MANUAL CARDAN SHAFTS

Regular maintenance and cleaning at the prescribed intervals is an indispensable prerequisite for efficient use of the cardan shaft. The specified intervals are guide values and depend on the use of the cardan shaft and may therefore be necessary more often than specified. In this case, correct the information in these translation of the original instruction manual and instruct the personnel accordingly. Any necessary repair work must be carried out by qualified personnel in due time, i.e. immediately after the damage has been detected.

1. Maintenance and lubrication plan

Lube all	or at maxi- mum after	inspection all	or at maxi- mum after
12,500 km or 250 h	2 months or according to Water ride	25,000 km	6 months

2. Cleaning

Never clean the cardan shaft with a high-pressure cleaner or steam jet. However, if such cleaning can not be avoided, in any case the cardan shaft then lubricate in the manner described until only fresh grease comes out at the

3. Cleaning

Clean the grease nipples before greasing and ensure grease passage. Do not lubricate with too much pressure and do not lubricate jerkily. We recommend 5 bar. Lubricate until the fresh grease comes out at the seals of the bearings. For the sliding piece, lubricate only 2-3 grease gun strokes per interval. Always keep an eye on the seals and lubricate with feeling.

4. Lubricant

The cardan shaft is always supplied by the manufacturer in a lubricated condition. Cardan shafts that have been stored for longer than 6 months should always be lubricated again before being put into op- eration. Only lithium saponified greases should be used. We use and recommend Fuchs Renolit LX- PEP 2 or Microlube GL 262 as standard grease. They are special greases based on mineral oil with a lithium special soap. Other lubricant brands that can also be used for our standard grease:

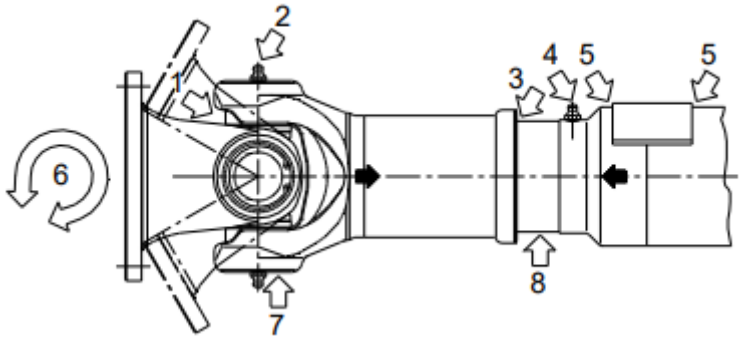
- BP Energrease LS 2
- Esso - Beacon EP 2
- Shell Alvania EP 2
- Mobilux 2

Do not use soda greases, Molykote lubricants or lubricants with MoS2 additives! If the cardan shaft is equipped with a low or high temperature cross fitting, use only the appropriate greases! Unless other- wise stated in the drawing, the grease nipples of our cardan shafts comply with DIN 71412. All DIN 71412 grease nipples are fitted with a removable plastic cap to protect against dirt and moisture. Any other lubricants for standard operation that meet the following requirements can be used:

- Operating temperature: -30°C to +140°C
- Consistency class: 2 (DIN 51818, NLGI)
- Penetration: ca.265-295 (DIN ISO 2137)
- Drip point: > 220-250°C (DIN ISO 2176)
- Density: approx. 0.9 g/cm³ (DIN 51757 at 20°)
- Water resistance: approx. 1 - 90 (DIN 51807 - 3h/90°C)
- Flow pressure: approx. 1400 mbar (DIN 51805 - 25°C)

- Corrosion protection properties: 1 (DIN 51802 Emcor Test)
- Speed characteristic: approx. 300 000-400 000 (dm x n)

5. Inspection checklist



1. Check flanges and screw connections for tightness and retighten with a torque wrench if necessary.
2. Check whether all bearing bushings of the cross fittings are still firmly secured with safety rings (7).
3. Check can bottom whether discoloration or deformation has occurred, which indicate a position defect and overheating (7). ¬ In case of discoloration, the entire cross set must be replaced.
4. Check the bottom of the bush for turning marks under the circlip, which indicate a bush turning (7). →I this case, the fork element and the cross fitting must be replaced.
5. Check if balancing plates have loosened or lost (5). → In case of damaged or lost balancing plates, the cardan shaft must be rebalanced.
6. All seals of the cross fittings in sight (1). → If a seal is damaged, worn or lost, the cross fitting should be replaced.
7. All seals of the displacement and any plastic coating for damage (1+3+8) examine. →In case of damage, the seals must be replaced or the corresponding parts must be replaced by the manufacturer.
8. check all lubrication nipples (2+4) and their protective cap. → Replace grease nipples if necessary and clean lubrication channels if necessary and make them free for grease to pass through.
9. By lifting slightly relieve the shaft and try to twist the displacement and joints (6). → If twisting is possible, the cardan shaft has too much play and must be overhauled.
10. Visually inspect for dents in the tube or profile protection and inspect all parts of the cardan shaft for visible cracks or breaks. → If cracks appear or there is a dent in the tube, the shaft must be overhauled by the manufacturer.
11. For intermediate shafts and cardan shaft trains, inspect center bearings:
→ The bearing must not make any noise when running. If noises occur, the bearing must be replaced.
→For elastic intermediate bearings: The elastic rubber insert must not show any cracks or damage, must be exactly in place and well anchored there. The rolling bearing must also be anchored exactly in place in the bearing frame. The seat of the bearing in the rubber insert must not have any play. Check fastening screws. Tighten if necessary. The actual rolling bearing must not have any damage, must run smoothly, have no play and make no noise when running. The connecting flange must be firmly seated on the bearing shaft and must not be able to move. There must be no play whatsoever when turning or even in the horizontal plane. An indication of a loosened flange may be a loose washer or guard plate. Tighten the locking screws or nut, if necessary.