

NORSOK STANDARD
SYSTEM REQUIREMENTS
FUEL GAS MEASUREMENT

I-SR-102

Rev. 1, January 1995

Please note that whilst every effort has been made to ensure the accuracy of the NORSOK standards neither OLF nor TBL or any of their members will assume liability for any use thereof.

1 FOREWORD

This standard has been developed by the NORSOK standardisation work group and agreed by the Norwegian industry for the widest possible national and international application.

2 SCOPE

The scope of this standard is to establish the system requirements for the design of fuel gas measurement systems.

3 NORMATIVE REFERENCES

ISO DIS 9951	Measurement of gas flow in closed conduits - Turbine meters
ISO 5167	Measurement of fluid flow by means of orifice plates, nozzles and venture tubes inserted in circular cross section conduits running full.
ISO 6551	Petroleum Liquids and Gases - Fidelity and Security of Dynamic Measurement - Calibrated Transmissions of Electric and/or Electric Pulsed Data.
AGA 7	Measurement of gas by turbine meters - Transmission Measurement Committee Report No. 7.
AGA 8	Natural Gas density and compressibility factor executable program and Fortran code. Committee Report No. 8.
NORSOK stds.	In particular
I-CR-100	"Fiscal measurement systems"

4 DEFINITIONS AND ABBREVIATIONS

4.1 Definitions

None

4.2 Abbreviations

SAS Safety and Automation System

5 FUNCTIONAL REQUIREMENTS

5.1 General

The system shall measure flowrate and totalise quantities in Sm^3 of fuel gas in accordance with governmental regulations. The calculation can either be done in a dedicated flow computer or in SAS (Unified Automation System). It shall be possible to route the gas stream through a by pass line for the fuel meter run(s).

5.2 Products/Services

Not applicable

5.3 Equipment/schematic

5.3.1 General

The measurement method shall be by orifice meter or turbine meter. Ref. Norsok std. I-CR-100 for criteria of selection. A typical block diagram of an orifice meter station is shown in Fig. 1. Other measurement methods can be used if it is documented by recognised method(s) that the fuel meter system fulfil the performance requirements specified in clause 7.

The flowcomputer shall have error detection and error correction functions according to ISO 6551, Section 3, Level A.

5.3.2 Orifice plate meters

The gas density shall either be measured directly or calculated according to AGA 8.

5.3.3 Gas turbine meters

Turbine meters shall have pipeline sections upstream and downstream according to AGA 7, ISO/DIS 9951 or manufacturer's requirements, whichever is the most stringent.

Turbine flowmeters shall be high quality meters of full profile, axial type, designed specifically for gas flow measurement. Design shall be according to AGA 7 Figure 1 (not Figure 1A).

5.4 Performance

5.4.1 Capacity

The flowrate in each meter run shall not exceed limits resulting in total uncertainty of standard volume specified below. The flow meter(s) shall be able to measure maximum/minimum fuel consumption.

5.4.2 Accuracy

Maximum uncertainty: ± 1.8 % of volume flow (95 % confidence level)

Flow computer uncertainty: less than 0.05 % (95 % conf level) (from mA to totalised Sm^3)

5.5 Regularity

The regularity for the fuel meter system shall be 98 %.

5.6 Process/Ambient Conditions

Not applicable

5.7 Operational Requirements

- Regular transmission of Sm^3 and common alarms to SAS (if dedicated computer).
- The calibration meter factors for the turbine meter (see Equipment above) shall be operator enterable.

5.8 Maintenance Requirements

The stream computers shall have calibration mode.

5.9 Isolation and Sectioning

Not applicable

5.10 Layout Requirements

None

5.11 Interface Requirements

Communication to SAS (if dedicated flow computer).

5.12 Commissioning Requirements

None.

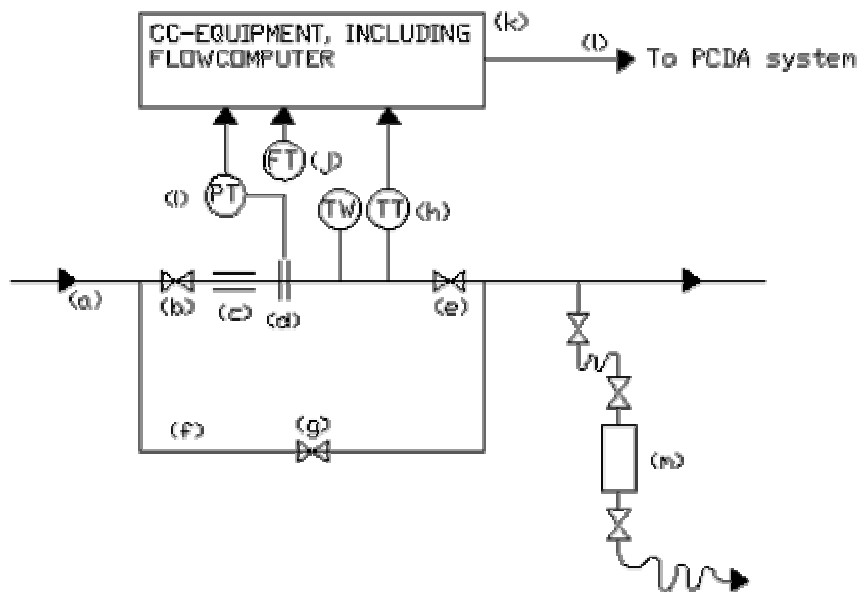


Fig. 1 Simplified P&ID, fuel measurement system.

Legend description

- (b) Full bore valve
- (c) Upstream meter run
- (d) Orifice
- (e) Block valve
- (f) By-pass line
- (g) Double block & bleed valve
- (h) Pt-100 element
- (i) Pressure transmitter
- (j) One or several Dp transmitters
- (k) Signal conditioning equipment and a flowcomputer
- (l) Link to SAS
- (m) Sample probe and manual sampling device