

Nestlé improves connections

Transparent and absolutely leakproof

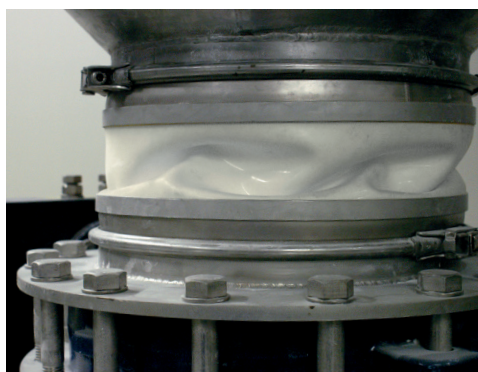


Fig. 1: a FDM flexible sleeve in use

Euro Manchetten started the development of this sleeve type in 2004. In 2006 it was nominated for the Process Innovation Award. The sleeve is transparent, extremely flexible, resistant to temperatures up to 90 °C, pressures of -0.2 to +0.3 bar and an explosion pressure of 1.5 bar (at 20 °C). The flexible Poly Urethane plastic material has a 1 mm thickness. The connection is a quick-connect coupling with flange. Everything is FDA EC 1935/2004 and 10/2011 approved. FDM also allows for the use of rubber, silicone, PTFE and even coated fabrics. And if you prefer a Triclamp coupling the sleeve is constructed in the same way with Triclamp ferules this variant is called LFR.

www.filcoflex.com
www.euromanchetten.nl



Fig. 2: Old-fashioned cotton with leaks

In Nunspeet, the Netherlands, Nestlé has very strict hygiene requirements for their baby food production process. Consequently, the company is continuously searching for improvements. They have had a weak spot for some time or rather about 25 weak spots. Flexible connections with different diameters and even reducers, resulting in leaks and accumulations of materials which are difficult to remove for cleaning. That is all in the past now.

One of the installations in Nunspeet is a spraying/drying system. It adds vitamin preparations (trace elements) to maltodextrin which acts as a carrier for low-dose trace elements. It is a fine powder which is highly hygroscopic. About 25 sleeves with different sizes are located in and around the installation. The sleeves are not only required for providing a connection between stationary and moving parts, but also because operators must be able to remove pipe sections for periodical cleaning. Willem Dekker, responsible for maintenance, explains what the problem was: "Before we used cotton sleeves with straps around them, there were always leaks due to rapid wear of the metal edges. Materials would also accumulate in the edges, crevices and folds of the sleeve. We were fed up with leaks and accumulations of materials."

FIRST PU-UF1 FLEXIBLES

Nestlé has strict internal protocols for hygiene and safety. For this reason, they wanted to avoid leaks of the volatile substance maltodextrin. And so a few years ago they started to search for dust-tight connections which do not cause accumulations of materials. Dekker contacted Euro Manchetten & Compensatoren, which was already a known supplier. Filcoflex in 2008 originated from Euro Manchetten & Compensatoren as the company that produces and sells FDM flexible connections and many other innovative products. During their conversations about these problems PU-UF1 was suggested as a material for sleeves. PU-UF1 is a transparent polyurethane formulated especially for Filcoflex, which makes it easier to check for accumulations. However, the problem of wrinkle formation at the hoseclamp connection persisted. Dekker: "We then came up with the idea of using a flange connection instead of hoseclamps. This connection consists of a flexible sleeve with a collar acting as a flange to be fitted with a bolted on counter flange, in order to form a perfect seal. And we were very pleased with it." This would normally mean the end of this article, except that Dekker accidentally found out that Euro-Manchetten was doing a test with a new type of sleeve. In 2004 he saw a test set-up with a flexible sleeve pressed on a Jacob pipe filled with water.

SAVING TIME

During its test phase, this flexible sleeve was called FDMTFL: Fast, Disconnectable, Modified Transparent Flexible. Later the name became FDM. Airtight and waterproof, heat-resistant, transparent and FDA as well as EC 1935/2004 and 10/2011 approved. Dekker: "At first we conducted some experiments at several silos by using sleeves with different diameters at each end and various lengths.

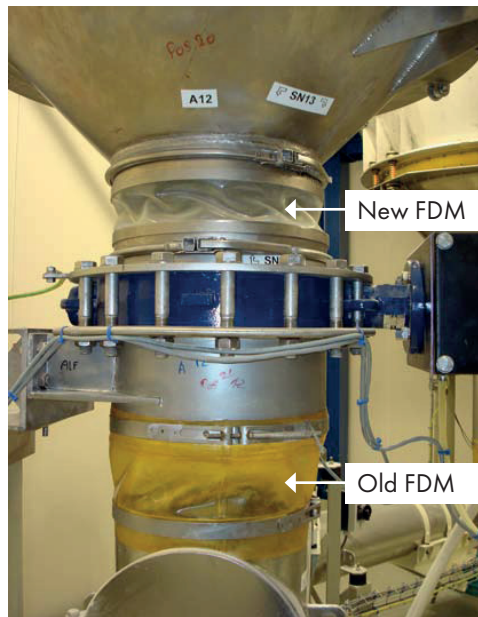


Fig. 3: Below one of the first FDM flexible soft connections with an old coupling, coloured yellowish brown and above a new one with a quick-connect coupling.

Nestlé was established in 1866 by Henry Nestlé and is currently one of the world's largest food and drink groups with 250,000 employees and active in almost every country in the world. In Nunspeet baby food products and semi-manufactured products such as vitamin mixes with trace elements are produced for use in this and other Nestlé branches, mainly for export in Europe and Asia. This is not unique: there are similar production plants in South Africa and Mexico. But worldwide Nunspeet is the only location where Nestlé produces baby specialties. The Nestlé Product Technology Centre in Konolfingen, Switzerland is specialized in dairy products.

www.nestle.com

Fig. 4: FDM flexible sleeve: easy quick-connect coupling, material flow is visible.

After a while, we found out that this type of sleeve was not only leakproof, but also did not cause any accumulations. This meant that we did not have to worry about these problems anymore. The advantages were so obvious that we converted everything to FDM flexible soft connections in a short while." The only disadvantage is that the machine connections have to be converted to quick-connect Jacob couplings. In addition, this type of sleeve is more expensive than others. Willem Dekker explains that the technical advantages are most important: absolutely leakproof, no accumulations of materials and time savings when cleaning.

This way, the cleaning frequency can be reduced and removal/installation is much faster than when using regular sleeves. But the dust-tightness was the main reason for switching to this type of sleeve. Because of the ATEX standards, this was a crucial reason for purchase. It prevents contamination and dust and consequently excludes any explosion hazards. Dekker: "For this reason, we have installed separate grounding everywhere, so it can remain intact during cleaning. The FDM sleeves can handle a constant pressure between -0.2 and +0.3 Bar and an explosion shock overpressure of 1.5 bar. That is sufficient to ensure that the explosion doors will be activated in case of an unexpected explosion, instead of the sleeves bursting..."

FROM NUNSPEET, THE NETHERLANDS, TO KONOLFINGEN, SWITZERLAND

At Nestlé the sleeve diameters used vary from 100 to 350 mm. They are not just straight sleeves, but also include reducers, some even with constrictors. For example, some flexible connections adapt from Ø350 to 200 and then to 250 mm, like an hourglass shape. And with lengths up to 900 mm! Meanwhile, Dekker has used the sleeves for some time now: "After a year they start to turn slightly yellow as a sign of ageing, due to the influence of heat and UV radiation. To us it is a fantastic indicator for replacement: by the time a sleeve turns yellowish brown, we replace it. And delivery times? "Filcoflex and Euro Manchetten keep stock for us. The delivery time is usually two days or one day in urgent situations." Within the Nestlé organization, the production location in Nunspeet is 'worldwide leading in nutrition'. This also means that there is close contact with the development centre in Konolfingen. The sleeves were discussed and studied at length at this location. It is now common knowledge that, based on the best practice in Nunspeet, Konolfingen recommends using this type of connections worldwide.

