



Training: The rules of safety

by Ronald Eschmann, Service Center Hamburg

- General safety rules
- Safety markings and their meaning
- Correct usage / intended use
- Non-compliance with the intended use
- Basic operating principles
- Operations on the separator
- Demands on the operating and maintenance personnel
- Spare part requirements
- Assembly
- Electrical installation
- Before start-up
- Starting
- Shut-down and "Emergency-Off"
- Maintenance and repair
- Corrosion, Erosion
- The health hazards involved when handling HFO and LO
- Code of practice and personal protective measures
- Cleaning

For your safety

 Always adhere to instructions marked with this symbol to avoid damage to the separator and other equipment.

 Exercise special care when carrying out operations marked with this symbol - otherwise danger to life!

Note: This symbol is not a safety precaution but rather a reference to information which helps to better understand the separator or plant components and the processes.

Observe the accident prevention regulations !

The local safety and accident prevention regulations apply unconditionally to the operation of the separator. The plant operator must ensure compliance with these regulations.

When operating electrical apparatus, certain parts carry dangerous voltage. Before working in electrical components, take adequate preventive measures according to the national provisions (in Germany in accordance with the rules and regulations of the VDE (Verein Deutscher Elektrotechnik / Association of German Electrical Engineering) or of the local electric power company. Non-compliance with the protective measures can result in serious damage to persons or property. Any work on electrical components may only be carried out by an authorized electrician.

Only qualified or authorized specialized staff may operate, maintain and repair the separator.

Corresponding training courses take place in the manufacturer's plant or are held on site by the manufacturer.

Follow the instructions in the manual. Follow only the instructions given in the manual. Repair and maintenance work that goes beyond the scope described in this manual may not be carried out.

Operate the separator only in accordance with agreed process and operating parameters.

Maintain the separator as specified in the manual.

Carry out safety checks on the separator.

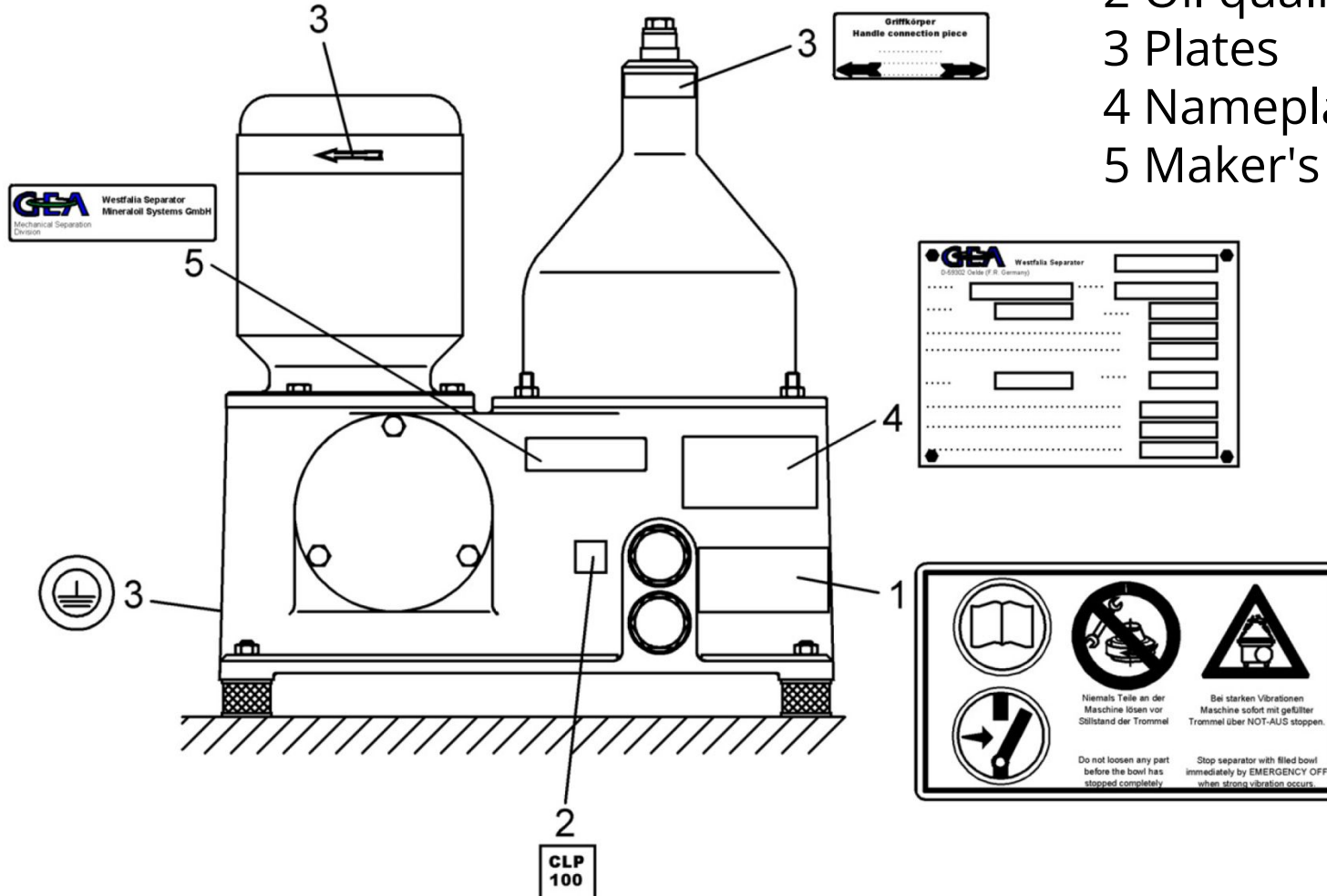
The safety markings (adhesive and metal plates) are attached to all separators on the hood and frame of the respective separator in such a way that they are clearly visible. All safety markings on the separator, control system and plant components must always be in perfect condition.

- Clean dirty safety markings.
- Replace damaged safety markings.

Safety markings



- 1 Safety sticker
- 2 Oil quality
- 3 Plates
- 4 Nameplate
- 5 Maker's nameplate



Safety markings



The following safety markings must be attached to the separator as adhesive labels.



**Niemals Teile lösen vor
Stillstand des
Separators**

**Do not loosen any part
before the separator has
stopped completely**



**Bei starken Vibrationen
Separator sofort mit
gefüllter Trommel über
NOT-AUS stoppen.**

**Stop separator with
filled bowl immediately
by EMERGENCY OFF when
strong vibration occurs.**

0024-6426-000

Refer to the machine documentation !



Every person who is assigned the task of installing, operating, maintaining and repairing the machine must have read and understood the documentation.

The documentation must be complete kept near to the machine and be readily accessible to the operators. It must be available to the operators at all times !

Before carrying out work, disconnect power to the all components of the monitoring system !



Risk of injury due to electrical voltage and unintended start-up of the separator !

Before carrying out work on the separator and electrical plant components:



- Make sure the separator is at a standstill.
- Switch off all electrical appliances via the main switch,
- Lock the installation to prevent it from being accidentally switched on.

Danger of life and limb through rotating machine parts !



Do not loosen any part and do not carry out maintenance or repair on the separator before the separator is at a standstill !

Warning of unusual noises or vibrations !

When unusual noises or vibrations occur on the separator:



- immediately shut down the separator via “emergency-stop”
- evacuate the room
- Do not re-enter the room until the centrifuge has come to a standstill.

Warning of extreme surface temperatures !

The surfaces of the separator and plant components can be hot!



Note: This adhesive plate is only used for hot operation.

Liability for the function of the machine passes to the owner.

Liability for the function of the machine passes unconditionally to the owner or operator irrespective of existing warranty periods in so far as the machine is improperly maintained or serviced by persons other than Westfalia Separator service personnel or if the machine is not applied in accordance with the intended use.

Westfalia Separator shall not be liable for damage which occurs as a result of non-observance of the above. Warranty and liability conditions in the Conditions of Sale and Delivery of Westfalia Separator are not extended by the above.

The separator is designed:

- for a very high bowl speed. The admissible bowl speed depends on the chemical and physical properties of the product:
 - Temperature
 - Density of the fluid and solid components.
- for products which contain no corrosive and erosive components. The aggressiveness of the product influences the careful selection of the bowl material. Only products conforming to the specifications on the nameplate may be processed.

The separator is designed:

- in accordance with the method of application of the separator agreed with Westfalia Separator. Refer to the data sheet and contractually agreements.
- in accordance with the admissible utilities (cleaning agents, lubricants, operating liquids etc.) specified in the documentation or on the data sheet.

intended use involves:

- paying attention to the safety precautions, the instruction manual of the separator and the safety markings on the separator.
- adhering to the data on the nameplate, e.g. maximum admissible bowl speed.


Further information on the intended use of the separator such as

- agreed areas,
- density of the product,
- throughput capacities,
- temperatures, pressures etc.

is given in the documentation or the data sheet furnished with the documentation.

- The contractually agreed conditions agreed with Westfalia Separator on the intended use of the separator must be passed on to the operating personnel by the plant operator.

intended use and can result in severe damage to
personnel and persons !



Any use that deviates from the intended use is considered to be non-compliant. Non-compliance with intended use can result in severe damage to property and persons !



The separator may not be operated by:

- Persons who have not read and understood these basic safety precautions.
- Persons who have not read and understood the instruction manual of the separator.
- Persons who have not been briefed on proper and correct operation.
- Persons who have not been adequately trained.
- Persons who have not reached the minimum age of 18 years.

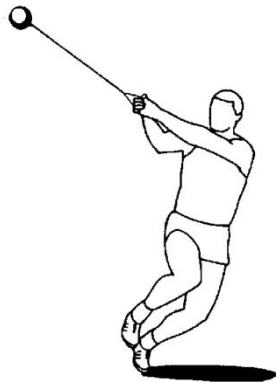


The separator may not be operated by:

- When the product does not conform to the specifications on the nameplate.
- Product with excessively high density.
- Solids with excessively high density.
- Product with excessively high temperature.
- When the max. admissible bowl speed has been exceeded through e.g. manipulation of the drive.
- in an incomplete state of assembly
 - e.g. required supervisory equipment is not activated or has been switched off.
 - the required safety and/or protective covers have not been installed.
- When the separator is operated with spare parts which does not come from Westfalia Separator.

Separators are used for the separation of liquid mixtures or for the separation of solids out of liquids or liquid mixtures.

the centrifugal forces are produced in the bowl. Under the influence of the centrifugal forces, separation of the liquid mixture and solids particles takes place.

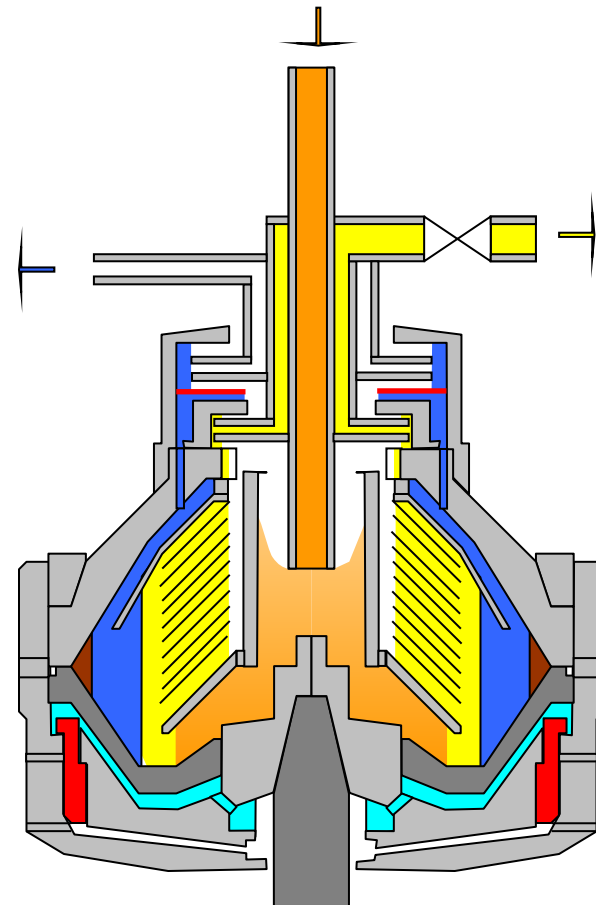


The specifically heavier components are displaced to the bowl periphery, whereas the specifically lighter components are displaced towards the centre of the bowl. The high centrifugal force is produced by very high bowl speeds. On the one hand, high bowl speeds signify high efficiency, while on the other hand, they signify high material stressing of the separator.

The separator works reliably, provided that it is operated and maintained in accordance with the operating instructions.

Special attention must be given to:

- Assembly
- Electrical installation
- Before start-up
- Start-up
- Shut-down
- Maintenance and repair



Demands on the operating and maintenance personnel:

Operating, maintaining or repairing the separator or the separator plant requires specialized knowledge.

CAUTION ! Operating, maintenance or repair work by unqualified or unauthorized personnel can lead to operating, assembly and handling errors and severe damage to persons and property.



Westfalia Separator accepts no liability for damage caused by unqualified or unauthorized personnel !

Demands on the operating and maintenance personnel:

The operator of the separator or separator plant:

- is responsible for the necessary skills and knowledge of the personnel.
- is responsible for briefing and training the personnel.
- must be sure that the personnel have read and understood the manuals necessary to carry out their work.
- Electrical work may only be carried out by an authorized electrician !

Westfalia Separator offers an extensive range of training and advanced training courses. You can obtain further information from Westfalia Separator or from one of the authorized representatives.

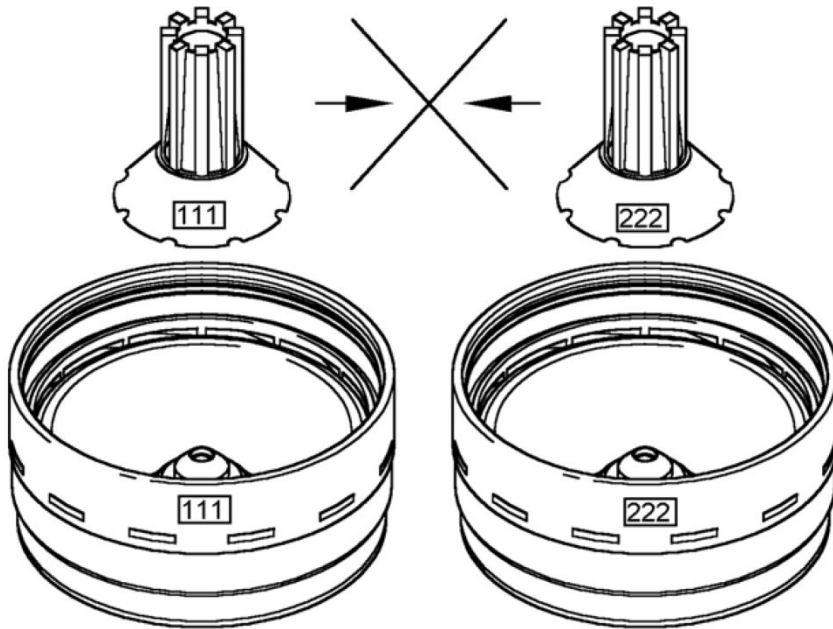
Use only genuine spare parts from Westfalia Separator.

The use of non-genuine parts leads to:

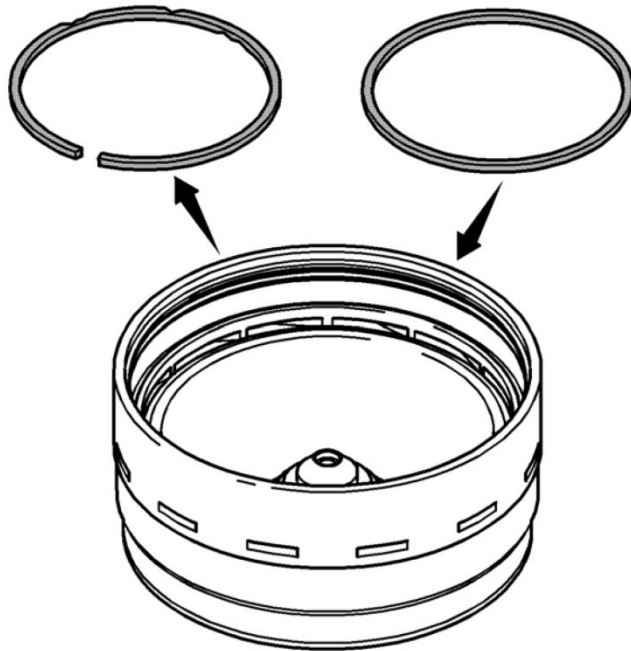
- safety risks,
- less durability and availability,
- increased service requirement.



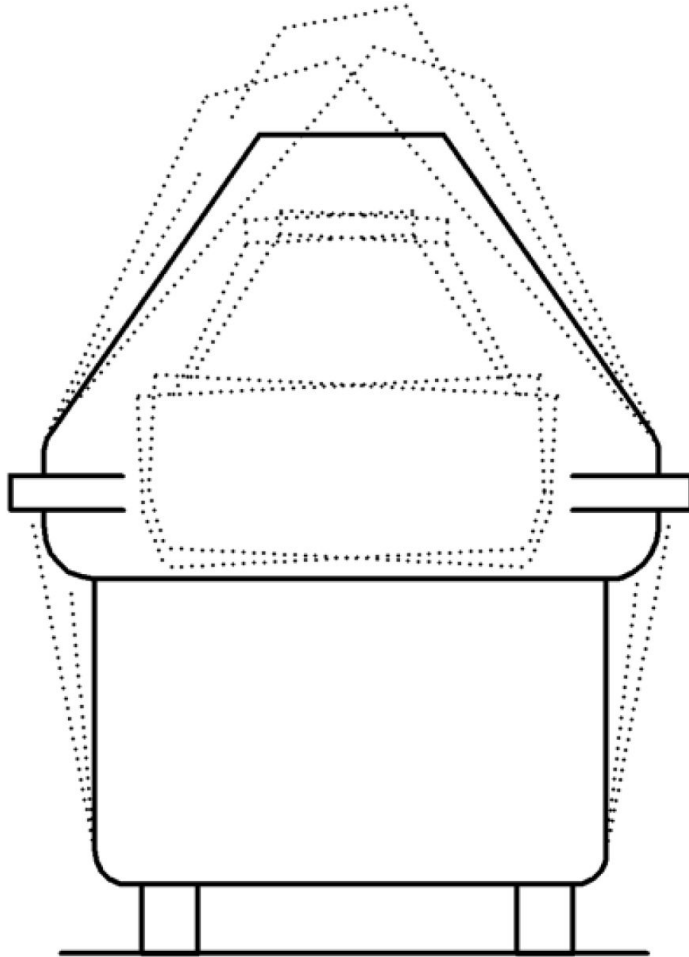
If a safety risk occurs when using non-original spare parts, this may have legal consequences for the responsible persons. In such cases, Westfalia Separator accepts no liability or warranty claims.



If the plant has several centrifuges, be careful not to interchange parts of different bowls since each bowl has been balanced individually. The bowl parts are marked with the serial-number of the machine or with the last three digits of the serial-number.



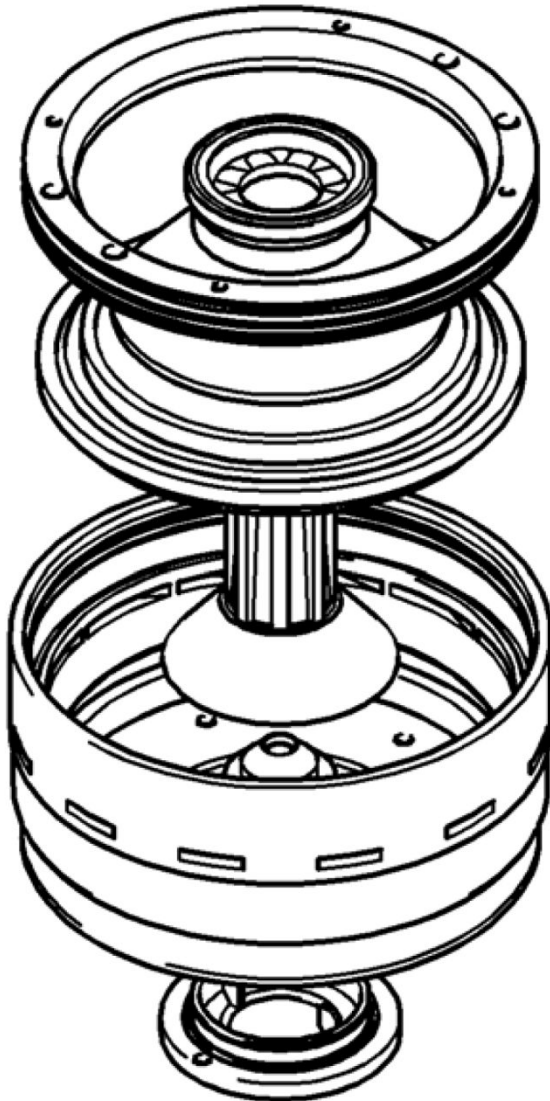
Damaged parts must be replaced immediately by new or reconditioned parts.



CAUTION:

Some bowl parts may be pre-assembled and balanced only by specialists from Westfalia Separator or in workshops authorized by Westfalia Separator.

Unqualified balancing can lead to dangerous operating states (vibrations) and destruction of the separator with danger to life.

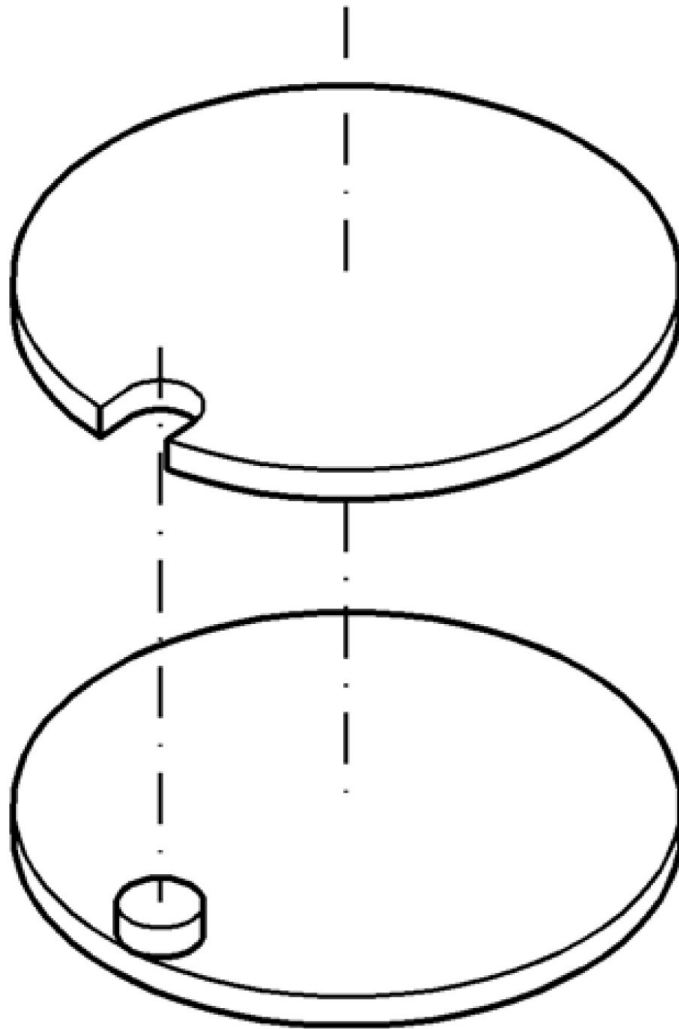


CAUTION:

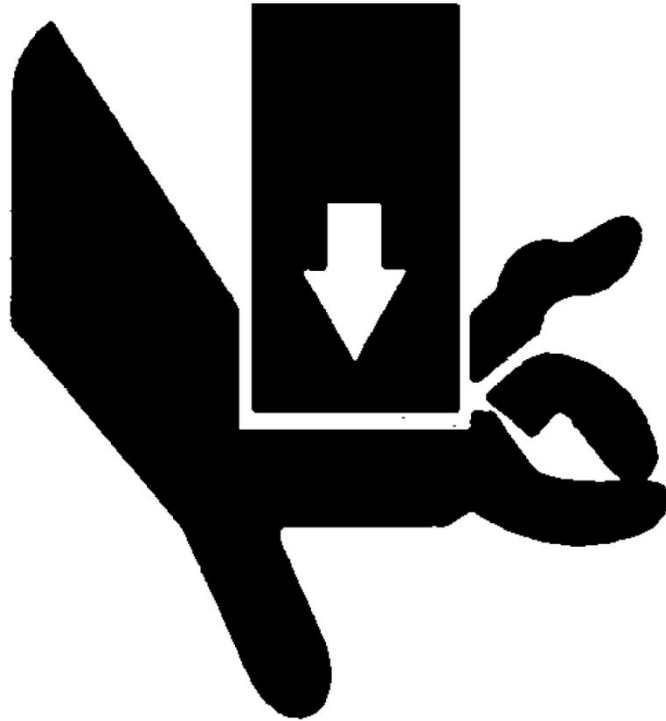
To avoid unbalance, when replacing some bowl parts like:

- Lock ring
- Bowl top
- Distributor
- Bowl bottom
- Water chamber bottom

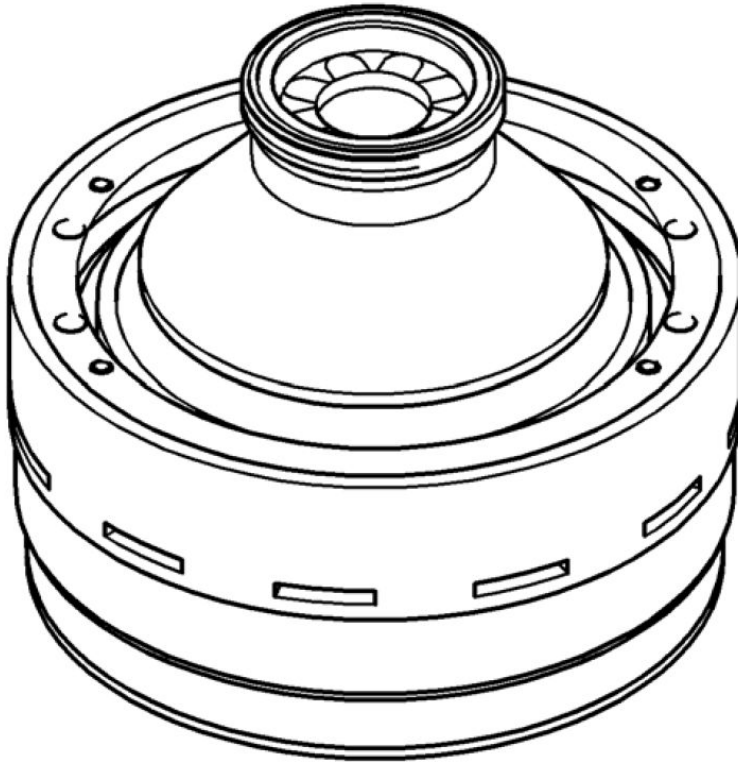
Westfalia Separator must be consulted. These parts are marked with a footnote in the separator manual.



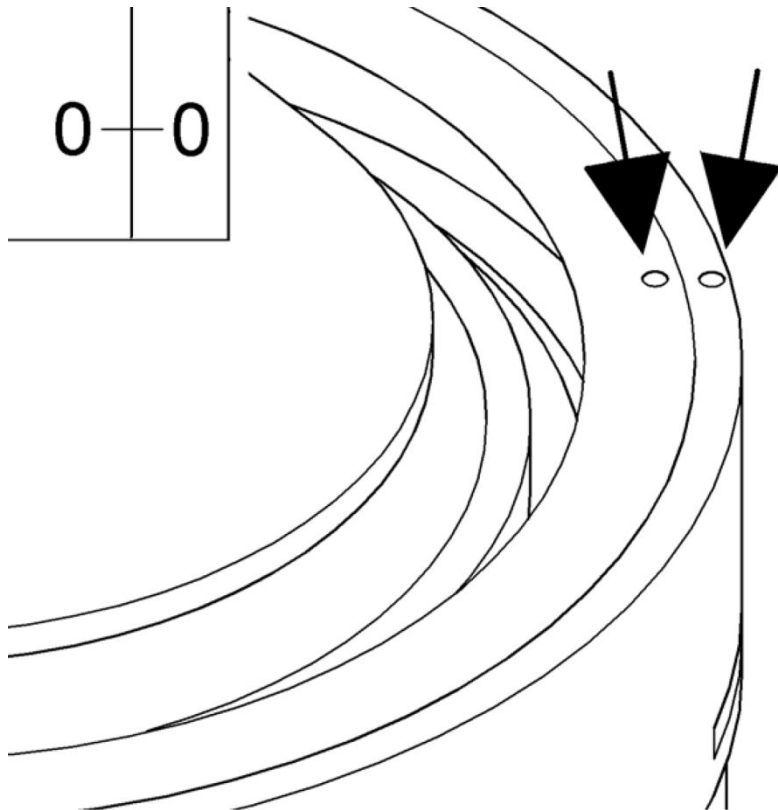
- Some bowl parts are arranged in fixed positions relative to one another.
- Locking devices and alignment marks must be in perfect condition. The bowl must otherwise not be operated.



- When transporting and assembling machine parts, avoid crushing and shear strain.



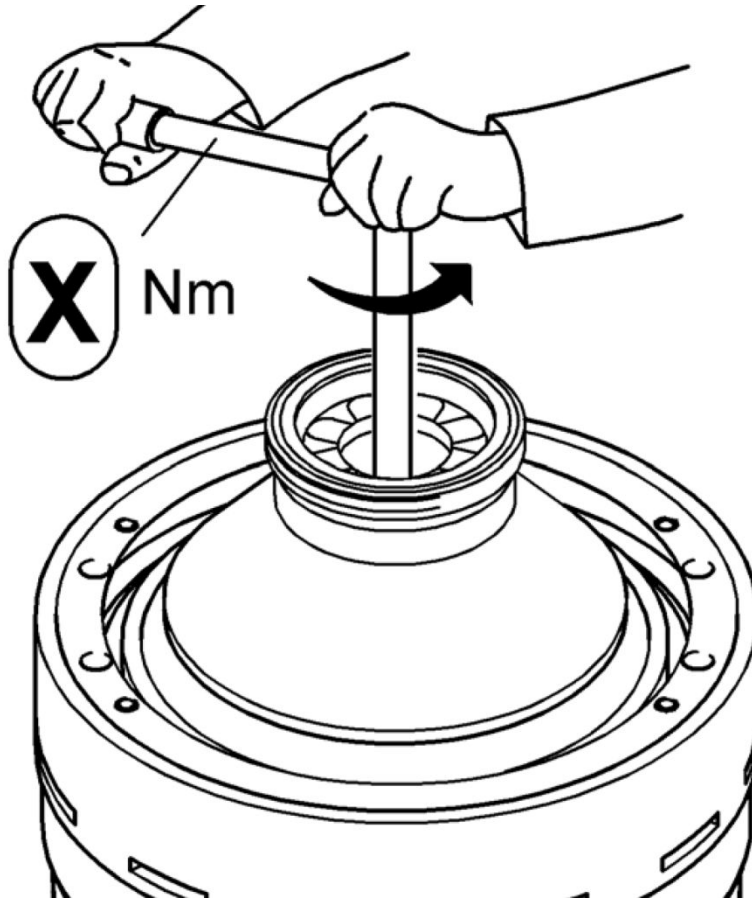
- When assembling the bowl, be sure to strictly adhere to the assembly instructions in order to avoid undue imbalance.
- Before starting the bowl, be sure to fit all parts.



- Tighten the bowl lock ring securely: the "O" marks on the bowl bottom or bowl top and on the lock ring must be in line with each other.
- Pay attention to the position of the marks !



CAUTION: A loose lock ring can endanger life !

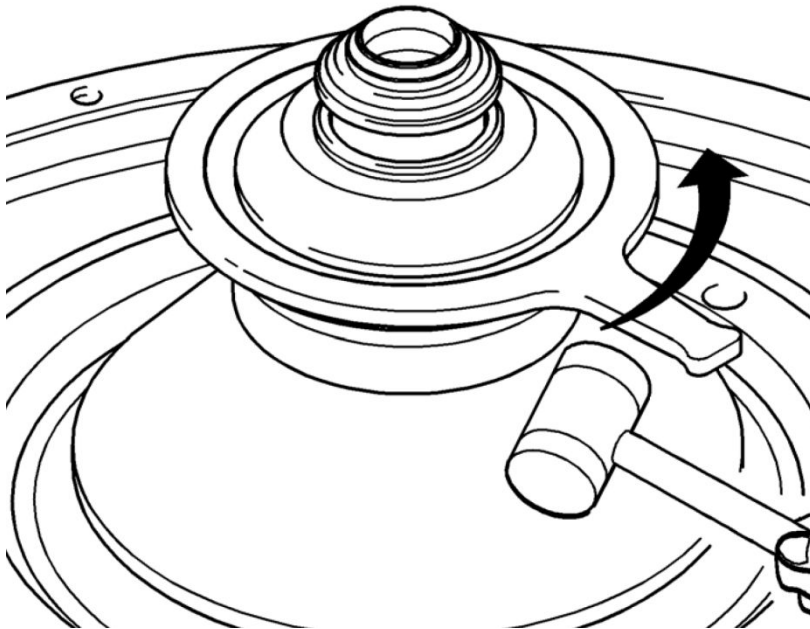


- Tighten the spindle screw with the separator-specific torque (left-hand thread) !

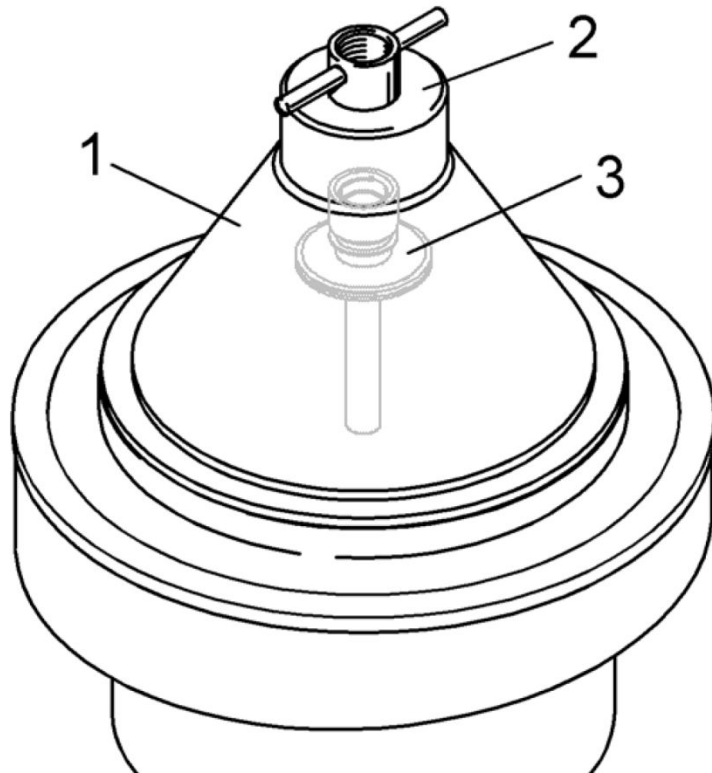


CAUTION: A loose spindle screw can endanger life !

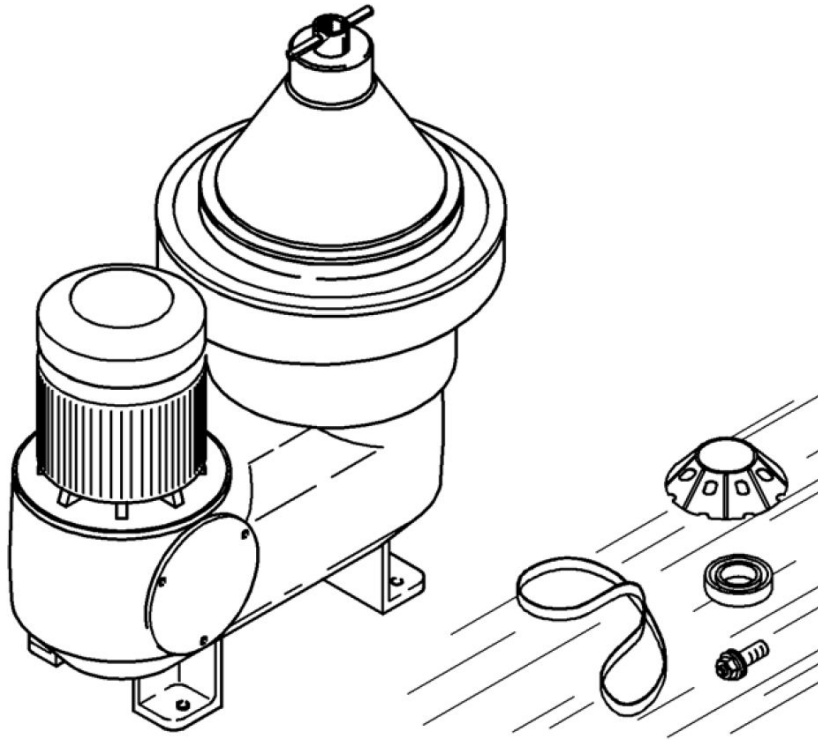
- Tighten the centripetal pump chamber lock ring securely (left-hand thread) !



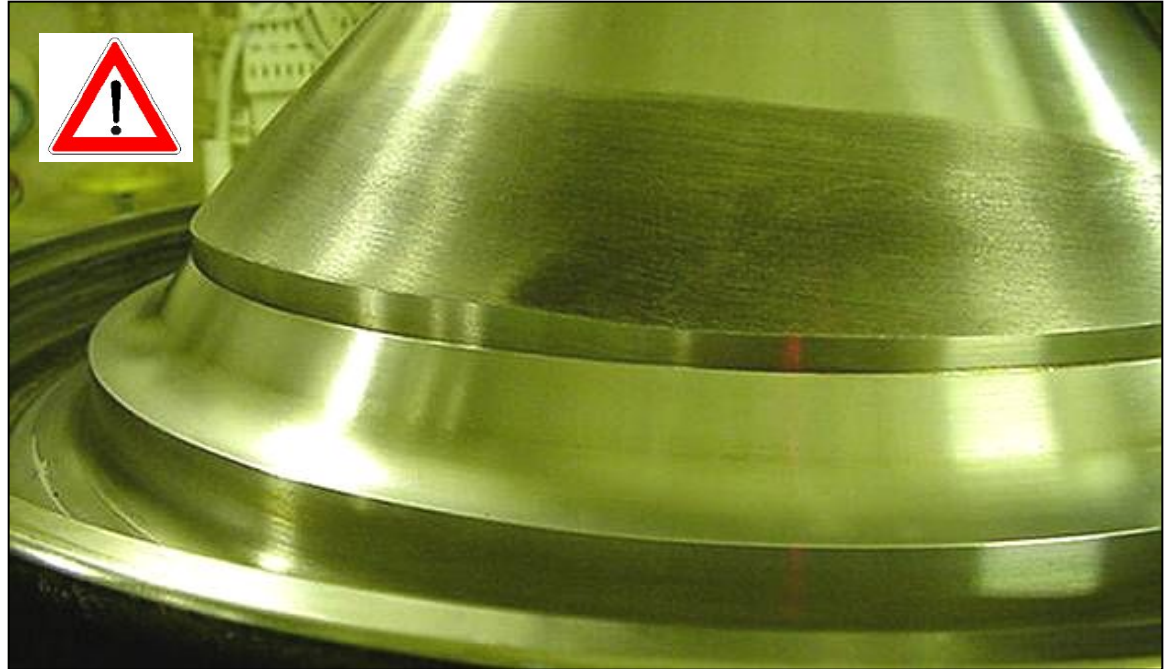
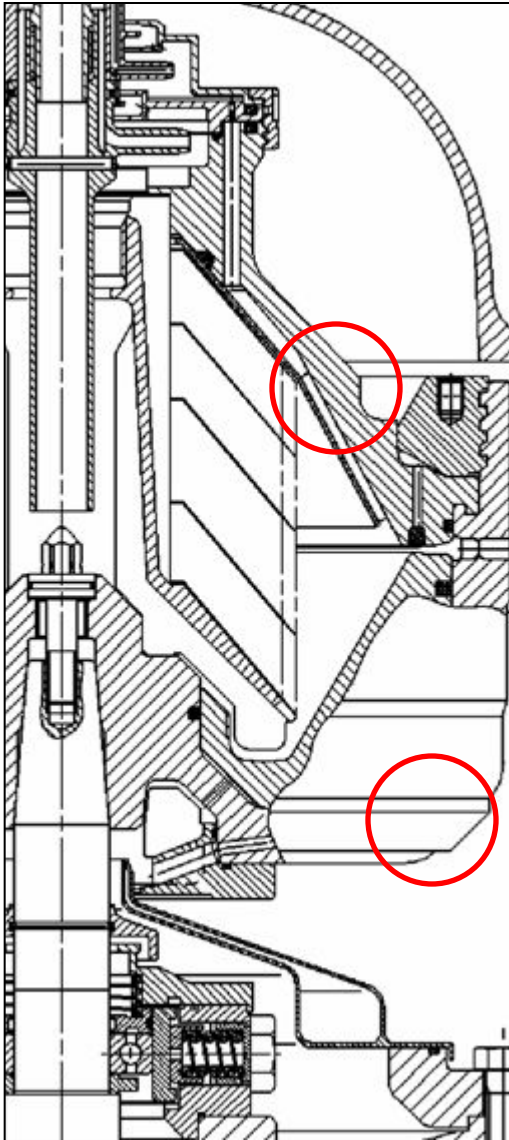
CAUTION: A loose lock ring can endanger life !



- Carefully fasten hood 1, feed and discharge housing 2 and centripetal pump 3.

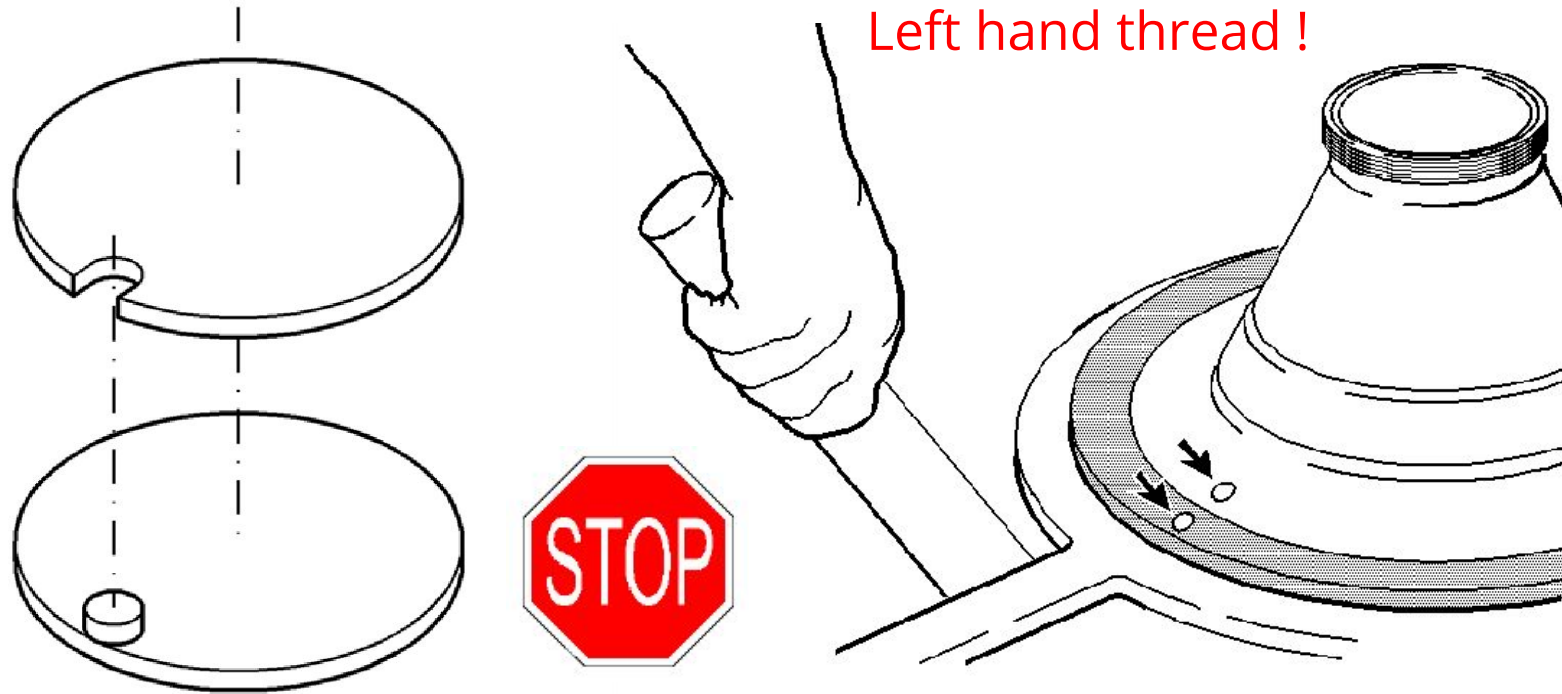


- Check if the machine is completely assembled and properly installed.

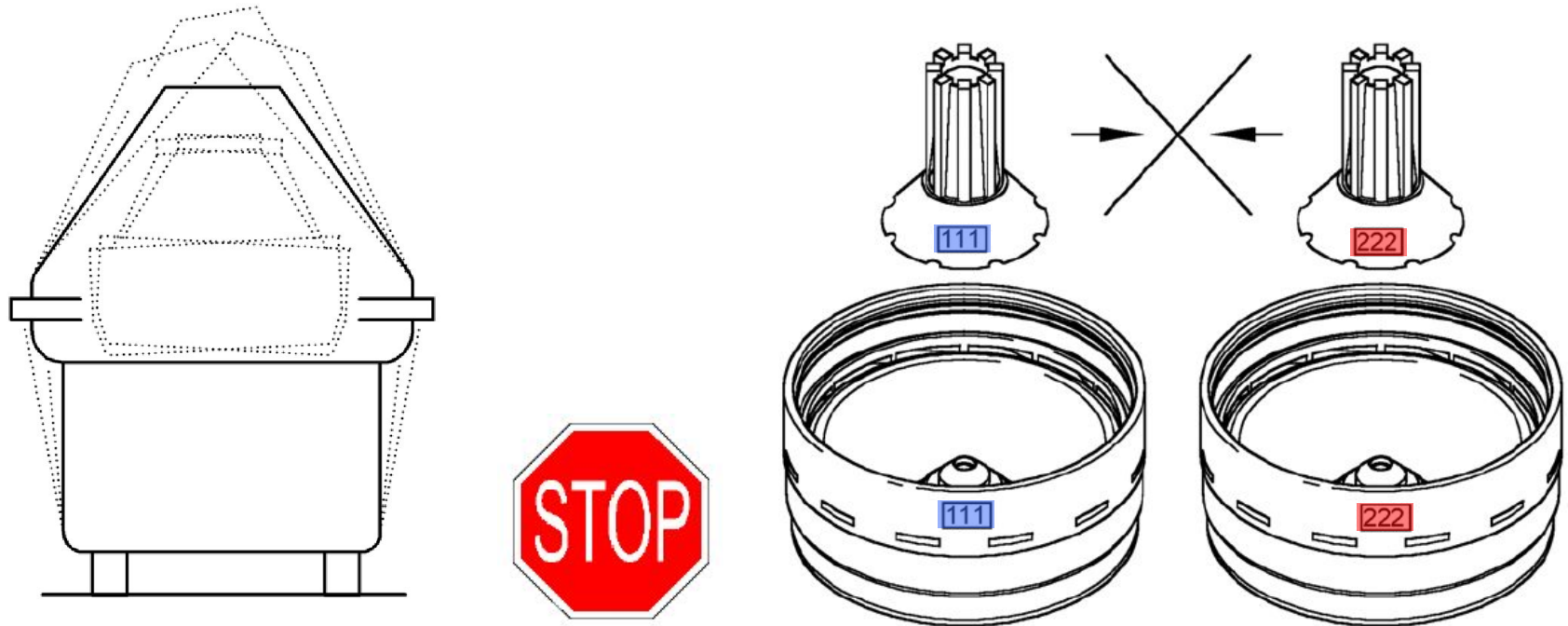


The bowls are **balanced** in the factory at the balancing rim on the bowl top as well as bowl bottom.

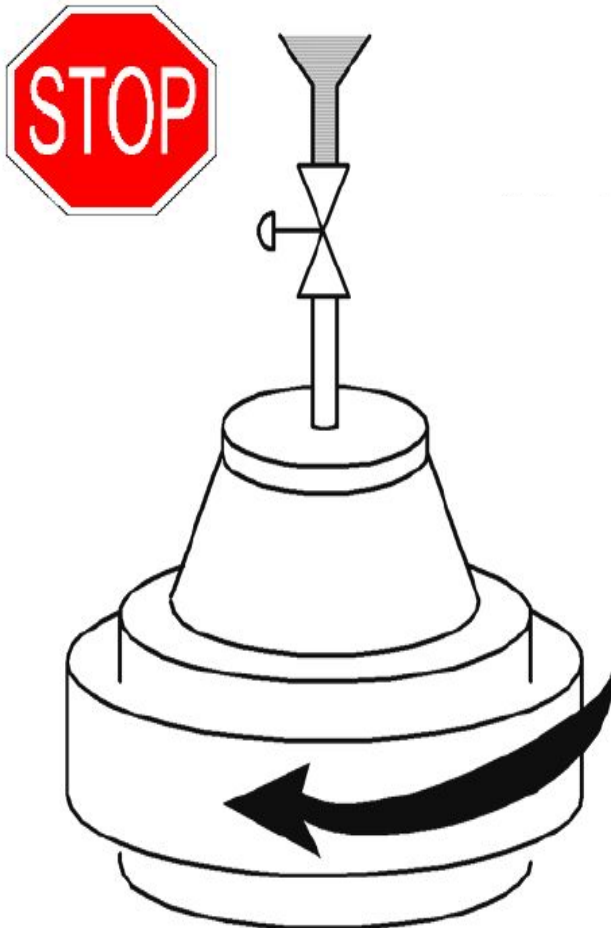
It may become necessary to send the bowl for re-balancing after replacing certain bowl parts.



Beside the separator motor and clutch the bowl might by a possible reason for **vibrations** as a result of **unbalance**. The position of the bowl parts are fixed by means of arresting pins and "0" marks. Attention: A wrong assembled bowl will cause unbalance. **Danger** !



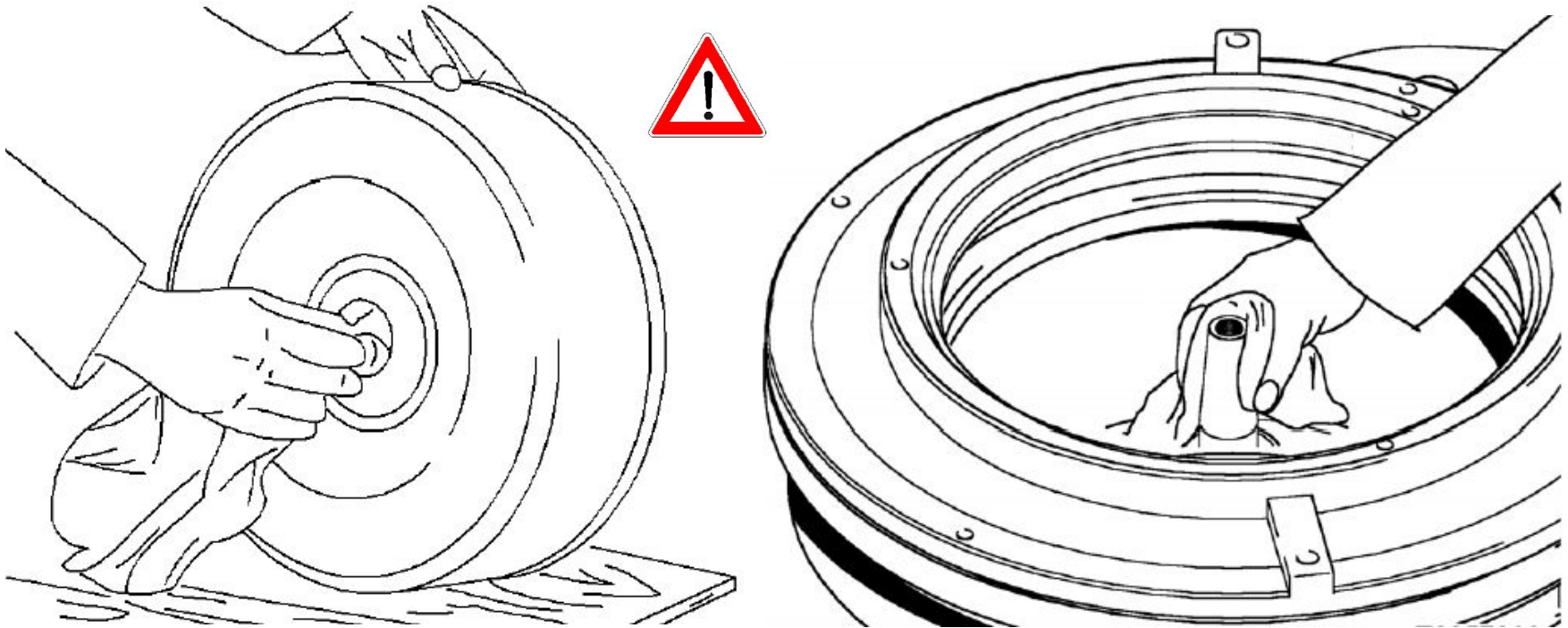
To avoid unbalance of bowl as a result of the interchange of bowl parts the bowl serial number is punched on all critical bowl parts. Those parts are not available as spare parts. The exchange on site must be carried out by Westfalia Separator certified Field Service Engineer.



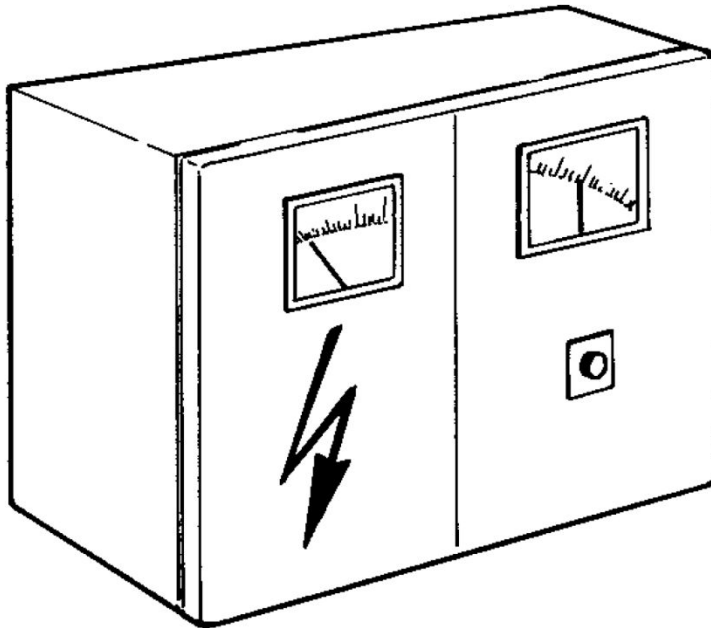
max. 30 min

In case the bowl is spinning for a longer period of time without product this will result in bowl overheating due to friction on air in the frame. Overheating is a very serious problem because the bowl as well as bowl gasket material, bowl speed, tolerances of bowl parts etc. it all depends on the operating temperature.

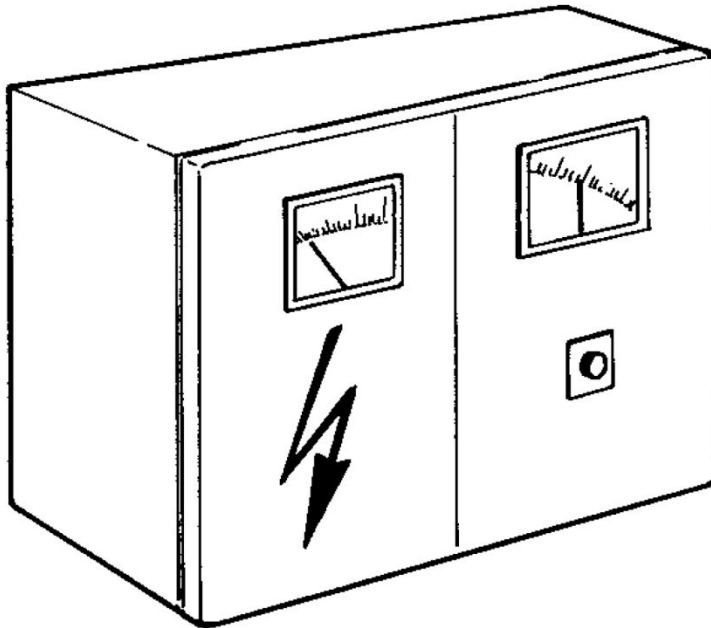
Overheating quite often means the total loss of the bowl. Westfalia keeps a certain number of loan / exchange bowl in stock. A repair is possible in one of our certified workshops.



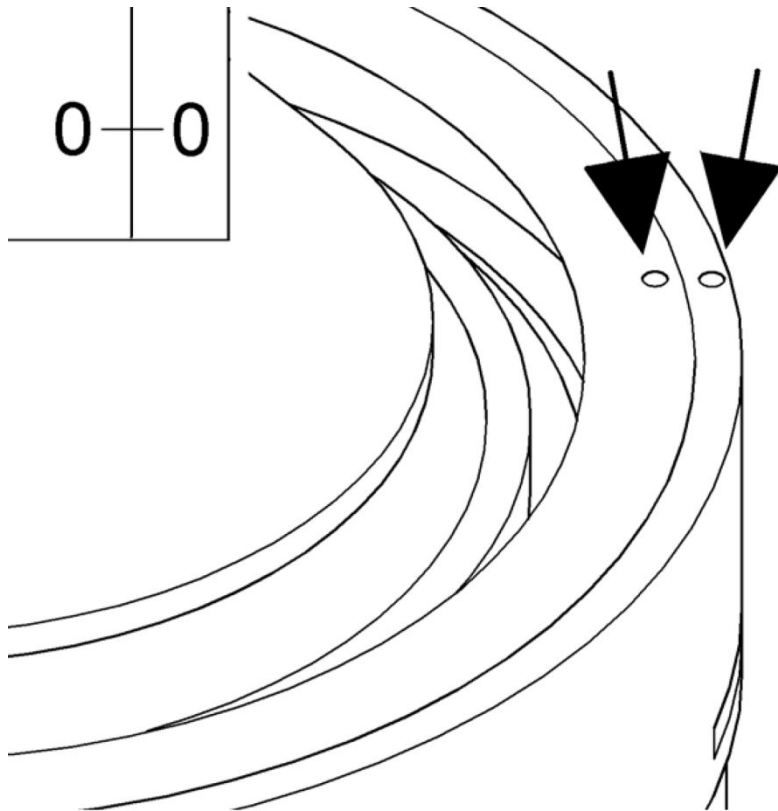
Clean and wipe dry the spindle cone as well as the bowl hub with a cloth. Do not grease the cone parts as this will result in bowl damages.



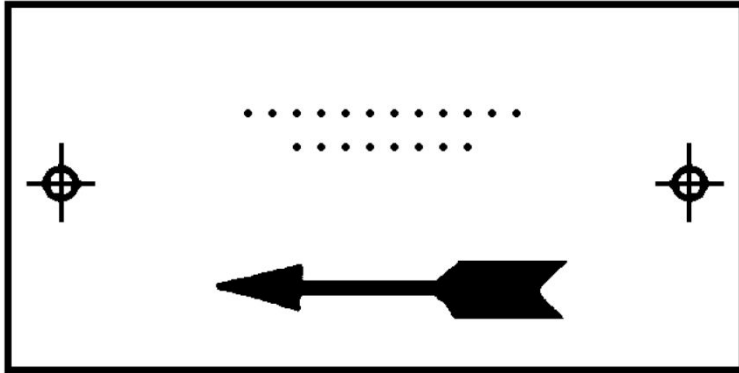
- Electrical work may only be carried out by an authorized electrician !
- The governing accident prevention regulations apply for the electrical appliances and installations.
- Special attention must be paid to the installation guidelines of Westfalia Separator.



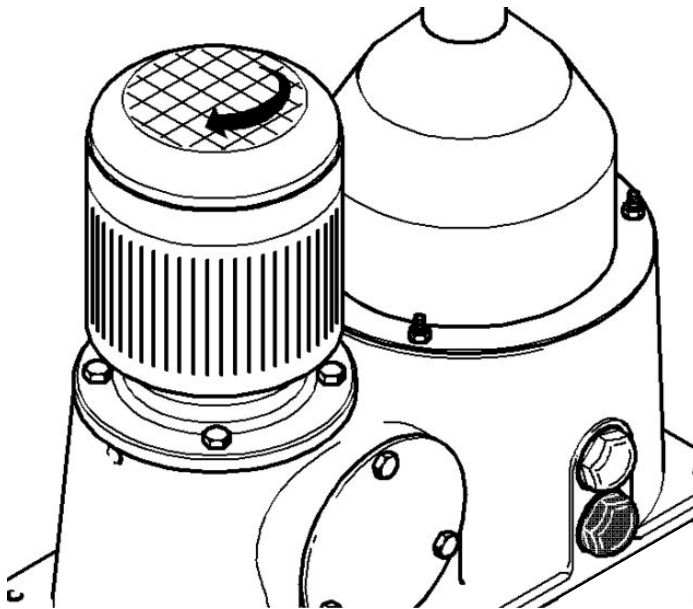
- The frequency and voltage of the power supply must correspond to the machine specifications.
- carry out voltage equalization
- Observe legal regulations e.g. in the EU:
- Low-voltage guideline 73/23/EEG
- Electro-magnetic compatibility 89/336/EEG.
- Guidelines of the classification societies.



- Check that the bowl lock ring has been firmly tightened.
- The "O" marks on bowl bottom or bowl top and on the lock ring must be aligned.

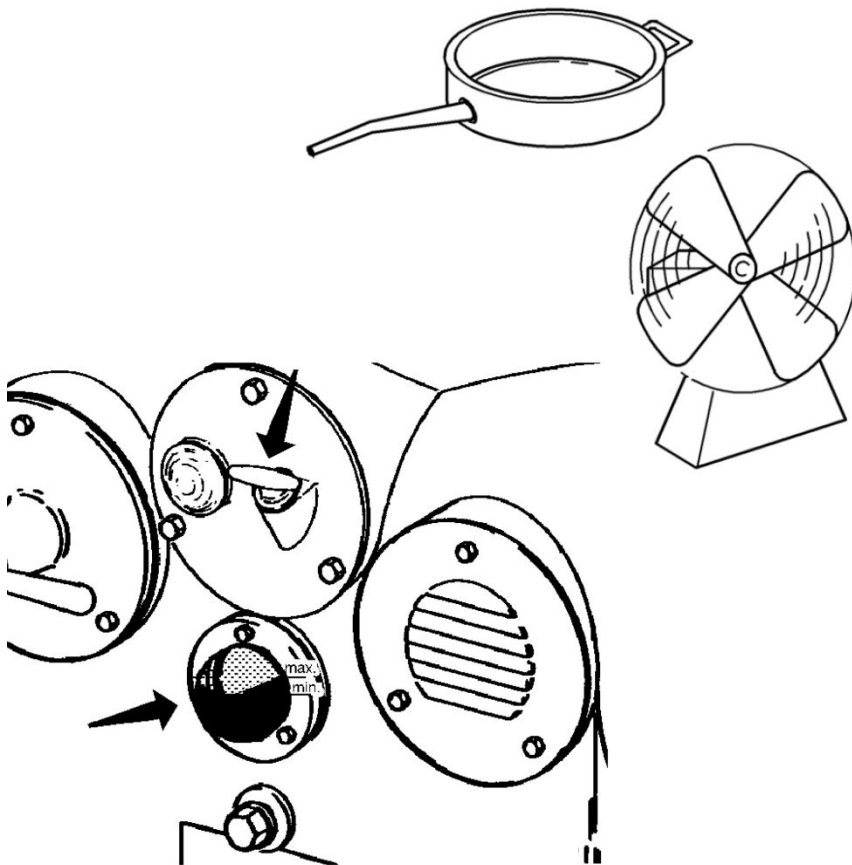


- The bowl must rotate in clockwise direction (see arrow on frame, solids collector or electric motor).

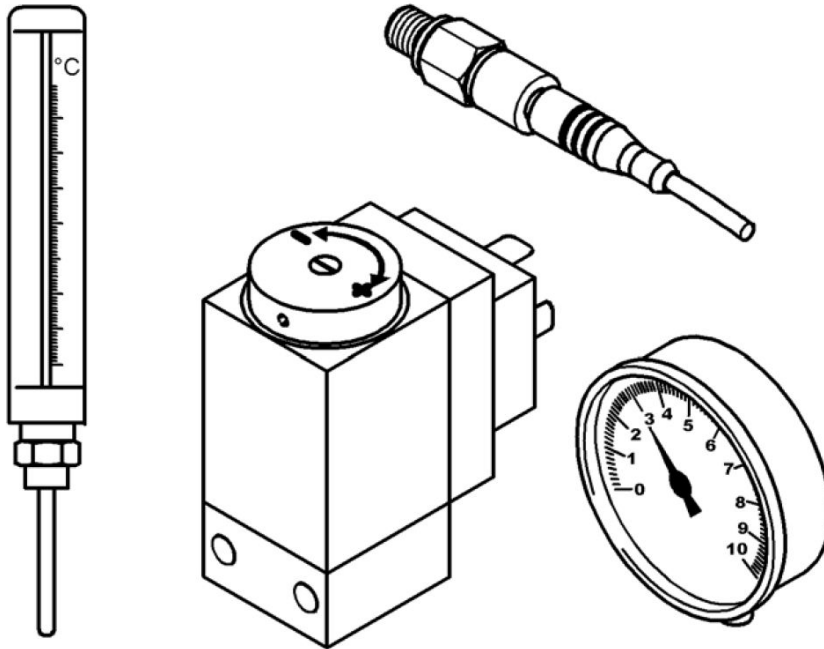




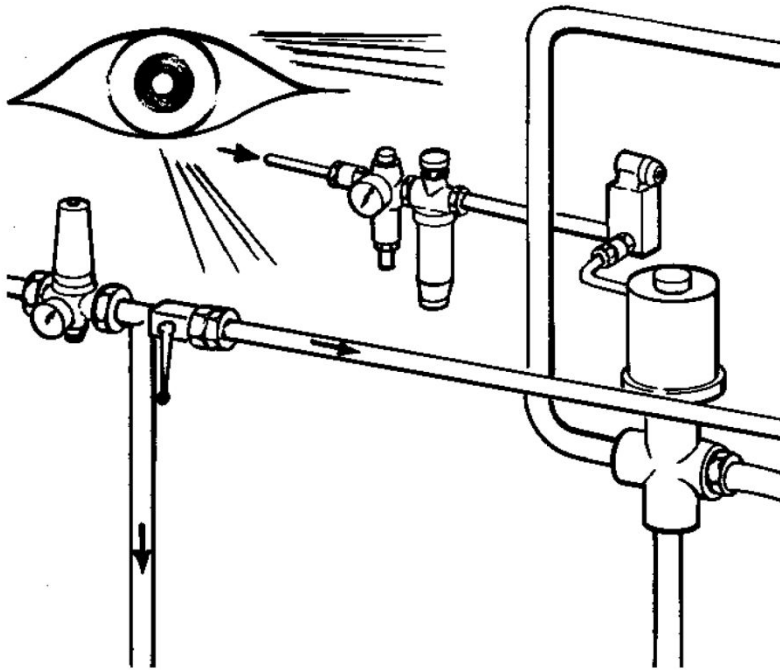
- The separator may only be operated with protection devices conforming to EN 294.
- Equip solid and liquid discharges accordingly where appropriate.




- Check that the lubrication and cooling systems are serviceable.



- Check whether the supervisory equipment is operational and the correct limit values are adjusted.
- When hoods, concentrate collectors and vessels are pressurized, e.g. by inert gas blanketing, cooling, steam sterilization etc. the pressures stated on the boiler plate must not be exceeded.



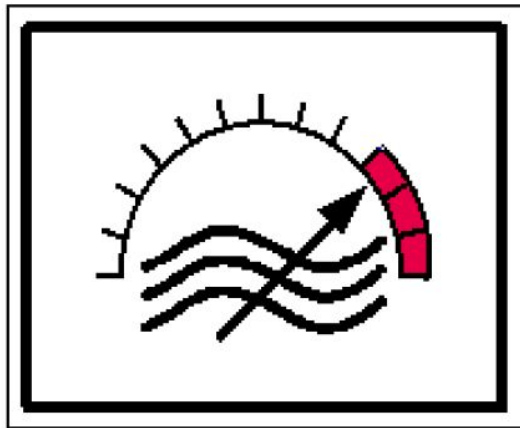
- Check that the product lines are set to operation.
- Regularly check hoses for signs of ageing.
- Check sight glasses for mechanical damage.
- Damaged parts must be replaced immediately by new or reconditioned parts.

 Westfalia Separator D-59302 Oelde (F. R. Germany)		Mineraloil Systems GmbH	
Model	<input type="text"/>	S/N	<input type="text"/>
Built in	<input type="text"/>	Ø in mm	<input type="text"/>
Max. admissible rated bowl speed in min ⁻¹	<input type="text"/>		
Max. admissible density in kg/dm ³ of product	<input type="text"/>		
Heavy liquid kg/dm ³	<input type="text"/>	Solids kg/dm ³	<input type="text"/>
min/max throughput m ³ /h		<input type="text"/>	
min/max temp. of product in °C		<input type="text"/>	
min/max housing in bar		<input type="text"/>	

- Refer to chapter “operation”
- Note nameplate:
The values for:
 - bowl speed,
 - density of the heavy liquid,
 - density of the solids
(centrifugally dry) are
maximum values and must
not be exceeded.



- Wear ear protection.



- In case of frequency converter operation:
- Do not under any circumstances manipulate the frequency converter to exceed the permissible bowl speed (see nameplate).
- The separator may only be operated with an independent device for speed limiting.



- Do not feed product which is categorised as explosive.
- The separator must not be used in areas where explosion protection is required.



- When processing products harmful to persons, observe the pertinent safety regulations.
- Refer to the safety data sheet of the product.
- Wear protective clothing.

The health hazards involved when handling heavy oils and lube oils

As a result of the deterioration in quality of fuel oils, the danger has arisen that the heavy oils used on board contain greater amounts of substances injurious to health. These include:

- polycyclic aromatic hydrocarbons,
- lead compounds,
- chemical residues.

The health hazards involved when handling heavy oils and lube oils

An increased amount of polycyclic aromatic hydrocarbons is also present in used lube oils (waste oils). The health hazards for the engine room staff depend to a large extent

- on the concentrations of the dangerous substances,
- the ambient air (inhalation of oil vapours/oil mist),
- the intensity and duration of the contact with the skin or mucous membrane.

The health hazards involved when handling heavy oils and lube oils

Possible short-term effects:

- headaches, dizziness, nausea, itching or burning of the skin

Possible long-term effects:

- allergic reactions, especially skin allergies,
- festering inflammation of the skin pores (oil-acne),
- damage to the central nervous system after inhalation over a long period,
- skin cancer caused by direct skin contact over a long period,
- Lung cancer or cancer of the digestive organs after inhalation over a long period (not certain as the causes are difficult to separate from the effects of smoking and alcohol).

Code of practice and personal protective measures

- Avoid skin contact with heavy oils or lube oils if possible !
- Wear suitable protective gloves.
- Apply a protective ointment to the skin, especially if no protective gloves are worn ! Personal hygiene is of the utmost importance!
- Avoid breathing in oil vapours if possible !
- If possible, improve the air circulation in the room ! Fully open the air regulation flaps in the outlets of the air supply ducts in the centrifuge and filter area.
- Wash affected areas of skin frequently and thoroughly !
- Change dirty overalls regularly !
- Exercise special care when carrying out maintenance work on and cleaning heavy oil and lube oil centrifuges and filters !



When unusual noises or vibrations occur on the separator:

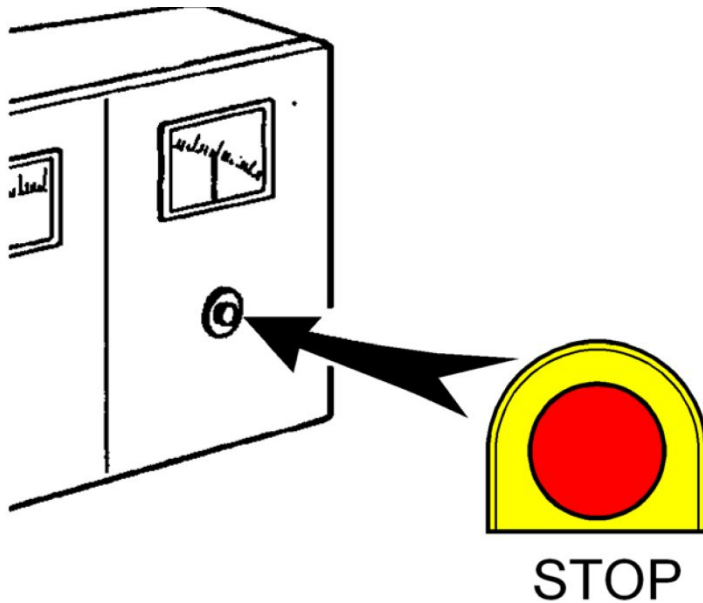
- Immediately shut down the separator with filled bowl via "emergency-off".
- Never trigger a bowl ejection !
- Evacuate the room.
- Do not re-enter the room until the centrifuge has come to a standstill.



Only in case of hot operation:

- Product-contacting parts such as:
 - pipes and hoses,
 - hood,
 - solids catcher

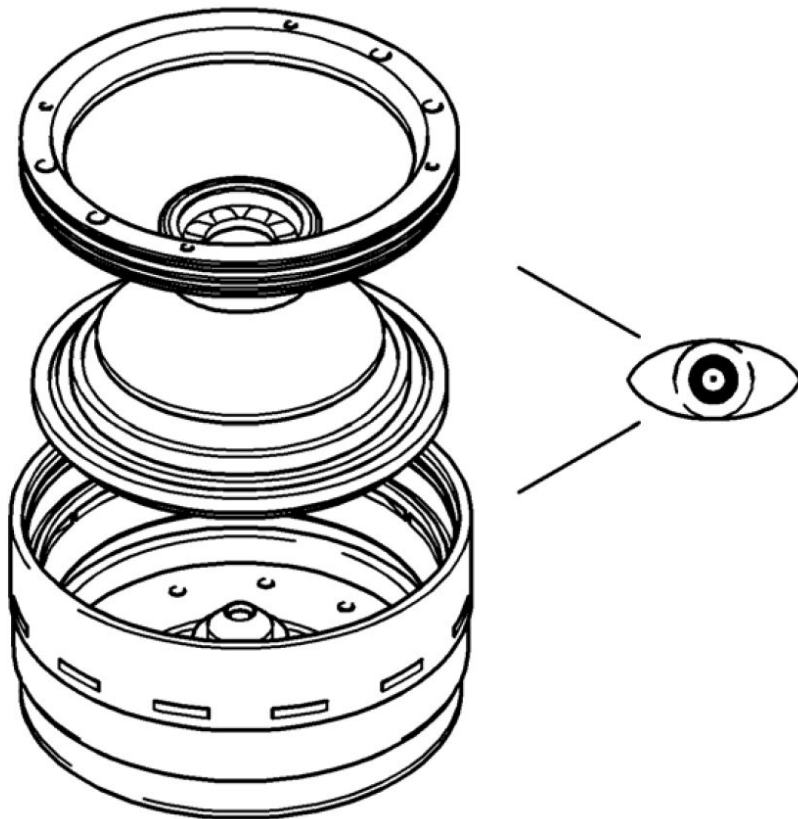
reach temperatures over 80 °C (176 °F).



- For shut-down refer to the chapter "Operation" of the manual and follow the start-up and shut-down instructions.
- In a hazardous situation, press the emergency-off button. The emergency-off button is on the control cabinet (see electrical documentation).

Unfavourable operating conditions may require shorter maintenance intervals. The factors listed below are unfavourable because they either attack the separator material directly or impair the lubrication/cooling system:

- aggressive product (chemical or physical)
- high product temperature
- product with grease-decaying properties
- environment: temperature, dust, vapours



- Particularly high-stressed separator parts like:
 - Bowl lock ring,
 - Bowl bottom,
 - Bowl top and
 - other bowl parts with a large outer diameter must be checked regularly to assure safe and efficient operation.

Timely maintenance of the separator and replacement of worn or damaged machine parts is essential for safe operation of the machine.

- Use only genuine spare parts from Westfalia Separator.
Otherwise, safety risks may arise.
- Carry out the required cleaning thoroughly.
- One-sided solid deposits in the bowl cause severe unbalance !

Maintenance and repair work may only be carried out to the extent described in the instruction manual. Maintenance and repair work not described in this manual may only be carried out by the manufacturer or by "repair shops" authorized by the manufacturer. We, therefore, recommend in your own interest to have your separator inspected by our service engineers at regular intervals. These checks help to maintain the operating safety and avoid unexpected downtime.



Before carrying out work on the separator and electrical plant components:

- Make sure the separator is at a standstill.
- Switch off all electrical appliances via the main switch,
- Lock the installation to prevent it from being accidentally switched on.



Do not loosen any part and do not carry out maintenance or repair work on the separator before the separator is at a standstill !



CAUTION:

Danger of life through rotating separator parts !

In case of a torn, jumped off or defective drive belt:

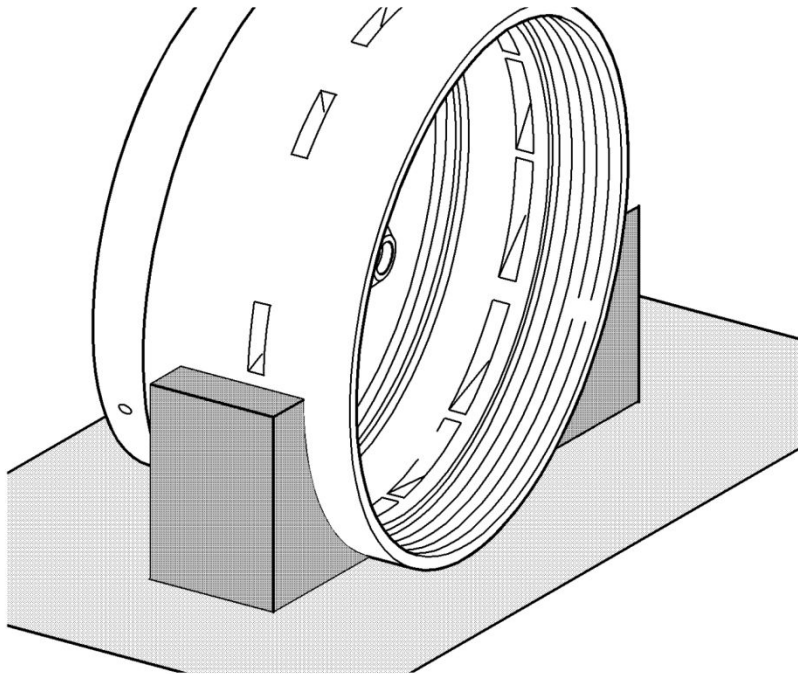
- No parts of the separator may be loosened before the bowl has come to a standstill.
- The run-down time without drive belt (see table below) until dismantling the separator **must** be observed !
- Applying the brake is ineffective !



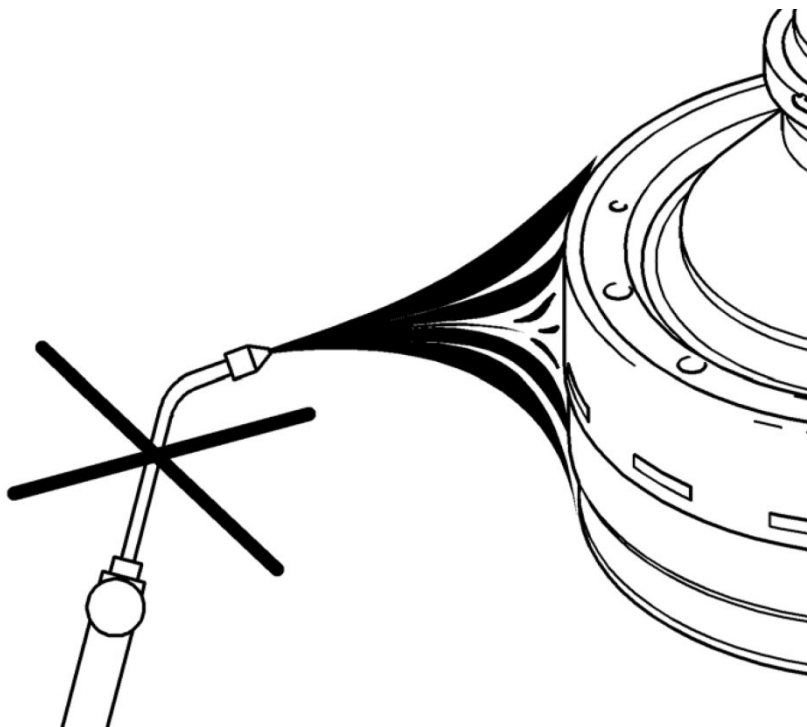
type of separator	Run-down time <i>without</i> drive belt (in case of torn, jumped off or defective drive belt)
OSD6, WSD8	60 min
OSD18, ESD18, WSD18	90 min
OSD35, WSD35	120 min
OSD60, OSD80, WSD60	200 min



- Do not climb onto or stand on the machine or parts of the machine.
- Make provision for and use a sturdy working platform.

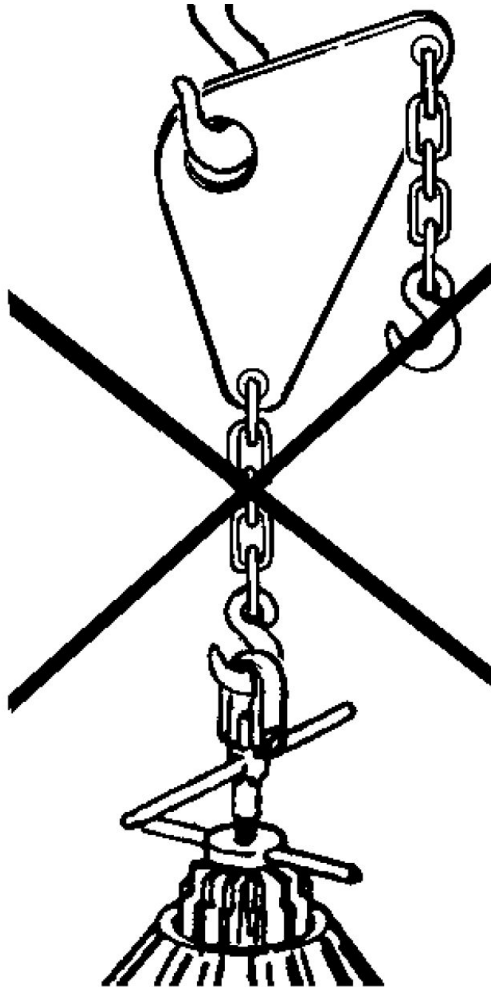


- Place dismantled machine parts on a suitable base, e.g. rubber mat.
- Secure the machine parts against overturning and rolling away with suitable aids.



Do not heat bowl parts with the naked flame.

- Bowl parts must never be welded. This also applies for hood and solids catcher parts of steam-sterilizable separators.
- Even during cleaning the bowl parts the temperature must not exceed 100 °C (212 °F).

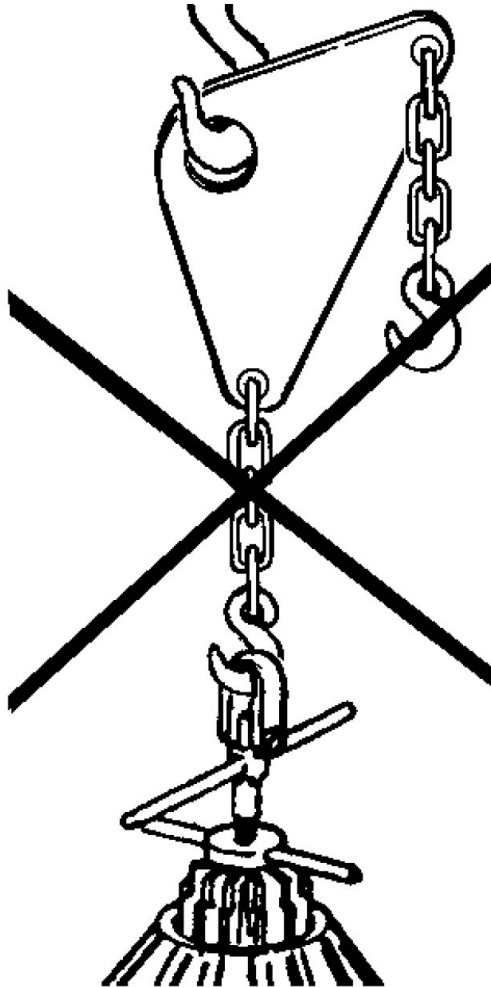


Load-carrying equipment such as:

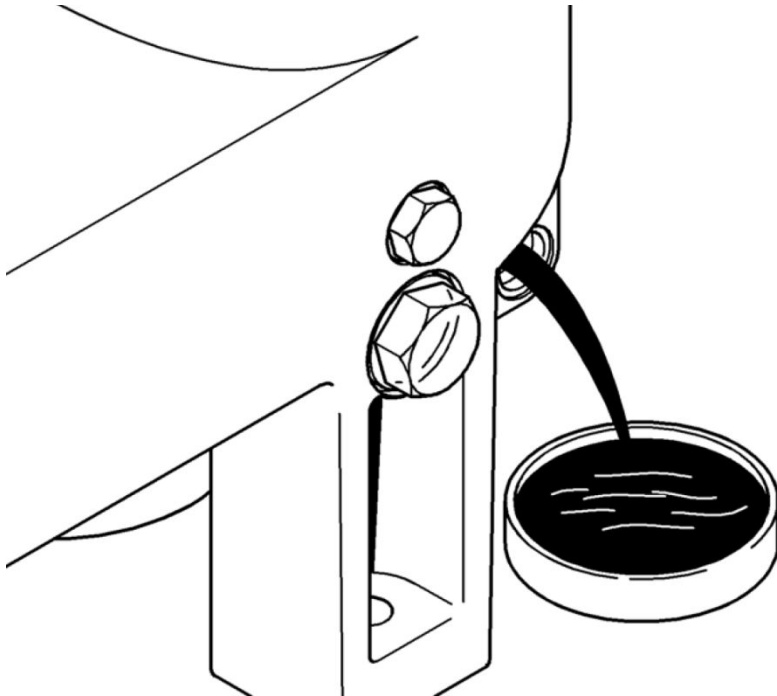
- lifting devices for bowl or distributor,
- chains etc.

may only be used for work routines as described in the instruction manual.

Do not use damaged or incomplete load carrying equipment.



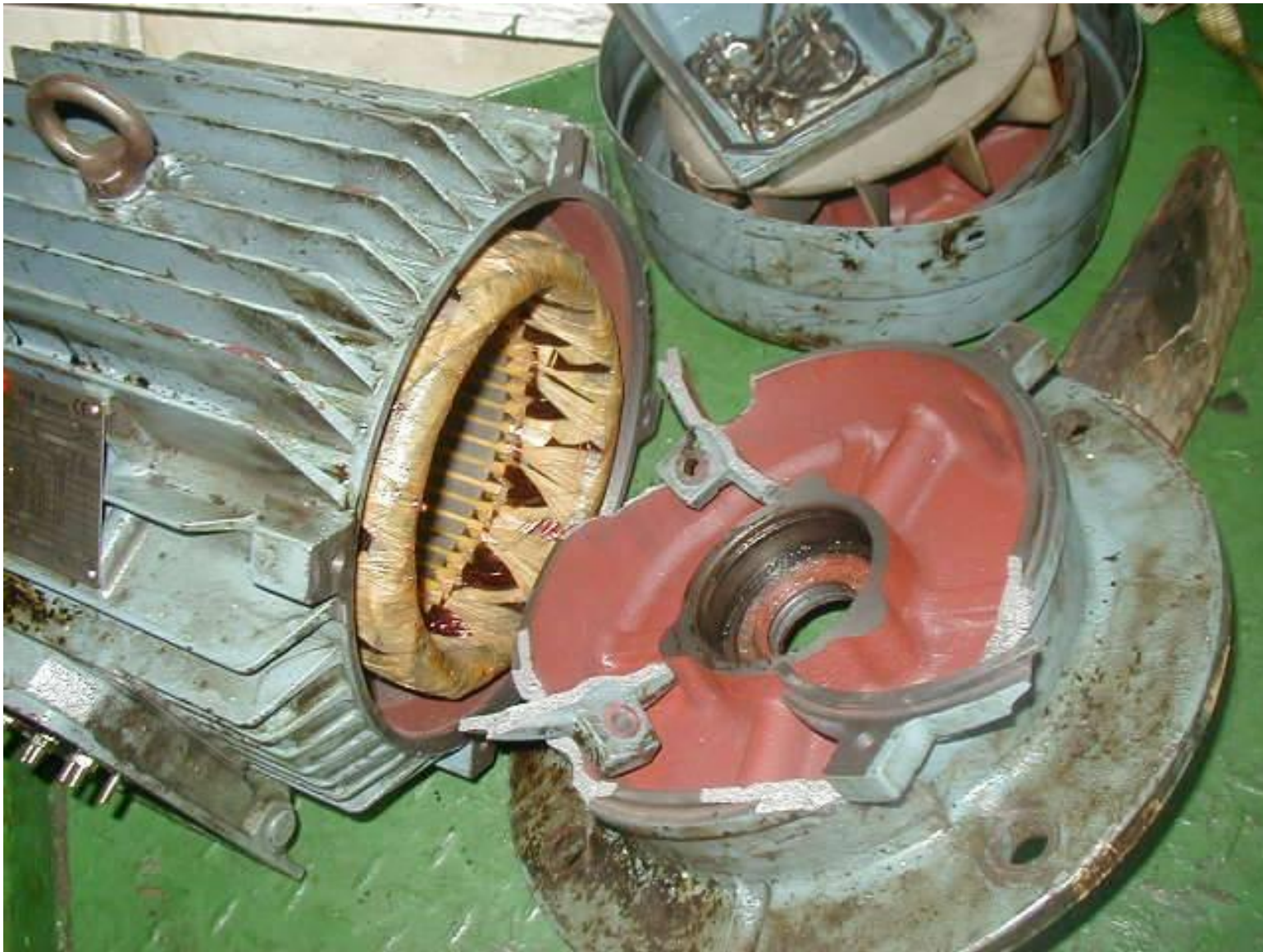
- All load suspension devices have to be checked for completeness and for possible damage at least once a year.
- In addition, when using load suspension devices and hoists, the applicable legislation and safety rules have to be strictly observed.

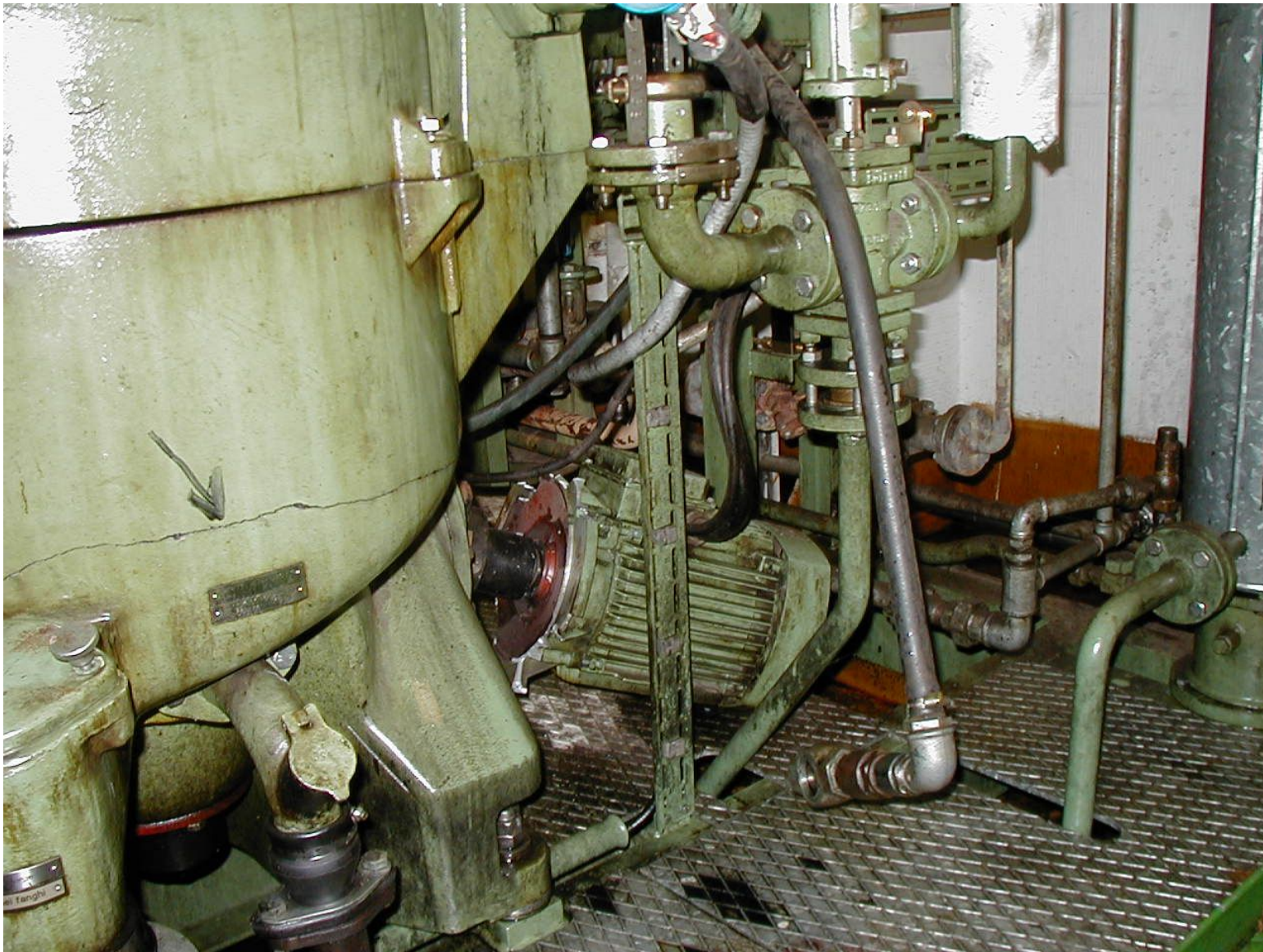


- Collect dripping oil to prevent danger of slipping or product infection.
- When handling waste oils note:
 - They can be injurious to health, depending on their chemical composition.
 - Waste oil must be disposed of in accordance with local regulations.





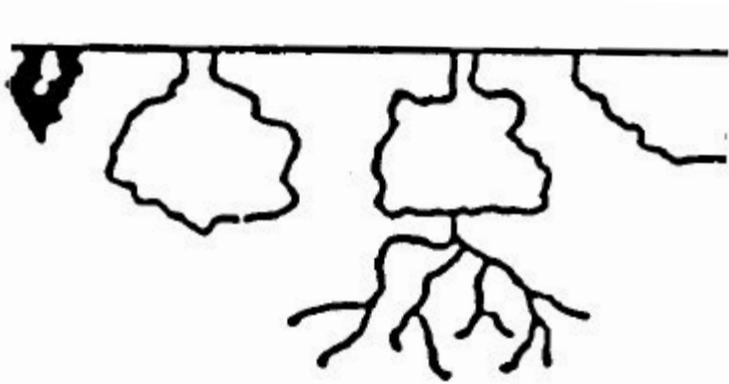




Corrosion can also affect bowl parts made of stainless steel. This corrosion can be flat-spread or pit- or crack-shaped and merits special attention.

Corrosion on stainless steel bowl material should be examined thoroughly and documented. Flat-spread corrosion can usually be measured (reduction of wall thickness).

Pit- or crack-shaped corrosion cannot be measured without the risk of damage. At the initial stage pit-shaped corrosion is generally caused by chlorine ions (seawater !). Depending on the stressing of the part, pit-shaped corrosion can result in crack-shaped corrosion.

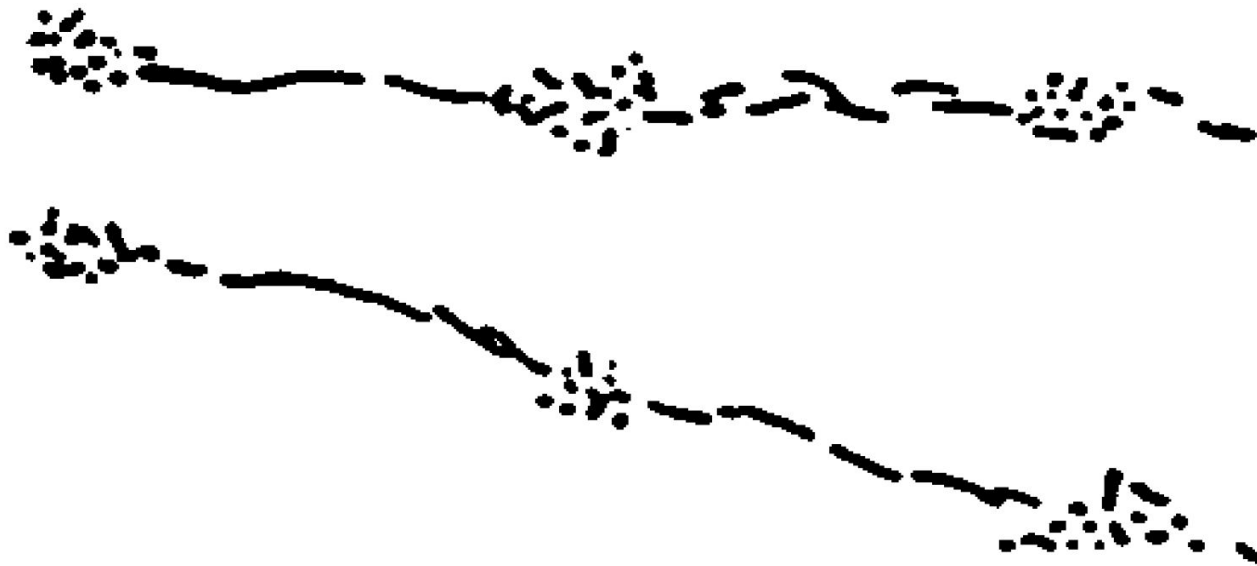


Possible formation of pit-shaped corrosion.



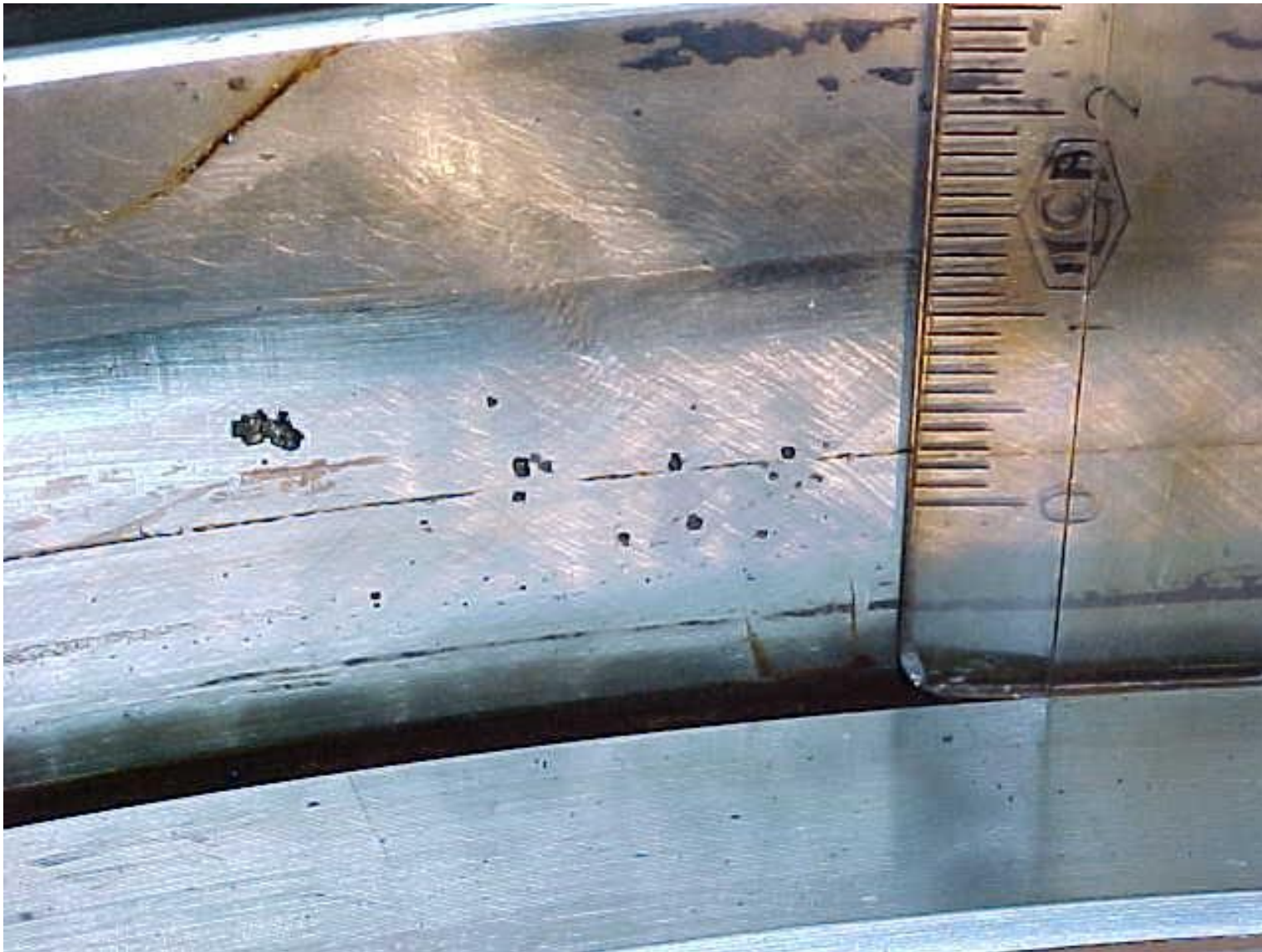
In case of crack-shaped corrosion attack with or without superposed flat-spread and pit-shaped corrosion on main bowl components, the machine must be shut down immediately !

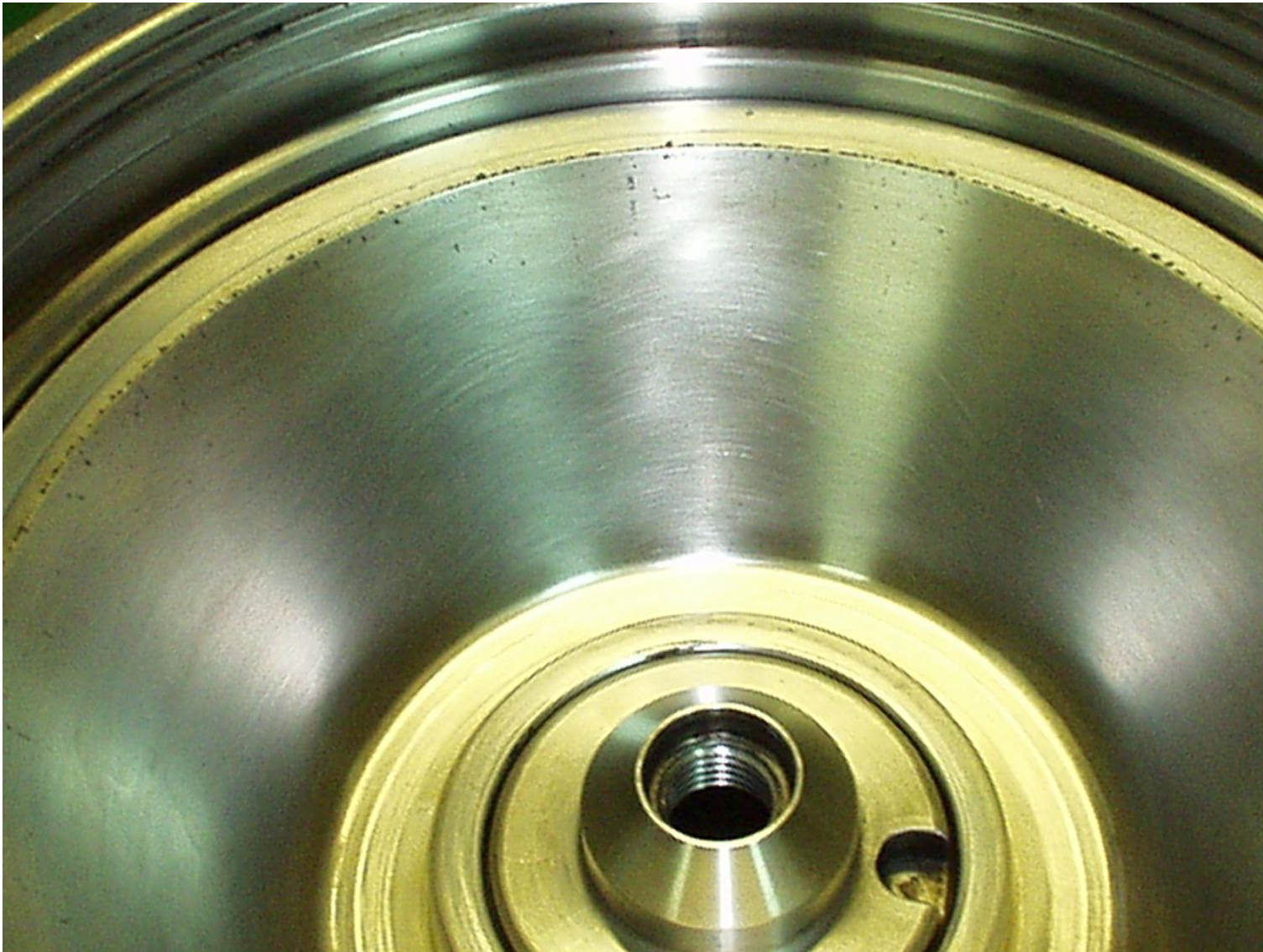
Such pittings can only be investigated by a materials expert. Contact your nearest Westfalia Separator representative for a thorough examination.



Pittings which are close together or form a linear pattern can signify crack formation beneath the surface. Such pittings should be investigated by a materials expert.







Standard operating water specification	
Suspended matter	max. 10 mg/l
Particle size	max. 50 μm
Hardness:	
- up to 55 °C separating temperature	< 12° dH
- above 55 °C separating temperature	< 6° dH
To convert the hardness values stated use the following equation: $1^\circ \text{ dH} = 1.79^\circ \text{ fH} = 1.25^\circ \text{ eH} = 17.9 \text{ ppm CaCO}_3$	
Chlorine ions	< 100 mg/l
pH	6.5 - 7.5

Erosion is caused by solid particles in the process liquid.

These solid particles grind marks into the surfaces with which they come into contact. The following factors favour the occurrence of erosion:

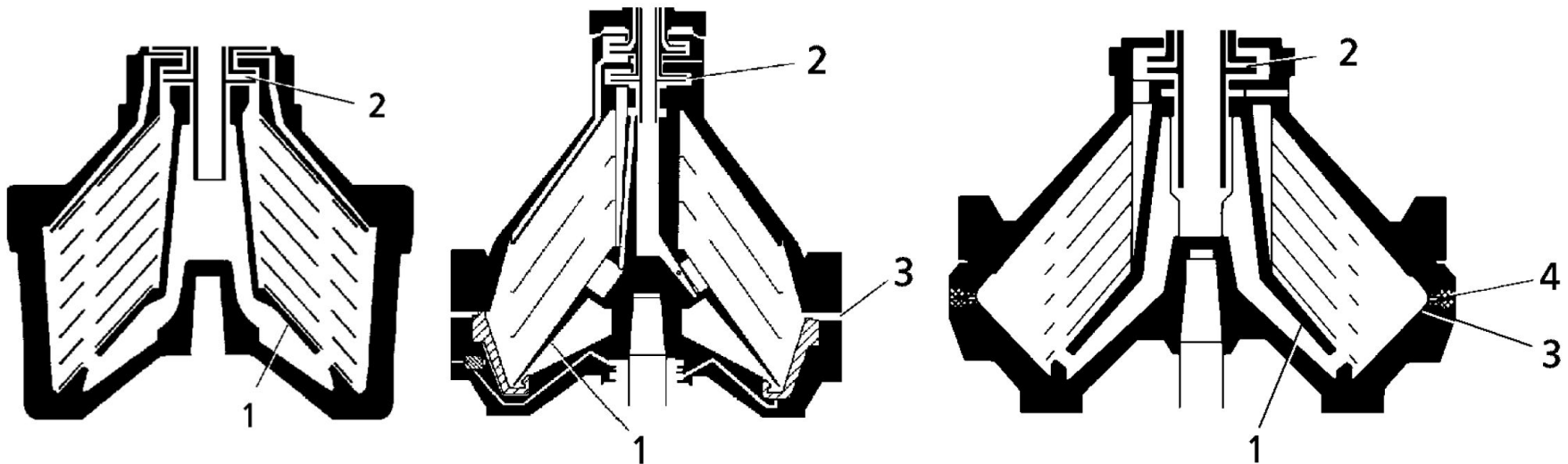
- hard solids particles
- high throughput capacities

The first signs of erosion should be carefully observed and documented. Erosion can deepen rapidly, thereby weakening the bowl material.

Contact your nearest Westfalia Separator representative for a thorough examination. Information on the nature of the damage can be provided by photos, plaster casts or lead molds.

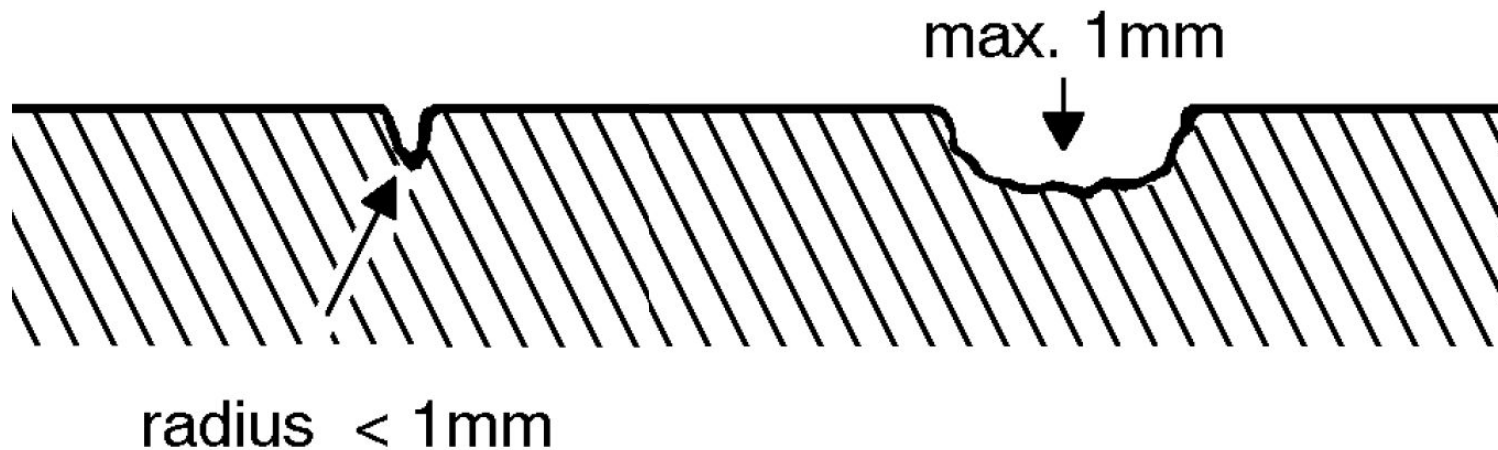
The surfaces most susceptible to erosion are:

- 1) the bottom of the distributor, the rising channels and the ribs,
- 2) the centripetal pump (cavitation),
- 3) all surfaces in the area of the solids discharge ports,
- 4) the nozzles



Signs of erosion which you should immediately report to your nearest Westfalia Separator representative:

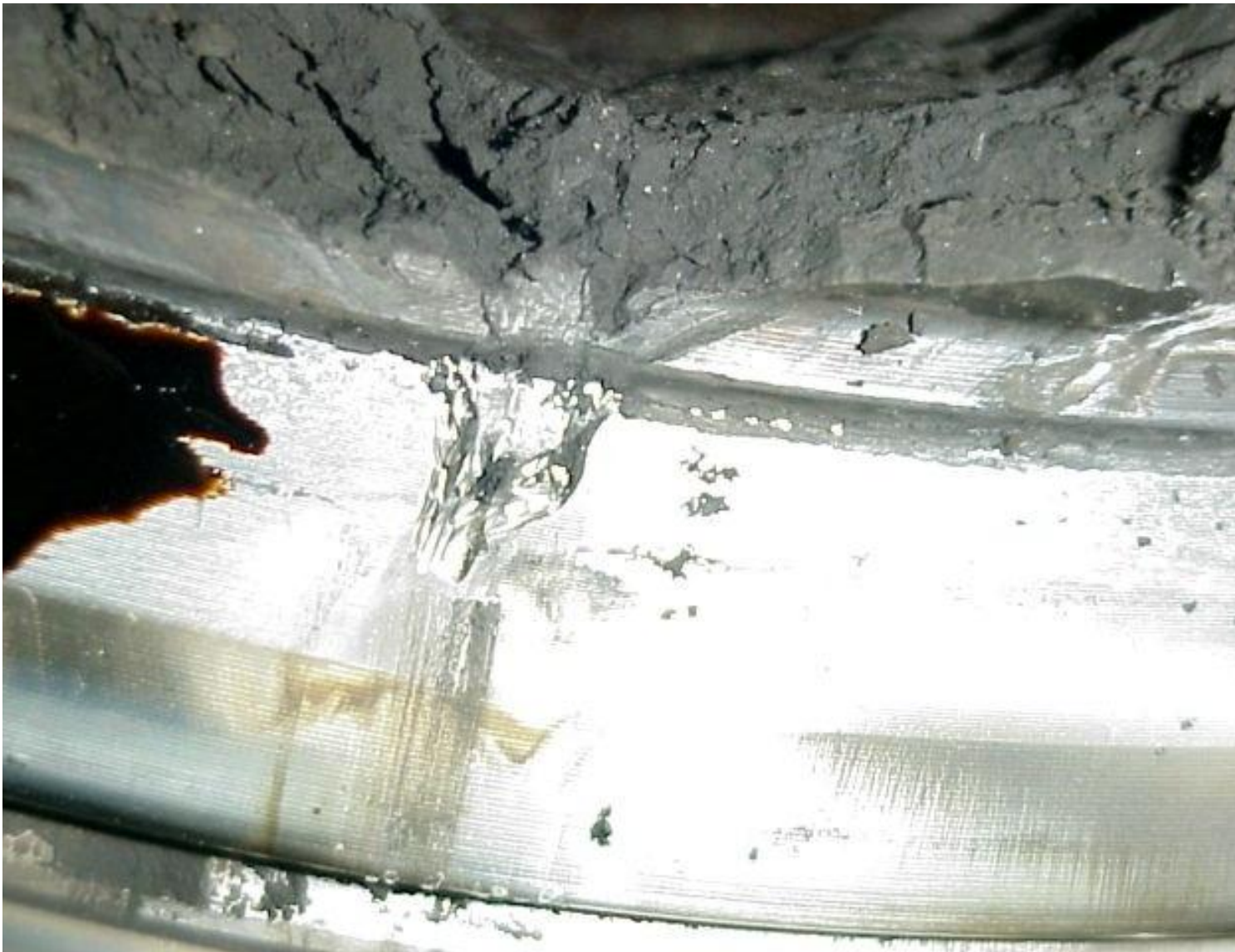
- The bottom of the erosion mark has a radius smaller than 1 mm (large notch effect).
- The depth of erosion mark exceeds 1 mm (0.04 inch) at the deepest point.



Erosion



Erosion



Erosion



It is generally not necessary to dismantle self-cleaning bowls for cleaning after separation unless:

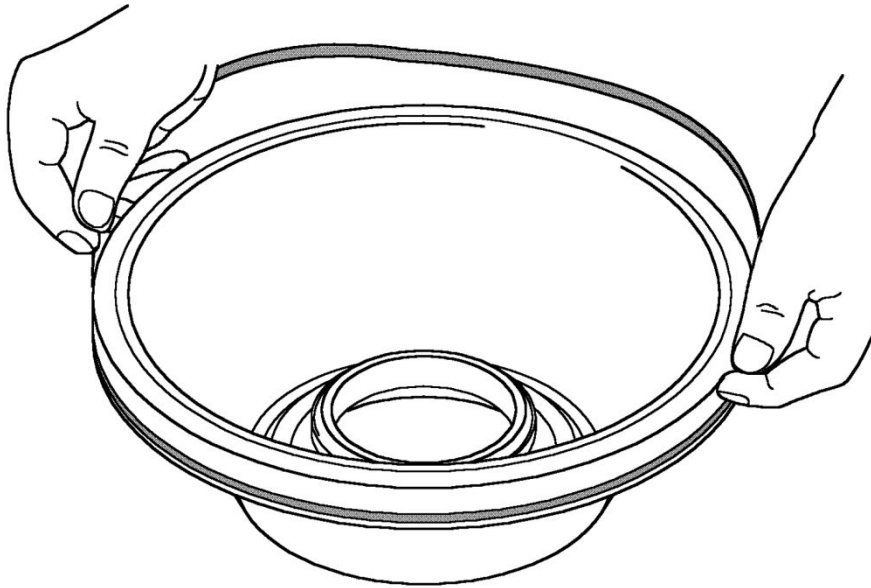
- The nature of the product makes it necessary,
- The separator is to be shut down for a lengthy period
- Dismantle and clean the bowl for checking from time to time. See Maintenance schedule in the manual.
- Use only a cleaning agent that is approved for the field of application !

Do not use acid or chloric cleaning agents. Chlorine attacks stainless steel parts.

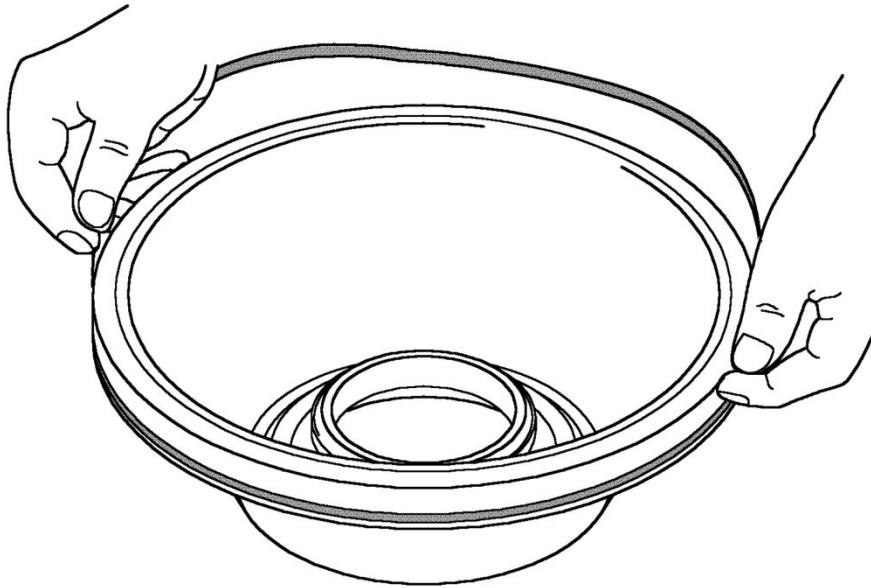
Dissolve dried scale with citric acid.

For cleaning the individual disks and bowl parts do not use metal scrapers and metal brushes !





- Take the gaskets out of the bowl parts.
- Clean the grooves and gaskets to avoid corrosion in the grooves.
- Replace damaged, very swollen, hardened or brittle gaskets immediately.
- Clean the small holes for the feed and discharge of the operating liquid with particular care to ensure trouble-free bowl ejections.



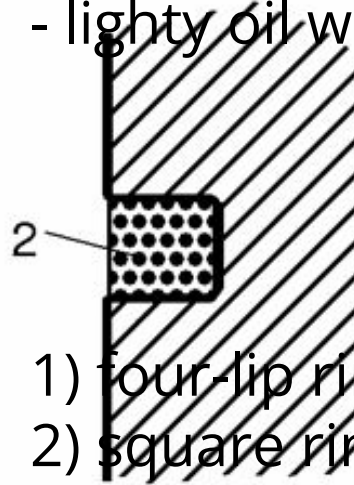
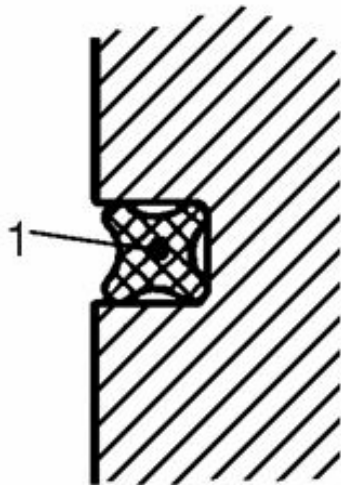
- Thoroughly clean the gasket grooves of the individual bowl parts and apply a thin coat of grease.
- After fitting check that:
 - the gaskets are not twisted,
 - the gaskets are evenly positioned in the groove.

Replacing the four-lip rings or square rings :

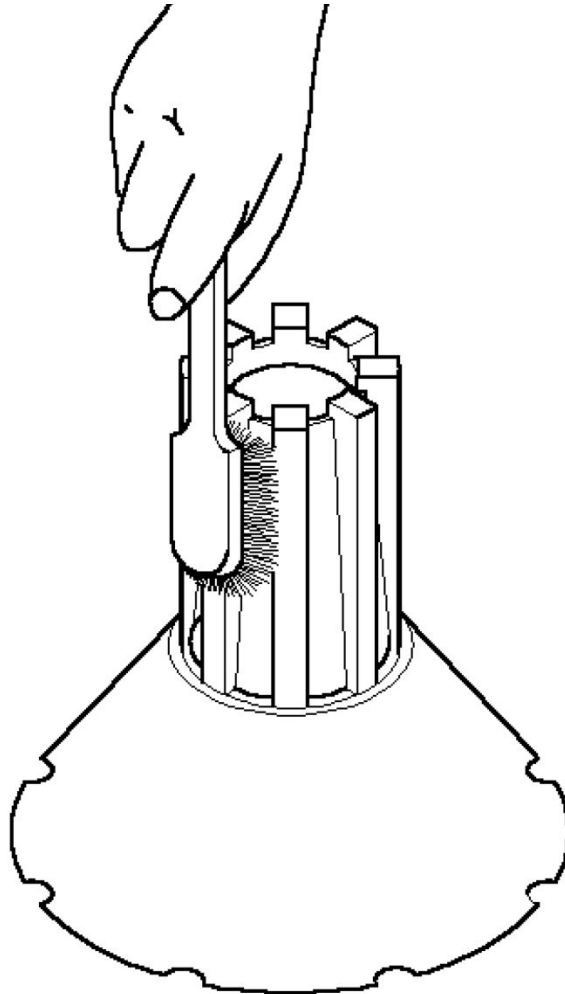
- check gaskets: when the sealing surfaces on the gaskets shows sings of wear or are hardened and brittle:
 - replace the gaskets

Before fitting the new gaskets:

- stretch the gaskets and
- lighty oil with lube oil



- 1) four-lip ring
- 2) square ring

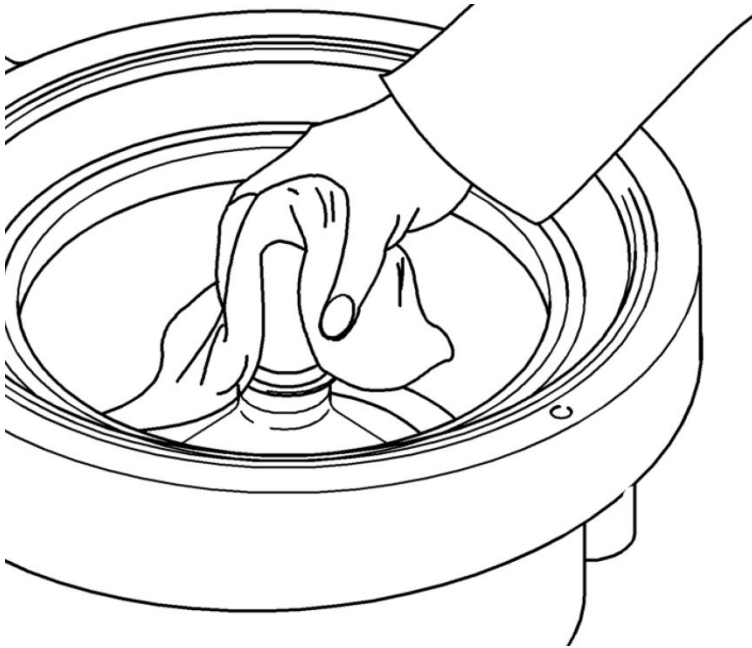


- Clean the distributor between the ribs with the brush on the inside and outside. When the distributor neck is very dirty, the feed clogs which can cause overflow.
- Apply a thin coat of grease to the guide surfaces and threads of the bowl parts after drying.
- Re-assemble the bowl immediately after cleaning.

CAUTION: Danger to life through electrical components !

- Never rinse off the motor with a direct water jet.
- Use only approved cleaning agents, preferably a neutral cleaning agent, benzene or diesel oil.
- Do not use chloric cleaning agents. Chlorine attacks stainless steel parts.
- Dissolve dried scale with citric acid.
- Clean the inside of the upper section of the frame from time to time.





Place a cloth over the spindle.

When the bowl has been removed, no cleaning liquid must spill onto the drive belt via the spindle.

Cleaning the strainer and the operating water feeding system

The strainer and the operating water feeding system must be cleaned depending on the quality of the operating water and overall load.

- Use citric acid in case of furring.
- Thoroughly clean the parts with water.
- Replacing or cleaning the filter element
- Close the main valve for operating water, filling and displacement water !



CAUTION: Danger due to electrical current !

CAUTION: Danger of injury through very hot separator parts !

Thank you.



Service Centre Hamburg, Germany