 175°F	ASTM D1264	5	4
Water Spray-off, % at 100°F	ASTM D4049	25	15
EMCOR Dynamic Bearing Rust, 10% Synthetic Sea Water, ASTM D6138	ASTM D6138	0,0	0,0
Lincoln Ventmeter, psig at 30 s, at 75°F 30°F 0°F -22°F	K95400	 250 600 1720 †	 625 1600 1800 †
Flow Pressure, psi 68ºF(20ºC) 32ºF(0ºC) -4ºF(-20ºC) -22ºF(-30ºC)	DIN 51805	 0.5 2 10 38	 2 5 22 max pressure
Copper Corrosion	ASTM D4048	1b	1b

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

	Test Method	Starplex HD 1	Starplex HD 2
Thickener, % Type		7.0 Lithium Complex	13.0 Lithium Complex
ISO Viscosity Grade Base Oil Equivalent		460	460
Base Oil Viscosity, Kinematic cSt at 40°C cSt at 100°C	 ASTM D445	 460 31	 460 31
Base Oil Viscosity Index	ASTM D2270	97	97
Oil Separation, wt %	ASTM D1742	2	2
Flash Point, °C(°F)	ASTM D92	274(525)	274(525)
Texture		Stringy	Stringy
Color		Red	Red

a Minimum operating temperature is the lowest temperature at which a grease, already in place, could be expected to provide lubrication. Most greases cannot be pumped at these minimum temperatures.
b Maximum operating temperature is the highest temperature at which the grease could be used with frequent (daily) relubrication.
† Too stiff at this temperature to pump through device.