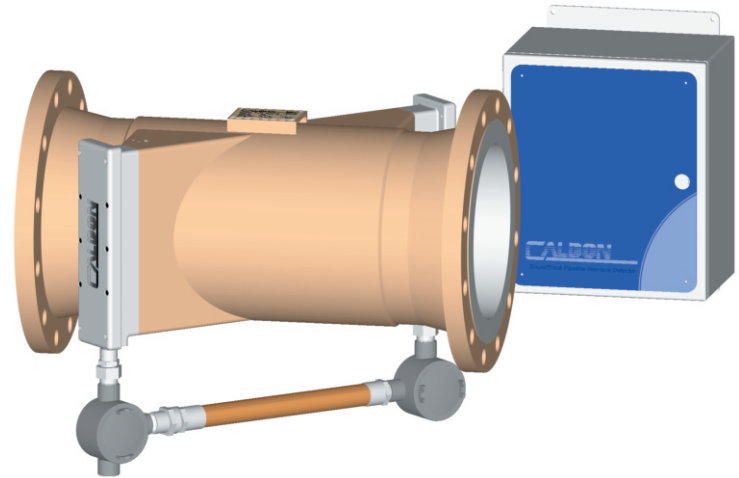


The Caldon LEFM 220C Ultrasonic Flow Meter is a two chordal path, ultrasonic flow meter intended for applications in which reliability and accuracy are critical. The LEFM 220C is ideally suited for petroleum allocation, check metering, and pipeline integrity (line balance) and provides unsurpassed economy and performance in these applications. The LEFM 220C will provide superior performance in many other applications, including chemicals with high and low temperatures, as well as liquids and liquids with high solids content where other metering technologies fail.

The LEFM 220C flow measurement system consists of a spool piece and a signal processing transmitter. Within the spool piece are four fully integrated, high performance ultrasonic transducers forming two chordal paths for accurate and stable flow measurement. These paths cross the flow stream at an angle so that there is a difference in the transit times of the ultrasonic signals, depending upon whether the sound is traveling with or against the direction of the flow. The difference between these transit times, as determined by the acoustic processing unit within the transmitter, forms the basis for calculating the volumetric flow of the stream.



**Model: LEFM 220C-10-CS-150-GP**

U.S. Patents: 5546813, 5597962, 5639972, 5705753; Korea Patent 208678; Canada Patent 2107.750; Taiwan Patents NI-080038, UM-119114. U.S. and foreign patents pending. All rights reserved.

## FEATURES

- **No Moving Parts**  
Most reliable flow measurement available.
- **Built-in Temperature Compensation**  
Provides volume corrected pulses, flow rate and volumes.
- **Non-intrusive Construction**  
Near zero pressure drop that minimizes pumping costs.
- **Bi-directional Flow**  
Measures flow in both directions.

## OPERATING SPECIFICATIONS

### Sizes, Maximum Flow Rates and K Factors

Size	Max. BPH	K Factor (P/bbl)	Max. m <sup>3</sup> /h	K Factor (P/m <sup>3</sup> )
4 in.	2,050	2,000	325	12,600
6 in.	4,650	1,000	740	6,300
8 in.	8,150	500	1,290	3,150
10 in.	12,800	350	2,030	2,200
12 in.	19,300	250	3,070	1,570
14 in.	23,600	200	3,750	1,000
16 in.	28,700	150	4,560	940
18 in.	41,000	100	6,500	630
20 in.	50,000	85	7,900	530
22 in.	61,000	70	9,800	400
24 in.	72,000	60	11,500	380
26 in.	87,000	45	13,900	280
28 in.	100,000	40	16,200	240
30 in.	115,000	35	18,700	220
32 in.	130,000	30	21,300	185
34 in.	150,000	25	24,200	165
36 in.	165,000	25	27,200	145

K Factors are based on ~1,100 Hz at maximum rate.  
They can be adjusted to a maximum of 10,000 Hz if required.

### ACCURACY

**Linearity:** +/-0.5% over 5:1 Flow Range

Note: Flow Range is reduced when operating on viscosities (cSt) greater than 10 times the line size (in.), e.g., 8 in. meter above 80 cSt or higher, 10 in. meter above 100 cSt, etc.

### End Connections & Maximum Working Pressures

END CONNECTION ANSI B16.5 Raised Face Spool Piece	MAXIMUM WORKING PRESSURE -20° to 100°F (-29° to 38°C)			
	Carbon Steel		Stainless Steel	
Class 150	285 PSI	1,965 kPa	275 PSI	1,900 kPa
Class 300	740 PSI	5,100 kPa	720 PSI	5,000 kPa
Class 600	1480 PSI	10,200 kPa	1440 PSI	10,000 kPa

Consult factory for other connections.

### MATERIALS OF CONSTRUCTION

#### Spool Piece

Meter Body, including Flanges.....Carbon Steel or Stainless Steel  
 Transducer Manifolds.....300 Series Stainless Steel  
 Junction Boxes.....Zinc Plated Iron  
 Flexible Conduit and Fittings.....Bronze, Brass, and Zinc Plated Steel  
 Interconnect Cable.....Copper Pairs with Aluminum Shields  
 in a PVC Jacket

#### Transmitter Enclosure

Nema 4X.....Stainless Steel  
 Nema 7.....Cast Aluminum

## Dimensions - inches (mm) and Net Shipping Weights - lbs. (kg)

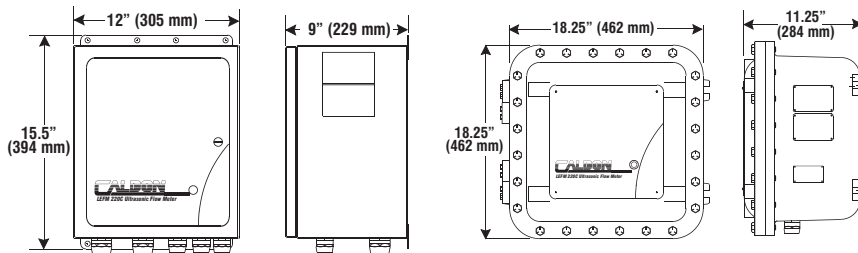
Size	End Connection	"L" Length inches (mm)	"H" Height inches (mm)	"W" Width inches (mm)	Weight	
4 in.	150 ANSI Class	18.0 (457)	14.9 (379)	13.4 (340)	132 lbs.	60 kg.
	300 ANSI Class	18.8 (478)	15.4 (392)	13.4 (340)	149 lbs.	60 kg.
	600 ANSI Class	20.5 (521)	15.8 (402)	13.4 (340)	183 lbs.	74 kg.
6 in.	150 ANSI Class	20.5 (521)	16.7 (425)	15.1 (385)	188 lbs.	85 kg.
	300 ANSI Class	21.3 (541)	17.5 (444)	15.1 (385)	222 lbs.	101 kg.
	600 ANSI Class	23.2 (590)	18.2 (464)	15.1 (385)	300 lbs.	136 kg.
8 in.	150 ANSI Class	24.0 (610)	19.0 (487)	17.1 (435)	308 lbs.	140 kg.
	300 ANSI Class	24.8 (630)	19.7 (502)	17.1 (435)	404 lbs.	183 kg.
	600 ANSI Class	27.0 (686)	20.5 (521)	17.1 (435)	470 lbs.	213 kg.
10 in.	150 ANSI Class	26.0 (660)	21.3 (541)	19.4 (495)	481 lbs.	218 kg.
	300 ANSI Class	27.2 (691)	22.1 (560)	19.4 (495)	559 lbs.	254 kg.
	600 ANSI Class	30.5 (775)	23.3 (592)	19.4 (495)	830 lbs.	376 kg.
12 in.	150 ANSI Class	29.5 (749)	23.8 (605)	21.4 (545)	687 lbs.	312 kg.
	300 ANSI Class	30.7 (780)	24.6 (624)	21.4 (545)	807 lbs.	366 kg.
	600 ANSI Class	33.2 (844)	25.3 (643)	21.4 (545)	977 lbs.	443 kg.
16 in.	150 ANSI Class	33.5 (851)	27.8 (706)	24.9 (630)	1137 lbs.	516 kg.
	300 ANSI Class	35.0 (889)	28.8 (732)	24.9 (630)	1277 lbs.	579 kg.
	600 ANSI Class	38.0 (965)	29.6 (751)	24.9 (630)	1477 lbs.	670 kg.

Consult factory for other sizes.

## SPOOL PIECE CONSTRUCTION

Slip-on or Welding Neck spool construction is available. Slip-on is more economical while Welding Neck offers X-ray inspection of the weld.

For welded-in construction, spool can be supplied without flanges.



Nema 4X Enclosure

Nema 7 Enclosure

## TRANSMITTER ENCLOSURE OPTIONS

Type NEMA 4X indoor or outdoor enclosure with hinged door is suitable for wall or pipe stand mounting. There are four (4) 1/2" and two (2) 3/4" conduit entrances on the bottom. Weight: 30 lbs. (13.6 kg)

Type NEMA 7 indoor or outdoor enclosure with hinged door attached with screws is suitable for wall or pipe stand mounting. There are three (3) 1/2" and two (2) 3/4" conduit entrances on the bottom.

CSA listed for hazardous locations classified as Class I, Division I, Groups C & D as defined by NFPA 70. Weight: 130 lbs. (54.5 kg)

## POWER REQUIREMENTS

120 or 240 Vac, 50/60 Hz, 24 Vdc, 80W max.

## CABLE LENGTH (1/2" Dia.) - Spool Piece to Transmitter

**Standard Length:** 15 ft. (4.5 m) Longer lengths available upon request.

Note: Transmitter can be mounted up to 1000 ft. (300 meters) from Spool Piece.



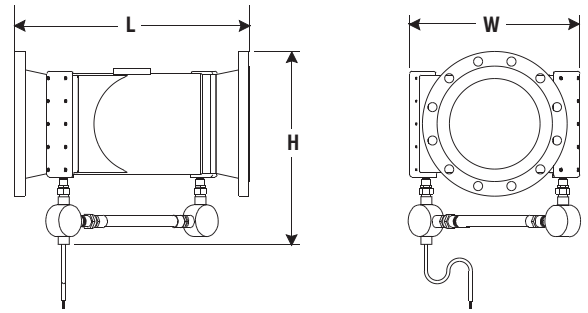
Specifications are subject to change - call Caldon, Inc. for verification or contact: instruments@caldon.net

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## MODEL DESIGNATIONS LEFM 220C Ultrasonic Flow Meter

EXAMPLE: LEFM 220C 10 - CS - 150 - WN - GP - 120A - T - F - S

<b>Size</b>	10	<b>Material</b>	CS	<b>Flange Class</b>	150	<b>Flange Type</b>	WN	<b>Enclosure</b>	GP	<b>Supply Power</b>	120A	<b>Analog Outputs</b>	T	<b>Analog Inputs</b>	F	S
4 - 4"		CS - Carbon Steel		150 - ANSI Class 150 RF		SO - Slip-on		GP - NEMA 4X, General Purpose		120A - 120 Vac, 50/60 Hz		(Up to 2)	O - None			
6 - 6"		SS - Stainless Steel		300 - ANSI Class 300 RF		WN - Welding Neck		EX - NEMA 7, Explosion Proof		240A - 240 Vac, 50/60 Hz		F - Flow Rate				
8 - 8"				600 - ANSI Class 600 RF		WI - Welded-In (No Flanges)				24D - 24 Vdc		D - Density				
10 - 10"												C - Speed of Sound				
12 - 12"												T - Temperature				
14 - 14"												P - Pressure				
16 - 16"																
18 - 18"																
20 - 20"																
22 - 22"																
24 - 24"																
26 - 26"																
28 - 28"																
30 - 30"																
32 - 32"																
34 - 34"																
36 - 36"																

## AMBIENT TEMPERATURE RANGE

-30° to 140°F (-34° to 60°C)

## OPERATING TEMPERATURE RANGE

**Spool Piece:** -20° to 212° F (-29° to 100° C)

Consult factory for other temperatures.

## INPUT

**Temperature and/or Pressure:**

4-20 mA, 0-20 mA, RTD

## OUTPUT

**Pulse:** 0-5 Vdc square wave signal up to 10KHz  
(see K Factor for pulses per unit volume)

**Serial Communications:** RS-232 for 25 ft. (8 m) or less; RS-485 up to 3900 ft. (1200 m), ModBus typical

**Analog Outputs:** 4-20 mA (max load 650 Ohms)

- Flow Rate
- Density
  - +/-0.025 g/cc for crude oils and refined products
  - +/-0.017 g/cc for LPGs
- Speed of Sound
- Temperature (if input)