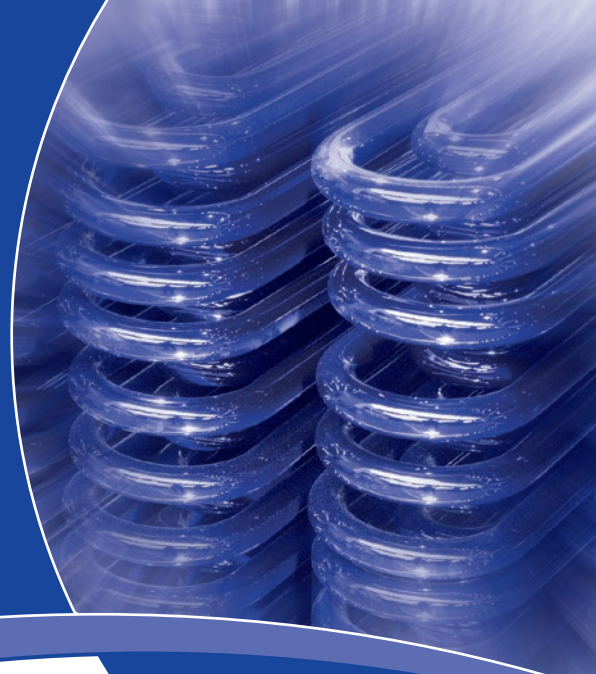


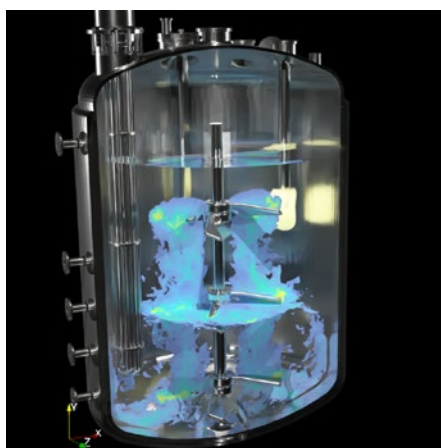
THALETEC

Process Engineering regarding
Mixing Technology and Heat Transfer



Process Engineering regarding Mixing Technology and Heat Transfer


Glass-lined equipment is often the centrepiece of a chemical plant to implement complex processes under aggressive conditions. The dimensioning of the glass lined apparatus during the project planning phase is of decisive importance for achieving the desired process parameters. Subjects of mixing technology and/or heat transfer have to be calculated under given conditions. Mechanical aspects, such as vibration behaviour, must also be taken into account during the project planning phase in order to avoid resonance phenomena. All these topics aiming to efficient and productive glass lined apparatus in order to save on investment and operating costs. THALETEC offers you a wide range of analytical and numerical calculation options to support you in this.

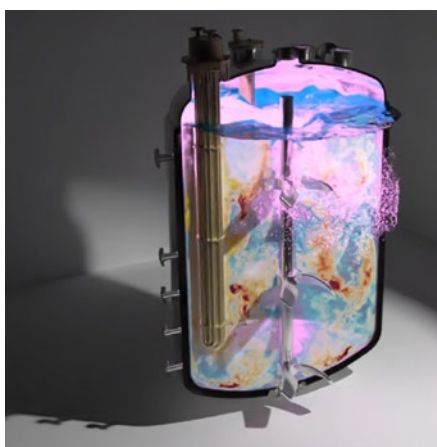


⤴ BE6300 with 3-stage TAR/TAF agitator system. Visualisation of the flow velocity and introduction of a second substance (yellow).

Designing the mixing technology of glass lined reactors

A wide range of mixing technology (turbines, baffles, feed options) are available for implementing individual processes. All these parts have been developed for special applications. Depending on the process (homogenisation, crystallisation, suspension, dispersion, gassing, heat

transfer, residual mixing, polymerisation, etc.), it is necessary to determine the correct configurations and operating parameters. To enable a numerical or analytical design, we recommend you to complete and send us the process questionnaire F001 .



⤴ BE6300 with visualised distribution of flow velocity and injected particles (pink)

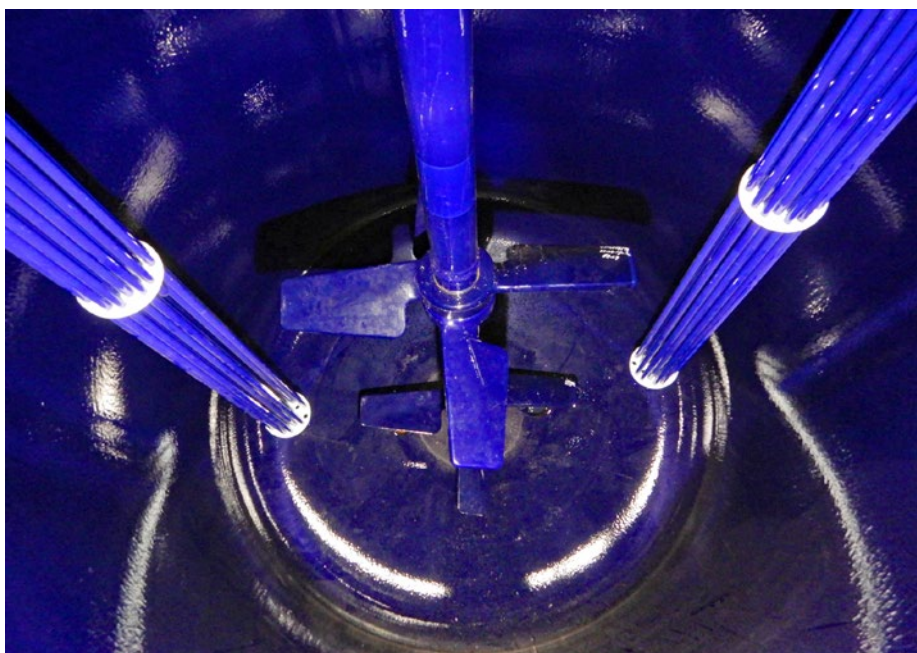
CFD simulation (Computational Fluid Dynamics)

Modern hardware and software allow in-depth insights into mixing processes

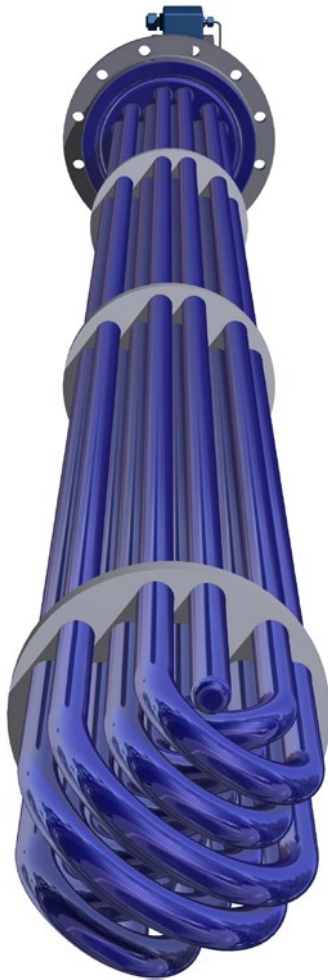
with easily variable mixing technology. Characteristic values of the mixing process can be easily determined with the CFD system used by THALETEC, such as power input, energy dissipation, concentration distribution in the reactor or particle distribution. Liquids, particles and even chemical reactions in the mixing process can be taken into account. The prerequisite is detailed knowledge of the material data. To assess the feasibility of a CFD simulation for your specific case, request a quote from process@thaletec.com!

Analytical design

In addition to a numerical simulation (CFD simulation), the free of charge and analytical design of the mixing technology can also be used in the course of an order. THALETEC GmbH can draw on decades of experience and comprehensive data, which have been determined experimentally and confirmed many times in practical use. The necessary mixing technology is designed for your individual process and characteristic data on power input, shaft torque or circulation capacity are determined, among other things. Send your questions by e-mail to process@thaletec.com!



⤴ BE16000 with two-stage TAF agitator system and two PowerBaffles for a significant increase in heat flux



↑ PowerBaffle to significantly increase the heat exchange surface - more power and shorter process times

Heat transfer for glass lined reactors and glass lined heat exchangers

A decisive influencing factor is the product temperature in chemical processes, which can be set specifically via various heat flows. Reaction heat must be dissipated with sufficient safety or the product must be tempered (cooled/heated) in order to activate or support chemical processes. Glass-lined reactors (types AE, BE, CE) offer a variety of options for providing the necessary heat flows. In addition to a jacket or a half-pipe coil, each of which can be additionally divided into different heating or cooling zones, THALETEC GmbH is the only manufacturer in the world to offer the option of glass-lined tube bundle heat exchangers (Flyer Powerbaffle K014 [↗](#)) for significantly increasing the heat transfer surface within a reactor.

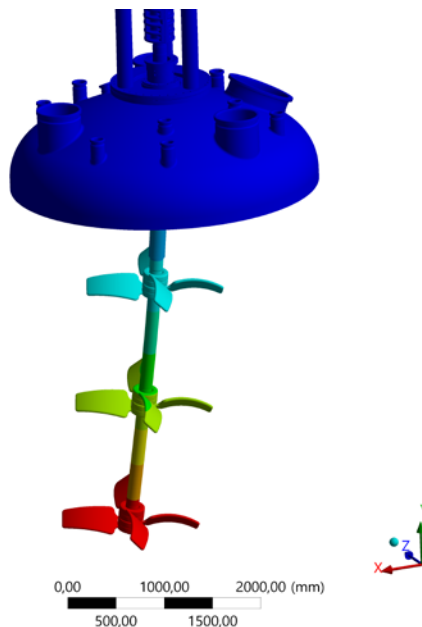
Glass-lined tube bundle heat exchangers (optionally also with SiC tube bundles) offer a further option for transfer heat flows

in a chemical plant. These can be used for heating, cooling, evaporation, condensation or as condensate cooling.

THALETEC GmbH offers you free of charge the calculation of heat flows including characteristic values and energetic aspects of a reactor (Flyer F001 [↗](#)) or the dimensioning of a glass lined heat exchanger (Flyer K014 [↗](#)) in the course of an order. Simply send us your enquiry via process@thaletec.com!

Vibration behaviour of agitated reactors

An often neglected topic is the vibration behaviour of agitators. Analytical calculation methods are limited exclusively to the shaft with turbines. It is known from the literature that the „critical speed“ determined in this way can be subject to an error of up to 40 %. The main sources of



↑ Visualisation of the natural mode of the 1st natural frequency of a 3-stage DCT agitator system of a BE32000 taking into account the stiffness of the top dished head.

error are due to the neglect of the bearing stiffness and, above all, the stiffness of the top dished head. With the help of the Finite-Element-Method (FEM), the natural frequencies and natural modes of a glass-lined agitated reactor and the internals

can be simulated via a modal analysis. The system boundary is freely selectable and can also include the frame suspension of the reactor. Request your individual offer process@thaletec.com!

Experimental studies

THALETEC GmbH has a test centre which enables mixing tests on a laboratory scale. All THALETEC turbines and baffles are available to carry out experimental studies and to determine or assess power inputs, mixing times, foam formation, gassing behaviour or particle distributions. For safety reasons, this can only be done with non-aggressive media. A transportable test set-up enables mixing tests directly at the customer's site. The power input of individual mixing technology can be measured and even exotic turbine geometries can be represented with the help of 3D printing.

Request your individual offer via process@thaletec.com!



↑ Curved X-shaped Residual CXR and Abrasion Minimised Turbine AMT

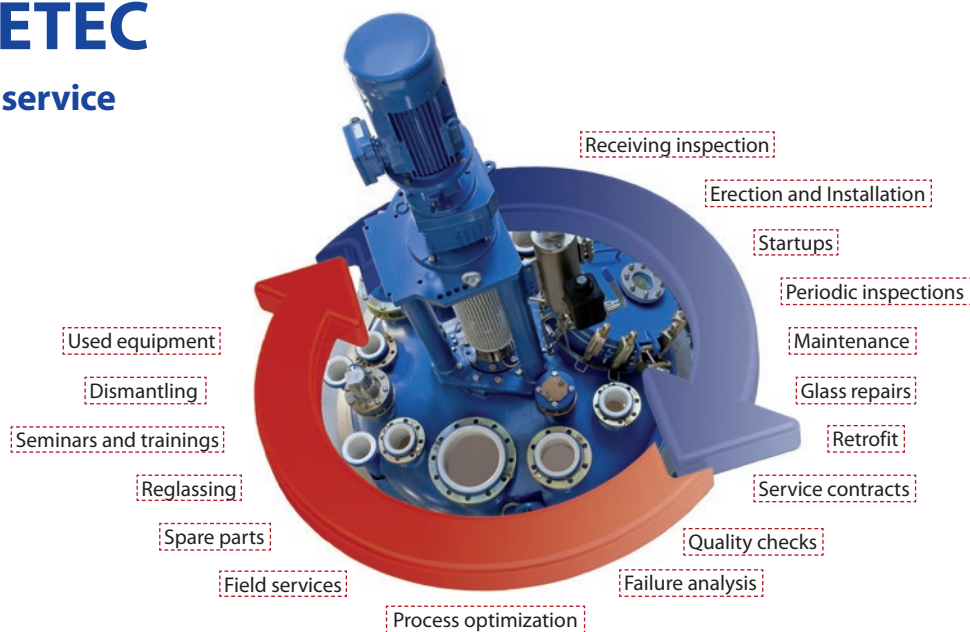
We would like to advise you regarding the advantages of glass lined equipment like:

- Glass lined reactors acc. to DIN 28136
- Glass lined Pharma Reactors
- Components for pharmaceutical and high purity applications
- Mixing technology for pharmaceutical and chemical industry
- Reactors for Polymerization
- Storage Tanks and Receivers
- Columns
- Heat Exchangers
- Sensor technology
- Accessories

www.thaletec.com

THALETEC

all around service



THALETEC GmbH

Steinbachstraße 3
D - 06502 Thale

+ 49 (0) 3947 778-0
+ 49 (0) 3947 778-130

Hotline:

+ 49 (0) 3947 778-111
@ service@thaletec.com
www.thaletec.com

