Preventing air leaks and air vortices in your screw conveyor

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THE STANDARD IN SCREW CONVEYING

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SUMMARY

Worn air seals cause air consumption, vortices and hence dust generation. Our air seals seal the shaft of the screw conveyor using oil seals and slight positive pressure. In this way the shaft can rotate and the product remains where it should be: in the screw conveyor

Generally the advice is to inspect the oil seals every 6 months or 4000 operating hours and if necessary to replace them. This interval is shorter the higher the speed, when processing abrasive and/or fine-grained product and when the screw conveyor is at a steeper angle. It may be worth replacing the oil seals just in time.

New air seals do not leak any air. After the running-in period air consumption varies from 20 to 25 litres per minute. If the oil ring wears further, there is constant air consumption. This is an indication that the air seal will soon fail. Replace the air seal then or contact us as soon as possible via info@van-beek.nl or call +31 (0)416 37 52 25 to replace it.

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THE NEED FOR AIR TIGHT OIL SEALS

Air leaks in screw conveyors may lead to unwanted vortices and hence dust generation. These leaks can also cost a lot of money in industrial process installations because all the leaks added together mean higher energy costs and extra maintenance on the compressed air installation. In this white paper you will learn how our air seals work, how you can identify leaks in good time and how you can avoid unnecessary expense.

OPERATION AND NEED

OPERATION AND NEED FOR AIR SEALS

Our air seals seal the shaft of the screw conveyor using oil seals and positive pressure. In this way the shaft can rotate without any product leaking. An air seal consists of two oil seals, the seal housing and an air connection. The air seal therefore keeps the air in the screw conveyor. In exceptional cases the screw conveyor is filled with a different gas, for example nitrogen. Because this rarely happens, for convenience we talk in this white paper about 'air'.

We mount the seal housing against the end plate of the screw conveyor, see Figure 1. We mount both oil seals (1) with the sealing lips on the same side in the seal housing (2). This means in this illustration that the air can only flow to the left, in the direction of the screw conveyor, and not to the right. An O-ring (5) ensures a tight seal with the end plate.

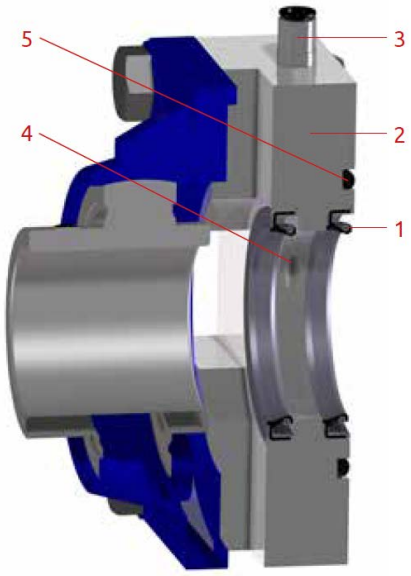

Figure 1

A compressor supplies air via connection (3). Through hole (4) a positive pressure is then created in the chamber between the oil seals. The right seal ring is pushed by the positive pressure onto the shaft. The air can therefore only flow out through the left seal ring. The air therefore automatically blows back all the product that threatens to accumulate by the shaft. We advise a positive pressure of 0.02 MPa (=0.2 bar) between the oil seals. This is in most cases enough to keep the product within the screw conveyor. With a higher positive pressure you lose more air and the oil seals wear faster.

REPLACEMENT

WHEN TO REPLACE THE AIR SEALS

Generally the advice is to inspect the oil seals, depending on the application, every 6 months or 4000 operating hours and to replace them if necessary. This keeps leakage to a minimum and prevents dust generation but the required interval may vary significantly due to many factors.

THE EFFECTS OF SPEED, APPLICATION AND ANGLE

The speed of our screw conveyors varies roughly between 1 and 200 revolutions per minute. Of course an air seal will wear faster at a speed of 200 than at a speed of 1. The product to be transported is another factor affecting wear.An abrasive or very fine-grained product will attack the oil seals faster than a neutral product. The air seal is also under a greater load the faster the product flows.

The diameter of the screw conveyor also plays a part. With a bigger diameter more product will put a load on the air seal than for a smaller diameter. In addition the angle of the conveyor will have an effect. The more vertical it is, the more the product will put a load on the bottom air seal.

THE ADVANTAGE OF JUST IN TIME REPLACEMENT

All these factors may therefore mean that the oil seals are still in excellent condition after 6 months or that they should have been changed sooner. It may be worth replacing the oil seals just in time.

You do not need to replace the oil seals yet if the required or a slightly fluctuating pressure is present. In case of a constant pressure that is lower than required, your oil seals will need replacing. Replace them or contact us as soon as possible to have them replaced.

THREE DEGREES IN AIR CONSUMPTION

As regards the wear of the air seals we distinguish between three degrees of air consumption.

First degree

Immediately after fitting our air seals are airtight. There is then no air consumption.

Second degree

The oil seal of the screw conveyor will wear due to use. After the running-in period the second degree occurs: a fluctuating air consumption. This is because the shaft to which the oil seals are connected will always show minimal sway. This is completely normal. In the beginning the oil seals in the air seal still absorb the radial sway, but after some wear at a certain point of every revolution a gap will occur between the oil seal and the shaft. Upon each revolution a little air will then leak here. Logically the fluctuation coincides with the speed. As time passes the air consumption of our air seals remains at a consumption of some 20 to 25 litres per minute.

Third degree

The third degree in air consumption is a constant air consumption. This may mean that the oil seal is worn so much that it no longer blocks any air. The radial play in the shaft then plays no further part here and the consumption therefore then no longer fluctuates. It is an important indication that the air seal will soon fail.

HOW TO IDENTIFY THE THREE DEGREES WITH A PRESSURE GAUGE

With a pressure gauge you can easily check the condition of your air seal. Every air seal has its own pressure regulator that brings the compressor pressure back to the pressure required for the air seal. You position the pressure gauge after this reducing valve to read off the pressure in the line to the air seal.

- When the pressure gauge shows the value of the reducing valve while the screw is rotating (we advise a positive pressure of 0.02 MPa/0.2 bar) and the value does not fluctuate, the air seal is not consuming any air. It is therefore still in very good condition.
- A fluctuating value that always returns to the required pressure means a fluctuating consumption. This means that the air seal is showing signs of wear but is not yet ready for replacement.
- When the value does not correspond with the value of the pressure regulator and does not fluctuate this means that the air seal is constantly consuming air. This may be an indication that the air seal will not last much longer. Replace the oil seal or contact us via **info@vanbeek.nl** or call **+31 (0)416 37 52 25** to replace the oil seals.
- The air consumption can of course also be measured directly for each shaft seal with a suitable flowmeter.

CONCLUSION

Replace air seals in good time to avoid unnecessary costs. We generally advise replacing the oil seals every 6 months or after 4000 operating hours. Speed, product (abrasive/ neutral, granular, flow rate etc.), diameter and angle of the screw conveyor may mean a longer or shorter maintenance interval. It may be worth replacing the oil seals just in time.

You can measure whether the oil seal is due for replacement with a pressure gauge or flowmeter. A fluctuating air consumption that always returns to the required value is acceptable. If the value measured does not correspond with the value of the pressure regulator and does not fluctuate, the oil seals need urgent replacement. Replace the oil seals or contact us as soon as possible to have them replaced.

Every two months we will send you a newsletter with our latest innovations, projects and useful tips. **Register for our newsletter via our website www.vanbeek.nl**

Van Beek would be pleased to improve your production process with innovative solutions. Contact us to explore the options.

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