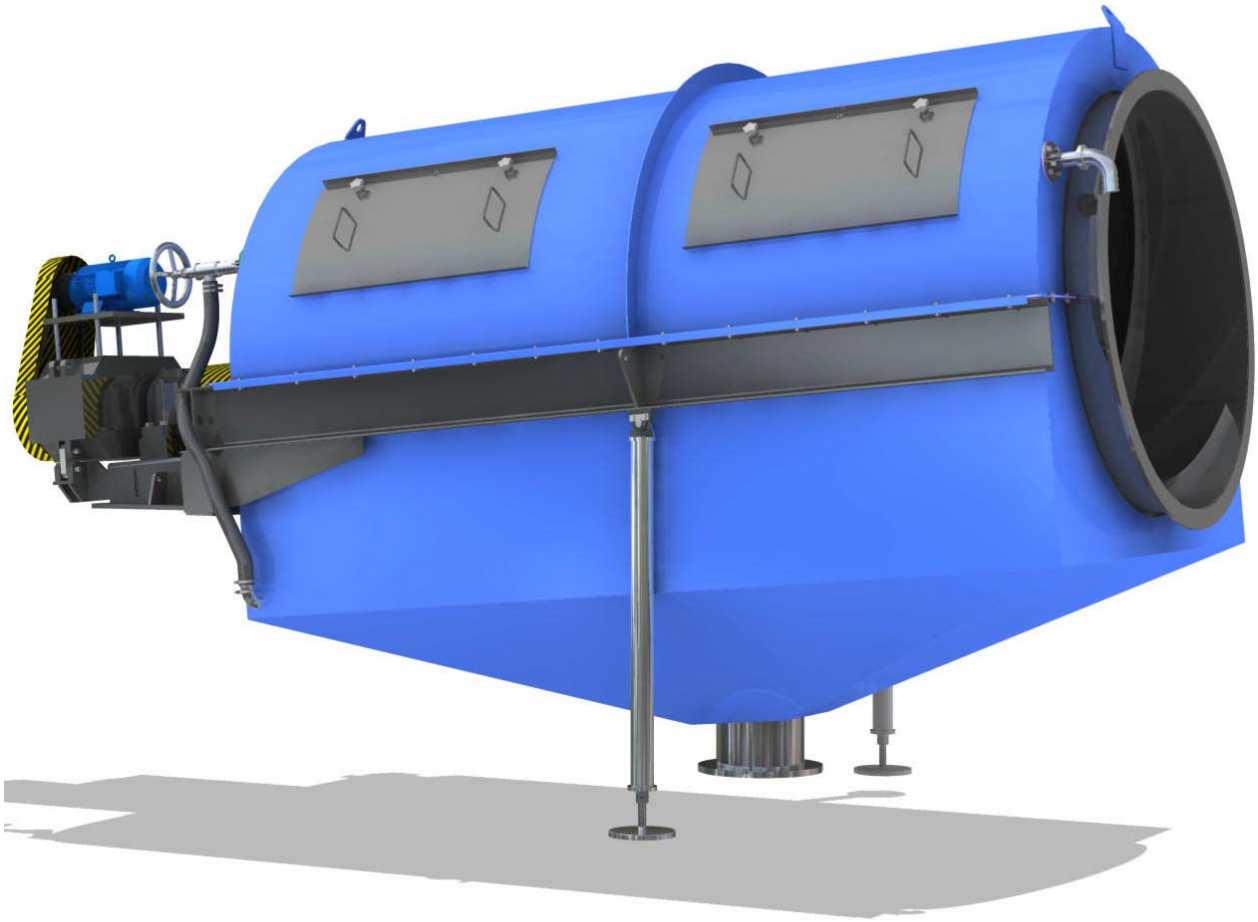

Erection Work, Operating and Maintenance Instructions

Machine: **FibreWash Drum FWD**

Machine No.:
Year of construction:2012

Order code: STANDARD
Order no.: C-00-00000

ORIGINAL LANGUAGE:german

Issued by:	PDe/Nöst, 2012-09	Revision:
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1 INTRODUCTION

This manual is part of the ANDRITZ technical documentation for the machine. It is intended as a supplement to the training provided, to supply the basic knowledge required for proper, safe and economical use of the equipment delivered by ANDRITZ. Observing these instructions helps avoid hazards and reduce repair and downtime costs, as well as increasing the reliability and useful life of the machines.

1.1 Use

Target group

This operating manual is intended for users with a knowledge of mechanical engineering and is for the exclusive use of the operating company and its personnel.

Personnel entrusted with work on the machine must have read and understood these operating instructions and comply with them. This refers in particular to the following tasks:

- Erection work, installation and start-up
- Handling, starting and stopping
- Troubleshooting
- Maintenance and upkeep
- Transport
- Maintenance and disposal of process materials, cleaning of machine and the area around the machine

In particular, the following must be considered:

- Chapter SAFETY
- the safety instructions contained in various other chapters

Supplementary instructions

The plant operating company shall complete this manual by adding national regulations on occupational health and safety, and on environmental protection.

Instructions on any special operational conditions concerning work organization, sequence of work/operations and the personnel assigned to the job shall also be added. This includes instructions regarding obligatory supervision and notification requirements.

Safekeeping

Keep the entire operating manual near the place where the machine is installed and within easy reach.

1.2 Standards and guidelines

The machine/plant has been built in accordance with state-of-the-art standards and the recognized safety rules.

The CE declaration of conformity confirms that the requirements of the machinery directive 2006/42/EG and the (harmonized) European standards EN 1034-1 and EN ISO 12100 have been observed.

The declaration of incorporation confirms that the safety requirements according to Annex 1 of Machinery Directive 2006/42/EC have been obeyed.

Auxiliary electrical equipment supplied has CE marking if it falls within the scope of a directive, for example the low-voltage or EMC Directive.

1.3 Use of manual

Presentation

- Chapter and paragraph headings are printed in capitals in the body text:

  Chapter SAFETY

- Designations for display and operating elements are written in inverted commas in the body text:

  Operate switch "xxx"

- Lists without numbering do not require operations to be carried out in a certain order.

Pictograms

The following pictograms are used in the operating instructions:

Warning signs

Warning signs are shown with an explanation of the type of hazard.

The meanings of the different graduations of hazards are described in the Chapter on SAFETY.

Marks an instruction on handling of the machine.

Marks a useful piece of information.

Marks a cross-reference to another Chapter with absolute path indication.

e.g.  /MACHINE/SAFETY

Work steps

Work steps are presented in tables. Work steps are numbered and must be carried out in the order specified.

Numbering of pages, tables and figures

Pages:	Consecutive numbering of chapters	2-1
Tables:	Tab.+ Consecutive numbering in Chapters	Tab.2-1
Figures:	Fig. + Consecutive numbering in Chapters	Fig.2-1

Abbreviations

Tab.	Table
Fig.	Figure

Illustrations and graphics

The figures and graphics show the basic design of the machine. This need not necessarily correspond exactly to the version supplied.

Detailed information on the equipment supplied

➨ .../PARTS BOOK

➨ .../SUB-SUPPLIER DOCUMENTATION

1.4 Warranty and liability

The ANDRITZ general terms of delivery and sale shall apply.

Guarantee and liability claims towards ANDRITZ shall become void if personal injury or material damage is caused by one or several of the following:

- Use of the machine for any purpose other than its designated use
- Non-conformity of erection work, start-up and handling of the machine
- Non-observance of the safety instructions in the manual
- Non-authorized structural changes to the machine
- Non-observance of the maintenance and upkeep instructions

In the event of a claim for repair under guarantee, ANDRITZ reserves the right to assess the damage to the machine.

1.5 Manufacturer and after-sales service

Manufacturer

Andritz (China) Ltd.
9 Tian Bao Road, West City Industry Zone
Chancheng District, Foshan
528000 FOSHAN
China

Service

The following SERVICE DEPARTMENTS are at your disposal:

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Europe (ANDRITZ AG):

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Fax: +43/316-6902-424
e-mail: paper.service@andritz.com

1.6 Copyright

2 SAFETY

2.1 General safety regulations

The Safety Chapter contains general safety regulations that must be observed when working with/on the machine/plant.

The regulations are supplemented by additional safety instructions for individual activities and which are provided in the relevant chapters of the manual. These inst ructions are highlighted in the text with special warning signs.

Safety instructions on components not supplied by ANDRITZ are contained in the descriptions of the components provided by sub-suppliers.

.../SUB-SUPPLIER DOCUMENTATION

These safety instructions supplement the ANDRITZ operating instructions.

All safety instructions must be observed. Non-observance of the safety instructions can lead to personal injury, damage to the environment, and/or material damage.

ANDRITZ requires the operating company to provide the following:

- The operating company has compiled a comprehensive, general safety program. Anyone working at or in the vicinity of the machine must have received training for working on plants of this type and on the process running there, including where to mount barriers and markings.

2.2 Danger and warning signs

The entire SAFETY chapter is of extreme importance and relevant to safety. Thus, the information in this chapter is not marked with special danger symbols.

In the Chapters on ERECTION WORK, START-UP, OPERATION, and MAINTENANCE in this Manual, warnings are marked by a pictogram. The following warning signs are used:

DANGER

This symbol indicates that there may be a risk to life and limb.

Non-compliance with the warning signs may lead to serious health problems or even fatal injuries, and can cause extensive damage to property.

WARNING

This symbol indicates that there is an imminent health risk, as well as a risk of environmental pollution and of damage to property.

Non-compliance with the warning signs may cause moderate health problems and/or extensive environmental pollution and damage to property.

DANGER

This symbol gives warning of a dangerous situation

Non-observance of these signs may cause environmental pollution and damage to property.

Further symbols and pictograms used are described in the INTRODUCTION chapter.

2.3 Intended use

The machine should only be used according to the specifications forming part of the purchase order.

Using the machine/plant for other purposes is considered contrary to its designated use.

Any modifications to the scope of supply made without the agreement of ANDRITZ are considered contrary to the designated use.

The term designated use also covers adherence to the operating instructions, compliance with the operating, inspection and maintenance conditions and with the regulations on cleaning and upkeep.

The machine is designed for installation in a non-explosive atmosphere. Designated use provides for operation outside a zone according to ATEX directive 1999/92/EU.

The machine is intended for installation in a plant with a roof covering.

2.4 General remarks on machine/plant safety

The machine/plant has been built in accordance with state-of-the-art standards and the recognized safety rules. Nevertheless, its use may constitute a risk to life and limb of the user or of third parties, or cause damage to the machine/plant and to other material assets.

The machine/plant may only be operated when in perfect condition and with due consideration to safety and the risks involved. All protective devices and the EMERGENCY STOP equipment must be in place and fully functional.

Malfunctions and unforeseen changes to the machine/plant must be remedied immediately.

2.5 Hazardous applications

The machine was designed specially for the process specified in the sales contract. All changes to this process must be checked and approved because ANDRITZ does not know in detail the chemical and biological properties of the numerous materials that can be processed in this machine. The machine as-sold is not suitable for safe processing of hazardous materials unless additional precautions are taken.

The operating company must conduct a thorough hazard analysis and risk assessment of the entire process if:

- materials are used that are already combustible, explosive, toxic or otherwise dangerous or can take on these properties as a result of a reaction.
- Dosing of corrosive or dangerous fluids according to Article 9 of the Pressure Equipment Directive 97/23/EC is planned. Overfilling of the dissolving tank must be prevent with appropriate measures depending on the dosage. The type of safety measures will be defined in the risk assessment conducted by the operating company.

This includes drawing up of contingency plans for handling process errors and faults.

In particular, the following must be observed:

- If combustible or potentially explosive materials are to be processed, all electric motors, cabling and operating elements MUST be explosion-proof. Furthermore, maintenance work on the plant MUST be performed using non-sparking tools. Smoking is forbidden.
- If the material processed is toxic, appropriate safety measures MUST be implemented.

2.6 Operating company's obligations

Intended use

The company operating the machine is responsible for its designated use.

Work instructions

In addition to the operating instructions, the applicable legal regulations in the user countries and other rules governing safety at work, health and environmental protection must be observed and personnel instructed in these matters.

Qualification of personnel assigned

The machine/plant may only be operated, maintained and serviced by authorized, skilled personnel with hands-on training.

The minimum legal age must be taken into account.

Any person undergoing training; in apprenticeship, or under instruction may only work on the machine/plant after receiving instruction on the theory and only under the supervision of an experienced person.

Instruction

The operating and maintenance personnel of the operating company must be instructed by qualified persons after completion of the installation work.

The user undertakes to have new, additional operating and maintenance personnel instructed in machine/plant operation and maintenance to the same extent and applying the same care, and with due consideration to the safety instructions.

Workers entrusted with the transportation, erection work, start-up, operation, and maintenance of the machine/plant must have read and understood the operating instructions, especially the Safety Chapter, the safety instructions concerning a certain activity, as well as the safety instructions issued by sub-suppliers.

Definition of areas of responsibility

The operating company is responsible for:

- definition of the machine operator's responsibility and his right to give instructions,
- definition of the contents and of responsibility for keeping the records on functioning and any failure of the monitoring equipment (log book),
- personnel areas of responsibility in terms of operating, tooling, maintenance and upkeep.

Inspections and tests

The operating company must:

- check regularly whether the safety instructions and regulations are observed when working on the machine/plant.
- carry out regular training to confirm the level of knowledge of the operating and maintenance personnel.

Attachment of safety features

The operating company shall ensure that all safety-relevant instructions are observed and that all symbols and notices are attached in the production area in accordance with the local regulations.

- Safety devices and regulations (**see Section 2.8**)

In addition, ANDRITZ recommends mounting the following devices, symbols and signs, in as far as these are not already included in the local regulations.

- Markings on the floor for vehicle routes, protective fencing and danger areas (yellow)
- Barriers and covers
- Handrails (foot, center and chest height)
- Emergency lighting
- Lockable maintenance switch (shut-off device for power to the drive motor)
- Means of shutting off water and air supply
- Information signs – fire prevention equipment
- Information signs – emergency phone number
- Direction signs – exits
- Direction signs – escape routes
- Information signs (first-aid post)
- Fire-fighting equipment as required by national regulations

2.7 General obligations of personnel

To avoid personal injury and material damage, all persons working on the plant shall observe the following safety instructions:

- The safety instructions in the manual and attached to the machine must be observed.
- In the event of a safety-relevant functional disorder, stop and secure the part of the plant affected. Report disorders and have them repaired immediately.
- All safety-critical modes of operation are prohibited.
- Use only the machine accesses, paths and passages intended for this purpose.
- Do not touch moving and rotating parts and/or reach out beyond them.
- Keep the machine and the workplace clean. Do not place tools and other objects on the machine/plant.
- Do not wear any garments/pieces of jewelry that might get caught on moving machine/plant parts. This includes ties, scarves, rings and necklaces.
- Do not wear long hair loose.
- Familiarise yourself with the function and any failure of machine monitoring equipment (log book) before starting work.
- No smoking in the vicinity of the machine/plant.
- Wear personal protective apparel when working on the machine/plant.
- When wearing a safety helmet, take care that it does not fall into the FibreWash drum. (e.g. use additional straps at chin and neck).

2.8 Safety devices

The machine/plant must not be operated without effective safety equipment.

Safety equipment must not be circumvented, dismantled or made unserviceable during operations. The safety equipment is there to protect operating personnel.

Safety equipment and access thereto must be kept clear.

Safety covers

Abb. 2-1 shows the protective covers for the FibreWash drum.

The FibreWash drum must not be operated without the safety covers mounted.

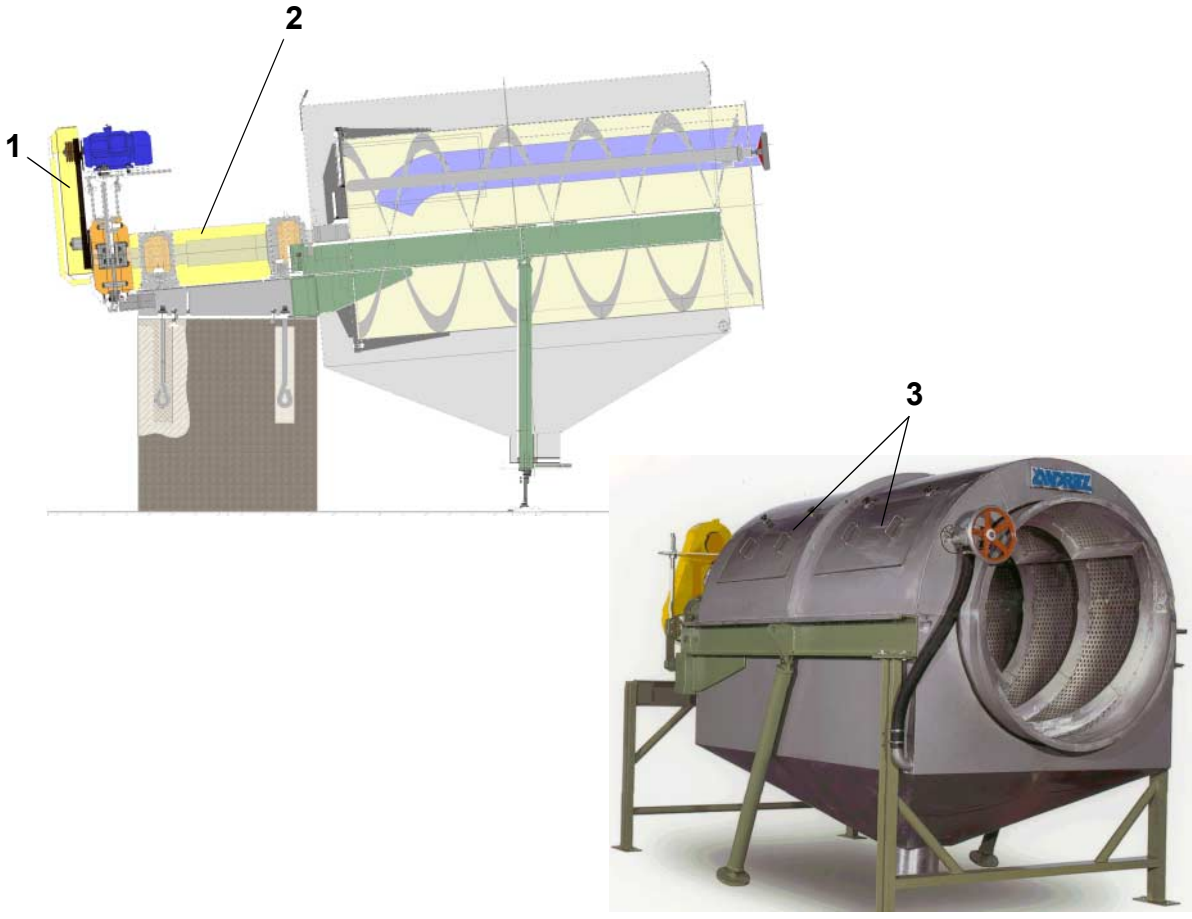

Abb. 2-1 Protective covers at the FibreWash drum

Item	Component	Item	Component
1	Cover for belt drive	3	Cover - service port
2	Cover for drive shaft		

EMERGENCY STOP switch, safety shutdown

The operating company must provide an EMERGENCY STOP switch in the immediate vicinity of the machine to guarantee that it can be shut down by immediately cutting off the power supply to the drive elements of the machine. Possible designs of the EMERGENCY STOP switch, see Abb. 2-2

Abb. 2-2 EMERGENCY STOP switch

The EMERGENCY STOP device must not be installed more than 15 m away from the machine.

The EMERGENCY STOP switch and further units included in the EMERGENCY STOP safety equipment must be installed and implemented by the operating company in accordance with the applicable standards, particularly EN ISO 13850 and EN 60204-1 (stop category 0).

Lockable switches

The keys for maintenance switches or operating mode switches for local machine settings must be removed from these switches and retained by the operator to prevent the setting being changed by any third parties and thus also prevent risks!

Indicative, warning and prohibiting signs

Information, warning and prohibiting signs must be observed. They must be checked regularly for legibility and completeness and they must not be removed or obstructed.

The following indicative, warning and prohibiting signs are attached to the machine:

Attach beside the covers!

Abb. 2-3 Warning signs on the machine

Do not enter the housing unless you have written permission to do so!

Do not reach into the machine!

Use eye protection

Do not switch on the electric drives again until all safety devices have been mounted!

2.9 Personal protective apparel

General safety equipment

Use and always carry personal protective equipment in accordance with local regulations or those of the plant operating company.

It should be compulsory to wear hard-toed boots throughout the entire mill premises.

In addition to the regulations applying, we recommend using the following safety equipment for certain work:

Activity	Safety equipment		
Time spent in the immediate vicinity of the machine while it is running			
Taking pulp samples			
Field installation and maintenance work for which parts of the machine have to be removed			

Tab. 2-1 Recommended safety equipment for certain work

Key to symbols

	Protective clothing to prevent the pulp from coming into contact with the skin		Safety shoes as protection against foot injuries
	Gloves to prevent hand injuries		Ear protection to prevent damage to hearing
	Eye protection to prevent eye injuries		Standard hard hat as protection against head injuries

Tab. 2-2 Purpose of the safety equipment

2.10 Safety at the machine installation site

There is no permanent place of work at the machine. Working near the machine is only necessary during inspection and maintenance work. The equipment is operated at the DCS (process control system) located in a control room.

A suitably large, clear, and unconfined working area must be created on all sides of the machine. Pipework, ducting, etc. must be laid such as not to impede access to the machine.

All operating and maintenance areas of the machine must have adequate lighting and ventilation (industrial lighting).

The foundation must be sized to withstand the loads caused by the machine.

The area around the machine and the marked escapes are to be kept clear. The area around the machine must be marked as a danger zone. It must be possible to enter and leave the operating area unimpeded.

Make sure machine and surrounding area are kept clean. In particular, oil and grease on the floor and on machine elements may cause slipping. This is therefore a considerable source of injuries, as are tools that have not been put down in a safe place. The operating area must be clear of waste materials, tools and other extraneous objects.

The floor around the machine must be provided with a non-slip finish.

In order to prevent any falls from or damage to the machine, it is forbidden to climb onto machine elements or on the machine (except for the treading areas provided). Use ladders or similar equipment in accordance with recognized standards.

Ramps, platforms and lifts must be used to avoid injury or excessive physical effort.

2.11 Temperature

The machine is designed for a pulp temperature of up to 70°C. The operating company shall be responsible for taking the necessary safety measures (e.g. protective gloves, proper training, etc.).

No maintenance work should be carried out until the hot surface has cooled down.

2.12 Noise

Sound pressure from the machine (including the drive) within the specified operating range: xx dB(A).

The total noise emissions from all machines in the production room can restrict spoken communication and impair hearing.

The machine is designed such that no operating personnel is required in the immediate vicinity of the machine during normal operation. Appropriate hearing protection should be worn throughout maintenance and adjusting work while the machine is running.

2.13 Electrical equipment

All work on the electrical equipment, without exception, must be carried out by skilled electricians.

Any form of contact with electrical equipment may cause fatal injuries.

Before beginning any maintenance or repair work, the operating company must disconnect the electric power supply to all drives securely. This can be achieved with a lockable maintenance switch, lockable racks in the MCC, or with other suitable measures that comply with the safety regulations applying.

If any work is necessary on live parts, it is essential to proceed according to the applicable standards.

Users of medical electronic equipment (e.g. pacemakers) must not enter the electric danger zone.

The machine must be grounded to avoid electrostatic loading or contact voltage. Machine, gears, tanks, and motors must be connected to the grounding system.

The operating company is responsible for the appropriate lightning protection measures, particularly if the equipment is installed in the open air.

2.14 Welding work

In general, welding work is only permitted after consulting ANDRITZ. Any welding work that is described in detail in the maintenance instructions is excluded from this ruling.
When performing welding work, always observe the relevant safety rules and the appropriate safety regulations for work performed in enclosed and confined spaces.

DANGER

HOT WORK PERMIT REQUIRED!

Danger of fire and explosions!
There is a considerable risk of fire or explosion during welding work. Always take the appropriate fire precautions before beginning work, e.g. keep fire extinguishers at the ready.

All motors should be disconnected before carrying out electric welding work.

During arc welding work the ground should never be allowed to run over the rolling bearings. A grounding cable is to be connected up in the immediate vicinity of the welding area.

2.15 Fluids, (liquids, gases, vapour or smoke)

Unintended chemical reactions may take place in fiber pulps during a prolonged standstill and hazardous fumes may be produced.

The machine must be thoroughly cleaned after prolonged stoppages.

The area must be adequately ventilated.

Before beginning work on the machine, ensure that no liquids, gases, vapors or smoke can enter the working area from inlet pipes, discharge pipes or shafts.

If it is not possible to exclude reliably the risk of liquids, gases, vapors or smoke flowing in, all persons working in the danger zone must be equipped with a safety harness and a safety rope. Each worker must be monitored by a second person outside the danger zone.
It must always be possible to evacuate a worker from the danger zone without delay.

2.16 Oils and greases

The safety instructions for the products concerned must be observed when handling oil, grease and other chemical substances.

Suitable skin protection is required when handling aggressive media. See manufacturers' information for the type of skin protection required.

Also observe the relevant requirements for disposal.

2.17 Hoses

In order to avoid injuries (e.g. caused by whiplash), all pressurized flexible hoses and pipes must be tied or held together.

In order to prevent staff from stumbling or falling over hoses, the hoses must be stored on a retaining system (e.g. hose drum) after use.

2.18 Work in enclosed vessels and in confined spaces

Definition

All operating equipment that is closed off towards the surrounding atmosphere is considered an enclosed vessel. This includes shafts, channels, pipework and cavities in machines.

Procedure

Step	Procedure
1	**The safety measures must be defined in writing before beginning any work.** The safety measures must be defined by a competent expert in this field.
2	**A permit to enter an enclosed vessel must be issued by a supervisor who is present at all times.** This supervisor must check personally that the measures defined in writing are implemented and thus, that it is safe to enter the enclosed vessel.
3	**Permanent supervisor available for rescue measures.** There must always be someone present who is well versed in the required protective and safety measures. This person must be capable of rescuing whoever is inside the container or of fetching help without actually leaving the place of the incident.
4	**Approval for re-start to be given by supervisor present at all times.**

Tab. 2-3 Working in enclosed vessels - procedure

Specimen permit to enter an enclosed vessel, see:

>> Section 2.19, Permit for work in enclosed / confined spaces.

Emptying and cleaning

The enclosed vessel must be disconnected reliably from all pipes leading to and from it.

The following shut-off devices are mandatory for automatic and remotely controlled shut-off devices:

- Blanking plates, blank flanges or two shut-off valves mounted one after the other with a pressure relief opening between the two. (Mount warnings against switching the equipment on again).

Possible cleaning methods:

- Flushing out
- Steaming out
- Using high-pressure cleaning equipment

If high-pressure cleaning equipment is used in a potentially explosive atmosphere, the cleaning lance must always be made of non-sparking material.

The enclosed vessel should only be cleaned mechanically in exceptional cases as this work requires someone to enter the vessel.

Safety measures against dangers from moving parts

Agitators, crushers, endless screws, and live bottom discharge units inside the tank that are operating or start up unexpectedly when someone enters or is working inside the tank can cause serious injury!

Before beginning any maintenance or repair work, the operating company must disconnect the electric power supply to all drives securely. This can be achieved with a lockable maintenance switch, lockable racks in the MCC, or with other suitable measures that comply with the safety regulations applying.

Pneumatic and hydraulic equipment must be de-pressurized so that it is impossible for moving parts to be started up unintentionally as a result of stored energy.

Moving parts that are able to change position and thus have crushing or shearing points must be secured in position with supporting bars or equivalent measures (e.g. lowering).

Ventilation – protective breathing equipment

The ventilation system must be sized such as to maintain the concentration of noxious substances below the maximum concentration permitted in the work place and also to ensure that sufficient oxygen is available. This will ensure that it is possible to work without protective breathing equipment and that there is no risk of fire or explosion. Ventilation is only permitted with air. It is forbidden to ventilate using pure oxygen or air with an increased oxygen content!

If the concentration of noxious substances exceed the maximum permitted value, suitable protective breathing equipment must be used.

Protective breathing equipment		
Oxygen content	**Concentration of noxious substances**	**Safety measures**
>17%	< MAC	None
>17%	> MAC < Retaining capacity	Filter mask
>17%	> MAC > Retaining capacity	self-contained breathing protection
<17%		self-contained breathing protection
	50% of lower explosion limit	Entry is forbidden

Rules for ventilation

- Solvent vapors are heavier than air, thus they must be extracted by suction at the lowest point of the tank.

- Fresh air should be blown in close to the respiratory organs.
- Ventilating efficiency should be monitored with measuring instruments.
- If substances presenting a fire hazard are extracted, the risk of explosion must be considered.

Further regulations and measures

Gas bottles

It is forbidden to take gas bottles or liquid fuel (liquid gas) into an enclosed vessel. (e.g. welding equipment, lamps or soldering tools).

Safety harness

If it is necessary to enter an enclosed vessel in which there is a danger of fire or of harmful work substances being present or a risk of oxygen deficiency, the person entering the vessel should be roped up with a safety harness.

The following items are important:

- The end of the rope must be secured outside the vessel. Do not allow the rope to sag too much.
- Each worker must be monitored by a second person outside the danger zone.
- It must always be possible to evacuate a worker from the danger zone without delay.
- If the only rescue route is upwards, use only approved rescue equipment, such as cable winches or manual lifting devices.

In the presence of working substances that may ignite, rescue ropes must either be plastic-sheathed steel ropes or ropes with at least equivalent heat-resistance properties.

If roping up is not possible, suitable escape hatches must be available that will allow anyone inside the vessel to climb out without assistance from outside.

Opening a manhole

In order to prevent any risks, such as hot and dangerous media splashing out, the filling level in the tank must be checked against the following table before opening the manhole:

Step	Activity
1	Check the tank filling level at the display for level monitoring (in the control room).
2	Visual check on the tank filling level by looking into the tank through the cleaning port in the roof of the tank. **The filling level must be below the manhole!**

Tab. 2-4 Check the filling level in the tank

2.19 Permit for work in enclosed / confined spaces

Object / location / point at which work is performed: . . . . . .
Type of work: . . . . . .
Supervisor . . . . . .

Preparatory protective measures

Which substances are or were present?

Amount / concentration . . . . . .

What substances can form?

Amount / concentration . . . . . .
Existing equipment . . . . . .
Equipment brought in . . . . . .

Access ports to be cleared:

No. / size . . . . . .

Definition of safety measures

Vessel to be emptied yes ☐ no ☐ Type: . . . . . .
Residue to be removed yes ☐ no ☐ Type:. . . . . .
Ventilation: natural ☐ technical ☐ Type: . . . . . .
Air analysis required . . . . . yes ☐ no ☐
Protective breathing equipment required. . . . . yes ☐ no ☐
Equipment available or brought in . . . . . .yes☐ no ☐
if so, what are the safety measures. . . . . .
Personal protective apparel required . . . . . yes ☐ no ☐
if so, what protection measures. . . . . .
Explosion protection measures required . . . . . yes ☐ no ☐
if so, what protection measures. . . . . .
Look-out personnel . . . . . yes ☐ no ☐
Rescue equipment required . . . . . yes ☐ no ☐

Safety measures cancelled

by. . . . . .
Safety measures mentioned were observed: . . . . . .

Approved

from _____ at _____ hrs to _____ at _____ hrs

_____ _____

(Supervisor) (Contractor or sub-contractor)

3 TECHNICAL DATA

3.1 Data

Weights	Tare weight	1280 kg
	Screening drum	170 kg
Operating data	Diameter screening drum	994 mm
	Screening length	xxx m
	Screening drum speed	xxx rpm
	Effective gross screening area	xxx m^2
Drive (50Hz)	Motor power	xxx kW
	Motor speed	xxx 1/min
Drive (60Hz)	Motor power	xxx kW
	Motor speed	xxx U/min
Process materials	Shower pipe	5xx l/min
	Water quality	≤ 1000 mg/l
	Pressure	≥ 5 bar

4 DESCRIPTION

4.1 Field of application

The FibreWash drum is used in treatment of recycled fibers to remove large-area impurities.

Abb. 4-1 FibreWash Drum (symbolic illustration)

4.2 Main plant components

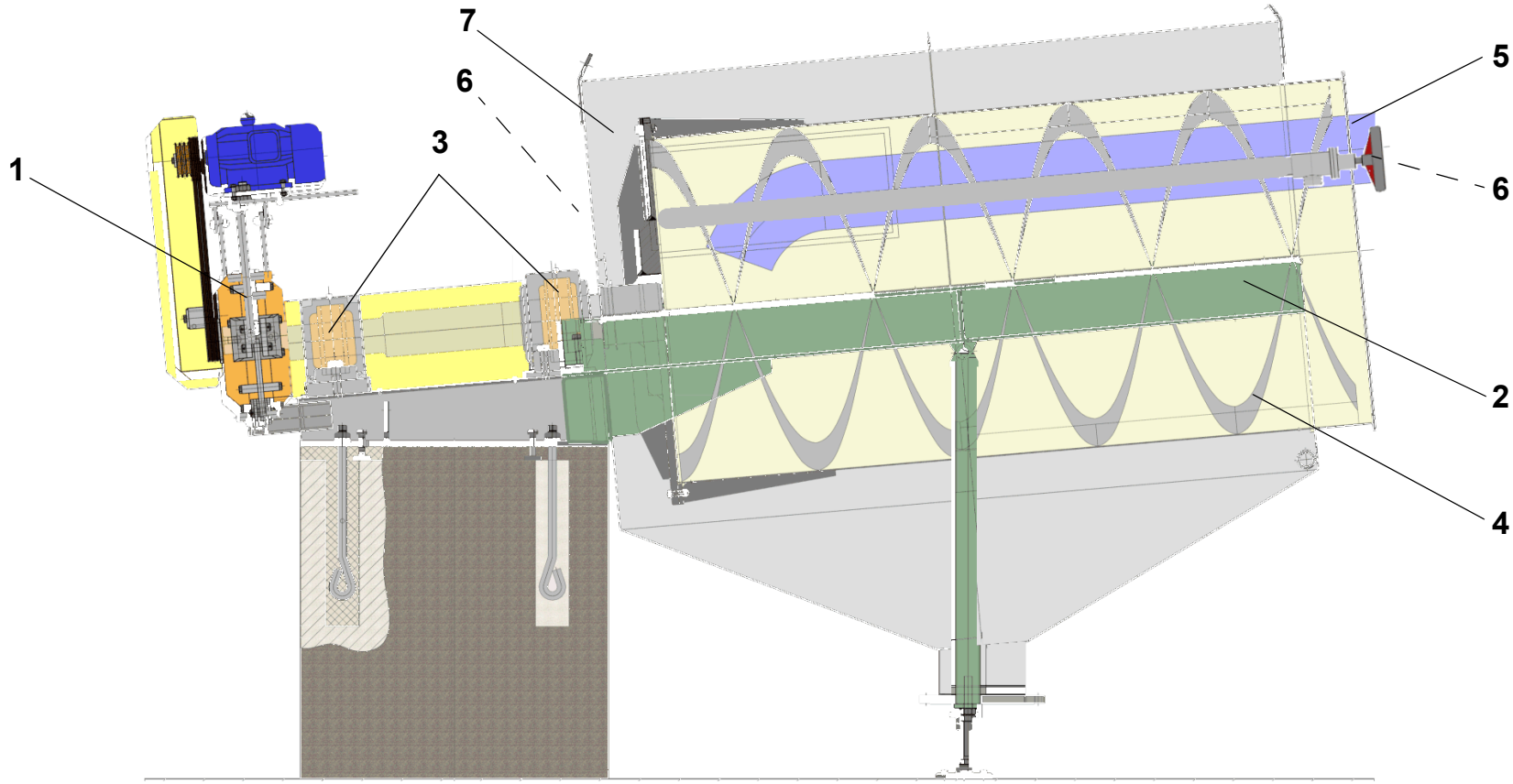

Abb. 4-2 FibreWash Drum (symbolic illustration)

Item	Component	Item	Component	Item	Component	Item	Component
1	Drive	3	Bearing	5	Feed pipe	7	Hood
2	Frame	4	Screening drum	6	Shower		

Drive (1)	Function: Driving the screening drum via the shaft. Design: Slip-on gear, belt drive with safety guard and three-phase motor.
Frame (2)	Function: Holds the machine components. Design: Welded structure made of acid-proof stainless steel with external reinforcing and flange connections for drainage.
Bearing (3)	Function: Shaft bearing assembly. Design: Bearing housing with self-aligning roller bearing. Fixed bearing on the side of the screening drum.
Screening drum (4)	Function: Holding the pulp and discharging the impurities. Design: Welded structure made of acid-proof stainless steel. A screw flight is welded into the screening drum.
Feed pipe (5)	Function: Feeding in the pulp. Design: Pipe made of acid-resistant, stainless steel with flange connection.
Shower pipe (6)	Function: Cleaning the screening drum. Design: Stationary shower with flat jet nozzles.
Hood (7)	Function: Protection against splash water and cover for screening drum. Design: Welded structure made of acid-proof stainless steel, with cover for access to the showers and screening drum.

4.3 Technological description

Function

The FibreWash drum with rotating screening drum runs in continuous operation as a device for removing impurities.

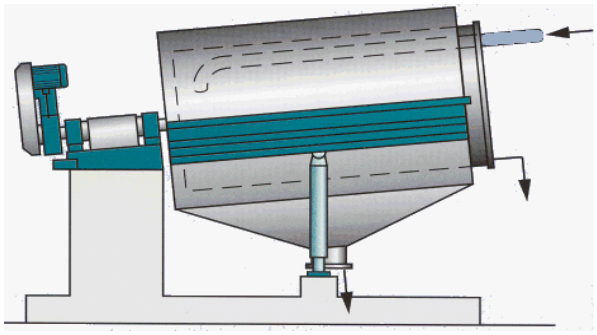

Abb. 4-3 Function sequence

Operating principle

The pulp is pumped through the feed pipe into the rear section of the screening drum.

The screw flight welded into the screening drum generates the scooping effect required for screening and, at the same time, conveys the impurities to the open side of the screening drum. Here, it drops through a chute out of the screening drum.

The accept pulp left after screening drops through the screening drum into the trough located underneath it. From there, it reaches the next process stage through the outlet flange.

5 ERECTION WORK and TRANSPORT

5.1 General

This chapter describes certain steps for transport, storage and installation of the machine, which may be the responsibility of the operating company.

Activities which are carried out by ANDRITZ, including works assembly, are not the subject of this description.

5.2 Safety regulations

DANGER

Do not disregard the safety regulations.
If the safety regulations are disregarded, this may cause a risk to life and limb and damage to the machine or its components.
All safety instructions in this section must be strictly observed!

General safety regulations

All applicable accident prevention rules must be observed.

The regulations for work in containers and enclosed spaces must be observed.

>> Section 2.18, Work in enclosed vessels and in confined spaces

Potential risks caused by gases and vapours forming must be analysed in detail and the appropriate safety measures implementd.

Do not exceed permissible crane loads and weights on lifting gear and ropes/shackles. Secure loads against falling from a height.

Do not step or walk below suspended loads! Standing below suspended loads is dangerous and thus, strictly forbidden!

Jolts must be avoided. This refers especially to the handling of pre-assembled machines.

Qualification of personnel assigned

Transport and unloading is to be carried out by personnel specially familiar with such work.

Personnel assigned to operate lifting gear and transport equipment must have the required national qualifications.

Erection work may only be carried out by trained, skilled personnel.

Personal protective apparel

Personal safety equipment must be worn when working (>> Section 2.9).

5.3 Transport

DANGER

During transport or loading/unloading there is a risk to life and limb from falling machine components and also a danger that machine components may be damaged.

Do not lift machine and transport crates except at the points marked for lifting by crane or forklift!

If the entire machine is lifted and there are several different types of lifting lug available, personnel should only use suitable lugs (according to the transport sketch) for the work in hand.

Do not step or walk below suspended loads!

Delivery

Pre-assembled FibreWash drum

The FibreWash drum is supplied ready for installation in a transport frame. The machine components and auxiliary materials are packed in crates.

Transport sizes and weights are stated in the shipping documents.

Largest supply weights:

➡ .../TECHNICAL DATA

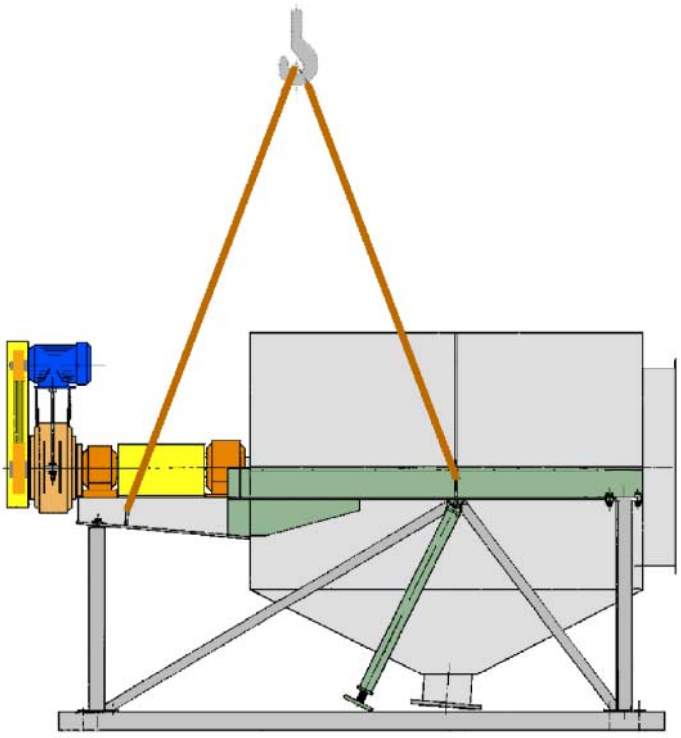

Abb. 5-1 Delivery status

Acceptance

- Check against shipping documents and packing lists whether the supply is complete and in perfect condition.

- In the event of transport damage or short supply, do not accept goods, but notify forwarder and the ANDRITZ shipping department accordingly.
- If there is a hidden loss or defect, notify the forwarder and the ANDRITZ shipping department within 15 days of receiving the goods.

Safekeeping

The following instructions must be observed if the system is not to be installed immediately:

- Please inform the ANDRITZ shipping department.
- Provide weather protection for stored machine components. In particular, avoid wide variations in temperature and ensure that the equipment is kept clean.
- Incidentals should be protected against damage and unauthorized withdrawal by storing in a lockable room.
- Packaging should not be removed until field installation work begins.
- Packaging should not be removed until field installation work begins.

Transport at installation location

Before beginning transport, prepare the hauling paths and define the degree to which the machine has to be dismantled together with the ANDRITZ erector-in-charge responsible for the work.

5.4 Installation

General

Erection work must be performed in accordance with the sequence plan defined by ANDRITZ.

WARNING

Disregarding the sequence plan and the installation instructions may result in hazardous situations causing a danger to life and limb, as well as machine damage.
The sequence of erection work is important and must be strictly observed!

Completion of the various steps must be documented in the certificate of completion of erection work.

The sequence of erection work is shown in step-by-step tables. The individual activities are numbered according to the sequence in which they are to be performed.

Required documentation at installation site

The following supplementary documentation must be available at the beginning of installation work:

- Foundation and arrangement drawing
- Pipe connection diagram
- Documentation on electrical, measuring and control equipment
- List of components for individual group assemblies
- Packing lists for each individual consignment

Space requirement for erection work, operation and maintenance will be defined with the ANDRITZ representative in charge before beginning erection work.

Ambient temperature during erection work should not fall below 10-15°C.

Preparations

Foundation

The foundation is prepared according to the ANDRITZ foundation plan.

The following preparations have to be made prior to placing the FibreWash drum on the foundation:

- Mark axes and elevations on the foundation.
- Check the workmanship of the foundation before beginning erection work.

Machine installation

DANGER

Machines or machine components may fall during transport at installation site.
Do not lift machine and transport crates except at the points marked for lifting by crane or forklift!
Do not step or walk below suspended loads!

DANGER

Parts of the body may be trapped or crushed during installation work.
Wear your personal protective apparel!

DANGER

The FibreWash drum should only be installed with the transport frame mounted. The transport frame should not be removed until installation and alignment of the machine have been completed.

Prepare the foundation, position and adjust the FibreWash drum according to the following table:

Step	Activity
1	Attach the FibreWash drum to a crane using suitable means (see Abb. 5-2).
2	Secure the rag bolts (1) to the machine in a central position (3) using hexagon head bolts (2).
3	Position shims (4).
4	Raise FibreWash drum and then lower onto the shims (4).
5	Align the FibreWash drum using jacking screws (**5**) and pendulum supports (**6**) according to the foundation drawing.
6	Mark the holes for the pendulum support.
7	Lift FibreWash drum out of the way and drill the holes for the pendulum support. Insert dowels.
8	Lift FibreWash drum onto foundation base once again, check alignment of the base frame and tighten the screws (**7**) a little.
9	Grout in the rag bolts (1) only with non-shrink grouting compound (8) and tighten the screws (2) a little.
10	Set up shuttering.
11	Check machine alignment after the grouting compound at the foundation blocks has hardened. Then complete the base casting layer with non-shrink grouting compound ((9)).
12	When the grouting compound has hardened completely, tighten the fastening screws (2) according to the torque table provided in the Chapter on "Maintenance".
13	Lock the nuts (**10**) at the pendulum support.

Tab. 5-1 Foundation for the FibreWash drum

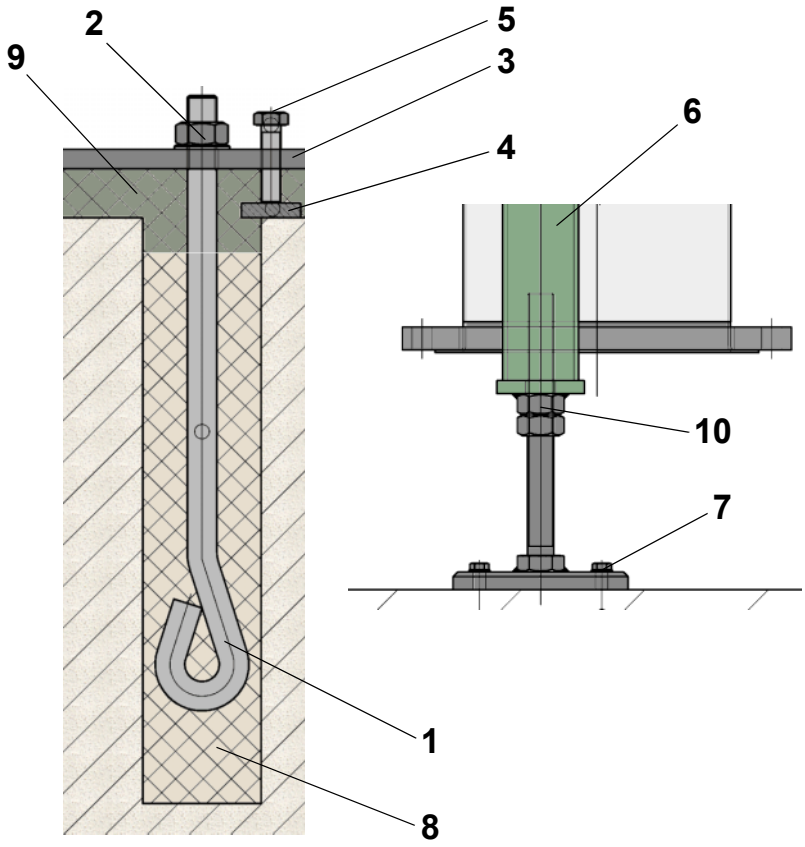

Abb. 5-2 Preparing the foundation

5.5 Connecting up

Pipes

All connections and connecting dimensions at the machine are shown in the arrangement drawing.

DANGER

Errors in the installation of pipework and hoses may result in risks to life and limb and in damage to the machine.

Mount all pipes stress-free and free of vibration!

The pipework must be mounted such that it does not stress the machine during operation (e.g. by heat expansion of the pipes).

Instruments

The instrumentation (instruments, actuators and control devices) of the machine is to be installed according to the flow sheet.

Electric

Complete electrical installations according to electrical documentation provided by ANDRITZ.

Safety devices

The following safety devices are to be provided by the operating company:

- EMERGENCY-STOP switch near the machine drive.
- Device for safe disconnecting of all drives from the power supply during maintenance and repair work. This can be achieved with a maintenance switch, lockable racks in the MCC, or with other suitable measures that comply with the safety regulations.

5.6 Inspections and remaining work

Sense of rotation of motor

Prerequisites:

- Drive is connected to power supply.
- V-belt and gear have been installed.
- Initial filling of lubricant according to lubricating schedule (gearing, bearings,).

Checking direction of rotation:

DANGER

Gearing mounted in between can reverse the sense of rotation!

The sense of rotation should be checked according to the following table:

Step	Activity
1	Switch motor on briefly.
2	Sense of rotation according to Abb. 5-3: Facing the open side of the screening drum: clockwise
3	Switch motor off again.

Tab. 5-2 Checking the sense of rotation of the motor

Abb. 5-3 Sense of rotation of the machine

Other work

- Staircases and walkways
- Clean the machine.
  Flush out screening drum and trough with water.
- Rinse pipework system before initial start-up.
- Mount protective covers and warning signs.

5.7 Cold test

Prerequisites

The following utilities must be available:

- Electricity
- Water

Lubrication

- First filling of lubricant and recording of all further lubrication procedures according to lubrication schedule (gears, bearings, etc.)

../MAINTENANCE/LUBRICATION

DANGER

Machine may be damaged if the wrong oil grades are used.
Only use oil with the properties listed in the lubrication schedules!

Cold test

The cold test is to be carried out together with the customer's authorized representative.

The work steps listed in the cold test certificate shall be carried out for the cold test, and documented.

Final inspection

The customer and the erection work supervisor shall conduct a final inspection of the installation upon completion of the cold tests.

Certificates

The following certificates are to be issued after completion of the cold test

- Cold test certificate
- Certificate of completion of erection work

5.8 Disassembly and disposal

DANGER

The machine must be disconnected from the power source and secured to prevent switching on again before disassembly!
The machine may only be disassembled by qualified and authorized personnel.

If the machine/plant is to be shut down, the following must be taken into account for subsequent disposal:

Machine parts

- The machine components must be disassembled according to the various materials, lubricant fillings, and various forms of contamination.
- The materials must be disposed of in accordance with the applicable legislation on waste disposal.
- Proof must be brought of the properties and the disposal route of the various materials according to the applicable regulations on proof of recovery and disposal (e.g. statement and entry in register).
- Compile the necessary documents before disposal and dispose of the materials according to the regulations, observing the documents.

Plastic parts

WARNING

Synthetic components may be flammable!
Observe the local fire protection regulations. When separating the materials, do not work with welding devices or other equipment that generates sparks.

Additives

- Oil, utilities and cleaning agents must be disposed of according to the local provisions and in compliance with the appropriate manufacturer regulations.

Other material groups to be separated are:

- Surface-treated sheet steel, such as powder-coated or wet-painted doors, covers, etc.
- Surface-coated construction steel, such as rotating parts, gratings, bolts, etc.
- Copper (electrical grade copper or silver-coated electrical grade copper), such as busbars, connecting straps, connections pieces, etc.
- Cables
- Built-in units, electrical components and components generating radiation (radio-active probe), etc.

6 START-UP

6.1 General

The preparations and other activities for initial start up of the machine will be carried out by ANDRITZ personnel. Initial start-up takes place according to the ANDRITZ start-up sequence plan and start-up protocols.

6.2 Safety regulations

DANGER

Do not disregard the safety regulations.
If safety regulations are disregarded, this may cause a risk to life and limb and damage to the machine or its components.
All safety instructions in this section must be strictly observed!

General safety regulations

All applicable accident prevention rules must be observed.

The regulations for work in containers and enclosed spaces must be observed.

See Chapter "Safety"

Potential risks caused by gases and vapours forming must be analyzed in detail. The appropriate safety measures must be implemented.

Qualification of personnel assigned

Start-up may only be carried out by skilled workers with the appropriate training.

Personal protective apparel

Personal safety equipment must be worn when working (>> Section 2.9).

6.3 Prerequisites for start-up

The following must be checked before start-up:

- Erection work completed.
- Cold test completed.
- Installation site has been cleared and cleaned.
- Power and water supply are available.
- All safety guards mounted.
- First filling of lubricants (gear units, bearings, etc.) provided.
- Direction of rotation has been checked.
- All electric interlocks are functional and checked.
- All personnel know the location of the EMERGENCY STOP switch.
- All control circuits have been installed and tested.
- Process control system installed and tested
- The FibreWash drum has been cleaned and all pipes flushed out thoroughly.

6.4 Start-up

DANGER

Machine may be damaged if incorrect start-up procedures are used. All electric interlocks must be functional and checked.

Before start-up, the procedure must be defined together with ANDRITZ AG's start-up engineer. Start-up of the machine is performed as described in the start-up certificate.

During start-up, practical training will also be provided on the machine. Participants must receive instruction on the theory beforehand.

After start-up, the machine will be handed over to the mill operating company in a complete, reliable condition and ready for operation.

6.5 Certificates

The following certificates must be completed and signed after start-up:

- Start-up protocol
- Provisional acceptance certificate

7 OPERATION

7.1 General

This chapter describes the activities required for starting, operating and stopping the machine. Possible malfunctions and troubleshooting methods are also presented.

7.2 Safety regulations

DANGER

Do not disregard the safety regulations.
If safety regulations are disregarded, this may cause a risk to life and limb and damage to the machine or its components.
All safety instructions in this section must be strictly observed!

General safety regulations

All applicable accident prevention rules must be observed. The regulations for work in containers and enclosed spaces must be observed.

Qualification of personnel assigned

The equipment may only be operated by trained and qualified personnel.

Operating personnel must know how to use and where the EMERGENCY STOP switches and the escape routes are located.

Operating personnel must have been instructed in the function and possible failure of machine monitoring equipment, and in carrying out maintenance and inspection work (shift log book, maintenance inspection records).

Personal protective apparel

Personal safety equipment must be worn when working (>> Section 2.9).

7.3 Control via DCS

The machine can be started up entirely from the DCS. The FibreWash drum and all auxiliary units are started and stopped with the group start and stop function.

7.4 Starting

Automatic starting

When using the group start, all of the steps required are implemented automatically by the DCS.

Manual start-up

Carry out the following steps for manual start-up: Normal operating mode

- Turn on main switch
- Switch on drive motor for FibreWash drum
- Switch on accepts pump
- Open hand wheel at shower
- Start feed of light reject
- Start transport device for carrying away impurities

DANGER

Do not operate without all safety devices in place

Daily

The following work has to be performed daily in normal operation:

Component	Activity
Screening drum	Check permeability and collecting of fiber webs.
Accept pump	Check functioning
Bearing and gear	Check for unusual noises
Shower	Check functioning

Tab. 7-1 Daily

In the event of a fault, proceed according to item 7.8.

7.5 Shutdown

Automatic shutdown

When using the group stop, all necessary steps are carried out automatically by the DCS.

Manual shutdown

Carry out the following steps for manual shutdown:

- Stop feed of light reject
- Switch off drive motor for FibreWash drum
- Close hand wheel at shower
- Switch off accepts pump
- Stop transport device for carrying away impurities
- Turn off main switch

After shutting down the screening drum, always remove any stock residue.

WARNING

Toxic gases and vapors can form or collect in the tank.
The regulations for work in containers and enclosed spaces must be observed!
Complete entry permit!

7.6 Re-start after an EMERGENCY STOP

Prerequisites for starting

In the event of power failures or emergency shutdown, the machine should not be started up again until the following requirements are met:

- Danger or fault has been eliminated
- Machine is emptied and cleaned
- EMERGENCY-STOP switch has been acknowledged.

Emptying

Step	Activity
1	Close off light reject feed
2	Leave the machine running until the screening drum and the chutes are clean. Cleaning according to Section 7.7

Tab. 7-2 Emptying

Starting

Follow this table when re-starting after an EMERGENCY STOP:

Step	Activity	Operation
1	Switch on the drives of subsequent machines.	DCS
2	Start-up according to Section 7.4 (Start-up)	

Tab. 7-3 Re-start after an EMERGENCY STOP

7.7 Cleaning

Step	Activity
1	Shut down all drives at all poles and secure against accidental start.
2	Remove any contaminants and fiber bundles. The hood cover can be opened for this purpose if necessary.
3	In order to prevent the pulp from drying on, any material adhering to the drum should be removed using a high-pressure cleaner.

Tab. 7-4 Cleaning

DANGER

Do not use caustic substances for cleaning purposes!
Make sure no water, steam or other cleaning medium enters electrical plant components.

WARNING

Toxic gases and vapors can form or collect in the tank.
The regulations for work in containers and enclosed spaces must be observed!
Complete entry permit!

7.8 Operating malfunctions and troubleshooting

Malfunction	Cause	Remedy
Increased power consumption by drive.	Input too high.	Set input.
	Bearing is worn.	Replace bearing.
Separation of accept inadequate.	Screening drum holes are clogged.	Clean the machine.
	Pulp consistency is too high.	Set consistency.
	Not enough shower water.	Increase shower water volume.
Smoke emission, smell of rubber.	V-belts are worn.	Replace V-belts.
	V-belts not sufficiently tensioned.	Tension V-belts.
Motor protection switch is triggered.	V-belts wet or not adequately tensioned.	Dry or tension V-belts, respectively.
	Motor is faulty.	Replace motor.
	Bearing is worn.	Replace bearing.
Bearings becoming too hot.	Insufficient lubrication.	Re-grease bearing.
	Bearing is worn.	Replace bearing.
No pulp input.	Clogging between feed pipe and screening drum due to fiber webs forming.	Clean the machine.

Tab. 7-5 Operating malfunctions and troubleshooting

8 MAINTENANCE

8.1 General

This chapter describes the maintenance and upkeep of the machine, which are the responsibility of the machine operating company.

All activities mentioned in this chapter must be performed at the correct time.

The ANDRITZ service department is at your disposal for troubleshooting, as well as for extensive maintenance and repair work.

.../INTRODUCTION

Repair work on the plant components may only be carried out at the supplier's works.

Workers trained and authorized by ANDRITZ may carry out repairs on site after obtaining consent from ANDRITZ.

8.2 Safety regulations

DANGER

Do not disregard the safety regulations.
If the safety regulations are disregarded, this may cause a risk to life and limb and damage to the machine or its components.
All safety instructions in this section must be strictly observed!

General safety regulations

All applicable accident prevention rules must be observed.

The regulations for work in containers and enclosed spaces must be observed.

.../SAFETY

Potential risks caused by gases and vapours forming must be analyzed in detail. The appropriate safety measures must be implemented.

Sufficient space for maintenance work must be included right away in the arrangement drawing.

Service and maintenance work should not be performed until the machine has come to a standstill and all supply lines have been closed off.

Do not exceed permissible crane loads and weights on lifting gear and ropes/shackles. Secure loads against falling from a height.

Do not step or walk below suspended loads! Standing below suspended loads is dangerous and thus, strictly forbidden!

The FibreSolve and the pulping tank must be emptied and thoroughly cleaned before carrying out any maintenance work.

Use only original spare parts.

When carrying out maintenance and repair work, use only new-value fixtures in perfect condition and new seals.

Safety devices

After completion of maintenance work, all required safety devices must be mounted again.

Power supply

Before beginning any maintenance or repair work, the operating company must disconnect the power supply to all drives securely. This can be achieved with a maintenance switch, lockable racks in the MCC, or with other suitable measures that comply with the safety regulations.

Lighting

The operating company shall ensure that adequate lighting is provided (with extra-low voltage bulbs) during service and repair work.

Qualification of personnel assigned

Maintenance and upkeep must be carried out by specially trained, skilled personnel only. All work on the electrical equipment, without exception, must be carried out by skilled electricians.

Personal protective apparel

Personal safety equipment must be worn when working (>> Section 2.9).

Gases, steam or smoke

Before beginning any service work, ensure that no gas, vapor or smoke can enter the working area from feed pipes, discharge pipes or shafts.

If it is not possible to reliably exclude the risk of gas, steam or smoke flowing in, all persons working in the danger zone must be equipped with a safety harness and a safety rope. Each worker must be supervised by a second person outside the danger zone. It must always be possible to evacuate a worker from the danger zone without delay.

8.3 Regular maintenance

For machines operating continuously (24 hours/day, 7 days/week) a prescheduled maintenance period is recommended every two weeks. During these periods the machine should be shut down, thoroughly cleaned, and checked for wear.

Machines operating less than 24 hours a day should undergo these routine checks and be cleaned at each shutdown.

The following tasks must be performed before beginning this work:

- Close shut-off elements to all showers.
- The FibreWash drum must be emptied before opening the cleaning ports.
- Ventilate and/or cool the screening drum down to ambient temperature.

General machine check

The following checks should be conducted when the machine has been shut down:

Component	Checks
Shower	Check functioning.

Tab. 8-1 General machine check

In the course of general machine checks, all additional units should also be checked to guarantee that the entire plant functions satisfactorily. For these checks, the attached maintenance and upkeep instructions provided by the manufacturer must be observed.

➡ .../SUB-SUPPLIERS DOCUMENTATION

Malfunctions and inadmissible changes found during these checks must be rectified immediately.

Cleaning

Machine must be cleaned as follows before carrying out any maintenance work:

Emptying

Step	Activity
1	Close off light reject feed.
2	Leave the machine running until the screening drum and the chutes are clean. Cleaning according to Section 7.7

Tab. 8-2 Emptying

Cleaning

Step	Activity
1	Shut down all drives at all poles and secure against accidental start.
2	Remove any contaminants and fiber bundles. The hood cover can be opened for this purpose if necessary.
3	In order to prevent the pulp from drying on, any material adhering to the drum should be removed using a high-pressure cleaner.

Tab. 8-3 Cleaning

DANGER

Do not use caustic substances for cleaning purposes!
Make sure no water, steam or other cleaning medium enters electrical plant components.

WARNING

Toxic gases and vapors can form or collect in the tank.
The regulations for work in containers and enclosed spaces must be observed!
Complete entry permit!

WARNING

Contact with the pulp may cause skin damage and burning.
Persons working with the pulp should not suffer from any allergic condition to such substances!
Personal protective apparel must be worn!

8.4 Maintenance schedule

In addition to the work outlined below, maintenance has to be carried out in accordance Section 8.3 and normal operation work.

.../OPERATION

Every 2 weeks

The following maintenance work is to be carried out every 2 weeks.

Component	Activity
Bearings	• Check temperature and for noises.
V-belts	• Check tension.

Tab. 8-4 Every 2 weeks

Quarterly

The following maintenance work is to be carried out at quarterly intervals.

Component	Activity
V-belts	• Check for wear and tear.
Gear unit	• List for unusual noises and check oil level.

Tab. 8-5 Quarterly

Annually

The following maintenance work is to be carried out at annual intervals.

Component	Activity
Screws/bolts	• Check that screws/bolts are firm and tighten if necessary.
EMERGENCY STOP switch	• Check function.

Tab. 8-6 Annually

8.5 Fasteners

Fastener material

Bolts and screws are manufactured in several classes of material. The heads of these screws and bolts are marked to show the strength class. Damaged or lost fasteners should only be replaced with fasteners of the same material.

DANGER

The installation data apply to standard screwed/bolted connections at the machine and should only be used if no special installation data are stated in the assembly drawings!

The information in the following table applies to commercially available hexagon head and cheese head screws with metric ISO thread.

SET SCREWS

	Pre-stressing forces for erection work (kN)							Tightening torques (Nm)					
	5.6	8.8	A4-50	A4-70	A4-80	C3-80	μ	5.6	8.8	A4-50	A4-70	A4-80	C3-80
M8	7	15	5	11	14	15	0.1	8	17	6	12	16	17
							0.125	10	21	7	15	19	21
							0.14	11	23	7	16	21	23
M10	11	24	8	17	23	24	0.1	16	34	11	24	32	34
							0.125	19	41	13	29	38	41
							0.14	21	45	15	32	42	45
M12	16	35	12	25	33	35	0.1	27	58	19	41	54	58
							0.125	33	70	23	49	66	70
							0.14	36	77	25	54	72	77
M16	31	65	21	46	61	65	0.1	66	140	46	99	132	140
							0.125	80	170	56	120	160	170
							0.14	88	188	62	133	177	188
M20	48	102	33	72	95	102	0.1	129	275	90	193	258	275
							0.125	156	334	110	235	313	334
							0.14	173	369	121	259	346	369
M24	69	147	48	103	137	147	0.1	222	474	156	333	444	474
							0.125	269	575	189	404	539	575
							0.14	298	635	209	447	596	635
M30	109	233	77	109	219	233	0.1	443	945	310	443	-	945
							0.125	538	1149	377	538	-	1149
							0.14	596	1271	417	596	-	1271
M36	159	340	111	159	319	340	0.1	767	1637	537	767	-	1637
							0.125	934	1992	654	934	-	1992
							0.14	1034	2205	724	1034	-	2205
M42	219	466	153	328	437	466	0.1	1223	2609	-	-	-	2609
							0.125	1490	3178	-	-	-	3178
							0.14	1650	3520	-	-	-	3520
M48	287	612	201	431	574	612	0.1	1841	3928	-	-	-	3928
							0.125	2245	4789	-	-	-	4789
							0.14	2487	5305	-	-	-	5305

Tab. 8-7 Installation data for set screws

Coefficients of friction and lubrication

The coefficient of friction depending on the lubrication can be found in the following table:

μ	Lubrication	
	5.6 / 8.8 / C3-80	**A4-50 / A4-70 / A4-80**
0.1	MoS2	Chlorinated paraffin or MoS2
0.125	dry or oiled	
0.14		Anti-seize compounds

Tab. 8-8 Recommended lubrication and friction coefficients

If the special lubricants mentioned here are not used, please follow the respective manufacturer's instructions.

The manufacturer's instructions should be observed for sub-supplies pertaining to the machine.

DANGER

Incorrect torque tightening may cause machine damage and hazards leading to personal injury.

Please apply the tightening torques as shown in the drawings and table (Tab. 8-7)!

8.6 Spare Parts

A list of the spare parts required for the FibreWash drum can be found in the parts book.

➨ .../PARTS BOOK

Details on spare parts from sub-suppliers are also included in specifications from component suppliers.

➨ .../SUB-SUPPLIERS DOCUMENTATION

8.7 Lubrication

Before start-up, check whether all lubrication points have been filled with the appropriate lubricants.

Details on lubrication are also included in the descriptions from component suppliers.

➨ .../SUB-SUPPLIERS DOCUMENTATION

Please also observe maintenance instructions on the maintenance signs and rating plates attached to the machine and components .

DANGER

Improper disposal of lubricant endangers our environment!
Do not add foreign matter such as solvents, brake fluid or cooling liquid.

8.8 Lubrication schedule

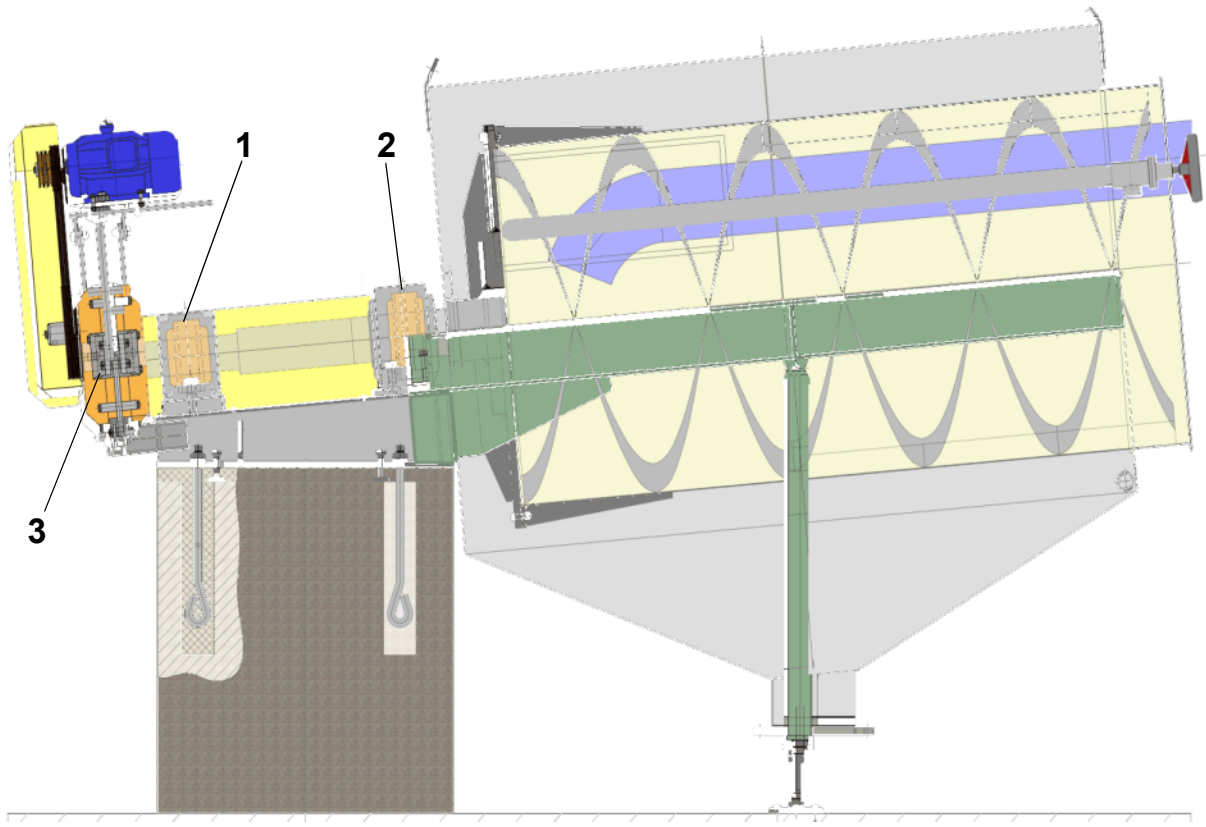

Abb. 8-1 Lubrication points

		Lubricating point			Quantity / grams		Intervals / Operating hours	
Item	**Structural component**	**No.**	**Designation**	**Recommended lubricant**	**First filling**	**Refill**	**Refill**	**Oil/Grease change**
1	Bearing	1	Self-aligning roller bearing	NLGI Class 2 DIN 51818 (Mobilux EP 2)	170 g	34 g	150 h	8000
2	Bearing	1	Self-aligning roller bearing	NLGI Class 2 DIN 51818 (Mobilux EP 2)	170 g	34 g	150 h	8000
3	Drive	1	Gear unit	see SUB-SUPPLIERS DOCUMENTATION				

Tab. 8-9 Lubrication schedule

8.9 Changing the V-belts

V-belt setting

The correct belt tension is immensely important in obtaining perfect power transmission and achieving the normal belt service life.

Too little or too much tension frequently leads to the belts failing prematurely. Overstretching the V-belts often leads to bearing damage at the drive or machine.

Detailed instructions for changing the V-belts, mounting the belt pulleys, and checking the V-belt tension are provided in the enclosed V-belt instruction manual.

>>.../SUB-SUPPLIERS DOCUMENTATION

DANGER

Always replace the complete set of V-belts!

Changing the V-belts

Step	Procedure
1	Shut down drive at all poles and secure against accidental start.
2	Remove safety cover (**1**).
3	Detach clamping screws (**2**).
4	Tension the V-belts with the tensioning device (**3**).
5	Remove the V-belts (**5**) from the pulleys.
6	Mount the new V-belts.
7	Tension the V-belts with the tensioning device. Both V-belt pulleys must be aligned to one another. Approximate values for tensioning are provided in the enclosed V-belt instruction manual.
8	Rotate the drive completely several times to distribute the tension evenly.
9	Check the V-belt tension once again.
10	Tighten hex. nuts and locking screws again.
11	Mount safety cover.

Tab. 8-10 Changing the V-belts

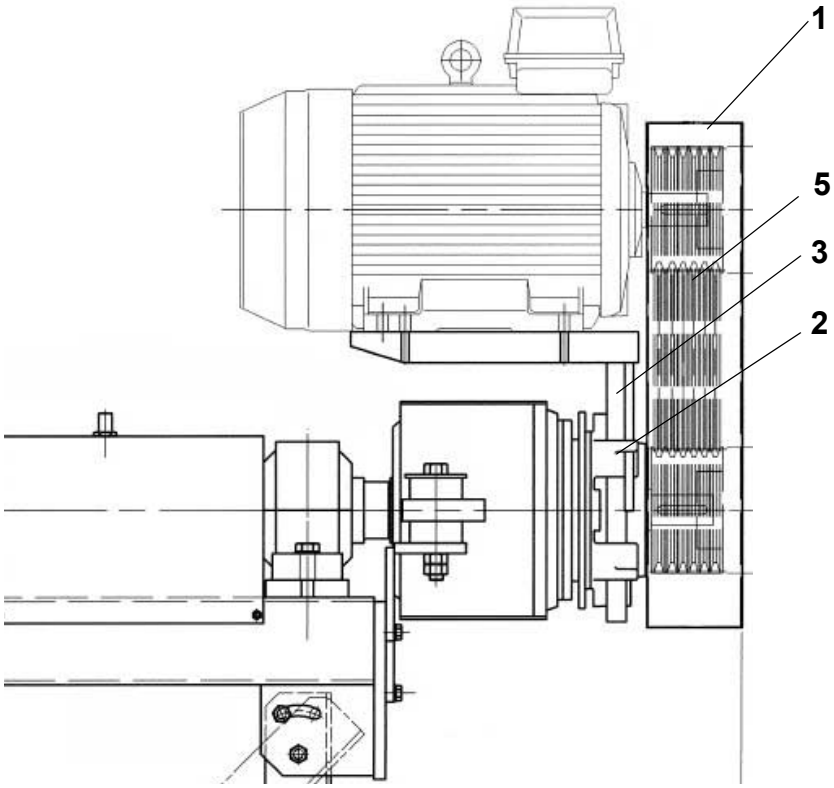

Abb. 8-2 Changing the V-belts

Re-tension new V-belts after a few hours in operation.

8.10 Mounting and removing V-belt pulleys and changing transmission ratio

Removing the belt pulleys

Remove the belt pulleys according to the following table:

Step	Procedure
1	Remove the bearing support covers (**>>8.9**):
2	Detach bolts (**1**) and remove the washers (**2**).
3	Pull off V-belt pulleys (**3**, **4**) with a detaching device.

Tab. 8-11 Removing the belt pulleys

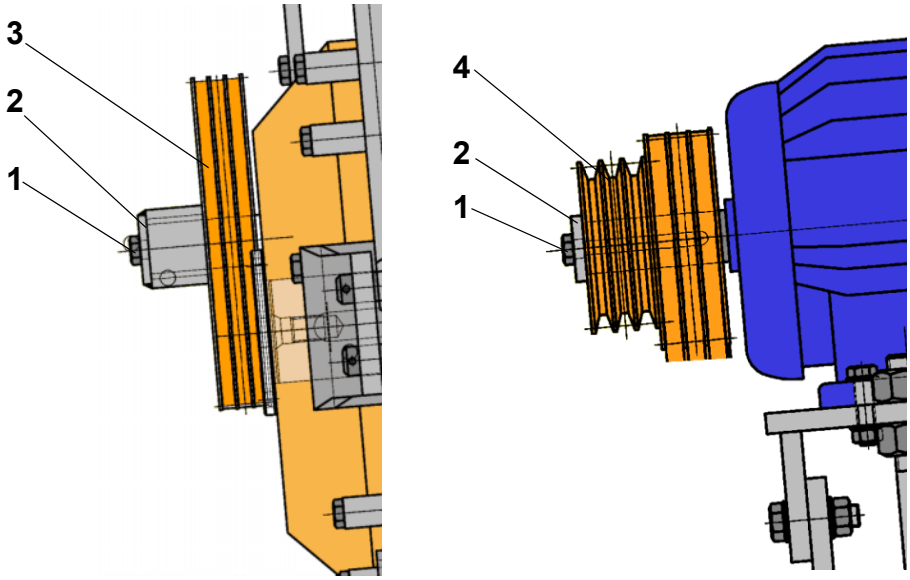

Abb. 8-3 Change the V-belt pulleys

Installing a V-belt pulley

Step	Procedure
1	Mount the V-belt pulleys with a pull-on device. **The transmission ratio is changed when the double V-belt pulley (4) is mounted after being rotated through 180°.**
2	Mount pulleys (**2**) and tighten the bolts (**1**).
3	Mount the V-belts and safety cover.

Tab. 8-12 Installing a belt pulley

8.11 Changing the slip-on gear

Removing the slip-on gear

Step	Procedure
1	Remove the V-belt pulley according to Section 8.10.
2	Detach screws/bolts (**1**) and lift motor (**2**) off its mounting plate.
3	Detach screws/bolts (**3**) and secure the motor mounting plate to prevent it from folding downwards.
4	Remove parallel pins (**4**) and lift motor mounting plate out of the way. **Swing eye bolt (5) downwards by hand.**
5	Remove pin retainer and pin (**6**), then lift eye bolt (**5**) out of the way.
6	Remove pin retainer and pin (**7**), then lift the support (**8**) out of the way.
7	Secure slip-on gear (**9**) to prevent falling, and remove the bolt (**10**) with the cover (**11**).
8	Pull slip-on gear off the shaft.

Tab. 8-13 Removing the slip-on gear

DANGER

Parts of the body may be trapped or crushed during installation work.
Do not place your hand below suspended loads!
Wear your personal protective apparel!

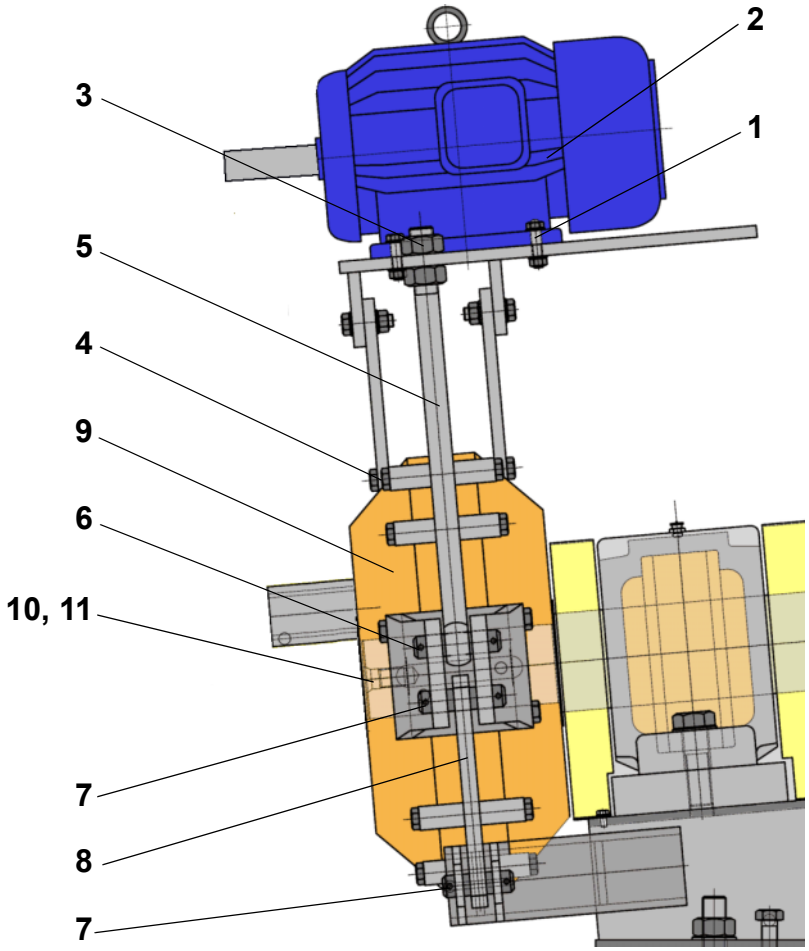

Abb. 8-4 Changing the slip-on gear

Mounting the slip-on gear

The slip-on gear is installed in reverse order to the above.

8.12 Installation and removal of bearings

Removing the bearing

Proceed according to the following table when removing the bearings:

DANGER

Parts of the body may be trapped or crushed during installation work.
Do not place your hand below suspended loads!
Wear your personal protective apparel!

Step	Procedure
1	Dismantle the slip-on gear (**>>8.11**).
2	Secure the stub shaft with a substructure in a suitable way to prevent tilting.
3	Remove locking plate (**1**).
4	Open top section of pedestal bearing (**2**).
5	Move the substructure so that the stub shaft can be raised slightly.
6	Remove locating rings (**3**) from fixed bearing.
7	Remove bearing grease.
8	Mark the position of the taper sleeves (**4**) on the shaft before removing them.
9	Bend locking plates (**5**) upwards and loosen slotted nuts (**6**).
10	Loosen the taper sleeves by striking the slotted nuts lightly.
11	Remove slotted nuts and taper sleeves.
12	Take the bearing off the shaft.

Tab. 8-14 Removal of bearing

DANGER

Only raise the stub shaft far enough to allow the bearing components to be pulled off the shaft. Otherwise, the screening drum will damage the hood or the trough.

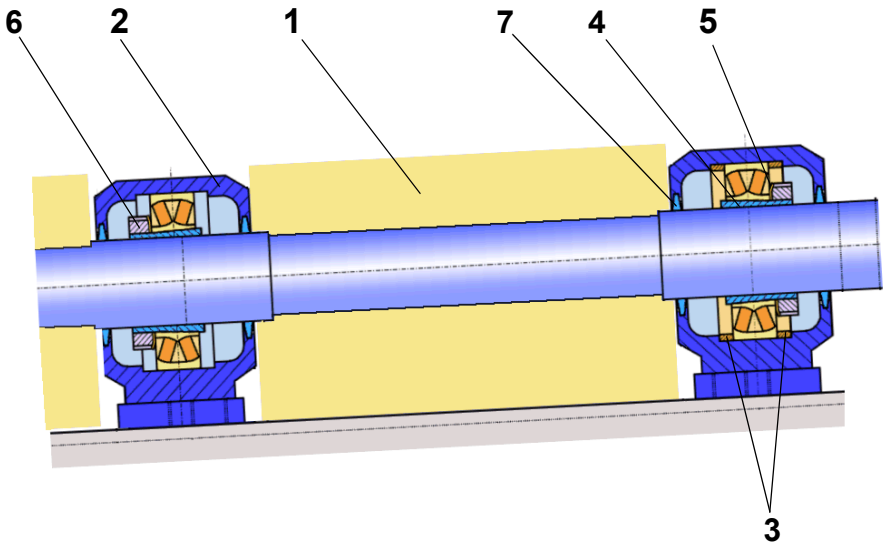

Abb. 8-5 Removal of bearing

Installing the bearing

The spherical roller bearings are installed in reverse order.

- Clean all parts before assembling.
- Position the taper sleeves at the marking.
- Set the radial play of the bearings using a slotted nut according to the manufacturer's instructions.
- Replace the seals in the bearing housing (**7**) each time the bearing is removed.
- Fill the pedestal bearing housings with grease (**>>** **Section 8.8, Lubrication schedule**).

9 SUB-SUPPLIERS DOCUMENTATION

9.1 Drive

9.1.1 Gear unit

Name of company xxxxx

Technical data

Type xxxxx
Motor power . . . . . xx kW
Transmission ratio . . . . . .xxx : 1

9.2 Shower

9.2.1 Shower

Name of company xxxxx

Technical data

Type xxxxx