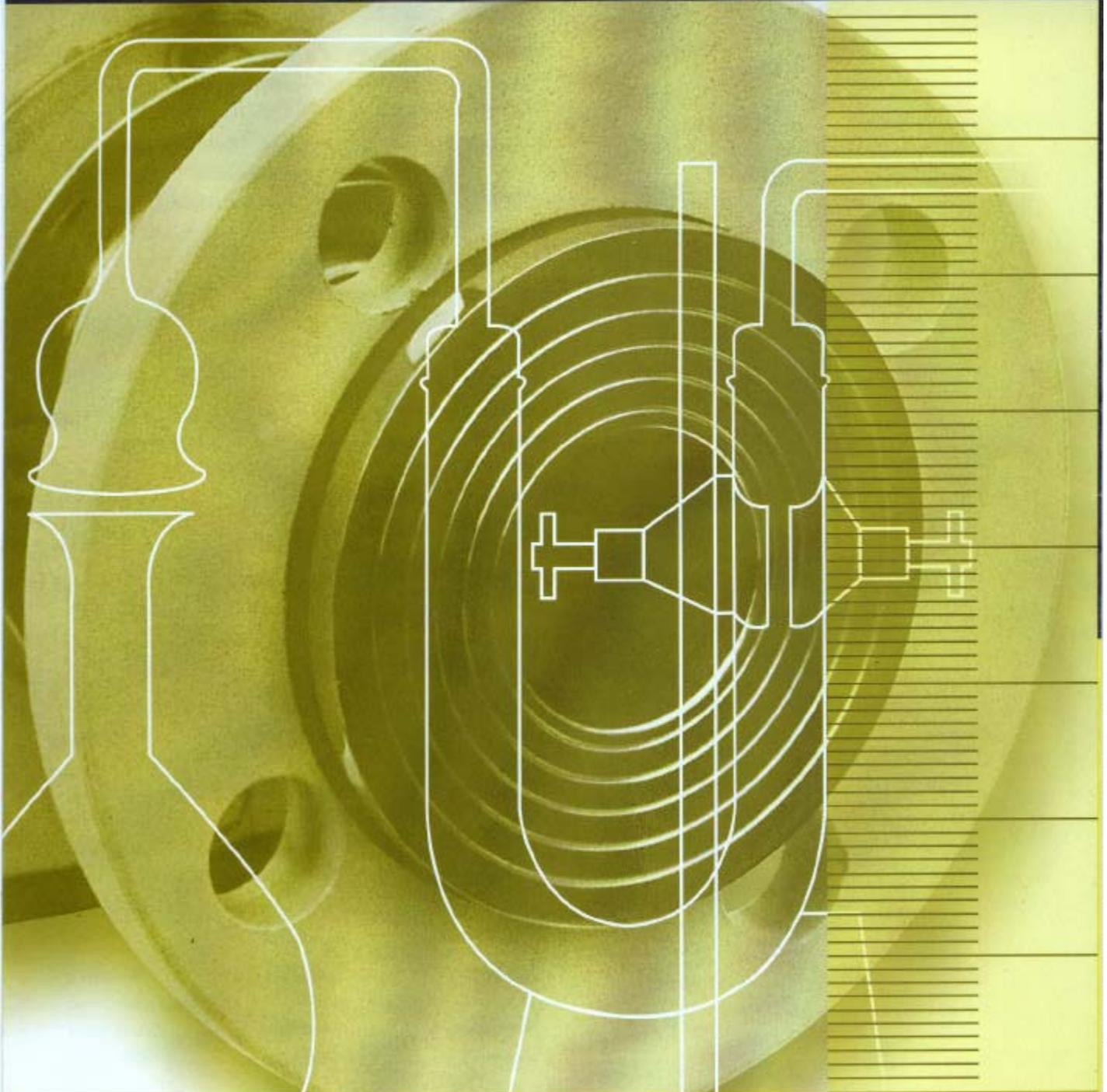


CUSTOMISED FLOW MEASUREMENT SOLUTIONS
INDUSTRIAL & SCIENTIFIC



CM FLOWMETERS

a measure of trust

The Company

Chemicals & Meters was established in 1967 by Raju Venkateswar (1929-94), a visionary US-trained chemical engineer. He was a pioneer in flowmeter manufacture in India. After much experimentation in a laboratory-cum-workshop in Kolkata, the technology was successfully developed for the manufacture of variable area flowmeters (or rotameters) for use in chemical and allied industries, scientific laboratories and medical applications. A small band of skilled and motivated workmen were intensively trained in the manufacturing process, with an accent on total quality.

"The CM brand is trusted for proven accuracy."

R & D has consistently been an important part of the company's work. Over the years a number of innovative technical measures and appropriate machinery have been introduced. A range of rotameter types was also developed for clients like the Telecom Research Center, Bhabha Atomic Research Center and Nuclear Power Corporation.

The company operates from its own factory - cum-office premises in the Kasba Industrial Estate in Kolkata, India.

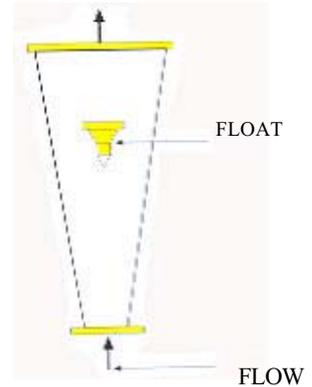
ROTAMETERS

Area flow meters are devices in which pressure drop is constant and the area through which the fluid flows varies with flow rate. Area is to be related to flow rate through proper calibration. Rotameter is a typical area meter.

The instrument consists of a gradually tapered, calibrated glass tube with a float inside, mounted vertically in a frame with the large end up. Fluid flows upward through the tapered tube and suspends freely a float (which is submerged in the fluid). Float is the indicating element, and the greater the flow rate; the higher the float rides in the tube.

The tube is marked in divisions, and the reading of the meter is obtained from the scale at the reading edge of the float, which is taken at its largest cross section. A calibration curve must be available to convert the observed scale reading to flow rate.

The company website at www.cmflowmeters.com outlines the principles of fluid flow measurement

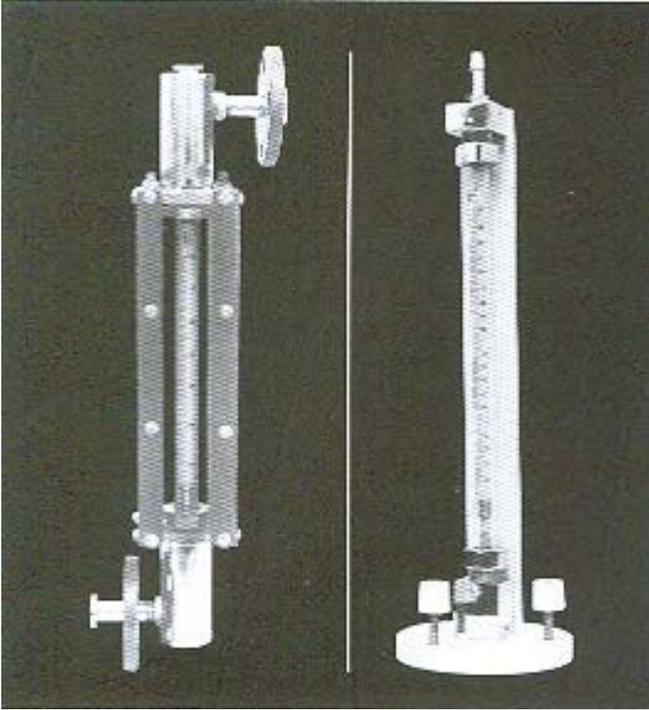


CM ROTAMETERS

CM Rotameters are designed to meet the needs of contemporary chemical and allied industries, pilot plants, laboratories and anaesthesia machines. These are recommended for use wherever a reliable, sensitive, repeatable indication of instantaneous flow rate is required for process control or other purposes. Our Rotameters are invaluable in all situations where the rate of flow of liquid or gas inside a pipeline or tubing is to be measured with a high degree of accuracy.

CM Rotameters are custom-made according to the user's specifications. The instruments are manufactured using our own Indian Patent for making the tapered glass metering tube in a novel way. Each and every instrument is individually crafted.

The range of instruments we make to meet the special requirements of customers includes stainless steel metering tubes, and Bypass Rotameters for measuring relatively large flow rates.



Anodised Aluminium, PVC, Ebonite, high density polythene or the like, with or without a Guide Rod, and with or without loading.

FLOW READING

With the conical rotating-type floats, the fluid flow should be read on the scale against the upper edge of the float. For viscosity compensating floats, this should be read against the central circular disc of the float. For ball-type float, this should be at the middle of the float.

FRAMES

The frame is usually made from Cast Iron and/or Mild Steel components. Depending upon the service requirements, the Trim Material (Le part coming in contact with the fluid), is made from Stainless Steel, or any other corrosion-resistant material. such as Lead, Ebonite or rubber lining. Our usual flange-type rectangular frames are a bit heavy but are very sturdy. We can also provide sturdy but very light and simple types of frames. We supply instruments fitted in an elegant, moulded Bakelite frame for Purge Rotameters, in frames for panel mounting, as well as in frames with heavy base and leveling arrangements - for use on Laboratory Benches, with integral fine regulating valves. All Mild Steel and Cast Iron parts are given a black oxidized finish.

The pipeline connections are either flanged type, screwed type, or with built-in grip for insertion of rubber hose / tubing,

METERING TUBE

Borosilicate glass tubes are ground and polished to a taper. An appropriate float is also prepared. The tube is then calibrated, using a standard precision master. The calibration marks are directly fused on the metering tube through the process of annealing. A white background is similarly fused into the glass surface, at the rear side. The markings on the tubes are then re-checked using another standard master.

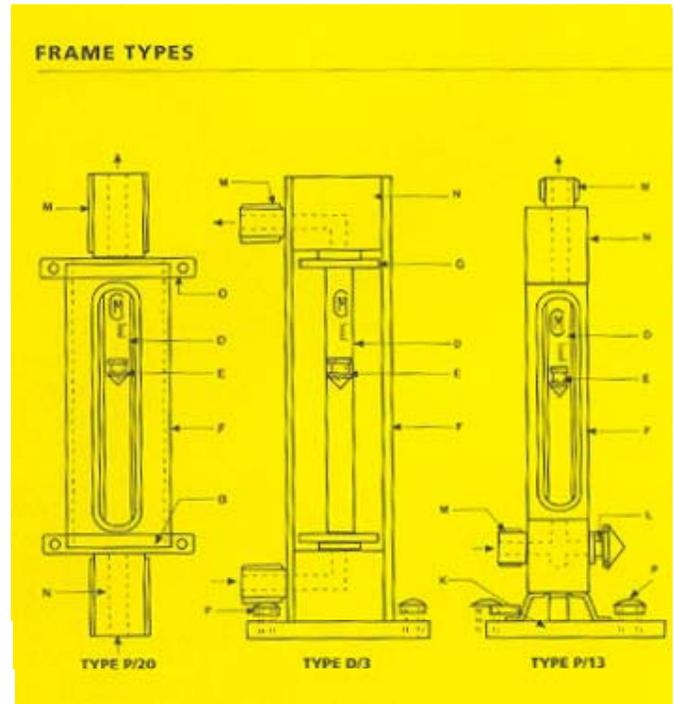
The metering tube has a high precision internal taper, made from thick-walled Borosilicate glass. For certain sizes, this may be a moulded tube with an external taper. For others, it may be a drawn tube with practically no outside taper. The metering tube can also be made of Perspex or Stainless Steel.

A special feature of our process is the possibility of giving an Expanded Scale at any desired range of flow, within the specific flow range. If required, etching and markings on the metering glass tubes are also provided, using ceramic-based colours.

FLOATS

We generally offer Rotating Type floats, which are superior to the non-rotating type. Non-rotating floats may sometimes get stuck inside the metering tube due to accidental ingress of tiny particles of dirt and this will usually remain unnoticed. This may mislead the operator, resulting in serious consequences. A rotating type of float will stop rotating in such a situation, thereby inviting the operator's attention to the improper functioning of the instrument.

Depending on the special requirement of the working conditions, the float can be made from Stainless Steel, Teflon,



depending on customers' specifications or service conditions. Usually we fit the metering tube by End Compression, by means of two end flanges, till it is leak-proof. In addition, we provide for packing to be pressed from the outer periphery of either end of the metering tubes, by means of suitable packing press nuts. In certain other types, tubes are fitted with leak proof Rubber/Teflon a-rings.

The gaskets are usually cut out or moulded from synthetic rubber. Depending on the service conditions, these may be of Teflon, Neoprene etc.

END STOPS

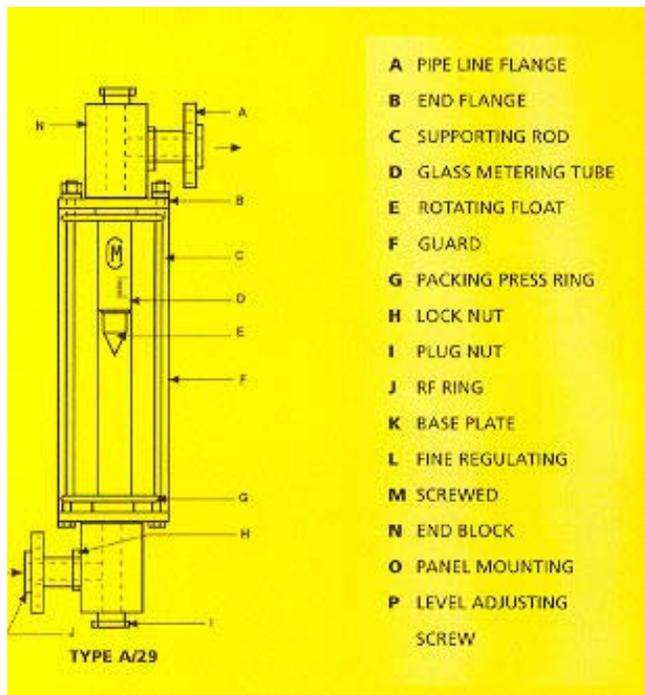
Depending on service conditions, the end stops are made from Stainless Steel, Ebonite, PVC, Teflon, Lead etc.

GUARD

In some types of completed Rotameters, the metering tubes are protected by a metal pipe. In others, protective Perspex guards/safety glasses are provided in such a way as to enable easy removal for opening/cleaning.

FLOW RANGES

In Rotameters other than the Bypass type, flow ranges may cover from 10 cdm³ to as high as 30,000 l/hr in terms of water,



and for gases 10 cdm³ to as high as 500 NM³/hr in terms of air.

Our custom-made instruments have been used for liquids like Water, Caustic Soda Solution, Brine, Hydrochloric Acid, Sulphuric Acid, Nitric Acid, Oil (mineral and vegetable), Sugar Solution, Formalin and various organic solvents; and for gases like Air, Hydrogen, Nitrogen, Oxygen, Carbon Monoxide, Carbon Dioxide, LPG, synthetic gases (for fertiliser industry) etc.

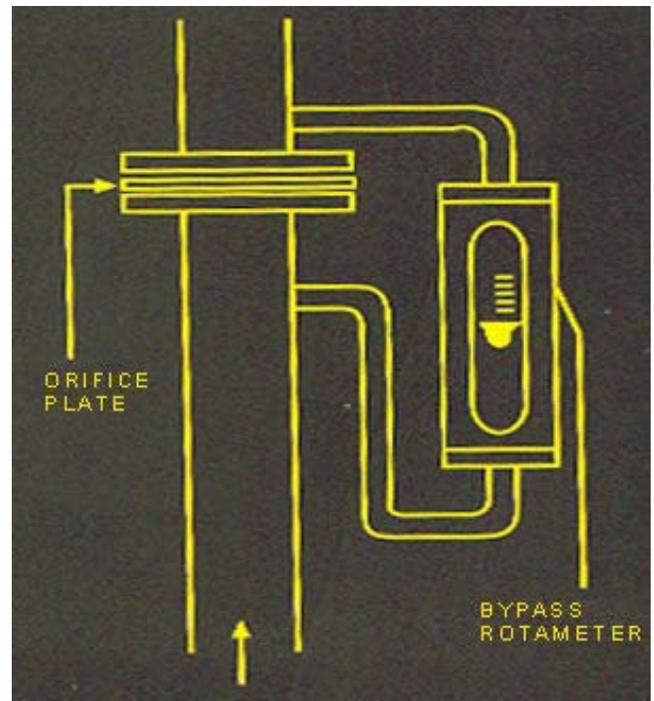
BYPASS ROTAMETERS

Bypass Rotameters are intended for measuring a very high rate of fluid flow. A built-in orifice of the required dimension is provided in the main flow pipe to ensure a desired proportion of flow through the bypass line. A complete Bypass Unit consists of a built-in orifice, bypass fittings and pipings, and a Rotameter on the bypass line.

QUALITY

The instruments are tested in-house against a Standard Precision Master Flowmeter, which in turn is regularly tested and re-calibrated. CM Rotameters are being manufactured from 1967 and our instruments have been tested for accuracy by institutions like National Test House and Jadavpur University in Kolkata, and Indian Institute of Technology (Powai).

CM Rotameters are recognised as the most reliable, high quality instruments of their kind available in India.



PRICE & DELIVERY

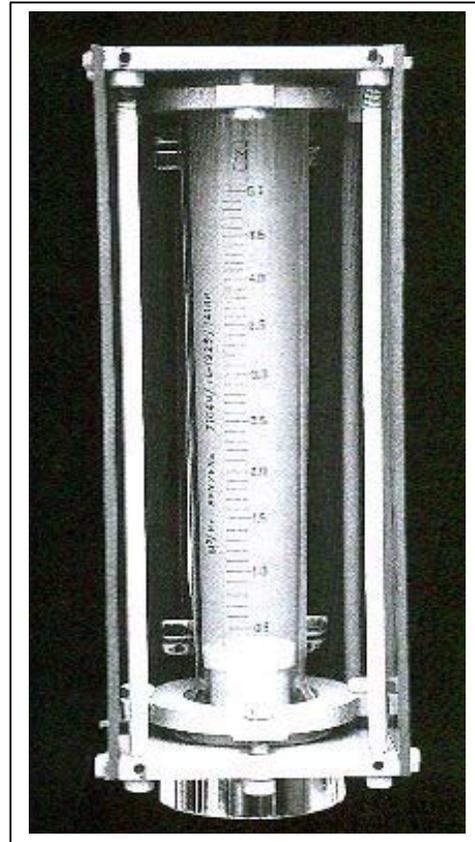
Price depends on the specifications, such as range of flow, material of construction of float, gaskets and frames etc. The number of units of an instrument of the same size, ordered in one lot, and prospect of repeat order of the same size, would also have a bearing on the quoted price.

Our usual terms of payments are 30% advance against order, rest against proforma invoice, through bank, against delivery documents. Exceptions may be made for regular customers.

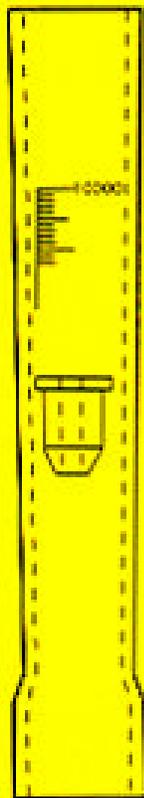
Delivery period varies from 224 weeks, depending on the specifications. We usually send the instrument fully assembled. In order to protect the metering tube from possible damage by the metallic float inside, soft ribbon or the like is pushed tightly from either end to hold the float in a fixed position during transit. The whole assembled instrument is suitably packed in a sturdy wooden box, with appropriate supports.

PRODUCT WARRANTY

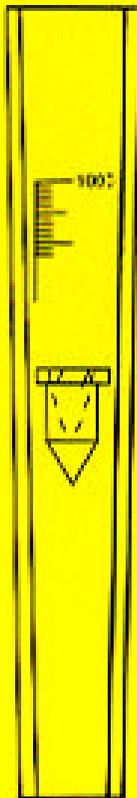
A "Yarranty is given for a period of 12 months from the date of supply provided the instrument is used in a proper manner as per our operation manual.



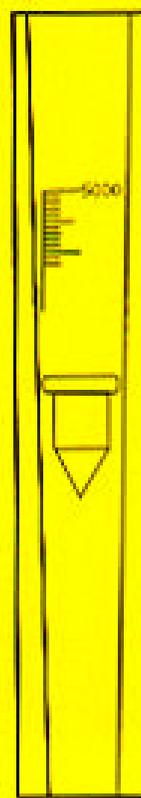
METERING GLASS TUBE



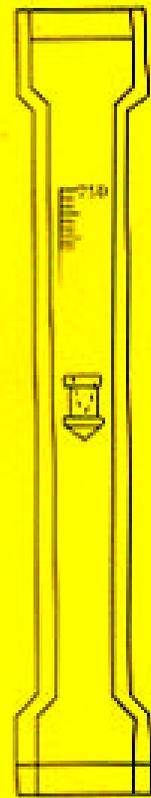
ONE END EXPANDED



INSIDE & OUTSIDE TAPER

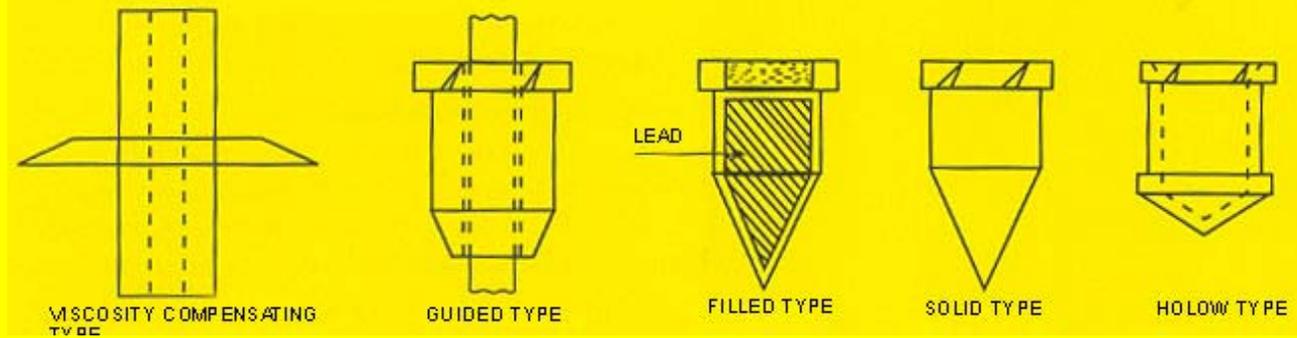


INSIDE TAPER



BOTH ENDS EXPANDED

FLOATS



ROTAMETER ADVANTAGES

- Inexpensive
- Somewhat self-cleaning
- No power required
- Available in chemically compatible materials
- Can be modified for needs of individual operation
- Low & constant pressure losses
- Suitability for very low
- Rangeability 10:1
- Measures fluids of varying density & viscosity
- Float rotates to indicate smooth operation

INFORMATION NEEDED FOR A QUOTATION

RANGE OF FLOW

Maximum, minimum, and working

NATURE OF FLUID (liquid or gas)

If it is not a very common material like water and air, its chemical and physical properties, as well as corrosion characteristics are needed, to enable us to select the right material for construction.

PHYSICAL PROPERTIES

Temperature, pressure, density and viscosity under working conditions.

END CONNECTIONS

Such as size of flanges, screwed ends or nipple, direction of entry and exit of the fluid etc. If possible, a simple sketch should be provided.

ANY SPECIAL REQUIREMENTS

Such as necessity of protective guard, preference of gasket material, float material etc., as well as limitation of length in the existing pipe line, if any.

CM FLOWMETERS (INDIA) PVT. LTD.

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