

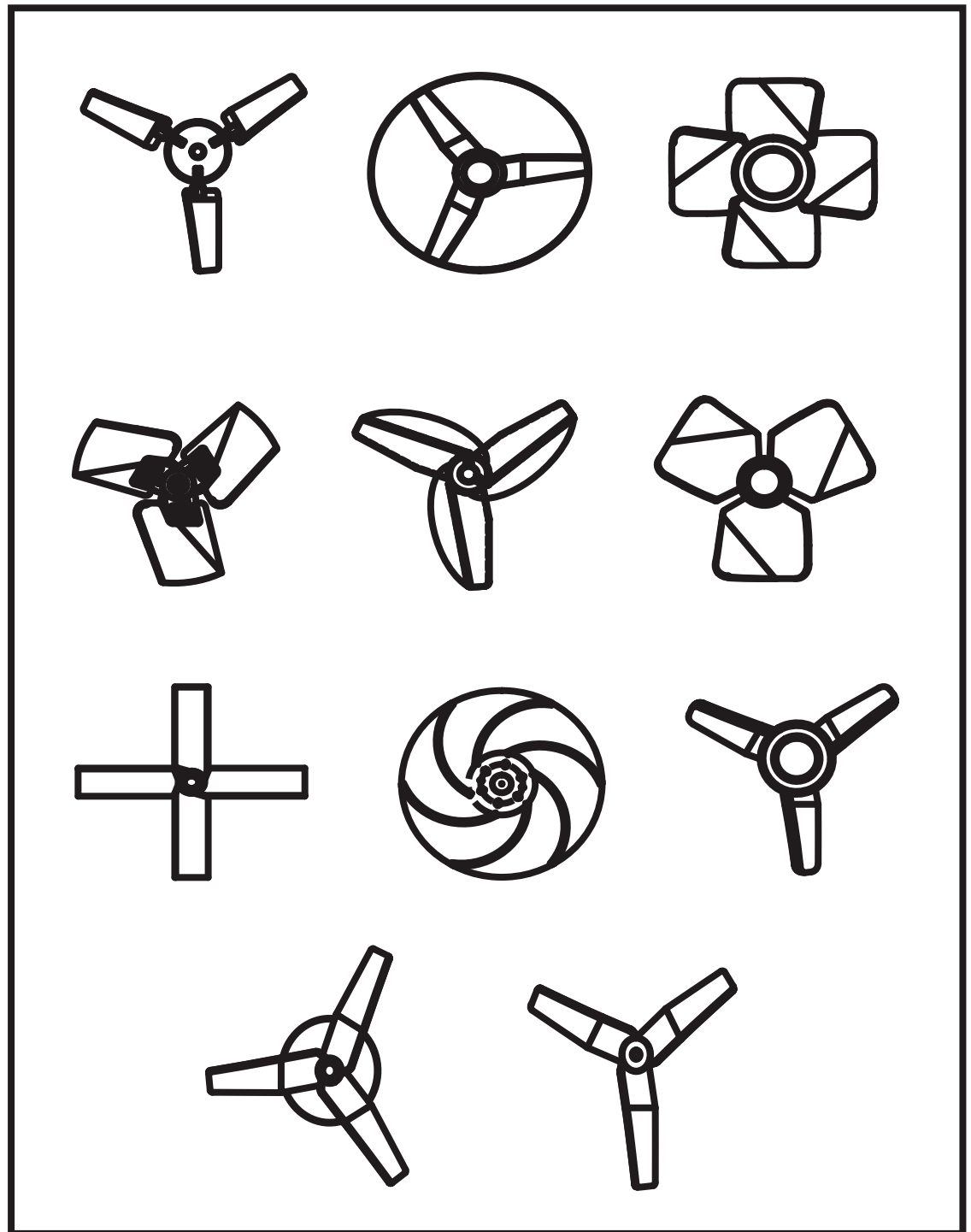
IMPELLERS

 **AMX** AGITATORS



Mixing technology represents a balance between the requirements of the process and the output efficiency of the impeller within the process. Often referred to as propellers, the impellers selected for a specific agitation system are required to produce one of three basic fluid regimes: Flow (Q), Shear (H) and Pressure (P); and there is also the possibility of producing a combination of the three.

Impeller Types



Agitator impellers all obey the relationship whereby Power is dissipated into Flow or Shear:

$$\text{Power} = Q \times H(S)$$

FOLDING IMPELLERS



AFX offers a broad range of unique folding axial flow impellers. These impellers have been adapted to suit applications whereby the mixing process takes place inside a vessel, which has a limited opening.

Before the development of folding impellers, applications such as these were approached by using impellers with fixed blades that had a diameter small enough to pass through the vessel opening. This meant that the agitator would run at speeds much higher than those whose impeller's D/T ratios had been created to meet the desired specification, thus increasing the power requirements of the agitator and reducing its overall efficiency.



Nowadays, due to the fact that we have adapted our axial flow impellers to incorporate the moving or folding blades, we are able to select the impeller which would be the closest fit in terms of your vessel dimensions and application demands. These impellers provide an economical and energy efficient agitator solution suitable to your application.

IMPELLER TYPE: F3

This type of impeller, also known as a hydrofoil impeller, is used in applications where high flow velocity is required, and is one of the most commonly used impellers throughout our vast industry. The F3 is called upon in many applications because of its robust and efficient structure. The impeller is able to meet the demands of the process at lower installed power than most other impellers within the range. F3 impellers are used where the generation of flow determines the agitator selection.

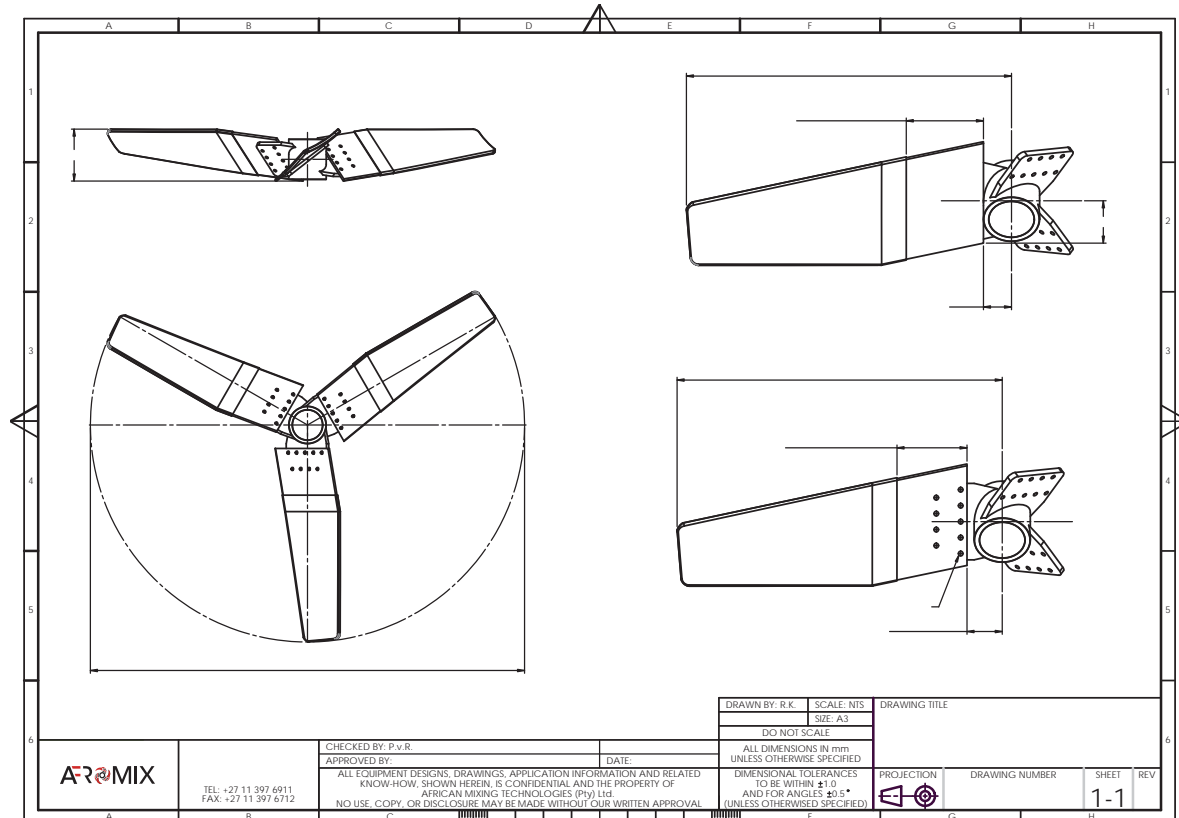
The impeller is multipurpose (by varying the blade pitch angle, one can alter the impeller's flow and shear characteristics) and is able to provide high axial flow with low shear whenever required.

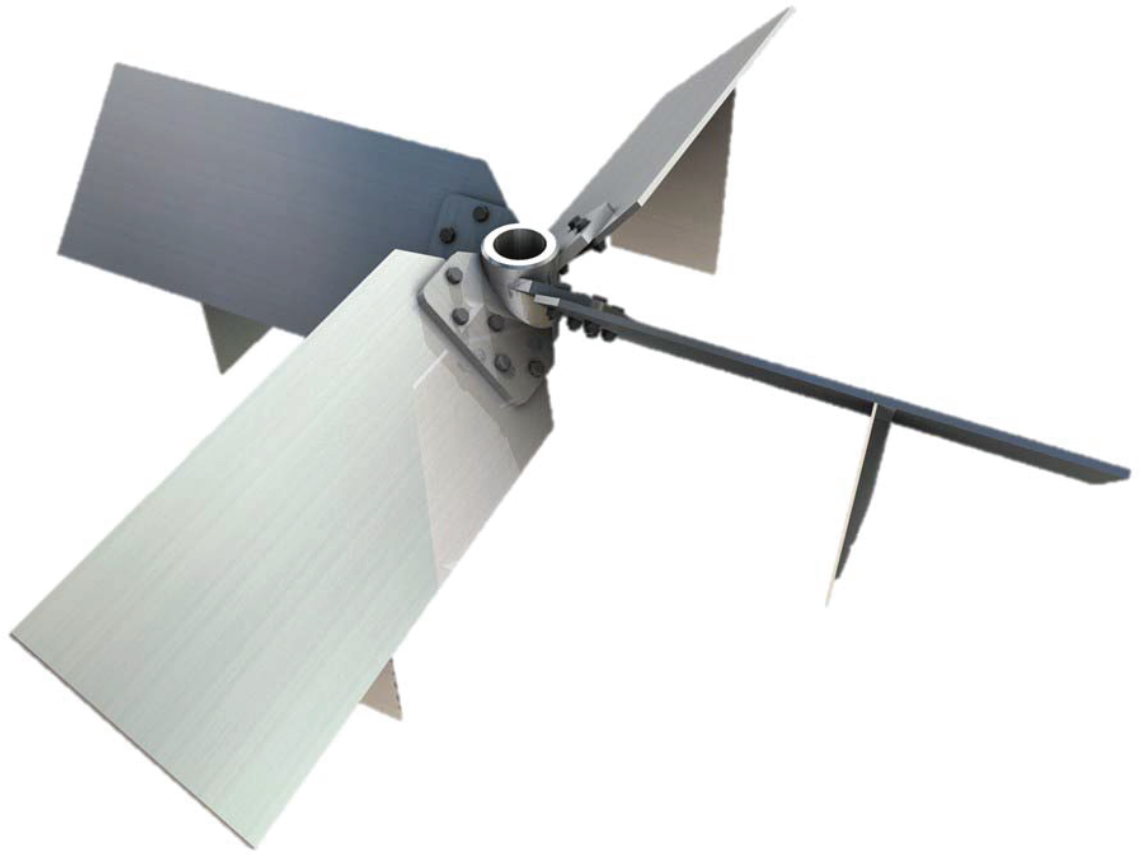
IMPELLER TYPE: F3

This impeller is industry proven and boasts a solid track record with thousands of successful installations in multiple industries. Some industry applications and examples include:

- **Mining:** CIL & CIP, ore (copper and gold), leaching, lime make up and storage, solid suspensions, chemical reaction tanks, slurry tanks;
- **Agricultural:** Fertiliser make up tanks, water storage tanks, jojo tank mixers;
- **Pharmaceutical:** Batch mixers, laboratory mixers, homogenising reactors, pressured vessel agitators;
- **Waste and Water Treatment:** Flocculent plants, water treatment plants, chemical reaction applications;
- **Paint and Ink:** Mixing tanks, batch and blending tanks, pre-mix within 210 litre drums, large and small scale applications;
- **Chemical Industry:** IBC bin agitators, soaps, cleaners and detergent mixing, fine powders and liquid blending, household cleaning products.

EXAMPLE DRAWING:



IMPELLER TYPE: FS4

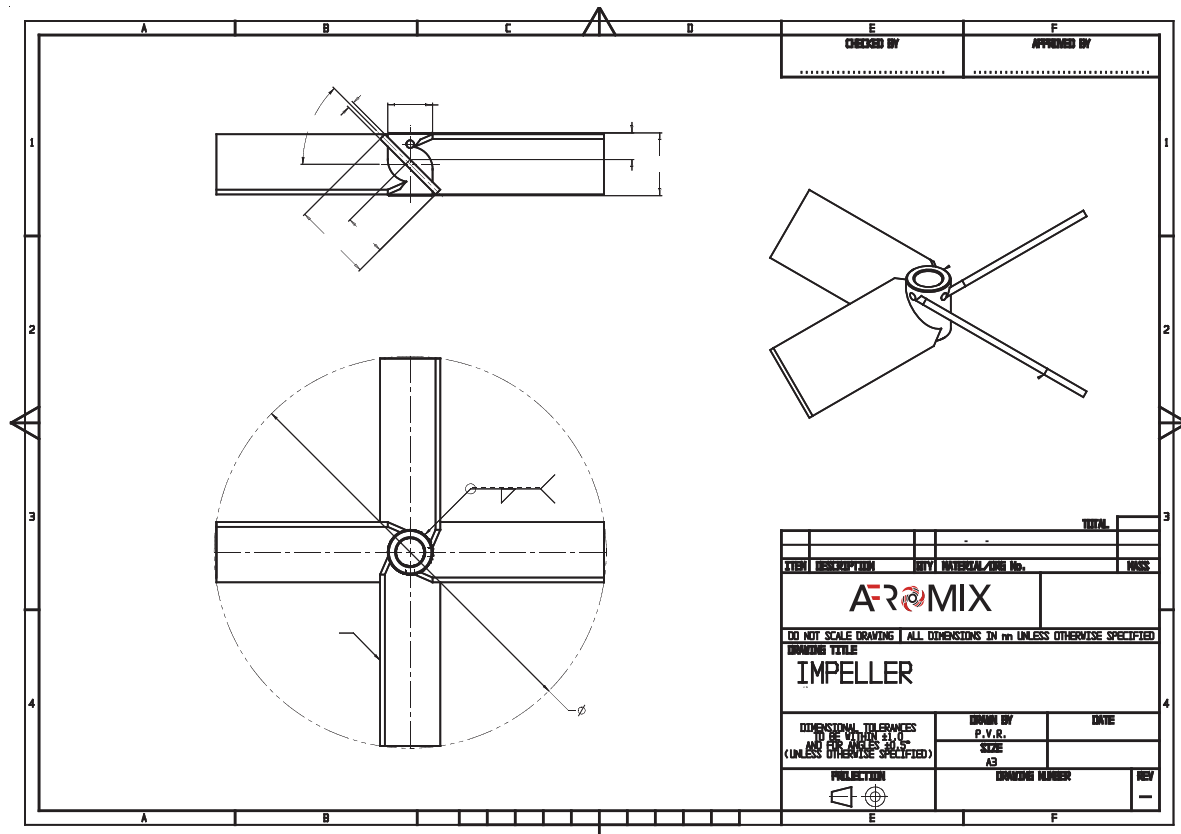
This type of impeller, also known as a pitch blade turbine impeller, is used in applications such as blending, high viscosity blending, applications requiring shear, and re-pulping where some flow and addition of power is still required. The FS4 impeller pitched blade turbine consists of four blades and is very limited to its performance tasks within process application parameters. This type of impeller is used for applications which require higher power draw and a lower efficiency in terms of mixing. There is still a demand for this type of impeller through some applications needing high flow and some shear.

IMPELLER TYPE: FS4

Some industry applications and examples include:

- **Mining:** Re-pulping applications;
- **Agricultural:** Blending applications with some solids needing to be broken up and dispersed throughout the tank;
- **Pharmaceutical:** Lower impeller in high viscosity batch mixers;
- **Waste and Water Treatment:** Aerators, sludge tanks to break up the "cake" crud collection;
- **Paint and Ink:** Viscous mixing tanks, batch and blending tanks, addition of solids into batches;
- **Chemical Industry:** Addition of solids into solutions where high power is required to assist with breaking down the solids.

EXAMPLE DRAWING:



IMPELLER TYPE: P3

Impeller Types



This type of impeller is also known as a high solidity hydrofoil impeller, similar to the P4 impeller but with three blades instead of four. These types of impellers are used in applications where macro flow is required, specifically in high viscosity, low Reynolds number fluids. They are also used when effective dispersion, as well as blending and solid suspension, is required.

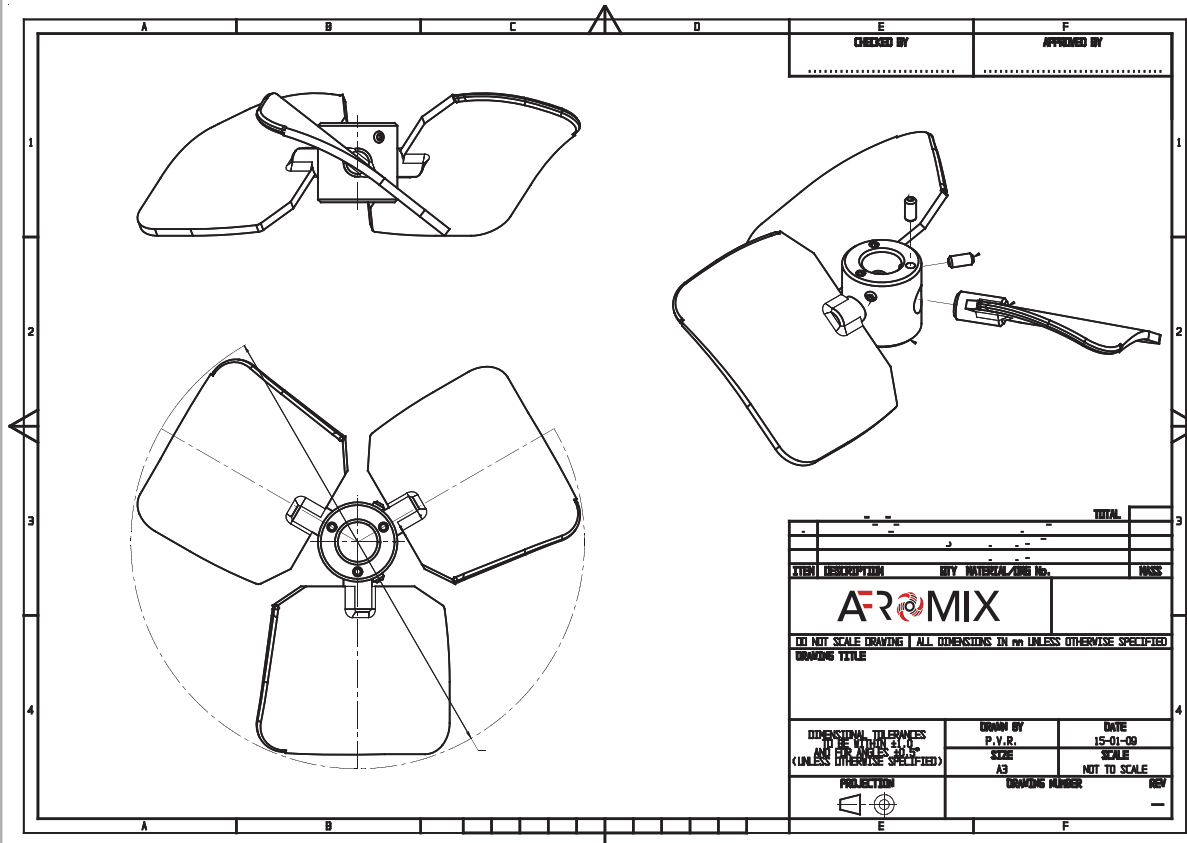
These impellers have been adopted in applications where close clearance impellers, such as scrapers, spirals and gate anchors, have traditionally been used. They are capable of blending in liquids where the viscosity is in excess of 40 000cP (Centipoise).

IMPELLER TYPE: P3

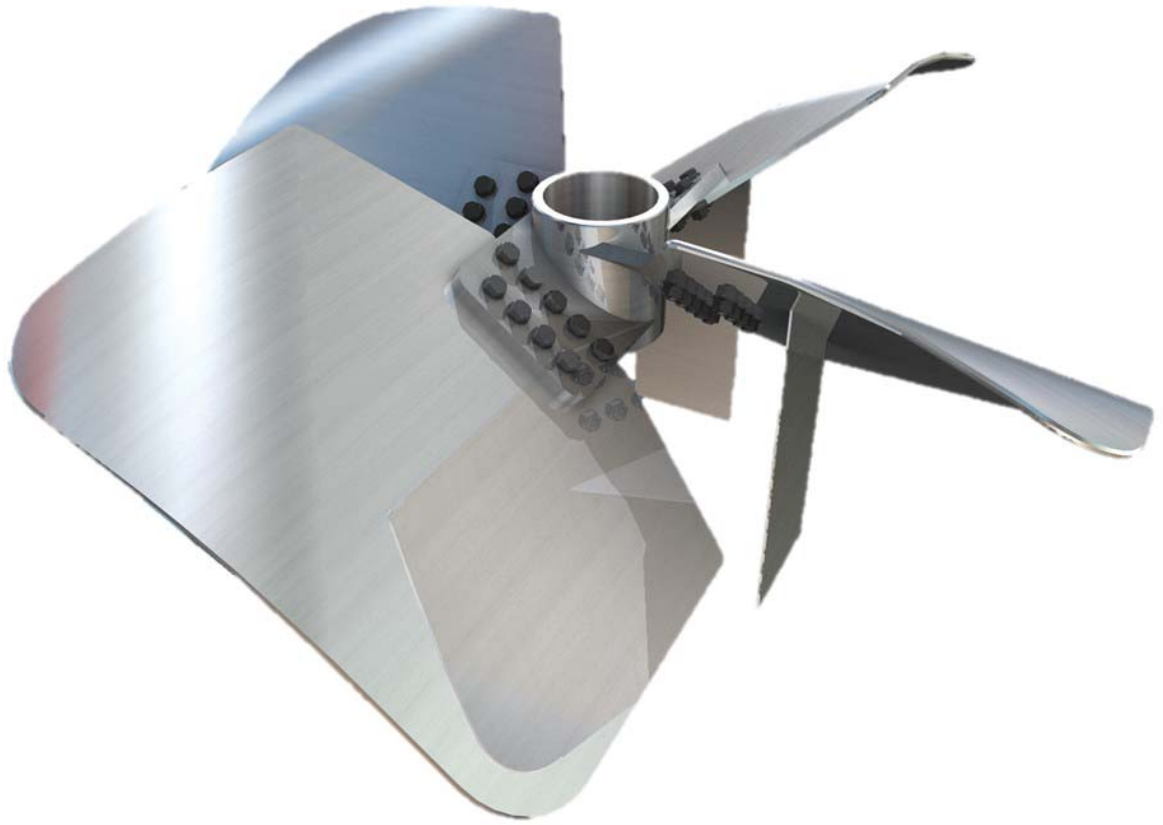
Some industry applications and examples include:

- **Pharmaceutical & Personal Care:** Shampoos and conditioners, hand wash liquid soaps, as well as relaxers (thixotropic products);
- **Paint and Ink:** High viscosity resins, high viscosity paint blends, bulk addition of solids to a viscous solution;
- **Chemical Industry:** Chemical reactions where the solutions thicken with time (anti-thixotropic).

EXAMPLE DRAWING:



IMPELLER TYPE: P4



This type of impeller, also known as a high solidity hydrofoil impeller, has been designed especially for the induction of large volumes of gas. Having a solidity value greater than 90%, these impellers ensure that the gas being introduced is not able to bypass the impeller. The result is increased absorbed power under gassed conditions. This is opposite to that of the Rushton impellers or Smith Turbine, both of which experience a reduction in power under gassed applications.

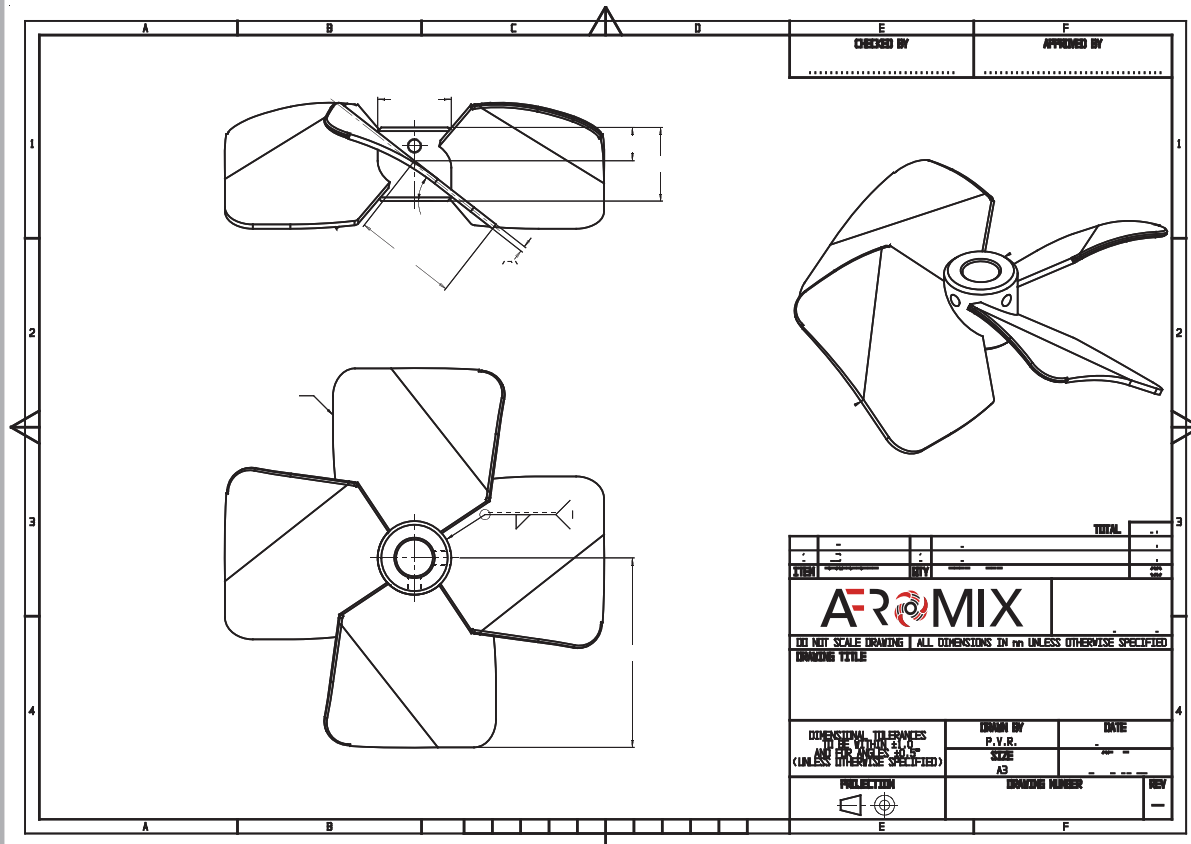
Impeller Types

IMPELLER TYPE: P4

These high efficiency axial gas dispersion impellers are used within the following applications:

- High pressure autoclaves;
- BIO oxidation reactors;
- Bacterial leaching;
- Fermentation and hydrogenation;
- Iron removal;
- Cyanide detox applications.

EXAMPLE DRAWING:



IMPELLER TYPE: R6

Impeller Types



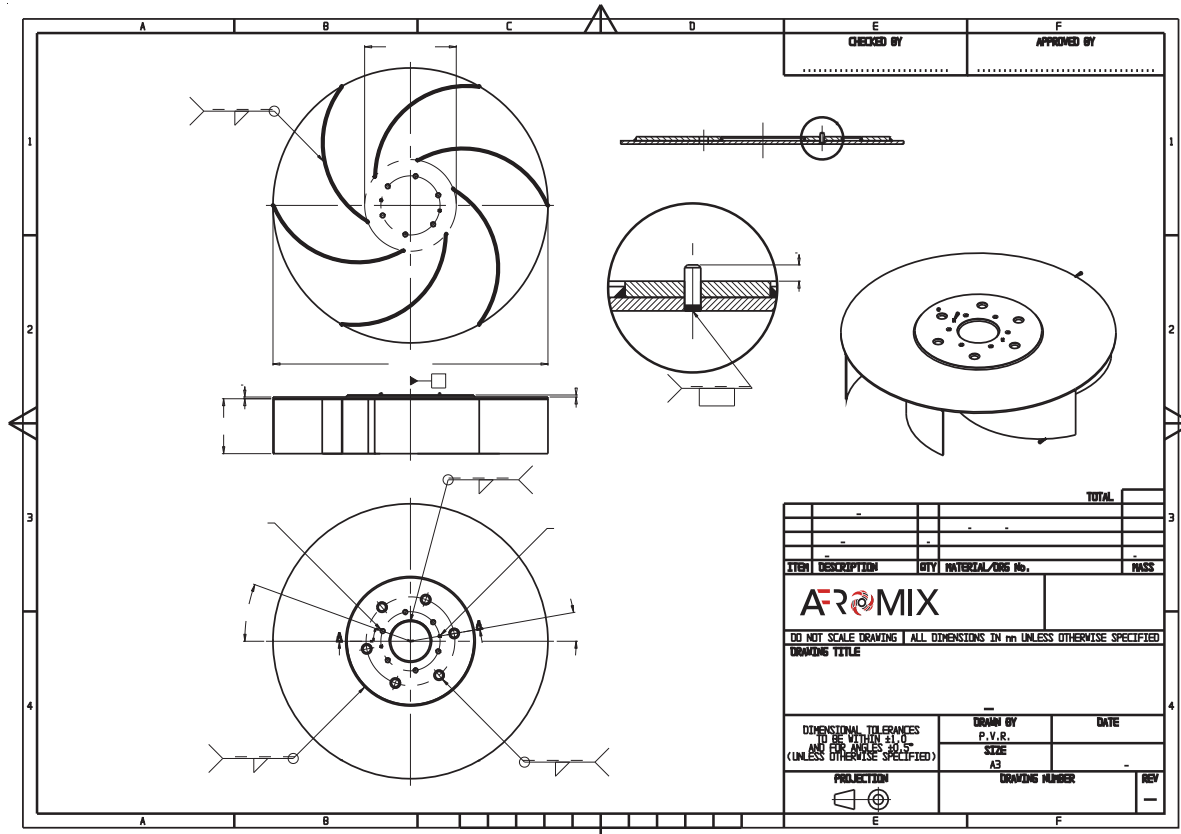
This unique radial flow impeller is designed for pumper mixer applications. The impeller discharges the fluid radially outward to the vessel wall. This particular type of radial impeller provides a more informal radial flow pattern when compared to the radial impellers that do not feature a disc. The progressive design ensures advanced flow, maximum dispersion, and provides a specified and desired head generation. The curved blade pump turbine design assists with reduced power consumption, minimum shear generation and turbulence. Radial flow impellers are most commonly used in gas-liquid or liquid-liquid dispersion applications.

IMPELLER TYPE: R6

These impellers are used in applications such as:

- Solvent extraction (SX Mixing);
- Thickener dilution systems.

EXAMPLE GA DRAWING:



IMPELLER TYPE: FCE3



A common problem, called "ragging", has been identified as a headache in waste water treatment plants, causing many process failures and mechanical breakdowns of the agitators. The most commonly found agitator solutions employ radial backswept turbines, which have a large power draw with a very low pumping/flow delivery. The radial flow, backswept impeller demands high power inputs in order to provide a marginal pumping delivery into the mixing tanks, but rag build up still occurs around the impeller blades and hub.

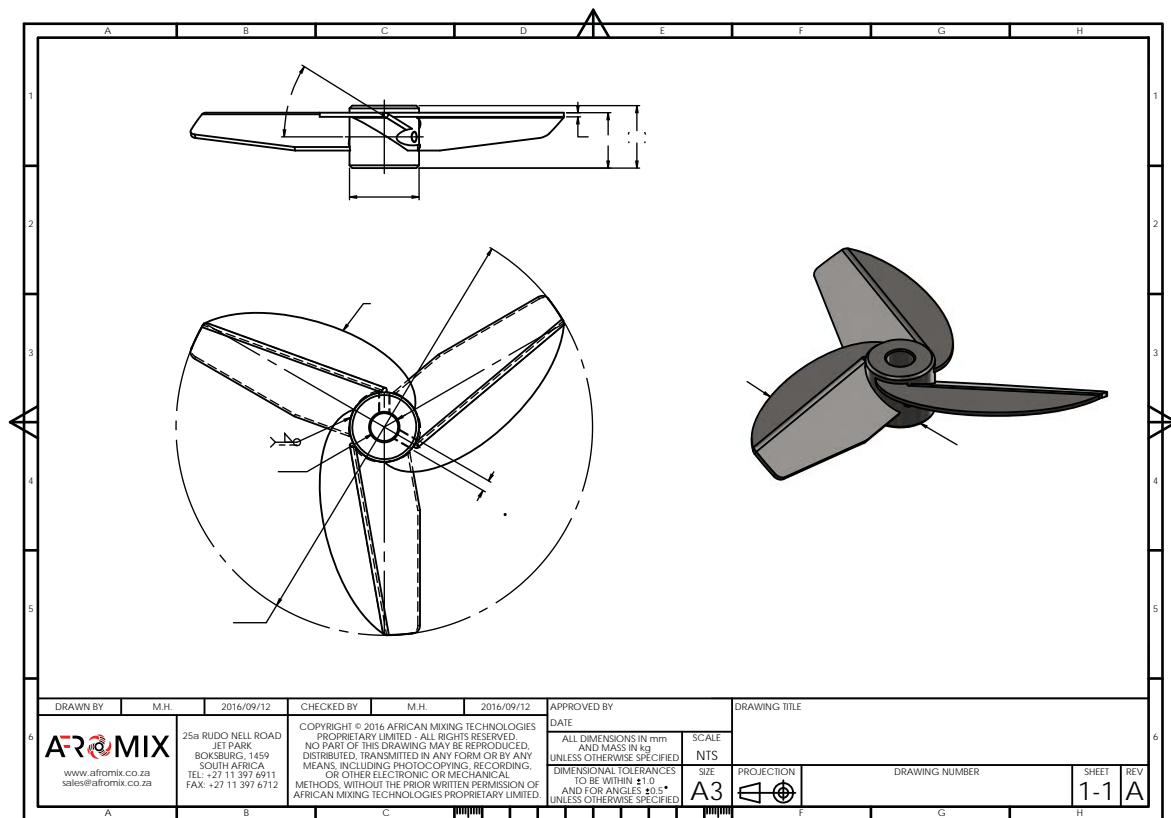
AFX was driven to find the "perfect" solution. Keeping our focus on efficiency for the process demands, as well as offering cost savings to the plants, AFX developed a clean edge impeller, also known as a ragless or non stringing impeller. The impeller, FCE3, boasts an impressive design. Eliminating areas where common rag build-up occurred, this impeller still produces the desired output pumping rate. The FCE3 impeller ensures that the high efficiency demands of the process are met, and provides a solution which is energy efficient. The inputted power required for the FCE3 is far less than the typical bio-reactor agitators with outdated turbine technology.

IMPELLER TYPE: FCE3

The welded hub and blade design, in conjunction with the blade geometry ensure that any fibrous solids and materials that come into contact with the impeller surface are pushed over the top edge and entrained back into the high velocity zone by the leading blade. The impeller has a high pumping number (Nq) similar to the F3 axial flow hydrofoil impeller. The power number (Np) is almost five times less than that of a radial flow backswept blade impeller. The FCE3 impeller, delivers not only a solution to eliminating rag build up, but provides you with a sound solution to the mixing process. The FCE3 impeller slots into AFX's energy saving endeavour, providing you with the best possible mechanical solution that saves you both time and money.

Impeller Types

EXAMPLE DRAWING:



AFX HOLDINGS

KEEPING FLUID IN MOTION

AFX

AFX Mixing and Pumping Technologies Inc.

– North America

Tel: +1 604 380 4458

Fax : +1 604 380 0810

E-mail: contact@afxmixing.com

Website: www.afxmixing.com

A Division of AFX Holdings

13782, 232a Street

Maple Ridge, BC

V4R 0C2

AFROMIX

- Africa

Tel: +27 (0) 11 397 6911

Fax: +27 (0) 11 397 6712

E-mail : sales@afromix.co.za

Website: www.afromix.co.za

A Division of AFX Holdings

25A Rudo Nell Road

Jet Park

Boksburg

South Africa

AFX

AFX Mixing and Pumping Technologies Ltd

- Europe

Tel: +44 (0) 120 279 8452

Fax : +44 (0) 872 110 7864

Email: contact@afxmixing.co.uk

Website: www.afxmixing.co.uk

A Division of AFX Holdings

Unit 17 Abbey Business Park

Blackhill Road

Holton Heath Trading Park

Poole

BH16 6NN

United Kingdom

CE