

NOFIRNO SEALING SYSTEM FOR FINNISH NUCLEAR POWER PLANTS

Beele Engineering (Aalten, the Netherlands) has supplied its NOFIRNO sealing system to the Finnish producer of electricity Teollisuuden Voima Oyj (TVO). The system is used in all the EI60 classified areas of the two nuclear power plant units operated by TVO, Olkiluoto 1 and Olkiluoto 2 (OL1 and OL2) where a minimum pressure tightness of 1,2 bar is required.

OL1 and OL2 are identical boiling water reactor power plant units. The net electrical output of both plants are 880 MW respectively 860 MW. Together the plants produce slightly more than 16% of all the electricity consumed in Finland.

TVO keeps the OL1 and OL2 units running as good as new through carefully planned long-term maintenance. The units are also systematically upgraded to conform to today's demands. Maintenance and modernization are undertaken on an annual basis. When several hundreds of pipe penetrations in both reactor units had to be updated and upgraded to the latest standards last year, the NOFIRNO sealing system of Beele Engineering was the system of choice.

NOFIRNO system

The NOFIRNO system of Beele Engineering is a sealing system that is both fire-safe and gas and watertight. The system has been tested intensively and severely. For example, the system successfully passed the harsh fire exposures of a jet fire test in accordance with ISO 22899-1:2007 and ISO/CD 22899-2 and was tested successfully according to EN1366-3:2004 and is certified according to EN13501-2:2003 (NEN 6069). The long-term mechanical stability of the sealing system has been proven in many stress relaxation and permanent deformation tests. Furthermore, the system is resistant to weathering, UV, ozone, shock and vibration. Prior to the application in the nuclear power plant units the system was also tested and approved to withstand maximum 30 mSv/h radiation, where a max. radiation of 0,5 mSv during the whole day is allowed for persons.

The many successful tests underline that the NOFIRNO system is designed to guarantee performance for decades and offers a service life of over 20 years. The unique service lifetime is based on the high quality of the NOFIRNO components that are made in Beele Engineering's own factory using the most advanced silicone rubber grades.

The rubber can be exposed to temperatures upto +180 °C, making the system applicable for high-temperature and steam pipes. Because the rubber also remains flexible at very low temperatures (-50 °C) the NOFIRNO system can also be used in very cold or arctic environments. The rubber has excellent fire resistant properties: when exposed to fire the rubber immediately forms a protective layer at the fire-side. The rubber won't be consumed by fire while smoke emission is prevented effectively.

An important feature of the NOFIRNO system is the fact that it can be easily combined with various other systems of Beele Engineering for the so-called MULTI-ALL-MIX system for ducting all types of pipes and cables through one single conduit. In fact NOFIRNO is the first sealing system that is approved for any combination of cable, metallic or plastic pipes. Even approved for ducting bundled LAN cables, enabling considerable savings on installation time.

The NOFIRNO system contains no metal parts and is approved water tight thus avoiding corrosion on the pipe work as well as (invisible) corrosion within the penetration.

Beele Engineering is market leader in the field of sealing solutions for the fire safe and gas and watertight sealing of pipe and cable penetrations. This position is based on the company's ongoing R&D and innovation, advanced manufacturing technology and first class service. All Beele's products are developed and manufactured on the basis of an integrated approach to fire safety. All components are made in the company's own factory under stringent ISO quality system.

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