Test set-up measures pressure surge resistance of sleeves

Fig. 1: the test set-up measures the pressure surge resistance of a Filcoflex sleeve

Fig. 2: a compressed air tank supplies the pressure surge for the test set-up

Navobi has tested the pressure surge resistance of several dedicated Filcoflex sleeves using an in-house built test set-up. The results were positive. Navobi is going to use the sleeves in their production process and Filcoflex has taken over the test set-up built by Navobi.

Navobi BV in Ermelo (the Netherlands) is part of the VanDrie Group and manufacturer of calf milk powder. Thanks to the milk powder's composition, calves get everything they need in terms of energy, proteins, vitamins and minerals. Strict testing of all raw materials and a complete track & trace system ensure a high-quality and safe product. The ultramodern factory in Staverden (in the Dutch municipality of Ermelo) supplies the calf milk powder in bags or bulk.

PIPE DIAMETERS

The production line includes a spray drying process during which milk powder is formed. This powder is then cooled in a fluid bed system. "Contrary to most spray dryers in the dairy industry, we work with very large pipe diameters", says Stan Cuypers of Navobi. "Normally pipe diameters of 1.5 to 2 metres are used, but ours are 4 to 5 metres. This poses quite a few challenges when using flexible connections."

EXPLOSION-PROOF

Given the nature of the powders, the flexible connections of the pipes must be explosion-proof. This implies that the sleeves have to be tested. However, sleeve manufacturers usually only carry out explosion or pressure tests for sleeves up to a certain diameter, often no more than 250 to 350 mm. "This prompted us to develop our own test set-up to test sleeves for a compressed air pressure surge", according to Stan Cuijpers. "We have called upon sleeve manufacturers to help us out. In the end we have reached satisfying results with the help of Filcoflex, manufacturer of high-end sleeves."

KNOWLEDGE

Filcoflex in Kaatsheuvel (the Netherlands), represented in the Netherlands and Belgium by Euro Manchetten & Compensatoren, has plenty of knowledge when it comes to pressure-resistant flexible connections. "Many of our products have already been subjected to explosion tests", says Managing Director Werner van Loon. "In addition, we use several in-house water pressure test set-ups. We frequently test DN250, DN630 and DN1400 sleeves, also on behalf of customers. When Navobi asked if they could test our sleeves using their in-house test set-up, we immediately agreed, convinced that we could provide a suitable solution."

Test conditions for Filcoflex sleeve

The Filcoflex sleeves used by Navobi must be able to withstand an explosion pressure of 1.2 Bar. The sleeves have been tested six times under the following conditions:

EXPLOSION PRESSURES

- 1.2 Bar
- 1.5 Bar
- 2.2 Bar

TEST SET-UP

- Compressed air receiver: 2,000 litres
- Hose diameter: Ø 100 mm
- Sleeve diameter: Ø 1,000 mm
- Sleeve length: 400 mm
- 1 infrared camera
- 2 GoPro cameras

Polyurethane qualities

Filcoflex sleeves are manufactured from dedicated, transparent polyurethane qualities. These materials have been tested in laboratories by recognized organizations. The Filcoflex sleeves are explosion-proof and food-safe. This is where they differ from Platilon products which have been introduced in the food industry by Euro Manchetten & Compensatoren. However, the company no longer uses this name, because Platilon has become a collective name for a series of polyurethane film brands and qualities which are not suitable for application in the food industry in most cases.

Fig. 3: cameras (mid-rear and right) record the behaviour of the sleeve

TEST SET-UP

Navobi's test set-up consists of a large compressed air tank which is pressurized by using a compressor. A hose is attached between the compressed air tank and a set of blanking plates which hold the sleeve. The upper blanking plate has a valve which can be opened remotely. If opened, the air is pressed inside the sleeve instantaneously and with great force. A high-speed camera and an infrared camera record how the sleeve behaves under this pressure surge.

DATA

"We have made several sleeves for this test set-up with the same size, but different polyurethane qualities", says Werner van Loon. "With all parties present we have tested the sleeves in one day and with good results. The various experiments have generated plenty of data. The properties of the sleeve, which we mentioned beforehand, were confirmed by the tests."

TAKEN OVER

Navobi has decided to include the Filcoflex sleeves in their manufacturing plant. "Tests have shown that the sleeves are safe and reliable and have given us sufficient information regarding explosion protection and food safety", according to Stan Cuijpers.

Filcoflex was very impressed by the test set-up and has taken it over. "This test set-up is an excellent addition to our existing testing options", says Werner van Loon. "If other customers are interested, they can contact us for pressure surge resistance tests."