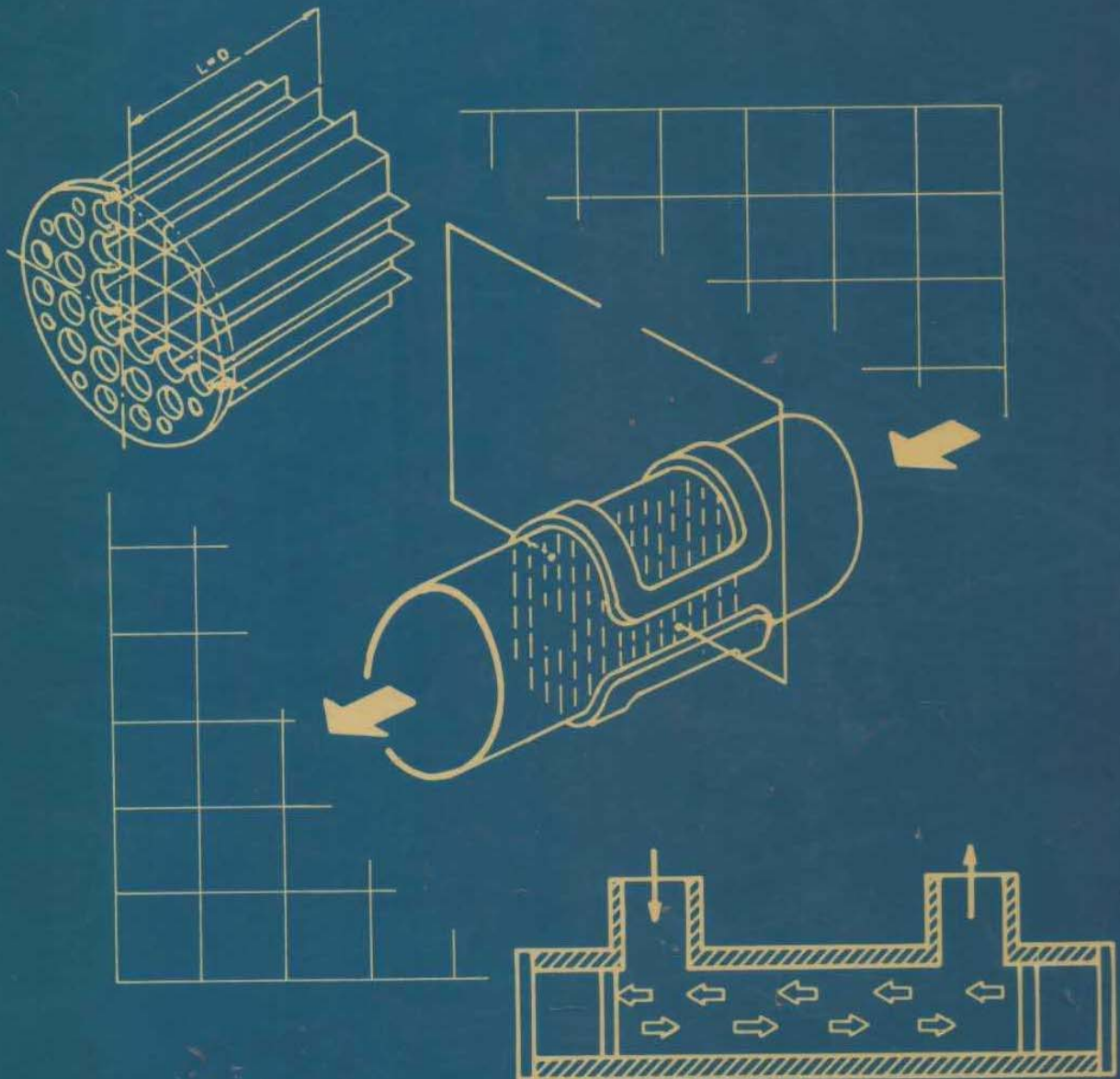


Handbook of

Fluid

Flowmetering



1st Edition

# CONTENTS

## SECTION 1 – Fundamentals and Principles

Classification of flow measurement system . . . . .	1
Definitions . . . . .	5
Measurement accuracy . . . . .	9
Preliminary flowmeter selection . . . . .	15

## SECTION 2 – Rate of Flowmeters

Turbine flowmeters . . . . .	25
Pelton wheel and other propeller flowmeters . . . . .	41
Target or dragplate flowmeters . . . . .	49
Fluidic flowmeters . . . . .	53
Electromagnetic flowmeters . . . . .	57
Ultrasonic flowmeters . . . . .	73
Vortex shedding flowmeters . . . . .	91
Swirl flowmeters . . . . .	97
Pressure drop flowmeters – constant head . . . . .	99
Pressure drop flowmeters – variable head . . . . .	113
Pressure drop flowmeters – variable orifice . . . . .	135
Shunt flowmeters . . . . .	143

## SECTION 3 – Insertion Flowmeters

General principles . . . . .	149
Pitot tube flowmeters . . . . .	157
Laser doppler anemometers . . . . .	165
Hot wire and hot film techniques . . . . .	167
Airspeed anemometers . . . . .	173

## SECTION 4 – Positive Displacement Flowmeters

Classification and selection . . . . .	179
----------------------------------------	-----

## SECTION 5 – Mass Flow Measurement

General principles . . . . .	199
Compensation mass flow measurement techniques . . . . .	201
Direct true mass flow measurement . . . . .	205
Inferential mass flowmeters (other than those using compensation techniques) . . . . .	213

## SECTION 6 – Cross-correlation Flow Measurement

Principles and techniques . . . . .	221
Radio-isotope marker methods . . . . .	225



<b>SECTION 7 – Multi-phase Flow</b>	
Measurement techniques . . . . .	229
Mixers . . . . .	233
<b>SECTION 8 – General Aspects</b>	
Metering steam . . . . .	237
Metering pumps . . . . .	239
Pulsating, fluctuating and transient flow . . . . .	241
Air elimination . . . . .	245
Secondary instrumentation . . . . .	249
Flowmeters and safety . . . . .	257
Flowmeter installation . . . . .	263
<b>SECTION 9 – Flowmeter Calibration</b>	
General principles . . . . .	267
Effect of pipework on flowmeter calibration . . . . .	273
Calibration of flowmeters for liquids . . . . .	283
Calibration of flowmeters for gases . . . . .	303
Effect of the process fluid on flowmeter calibration . . . . .	311
<b>SECTION 10 – Flow Control</b>	
Principles and techniques . . . . .	315
Valve selection . . . . .	325
<b>SECTION 11 – Density and Viscosity</b>	
Density measurement . . . . .	333
Viscosity measurement . . . . .	361
<b>SECTION 12 – Engineering Data</b>	389
<b>SECTION 13</b>	
Editorial Index . . . . .	405
Buyers' Guide . . . . .	413