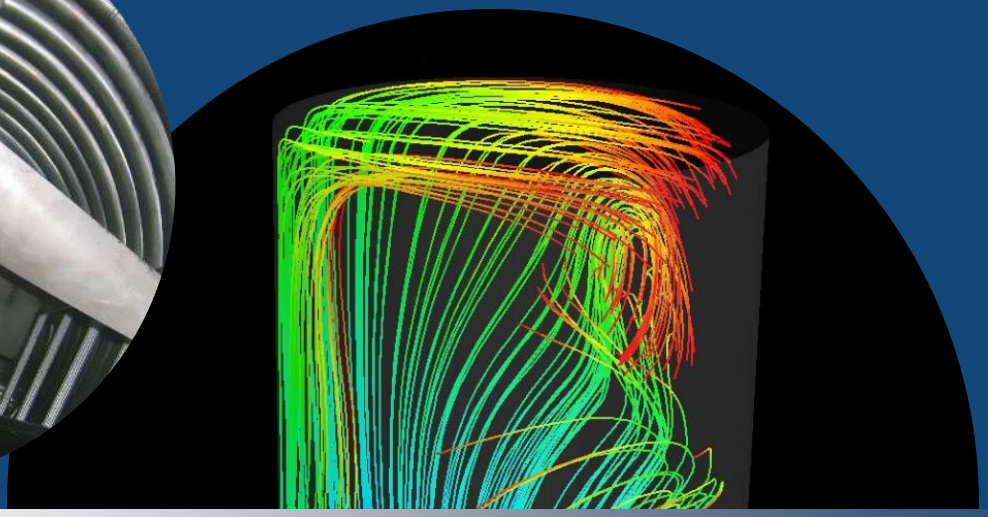
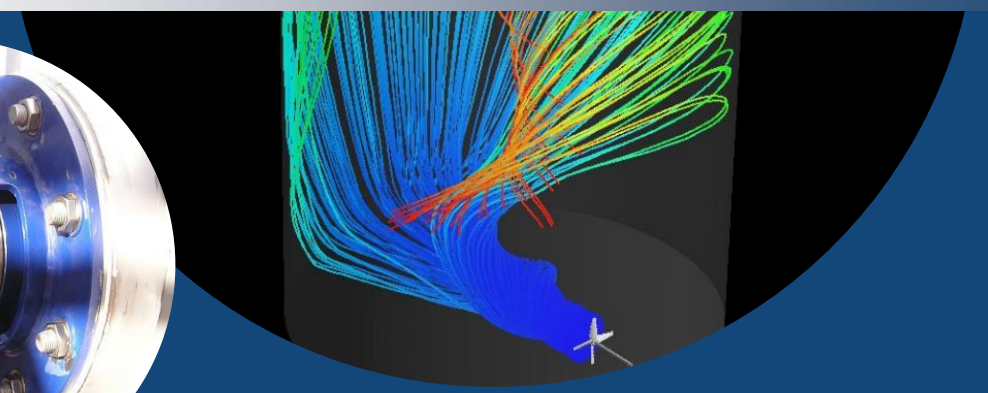
CHEMICAL PLANT & ENGINEERING



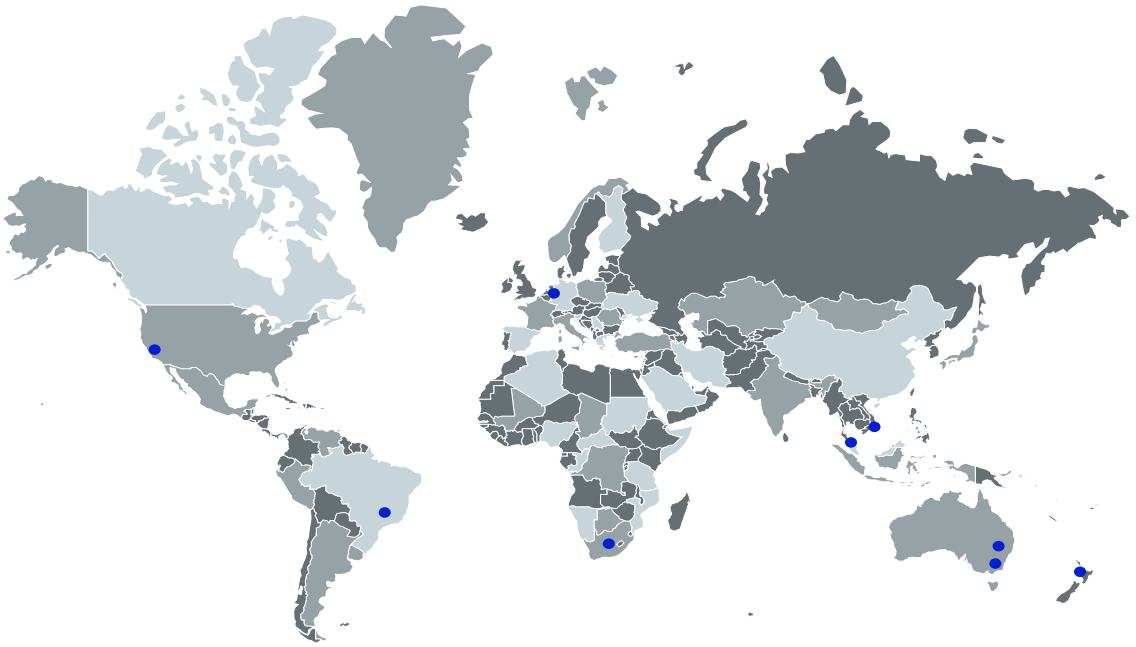
Agitation Retrofit & Process Optimisation



Company Introduction

Chemical Plant & Engineering (CPE), formed in 1953, is a division of CEM International Pty Ltd which is a wholly owned Australian Company. CPE is a global supplier and leading Australian manufacturer of field process technology and complete system solutions.

CPE has manufacturing facilities in Australia as well as strategic manufacturing partnerships and licensing agreements, and agents and distributors worldwide.



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CHEMICAL PLANT & ENGINEERING

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Agitators

CPE has over 40 years of experience in design, manufacture and global supply of agitation solutions for a variety of processes and industries.

- **World Leading Technology**
- **Versatile Range**
- **Custom Designed**
- **Process Improvement (CFD)**

Processes

- Liquid/liquid blending
- Additive Dispersion
- Heat Transfer
- Solid Suspension
- Gas Dispersion

Applications

- Mineral Processing
- Chemical & Environmental
- Food & Beverage
- Wine & Spirits
- Pharmaceutical & Cosmetics
- Oil & Gas

We custom design each agitator to suit the process and industry requirements. Our design and engineering philosophy is to provide our customers with the **Best Solution** to their processing problems

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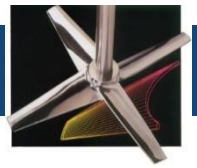
Impeller Technology

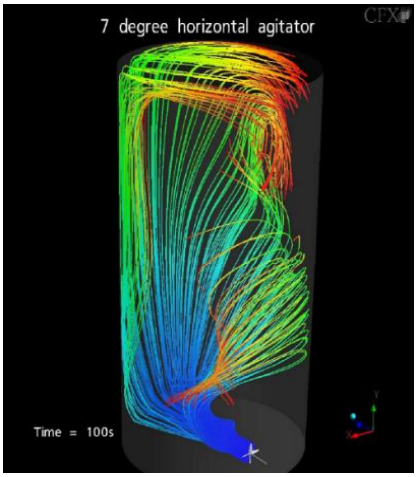


CPE's world leading agitation technology provides effective mixing at fraction of the time and energy input. This offers significant operation and maintenance cost savings, maximum plant utilisation, and a better quality product.

High Efficiency Hydrofoil – RTF4

World Leading low shear mixing technology

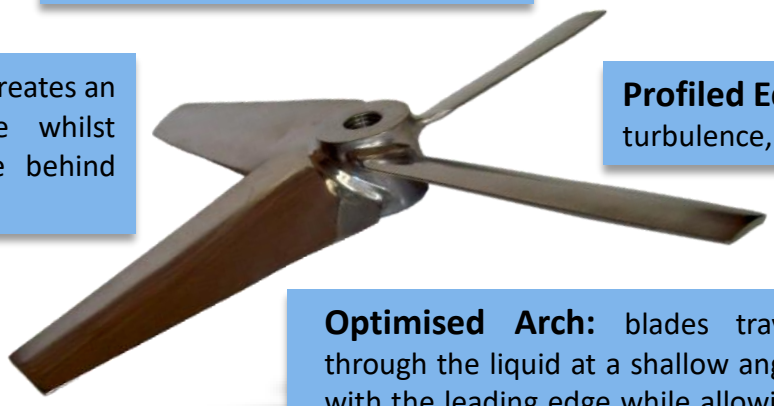
- RTF4 creates a high velocity yet low shear axial flow which results in quick and thorough blending and solid suspension with minimum energy input.
- minimises product damage through gentle mixing.
- RTF4 can replace existing impellers to reduce energy consumption and increase flow and tank utilisation **(Retrofit)**.
- Designed to meet global standards and CIP compatibility.



Side Entry RTF4 - axial flow pattern with no dead zone

Variable Width: uniform flow across the impeller diameter for efficient pumping action.

Decreasing Twist: creates an even velocity profile whilst minimising turbulence behind the impeller blades.



Profiled Edge: eliminates turbulence, reduces erosion

Optimised Arch: blades travel through the liquid at a shallow angle with the leading edge while allowing the trailing edge to direct powerful currents downwards.

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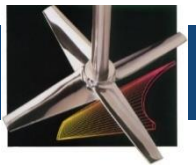
Agitation Process Optimisation



In addition to OEM, we provide agitator retrofit services.

When to Retrofit an Agitator?

- Ineffective solids suspension
- Time to uniform mix is long or never!

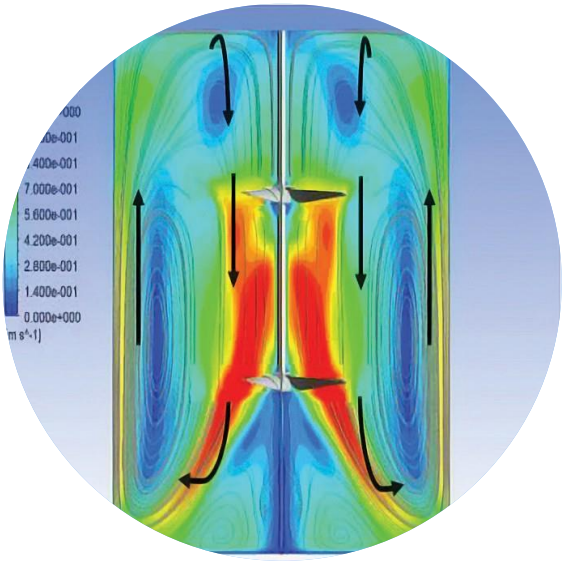
- Frequent mechanical failure
- Excessive energy consumption

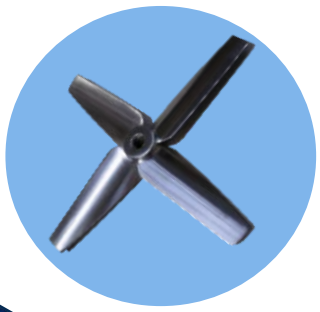
- Process/product change

Benefits of Agitator Retrofit

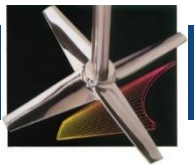
- More efficient mixing, thus maximised tank utilisation
- Lower power Consumption
- Cost savings
- Longer lasting agitator

- Our team of experienced engineers at CPE can conduct in-depth process analysis on your existing agitator using CFD modelling and laboratory testing in order to solve your process issues.
- The existing agitator will be re-designed to create the required flow and meet the process goals **at minimum power input**.
- All process requirements (power draw, mix time, etc.) and conditions (tank size, manway size, etc.) will be taken into account when designing a new agitator.





In most cases, retrofitting an existing agitators involves impeller replacement without the need to change the motor and gearbox. Our **RTF4 impeller** has been extensively used to retrofit underperforming agitators to enhance performance and reduce power consumption.



Other Agitator Retrofit Services

Direct to Geared Drive Change-over: CPE gear reduced agitators provide the required performance at a considerably lower power input and impeller speed.

Product Benefits

- No product damage during mixing
- Better quality finished product

Process Benefits

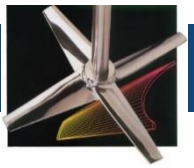
- Lower energy consumption
- Longer lasting agitator

Retractable Agitator System: designed for ease of maintenance

Process Benefits

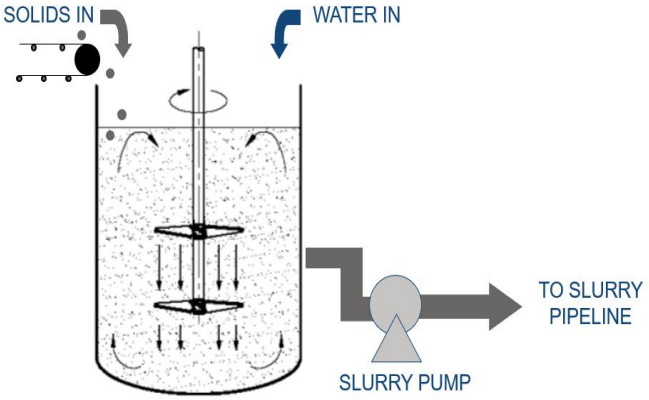
- Maintenance can be done with tank full
- Confined space maintenance is eliminated

CPE has expensive experience in successfully conducting agitator retrofits in various industries worldwide including food & beverage, chemical, and mineral processing applications.



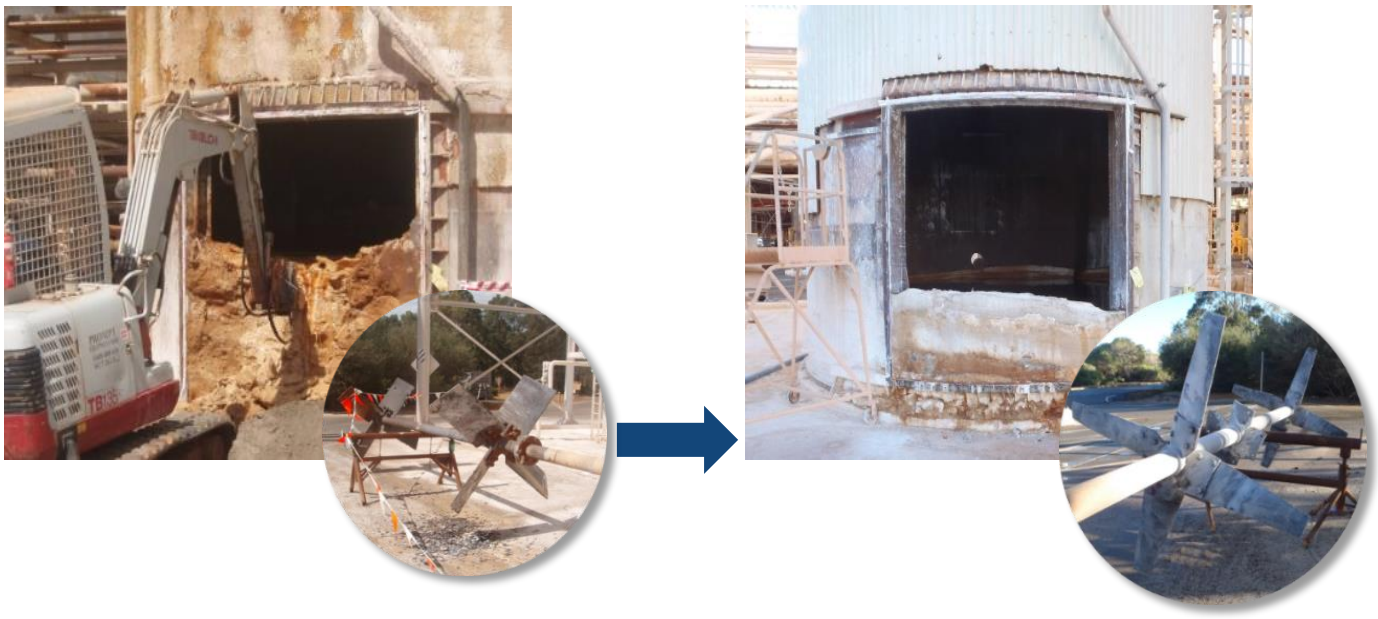
Solid Suspension Process

RTF4 agitation technology is extensively used in surge and holding tanks and precipitator tanks to ensure the solids are constantly suspended in the slurry for uniform feeding of solids to the downstream process. Our **superior mixing technology** has proven to significantly reduce scale buildup solids precipitation, minimising maintenance cost/labour and increasing the workable volume of the tank.

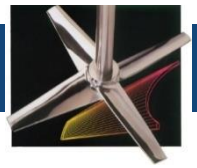


Fully axial flow created by RTF-4 impeller keeps the liquid in motion and solids in suspension at all times

Customer: Alcoa
Application: Alumina
Problem: excessive scale build up in the tank.
Solution: The old impellers were replaced by twin RTF4 impellers on single shaft which reduced the scaling dramatically as a result of effective solid suspension in the tank.



Case Studies



Customer: Newmont Gold (Phoenix)
Application: CIP
Problem: Motor overloading
Solution: replacing impeller with RTF4 (larger diameter) to increase pumping capacity
Outcome: The motor power draw was reduced away from its overload trip point whilst continuing to provide the process response (agitator pumping capacity) required by the plant.

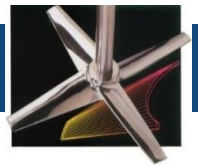
	Original	Retrofit
Instant Power	55 kW	55 kW
Shaft RPM	22.4 rpm	18.5 rpm
Impeller Type	2 x Hayward Gordon	2 x CPE RTF4
Impeller Diameter	4115 mm	4826 mm
Power Draw	64 kW	55 kW
Agitation Scale	4	5
Pumping Capacity	1875 m^3/min	2080 m^3/min

Note: Power draw is after drive system losses

Customer: Newmont Gold (Mill 5)
Application: Gold Leach (CIP)
Problem: Insufficient flow to suspend solids
Solution: replacing impeller with RTF4 for more effective solid suspension
Outcome: Flow was increased by almost 25% for the same power requirements

	Original	Retrofit
Instant Power	37.3 kW	37.3 kW
Shaft RPM	30.3 rpm	30.3rpm
Impeller Type	2 x Lightnin A510	2 x CPE RTF4
Impeller Diameter	3251mm	3300mm
Power Draw	32kW	32.5kW
Agitation Scale	2	4
Pumping Capacity	874.6 m^3/min	1090.7 m^3/min

Case Studies



Customer: Lihir Gold (PNG)
Application: Gold Leaching
Problem: Excessive scale build up in the tank
Outcome: Savings of 38% on power usage whilst creating slightly more pumping capacity. Improved solids suspension was also noted. Agitator life was also increased due to minimal erosion due to solids build up.

	Original	CPE Retrofit
Application	Gold Leach	Gold Leach
Installed Power	75kW	75 kW
Shaft RPM	20	20
Impeller Type	2 X Lightnin A310	2 X CPE RTF4
Impeller Diameter	1 x 4125mm 1 x 4775mm	2 x 4700 mm
Power Draw (Note)*	75 kW	46.2 kW
Agitation Scale	6	6
Pumping Capacity	2006 m3/min	2082 m3/min

Note: original power draw of 75kW reduced to 46.2kW = 28.8 kW reduction x 8,000 operating hours (average annual operating time) = 230,400 kWH/Year power savings.

Customer: Modder East Gold (South Africa)
Application: Gold Leach
Problem: High power consumption
Solution: Impellers were replaced by twin RTF4 hydrofoils
Outcome: Savings of 38% on power usage whilst creating slightly more pumping capacity. Improved solids suspension was also noted. Agitator life was also increased due to minimal erosion due to solids build up.

	Original	CPE Retrofit
Application	Leach	Leach
Installed Power	75kW	75kW
Shaft RPM	23.2	23.2
Impeller Type	KEMIX Hydrofoil	CPE RTF4
Impeller Diameter	2 x 4000mm	2 x 4140mm
Power Draw (Note)*	54kW	32kW
Agitation Scale	6	6
Pumping Capacity	1663m3/min	1647m3/min

Notes:
Original power draw of 54 kW reduced to 32 kW = 22 kW reduction x 8,000 operating hours (average annual operating time) = 176,000 kWH/Year power savings.

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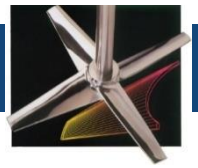
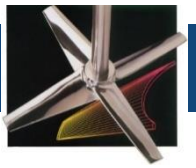
Other Case Studies



Customer	Mineral Processing Application	Solution
QLA	Alumina refinery	Shaft and impeller (RTF4) replacement to increase pumping capacity
BARRICK (GRANNY SMITH)	Gold refinery (multiple)	Impeller replacement to RTF4 to maximise pumping capacity
Newcrest Mining	Gold refinery (multiple)	Shaft and impeller (RTF4) replacement to increase pumping capacity
RIO TINTO	Nickel refinery	Shaft and impeller replacement to enhance solid suspension
ANGLO	Gold refinery (multiple)	Direct drive to gear reduced motor to reduce power consumption
FOSTER VILLE	Gold refinery	Impeller replacement to enhance solid suspension
MURRIN MURRIN OPERATIONS	Nickel refinery	Shaft and impeller replacement to enhance solid suspension

Customer	Industrial Application	Solution
APS CHEMICALS	Chemical Processing (multiple)	Impeller replacement to RTF4 to increase pumping capacity
RENISON LTD	Foam breaker agitator	Impeller modification to optimise mixing performance
YARA PILBARA FERTILISERS	Fertilisers	Replacement of 2 Milton Roy agitator shafts
HYDROMET OPERATIONS	Chemicals (multiple)	Impeller replacement to RTF4 to increase pumping capacity- bolted blades, clamped hub-
AUSTRALIAN VINYLS	Chemicals	Direct drive to gear reduced motor
CLARIANT	Chemicals	Shaft modification and impeller replacement to optimise performance
ORICA SPECIALTY CHEMICALS	Fertilisers	Shaft replacement (increased shaft wall thickness), elimination of previously installed stiffeners
MERA CHEMICALS	Chemicals	Impeller replacement with 2x RTF4 and new shaft
Nufarm	Agrochemical processing	Shaft modification
THALES (Chemicals)	Chemicals	Tickler Upgrade to blend tank, Deflaker and Boiler agitator replacement for improved performance
DOW CHEMICAL	Coating processing	Direct drive to gear reduced motor
H.B. FULLER	Building material processing	Direct drive to gear reduced motor

Other Case Studies



Customer	Sanitary Application	
SAPUTO	Brine Silo	Impeller replacement to RTF4 with sanitary shaft
Coca-Cola AMATIL	Beverage processing	Shaft and impeller replacement (RTF4) to improve mixing performance
MONDELEZ AUSTRALIA	Food processing	Impeller and shaft modification to improve mixing performance
DB BREWERIES	Beverage processing	Impeller replacement to RTF4 to improve pumping capacity
AMCOR RESEARCH & TECHNOLOGY	Food processing	Impeller replacement to RTF4 to improve mixing performance
CSL	Pharmaceutical	Impeller replacement to CPE Gas Dispersion Technology to optimise performance
BONLAC FOODS	Food processing	Shaft and impeller (RTF4) replacement to increase flow
MANILDRA	Food processing	Retrofit agitator with carbon steel material
GEORGE WESTON FOODS	Brine holding tank	Impeller replacement (2 x RTF4)
KRAFT FOODS	Food processing	Shaft modification
SUN PHARMACEUTICALS	Pharmaceutical	Impeller replacement to improve mixing performance
BEGA FOODS	Dairy processing	Impeller replacement to improve mixing performance
GELITA AUSTRALIA	Food processing	Multiple shaft replacement (increased to 1100mm) for small tanks
BEAUTIWORX	Pharmaceutical	Replacing Teralba agitators (impeller only)
PFIZER GLOBAL MANUFACTURING	Pharmaceutical	Impeller replacement to RTF4 to improve mixing performance
TATURA MILK INDUSTRIES	Dairy processing	Impeller replacement to RTF4 to improve mixing performance

Why Choose CPE ?

Decades of Knowledge & Experience

World Leading Technology

Efficient Solutions

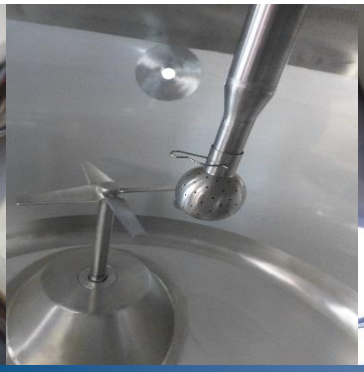
Maximum Plant Utilisation

Pilot Plant Testing R&D

Custom design and Retrofit

Numerous Installations Worldwide

Process Analysis and Optimisation

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