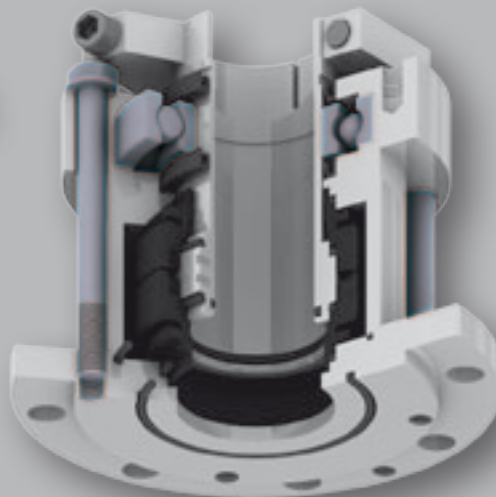
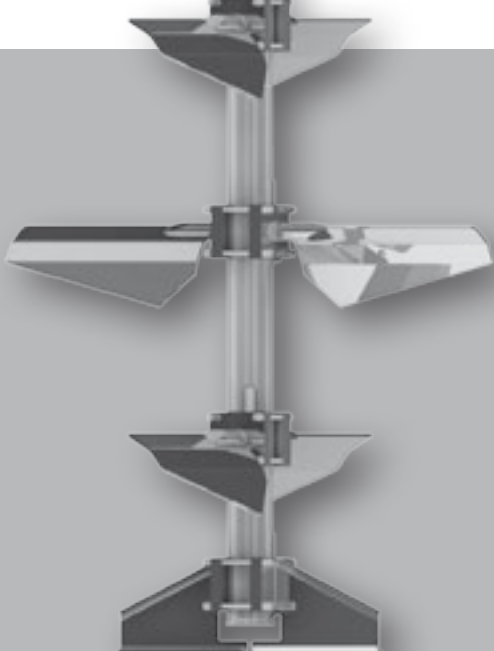


# CERTIFIED AGITATORS FROM THE MANUFACTURER

**TSCHAMBER**   
MUT MISCH- UND TRENNTÉCHNIK



More than 35 years of experience

- Process technology
- Mixing technology
- Project planning
- Manufacturing





## FACTS AND FIGURES

**1979**

Founding of MUT Misch- und Trenntechnik GmbH

**1989**

Founding of Tschamber Maschinenbau

**1995**

Fusion of both companies MUT Misch- und Trenntechnik & Tschamber Maschinenbau. Founding of MUT-Tschamber GmbH

**2013**

The course for continuing a successful family business is set. Founder Hans-peter Tschamber begins to integrate his MBA educated son-in-law Michael Müller into the company's leadership position

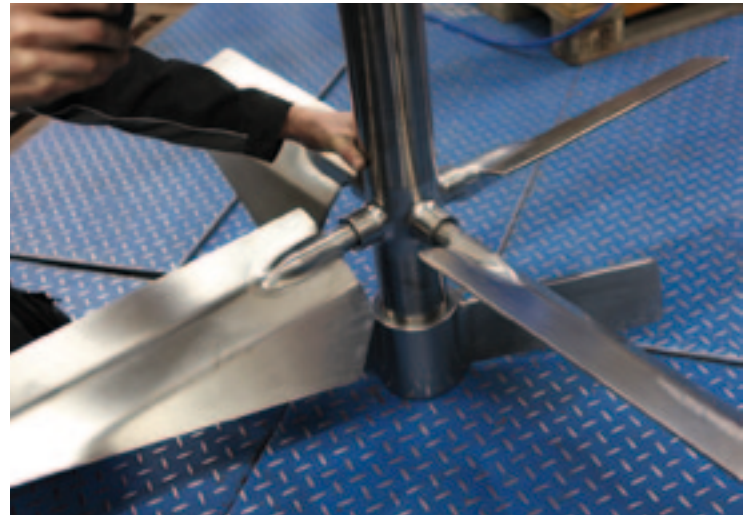
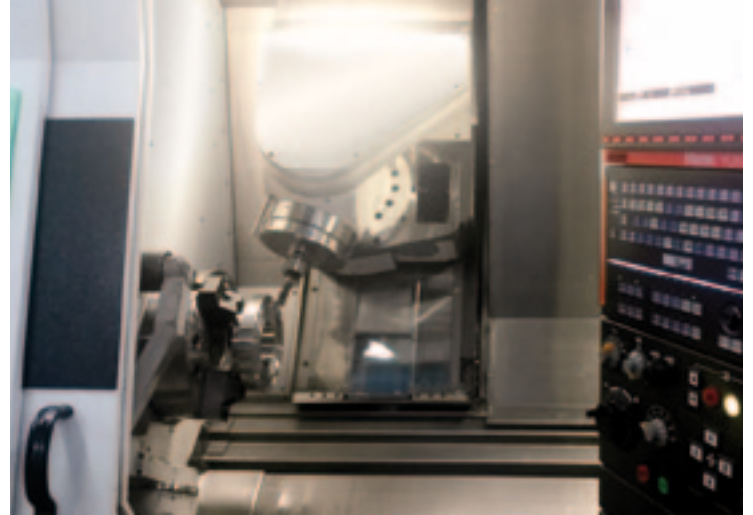
**30.000**

Agitators had been successfully set into operation worldwide

**4.000 m<sup>2</sup>**

Production Area

# EVERYTHING FROM THE SAME SOURCE





## AGITATORS / TYPES

- DIN
- Standard
- Compact
- Stand
- Side-Entry
- Magnetic Coupled
- Jet Stream

## AGITATOR SEALS

- TD4 double-acting seals
- TD3 single-acting 3-ring seals
- TDSL slurry seals
- TDSL2 FGD seals with shut-off function
- TDST sterilizable seals
- Gland, water trap, shaft seal ring
- Supply systems for seals



## ACTIVITIES

- Planning / Calculation
- Engineering / Design
- Assembly / Construction
- Service / Maintenance
- Support / Assistance
- Modification / Repair
- Retrofit

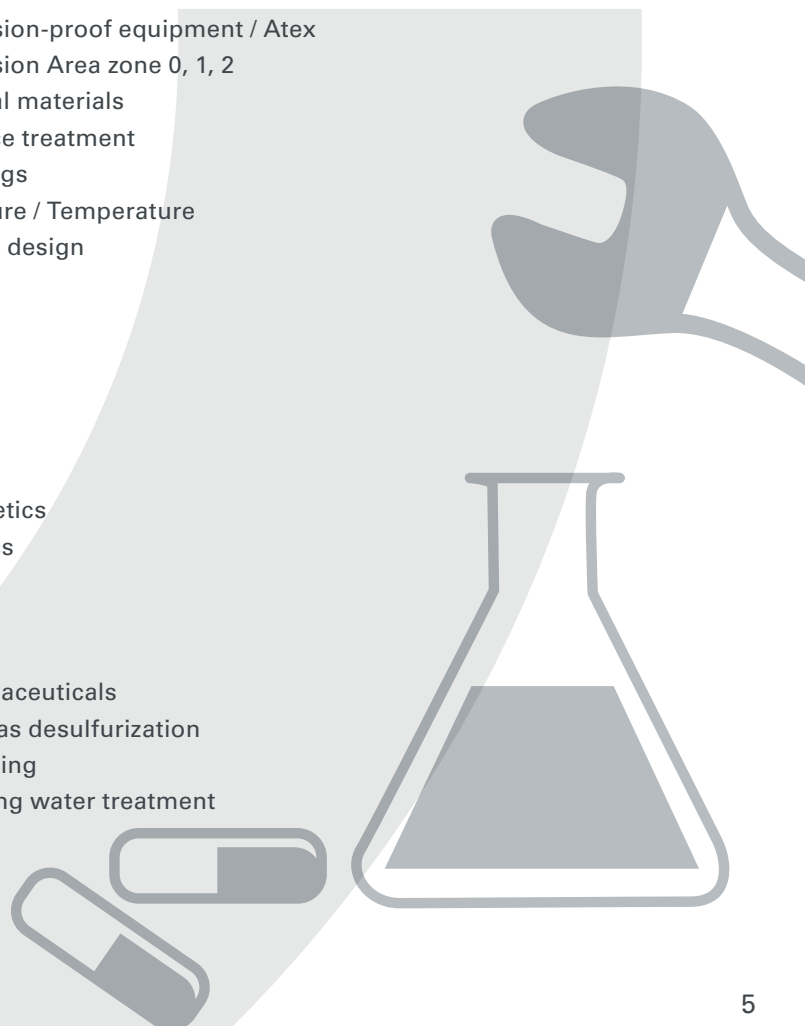
## SPECIAL REQUIREMENTS

- Explosion-proof equipment / Atex
- Explosion Area zone 0, 1, 2
- Special materials
- Surface treatment
- Coatings
- Pressure / Temperature
- Sterile design

## INDUSTRIES

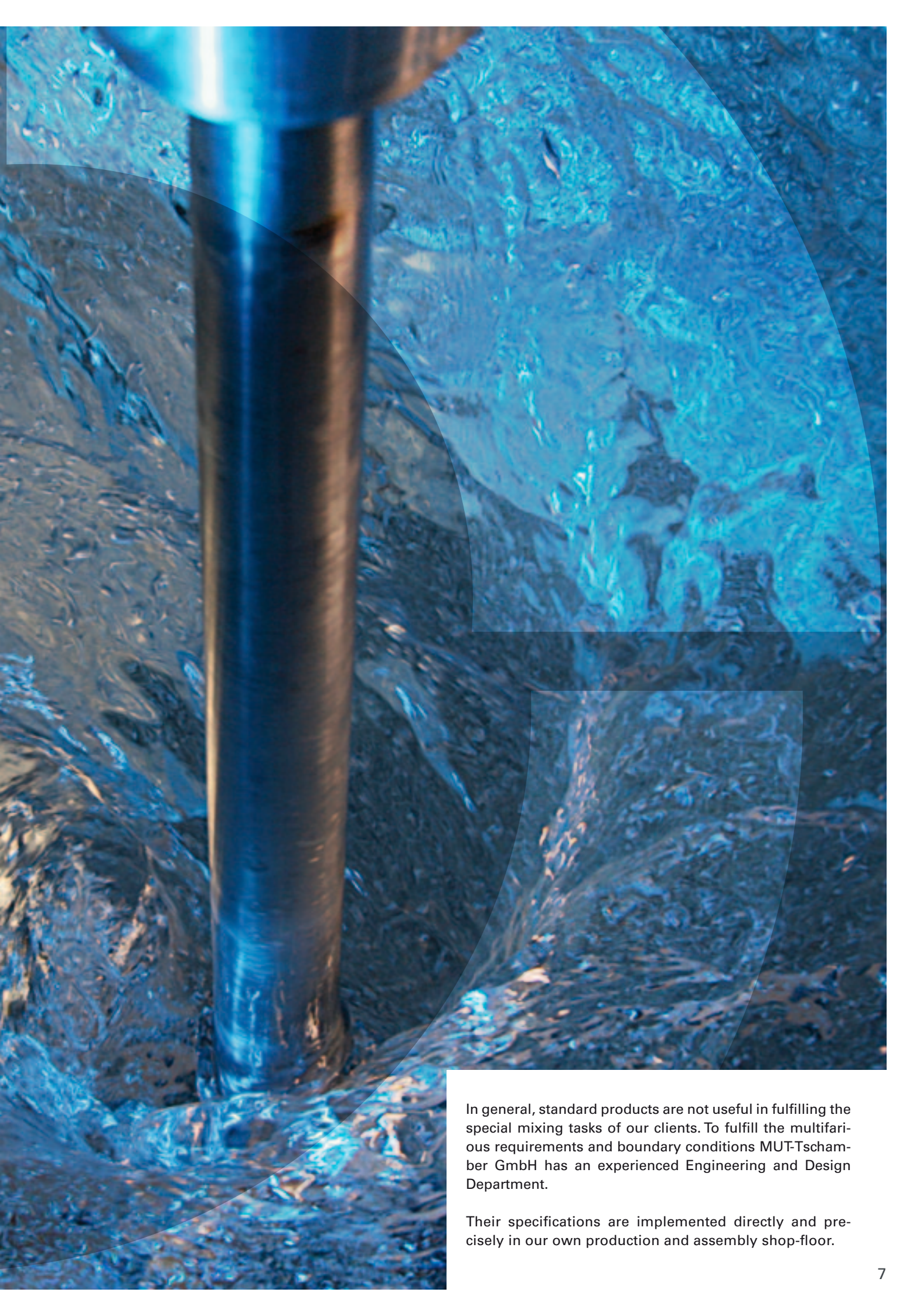
- Waste water treatment
- Mining
- Bioethanol
- Bioreactors
- Biogas
- Biotechnological industry
- Chemical industry
- Dye
- Rubbers
- Resins
- Ceramics

- Cosmetics
- Plastics
- Paint
- Food
- Paper
- Pharmaceuticals
- Flue gas desulfurization
- Recycling
- Drinking water treatment
- Sugar



An aerial photograph of a river delta, showing intricate patterns of water and land. A large, semi-transparent circular graphic is overlaid on the image, starting from the top left and curving across the middle. The text "DIVE INTO THE WORLD OF MIXING TECHNOLOGY" is positioned in the top left corner, partially overlapping the circular graphic.

# DIVE INTO THE WORLD OF MIXING TECHNOLOGY



In general, standard products are not useful in fulfilling the special mixing tasks of our clients. To fulfill the multifarious requirements and boundary conditions MUT-Tschamber GmbH has an experienced Engineering and Design Department.

Their specifications are implemented directly and precisely in our own production and assembly shop-floor.

# KNOW-HOW IS THE REQUIREMENT FOR A CUSTOMIZED AGITATOR DESIGN

At this juncture there are a lot of boundary conditions to consider, for example vessel geometry, temperature, pressure, material resistance and the product properties. In addition, precise engineering tasks, the mixing tasks of the customers and compliance with the standard rules and regulations must be adhered to.

The well-grounded knowledge of how the different Impellers operate guarantees the successful completion of a mixing task.

## DRIVE UNITS

- Motor (direct, belt drive)
- Geared motor (bevel, helical, flat)
- Explosion proof (gas, dust)
- ATEX, CE, NEMA, AGMA
- Speed control (frequency converter)
- Pharmaceutical design

## HOUSING

- Double bearing (Standard)
- Bearing support (DIN)
- Sideways seal change
- Swivel device for seal change

See adjacent examples of our proven variants and modules. These represent only a small selection of our possibilities.

If you would like to learn more...  
Ask our specialists:

+49 7762/5206-36  
sales@mut-ts chamber.de

## SHAFT DESIGN

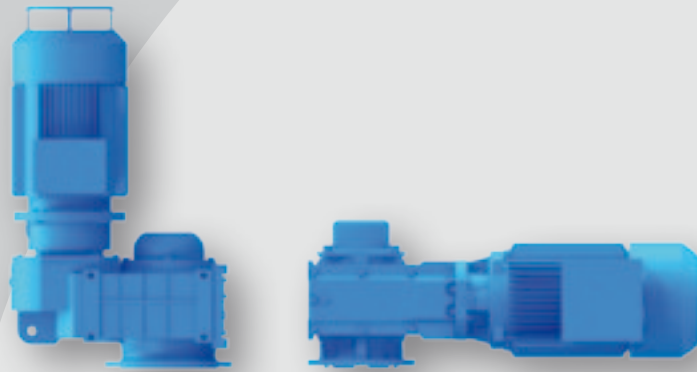
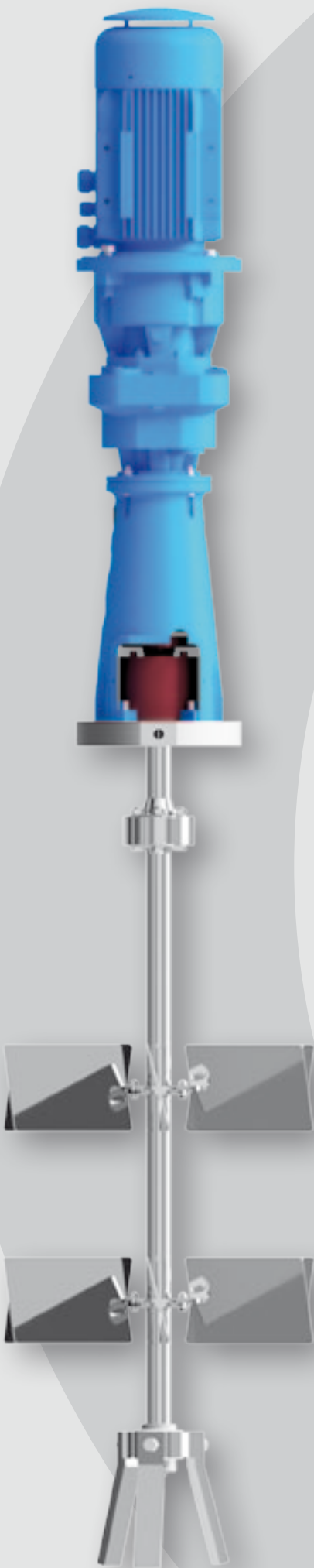
- Solid bearing shaft
- Solid or hollow agitator shaft
- Flange coupling acc. DIN 28155

## BOTTOM BEARING

- Floatingly supported
- Various bushing materials
- Sterile design
- ATEX conform

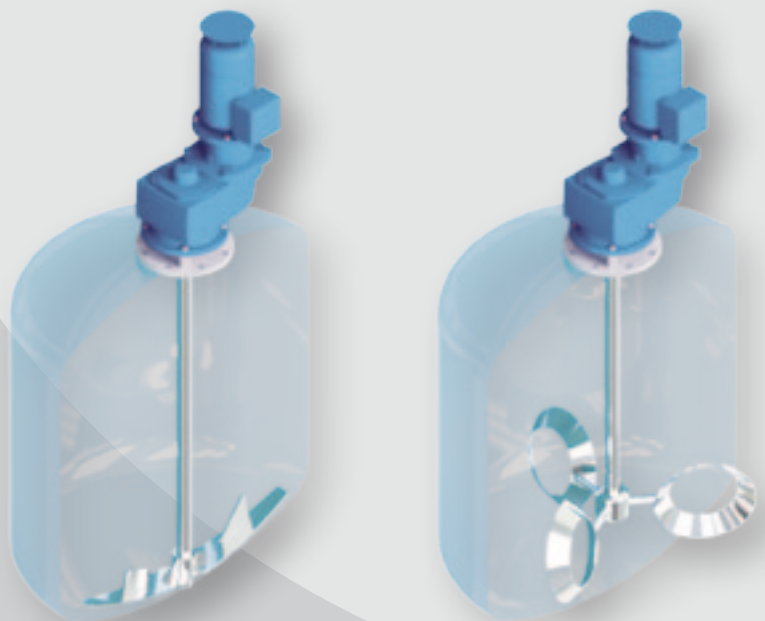






## MOUNTING FLANGE

- DIN (EN1092-1, DIN28141...)
- ANSI
- IEC
- Sterile / GMP model
- Mounting plate
- Special dimension



## SPECIAL REQUIREMENTS

- Sterile design
- Slurry design
- For abrasive media
- ATEX, TA Luft

## SHAFT SEALS

- Radial shaft seal
- Water trap
- Lip seal
- Gland
- Labyrinth seal
- Zone 0

## COATINGS

- Rubber lining hard / soft
- PTFE, Halar
- PVDF
- PVC / PE / PP
- Epoxy
- Hardfacing

## MECHANICAL SEALS

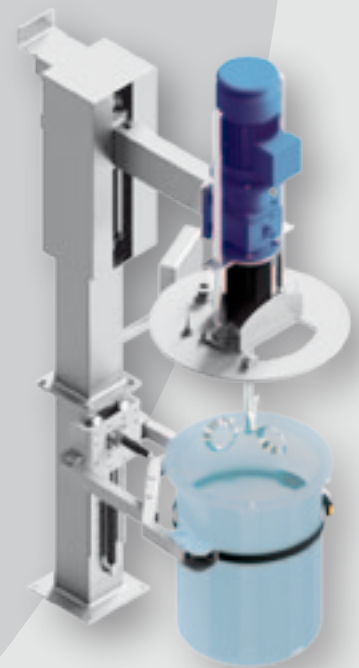
- Single acting
- Double acting
- Dry running
- Gas lubricated
- FGD design with shut-off device

## STAINLESS STEEL AND SPECIAL MATERIALS

- 1.4301, 1.4404, 1.4571, 1.4501, 1.4529, 1.4539, 1.4563
- 1.4462 Duplex, 1.4410 Superduplex
- Alloy steel C4, C22, C59, ...
- Carbon steel
- Solid PTFE

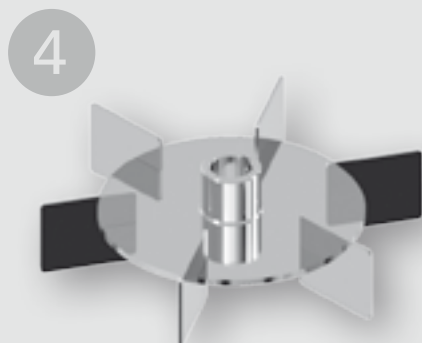
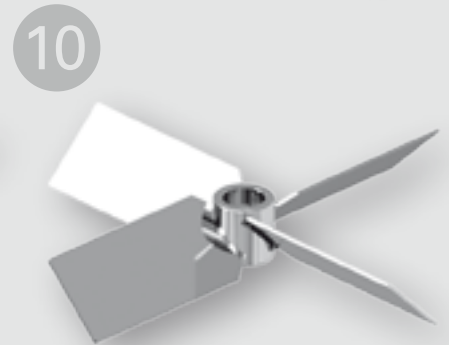
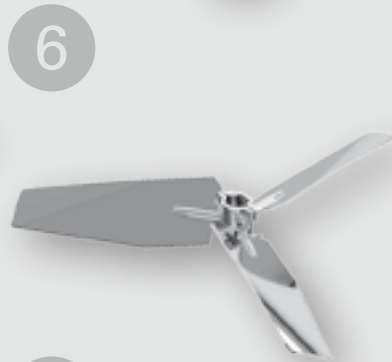
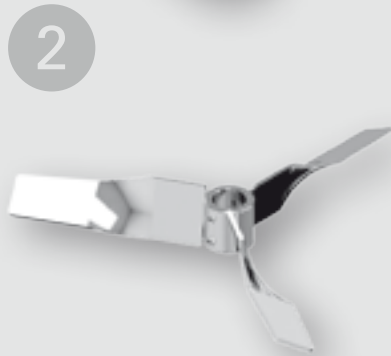
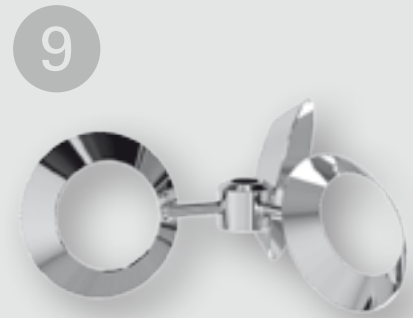
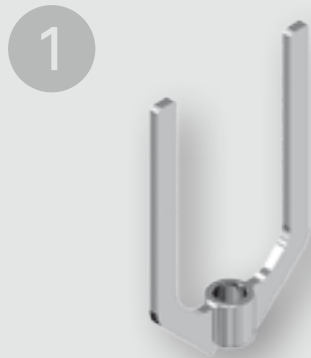
## SURFACES

- Glass blasted
- Polished up to Ra 0,1
- Electro polished
- Pickled / passivated
- GMP design



## IMPELLERS

- |                             |                             |                               |
|-----------------------------|-----------------------------|-------------------------------|
| 1) Anchor                   | 5) Jet stream Impeller      | 9) Cone Impeller R30.3k       |
| 2) Axial Flow Impeller A3.1 | 6) Axial flow Impeller A5.1 | 10) Pitchblade Impeller A20.4 |
| 3) FGP Impeller C10.3       | 7) Viscosity Impeller VP2   | 11) Trapeze Impeller TR       |
| 4) Rushton turbine R10.6    | 8) Coil segment Impeller WS | 12) Propeller A10.3           |



# PROCESS ENGINEERING – THE BASICS OF AGITATOR DESIGN

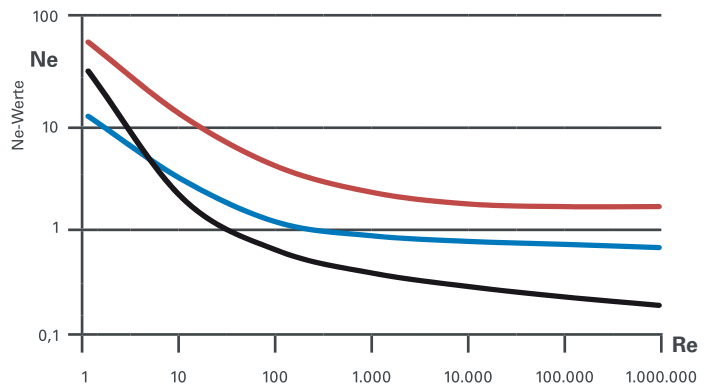
A high level of knowledge of rheology is necessary to understand the wide variety of fluids and their specific features. To compliment this knowledge our process engineers are equipped with a range of tools and methods.

Performance curves, mixing time curves, degree of viscosity, suspension calculations, settling speeds and heat-transfer calculations form the basics.

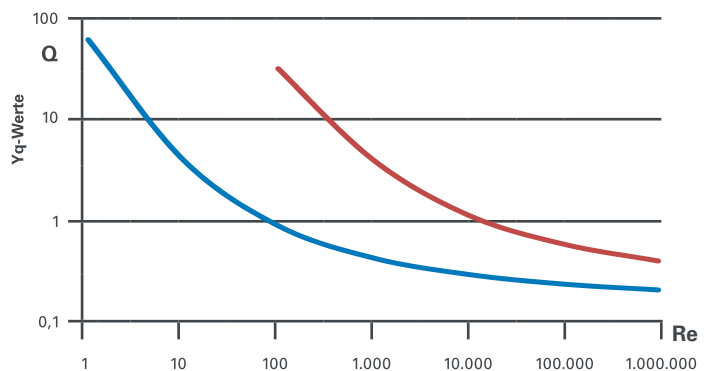
Angebot 15-30961		Technische Auslegung		Kunde BASF									
Pos. 12		MUT-Techamber GmbH		Datum 07.07.2015									
Kunden-Pos. Reaktor A				Bearbeiter H. Sudeu									
<b>Stoff- und Betriebsdaten</b>		<b>Leistungsdaten</b>		<b>Viskosität</b>									
Dichte in kg/m <sup>3</sup>	1290	Leistung Welle in kW	66,3	Lagerwelle	1.4462								
Viskosität in mPas	21000	Leistung Antrieb in kW	110	Sigma bei 320 °C in N/mm <sup>2</sup>	277,0								
Temperatur in °C	320	Drehzahl in 1/min	43,3	Rührerwelle	1.6539								
Druck in bar (abs)	7,0	Re-Well	215	Sigma bei 320 °C in N/mm <sup>2</sup>	133,9								
<b>Abmessungen Lagerung</b>		<b>Abmessungen Welle</b>		<b>Randbedingungen</b>									
Dicke Zapf / MoFl	0 / 80	W1 kg/m, mm	204 4200	Durchtriebsbetrieb	<input type="checkbox"/> Ja								
Getriebe Hohlwelle	160 x 595	L, D, Da	180	Störung	<input type="checkbox"/> Normal								
Laternen	DFD G31265F	W2 kg/m, mm	161 3380	Einbau	<input type="checkbox"/> zentrisch								
Lagerabstand	1712	L, D, Da	160	<b>Bodenlager</b>									
Ø Lagerwelle	180	W3 kg/m, mm		<input type="checkbox"/> Nein									
Abmaß oberes Lager	1090	L, D, Da		Welle ab Unterkante MoFl									
Ø Abmaß	180	W4 kg/m, mm		Kritische Drehzahl in 1/min									
Unteres Lager-Flansch	220	L, D, Da		n2 / nk									
Länge Lagerwelle	2532			0,67									
<b>Momente und Festigkeitswerte</b>		<b>Umweltleistung</b>											
	Mb Nm	Sigma vorh.	Sigma zul.	Ø min mm	ß								
Abmaß Lagerwelle	12710	48,4	92,3	129	5,7								
Unteres Lager	20723	44,4	92,3	141	6,2								
Rührerwelle	17257	39,7	44,6	173	3,4								
		Q m <sup>3</sup> /h, m <sup>3</sup> /min		80780	1346								
		Umweltleistung korrigiert m <sup>3</sup> /min		157									
		Umweltlaste in 1/min		2,3									
		Machzahl (95%) in min		2,17									
<b>Rührergänge</b>													
Nr.	Name	Ø in mm	d/D1	u in m/s	alpha	βD in mm	Ne	P in kW	Q m <sup>3</sup> /min	m in kg	l ab MoFl	Pn in N	
1	TR.2	2000	0,58	4,53	24	400	0,442	6,86	154	124	8100	339	
2	TR.2	2200	0,61	4,99	24	440	0,326	6,14	136	173	7500	349	
3	TR.2	2200	0,61	4,99	24	440	0,366	9,16	136	173	6600	363	
4	TR.2	2200	0,61	4,99	24	440	0,366	9,16	136	173	6100	363	
5	TR.2	2200	0,61	4,99	24	440	0,366	9,16	136	163	5400	363	
6	TR.2	2200	0,61	4,99	24	440	0,366	9,16	136	173	4700	363	
7	TR.2	2200	0,61	4,99	24	440	0,366	9,16	136	163	4000	363	
8	TR.2	2200	0,61	4,99	24	440	0,366	9,16	136	163	3300	363	
9	TR.2	2200	0,61	4,99	24	440	0,366	9,16	136	163	2600	363	
10	TR.2	2200	0,61	4,99	24	440	0,366	9,16	136	163	1900	786	
<b>Strombelastungen</b>													
Biegemoment +/- 25% in Nm		20175		Axialkraft in N		40098		Torsionsmoment in Nm		24261			
Querkraft unteres Lager in N		16331		Querkraft oberes Lager in N		-12104		Kippmoment in Nm		60652			



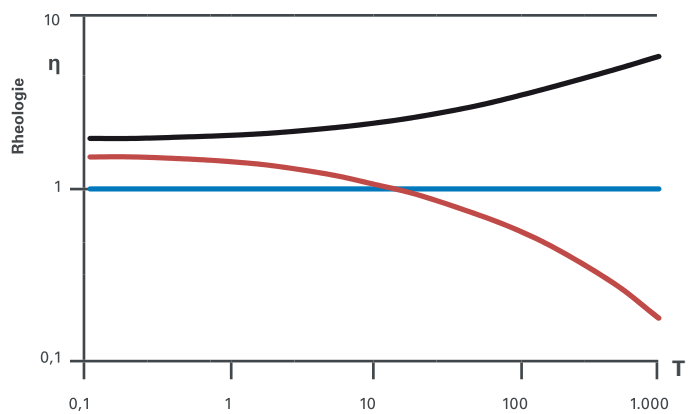
## PROCESS DESIGN



Performance curves



Mixing time curves



Viscosity

## DESIGN / ENGINEERING PROCESS ENGINEERING

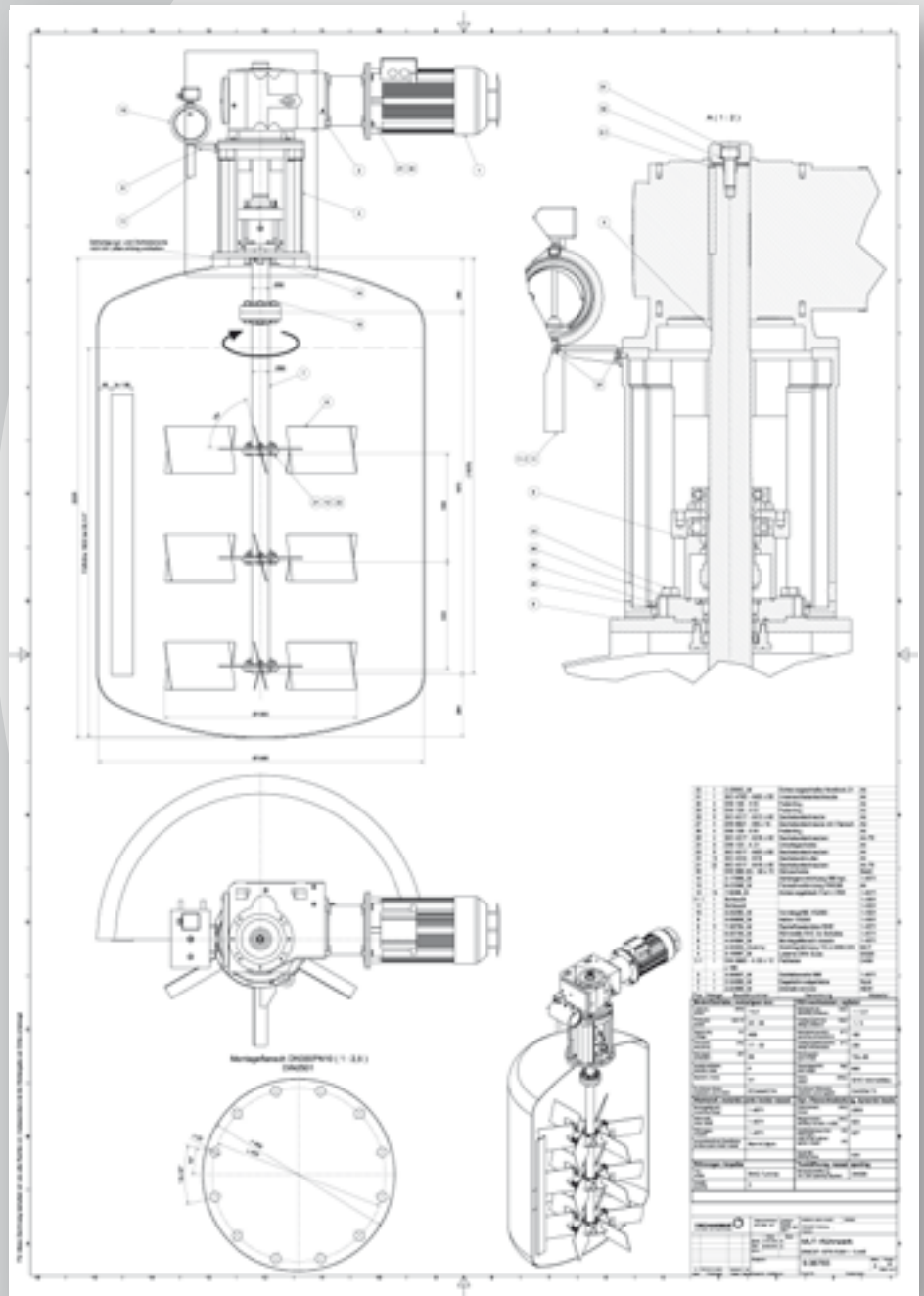
- Shaft power
- Mixing time
- Suspension performance
- Heat transfer
- Viscosity effect
- Gassing calculation
- Draft tube application

## DESIGN / ENGINEERING MECHANIC

- Shaft dimension
- Critical speed
- Nozzle load
- Baffle forces
- Thickness of Impeller blade
- Temperature influence
- Material choice
- Hollow shaft dimension
- Impeller geometry

## OPTIMIZATION

- Engine power
- Mixing time
- Suspension performance
- Lifetime





## AGITATORS

- DIN
- Standard
- Compact
- Stand
- Side-Entry
- Magnetic Coupled
- Jet Stream

## AGITATOR SEALS

- TD4 double-acting seals
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- TDSL2 FGD seals with shut-off function
- TDST sterilizable seals
- Gland, water trap, shaft seal ring
- Supply systems for seals



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