



# C-Series Sterile Tubing Sensors

**Sterile tubing flowsensors (C-Series) clamp around the outside of flexible tubing and measure the volume flow within**

Measurements are bi-directional, largely independent of flow profile, and turbulence and cover a wide dynamic range. Because no physical contact with the liquid under study is necessary, the device is suitable for applications where non-thrombogenic surfaces must be maintained or where biohazardous liquids (*radioactive, chemotherapeutic and infectious solutions*) must be contained within tubing. Sensors may be made of non-magnetic components for use with MRI.



The flowsensor is custom manufactured for the material, internal diameter, and wall thickness of the tubing on which it is used. A 30 cm sample of tubing is required. See page 36 for tubing stocked. Please specify operational temperature and fluid to be used (blood, saline, other).

*For tubing circuit applications only, the T110 flowmeter offers higher accuracy with X-style sterile tubing flowsensors on a broader spectrum of tubing types (see pages 30-35).*

## Specifications

TYPE	TUBING			BIDIRECTIONAL FLOW				ACCURACY			ULTRA-SOUND Frequency
	I.D.	Wall Thickness	Material	Resolution	Low Flow Scale Factor	Normal Scale Factor	Maximum Range	Typical 8 Hr. Zero Stability <sup>2</sup>	Absolute Accuracy <sup>3</sup>	Relative Accuracy <sup>3</sup>	
	inches	inches		ml/min	ml/min	ml/min	L/min	ml/min	%	%	MHz
3CA	1/8	1/32	S,U,P	0.5	50	200	1L	± 2.5	± 7	± 2	3.6
	3/16	1/16	S,U,	1.0	100	400	2L	± 4.0	± 7	± 2	2.4
	1/8	1/16	S								
6C / 7C	1/4	1/16	S,U,P	2.5	250	1 L	5L	± 7.5	± 7	± 2	1.8
	1/4	3/32	S,U								
8CS 8C / 10C	1/4	3/32	P	5.0	500	2 L	10 L	± 10	± 7	± 2	1.2
	3/8	1/16	S,U,P								
	3/8	3/32	S,U,P								
12C / 14C	1/2	1/16	S,U,P	10.0	1 L	4 L	20 L	± 20	± 7	± 2	0.9
	1/2	3/32	S,U,P								
	1/2	1/8	S,U								
16CB	5/8	3/32	S,U,P	25.0	2.5 L	10 L	50 L	± 45	± 7	± 2	0.6
	5/8	1/8	S,U,P								
16C	3/4	3/32	S,U,P	25.0	2.5 L	10 L	50 L	± 45	± 7	± 2	0.6
	3/4	1/8	S,U,P								
28C <sup>4</sup>	1	1/8	S,U,P	50.0	5 L	20 L	100 L	± 100	± 7	± 2	0.45

- S = Silicone or C-Flex; U = polyurethane such as Tygothane, Nalgene 8030,290; P = PVC type, with durometer hardness (shore A) between 40 and 64 such as Tygon R3603, R1000, S-50, Mediflex, Nalgene 8000. Note: probes for tubing materials with sizes not listed may be custom built. Preferred tubings are "S" and "U" types.
- Stability: Zero offset variation in the above table represents the maximum variation, after pre-zeroing of the flowmeter over an 8-hour time period for a liquid temperature change not exceeding 5° C.
- Accuracy: The sterile tubing (clamp-on) flowsensors are precalibrated for the liquid on which they are used. Total accuracy will be the sum of absolute accuracy (or relative accuracy [linearity] if only relative measurements are made) and zero offset drift. The absolute accuracy is ± 7% of the flow reading and is the maximum deviation from 1.00 of the slope of the plot of measured flow versus true flow. Absolute accuracy varies with temperature, composition of fluid, and tubing diameters and can be increased to ± 2% by calibrating *in situ* on the tube with a given fluid and temperature. Relative accuracy is ± 2% of flow reading and is the maximum deviation from linearity of the above plot.
- For use on T108 / T208 flowmeters only.