

#### **Chemical Plant & Engineering Pty Ltd**



**Designer and Manufacturer of Process Agitation Equipment** 

# **Chemplant Agitators**

**CHEMICAL PLANT & ENGINEERING** specialises in the design and manufacture of agitation equipment. Continuous research and development together with proven sizing technology means that we can offer a solution to most agitation problems.

Each Chemplant Agitator is custom designed to meet your process requirements in the most cost-effective manner avoiding the problems of under or over-sized equipment. Whether your application is simple blending, solids suspension, gas dispersion or a combination of all of these duties Chemical Plant & Engineering will design the most appropriate equipment.

Our range of equipment covers motor sizes from 0.18 to over 150 kW and speeds up to 3000 rpm. Numerous options are available which depend on the application and individual preference. Some of these are detailed in the following sections:



**DRIVES** - Various drive configurations can be considered. Large agitators are generally supplied with a Helical Bevel gearbox (BHD type) and small to medium units with helical gearing (VLBT type). Belt and variable speed drive options are also available on request.

**SEALING** - Chemplant Agitators can be custom designed to suit any seal arrangement. Packed Glands can be supplied with either 3 or 6 rings depending on the tank pressure. Single, double or dry running mechanical seals can be provided and sourced from the customers normal suppliers. This helps to avoid difficulties in both spare parts inventories and maintenance of many different types of seals. Other types such as lip and hydraulic seals can also be provided on request.

**MOUNTING OPTIONS** - Chemplant Agitators are available in a variety of mounting configurations. Our standard design for open tanks include mounting feet or a mounting plate. For agitators requiring a seal the mounting flange is selected to suit both the seal and the vessel flange.

IMPELLERS - Chemplant offer a range of different impellers carefully matched to give the optimum process response. The RTF4 hydrofoil is used for blending and solids suspension at lower viscosities and is an example of how Chemical Plant & Engineering can provide both cost effective and world leading agitation technology. A range of turbines can also be offered from the industry standard Disk turbine for gas dispersion to Pitched Blade turbines for general purpose agitation. Other impellers such as Helix, Anchor and food quality turbines and hydrofoils are also available.







**MATERIALS OF CONSTRUCTION** - Wetted parts can be manufactured from all machinable alloys. Many non-metallic coatings such as rubber and teflon are also available.

#### **RTF4 Hydrofoil**

THE CHEMPLANT RTF4 Hydrofoil is world leading technology. Whether your application is simple blending, solids suspension or a complex reaction the RTF4 can save you power and torque and provide a cost effective solution to your agitation problem.

How...AND WHY...IT WORKS - Most simple blending applications require a controlled uniform flow pattern. This ensures that the whole of the tank contents is kept in motion and that areas in the tank are not left unmixed. The best way to achieve this turn over is to use an axial flow impeller which discharges downward towards the vessel bottom.

A pitched blade turbine impeller has traditionally been used for blending and solids suspension, however the discharge flow can be spread by more than 45°. This leaves a low velocity area under the shaft where agitation is difficult or solids can settle. The Chemplant RTF4 creates an axial flow pattern with a very even velocity profile across the impeller. This minimises any low velocity areas and ensures the tank contents are quickly and thoroughly mixed. At the same time the RTF4 has the lowest power consumption for a given discharge velocity, which can give energy savings of up to 60%.

The greatest benefit of the RTF4 is the low torque requirement for a given amount of flow. Low torque means that the drive and shaft sizes can be minimised and the service factor on the drive maximised. This results in extended agitator life and normal operational spares requirements will be reduced. The RTF4 has one of the lowest torque requirements of any impeller which equates to significant capital and running cost savings.

#### Four Ways Better...By Design

**PROFILED EDGE** - Both the leading and trailing edges are profiled to minimise turbulence. This also has the added benefit of reducing erosion caused by particle-blade collisions.

VARIABLE WIDTH - The RTF4 blade is slim at the tip where the speed is greatest and wide at the base where the speed is lowest. This gives a more uniform discharge velocity along the blade length producing the most efficient pumping action.

**OPTIMISED ARCH** - The blade arch is calculated to slice through the liquid at a shallow angle with the leading edge while the sharply-cambered trailing edge directs powerful currents downwards.

**DECREASING TWIST** - Starting with a pronounced twist at the base the RTF4 blade gradually decreases its angle of attack towards the tip. This creates an even velocity profile whilst helping to keep turbulence behind the impeller blades to an absolute minimum.

# **BHD Series Agitators**

CHEMPLANT BHD SERIES AGITATORS are used for larger applications or when the process requires a heavy-duty drive. Ordinary commercial gear reducers are not suitable for this type of duty where high bending moments and thrust loads will occur. For around-the-clock reliability and absolutely no leakage of lubricants into the product the BHD series is ideal.





The BHD series is designed specifically for agitator service where high bending moments can cause problems with traditional drives. Specific features include the following: -

- LARGE DIAMETER, HIGH CAPACITY OUTPUT SHAFTS to accommodate the high bending moments.
- EXTENDED BEARING LIFE minimum 30,000 hours L-10 at 1.5 service factor even with high thrust loads and bending moments.
- NO-LEAK DRY-WELL DESIGN (option) which physically separates the oil sump from the output shaft to eliminate gear oil contamination of the product.
- Rugged cast or FABRICATED HOUSINGS designed to withstand the stresses of agitation while maintaining accurate gear alignments.
- · HELICAL AND SPIRAL-BEVEL GEARING for quiet operation and high reducer efficiency.



THE COMBINED EFFICIENCY OF SPIRAL BEVEL AND HELICAL GEAR DESIGN AND HIGH EFFICIENCY **RTF4** Hydrofoil technology ensures minimal maintenance and the most cost effective drive solution.

### **VLBT Series Agitators**

**CHEMPLANT VLBT SERIES AGITATORS** are used for medium sized applications. Commercial gear reducers are used with the additional support of a heavy-duty pedestal and bearing to prevent bending moments causing excessive gear tooth wear. For medium sized applications where flexibility of the agitator and drive are important the VLBT series is ideal.

Our design procedures for gearbox, shaft and bearing have conservatism built-in to ensure reliability and minimize downtime. The type of gearbox used can be selected from many different configurations to match the features of the unit to the process requirements.

The VLBT series offers the flexibility of commercially available drives with the added features required for excellent reliability. The VLBT agitator features: -

- HEAVY DUTY SUPPORT PEDESTAL AND BEARING to accommodate the high bending moments.
- LIP SEALS can be included in the design to prevent product contamination from the outside or the product splashing external parts.
- CUSTOM PEDESTAL DESIGNS for special applications such as mounting to existing beams, hygienic or corrosion resistance requirements.
- HIGH GEARBOX SERVICE FACTORS The minimum gearbox service factor used in the VLBT series is 1.5. In practice when combined with the torque efficiency of the RTF4 hydrofoil it can be substantially higher.
- COMMERCIALLY AVAILABLE GEAR REDUCERS combining extreme flexibility in design and operating speeds with excellent spare parts availability.
- · HELICAL GEARING for quiet operation and high reducer efficiency.



THE FLEXIBILITY OF THE VLBT SERIES WHEN COMBINED WITH THE EFFICIENCY OF THE **RTF4** HYDROFOIL ENSURES AN EFFICIENT, FLEXIBLE AND EASY TO MAINTAIN AGITATOR.

### Portable Agitator Series

**CHEMPLANT PA AND PG SERIES AGITATORS** are used for smaller applications where the flexibility of a clamp-on agitator is required. The PA series is available in sizes from 0.25 to 2.2 kW. It is directly driven from the 4 pole motor giving an output speed of around 1400 rpm. The PG series is for larger duties and incorporates a helical gearbox. It is available with motor sizes from 0.37 to 1.5 kW at an output speed of around 400 rpm.

Both units include an extended housing below the drive mechanism. This incorporates a bearing which is included to prevent bending moments being transferred back to the gearbox or motor. The housing also includes a shaft seal to prevent particle ingress and an integral clamp and ball socket system to allow the agitator to be easily mounted on a process vessel.

The PA and PG series offer process flexibility for smaller applications in a rugged construction. They include the following features as standard: -

- EXTENDED HOUSING manufactured from cast aluminium with a single or double bearing.
- LIP SEAL to prevent the ingress of particles into the housing.
- INTEGRAL CLAMP which allows the agitator to be installed quickly and easily into a process vessel.
- BALL SOCKET so that the shaft angle can be optimised for the process conditions.

#### Mounting Details for the PA and PG Series

When mounting the PA or PG series agitator in an unbaffled tank care should be taken to angle the shaft correctly. This ensures that the fluid flow is maximised. The following drawing shows a typical installation for portable agitators in unbaffled tanks.







### **Side-Entry Agitators**



**CHEMPLANT SIDE-ENTRY AGITATORS** are used in large storage vessels or when the use of a top entry agitator is impractical. They utilise the RTF4 impeller technology to ensure good blending with a cost effective drive system and low running costs.

Side-entry agitators in combination with the RTF4 Hydrofoil are designed to produce a high velocity jet of fluid from the impeller which travels across the tank entraining additional process fluid until it reaches the far wall from where it circulates around and back to the impeller. Bulk movement in the tank is obtained by angling the agitator so that the fluid is forced around the tank and back into the fluid jet.

• **CHOICE OF SPEED REDUCER** - In-line Helical, Right-Angle Helical-Bevel, and Belt Drives are available. This allows us to offer the optimum speed reducer depending on the process requirements and user preference. No design compromise is made with any of the different construction methods so a rugged and robust construction is always assured.

• CARTRIDGE MECHANICAL SEAL - Chemplant Side-Entry Agitators feature a simple and standardised cartridge mechanical seal. This allows rapid removal on site and ensures that spare parts are readily available. Special seal constructions are also available if required.

• SHAFT SEALING AND LOCKING MECHANISM - An important feature of any side-entry agitator. This allows the agitator seal to be maintained even while the tank is full of process fluid. Using a simple construction the shaft can be sealed and locked into place so that the complete seal cartridge can be removed and replaced.

Bevel, Mechanical Seal SHAFT Collar HOUSING SPACER

**CHEMPLANT SIDE-ENTRY AGITATORS** are a very flexible and cost effective method of agitating larger tanks. They include a range of features ensuring that they are easy to maintain on site and are available in a wide variety of configurations. The use of the highly efficient Chemplant RTF4 hydrofoil means that not only do you get the benefits of low power costs, the gearbox size can often be optimised making the complete system a highly competitive option.





**CHEMICAL PLANT & ENGINEERING** provide a wide range of Fluid Agitation Equipment that have been installed throughout the world since 1953. Chemplant Agitators can offer the most modern and efficient technology available backed up with years of process and mechanical experience. Chemplant Agitation Equipment can be supplied to virtually every area of fluid agitation:

- Low VISCOSITY LIQUID BLENDING (LARGER DUTIES) Chemplant BHD or VLBT series agitators incorporating the RTF4 hydrofoil or turbine.
- Low VISCOSITY LIQUID BLENDING (SMALL DUTIES) Chemplant PA or PG series agitators incorporating the RTF4 hydrofoil or propeller.
- HIGHER VISCOSITY LIQUID BLENDING Chemplant BHD or VLBT series agitators incorporating a turbine, anchor or helix impeller.
- · SOLIDS SUSPENSION Chemplant BHD or VLBT series agitators with the RTF4 hydrofoil.
- Gas DISPERSION Chemplant BHD or VLBT series with a turbine impeller.
- LARGE TANK Chemplant Side-Entry Agitator with the RTF4 hydrofoil.
- IN-LINE MIXING Chemplant Static Mixers.
- HIGH SHEAR MIXING Chemplant Rotosolver.

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