WE CARE

BEELE ENGINEERING
COMPANY PROFILE
RELIABLE SAFETY MUST BE BASED ON: EXPERTISE-DEDICATION-QUALITY-DURABILITY

BEELE ENGINEERING: A COMPANY DEDICATED TO SAFETY FOR OVER 35 YEARS

WE CARE
BEELE ENGINEERING - SAFETY, RELIABILITY, INVOLVEMENT

Every moment of the day, in every business and every situation, the threat of fire is present. For over three decades, BEELE Engineering has specialized in passive fire safety in the form of systems which prevent the spread of fire, smoke, water and gases via cable and pipe penetrations. With our superior sealing technologies, we have become the undisputed Number One in this particular field.

It is BEELE Engineering’s philosophy that R&D exists to respond to market demands. Only then can research and development activities be classed as functional. Only then are innovative solutions generated for problems that have current or near-term relevance. Our policy is one of continuous active response to customer’s demands or modified or new functional requirements. We listen, we observe and we interpret, and so we arrive at new product developments and bold innovations.

BEELE Engineering has built up an enormous body of specialized expertise and knowledge. Our company is the world market leader in sealing systems for state-of-the-art shipbuilding applications as well as civil and industrial applications. We do not follow trends, we set them.

Development of new products and technologies, as well as pioneering know-how, are present in every fibre of our organization. We are driven by passion for our specialization, and our customer involvement drives us to exceed the boundaries of what is technically feasible.

BEELE Engineering operates world-wide. From our agencies in virtually every industrialized country, our support and services are always somewhere nearby. We are there for you – also for on-site advice or in-house demonstrations, instructions and support at your location.

J.A. (Hans) Beele
President
BEELE Engineering
BEELE ENGINEERING - HISTORY

Founded in 1973, BEELE Engineering started in Amsterdam as a trading company importing safety devices from abroad for the Dutch market. Due to the specific conditions of The Netherlands (where almost 50% of the country is below sea level), the requirements for underground gas tight ducting are not easy to match. In the 1970’s this resulted in regular explosions caused by natural gas entering the crawl spaces underneath the houses. Less severe, but also damaging, are the numerous non-watertight, leaking conduits in many buildings.

Responding to the problems, BEELE Engineering developed the world famous CSD sealing plug. The system was adopted in 1979 by utility companies as the standard for ducting gas and water pipes, and cables for electricity and telecom, into houses and buildings.

At that time, the requirement was not necessarily for a fire-prevention system but rather for a “gas-tight” solution. In 1984, BEELE Engineering introduced their products to a marine industry craving for answers to the problem of protecting Class “A” bulkhead penetrations from the dangers of the spread of fire and smoke and the ingress of water and gas.

Shortly after the introduction to the world market, the company established its own manufacturing facilities. In 1988, a brand new factory was built to manufacture the sealing plugs, followed by offices, warehouse and testing facilities in Opmeer near Amsterdam in the early 1990’s.

A new development was then made which set an innovative trend in shipbuilding with regard to performance, ease of installation and maintenance of cable penetrations: the RISE system. Further growth of BEELE Engineering was the result.

Later the company moved to Aalten. Today all activities of the company, including administration, manufacturing, warehousing, R&D and testing facilities are located in Aalten.

Thirty-five years after the company founding, our products are arguably the benchmark for quality in the field of cable and pipe transits.
BEELE ENGINEERING - GROUP STRUCTURE

The BEELE Holding Company is privately owned by Mr. J.A. (Hans) Beele, who is also President of the company, which has two operational units:

- **BEELE Engineering BV**
  research & development, worldwide marketing of the products, training and technical field assistance. The company performs all kinds of tests (fire, mechanical, electrical) worldwide to enable the company to apply for certificates and to obtain approvals. BEELE Engineering operates three in-house laboratories and performs fire tests on request of customers in case of special application of the products, if necessary under survey of classification societies. The fire laboratory is officially recognized by Bureau Veritas and can be used for additional testing to obtain extensions on existing certificates. BEELE Engineering is also holder of patents, design rights and trade marks on the BEELE/CSD products.

- **CSD International BV**
  manufacturing facilities for all CSD/BEELE products such as the CSD/SLIPSIL sealing plugs, the RISE/RISWAT multi-cable and pipe sealing system, the range of high-tech silicone sealants and the newly developed RISE/NOFIRNO and RISE/ULTRA sealing systems.

The BEELE Holding Company is the owner of all buildings in which the companies operate, nowadays all located in Aalten:

- head office for administration and marketing (1000 m²);
- warehouse/export (2000 m²);
- R&D centre including the certified laboratories and training facilities (2000 m²);
- Brand new factory covering 5000 m² with separate departments for extrusion, vulcanization, sealants and rubber compounding;
- Mould-making shop and warehouse for raw materials (1000 m²);
- Extension of the factory with 5000 m² in 2009.
CSD INTERNATIONAL - ADVANCED MANUFACTURING FACILITIES

- Extrusion department

For the manufacturing of the RISE insert and filler sleeves, used for multi-cable and pipe transits, two extruder lines are in operation. The larger one was specially developed for the most efficient production of larger amounts of single sleeves. This line has a maximum capacity of 400 kg of rubber per hour and features special technologies with regard to cooling, slitting and cutting of the sleeves.

The other extruder line is used for the production of the RISE multi-sleeves. To increase the production efficiency of the multi-sleeves, a newly developed and fully automatic machine has been installed. This investment enables us to cope with the large order entry of these types of sleeves. A second machine has been ordered. Once installed ample production capacity will be in place to handle future increase of the order entry.

The extrusion department also contains an extruder line for thermoplastics for the manufacturing of the RISWAT sleeves.

Following the latest development and introduction to the world market of the RISE/ULTRA C-fit crushers and RISE/ULTRA wraps for plastic pipe penetrations, a brand new extrusion line will be in operation in 2009.

The extruder line features several new technologies for cooling, cutting, slitting as well temperature management. This new line underscores our philosophy that innovation and investments in advanced production technology are the keys to success.
CSD INTERNATIONAL - ADVANCED MANUFACTURING FACILITIES

- Rubber vulcanization department

This area of the factory has been divided into two sections: one for compression moulding and one for injection moulding. The compression moulding process is used for the larger sizes of the SLIPSIL plugs and the ULEPSI tank support plates. In this section of the factory 15 presses in the range of 200-300 tons are operational. Manufacturing of smaller quantities is today an option by an advanced system of changing moulds, which offers optimal flexibility.

For highest efficiency, the smaller sizes of the SLIPSIL plug are manufactured on injection moulding presses. In one run, more products can be produced and the vulcanization time is shorter. Injection moulding also excludes the pre-weighing of the rubber compound as needed for compression moulding. This section in the factory operates on 16 new rubber presses, ranging of 40-160 tons.

All rubber presses have been installed in the last 3 years so that manufacturing is on latest technology.

The NOFIRNO filler sleeves are manufactured on two 400 ton injection presses. Another two - fully automatic - injection presses for this product line are on order and will be installed in 2009. This will bring the annual production capacity for NOFIRNO sleeves to more than 1 million.

For the production of ACTIFOAM rubber sheets with closed cellular structure, a tailor-made 500 ton compression press is in operation. Due to the order volume, an identical 500 ton machine has been recently installed.
Proper compounding of the rubber grades is of utmost importance for the production process. The use of specified types of ingredients, as well as the mixing of the ingredients into the basic polymer, are vital for the high quality of our products. Since our sealing systems are safety devices, any risk has to be excluded. For this reason all compounds are made in house under a high ISO quality regime.

A specially developed, non-traditional mixing process has been installed in this section of the factory. It enables us to manufacture innovative and high quality rubber grades like NOFIRNO. This rubber grade will not be consumed by fire and forms a protective ceramic shield in case of fire. It is a unique rubber that can withstand the harshest fire conditions. In this section the ACTIFOAM, RISE and RISE/ULTRA compounds are produced as well.

Due to the substantial product volumes of RISE and the latest development of the RISE/ULTRA crusher technology, a new and non-traditional compounding process will be introduced. Test runs show that this new technology enables us once again to obtain the highest quality. The technology is being incorporated into a new compounding line to be delivered.

Once this machinery is installed, our capacity of rubber compounding reaches 7,500 - 10,000 kg/day based on a single 8 hour shift.

Confident of further growth, the management has decided to expand the factory this year.
CSD INTERNATIONAL - ADVANCED MANUFACTURING FACILITIES

• Sealants department

The various high grade sealants are manufactured in a special department inside the factory. The range of sealants that are manufactured includes FIWA, DRIFIL and NOFIRNO. The complexity of the manufacturing process requires high-tech tailor-made machines offering not only highest quality but also extended shelf life of the sealants. A completely automatic drying, mixing and filling machine has been installed covering 200 m². With this equipment it is possible to manufacture over 30,000 sealant cartridges (equals 12,000 kg of sealant) per week in a 8 hour shift.

• Mould-making department

In 2008 we have invested in a brand new mould-making shop equipped with the newest turning lathes, automatic milling machines and cutting/sewing machines. Since the precision of the moulds is of vital importance for the production, the moulds are made in house to ensure full quality control. Besides, it offers a lot of flexibility in the production process and enables us to follow the demand for plug production easily.

All moulds are coded with special lasers. Based on the range of SLIPSIL sealing plugs more than one thousand different moulds are needed.

• Warehousing

To avoid any standstill in production, hundreds of tons of polymer and additives are stored in a special warehouse. Another warehouse is used for stocking the products and preparing the shipments. Large inventories are built up to ensure the shortest delivery times possible.

Since products are shipped worldwide, double checking of packaging is a prerequisite to avoid any mistakes in deliveries.

Personnel are well trained, which results in an excellent record of prompt and exact shipments.
Our development, test and production facilities are among the most advanced in the world. We have implemented a high-level ISO system and work with unmatched involvement. The management of the BEELE group of companies is committed to quality, and for this reason our ISO system is of such a high standard that mistakes in production are almost impossible. No deviation is allowed in the factory with regard to processes and materials.

Compounding and production, up to final packaging, takes place under continuous checking: not once, but at several spots to exclude any risk of malfunctioning. Even at the last moment before the products leave the company, a final visual inspection takes place.

Continuous investments in advanced production and testing equipment, highest polymer quality and the search for state-of-the-art technologies are our guarantees for the safety of people, the installations and the environment.

Bureau Veritas has issued the ISO 9001:2001 certificate, the Module D Production Quality Assurance and the Recognition of the test laboratories.

Regular audits are carried out so that our customers can be assured that the BEELE group has everything quality controlled in one hand - from R&D and testing to production.
BEELE ENGINEERING - TESTING FACILITIES

The R&D centre incorporates three fully equipped test laboratories each measuring about 100 m².

• **Mechanical testing facilities**

This laboratory is used for all kinds of mechanical testing (pressure, linear and axial movements, abrasion, etc.), for determining mechanical values of the rubber and sealant compounds, and for quality control of manufactured products. A complete set of units for pressure testing the BEELE/CSD water and gas tight systems has been installed. All equipment is calibrated on a regular basis. Following the development of the DYNATITE technology, a new test unit for pressure tests up to 20 bar is under design.

• **Fire testing facilities**

The laboratory is equipped with a state of the art, and fully electronically controlled furnace for carrying out fire tests in house. Time/temperature curves are pre-programmed in the furnace’s operating system so that the temperature will remain within the specified values. All relevant data are being visualized during the fire tests and all measured data are printed directly after finishing the fire test. Reports are drafted immediately, enabling a process that is fully transparent for surveyors. The furnace is able to run both the IMO and Hydrocarbon Curve. The laboratory is accepted by the classification societies and fire tests under survey take place on a regular basis.

• **Light measurements facilities**

Safety measures for a safe escape from a ship, offshore rig or building should be part of passive (fire) prevention. For this purpose, BEELE Engineering developed luminescent materials with highest light emission in darkness and with longest duration.

For testing luminescent materials according to the regulations, a Xenon lamp is used for charging the materials. Optical equipment connected to a computer is recording the read outs of the light emission during 60 minutes after exposure. BEELE Engineering possesses also professional equipment to do on site light emission measurements.
BEELE Engineering invests substantial amounts of money in testing, both at official institutes and in-house, in order to obtain the necessary certificates and approvals worldwide. Over the years, fire tests were carried out according to IMO A.754(18) and according to EN 1366-3:2004, in high pressure leak tests, in thermal and dynamic cycling tests, in shock and vibration tests to obtain approvals for use on navy vessels, in aging tests, in smoke and toxicity tests, in oxygen index tests, in sound damping tests, and even in EMC testing of cable and pipe penetrations.

Included in this year’s program are Jet Fire and Hydrocarbon Fire testing to obtain the highest possible fire ratings.

This is only one part of the responsibilities of the R&D department within the company. Fire and pressure tests are carried out on a regular basis to determine the properties of newly developed systems and products, and also to investigate if products can be made suitable for existing installations. Due to the formal Recognition of the laboratory, many fire tests are carried out in-house on customer demand and/or for modifications on existing systems.

It will be clear that over the years all these tests have resulted in a tremendous expertise.

Fire prevention is not a simple matter. Know-how and field expertise are a must to be able to develop systems which will function not only newly installed but also during a long service life. Repeated testing and ongoing research and development are the main keys to achieve this high level. Furthermore, dedication is the driving factor. Just putting a product on the market on the basis of a single test is not the way to deal with safety.

Our employees and representatives worldwide are trained on a regular basis so they understand the merits and application of passive fire prevention.
Finally the owners, builders, architects and engineers are all confronted with fire safety aspects of cable and pipe transits, and have to rely on the data provided in the issued certificates. This all underlines the need for technical support, manuals and for all knowledge transfer. Our company is committed to education in this field. In our R&D centre a “theater” is incorporated where we have the facilities to educate groups up to 40 persons.

BEELE Engineering has published a booklet showing all the ins and outs with passive fire prevention. The booklet “Everything you should know about cable and pipe transits to ensure a safe vessel” is available free of charge.

BEELE Engineering has made recommendations to the regulations, testing procedures and certification process, all with the intention of getting passive fire prevention to a level on which people can rely. It is our commitment to avoid any flawed passive fire safety.

How can we be sure that the products are applied in the field under the same parameters which they were tested?

BEELE Engineering was the first company to require stamped installation drawings to the Type Approval Certificates.
Within the BEELE group of companies, human resources are considered to be the key to the success for our companies and our customers. Well trained and motivated employees determine the existence of a company. A very transparent, open and flexible organizational structure is chosen so that all employees are fully aware of what is going on and what the goals are. Our human resources policy is focussed on job security, enabling precious know-how to be preserved – both for our company and for our customers.

Our Health Safety & Environment policy is one of the top priorities of our management. It varies from the design of our buildings and the involvement of employees when new machines are developed, to the choice of the materials we are working with. It is one of the foundation stones for the commitment of our personnel and of utmost importance for the high quality levels we are striving after. We consider our employees to be professionals and regard them as such.

Visitors are generally surprised and impressed with the internal operations at BEELE/CSD. This makes us quite proud.
BEELE ENGINEERING
INTERNATIONAL PRESENCE

Export takes place to all European countries, North America, Australia and New Zealand, China, Japan, Korea, Singapore, Brazil, Chile, the United Arab Emirates, Egypt, Turkey, Russia and India. Our company is active in more than 40 countries.

Shipyards worldwide are among our customers and have been using our products for many years. Our systems have been applied on projects for Anadarko, BHP Billiton, GDF, Maersk, Noble, Petrobras, Saipem, SBM, Shell, Statoil, Talisman, Total, Transocean and many others.

On many FPSO’s, drill ships and LNG carriers the RISE system has been used extensively. Our systems are also used to quite an extent for upgrading existing installations.

Our sealing systems are also approved and applied on US Navy vessels and on the new T45 frigates and the Astute nuclear submarines of the British Royal Navy.

Furthermore the systems are widely used on cruise vessels and ferries and on luxury yachts and sailing vessels.

In the building and construction industry the BEELE systems are used on a large scale as well. Power plants, wind farms, infrastructures, telecom, petro-chemical plants, gas storage plants, tunnels and river locks, just to name a few.

Our representatives are well trained, which means that our expertise is always near. Our installation instructions and technical documentation are also of the highest standard, to ensure that the applications on site run smooth.
In the year of its foundation, our company was confronted with the first oil crisis, causing tremendous economic problems. Right then the management made the strategic decision to survive any crises by increasing the company’s activities. Even today, this policy is maintained allowing us to survive amongst the strongest.

It is for this reason that BEELE has been investing in the latest technologies over all these years. Our R&D budget amounts to approx. 10-15% of the yearly turnover.

The group possesses over one hundred patents on several products. All of these patents are commercial and allow for a wide spread sale on various markets. Economic fluctuations on the world market can be responded to by strategic use of the Intellectual Property portfolio. Patent rights have been granted for existing products and are continuously applied for when new products are developed. This allows for a form of protection against copy makers.

Lessons from the past are that an organization should be capable of switching direction in a very short time frame when the market situation changes. This means the need for a transparent, open and flexible organizational structure, which is encouraged to react swiftly to changing market demands.
Since the beginning, the company’s financial policy is to buffer finances to overcome the worst economic times. It also allows us to invest swiftly when our company’s markets expand. This strategy has paid off. The BEELE group of companies are financially rock-solid and fully independent. Our financial buffer enables a continuous flow of investments in R&D, equipment and raw materials.

Furthermore the company strategy has been over all the years to be as independent as possible from third parties. Therefore, our primary processes - R&D and production - as well as everything needed to support this are in our own hands. This policy minimizes the influence on our organization by ups and downs in the market place. It also allows us to operate without any restrictions caused by third parties, such as suppliers, or the need for external financing.

Aalten, The Netherlands,
April, 2009
NOFIRNO NEW TECHNOLOGY

- Approved for harshest fire ratings for pipe penetrations (A, H and Jet Fire class).
- Allows substantial movement of the ducted pipe within the conduit.
- High pressure ratings - designed for gas and/or watertight penetrations.
- Prevents corrosion inside the penetration.
- Longest service life and best Total Cost of Ownership on the market.
- NOFIRNO rubber sleeves and sealant will remain stable and not be consumed by fire.
- Breakthrough - MULTI-ALL-MIX SYSTEM
  Approved for any combination of cable, metallic, GRP or plastic pipes!

CRUSHER NEW TECHNOLOGY

- Most simple and effective system for all plastic pipe penetrations.
- RISE/ULTRA C-fit crushers squeeze down and seal opening during a fire.
- RISE/ULTRA wraps are used for oversized conduit sleeves.
- Approved for a multiple mixture of all kinds of plastic pipes.
- NOFIRNO sealant adheres well to plastics: high degree of water tightness feasible.
- Breakthrough - adhesion under fire load
  RISE/ULTRA compound forms an adhesive mass during fire exposure!

DYNATITE NEW TECHNOLOGY

- For applications where a high degree of (instantaneous) tightness is required.
- Dynamic sealing when a disaster occurs.
- Plugs are compressible and will return to their original shape after shock pressure.
- Easily withstands shock pressure loads of more than 150 psi (10 bar) easily.
- Ideal solution for the columns of offshore rigs and collision bulkheads.
- Breakthrough - dynamic compression
  Based on high-tech rubber grade and engineered profiling, the DYNATITE plugs can be substantially compressed and get tighter with excessive pressure.
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