

NTX™

melt pressure transducer

Environmentally-friendly and innovative



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Content

- 1. Pressure sensors as hidden cost factors in the extrusion process 3
- 2. Environmental and quality expectations..... 3
- 3. NTX™ technology displaces mercury-filled sensors 3
- 4. Why melt pressure transducers can fail 5
- 5. Conclusion..... 6

1. Pressure sensors as hidden cost factors in the extrusion process

Pressure transducers play a critical and central role in the monitoring and control of extrusion processes. Control of the manufacturing process without an accurate or even functioning melt pressure transducer is not even possible in most cases.

The melt pressure values of the plastic melt are not only required for the control of the extruder and pump speed, but are also indispensable in measurement of the material.

Despite their central function, pressure transducers can be in some cases treated carelessly during storage and installation: the product quality is of secondary importance relating to purchasing decisions, and in situations where untrained personnel handle them incorrectly, will likely lead to an unnecessarily shorter operating life.

In practice the impact of defective or poor quality sensors on costs are often underestimated, since in many cases the only costs being considered are those directly linked to the purchase price of the transducer. However, much of the time, the indirect costs caused by production disturbances due to missing or faulty pressure measurement, downtime resulting from the necessity to stop the production, and replacement of the transducer are of far greater significance.

2. Environmental and quality expectations

Historically, companies only recognized melt pressure measurement devices able to ensure their high product quality requirements, by depending on pressure transducers containing mercury as the pressure transmission fill-medium. Awareness has increased regarding the fact that incorrect handling of mercury is a danger to the environment and a health hazard to the individuals associated working in these facilities. Over the years, there have been other available non-mercury alternatives, although proven to have limited life, lower accuracy, and higher cost.

3. NTX™ technology displaces mercury-filled sensors

As early as 2007, the European Parliament introduced a guideline for the „restriction of commercial trafficking in mercury filled measurement instruments“. The EU Directive 2011/65 (RoHS 2) specifies that the sale, distribution or otherwise of mercury- filled pressure sensors for industrial applications is forbidden from July 22nd, 2017.

Gneuss MC has adopted a philosophy to focus on environmental issues for many years already, and after successful research and development introduced a new generation of sensors, which actually exceed the performance of mercury-filled sensors.

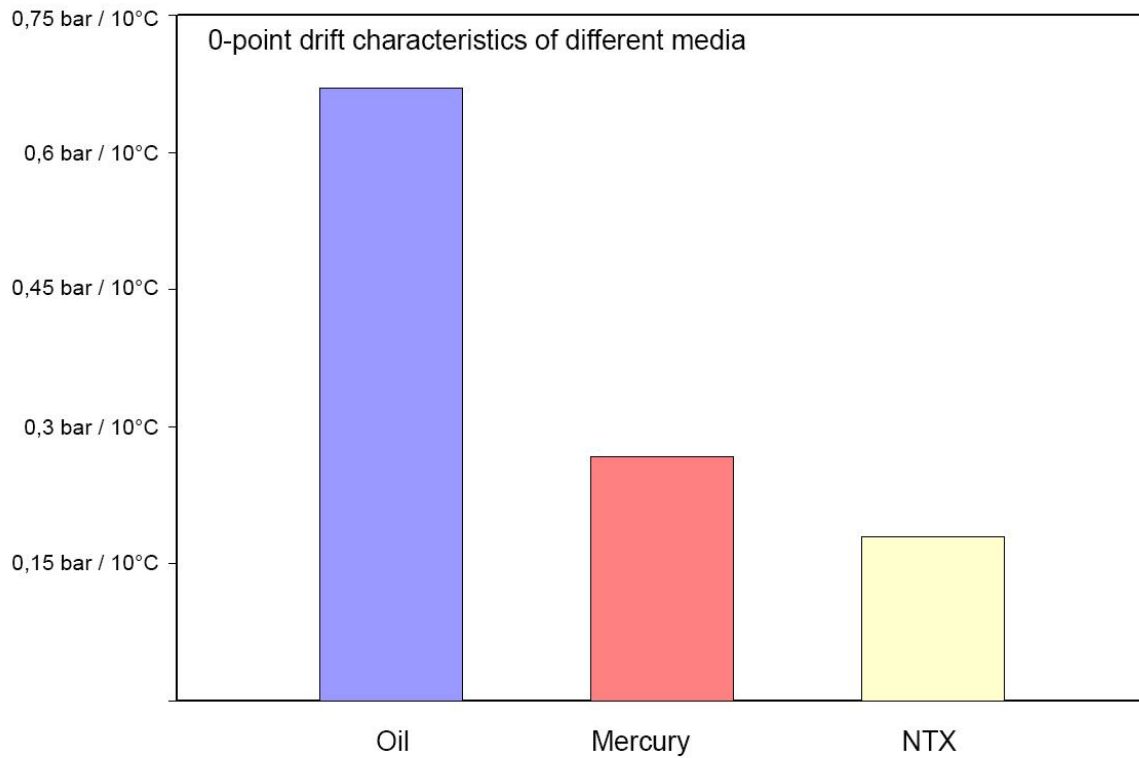


Abb. 1: Direct comparison of melt pressure transducers with different media

The graph shows the 0-point drift for 3 pressure sensors with different pressure transmission media and their corresponding behaviour between ambient temperature and 200°C. It clearly illustrates that the Gneuss MC sensors with NTX™ technology are more than simply an alternative to mercury-filled sensors.

The Advantages of the new NTX™ Technology are:

- Low 0-point drift;
- High accuracy (up to 0.1% of scale);
- Suitable for high temperatures (up to 300°C);
- No health risk;
- Suitable for use in pharmaceutical and food industry applications;
- No regulated or special disposal necessary

4. Why melt pressure transducers can fail

The analysis of melt pressure transducer failures and the reasons behind the failures were central to a survey carried out by Gneuss among the users of melt pressure transducers.

Some 78 companies took part in the survey. When asked regarding the frequency of problems with melt pressure transducers, roughly half (52 %) of the respondents replied that they are only rarely confronted with melt pressure transducer problems. The situation was far more critical when the respondents replied regarding the consequences of problems with melt pressure transducers: Almost three quarters (72 %) of the respondents confirmed that they had experienced serious or at least fairly serious problems as the result of a defective melt pressure transducer.

The reasons for the failure of the pressure transducers are shown in the following graph (multiple answers possible).

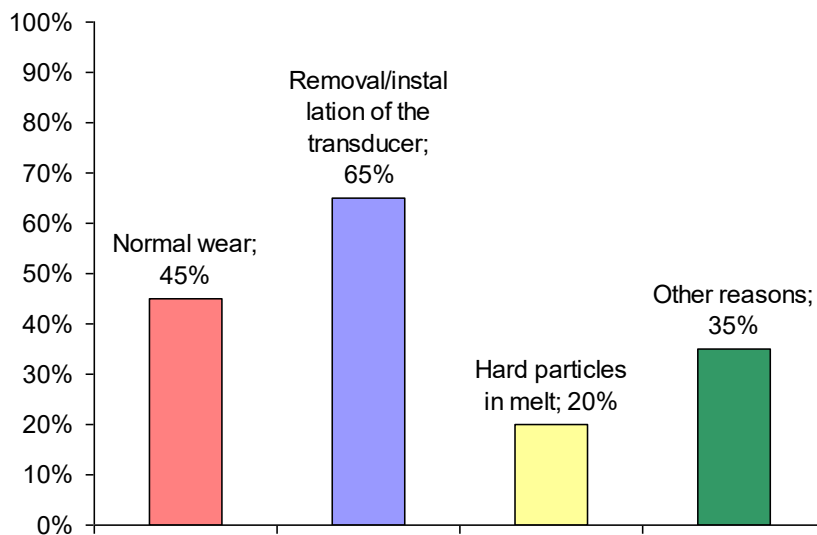


Fig. 2: Reasons for melt pressure transducer failures

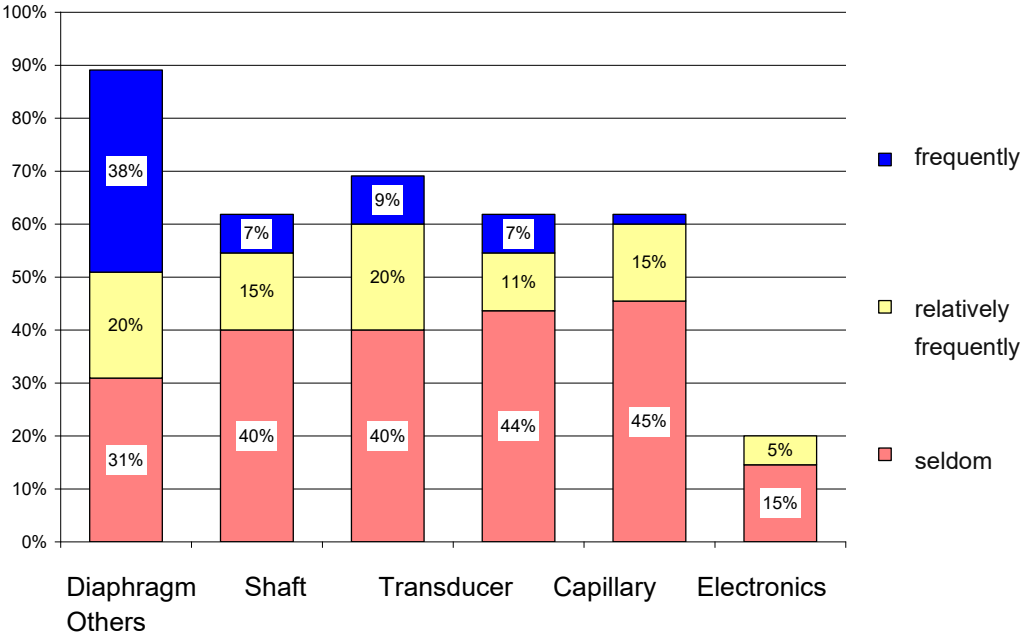
It is quite clear that the removal and installation of the melt pressure transducers is named as the single most common cause of their destruction. Damage caused by hard particles in the melt is of much less importance.

Against this background, the types of damage to melt pressure transducers can be interpreted in the following graph. (Multiple answers possible).

By far the most damage was incurred by the melt pressure transducer diaphragm. This is not surprising, since this is the most easily damaged part of the pressure transducer. Diaphragm damage can be caused for example when hard particles in the melt contact the membrane, or more importantly the diaphragm becomes damaged when the pressure transducer is removed with solidified polymer adhering to the diaphragm, or simply when the polymer cools down and the material stuck to the diaphragm will shrink and pull the diaphragm, tearing it in the process. With mercury-filled pressure transducers, this of course immediately leads to contamination of the immediate area. Of the companies which experienced damage to the diaphragms, roughly 60 % responded that these problems occurred

either often or fairly often. On the other hand, the majority of the companies reported they seldom experience damage of the other kinds mentioned, although the transducer head is mentioned fairly frequently. Mostly this relates to visible plug and socket connections.

Fig.3: Type of damage to the melt pressure transducer



5. Conclusion

Gneuss MC melt pressure transducers offer excellent technical features such as measurement accuracy and a range of completely new features, with regard to the strength and longevity of the instrument.

The key feature of the Gneuss NTX™ melt pressure transducer is its high quality at a competitive price as well as its environmentally-friendly characteristics. The costs for replacement melt pressure transducers can be kept to a minimum, thanks to the robust design for challenging environments. In addition, much higher indirect costs caused by production failure resulting from pressure transducer failures, can be drastically reduced.

The optimum applications for the melt pressure transducer are those where a precise melt pressure measurement is required and the reliable operation of the melt pressure transducer is vital to the process.

Imprint

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