ISO 15169:2003-12 (E)

Petroleum and liquid petroleum products - Determination of volume, density and mass of the hydrocarbon content of verti cal 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