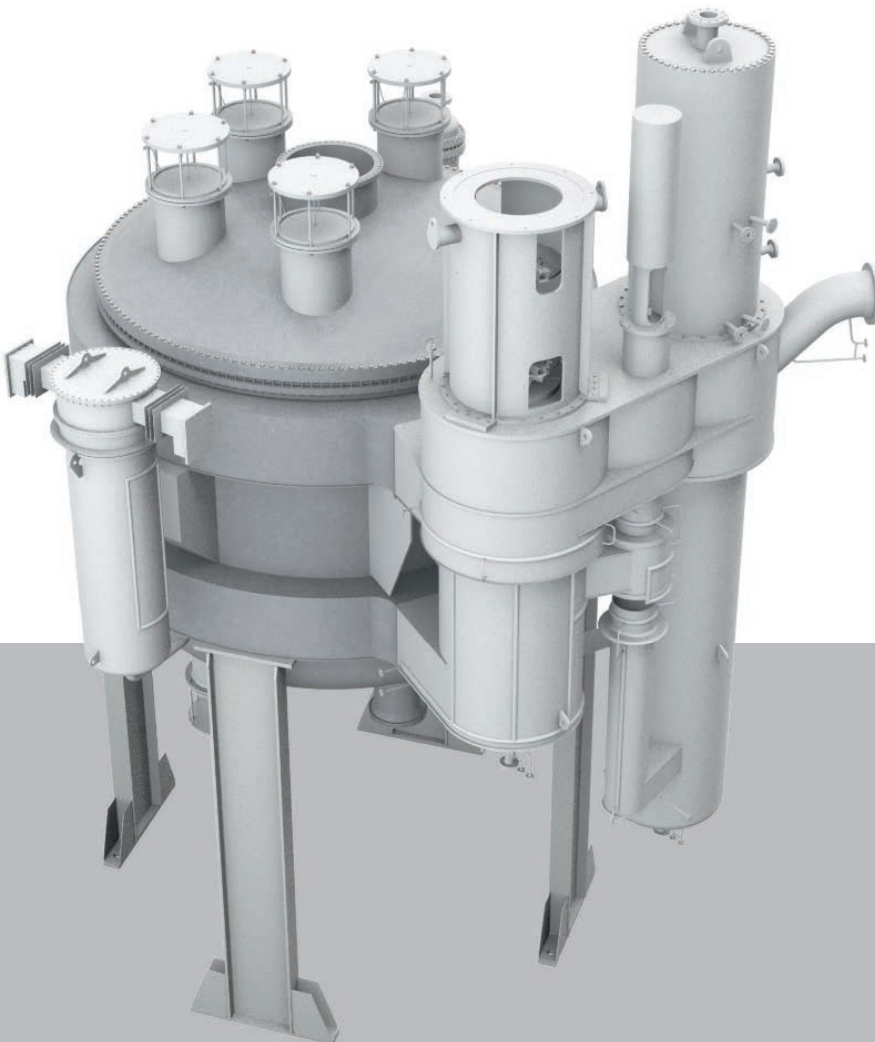


Salt operated reactors

Maleic Anhydrid

**DWE® – global no. 1 in tubular
reactors**

- First reactor in 1955
- More than 750 contracts
- up to 45,000 tubes
- heat removal up to 40 MW
- Salt flow up to 11,000 m³/h
- More than 750 catalytic gas phase tubular reactors for 54 products and use of 77 different processes
- 28 Deflagration pressure containment design reactors
- Up-scale from pilot test (1-2 tube) to commercial reactor size with same salt temperature conditions





Market leader for MA reactors

- 85+ reactor systems manufactured until today
- Feedstock: n-Butane or Benzene
- Deflagration vented or pressure containment design feasible
- Highest loadings
 - n-Butane 2.1 Mol%
 - Benzene 200 grams per h and tube
- Biggest tube number: up to 45,000

Maleic Anhydrid (MA) reactor

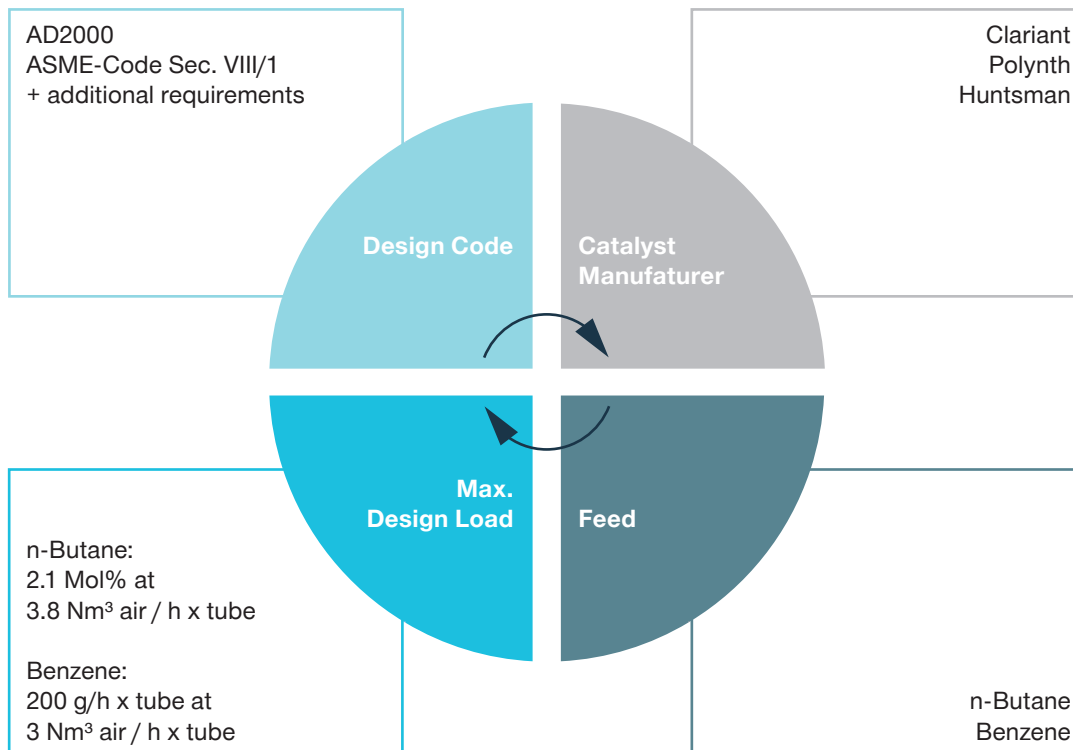
Technical data

Standard design data/operating data

| Pressure/temperature | Design | Operating |
|-----------------------|---------------------|---------------------|
| Pressure tube side | 2.0 barg – 5.0 barg | 1.4 barg – 2.4 barg |
| Temperature tube side | 450 °C | 420 °C – 450 °C |
| Pressure shell side | static + pump | static + pump |
| Temperatur shell side | 450 °C | 390 °C – 445 °C |

Characteristic design data

| Design data | Feed: Propylene |
|---------------------------------|------------------------|
| Design load | max. 2.1 Mol % |
| Space velocity | max. 2,000 1/h |
| Inner diameter x wall thickness | Ø 25 x 2.0 mm |
| Tube length over tube sheets | up to approx. 7,000 mm |
| Tube length between tube sheets | up to approx. 6,500 mm |
| Amount of heat to salt per tube | max. -900 W |
| Yield | 100 % – 106 % |
| MA per tube and hour | 0.14 kg – 0.18 kg |
| Max. tube number per reactor | 45,000 |



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