



# ALTURBINE

Turbine Flowmeter

Series ALTM HM

## GENERAL

### ALTM Turbine Flow Meters

ALTM turbine flow meters (hereinafter referred to as turbines) are used for the precise measurement of instantaneous flow rates of low-viscosity fluids as tap and demineralised water, fuels, liquefied gases, light fuel oils, solvents, and pharmaceutical fluids. Turbine flowmeters measure volumetric flow, where fluid passing through the meter body is measured by the mean velocity of the flowing fluid media. Flow rectifiers ensure a laminar flow in the axial direction of the wheel. A low-mass turbine wheel carried concentrically within the meter body is rotated by the fluid. The RPM of the turbine wheel is directly proportional to the mean flow rate within the meter body and directly corresponds to the volumetric flow over a wide range.

### ALVTM Display with Frequency and Analog Output

The ALVTM is a programmable local display module with integral carrier-frequency pickup and amplifier for SMC turbine meters. The flow rate is indicated by an 8 digit LCD display with 14 segments. A 10 point linearization is included to provide superior accuracy. The pulse output provides a flow-proportional frequency signal or scaled volume pulse in accordance with user programming. For electrical connections, a 6-pin plug or a junction box with 6 internal terminals is provided.

## FEATURES

- High resolution and fast response time; 5 to 50 msec
- Wide temperature range; -460 to 660 °F ( -273 to 350°C)
- Pressures up to 9,100 psig (630 bars) or 58,000 psig (4,000 bar) using high-pressure adapters or flanges
- Easily cleaned; designed to flush particulates through the meter with the fluid media
- Available with dairy connections as per DIN 11851, suitable for food applications
- Available with Tri-Clamp connections, suitable for pharmaceutical applications
- Sapphire bearings enable excellent low-flow performance
- Factory calibrated, traceable to NIST

## SPECIFICATIONS

### Flow body - ALTM - HM series

- Process Connections : BASF flanges up to 58,000 psig (4,000bar) (ANSI and DIN),dairy or tri-clamp, FNPT
- Operating pressure : max.58,000 psig (4,000 bar)
- Process temperature : -460 ~ 660 °F (-273 ~ 350 °C)
- Flow rates : 0.008-0.2 GPM (0.03-0.8 LPM)-smallest size ½" (15mm)  
115-6,600 GPM (430-25,000 LPM)-largest size 10" (250mm)
- Accuracy : ±0.15%
- Viscosities : 1 to 60 cSt
- Material : Stainless steel as per DIN (AISI)  
Body : 1.4305 (1.4571 with flange)-(316 Ti)-specia  
Internal parts : 1.4305 (303)-standard, 1.4571 (316 Ti)  
Wheel : 1.4122 (303)-standard, 1.4460 (329) special  
Bearing : Tungsten carbide or teflon
- Weight : Small sizes : 4 to 35 lbs (2 to 16 kg)  
Large sizes : 25 to 340 lbs (11 to 155 kg)  
Electronics : 0.5 to 5.5 lbs (0.25 to 2.5 kg)

### ALVTE Carrier Frequency Pulse Amplifier

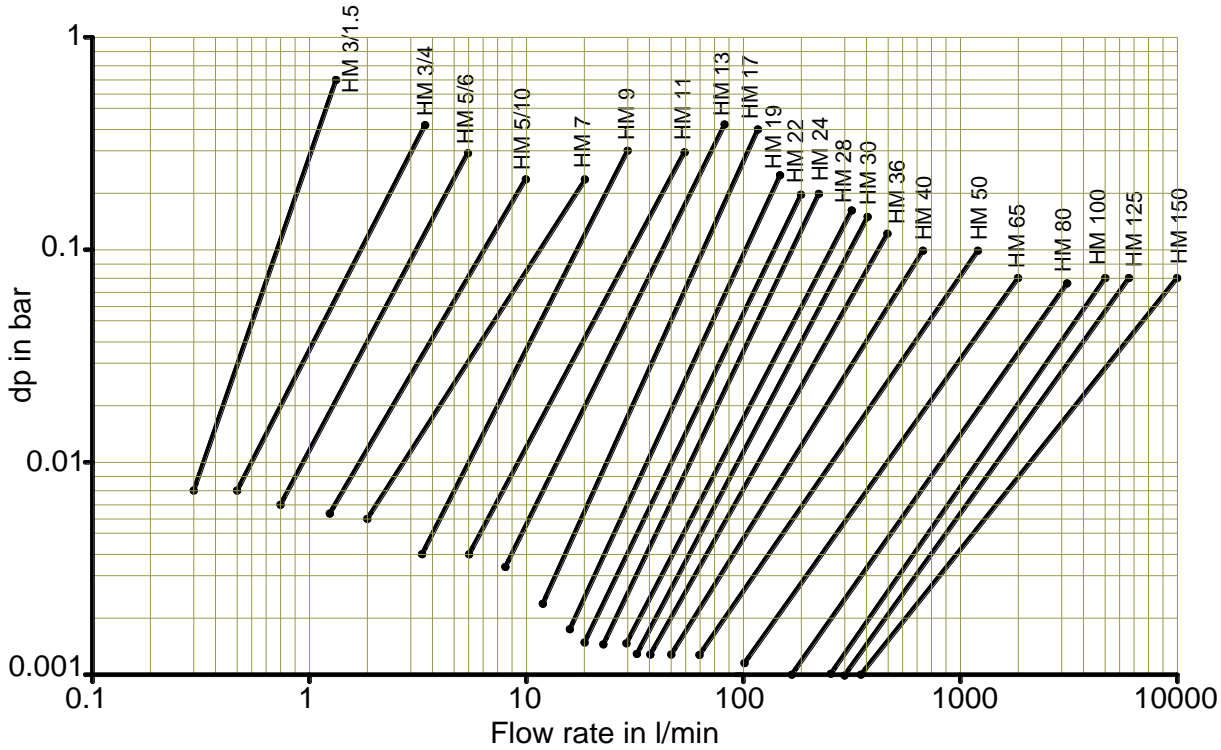
- Supply Voltage  $V_B$  : +8.5 up to 29  $V_{DC}$ , regulated  
(incl. reverse-battery protection)
- Quiescent current : < 5 mA
- Frequency range : 2 up to 4,000 Hz



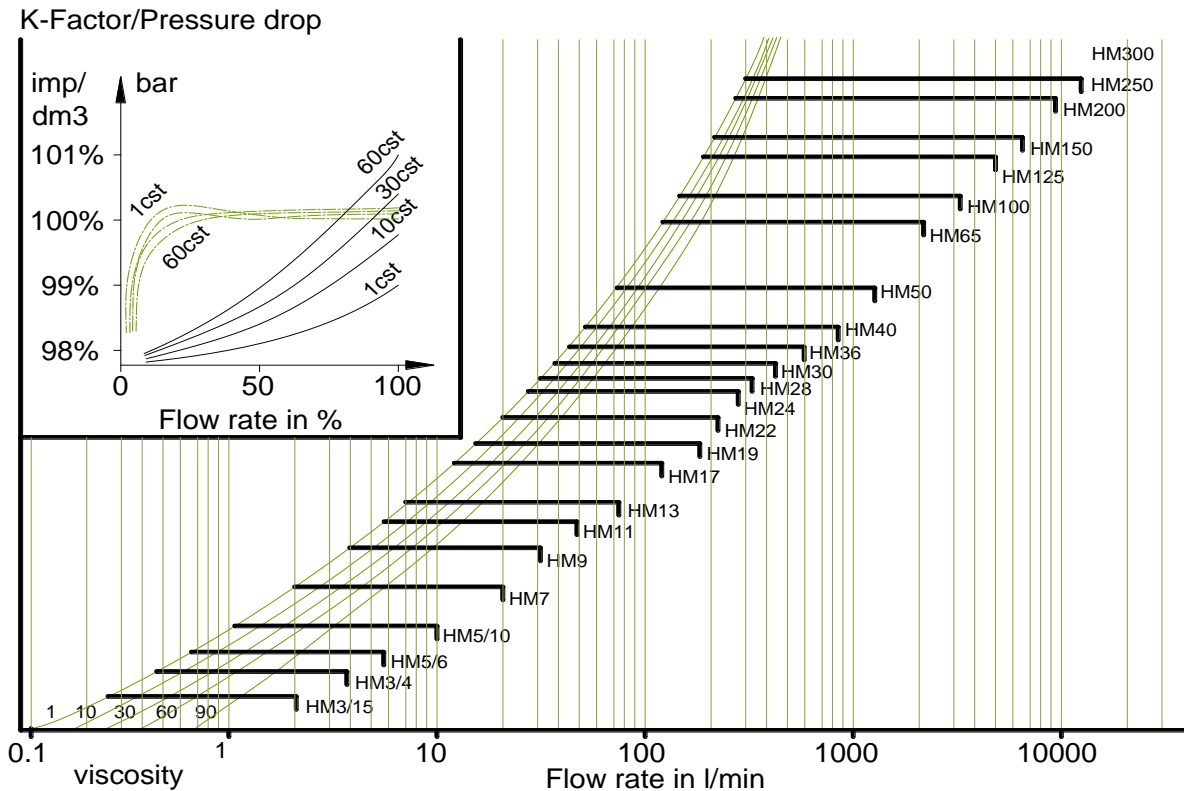
### ALVTM Electronics

- LCD display : 8 digits(14 segments), digit height ¼" for real-time value, totals and programmable
- Linearization : with 10 points
- Process temperature : -40-248 °F (-40-120°C) with a distance of at least 1" between flow meter and electronic housing
- Ambient temperature : -40 - 158 °F (-40 - 70 °C)
- Weight : 1.5 lbs (700 g)
- Frequency output/divider : 3-wire, 8-30  $V_{DC}$  regulated,  
Ex-versions : 12-30  $V_{DC}$ , < 25 mA
- Signal output : push/pull,  $I_{max}$ : 20 mA,
- Frequency output,  $f_{max}$ : 3,000 Hz,duty cycle: ≈ 50%, 2.divider,  
pulse width: 1 ms, 20 ms, 50 ms,  $f_{max}$ : 500 Hz.
- Analog output : 2-wire (4-20mA)
- Supply voltage : 14-30 $V_{DC}$  controlled,  $V_B=(R_{load} \times 20mA) + 14V$
- Load : < 800  $\Omega$
- Time constant : < 0.2-3 s (programmable)
- Resolution : 12 bit (3.9  $\mu A$ )
- Housing : IP 65, aluminum AlMgSiPb, blue anodized
- Ex-protection : II 2 G EEx ia IIC T4, BVS 03 ATEX E 205
- Process temperature: 248 °F (120 °C) with a distance of at least 1" between flow meter and electronic housing; 300 °F (150°C) @ 2½"

Pressure drop for turbine at different sizes

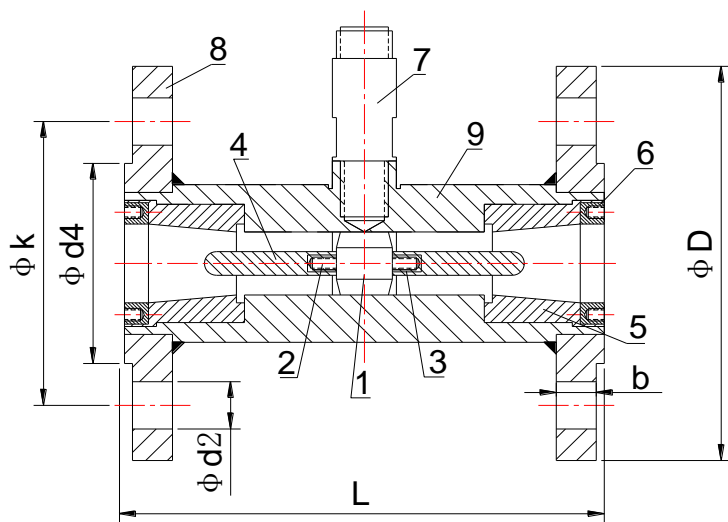


Measuring ranges for turbines at different viscosities



Type dia (mm)	Flow (GPM)	K-factor* pulses/ltr.		Frequency range in Hz. 0 to max		Output signal mV
HM 9 EP	0.008 - 0.2	538,625		1970		0.5 to 5
HM 3/1.5	0.08 - 0.35	124,000	125,938	1000	1000	0.5 to 5
HM 3/4	0.1 - 1	93,000	73,625	1250	1250	0.5 to 5
HM 5/6	0.2 - 1.6	68,975	68,975	1740	1780	1.0 to 10
HM 5/10	0.3 - 2.6	42,625	42,625	1750	1750	1.0 to 10
HM 7	0.5 - 5.3	20,150	20,150	1800	1800	1.5 to 15
HM 9	0.9 - 8.7	7,363	16,275	1080	2200	1.7 to 17
HM 11	1.6 - 16	5,038	10,579	1350	2700	2.0 to 20
HM 13	2.2 - 22.5	3,488	7,363	1300	2600	2.5 to 25
HM 17	3.2 - 32	1,473	3,255	800	1650	2.7 to 27
HM 19	4 - 40	1,201	2,519	925	1600	2.9 to 30
HM 22	5-52	841	1,744	800	1600	3.1 to 31
HM 24	6.6 - 66	659	1,403	800	2000	3.8 to 40
HM 28	8 - 95	601	1,240	960	2000	4.0 to 42
HM 30	9 - 105	504	1,046	860	1850	4.1 to 45
HM 36	10 - 130	233	523	600	1200	4.3 to 48
HM 40	13 - 200	407	426	1320	1400	4.5 to 52
HM 50	20 - 315	252		1400		6.0 to 64
HM 65	25 - 525	97		850		10 to 80
HM 80	42 - 845	43		615		15 to 100
HM 100	66-1300	27		560		20 to 120
<b>pulses/ 1000 gallons</b>						
HM 125	80 - 1745	1189		495		30 to 125
HM 150	90 - 2640	898		420		35 to 140
HM 200	110- 3540	110		134		40 to 150

Cut off drawing HM...F



1 to 4=measuring kit

1 = turbine wheel

2 = shaft

3 = bearing bush

4 = flow rectifier

5 = inlet cone

6 = ring nut

7 = pick up

8 = flange

9 = body

**\*\* Please contact your local SMC application engineer**

**You also need to provide the following information:**

Type of liquid	Please provide the name of your liquid, including operating density and viscosity
Full Scale Flow	Maximum and minimum flow rates, units must be volumetric such as LPM or GPM
Line Size	Please indicate pipe size as well connection type (flange, threaded, etc..)
Process Pressure and Temperature	We will calibrate your flowmeter as close to your operating conditions as possible
Pressure drop	Please indicate the maximum pressure drop (see graph) that your process can withstand
Type of Electronics	Indicate if you want integral, remote panel or remote wall mounted electronics
Power Requirements	Please specify your power requirements such as 24 V <sub>DC</sub> or 115 V <sub>AC</sub> or 230 V <sub>AC</sub>

**Model Selection Guide**

<b>ALTM Series</b>			
Example ALTM-HM17/25-F-ALVTM-F-EX			
ALTM-HM Series (Flanged Connection, other process connection available)		<b>Description</b>	
Small Size ½" to 1½" (15mm to 40mm).			
DN 15 PN 40 (½" ANSI 150)	3/1.5-15F	0.08 - 0.35 GPM (0.3-1.3 LPM)	
DN 15 PN 40 (½" ANSI 150)	3/4.0-15F	0.1-1 GPM (0.5-4 LPM)	
DN 15 PN 40 (½" ANSI 150)	5/6.0-15F	0.2-1.6 GPM (0.8-6 LPM)	
DN 15 PN 40 (½" ANSI 150)	5/10-15F	0.3-2.6 GPM (1.2-10 LPM)	
DN 15 PN 40 (½" ANSI 150)	7/15-F	0.5-5.3 GPM (2-20 LPM)	
DN 15 PN 40 (½" ANSI 150)	9/15-F	0.9-8.7 GPM (3.3-33 LPM)	
DN 25 PN 40 (1" ANSI 150)	11/25-F	1.6-16 GPM (6-60 LPM)	
DN 25 PN 40 (1" ANSI 150)	13/25-F	2.2-22.5 GPM (8.5-85 LPM)	
DN 25 PN 40 (1" ANSI 150)	17/25-F	3.2-32 GPM (12-120 LPM)	
DN 25 PN 40 (1" ANSI 150)	19/25-F	4-40 GPM (15-150 LPM)	
DN 25 PN 40 (1" ANSI 150)	22/25-F	5-52 GPM (20-200 LPM)	
DN 25 PN 40 (1" ANSI 150)	24/25-F	6.6-66 (25-250 LPM)	
DN 40 PN 40 (1½" ANSI 150)	22/40-F	5-52 GPM (20-200 LPM)	
DN 40 PN 40 (1½" ANSI 150)	24/40-F	6.6-66 GPM (25-250 LPM)	
DN 40 PN 40 (1½" ANSI 150)	28/40-F	8-95 GPM (30-360 LPM)	
DN 40 PN 40 (1½" ANSI 150)	30/40-F	9-105 GPM (35-400 LPM)	
DN 40 PN 40 (1½" ANSI 150)	36/40-F	10-130 GPM (40-500 LPM)	
Large Size 1½" to 10" (40 mm to 250 mm)			
DN 40 PN 40 (1½" ANSI 150)	40-F	13-200 GPM (50-750 LPM)	
DN 50 PN 40 (2" ANSI 150)	50-F	20-315 GPM (70-1200 LPM)	
DN 65 PN 40 (2½" ANSI 150)	65-F	25-525 GPM (100-2000 LPM)	
DN 80 PN 40 (3" ANSI 150)	80-F	42-845 GPM (160-3200 LPM)	
DN 100 PN 40 (4" ANSI 150)	100-F	66-1300 GPM (250-5000 LPM)	
DN 125 PN 40 (5" ANSI 150)	125-F	80-1745 GPM (300-6600 LPM)	
DN 150 PN 40 (6" ANSI 150)	150-F	90-2640 GPM (350-10000 LPM)	
DN 200 PN 40 (8" ANSI 150)	200-F	110-3540 GPM (430-13400 LPM)	
DN 250 PN 40 (10" ANSI 150)	250-F	220-6600 GPM (830-25000 LPM)	
Electronics - ALVTM (programmable display)			
Frequency/divider and analog	ALVTM		Analog outputs
Top View		D	display arrangement
Standard with window		NX	Protection
Ex proof with window		EX	
Electronics - ALVTE Carrier Frequency Pulse Amplifier			
Carrier-Frequency pickup	ALVTE		frequency range 2-4000 Hz
Standard		NX	Protection
Ex proof		EX	
Short thread - 4.35" (110 mm)		EK	Thread size
Long thread - 5.87" (149 mm)		EL	
Electronics - ALIF-Inductive Pickups and Pulse Amplifiers (for -12 to 350C)			
Frequency pulse amplifier(10-450 °F)	ALIF		
Standard		NX	Protection (II 2 G EEx ia IIC T6)
Ex proof		EX	
High temperature (350C)		HTK	Higher temperature (with NX only)