



A compendium  
of good characteristics

## Significant – all around the world

A hardness based on fire, water, air and earth is all that is needed for achieving safe production processes in sensitive industries.

**email800** is made in a number of stages from quartz, feldspar, borax, soda, saltpeter and metal oxides and by melting at 1.400°C (2552 F). The special mix ratio of the basic substances determines the final resistance to aggressive media.

**email800** is therefore a very special surface protection and its uses include the chemical, pharmaceutical and food industries.

**Why? This can be explained with quality and economical reasons:**

It meets quality and economic requirements in that components made of **email800** reduce the usual amount of care and maintenance required. Pipelines, fittings, valves, bottom outlet valves and columns from Düker can be combined to form durable complex units. The many options for users include the standard range, the design of special parts or a customized combination of both.

## A complete program

Technical enamel from Düker caters for all requirements

**email800** from Düker is a convincing product in competition with different technologies and makes a great deal of current surface protection seem old-fashioned. This is the opinion not only of users but also of independent research bodies and independent test establishments.

Customers' technicians are primarily interested in hygiene, economic effectiveness, holding times and the particular corrosion protection appropriate for specific purposes. Opting for **email800** not only provides them with high quality, long-lasting and permanently maintenance-free installations but also enables them to call upon the know-how of experienced specialists at every stage from planning and customised design to commissioning and after-care.

- Product range of our pipe parts, finished goods and special productions
- Modular constructed bottom outlet valves
- Highly acid resistant fittings, oblique seated valves and diaphragm valves, sight glasses, flat sight glasses
- Distillation columns, absorption, extraction, as gas washer or reaction tube



# Resistance in full operation!

## Characteristics of email800

New products and new process techniques are creating larger areas of use and more exacting requirements for surface protection in plant engineering in the chemical, pharmaceutical and food industries. We catered for these requirements when developing our particularly durable “email800”.

email800 is highly resistant against attack, wear and corrosion and to diffusion during long holding times. These characteristics have been confirmed by independent tests and major chemical laboratories in Germany and Switzerland.

### Acid Resistance

- according to DIN ISO 2743 (HCL 20%; 108 °C / 227 °F)
- according to DIN 51174 (HCL 20%; 140 °C), abrasion 0.18 mm/year

### Alkali Resistance

- according to DIN ISO 2745 (NaOH 4%; 80 °C / 176 °F), abrasion 0.4 mm/year
- according to DIN ISO 2745 as amended, abrasion 0.3 mm/year



## Email350 – enamel quality in white

Our email350 quality is the economical solution against plastic materials. Pipes and fittings as well as special parts can be delivered in this quality. They can be used, in respect of operating conditions, in high temperature areas (till 150°C / 320 °F). The small production costs are a result of less coating layers.



## email850P – special made for the pharmaceutical industry

email850P colour is light blue. The application of email850P can be found in pharmaceutical areas, drinking water supply and sewage technology. It combines better surface properties, optimizes corrosion properties and neutral biological behavior to the advantage of plant safety and to avoid product contamination in pharmaceutical processes.



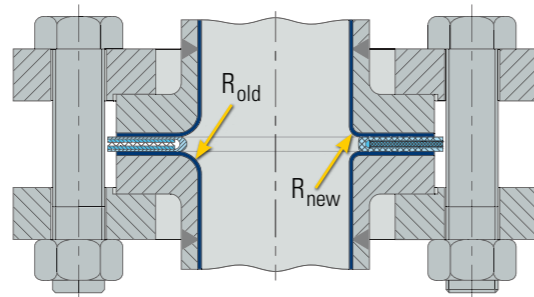
# Pipeline components

Best surface protection ...

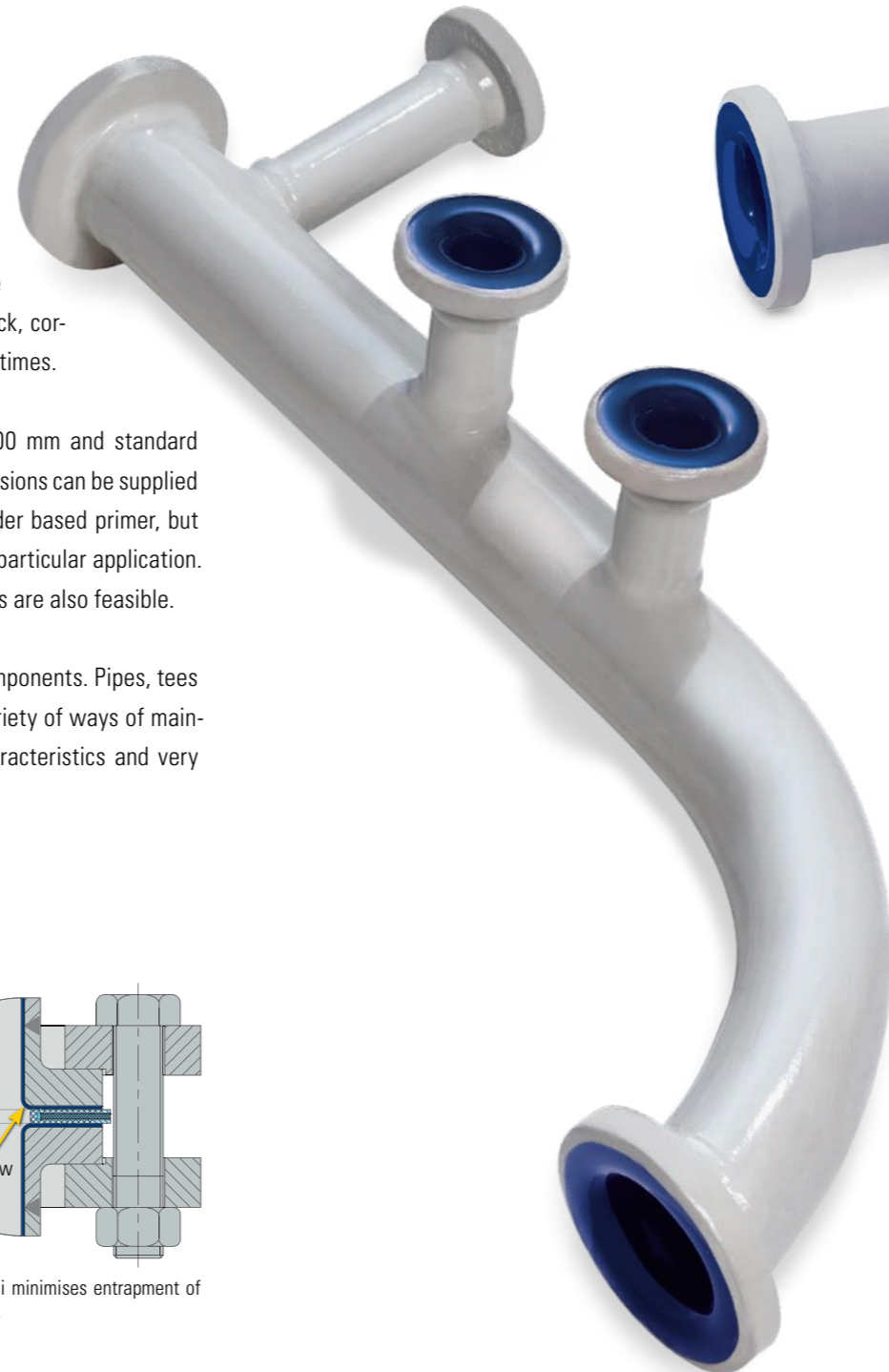
... for use in the chemical and pharmaceutical industries. In situations involving aggressive media, the particular surface protection provided by email800 is highly resistant to attack, corrosion, diffusion, temperature and wear during long holding times.

Our basic range comprises nominal diameters of 25 to 600 mm and standard lengths of up to 4 metres depending on nominal diameter. Versions can be supplied both to DIN or ANSI. The usual external finish is zinc powder based primer, but galvanising and painting are available if desired to suit the particular application. Special fabrications and special technical versions or lengths are also feasible.

The range of supply also includes jacket-heated pipeline components. Pipes, tees and bends with heating or cooling jackets afford a wide variety of ways of maintaining temperature stability without affecting quality characteristics and very high safety standards.



The reduction by half of the flange radii minimises entrapment of residues and ensures better cleanability.



From "simple" pipe section to...



...double-wall pipeline components for heating or cooling and...



...special fabrications to meet customer wishes—all this is part of the range!

Good connections are provided by our new push-in loose flange, developed from our DIN loose flange. The two halves are easy to assemble and secure without using any tools. It can be used in combination with any conventional flange to produce a reliable connection.



"Even in extreme temperature conditions and with vacuum ( $10^{-5}$  and  $10^{-6}$  mbar l/s ) with this flange connection leakage rates are minimized. The high residual torques ensure permanent tightness regardless of fluctuating temperature influences". (source: Test Infraseriv)

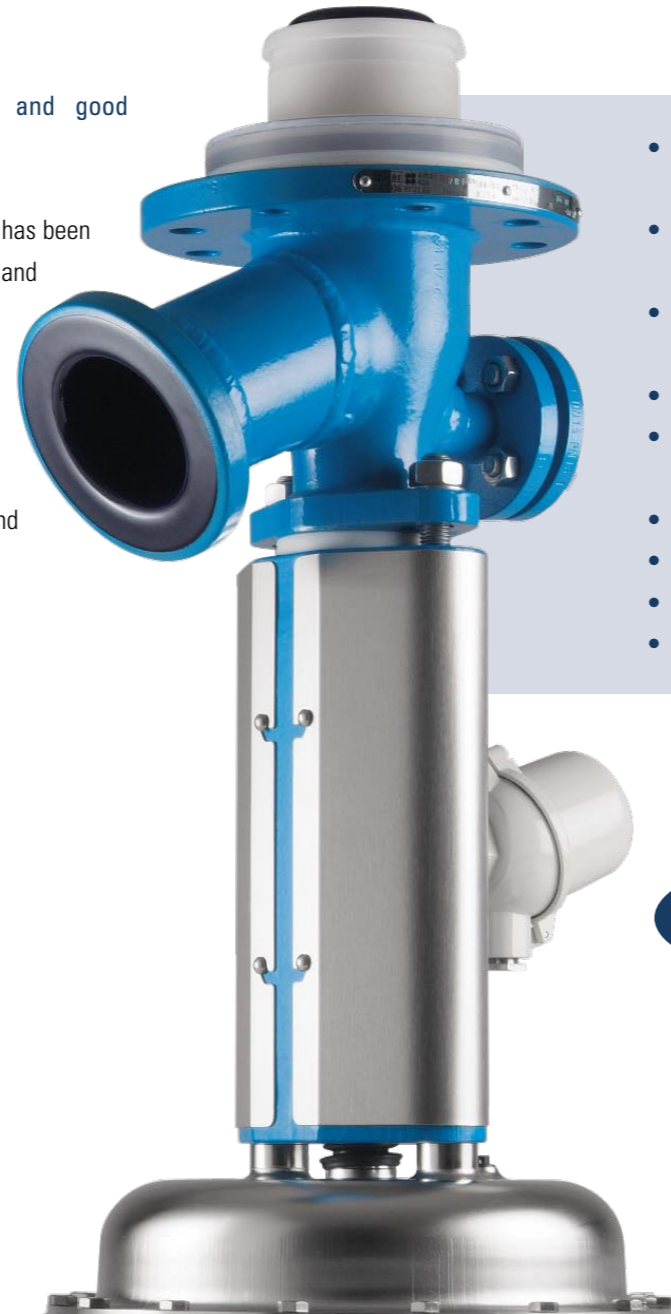
# The New Generation – Glass lined bottom outlet valves with gap free design

Düker innovations are characterized by low maintenance and good cleanability.

For the new generation the number of convolutions in the bellows has been reduced to 6 which reduces the risk of product entry or crystallization and improves the cleanability.

Bottom outlet valves according to DGRL 97/23/EG (PED) Category II, Module A1 with CE mark and declaration of conformity.

Designed in accordance to TA-Luft with bellow, safety packing and connection thread for bellow monitoring.



- seal with valve seat and sealing cap towards the glass lined vessel nozzle (no product entry or crystallization behind the valve seat)
- valve seat (PFA) with stainless steel core and integrated gaskets (better stability with high temperatures)
- new bellows of TFM1600 (6 convolution bellows and seal with PTFE-encapsulated O-ring)
- replaceable PT100 (without dismantling the valve)
- Actuator made of electro-polished stainless steel with emergency opening
- Headpiece with stainless steel cladding against dirt
- Flushing nozzle provided as standard
- Easy assembly with lifting device
- Limit switch by NAMUR

## Tight and clean

The new sealing cap can be used for all Düker bottom outlet valves to avoid a gap between the glass lined vessel nozzle and the valve seat. In addition large tolerances can be eliminated.



Versions: Lateral actuator for vessels with small space

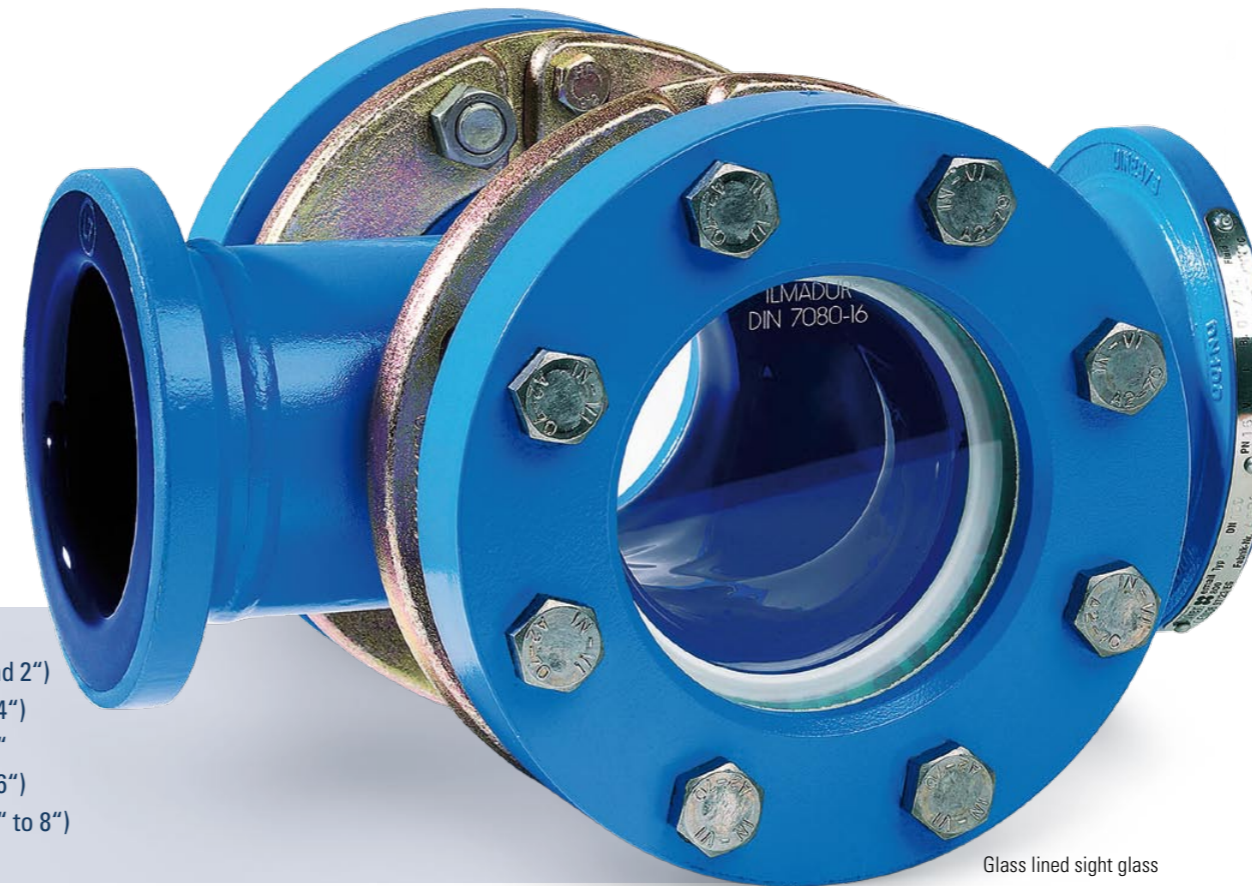


Check gauge to find out the right O-Ring.

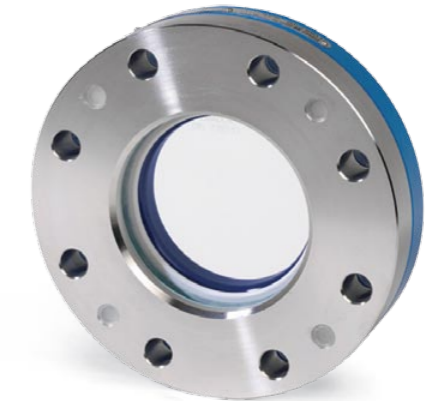
# Highly acid resistant valves – with smooth surfaces, scratch resistant, easy to clean

...are authorised, depending on version, for temperatures up to 180 °C/356 °F and operating pressures ranging from -1 to +16 bar. All versions can be supplied to DIN or ANSI.

Our forged-steel valve bodies and precision cast steel or class GGG 40.3 spheroidalgraphite iron components meet the high safety standards required in chemical plants. Particularly in the pharmaceutical industry, smooth and scratch resistant surfaces and easy cleaning are further important criteria for optimum production results. The QHD guidelines set all this out in black and white.



Glass lined sight glass



Glass lined flat sight glass

Ball valves	DN 25 and 50 (1" and 2")
Diaphragm valves	DN 25 to 100 (1" to 4")
Oblique-seates valve	DN 25 to 50 (1" to 4")
In-line sightglass	DN 25 to 150 (1" to 6")
Flat sightglass	DN 40 to 200 (1-1/2" to 8")



GMP Diaphragm valves: Head piece optional made of plastics or stainless steel. Sealing through PTFE-Protection shield with rubber back-up diaphragm



Glass lined ball valve

# Glass lined columns

for distillation, absorption, extraction, in gas scrubber or reaction tube

Construction and equipment are each designed for the desired application and specific process, up to and including DN 600 (24") and in section lengths of up to 4 meters.

The various column sections up to DN 400 (16") are usually connected by loose flanges. Nominal diameters of 500 (20") and 600 mm (24") require the use of profile rings and pipe clamps. If the customer so desires, the supply includes internals such as supporting rings, perforated plates, inlet pipes, flow distributors and the like. Comprehensive internal testing to DIN, ISO, ASME and factory standards, company-specific regulations and TÜV acceptances afford optimum certified safety.



The development and setting up of complex process equipment call for a great deal of planning and advice. You can rely on Düker as a competent partner when it comes to operationally safe and economic incorporation of reliable units and columns into a production system. Our expertise is available not only for the process of making plant items but right through the tender and design stages, project work, installation and after-care.

Beside the production of pipes, fittings and columns we are also reglassing. Reglassing is not only cost saving but also time saving than a new production. A spark test with 20 KV will be made of course after glass lining.

We offer our columns in three different enamel qualities, which vary in specification, coat application or other special operating conditions. These are:

- email350** white enamel, applicable till 150 °C / 302 °F
- email800** dark blue enamel, all-purpose in chemical and pharmaceutical industry
- email850P** light blue enamel, special made for pharmaceutical industry



# email250/light – glass lined pipe system for aggressive exhaust air and waste water

Under the trade name *email250/light* Düker produce glass lined piping for aggressive exhaust air and waste water.

*email250/light* is easy to mount, stable and a long-life product. Because of the inner glass lining this pipe system is proper for aggressive fluids.

In general *email250/light* has a coating thickness of 0.4 mm. In case of higher aggressive substances in connection with higher temperature we are using *email250-hsf*. Here we have a thickness of 0.5 mm. Both types are pore free glass lined of course.

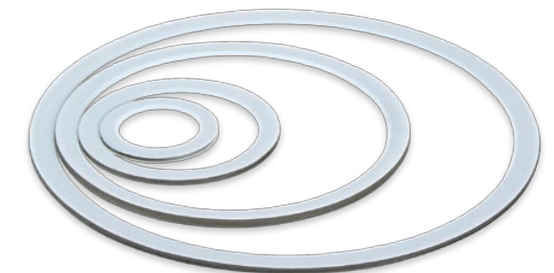
Components between diameter DN50 and DN300 are produced with a wall thickness of 3 mm respectively 4 mm. As a general rule the sealing is a graphite gasket – alternative with a PTFE envelope.



Our *email250/light* pipe components are connected with "easy-to-mount" loose flanges.

## The advantages of *email250/light* at a glance:

- high thermal loading up to 200 °C / 392 °F
- high long-term resistance
- no material embrittlement typical of plastic
- high safety factor in the case of fire
- easy-to-clean and anti-adhesive
- fracture-proof
- smooth surfaces to counteract abrasion
- low weight



The shown graphite gasket with a PTFE envelope is favored built in besides of the pure graphite gasket.



# DPI – with system to solutions

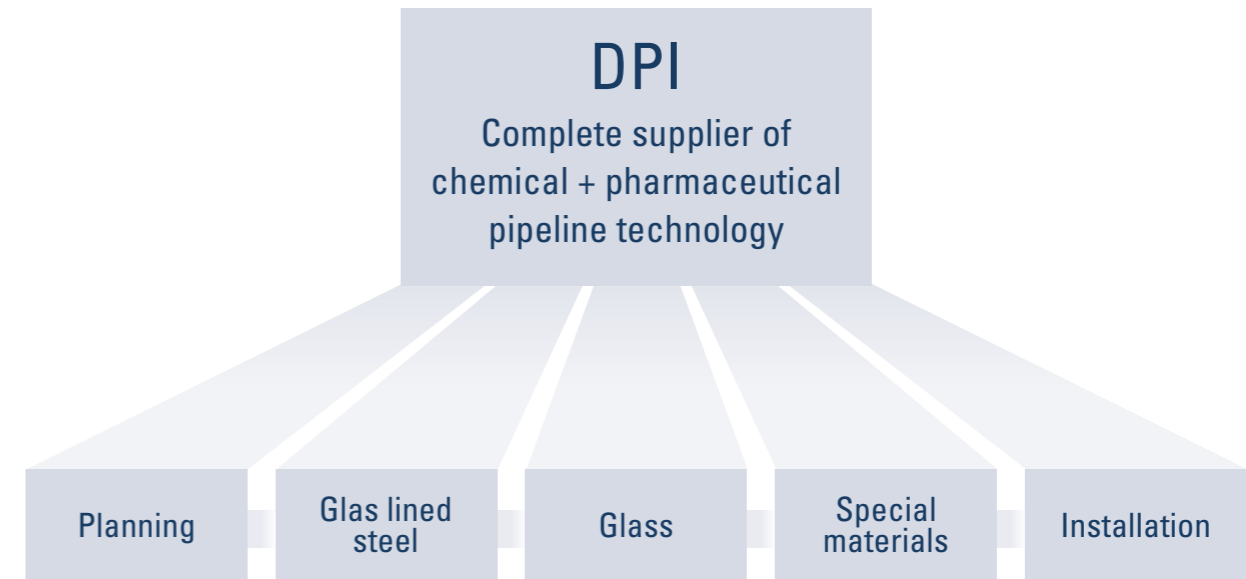
Vendor with competent experts

The trend for operator of chemical plants is the reduction of contact points. Chemical and Pharmaceutical industries decide to count on less suppliers instead of many.

Düker DPI concentrates and structures the expertise of particular areas in one hand. The close teamwork of our experts brings safety in technical matters and a big economical advantage. Extensive technical advise, exact planning and calculation will show already in the planning phase the best efficiency of your plant concept.

DPI's services include:

- engineering and planning
- supply of glass lined pipeline components
- supply of PTFE-lined pipeline components
- procurement of glass lined vessels
- installation and validation



# email800 – in use worldwide

Certified to meet highest quality requirements

The particular nature of the chemical and pharmaceutical industries calls for high standards of safety in processing and production and in maintenance and care.

Düker's products, particularly email800, cater for these requirements in theory and practice at all levels. As early as 1994 Düker set up quality management to ISO 9001 and successfully audited all installations to TÜV CERT.

The first stage is the careful selection of suitable materials, authorised by TÜV regulations, for high-quality linings, and initial material checks with our suppliers. Before being glass lined, each part is checked for exact dimensional accuracy. We use parts with overdimensioned wall thicknesses for glass lined components.

The regular tests included in the comprehensive technical monitoring for all products include high-voltage tests after lining, measurement of lining thicknesses and monitoring of angularity and plane parallelism.

Making pressure vessels to the ASME Code involves specifically defined materials, welding processes and documentation.



Since May 2002, Düker has also been making fittings, columns, vessels and complete piping systems according to the European Pressure Equipment Directives ( PED ) 97/23/EC (German abbreviation DGRL).

The frequent changes in production campaigns make hygiene and clean ability important factors, including from the economic point of view. The QHD (Qualified Hygienic Design ) test method enables us to comply with relevant standards concerning choice of materials, design, manufacture, installation and surfaces. Its second stage produces practical evidence of clean ability.

Plant constructors and clients throughout the world have the benefit of Düker's quality management and uniformly conducted certifications. This supports and eases procedures and promotes objectivity in the placing of orders.

Pipe systems with email800 are durable and resistant to aggressive media and their long service life is convincing. In addition, the materials used are recyclable to become 100% available for reuse!

We thus supply a product that corresponds to the state of the art – and properly certified at that...



GLASS LINING TECHNOLOGIES

JOBGING FOUNDRY

FITTINGS AND VALVES

DRAINAGE TECHNOLOGY

ENGINEERING

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