


2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 1	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

Dependence on/from other documents	Replaced by
	Supplier
Working process Instruction, Procurement, Rationalization of Stock, Maintenance	Supplier's document number
Key words Instruction, code of practice,	Supplier's reference designation

Document history

Revision	Date	Signature	Comments
01	2017-03-31	MLCHGA	First approval
02	2018-08-17	MLJNPV	Revision chemical supply

Swedish version


This document is also available in Swedish as LKAB Technical Instruction LKT
In the event of disagreement concerning the interpretation and content of this text, the Swedish version shall have priority.

Latest revision

The latest revision of this instruction can be obtained from e-mail address: tekadm.krn@lkab.com

Table of contents


DEFINITIONS.....	2
BACKGROUND AND PURPOSE.....	3
LKAB LUBRICANT PORTFOLIO FOR PRODUCTION MACHINERY	3
LKAB LUBRICANT CATALOGUE SELECTED PRODUCTS LUBRICANTS FOR INDUSTRY, THE FIRST LINE LISTED.....	3
PROVEN BY HISTORY IS THE HIGHEST QUALIFICATION DESIGNATION, SECOND LINES LISTED	3
INSTRUCTIONS SUPPLIER - CHEMICAL PRODUCTS	4
THE AGREED SCOPE OF SUPPORT FOR TECHNOLOGICAL DEVELOPMENT OF THE LUBRICATION AREAS	5
BASELINE OF SUPPORT:	5
DEMAND SCOPE OF SUPPORT AND GENERAL PLAN MEETINGS:.....	5
CRITICAL MACHINERY AND RECOMMENDED QUALIFICATION	6
OUTDOOR MOBILE LUBRICANTS	6
OUTDOOR ARCTIC GREASE	6
ENGINE OILS AND FLUIDS	6
HYDRAULIC OILS	6
GEAR OILS	7
BEARING AND MULTIPURPOSE GREASES	7

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 2	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

PURITY REQUIREMENTS FOR LUBRICATING AND HYDRAULIC OILS IN LKAB	9
STATIONARY HYDRAULICS – LKT.....	9
MOBILE HYDRAULICS – LKS.....	9
MACHINES OR MACHINE ELEMENTS - ISO THE FOLLOWING RECOMMENDATIONS ARE GIVEN IN ISO 4406: 1999.	9
LKAB LUBRICANT PORTFOLIO AND SELECTED PRODUCT CATALOGUE	11
LKAB LUBRICANT CATALOGUE SELECTED PRODUCTS LUBRICANTS FOR INDUSTRY	11
OUTDOOR MOBILE LUBRICANTS.....	11
OUTDOOR ARCTIC GREASE	12
ENGINE OILS AND FLUIDS	12
HEAVY GEAR OILS	13
HYDRAULIC OILS.....	14
GEAR OILS	14
CHAIN OILS	15
COMPRESSOR OILS	15
TURBINE OILS	15
EL. TRANSFORMER OILS	15
CONCRETE RELEASE OIL.....	16
BEARING AND MULTIPURPOSE GREASES	16
OPEN - OR SEMI OPEN GEAR LUBRICANTS	17
SUGGESTIONS FOR IMPROVEMENTS.....	17
APPENDICES	18

Definitions

Portfolio	LKAB Specified requirement on lubricants
Catalogue	LKAB selected products from suppliers
API system classes	gasoline SA-SN, diesel engines CA CJ
ISO VG	viscosity grades of base oil, mm ² / s at 40 ° C, centistokes
NLGI	Consistence nr.
SAE system	Viscosity Classes engine and transmission oils
SDS	Safety data sheet
VI	Viscosity index, viscosity temperature dependence

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 3	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

Background and purpose

LKAB Lubricant portfolio for production machinery

The LKAB general need of lubricants quality, specification and grades are listed in the LKAB Lubricant portfolio.

LKAB Lubricant catalogue selected products lubricants for industry, the first line listed

LKAB has lubricant agreement with contracted suppliers and a selected LKAB catalogue of products. To rationalize, the selection of lubricants for production machinery at LKAB shall mainly be according to the LKAB catalogue of listed products below. The preferred product is listed on the **top line** in each quality and grade from the contracted supplier.

If other lubricants are required than in the LKAB catalogue, these should be chosen in collaborations with LKAB, see contacts below. These products shall also preferably be chosen from the LKAB contracted suppliers catalogue.

Proven by history is the highest qualification designation, second lines listed


The LKAB proven by history of qualified products are listed in second line in the catalogue. For reliability reason or production safety this product is the backup if failure occurs in delivery or lubricant performance is not satisfactory.

Recommendation by manufacturer in product data sheet, the product is according to specification and it has been tested by the manufacturer.

Qualification justified by specification or translation from product to equal product a qualification and risk elimination plan has to be adopted. LKAB critical machinery known by history and relevant qualification tests are mentioned below.

Compatibility mixed oils, lubricants which have poor compatibility with existing products should be avoided if possible for example PAG:s (polyalkyleneglycols). Generally to change the entire volume of a system, a successful mixing test is required if different products has to be blended in the same system.

Compatibility mixed greases, generally to avoid mixing greases clean or over smear the bearings, some thickeners and some base oil types are not compatible, take advice from the lubricants supplier.

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 4	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

LKAB want for cost reduction the first choice to be a mineral oil base type. General base oils shall be of minimum Grp.II for compatibility with LKAB:s machine requirements. Choices of synthetic alternatives should be motivated by extreme running conditions of either:

- Low temperature (< - 20 °C).
- High temperature (> 70 °C).
- Large temperature variations (the needs of higher viscosity index, VI).
- Extended re-lubrication intervals (> 1 year).
- Extreme lubrication situation or materials that may be sensitive for chemical components in the lubricants.

Data sheet languages, Product Data Sheet PDS and Safety Data Sheet SDS, shall be delivered in English and Swedish.

SDS has to be accepted by the LKAB Chemical Board before any delivery to LKAB.

Instructions supplier - Chemical products

All activities using chemical products must, according to current legislation, have competence and good knowledge of these, e.g. which chemical products are authorized to be used, how they are handled, stored, possible hazards and have a proper and systematic self-check that ensures compliance with these and other legal requirements.

The supplier shall describe responsibilities, how to prevent and address chemical hazards, handling, storage, deposition, fire protection, remediation, waste disposal, transportation, personal protective equipment, medical examinations.


In addition to complying with the requirements of the law, the supplier must match all chemical products to "Forbidden substances in chemical products at LKAB" list to ensure that no forbidden substances will be used. The supplier shall ensure that the chemical list contains the requested information and is always kept up to date. For each chemical product there must be a current safety data sheet and a risk assessment.

A supplier who, in his or her assignment, hires another supplier is responsible for fulfilling his / her requirements.

Chemical list: To facilitate the suppliers, LKAB provides this template on chemical list and template for application to the LKAB Chemical Board.

This LKAB Template for Chemicals List can be used with advantage. The user's own template must contain all the headings contained in the LKAB template.

1. Fill in the chemical list using the information in the product safety data sheet (SDS)
2. Match all chemical products with the "Forbidden substances in chemical products at LKAB", which is available on LKAB's external website under "Supplier". See the instructions below.
3. Submit the file to LKAB's Contact Person

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 5	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

The agreed scope of support for technological development of the lubrication areas

Supplier agreement with LKAB includes planned support activities and continuously improvement.

Baseline of support:

- Rationalization of lubricants directory of cost
- Skills to lift the status of the lubricating role and commitment of staff innovation and responsibility C.I.R.
- Standardize the effectiveness of lubrication and cross technological dissemination within the LKAB of focus areas for improvement:
 - Energy savings
 - Health Safety Environment, HSE
 - Quality Improvement
 - Method - / operation improvement
 - Rationalization
 - Fault Elimination

Demand scope of support and general plan meetings:

Meeting plan / Content

3st Quarterly meetings with lubricating area groups

Agreed Agenda plus systematic improvement

1st Joint Annual Meeting of lubricating area groups

Production and maintenance, supply and purchasing, engineering support

Reference group / Content

Reference lubricating development

Technology Developers key people and convener

Meets provider technical support

Purpose

Problem solving, knowledge development, continuous improvement "top ten lists per site"

Quality, rationalization, Health Safety Environment HSE, energy, method, noise-canceling "

Knowledge, assessment year, highlighting the role lubricators, Community

Retaining skills, new employees, women and men in the lubrication profession

Educate career steps appointment first lubricator, winner best improvements


Mission statement, create joint lubrication area development and content technology cooperation

Standardization LKAB's lubricants portfolio, specifying the machine groups / lubricant quality

Qualification Plan, relevant methods and evaluations tests for lubricants in critical drives the product change alt. new intron

LKAB lubricants directory, disclose future product updates, changes, plan possible. qualification needs

Plan training, targeted training

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 6	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

Critical machinery and recommended qualification

Outdoor Mobile Lubricants

Caterpillar

Engine oil cold start at conditions temperature below -20°C to -45°C . Though electric heaters are installed a cold start can be impossible at cold conditions. If the engine oil is too thick the axis has to be de mounted out door and engine warm run. For these conditions is recommended 5W-40 or 10W-40 engine oils.

Outdoor Arctic Grease

Caterpillar

Ultra 5 Moly Grease, NLGI 1, 5% MoS₂. This product has a long qualification history. If to test a new product the qualification period must be long and stretching over all season. A restriction to overloading has to be established at low temperature below -20°C .

Engine oils and fluids

Rigs

Rigs in open pit mines run on the day and left the field in the evening. When power is not usually available starting the engine cold in the morning, all year round. Night-time temperature in open-pit mines in the winter is often colder than -35°C and the temperature can fall below -45°C . For these conditions, Atlas-Copco recommended 0W-40 or 5W-40 engine oil.

Hydraulic oils

Stationary indoor systems


Electric engines for mills or heavy hydraulic systems $>3\text{MW}$ to 8MW , oil viscosity risk down shearing in heavy loaded slide bearing systems or worn pumps. Continuous oil analysis is recommended to verify if the system oil has to be changed before the planned maintenance stop.

Intense hydraulic systems with warm to cold temperature risk varnish deposition, overheating and mal function. The oil quality can be degraded and short in life span. Recommended to detect varnish prone systems and follow up with oil analysis and MPC-test if oils has to be changed more frequently or system to be cleaned, cooling to be upgraded, oil quality or grade to be changed. There are filtering methods for varnish with mesh less than $1\mu\text{m}$.

Front loader hydraulic systems underground mine

From previous experience of the vendor / product change has been the biggest problems occurred in the hydraulic systems on loaders underground.

Recommendation is that after performed mixing test on compatibility be full-scale test performed with selected loader into production. In this test, the machine is filled with various mixtures percent of the old and new hydraulic 90/10, 50/50, 10/90 and evaluated with careful condition monitoring

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 7	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

and regular oil samples.

Thereafter a longer qualifying period 2000 hours to accompany the product and machine in production. When changing oil, drained the tank that might contain only half of the entire system. The machine must therefore have received at least 3 services oil changes for having given high oil mixture. At every 250 hours service should include condition monitoring and oil analysis. Suitable oil analysis is a series of viscosity, acid number, wear particles, water, MPC- and color number.

Front loader axels underground mine

The teeth in the rear axle on loaders underground is subjected to extreme forces due to high load weight and extreme engine power. Since most of the machines have electric engine they have extremely high torque force at stop and start. LKAB along with the oil supplier have had a long qualifying period of lubricant with very high viscosity index (VI) which delivers the right protection to the teeth.

HD -1000 cSt Oils

Pelletizing machinery Grate Kiln and Cooler hydraulic systems

Hot parts (Grate, Kiln, Cooler) in both SK and KK4 are driven by hydraulic engines. These hydraulic systems are critical to the reliability of the pelletizing plants. If product change a blend of old and new hydraulic should be avoided. Qualifying tests should include oil analysis of systems, compatibility / foaming tests and down shearing KRL. Thereafter, a test notification sent to the management and evaluation of status control and regular oil analysis.

Gear oils

Indoor gear oils.

Mill gearboxes, the gearboxes to remain operational in the ANR section 06, KA2, KA3, SA has large volumes of lubricating oil at high risk of foaming at the improper mixing. Risk of foaming are particularly high in the ANR section 06 where lubrication units lack oil reservoir. The lubricating oil to the ANR section 06 should be replaced completely with the new. The mills in KA2 and KA3 has large oil tanks with several cubic meters of oil per mill which makes it impractical to replace everything at once. It is therefore important that accurate mixing test compatibility is performed on this particular transmission oil.

Bearing and multipurpose greases

Normal temperature greases.

High temperature greases.

Compatibility mixed greases, generally to avoid mixing greases clean or over smear the bearings, some thickeners and some base oil types are not compatible, take advice from the lubricants supplier.



2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 8	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

Table. Compatibility Greases

Eng	Lithium	Calcium	Lithium/ Calcium	Lithium- Complex	Calcium- Complex	Aluminum- Complex	Clay/ Bentonite	Diurea/ Polyurea	Natrium
Lithium									
Calcium									
Lithium/ Calcium									
Lithium-Complex									
Calcium-Complex									
Aluminum-Complex									
Clay/ Bentonite									
Diurea/ Polyurea									
Natrium									
				Compatible		No comp		Limited	

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 9	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

Purity Requirements for lubricating and hydraulic oils in LKAB

Below are recommendations on which purity requirements on oil systems and the machine elements has to meet at LKAB. The recommendations are based on ISO standards and recommendations from the manufacturer of the equipment. The values can be used as guidelines for the filtration of oil systems.

Stationary hydraulics – LKT

The following general purity requirements for stationary hydraulics applies LKAB and which is described in the document LKT 1520.600.003. Purity level must be on ISO 4406 15/11. For servo systems 13/9.

Mobile hydraulics – LKS

The following general requirements of mobile hydraulics applies LKAB and which is described in the document LKS 090.01. The purity level according to ISO 4406 17/13. . For servo systems 13/9.


Machines or machine elements - ISO


The following recommendations are given in ISO 4406: 1999.

Servo valves	13/12/10
Proportional valves	14/13/11
Variable displacement pump	15/14/12
Vane pump	16/15/12
Piston pump	16/15/12
Gear pump	16/15/12
Roller bearings	15/14/12
Plain bearings	16/15/12
Ball bearings	14/13/11
Industrial transmission	16/15/12
Diesel engine	17/16/14

Recommendations from manufacturers

Hydrostatic bearings (SKF)	t.b.d. SKF Handbook
Hydraulic engines (Hägglunds)	16/13 water content > 0.05% (500 ppm)

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 10	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 11	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

LKAB Lubricant portfolio and selected product catalogue

The LKAB general need of lubricants quality, specification and grades are listed in the LKAB Lubricant portfolio.

LKAB Lubricant catalogue selected products lubricants for industry

The preferred product is listed on the **top line** in each quality and grade and supplied by the lubricant agreement.

The second line products are qualified proven by history at LKAB's facilities.

The viscosity (SAE) or (ISO VG) in (40°C,mm²/s) (centistoke).


Outdoor Mobile Lubricants

Caterpillar 793 Truck, 994H Front loader.

Product	Spec	Viscosity (SAE)	Base oil	Packing (ltr.)
Texaco Ursa Premium TD Cat DEO Shell Rimula R4 X	ECF-1a ECF-2	15W-40	M	Bulk
Delo 400 LE Synthetic Cat DEO-ULS SYN Shell Rimula Ultra Shell Rimula R6 LM	ECF-3	5W-40 5W-40 5W-30 10W-40	S	Bulk
Cat HYDO Advanced Shell Spirax S4 CX	HVI DIN 51524-3	10W Min.10mm ² /s	M	209 / Bulk
Texaco Ursa TorqForce Cat TDTO Shell Spirax S4 CX	TO-4	SAE 10W, 30, 50	M	Bulk
Cat FDAO SYN Shell Spirax S5 CFD M	FD-1	50	S	
Chevron Final Drive Cat FDAO Shell Spirax S5 CFD M	FD-1	60	M/S	Bulk

Caterpillar 6060FS Front loader hydraulic.

Product	Spec	Viscosity	Base oil	Packing (ltr.)
Cat Long Term Hydraulic Fluid HSS Shell Tellus S4 VX 32	ISO 6743- 4 CLP	SAE 10W	M	209 / 20
Texaco Meropa Synthetic EP 220 Cat Gear Oil CLP 220 LT Shell Omala S4 GX 220	DIN 51517-3 CLP	ISO VG 220	S	1000 / 209 / 20 / Bulk

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 12	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

Outdoor Arctic Grease

Caterpillar 793 Truck, 994H Front loader.

Product	Spec	Viscosity (40°C,mm ² /s)	Base oil	Packing (kg)
Cat Extreme Appl Grease Arctic, NLGI 0 Cat Arctic Platinum, NLGI 0 Shell Gadus S4 OGT, NLGI 0 Shell Gadus S4 OGXX, NLGI 00/000	Cat SA 11-005 SD 4713 - 50C	60	M / S Li.comp. MoS2 5%	170
Cat Ultra 5 Moly Grease, NLGI 1 Shell Gadus S5 V150 XKD 1	Bucyrus SD 4711 P&H 472	150	M Ca.Sulf. MoS2 5%	170

Caterpillar 6060FS Hydraulic excavator.

Product	Spec	Viscosity (40°C,mm ² /s)	Base oil	Packing (kg)
Fuchs Urethyn HG 0 Shell Gadus S4 OGXX	Cat SA 11-005 SD 4713 -50C	40	M + S Li MoS2 max.3%	170
BM All Season Grease, NLGI 1 Shell Gadus S5 V150 XKD 1	Bucyrus SD 4711 P&H 472	70	M + S Li MoS2 max.3%	170


Engine oils and fluids

Engine oils Trucks.

Product	Spec	Viscosity (SAE)	Base oil	Packing (ltr.)
Texaco Ursa Premium TD Mobil Delvac MX Shell Rimula S4 X	VDS-3/2 MB 228.3	15W-40		1000 / 209 / 20
Texaco Ursa Ultra LE Mobil Delvac MX ESP Shell Rimula R4 L	VDS-4	15W-40		1000 / 209 / 20
Texaco Ursa Premium TDS Shell Rimula R6 MS	LDF-3	15W-40 10W-40		1000 / 209 / 20

Engine oils Cars.

Product	Spec	Viscosity (SAE)	Base oil	Packing (ltr.)
Texaco Havoline Synthetic Mobil Super X1 2000 Shell Helix HX7 Shell Helix HX7	VW 502.00, 505.00	5W-40 10W-40 5W-40 10W-40		1000 / 209 / 20
Texaco Havoline Energy Mobil 1 FE Shell Helix Ultra A5/B5	Volvo	0W-30		1000 / 209 / 20
Texaco Havoline Ultra V Mobil 1 ESP Shell Helix Ultra ECT C2/C3	VW 504.00, 507.00	5W-30 5W-30 0W-30		1000 / 209 / 20
Texaco Havoline Energy	Ford913-D	5W-30		1000 / 209 / 20

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 13	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

Shell helix Ultra prof. AF				
----------------------------	--	--	--	--

MTF Trucks.

Product	Spec	Viscosity (SAE)	Base oil	Packing (ltr.)
Texaco Multigear MTF HD Mobil Delvac Syn Trans V.30 MTL Shell Spirax S6 GXME		75W-80		1000 / 209 / 20

ATF/Servo.

Product	Spec	Viscosity (SAE)	Base oil	Packing (ltr.)
Texaco Havoline Multi-Vehicle ATF RedLine ATF 4	ATF D-4			1000 / 209 / 20
Synthetic ATF Heavy Duty Mobil ATF 320 Shell Spirax S4 ATF HDX	Volvo 97341 AT 101			1000 / 209 / 20
Texamatic 7045E RedLine Power steering fluid Shell Spirax S4 ATF HDX	Dexron III			209

Axel gear oils.

Product	Spec	Viscosity (SAE)	Base oil	Packing (ltr.)
Texaco Geartex LS Mobillube Syn LS Shell Spirax ALS		80W-90 75W-90 80W-90		1000 / 209 / 20
Texaco Multigear S Mobillube 1 SHC Shell Spirax S5 ATE	API GL-4, GL-5	75W-90		1000 / 209 / 20
Texaco Multigear Mobillube HD-N Shell Spirax AS		80W-140		1000 / 209 / 20


Utto oils.

Product	Spec	Viscosity (SAE)	Base oil	Packing (ltr.)
Texaco Textran TDH Premium Statoil Transway WB Shell Spirax S4 TXM	API GL-4 WB 101	80W		1000 / 209 / 20
Texaco Textran WBT	API GL-4 WB 102		S	1000 / 209 / 20

Heavy gear oils

Front loaders.

Product	Spec	Viscosity (SAE)	Base oil	Packing (ltr.)
Texaco Geartex LS Statoil Gearway XL S5 Shell Spirax S3 AX Shell Spirax S2 ALS		85W-140 80W-140 85W-140 85W-140		IBC

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 14	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

RedLine		85W-280		IBC
---------	--	---------	--	-----

Hydraulic oils

Stationary indoor hydraulics.

Product	Spec	Viscosity (ISO VG)	Base oil (Grp.II)	Packing (ltr.)
Texaco Clarity Hydraulic Oil AW Shell Tellus S3 M	DIN51524-2: HLP	46	M	1000 / 209 / 20 / Bulk
Texaco Clarity Hydraulic Oil AW Shell Tellus S3 M	DIN51524-2: HLP	68	M	1000 / 209 / 20 / Bulk
Texaco Clarity Hydraulic Oil AW Shell Tellus S3 M	DIN51524-2: HLP	100	M	209 / 20

Outdoor hydraulics.

Product	Spec	Viscosity (ISO VG)	Base oil	Packing (ltr.)
Texaco Rando HDZ LT Shell Tellus S3 V (Zink free)	DIN51524-3: HVLP	32	M	1000 / 209 / 20 / Bulk
Texaco Rando HDZ LT Shell Tellus S3 V (Zink free)	DIN51524-3: HVLP	46	M	1000 / 209 / 20 / Bulk

Specialitys.

Product	Spec	Viscosity (ISO VG)	Base oil	Packing (ltr.)
Texaco Clarity Synthetic Hydraulic Oil AW Shell Tellus S4 ME	DIN51524-2: HLP	46	S	209 / 20
Texaco Clarity Synthetic Hydraulic Oil AW Shell Tellus S4 ME	DIN51524-2: HLP	68	S	209


White oils.

Product	Spec	Viscosity (ISO VG)	Base oil	Packing (ltr.)
Texaco Clarity Hydraulic Oil AW Univar Fuchs Lubr. FM Hydraulic Oil	Reviewed-LKAB K.B.	46	M	1000 / 209

Gear oils

Indoor gear oils.

Product	Spec	Viscosity (ISO VG)	Base oil	Packing (ltr.)
Texaco Meropa Shell Omala S2 G	DIN51517-3: CLP	68	M	1000 / 209 / 20
Texaco Meropa Shell Omala S2 G	DIN51517-3: CLP	220	M	1000 / 209 / 20
Texaco Meropa Shell Omala S2 G	DIN51517-3: CLP	320	M	1000 / 209 / 20
Texaco Meropa Shell Omala S2 G	DIN51517-3: CLP	460	M	1000 / 209 / 20
Texaco Meropa Shell Omala S2 G	DIN51517-3: CLP	680	M	1000 / 209 / 20

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 15	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

Outdoor or high temperature gear oils.

Product	Spec	Viscosity (ISO VG)	Base oil	Packing (ltr.)
Texaco Meropa Synthetic EP Shell Omala S4 GX	DIN51517-3: CLP	150	S	209 / 20
Texaco Meropa Synthetic EP Shell Omala S4 GX	DIN51517-3: CLP	220	S	209 / 20
Texaco Meropa Synthetic EP Shell Omala S4 GX	DIN51517-3: CLP	320	S	209 / 20
Texaco Meropa Synthetic EP Shell Omala S4 GX	DIN51517-3: CLP	460	S	209 / 20
Univar Gear Oil HD Shell Omala S4 GX Mobil SHC 639 Klüber Synth GEM 4-.... N	DIN51517-3: CLP	1000	S	209

Chain oils

Environmentally adapted chain oils.

Product	Viscosity (ISO VG)	Base oil	Packing (ltr.)
Preem Bio Chain Oil Univar Chain Fluid SM..Bio Shell Naturelle HF-E	68	Rapeseed Rapeseed Synthetic Ester biodegradable	209 / 20

Compressor oils

Compressor lubricants.

Product	Viscosity (ISO VG)	Base oil	Packing (ltr.)
Texaco Compressor Oil EP VDL Shell Corena S2 P	68	M	209 / 20
Texaco Compressor Oil EP VDL Shell Corena S3 R	46	M	209 / 20
Texaco Cetus PAO Shell Corena S4 R	46	S	209 / 20

Turbine Oils


Turbine oils.

Product	Viscosity (ISO VG)	Base oil	Packing (ltr.)
Texaco GST EP Shell Turbo T	32	M	209

El. Transformer Oils

El. Transformer oils.

Product	Viscosity (ISO VG)	Base oil	Packing (ltr.)
---------	--------------------	----------	----------------

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 16	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

Shell Diala S4 ZX-I		GtL Sulph. free	209 / 20
---------------------	--	-----------------	----------

Concrete release oil

Concrete release oils.

Product	Viscosity (ISO VG)	Base oil	Packing (ltr.)
Preem Release Bio 32 Univar Mould Oil 10	32	Rapseed	20

Bearing and multipurpose greases

Normal temperature greases.

Product	Viscosity (40°C,mm ² /s)	Base oil	Thickener	Packing (kg)
Shell Gadus S2 V100 2	100	M	Li	170 / 50 / 18 / 0,4
Texaco Starplex EP 3 Shell Gadus S2 V100 3	100	M	Li	170 / 50 / 18 / 0,4
Texaco Multifak EP 2 Shell Gadus S2 V220 2	200 220	M	Li	170 / 50 / 18 / 0,4
Texaco Starplex EP 2 Shell Gadus S3 V220 1.5	200 220	M	Li-comp	170 / 50 / 18 / 0,4 / Container
Texaco Starplex HT 1 Shell Gadus S3 V550L 1	550	M	Li-comp	170 / 50 / 18 / 0,4 / Container
Texaco Novatex Heavy EP 2 Shell Gadus S3 A1300C	1300	M	Ca	170 / 50 / 18 / 0,4
Texaco Molytex EP 2 Shell Gadus S2 V220AD 2	200 220	M	Li+ MoS2	170 / 50 / 18 / 0,4
Preem Synthgrease Medium Shell Gadus S5 V100 2	100	S	Li-comp	170 / 50 / 18 / 0,4

Normal temperature greases for top bearing cone crusher.


Product	Viscosity (40°C,mm ² /s)	Base oil	Thickener	Packing (kg)
Preem Mineral Grease HD 000 Univar Grease L Speed Coup. 000	920	M	Li	IBC

Outdoor temperature grease for top bearing cone crusher.

Product	Viscosity (ISO VG)	Base oil	Thickener	Packing (kg)
Castrol Tribol 3020/1000-00 - 40°C	1000	S	Li	180

High temperature greases.

Product	Viscosity (40°C,mm ² /s)	Base oil	Thickener	Packing (kg)
Klüber Stabutherm GH 461 Shell Gadus S3 T460 1.5	480 460	M	Polyurea	170
Preem Synthgrease Heavy	460	S	Li-comp	18 / 0,4

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 17	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

Shell Gadus S5 T460 1.5			Polyurea	
-------------------------	--	--	----------	--

Outdoor temperature grease for rail road.

Product	Viscosity (ISO VG)	Base oil	Thickener	Packing (kg)
Whitmore BioRail EP 1	32	Bio	Li	20

Open - or semi open gear lubricants

In open gear applications e.g. mills, balling drums, kilns; LKAB has Klüber as the first choice of supplier for lubricants. Open gear lubricants.

Product	Viscosity (40°C, mm ² /s)	Base oil	Thickener	Packing (kg)
Klüber Grafloscon C-SG 0 Ultra	680	M	Al	Bulk
Klüber C-F 3 Ultra	16500	M/S	-	IBC
Klüber C-F 4 Ultra	3100	M/S	-	IBC
Klüber Grafloscon B-SG 00 Ultra*	500	M	Al	

*running in lubricant

References

<http://preem.texaco.se/produkter>

<http://shell.univarlubricants.se/produkter/>

LKT 1520.600.003

Supplier (2016-..) product catalog

Supplier (2005-2016) product catalog

General demand purity requirements on stationary hydraulics

Suggestions for improvements

Suggestions for improvement


LKAB conducts continuous improvements in accordance with LKAB's quality policy (EN ISO 10006, paragraph 8.2 and 5.2.7), and it also applies to directives and instructions. Comments and suggestions for improvement are gratefully accepted at the following address:

instructions@lkab.com

LKAB's internal address in Outlook: SE SM Instructions LKT

LKAB strives to comply with international standards where possible and in our technical instructions, LKT, stated that the company's specific requirements and interpretation of the standards. The manual will also be the company's experience is expressed and tells LKAB's choice of alternative solutions in standards.

LKAB can also set requirements that are higher than those set in the standards. By following these guidelines are met LKAB's requirements.

2 	Document type TECHNICAL INSTRUCTION	Document number LKT 1500.500.002	Page 18	of 18
Prepared by Christian Gahm / TPT	Replaces	Project number	Revision 02	Date 2017-03-31
Approved by Christian Gahm / TPT	Title Lubricant portfolio	lang en	Technical area General	
Status Approved	Subtitle Lubricant catalog of selected lubricants for industry	Plan reference/ Objekt		

Appendices