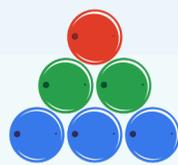
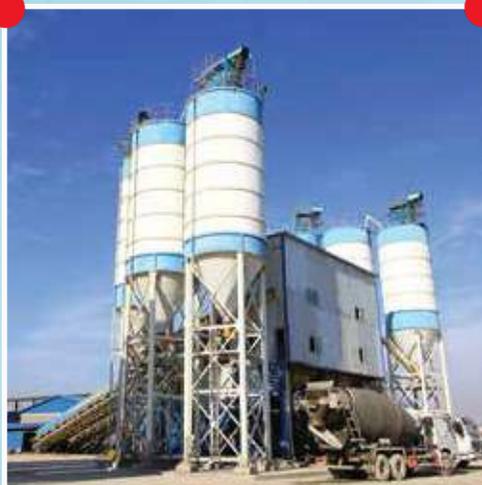


# COMPLETE LUBRICATION SOLUTIONS FROM *SERVO* - CEMENT SECTOR



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## LUBRICANTS FOR THE CEMENT SECTOR

Cement is the world's most widely used construction material. Over three tons of concrete are produced each year per person for the entire global population, making it the most widely used manufactured product in the world. With over 300 mtpa of cement manufacturing capacity built in, India is the 2nd largest producer of cement in the world after China.

The key challenge for cement industry is to reduce costs and maximize productivity. Thus, extending the life of equipment is a critical requirement of lubrication here.

In Cement industry, tough operating conditions are encountered such as high temperatures, continuous operation,



high loads and cement dust etc. Consequently, components such as the bearings and gears in rotary kilns, mills, roller presses and crushers are incessantly subjected to wear. Therefore, this industry has stringent lubrication requirement.

Cement industry has changed dramatically in both "technology and capacity" built up in the last one decade in India. Higher capacity and improved technology brings in more complex tribological challenges for which new high performance oils and greases have been developed by IndianOil.



## INDUSTRIAL GEAR OILS

The mining industry operating conditions include heavy loads, shock loads, temperature extremes and constant presence of contaminants.

**SERVO** industrial gear oils (mineral as well as synthetic) provide superb wear protection against shock loading, superior anti-foaming, outstanding water separation, prevents rust and corrosion, superior compatibility with bearing & gear metallurgies which extends the life of the gear oil as well as the gearbox.

**SERVO** has a wide range of mineral & as well as synthetic gear oils in its range which provides energy efficiency and anti-micropitting properties. Servomesh Gold and Servosyngear Plus oils are approved by Flender-Siemens for their gear boxes.



## SERVO Industrial Gear Oils

Performance at a Glance			
Product	Wear Protection	Long Oil Life	Equipment Efficiency
Servomesh Gold Oils*	☆☆☆☆☆	☆☆☆☆☆	☆☆☆☆
Servomesh XP Oils	☆☆☆☆☆	☆☆☆☆☆	☆☆☆☆
Servomesh Plus Oils	☆☆☆☆	☆☆☆☆	☆☆☆
Servomesh EE Oils	☆☆☆	☆☆☆	☆☆☆
Servomesh SP Oils	☆☆	☆☆☆	☆☆

\*Approved by Flender-Siemens

Performance values are relative indication only

Product	Type	VI	Remarks
Servosyngear series	PAO	140 - 145	ISO VG 100 - 3200
Servosyngear HVI series	PAG	200 - 250	ISO VG 100 - 1000
Servosyngear Plus series*	PAO based Anti-Micropitting	145 - 150	ISO VG 220 - 680
Servosyngear AMP series	PAO based Anti-Micropitting	155 - 160	ISO VG 320 - 460

\*Approved by Flender-Siemens

### HEAVY DUTY DIESEL ENGINES OILS

- Engines operating in limestone mines are built to handle bigger loads and the most severe operating conditions while delivering the best fuel economy per ton. A wide variety of equipment operates with such engines. These engines routinely average above 95% uptime in mining operations where load factors commonly exceed 40%.
- Important factors to be considered while choosing an Engine Oil are:
  - Appropriate SAE Viscosity , as recommended by OEM
  - Adequate Performance Level as stipulated by API, ACEA etc.
  - Viscosity consistency at wide operating temperatures
  - Good TBN Characteristics.
  - Good Soot Dispersancy
  - Good Wear Protection.
  - High Thermal & Oxidation Stability to minimize oil thickening & sludge.
  - Long Oil drain, typically 500-1000 hours .
  - Fuel economy improvement, without sacrificing durability.
- Changes in emissions and fuel efficiency regulations drive changes in engine hardware, which in turn, drive changes in

heavy duty engine oil technology. Increased fuel economy and reduced greenhouse gases are being supported by lower 'high-temperature high-shear' engine oil viscosity.

- SERVO** HDDEO are robust products designed to protect your engine and also provide you the best performance.



# COMPLETE LUBRICATION SOLUTIONS

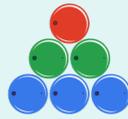
## SERVO Heavy Duty Engine Oils

Product	Specification	Salient Features
Servo Premium CF-4 15W-40	API CF-4, SAE 15W-40	250 hours drain
Servo Pride XL 15W-40	API CH-4, SAE 15W-40	500 hours drain
Servo Pride Supreme 15W-40	API CI-4, SAE 15W-40	500 hours drain, EGR compatible
Servo Pride Supreme Plus 15W-40	API CI-4 Plus, SAE 15W-40	500 hours drain, EGR compatible, higher soot dispersancy
Servo Pride XL Plus 15W-40	API CI-4 Plus, SAE 15W-40	500 hours drain, EGR compatible, excellent soot dispersancy, cummins approved
Servo Pride TH Plus 15W-40	API CI-4 Plus, SAE 15W-40, For Tata Hitachi Eqpt.	500 hours drain, EGR compatible, higher soot dispersancy, Tata Hitachi approved
Servo Pride Max 15W-40	API CJ-4 , SAE 15W-40	Low SAPS, compatible with DPF, ULS HSD fuel
Servo Pride XL Plus 10W-40	API CI-4 Plus, SAE 10W-40	500-1000 hours drain, EGR compatible, excellent soot dispersancy, fuel economy
Servo Pride XL 10W-30	API CH-4, SAE 10W-30	500 hours drain, fuel economy grade
Servo Pride XL Plus 10W-30	API CI-4+, SAE 10W-30	500-1000 hours drain, EGR compatible, excellent soot dispersancy, fuel economy grade

## OILS FOR HEAVY DUTY TRANSMISSIONS & AXLES

- Transmissions, differentials and final drives are subjected to increasingly higher loads as machines become capable of shifting larger quantities of material and much faster. The surface finish of components, their design and metallurgy have steadily improved but they still require the highest level of lubrication to deliver maximum performance and remain durable.
- Unlike engine oils, there are no industry-wide standards for powershift transmission fluids. Instead, equipment manufacturer recommendations or fluid specifications, which owners and fleet managers must follow, drive performance.
- Some of the recent performance improvements that have resulted in the new dedicated fluid technologies include:
  - Improved overall lubrication to protect against wear, micropitting and fatigue in clutches, wet brakes, pumps, planetary gears, and final drive gears and bearings.
  - Improved frictional stability to enhance clutch life, eliminate brake noise and provide operating efficiencies while moving heavy loads on inclines.
  - Compatibility of lubricants and machinery to combat negative effects on elastomers in rings and seals or with various metals.
  - Oxidation & Thermal stability to ensure that fluids will not degrade at high temperatures, maintaining fluid performance.
  - Sludge control to reduce blockages within the system that prevent fluids from flowing where they are needed.
  - Rust and corrosion protection to extend equipment life and improve performance.
  - Foam protection to prevent damage caused by wear due to foam.
- Minimized brake chatter to provide better wet brake control.
- Sustained film thickness to provide antiwear protection for gears.
- Shear stability control to maintain viscosity of the lubricant grade,
- New generation **SERVO** transmission and axle oils for HEMMs have been developed by IOC R&D which, apart from providing long drain and durability, also contributes substantially to fuel economy gains.





**SERVO** Heavy Duty Transmission & Axle Oils

Application	Product	Specification	Salient Features
<b>TRANSMISSIONS</b>	Servo Transmission C4 SAE 30	Allison C4, SAE 30	1000 hours drain
	Servo Transmission XL 439	Allison TES 439,	>1000 hours drain, superior performance
	Servo Trans TH SAE 30	Tata Hitachi specs	1000 hours drain
	Mahindra Earthmaster Transmission Oil	Mahindra Earthmaster specs	1000 hours drain
	BEML ALS Transmission Oil	BEML specs (Allison Transmission)	1000-1500 hours drain
	Servo Transmission TO4 10/ 30	Caterpillar TO4 specs	1500 hours drain
	BEML Transmission Oil ET 30 CD	BEML specs (BEML Transmission)	1000-1500 hours drain
	Servo Gear Super LS 80W90	ZF Transmission	1000 hours drain limited slip applications
	Servo Gear Super LS 90	ZF Transmission, BEML specs	1000 hours drain limited slip applications
	Servo Ultra KB 10/30	Komatsu specs	1000 hours drain, suitable for wet brakes
Application	Product	Specification	Salient Features
<b>AXLES</b>	Servo Gear Super 85W-140	API GL-5	1000 hours drain
	Servo Gear HP 90/140	API GL-4, BEML specs	1000 hours drain
	Servo Gear Super 90/140	API GL-5, BEML specs	1000 hours drain
	Servo Gear TH 85W-140 LS	Tata Hitachi specs	1000 hours drain limited slip applications
	Servo Gear Super ALT 85W-140 LL	API GL-5, SAE 85W-140	Long life drain interval, upto 1500 hours
	Mahindra Earthmaster Rear Axle Oil	Mahindra Earthmaster specs	1000 hours drain



## HYDRAULIC OIL FOR MOBILE EQUIPMENTS

- Since there are no industry-wide standards for mobile hydraulic fluids, OEM recommendations, combined with fluid specifications, drive development and performance.
- It is a common practice in the construction and mining industries to use engine oil SAE 10, SAE 20 or SAE 30 with the lowest API rating as a substitute for hydraulic oil ISO 32, ISO 46 or ISO 68, respectively for hydraulic systems of heavy equipment.
- There is also a class of hydraulic fluids (DIN 51524) that contains dispersive and deterative additives much like engine oils. The use of these fluids is approved by many OEMs and can offer several advantages in mobile equipment such as preventing varnish, sludge and controlled emulsification.
- Some OEMs recommend using multi-grade oil in hydraulic systems for their mobile equipment. Viscosity index (VI) improves extend the operating temperature range for the fluids from cold starts to high-temperature operations. Multigrade oils with outstanding shear stability are the wave of the future as the equipment is able to perform work using less fuel, lowering the cost of operation.
- Servo hydraulic oil are available under Servosystem HLP Series (VG 32, 46, 68, 100 & 150) premium AW hydraulic oils. The oil meets Denison HF-0 and DIN 51524 part-2 specs.
- Other variants of hydraulic oils include Servohydrex Series (VG 32, 46, 68 & 100), high viscosity index anti-wear hydraulic oil. It meets E & F specs and DIN 51524 Part-3 Specification. Servohydrex series meets requirements of LT CEL excavators.
- Servohydrex Plus Series formulated with group-3 base oils is ideal for long drain in high capacity excavators at 4500 hours as compared to the conventional oils with 1500 hours drain period.
- Servohyvis EE 46 is formulated with DYNAVIS® technology which stands for 'more power' and 'less fuel'. With this fluid, users can count on 'increased productivity, fuel savings, better reliability and sustained performance from construction equipment'.



### SERVO Hydraulic Oils

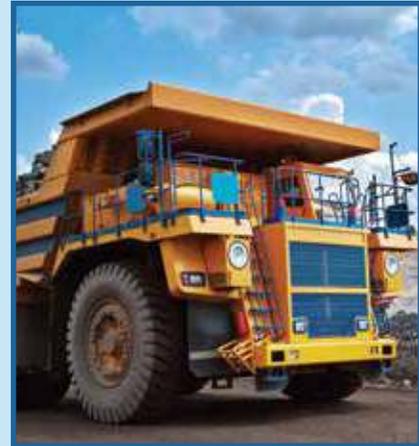
Product	Specification	Salient Features
Servo Ultra KB10	Komatsu-BEML specs	1000 hours drain
BEML Hydraulic EH 10 CD	BEML specs (BEML Hydraulics)	1000-1500 hours drain, high antiwear protection
Servosystem HLP 46/68	DIN 51524 (part II),	1000 hours drain, excellent filterability and hydrolytic stability
Servosystem XLP 46 / 68	DIN 51524 (part II)	1200 hours drain, greater wear protection
Servohydrex TH 46 / 68 / 100	DIN 51524 (part III), High Viscosity Index	1500 hours drain
Servo Excavator TH 46	Tata Hitachi approved	1500 hours drain
Servo Hydro Supreme 10	Meets Caterpillar requirements	Long drain (3000 hours), extra wear protection, excellent filterability & hydrolytic stability
Servohydrex TH 46 Plus	DIN 51524 (part III), Very High Viscosity Index	4000 hours drain interval high performance oil
Servohyvis EE 46	DIN 51524 (part III), Extra High Viscosity Index	4000 hours drain interval, up to 12% fuel savings

## ENGINE COOLANTS

- Coolants are used to prevent freezing, corrosion and rust in cooling systems, as well as providing other useful functions. Using the correct coolant will have a significant beneficial impact on the life of engines, radiators and power-trains.
- Antifreeze types can be classified into three basic categories: 1) inorganic-acid technology (IAT); 2) organic-acid technology (OAT); and 3) OAT variations—often called hybrids, hybrid-OATs, or HOATs.
- The most widely used antifreeze is

“fully formulated,” which uses an additive package consisting of inorganic compounds.

- OAT-type antifreeze, often called “extended-life coolant” (ELC), uses additives made from neutralized versions of organic (carbon-containing) acids. Hybrids result when an OAT antifreeze also contains certain inorganic additives used in fully formulated—such as nitrite, silicate or phosphate. A nitrite-containing OAT, for instance, is a NOAT.



### SERVO Engine Coolants

Product	Specification	Salient Features
Servo Kool HWC	JISK-2234 specs	OAT technology, 700 ppm hard water compatible. Also available in ready to use @ 30% concentration and ready-to-use @ 50% concentration. Provides 1500 hours performance @ 50%.
Servo Kool HWC 30		
Servo Kool HWC 50		
BEML Antifreeze	BEML specs	Specially formulated for BEML excavators & dumpers. Provides >3000 hours performance.
Servo Kool HD	JISK-2234 specs	NOAT technology, offers excellent protection against Liner Cavitation. >3000 hours performance. Also available in ready-to-use @ 50% concentration.
Servo Kool HD 50		

## COMPRESSOR OILS

- Advancements in lubrication technology, especially in fully synthetic based products, have made significant breakthrough in extending equipment life and oil drain intervals in a range of industries.
- High quality synthetic lubricants deliver advantages which mineral oils cannot match. Under the severe operating conditions often experienced at a cement plant such as high temperatures, loads and

pressures, synthetic lubricants offer better suitability.

- Servosynco E 32, 46, 68, 100, 150 & 220 - specially designed PAO based synthetic, long drain compressor oils for high pressures air compressors which provide excellent lubricity, low oil consumption rate and enhanced safety factor.
- Servosynco PE 32, 46, 68, 100, 150 & 220 - Polyol ester based fully synthetic compressor oils designed

to lubricate reciprocating air compressors working under severe operating conditions, air discharge temperature exceeding 200°C. These oils possess superior oxidation stability, reduced carbon deposits tendency, high flash point and low volatility wear protection extended lubrication interval.



## GREASES

- **SERVO** offers complete range of high-performance industrial greases which are backed by advanced technology for encountering harsh, humid, dusty environment of the cement industry. **SERVO** offers solutions for all the applications with a variety of thickener types (lithium, lithium complex, sulfonate complex, clay, polyurea, etc.) in mineral / semi-synthetic / synthetic base oils fortified with tailor made / synergistic additive compositions suitable to particular applications.

### **SERVO** greases :

- Servogem EP 00 / EP 0 / EP 1 / EP 2 - consist of lithium soap in highly refined base oil(s) fortified with judiciously selected additives to provide extra protection against extreme pressure, wear, rusting and water washout.
- Servogem Super HTXX - based on calcium sulfonate thickener chemistry, possesses excellent extreme pressure/anti wear, anti-corrosion and anti-oxidant properties. Its unique combination of base oil & thickener fortified with solid additive in formulation boosts its inherent EP properties to take care of extremely high as well as shock loads. Servogem Super HTXX

possesses excellent mechanical/ shear stability even in presence of water.

- Servoplex SHC 120 - specially designed to meet lubrication requirements of machineries encountering high temperature & severe loads for reducing downtime. Based on Lithium Complex thickener in synthetic PAO oils fortified with synergistic EP, AW and antirust additives.
- Servoplex PU 1 (S) - new polyurea base grease with special metal free thickener. Brown coloured NLGI grade 1.5 grease formulated with carefully chosen combination of Group I & II mineral base oils and special additives to impart superior performance characteristics, designed to provide longer service life to bearings used in equipment working under high temperatures, excellent oxidation stability, shear stability, high dropping points, water resistance, good pumpability, elastomer/seal compatibility, low oil separation, wide operating temperature range, etc.
- Servogrease CG-10, Servogrease CG-20 & Servogrease CG-50 - predominantly used for lubricating open and enclosed gear drives during service. It protects the

overloaded open gears from damage by pitting & wear. Premium quality semi fluid grease based on Al-complex soap as a thickener and mineral oil containing adequate amount of solid lubricants that includes super-fine graphite & molybdenum disulphide powders together with superior extreme pressure antiwear additive system to withstand high loads at high circumferential speeds. Primarily recommended for large open gears in rotary kilns, ball, coal and cement mills, dryers, debarking drums, excavators, large chains, rack & pinion drives, slewing rings & other rotating machinery with open gear drives and can even be applied with spraying system. Consumption of grease depends on the running conditions of the gears. The benefits of Servogrease CG series are as follows:

- Extended Girth Gears/ Bearings life and re-lubrication interval
- Increased productivity and Lower Maintenance Costs
- Excellent Pumpability for easy application
- Excellent Sprayability for adequate lubrication of gears.



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