



A Compendium of Good Characteristics

Maximum Hardness with the Elements Air, Fire, Earth and Water

This is really all it takes to implement safe production methods in sensitive industries.

This is how, in several phases and in a melting process of 1,400 °C, quartz, feldspar, borax, soda, salpetre and metallic oxides result in “Technical Enamel – made by Düker Email Technologie”. In the end, it is the special mixing ratio of the basic substances that determines the resistance to aggressive media.

This is why **technical enamels** are considered a more specific type of surface protection which is, among others, used by the chemical and pharmaceutical industries for their plants.

Why is that so? The reason for this can be found in quality-oriented and economic requirements:

Components that have been coated with **technical enamel** contribute to minimizing the usual time and effort spent on maintenance and care.

Pipes, valves, bottom outlet valves and columns by **Düker Email Technologie** can all be combined into complex and extremely durable units. For the user this means that all options remain open: the standard range, special parts design or custom-made design combining both...

Technical Enamels by Düker Email Technologie are convincing products which beat out other technologies and leave other modern surface protection systems in the dust. This is confirmed not only by users but by independent research institutions and neutral testing institutes.

Above all, our customers are interested in hygiene, economy, lifetime, and which corrosion protection is the most suitable for their specific requirements.

By using technical enamels from **Düker Email Technologie** on the one hand, you decide for high-quality, durable and permanently maintenance-free installations. On the other hand you can use the knowledge of experienced specialists.

From planning through tailor-made construction to commissioning and subsequent support.

- Basic program of our pipeline parts, finished goods and custom-made products
- Modular bottom outlet valves made of steel enamel, stainless steel and Hastelloy
- Highly acid-resistant fittings and sight glasses of various types
- Columns for distillation, absorption, extraction, heat exchanger, filter, as a gas scrubber or reaction tube and their components



Resistance in Every Use!

A Full Range of Different Qualities

New products and new process techniques are creating larger areas of use and specific requirements for surface protection in plant engineering in the chemical, pharmaceutical and food industries. We catered for these requirements when developing our particularly resistant **Technical enamels**.

email250light – the lightweight for aggressive exhaust air and waste water

email250light is a pore-free chemical glass lining with a layer thickness between 0.4 mm and 0.6 mm.

email800 – the standard for maximum resistance

email800, the premium version, is highly chemical corrosion-resistant, diffusion safe, temperature and wear-resistant with long service life.

email850P – especially for the pharmaceutical industry

email850P light blue combines improved surface properties, optimized corrosion properties and biologically inert behaviour, which benefits operational safety and avoids product contamination in pharmaceutical processes.

emailABR60 – abrasion-resistant enamel

emailABR60 is the perfect combination of chemical resistance and a high degree of abrasion resistance. This type enamel is usually used in process engineering where corrosive media containing solid matter particles need to be transported, even under high temperatures.

email800 Bi-color – additional security through monitoring

The use of **email800 Bi-color** offers additional security by controlling the thickness of the enamel layer even under unfavorable or borderline operating conditions. A color change in the enamelling warns that the wear limits have been reached.



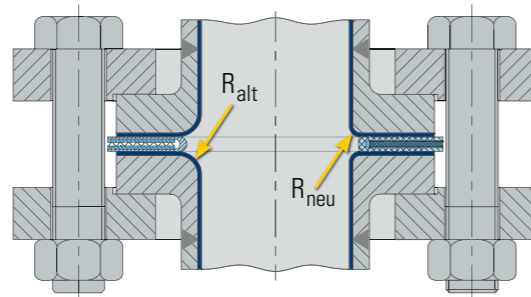
Pipeline Components

Best Surface Protection ...

... for use in the chemical and pharmaceutical industries. In situations involving aggressive media, the particular surface protection provided by **Technical enamels** is highly resistant to attack, corrosion, diffusion, temperature and wear confirming long service lifetime.

Our basic range comprises nominal diameters of 25 mm to 600 mm and standard lengths of up to 4 metres depending on nominal diameter. The versions can be supplied according to DIN or ASME. 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.



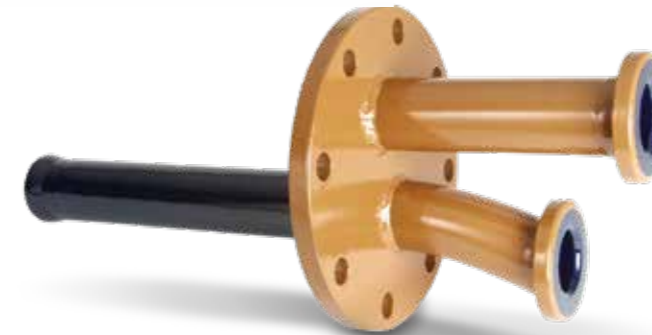
The reduction by half of the flange radii minimises entrapment of residues and ensures better cleanability.



From "simple" pipe section to...



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



...special fabrications to meet customer requirements – all this is part of the range !



Our new DuoSafe Flange (DSF), which has been further developed on the basis of our DIN loose flange, ensures correct connection. The two halves are easy to assemble and secure without needing any tools. It can be used in combination with any conventional flange to produce a reliable connection.

"Even under extreme temperature conditions with this flange connection leakage rates are minimized. The high residual torques ensure permanent tightness regardless of fluctuating temperature influences". (source: Test Infrserv)

Glass Lined Bottom Outlet Valves with Gap-free Design

Düker Email Technologie bottom outlet valves are characterized by reliable operation, long service life, and easy maintenance and cleaning. They are manufactured according to the Pressure Equipment Directive (PED) and are TA Luft, SIL II and ATEX compliant. All seals in contact with the product are designed according to the guidelines of the Food and Drug Administration (FDA).

Different basic types are available for various applications and areas of use:

- Glass lined version
- Glass lined, gap-free version
- FireSafe version according to EN ISO 10497

The following additional variations are an option*:

- Hand wheel
- Axially mounted pneumatic actuator
- Lateral pneumatic actuator
- With/without bellow
- Block flange – opening into the vessel
- Block flange – opening into the valve

Optional:

- Finished painting according to customer specification
- email800 in white colour
- email850P in light blue colour

* does not apply to FireSafe bottom outlet valve



Mounting aid for bottom outlet valves

- Sealing with valve seat and sealing cap in the the glass lined outlet connection (no product entry or crystallization or between the valve seat and vessel connector)
- Valve seat (PFA) with stainless steel core and integrated gaskets (increased stability under high temperatures)
- New bellow TFM1600 (6 convolutions and gap-free sealing through FEP-covered O-ring)
- PT 100 easy to replace (without dismantling of the valve)
- Stainless steel actuator with emergency opening (polished or mat finish)
- Stainless steel cover of head piece against dirt particles
- Flushing nozzle DIN 15 provided as a standard
- Easy to install with lifting device
- Limit switch pursuant to NAMUR
- Specific customer requirements



Master gauge for determining the required O-ring.

Tight and clean

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

Useful range from $-60\text{ }^{\circ}\text{C}$ to $+200\text{ }^{\circ}\text{C}$ including pressure rating of -1 bar to $+10\text{ bar}$.

Examples of Special Constructions of Gap-free Bottom Outlet Valves

Bottom outlet valves in stainless steel and hastelloy

Comply to the standards of the PED Pressure Equipment Directive and Air Quality Control (TA-Luft). All gaskets are designed to meet the FDA regulations.

Useful range from $-60\text{ }^{\circ}\text{C}$ to $+200\text{ }^{\circ}\text{C}$ including pressure rating of -1 bar to $+10\text{ bar}$.



Glass lined firesafe bottom outlet valve – in line with the latest EN ISO 10497

Comprehensive tests confirming tight sealing of at least 30 minutes at temperatures between $750\text{ }^{\circ}\text{C}$ and $1,000\text{ }^{\circ}\text{C}$. This is sufficient time for pumping the vessel dry in order to prevent serious damage.



Bottom outlet valves with block flange

Useful range from $-60\text{ }^{\circ}\text{C}$ to $+200\text{ }^{\circ}\text{C}$ including pressure rating of -1 bar to $+10\text{ bar}$.

Bottom outlet valves with block flange we offer in 2 versions:

- opening into the vessel
- opening into the valve

Accessories for bottom outlet valves

Due to various applications you can add or replace different accessories in reliance to the execution. Some parts are able to be upgraded any time, e.g. pneumatic actuator or temperature sensors.

Highly Acid Resistant Valves – with Smooth Surfaces, Scratch Resistant, Easy to Clean

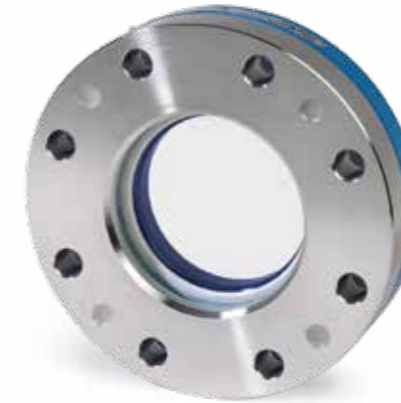
...are certified, depending on version, for temperatures up to 180 °C / 356 °F and operating pressures ranging from –1 bar to +10 bar. The versions can be supplied according to DIN or ASME.

Our steel-forged valve bodies and components made of steel investment casting can meet the high safety standards of industrial plants. Particularly in the pharmaceutical industry, smooth and scratch resistant surfaces and easy cleaning are further important criteria for optimum production results.

Ball valves	DN 25 and DN 50
Diaphragm valves	DN 25 to DN 100
Sight glass	DN 25 to DN 150
Flat sight glass	DN 40 to DN 200
Cylindric sight glass	DN 25 to DN 150



Cylindric sight glass



Glass lined flat sight glass



Glass lined ball valve



Sight glass



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

Glass Lined Columns

For Distillation, Absorption, Extraction, in Gas Scrubber or Reaction Tube

Construction and equipment are 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 individual column sections are usually connected with loose flanges up to DN 400. Profile rings and clamp screws are used for nominal widths of 500 mm and 600 mm. Upon customer request, internal parts such as support rings, perforated plates, inlet pipes and liquid distributors or other components can be supplied. Extensive tests according to national and international standards, **Düker Email Technologie** factory standards, as well as customer-specific regulations and TÜV approvals create optimum certified safety.



The development and setting up of complex process equipment call for great deal of planning and advice. You can rely on **Düker Email Technologie** 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-sales.

Beside the production of pipes, fittings and columns we offer also reglassing. Reglassing is not only cost saving but also time saving compared to new production. A spark test with 20 KV will be included after reglassing.

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

- email800** dark blue, universally applicable in chemical and pharmaceutical industry
- email850P** light blue, special made for pharmaceutical industry
- email800 Bi-color** additional security due to control of the enamel layers

email250light – the Lightweight for Aggressive Exhaust Air and Waste Water

Under the trade name *email250light* Düker Email Technologie produce glass lined piping for aggressive exhaust air and waste water.

email250light is easy to mount, stable and a long-lasting product. The glass lining of the inner surface contributes to withstand aggressive media.

In general *email250light* has a coating thickness of 0.4 mm–0.6 mm. Components between diameter DN 50 and DN 300 are produced on a steel body 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.

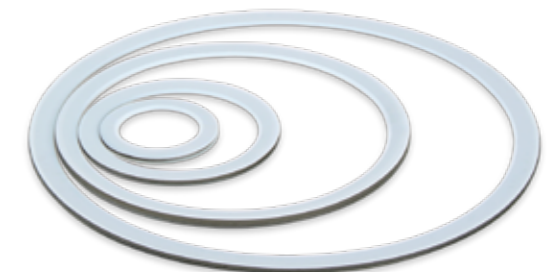


Our *email250light* pipe components are connected with "easy-to-mount" loose flanges.



The advantages of *email250light* at a glance:

- Thermal loading from –20 °C to +200 °C
- Long-term stability
- No material embrittlement as is typical for plastic material
- Extremely safe during fire
- Fracture-proof
- Anti-adhesive smooth surface
- Low weight
- Spark test with 5 kV



In addition to the graphite gasket the shown PTFE enveloped graphite gasket is favoured.

emailABR60 – Extreme Hardness for Heavy-Duty Demands

Out of the demand to corrosion during chemical process there are further applications asking to confirm extended abrasion resistance. This is why Düker Email Technologie has developed new enamel types that are characterized by extreme resistance.

The emailABR60 is the perfect combination of chemical resistance, comparable to the email800 quality, and a high degree of abrasion resistance.

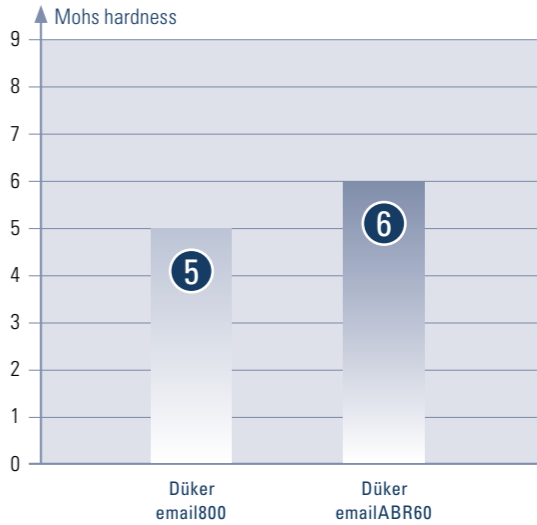
The benefits at a glance :

- High abrasion resistance
- Extended lifetime of installations and components
- Reduction of system downtimes
- Can be also used under combined abrasive/corrosive stress
- Use in various sections of the conveyance of solid media
- Suitable for re-glassing



emailABR60 – abrasion-resistant enamel with high corrosion resistance

These enamel types differ in their degree of hardness. emailABR60 reaches 6 Mohs on the hardness scales. Comparison: Regular enamel reaches 4 Mohs, email800 5 Mohs and Diamonds 10 Mohs.



DPI – with a System for Solutions

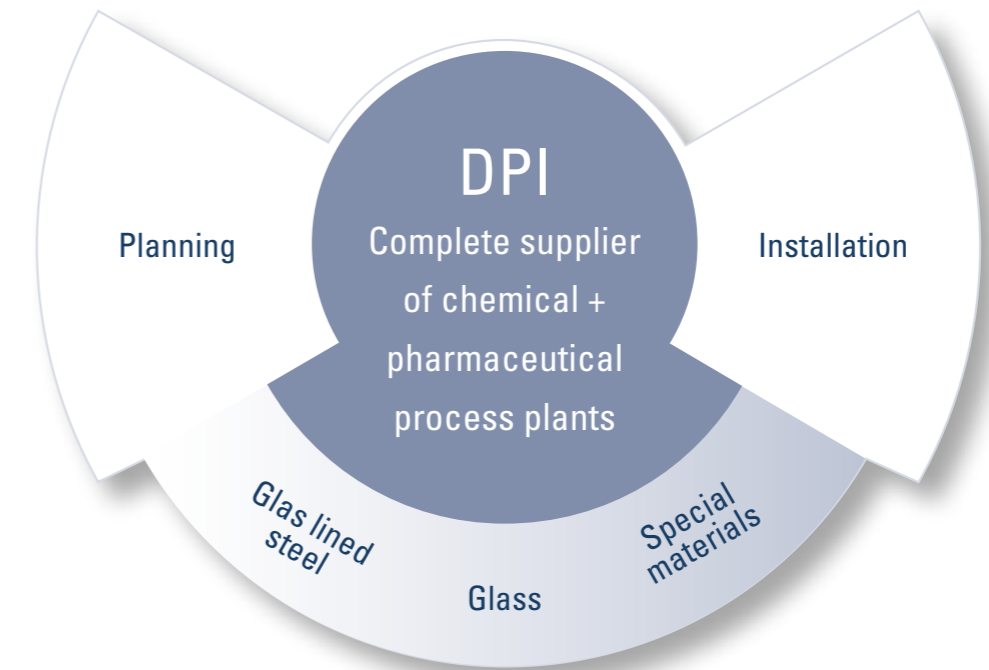
Integrated Solutions from a Single Source for Functionality, Security and Customer Benefit

A trend for operators of process plants is the conscious reduction of interfaces. In plant construction, the chemical and pharmaceutical industries are increasingly relying on the selection of system suppliers.

With DPI, Düker Email Technologie focuses all services connected with pipeline and plant installations to a single source. The customer benefits from a network of experts who will contribute their knowledge and experience on the basis of individual projects, acting as a team. The operators benefit by reducing their administration costs and relieving some of the work load on their internal departments. As a full-service provider, DPI further assumes overall warranty.

DPI offers:

- Engineering/planning
- Delivery of glass lined pipeline and system components
- The procurement of enamelled, process engineering modules, e.g. columns, separators and containers
- Supplying glass lined vessels
- Supply of PTFE-lined pipeline components
- Installation/start-up
- Maintenance



Technical Enamel – 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 Email Technologie meets these requirements with its products. Düker Email Technologie already installed an ISO 9001 quality management system in 1994.

It begins with the careful selection of suitable, nationally and internationally approved materials for the high-quality enamelling and initial material tests of raw materials provided by 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 Email Technologie has been manufacturing valves, columns, containers or complete pipeline systems according to the European specifications of the latest version of the Pressure Equipment Directive (PED).

Plant constructors and clients throughout the world have the benefit of Düker Email Technologie 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...

The certificates are listed on the website:
<http://www.dueker-germany.com/glass-lining-technologies/downloads/zertifikate.html>

Committed to Environmental Protection

For Düker Email Technologie, environmental protection is an essential obligation on the way to achieving the formulated company goals and is an indispensable aspect of the operative activity of every employee. In this sense, the protection of the environment and the responsible use of natural resources are not merely an end in themselves, but also secure the future of the company. The economical and efficient use of natural resources has a direct impact on the environment and ensures availability for future generations.

Düker Email Technologie regularly and systematically determines and evaluates its environmental impact and works towards limiting it to an environmentally-friendly level. This also applies to the selection and use of our primary materials and feedstocks, energy sources, technical equipment and work processes. The use of energy-efficient technologies has a high priority in the purchase of new equipment and in the modification of machines and systems. In the assessment and selection of the essential suppliers and service partners, Düker Email Technologie works towards ensuring that they act according to equivalent standards in their procedures and workflows.



Düker Email Technologie offers

- Functionality, safety and customer benefits for the chemical and pharmaceutical industries
- Integrated solutions from a single source

- Highly acid-resistant enameled pipeline parts, fittings and columns
- Comprehensive services
- Qualification of your employees
- Engineering, procurement, construction, assembly and maintenance for process plants

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