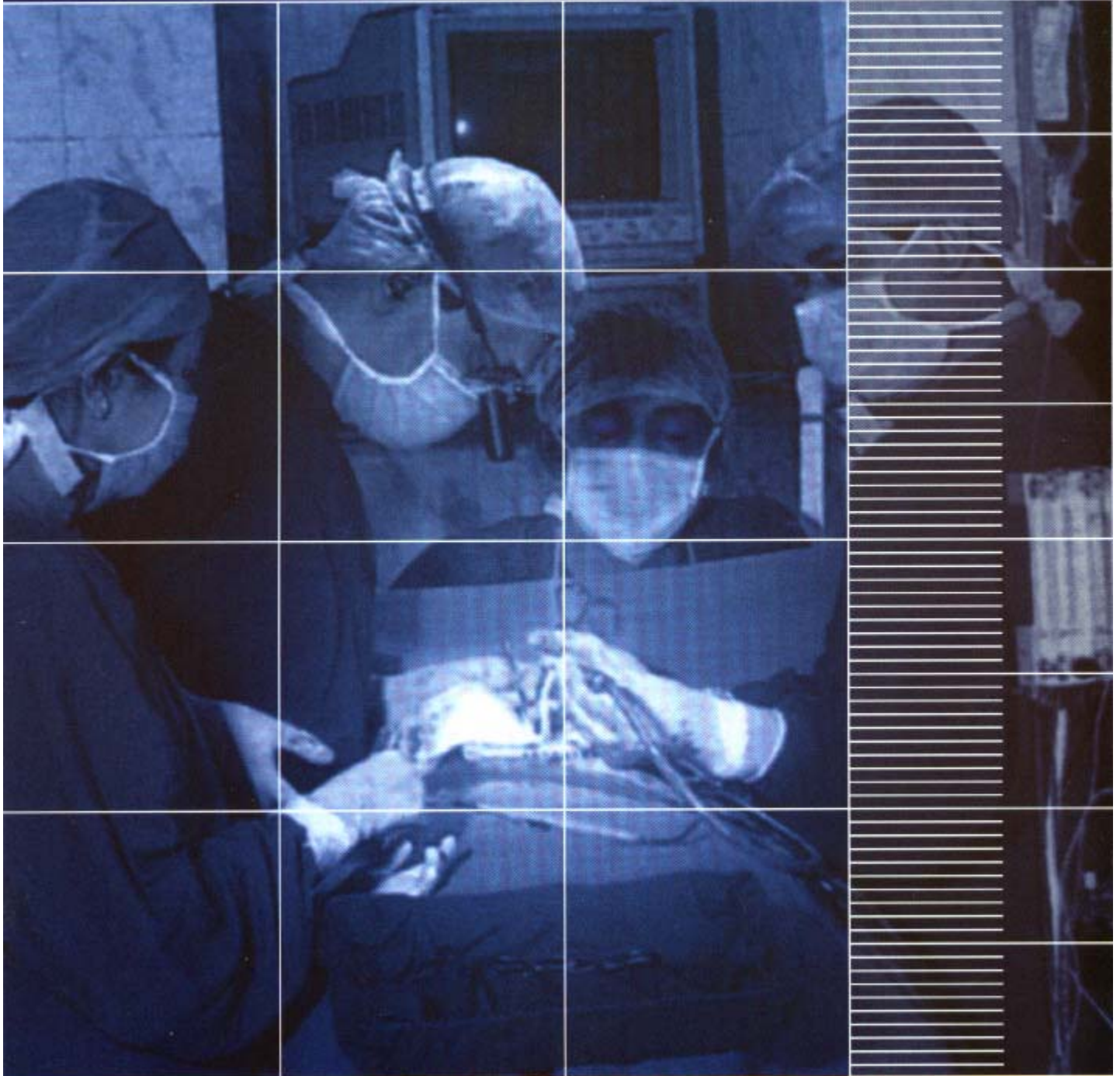


**WHEN EVERY BREATH REQUIRES ACCURACY**



**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 rotameter is a vital precision instrument needed to measure the rate of flow of liquids and gases. From the early 1970s, our company has been the leading manufacturer of rotameters in India, supplying meters to large industries across the country, including public sector corporations, multinational companies and private sector units. Our meters are trusted for their proven accuracy.

**"Virtually every occasion of anaesthetic surgery in India is supported by CM Medical Rotameters."**

All anaesthetic machine manufacturers in India, including ISO-certified multinational companies as well as small-scale units, obtain the rotameters from us. This is only because of the quality assurance the **CM** brand carries.

R&D has always been an important part of the company's work; and 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 office-cum-factory premises in the Kasba Industrial Estate in Kolkata, India.

## PRODUCT

Rotameters or variable area flowmeters are vital 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 medical Rotameters give a highly accurate and reliable indication of gas flow rates in anaesthesia machines.

## BRAND

CM is a highly respected brand in flowmeters in India. Customers for anaesthesia meters include ISO certified manufacturers such as ESAB (ISO 9001/14001) and Datex Ohmeda.

## SPECIFICATION

For medical flowmeters (in anaesthesia machines), the uniform specification provided is 100 cc to 8,000 cc per minute for Oxygen and 200 cc to 12,000 cc per minute for Nitrous Oxide. Assumed temperature for use of the machine is 20° Celsius, and pressure of 60 PSI. End connections are 7/16 inch UNF for Oxygen and 1/2 inch UNF for Nitrous Oxide.

The flowmeters conform to Indian Standards specifications for Continuous Flow Inhalation Anaesthetic Apparatus (Anaesthetic Machines) for Use with

## MANUFACTURE

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.

Borosilicate glass tubes are ground and polished to a taper. A float is prepared using anodised aluminium. The tube is then calibrated, using a standard

precision master. Markings are made on the glass surface of the tube against this master. These are then fused on the glass surface, becoming permanent in the process of annealing in an electric furnace. The markings on the tubes are then re-checked using another standard master. Besides providing calibrated meter tubes, the instrument set is also provided in an elegant, anodised aluminium/powder-coated frame. A luminous reading plate is also provided.

The metering tube has a high-precision internal taper. 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. Etching and markings on the metering glass tubes are made using ceramic-based colours.

The float is of the rotating type, which is superior to the non-rotating ones. 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: Reading is from the top level of the float.

The pipeline connections are of the standard screwed type. Tubes are fitted with leak proof Neoprene Rubber O-rings. The gaskets are made of moulded Neoprene rubber. The end stops are made of plastic.

## QUALITY

The products are tested in-house against a Standard Precision Master Flowmeter, which in turn is regularly tested and re-calibrated.

The products are being manufactured from 1967 and are recognised as the most reliable, high quality products of their kind available in India.

## PRICE & DELIVERY

Price may vary depending on the volume of the order and prospect of further orders.

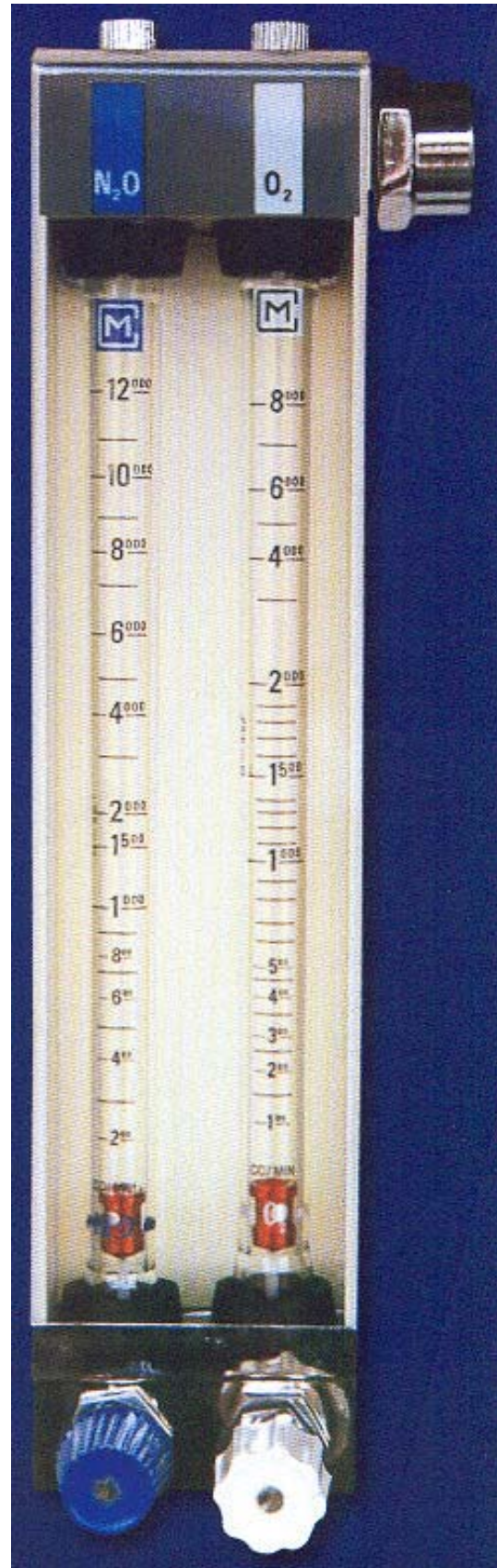
We provide both a pair of tubes, without any mounting (one for Nitrous Oxide, one for Oxygen) as well as a mounted set. Prices are ex-works, excluding packaging and freight.

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 is 8-10 weeks from receipt of order with full specifications.

We usually send the instruments fully assembled. The assembled instrument is suitably packed in a sturdy container, with appropriate supports.

## WARRANTY

A warranty 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.



## GAS FLOWMETER SET UP (OXYGEN AND NITROUS OXIDE) FOR ANAESTHESIA MACHINES

### GENERAL

The two gas flowmeters are housed in a single frame, monitoring the rate of flow for Oxygen and Nitrous Oxide, used in medical centers for anaesthetic purposes.

**Type** The flowmeters are Rotameter type  
**Range of flow** The range of flow for Oxygen and Nitrous Oxide are 100-8000 cc/min and 200-12000 cc/min respectively

### DESCRIPTION

The gas flowmeter consists of two flowmeter tubes assembled together to work in parallel from two separate sources of gas supply and discharge through a single outlet.

**Control valve** At inlet on the base of the front side of the instrument  
**Inlet Connection** At back, 7/16 inch UNF and 1/2 inch UNF (for O<sub>2</sub> & N<sub>2</sub>O respectively), threaded male end  
**Outlet connection** Female nipple end at top right side of the frame

### MATERIALS

Mating tube	Borosilicate Glass OD 15 mm. Length 9"
Float	Aluminium (Anodised)
Float Stopper	Top/Bottom, Plastic
Frame	Aluminium (Anodised / Power coated)
End Connections	Brass (Chromium Plated)
Control Valve	Brass (Chromium Plated)
Knob for control valve	Plastic
Front cover	Transparent plastic (Perspex)
Back cover	As and when required or if ordered, luminous sheet
Packing Materials	Neoprene rubber
Screws and nuts	Brass (Chromium Plated)

### CALIBRATION

The flowmeters are calibrated at 20° C and 760 mm of Hg (Barometric Pressure)  
The accuracy of calibration shall be within the limits of variation of +5% of scale upto 1000 cc/min and +2% of scale for remaining range  
**Accuracy**  
**Scale length** 5.5 inch  $\pm$ 0.25 inch

### DIMENSIONS

The overall dimensions of the flowmeters shall generally conform to our standard diagram (Changes may be incorporated to suit customer's specific requirements)

### TESTE

**Visual** The flowmeters are visually examined for any damage, cracks, missing parts, defects or discrepancy  
**Pressure** The gas flowmeters can withstand air flow pressure at 20 psig, and the control valve at 90 psig without any leak  
**Calibration** The calibration of the flowmeter is checked against Standard Precision Flowmeter and does not vary by more than 2-5%  
The flowmeters conform to Indian Standards specifications for Continuous Flow Inhalation Anaesthetic Apparatus (Anaesthetic Machines) for Use with Humans, i.e. ISO 5358-1980.



## CM Flowmeters (India) Pvt. Ltd.

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