



Connecter les énergies d'avenir



CODE OPERATIONNEL DE RESEAU TRANSMISSION



PART A2 TECHNICAL REQUIREMENTS APPLICABLE TO GRTGAZ' TRANSMISSION PIPELINES AND TO GAS TRANSMISSION, DISTRIBUTION AND STORAGE INSTALLATIONS CONNECTED TO THE GRTGAZ NETWORK

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Article 1 Part constitution, amendments and changes

The present part forms integral part of the Contract which is part of the appendices of Sections A B C D1 and D2 of the Contract since applicable to the title of the Contract.

All the Contract stipulations apply mutatis mutandis to the present part.

In accordance with article 2 of the Contract, the Shipper commits himself becoming acquainted with any evolution or update of this posterior part at the date of signature of the Contract, notified by GRTgaz.

1.1 Amendments following legislative and regulatory changes of the legal framework

The stipulations of article "Amendments following legislative and regulatory changes" Section A of the Contract apply mutatis mutandis in the case of new legislative or regulatory provisions from any competent authority that may apply directly or indirectly to this part or a decision of the Energy Regulatory Commission under the article L 134-2 of the energy Code or a final decision of the CoRDIS under the articles L 134-19 to 24 of the energy Code, would come into effect after the Contract signature.

1.2 Other changes

The stipulations of article "Other changes" Section A of the Contract apply mutatis mutandis in the case of GRTgaz should amend the Contract for reasons other than those referred to in sub-clause 1.1 above.

Article 2 Object

These requirements, specific to GRTgaz, incorporate the specifications defined in article L453-4 and articles R433-14 and following from the Code of Energy, which are the minimum requirements to be met in the technical design and operation of transmission pipelines, together with the requirements regarding the connection of third parties to GRTgaz's installations.

They are available on the website for consultation by all operators or customers.

Parties connected or wishing to be connected to the GRTgaz system must sign an individual agreement with GRTgaz, which covers all aspects relating to connection to the GRTgaz system.

Article 3 Definitions

Assimilated Gas: Gas with specifics allowing transportation or injection in Natural Gas transmission Pipelines, under conditions defined by the transmission operation in application of article L453-4 of the Code of Energy, which means according to present requirements.

Connection: Interconnection point between the Pipeline and an adjacent infrastructure, whether it is an infrastructure for the transmission, distribution or storage of Natural Gas, a liquefied Natural Gas facility, Customer facility or Assimilated Gas producer facility.

NB: depending on the circumstances, the individual agreements referred to above may employ the term "connection" (interconnection with distribution or Customer facilities) or "interconnection" (interconnection

with other infrastructures). These contracts specify the precise location of the connection or interconnection points.

Connection Contract: Contract between GRTgaz and a distributor or Customer, covering all the technical and commercial aspects not covered in these technical requirements.

Connection Facility: Part of the infrastructures located near the Connection, specifically required for interconnection.

Customer: Natural Gas consumer connected to the GRTgaz system.

Interconnection Contract: Contract between GRTgaz and an operator other than a distributor, covering all the technical and commercial aspects not covered in these technical requirements.

Intervention Procedures: Procedures specifying the organization, resources and methods that GRTgaz employs when carrying out repair or maintenance works on the system, or in the event of an accident on the system.

Natural Gas: A gaseous fuel of underground origin consisting of a complex mixture of hydrocarbons, primarily methane, but also ethane, propane and higher hydrocarbons in much smaller quantities. Natural Gas may also generally contain inert gases such as nitrogen and carbon dioxide, plus very small quantities of trace elements. It remains in a gaseous state in the pressure and temperature conditions usually encountered in operation. It is produced and processed from raw gas or Liquefied Natural Gas. If necessary, it may be mixed for direct use (as specified by ISO 13686).

Pipeline: A transmission Pipeline transmit Natural Gas or Assimilated Gas to distribution networks, other transmission Pipelines, industrial or commercial Customers or storage sites. For the purposes of this document, a Pipeline is one or several lines or sections of lines and all additional infrastructures which contributes to its operation, i.e.:

- compressor stations,
- reheating, filtering, mixing, odourisation or pressure reduction stations,
- transported quantity measurement and quality controlling stations,
- block-valve stations,
- delivery stations,
- injection stations,
- switching and interconnection stations,
- any other function contributing directly or indirectly to the transmission system.

It includes, from outside to inside of departing or arrival station, the first isolation system (and, if applicable, any additional equipment designed specifically for the pipeline, for instance a pressure reduction or compression station) to its last isolation system. However, in case of a delivery station that can be dismantled, the limit with the distribution network is set at the last flange of the station.

Prudent and Reasonable Operator: An operator acting in good faith to apply good practice and, for this purpose, employing the skills, the effort, the prudence and the foresight that are reasonably and usually implemented by a competent and experienced operator.

Article 4 Technical requirements applicable to Pipelines

The requirements for the design and building of Pipelines are established by the regulations and the technical provisions in the existing standards. The main provisions are listed below.

Legal and regulation references indicated below are the ones in force at the publication date of this document. They can be subject to evolutions available for consultation on <https://www.legifrance.gouv.fr/>.

4.1 Regulations

Pipelines:

- Code of Environment Book V Title V Chapter IV & V: legal and regulation parts relating to transmission pipelines
- Modified Order of March 5th 2014, defining the conditions of application of the Code of Environment Book V Title V Chapter V and regulating the safety of the pipelines used for transmission of Natural Gas, Assimilated Gas, hydrocarbons and chemical products
- The full GESIP guidelines, as quoted in the Order of March 5th 2014 mentioned above, apply
- Modified Ministerial Order of July 13th 2000 regulating the safety of Pipeline distribution of combustible gas

Equipment under pressure, located in secondary infrastructures, other than equipment carrying Natural Gas or Assimilated Gas:

- Code of Environment Book V Title V Chapter VII: legal and regulation parts relating to equipment under pressure for the utilities in particular
- Amended Ministerial Order of March 15, 2000 on the operation of equipment under pressure,

Prevention of explosions (ATEX):

- Labor Code: regulation Part 4th Part
 - Book II Title II Chapter VII Section 6: prevention of explosions applicable to workplaces
 - Book II Title I Chapter VI Section 8: prevention of explosions Obligations of the developers while constructing workplaces

4.2 Standards

- NF EN 1 594, June 2014, "Gas supply systems – Pipelines for maximum operating pressure over 16 bar – Functional requirements", GESIP professional guidelines names "Transmission pipeline standards", reference "2007/09 report – Edition of November 19th 2009",
- NF EN 12 007, September 2012, Parts 1, 2, 4 and July 2015, part 3, "Gas supply systems – Pipelines for maximum operating pressure of 16 bar or less",
- NF EN 12 186, December 2014, "Gas supply systems – Gas pressure regulators for transportation and distribution – Functional requirements",
- NF EN 12 583, April 2014, "Gas supply systems – Compressor stations – Functional requirements",
- NF EN 12 732, June 2014, "Gas supply systems – Welding steel pipework – Functional requirements",

Article 5 Technical requirements applicable to Connection Facilities

Any connection of a distributor, a Customer or an operator other than a distributor is subject to the prior signature of a contract.

The technical requirements are established in accordance with regulatory requirements and with the technical provisions of the following standards, in their respective spheres of application. The principal standards are those quoted in Article 4.

Article 6 Technical requirements applicable to metering equipment

At Connections, GRTgaz metering stations that have a transactional (or similar) character and the associated instruments shall be installed and operated in accordance with French regulations in so far as they are applicable and in accordance with the technical provisions of existing standards, the main ones being listed below as a reminder.

As regards the technical aspects not covered by the regulations or not included in existing standards, equipment is installed and operated in accordance with international good practice.

I.e. in order of precedence:

6.1 Regulations

- Directive 2014/32/UE of the Parliament and the Council of February 26th 2014 relating to the harmonization of the laws of the Member States on commercialization of measuring instruments (MID),
- Modified Decree No. 73-788 of August 4th 1973 applying the prescriptions of the EEC relating to the common provisions for measuring instruments and to methods of metrological control
- Modified Decree No. 2001-387 of May 3, 2001 on the inspection of measuring instruments,
- Decree No. 2006-447 of April 12, 2006 on the commercialization and implementation of certain measuring instruments,
- Modified Order of December 31st 2001 setting the procedures for implementing certain conditions of the modified Decree No. 2001-387 of May 3rd 2001 relating to the control of measuring instruments
- Modified Order of February 25th 2002 relating to the initial verification of certain categories of measuring instruments
- Order of April 28, 2006 setting the conditions of application of the Decree No. 2006-447 of April 12th 2006 relating to the commercialization of certain measuring instruments,
- Order of October 2nd 2010 relating to the combustible gas meters.

6.2 Standards

- NF EN 1 776, April 2016, "Gas supply – Natural gas measuring stations – Functional requirements",
- NF EN 12 261/A1, September 2006, "Gas meters – Turbine meters",
- NF EN 12 480/A1, September 2006, "Gas meters – Rotary piston meters",
- NF ISO 17089-1, April 2011, "Ultrasonic gas meters",
- CEI 60 571:2003, "Industrial platinum resistance thermometer sensors",
- NF EN 12405-1/A2, in December 2010, "Gas meters – Conversion devices – Part 1: Volume conversion",
- NF ISO 10715, March 2001, "Natural gas – Sampling guidelines",
- NF EN ISO 6974, August 2003, May 2004 and August 2012, "Natural gas – Determination of composition with defined uncertainty by gas chromatography",

- NF EN ISO 6976, November 2005, “Natural gas – Calculation of calorific values, density, relative density and Wobbe index from composition”,
- NF EN ISO 13443, November 2005, “Standard reference condition”.
- NF EN ISO 12213, December 2009, “Natural gas – Compression factor”.
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6.3 International regulations

- International recommendation – International Organization of Legal Metrology / “Combustible gas metering systems” R140, 2007 edition,
- International recommendation – International Organization of Legal Metrology “Gas meters”, R137, 2012 edition,
- EASEE-gas – Common Business Practice “Harmonization of units”, (CBP 2003-001/02 –approved August 27, 2003).

Article 7 Characteristics of gas

7.1 Physicochemical characteristics of the gases injected into GRTgaz installations

7.1.1 Physicochemical characteristics required for Natural Gas

For the purpose:

- Of protecting the integrity of GRTgaz’ facilities against the risks of chemical reaction and of a change in the physical characteristics of their constituent materials,

Of guaranteeing transportation to Customers and to the distribution systems of a gas suitable for combustion and compliant with existing regulations, all Natural Gas injected into the GRTgaz system must meet the specifications set in the table below, without prejudice as regards the obligations arising out of the regulations (with the exception of the specific case where the gas comes from a distribution grid, in which case it must comply with the requirements specified in paragraph 5.2).

Characteristic	Specification
Higher Calorific Value (combustion conditions 0°C and 1.01325 bar)	H type gas ⁽¹⁾ : 10.70 to 12.80 kWh/m ³ (n) (combustion 25°C: 10.67 to 12.77) B type gas ⁽¹⁾ : 9.50 to 10.50 kWh/m ³ (n) (combustion 25°C: 9.48 to 10.47)
Wobbe index (combustion conditions 0°C and 1.01325 bar)	H type gas ⁽¹⁾ : 13.64 ^(1bis) to 15.70 ^(1bis) kWh/m ³ (n) (combustion 25°C: 13.6 to 15.66) B type gas ⁽¹⁾ : 12.50 to 13.06 kWh/m ³ (n) (combustion 25°C: 12.47 to 13.03)
Density	Between 0.555 and 0.700 ⁽²⁾
Water dew point	Below -5°C at Maximum Service Pressure on the system below the Connection ⁽³⁾
Hydrocarbon dew point ⁽⁴⁾	Below -2°C from 1 to 70 bar(a) ⁽²⁾
Total sulphur content	Less than 30 mgS/m ³ (n) ⁽²⁾

Total mercaptan sulphur content	Less than 6 mgS/m ³ (n) ⁽²⁾
H ₂ S + COS sulphur content	Less than 5 mgS/m ³ (n) ⁽²⁾
CO ₂ content	Less than 2.5% (molar) ⁽²⁾
Tetrahydrothiophene content (THT- odorizing product)	Less than 40 mg/m ³ (n)
O ₂ content	Less than 100 ppm (molar) ⁽²⁾
Impurities	Gas that can be transported, stored and distributed without further processing on injection into the system

- (1) H gas: Gas with a high calorific value. B gas: Gas with a low calorific value.
- (1bis) H gas: pending contractual changes, gas with a Wobbe index (combustion conditions 0°C and 1.01325 bar) between 13.64 (value recommended by the European EASEE-gas association) and 13.50 kWh/m³(n) is likely to be accepted.
As regards the upper limit for the Wobbe index, checks are being carried out to establish when the value of 15.85 kWh/m³(n) (instead of 15.70) discussed within EASEE-gas will be acceptable in France.
- (2) These values are the ones recommended within the European EASEE-gas Association.
- (3) The conversion of the water dew point to water content and vice versa is done in accordance with standard ISO 18 453 "Natural gas – Correlation between water content and water dew point." (Gergwater correlation).
- (4) This is a specification that is applicable to Natural Gas, which covers only hydrocarbons and not oils.

Where applicable, GRTgaz can accept gas that does not meet the above specifications, for example if it would be possible to mix gases as a temporary measure to guarantee the characteristics specified in these requirements for gas leaving the system, or when there are special agreements between adjacent operators. Any acceptance of such gases by GRTgaz must be subject to a special agreement.

7.1.2 Physicochemical characteristics required for the injection of Assimilated Gas

The particular composition of gases other than Natural Gas automatically imposes further requirements, in addition to those listed in paragraph 5.1.1.

Any gas other than Natural Gas likely to be injected into the GRTgaz system must, prior to injection, meet the following specifications, in addition to those laid down for Natural Gas:

Characteristic	Specification
Hg	Less than 1 µg/m ³ (n)
Cl	Less than 1 mg/m ³ (n)
F	Less than 10 mg/m ³ (n)
H ₂	Less than 6% (molar)
NH ₃	Less than 3 mg/m ³ (n)
CO	Less than 2% (molar)

Depending on the type of gas to be injected, the maximum content of other compounds may be specified in terms of the risk of damage to GRTgaz facilities.

GRTgaz can ask for a ruling from a competent and legitimate authority on the territory where the injection point is located, confirming that the gas to be injected poses no risk to public health, the environment and the safety of facilities. It is the responsibility of the Upstream Operator to obtain this ruling.

In the event that the above-mentioned authority should subsequently revise this ruling, GRTgaz must be informed within fifteen calendar days by a letter sent by recorded delivery.

The revision of the ruling legally suspends GRTgaz's acceptance of the gas for injection, without the need for any kind of formal proceedings, and results in the immediate interruption of the injection process.

Requirements regarding the HCV

Given the risk of significant variations in the HCV of gases other than Natural Gas, the Upstream Operator shall inform GRTgaz of the provisions made to prevent fluctuations in the HCV that may disrupt the operation of Customer facilities connected to its system.

7.1.3 Technical conditions for the injection of all types of gas

Injection point

The position of the injection point and the quantities injected must be compatible with the capacity and operating conditions of the system (pressure, temperature,...).

Purification

If the gas for injection does not meet the specifications in the tables above, GRTgaz can nevertheless agree to accept it. The gas for injection may then need to be purified before entering the GRTgaz system.

In this case, GRTgaz must be shown the Upstream Operator's treatment facilities before it agrees to inject the gas.

Inspection system

The effectiveness of any purification process shall be checked by the Upstream Operator by gas analysis. The results of the analyses shall be made available to GRTgaz. The frequency of inspection will be agreed contractually with GRTgaz.

In addition, GRTgaz may ask the Upstream Operator to prove that it is handling the liquid phase phenomenon as a Prudent and Reasonable Operator.

7.1.4 Specificities of a B gas supply area

If the gas is intended for injection into a B gas system or facility, the Upstream Operator cannot object to GRTgaz subsequently transporting or using H gas in this system or facility. Injection may then continue provided that the Upstream Operator changes the characteristics of the gas for injection to meet the specifications for the H gas zone, as described in the table in paragraph 5.1.1.

7.2 Physicochemical characteristics of the gas delivered by GRTgaz

The characteristics of the gas delivered by GRTgaz to the Connections with its Customers and all types of operators, at all times meet the existing regulatory requirements for gas characteristics.

The regulatory requirements as of September 1st, 2016 are:

Characteristic	Specification
Higher Calorific Value ⁽¹⁾ (combustion conditions 0°C and 1.01325 bar)	H gas: 10.70 to 12.80 kWh/m ³ (n) (combustion 25°C: 10.67 to 12.77) B gas: 9.50 to 10.50 kWh/m ³ (n) (combustion 25°C: 9.48 to 10.47)
Wobbe index for the geographic areas being converted B gas / H gas (combustion conditions 0°C and 1.01325 bar) ⁽⁷⁾	B gas : 12.50 to 13.06 kWh/m ³ (n) (combustion 25 °C : 12.47 à 13.03)
Water dew point ⁽³⁾	Below -5°C at the system's maximum operating pressure
Sulphur and H ₂ S content ⁽⁴⁾	The instant H ₂ S content must be less than 15 mg/m ³ (n) (period when 12 mg/m ³ (n) exceeded less than 8 hours) The average H ₂ S content over 8 days must be less than 7 mg/m ³ (n). The sulphur content must be less than 150 mg/m ³ (n)
Gas odour ^{(2) (5) (6)}	The gas delivered to all exit points from the transmission system to the distribution system and Customers must have an odour: <ul style="list-style-type: none"> • sufficiently identifiable for any leaks to be apparent • which must disappear when the gas is completely burnt.

- (1) H gas: Gas with a high calorific value. B gas: Gas with a low calorific value. These provisions are applicable to natural gas distributed through the public distribution system (orders of 16/9/1977 and 28/03/1980).
- (2) Ministerial order of July 13, 2000 regulating the safety of distribution of combustible gases through pipelines, and the associated specifications for the "Odorization of distributed gas".
- (3) "Transmission" Order of January 28, 1981 on the sulphur and sulphur compound content of natural gases.
The conversion of the water dew point to water content and vice versa is done in accordance with ISO 18 453 "Natural gas – Correlation between water content and water dew point." (Gergwater correlation).
- (4) "Transmission" and "distribution" Orders of January 28, 1981 on the sulphur and sulphur compound content of natural gases.
- (5) Decree of March 19, 2004 on the public service obligations in the gas sector.
- (6) This specification only applies legally for exit points from the transmission system to the distribution system and to Customers. With the odorization technique currently used by GRTgaz (THT-based centralised odorization) and with gases that are usually very low in mercaptan sulphur content less than 2 mgS/m³(n)), GRTgaz does its best to deliver a gas which has a consistent odour. This corresponds to a THT content of between 15 and 40 mg/m³(n).
- (7) Decree No. 2016-348 of March 23rd 2016. This specification applies to exit points from the transmission system to the distribution system and to Customers located in the geographic areas being converted B gas / H gas, at the latest at the date when the delivery pressure is decreased at the individual customer consuming B gas and until the date when gas

delivered becomes H gas. It also applies to the exit from the transmission system to the storage of Gournay-sur-Aronde as long as the gas stored there is B gas.

Purification of gas delivered to Distributors and Customers

The delivery stations are fitted with a standard filter manufactured to specifications that will trap a proportion of solid particles of a specific size. Despite the presence of this filter, the Natural Gas delivered may contain certain elements, in particular solid and/or liquid phases, to which some Customers' facilities may be sensitive. In this case, it is the responsibility of the Customer to install a filtration and/or treatment system to ensure that their facilities properly operate with the Natural Gas delivered.

7.3 Pressure and temperature requirements

7.3.1 Requirements for the Connections with distributors and Customers

A distributor or Customer who wishes to have a Connection into GRTgaz' system must establish a Connection Contract with GRTgaz, where in particular the pressure and temperature of the gas delivered are specified.

Pressure of the gas delivered

The Connection Contract specifies the minimum and maximum pressures for the gas on delivery. The pressure can be guaranteed, beyond the standard pressure available on the system, on terms specified in the Connection Contract, in keeping with a general published framework.

Temperature of the gas delivered

The Connection Contract can specify the minimum and maximum temperature of the gas on delivery. Specific equipment can be installed on the delivery station to heat up the gas, on the terms specified in the Connection Contract.

7.3.2 Requirements for Connections with other operators

An operator who wishes to have a connection into the GRTgaz system must establish an Interconnection Contract, which lays down the conditions for delivery and withdrawal of the gas between the operators on either side of the Connection.

This interconnection agreement sets a reference pressure, a minimum reference temperature and a maximum reference temperature for each direction of the flow of the gas to the Connection.

In any case, the reference pressure in a given direction of flow cannot be greater than the maximum operating pressure in the downstream pipeline and the reference temperature must be between 0°C and 60°C.

Procedures for pressure

In this paragraph, the notion of the Upstream or Downstream Operator should be understood in terms of the physical direction of flow of the gas, and not in relation to the GRTgaz system.

In the Interconnection Contract, depending on the physical direction of flow of the gas, the Upstream Operator undertakes to deliver to the Downstream Operator, and the Downstream Operator agrees to withdraw, under threshold pressure conditions, the quantities of gas flow that can physically be exchanged at the Connection.

On this basis, the parties specify pressure conditions at the Connections such that:

- The delivery pressure is below the maximum operating pressure of the downstream system.
- The Downstream Operator cannot demand from the Upstream Operator a delivery pressure greater than the reference pressure.
- The Upstream Operator cannot demand from the Downstream Operator a withdrawal pressure lower than the reference pressure.

Procedures for temperature

Similarly, the parties specify conditions for the temperature of the gas at the Connection such that neither of the parties can require the other to provide temperatures that do not fall between the minimum and maximum reference temperatures.

Article 8 Operating, monitoring and maintenance conditions

Facilities are operated, monitored and maintained in accordance with existing regulatory requirements. GRTgaz handles liquid phase phenomena as a Prudent and Reasonable Operator, without prejudice as regards the provisions of paragraph 5.2 on the purification of the gas delivered.

Article 9 Intervention procedures

In accordance with existing regulations, the procedures specifying the organization, resources and methods that GRTgaz employs when carrying out repair or maintenance works on the system, or in the event of an accident on the system, are specified by:

- **Company health and safety rules**, under the Labour Code Part 1 Book III Title I and Title II Chapter I and under article L4122-1.
- **A Safety and Intervention Plan (PSI)**, under Article R555-42 of the Code of Environment. The PSI specifies the procedures for the organization, resources and methods that GRTgaz will implement in the event of an accident on the system for protecting the staff, the population and the environment and defines the relationship with the public emergency authorities and how it articulates with the ORSEC plan.
- **A Prevention Plan or General Coordination Plan**: As a general rule, there is a Prevention Plan, unless the characteristics of the site and the level of joint activities between operators requires the services of a safety coordinator.
 - Prevention Plan: Labour Code Regulatory Part Book V Title I (codifying the Decree No. 92.158 of February 20th 1992) and modified Order of March 19, 1993 setting, implementing Article R. 4512-7 of the Labour Code, the list of the dangerous works for which a prevention plan must be put in writing.
 - General Coordination Plan for safety and health protection: Labour Code Legal Part Part 4 Book V Title III (codifying the Law of December 31, 1993) and Labour Code Regulatory Part Book V Title III (codifying the order of December 26, 1994).

- Environment Code Book V Title V Chapter IV : Legal and Regulatory Part (Article R. 554-1 and following) on the execution of works in the vicinity of certain underground, overhead or underwater transport or distribution structures, and its implementing orders.

In addition, these legal requirements may be supplemented by additional provisions, applied locally under the authority of the Plant Manager.

GRTgaz meets the requirements of the Articles R 121-8 and following of the Energy Code regarding the scheduling of interruptions in gas transportation.