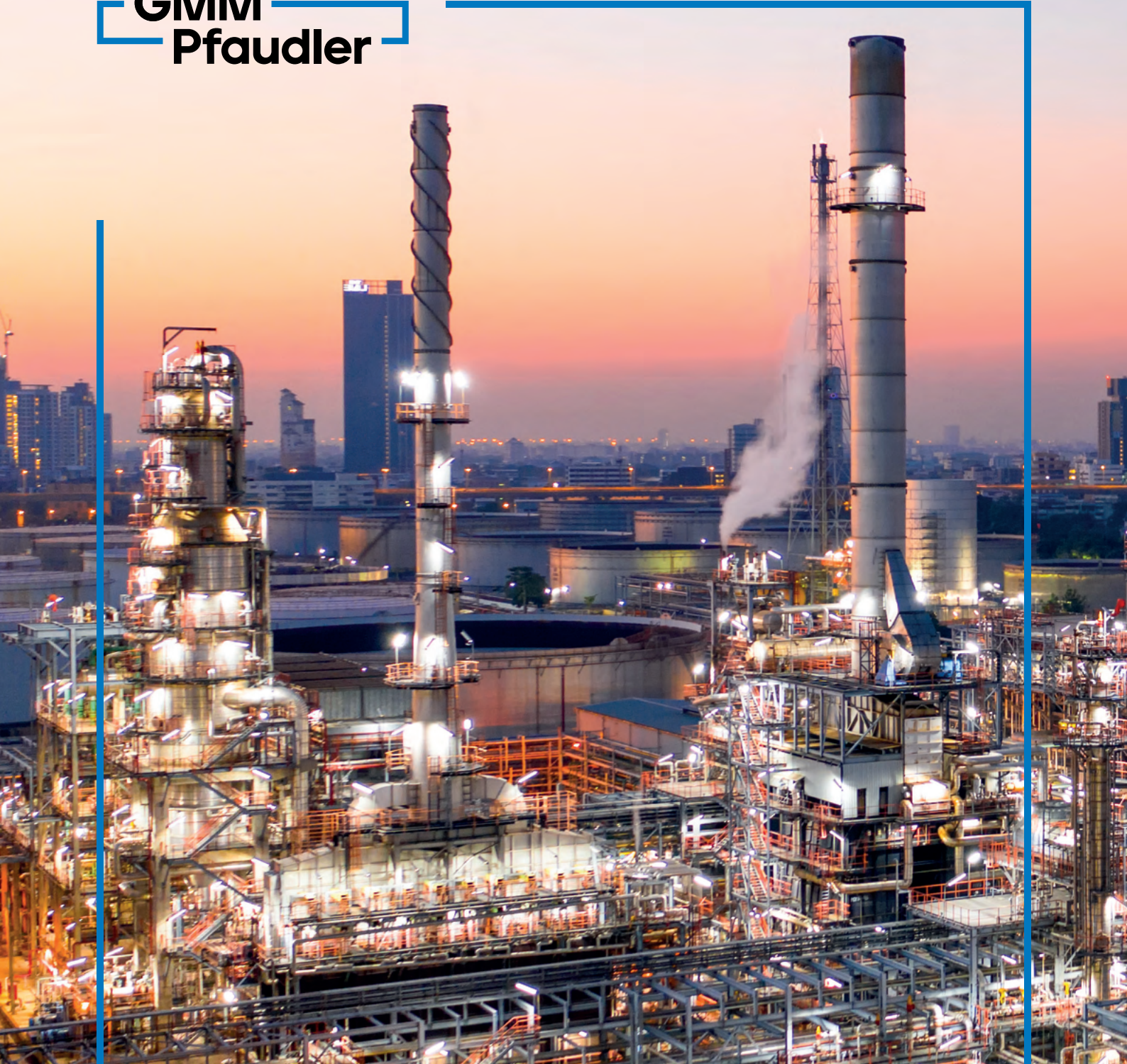


GMM
Pfaudler



**Global
Capabilities**
for the Process Industry



End-to-end solutions for the Global Process Industry



[View more](#)

GMM Pfaudler

PFAUDLER

— Glass-Lined Technology

NORMAG

— Lab & Process Glass

MAVAG

— Filtration & Drying

MIXION

— Mixing Technology

INTERSEAL

— Sealing Technology

EQUILLOY

— Alloy Process Equipment

EDLON

— Fluoropolymers

HYDROAIR

— Membrane Separation Systems



GMM Pfaudler is a global leader in corrosion-resistant technologies, systems, and services for the chemical, pharmaceutical, food and energy industry.

Our Branded Product Lines that include **PFAUDLER, NORMAG, MAVAG, MIXEL, MIXION, MIXPRO, INTERSEAL, EQUILLOY, EDLON** and **HYDROAIR** showcase our strength as a group, our capabilities, and our pursuit for constant innovation.

With an end-to-end solutions-oriented approach, a global footprint, and a perfectly integrated offering system we are able to meet complex industry demands worldwide.

GMM
Pfandler



Explore Our Broad Portfolio

A broad portfolio with many capabilities beyond glass lining

Our technologies are installed globally in a wide range of **chemical**, **pharmaceutical** and **food processes**. Proper selection, design and manufacture of **high performance** and **corrosion-resistant materials** are vital for safe production of corrosive or hazardous chemical storage.

GMM Pfaudler has many years of expertise in the use of any type of corrosion-resistant material, such as **Zirconium**, **Tantalum**, **Titanium**, **High Nickel Alloys**, **Glass**, **Enamels** and **Fluoropolymers** to name a few. We can meet Customer needs and we can be considered as a single point of contact for complex requirements due to our wide portfolio and our global operational footprint.



PFAUDLER

Glass-Lined Technology

Glass-Lined Technology

World-Leading Supplier
for Process Solutions
in Glass-Lined Equipment



[View more](#)

GMM
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Reactors

The reason why our glass-lined reactors are trusted by over 90% of the world's top chemical companies is the sheer reliability of our reaction technologies.



AE (RT*) Reactor

The DIN-AE (RT*) designed series reactors in two parts, capacities from 63 to 1,000 litres (from 1 to 2000 Gallons*).

- > In-line drive on sealing unit to save space on upper dish.
- > Full range of instruments and accessories.
- Special Options
- > Flat cover with ultra clean sealing.
- > Glass-lined stainless steel for cover and base vessel.



BE (RS*) Reactor

The standard for safety, reliability & economic operation. The BE (RS*) Series, a DIN (US Standard*) designed series reactor with conventional jacket or half-pipe heating/cooling circuits is available from 630 to 80,000 litres (from 300 to 15,000 Gallons*).

- > Single-piece construction, reliable operation.
- > Reduced number of openings and gaskets with lower risk of leakages.
- > Flexibility and efficiency thanks to customized single or multistage agitation systems.



CE (RA*) Reactor

The CE (RA*) Series reactors, a DIN (US Standard *) designed series reactor, with conventional jacket or half-pipe heating/cooling circuits is available from 1,600 to 40,000 liters (from 300 to 15,000 Gallons*).

- > Designed with the agitator inlet at the top.
- > Specific use when single-stage agitation for the process is enough.

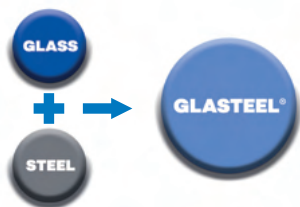
Storage Tanks & Receivers



Used for the storage of highly corrosive chemical fluids and pharmaceutical substance.

- > Horizontal or vertical design with capacities from 20 to 125,000 Litres.
- > Available with and without conventional jacket or half-pipe external circuits.
- > Pressure & temperature ranges can be adapted to suit customer 's needs.

Excellence in Glass Lining



Glasteel®

Glasteel® combines the mechanical strength of steel with the chemical corrosion resistance of glass.



Multipurpose Glass World Wide Glass® (WWG)

Multipurpose chemical glass for corrosion resistance combined with excellent mechanical stability.

- > Remarkable corrosion resistance.
- > Highly resistant to mechanical & thermal shocks.
- > Anti-adhesive surface.



Pharma Glass

Pfautler Pharma Glass® (PPG) European Patent # EP 1231189

Patented glass recommended for pharmaceutical, API, vitamins & fine chemicals applications.

- > Smooth and easy to clean surface.
- > Heavy metal-free glass, no risk of pollution.
- > Increased alkaline resistance allowing for CIP processes without degradation.



Antistatic Glass Antistatic Glass (ASG)

Developed to divert electrical charges that may occur with non conductive media.

- > Conductive already at a voltage of 3 kV; electrical resistance 1 to 100 Ohm.cm (vs 10^{13} Ohm.cm for standard glasses).
- > Surface with same corrosion resistance as standard glasses.
- > Chemically inert glass surface, no risk of catalytic effect on the product..

Non-Abrasion Glass



Abrasion Resistance Glass® (ARG)

Designed for highly abrasive & corrosive processes such as Poly-Aluminum Chloride (PAC), precious metal refining & ore recovery.

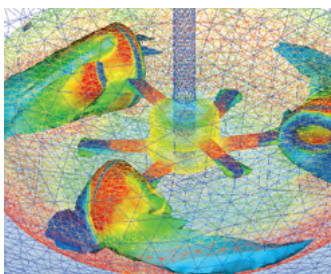
- > Special glass with doubled abrasion resistance and unchanged corrosion resistance
- > Increased lifetime and productivity.

Glass-Lined Columns



In addition to chemical reactors and storage tanks, Pfaudler also designs and fabricates glass-lined steel columns. Depending on the column application, the shell is manufactured with any one of the glass-lining formulations or with fluoropolymer loose lining, bonded lining or coating. Based on our global capabilities and the single-source responsibility, Pfaudler can ensure a proper system performance for any corrosive chemical process.

Glass-Lined Mixing Systems



Based on over a century of design experience and processes simulation, we offer Glass-Lined mixing solutions optimized for specific process's and applications in the pharmaceutical, agrochemical, specialty chemical, biotechnology, food, paint, paper and cellulose product industries, that maximize product quality and operating cost.

Agitation



Cryo-Lock Technology

A broad range of turbines can be configured to meet customer process needs. Fully glass-lined, liquid-tight connection between agitator and shaft.

- > High rotating speeds with robust agitation systems.
- > Easy spare parts management.
- > Available in up to 7 levels of turbines.

Elco-Lock Technology

Features and benefits similar to the Cryo-Lock technology. No need for liquid nitrogen to fix the assembly of flyers on the shaft.

Turbines



CBT
Curved Blade Turbine

- > Radial, medium/high shear flow.
- > Low-medium viscosity range.
- > Homogenization suspension, gas dispersion, heat transfer, multi-purpose.



TBF
Turbofoil

- > Axial, low shear flow.
- > Low viscosity.
- > Homogenization, heat transfer, suspension, crystallization, gentle treatment.



CBR
Curved Blade Residual

- > Radial, medium/high shear flow.
- > Low-medium viscosity range.
- > Homogenization suspension, gas dispersion, heat transfer, solid suspension, residual mixing, multi-purpose.



ANC
Anchor

- > Tangential, low shearing flow.
- > Medium-high, viscosity range.
- > Heat transfer, residuals, crystallization, high viscous products.



TBX
Turbofoil X-Shape

- > Axial, low shear flow.
- > Low viscosity.
- > Homogenization, heat transfer, suspension, crystallization, gentle treatment.



RCI
Retreat Curved Impeller

- > Radial, medium shear flow.
- > Low-medium viscosity range.
- > Homogenization, heat transfer.



MXT
Maximum Flow Turbine

- > Axial, medium shearing flow.
- > Low-medium viscosity range.
- > Homogenization, heat transfer, suspension, crystallization.



GST
Gas Dispersion Turbine

- > Radial, high shear flow.
- > Low viscosity.
- > Homogenization, gas dispersion.



FBT
Flat Blade Turbine

- > Radial, high shear flow.
- > Low-medium viscosity range.
- > Homogenization, dispersion, emulsification.



PBT
Pitched Blade Turbine

- > Axial and radial, medium shearing flow.
- > Low-medium viscosity range.
- > Homogenization, heat transfer, suspension, dispersion.



MSG
MultiStep Countercurrent Agitator

- > Opposing axial, shearing flow.
- > Low-medium-high viscosity range.
- > Homogenization, heat transfer, crystallization.



RBT
Ring Blade Turbine

- > Combined flow of axial and spiral, shear sensitive treatment.
- > Low viscosity.
- > Homogenization, solid suspension, especially crystallization.

Baffling Technology

The baffle is a key element of the agitator and allows to achieve the desired flow in the reactor. Considering that a baffle may be susceptible to normal wear and tear, Pfaudler supplies only baffles that are flange-mounted for easy replacement.



Beaver Tail Baffle

- > Simple and cost-effective, flange-mounted technology.
- > Multipurpose, can be rotated to adapt the baffling effect to process needs.

C-Baffle

- > Maximum baffling efficiency in the reactor.
- > In-line nozzle for loading liquid/solids in a highly stirred medium.
- > Sensor available to measure the temperature and the detect corrosion.

Quatro Pipe and Polycon

- > Multipurpose beavertail baffle with built-in dip pipe.
- > Temperature sensor for quick measurement.
- > With built in dip pipe and possibility of sampling system.
- > Can be turned to adapt baffling effect to process needs.

PFAUDLER

Glass-Lined Technology



Glass Lining Instrumentation



Liquid Analysis

In-line liquid analysis permits automated monitoring and regulation of industrial processes in many sectors. In addition to pH, other important process control parameters include redox potential and conductivity.

ph Measurement

Benefits

- > High mechanical strength and suitable for use at high temperatures.
- > Very high mechanical resistance - no risk of glass breakage.
- > Can be use without a retractable systems or bypass installation.
- > CIP and SIP compliant.
- > Self-cleaning and low-maintenance.

Temperature Measurement

Sometimes speed is key. Quick measurement results are essential for optimal temperature control. Pfaudler's fused-in glass lining solutions offer a clear advantage.

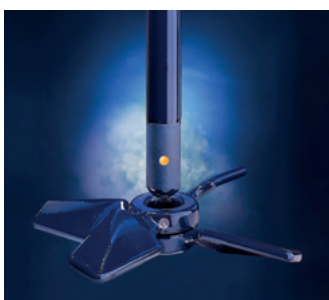
- > Fastest glass-lined temperature probe.
- > No sealing elements.
- > Long services life, excellent long-term stability and maintenance free.
- > Up to six measurements points.



Corrosion Monitoring

With analysis of the decomposition voltage always the right decision.

- > Principle of decomposition voltage analysis.
- > Measurement not influenced by electrical conductivity.
- > Monitors all wetted corrosion resistant surfaces.
- > Clear display of measurement results based on electrical current thresholds.
- > Display operating conditions based on defined current thresholds.
- > Certified for explosion zone O.a



Cryo-Lock / Corrosion Monitoring

- > Allows to monitor also fully glassed turbines assembled on shafts by glass to glass connection.

PFAUDLER

— Glass-Lined Technology

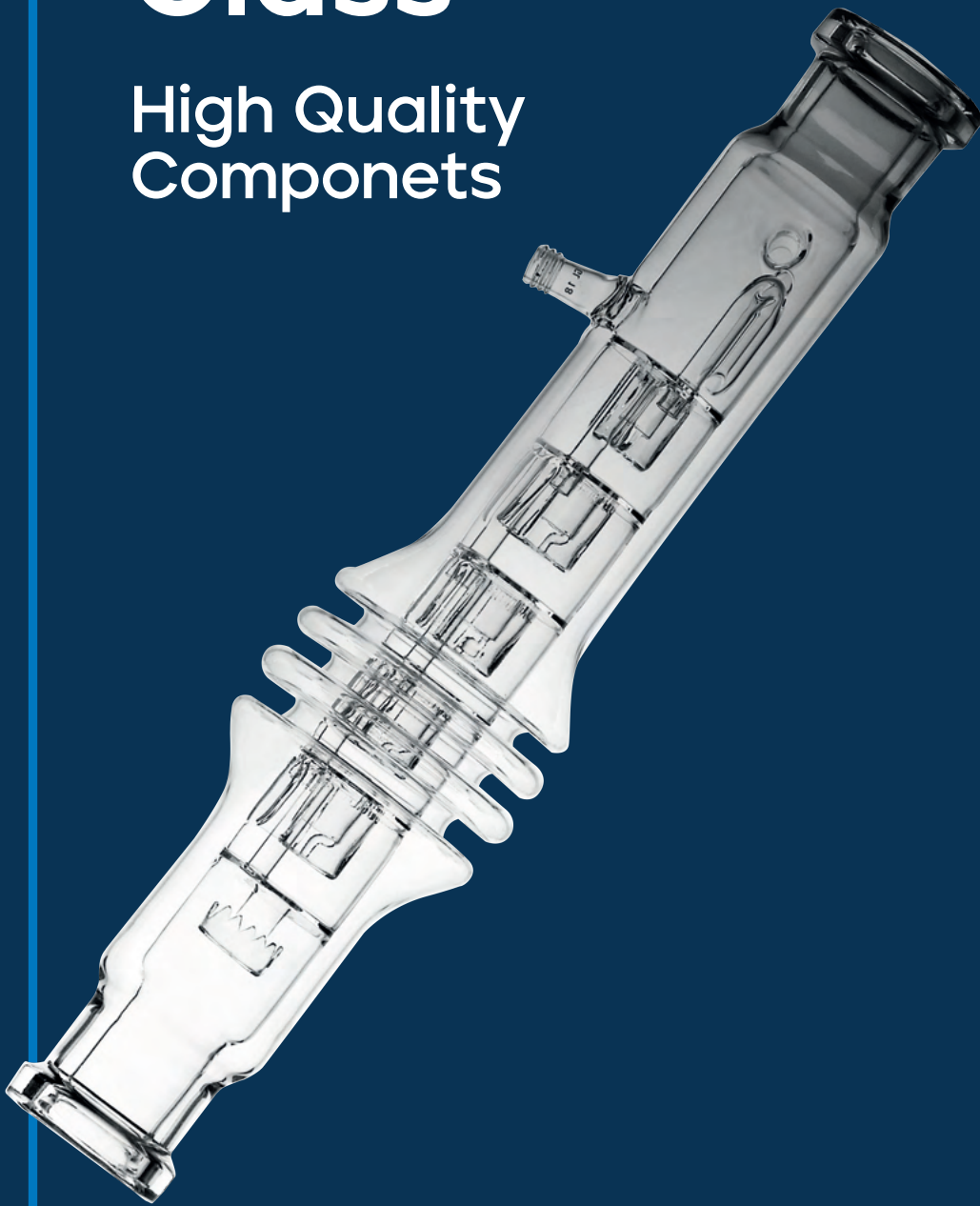


NORMAG

Lab & Process Glass

Lab & Process Glass

High Quality
Componets



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Components & Apparatus

Reaction units and distillation tops are used for various processes, like production and separation of fine chemicals or pharmaceutical products.



Semi-Finished Products / Accessories

Versatile units for deep bed & solid-liquid separation. Performs a lot of tasks where filtration & cake washing is required.

- > High vacuum tight stopcocks and valves.
- > Different laboratory & technical flanges.
- > Valves, grindings, connections and framework.



Coupling Systems

Process Scale

- > Safety Flat (PF System).
- > Ball & Socket (KF System)

Lab scale

- > Rotulex (RS System).
- > Rodaviss (RV System).
- > Laboratory Flat Flange (LF System).
- > High Vacuum Flange (HF System).
- > Conical Joint (NS System).
- > Spherical Joint (K System).
- > Glass Thread (GL System).



Parts / Components

- > Connections.
- > Piping.
- > Valves.
- > Distillation columns & parts.
- > Heat exchangers.
- > Agitators.
- > Vessels.
- > Instrumentation.
- > Framework.



Equipments

- > Reaction vessels.
- > Pressure reaction vessels.
- > Mixer-Settler.
- > Nutsche Filter.
- > Thin film, short path, falling film evaporator.
- > Condenser.
- > Scrubber.
- > Crystallization.
- > Distillation columns.
- > Extraction columns.
- > Others.

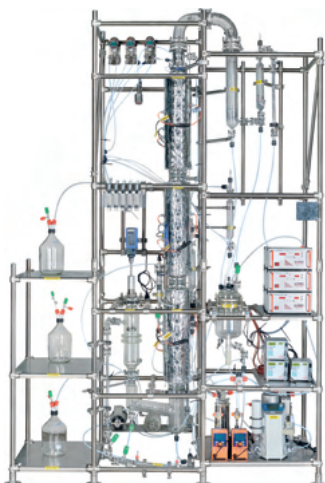


Automation

- > Sensors for all common measuring data.
- > Pneumatic or electro-pneumatic actuated control valves.
- > Measurement and control systems.

Units & Processes

The combination of our glassblowing skills, constructive and process-technical experiences enable us to build apparatus and process-engineering units. Due to the equipment of our apparatus and units with measurement and control technology up to process visualisation we are able to supply customer specific solutions reaching from laboratory size to process.



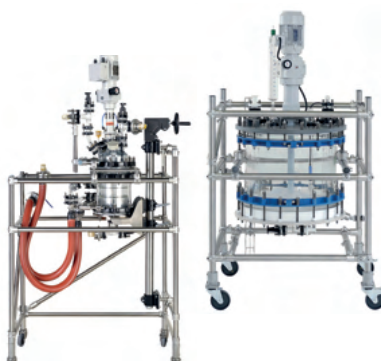
Rectification, Absorption / Scrubber

- > Lab & process scale rectification.
- > Scale up.
- > Chemical Engineering design.
- > High skilled internals such as bubble cap tray and structured packing & distributors.
- > Group materials optionally combined with alloys according process requirements.
- > Columns, units or complete process systems.



Reaction & Crystallization

- > Lab & process scale reaction and crystallization systems.
- > Special mix & reaction vessel design for scale up.
- > Corrosion resistant materials incl. Boro 3.3, Glass-lined steel, Alloy or Fluoropolymers according to the process requirements.
- > Agitated vessel, units or complete process systems.
- > Sophisticated and low weight agitators.



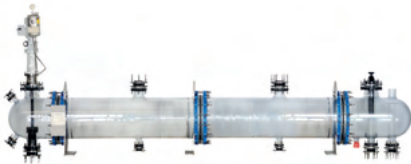
Filtration

- > Lab & process scale fixed & mobile nutsche filter.
- > Chemical Engineering design & scale up.
- > Corrosion resistant materials incl. Boro 3.3, Glass-lined steel, Alloy or Fluoropolymers according to the process requirements.
- > Filter, filter unit or complete filtration process systems.
- > Sophisticated jacketed glass part for best heating and cooling.



Evaporation

- > Lab & process scale evaporator.
- > Wiped-Film-Evaporator (WFE), falling film & short path evaporator and various special evaporators.
- > Chemical Engineering design & scale up.
- > Corrosion-resistant materials incl. Boro 3.3, Glass-lined steel, Alloy or Fluoropolymers according to the process requirements.
- > Evaporator, evaporator unit or complete evaporation process systems.



Extraction

- > Lab & process scale mixer-settler and extraction columns.
- > Chemical Engineering design & scale up together.
- > Corrosion-resistant materials incl. Materials Boro 3.3, Glasteel, Alloys or Fluoropolymers according to the process requirements.
- > Mixer-settler & extraction columns, extraction unit or complete extraction process systems.



Dedicated Customer Systems

Our expertise allows us to design technology for different corrosion process able to provide a proper customer solutions

- > HCl, HBr, NOx and other scrubber systems.
- > Poly-Aluminum-Chloride systems.
- > Sulfuric Acid, Nitric Acid & hydrochloric acid dilution systems.
- > Sulfuric Acid, Bromic Acid & Nitric Acid concentration systems.
- > Nitric Acid, Ammonium hydroxide & hydrochloric acid electronic grade purification systems.
- > Precious Metal Recovery Systems.
- > Precious Metal Recovery Systems.
- > Acetic Acid, Alcohol and other rectification systems.

MAVAG

Filtration & Drying

Filtration & Drying

Systems & Solutions
for Filtration,
Drying & Agitation



[View more](#)

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Filtration > Solid-Liquid Separation



Agitated Nutsche Filters & Filters Dryers

Mavazwag®

Versatile units for deep bed & solid-liquid separation. Performs a lot of tasks where filtration & cake washing is required.

- > Processing of concentrated suspensions.
- > Cake filtration, washing and purification.
- > Extraction of active agents from organic solids.
- > Environmentally safe, totally enclosed systems.
- > Designs for HAPI applications.
- > Clean sweep design for total heel discharge.
- > Wide range of materials of construction.
- > Full range of peripheral systems available.



Pre-Engineered Mobile Turn Key Pilot

Mavalab

This filter dryers are easy to operate, user friendly trial and small batch mobile units.

- > Hydraulic free compact design.
- > Shaft sealing with dry9000® seal.
- > Control panel according ATEX or NEMA.



Single Plate Manual Nutsche Filters

Single plate nutsche filter for manuale cake discharge. This filter dryers are easy to operate, user friendly trial and small batch mobile units.

- > Manual or hydraulic base plate lowering.
- > Available filtration surface area from 0,1 - 1,5 m².
- > Tilting or swivelling top cover.
- > Mobile or stationary designs.



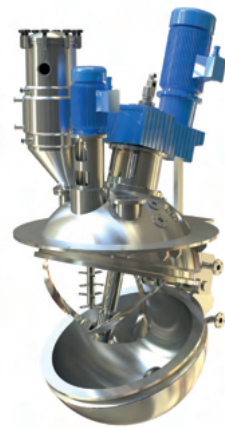
Centrifugal Disc Filter

Funda®

Totally enclosed pressure filter horizontally arranged. Self-supporting filter screens for pre-coat or residue filtration of large quantities of diluted suspension.

- > Enclosed system ensuring quality, product consistency and operational safety.
- > Uniform cake formation.
- > Cake or slurry discharge.

Drying > Vacuum Drying



Spherical Dryer

Mavasphere®

Multi purpose dryer used in the drying of Active Pharmaceutical Ingredients (API's) and Fine chemical in compliance with CGMP and FDA guidelines.

- > Minimal clearance between the vessel wall & agitator for efficient and uniform drying.
- > Minimal product hold-up for easy cleaning.
- > Top mounted agitator for uniform produce mixing and drying.
- > Discharge occurs at the lowest point for complete product discharge.
- > Good turn down ratio.



Vacuum paddle Dryer

Mavapad®

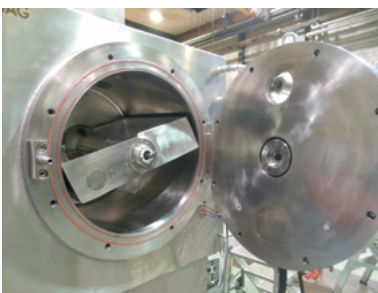
Versatile energy efficient system for the drying of a wide range of products under vacuum. The special Agitator ensures the homogenous mixing of the product, improves heat exchange and reduces drying time.

- > Large heat transfer area for faster drying .
- > Designs for clean room installation
- > Full-openable door for easy cleaning.

Universal Vacuum Paddle Dryers

Mavadry

High performance paddle dryer with special heated airfoil blade and chopper.



- > Entire vessel covered by jacket for better heat transfer.
- > Wide range of filling capacities with good turndown ratio.
- > Hinged front door for easy inspection.
- > Special high speed chopper for difficult to dry products.



Vertical Conical Dryer (VCD)

Versatile energy efficient system used for the drying of Active Pharmaceutical Ingredients (API's) in compliance with cGMP and FDA guidelines.

- > Effective utilization of static & dynamic heat transfer areas resulting into efficient drying
- > Wide range of filling capacities with good turndown ratio
- > Effective utilization of Lump breaker
- > Vertical orientation & discharge at the bottom most point ensures lower heel volumes and better emptying characteristics



Magnetic and Sterile Agitators Mavadrive

Designed for use in the pharmaceutical, biotechnology, food & beverage industry.

- > No contamination, emission & sealing problems.
- > No maintenance and long-terms trouble-free operation.
- > Multi-stage impellers for cell culture & microbial fermentation.
- > Easy to clean & sterilize.

MAVAG
— Filtration & Drying



MIXION

Mixing Technology

Industrial Mixing Solutions



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GMM
Pfaunder

Mixing Technology

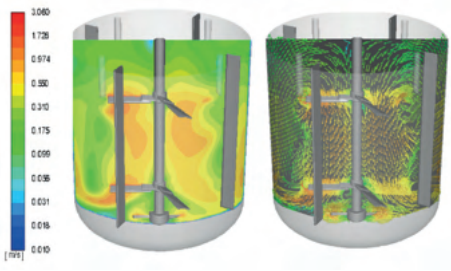
Mixion offers comprehensive mixing expertise, including the design, simulation, engineering and manufacturing of agitators, mixers, reactors and other related mixing equipment.

Stirring Across Industries



- > Chemical
- > Mining
- > Power Generation
- > Pharma & Biotech
- > Pulp & Paper
- > Food & Beverages
- > Paint, Resins & Inks
- > Petrochemicals & Refineries
- > Water & Waste Water

Computational Fluid Dynamics



CFD capabilities assist towards better understanding of hydrodynamic phenomenon such as flow pattern, shear and velocity distribution and so on to optimize mixing results.

Effective to evaluate mixing performances of varied impellers and assist selection process best suited for critical mixing applications.

The Perfect Blend of Products



TEMI
Top Entry Agitators

COAX
Co-Axial Drives

SLRY
Slurry Agitators

HISD
High Speed Dispersers

HEGI
High-Efficiency Gas Induction Impeller



MPAC
Mechanical Pan Circulators



SMIX
Static Mixer



SDMI
Side Entry Mixers



MAVADRIVE®
Bottom Entry Magnetic Mixers

INTERSEAL

Sealing Technology

Sealing Technology

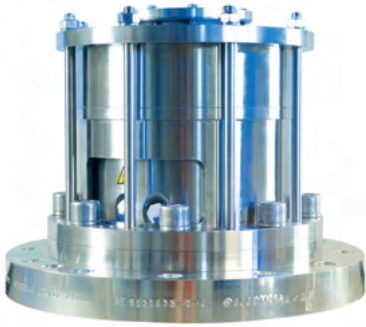
dry9000[®] Innovative Product
For Sealing Technology



View more

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Pfaudler

State-Of-The-Art Technology



Innovative dry running

Our innovative dry9000® offers the standardized solution for your: Agitators, Mixers, Thin film evaporators, Screw conveyor, Nutsche filters, Filter dryers.
Main Sectors: Pharmaceutical, Chemical, Food Industry.

Contamination free design

dry9000® is 100% leak proof and ensures that your production runs permanently and safely. The specially developed tribological system between the shaft protection sleeve and the sealing lips ensures that no support lubrication, either liquid or gas, is required, reduces the risk of a production loss to an absolute minimum, protects people and the environment.

Flexible movement

The dry9000® follows every movement, both axial and radial, of the shaft, eliminating any movement at the sealing components, resulting in no gaps at the critical sealing surfaces and a leak free sealing system.

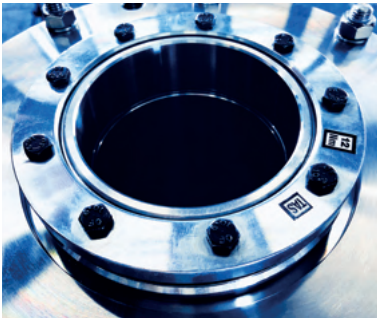


Conformity With Industry Standards

Longer lifetime

Benefits

- > No support system needed.
- > No continuous cleaning of contaminated support system.
- > No constant monitoring necessary due to patented dry running technology.



Clear reduction of total cost of ownership

Benefits

- > Reduction in the time and complexity of installation.
- > No-start up protocols or 'bedding in' issues.
- > Easier and improved cleaning/sterilization between batches.
- > Planned seal changes.



Full Compatibility

Full compatibility with major industry agitators; dry9000® can easily be integrated into every machine, regardless of supplier, for pharmaceutical, chemical and food industry. dry9000® is a modular concept available in various formats to ensure that every type of production can benefit from all the advantages of our patented seal. Furthermore, Interseal can customize the dry9000® to meet your unique requirements.

EQUILLOY

Alloy Process Equipment

Your Single Source for Alloy Systems



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Alloy Process Equipment

We are the leading supplier of various types of pressure vessels built for the chemical processing industries. The sectors served by our Group include the petrochemical industry, oil & gas refineries, specialty chemicals, polymers, fats & oils, nutraceuticals, renewable energy, green chemistries, fertilizers, and other specialized chemical process industries. We also serve the biotech industry with fermenters, upstream and downstream equipment, and systems.

Design Standards

- > ASME Sec. VIII Div. 1
- > ASME Sec. VIII Div. 2
- > ASME Sec. I
- > API 650 / 660
- > TEMA
- > JIS
- > IBR
- > AD Merkblätter 2000
- > EN 13445
- > PED - (Directive 2014/68/EU)
- > ATEX - (Directive 94/9/EC)
- > PD 5500

Metallurgies

- > Stainless Steel (316L/304L/904L/316Ti/410)
Duplex Stainless Steel
- > Hastelloy (C276/C22/B3)-Alloy 59
- > Incoloy (600/800/825)
- > Monel 400
- > Titanium
- > Reactive Metals (Tantalum, Zirconium, Niobium)
- > Cupro - Nickel
- > Clad Steels
- > Carbon Steel
- > Chrome - Moly Steels
- > Low Alloy Steels

Agitated Reactors

Main Features

- > Operating Pressure up to 100 Bar
- > Motor Rating (Kw) 0.25 - 315
- > Agitator Shaft Diameter (mm) 20 - 350

Agitator Types

- > Top Entry Agitator
- > Hydrogenators
- > Co-Axial Drives
- > Bottom Entry Agitator
- > High Speed Dispersers



Heat Exchangers

- > Max pressure 155 kg/cm²
- > Dimensional capacity 5,000 mm diameter x 18,000 mm length
- > Tube thickness 225 mm
- > Weight handling capacity - 200 tons





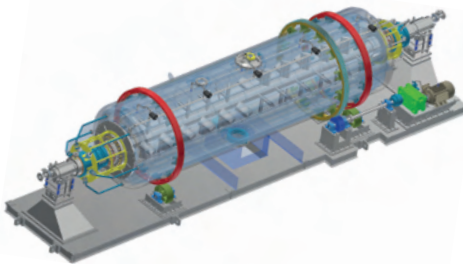
Columns

- > Max pressure up to 50 kg/cm²
- > Dimensional capacity 6,000 mm diameter x 40,000 mm length
- > Thickness 100 mm
- > Weight handling capacity - 200 tons



Pressure Vessels

- > Max pressure 50 kg/cm²
- > Dimensional capacity 6,000 mm diameter x 12,200 mm length
- > Thickness 100 mm
- > Weight handling capacity - 200 tons



Special Purpose Equipment

Complex Rotating equipment for:

- > Drying
- > Sterilization
- > Digester

Tantalum Process Equipment

Tantec's competence in using Tantalum for pressure equipment, heat exchangers, plant components and other components is world renowned. **Pfautler & Tantec** are working together to supply tantalum process equipment in conjunction with glass-lined equipment and systems, for the pharmaceutical, chemical and process industry.



Shell & Tube
Heat Exchangers



Hairpin
Heat Exchangers



Heating
& Cooling Coils



Service
& Repair Parts



Bayonet Heaters



Vessels & Columns

EQUILLOY

Alloy Process Equipment



EDLON

Fluoropolymers

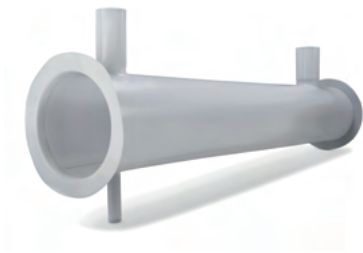
Fluoropolymers

The Smart Solutions
With Fluoropolymer
Linings & Coatings



[View more](#)

GMM
Pfaunder



Fluoropolymer Loose Linings

Pure-Fusion™

Fabricated from PFA, FEP and PTFM with thicknesses ranging from 1.5 to 47.5 mm. Designed to fit inside plastic, fiberglass, steel or metal alloy structures.

- > Best corrosion resistance and permeation management systems.



LowStress™

Specifically designed for High Temperature HF and Fluorinated chemicals service.

- > Designed to enable easy installation in vessels and columns.
- > Minimize downtime & increase system performance.



Thick Pfa And Etfе Lining

Fluorolock™

Designed for demanding high temperatures and vacuum applications. The lining encapsulates a wire mesh pre-welded to the vessel inner surface.

- > Guarantees a significant improvement in adhesive strength in harsh thermal and chemical conditions thickness 4-5 mm.



Engineered Fluoropolymer Coatings

High resistance to chemical and mechanical damage in corrosive environments and high purity applications.

- > PFA and PVDF 1mm thick
- > ETFE and ECTFE 1.5mm thick
- > Coatings can be Field-repairable and can be applied to complex shapes.

Fluoropolymer Column Internals

Multi-Arch Packed Bed Support



Combine corrosion resistance and strength in a design that separates liquid and vapour flow paths for minimum pressure drop. Provides open area for high volume vapour flow, while handling a wide range of liquid flow rates.

- > Modular design to allow flexible on-site assembly within the column.
- > Available in different configurations to save column height and reduce installation time.

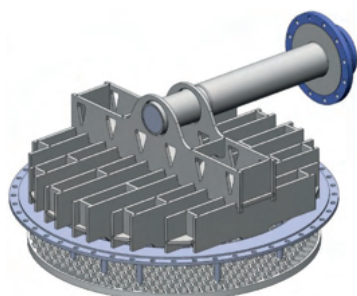
Fabricated from virgin PTFE and PFA.

Orifice-Riser Liquid Distributor



- > PTFE and PFA Orifice-Riser Distributors are non-clogging and adaptable to a wide range of flow rates.
- > Unique design is a combination of a pan-type orifice distributor and weir-riser distributor.
- > Flow is self-regulated by the liquid level on the pan.
- > Structural strength up to 170°C provide uniform liquid distribution.

Weir-Trough Distributors



Designed for large diameter columns while providing open area for high volume vapour flow, and handling a wide range of liquid flow rates

- > Provide even distribution over a wide range of liquid flow rates.
- > Combines a continuous support ledge to support the Weir-Trough in the column.
- > Structural strength needed to maintain shape and stiffness up to 170°C.

Glass-Lined Vessel Accessories & Repairs

PFLUORO-PFIX™ Nozzle & Manway Repair Shields



Used to repair damaged glass-lined steel on the flange face or radius of nozzles.

- > The design ensures resilient seal performance for effective sealing, even at extreme pressure and temperature cycling sizes.



Fluoropolymer Nozzle Liners

Fluoropolymer Nozzle Liners offer protection for glass-lined, ceramic and coated nozzles.

- > Stress-free design with uniform wall thickness.
- > Wide range of nominal sizes from ½ inch to 30 inches.
- > Elliptical designs available.



Coated Manway Covers & Protection Rings

Provides corrosion resistance while increasing protection against mechanical damage.

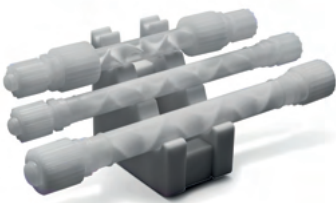
- > Installed with Edlon patented PFA Coating



Dip Pipes & Spargers

A complete list of products and expert field service.

- > Dip Pipes and Spargers designed to withstand agitation forces.
- > Custom-designed PTFE spargers for optimum performance at various flow conditions.



Secure And Pure™ Products

PFA-PTFE Static Mixers

The perfect solution for your Chemical Mechanical Planarization (CMP) slurry and high purity chemical mixing needs.

- > All mixers are based on a helical mixing element, which directs the flow of material away from the wall. The design combines alternating right-hand and left-hand elements that results in flow division and radial mixing.

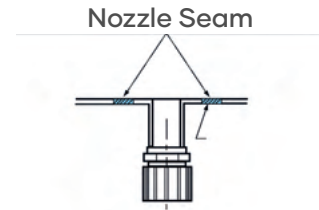


Secure and Pure™ & Pure Fusion™

Seaming incorporates flat, indiscernible seams that provide clean, smooth surface that eliminates entrapments, eliminates cracks and crevices for metal cation contamination, particle entrapment, or bacterial growth.



FLAT, SMOOTH, HIGH-STRENGTH
INDISCERNIBLE SEAM



SECURE & PURE™ PURE-FUSION WELD



PFA & ETFE Rotolined Transport Tanks UN-Certified Tank Design

Edlon's ultra-high purity Secure & Pure™ fluoropolymer lined chemical transport tanks are ideal for moving your high purity media from site to site.. Typical Application: Rinse & Etch Tanks.

- > Fluoropolymer lining eliminates cation contamination
- > Product purity to parts per trillion (ppt) levels
- > Approved for handling highly concentrated acids
- > Custom ports that assure connection compatibility.



Ultra-High Purity Fluid Handling Products

Secure and Pure™

Designed for safe storage of ultra-pure electronic grade chemicals. The welding construction ensures fluoropolymer linings with ultra-smooth, leachant-free wetted surfaces.

- > Transferring, and mixing ppt-level ultra-pure chemicals.
- > Tanks designed with a rugged 2.3 mm thick, removable Teflon® PFA liner.
- > Outer shell can be HDPE, RFP or Stainless Steel.
- > Optional unique design with continuous PFA coils for heating/cooling.
- > Optional Static dissipative PFA tubing for fluorinated solvents.
- > Supplied with containment boxes and sight tubes.

EDLON

Fluoropolymers



HYDROAIR

Membrane Separation Systems

Membrane Separation for Process Industry



View more

GMM
Pfaunder

Capabilities

Hydroair specializes in membrane separation systems for process applications and industrial effluent treatment.

We provide a complete support service with test facilities and pilot plants for preliminary feasibility studies and semi-industrial process tests.



Research and Development

R&D provide up-to-date answers to complex problems



Process Design & Engineering

Project pre-study, design, cost estimation, engineering and project management



Installation & Commissioning

Installation, start-up and commissioning of systems



After Sales Service

Keep your system operating at peak efficiency throughout its life



Pilot Plant

Testing of the pilot plant at the customer site is recommended to generate data under real conditions in the field.

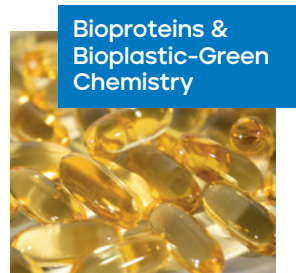
Industries & Sectors



Membrane Process Applications

By working through lab test, pilot scale test and industrial plants, Hydroair has gained extensive experience and own know-how on several process applications.

Industrial process applications include biotechnology and pharmaceutical applications, where Hydroair developed its own know-how, as well as applications in food and dairy, fine chemicals, petrochemical and chemical field.



Industrial Effluent Treatment

Hydroair designs and supplies complete plants "Zero Discharge Water Recycling", an advanced process to treat effluents obtaining water suitable to reuse or to discharge according to the law restrictions.

Recycling and reuse are central to a circular green economy approach and offer a strategy to improve water supply by better managing waste water, also on segregated streams more than traditional "end of pipe" treatment approach.



Membrane Separation Solutions



Membrane technology can be used in a wide range of separation processes.

Hydroair expertise covers all the range of membrane processes, from Microfiltration and Ultrafiltration through Nanofiltration and Reverse Osmosis.

Depending on the purpose of the separation, different type of membranes can be used, characterized by different material of construction, configuration and selectivity.

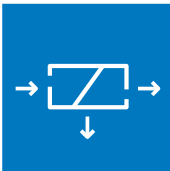
Organic and inorganic membranes, spiral wound and hollow fiber, tubular and plate type can be selected depending on the application and on process requirements.

Membrane Separation



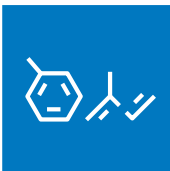
Microfiltration & Ultrafiltration

Low pressure process for selective filtration of large molecules.



NARO[®], Nanofiltration & Reverse Osmosis

Medium-High pressure separation processes and Hydroair trade mark system to improve solids concentration and permeate recovery.



Solvent Stable Membranes

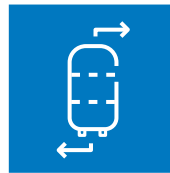
Membrane separation of molecules dissolved in organic solvents.



bioHAR[®] Membrane BioReactor

Combination of activated sludge biological system and ultrafiltration system.

Other Separation



Pervaporation

Process for organic solvent drying and concentration, breaking azeotropes.



Evaporation & Crystallization

Concentration or separation of liquid solutions, suspensions and emulsions.



Chromatography & Electrodialysis

Selective separation by means of specific resins (chromatography) and charged membranes together with electrical potential difference (electrodialysis).

GMM
Pfauder
Systems



Process Systems Packages

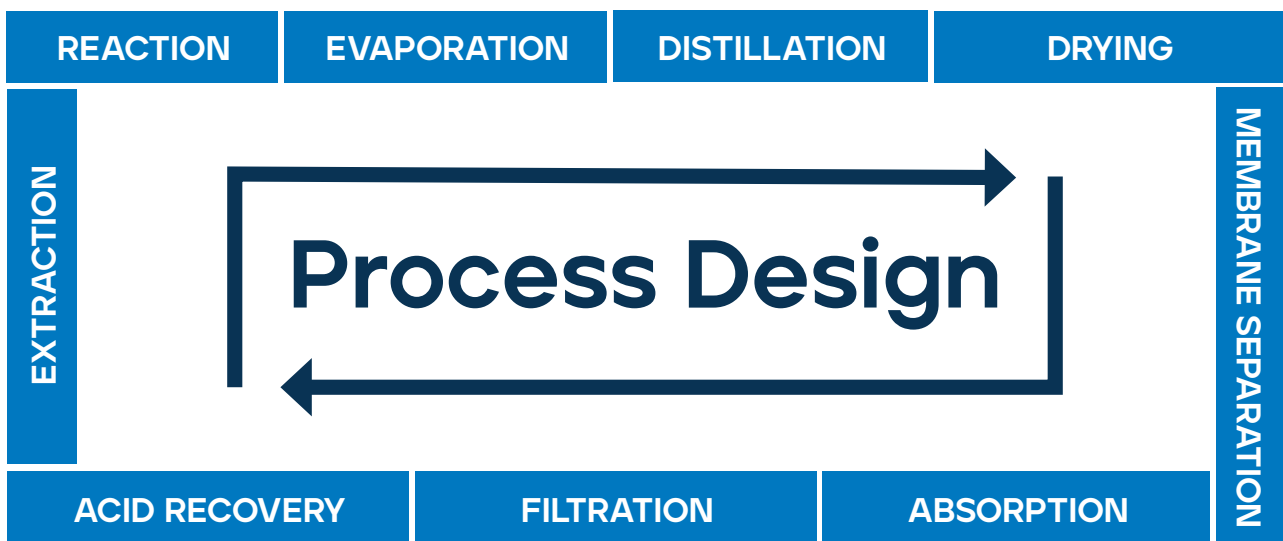


[View more](#)

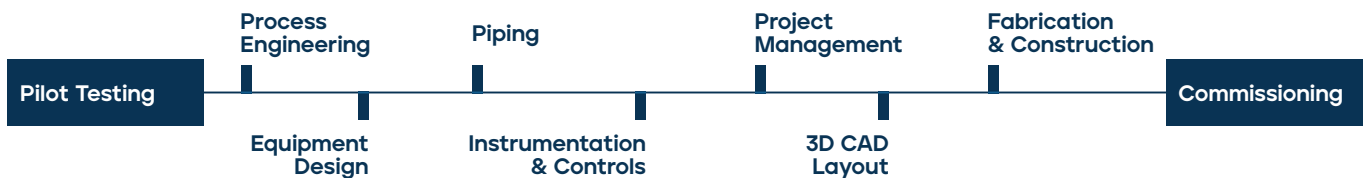
Complete Process Systems

GMM Pfadler capabilities are not limited to the individual technologies themselves. We can combine technologies and services into complete and efficiently **operating process systems**.

Our expertise allows us to design process technology to solve complex requirements. Our focus is to provide our Customers innovative solutions and comprehensive service offerings around the world.



Full Engineering Package



Technologies & Materials

Technologies integrated into complete solutions

Chemical and pharmaceutical companies rely on the quality, durability and performance of our technologies.



Our Process Expertise

- > Reaction & Mixing.
- > Evaporation Systems.
- > Distillation Column Systems.
- > Extraction.
- > Heat Transfer.
- > Temperature control.
- > Filtration & Drying.
- > Acid Recovery.

Our Corrosion Resistant Materials

- > Borosilicate glass 3.3.
- > PTFE and Fluoropolymers.
- > Stainless Steel, Tantalum, Hastelloy, Zirconium and other Alloys.
- > Glass-lined apparatus and piping.
- > Standard glass, pharma glass, anti-static glass, abrasion resistant glass.

Reaction & Mixing

Complete batch processing Solutions

Whether of Glass-lined, Borosilicate 3.3 or alloy construction, we start with our core Reaction Technology and design and manufacture **complete modular reactor systems** from small pilot plants to complete production plants and encompassing many types of reactions in batch or continuous mode. Each system is custom designed to the customer's process requirements.



Wiped Film Evaporators & Evaporation

Wiped Film Evaporators are used in difficult separation processes such as high viscosity materials, slurries, heat sensitive products, fouling applications and products with high boiling point temperatures. There are many aspects to a complete WFE process system including preheat, de-gas, de-volatilization, vacuum, utilities as well as product and waste handling. Our process engineers design all critical processes surrounding the **WFE to ensure the entire system is completely integrated.**



Pilot Testing

Before chemical production begins, or construction starts, and before engineers design the facility, an optimal chemical process must be developed, and proven. At GMM Pfaudler's world-class Process Test Facilities, our experienced chemical process engineers develop and optimize your process, and collect the data required to design your commercial-scale facility.



Column Systems

Columns are used in the chemical industry for many different mass transfer processes with the required separation accomplished through countercurrent flows of liquid and vapor inside the column. Whether your separation requirements are for distillation, stripping, absorption or reaction, our chemical process engineers will complete a column solution for your specific process.



Heat Transfer & Temperature Control

Efficient heat transfer and tight temperature control are key factors in reactor batch quality control, batch-to-batch repeatability and reduced operating times and costs. Our process and vessel engineers work together to design the reactor geometry, mixing system, jacket design and utility selection to maximize heat transfer. For the heat transfer design of every Thermal Control Units (TCU), all factors are carefully considered, including conduction, convection, batch side film coefficient, fouling factors, wall resistance and jacket side coefficient.



Filtration & Drying

As a global leader in chemical process systems, we are able to provide complete solutions for filtration and drying.

- > Lab & process scale fixed & mobile nutsche filter.
- > Chemical Engineering design & scale up .
- > Corrosion-resistant materials incl. Materials Boro 3.3, Glasteel, Alloys or Fluoropolymers according to the process requirements.
- > Filter, filter unit or complete filtration process systems.



Acid Recovery

Acids play many different roles in a large number of sectors of the chemical process industries.

Recovery of spent sulfuric and nitric acid helps to reduce operating costs compared to total raw material and disposal costs, and is an environmentally sound practice.

Acid Treatment Technologies

- > Spent Acids.
- > Nitric Acid.
- > Sulfuric Acid.
- > Hydro-chloric Acid.
- > NOx Absorption.
- > Waste Water.



Membrane Separation System

Specialists in membrane separation systems, we can supply a wide range in various fields of application for the process industry.

Membrane solutions are designed in close cooperation with customers through the use of pilot plants, engineering design, construction through start-up.

Global Services Capability

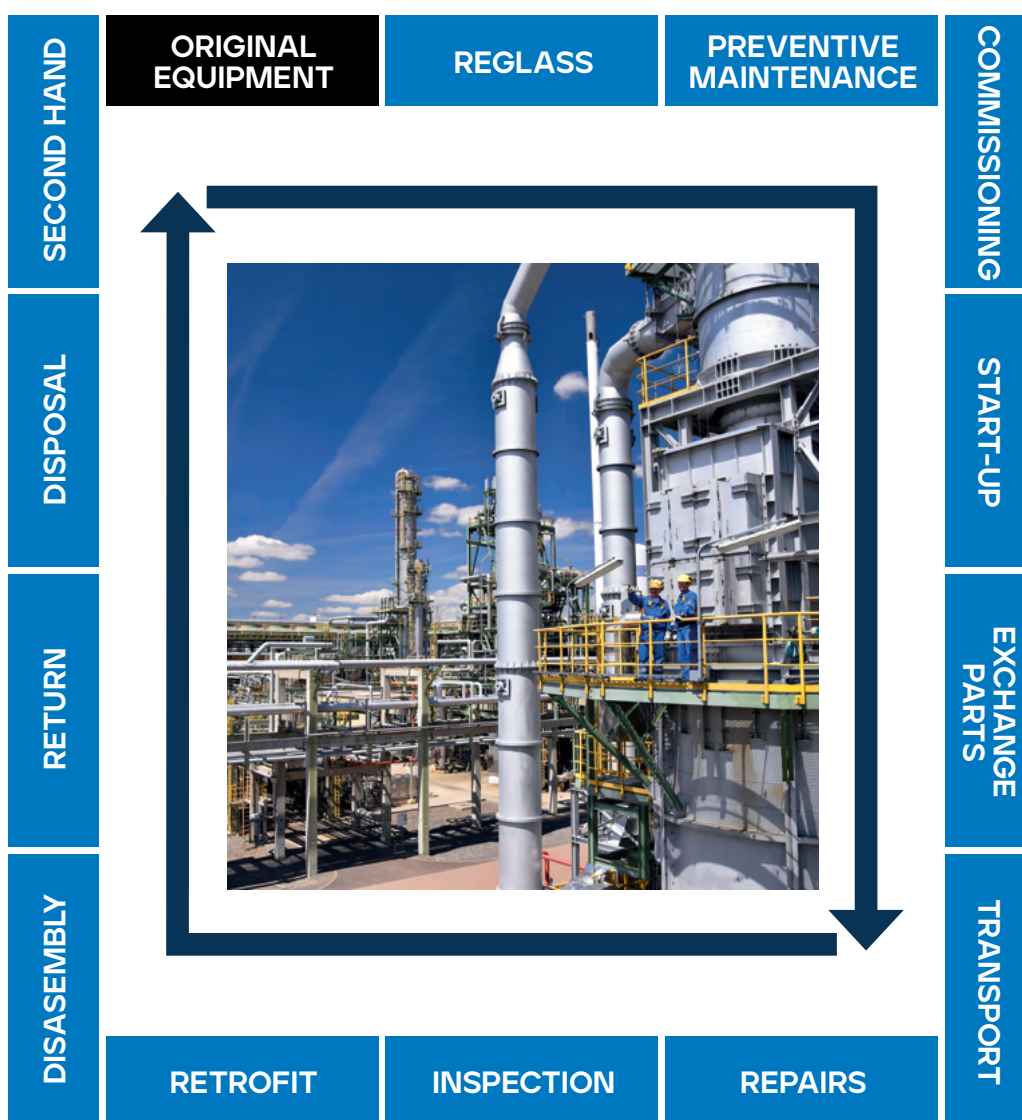


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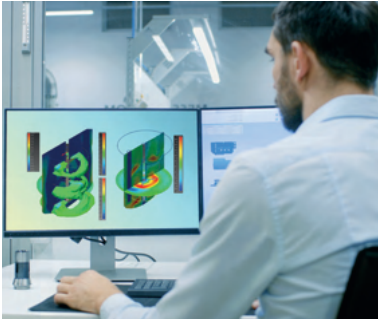
Our Total Services

GMM Pfaudler's **world-class Services organization** is close to the Customer to guarantee **fast and flexible support** across the Group Technologies and Systems portfolio. From comprehensive engineering and technical support to our rapid and reliable field services, from instrumentation and probe solutions to aftermarket parts; you can count on us to monitor and keep your process system operating appropriately.

Our Teams are working with our Clients to troubleshoot the existing process and design, **install upgrades** and offer **preventive maintenance** to help achieve improved efficiency and reliability, **reduce operating costs** and increase system uptime.



Our global Services work upfront and during projects to optimize and improve the whole life cycle of any process equipment normally used in the chemical and pharmaceutical industries.



Engineering & Upgrades

If you are looking for the installation of a new process, to update aging equipment or modify equipment to improve performance, our **process engineers and service technicians provide single source responsibility**, from redesigning your process right through to site installation. Our team can review your existing equipment and your new process requirements, providing options on upgrades to enhance performance levels and ensure it matches the new process requirements.

Engineering at a glance

- > Consultancy Services.
- > Pilot Testing/Toll Operation.
- > Process Engineering.



Installation, Commissioning & Start-Up

The know-how of our engineers, backed by the expertise of our design team, guarantees safe, efficient installation and commissioning of the plant – including training for your operators by our experts.

Planning

GMM Pfaudler Services is comprised of experienced engineers and highly skilled technicians possessing all the knowledge to build a turnkey plant design and certify it in accordance with International standards. Our specialists have a vast experience in all chemical operations, including: Evaporation, Distillation, Mass Transfer, Reaction, Mixing, Heat Transfer, Filtration and more.

Project Management

Whether your project is a process upgrade to an existing facility or a complete new process installation, we **will manage your project from conception through to design and installation**.

Installation

Our Team can support in the installation phase, as necessary. The turnkey approach to project execution ensures plant installations are completed efficiently and on time.



Maintenance & Aftersales

Maintenance

Regular & preventive maintenance of plants especially for parts like rotating, seals, flange gaskets and measuring probes is critical. The choice of a suitable replacement or repair method play a key role in terms of avoiding long downtimes and to keep the equipment running better.

Troubleshooting

Component failure comes at a significant cost – both in terms of repairs and lost production. Our technicians will not only repair your equipment but, along with our engineers, will also work with you to troubleshoot the process, find the root causes and prevent repeating the problem.

Glass Inspection, Reglassing and Repair

We offer complete glass-lining inspection services to ensure that your reactor is in proper condition for safe and efficient operation. In addition to its expertise in manufacturing and engineered solutions, Pfaudler has core expertise in the service area of total equipment refurbishing. The reactors are completely reglassed, refurbished and comply with international regulations.

Aftermarket Parts

We supply OE aftermarket parts that guarantee you high quality, interchangeability and reliability with the full backing and warranty of Pfaudler.

Benefits

- > Qualified damage assessment.
- > Dismantling onsite and transportation to Pfaudler Reglass Center.
- > Upgrading easily possible.
- > Standard warranty as new vessels.
- > Reglassing of all glass-lined, including equipment from alternative suppliers.
- > Spare/replacement parts.
- > Repairs.
- > Renewal & Seal Exchange.



Machined PTFE & Engineered Plastic

Specialist at the forefront of the technological machining of PTFE & Engineered Plastics. We manufacture & stock a wide variety of high performance plastics including: Acrylic, Acetal, Nylon, Peek, Polycarbonate, PTFE & more.

Product Range

- > Bespoke Machined Components.
- > Semi-Finished Materials.
- > PTFE Envelopes.
- > Solid & Expanded PTFE Sheeting.
- > Soft-Cut Gaskets.
- > Spiral Wound Gaskets.
- > Gland Packing.

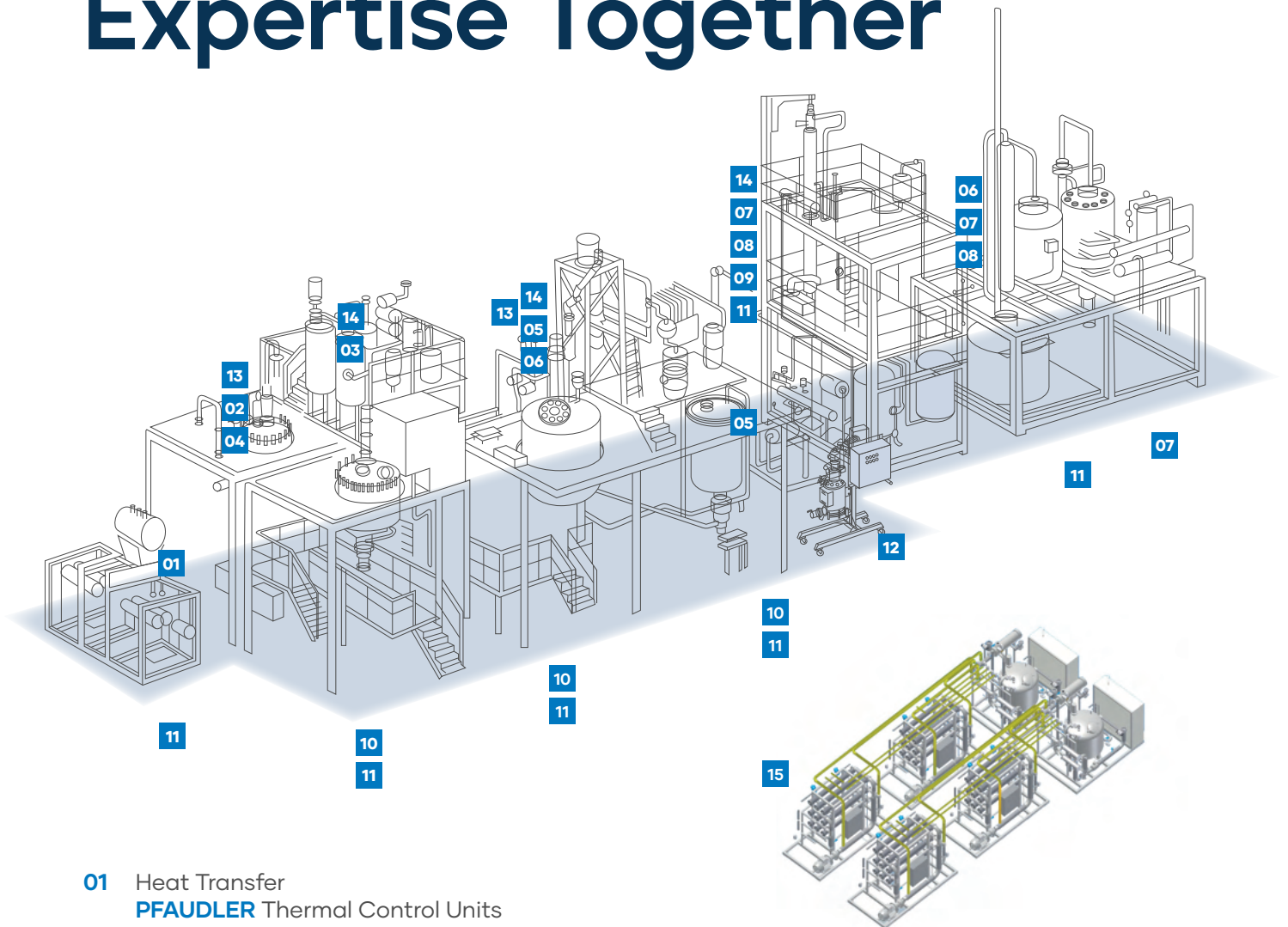
A worker in a blue cleanroom suit, including a hairnet and face mask, is operating a control panel in a highly industrial, stainless steel environment. The background shows complex piping, tanks, and machinery, typical of a pharmaceutical or chemical manufacturing plant. The entire scene is bathed in a cool blue light, creating a clean and professional atmosphere.

A reliable partner to improve plant performance

With extensive experience in the **chemical & pharmaceutical** industries and a wide range of **corrosion resistant technologies, systems and services**, GMM Pfaudler supports customers around the globe for their needs.

GMM
Pfaudler

Putting All Our Expertise Together



01 Heat Transfer
PFAUDLER Thermal Control Units

02 Corrosion Resistance & Mixing
PFAUDLER Glass Steel Reactors, Tanks, Receivers

03 Heat Transfer
PFAUDLER Glass Steel & Silicon Carbide Heat Exchangers and Condensers

04 Instrumentation
PFAUDLER Glass Lined Sensors

05 Corrosion Resistance & Mixing
EQUILLOY High Alloy Reactors, Receivers, Tanks, Heat Exchangers

06 Corrosion Resistance & Purity
EDLON Fluoropolymers Reactors, Tanks, Internals

07 Heat and Mass Transfer
PFAUDLER Glass Lined Columns
EQUILLOY Alloy Columns

08 Heat and Mass Transfer
PFAUDLER Columns System and Internals
EDLON Fluoropolymers

09 Heat and Mass Transfer
EQUILLOY Wiped Film Evaporators and Evaporation Systems

10 **PFAUDLER** Reactor Systems

11 **PFAUDLER** Modular Assemblies

12 **MAVAG** Filtration and Drying Equipment
EDLON Fluoropolymers

13 **INTERSEAL** Sealing Technology

14 **NORMAG** Lab & Process Glass

15 **HYDROAIR** Membrane Separation Systems

Worldwide Presence

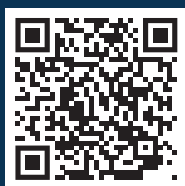


GMM Pfaudler is driven by 2000+ individuals across 4 continents and 20 global manufacturing facilities around the world.

Targeted investments in strategic markets, innovation and competitiveness allow the GMM Pfaudler Group to be a landmark in the industry.

You can either click on the link or scan the QR-Code for more information about our global contacts.

[Global Contacts](#)



80+
Countries

2000+
Employees

04
Continents