

## HAMMONDS ADDITIVE INJECTION EQUIPMENT

- INJECTION RATIOS FROM 0.1 TO 4000PPM
- FLOW RATES FROM 25 TO 30,000 L/MIN
- LINE SIZES FROM 1.1/2" TO 20" DIAMETER
- NO EXTERNAL POWER REQUIRED
- FLOW PROPORTIONAL INJECTION
- UP TO 4 DIFFERENT ADDITIVES PER UNIT
- RANGE OF BODY MATERIALS AND SEALS
- SIMPLE TO CALIBRATE



### Introduction.

Additives have to be injected into jet fuel, gasolines and other petroleum products at various stages of the distribution and supply chain. Some are added at the refinery but others become necessary at a later stage, either to compensate for additive depletion, to modify the fuel to a customer's specification or because of compatibility issues with other fuel system components.

Hammonds additive injection units have a proven track record with a large number of military and commercial users worldwide so we can offer a unit for the majority of applications. As the units are self-powered, they can be installed in any part of the plant or pipeline system without the need for an air or electrical supply, making them the perfect choice for use in remote locations, hazardous areas and for vehicle or trolley mounting.

### General Description.

The Hammonds injection unit is based on a fluid motor powered by product flow in the pipeline. This fluid motor is mechanically connected to up to four injection pumps either directly or through fixed or variable ratio gearboxes. The mechanical interface between fluid motor and pump ensures that as the product flow increases or decreases the speed of the pump also increases or decreases. Once the correct injection ratio is set it will remain correct even as product flow changes and when flow stops, injection stops.

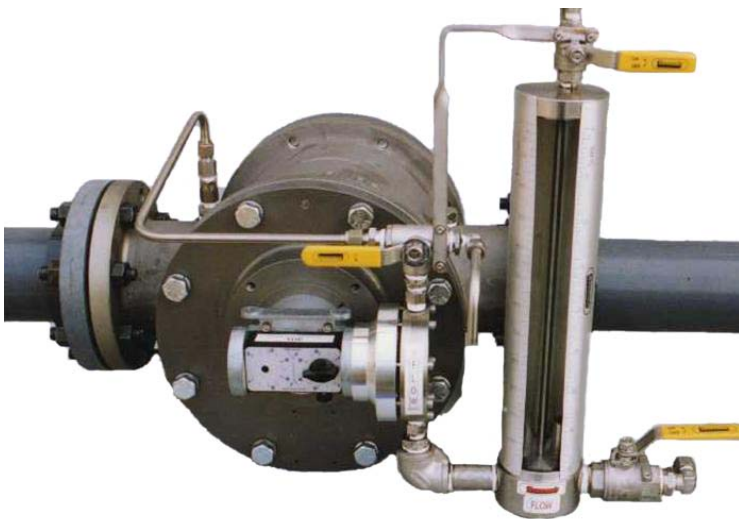
The fluid motor may either be a simple turbine or a unique positive displacement design, and the pumps can be either piston, diaphragm or rotary. Fluid motors can be Aluminium alloy, Carbon or Stainless Steel and are easily installed between flanges in the piping system downstream of the product delivery pump. The additive is normally injected at the fluid motor but may also be injected remotely.

In addition to stand-alone units we can supply fully assembled and tested packages with additive reservoirs, hoses, couplings and flow metering if required.

# TYPICAL APPLICATIONS

## Static Dissipator (Stadis 450) Injection Into Jet Fuel Pipeline.

- Cost effective turbine drive unit for applications with constant flow over long batches. Fabricated housings for high pressure applications.
- Small piston type injection pump to overcome pipeline pressures.
- Piston pump driven through reduction gearbox gives long service life.
- High calibration resolution, typically as low as 0.1 ppm is possible. This allows very accurate adjustment of conductivity figures.
- Simple to install and low cost of ownership.



## Dye Injection At Vehicle Loading Gantry.

- Accurate positive displacement fluid motor giving consistent injection rates even while the flow ramps up and down.
- Reliable diaphragm pump for higher injection ratios.
- System will maintain calibration within 5% of set point over full range of flowrates.
- Integral calibration jar facilitates calibration checks during normal system operation.

## Anti Icing Additive (FSII) into Jet Fuel on a Fueller Vehicle.

- Positive displacement fluid motor allows calibration for underwing and overwing fuelling on a single system.
- The system can be set up with multiple pumps for additional additives, for example a typical Military application may require FSII, CI and SDA on a single system.
- Solenoid valves can be installed to allow operators to select additive only for specific customers.
- The injection point can be inserted downstream of the filter allowing the fluid motor and pump to be installed upstream of the filter if there are space constraints on a vehicle.



### Accessories.

The following accessories can be supplied with Hammonds additive injection units.

**Additive Meter.** Installed in the additive injection line. Measures the additive volume and displays it locally on a mechanical register or digital display. The digital display can also be remote mounted.

**Sight Flow Indicator.** Installed in the additive supply line to the injection pump. Gives a visual indication of additive flow for operator peace of mind.

**Suction Calibration Gauge.** Installed in the additive suction line. Permits accurate calibration checking of additive ratio by comparison of an additive volume with a metered fuel reading.

**Remote Panel.** Installed at the fuelling vehicle operating panel. Gives a visual indication of additive flow and allows remote control of additive injection.

**Additive Reservoirs.** Available in various standard volumes or custom built for specific requirements. Supplied loose for vehicle installation or available with support frames. A full range of level indicators, isolating valves, air dryers and other accessories are available.

### Installation.

Hammonds injectors can be installed in almost any location. There is no restriction on mounting the unit adjacent to valves, bends or similar fittings. However, care must be taken with the orientation of drive shafts and bearings, full guidance will be provided by Aljac Engineers.

The injection unit comes as standard with the injection point into the fluid motor. Where there are space constraints the fluid motor and additive pump can be installed anywhere in the system as long as it is downstream of the pump. The injection point can be installed at a suitable location elsewhere in the system, for FSII this would typically be downstream of the filter.

The additive supply reservoir should be located as close to the injection pump as possible, ensuring additive pipework is of sufficient size to prevent pump cavitation. The injection pump can operate with a slight negative fluid head but this can slow down the priming process and make calibration checks more difficult. We always recommend a positive fluid head where possible.

### How To Order.

There are many options available in both turbine and positive displacement style fluid motors and the wide range of additive pumps available can provide injection ratios from 0.1ppm to 4000ppm at varying operating pressures. In addition, different customer or location requirements will mean that different accessories are required.

For these reasons it is not possible to provide standard solutions, we believe it is important to look at each individual requirement and develop the best solution for each application.

In order to achieve this we need as much information as possible. Please call our office to discuss your requirements or preferably complete the form on the following page and email it to our Sales Department. sales@aljac.com.

# ADDITIVE INJECTION APPLICATION SHEET

Email the form below to sales@aljac.com or complete the interactive form at www.aljac.com

Date :-		Project Title :-		
Your Company Details :-				
Your telephone number/email address :-				
<b><u>Product Information</u></b>				
Product To Be Treated :-			Viscosity :-	
Flow direction	Left to right	Right to left	Vertical up	Vertical down
<b><u>Installation Information</u></b>				
Product line size :-			Connections :-	
Operating Flowrate :-				
Maximum Flowrate :-			Minimum Flowrate :-	
Maximum Line Pressure :-				
Operating Pressure :-				
Operating Temperature :-				
<b><u>Operation Information</u></b>				
Continuous Flow :- Yes / No				
Batch Flow :- Yes / No			Batch Volume :-	
Type of installation :- Fixed / mobile/ batch loading, Please describe:-				
Estimated hours of use per day:-				
<b><u>Additive Information</u></b>				
Additive # 1 :-			Injection Ratio (ppm) :-	
Additive # 2 :-			Injection Ratio (ppm) :-	
Additive # 3 :-			Injection Ratio (ppm) :-	
Additive # 4 :-			Injection Ratio (ppm) :-	
<b><u>Other Information</u></b>				
Hazardous area certification required Y/N			What standard?	
CE Marking required Y/N				
Material certification required Y/N			What standard?	
Special testing requirements, Please list:-				
Any other information which may be of use or any accessories required:-				