Erection Work, Operating and Maintenance Instructions

Machine: **FibreSlush FS2**

Machine No.: 132206553
Year of construction:2013

Order code: Dong Tien Paper,Vietnam
Order no.: PPF 40025865

ORIGINAL LANGUAGE:german

Issued by:	PPF/Zhang Wenna, 2013-07	Revision:
Checked:	PPF/Ren Xiaojiang, 2013-07	Checked:

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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.

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

>> .../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 Name and address of the manufacturer

ANDRITZ TC
9 Tianbao Road, West City Industry Zone, Chancheng District,
Chancheng District,Foshan 528000,China

Our Service Department will be pleased to help you and can be contacted at:

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e-mail: pulppaper-service.cn@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.

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.

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.

Before processing materials that are already combustible, explosive, toxic, or hazardous in other ways or which can become hazardous in a reaction, the operating company must conduct a thorough hazard analysis and risk evaluation of the entire process. This includes drawing up of contingency plans for handling process errors and faults.

In particular, the following must be observed:

1. 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.
2. If the material processed is toxic, appropriate safety measures MUST be implemented.

2.6 Operating company's obligations

Intended use

The operating company of 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 or 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 which 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 (see Section 2.9).

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

The illustration (Abb. 2-1) shows the safety covers at the machine. The machine must not be operated without the safety covers mounted.

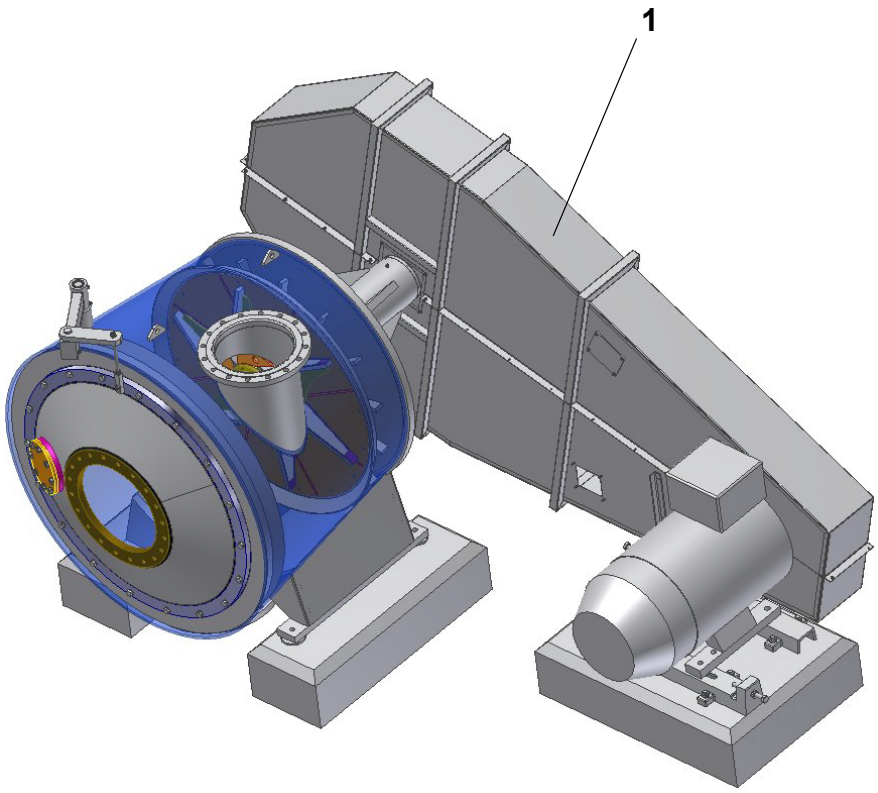


Abb. 2-1 Safety covers (symbolic illustration)

Item	Component	Item	Component
1	Belt guard		

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!

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 operator in accordance with the applicable standards, particularly EN ISO 13850 and EN 60204-1 (stop category 0).

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:

Hot surface warning!

Only authorized personnel are permitted to climb onto the machine!

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. If pulp at higher temperatures is used, the operating company must take the necessary safety measures (e.g. protective gloves, training of operating staff, 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: 80 dB(A).

When the machine is in operation, the noise level of the motor is higher than the noise level of the machine itself. As a result, the overall noise level may vary according to the motor type used.

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 and motors must be connected to the grounding system.

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 fibre 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.

3 TECHNICAL DATA

3.1 Data

Main data	Net tank volume	0,6 m^3
	Rotor diameter	692mm
	Maximum internal pressure	2.5 bar
	Minimum inlet pressure	1.2 bar
Motor data (50Hz)	Motor power	90 kW
	Nominal motor speed	1470 rpm
	Rotor speed	518/525 rpm
Sealing water	Flow rate	0.5 l/min
	Pressure	1.5 bar
	Temperature	20?
	Quality	75 microns (fresh water)
Weights	Weight FibreSlush	1310 kg

4 DESCRIPTION

4.1 Field of application

The FibreSlush is used for wet preparation of recycled fibres. It is located in the secondary pulp line after the pulper. The FibreSlush is used for secondary pulping of paper particles, screening of pulped fibers, and discharge of impurities.

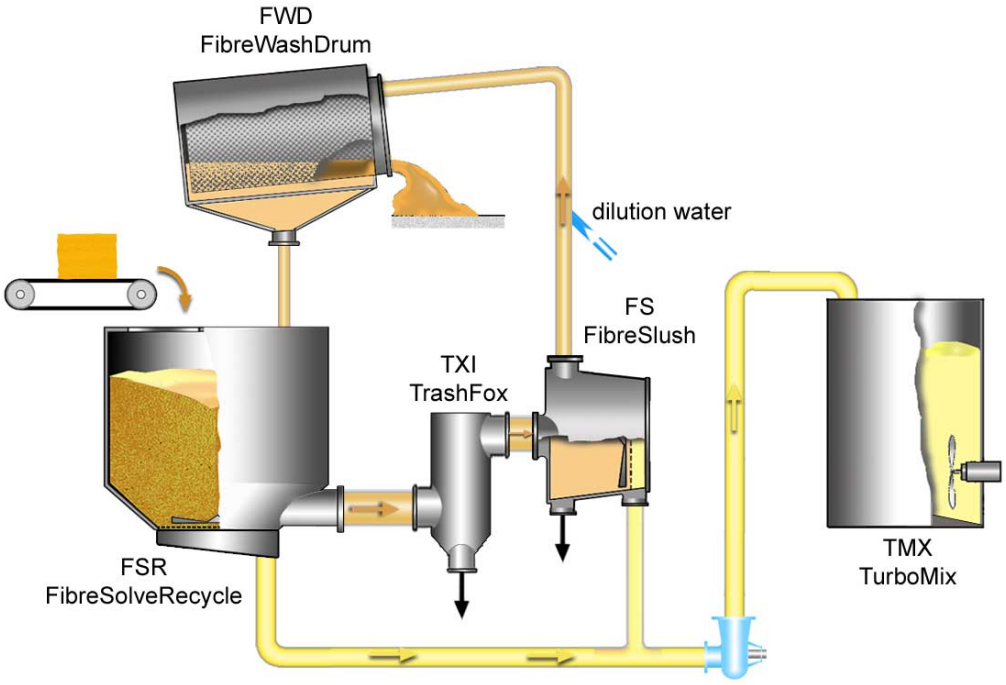


Fig. 4-1 FibreSlush system

4.2 Main components

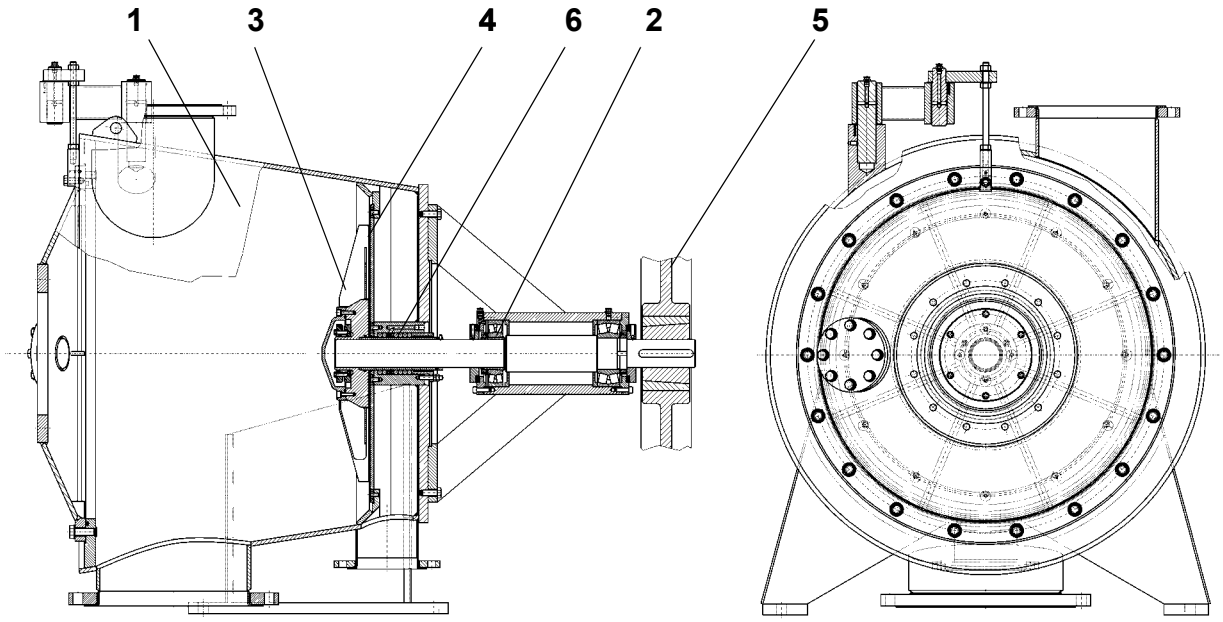


Fig. 4-2 FibreSlush

Item	Component
1	Housing
2	Bearing
3	Rotor
4	Screen plate
5	Drive
6	Shaft seal
7	Safety cover (not shown)

Housing (1)

Function: The housing forms the process area in which the fiber bundles are pulped and screened.

The reject branch for heavy reject is located on the underside of the housing. The reject branch for light reject is located on the upper side of the housing. On the front side the feed connection is provided in the housing cover. On the underside of the housing the accept branch is mounted behind the screening plate (**4**).

Design: Welded structure made of acid-proof stainless steel. Replaceable wear plates are mounted on the rear wall.

On the front side of the housing there is a cover that can be opened out to the side using a rod assembly after removing the flange bolts.

Bearing (2)

Function: Holding and supporting the rotor. The fixed bearing secures the rotor in axial direction. The movable bearing allows length compensation in axial direction.

Design: The bearing housing (**2b**) is a welded structure made of steel and bolted to the housing (**1**). The rotor shaft runs in two grease-lubricated self-aligning roller bearings.

The fixed bearing (**2a**) is located on the side of the drive.

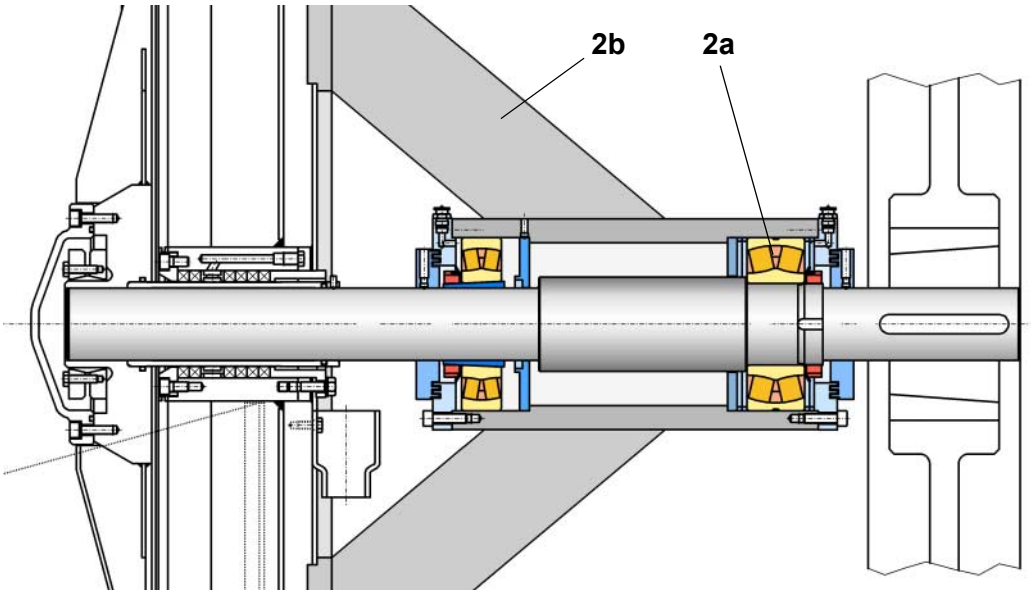


Fig. 4-3 Storage

Rotor (3)

Function: The rotor generates a turbulent rotating current in the pulping tank and scrapes the screen surface clear.

Design: Welded structure made of stainless steel with several vanes. All edges subject to high loads are reinforced. The rotor is secured to the rotor shaft by a shrink disc.

Screen plate (4)

Function: The screening plate separates the pulping tank from the accept tank and only allows pumpable suspension through to the pump. The screening plate ribs assist the pulping process.

Design: Perforated screening plate with ribs.

Drive (5)

Function: The drive turns the rotor..

Design:

- Three-phase motor (**5a**) and belt drive (**5b**)

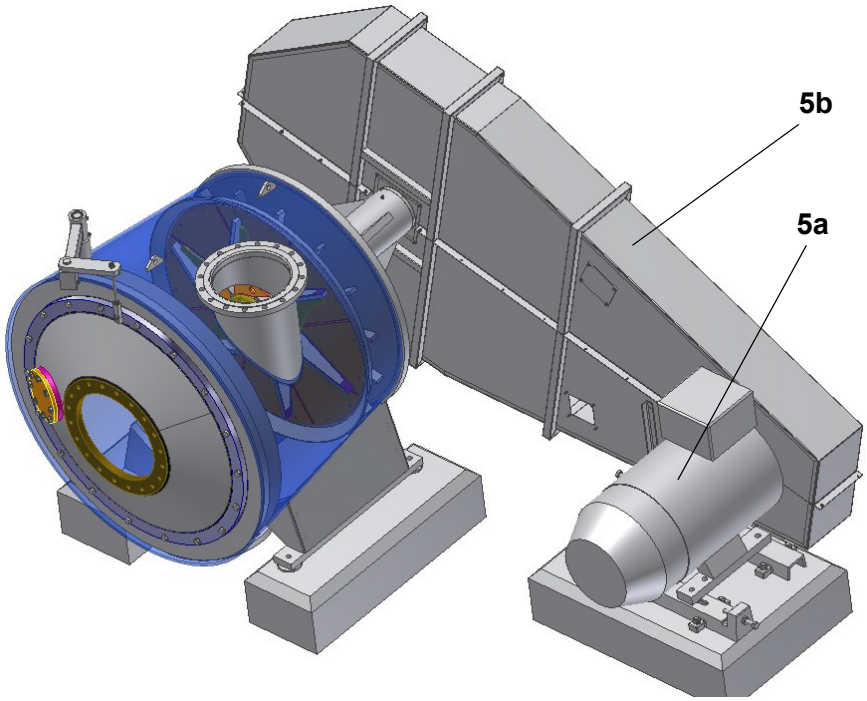


Fig. 4-4 Drive

Shaft seal (6)

Function: The shaft seal (**6**) prevents the reject pulp from escaping from the housing.

Design: Stuffing box with packing rings and one lantern ring.

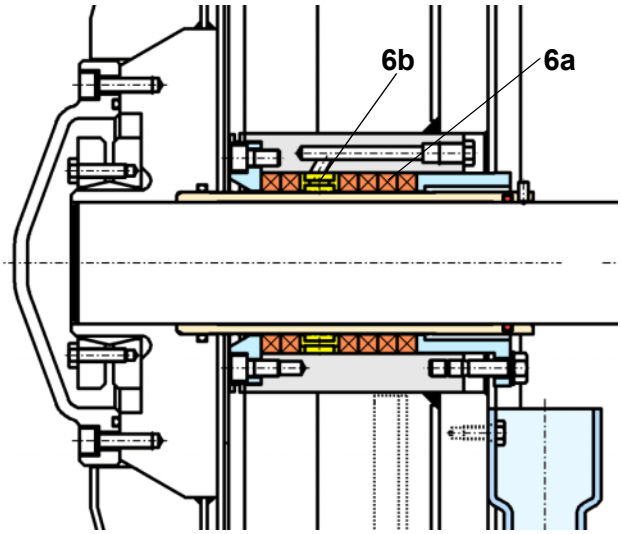


Fig. 4-5 Shaft seal

Safety cover (7)

Function: The safety cover protects moving parts of the drive against foreign objects and contact.

Design: The safety cover made of sheet steel is manufactured in several parts and has a maintenance hatch for checking the belt tension.

4.3 Technological description

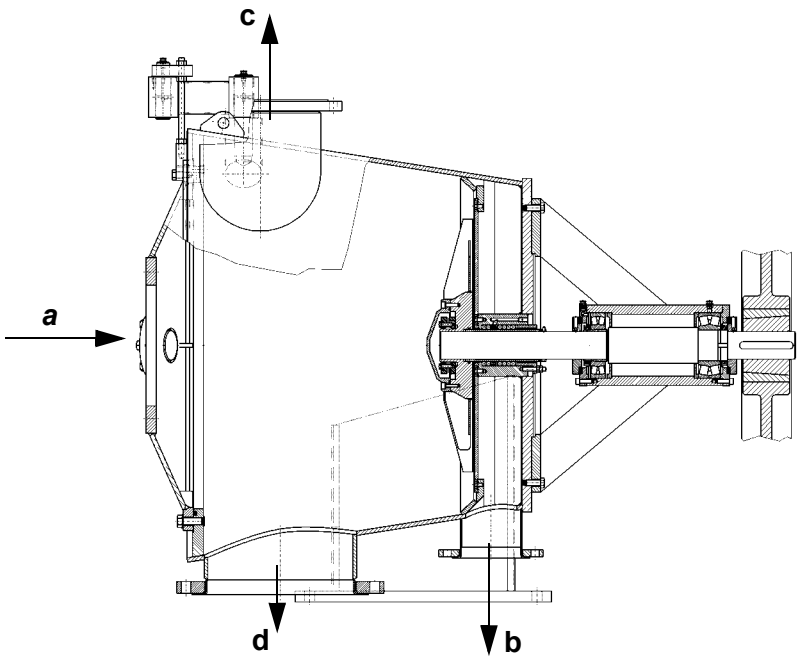


Fig. 4-6 FibreSlush (symbolic illustration)

The pulp enters the housing of the FibreSlush through the feed branch (**a**). In the process area, paper scraps that have not been pulped undergo secondary pulping, with the rotor and screen plate ribs assisting the pulping process. During the pulping process, both the accept (**b**) and the two reject outlets are closed. The gate valve in the accept branch is opened periodically for a few seconds and the screened suspension drains off. As a result, impurities build up in the process area of the FibreSlush. The gate valves in the light (**c**) and heavy reject branches (**d**) are also opened periodically for a few seconds, depending on the amount of impurities present.

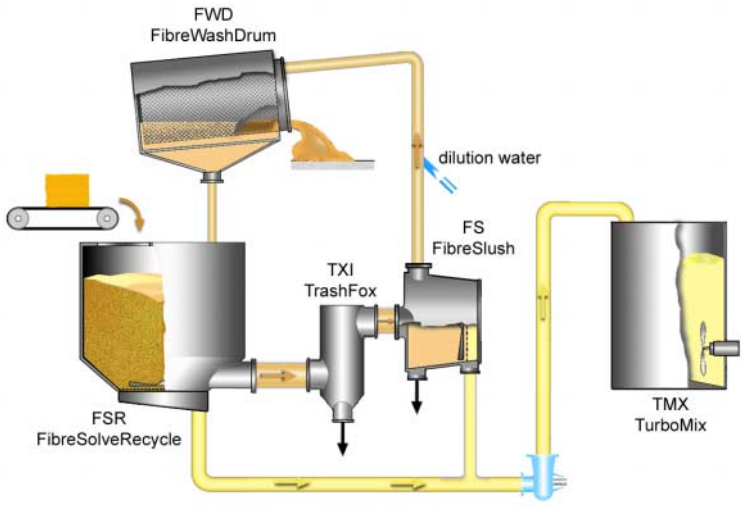


Fig. 4-7 FibreSlush system

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 observed!

DANGER

If the machine is not secured to the foundation, it must always be supported by appropriate means when put down somewhere!
The machine tilts due to the uneven distribution of weight.

General safety regulations

All applicable accident prevention rules must be observed.

Do not exceed permissible crane loads and weights on lifting gear and ropes/shackles. Secure loads to prevent them from falling.

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.

Workers entrusted with lifting and conveying equipment must have the national qualifications required.

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

The machine is supplied pre-assembled. The machine components and auxiliary materials are packed in crates.

Further information on transport sizes and weights are provided in the shipping documents.

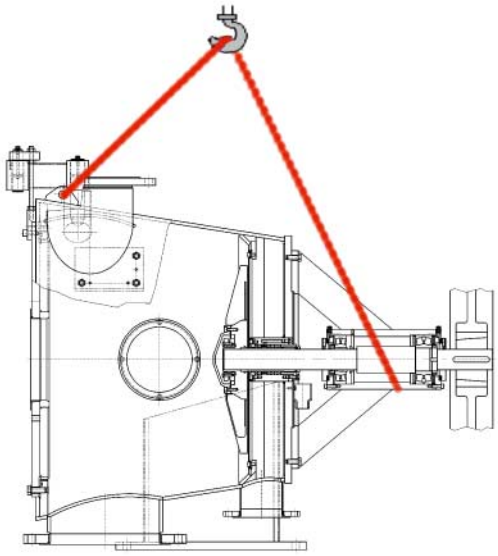


Fig. 5-1 Attaching

Acceptance

- Check against shipping documents and packing lists whether 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.

5.4 Storage

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.

5.5 Installation

General

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
- Packing lists for each individual consignment

Preparations

Foundation

The foundation is prepared according to the ANDRITZ foundation plan.

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

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

CAUTION!

Do not open the FibreSlush until it has been anchored to the foundation!
The FibreSlush may tilt forward due to the uneven distribution of weight.

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.
Do not place your hand below suspended loads!
Wear your personal protective apparel!

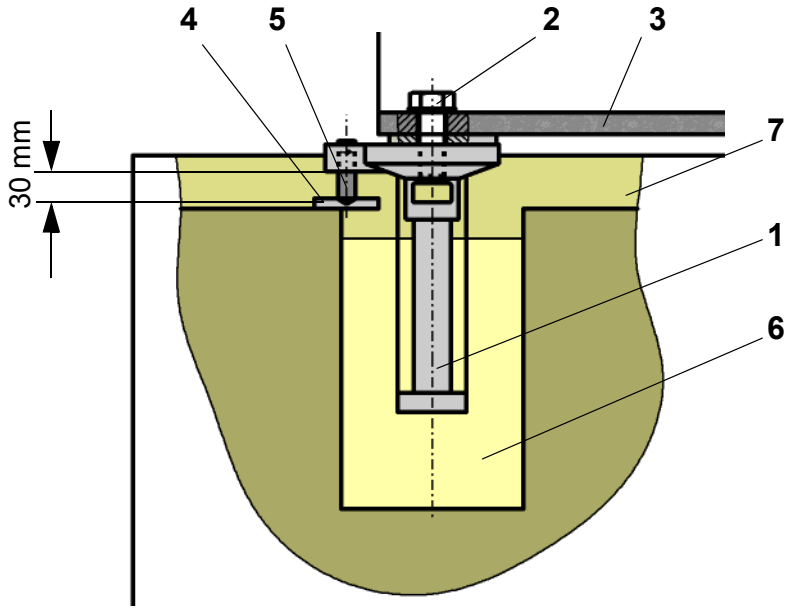


Fig. 5-2 Foundation

Machine installation

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

Step	Activity
1	Secure the foundation blocks (**1**) at the housing (**3**) in a central position using hexagon head bolts (**2**).
2	Raise the machine and place on the foundation.
3	Align the machine according to the foundation drawing.
4	Grout in the foundation blocks (**1**) with non-shrink grouting compound (**4**) only and tighten the screws (**2**) a little.
5	Set up shuttering.
6	Check machine alignment after the grouting compound at the foundation blocks has hardened. Then complete the base casting layer with non-shrink grouting compound (**5**).
7	When the grouting compound has hardened completely, tighten the fastening screws (**2**) according to the torque table provided in the Chapter on "Maintenance".

Tab. 5-1 Machine installation

5.6 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).

Sampling

Sampling equipment

Sampling equipment is to be provided in the pipes carrying the pulp.

DANGER

When taking samples, hot liquids or vapors may escape or there may be a risk of chemical burns due to the chemicals added in the process!
Personal safety equipment, in particular eye protection and safety gloves, must be worn when taking samples.

Personal protective apparel

The following personal safety equipment must be worn when taking pulp or filtrate samples.

Safety equipment	
Protective clothing	
Protective gloves	
Eye protection	

Tab. 5-2 Safety equipment

WARNING

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

	Examples of sampling devices
	Manually operated sampling fitting
	Sampling vessel

Tab. 5-3 Sampling equipment

Instruments

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

Electrical equipment

The complete electrical installations are to be set up and operated according to the applicable standards.

5.7 Inspections and remaining work

Direction of rotation

Prerequisites:

- Motor is connected to power supply
- Belts have not been mounted.

Checking sense of rotation:

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

Step	Activity
1	Switch motor on briefly.
2	Direction of rotation according Fig. 5-3 View of drive journal of the rotor: clockwise
3	Switch motor off again.
4	Mount belt and set belt tension. Detailed instructions for changing the V-belts and checking the V-belt tension are provided in the enclosed V-belt instruction manual.

Tab. 5-4 Checking the sense of rotation

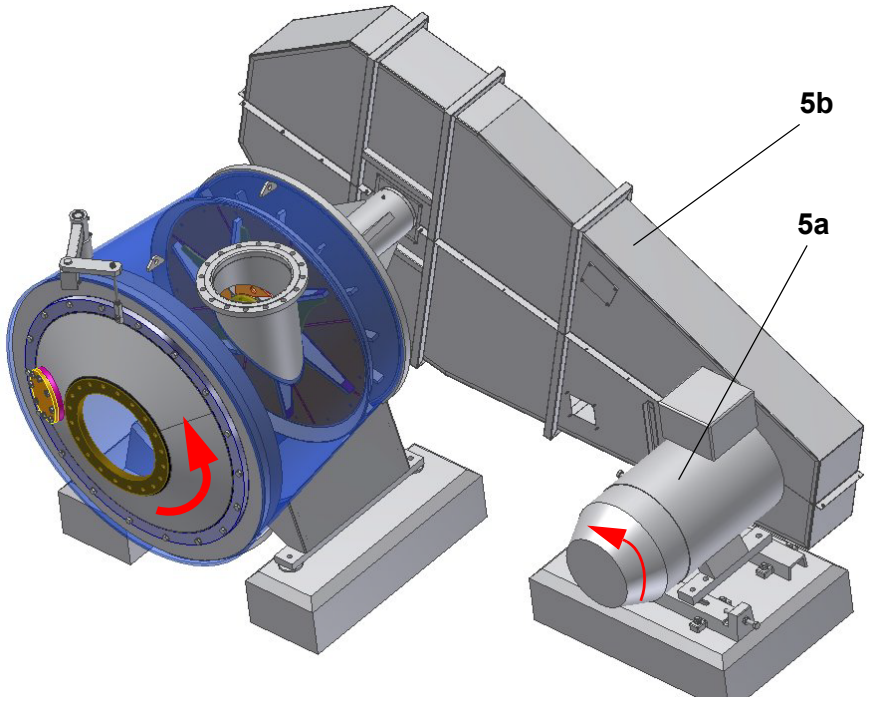


Fig. 5-3 Direction of rotation

Offset of the belt pulleys

The belt pulley at the rotor shaft and at the motor should neither be mounted offset, nor at different angles.

Other work

Other work to be completed:

- Clean the machine.
- Mount safety cover.

5.8 Cold test (preparation for initial start-up)

Sealing water

Before sealing water is fed to the shaft seal, the sealing water pipe must be closed off at the machine and flushed out. The entire sealing water pipe from the main sealing water pipe to the machine must be flushed out until all of the dirt has been removed from the pipe. After flushing out the pipe, connect it up to the machine again.

Stuffing boxes

The stuffing boxes must be set together with the ANDRITZ start-up engineer.

Cleaning

Open machine and remove any heavy items that may have been caught up inside, as well as any fastening devices for transport purposes.

Pipes

All connections (flanges, screw fittings, etc.) must be checked to ensure they have been mounted correctly (screws tightened, seals mounted, welds complete, etc.).

Lubrication

Initial filling of lubricant according to lubricating schedule (bearings, etc.).

DANGER

Damage to machine due to use of wrong lubricants.
Only use lubricants with the properties listed in the lubrication schedules.

Cold test

The checks to be performed must be carried out according to the cold test protocol and ticked off after completion.

5.9 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.

Synthetic 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

This chapter describes the preparations and steps required for initial start-up of the machine.

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.

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.
- Housing cover and pipework have been checked for leaks.
- Cold test completed.
- Installation site has been cleared and cleaned.
- Power and water supply are available.
- Supply of sealing water to shaft seal has been checked.
- All safety guards mounted.
- First filling of lubricants (bearings, etc.) provided.
- The sense of rotation of the drives has been checked.
- Belt tension has been checked.
- All electric interlocks and EMERGENCY STOP safety devices are functioning and have been checked.
- All control circuits have been installed and tested.
- Process control system has been installed and tested.
- FibreSlush and all pipes have been flushed out thoroughly.

6.4 Start-up

Step	Activity
1	Activate main switch and control system.
2	Close all shut-off valves.
3	Open sealing water supply to shaft seal.
4	Fill the process area of the machine dilution water.
5	Switch on drive.
6	The feed gate valve opens after approximately 30 seconds.
7	Check the operating cycle of the accept and reject dischargers.
8	Check discharge of heavy reject.

Tab. 6-1 Start-up

DANGER

The FibreSlush should not be operated for longer periods with the feed and discharge gate valves closed.
Heating of the pulp suspension can lead to excessive pressure build-up in the housing.

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 machine may only be operated with all the required safety devices.

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 BUTTONS and the escape routes are located.

Operating personnel must be 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).

Safe operation

The machine is operated under pressure. Thus it is important to ensure that housing cover, manholes, windows, etc. have been closed properly with fully functioning fixing elements.

Under no circumstances should the machine be operated at a higher pressure than the maximum permitted inlet pressure

.../TECHNICAL DATA

Reasons for increased pressure

Cause	Counter-measure
Flow is not guaranteed	Open shut-off elements in the feed and discharge pipes.
Surge pressure due to shut-off elements closing too quickly.	Always close shut-off elements slowly.

7.3 Control via DCS

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

7.4 Starting

Prerequisites

Before starting the machine, complete the following preparation work:

- Check for residual pulp that has dried on

Automatic starting

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

Manual start-up

Start up the machine manually according to the following table:

Step	Activity
1	Activate main switch and control system.
2	Close all shut-off valves.
3	Open sealing water supply to shaft seal.
4	Fill the process area of the machine dilution water.
5	Switch on drive.
6	The feed gate valve opens after approximately 30 seconds.
7	Check the operating cycle of the accept and reject dischar-gers.
8	Check discharge of reject.

Tab. 7-1 Manual start-up

DANGER

The FibreSlush should not be operated for longer periods with the feed and discharge gate valves closed.
Heating of the pulp suspension can lead to excessive pressure build-up in the housing.

7.5 Normal operation

DANGER

Do not operate without all safety devices in place

During operation, operating personnel must make sure that data are recorded (in the shift log book and data recording sheets), and also carry out the following work:

Daily jobs and checks

The following work has to be performed in normal operation:

Component or process value	Check and activity
Locking water consumption	Optimum consumption: 0.5 to 2 l/min. Check flow indicator for function and cleanliness.

In case of a malfunction, proceed as described in 7.9 (Operating faults and troubleshooting).

DANGER

Shut down the FibreSlush if there is no supply of pulp.
The FibreSlush must not run without pulp for longer than 15 minutes!

7.5.1 Operating cycles of the dischargers

The cycle begins when the process area has been filled. The feed gate valve is open during filling, and the accept and reject dischargers are closed.

Cycle	Duration [sec]	Step	Feed gate valve	Accept valve	Reject gate valve
I	10 - 20	Remove accept from the accept tank	open	open	closed
II	10 - 20	Secondary pulping	open	closed	closed
III	10 - 20	Remove accept from the accept tank	open	open	closed
IV	10 - 20	Secondary pulping	open	closed	closed
V	2 - 3	Discharging reject	open	closed	open

Tab. 7-2 Operating cycles of the dischargers

7.6 Shutdown

Automatic shutdown

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

Manual shutdown

Always flush out the machine before switching it off.

Step	Activity
1	Discontinue pulp feed.
2	Flush out the machine with water for a short period in order to clean the feed and accept piping.
3	Flush out both reject pipes.
4	The gate valves in the pipes close automatically.
5	Shut down machine.
6	Shut off supply of sealing water.

Tab. 7-3 Manual shutdown

DANGER

The FibreSlush must not run without pulp for longer than 15 minutes!

7.7 EMERGENCY STOP

If there is a danger to personnel or any other operating faults (excessive noise or vibrations), the EMERGENCY STOP system must be activated according to the following table:

Step	Activity
1	Press the EMERGENCY STOP switch. This shuts down the machine and the pulp feed system simultaneously.
2	Switch off service switch for the machine main drive and lock out.
3	Find and eliminate the cause of the operating faults . **>> Section 7.9, Operating malfunctions and troubleshooting**

Tab. 7-4 EMERGENCY STOP

7.8 Re-start after an EMERGENCY STOP

Prerequisites for starting

Before starting up again after an EMERGENCY STOP, the reason for the stoppage must be found and eliminated.

Starting

The machine should be started up according to Section 7.4.

DANGER

Pulp may dry on inside the machine after a longer shutdown period if the machine has not been flushed out.

Empty the machine manually before starting up again and remove any pulp residue that has dried on.

7.9 Operating malfunctions and troubleshooting

Malfunction	Cause	Remedy
Higher proportion of paper in the final stage screen.	Scraping edges of the pulping element bearing are worn.	Change rotor or replace reinforcing on scraper edges.
	Screen ribs worn.	Replace screening plate or weld on new screen ribs.
	Clearance betwen rotor and screen ribs is too wide.	Set clearance again.
	Pulping time is too short.	Extend secondary pulping time.
	Too high wet-strength portion in overflow from final stage screen.	Reduce wet-strength portion in feed.
Stuffing box is overheating.	Inadequate flow of sealing water.	Set sealing water flow.
	Sealing water supply is clogged.	Switch FibreSlush off. Clean the sealing water feed.
	Stuffing box gland is too tight.	Loosen the screw fitting at the stuffing box gland. Set sealing water flow.
Pulp escaping at the stuffing box seal.	Inadequate flow of sealing water.	Increase locking water pressure until it is 0.5 bar above the pressure of the pulp.
	Stuffing box packing is worn.	Switch off FibreSlush and replace the stuffing box packing
	Shaft protection sleeve is worn.	Switch FibreSlush off. Replace the shaft protection sleeve.
Drive motor is overloaded.	Proportion of impurities in process area is too high.	Extend withdrawal times for accept.
	Fibres forming a rope or spun together in the process area.	Switch FibreSlush off and empty it. Check that the rotor can turn freely and then re-start the machine.
Drive motor shuts down.	Overpressure (2.5bar) in the process area or accept tank.	Shorten secondary pulping time.

Tab. 7-5 Operating malfunctions and troubleshooting

Malfunction	Cause	Remedy
Motor protection switch is triggered.	The rotor is jamming because the belt is wet or loose.	Switch off the FibreSlush and dry and/or tension the belt.
	The rotor is worn.	Switch off the FibreSlush and replace the rotor or apply new reinforcing to the scraper edges.
Noise and vibration occur.	Foreign matter in the rotation area of the rotor.	Switch off the FibreSlush and remove foreign matter through the heavy matter discharger. Check that the rotor can turn freely and then re-start the machine.
	Bearing damage	Switch FibreSlush off and replace bearing.
	The rotor is unbalanced.	Switch off the FibreSlush remove the rotor and repair it.

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.

>> Kapitel 1 ,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.

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 machine must be thoroughly cleaned before carrying out any maintenance work.

Use only original spare parts.

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 energy 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).

Welding work

In general, welding work is only permitted after consulting ANDRITZ.

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.

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 monitored 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.

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 maintenance and upkeep instructions provided by the manufacturer must be observed.

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:

- Cut off stock feed.
- Flush out the machine with water.

WARNING

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

DANGER

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

8.4 Maintenance schedule

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

>> Kapitel 7 ,OPERATION

Monthly

Component	Activity
Rotor	• Check for wear and tear.
Screen plate	• Check for wear and tear.
Bearings	• Check temperature and for noises .
Shaft seal	• Check leaking water rate.
Belt drive	• Check belts for wear and tear.

Tab. 8-1 Monthly

Six-monthly

Component	Activity
Belt pulley	• Check for wear and tear.
Instruments and fittings	• Check functioning.

Tab. 8-2 Six-monthly

Annually

Component	Activity
Screws/bolts	• Check secure fitting and tighten if necessary.
Stuffing box	• Check function and for wear and tear.
EMERGENCY STOP switch	• Check function.
Grounding	• Check
Foundation bolt connection	• Check

Tab. 8-3 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)						μ	Tightening torques (Nm)					
	5.6	8.8	A4-50	A4-70	A4-80	C3-80		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. 8-4 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. 8-5 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. 8-4)!

8.6 Lubrication

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

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

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

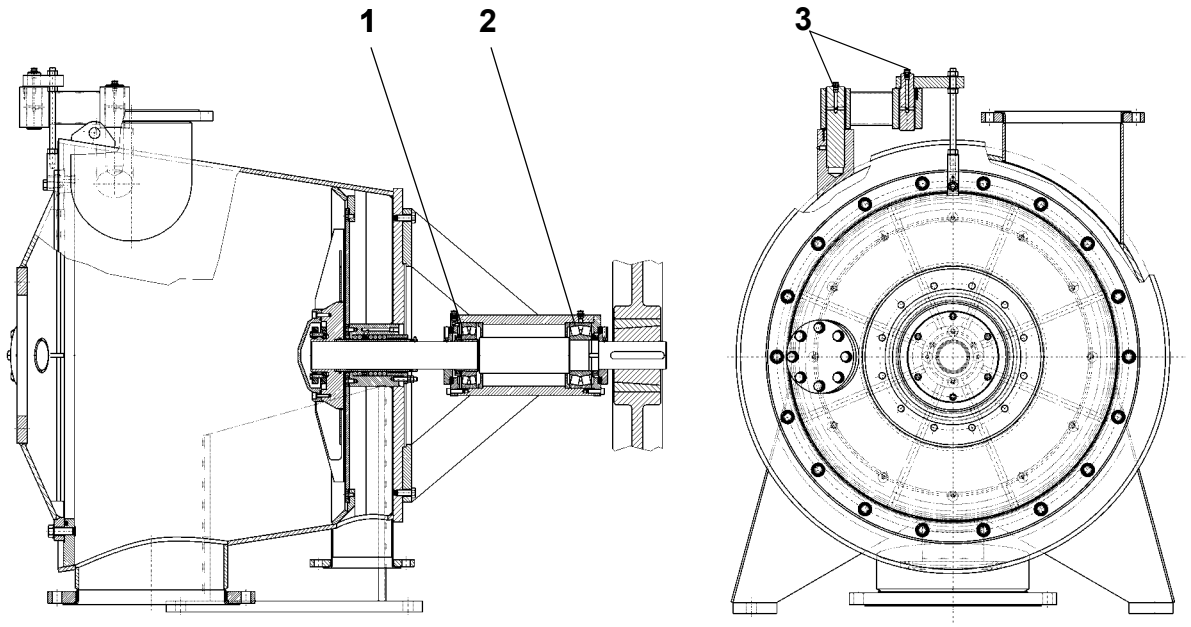


Fig. 8-1 Lubrication points

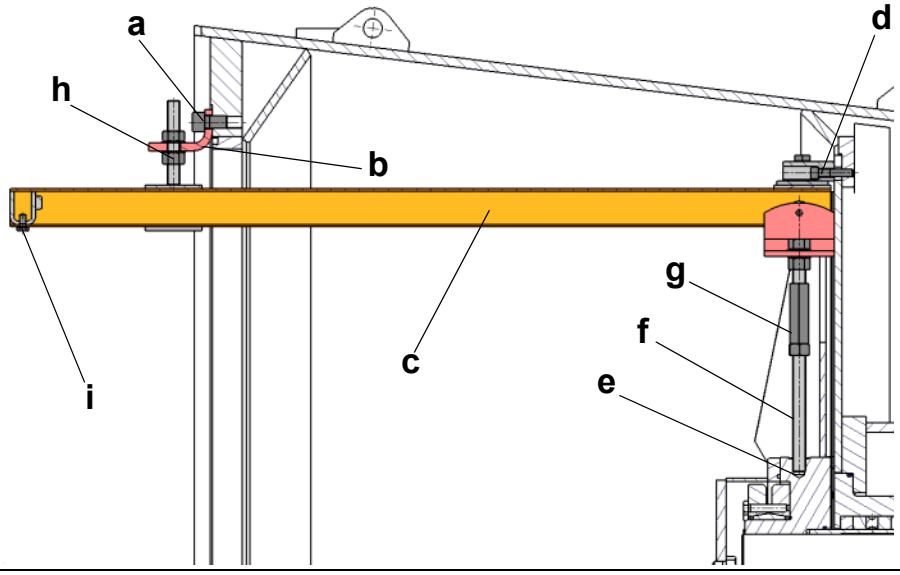
		Lubricating point			Quantity [grammes] / [pounds]	Intervals / Operating hours	
Item	**Structural component**	**No.**	**Designation**	**Lubricants recommendation**	**First filling**	**Refill**	**Replace grease**
1	Bearing assembly of the rotor shaft	1	Antifriction bearing	Grease, NLGI - Class 2 DIN 51818 (Mobilux EP 2)	15 g	150	Annually
2	Bearing assembly of the rotor shaft	1	Antifriction bearing	Grease, NLGI Class 2 DIN 51818 (Mobilux EP 2)	22 g	150	Annually
3	Pivoting points of swing arm	2	Fulcrum bearing	Grease, NLGI Class 2 DIN 51818 (Mobilux EP 2)	approx. 2 g	150	Annually

Tab. 8-6 Lubrication schedule

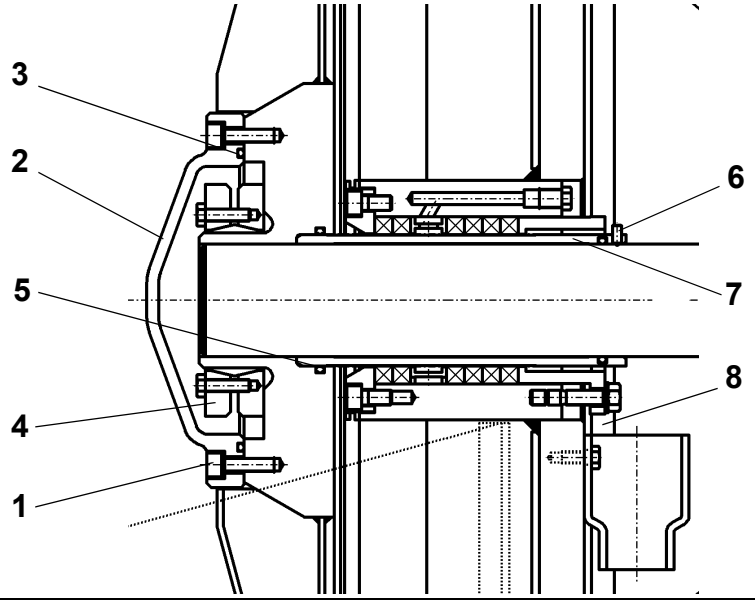
8.7 Changing the rotor

Dismounting the rotor

Step	Procedure
1	Clean the machine (see Section 8.3).
2	Close all gate valves.
3	Shut down drive at all poles and secure against accidental start.
4	De-pressurize the casing and empty out the flushing water.
5	Detach feed pipe in housing cover.
6	Detach hex. head screw in the casing cover and swing the cover aside.
Mount removing device.	
7	Detach screws (**a**).
8	Mount holding angle (**b**).
9	Screw the removing device (**c**) to the screen plate (**d**) first of all and then to the holding angle.
10	Turn the rotor further by hand so that the bore hole (**e**) is at the top.
11	Screw the threaded rod (**f**) into the rotor.
12	Connect the threaded rod and the removing device using the turnbuckle (**g**).
13	Set the removing device in a horizontal position using the adjusting screws (**h**). **Caution! Check the back limit stop (i) before removing the rotor.**



Tab. 8-7 Dismounting the rotor

Step	Procedure
Remove the rotor.	
14	Remove the screws (**1**) and remove the cover of the rotor shaft (**2**) with the O-ring (**3**).
	
15	Remove the shrink disc (**4**).
16	Pull the rotor off the shaft with the O-ring (**5**) and out of the machine with the removing device. For weight of rotor, please refer to .../TECHNICAL DATA

Tab. 8-7 Dismounting the rotor

Installing the rotor

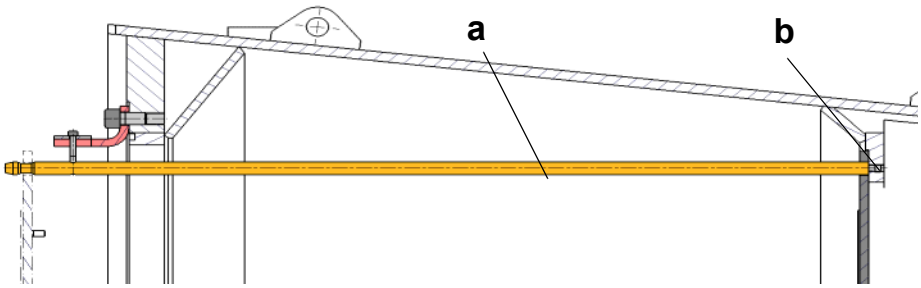
Step	Procedure
1	Detach set screw (**6**).
2	Detach stuffing box gland (**8**) and push the shaft protection sleeve (**7**) towards the bearing by approximately 20 mm.
3	Replace the O-ring (**3**).
4	Push on rotor until it is touching the shearing strips. Use removing device.
5	Push on shrink disc.
6	Pull rotor back a little (approx. 0 - 1 mm) and check that it is turning freely.
7	Tension the lock screws at the shrink disc with the appropriate tightening torque. see .../SUPPLIER DOCUMENTATION
8	Replace O-ring (**3**) and mount cover hood (**2**).
9	Screw bolts (**1**) tight and secure with LOCTITE 243.
10	Push shaft protection sleeve (**7**) onto the rotor as far as the limit stop.
11	Screw set screw (**6**) tight and secure with LOCTITE 243.
12	Tighten stuffing box gland as described in Section 8.9 (Tab. 8-12).
13	Mount feed pipe in housing cover.

Tab. 8-8 Installing the rotor

Check that there are no leaks at any of the connections when the machine is not pressurized.

8.8 Changing the screen plates

Removing the screening plate

Step	Procedure
1	Dismount the rotor and dismantle the removing device, leaving only the holding angle in place (see Section 8.7).
Mount removing device.	
2	Screw the removing device (**a**) into place at the screen plate (**b**).
3	Screw the removing device to the holding angle.
	
Dismount the screen plate.	
4	Undo fastening screws (**1**).
5	Pull the screen plate out of the machine using the removing device.

Tab. 8-9 Removing the screening plate

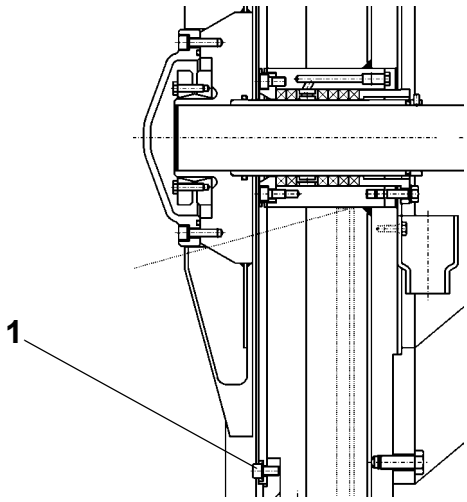


Fig. 8-2 Removing the screening plate

Installing the screening plate

The screening plate is installed in reverse order.

8.9 Changing the stuffing box packing

Removing the stuffing box packing

Step	Procedure
1	Clean the machine (see Section 8.3).
2	Shut down all drives at all poles and secure against accidental start.
3	Remove the drainage channel for sealing water.
4	Detach the bolt (**1**) and pull back the stuffing box gland (**2**).
5	Remove old stuffing box packings (**3**).
6	Take off the lantern ring (**4**).
7	Then remove the remaining stuffing box packings (**3**).
8	Turn on sealing water supply and check flow.
9	Clean the stuffing box gland, lantern ring and packing area thoroughly.
10	Check shaft protection sleeve (**5**) and replace if worn. (Section 8.10) **Notches or grooves on the surface of the shaft protection sleeve cause excessive wear on the stuffing box packing!**

Tab. 8-10 Removing the stuffing box packing

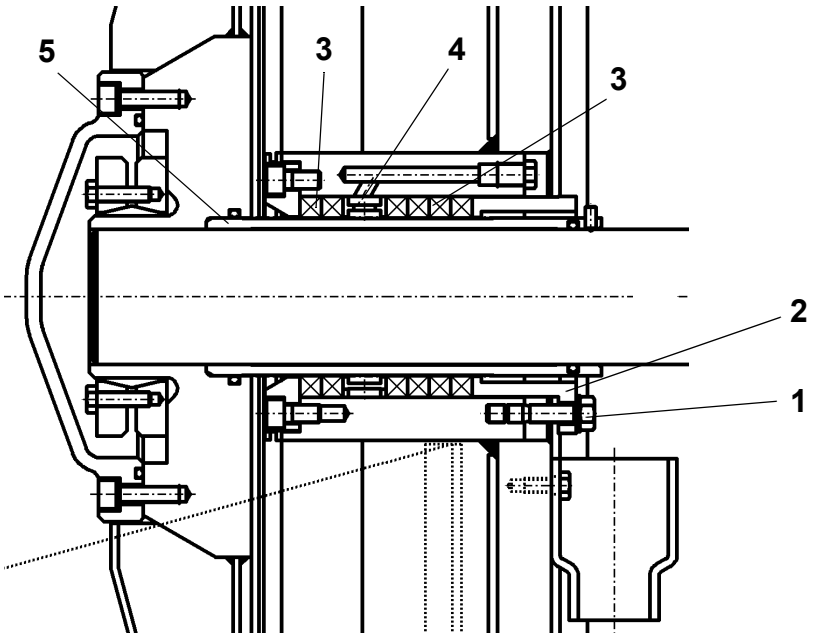


Fig. 8-3 Changing the stuffing box packing

Installing the stuffing box packing

Proceed according to the following table when installing the stuffing box packing:

Step	Procedure
1	Mark stuffing box packing and cut to the appropriate length. Keep stuffing box clean, do not stretch or squash stuffing box when measuring and cutting!
2	Wrap the gland packing round the shaft protection sleeve, then push the first packing ring into the stuffing box, starting at the butt joint. The ends of the cord must form a butt joint with no gap.
3	Push the first packing cord right in using a suitable tool. Mount the second packing ring with the butt joint offset by 120 degrees.
4	After inserting the second packing ring, mount the lantern ring.
5	Mount the remaining packing cords with the butt joints offset by 120 degrees.
6	When the stuffing box gland has been installed, tighten all bolts evenly according to the setting guidelines provided below.

Tab. 8-11 Installing the stuffing box packing

Setting the stuffing box

New packings swell because they absorb water. This increases the surface pressure on the shaft and the large amount of sealing water that escapes at first is then reduced.

DANGER

The stuffing box packing will be damaged if the stuffing box gland is screwed too tight.
If the stuffing box gland is too tight, this will cause burning on the seal surfaces.

Set the stuffing box gland according to the following table:

Step	Procedure
1	Tighten the screw fitting slightly at the stuffing box gland.
2	Turn on supply of sealing water.
3	Start up the machine.
4	Shut down the machine after a few minutes and check the temperature of the stuffing box seal. The temperature of the seal housing must not exceed 60°C.
5	Tighten the stuffing box gland further until there is less sealing water escaping.

Tab. 8-12 Setting the stuffing box gland

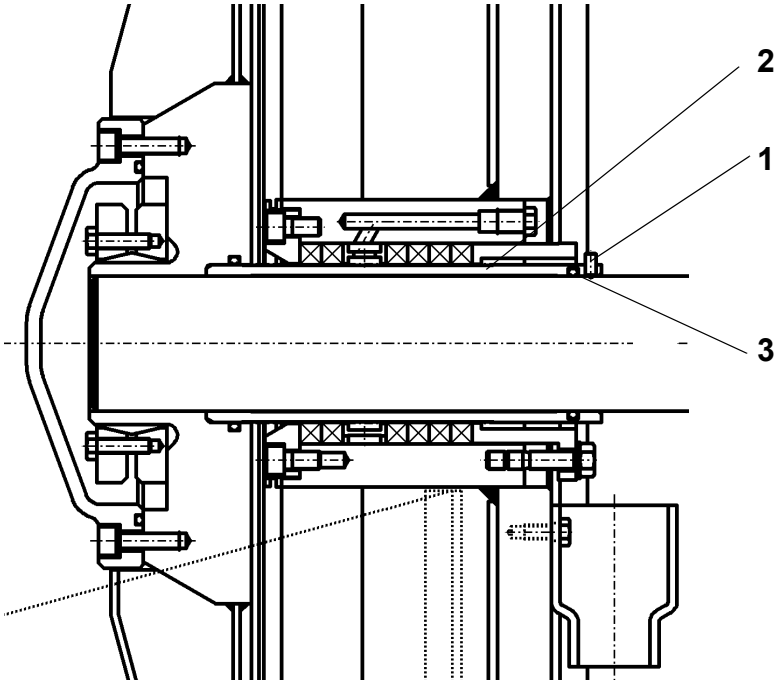
- The stuffing box should be checked at short intervals during the first few hours in operation.
- Set the stuffing box such that the shaft at the stuffing box gland is always moist.
- Loosen the screw fitting at the stuffing box gland if the stuffing box overheats.

8.10 Changing the shaft protection sleeve

Removing the shaft protection sleeve

Step	Procedure
1	Clean the machine (see Section 8.3).
2	Shut down all drives at all poles and secure against accidental start.
3	Dismount the stuffing box packing (see Section 8.9).
4	Dismantle the rotor (see section 8.7).
5	Remove the set screws (**1**) and pull the shaft protection sleeve (**2**) with the O-ring (**3**) forwards off the shaft.

Tab. 8-13 Removing the shaft protection sleeve



Tab. 8-14 Removing the shaft protection sleeve

Mounting the shaft protection sleeve

The shaft protection sleeve is installed in reverse order to the above. Replace the O-ring (**3**) if necessary when changing the shaft protection sleeve.

Secure the set screw (**1**) with LOCTITE 243.

8.11 Changing the bearings

Preparations for dismounting the bearing

When dismounting the bearing, proceed according to the following table:

Step	Procedure
1	Clean the machine (see Section 8.3).
2	Shut down all drives at all poles and secure against accidental start.
3	Dismantle the rotor (see section 8.7).
4	Dismount the stuffing box packing (see Section 8.9).
5	Remove the shaft protection sleeve (see Section8.10).
6	Remove belt and belt pulley.

Tab. 8-15 Removal of bearing

Removal of bearing

When dismounting the bearing, proceed according to the following table:

Step	Procedure
1	Attach the bearing housing complete with rotor shaft to a crane.
2	Undo bolts (**1**) and detach the bearing housing from the rotor casing. Place the bearing housing on a suitable base.
3	Turn the set screws (**2**) and bolts (**3**) out and remove the laby-rinth rings (**4**).
4	Remove the locating rings (**5**).
5	Remove shaft nut (**6**) and lock washer (**7**).
6	Pull the shaft to the left out of the housing.
7	Remove spherical roller bearing (**8**) from the shaft according to the manufacturer's instructions. (➡ /ANNEX/Maintenance, installation and removal of anti-friction bearings)
8	Remove spherical roller bearing (**9**) from the housing according to the manufacturer's instructions. (➡ /ANNEX/Maintenance, installation and removal of anti-friction bearings)

Tab. 8-16 Removal of bearing

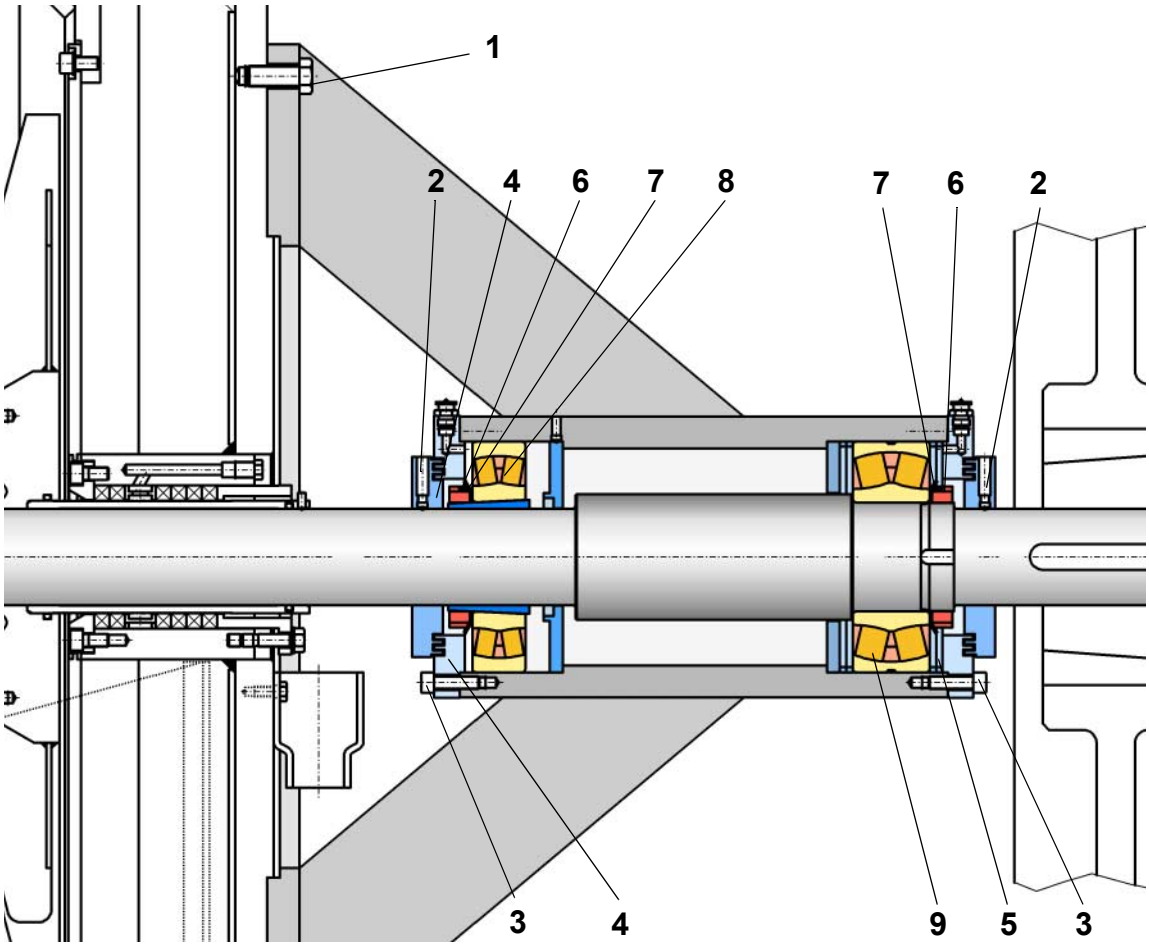


Fig. 8-4 Removal of bearing

Installation of bearing

The anti-friction bearings are installed in reverse order to the above. When the anti-friction bearings are changed, the two mechanical seals (**7** and **8**) have to be replaced.

8.12 Changing the V-belts

Change the V-belts according to the following table:

Step	Procedure
1	Shut down drive at all poles and secure against accidental start.
2	Remove the safety cover (**1**).
3	Relieve tension on the V-belts by means of the tensioning device (**2**) at the motor.
4	Remove the V-belts from the pulleys.
5	Mount the new V-belts.
6	Tension the V-belts with the tensioning device (**2**). Both V-belt pulleys must be aligned to one another.
7	Rotate the drive completely several times to distribute the tension evenly.
8	Check the V-belt tension once again.
9	Mount safety cover (**1**).

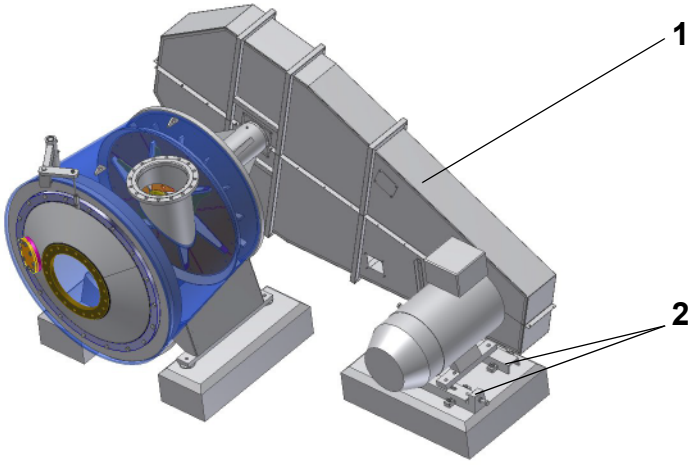


Fig. 8-5 Changing the V-belts

Detailed instructions for changing the V-belts and checking the V-belt tension are provided in the enclosed GATES manual.

See ➡ /SUPPLIER DOCUMENTATION/GATES

9 SUPPLIER DOCUMENTATION

9.1 116 30 - Rotor

9.1.1 Shrink disc

Name of company RINGFEDER

Technical data Type . . . . . 90 RFN 4071

9.2 116 50 - Drive

9.2.1 V-belt drive

Name of company GATES

Technical data Type . . . . . TAPER-LOCK Taper sleeves