

# ISO 9200:2024-05 (E)

## Petroleum measurement systems - Metering of viscous and high temperature liquids

<b>Contents</b>		<b>Page</b>
Foreword .....		iv
Introduction .....		v
1	Scope .....	1
2	Normative references .....	1
3	Terms and definitions .....	1
4	Properties of high viscosity liquids .....	2
4.1	Viscosity .....	2
4.2	Reynolds number and flow profile .....	3
4.3	Density .....	4
4.4	Effect of temperature on viscosity .....	4
4.5	Examples of high viscosity liquids and behaviour .....	5
4.6	Further considerations .....	6
5	Metering systems .....	6
5.1	General .....	6
5.2	Installation .....	7
5.3	Heating .....	8
5.4	System start-up and filling .....	9
6	Flowmeters .....	10
6.1	Differential pressure meters .....	10
6.2	Displacement meters .....	10
6.3	Turbine meters .....	12
6.4	Coriolis mass flowmeters .....	13
6.5	Ultrasonic meters .....	14
7	Meter proving .....	16
7.1	General .....	16
7.2	Pipe provers .....	16
7.3	Volumetric measures .....	17
7.4	Gravimetric proving .....	18
7.5	Master meter proving .....	18
8	Volumetric corrections .....	18
8.1	Standard volume .....	18
8.2	Thermal expansion and temperature effects .....	19
8.2.1	Overview .....	19
8.2.2	Temperature effect on Coriolis meters .....	19
8.2.3	Thermal expansion for ultrasonic meters and differential pressure meters .....	20
8.2.4	Thermal expansion for displacement and turbine meters .....	20
Bibliography .....		21