

Coulton Instrumentation

Data Sheet

SYSTEM FEATURES

- * Single source responsibility
- * Very low cost of ownership
- * Rugged and easy to install
- * Wide range of flow element types
- * Sub-assembled ready for installation
- * Installations tested in Northern Siberia
- * Ambient temperature -40 to 80 deg C
- * Weatherproofing to IP67
- * EExia, Exds or ExN certification
- * Supplied with a full set of documentation
- * Flow calibration certificate available

SCOPE

Coulton Instrumentation will supply individual items or a complete system. The complete system includes:

Flow Element

Nine types of flow element are available. All except where indicated, are calculated and manufactured in accordance with ISO5167 or BS1042.

Flow Assembly

Orifice plates and nozzles can be purchased separately or fitted into a flow assembly to simplify installation and/or improve accuracy.

Valves

Isolating valves can be fitted to the flow assembly. Extension nipples are used to ensure that the valve handles clear the process flanges. A 3-valve or 5-valve manifold may also be fitted to the dp transmitter.

DP Transmitter

Coulton Instrumentation carries a very large stock of process transmitters. If required, Coulton will supply the correct transmitter for the process conditions. For full details please refer to a separate data sheet.

DOCUMENTATION

The documents listed below are supplied automatically with each system.

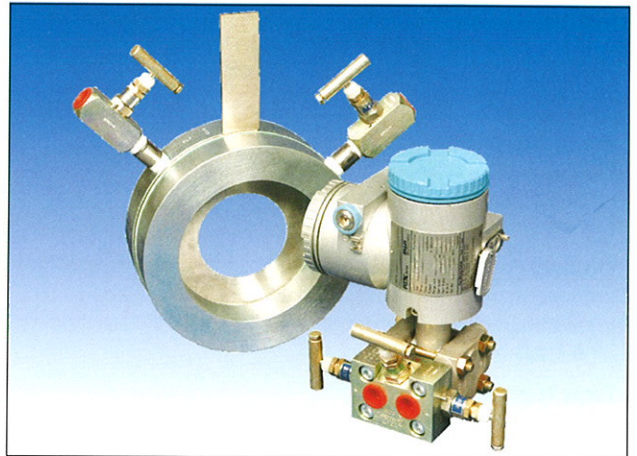
Certificate of conformity
Flow calculation sheet
Transmitter calibration certificate
Installation drawing
Instruction manual

Special certificates, for example material certificates, hydrostatic pressure test certificates etc are available if specifically described in the customers purchase order.

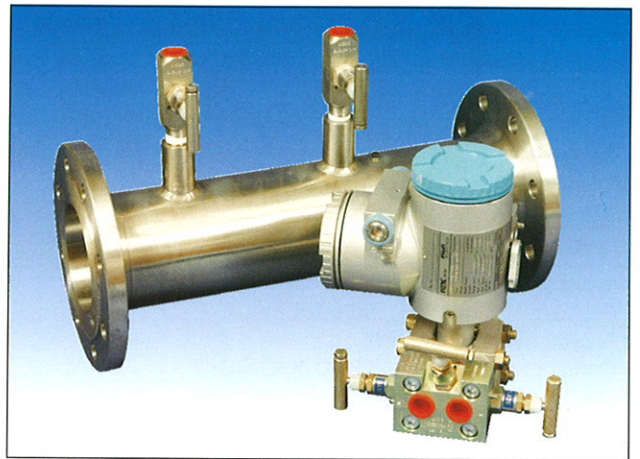
OPTIONS

A list of the most common options is given below. Please advise if any of these are required.

Gauge pressure transmitter
Temperature transmitter
Steam or gas flow computer
Transmitter power supply
Field-mounted enclosure
Flow controller with autotune
Flow/pressure/temperature recorder



Orifice Plate & Carrier



Classical Venturi

RED6 PRIMARY FLOW ELEMENTS

RED6 Primary Flow Elements may be supplied individually or as part of a flow metering system. Advanced manufacturing technologies ensure fast delivery with very competitive pricing.

The RED6 system consists of all the necessary items in one package, including certificates and documentation. This gives lower installed cost and single-source responsibility.

Pre-assembly is completed as far as possible and detailed installation instructions provided to ensure that equipment can be installed in remote areas by unskilled personnel.

Please do not hesitate to contact our Christchurch office if special materials are required or if manufacture is required to a standard other than BS, DIN, ANSI or JIS.

CE Mark Approval

DS1295-R6

DATE 12 Dec 1995

FLOW ELEMENTS

Concentric Orifice Plate

General purpose for liquid, gas and steam
Simple, inexpensive and widely accepted
Line sizes 15-1800 mm

Eccentric Orifice Plate

For dirty fluids or two phase flow
Less accurate than concentric orifice plate
Line sizes 50-600 mm

Conical Entrance Orifice Plate

For viscous fluids with low Pipe Reynolds Number
Less accurate than concentric orifice plate
Line sizes 50-600 mm

Flow Nozzle

High velocity measurement of non-viscous fluids
Suitable for abrasive fluids or fluids with suspended solids
Commonly used for steam
Accurate with low pressure loss
ISA-1932 and long radius types
Weld-in or slip-in (between flanges) types
Line sizes 50-800 mm

Classical Venturi Tube

Clean, dirty or abrasive fluids
Accurate with very low pressure loss
Expensive compared to orifice plate
Robust with little maintenance
Line sizes 25-1800 mm

Truncated Venturi Tube

Cheaper than classical venturi tube
Shorter insertion length
Does not conform to BS1042 or ISO5167
Line sizes 25-1800 mm

Averaging Pitot Tube

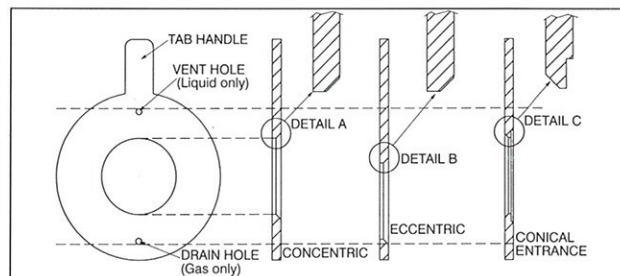
Easy installation and low pressure loss
Relatively low cost for large line sizes
Fluid should be reasonably clean
Does not conform to BS1042 or ISO5167
Line sizes 100-2400 mm

Flow Wedge

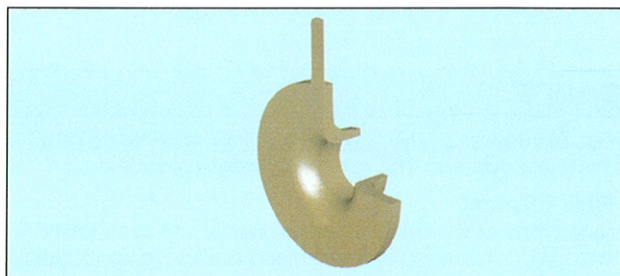
General purpose for use on all fluids
Can measure flow in both directions
Suitable for slurries and liquids with suspended solids
Pipe Reynolds Number has very little effect (down to 600)
Can be supplied flanged for remote seal connection
Wedge can be removed for cleaning and checking
Accuracy ± 3 percent, with flow rig cal ± 1 percent
Does not conform to BS1042 or ISO5167
Line sizes 50-800 mm

Coulton Nozzle

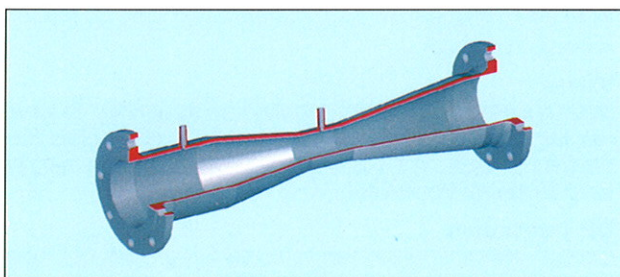
General purpose for use on all fluids
Combines features of orifice plate and flow nozzle
Lower pressure loss than orifice plate
Lower cost than flow nozzle
Easy installation, fits between flanges
Accuracy ± 5 percent, with flow rig cal ± 2 percent
Does not conform to BS1042 or ISO5167
Line sizes 50-300 mm



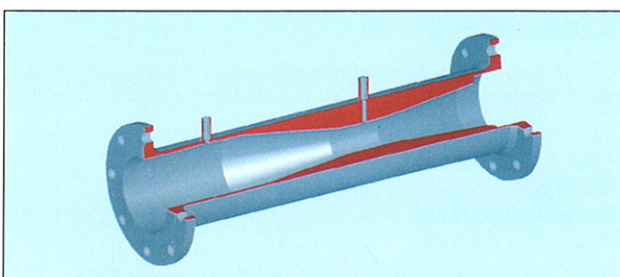
Orifice Plates



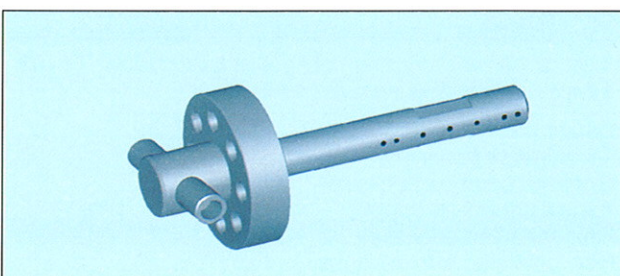
ISA-1932 Flow Nozzle



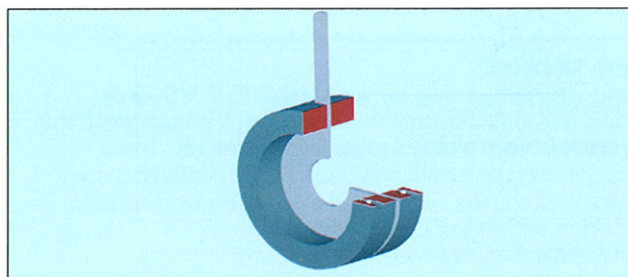
Classical Venturi Tube (Fabricated)



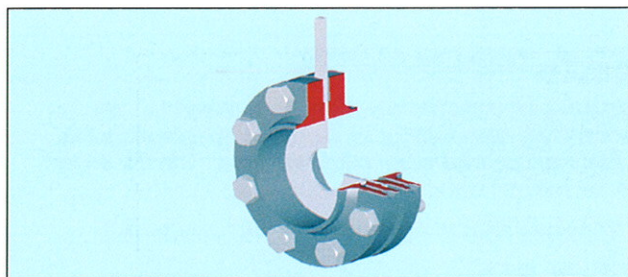
Truncated Venturi Tube (Machined From Solid)



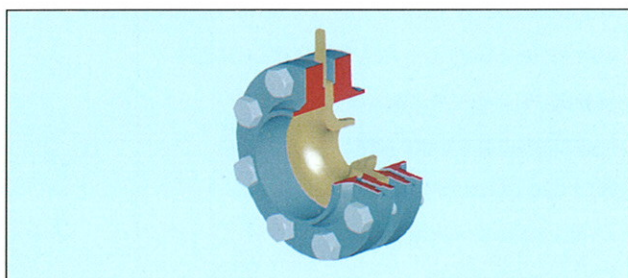
Averaging Pitot Tube



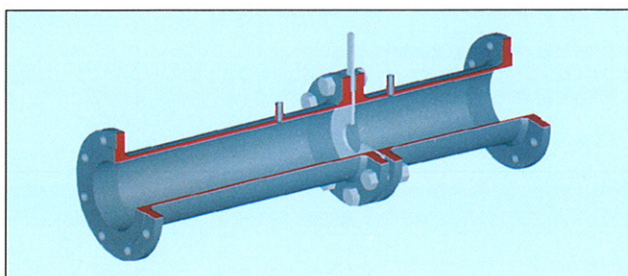
Orifice Plate Carrier Assembly



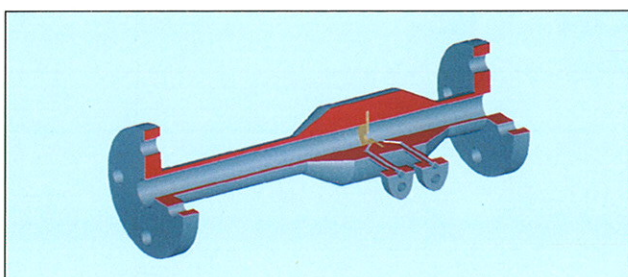
Orifice Plate Flange Assembly



Nozzle Flange Assembly



Calipered Metering Run



Integral Metering Run

FLOW ASSEMBLIES

Orifice Plate Carrier Assembly

The orifice plate is held between two carrier rings, each ring drilled with a pressure tapping point. Flange type tapplings are normally supplied for sizes above 40 mm NB and corner type tapplings for 40mm NB and below. This assembly is then sandwiched between the existing process flanges. It is very easy to install. No on-site drilling or welding is required.

Orifice Plate Flange Assembly

The orifice plate is bolted between two process flanges (manufactured to ANSI B16.36 or similar standard). Each flange is drilled with a pressure tapping point. The complete assembly is then welded into the process pipeline taking care not to damage the flange gaskets. Jacking screws can be provided to help fit or remove the flow nozzle. No on-site drilling is required. This type of assembly is often used on power stations and other applications where process pressure and temperature is high.

Nozzle Flange Assembly

The nozzle is bolted between two process flanges, each flange is drilled with a pressure tapping point. The complete assembly is then welded into the process pipeline (take care not to damage the flange gaskets). No on-site drilling is required. This type of assembly is commonly used on power stations and other applications where process pressure and temperature is high.

Calipered Metering Run

Upstream and downstream pipe sections are provided to the length specified in BS1042/ISO5167 and then measured for use in the flow calculation. Concentric orifice plates are normally used although in some applications a flow nozzle may be preferred. This type of device is usually encountered in fiscal metering applications or where accurate flow measurement is necessary for plant handover trials. A flow calibration certificate can be provided.

Integral Metering Run

A concentric orifice is accurately machined into a section of metered tube. The pressure tapplings are taken to a direct-mounted dp transmitter through an integral 3-valve manifold. This device is used for very low flows and pipelines below 25 mm.

Flow Assembly Isolating Valves

Each flow assembly is supplied complete with two process isolating valves suitable for the design pressure and temperature. These are fitted to the assembly using an extension nipple of length suitable to ensure that the process flange and/or pipe insulation is cleared. Valves manufactured by Anderson Greenwood or Oliver Valves are normally used.

FLOW STRAIGHTENER

Used when there is insufficient length of straight pipeline to satisfy BS1042/ISO5167. The straightener consists of a "bundle" of small pipes held inside a full-size tube. These small pipes have the effect of reducing flow turbulence. The complete straightener is supplied flanged to the customer's requirements or ready to weld directly into the pipeline and is normally fabricated from CS, 304SS or 316SS.

DETAILS REQUIRED

The following information is required to size the flow element and manufacture the complete assembly. Blank flow data sheets are available on request. Please note that in many cases only part of this information may be required. If help is required please contact our Christchurch Office.

Tag No	Name of Measurement

<p>FLOW DEVICE</p> <p>Flow element type/material</p> <p>Flow assembly type/material</p> <p>Type of tappings</p> <p>Is a vent/drain hole req'd</p> <p>PIPE DETAILS</p> <p>Nominal bore</p> <p>Schedule</p> <p>Standard design code</p> <p>Actual measured bore</p> <p>Material</p> <p>FLANGE DETAILS</p> <p>Standard</p> <p>Rating</p> <p>Type</p> <p>Facing (RF/RTJ)</p> <p>Pipe O/D (for butt weld)</p> <p>Material</p> <p>FLOW DETAILS</p> <p>Normal flow</p> <p>Maximum flow</p> <p>Meter scale required</p> <p>Max press loss permissible</p> <p>Required DP (If known)</p> <p>Required bore (If known)</p>	<p>D/2 Flange Corner</p> <p>yes / no</p> <p>FLUID DETAILS</p> <p>Fluid to be measured</p> <p>Normal upstream pressure</p> <p>Maximum design pressure</p> <p>Normal upstream temp</p> <p>Maximum design temp</p> <p>Working density</p> <p>Working viscosity (poise)</p> <p>Relative moisture content</p> <p>Compressibility (gas)</p> <p>Specific heat ratio (gas)</p> <p>PROCESS ISOLATION VALVES</p> <p>Valves required</p> <p>Material</p> <p>FLOW TRANSMITTER</p> <p>Square root extraction</p> <p>Smart communication</p> <p>Indicator</p> <p>Indicator type</p> <p>Calibration certificate</p> <p>Other transmitter options</p> <p>TRANSMITTER VALVE MANIFOLD</p> <p>Manifold required</p> <p>Manifold type/material</p>	<p>yes / no</p> <p>yes / no</p> <p>yes / no</p> <p>analogue / digital</p> <p>yes / no</p> <p>yes / no</p> <p>yes / no</p>
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Signature	
Company	
Date	

Notes

Coulton markets a full range of process measurement and control products including:

PRESSURE TRANSMITTERS
FLOW & LEVEL TRANSMITTERS
PROCESS CONTROLLERS
TEMPERATURE CONTROLLERS
CHART RECORDERS
ULTRASONIC FLOWMETERS
MAGNETIC FLOWMETERS
OXYGEN ANALYSERS
PRIMARY FLOW ELEMENTS
THERMOWELLS
VALVE SWITCHBOXES

For further information please telephone or contact our Christchurch Office.

FLOW TRANSMITTER

Coulton are able to recommend the correct transmitter according to the design pressure rating and the dp required by the flow calculation. For a detailed specification refer to the manufacturers data sheet. Brief details are given below:

Type:	Electronic differential pressure
Process Body:	316SS
Measuring Diaphragm:	316SS
Measuring Cell:	Capacitance type
Accuracy (DP):	± 0.1 percent of calibrated span
Fill Fluid:	Silicone oil
Power Supply:	24Vdc nominal
Output:	4-20 mA 2-wire
Electrical Connection:	20mm (see options)
Process Connection:	1/2" NPT through valve manifold
Weather Protection:	IP67
Certification:	EEExia

Options

The flow transmitter can be supplied with several built-in options. These options may be functional or may be necessary to meet process conditions. The common options are described below:

Built-in analogue indicator
Built-in LCD indicator
Square root extraction
Smart/Hart communication
Stainless steel flange bolts & nuts
Electrical connection Pg13.5 or 1/2" NPT
Exds or ExN certification
Cleaned for oxygen service
NACE specification
Static pressure rating to 420 BarG
Wetted parts in Hastelloy C, Monel or Tantalum

3-Valve Manifold

It is good practice to fit a 3-valve manifold to the dp transmitter. It is used to isolate and equalize the transmitter input for zeroing purposes.

Impulse Tube Connections:	1/2" NPT
Transmitter Centres:	54 mm
Bolt thread:	M10 or M12
Material:	CS or 316SS
Manufacturer:	Anderson Greenwood or Oliver Valves

5-Valve Manifold

In some situations it may be appropriate to fit a 5-valve manifold to the dp transmitter, this is often the case when the transmitter is fitted inside a protective enclosure. Three valves are used to isolate and equalize the transmitter input for zeroing purposes. In addition, two extra valves enable bleeding or draining of the impulse lines.

Impulse Tube Connections:	1/2 NPT
Transmitter Centres:	54 mm
Bolt Thread:	M10 or M12
Material:	CS or 316SS
Manufacturer:	Anderson Greenwood or Oliver Valves

SPECIAL REQUIREMENTS

Please advise if there are any special requirements. We can not accept any responsibility for customer requirements that are not clearly defined in the purchase order. The following check list may be useful:

- ☐ Calculate bore to BS 1042 / ISO 5167 standards
- ☐ Supply flanges to BS / DIN / ANSI / JIS standards
- ☐ Manufacture flanges to ANSI B16.36 / ANSI B16.5
- ☐ Manufacture to Boiler Regulations
- ☐ Use weld procedure ASME IX / BS EN 288
- ☐ Lloyds Register to inspect
- ☐ Hydrostatic pressure test
- ☐ Red dye penetrant test
- ☐ Stress relieve welds
- ☐ Radiograph welds
- ☐ Clean for oxygen use
- ☐ Supply materials to NACE specification
- ☐ Provide material certificates
- ☐ Provide flow calibration certificate
- ☐ Provide flow straightener



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