transvac

ejector solutions

Tank Jet Mixers

It's what we do.

Transvac has 45 years experience in the design and optimisation of Ejectors and Ejector solutions, including Tank Jet Mixer units. This experience is invaluable because correct design can only be achieved using both empirical and theoretical considerations.

To ensure maximum efficiency with minimum capital costs, all venturi jet units are custom designed to meet specific process requirements and Transvac has many thousands of successful applications.

Meeting the high standards of quality, service and reliability demanded by the water, chemical, pharmaceutical and other industries, Transvac can offer single Tank Jet Mixer units or complete Jet Mixer systems suitable for any industry.

Markets & Applications

Industrial

- Neutralisation
- Solids suspension
- Washdown tank mixing
- Chemical mixing & oxidisation
- Heat transfer
- Lime mixing

Water supply

- Sludge mixing
- Flash mixing
- Polyelectrolyte mixing
- Chemical mixing
- Disinfection
- Balance tank mixing

Food/Pharmaceutical

- Blending
- Heat transfer
- Brewery mixing
- Oil blending
- Glucose mixing

Transvac Tank Jet Mixers can achieve a discharge flowrate equal to 4 times the motive liquid flowrate

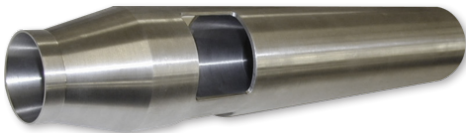
Examples of Transvac Jet Mixers

Stainless Steel Tank Jet Mixers

Stainless Steel Tank Jet
Mixers for Nuclear Mixing

Tank Jet Mixer System

Multiple Jet Mixers installed
on a manifold



Stainless Steel Tank Jet Mixer

Hastelloy Tank Jet Mixer

Polypropylene Tank Jet Mixer

Carbon Steel Tank Jet Mixer

Carbon Steel Tank Jet Mixer

Hygienic Stainless Steel Tank Jet Mixer

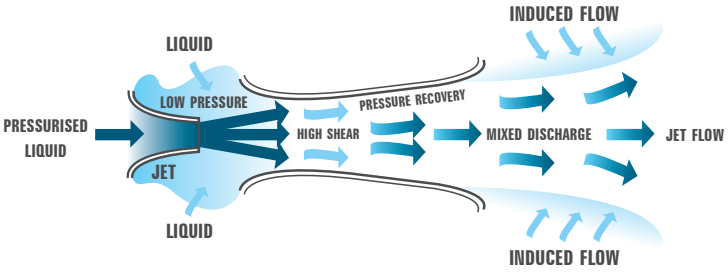
Carbon Steel Tank Jet Mixer

Stainless Steel Tank Jet Mixer

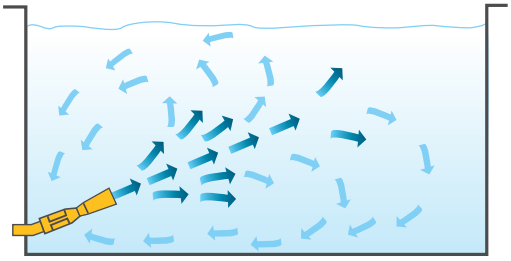
Principle of Operation

Transvac Tank Jet Mixers (TJMs) are mass momentum exchange devices which use the energy of pressurised liquid to entrain, mix and pump the same or a secondary fluid.

This principle is used for many process applications including blending, solids suspension, dilution and heat distribution.



Jet Mixer Principle



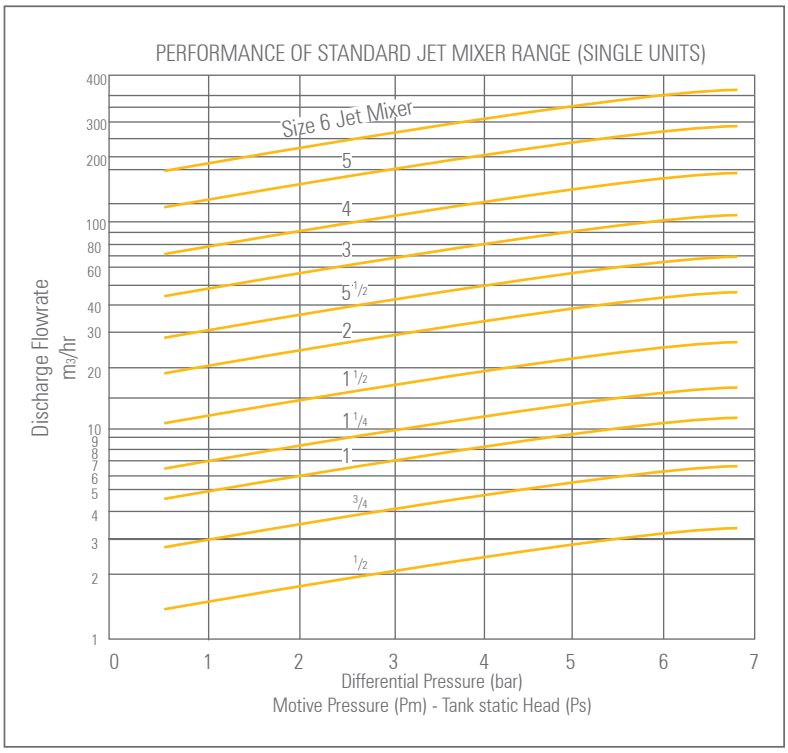
Transvac Tank Jet Mixer Flow

In operation, pressurised liquid is discharged through the jet nozzle into the suction chamber. The change from pressure energy to kinetic energy (velocity) creates an area of low pressure which entrains liquid from within the process vessel via the open suction ports. The motive and suction liquid streams combine and mix under high shear conditions in the venturi diffuser. As the resulting mixture passes through the diverging cone of the diffuser, velocity is partially reduced to regain sufficient pressure to overcome backpressure from the static head of liquid in the process vessel.

At the discharge, a high energy turbulent jet is emitted, entraining and absorbing surrounding liquid at the boundary thus creating additional currents and turbulence to ensure complete mixing of the process vessel contents.

Performance Data

A Transvac Jet Mixer can normally be employed on any application in which the process liquid is capable of being handled by a centrifugal pump. The overall capacity of the jet mixing system is determined by the rate at which the liquid in the process vessel is completely rotated. Other important factors such as liquid volume, viscosity, specific gravity, size and percentage of solids as well as vessel geometry are used to determine the number and orientation of jet mixers in the system.



Because of their ability to entrain surrounding process liquid from within the mixing vessel, each Transvac Tank Jet Mixer can achieve a discharge flowrate equal to 4 times it's motive liquid flowrate. Thus the time to rotate the entire vessel contents is simply V/(4Qm), where V is the vessel working volume and Qm is the motive liquid volume (when operating at pump differential pressures between 1 and 6 bar). Jet mixer designs are also available to suit specific applications outside this pressure range.

In general, a single Transvac Jet Mixer can effectively mix 100 to 400m3 capacity deep vessels and 5 to 100m3 capacity shallow vessels. At operating depths less than 1 metre, foaming or surface breakthrough may occur. For every 1 bar pressure drop across the jet mixer, turbulence will be experienced for up to 5 metres within the mixing vessel. The venturi action can be employed to also entrain atmospheric air where some biological treatment is advantageous during mixing.

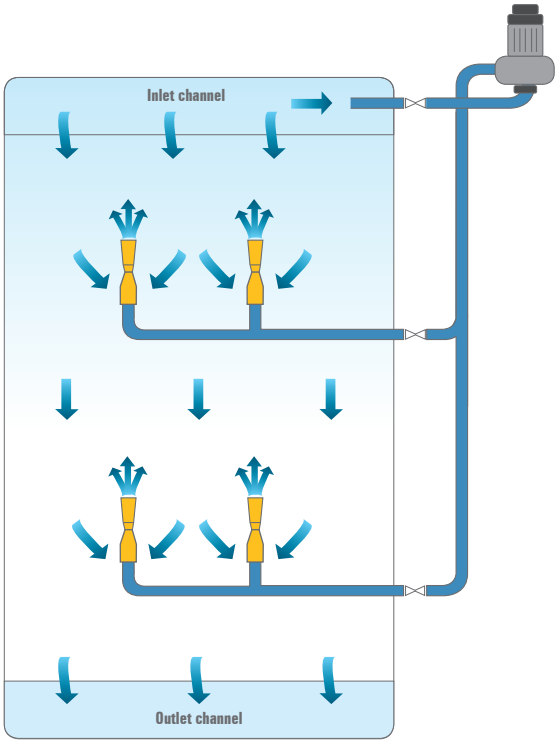
The standard operating characteristics outlined above apply to Newtonian liquids. Special design criteria are applied to Thixotropic (shear thinning) and Dilatent (shear thickening) liquids.

General Mixing/Blending

- Municipal and industrial sludges - Digesters mixed to promote ideal process conditions. Pre and post digestion sludge holding tanks mixed to prevent stratification.
- Odour control - Municipal/industrial sludge balance tanks mixed to prevent anaerobic conditions (optional atmospheric air entrainment to assist process).
- Radio-active waste mixed on nuclear powerstations and waste processing centres (exotic materials used).
- Mix corrosive/hazardous waste on effluent treatment plants.
- Homogenisation of epoxy liquid in paint production.
- Mixing of food products including wine, soft drinks, sauces etc.
- Blending of lube oils on petroleum plant.
- Blending effluent containing glycol on pharmaceutical process.
- Neutralisation mixing duties using phosphoric, hydrochloric and sulphuric acids on water treatment.

Solids Suspension

- Agitation of resin beads for water treatment.
- Mixing styrene without generating static



Jet Mixing System For Storm Tanks, Retention Basins And Waste Run-Off Ditches

R&D Test Facility

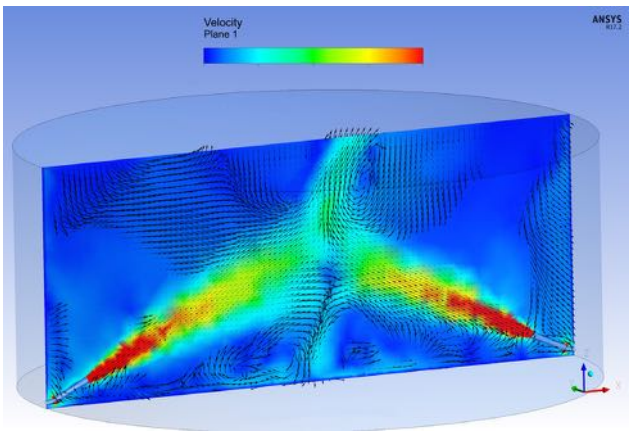
Transvac officially opened its R&D Test facility in April 2010. The state-of-the-art test facility primarily develops new oil & gas Ejector technology for subsea processing, flare gas recovery, sand slurry pumping and enhanced recovery & production solutions.

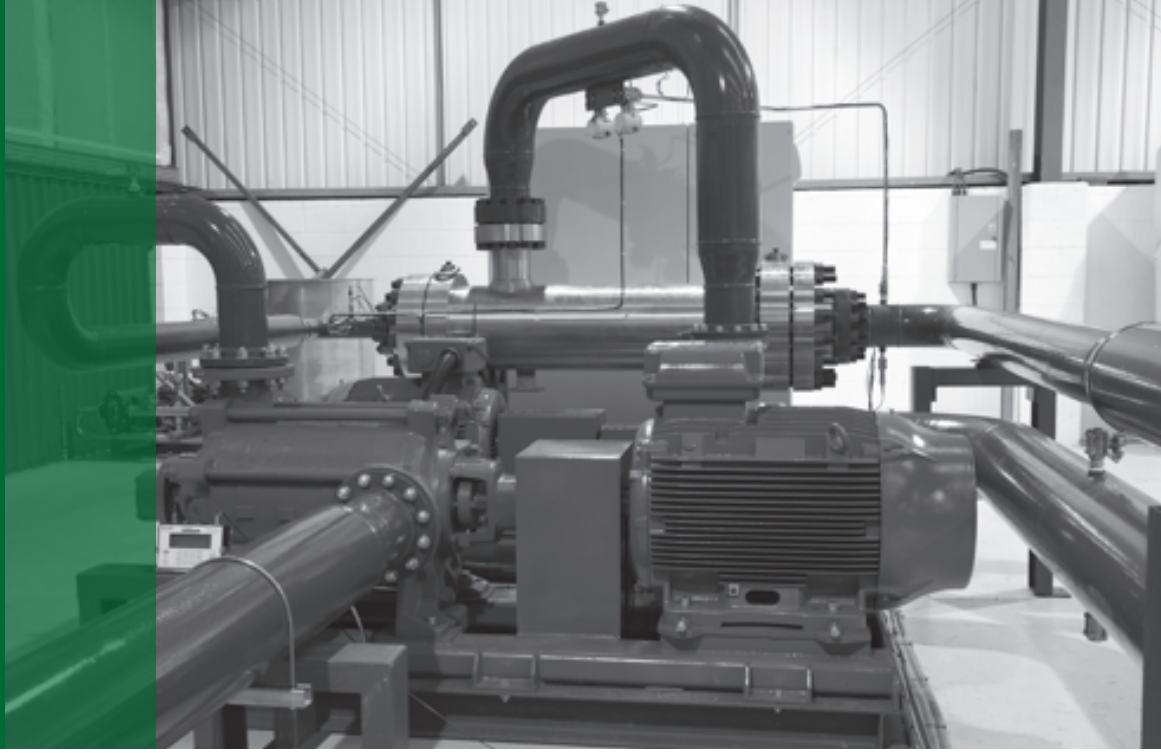
Ejector applications for the nuclear, bio-fuel, chemical and water treatment industries are also under development.

The R&D test facility includes high and low pressure equipment for handling water, oil, gas, multi-phase and slurry. Test programmes are supported by CFD studies and include fundamental University research.

The Transvac facilities include liquid flow lines for high, medium & low pressure testing (in excess of 350 barg) and solids handling systems.

For tank mixing, CFD studies can be undertaken to test variations of mixers including size, quantity and arrangement, to obtain the optimum mixing performance.





Test Facilities

- 9 x flow loops
- 9 x VSD water pumps
- Pump pressure up to 300 barg
- Liquid flows up to 700 m^3/h
- Sand slurry flows up to 60 m^3/h [up to 60% SVF]
- Nitrogen 320 barg @ 200 kg/h
- Gas (inert) flow > 2000 m^3/h
- 400 KvA stand alone generator
- Stainless Steel Test Rig - 60 m^3/h up to 25 barg motive
- 2 x 9 m^3 clean water tanks
- 1 x 35 m^3 slurry / water tank
- 1 x 6 m^3 calibrated weigh tank
- 7 x Coriolis meters (liquid / gas) 1/2" to 4", 5 to 150,000 kg/h
- Gas heater 150°C at 500 kg/hr
- 17m^3 x 27 barg rated separator tank
- Fully automatic control and data acquisition system using ASi field bus system (LabView)
- Flow assurance : flow accuracy 0.1 - <1.0 % FS / Pressure Accuracy 0.1% or better
- 7m^2 vertical CFU pressure tank
- High speed video recording 400,000 fps

About Us

Transvac Systems Limited is a privately owned Ejector Solutions provider formed in 1973.

As both a designer and a manufacturer of Ejectors, Transvac has full in-house control over process and mechanical design, supply of raw materials, manufacturing, scheduling and testing. With all of our procedures certified to BS EN ISO 9001:2015 the quality of the final product is assured.

Transvac is accredited to Module H of the Annexe III Pressure Equipment Directive (PED) and our products are CE marked where appropriate. We are also 1st Point Assessment (FPAL) and Achilles registered.

All products are custom designed to suit the process and mechanical requirements of each application to ensure maximum operating efficiency.

Transvac offers standard and exotic materials of construction including Hastelloy, Duplex, Super Duplex, Titanium etc.

Transvac Systems Ltd., Monsal House, 1 Bramble Way, Alfreton, Derbyshire, DE55 4RH, UK
Tel: +44 (0) 1773 831100 | **Email:** sales@transvac.co.uk | **Web:** www.transvac.co.uk

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