



3E-Flex Norm Compliance

3E-Flex is a part of a pipe system, designed for district heating, cooling and other services requiring a high quality insulation and external protection.

The standards for preinsulated pipes are all derived and written on the basis of EN 253 “District Heating Pipes – Preinsulated bonded pipe system for directly buried hot water networks---“

This standard was first issued in 1992 where it replaced the Danish standard DS 2178 which had been used in Europe for a decade by then. (In the 1980’ies the major part of preinsulated pipes were produced in Denmark)

By the time EN 253 was produced, it was common to manufacture all preinsulated pipes by the “Pour – Rise Method” injecting the foam liquids into a void between casing and steel pipe, in which it expanded and created an insulation with the physical properties needed for both insulation and for carrying the steel pipe and transferring forces due to the thermal expansion and friction forces. The requirements in the standard was agreed by the CEN-Working Group TC-107, ensuring the buyer a good quality seen form the knowledge and the technological development level of that time.

A separate set of norms for flexible pipes was produced over a very long time and finally issued in 2007. The norm EN 15632 is split in four sections for bonded and for non-bonded pipes each again split in metal service pipes and plastic service pipes.

The leading personal in the TC-107 was “experts” from the district heating business, most of them employees from manufactures. The state of the art production method for flexible pipes has been “conti-production” where the foam is sprayed into a foil in a mould and then drawn through an extruder head, applying the casing.

This has resulted in the norm being a mirror of that production method and a set of demands, which could be met by all participants in the group.

3E-Flex meets increased demands

As the demand for insulation increases, the casing sizes was increased and the installation jobs were more time consuming and caused a lot of problems for the installers, as the pipes would rewind after they were rolled out and as the manual labor by pushing the pipes through the wall penetrations was too hard on the human body. This has resulted in a need for special tools and even more installation time = less progress.

Using the second generation lance technique, the 3E-Flex product solves the problems. We obtain a flexibility of the product by using corrugated casings and by reducing the density of the polyurethane foam.



The product is foamed after extrusion of the casing, by taking a mixing head into the void between media pipes and the casing. This makes it possible to add more insulation gas and to work with a pressure in the reacting foam, giving less density and much less thermal conductivity = better insulation capacity.

The production method deviates from the assumptions behind the above norms and thus the product can deviate from the standard in some aspects.

See e.g. the technical information TI 12-10. We produce a product that may well absorb less water in a boiling test, than foam from old production methods, but even though, the product may fail to comply with the norm ?????? This is a result of the assumption, that the foam has a density around 80 kg/m³.

This was NOT the intention of the norm, but a result of lacking knowledge about the development within the production methods.

There are two very important aspects of the standard:

- 1) Performance
- 2) Durability if the pipe system

In respect of performance the 3E-Flex provides an insulation capacity superseding the requirements by far.

The norm requires the Lambda value to be less or equal to 29 mW/mK, 3E-Flex has only 22 mW/mK, which means 24% less heat losses.

The durability is secured by the choice of materials and the way they are produced. In order to ensure the life span required, the service pipes are all produced acc to the norms referred to in the norms above, the casing material is bimodular HDPE which also comply with the norm. The foam is a product from Bayer which has proven thermal resistance and min. 30 – 50 years expected life span at elevated temperatures 120 – 140°C.

This way the functional requirements are ensured and the client has a safe and durable pipesystem, when installing 3E-Flex.

2012.10.30

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