



## ACE INSTRUMENTATION

- No more size limitations
- No pipeline pressure drop
- Upfront performance guarantee using CFD modelling
- Fully ISO and API compliant
- Withdrawable mixer for ease of maintenance

# Auto Sampling For Larger Pipelines

Automatic Sampling and Analysis with Jet Mixing provides the ideal solution for custody transfers of Hydrocarbons transported via larger pipelines (12" and above). It can be installed and maintained without pipeline shutdown and unlike automatic sampling using traditional mixers, it causes minimal pressure loss. Millions 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.



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## Applications

Crude oil

Condensate

Low temperature hydrocarbons

Refined products

Hazardous liquids



## Principle

The primary elements of a JetMix 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 A small portion of the process fluid is withdrawn and re-injected upstream in the form of high velocity jets.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 JetMix was originally developed for use in mixing water into crude 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.

## 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 JetMix is constant: the energy added per unit volume increases as the mainline flow rate drops. As a result

the performance of the JetMix is not affected by changing flow-rates. JetMix 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.

## Removable for pipeline pigging

Many pipelines need pigging and all equipment contained within the pipe is a hindrance to this process. The JetMix 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. JetMix

adds energy to the flow and therefore causes no measurable pressure drop.

## Minimal installation time

The JetMix can be installed by hot tapping minimising the disruption to the process. This is an important consideration when calculating initial costs.

## Low maintenance costs

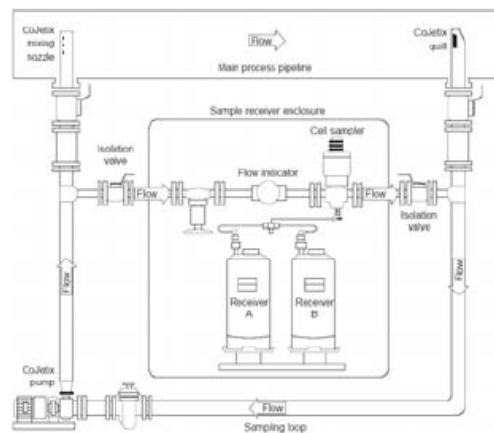
The nozzle has no moving parts and can be removed from the line for service without shut-down. The pump and skid is all exterior to the pipeline and can be serviced on-line.

## No size limitation

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

## Reliability

KPS have a large worldwide installed base of JetMix systems.



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## Typical specifications

### Fluids mixed

Crude oil/water mixtures, refined hydrocarbons & chemicals

### Max line pressure

Designed to suit

### Line size range (typical)

12" - 48" (other sizes available on request)

### Line tapping size

Typically 2" - 6" (this depends upon application, location and up/down stream piping configuration)

### Installation requirements

Please contact KPS

### Velocity range

Designed to suit

### Options

Withdrawable JetMix nozzle (and quill in top entry applications)

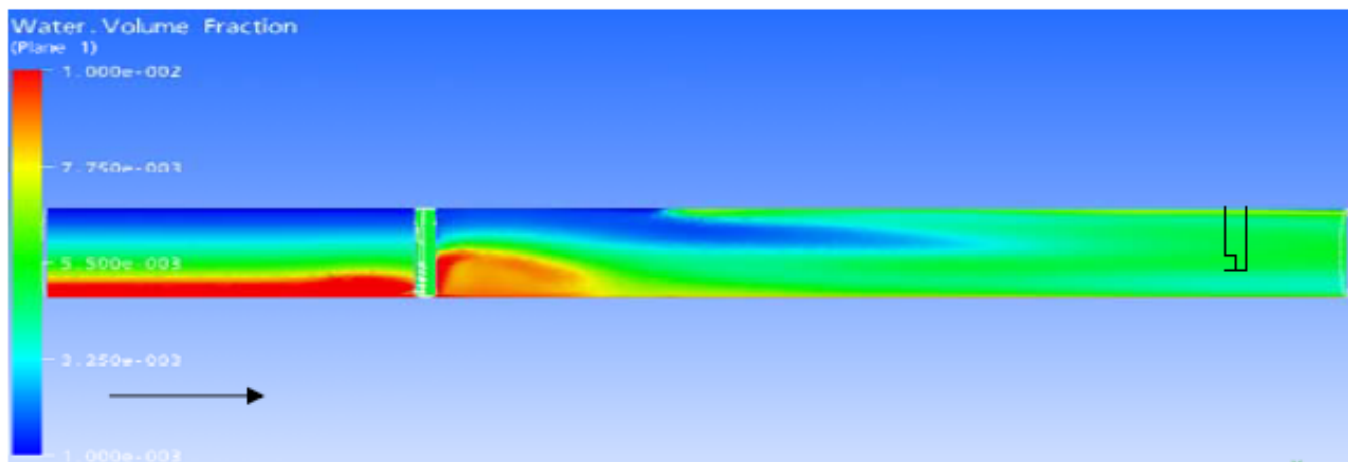
Extractor tool for withdrawable nozzle (and quill)

In addition to the standard fixed bottom entry JetMix assembly a retractable JetMix can be supplied

for top or bottom mounting. The retractable JetMix nozzle is supplied with an extraction tool to both insert and retract it under full process conditions without de-pressurising and draining the pipeline.

JetMix is normally installed in a horizontal section of pipeline.

On-line analysers such as water-in-oil monitors and densitometers can be integrated as part of the sampling loop ensuring optimum representivity, accuracy and direct comparison of results.



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