

DIN EN ISO 8222:2020-10 (E)

Petroleum measurement systems - Calibration - Volumetric measures, proving tanks and field measures (including formulae for properties of liquids and materials) (ISO 8222:2020)

Contents

	Page
European foreword	4
Foreword	5
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms, definitions, symbols and units	7
3.1 Terms and definitions	7
3.2 Symbols and units	14
4 Traceability	15
5 General design characteristics of volumetric measures	16
5.1 General design	16
5.2 Design to indicate the volume — Resolution	18
5.2.1 Neck size	18
5.2.2 Gauge glass	18
5.2.3 Scales	19
5.2.4 Adjustment of scale and calibrated volume	21
5.2.5 Levelling	21
5.3 Additional design aspects	21
5.3.1 Temperature measurement	21
5.3.2 Valves and connections	22
5.3.3 Size of measures	23
5.4 Filling and drainage	24
5.4.1 Drainage times and fluids	24
5.4.2 Filling and drainage methods	25
5.5 Markings	26
6 Test measures	27
6.1 Overview	27
6.2 Design and construction of test measures	29
7 Proving tanks	30
7.1 Overview	30
7.2 General construction	34
7.3 Bottom neck	34
7.4 Strength	35
7.5 Support	35
7.6 Size	35
7.7 Mobility	35
7.8 Overflow and vapour recovery	35
7.9 Filling and drainage	35
8 Alternative designs	36
8.1 High-accuracy designs	36
8.2 Automatic pipettes	36
8.3 Proving tanks with bottom sight gauge	36

9	Calibration	37
9.1	General	37
9.2	Common calibration procedures	37
9.3	Gravimetric calibration	39
9.3.1	Principle	39
9.3.2	Calibration circuit and equipment	39
9.3.3	Procedure for calibrating a measure gravimetrically	40
9.4	Volumetric calibration	40
9.4.1	Principle	40
9.4.2	Calibration circuit and equipment	41
9.4.3	Procedure for calibrating a measure volumetrically (water pour)	42
9.4.4	Procedure for calibrating a measure volumetrically (water withdraw)	42
9.4.5	Additional notes on procedures	43
9.5	Calibration by reference meter	44
9.5.1	Principle	44
9.5.2	Calibration circuit	44
9.5.3	Equipment	45
9.5.4	Procedure for calibration by reference meter	46
9.6	Calibration of neck scales	46
10	Calculations	47
10.1	Overview	47
10.2	Reference volume	47
10.3	Transferred volume (volumetric method)	48
10.4	Transferred volume (gravimetric method)	49
10.5	Calibrated volume of test device	50
10.6	Multiple fills	51
10.7	Calibration of a measure using a reference measure	51
10.8	Calibration of a flowmeter using a measure as reference	52
10.9	Calibration of a displacement (pipe) prover using a measure as reference	52
11	Calibrating and setting the neck and scale	52
11.1	Calibrating the neck	52
11.2	Setting the scales	53
12	Safety	54
Annex A (informative) Properties of fluids and materials		55
Annex B (informative) Temperature measurement and thermometers		69
Annex C (informative) Standard glass contents measures		71
Annex D (informative) Meniscus reading		72
Annex E (informative) Accuracy and uncertainty of volumetric measures		73
Bibliography		74