ANNEX 4

PRESSURE SAFETY AND TEMPERATURE SAFETY

HYDROGEN DELIVERY STATION

8 BAR

Representative/Author	Initials	Company	Date	Signature

This Annex 4 template serves as an example in which a delivery pressure of 8 bar (g) has been specified, together with the corresponding design pressure applicable to Connected Party's Facilities. It is noted that a higher delivery pressure may require a higher design pressure for Connected Party's Facilities.

Information relating to the design pressure of Connected Party's Facilities shall be made available by HNS upon request.

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1 General description

This Annex 4 (*Pressure Safety and Temperature Safety*) describes the mechanisms and procedures for safeguarding and control of pressure and temperature (together, the 'Pressure Safety and Temperature Safety'), in relation to the technical integrity of the Connection. HNS shall operate their Facilities as an open grid for unidirectional Gas Flow. HNS is responsible for Pressure Safety at the Connection, including all downstream pipework up to the next pressure boundary. Connected Party shall not cause any Reverse Gas Flow into the HNS Transport System. For the purposes of this provision, "Reverse Gas Flow" means the delivery of Gas from Connected Party into the HNS Transport System.

2 Abbreviations and units

abbreviations	**description**	**unit**
DPu	design pressure upstream (HNS)	bar (g)
DPd	design pressure downstream (Connected Party)	bar (g)
MOPu	maximum operating pressure upstream (HNS)	bar (g)
MOPd	maximum operating pressure downstream (Connected Party)	bar (g)
LOPu	lowest operating pressure upstream (HNS)	bar (g)
LOPd	lowest operating pressure downstream (Connected Party)	bar (g)
MIPu	maximum incidental pressure upstream (HNS)	bar (g)
MIPd	maximum incidental pressure downstream (Connected Party)	bar (g)
DTu	design temperature upstream (HNS)	°C
DTd	design temperature downstream (Connected Party)	°C
MOTu	maximum operating temperature upstream (HNS)	°C
MOTd	maximum operating temperature downstream (Connected Party)	°C
LOTu	lowest operating temperature upstream (HNS)	°C
LOTd	lowest operating temperature downstream (Connected Party)	°C
MITu	maximum incidental temperature upstream (HNS)	°C
MITd	maximum incidental temperature downstream (Connected Party)	°C

3 Standards

The Pressure Safety shall comply with the following National and International Standards:

(a) NEN 1059:2019, Dutch edition, based on NEN-EN 12186 and NEN-EN 12279 - Gas supply systems - Gas pressure regulating stations for transmission and distribution;
(b) NEN 3650-1:2020, Dutch edition - Requirements for pipeline systems - Part 1: General requirements, Chapter 1 to 7 inclusive;
(c) NEN-EN 15001-1:2023, Gas Infrastructure - Gas installation pipework with an operating pressure greater than 0.5 bar for industrial installations and greater than 5 bar for industrial and non-industrial installations - Part 1: Detailed functional requirements for design, materials, construction, inspection, and testing.

In the event of newly published National and International Standards, the Parties shall discuss in good faith whether to implement the changes introduced by such standards.

4 Design specification

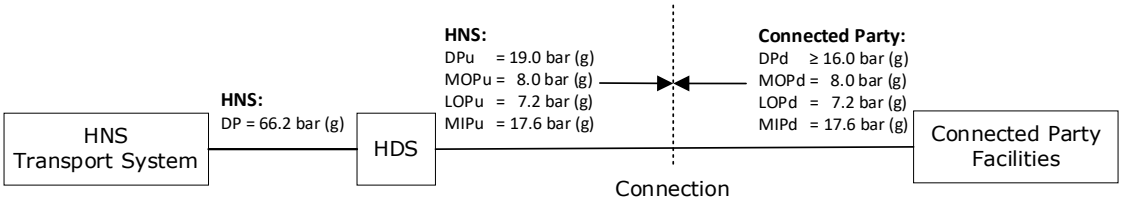
HNS:
The design pressure (DP) upstream of the HDS of the Facilities is 66.2 bar (g).
The design temperature (DT) upstream of the HDS of the Facilities is -20 °C to +50 °C.
The design pressure upstream (DPu) of the Connection is 19.0 bar (g).
The design temperature upstream (DTu) of the Connection is -20 °C to +50 °C.

Connected Party:
The design pressure (DPd) of the Facilities is ≥16.0 bar (g).
The design temperature (DTd) of the Facilities is ≤0 °C to ≥+50 °C.

5 Pressure devices and their settings

HNS:
An HDS is installed between the HNS Transport System and the Connection.
The pressure regulating system shall maintain the pressure within limits acceptable to the downstream system. The setpoint shall not exceed the maximum operating pressure (MOP). However, the operating pressure may temporarily exceed the setpoint due to the dynamic nature of the system. The pressure regulating system shall prevent the pressure downstream from exceeding the design pressure downstream (DPd).
The Pressure Safety system shall operate automatically to prevent the pressure in the downstream system from exceeding permitted levels, taking setting tolerances into account, in the event of a failure of the pressure regulating system.
For upper pressure limits, refer to Appendix 1: Alarm and trip setting table. Lower pressure limits are not defined. The pressure settings of regulators and safety devices are shown in detailed P&ID in Appendix 2.
The maximum pressure variation downstream of the HDS system is 0.8 bar (g).
The maximum operation pressure upstream (MOPu) after the HDS is 8.0 bar (g).
The design of the pressure control and pressure safeguarding systems complies with the standards NEN 1059:2019 and NEN-EN 15001-1:2023.

Connected Party:
For regulated gas pressure, a pressure control system within Connected Party's system is not mandatory.
The design of Connected Party's Facilities complies with the Dutch Design Standard NEN-EN 15001-1:2023.
NEN-EN 15001-1:2023 has been harmonized to address the essential safety requirements of the Pressure Equipment Directive (PED, 2014/68/EU), which is applicable to the joining of gas installation pipework (assemblies) falling within the scope of the PED.



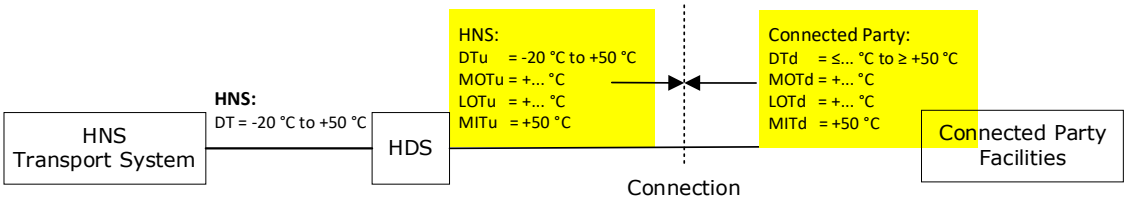
HNS is responsible for ensuring that the pressure at the Connection does not exceed the maximum operating pressure (MOP).

6 Temperature devices and their settings

HNS:
The Gas at the Connection shall comply with the temperature specification as published by the Competent Authority, as may be amended from time to time.
HNS shall be entitled to implement the MOTu. The maximum permissible value of the MOTu shall be limited by the design temperature (DT) of the HNS Transport System.

The design of the temperature control and temperature safeguarding systems is in accordance with the approach set out in the Dutch design standard NEN 3650-1.
The maximum operating temperature upstream (MOTu) is xx.x °C.
The lowest operating temperature upstream (LOTu) is +xx.x °C.

Connected Party:
The design of the temperature control and temperature safeguarding systems is in accordance with the Dutch Design Standard NEN-EN 15001-1:2023.
A temperature safeguarding device is not required if the design temperature downstream (DTd) upper limit is equal to or higher than the design temperature upstream (DTu) upper limit.
The design temperature downstream (DTd) is less than or equal to 0 °C and greater than or equal to +50 °C.
The maximum operating temperature downstream (MOTd) is +xx.x °C.
The lowest operating temperature downstream (LOTd) is + xx.x °C.
The maximum incidental temperature downstream (MITd) is +50.0 °C.



HNS shall ensure that the temperature at the Connection does not exceed the maximum operating temperature (MOT).

7 Reliability and maintenance of pressure safety and temperature safety systems

HNS:
HNS shall verify pressure safety through periodic functional testing of the relevant systems and equipment. A temperature safety system is not mandatory.
The test results shall be documented and made available for Connected Party upon request.
The scope and frequency of maintenance and testing shall comply with the Dutch standard NEN 1059:2019.

Connected Party:
Pressure Safety and Temperature Safety systems are not mandatory.
Connected Party shall have the pipelines and pressure equipment periodically inspected by an accredited inspection service or a Notifies Body (NOBO).
Inspection results shall be documented and made available to HNS upon request.
The scope and frequency of maintenance and testing shall comply with the "Warenwet Regeling Druk-Apparatuur" (WRDA).

8 Exchange of information

(a) Before commencing Gas Flow, HNS and Connected Party shall exchange Process & Instrumentation Diagrams (P&ID's) showing all relevant control loops as well as Pressure Safety and Temperature Safety systems, including the actual settings;
(b) Connected Party shall provide HNS with the declaration of conformity issued by the legally designated inspection service;
(c) Parties agree to exchange information relating to the control and safeguarding of pressure and temperature upon the request of either Party.
(d) Connected Party is entitled to witness the inspection results of any part of the pressure safeguarding system.
(e) Prior to decommissioning any pressure safety system, Parties are obligated to inform the other Party.

9 Pressure safeguarding diagram and alarm and trip setting table

The actual pressure settings at the Connection are documented in the alarm and trip setting table.
The existing safety systems are shown in the detailed P&ID, drawing number X-YZ-xxx-xxx.

HNS is responsible for preparing and updating both the alarm and trip setting table and the detailed P&ID.

Appendix 1: Alarm and trip setting table

Appendix 2: Detailed P&ID