

Third Party Connections (IGT & UIP)

Selection of Pipeline Materials when connecting to 2-7 barg Network

1. Introduction

This briefing note is intended to provide guidance to all personnel who scope/design & undertake connections onto Cadent's 2-7 barg Intermediate Pressure (IP) network, specifically regarding the selection of pipeline material for below 0 °C gas temperatures.

2. Guidance

When Cadent receive an IP enquiry or request for a connection to the 2-7 barg (IP) network, Cadent will carry out Heat Recovery calculations to determine if the temperature of the gas recovers to 0 °C by the time it reaches the proposed connection point to our parent main. The reason Cadent will be completing Heat Recovery Calculations is that there are some operational circumstances where AGI's can output cold gas. This information can be used to ensure that the design for the connection is in accordance with IGEM/TD/3 which covers PE pipelines operating at a temperature of 0 °C to 20 °C inclusive.

Cadent will not change the maximum operating pressure (MOP) of a pipeline because of a connection request. However, the MOP of the connection point shall be considered as other operational restrictions placed on the network may have reduced the MOP. Permanent restrictions could allow for differing pipework to be used (refer to Tables B1, B2 & B3 of GIS/PL-2 Part 8).

Once Cadent have processed your enquiry or request we will inform you if the temperature of the gas has recovered to 0 °C by the time it reaches the connection point. A Planning Data Sheet (FM352) will be provided which will contain all the information required for Heat Recovery Calculations (see section 5 for an example). When requesting Land Enquiry, Quote or Fast Track application the process and SLA will remain with the inclusion of a PDS in the response. Where a Pressure Tier Information is requested via FM176, for IP submission the SLA shall rise to 5 working days.

The Heat Recovery Calculations will help you to make an informed decision on the material selection from the initiation of the project.

An example of the PDS are shown in Section 5.

3. Document References

This guidance takes into Consideration key elements from several documents which are detailed below with the rationale and impact:

CAD/PM/MSL/1 - *Management and Work Procedure for: Main Laying and Service Laying on system operating at pressures up to and including 7bar.*

"Table M 2.3 - Page 111 - The combinations of diameter and SDR, together with their Maximum Operating Pressures for the temperature range 0oC to 20oC for both PE80 and PE100 is shown in Table M 2.3 below.

GIS/PL-2 Part 8 - *Polyethylene pipes and fitting for natural gas and suitable manufactured gas - Pipes up to 7 Bar*

Table B3 - Diameter and maximum operating pressures for PE100 Orange polyethylene pipe

IGEM/TD/13 - *Pressure regulating installations for Natural Gas, Liquefied Petroleum Gas and Liquefied Petroleum Gas/Air Section 7.6.2 & 7.6.4*

GD/SP/E/28 - *The Design of Pressure Regulating Installations with Inlet Pressure not exceeding 100Barg*

11.1.4 - It is possible to minimise some of the effects of sub-zero operation by the use of special backfill materials for an appropriate distance to allow temperature recovery by ground heat effect. The effect of ground heat recovery can be predicted by use of software tools such as HTREC. This allows the user to determine the temperature profile along the pipeline and predict the distance for the temperature to return to an acceptable level.

IGEM/TD/3 - *Steel and PE pipelines for Gas Distribution*

Table 5 - Operating Pressure limits for grades of PE for the temperature range 0 to 20°C

4. Contact Details

For further information or queries please email box.ComplexExitConnections@cadentgas.com

5. Attachments

Example PDS Response (FM352)

Cadent Gas Connection Projects - Planning Datasheet

Project Name: CRM reference number and Project Name
 LDZ: Distribution Area
 Date of Issue: Date Analysis completed

Design Parameters for IP		Unit
Existing outlet pipeline material and diameter		IP outlet size and material
Safe Operating Limit (SOL)	IP SOL	barg
Design Pressure (DP)	IP Minimum design pressure	barg
Maximum Operating Pressure (MOP)	Maximum IP network pressure	barg
Minimum Operating Pressure	Minimum IP network pressure	barg
Normal Operating Pressure	Source pressure at connection point	barg

Pressure accepted by customer (1-20)

Upstream AGI(s)	Heating system	Pre-heat redundancy	Distance from connection point	Inlet maximum operating pressure	Gas Flow through AGI
Name of influencing AGI/s	System heating type	Indication of whether redundancy exists	AGI distance from Connection Point	MOP of AGI	kscmh

Additional Information:

The screenshot shows a software window with the following data:

Inlet Press		Outlet Press		Gas Flow	
37.2 barg	7.0 barg	22.5 kscmh			
Inlet Temp		Outlet Temp		Heat Input	
5.7 DegC	-11.9 DegC	0.0 kW			
Ground Temp		Diameter		Soil Condition	
5.7 DegC	250 mm	Wet			

Dist (km)	Temp (dgC)						
0.00	-11.90	0.41	-8.32	0.95	-4.74	1.71	-1.16
0.04	-11.54	0.46	-7.96	1.01	-4.38	1.81	-0.80
0.08	-11.18	0.51	-7.60	1.06	-4.02	1.91	-0.44
0.11	-10.83	0.56	-7.24	1.14	-3.66	2.02	-0.08
0.15	-10.47	0.61	-6.89	1.21	-3.30	2.13	0.28
0.19	-10.11	0.66	-6.53	1.29	-2.95	2.26	0.64
0.24	-9.75	0.71	-6.17	1.37	-2.59	2.39	0.99
0.28	-9.39	0.77	-5.81	1.45	-2.23	2.53	1.35
0.32	-9.03	0.83	-5.45	1.53	-1.87	2.69	1.71
0.37	-8.68	0.89	-5.09	1.62	-1.51	2.86	2.07
						10.63	5.65

Gas Spec Heat: 2122 J/kg K Elapsed Time: 1.0 Days

Distance taken for heat to recover to 0 degrees using the above design parameters