It’s what we do.

Transvac has more than 40 years experience in the design and optimisation of 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 Chemical, Pharmaceutical and other industries, Transvac can offer 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
Transvac Jet Mixers can achieve a discharge flowrate equal to 4 times it’s motive liquid flowrate.
Transvac jet mixers are a mass momentum exchange device which use the energy of pressurised liquid to entrain, mix and pump a secondary fluid.

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

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 boundary thus creating additional currents and turbulence to ensure complete mixing of the process vessel contents.

"The world’s leading supplier of innovative, custom designed ejector based solutions"

- Philip Ainge, Technical Sales Manager
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 jet mixer can achieve a discharge flowrate equal to 4 times its motive liquid flowrate. Thus the time to rotate the entire vessel contents is simply \( V+ (4Q_m) \), where \( V \) is the vessel working volume and \( Q_m \) 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 400 m\(^3\) capacity deep vessels and 5 to 100 m\(^3\) 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.
Free Standing or Slide Rail Design

There are three configurations of transvac jet mixers covering most applications. Custom designed units can also be provided to meet specific process requirements.

Free Standing or Slide Rail Design

Designed to stand on the vessel floor, the free standing model can be installed without the need to stop the process or drain the vessel contents and is an ideal design for emergency and standby applications. The slide rail mounted model can be removed without the need for a crane.

Fast-track solution for failing works

Transvac performs functional validation tests for Ejectors used in the oil & gas, nuclear and process industries.
Externally Mounted

This model is designed so that the pump is external to the process vessel mounted at ground level to aid pump servicing. The design is attractive when mixing hazardous liquids as there are no moving parts in the process vessel. A single pump can be combined with a multi-jet mixing system installed on an in-tank manifold to ensure complete mixing large capacity vessels.

In-line Design

In-line models known as a liquid jet pumps are designed to self entrain and mix predetermined quantities of a secondary liquid before pumping the mixture to a
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.


Solids Suspension

Agitation of Resin beads for water treatment.

Mixing Styrene without generating static
Research & Development - Key Research Areas

Fluid Structure Interaction

► Jet break up characterisation
► Coalescing and dispersion of multiphase flows
► Measurement techniques [laser Doppler]
► CFD model calibration [new code development]

High Motive Pressure Liquid Jet Compressor

► Optimisation & characterisation
► Scaled trials
► CFD model calibration

Low energy inline micro bubble generation

► Optimisation of new equipment and envelope testing

Gas Motivate Liquid Units

► Optimisation and stabilisation studies

Liquid Jet Pump Erosion Prediction Techniques

► Micro scale experimental trials
► CFD modelling and calibration
► Full scale Ejector testing
► Accelerated testing methods
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 production boosting.

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

The R&D test facility includes high and low pressure equipment for handling water, 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 250 barg) and solids handling systems.

Transvac performs functional validation tests for Ejectors used in the oil & gas, nuclear and process industries.

"we are focused on turning innovative designs into proven solutions."
- Gary Short, R&D Director
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 9001:2008 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.