**Fields of application**
We care for gas phase reactions within a fixed bed reactor. DWE® has built salt operated reactors for more than 70 different products, such as:
- Phthalic anhydride
- Maleic anhydride
- Acrylic acid
- Acrylon
- Methyl methacrylate
- Methyl mercaptan
- Vinyl formamide

**The technical concept**
We manufacture fixed bed tubular reactors for gas phase reactions, exothermic and endothermic processes as well as high and highest operational temperatures.
The heat of formation is removed by liquid salt. Due to the unique design of DWE® reactors all necessary equipment to operate the reactor as cooler, heater, salt pump and control valves are directly mounted at the reactor.

**Support: Heling**
Our reactors are in operation for decades, so does our aftersales service. We will provide you with outstanding technical support and original spare parts throughout the life of the equipment. Furthermore you benefit from our expertise and ongoing product refinements.

**More than 750 reactors since 1955 provided to all major chemical companies verify the outstanding quality of our reactors.**

**Benefits at a glance**

**Low OPEX**
- Precise process control and high capacity
- Outstanding availability
- Reduced downtime

"Your solution" is our promise
- We customize any reactor to the extent your processes require.
Your needs – our solution

Customized solutions
To fulfill special process requirements DWE® has the ability to design multi-zone reactors and to integrate preheating and cooling zones into the reactor. Therefore customization of DWE® reactors is not reduced to particular process parameters and the local environmental conditions. DWE® reactor design: The reactor center part is delivered in two segments which reduces the individual weight to avoid shipping limits.

Health, Safety and Environment
With DWE® pilot reactors and demonstration plants reactor design parameters like tube diameter and length can be optimized. Furthermore suitable catalysts can be tested under operational conditions. Therefore DWE® offers research capacity in its own technical center or provides customized pilot plants. DWE® has the ability to design the local environmental conditions. Therefore DWE® offers research capacity in its own technical center or provides customized pilot plants.

Scale up and development of processes
We have developed proprietary solutions to keep people safe, the plant secure and the environment clean.

Containment design:
- no hazard to operating staff from escaping hot gases and ejected parts
- no deformations, pressure waves
- no emissions of gases, and smoke
- no risk of fire

Vented design reactors fitted with "KSBS" buckling rod pressure relief device
- Excellent response behaviour and accuracy
- Buckling rod works at ambient temperature and is not affected by process side conditions
- Low cost spare parts

Low CAREX
Outstanding lifetime
The lifetime of DWE® reactors is measured in decades. Most important the high availability is not a function of lifetime and lasts for longer than the amortization period.

Highest yield and selectivity
The high yield and selectivity is based on the outstanding temperature control of DWE® reactors. Due to the high efficiency reactor control the product composition reaches an optimum and the costs of downstream components are decreased.

Compact design
All necessary equipment to run the DWE® reactor is directly fitted to the reactor shell. The so called side equipment consists of coolers, pumps, (super-) heat exchangers, etc. Due to this design space requirements are minimized furthermore costs for piping, trace heating, isolation and so on are reduced.

Low OPEX
Precise process control and high capacity
DWE® reactors offer the highest possible inlet loading, space velocity and outlet yield due to proprietary temperature control with unique low temperature differences in each horizontal level of the reactor. Furthermore each operator can adjust and optimize the DWE® reactor in between these factors to gain the most economic benefit out of the plant on a day to day basis to follow the market.

Developed solutions
- Low energy costs
- Reduced energy costs
We customize the reactor and its side equipment to use the source of energy which is economically available at the plant site. Same for waste heat recovery and heat removal. We offer solutions to generate saturated or superheated steam to feed it into the plant steam grid or if not available to just discard the heat by use of ambient air.

Benefits in detail

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Outstanding availability
DWE® reactors have to run 24/7. That is what is expected and what is delivered. We have a proven track record even for second hand reactors.

Outstanding lifetime
DWE® reactors are always on time. We grant in case of a turnaround we have our spare parts and components of DWE® reactors in stock. In case of an incident line deflagration the proprietary Containment Design reduces time to recommissioning. E.g. there are no rupture discs to replace and there is no catalyst filter to clean.

Reduced downtime
In order to cut short your downtime all components which are subject to wear are easy to access and replace without cooling down the reactor or drain salt. In case of an incident line deflagration the proprietary Containment Design reduces time to recommissioning. E.g. there are no rupture discs to replace and there is no catalyst filter to clean.

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Health, Safety and Environment

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Low CAREX

Outstanding lifetime

The lifetime of DWE® reactors is measured in decades. Most important the high availability is not a function of lifetime and lasts for longer than the amortization period.

Containment design:

- no hazard to operating staff from escaping hot gases and ejected parts
- no failures of the reactor shell
- no emissions of gases, and smoke
- no risk of fire

Ventilated design reactor filled with "KSBS" buckling rod pressure relief device

- Excellent response behaviour and accuracy
- Buckling rod works at ambient temperature and is not affected by process side conditions
- Low cost spare parts

Low OPEX

Precise process control and high capacity

DWE® reactors offer the highest possible inlet loading, space velocity and outer yield due to proprietary temperature control with unique low temperature differences in each horizontal level of the reactor. Furthermore each operator can adjust and optimize the DWE® reactor in accordance to his own needs. The high yield and selectivity is based on the outstanding temperature control of DWE® reactors. Due to the high efficiency reactor control the product composition reaches optimum values and the costs of downstream components are decreased.

Compact design

All necessary equipment to run the DWE® reactor is directly fitted to the reactor shell. The so-called side equipment consists of coolers, pumps, pumps, heaters, etc. Due to this design space requirements are minimized. Furthermore costs for piping, trace heating, isolation and so on are reduced.

Reduced energy costs

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Outstanding availability

DWE® reactors have to run 24/7. That is what is expected and what is delivered. We have a proven track record even for second hand reactors. We provide spare parts during the decades lasting lifetime and offer adjustments to the current state of art and legislation. Therefore all components of the side equipment can be replaced individually. Besides containing temperature control of our reactors prolongs the lifetime of catalysts and therefore extends the turnaround period.

Reduced downtime

In order to cut short your downtime all components which are subject to wear are easy to access and replace without cooling down the reactor or drain salt. In case of an incident flame deflagration the proprietary Containment Design reduces time to recommissioning. E.g. there are no rupture discs to replace and there is no catalyst bypass line to remove. We grant in case of a turnaround spare parts and components of DWE® reactors are always on time.
Your needs – our solution

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We grant in case of a turnaround or drain salt, In case of an incident like deflagration the proprietary containment design reduces time for recommisioning. E.g. there are no rupture disks to replace and there is no catalyst filter out to remove. We grant in case of a turnaround spare parts and components of DWE® reactors are always on time.

Benefits in detail

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In order to cut short your downtime all components which are subject to wear are easy to access and replace without cooling down the reactor or drain salt. In case of such an incident like deflagration the proprietary containment design reduces time to recommisioning. E.g. there are no rupture disks to replace and there is no catalyst filter out to remove.

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DWE® Reactors
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Werftstr. 17
94469 Deggendorf, Germany
P +49 991 381-164
F +49 991 381-5164
dwe-reactors@man.eu
man-es.com

Salt operated reactors

Benefits at a glance
Low CAPEX
- Outstanding lifetime
- High selectivity reduces downstream costs
- Low NOx and CO exhaust emissions
- Compact design / low space requirement

Low OPEX
- Precise process control and high capacity
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Salt operated
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Fields of application
We care for gas phase reactions within a fixed bed catalysis. DWE® has built salt operated reactors for more than 70 different products, such as:
- Phthalic anhydride
- Maleic anhydride
- Acrylic acid
- Acrylonitrile
- Methyl methacrylate
- Methoxyacrylonitride
- Vinyl formamide

Technical concept
We manufacture fixed bed tubular reactors for gas phase reactions, exothermic and endothermic processes as well as high and highest operational temperatures. The heat of formation is removed by liquid salt. Due to the unique design of DWE® reactors all necessary equipment to operate the reactor as cooler, heater, salt pump and control valve are directly mounted at the reactor.

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- Compact design / low space requirement

**Low OPEX**
- Precise process control and high capacity
- Outstanding availability
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