

2. MEASUREMENT

Unit of Measurement. The unit of measurement shall be one cubic foot of gas and the term "cubic foot of gas," whenever used in Northern's Rate Schedules and these GENERAL TERMS AND CONDITIONS shall mean one cubic foot of gas at an absolute pressure of 14.73 pounds and a temperature of sixty degrees Fahrenheit (60 F).

COMPUTATION OF VOLUMES OF GAS:

Measurement Factors. The volume of gas delivered as measured by pipeline pressures shall be corrected to the unit of measurement. Measurement and determination of volume delivered shall be made in accordance with the recommendations set forth in the A.G.A. Gas Measurement Committee Report Number Three latest edition for orifice meters or (the A.G.A. Gas Measurement Committee Report Number Seven latest edition, for turbine meters or industry standards for other meters).

Temperature. The temperature of the gas passing through the meters shall be determined by the use of a continuous recording thermometer so installed that it will record properly the temperature of the gas flowing through the meters.

The daily temperature, based on the arithmetic average of the hourly temperature so recorded shall be used in measurement computation. Provided that, in case of small volume delivery, the installation of a thermometer may be omitted at the election of Northern, and in any such case, the temperature of the gas for the purpose of measurement shall be assumed to be sixty degrees Fahrenheit (60 F).

Specific Gravity. The specific gravity of the gas shall be calculated from chromatographic analysis of a representative gas sample.

Atmospheric Pressure. The normal barometric pressure in pounds per square inch, carried to one decimal place, for each Point(s) of Delivery, shall be used as the atmospheric pressure for measurement purposes.

Heating Value. The heating value of the gas delivered shall be calculated from a chromatographic analysis of a representative gas sample collected daily during the month, or any other method mutually agreed upon. Such chromatographs shall be owned, operated and maintained by Northern at representative locations on Northern's transmission system, or as agreed upon.

The heating value of the natural gas received by Northern from its various sources of supply and of gas received for transportation will vary. However, Northern will operate its system such that the heating value will not fall below 950 Btu per cubic foot.

The unit of volume "at 1,000 Btu per cubic foot" or "as adjusted to 1,000 Btu per cubic foot" shall mean one cubic foot of gas as defined above and having an average total heating value of one thousand (1,000) British thermal units. Such units of volume shall be determined by multiplying the number of cubic feet of gas delivered during any billing day by the factor arrived at by dividing the average total heating value per cubic foot delivered on the previous day by 1,000 unless otherwise agreed to by Northern.

To the extent that Northern does not have chromatograph information for a Field Area point, and if the Btu changes after the 20th of the production month, such Btu change will not become effective until the beginning of the following month. If the Btu changes during the period from the first of the month through the 20th, such Btu change can be effective for the beginning of such month.

Supercompressibility. Determination of supercompressibility of natural gas shall be calculated from chromatographic analysis of gas samples taken at representative points as determined by Northern.

Gas Sampling and Analysis. Gas samples may be obtained and analyzed by one of the following methods:

- (1) Portable Chromatograph. Chromatographic analysis of a spot sample of gas taken at a representative location and analyzed on site by means of a portable gas chromatograph.
- (2) Spot Sample. Spot sample of gas taken at a representative location using a sample bottle and analyzed using a gas chromatograph at a location remote from the sampling location.
- (3) Continuous Sample. Sampling continuously into a sample bottle for a period of time at a representative location and then analyzing the sample using a gas chromatograph.
- (4) On-Site Gas Chromatograph. On-site chromatograph sampling directly from a representative source and analyzing continuously.
- (5) System Gas Chromatograph. Gas chromatograph sampling directly from a representative source and analyzing continuously. The results are then applied to all other locations on the system that are representative of the sample source.

Spot Sampling Frequency. Mutually agreed upon frequency (monthly, quarterly, etc.)

Meter. Gas delivered by Northern to the Shipper shall be measured by an adequate meter or meters of standard type, installed, operated and maintained by Northern at its sole expense. In the alternative, the responsibility for meter installation, operation and/or maintenance may be as mutually agreed upon between the parties. When more than one meter is used for measurement of gas delivered to the Shipper, the term "Meter" shall be construed to mean and include all such meters used for that purpose.

Receipt and Delivery Point Operator Flow Information Systems. Receipt and Delivery Point Operators may, subject to Northern specifications and at the operators' sole expense, install flow information systems at Northern's facilities sufficient to provide daily flow information. Such equipment shall be operated and maintained as agreed to between Northern and the Operator. Receipt and Delivery Point Operators who have installed flow information systems may provide such information to Northern in accordance with the established parameters, for use in compiling daily imbalances and daily service charges, subject to reasonable verification. To the extent the facilities become outdated and are no longer in compliance with Northern's specifications, the Receipt and Delivery Point Operators shall be so notified by Northern, and may install replacement facilities. If the replacement facilities are not installed within a reasonable period of time, Northern will discontinue accepting data from the outdated facilities and begin using Northern's data.

Equipment Testing. At reasonable intervals, Northern shall test and adjust to within measurement tolerances all equipment used in making the determination of factors used under the provision of this Section. Such equipment shall, at all reasonable times, be subject to test or an inspection by a representative of the Shipper in the presence of a representative of Northern.

The Shipper shall test, at reasonable intervals, all Shipper equipment used for measurement of gas where such measurement enters into the measurement computations and shall at the time of the tests, adjust such equipment to record accurately. Northern's representative shall have the right to witness such tests, or at reasonable times at Northern's election, to test and inspect such equipment in the presence of the Shipper.

Measuring Equipment Out of Repair. If, for any reason, any measuring equipment is out of service or out of repair so that the quantity of gas delivered is not correctly indicated by the reading thereof, the gas delivered during such period shall be estimated by the parties on the basis of the best data available using the first of the following methods which is feasible:

- (1) By using the registration of any check measuring equipment installed and accurately registering; or
- (2) By correcting the error if the percentage of error is ascertainable by calibration, test or mathematical calculations; or
- (3) By estimating the quantity of delivery by deliveries during a preceding period under similar conditions when the meter was registering accurately.

Adjustment of Inaccuracies. If any meter is found to be inoperative or inaccurate, it shall be adjusted to register correctly. The amount of error shall be determined by the most accurate method found feasible, and, if the error shall have resulted in an error of more than two percent (2%) in the measurement of gas delivered, then the calculated deliveries of gas through such meter shall be accurately adjusted to compensate for such error. Such adjustment shall be made for such period of inaccuracy as may be definitely known, or if not known, then for one-half the period since the date of the last meter test. Measurement data corrections must be processed within six (6) months of the production month with a three (3) month rebuttal period. This time limitation will not apply in the case of deliberate omission or misrepresentation or mutual mistake of fact. Also, the parties' other statutory or contractual rights shall not otherwise be diminished by this provision. Mutual agreement between parties, legal decisions, and regulatory guidance may be necessary to determine if the event qualifies for an extension of the above time periods. A meter adjustment or correction becomes a prior period adjustment after the fifth Business Day following the production month. Any measurement prior period adjustments are taken back to the production month.