

ISO 10976:2015-12 (E)

Refrigerated light hydrocarbon fluids - Measurement of cargoes on board LNG carriers

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	1
3	Terms, definitions and abbreviated terms	1
3.1	Terms and definitions	1
3.2	Abbreviated terms	5
4	General operating safety precautions and regulatory requirements	6
4.1	General	6
4.2	Electrical equipment classification	7
4.3	Electromagnetic disturbance	7
4.4	Maintenance	7
4.5	Service conditions	7
4.6	Compatibility	7
4.7	Personnel protection	7
4.8	Procedures	7
5	Measurement systems and equipment	8
5.1	General	8
5.2	Measurement equipment performance	8
5.3	Calibration and certification of measurement equipment	9
5.4	Verification of measurement equipment between dry dockings	9
5.5	Inspection of measurement equipment during transfer operations	9
5.6	Static measurement systems and equipment	10
5.6.1	General	10
5.6.2	Tank capacity tables	10
5.6.3	Trim and list measurement	12
5.6.4	Tank gassing-up tables or means of determination	12
5.6.5	Tank cool-down tables or means of determination	13
5.6.6	Liquid level measurement equipment	13
5.6.7	Temperature measurement equipment	17
5.6.8	Pressure measurement equipment	18
5.6.9	Custody transfer measurement system	18
5.7	Dynamic measurement systems and equipment	19
6	Measurement procedures	19
6.1	General	19
6.2	Static measurement	20
6.2.1	General	20
6.2.2	Measuring liquid level	21
6.2.3	Loading	21
6.2.4	Discharge	21
6.2.5	Shipboard measurements	21
6.2.6	Liquid level	22
6.2.7	Temperature	23
6.2.8	Pressure	24

6.2.9	CTMS	24
6.2.10	Sampling	24
6.2.11	Vapour return	25
6.3	Gas-up and cool-down quantification	25
6.3.1	General	25
6.3.2	Inerting	25
6.3.3	Gas up and cool down	25
6.4	Dynamic measurement	26
7	Cargo calculations	26
7.1	General	26
7.2	LNG volume determination	26
7.2.1	General	26
7.2.2	Liquid levels below lower measurable limit	27
7.3	LNG density determination	27
Annex A (informative) LNGC design and marine operations		28
Annex B (informative) Additional considerations for measurement on board an LNGC		36
Annex C (informative) Examples of tank capacity tables for a spherical tank		40
Annex D (informative) Calculation examples		46
Annex E (informative) Sampling		55
Annex F (informative) Marine measurement witnessing checklists		59
Bibliography		62