Datasheet:
Flow Measurement Consultancy
Metering Documentation Services

Introduction

This document details the fiscal metering documentation services provided by KELTON recognising the need for a comprehensive set of documentation for a measurement and allocation system.

The KELTON service starts when the projects ends as the system vendor would normally provide a functional design specification, operating instructions, material/equipment certification and unique system data whereas the KELTON package is aimed at the commissioning, operation and routine calibration of a metering system. There is a statutory requirement on all Operators to produce some or all of this documentation for submission to the Regulatory Authority and/or the Pipeline Operator. KELTON can provide experienced engineers and consultants in all areas from conceptual design through to operation and maintenance.

Typical Documentation available for Development

Metering Manual will bring together the documents and drawings that are required to provide a full description of the metering system and can serve several purposes; satisfy regulatory bodies, provide familiarisation of the system and serve as a design record. It should also contain the following system information; P&ID, sizing calculations, uncertainty calculations, general arrangements, full description and a list of standards applied.

Pre-commissioning Procedures will detail the requirements to confirm the correct installation and verify the calibration (where necessary) of each instrument. It is intended that following the application of the procedures the system will be ready for gas/oil-in. As a minimum the following checks would be included; leak, instrument function, loop, flow computer and de-isolation/isolation for commissioning.

Commissioning Procedures will detail the activities to be followed to safely introduce hydrocarbons and test the integration of equipment controlling and monitoring the system.

Operating Procedures will identify the range of operations required and a specific procedure prepared for each. Typical operating procedures are as follows:

- System start-up and shutdown
- Opening, closing and changing over streams
- Valve integrity checks
- Reporting requirements
- Action on alarms
- Flow computer & database operation
- Keypad including fall-back modes
- Sampler set-up, handling and probes
- System security and seals
- Orifice plate removal/replacement
- Prover sphere removal/replacement
- Meter proving – auto, manual and aborted
- Meter performance monitoring
- Action on change in operating conditions

About KELTON™

Fully accredited, KELTON is the leading independent measurement consultancy and software developer for the oil and gas industry. For well over two decades, KELTON has helped many international and national operators to ensure their full compliance with industry regulations. Whether clients require inspection, auditing or certification as part of System Compliance, uncertainty calculations for System Assurance or System Support – in KELTON they find a partner they can trust.

Services include:

- System Compliance
  - Inspection
  - Audit
  - Certification
- System Assurance
  - Design uncertainty
  - Modelling uncertainty
  - System uncertainty
- System Support
  - Manual/guidelines
  - Procedure generation
  - Educational
- Measurement Software
  - Desktop applications
  - Database applications
  - Pipeline applications

KELTON encompasses ISO/EN 9001 & 14001, BS/OHSAS 1800 and UKAS type 'C' Accreditation, is Microsoft Certified and is recognised as an Investor in People. Support is available from three strategic locations; UK, Qatar and Abu Dhabi.

If additional information is required visit:

www.kelton.co.uk

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- Discrepancy pulses
- Density transducer change-out
- Operating with reduced facilities

Calibration Procedures can be prepared as appropriate for each instrument/item of equipment in the metering system and will be written as 'stand-alone' documents. Each procedure will comprise a 'core' section containing information common to a particular equipment type i.e. pressure transmitter and a 'specific' section containing information which is unique to the instrument. The former will describe the method of calibration, the use of test equipment and any necessary preparations/precautions. The latter will detail the equipment under test, its specification, test equipment used, frequency of calibration and accept/reject criteria for the test and if appropriate, include a simple schematic for the relevant test and any other data required for the calibration task. Typical calibration procedures that can be produced for gas and liquid systems are listed below:

- Flow totalisation and flow rate computation
- Input, line and upstream density computation
- Flow computer configuration
- ADC input/DAC output
- Temperature input
- Relative density computation
- Gas chromatograph calculations and calibration
- DP transmitter calibration changeover
- Pressure transmitter calibration and temperature element calibration or check
- Densitometer check, calibration & change
- RD analyser calibration
- Sampler check
- Orifice plate inspection
- K-factor computation

Tolerance manual may be required as in many cases the tolerances applied to the calibration checks are based on the equipment manufacturers' data sheets. This is not always correct as then the claimed accuracies cannot be achieved in the routine calibration activity. The primary purpose of this document is to define a practical tolerance for each calibration check. This is achieved by determining the design uncertainty which would be applied to the checks taking into account all components in the calibration procedure, e.g. test equipment, loop conditioning components etc. A practical calibration tolerance is then defined and where required are matched to the overall system uncertainty to ensure full compliance.

Configuration manual is often overlooked and if properly maintained provides in a single document control of any changes to the flow computer configuration. It will also contain the necessary back-up certification to support the use of the various values entered, e.g. densitometer certificates, orifice plate certificates etc. Each location in the flow computer will be identified and where applicable a value chosen for entry. The appropriate value will be defined and supporting data provided where necessary.

KELTON have produced page formats for a complete set of metering log books that can be supplied in various formats and can also provide softcopy masters for the customers' own modification or production. Alternatively, KELTON can supply a software application for electronic logging which is part of KELTON MeterManager a suite of applications aimed at managing measurement. Used together these applications provide an integrated electronic measurement solution.

Accurate understandable procedures are critical to the successful management of your metering systems and should provide a step-by-step guide of each calibration, validation and operational activity.