

We have the solution...

...the future has a name



TURMOFLUID® Series B

Chains are made up of links supported by plain bearings. Most of these small bearings operate at low speeds and are subject to oscillations. From experience it is known that full fluid film lubrication usually does not occur under such conditions.

Instead, they are difficult to access, speeds are moderate and lubrication often fails completely at the points of reversal. This is the reason why there is normally a mixed friction condition.

Friction and wear can be prevented by using special lubricants which form a reaction layer in the contact areas, a phenomenon which is often referred to as “**chemical lubrication**”.

An important criterion is the specific running-in wear which causes a certain geometrical modification of the contact elements and ensures that the roughness peaks of the contact surfaces are smoothed to the desired extent. As is well known, this running-in process leads to a significant decrease of the surface pressure, similar to plain hydrodynamic bearings.

Advantages:

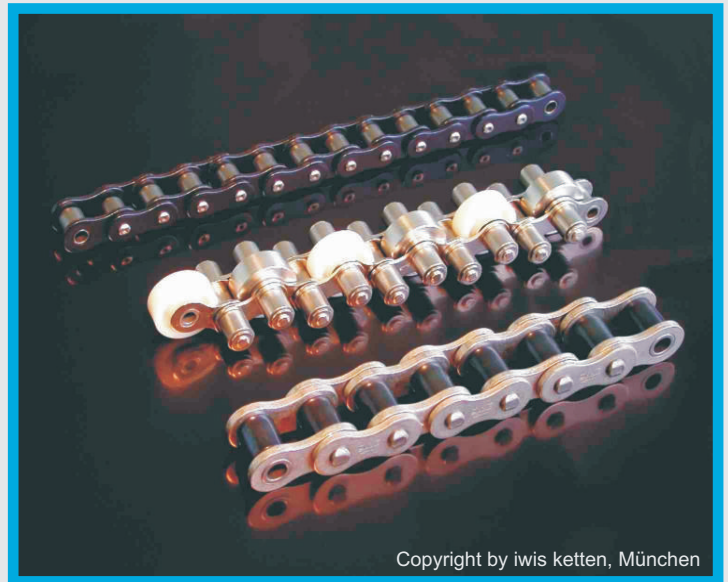
- **high-temperature resistance**
- **higher service life and longer maintenance intervals**
- **replacement of many lubricants used in different points by one lubricant specified to the optimum**
- **reduction of stock keeping**
- **simple and cost-saving disposal**
- **minimization of manpower**
- **not liable to identification marking**

The following lubricant recommendation is only a suggestion because of the manifold demands and different machines and therefore **LUBCON** offers you a free consultation and complete assistance before, during and after your purchase of **LUBCON** lubricants.

Should one or the other point of lubrication need a new product, our development department is, of course, always available to you.



Fig. 1: Roller chain after operation
Lubrication with **TURMOFLUID 40 BK**



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TURMOFLUID oils of the B series are light colored chain oils on a synthetic oil basis with thermally stable oxidation inhibitors and special EP additives which, owing to synergetic effects, ensure that the required reaction layer is formed in a wide temperature range.

The oil's excellent penetration properties ensure that it reaches all contact points.

TURMOFLUID Series B oils do not contain harmful heavy metals. Due to the favorable viscosity temperature behavior and the high viscosity index of 160, they can be used without problems in the specified service temperature range.



Fig. 2: Roller chain after operation
Lubricated with a competitor's product

The oils do not resinify at high temperatures and they do not leave solid residues but only a small quantity of power-like residues which have no detrimental effect onto the performance.

TURMOFLUID Series B oils have a low tendency towards evaporation, even at increased temperatures. Their full lubricating effect ensures low friction, and thus also reduced power consumption in practical applications.

The chain lubricated with TURMOFLUID 40 BK is free from encrustations even after operation at high temperatures and still has a bright surface, see fig.1. The chain lubricated with an unfavorable competing oil clearly leaves residues, see fig.2. The special oils of the TURMOFLUID B series are suitable for the lubrication of chains subject to high temperatures, e.g. in dryers, painting systems and stenters. In the wood processing industry they are used in ContiRoll systems (roller bar chain and steel belt lubrication).

Formation of Residues and Residue Dissolving Properties of TURMOFLUID 40 BK

If aging, usually under the presence of oxygen, leads to oil residues, it is important to prevent these residues from hardening. They should remain soft in order to guarantee a stable lubrication condition. The residues should be dissolved when adding fresh oil. When stored in a heating cabinet (+250C) TURMOFLUID 40 BK oil samples do not leave any hard residues but a powder-like substance, see fig. 3 right. The base oil of TURMOFLUID 40 BK and the contained additives make the residues soft and give the product the capability of dissolving residues.

The unfavorable competing oil leaves hardening residues partly splintering pieces as hard as glass which can be dissolved by using TURMOFLUID 40 BK, see fig. 3.

The best results are usually achieved by using TURMOFLUID 40 BK as a lubricating oil for chains and to regenerate solid residues especially if the operating temperatures are high and aging is a problem due to the ingress of oxygen.



Fig. 3: Residues after storage at 250 °C (482 °F)
left: competitors product - **right:** TURMOFLUID 40 BK

Wear Test with Roller Chain 08B - 1 DIN 8187, A + S, Type 1603

The roller chains used in the wear test contains 32 links and operates on rollers with a gear ratio of $z_1 = z_2 = 17$. The test conditions are as follows:

- Tension load $F = 2400 \text{ N}$
- Contact area pressure $p = 4800 \text{ N/mm}^2$
- Speed $n = 70 \text{ min}^{-1}$

The change in length obtained with TURMOFLUID® 40 BK during the test run is shown in diagram below, which also indicates the change in length when using a competitors oil.

TURMOFLUID® 40 BK ensures good wear protection, reduces chain elongation, or in other words, extends chain service life almost by factor two.

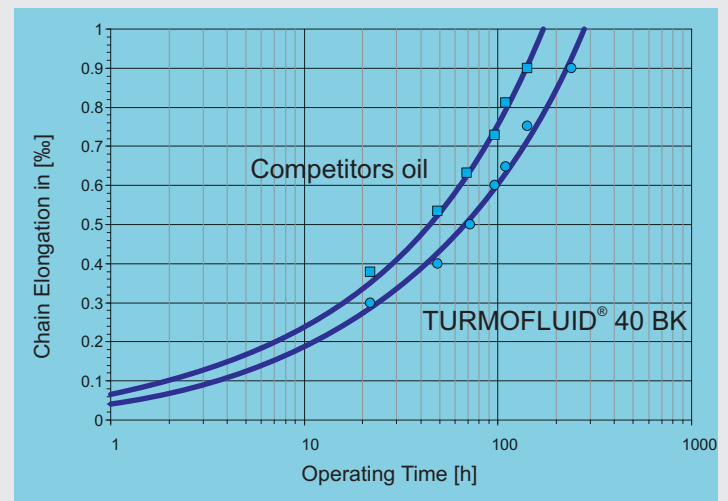


Fig. 4: Results of the wear test with roller chains 08B according DIN 8187, A+S, type 1603 with different oils.

TURMOFLUID®	15 B	20 B	40 B	60 B
Density at 20 °C DIN 51751 in [g/ml]	0.975	0.975	0.915	1.003
Base oil viscosity [mm ² /s] DIN 51562 at 40 °C/100 °C	60 / 11	110 / 14	270 / 32	618 / 70
Viscosity index (VI _E) ISO 2909	140	133	160	191
Flash point [°C] DIN 51758	280	280	280	265
Service temperature range [°C]	-30 to 250	-20 to 250	-20 to 250	-10 to 260
Peak temperature [°C]	300	300	300	300
VKA welding load DIN 51350 T2 in [N]	2000/2200	2000/2200	2800/3200	2800/3200
AWM contact pressure DIN 51350 in [N]	20,000	20,000	20,000	20,000
FZG test A 8.3/90 °C DIN 51354 Bl. 2 scuffing load test	-	-	12	12