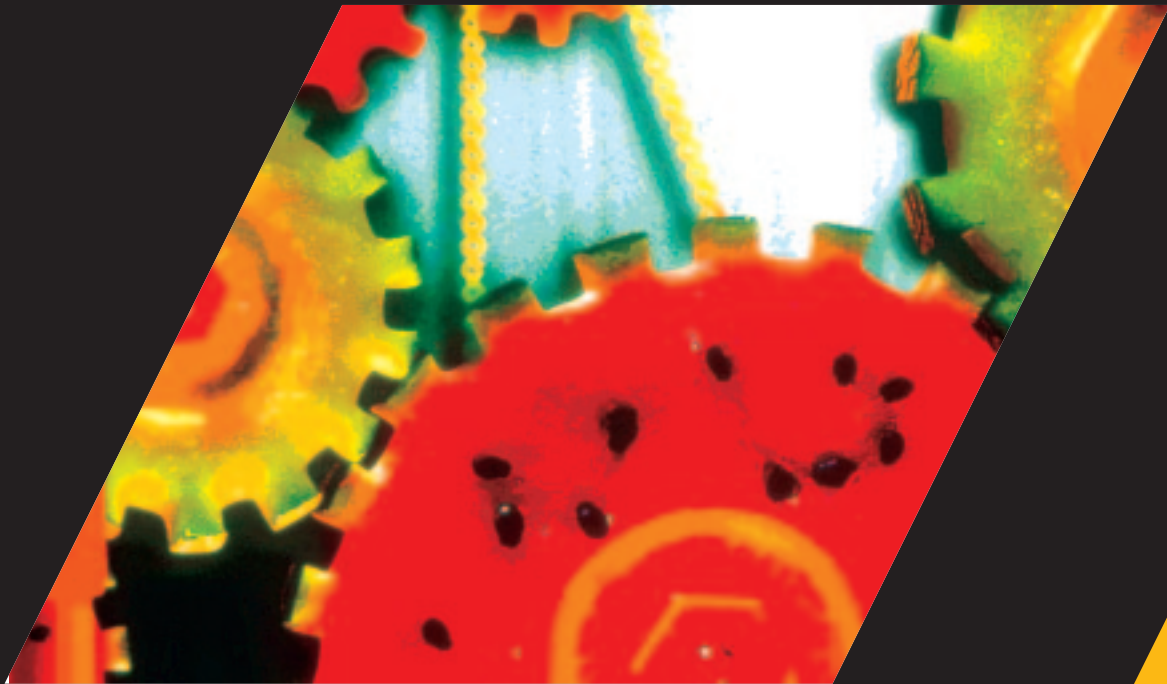


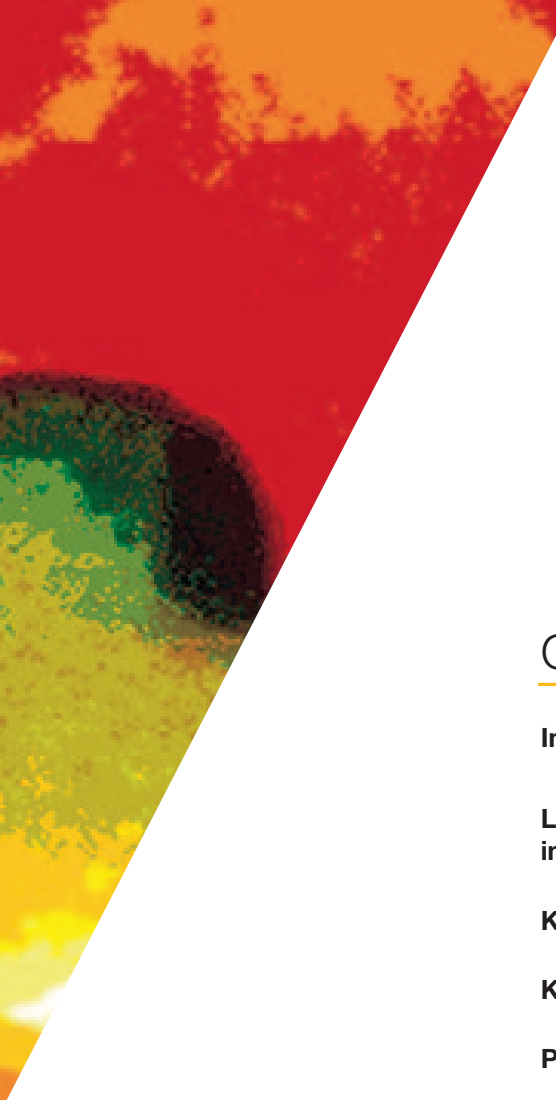
KLÜBER
LUBRICATION

Lubricants ...



... for the food-processing industry

Lubrication is our World



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Improve the Quality & Protect the Environment

A simple philosophy pays off twice

Provide only top quality products and services and your customers will hold you in high esteem. Based on this philosophy, Klüber has been manufacturing speciality lubricants for almost 80 years.

With more than 30 subsidiaries, 14 production plants and more than 1,700 employees worldwide, Klüber is your reliable partner in lubrication engineering.

Selected raw materials, highly qualified experts, high-tech production facilities and stringent safety tests ensure the consistent quality of our products.

To protect both people and nature, we offer special lubricants with a long service life, high stability, and exceptional environmental compatibility. The environmental award we received from the City of Munich testifies to our success

in this respect. The first company in Munich to pass the EC Eco Audit, Klüber actively pursues a global environmental management policy in line with the ISO 9001 quality management system.

Based on our long-standing experience we are in a position to support the food-processing industry efficiently in their due care towards the consumer.

The prompt technical consulting services we provide locally and our uniform quality standards around the globe are one of the many reasons why such sensitive sectors as the food, pharmaceutical and tobacco industries, rely on Klüber.

Your total satisfaction is a challenge we're confident to meet.



Lubricants for the food-processing industry

Lubricants for incidental food contact

For decades Klüber has been developing and manufacturing special lubricants tailored to suit the requirements in the food-processing industry.

Lubricants for technically unavoidable product contact¹ have to:

- comply with food regulations
- be physiologically inert
- be without taste or smell and
- be internationally approved.

Furthermore, lubricants for technically unavoidable product contact have to meet general technical requirements, i.e.

- reduce friction and wear
- protect against corrosion
- dissipate heat and
- have a sealing effect.

Depending on the operating conditions and manufacturing processes in the individual food-processing plant, food-grade lubricants have to ensure for example

- resistance to food products
- resistance to chemicals
- resistance to water
- neutral behaviour towards plastics and elastomers
- steam resistance
- sugar dissolving properties
- compatibility with rubber and sealing materials.

Historically the USDA (United States Department of Agriculture) but now the NSF (National Sanitation Foundation), an internationally recognised institute offering a comprehensive certification programme for drinking water and food-processing, registers lubricants for use in the food industry.

The lubricant manufacturer has to prove that all ingredients used in its formulation are on the FDA (U.S. Food and Drug Administration) list of allowable substances in accordance with the Guidelines of Security CFR 21², section 178.3570.

¹ These lubricants are applicable in the food, pharmaceutical, cosmetics, tobacco and animal feeds industries

² Code of Federal Regulations

Based on the specified raw material lists, NSF registration is done in two categories:

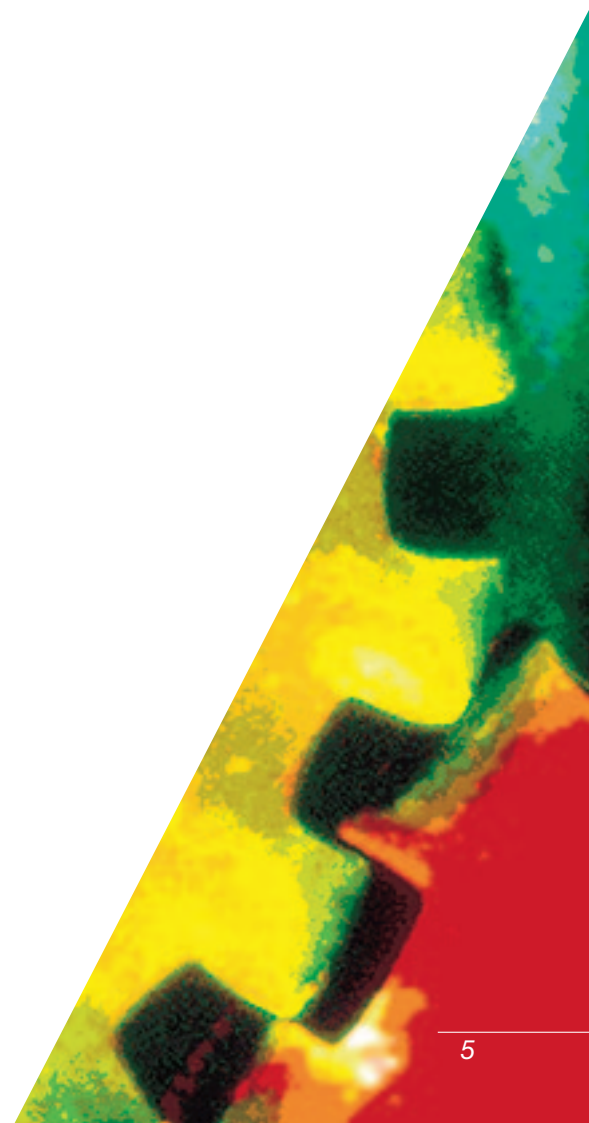
Speciality lubricant according to NSF H1:

Suitable for an incidental, technically unavoidable contact with the food product.

Manufacture (constituents, quantity and purity) conforming strictly to FDA 21 CFR § 178.3570

Speciality lubricant according to NSF H2:

Suitable for use in the food-processing industry provided that a contact with the food product is absolutely impossible.



Klüber takes initiative

Klüber working for a common goal

As a manufacturer of H1 lubricants for technically unavoidable product contact, we accepted the challenge of meeting the requirements of the ISO 21469 standard for H1 lubricants. ISO 21469 determines hygiene requirements for the formulation, manufacture and use of H1 lubricants.

The NSF developed a certification procedure on the basis of ISO 21469, which includes the yearly inspection of the plant by an NSF auditor with regard to the adherence to strict hygiene requirements to prevent contamination during the manufacture of H1 lubricants. In addition to that, product samples are taken on an annual basis and analysed for contamination, and even lubricant packs, storage and use are evaluated during the audit.

**The clean solution for high requirements: Klüber H1 lubricants
NSF H1-registered and
NSF ISO 21469-certified
for more product responsibility!**



ISO 21469 Certified



Nonfood Compounds
Category Code: H1
Registration No.

Do you have any questions?
We have the answer. Just write us an
e-mail: iso21469@klueber.com

Klüber Lubricants

Service and more

All the lubricants we offer for the food-processing industry have been developed and tested on the basis of our worldwide experience and R&D work. They are either registered according to or correspond with NSF H1/H2.

In addition to a great many of NSF H1/H2-lubricants, Klüber also offers a full range of synthetic and mineral oil-free food-grade lubricants of high performance.

Test results obtained on the Klüber worm gear test rig show that synthetic, mineral oil-free food-grade lubricants outperform mineral oil-based lubricants. For example, wear rates of synthetic food-grade oils lie below those of a mineral oil.

Due to the better friction coefficient of our synthetic oils, the efficiency is higher and oil temperatures are lower. As a consequence, energy consumption is reduced and the oil service life increased.

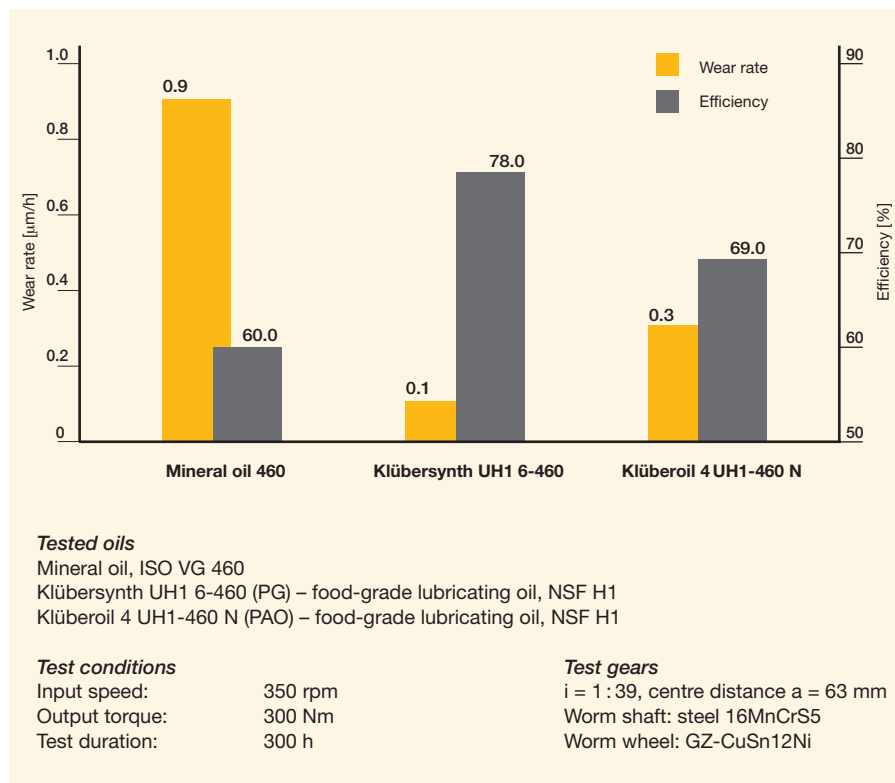
All-round lubrication engineering service

The service designed to ensure optimum lubrication management systems to be delivered by careful consideration of both personnel and machines. Our service tool selection comprises:

- Extensive technical consulting services provided locally by our application-engineering team.
- Lubrication training workshops.
- Worldwide uniform designation and availability of Klüber products.
- We assist you in HACCP¹ analyses by classifying lubrication points locally, and we offer customer training and seminars at our headquarters and at your company.
- Production sites specifically qualified for the manufacture of H1 food-grade lubricants.
- Kosher certification of the production sites takes place once a year.
- Self-certification of individual products for FDA 21 CFR 178.3570 on request.
- Apart from streamlining the products used in your production area, our Service Engineers help you optimise the lubrication quantity and intervals according to your operating conditions.
- We assist you in first-time product application in situ.

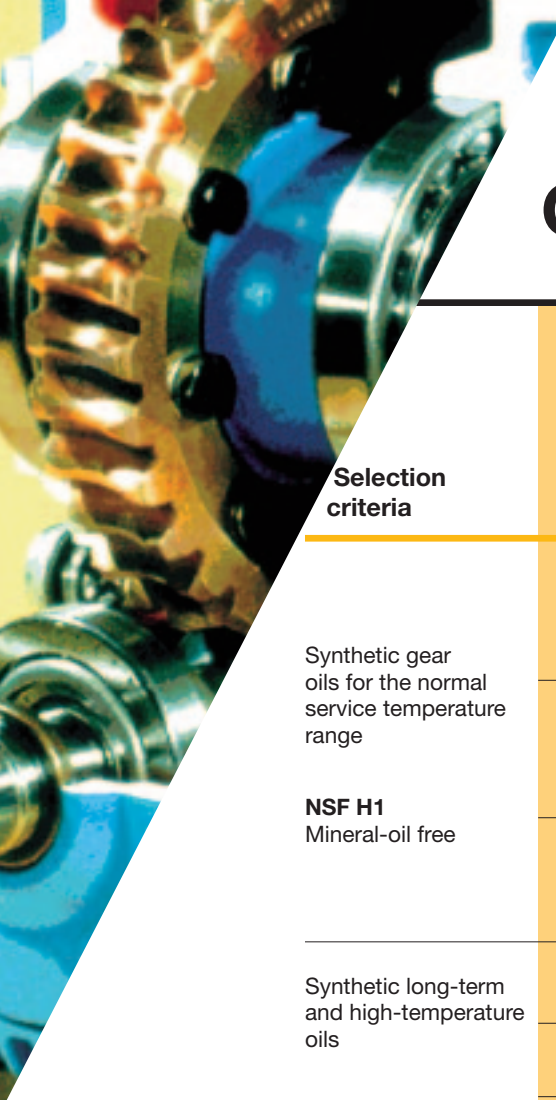
- We offer a special software for managing and monitoring your lubrication points.
- Used lubricant analyses ensure optimum lubrication intervals, thus providing economical advantages for your company and conserving nature's resources.
- Should your particular requirements go beyond our wide product range, we also develop customised products.

We recommend contacting our Consulting Service to discuss the service tools required which can be delivered in a customised service programme.



¹ Hazard Analysis and Critical Control Point

Gears



Selection criteria	Product	Base oil	Service temperature range* [°C] ≈	ISO VG DIN 51 519	Density at 20 °C [g/ml] DIN 51 757 ≈
Synthetic gear oils for the normal service temperature range NSF H1 Mineral-oil free	Klüberoil 4 UH1-150 N	synth. hydrocarbon oil, ester oil	- 30 to 120	150	0.85
	Klüberoil 4 UH1-220 N	synth. hydrocarbon oil, ester oil	- 30 to 120	220	0.85
	Klüberoil 4 UH1-460 N	synth. hydrocarbon oil, ester oil	- 30 to 120	460	0.86
Synthetic long-term and high-temperature oils NSF H1 Mineral-oil free	Klübersynth UH1 6-150	polyglycol oil	- 35 to 160	150	1.05
	Klübersynth UH1 6-220	polyglycol oil	- 30 to 160	220	1.05
	Klübersynth UH1 6-460	polyglycol oil	- 30 to 160	460	1.05
Multi-purpose gear oils NSF H2	Klüberoil GEM 1-150 N	mineral oil	- 5 to 100	150	0.85
	Klüberoil GEM 1-220 N	mineral oil	- 5 to 100	220	0.85
	Klüberoil GEM 1-460 N	mineral oil	0 to 100	460	0.85

Selection criteria	Product	Base oil/ thickener	Service temperature range* [°C] ≈	Density at 20 °C [g/cm³] ≈	Base oil viscosity DIN 51 562 pt. 1 [mm²/s] at ≈ 40 °C 100 °C		Colour
Synthetic, fluid gear grease Compliant with NSF H1 Mineral-oil free base oils	Klübersynth UH1 14-1600	synth. hydrocarbon oil/ Al complex soap	- 45 to 120	0.85	160	21	light yellow

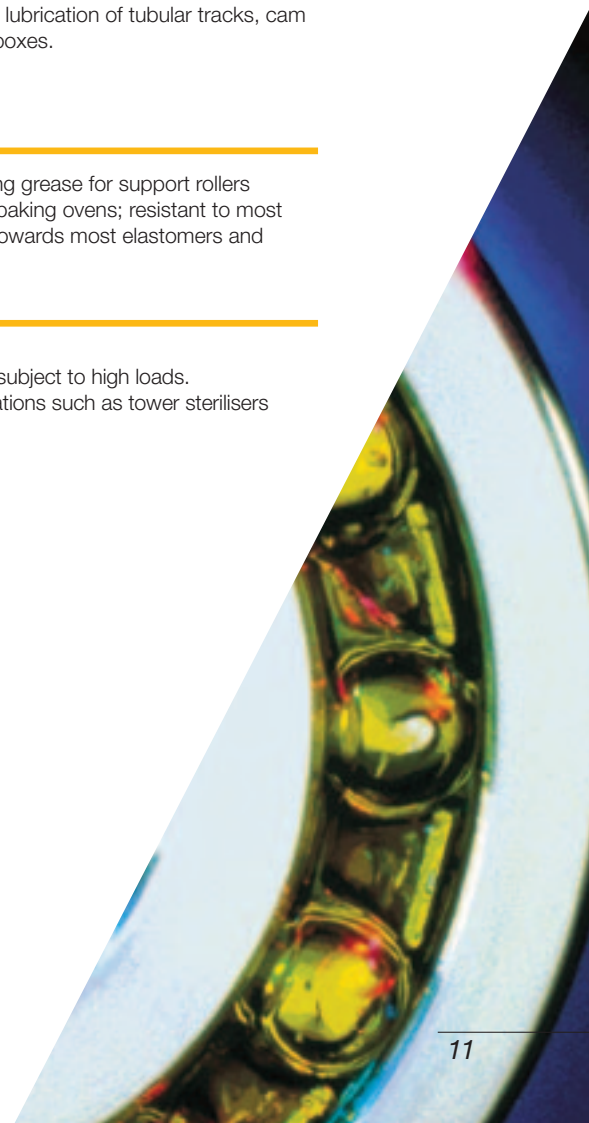
Kinematic viscosity DIN 51 562 pt. 1 [mm ² /s] at 40 °C ≈ 100 °C		Viscosity index DIN ISO 2909 (VI) ≈	Pour point DIN ISO 3016 [°C]	Notes
150	19	150	≤ - 30	Wide service temperature range, good ageing and oxidation stability, good wear protection and load-carrying capacity, good corrosion protection, neutral towards sealing materials and paints. Klüberoil 4 UH1-68 N ... 1500 N-oils comply with CLP requirements DIN 51 517 T3; scuffing load stage > 12 in the FZG test, DIN 51 354, pt. 2, A/8.3/90. For the lubrication of spur, bevel and worm gears.
220	26	150	≤ - 30	
460	47	150	≤ - 30	
150	28.5	> 210	< - 35	Good ageing and oxidation stability, good wear protection; reduces friction; complies with CLP requirements; not miscible with mineral and synthetic hydrocarbons; good corrosion protection; compatibility with sealing materials and paints has to be checked. Scuffing load step 12 in the FZG test, DIN 51 354, pt. 2 A/8.3/90. For the lubrication of worm gears with steel/bronze gear wheels, but also for the lubrication of all types of spur and bevel gears operating at increased temperatures.
220	41	> 220	< - 35	
460	73	> 240	< - 30	
150	15	90	< - 10	Ageing and oxidation resistant; protects against wear; meets CLP requirements, scuffing load stage > 12 in the FZG test, DIN 51 354, pt. 2, A/8.3/90. For the lubrication of friction points subject to high loads in spur, bevel and worm gears.
220	19	90	< - 10	
460	30	85	< - 10	

Drop point DIN ISO 2176 [°C]	Speed factor** [n · d _m] mm × min ⁻¹ ≈	Worked penetration DIN ISO 2137 [0.1 mm]	Consistency NLGI grade DIN 51 818	Apparent dynamic viscosity KL viscosity grade	Notes
> 220	500,000	400 to 430	00	EL	Applicable through centralised lubrication systems; good wear protection; good corrosion protection; scuffing load stage 12 in the FZG special test A/2.76/50. For splash lubrication of toothed and worm gears.

Rolling bearings

Selection criteria	Product	Base oil/ thickener	Service temperature range* [°C] ≈	Density at 20 °C [g/cm ³] ≈	Base oil viscosity DIN 51 562 pt. 1 [mm ² /s] at		Colour
					40 °C	100 °C	
Lubricating grease for a wide service temperature range Compliant with NSF H1 Mineral-oil free	Klübersynth UH1 64-62	synth. hydro-carbon oil, ester oil, silicate	- 40 to 150	0.92	65	10	beige
Smooth running grease with good low-temperature behaviour NSF H1 Synthetic	Klübersynth UH1 14-31	synth. hydro-carbon oil, ester oil/ Al complex soap	- 45 to 120	0.90	30	6	white
Adhesive lubricating grease Compliant with NSF H1 Mineral-oil free	Klübersynth UH1 64-1302	synth. hydro-carbon oil, silicate	- 10 to 150	0.99	1,300	100	beige
High-temperature, long-term grease NSF H1	BARRIERTA L 55/2	PFPE / PTFE	- 40 to 260	1.96	420	40	white
Bearing applications subject to high loads NSF H1	Klüberfood NH1 94-402	white oil/ calcium complex soap	- 30 to 140	0.97	400	40	beige

Drop point DIN ISO 2176 [°C]	Speed factor** [n · d _m] mm × min ⁻¹ ≈	Worked penetration DIN ISO 2137 [0.1 mm]	Consistency NLGI grade DIN 51 818	Apparent dynamic viscosity KL viscosity grade	Notes
none	500,000	265 to 295	2	L	Good wear protection, good water resistance, high ageing and oxidation stability, good corrosion protection, good resistance to aggressive media. Also suitable for the lubrication of guide bars, lifting cylinders and joints.
> 220	800,000	310 to 340	1	L	Excellent low-temperature behaviour; good water resistance, good corrosion protection; high ageing and oxidation stability; Applicable through centralised lubrication systems. Suitable for use in freezing and deep-freezing tunnels.
none	50,000	265 to 295	2	S	For rolling bearings subject to high loads and low speeds, excellent wear protection; good water and hot steam resistance. Also suitable for the lubrication of tubular tracks, cam plates and stuffing boxes.
not measurable	300,000	265 to 295	2	S	Long-term lubricating grease for support rollers in automatic waffle baking ovens; resistant to most chemicals; neutral towards most elastomers and plastics.
≥ 250	–	280 to 310	2	–	For rolling bearings subject to high loads. Pumpable in applications such as tower sterilisers and pelletisers



Plain bearings/joints

Selection criteria	Product	Base oil/ thickener	Service temperature range* [°C] ≈	Density at 20 °C [g/cm ³] ≈	Base oil viscosity DIN 51 562 pt. 1 [mm ² /s] at		Colour
					40 °C	100 °C	
Universal lubricating grease NSF H1 Synthetic	Klübersynth UH1 14-151	synth. hydro- carbon oil/ Al complex soap	- 40 to 120	0.92	150	22	beige
White lubricating paste Compliant with NSF H1 Mineral-oil free, metal-free	Klüberpaste UH1 84-201	synth. hydro- carbon oil/ PTFE	- 45 to 120	1.13	200	75	white
Sugar-dissolving oil Compliant with NSF H1 Mineral-oil free	Klüberfood NH1 6-10	polyalkylene glycol oil	- 5 to 80	1.06	12	-	colourless- yellowish
Adhesive lubricating grease NSF H2	POLYLUB GA 352 P	mineral oil/ synth. hydro- carbon oil, Al complex soap	- 35 to 120	0.92	210	20	amber

Corrosion protection

Selection criteria	Product	Service temperature range* [°C] ≈	Density at 20 °C [g/cm ³] ≈	Colour
Grease-like corro- sion protection NSF H1	Klüberfood NH1 K 32 Spray	- 10 to 80	0.88	transparent

Drop point DIN ISO 2176 [°C]	Speed factor** [n · d _m] mm × min ⁻¹ ≈	Worked penetration DIN ISO 2137 [0.1 mm]	Consistency NLGI grade DIN 51 818	Apparent dynamic viscosity KL viscosity grade	Notes
> 250	300,000	310 to 340	1	L / M	Applicable through centralised lubrication systems; good water resistance; good wear protection; good corrosion protection: also suitable for the lubrication of gears, lifting cylinders, guide bars, cam plates.
> 240	–	310 to 340	1	S	Excellent low-temperature behaviour; good load-carrying capacity, good corrosion protection; neutral towards alloyed steels; universal assembly and screw paste. Assembly and lubricating paste for low-speed plain bearings, for guide rails, hinges, rollers etc.
–	–	–	–	–	Lubricating capacity; good wear and corrosion protection; particularly suitable for friction points subject to sugar, such as rocking levers, chain links, sensors, spindles, levers etc. For use on functional surfaces of tablet compressing, packaging, tin foiling and wrapping machines.
> 220	500,000	280 to 310	–	L / M	Water-resistant lubricating grease for plain bearings, racks, cylinder guides, pneumatic cylinders, support rollers, sliding rails.

**Salt spray test, DIN 50 021,
5% NaCl solution at 35 °C,
material steel 101-A
Corrosion after 50 h
[corrosion degree]**

≤ 1

Taps, valves, fittings

Selection criteria	Product	Base oil/ thickener	Service temperature range* [°C] ≈	Density at 20 °C [g/cm ³] ≈	Colour	Drop point DIN ISO 2176 [°C]
Sealing grease for valves & fittings NSF H1 Mineral-oil free	PARALIQ GTE 703	silicone oil/ PTFE	- 50 to 150	1.31	white	> 250
Sealing grease for valves & fittings in aseptic applications NSF H1	Klübersynth UH1 64-2403	synth. hydro- carbon oil/ silicate	- 10 to 140	0.87	beige	none
	Klüberfood NH1 87-703 Hygienic	synthetic hydrocarbon oil/ silicate	- 45 to 150	1.32	white	≥ 250

Hydraulic systems

Selection criteria	Product	Base oil	Service temperature range* [°C] ≈	ISO VG DIN 51 519	Density at 20 °C [g/ml] DIN 51 757 ≈
Hydraulic oil Compliant with NSF H1 Mineral-oil free	Klüberfood 4 NH1 68 Klüber-Summit HySyn FG 68	synth. hydro- carbon oil	- 40 to 135	68	0.83

Pneumatic systems

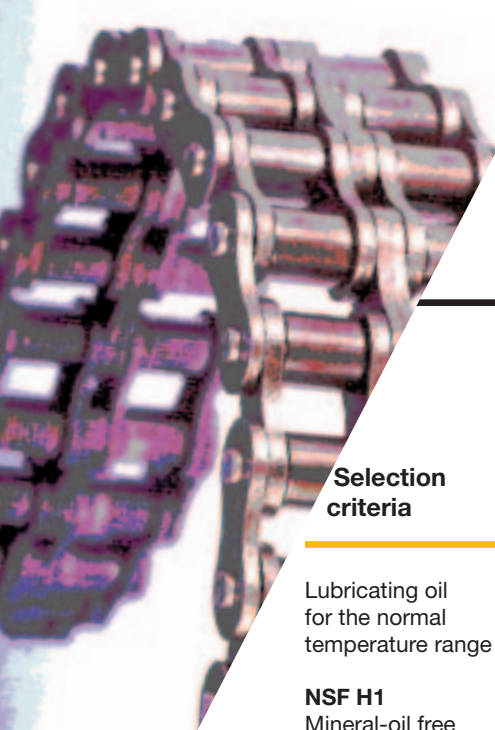
Selection criteria	Product	Base oil	Service temperature range* [°C] ≈	ISO VG DIN 51 519	Density at 20 °C [g/ml] DIN 51 757 ≈
Pneumatic oil for pressurised air maintenance units NSF H1 Mineral-oil free	Klüber-Summit HySyn FG 32	synth. hydro- carbon oil	- 45 to 135	32	0.83

Worked penetration DIN ISO 2137 [0.1 mm]	Consistency NLGI Klasse DIN 51 818	Apparent dynamic viscosity, KL viscosity grade	Compatible with elastomers ¹	Notes
220 to 250	3	S	EPDM, FPM, NBR	PARALIQ GTE 703 has also been certified as NSF 51 and NSF 61 . Resistant to disinfectants and cleaning agents; does not affect beer froth formation, resistant to hot and cold water; neutral in smell or taste. For use in bottling machines.
220 to 250	3	S	NBR	
220 to 250	3	S	EPDM, FPM, NBR	Resistant to disinfectants and cleaning agents; does not affect beer froth formation; resistant to hot and cold water; neutral in smell and taste. For use in bottling machines. Designed for use in aseptic filling machines where high levels of hygiene are required.

¹ The data in this product selection is based on our current knowledge and does not imply any claim to completeness. Owing to the many different elastomer compositions, we recommend having their compatibility checked by the elastomer manufacturer prior to series application.

Kinematic viscosity DIN 51 562 pt. 1 [mm ² /s] at 40 °C 100 °C		Pour point DIN ISO 3016 [°C]	Notes
66	9.9	≤ - 45	Good oxidation stability, wide service temperature range, complies with VDL- (DIN 51 506) and HLP- (DIN 51 524 pt. 2) requirements.

Kinematic viscosity DIN 51 562 pt. 1 [mm ² /s] at 40 °C 100 °C		Viscosity index DIN ISO 2909 (VI) ≈	Pour point DIN ISO 3016 [°C]	Notes
32	5.9	130	≤ - 50	Air compressor oil with good oxidation stability



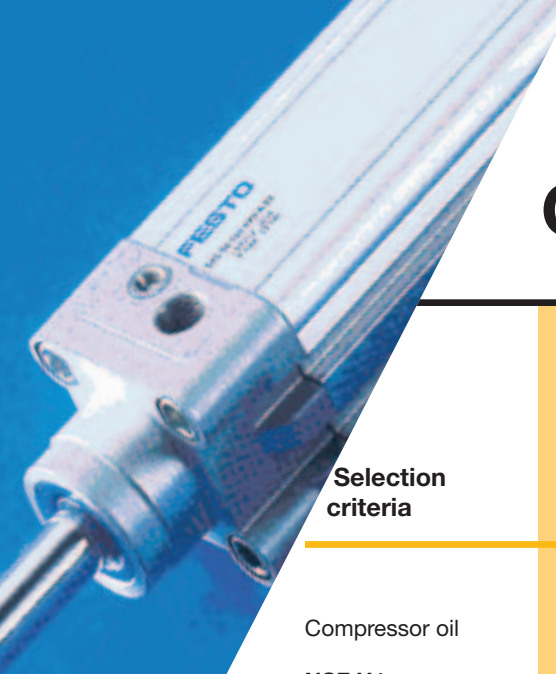
Chains

Selection criteria	Product	Base oil	Service temperature range* [°C] ≈	ISO VG DIN 51 519	Density at 20 °C [g/ml] DIN 51 757 ≈
Lubricating oil for the normal temperature range NSF H1 Mineral-oil free	Klüberoil 4 UH1-460 N	synth. hydrocarbon oil, ester oil	– 30 to 120	460	0.86
Low-temperature oil NSF H1 Mineral-oil free	Klüberoil 4 UH1-68 N	synth. hydrocarbon oil, ester oil	– 35 to 120	68	0.84
Highly viscous lubricating oil NSF H1 Mineral-oil free	Klüberoil 4 UH1-1500 N Spray <i>data of the solvent-free active agent</i>	synth. hydrocarbon oil, ester oil	– 20 to 120	1,500	0.89
High-temperature chain oil NSF H2	Klüberoil YF 100	polyalkylene glycol oil solid lubricant	– 30 to 500	–	1.04
Intrinsically viscous long-term lubricant NSF H2	STRUCTOVIS EHD	synth. hydrocarbon oil, mineral oil	– 5 to 120	460	0.89
Mineral-oil free high-temperature chain oil NSF H1	Klüberfood NH1CH2-220	ester oil	0 to 250	220	0.95

Kinematic viscosity DIN 51 562 pt. 1 [mm ² /s] at 40 °C ≈ 100 °C		Viscosity index DIN ISO 2909 (VI) ≈	Pour point DIN ISO 3016 [°C]	Notes
460	47	150	< - 30	Good wear protection, load-carrying capacity and corrosion protection. For the lubrication of lifting, drive and transport chains, spindles and joints.
68	11	140	< - 35	Good wear protection, high load-carrying capacity. Suitable for the lubrication of lifting, drive and transport chains.
1,500	125	180	< - 25	Good wear and corrosion protection and EP properties, high ageing and oxidation stability, load-carrying capacity. Suitable for the lubrication of lifting, drive and transport chains.
120	20	-	-	Solid-matter containing high-temperature chain oil for the lubrication of transport chains in prebaking ovens equipped with plates; good wetting properties, excellent penetrating properties; above 200 °C gradual transition to dry lubrication.
460	36	> 100	- 10	Good adhesion, good wear and corrosion protection, provides Hydrokapilla effect (penetrates beneath moisture / water); suitable for transport chains in the wet zone.
200 to 240	17	70	-	Low evaporation, low residue formation for cleaner chains.



Compressors



Selection criteria	Product	Base oil	Service temperature range* [°C] ≈	ISO VG DIN 51 519	Density at 20 °C [g/ml] DIN 51 757 ≈
Compressor oil NSF H1 Mineral-oil free	Klüber-Summit HySyn FG 46	synth. hydrocarbon oil	- 40 to 135	46	0.83

Screws & bolts

Selection criteria	Product	Base oil/ thickener	Service temperature range* [°C] ≈	Density at 20 °C [g/cm³] ≈
Lubricating and assembly paste for the normal and high-temperature range Compliant with NSF H1 Mineral-oil free	Klüberpaste UH1 84-201	synth. hydrocarbon oil/ PTFE	- 45 to 120	1.13
High-temperature lubricating and assembly paste NSF H1 Mineral-oil free	Klüberpaste UH1 96-402	polyalkylene glycol oil/ silicate	- 30 to 1,200	1.58

Klüber viscosity class	Shear viscosity (mPa s)	
EL	≤ 2,000	extremely light
L	2,000 ... 4,000	light
M	4,000 ... 8,000	medium
S	8,000 ... 20,000	heavy
ES	≥ 20,000	extremely heavy

Kinematic viscosity DIN 51 562 pt. 1 [mm ² /s] at 40 °C ≈ 100 °C		Viscosity index DIN ISO 2909 (VI) ≈	Pour point DIN ISO 3016 [°C]	Notes
46	7.9	130	≤ - 45	Good oxidation stability. The viscosity grades ISO VG 32, 46 and 86 are suitable for screw-type and sliding vane compressors. Klüber-Summit HySyn FG 100 is applicable for the lubrication of reciprocating compressors and sliding vane compressors.

Base oil viscosity DIN 51 562 pt. 1 [mm ² /s] 40 °C ≈	Colour	Worked penetration DIN ISO 2137 [0.1mm] ≈	Four-ball tester welding load DIN 51 350 [N]	Notes
200	white	310 to 340	> 3,000	Good water resistance and anticorrosion properties; free from metals; neutral towards alloyed steels. For use as lubricating and assembly paste for guide rails, hinges, rollers etc. Suitable as screw paste for high-alloy steels to improve the tightening torque and ease disassembly after a long period of use.
360	light grey	265 to 295	> 2,500	Good high-temperature properties; good corrosion protection; free from metals; neutral towards alloyed steels. For use as assembly paste for bolts, pins, bushings etc. Lubricating paste for guide rails, hinges etc.

* Service temperatures are guide values which depend on the lubricant's composition, the intended use and the application method. Lubricants change their consistency, shear viscosity or viscosity depending on the mechano-dynamical loads, time, pressure and temperature. These changes in product characteristics may affect the function of a component.

** Speed factors are guide values which depend on the type and size of the rolling bearing type and the local operating conditions, which is why they have to be confirmed in tests carried out by the user in each individual case.



Request for Information

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81379 München
Deutschland

Fax no.: +49 89 7876-333

Sender:

Company

.....

Name

Position

Street

City

Phone

Fax

E-mail

Please send me more information about the following product(s):

.....
.....

Please quote a price for:

Product:

Quantity:

.....
.....

Please give me a call about the following:

Application:

Product:

.....
.....

Please call me for an appointment

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9.13.4 en
Edition 09.09,
replaces edition 11.06

The data in this technical brochure is based on our general experience and knowledge at the time of printing and is intended to give information of possible applications to a reader with technical experience. It constitutes neither an assurance of product properties nor does it release the user from the obligation of performing preliminary tests with the selected product. We recommend contacting our Technical Consulting Staff to discuss your specific application. If required and possible we will be pleased to provide a sample for testing.

Klüber products are continually improved. Therefore, Klüber Lubrication reserves the right to change all the technical data in this technical brochure at any time without notice.



We are where you are.

Klüber Lubrication – the world market leader in speciality lubricants

- subsidiaries in over 30 countries
- more than 1,700 staff
- products available worldwide

Klüber Lubrication offers expert tribological solutions.

Through our worldwide presence, we meet customers' needs reliably and on time.

We supply tailor-made speciality lubricants to customers from nearly all branches of industry and around the world – oils, greases, bonded coatings, pastes and many more. Over 80 years of experience, industry-specific know-how, and exceptional test facilities all help to optimise our solutions.



Klüber Lubrication München KG
A company of the Freudenberg Group

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