Specifications for Approval, Installation, Use and Verification of Flow Conditioners Used in Gas Measurement Systems

1.0 Scope

These specifications apply to flow conditioners used in natural gas custody transfer metering systems.

2.0 Authority

These specifications are issued under the authority of sections 12 and 18 of the Electricity and Gas Inspection Regulations.

3.0 Application for Approval

3.1 Design

3.1.1 Along with the application for approval, the applicant shall submit diagrams of the flow conditioner and state the design parameters and manufacturing tolerances of the flow conditioner(s).

3.1.2 The design parameters in 3.1.1 shall include the following as a minimum:

(i) Plate diameters (and outer flange where applicable).

(ii) Plate thickness.

(iii) Number of bore holes and their pattern.

(iv) Dimensions of the bore holes, as a function of the inside pipe diameter of the pipe for which the conditioner is intended to be used.

(v) Manufacturing tolerances for the plate diameter(s), thickness of the conditioner, bore whole dimensions and bore whole configuration.
3.2 Construction Material

3.2.1 The applicant shall provide a listing of the acceptable materials that the flow conditioner may be constructed of.

3.3 Test Data

3.3.1 Applicants shall submit test data that demonstrates improvement in base line conditions for specific the meter types or classes. The test data shall be from a test facility recognized under bulletin G-16.

3.3.2 The test data supplied shall conform to the latest version of the applicable American Gas Association (AGA) Report for the type or class of meters the conditioner is intended to be used with.

3.3.2.1 Where the applicable AGA Report does not provide test data requirements for approval of flow conditioners, the following test data requirements shall apply:

   (a) Appendix 2-C of AGA Report No. 3, Part 2 (Fourth Edition) or;

   (b) Test data conforming to the requirements as set out by another industry-recognized authority, subject to the following conditions:

       (i) identification of the industry-recognized authority and the requirements document;

       (ii) provide the flow conditioner approval requirements document to the MC Senior Gas Engineer, where requested;

       (iii) MC Senior Gas Engineer approval of the use of the approvals requirement document for the submission of test data.

3.3.3 Test data shall be supplied for each combination of flow conditioner model and meter type or class for which approval is being sought.

3.3.4 The test data in 3.3.3 shall be supplied for the $Q_{\text{min}}$ and $Q_{\text{max}}$ flow rates for each meter type or class for which approval is being sought (i.e. $Q_{\text{min}}$ for lowest capacity meter in the meter type or class and $Q_{\text{max}}$ for the largest capacity meter in the meter type or class).
### 3.3.5 The flow range of the flow conditioner, if less than the meter(s) range.

### 3.3.6 The test medium used to conduct testing (natural gas/air).

### 3.3.7 The flow conditioner and piping configuration, for each combination in 3.3.3, shall reduce pipeline perpetuations resulting in a measurement system improvement of 1/2 the limit of error of the meter installed.

### 4.0 Marking Requirements

#### 4.1 The model/type designation and the approval number shall be stamped on the edge of the flow conditioner flange. This marking shall be legible and visible when viewed from the top of the piping when the conditioner is installed.

#### 4.2 The manufacturer's inspection marking (if other than the marking in 4.1) shall also be stamped on the top edge of the flow conditioner to attest to the conformance of the flow conditioner to the manufacturer's design and construction specifications.

#### 4.3 The pipe size and schedule of the upstream pipe that the flow conditioner is intended to be used with, shall be stamped on the downstream face of the plate.

#### 4.4 Where the flow conditioner is not a flange mounted type the required markings shall be stamped on the downstream face of the plate and on a nameplate/tag, to allow for identification the model and its status with regards manufacturers inspection to design requirements, without disassembling the meter run.

### 5.0 Configuration Requirements

#### 5.1 The manufacturer shall supply the piping configuration requirements for each type of meter the flow conditioner is intended to be used with.

#### 5.1.1 The piping configuration shall include the distance between the meter and flow conditioner, the downstream meter tube requirements, and the distance between between the flow conditioner and any elbows or valves upstream of it. The distances shall be stated in the form of the number of pipe diameters.

#### 5.1.2 Any limitations shall be stated, such as the number of elbows or partially opened valves preceding the flow conditioner.
6.0 Notice of Approval (NOA)

6.1 Upon recommendation from the MC Senior Gas Engineer, the MC approvals laboratory shall generate an NOA for the flow conditioner.

6.2 The NOA shall contain pictorial representations of the flow conditioner model(s) and the piping configurations for each type of meter the flow conditioner is approved for use with.

6.3 Limitations in flow ranges identified in section 3.3.5 shall be communicated in the NOA.

7.0 Installation and Use

7.1 Only approved flow conditioners are permitted in custody transfer metering systems.

7.2 The flow conditioner shall be installed with the model identifier, manufacturer's inspection mark (marking of the model may serve as inspection mark) and NOA number clearly visible, when viewed from the top of the pipe.

7.3 The piping configuration shall conform to the configuration set out in the NOA for the type of meter the conditioner is installed with.

7.4 Where flow range limitations have been identified in the NOA, an evaluation of the installation shall be done to determine if these limitations are exceeded. A record of this evaluation shall be kept and made available to MC upon request.

8.0 Field Verification for Flow Conditioner Installations

8.1 Flow Conditioners Manufactured prior to issuance of this Specification

8.1.1 Flow conditioners manufactured prior to the issuance of this specification and the applicable NOA's are not required to have the additional marking requirements of this specification prior to the field verification.

8.1.2 To facilitate the identification of the approval of the flow conditioner and its verification to the design requirements, these marking shall be made where it has been determined the device manufacturers inspection or an on site inspection against the design requirements has been completed and the results are found to be acceptable.

8.1.3 The piping configuration shall comply with the approved requirements (NOA) for the type of meter the flow conditioner precedes.
8.1.4 Where flow range limitations have been identified in the NOA the records of the contractor evaluation shall be reviewed and the maximum expected flow range for the metering site shall be recorded on the inspection record.

8.1.5 A field inspection mark shall be applied on the top edge of each section of pipe in the piping configuration, to signify acceptance, where the requirements of sections 8.1.1 to 8.1.4 have been met.

8.1.6 An inspection certificate containing the results of the inspection, including all pertinent information required to identify the contractor, customer and site, shall be issued.

8.2 Flow Conditioners Manufactured after issuance of this Specification

8.2.1 The installed model of flow conditioner shall be an approved model.

8.2.2 Flange type flow conditioners shall bear the NOA number, manufacturer’s model and inspection mark (if different), on the edge of the flange. These markings shall be clearly visible, when viewed from the top of the pipe.

8.2.2.1 Where the flow conditioner is not a flange mount type the marking requirements shall be stamped on downstream face of the plate and on a nameplate/tag. Disassembly of the meter run is not required, the nameplate/tag provides for the identification of the flow conditioner and its status with regards to the manufacturers design requirements.

8.2.3 The meter type preceding the flow conditioner in the piping configuration shall be a type which has been identified in the NOA.

8.2.4 The piping configuration shall comply with the approval requirements (NOA) for the type of meter the flow conditioner precedes.

8.2.5 Where flow range limitations have been identified in the NOA the records of the contractor evaluation shall be reviewed and the maximum expected flow range for the metering site shall be recorded on the inspection record.

8.2.6 A field inspection mark shall be applied on the top edge of each section of pipe in the piping configuration, to signify acceptance, where the requirements of sections 8.2.1 to 8.2.5 have been met.

8.2.7 An inspection certificate containing the results of the inspection, including all pertinent information required to identify the contractor, customer and site, shall be issued.

Alan E. Johnston
President