

ISO 15169:2003-12 (E)

Petroleum and liquid petroleum products - Determination of volume, density and mass of the hydrocarbon content of vertical cylindrical tanks by hybrid tank measurement systems

Contents		Page
Foreword		iv
1	Scope	1
2	Normative references	1
3	Terms and definitions	2
4	General precautions	2
4.1	Safety precautions	2
4.2	Equipment precautions	3
5	Selection and installation of hybrid tank measurement system equipment	3
5.1	General	3
5.2	Automatic level gauge	4
5.3	Pressure sensor(s)	4
5.4	Automatic tank thermometer (ATT)	5
5.5	Hybrid processor	5
5.6	Optional sensors	6
6	Accuracy effects of HTMS components	6
6.1	General	6
6.2	Accuracy effects of the ALG	6
6.3	Accuracy effects of the pressure sensor(s)	7
6.4	Accuracy effects of the ATT	7
7	HTMS measurement and calculations	8
7.1	General	8
7.2	HTMS Mode 1	8
7.3	HTMS Mode 2	8
8	Commissioning and initial field calibration	8
8.1	General	8
8.2	Initial preparation	9
8.3	Initial calibration and verification of HTMS components	9
8.4	Verification of hybrid processor calculations	10
8.5	Initial field verification of HTMS	10
9	Subsequent verification	11
9.1	General	11
9.2	Objectives	12
9.3	Adjustment during regular verification	12
9.4	Subsequent verification of HTMS in volume-based custody transfer application	12
9.5	Subsequent verification of HTMS in mass-based custody transfer applications	13
9.6	Handling out-of-tolerance situations during regular verification of HTMS in custody transfer application	14
Annex A (informative)	Calculation overview	17
Annex B (informative)	Measurement accuracy and uncertainty analysis	21