



# Jet-Mix<sup>®</sup>

The Jet-Mix<sup>®</sup> provides the ideal solution for mixing pipeline contents across an extended range to a suitable quality for sampling, blending, or analysis.

It can be installed and maintained without pipeline shutdown and unlike traditional mixers causes minimal pressure loss.



# Mixing Solutions

**M**illions of dollars are lost every year by the Petroleum Industry through inaccurate measurement. Any on-line measurement or sampling device is only as representative as the fluids it receives. To guarantee accuracy a device must be presented with fluid that is representative of the whole cross-section of the pipeline. Where non-homogeneous fluids are flowing or where fluids have been blended mixing may be required. To achieve this a suitable pipeline location must be found or created at which the fluid is thoroughly mixed. Relying on natural turbulence for mixing is frequently not possible as this depends on maintaining minimum flow-rates. Rapid mixing may be essential, therefore a mixing system is required which provides adequate mixing regardless of flow conditions.

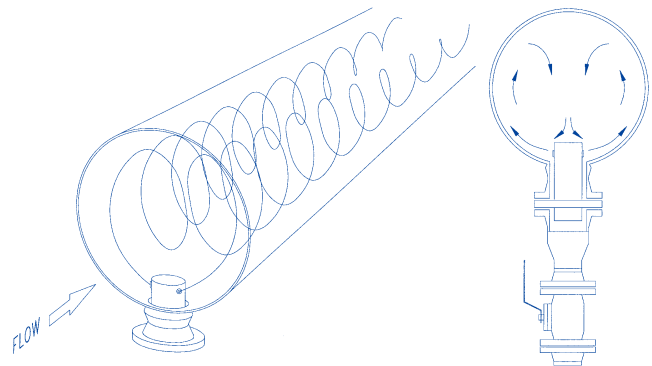
The primary elements of a Jet-Mix<sup>®</sup> are a jet nozzle and a pump. A small portion of the process fluid is withdrawn and re-injected upstream in the form of high velocity jets. The jets are positioned to produce maximum energy addition in the area of the greatest stratification. The effect of the jets is to finely disperse and evenly distribute the phases over the complete cross-section of the pipeline by twin helix rotation, ensuring that the pipeline is rapidly mixed with minimal loss of process pressure. The Jet-Mix<sup>®</sup> was originally developed for use in mixing water into crude



*Fixed Jet-Mix<sup>®</sup> Quill take-off (used in top entry applications) and Nozzle*

oil but can be used for applications such as mixing on blend headers prior to trim

control, injection and rapid dispersal of fluids into pipelines.



*Jet function*

### **Operates at all flow-rates**

The degree of mixing in a fluid depends on the rate of energy dissipation. Where natural turbulence is inadequate traditional in-line mixers divide and turn the fluid increasing the rate of dissipation through pressure loss. Energy added to the flow for mixing in this way is generally proportional to the square of the flow-rate which means that if the mixer adds enough energy at the lowest flow-rates where it is needed, it will waste energy and even possibly over-mix at high flow-rates. Conversely the energy added to the flow by a Jet-Mix® is constant: the energy added per unit volume increases as the mainline flow rate drops. As a result the performance of the Jet-Mix® is not affected by changing flow-rates.

Jet-Mix® supplies a constant mixing energy, vital during low flow-rates when the need for mixing is greatest and when natural turbulence is sufficient it can be turned off.

### **Can be removed for pipeline pigging**

Many pipelines need pigging and all equipment contained within the pipe is a hindrance to this process. The Jet-Mix® was designed from the outset in both fixed and withdrawable versions to allow removal for pipeline pigging. This design also provides for easy maintenance whilst the pipeline remains in operation, in stark contrast to

a static mixer which is not removable and a power (turbine) mixer which requires the line to be drained for maintenance.

### **Causes no pressure drop**

Traditional mixers derive energy from the flow within the pipeline, thereby causing a drop in pressure. Jet-Mix® adds energy to the flow and therefore causes no measurable pressure drop.

### **Minimal installation time**

The Jet-Mix® can be installed by hot tapping minimising the disruption to your process. This is an important consideration when calculating initial costs.

### **Low maintenance costs**

The nozzle has no moving parts and can be removed from the line for service without shut-down. The pump and skid is all exterior to the pipeline and can be serviced on-line.

### **No size limitation**

The Jet-Mix® is designed to operate in all pipelines and can be supplied to fit lines from 3" - 48".

### **Reliability**

Jiskoot have a large worldwide installed base of Jet-Mix® systems many of which have been in operation for over 15 years.

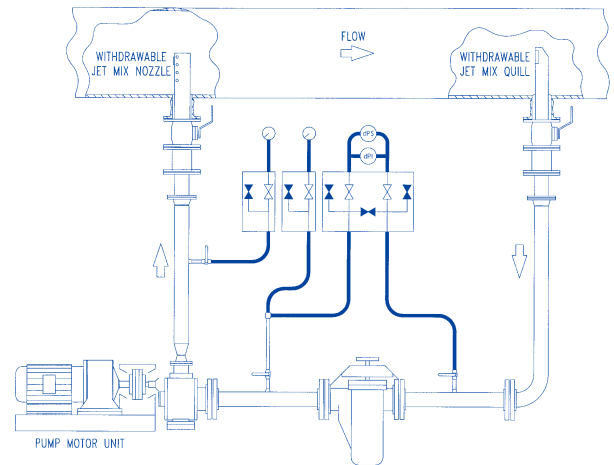
*Withdrawable Jet-Mix®  
Nozzle/Quill take-off  
(used in top entry applications)  
with hydraulic insertion and  
extraction tool*



In addition to the standard fixed bottom entry Jet-Mix<sup>®</sup> assembly a retractable Jet-Mix<sup>®</sup> can be supplied for top or bottom mounting. The retractable Jet-Mix<sup>®</sup> nozzle is supplied with an extraction tool to both insert and retract it under full process conditions without de-pressurising and draining the pipeline.



## Jet-Mix<sup>®</sup> Specifications



**Fluids mixed**  
Crude oil/water, refined hydrocarbons & chemicals

**Max line pressure**  
Designed to suit

**Line size range (typical)**  
12" - 48" (other sizes available on request)

**Line tapping size**  
Typically 3" - 8" (this depends upon application, location and up/down stream piping configuration)

**Installation requirements**  
Please contact Jiskoot

**Velocity range**  
Designed to suit

**Options**  
Withdrawable Jet-Mix<sup>®</sup> nozzle (and quill in top entry applications)

Extractor tool for withdrawable nozzle (and quill)

Jet-Mix<sup>®</sup> is normally installed in a horizontal section of pipeline.

The above specification is only typical. Jet-Mix<sup>®</sup> systems can be supplied to meet most requirements, please contact Jiskoot with details.

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