## 6.5 Maintenance

This chapter provides personnel with instructions on preventative actions for reducing wear and maintaining the functionality of the machine.

### 6.5.1 Safety instructions

**WARNING!**

**Danger of falling**

During tasks on the front filler table, there is the risk of falling from the front filler table.

This could result in death or serious injury.

– Use an appropriate stepladder to access the front filler table.

**DANGER!**

**Non-compliance with safety precautions**

Non-compliance with safety precautions can cause detergent leakage.

This could cause severe and even fatal injury.

Adhere to the safety precautions before commencing maintenance work:

– Wear personal protective equipment.
– Switch off and secure the machine.

**NOTICE!**

**Unrepaired defects**

Any defects found during maintenance and not repaired could cause product flaws, operational down-time, and damage or destruction of components.

– Always repair any defects or damage found immediately.

**NOTICE!**

**Using non-original manufacturer parts**

Replacing components with non-original manufacturer parts during maintenance.

The result is misuse with regard to the intended use. This could lead to product flaws, loss of safety functions, and damage or destruction of components.

– Replace parts only with original spare parts from KHS.

### 6.5.2 Maintaining the seals

This operating instructions applies to seals that are exposed to the following media:

- Beverages
- Process gases
- Solutions and liquids for
  - Sterilization
  - Cleaning
  - Disinfection

*Seals are wear parts.*

*The following factors shorten the service life of the seals:*

- *High temperatures and temperature fluctuation*
- *Chemical loads (reactions) from detergent and the contents of products*
- *Mechanical loads from rotary movements (pump shafts, disk valves) and linear movements (seat valves and control valves)*
- *Environmental factors (e.g. sunlight, UV, ozone)*

*The material FKM (also commonly known as Viton) can have an up to 50% shorter service life in comparison to EPDM at the same level of mechanical load. FKM should only be used where absolutely necessary.*

*The operator is responsible for implementing continuous checking procedures.*

**Interval: Regularly as necessary, but at least once a year. The interval depends on the type of material, the load, the locations of the seals and the products processed.**

| Place | Maintenance work | Personnel |
|---|---|---|
| Seals, membranes | Take microbiological and hygienic aspects into consideration during the replacement process. | Maintenance personnel |

### 6.5.3 Maintenance schedule

The maintenance schedule is sorted by operating status and operating mode. The operating statuses and operating modes are described in the *"Operating statuses and operating modes"* section of the *"Safety"* chapter.

#### 6.5.3.1 Operating status ON

Prerequisite: the *[Operation on]* key switch is in the *[1]* position.

**Interval: Weekly/every 125 operating hours**

| Place | Maintenance work | Personnel |
|---|---|---|
| Machine | Operate one of the emergency stop switches once a week. Operate a different emergency stop switch with each test. Note: the machine will shut down automatically if these tests are not carried out within the specified 7-day period. | Operating personnel |
| Machine | Open and close one door in each machine area once a week. Open and close a different door with each test. Note: the machine will shut down automatically if these tests are not carried out within the specified 7-day period. | Operating personnel |

#### 6.5.3.2 Automatic

Prerequisite: Select *"Automatic"* operating mode on the operator console's graphical user interface.

**Interval: Every shift/every 8 operating hours**

| Place | Maintenance work | Personnel |
|---|---|---|
| Machine | Clean the floor outside the machine paneling. | Operating personnel |

**Interval: Daily/every 24 operating hours**

| Place | Maintenance work | Personnel |
|---|---|---|
| Electrical system | Activate the *"Lamp test"* function key on the operator console. Check if the visual signaling equipment is working properly. Instruct the maintenance personnel to replace any faulty lights. | Operating personnel |

**Interval: Weekly/every 125 operating hours**

| Place | Maintenance work | Personnel |
|---|---|---|
| Machine | Operate one of the emergency stop switches once a week. Operate a different emergency stop switch with each test. Note: the machine will shut down automatically if these tests are not carried out within the specified 7-day period. | Operating personnel |
| Process engineering | Check the valve manifold for leaks. | Operating personnel |

#### 6.5.3.3 Setup

Prerequisite: Select *"Setup"* operating mode on the operator console's graphical user interface.

**Interval: Every shift/every 8 operating hours**

| Place | Maintenance work | Personnel |
|---|---|---|
| Format parts | Check the format parts for damage. | Operating personnel |
| Filler base | Check the spray head in the bell spray for blockages. | Operating personnel |

**Interval: Daily/every 24 operating hours**

| Place | Maintenance work | Personnel |
|---|---|---|
| Electrical system | Clean the light barriers and the associated reflectors. | Operating personnel |
| Machine | Remove any visible signs of excess lubricant. | Operating personnel |
| Process engineering | Check water separator in the maintenance group filter and empty if necessary. The maintenance groups are described in the *"Layout and operation"* chapter. | Maintenance personnel |

### Interval: Weekly/every 125 operating hours

| Place | Maintenance work | Personnel |
|---|---|---|
| Machine | Open and close one door in each machine area once a week. Open and close a different door with each test. Note: the machine will shut down automatically if these tests are not carried out within the specified 7-day period. | Operating personnel |
| Filling valve | Check rubber contact seal and centering bell for glass fragments and damage. | Operating personnel |
| Filling valve | Check the ventilation holes for leaking gases or liquids. If liquid leaks out of a ventilation hole, the membrane is defective. A defective membrane results in malfunctions. The defective membrane must be replaced immediately. Servicing by the maintenance personnel is required where appropriate. | Operating personnel |
| Electrical system | Check the sensors (e.g. limit switches, light barriers, proximity switches and pressure controllers) for damage. | Maintenance personnel |
| Filler turret | Check the relief openings of the rotary distributor for leaking gases or liquids. Any maintenance work in the case of gas or fluid leaks must be carried out by KHS staff. | Operating personnel |
| Filler turret | Manually actuate the relief valve and make sure that it moves freely. | Maintenance personnel |
| Filling valve | Sterilize the centering bells together with the rubber contact seals for a period of 40 minutes in a water bath heated to 85°C. | Operating personnel |
| Machine | Check the signs for damage and legibility. Have the signs cleaned or replaced. | Operating personnel |
| Machine | Check the gearing mechanism for leaks. | Maintenance personnel |
| Machine | Run all height-adjustable components once to their upper and lower limits. | Operating personnel |

**Interval: Monthly/every 500 operating hours**

| Place | Maintenance work | Personnel |
|---|---|---|
| Electrical system | Check the electrical lines, connections and distributors for damage. | Maintenance personnel |
| Machine | Inspect the pneumatic lines, connections and distributors for leaks and damage. | Maintenance personnel |
| Machine | Check the lines, connections and distributors in the lubrication system for leaks and damage. | Maintenance personnel |
| Machine | Inspect the threaded joints on all moving parts and parts subject to stress. | Maintenance personnel |
| Bottle conveyor | Check the infeed screw for leaks. | Maintenance personnel |

**Interval: Annually/every 7000 operating hours**

| Place | Maintenance work | Personnel |
|---|---|---|
| Filler base | Check the axial clearance of the ball bearing ring. The axial clearance should not exceed 1.5 mm. | Maintenance personnel |
| Electrical system | Calibrate the sensors; see *"Purchased parts documentation"*. | Maintenance personnel |
| Filler turret | Replace rubber contact seal and centering bell. | Maintenance personnel |

#### 6.5.3.4 De-energized machine

Prerequisite: The machine is disconnected from the power supply.

A description of how personnel should disconnect the machine from the power supply is provided in the chapter *"Servicing"*, section *"Disconnecting and securing"*.

**Interval: Every shift/every 8 operating hours**

| Place | Maintenance work | Personnel |
|---|---|---|
| Area around the machine | Clean the floor inside the machine paneling. | Operating personnel |

**Interval: Twice a week/every 72 operating hours**

| Place | Maintenance work | Personnel |
|---|---|---|
| Machine | Check the paneling for damage and loose screws. | Maintenance personnel |

### Interval: Monthly/every 500 operating hours

| Place | Maintenance work | Personnel |
|---|---|---|
| Electrical system | Check the filter mats in the ventilation system and the cooling units and clean if necessary. | Maintenance personnel |
| Electrical system | Maintain the cooling units as specified by the manufacturer: see *"Purchased parts documentation"*. | Maintenance personnel |

### Interval: Every two months/every 1000 operating hours

| Place | Maintenance work | Personnel |
|---|---|---|
| Machine | Check the motor cable for corrosion. | Maintenance personnel |

### Interval: Annually/every 7000 operating hours

| Place | Maintenance work | Personnel |
|---|---|---|
| Electrical system | Replace the buffer battery in the machine control system (PLC), the filler computer and the operator console. The main switch must remain switched on. | Maintenance personnel |
| Filler turret | Replace all seals on the rotary distributor. | Maintenance personnel |
| Machine | Replace all seals and membranes that are exposed to the product, detergent or process gases. | Maintenance personnel |
| Filler turret | Check the springs of the control cylinder and the main cylinder on the filling valve. | Maintenance personnel |
| Filler turret | Change the bearings and seals on the rotary distributor. | Maintenance personnel |
| Filler base | Check the tooth clearance of the ball bearing ring between the drive shaft and ball bearings (max. 0.2 mm). If the tooth clearance is greater than the maximum, readjust the ball bearing ring. If the tooth clearance is greater than 0.4 mm, replace the ball bearing ring. | Maintenance personnel |
| Process engineering | Check the control valves on the valve manifold for damage. | Maintenance personnel |

### Interval: Every two years/every 14,000 operating hours

| Place | Maintenance work | Personnel |
|---|---|---|
| Filler turret | Maintain the rotary distributor as specified by the manufacturer: see the *"Purchased parts documentation"*. | Maintenance personnel |

**Interval: Every four years/every 28,000 operating hours**

| Place | Maintenance work | Personnel |
|---|---|---|
| Filler turret | Check the leakage holes of the filling valve for media leakage. Replace the membranes if necessary. | Maintenance personnel |
| Filler turret | Check the leakage holes of the rotary distributor for air or grease leaking out. | Maintenance personnel |

#### 6.5.3.5 Machine maintenance schedule

**Interval: Annually/every 7000 operating hours**

| Place | Maintenance work | Personnel |
|---|---|---|
| Complete machine | A general overhaul of the machine by KHS personnel is recommended. | KHS personnel |

### 6.5.4 Lubrication schedule

This section contains the lubrication points on the machine indicating the lubricant to be used and the lubrication interval.

The lubricants and lubrication intervals specified by KHS may differ from the specifications in the operating and maintenance instructions of the suppliers of the motors and gears.

All gears not listed are lubricated for life.

The lubrication of the gears must be carried out by maintenance personnel while the machine is in the **Deenergized machine** operating status.

Manual lubrication other lubrication points and filling the central lubrication system must be performed by maintenance personnel while the machine is in the **setup** operating mode. These tasks can also be performed by operating personnel.

The operating statuses and operating modes are described in the *"Operating statuses and operating modes"* section of the *"Safety"* chapter.

***Lubricant filling***

*For assembly and for filling of the central lubrication system, KHS uses the grease **KHSMULTI GREASE 01**. **KHSMULTI GREASE 01** is approved for use in the foodstuffs industry and is listed according to NSF H1.*

*The integrated gears are also filled with lubricants that are approved for use in the foodstuffs industry.*

*Components with lifetime lubrication*

*Components with lifetime lubrication are designed for specific operating conditions. If these operating conditions are met, do not relubricate the components with lifetime lubrication.*

*In difficult operating conditions, such as high levels of humidity, extreme temperature fluctuations and aggressive ambient conditions, relubricate components with lifetime lubrication.*

*Check components with lifetime lubrication regularly to ensure that they are lubricated.*

NOTICE!

**Incompatibility of lubricant**

The grease **KHS MULTI GREASE 01** is not suitable for lubricating components which are made from the sealing material EPDM.

– Use only **KHS SEAL & SILICON GREASE 04** to lubricate parts made from the sealing material EPDM.

### 6.5.4.1 Lubricants

| Material number | Lubricant | Container size | |
|---|---|---|---|
| 301142150102 | KHS MULTI GREASE 01 | 0.5 | kg |
| 301142150106 | KHS MULTI GREASE 01 | 19 | kg |
| 301142150108 | KHS MULTI GREASE 01 | 50 | kg |
| 301142110507 | KHS GEAR FLUID 220 | 22 | l |
| 301142110509 | KHS GEAR FLUID 220 | 205 | l |
| 301142110607 | KHS GEAR FLUID 320 | 22 | l |
| 301144110042 | Two-handed press | 1 | units |
| 301142150413 | KHS SEAL & SILICONE GREASE 04 | 0.1 | kg |
| 301142150403 | KHS SEAL & SILICONE GREASE 04 | 0.9 | kg |

The table lists the recommended KHS lubricants for the machine. KHS lubricants are NSF and/or InS "H1" certified and are therefore classified as not presenting any health risks. This certification guarantees maximum product safety and food safety. In the event of incidental product contact, KHS lubricants meet all hygiene requirements and can be used at any stage of the production process.

Do not mix mineral oil-based and synthetic lubricants. All lubrication points must be free of impurities for applications involving foodstuffs.

Particular care must be taken when mixing synthetic lubricants. Make sure that the thickener, base oil and additives are compatible or the same.

The original lubricant must be removed completely before switching from mineral oil-based to synthetic lubricants or from synthetic to mineral oil-based lubricants. Drain the oil when warm to avoid gumming or leaving unwanted residue in the reservoir.

The information in the following sections refers to a standard operating temperature of up to 70°C. Higher operating temperatures may shorten the service life of the lubricant significantly.

The lubrication points are labeled with stickers stating the required lubricant. The quantities of lubricant required are stated in the spare parts list.

If you are unsure of which lubricant to use, please contact Service.products@khs.com.

Information about the lubricants can be found in the technical documentation *“Specific data and KHS standards”*, chapter *“K1000 — Lubricant overview”*.

### 6.5.4.2 Filler lubrication points

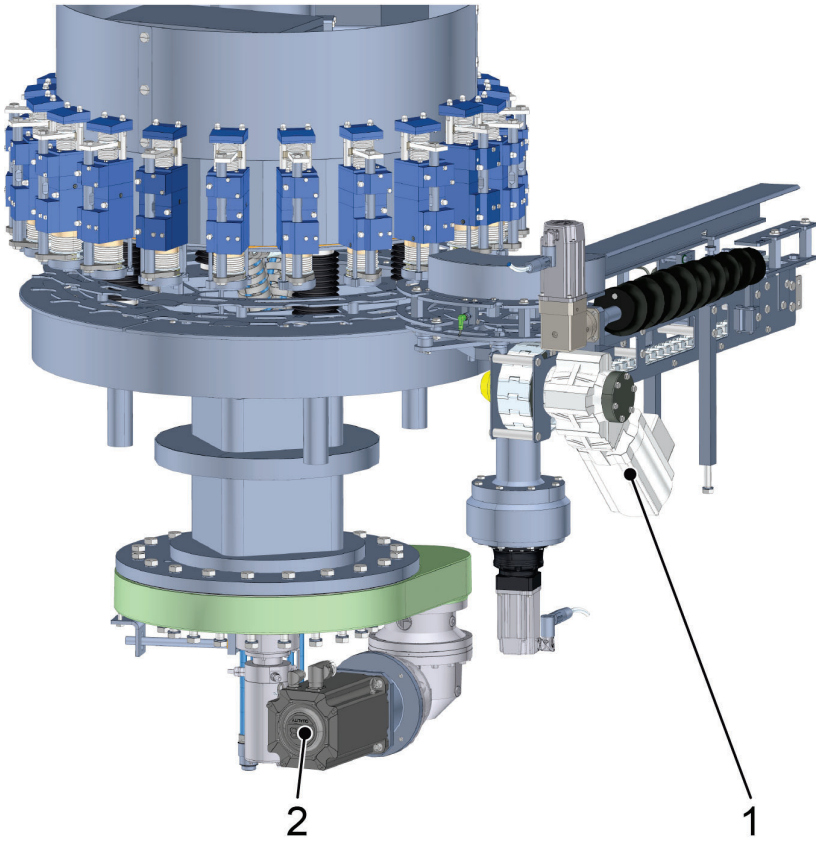


*Figure 201: Filler lubrication points*

| Item | Assembly | Lubricant | Interval | Task |
|---|---|---|---|---|
| 1 | Infeed conveyor gearing mechanism; belt drive | KHS GEAR FLUID 220 | Annually/ every 7000 h | Changing the lubricant |
| 2 | Main drive gears | KHS GEAR FLUID 320 | Annually/ every 7000 h | Changing the lubricant |

### 6.5.4.3 Lubrication points on the height adjustment

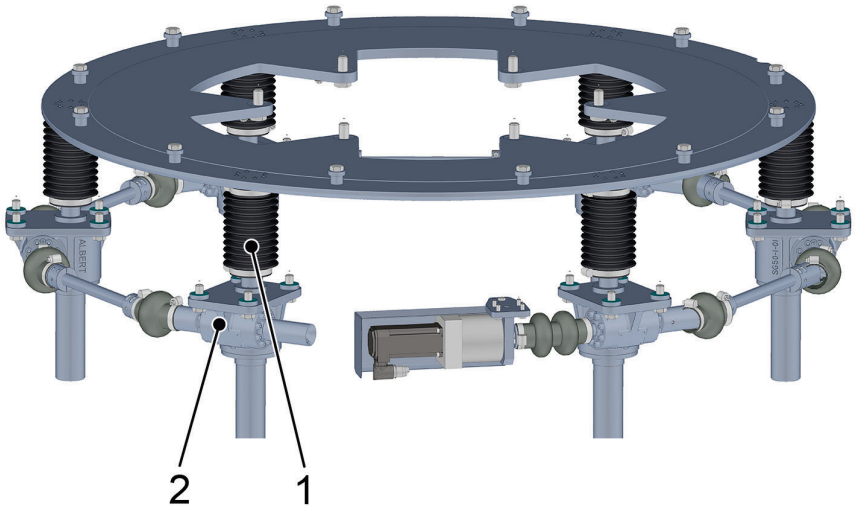


*Figure 202: Lubrication points on the height adjustment gears*

| Item | Assembly | Lubricant | Interval | Task |
|---|---|---|---|---|
| 1 | Trapezoidal spindle | KHS MULTI GREASE 01 | Every two years/ 14000 hours | Lubricating |
| 2 | Spindle lift gear | KHS MULTI GREASE 01 | Every two years/ 14000 hours | Changing the lubricant |