CHAPTER 10

GAS QUALITY

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10.1 INTRODUCTION

This chapter describes the requirements for gas quality with regard to storage injection and withdrawal, to allow the interoperability of storage facilities and the connected transport system.
The chapter also describes the procedures adopted to ascertain the gas quality and validate measurements.
Lastly, the chapter specifies the methods for determining the Higher Heating Value at the points of injections and withdrawal.

To ensure the integrity of the system security and the interoperability with the National Gas Pipeline Network (NGPN), the Storage Company complies in matters concerning gas quality as specified in Resolution 185/05 of the authorities and subsequent amendments and the provisions of the Bill; in addition, for the assessment of gas quality and for validation of the injection and withdrawal measurements from the storage sites of Collalto and Cellino, the Storage Company uses its own directly managed systems.

10.2 GAS QUALITY PARAMETERS

The parameters that characterise gas quality can be broken down into the chemical-physical parameters necessary for calculating energy (Higher Heating Value) and for controlling the specifications of gas quality.

10.3 QUALITY SPECIFICATION

The chemical-physical characteristics of the gas injected and withdrawn from the system must comply with the values defined in Annex 10A.

10.4 CALCULATION OF PARAMETERS FOR QUALITY CERTIFICATION

The calculation of the control parameters for the quality specification is conducted at the Delivery and Redelivery Points as it enters and exits the Storage Company's Station.

10.4.1 Parameters for calculating energy (HHV components)

The fundamental chemical-physical parameter for calculating energy is the Higher Heating Value (HHV), determined in compliance with the ISO 6976 standard based on the chemical composition of the gas, taking into consideration, at a minimum, the following elements:

1. Methane – C_1
2. Ethane – C_2
3. Propane – C_3
4. Isobutane – iC_4
5. Normal butane – nC_4
6. Isopentane – iC_5
7. Normal pentane – nC_5
8. Hexanes and higher – C_6^+
9. Nitrogen – N_2
10. Carbon dioxide – CO_2

10.4.2 Quality control parameters

The quality control parameters for gas, to ensure the interchangeability and security of the storage facilities and the transport systems, are as follows:

1. Higher Heating Value
2. Relative density
3. Wobbe Index
4. Carbon dioxide – CO_2
5. Oxygen – O_2
6. Hydrogen sulphide – H_2S
7. Mercaptan sulphur – S_{RSH}
8. Total sulphur - S_{tot}
9. Water dew point
10. Hydrocarbon dew point

10.4.3 Management of out-of-spec gas

It is forbidden to deliver gas to the system or return gas to the transport network that does not comply with the specifications listed in Annex 10A, or even if it meets these specifications, gas that contains elements not normally present in natural gas in quantities that could cause damage to the Shippers.

Therefore, the gas quality that the Shipper delivers or arranges for delivery to the Storage Company at the Delivery Point and what the Storage Company returns at the Redelivery Point, must comply with the specifications defined in Annex 10A.

Without prejudice to the provisions of Resolution no. 185/05 from the authorities, in cases of non-compliance with the Gas Injection Quality Specification which, although not out-of-spec, contains elements, normally not present in gas, in quantities that could cause damage to the Shippers, will be applied the provisions set forth in paragraph 17.2 of the chapter "Responsibilities of the Parties".

10.4.4 Methodology for calculating parameters

The "energy" and quality parameters are calculated by the Storage Company in compliance with the requirements pursuant to Resolution 185/05 and its subsequent amendments and supplements.

The detection of HHV components listed in the Quality Specification is carried out by means of systems set up for this purpose, consisting of the set of qualitative measurement devices and accessory services necessary for their operation.

At the Collalto and Cellino storage sites, energy parameters and some gas quality parameters (HHV, relative density, Wobbe Index and carbon dioxide) are calculated using a gas chromatograph that continuously sends the HHV value to the fiscal calculators that multiply it by the volume in transit by calculating the energy value.

At the Collalto site, the calculation of the water and hydrocarbon dew point is carried out continuously with appropriate analysers; while at the Cellino site, only the water dew point is continuously calculated; the hydrocarbon dew point is determined monthly with detection on a spot day.

For both sites the content of oxygen, hydrogen sulphide, mercaptan sulphur and total sulphur is determined, on a monthly basis, through laboratory analysis of an instantaneous sample.

The instantaneous gas sample follows the UNI EN ISO 10715 standard "Natural gas - Sampling guidelines" regarding the sampling line, control of the filling process, and traceability of the cylinder. This gas sample then is subject to gas chromatographic analysis in a SINAL or SIT accredited laboratory.

10.5 QUALITY DATA VALIDATION

The gas composition and quality data originating from gas chromatographs and "instantaneous" samples are considered valid for the purpose of calculating the HHV based on the provisions of Resolution no. 185/05 and its subsequent amendments and supplements as well as based on the following criteria:

a) Acquisition and review of data from each gas chromatograph and from the chemical analysis performed in the laboratory on the gas sample taken;
b) Comparison with the data from the previous gas chromatograph analyses and with the results of the chemical analyses on gas samples previously collected;
c) Consistency of analysis data;
d) Concentration limit values taken from the field of historical values;
e) The gas chromatographs are subjected to periodic calibrations to control the precision, in compliance with relevant legislation and reference technical standards in force or, if these are incomplete, with the technical file prepared by the manufacturer.

10.6 OPERATIONAL AND FISCAL VALUES

For the purposes of the Allocation and the subsequent invoicing, the HHV value used is that acquired, calculated and validated by the Storage Company.
In particular, note that as a result of the presence of a gas chromatograph operating on both injection and withdrawal measurements, the HHV of the gas in transit is measured continuously and consequently, also the volumes in standard cubic meters and their energy equivalent in Giga Joule.
For invoicing purposes, the relevant figure is that acquired, calculated and validated by the Storage Company.

A copy of the quality report is sent each month to the Transport Company.

10.7 VERIFICATION REQUEST FROM SHIPPER

The Shipper may request that the Storage Company verify the aforementioned data, indicating:

a) The relevant storage site;
b) The figure to be verified and the reference period;
c) Other technical elements supporting the request.

Based on the elements indicated above and/or other elements that may be required, the Storage Company performs the relevant verifications and assessments within the technical times strictly necessary to carry out the activities, if this falls within the responsibilities referred to in this chapter.

The results of the controls in question are communicated to the Requesting User as soon as they are available.

If the controls demonstrate the accuracy of the recorded data, the Storage Company will charge back the costs incurred for the verification in question to the requesting user.