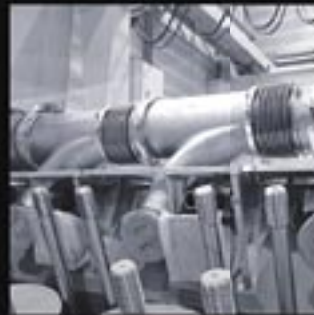
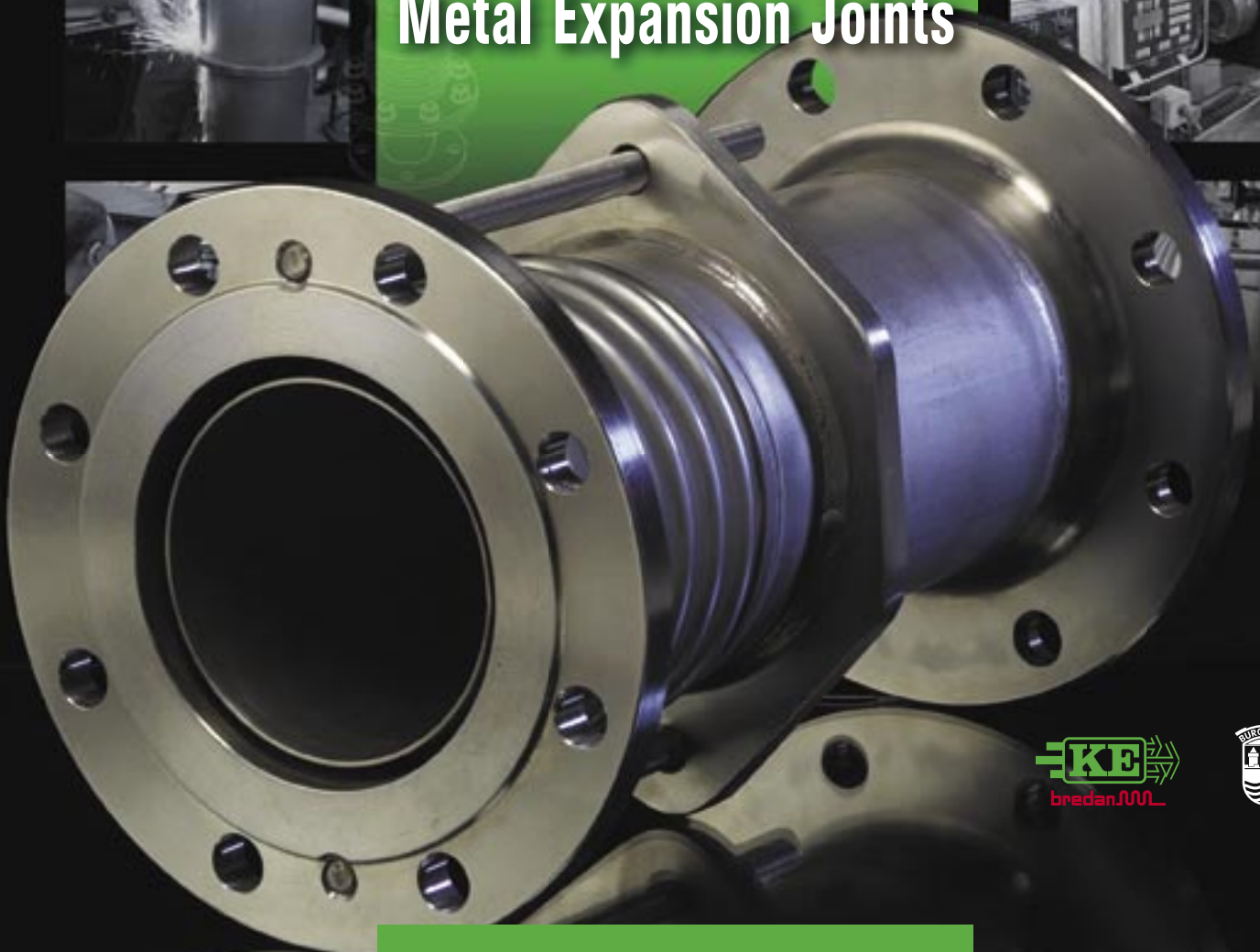


KE BURGMANN



Competence in
Metal Expansion Joints



Metal expansion joints and their applications

Pipework and ducting systems in industrial environments can be damaged, stressed and fatigued to the point of catastrophic failure by variations in temperature or pressure, or by mechanical vibrations and movement, unless the effects of those instabilities

are neutralised or eliminated at source. The most effective way of achieving this neutralisation is to install metal expansion joints at points in the system where such movements and stresses are generated. Metal expansion joints compensate for these movements and

stresses and provide the flexibility that the pipe or duct system requires for its safe, longterm operation.

Metal expansion joints are used in many industrial sectors including:

COMPETENCE IN METAL EXPANSION JOINTS



The energy sector:

- Power plants
- Flue gas cleaning systems
- Gas turbine systems
- Diesel engine installations
- District heating systems

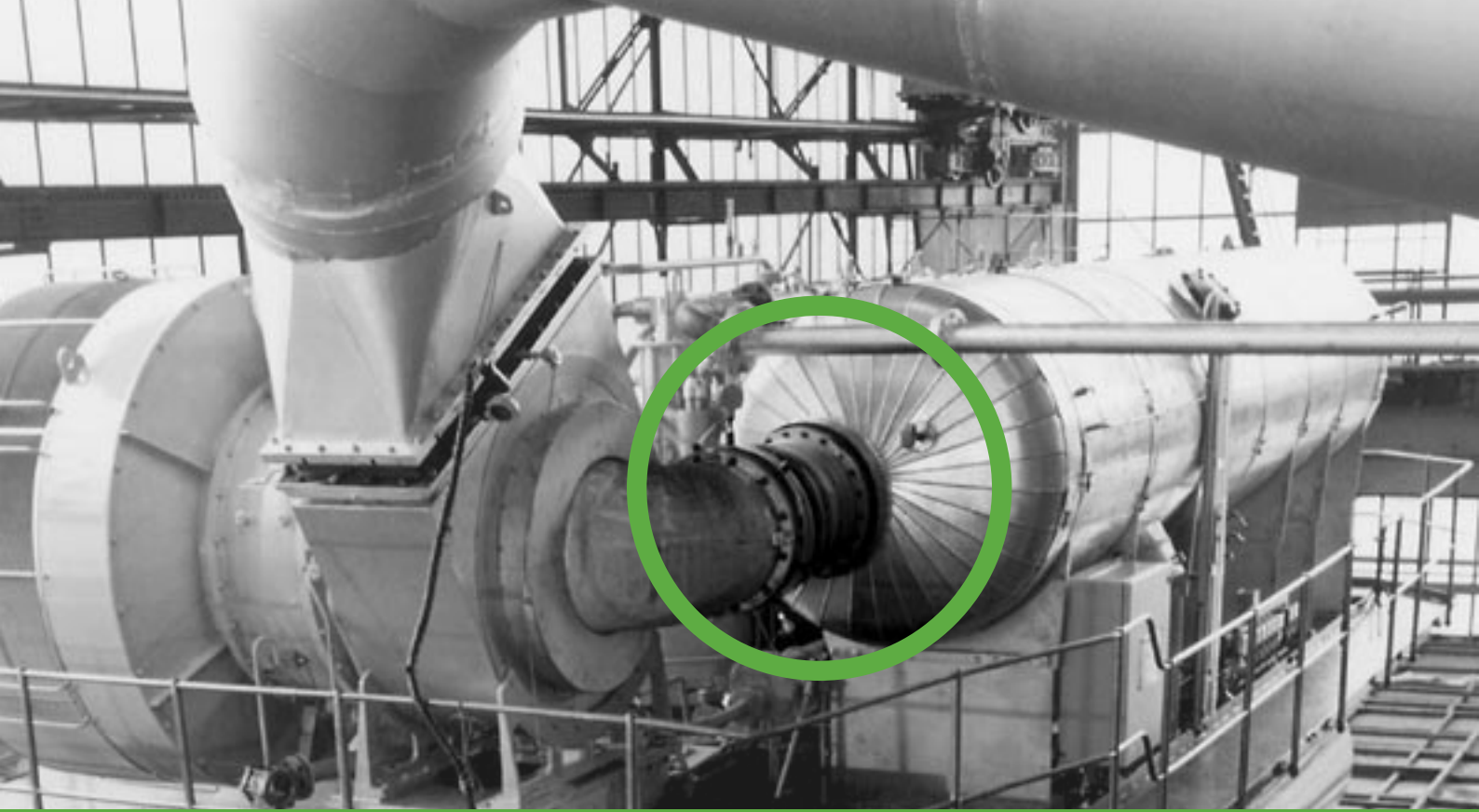
The process industries:

- Petro-chemical plants
- Chemical plants
- Cement works
- Steel works

The marine sector:

- Engine construction
- Ship building
- Operators / Shipowners
- Original Equipment manufacturers
- Spare parts supply





TECHNOLOGY THAT EXPANDS WITH YOU

Service all over the world – 24 hours a day

Metal expansion joints are important components and must be installed correctly to ensure reliable operation in the plant.

The service department at KE-Burgmann Bredan A/S has extensive experience with the installation and inspection of expansion joints on systems all over the world. We have a global network of experienced service engineers, ready to go to any installation in the world at very short notice. We offer to take measurements, and to design and install the most efficient expansion joints available. We provide supervision, final-inspection and all supporting services necessary in the application of metal expansion joints manufactured by our company.

A special field of expertise is refurbishment of old or damaged metal expansion joints in existing plants. KE-Burgmann Bredan A/S has extensive experience in this type of service and is able to offer clamshell metal expansion joint solutions for this purpose:

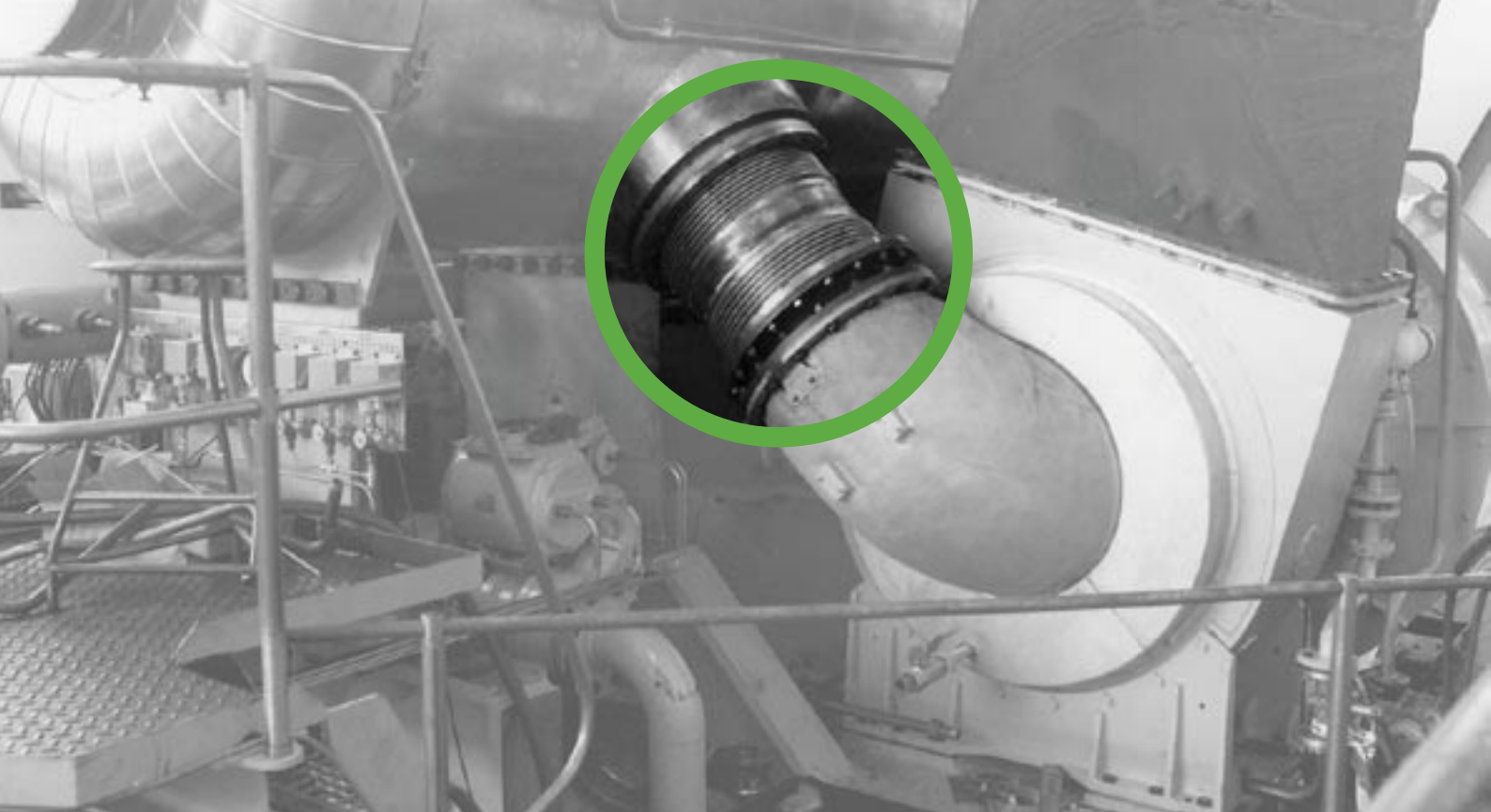
Oversize clamshell expansion joint
- an innovative solution to sealing a leaking bellows while keeping the plant on line

Same-size clamshell bellows
- if you need to replace a bellows with minimum plant downtime.

KE-Burgmann Bredan A/S has an experienced service team of clamshell welders, who have carried out over 100

on-line installations all over the world, e.g. in refineries, petrochemical plants, fertiliser plants, power and gas turbine plants, and in chemical plants using such chemicals as styrene, MTBE, polystyrene and similar.





COMPETENCE IN METAL EXPANSION JOINTS



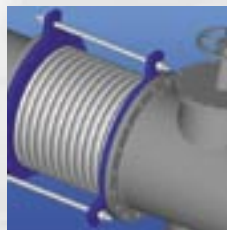
The Bellows - Design and dimensions

The basic element of an expansion joint is the bellows - a flexible, corrugated tubular metal element. Its flexibility enables the bellows to absorb the potentially harmful movements in the system. This flexibility makes the bellows the most sensitive part of the system. However, if it is correctly designed and installed, a metal expansion joint will provide long term service in any application.

In the operating environment the critical stresses and movements may act in axial, lateral or angular directions and the bellows must therefore be designed and dimensioned to accommodate these movements.

Special designs are documented by means of Finite Element Analysis (FEA), a 3D technique that provides a high degree of documentation and detailing. KE-Burgmann Bredan A/S engineers use FEA extensively to enable them to predict accurately how a structure or assembly will react to forces caused by heat, vibration, mechanical stress etc. in actual operating conditions. It enables them to predict whether that product or assembly will fail, wear out or operate as it was intended.

Through intensive research KE-Burgmann Bredan A/S has established accurate methods for the calculation of material stresses. For instance we have developed a specially designed programme for calculating bellows characteristics according to lifetime analysis and rules according to EJMA (Expansion Joint Manufacturer Association) with incorporate experience factors.



Research and development, materials and quality assurance

Product development is an on-going activity that enables KE-Burgmann Bredan A/S to provide constantly improving standards of service to our customers, thus enabling us to offer the latest technology to establish the design and application of metal expansion joints as a scientific rather than an empirical technique. Consequently our production technology, plant and test facilities are also being constantly updated.

Quality control and quality assurance according to the ISO 9001 standard is an integral part of the KE-Burgmann Bredan standard procedure, ensuring a uniform and high level of quality. Welding integrity and product quality are constantly checked using NDT (non-destructive tests) such as DP (dye penetration), X-ray tests, pressure tests or other tests according to customer request. These tests may be carried out

in-house, externally or supervised by an independent body. More complex tests and other quality control procedures are documented according to an accepted standard or according to customer requirements.

T E C H N O L O G Y T H A T E X P A N D S W I T H Y O U



AXIAL MOVEMENT



LATERAL MOVEMENT



ANGULAR MOVEMENT

KE-Burgmann Bredan holds:

- ISO 9001
- Pressure Equipment Directive (PED) according to 97/23/EC (CE-marking)
Module H certification certified by BVQI
- ASME
- EN 13445
- AD-Merkblatt HPO
- German Pressure vessel code certified by TÜV

In addition to our ability to operate with-in these design codes, KE-Burgmann Bredan A/S also holds type approval certificates from the following classification companies:

- Det Norske Veritas (DNV)
- Bureau Veritas
- Germanischer Lloyds (GL)
- American Bureau of Shipping (ABS)
- Lloyds Register of Shipping (LR)
- Nippon Kaiji Kyokai (Japan)
- Russian Maritime Register of Shipping



KE-Burgmann Bredan A/S Product Programme

KE-Burgmann Bredan A/S metal expansion joints are manufactured as round and rectangular, single, multilayer, two-ply testable in the following types:

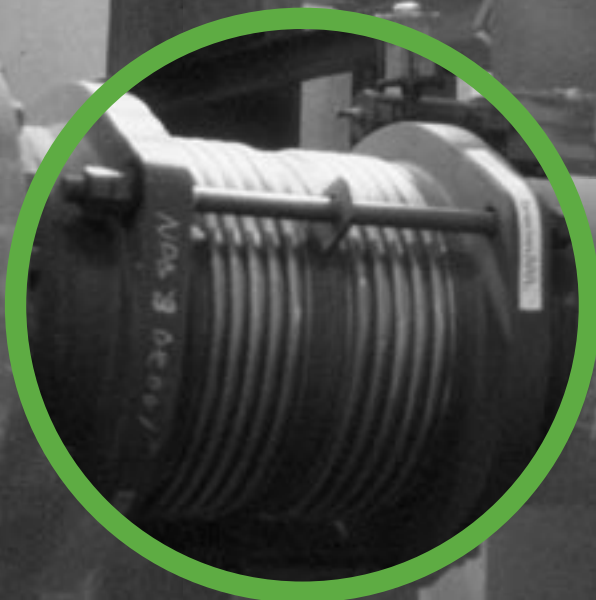
- Axial expansion joints
- Lateral expansion joints
- Angular expansion joints
- Universal expansion joints
- Expansion joints for low pressure and high temperature (exhaust/flue gas)
- Complete engineered pipe systems
- pressure balanced elbow
- In line pressure balanced

- Externally pressurised
- Camera, single mitre, double mitre and radius corner rectangular
- Connectors for heating & ventilation (HVAC)
- PTFE-lined expansion joints

Special expansion joint configurations:

- Double
- With an internal sleeve
- With an outside protective cover
- With tie rods, hinges and gimbals
- Clamshell configurations

C O M P E T E N C E I N M E T A L E X P A N S I O N J O I N T S



Good reasons for choosing KE-Burgmann Bredan A/S as your partner

KE-Burgmann Bredan A/S has more than 25 years of experience in designing metal expansion joints. We are flexible in design and have a full range of manufacturing capabilities in house.

You can have confidence in product selection because we have the whole product range under one roof and we guarantee the best advice in selecting the correct metal expansion joints for any particular duty.

Security in quality assurance: we are approved according to the ISO 9001 standard and we are members of the international Euro Qualiflex Association.

Reliability in installation: we have our own service and installation department, constantly occupied installing expansion joints all over the world. We are on call 24 hours a day, to service any destination by the quickest available route.

Prompt delivery: we use state-of-the-art machinery and production equipment to ensure manufacturing flexibility and to guarantee delivery in the shortest possible time.

Rapid and reliable service: we are represented globally by well-trained local partners who can give you a total service in any part of the world.

TECHNOLOGY THAT EXPANDS WITH YOU

Advantages in the use of metal expansion joints

1. Safety

Safety in operation: metal expansion joints offer flexible and reliable solutions at temperatures up to 1100°C (2,000°F) for special materials. Safety for personnel: strong and stable designs. Safety for the environment: gas-tight and leak-proof design – KE-Burgmann Bredan A/S metal expansion joints are safe with corrosive gases and other media.

2. Flexibility

Flexibility in sizes: dimensions from DN15 upwards.

Flexibility in design: KE-Burgmann Bredan A/S metal expansion joints can be manufactured as single- or multi-layer designs and in a wide variety of materials

3. Choice

Our production programme and our wide range of designs are indicative of our capabilities – but in no way limiting. Designs other than those quoted in this document are available on application.



KE-Burgmann Bredan A/S - a team with experience in metal expansion joint technology



KE-Burgmann Bredan A/S is part of KE-Burgmann A/S, a group that is dedicated to the development, design, engineering and manufacture of fabric, rubber and metal expansion joints in an almost unlimited variety of designs for the solution of a similarly vast range of industrial alignment problems in industrial facilities throughout the world.

KE-Burgmann Bredan A/S is the Metal Expansion Joint Division within the KE-Burgmann Group of companies worldwide and has more than 25 years of experience in designing and producing metal expansion joints. We have an in-depth knowledge of

materials, advanced production technology and technical expertise in the design and application of metal expansion joints and we have developed our own integrated software for calculating dimensions and operating characteristics to support our technical engineering team.

KE-Burgmann Bredan A/S is committed to maintaining its reputation of always providing the best solutions and supplying the highest quality products from all levels of our organisation. With this high level of commitment, we are able to enter a meaningful dialogue with our customers in which advice, co-operation and application

knowledge are the keywords. Product quality and reliability; delivery; technical service; and commercial integrity have always been the foundations of our relationship with our customers, partners and suppliers all over the world. They will continue to be so.



COMPETENCE IN METAL EXPANSION JOINTS



The Burgmann Group

KE-Burgmann is a member of the Burgmann Group of companies with more than 3,000 employees and more than 50 subsidiaries, joint ventures and associate companies worldwide. With 40 years of experience in expansion joint technology, production facilities in a number of countries and its own subsidiaries all over the world.



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