ANNEX 4

PRESSURE SAFETY AND TEMPERATURE SAFETY

Representative/Author	Initials	Company	Date	Signature

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1 General description

This Annex 4 (*Pressure Safety and Temperature Safety*) describes the mechanisms and procedures regarding safeguarding on pressure and temperature, and for control on pressure and temperature (together, the Pressure Safety and Temperature Safety), in relation to the technical integrity of the Connection. Connected Party and HNS shall operate their Facilities as an open grid for unidirectional Gas Flow. Connected Party is responsible for the Pressure Safety at the Connection. HNS is responsible for the (passively acting) Pressure Safety of the HNS Transport System at the Connection.
The Parties shall install and maintain the Pressure Safety and Temperature Safety at their respective Facilities.

2 Abbreviations and units

abbreviations	**description**	**unit**
DPu	design pressure upstream (Connected Party)	bar (g)
DPd	design pressure downstream (HNS)	bar (g)
MOPu	maximum operating pressure upstream (Connected Party)	bar (g)
MOPd	maximum operating pressure downstream (HNS)	bar (g)
LOPu	lowest operating pressure upstream (Connected Party)	bar (g)
LOPd	lowest operating pressure downstream (HNS)	bar (g)
MIPu	maximum incidental pressure upstream (Connected Party)	bar (g)
MIPd	maximum incidental pressure downstream (HNS)	bar (g)
DTu	design temperature upstream (Connected Party)	°C
DTd	design temperature downstream (HNS)	°C
MOTu	maximum operating temperature upstream (Connected Party)	°C
MOTd	maximum operating temperature downstream (HNS)	°C
LOTu	lowest operating temperature upstream (Connected Party)	°C
LOTd	lowest operating temperature downstream (HNS)	°C
MITu	maximum incidental temperature upstream (Connected Party)	°C
MITd	maximum incidental temperature downstream (HNS)	°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-EN 12186:2014, English edition - Gas supply systems - Gas pressure regulating stations for transmission and distribution - Functional requirements;
(c) NEN 3650-1:2020, Dutch edition - Requirements for pipeline systems - Part 1: General requirements, Chapters 1 to 7 inclusive.

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

Connected Party:
The design pressure (DPu) of the Facilities is ≥66.2 bar (g)[1]; for reference, see Article 9 of this Annex 4. Design temperature (DTu) of Facilities is -xx °C to +xx °C.

HNS:
The design pressure (DPd) of the Facilities is 66.2 bar (g); for reference, see Article 9 of this Annex 4. Design temperature (DTd) of Facilities is -20 °C to +50 °C.

5 Pressure devices and their settings

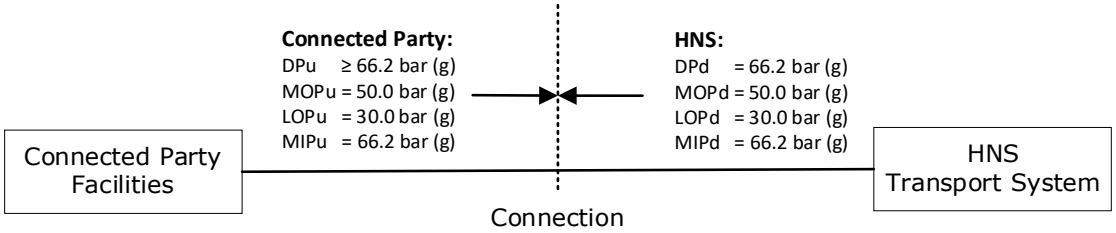
The temporary operational pressure range of 30.0 to 50.0 bar (g), as determined by HNS, can be increased towards the maximum operational pressure of 66.2 bar (g), with a corresponding operational pressure range of 46.2 bar (g) to 66.2 bar (g). Should HNS decide to increase the operational pressure, it shall provide a notice period of 48 months.

5.1 Temporary operational pressure range of 30.0 bar (g) to 50.0 bar (g)

Design of pressure control and pressure safeguarding systems is in accordance with the approach of the Dutch design standard NEN 3650-1. The controller setpoint is based on the lowest value of MOPu and MOPd, in this Annex 4 the MOPd of the HNS Transport System with a pressure of 50.0 bar (g).
The pressure safety setpoint is based on the lowest value of MIPu and MIPd, in this Annex 4 the MIPd of the HNS Transport System with a pressure of 66.2 bar (g).

Connected Party:
The setpoint of the pressure (override) control shall be less than or equal to 50.0 bar (g), with an accuracy of ±5%.
The pressure safeguarding device shall have a setpoint less than or equal to 66.2 bar (g) (MIPd), taking into account the inaccuracy and dynamic behaviour of the pressure safety system; the MIPd shall not be exceeded.

HNS:
The maximum operating pressure downstream MOPd is 50.0 bar (g).



The Parties are responsible for ensuring that the pressure at the Connection does not exceed the MOP.

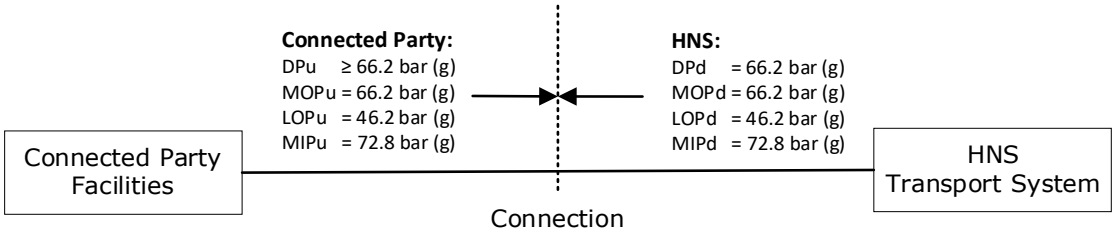
[1] The maximum incidental pressure (MIP) of the HNS Transport System is identical to that of Connected Party's Facilities, as it is limited to 110% of the design pressure (DP). The setpoints of the pressure protection systems should be configured sufficiently low to ensure that the MIP is not exceeded.

5.2 Envisaged operational pressure range of 46.2 bar (g) to 66.2 bar (g)

Design of pressure control and pressure safeguarding systems is in accordance with the approach of the Dutch design standard NEN 3650-1. The controller setpoint is based on the lowest value of MOPu and MOPd, in this Annex 4 the MOPd of the HNS Transport System with a pressure of 66.2 bar (g).
The pressure safety setpoint is based on the lowest value of MIPu and MIPd, in this Annex 4 the MIPd of the HNS Transport System with a pressure of 72.8 bar (g).

Connected Party:
The setpoint of the pressure (override) control shall be less than or equal to 66.2 bar (g) minus the controller's accuracy.
The pressure safeguarding device shall have a setpoint less than or equal to 66.2 bar (g) (MIPd), taking into account the inaccuracy and dynamic behaviour of the pressure safety system; the MIPd shall not be exceeded.

HNS:
The maximum operating pressure downstream MOPd is 66.2 bar (g).



The Connected Party is responsible for ensuring that the pressure at the Connection does not exceed the MOP.

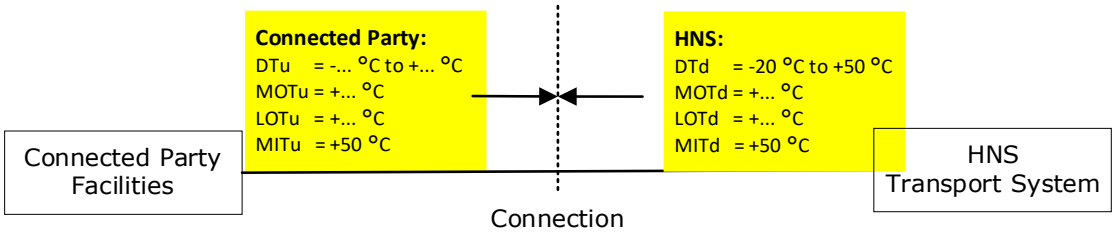
6 Temperature devices and their settings

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 MOTd. The maximum permissible value of the MOTd shall be limited by the Design Temperature (DTd) 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 controller setpoint is based on the lowest value of MOTu and MOTd.
The temperature safety setpoint is based on the lowest value of MITu and MITd; in this Annex 4 the MITd of the HNS Transport System is 50.0 °C.

Connected Party:
The controller setpoint is based on the lowest value of MOTu and MOTd.
The temperature safeguarding device shall have a setpoint less than or equal to MIT 50 °C, taking into account the inaccuracy and the dynamics of the temperature safety system; the MITd shall not be exceeded.

HNS:
The MOTd shall be less than or equal to the temperature specification as published by the Competent Authority.



The Connected Party is responsible for ensuring that the temperature at the Connection does not exceed the MOT.

7 Reliability and maintenance of the Pressure Safety and Temperature Safety systems

The Parties shall verify the Pressure Safety and Temperature Safety through periodic functional testing of the relevant systems and equipment. Test results must be documented and made available to each Party upon request. The extent and frequency of maintenance and testing shall be in accordance with the aforementioned standard NEN 3650-1 and with the applicable procedures valid in the country of installation.

8 Exchange of information

(a) Before commencing the transmission of the Gas, Connected Party and HNS shall exchange P&IDs (Process & Instrumentation Diagrams) showing all relevant control loops and Pressure Safety and Temperature Safety systems, including the actual settings;
(b) Connected Party shall provide HNS with the test results of the initial and annual tests of the Pressure Safety and Temperature Safety systems at Connected Party's Facilities;
(c) The Parties agree to exchange pressure safeguarding and temperature safeguarding information upon request of either Party;
(d) The Parties are allowed to witness inspections of any part of the safeguarding system on pressure and temperature;
(e) HNS shall perform a verification of the maintenance carried out on the safeguarding systems on pressure and temperature at Connected Party's Facilities on a regular basis;
(f) Prior to taking any pressure safety or temperature safety system out of service, the Parties have the obligation 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 documented in the pressure safeguarding diagram (PSD, drawing number x-xxx-xx-xxx-x) and have been included in this Annex 4.

HNS is responsible for preparing and updating both the alarm and trip setting table and the PSD.

Appendix 1: Alarm and trip setting table pressure range of 30.0 bar (g) to 50.0 bar (g)

Appendix 2: Alarm and trip setting table pressure range of 46.2 bar (g) to 66.2 bar (g)

Appendix 3: Pressure Safeguarding Diagram