Installation and maintenance instructions

Trough-type screw conveyor,

vanBeek

The standard in screw conveyors

November 2, 2010

Installation and maintenance instructions

For questions, problems, malfunctions, contact:

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Referring to the following data:

Type:
Series number: 600617.A
Year built: 2010

This documentation is only valid for the machine with which this documentation is enclosed.

This documentation is a translation of the original Dutch Installation and maintenance instructions.

Contents

Chapter

1

Introduction

This manual goes with a **van Beek B.V.** Trough-type screw conveyor, type .

On delivery check the conveyor system for damage that may have occurred during shipment and storage. See whether any parts are missing. If any shortcomings are found contact **van Beek B.V.** immediately.

With regard to safety, the whole manual should be read before installing the machine and putting it into operation.

We want you to take particular note of the chapter on safety, which deals with the safety measures involved but also with the dangers that could not be avoided during design and manufacture.

In other places in this manual, dangerous situations are pointed out. These warnings are shown as below.

Warning

Warning Warning Warning Warning Warning Warning Warning Warning Warning Warning

Other important comments are shown in the following way.

Comment

Comment Comment Comment Comment Comment Comment Comment Comment Comment Comment

Finally, maintenance guidelines are shown in a unique way, as follows.

Maintenance

Maintenance guideline Maintenance guideline Maintenance guideline Maintenance guideline Maintenance guideline Maintenance guideline

The reliability and life of the conveyor system delivered to you depends in large part on your maintenance. The maintenance that you have to do is described in Chapter 5. We want to point out, however, that it is possible to conclude a maintenance contract. A maintenance contract means that we take care of the installation and maintenance work, at a reduced rate. This assures you of fast and expert assembly and optimum maintenance. We are timely in initiating maintenance rounds.

Chapter

2

General

2.1 Description of the installation

The Trough-type screw conveyor is used to efficiently move bulk materials such as granulates, powders and pastas. Bulk materials can be moved up with a Trough-type screw conveyor at an angle of up to 35 degrees. By changing the shape of the trough and lid, however, this angle can be increased to 90 degrees. The Trough-type screw conveyor can (if necessary) be provided with a lid that allows quick and efficient cleaning of the screw. The bulk materials can be fed in manually or using another transport medium, depending of the particular version. Figure 2.1 shows a standard Trough-type screw conveyor. Depending on your specifications, your own screw conveyor may involve small differences.

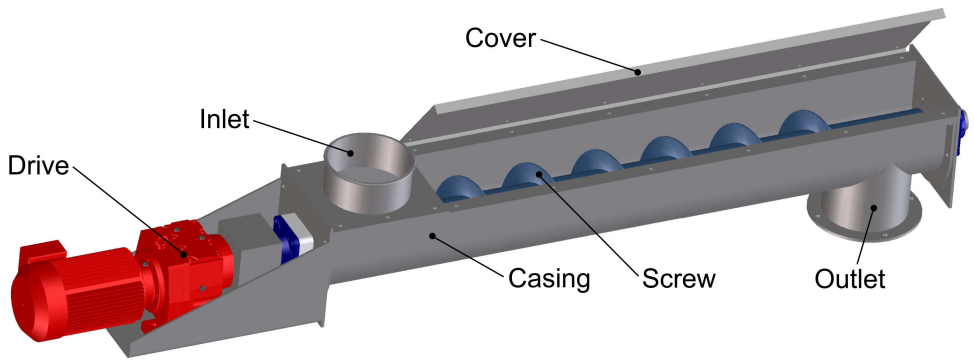


Figure 2.1: *Standard version of a Trough-type screw conveyor.*

2.2 Brief elaboration on various parts of the Trough-type screw conveyor

2.2.1 Dosage unit

A Trough-type screw conveyor can be equipped with a dosage unit (see figure 2.2). A weighing unit weighs the mass of a product that drops out of the Trough-type screw conveyor into, for instance, a bag. The moment that the set mass is reached, the screw stops turning and the outlet is closed to prevent excess material falling out. Closing the outlet takes place by way of a rubber stop mounted in a pneumatic cylinder.

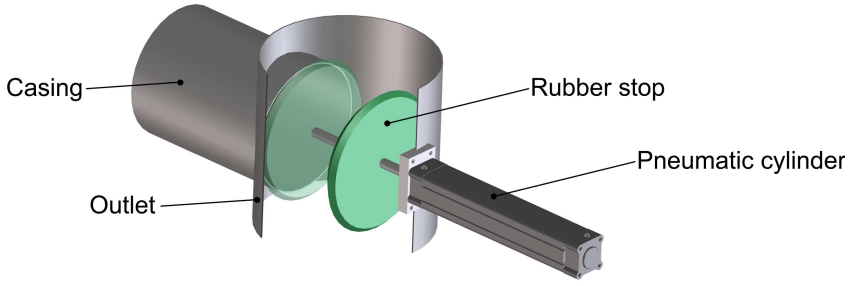


Figure 2.2: *Dosage screw version of a tubular conveyor.*

2.3 The signs and symbols explained

2.3.1 Type plate

The Trough-type screw conveyor is provided with a type plate, as shown below:

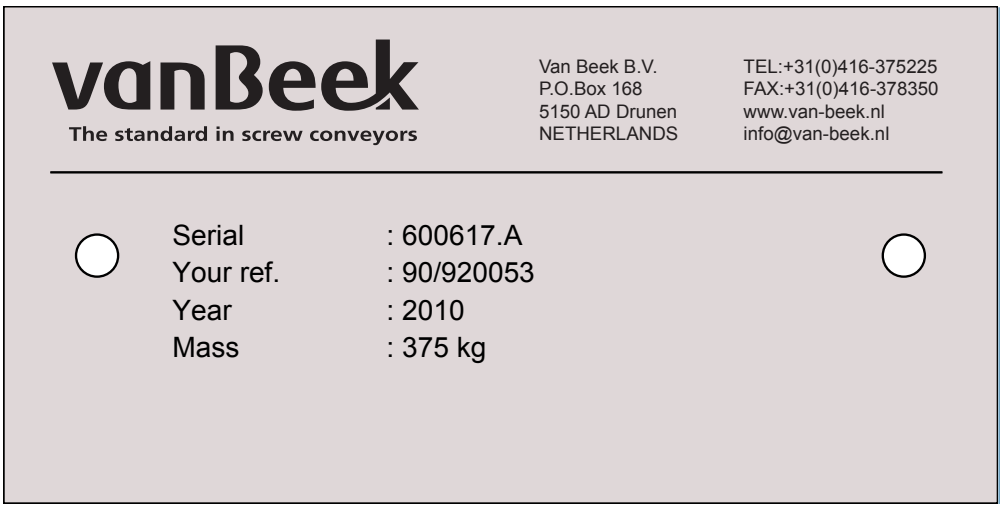
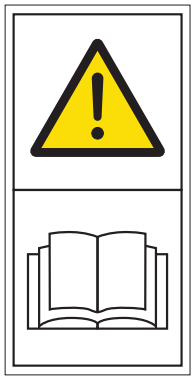


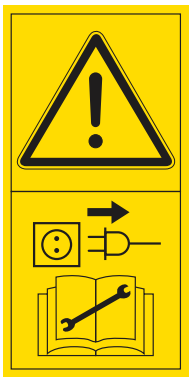
Figure 2.3: *Type plate*

Markings		Explanation
van Beek B.V.	:	the manufacturer
Address	:	the manufacturer's address
Tel.	:	telephone number of the manufacturer
Fax.	:	fax number of the manufacturer
www.van-beek.nl	:	Internet site of the manufacturer
info@van-beek.nl	:	e-mail address of the manufacturer
Year	:	year the machine was built
Serial	:	series number of the machine
Type	:	type of machine
Your Ref.	:	your reference number
Mass (kg)	:	The tare mass of the machine in kilogram

2.3.2 Explanation of the stickers

Different stickers are applied to the Trough-type screw conveyor, to point to safety, required maintenance, installation regulations and guarantee provisions. The stickers shown in table 2.1 can be present on the Trough-type screw conveyor.

sticker	explanation
	Direction of rotation of the screw
	Danger from clamping
	Interference prohibited
	Read the manual before use

sticker	explanation
	Danger from moving parts, **follow the recommendations!**
	Danger from clamping
	Danger! First switch off power
	You must earth the system at these points

sticker	explanation
	Maintenance instruction
	Installation instruction
	Maintenance instruction
	Only lift at these points
	Danger! The system may be live

Table 2.1: Explanation of the stickers that you can find on the Trough-type screw conveyor.

2.4 Use in accordance with the instructions

The Trough-type screw conveyor of **van Beek B.V.** is intended only for transporting, mixing, dosing, cooling, heating, inputting and outputting of bulk goods such as chemicals, food, construction materials or pulp.

The Trough-type screw conveyor of **van Beek B.V.** is supplied with electrical components that are connected to the terminal boxes. The responsibility for integration of continuous conveyors in a complete installation and the implementation of the control lies with the customer and/or user.

Warning

The use of spontaneously combusting materials is prohibited and not in accordance with the instructions.

The Trough-type screw conveyor may only be used with the accessories provided and released for this by **van Beek B.V.**.

For damage arising from the failure to comply with these safety instructions only the user of the Trough-type screw conveyor is liable. This also applies for unauthorised modifications to the Trough-type screw conveyor .

Use in accordance with the instructions also includes following the instructions relating to safety, use and maintenance/repair which are described in these instructions for use and in the supplier documentation.

Warning

A Trough-type screw conveyor , unless expressly agreed otherwise in writing, has **not** been made or developed to process risk-bearing materials or function in hazardous environments.

'Risk-bearers' are materials that are explosive, flammable, toxic or otherwise dangerous for personnel and environment if they are not completely enclosed by the housing of the screw conveyor. For the conveyance of these materials, specific conveyors can be developed. In the event of uncertainty in this area, contact **van Beek B.V.**.

Any other use than that for which the Trough-type screw conveyor is intended can result in danger for the operator or persons located in the vicinity of the installation.

If the machine is used in the food industry, we point out observe the current hygiene regulations. From the technical specifications we prescribe no cleaning directions because these depend on the use of the system by the customer.

Chapter

3

Safety

It is the responsibility of the employer and/or the user to install, maintain and operate the screw conveyor in such a way that the applicable regulations are fully met (among others, from the Labour Inspectorate).

Warning

Before putting the system into operation, in any case, read all of this chapter.

3.1 Safety functions

A Trough-type screw conveyor has a number of safety functions for preventing bodily injury or damage to the machine.

- The Trough-type screw conveyor is equipped with a temperature sensor in the seals. This sensor signals when the temperature in the seal reaches the threshold of 80ºC. The system should turn off on this signal.
- Failure of the screw is monitored by means of a revolutions monitor. At the moment that a failure in the screw occurs the speed at the end of the conveyor screw changes. Upon an observed change in revolutions there is an alert or the machine is switched off.

Comment

Check regularly whether the different safety functions are still in good working order.

Warning

The safety functions are there for the safety of the operator and may thus never be removed or bypassed!
If this happens anyway all claims on any guarantee become null and void.

3.2 General warnings

The Trough-type screw conveyor is provided with a number of safety features, such as for example, switches and/or protective parts. Despite these features, the following regulations should be kept in mind.

- If the screw conveyor has to be opened for inspection, cleaning, maintenance or sample taking, the main switch should be switched off and locked in such a way that the machine cannot be put into operation without the assent of the mechanic.
- Never remove protective parts while the Trough-type screw conveyor is in operation.
- If a Trough-type screw conveyor is in operation one may never be on the machine.
- Never walk under the run-out.
- Never push or prod through openings and the entry and run-out.
- Stay away from the vicinity of the screw and other moving parts.
- Do not leave any tools on or in the machine. These can cause lasting damage to the machine on start-up, or create danger for persons who are in the vicinity of the machine.

Warning

The regulations above are for the personal safety of the user(s) and should therefore be observed AT ALL TIMES.
If these regulations or not met all claims on any guarantee become null and void.

3.2.1 General comments

- Never overload the Trough-type screw conveyor and do not use it for any other medium or product than what the system was designed for.
- Be timely in doing maintenance and check the safety-enhancing functions to see if they are operating well.
- Adjustments made to the machine by the user (as to function, operation or principle) are not the responsibility of **van Beek B.V.** and are the full responsibility of those who made these changes.
- Other regulations in the area of labour conditions and safety on the workfloor must be observed in use of this machine.
- Do not apply high-pressure cleaning directly to electrical components.

Chapter

4

Check before putting into operation

Before the Trough-type screw conveyor is put into operation for the first time the following points should be checked.

4.1 Temperature sensor at the seals

Because the system has to be able to operate in an explosion-prone environment, it has temperature sensors in the mounted seals. The sensor has to be connected to the controls. The machine has to be automatically turned off when the temperature threshold is reached. (this is also applicable for machines directly connected in front and behind the system)

Maximum temperature measured in the seals: $80°C$

Warning

When the machine is turned of by the temperature sensor the cause of the temperature rise has to be removed before the system can be started again.

Comment

Employ a certified electrician to install the temperature sensor .

4.2 Assembly instructions

Assembly normally does not present any problems, provided the following instructions are followed.

- The bolts in flanged connections must be mounted and tightened diagonally.
- Check to make sure that the voltage and circuit indicated on the motor type plate conform with the situation on the spot. Also consult the diagram in the

clamping box of the motor.

Comment

Let a qualified electrician connect the motor.

- Put air into all forced air seals. Install 0.2-0.3 bar air.

4.2.1 Assembly instructions motor

- Check to make sure that cooling air can flow in unhindered and air discharge is secure.

To connect the motor, we refer you to the supplied manual of the manufacturer of the motor (this can differ depending on the conveyor in question). See appendix.

4.3 Alignment of the screw

Upon the screw becomes misaligned, a friction surface can be created between the screw and the housing. The consequence is excessive wear, noise, metal particles in the product and the chance of an explosion.

Warning

Checking the alignment must be done while the Trough-type screw conveyor does not contain any product.

Check the alignment of the screw before the Trough-type screw conveyor is put into use. Switch on the power **very briefly**. Due to this the screw will make only one or a few revolutions. If the screw produces a scraping sound, the screw is not running true.

A screw running out of true should sometimes be realigned. Do not use such a screw. Running out of true is frequently the consequence of shocks and impacts during shipment and/or faulty assembly.

Comment

In this case contact **van Beek B.V.**.

4.4 Direction of screw conveyor's rotation

A screw conveyor system can seize up if the direction of the screw's rotation is incorrect. This is caused by the motor being connected incorrectly.

Comment

Check the screw's direction of rotation.

In the order to check that the direction of the screw's rotation is correct, you must verify this direction by looking at the arrow on the drive side of the machine.

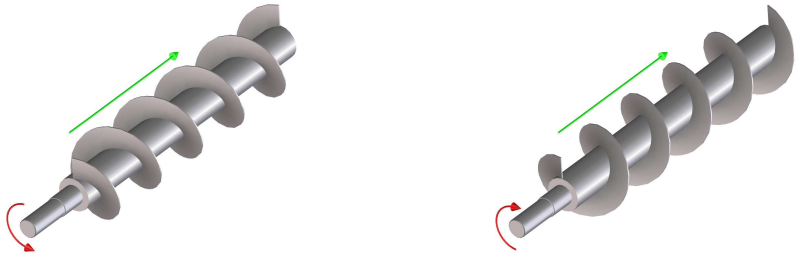


Figure 4.1: *Direction of the conveyor screw's rotation, for a right-hand screw (a) and a left-hand screw (b)*

If you find that the direction of the screw's rotation is incorrect, you need to take the following steps:

- Stop the motor.
- Cut off the power for the Trough-type screw conveyor (pull out the plug).
- Check the axle seals for damage.
- Check the screw leaves for damage.

If there is damage, contact **van Beek B.V.**.

If you can't find any damage, the direction of the screw's rotation must be changed. This will be dealt with later.

4.4.1 Changing direction of rotation

If a wrong direction of rotation is found, it should be changed.

This can be done, for example, by:

- changing the phasing on the terminal board of the electric motor.
- changing the phasing in the plug.

Warning

Have the direction of rotation changed by an authorised person in accordance with the installation instructions

4.5 Bleeding (venting) the reduction box

To prevent oil leaks during transportation and storage, the bleeding option of a motor reducer is sealed. The seal has to be removed before the machine is put into operation.

With some brands, you have to replace a closed screw with a (separately supplied) bleeding plug. Other brands come with a reducer that is protected by a synthetic plug, which must removed the moment the reducer is put into operation.

Comment

Check to make sure the vent has been mounted in the correct spot. The vent must be mounted in the highest spot on the reducer.

4.6 Oil level of reduction gearbox

It is necessary before putting the Trough-type screw conveyor into operation to check the oil level of the reduction gearbox. This control may only be carried out when the screw conveyor is assembled in its definitive set-up. For further instruction about the oil levels, see section 5.5.

4.7 Lubrication

Check the bearings, the seals and the transmission of the motor of the screw for the requisite lubricants (for lubricating directions, see Chapter 5).

Chapter

5

Maintenance and storage

This chapter describes how the machine should be maintained. All components in the machine that require maintenance will be described here. In addition, there will be a number of general maintenance instructions.

Warning

All maintenance work should be done by professional personnel.

Warning

Maintenance and assembly work done on a machine in operation can result in serious accidents. To prevent this, the power to the machine should be switched off. The machine may not be put into operation without the assent of those who are doing the maintenance work

Maintenance

In this section maintenance work is indicated for each component of the machine. For a complete overview of all maintenance work on this machine see Annex A

The reliability and length of life of the conveyor system delivered to you depends in large part on the maintenance work to be done by you. We want to point out, however, that there is a possibility to conclude a service contract. This assures you of fast and expert maintenance at minimal costs and, with that, you avoid unexpected idleness through overdue maintenance (see page 2).

5.1 General

The Trough-type screw conveyor should be stored at temperatures above freezing point to prevent the pneumatic components freezing up.

If the machine is stored away for a longer period, it has to be cleaned. Thereafter, all lubrication points must be provided with new lubricants. Upon storage the machine must be dry and stay dry.

> Comment
>
> The lubrication advice in this manual is for normal use in a clean environment. if a specific lubrication advice is needed, contact **van Beek B.V.**for a specific advice for your situation.

Periodic inspection of a screw conveyor is recommended to be assured of continuous use. Check regularly for unusual wear, excessive sound production, shortcomings or incorrectly mounted parts.

A screw conveyor is always subject to vibrations. This vibration can result in bolt fastenings becoming loose.

> Maintenance
>
> Every month / 500 h:
> Check all bolt fastenings.

If damage or loosened parts are found, this should be reported and/or repaired immediately. Missing assembly parts, such as shaft bolts and nuts, should be replaced immediately.

5.2 Air purge

5.2.1 Description

The plastic (HMPE) housing is provided with a radial groove and radially drilled holes, this to achieve a small overpressure by means of air or an inert gas introduced from outside (about 0.02 - 0.03 MPa).

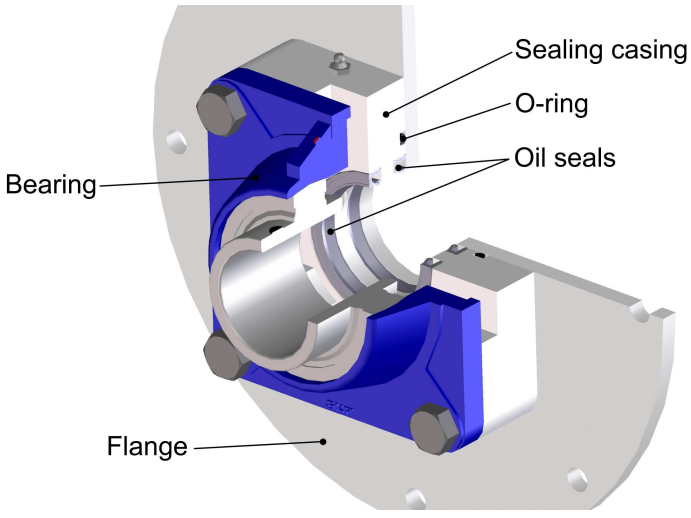


Figure 5.1: *Reversed air seal*

If materials such as dust, powders or granules want to escape along the shaft end of the screw, they are held back by this light overpressure (in an explosion-risk area, nitrogen can also be worked with).

5.2.2 Maintenance

The air purge is characterised by low maintenance. In an operating conveyor, it is essential that an overpressure always prevails in the chamber between the two oil seals.

Comment

The recommended overpressure is 0.02 MPa.

The barriers will be subject to limited wear.

Maintenance

Every 6 months / 4000 h:
As preventive maintenance, replace the oil seals for the air purge.

Replacement of the oil seals

1. Remove the bearing and possibly the drive of the shaft.
2. Take the air purge off the shaft.
3. Remove the oil seals by carefully unseating them from the plastic (HMPE) housing with the aid of a screwdriver. Take care here that the plastic housing is not damaged.
4. Place the new oil seals by carefully tapping them into the housing with a hammer. Take care not to place the oil seal crookedly in the housing. Ensure that the oil seals are positioned in the right way. The two oil seals should be placed with the 'open' side towards the product side (see figure 5.1).
5. Place the air purge over the shaft.
6. Reposition the bearing and fasten both the bearing and the air purge using the fastening bolts.

After removal of the seal, it can be necessary to align the screw with respect to the housing. This is described in section 5.6.

Warning

Never put the conveyor into operation without overpressure on the air purge.

If this happens anyway, irreparable damage will be done to the oil seal within a few minutes. The seal will have to be replaced. In such a case, contact **van Beek B.V.**.

If a seal begins to 'whistle' despite the correct overpressure, you can assume that one or both barriers are in need of replacement.

5.3 Multi seal with barriers

5.3.1 Description

The plastic multi seal(HMPE) housing is provided with two barriers.

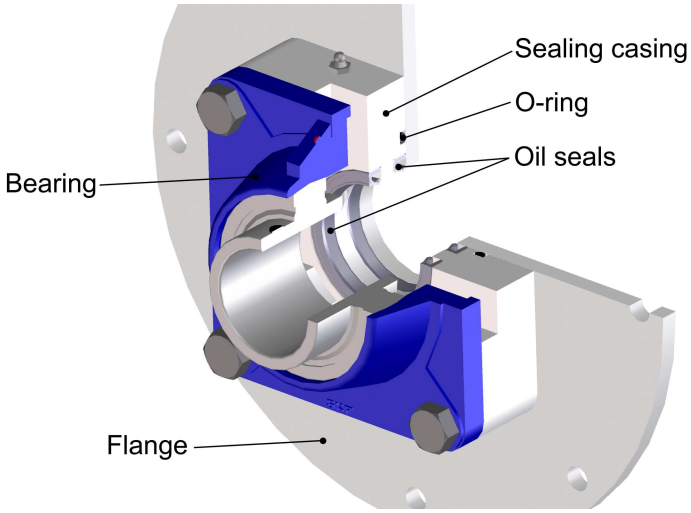


Figure 5.2: *Multi seal*

5.3.2 Maintenance

The multi seal is characterised by low maintenance.

The barriers will be subject to limited wear.

Maintenance

Every 6 months / 4000 h:
As preventive maintenance, replace the seals.

Replacement of the barrier seals

1. Remove the bearing and possibly the drive of the shaft.
2. Take the seal off the shaft.
3. Remove the oil seals by carefully unseating them from the plastic (HMPE) housing with the aid of a screwdriver. Take care here that the plastic housing is not damaged.
4. Place the new oil seals by carefully tapping them into the housing with a hammer. Take care not to place the oil seal crookedly in the housing. Ensure that the oil seals are positioned in the right way. The two oil seals should be placed with the 'open' side towards the product side (see figure 5.2).

5. Place the seal over the shaft.
6. Reposition the bearing and fasten both the bearing and the seal using the fastening bolts.

After removal of the seal, it can be necessary to align the screw with respect to the housing. This is described in section 5.6.

5.4 Flanged bearing

5.4.1 Description

A flanged bearing is a rotating bearing that has been placed in a flanged casing. The bearing has been secured on the axle by way of two locking screws.

> Comment
>
> Remove the locking screws before the flanged bearing is taken off the axle.

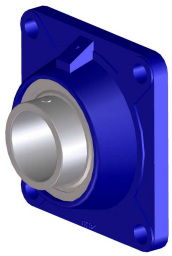


Figure 5.3: *Flanged bearing*

5.4.2 Maintenance

The flanged bearings are supplied filled with an anti-rust lithium soap grease. To grease them again at a later stage, the new grease has to be able to be mixed with the original grease, this means that a lithium-based soap grease has to be used. The grease nipple of the bearing casing has to be thoroughly cleaned before the grease is applied. This has to be done slowly, while the bearing is rotating. Keep inserting the grease until clean grease comes out of the bearing. Do not use excessive pressure, because you could damage the bearing seals.

> Comment
>
> FDA regulations have to be observed in the food industry. This means that only food-approved grease may be used.

Greasing intervals vary greatly depending on the operational conditions. So it is difficult to prescribe general rules in this area. Your own experiences in your own company are usually the best criterion. Because the Trough-type screw conveyor is often used in dusty environments, we prefer to observe the rule:

Maintenance

Every month / 500 h:
Greasing the flanged bearing.

If the flanged bearings operate in wet conditions or are regularly rinsed or hosed down, grease at least once every two weeks.

If the Trough-type screw conveyor is used only during a certain season, we recommend that the flanged bearing be cleaned and greased again at the end of the period of its operation. So this should be done before the Trough-type screw conveyor is shut down. At the start of a new season, the bearings should be given new grease.

5.5 Motor reductor

The reduction gearbox is delivered by the supplier full of oil. The standard filling is Shell Omala 150 for an ambient temperature of -10 to +40 degrees Celsius.

Involved here is a mineral oil which is provided, among other things, with E.P. dopes. Under normal conditions the oil bath temperature will lie between 60 to 80 degrees Celsius. Under these conditions the life of the oil is set at 10,000 operating hours, with a maximum of approx. 3 years.

Maintenance

Every month / 500 h:
The temperature and the oil level of the motor reductor should be checked. The motor reductor should then also be checked for the free intake and exhaust of cool air, and for leaks.

To check the oil level the level screw should be removed.

Ball bearings have lubrication that lasts for the life of the product. The fat filling is sufficient for approx. 10,000 operating hours, depending on the building size, the company conditions and the number of revolutions.The bearings are filled with a lithium ball-bearing fat (Shell Alvania 3) For further documentation, see Appendix .

5.6 Alignment of the screw

The alignment of the screw with respect to the housing can go out of line because of the vibrations of the system or as a result of maintenance work. A wrong alignment leads to excessive wear, noise, metal particles in the product and the chance of an explosion (depending on the surroundings).

The position of the screw with respect to the housing is determined by the position of the bearings with respect to the housing. The screw can be helped from running out of true by changing the position of the bearings (a little).

5.6.1 Changing the position of the y-bearing with flanged casing

Normal rubbing (with the screw running just out of true) can sometimes be dealt with by loosening the fastening bolts of the bearing blocks a little and shift the screw inside the mantle a little, using a rubber hammer, until it no longer touches the walls. It is also possible to move the whole flanged plate and bearing a little. When you screw down the bolts again, they need to be tightened diagonally.
If this action does not help after rebalancing the screw or after a few hours of operation, contact **van Beek B.V.**.

Comment

An overview of all maintenance guidelines that come in for attention in this chapter is to be found in the Appendix 'Maintenance overview'.

Comment

Any maintenance guidelines for other machine parts that are not treated in this manual (but are nevertheless incorporated into the system) will be found in the related appendix/appendices.

Appendix

A

Maintenance overview

Maintenance frequency	Action
Every 8 hours	◇ Carry out a visual inspection for leaks, kinks, abrasion points, deformation or other damage and if necessary have the parts in question replaced immediately.
Daily	◇ Check all flange connections for tightness. If necessary tighten the screws or seal the flange connections if material is released at the flange connections. ◇ Check the screw conveyor for external leaks. If necessary switch off the screw conveyor and have the leaks rectified immediately. ◇ Check the screw conveyor for damage. If necessary switch off the screw conveyor and repair the damage or contact **van Beek B.V.** customer service ◇ Check the screw conveyor for abnormal running noises. If abnormal running noises occur contact **van Beek B.V.** customer service ◇ Check the screw conveyor for fouling. Clear up fouling.

	◇ Check the metering equipment of the screw conveyor for proper operations. In case of faulty metering equipment contact **van Beek B.V.** customer service.
	◇ Check bearings for flexible running. Lubricate the bearings if necessary.
Every 2 weeks / 300 h	◇ Carry out a visual inspection of the bearings and seals of the screw conveyor. In case of visible wear and tear on bearings and seals contact **van Beek B.V.** customer service
Every month / 500 h	◇ Greasing the flanged bearing.
	◇ Check all bolt fastenings.
	◇ The temperature and the oil level of the motor reductor should be checked. The motor reductor should then also be checked for the free intake and exhaust of cool air, and for leaks.
	◇ Check the reductor oil. Replace the reductor oil if it is fouled. Take into account the information in the reductor manufacturer's instructions for use!
Every 3 months / 2000 h	◇ Check the tightening torque of the fixing screws. Retighten loose or loosened fixing screws. Take into account the tightening torques!

◇ Cleaning of the screw conveyor. Clean the outside of the screw conveyor.

Warning

Cleaning products should not be allowed to get inside the installation!Tape up or cover all openings before cleaning the machine with water, steam (high pressure cleaner) or other cleaning products into which for safety or functional considerations no water/ steam/ cleaning product may penetrate. Take particular care with electric motors, switch and terminal boxes. Ensure that after cleaning the covers are completely removed.

Every 6 months / 4000 h

◇ Check the wear plate for wear. If the wear plate is worn contact customer service

◇ As preventive maintenance, replace the oil seals for the air purge.

◇ Check the oil level in the reductor. If the oil level is too low top up.Take into account the information in the reductor manufacturer's instructions for use!

◇ Check the fixings of the reductor. Retighten loose or loosened screws.Take into account the tightening torques!

Every year /8000 h

◇ Replace the reductor oil.

Appendix

B

600617.A - Declaration of incorporation

vanBeek
De norm in schroeftransport

Declaration of incorporation

(Directive 2006/42/EC, art. 13 sub 1c and Annex II B
for partially completed machinery)

Manufacturer,

Van Beek B.V.
Lipsstraat 42
5151 RP Drunen
The Netherlands

Declares that the machine specified by:

Doseerder type 250/100 RVS 304
Serial: 600617.A

Is a partly completed machine, in accordance with Article 1.g of Directive 2006/42/EC (her on after named: directive) and complies with the Essential Health and Safety Requirements in accordance with Annex I of the directive, provided that the machine is incorporated as specified in the appended assembly instructions (in accordance with annex VI of the directive).

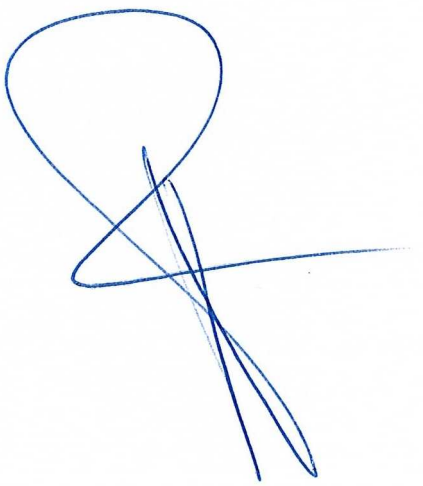
It is prohibited to utilize the partly completed machine as long as the machine in which the partly completed machine has been incorporated has been declared to comply with the directive.

The requirements specified in the directive are fulfilled in accordance with the following standards:

EN 12100-1
EN 12100-2

A technical file of the specified machine has been compiled in accordance with annex VII part B of the directive. This file will be transmitted to the national authorities in response to a reasoned request referring to the serial number. The file will be supplied in digital form.

As stated on: : 02-11-2010, Drunen
Quality control : P.P. Rutten



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