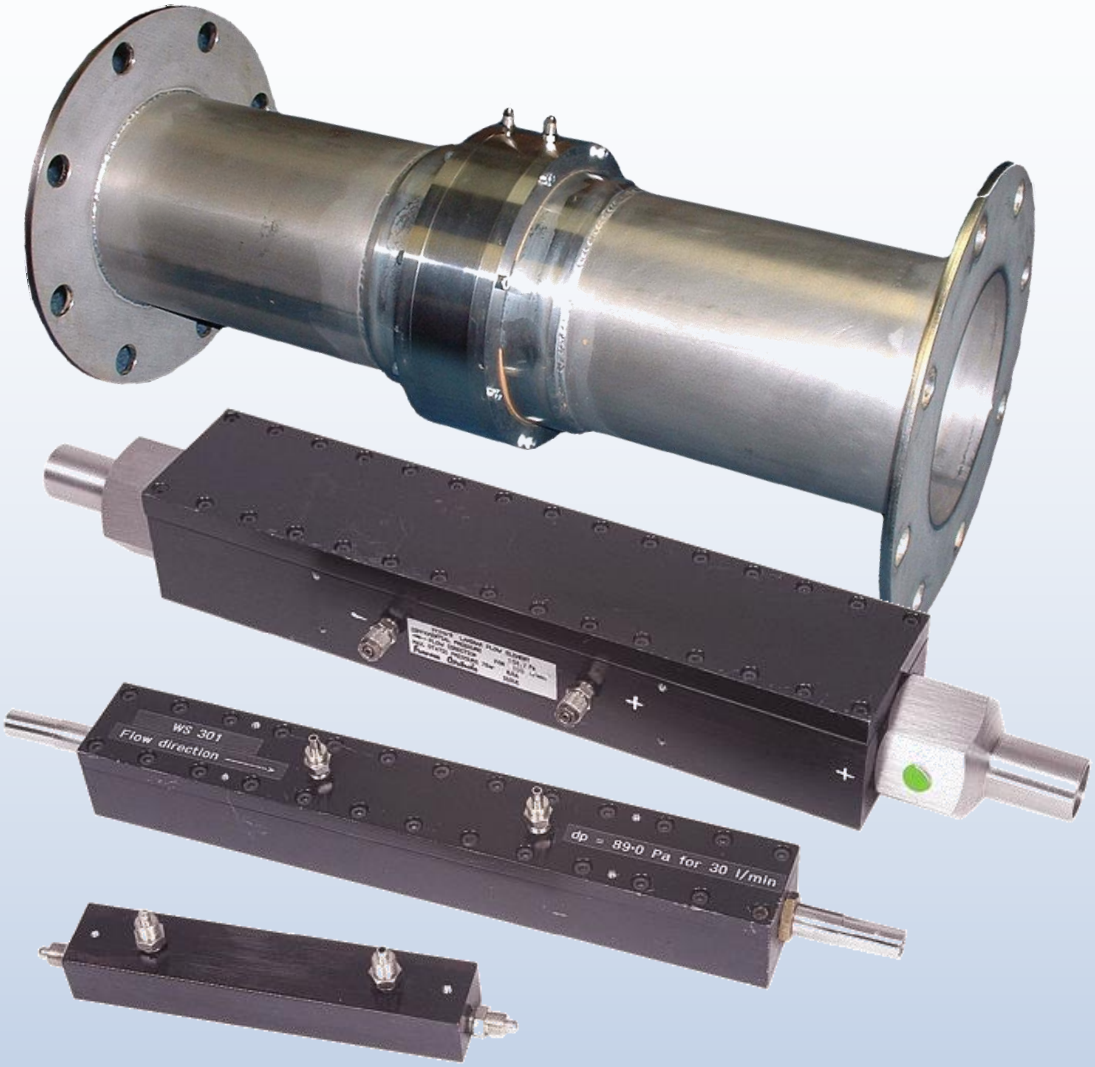
FCO96

Low Pressure
Laminar Flow Elements



- **Primary Flow Elements**
- **Flows from 0.1ml/min to 40,000 Litres/min**

The FCO96 series of Laminar Flow Elements (LFE's) is a family of primary flow devices for the measurement of volumetric gas flow rates from 0.01 ml/min to 40000 litres/min.

Extensively used in the many industries including manufacture of gas boilers, pharmaceutical & chemical manufacturing, building leak testing, calibration services and the automotive industry. Laminar flow systems are used for applications involving process air and gas measurement, emissions analysis, component leak detection, calibration standards & reference, engine air intake measurement & flow benches.

The FCO96 Laminar Flow Elements generate a low differential pressure, offering little restriction to flow. Typical is a value of 100 Pascals for full flow rate. Suitable measuring instruments are Furness Controls range of Micromanometers, transducers and transmitters.

FCO96

Flow Measurement

Flow Range	2 ml/min	20 ml/min 200 ml/min	2 l/min 6 l/min 20 l/min 30 l/min	100 l/min	200 l/min 600 l/min	2000 l/min 5000 l/min	10 m^3/min	40 m^3/min
Flow connections	4/3 push-on tube	6/4 Push-on tube	12mm o/d spigot	22mm o/d spigot	28mm o/d spigot	3" BS Flange	6" ANSI 150 flange	8" ANSI 150 flange
Nominal DP for fsd	100Pa						200Pa	
Max. Static Pressure	0 to 7 bar	0 to 7 bar	0 to 7 bar	0 to 7 bar	0 to 7 bar	0 to 7 bar	0 to 1 bar	0 to 1 bar
Resolution	Infinite (determined by the resolution of the DP measurement device)							
Media compatibility	Clean dry air and non-corrosive gases							

Laminar Flow Elements (LFE's) have inherent high accuracy, stable calibration, excellent repeatability and fast response time. Furness Controls LFE's are excellent for critical gas and air flow measurements and can be utilised in validating calibration standards. Models are available to measure air and gas flows as low as 0.1 ml/min and with a large 8 inch flanged stainless steel model flow rates up to 40,000 litres/min (3000 Kg/hr).

The element measures volumetric gas flow rate and is based on the physics of the Poiseuille equation. A Laminar Flow Element forces the gas flow to be parallel and eliminates flow turbulence. This produces a very small differential pressure (DP) drop which is linear to volumetric flow.
Flow measurements are often made by orifice plate, pitot tube, venturi or nozzle, where the differential pressure generated is related through square law to flow so this dramatically reduces the effective range, as 25% of the maximum flow produces only 6% of the DP. This reduces the turndown ratio of the flow meter to around 5:1, below this accuracy is severely affected.

Furness Controls Laminar Flow Elements have a linear relationship between differential pressure and flow. This relationship gives a massive turndown ratio compared to other flow devices. A typical turndown can be achieved of up to 100:1 when using two stage or high accuracy measuring instruments, ensuring that accuracy is maintained over a wide range. The LFE generates a very low differential pressure, offering little restriction to flow, typically a pressure drop of 100 Pa (1 mbar) at full flow rate. The tubes of larger models are manufactured in stainless steel with windings of SS foil to create the element. These tubes are long enough, relative to their inside diameter to cause laminar flow to occur inside the element. The result is a near linear relationship between DP and flow rate.

An LFE flow system comprises of a laminar flow element and a differential pressure measuring device. The system accuracy is determined by the accuracy of the DP device and the level of uncertainty of the master calibration equipment used to measure the flow during initial calibration. For better accuracy and wider turndown it is common to use two DP devices one for low flows and one for high flows. The flow system is then calibrated and matched together to form a complete high accuracy flow system.
Furness Controls specialise in the accurate measurement of ultra-low differential pressure, the 300 series differential pressure transmitters have an overall accuracy of <0.25% of reading. This accuracy of "reading" is significant as many accuracies are quoted of "full scale" so when reading at 10% the accuracy of reading is 10 times better (in this case 0.025% of FS).

Furness Controls has a UKAS accredited laboratory which offers pressure calibration from 0 to 40 kPa and flow calibration from 0.1 ml/min to 2000 litres/min

Furness Controls
Pressure|Flow|Leak Detection

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Beeching Road • Bexhill On Sea
East Sussex • UK • TN39 3LG
Tel: +44 1424 819980
Email: sales@furness-controls.com
Web: www.furness-controls.com