

## **Supplementary Specification for GIS/E34**

**Pressure Regulating Modules with Inlet Pressures Above 75 mbar but No Greater Than 7 Bar for Regulators with Design Flow Rates Greater than 6 m<sup>3</sup>/h**

**CAD/SP/E/34**

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**Mandatory & Non-Mandatory requirements:**

In this document:

**Shall:** Indicates a mandatory requirement.

**Should:** Indicates best practice and is the preferred option. If an alternative method is used then a suitable and sufficient risk assessment must be completed to show that the alternative method delivers the same, or better, level of protection. This must be accepted by the company.

**The Company:** Any reference in this document to 'The Company' shall be taken to mean Cadent Gas Ltd.

## Document History

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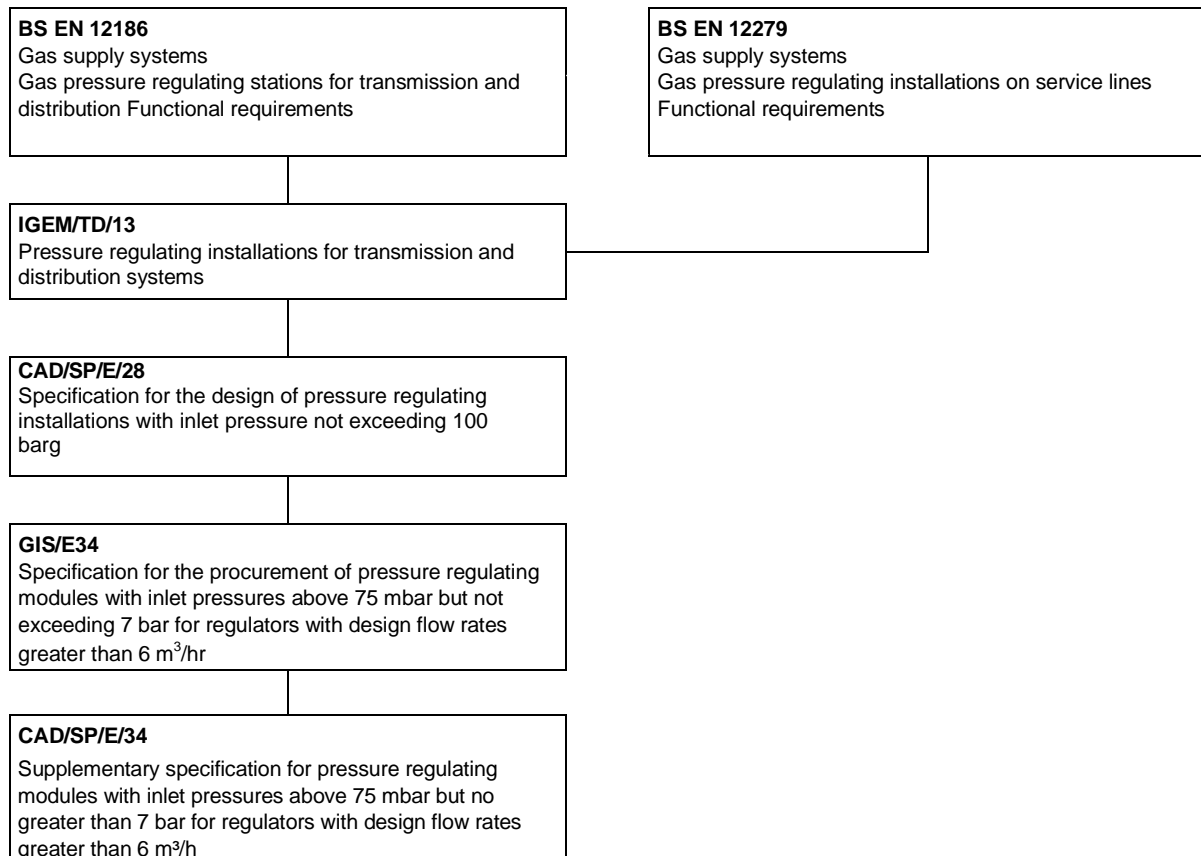
## Order of Precedence with other Publications

The order of precedence for applying codes, standards and regulations quoted in this specification shall be:

1. UK Law and Statutory Regulations
2. This Specification – CAD/SP/E/34
3. GIS/E34
4. CAD/SP/E/28
5. Referenced national, international and industry codes
  - i. IGEM/TD/13
  - ii. BS EN 12186
  - iii. BS EN 12279

Areas of apparent conflict between documents shall be brought to the attention of the company for resolution via a technical query to Engineering Services.

In the event of a conflict between this document and a relevant law or regulation, the relevant law or regulation shall be followed.



## Introduction

The manufacture of pressure regulating modules in accordance with this document shall in all respects conform to the requirements of GIS/E34:2021, furthermore referenced as GIS/E34 within this document, except where modified or additional clauses are made by this document. These modified or additional clauses are identified through the following descriptors:

Add: This identifies that the following is an additional clause made by this supplement over GIS/E34

Modify: This identifies that the following is a modification to the indicated clause made within GIS/E34

The additional or modified clauses correspond to the applicable clause number in GIS/E34 and shall take precedence over the corresponding guidance in GIS/E34.

Clauses in GIS/E34 that remain unchanged are not repeated in this document.

Where alternative standards and specifications are proposed to be used by suppliers, these shall be formally submitted to the Company for review. The Company Project Manager shall ensure suitable engineering assessments have been undertaken on these standards. The Supplier shall only use the alternative specification where express written permission is given.

The Purchaser shall provide a completed Module Enquiry Request Form – Section A given in Appendix F and Purchase Order Quality Requirements (POQR) form in Appendix G to the Supplier upon submission of a purchase order.

Once a purchase order has been received, the Supplier shall return to the Purchaser a completed Module Enquiry Return Form – Section B given in Appendix F and the minimum documentation identified in the POQR in Appendix G.

Company referenced specifications beginning with the prefix GD may have been superseded by the prefix CAD after the time of publication of this document, however the most recent document shall be referenced in the procurement order (Confirm with Company).

## 1. Scope

This document specifies additional or modified requirements for the manufacture of pressure regulating modules as identified in GIS/E34 with inlet pressures above 75 mbarg but no greater than 7 barg.

This supplement shall only be applied for:

- Pressure reduction installations (PRI) with design flow rates greater than 200 m<sup>3</sup>/h
- or
- Where main pipework is larger than 50 mm or 2-inch diameter

## 2. Normative References

Add:

This Specification makes references to the documents listed in Appendix A. Unless otherwise specified, the latest editions of the documents apply, including all amendments.

## 3. Terms and Definitions

No amendments made to this section

## 4. General Requirements

### 4.4. Lifting and Support

#### 4.4.6. Modify:

All above ground supports, foundations and where mechanical equipment is supported within a structural steel frame, shall be designed in accordance with CAD/SP/CE/1, CAD/SP/CE/2 and CAD/SP/CE/4 as appropriate.

### 4.9. Documentation

Add:

Add the following:

- g) The minimum certification and level of documentation required for the components and materials as identified in Appendix B in accordance with BS EN 10204.

**Note:** *Appendix B is not exhaustive, if a component is not listed in Table B.1, the required documentation shall be agreed with the Company.*

- h) Certification that a Global Conformity Assessment of the PRI has been carried out in accordance with Pressure Equipment Directive 2014/68/EU (PED).

## **5. Construction of Modules**

### **5.1. General**

#### 5.1.5. Modify:

Covers for buried modules shall conform to CAD/SP/CE/4.

#### 5.1.7. Add:

Where control or impulsing systems bridge a cathodic protection insulating joint or flange, suitable means of electrically isolating the small-bore pipework shall be provided e.g. small-bore insulation joints or dielectric tube fittings.

## **6. Components**

### **6.1. Stream Isolation Valves**

#### 6.1.1. Modify:

Stream isolation valves shall be fitted on the inlet and outlet of each stream and shall conform with GIS/V7-1 or alternatively, BS EN 13774 subject to the additional requirements given in Appendix C. Ball valves shall comply with BS EN ISO 17292.

### **6.5. Stream Discrimination**

#### 6.5.3.9. Add:

Non-return valves (NRV) shall conform to the performance requirements specified in IGEM/TD/13, Appendix 7 - Performance Requirements for Stream Discrimination NRV's.

## **7. Testing**

No amendments made to this section

## **8. Materials**

### **8.1. Pipe Materials**

#### 8.1.1. Modify:

Pipe materials shall conform to;

- a) GIS/L2
- b) API 5L - PSL 2 / BS EN ISO 3183 - PSL 2 as supplemented by Appendix D

The following may be used but only with prior agreement from the Company with appropriate requirements of GIS/L2;

- c) BS EN 10216-1;
- d) BS EN 10217-1;

#### 8.1.2. Modify:

Pipe to BS EN 10255 (medium or heavy plain ended) shall not be used.



## 8.6. Malleable Iron

### 8.6.1. Add:

The use of malleable iron for impulse and auxiliary pipework fittings shall be limited up to 2 barg and be in compliance with the standard listed in Table 1.

## 9. Impulse Pipe and Auxiliary Pipework

### 9.1. Modify:

Impulse and auxiliary pipework shall be designed to conform to BS 6739 and materials shall conform to a Company, national or international standard as given in Table 1:

**Table 1 - Impulse and auxiliary pipework**

	Carbon Steel (Auxiliary Pipework)	Stainless Steel (Impulse Pipework)	Malleable Iron (Fittings)
Pipe	Refer to Section 8	ASTM A269 – TP 316, TP 321 or TP316L  BS EN 10216 – 5  Steel numbers: 1.4401, 1.4541, 1.4404 or 1.4435	
Fittings	Refer to Section 12		BS 143/1256  BS EN 10242
Compression Fittings		GIS/F9	

### 9.10. Add:

Critical pipework is defined as that which provides a primary safety, sensing or control function such as:

- a) Sensing pipework to safety devices (slamshut or slam open valves), direct acting regulators, monitor regulators or pilots, outlet pressure limiting pilots or controllers
- b) Auxiliary pipework connecting control systems to inlet or outlet pipework.

### 9.11. Add:

Copper shall not be used for any pipework application.

## 10. Flanges

### 10.1. Modify:

Flanges shall be PN 16 and conform to GIS/F7, BS EN 1092-1 as supplemented by Appendix E or BS EN 1092-2.

### 10.2. Modify:

Where the corresponding flange on a component does not have the same number of bolts or bolt circle pattern, typically found on legacy installations, in these cases blank PN 16 flanges will be modified to align to the bolt circle pattern and number of bolts in conformance to BS 10 or BS 1560 to match component connections.

### 10.3. Modify:

Gaskets for use with raised-face flanges shall comply with the specification within CAD/SP/E/55.

### 10.4. Modify:

Bolting materials, dimensions and procedures shall conform to CAD/SP/E/55.

## 11. Special Forgings

No amendments made to this section

## 12. Fittings

### 12.1. Modify:

Fittings shall conform to one of the following standards:

- a) GIS/F7.
- b) BS EN 10253-2 as supplemented by Appendix E
- c) ASTM-A234 WPB as supplemented by Appendix E

## 13. Screwed Pipework and Fittings

### 13.5. Modify:

Threads shall conform to CAD/SP/E/55.

## 14. Welding

### 14.1. Modify:

Welding procedures and controls shall meet the standards outlined within BS 2971 or CAD/SP/P/1. In either case, the Non-Destructive Testing (NDT) regime for welds on the PRI shall be applied as per Table 2 below in line with the PRI risk level which shall be specified by the purchaser on the manufacturer enquiry form given in Appendix F.

If a PRI, upon assessment, matches any of the risk level identifiers within any of the three risk levels, the PRI shall be inspected as per the highest risk level that the risk level identifier was recognised within.

**Table 2 - Welding NDT Inspection**

PRI Risk Level	Risk Level Identifier	NDT Inspection Type and Extent
High Risk	<ul style="list-style-type: none"> <li>• All installations with inlet pressure above 2 barg</li> <li>• Capacity of PRI above 25000 m<sup>3</sup>/hr</li> </ul>	<ul style="list-style-type: none"> <li>• Butt weld / Girth weld               <ul style="list-style-type: none"> <li>○ 100% Visual Inspection</li> <li>○ 10% X-ray Testing or Ultrasonic Testing (UT)</li> </ul> </li> <li>• Fillet Welds &amp; All other Welds               <ul style="list-style-type: none"> <li>○ 100% Visual Inspection</li> <li>○ 100% Magnetic Particle Inspection (MPI)</li> </ul> </li> </ul>
Medium Risk	<ul style="list-style-type: none"> <li>• Capacity of PRI up to 25000 m<sup>3</sup>/h</li> <li>• Supplies more than 10 properties (District Governor)</li> </ul>	<ul style="list-style-type: none"> <li>• Butt weld / Girth weld               <ul style="list-style-type: none"> <li>○ 100% Visual Inspection</li> <li>○ 10% X-ray Testing or Ultrasonic Testing (UT)</li> </ul> </li> <li>• Fillet Welds &amp; All other Welds               <ul style="list-style-type: none"> <li>○ 100% Visual Inspection</li> <li>○ 10% Magnetic Particle Inspection (MPI)</li> </ul> </li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>• Capacity of PRI up to 200 m<sup>3</sup>/h</li> <li>• Supplies 10 or fewer properties (Service governors)</li> </ul>	<ul style="list-style-type: none"> <li>• Butt weld / Girth weld               <ul style="list-style-type: none"> <li>○ 100% Visual Inspection</li> </ul> </li> <li>• Fillet Welds &amp; All other Welds               <ul style="list-style-type: none"> <li>○ 100% Visual Inspection</li> </ul> </li> </ul>

14.4. Add:

All NDT requirements shall be completed as per CAD/SP/NDT/2.

14.5. Add:

If the percentage of radiography, ultrasonic or magnetic particle inspection identified in Table 2 reveal a defective weld, two welds on either side of this defective weld shall be examined by radiography or ultrasonic methods. The following shall then apply as required:

- If the additional welds inspected meet the quality requirements of CAD/SP/NDT/2, NDT inspection can return to the minimum specified requirements.
- If either of the additional welds inspected do not meet the quality requirements of CAD/SP/NDT/2, the extent of the NDT shall be increased to 100% of completed welds. This level of NDT shall be maintained until the causes of the defects are identified and corrective action taken to prevent further occurrence. At such time the standard level of inspection may be reinstated.

14.6. To ensure effective quality control of all \*stages of the welding process, a quality management system typical of that described in BS EN ISO 3834-1 and BS EN ISO 3834-2 shall be adopted. With prior agreement of the Company, other technically equivalent supporting standards and documents may be substituted for the documents specified in BS EN ISO 3834-5.

***Note:** To include as a minimum, the planning, design, qualification, execution, inspection, testing and recording stages.*

## **15. Instrumentation Connection**

No amendments made to this section

## **16. Auxiliary Systems**

16.6. Modify:

Isolation valves of auxiliary systems shall be plug or ball type conforming to BS EN 331 or GIS/V8.

All valves requiring 90° operation from fully open to fully closed. Isolation valves shall be of a tamperproof design or the operating handles shall be removable.

## **17. Equipment within Hazardous Areas**

17.1. Add:

Electrical equipment located in hazardous areas shall conform to CAD/PM/EL/2 and CAD/PM/HAZ/5.

17.2. Add:

Non-Electrical equipment located in hazardous areas shall conform to BS EN ISO 80079 and CAD/PM/HAZ/5.

## Appendix A - References

This specification makes reference to the documents listed below:

	<b>European Standards</b>
BS 10	Specification for flanges and bolting for pipes, valves and fittings
BS 143 / 1256	Threaded Pipe Fittings in Malleable Cast Iron and Cast Copper Alloy
BS 1560	Specification for Circular Flanges for Pipes, Valves and Fittings
BS 2971	Specification for Class II Arc Welding of Carbon Steel Pipework for Carrying Fluids
BS 6739	Code of practice for instrumentation in process control systems: installation design and practice
BS 903	Physical testing of rubber
BS EN 10204	Metallic materials — Types of inspection documents
BS EN 10216	Seamless steel tubes for pressure purposes — Technical delivery conditions Part 1: Non-alloy steel tubes with specified room temperature properties
BS EN 10217	Welded steel tubes for pressure purposes - Technical delivery conditions Part 1: Electric welded and submerged arc welded non-alloy steel tubes with specified room temperature properties
BS EN 10242	Threaded Pipe Fittings in Malleable Cast Iron
BS EN 10253-2	Butt-welding pipe fittings - Part 2: Non alloy and ferritic alloy steels with specific inspection requirements
BS EN 10255	Non-Alloy steel tubes suitable for welding and threading - Technical delivery conditions
BS EN 1092-1	Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated Part 1: Steel flanges
BS EN 1092-2	Flanges and Their Joints - Circular Flanges for Pipes, Valves, Fittings and Accessories, PN Designated Part 2: Cast Iron Flanges
BS EN 13774	Valves for gas distribution systems with maximum operating pressure less than or equal to 16 bar - Performance requirements
BS EN 1562	Founding – Malleable cast irons
BS EN 1563	Founding – Spheroidal graphite cast irons
BS EN 331	Manually operated ball valves and closed bottom taper plug valves for gas installations for buildings
BS EN 682	Elastomeric Seals - Materials Requirements for Seals Used in Pipes and Fittings Carrying Gas and Hydrocarbon Fluids
BS EN ISO 17292	Metal ball valves for petroleum, petrochemical and allied industries

BS EN ISO 17636	Non-destructive testing of welds - Radiographic testing
BS EN ISO 17637	Non-destructive testing of welds - Visual testing of fusion-welded joints
BS EN ISO 17638	Non-destructive testing of welds - Magnetic particle testing
BS EN ISO 3183	Petroleum and natural gas industries — Steel pipe for pipeline transportation systems
BS EN ISO 3834-1	Quality requirements for fusion welding of metallic materials — Part 1: Criteria for the selection of the appropriate level of quality requirements
BS EN ISO 3834-2	Quality requirements for fusion welding of metallic materials Part 2: Comprehensive quality requirements
BS EN ISO 3834-5	Quality requirements for fusion welding of metallic materials Part 5: Documents with which it is necessary to conform to claim conformity to the quality requirements of ISO 3834-2, ISO 3834-3 or ISO 3834-4
BS EN ISO 80079	Explosive atmospheres: Non-electrical equipment for explosive atmospheres
	<b>International Standards</b>
API 5L	Specification for line pipe.
ASTM A234/A234M	Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
ASTM A269/A269M	Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
ASTM A333/A333M	Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service and Other Applications with Required Notch Toughness
ISO 9001	Quality management systems
	<b>Institution of Gas Engineers &amp; Managers Standards</b>
IGEM/SR/25	Flanges and their joints - Bolting - Part 1: Selection of bolting
IGEM/TD/13	Pressure regulating installations for transmission and distribution
	<b>Gas Industry Standards</b>
GIS/C5	Distribution pipe fittings cast in grey cast iron for use up to 7 bar maximum operating pressure
GIS/CW6	The external protection of steel line pipe and fittings using fusion bonded powder and other coating systems - requirements and methods of test for coating materials and factory applied coatings
GIS/E13-1	Gas filters (80 mm nominal size and above) suitable for use in the pressure range above 75 mbar and not exceeding 7 bar

GIS/E34:2021	Pressure regulating modules with inlet pressures above 75 mbar but no greater than 7 bar for regulators with design flow rates greater than 6 m <sup>3</sup> /h
GIS/F7:2021	Steel welding pipe fittings nominal size 15 mm to 1200 mm inclusive, for operating pressures not greater than 7 bar
GIS/F9	Specification for Metric and Imperial Stainless Steel Single and Twin Ferrule Compression Fittings for Tubes
GIS/L2	Specification for Steel pipe 21.3 mm to 1219 mm outside diameter for operating pressures up to 7 bar (supplementary to BS EN ISO 3183 PSL 2)
GIS/PRS35	Housings for Gas Regulator Installations and Associated Operation Equipment
GIS/V7-1	Specification for distribution valves Part 1: Metal-bodied line valves for use at pressures up to 16 bar and construction valves for use at pressures up to 7 bar
GIS/V8	Specification for Valves (25 Mm Nominal Size and Below) For Instrumentation and Control Purposes
	<b>Internal Specifications</b>
CAD/PM/EL/2	The Standards that are used for the Certification of Electrical Apparatus for Potentially Explosive Atmospheres
CAD/PM/HAZ/5	Compliance with the Dangerous Substance and Explosive Atmosphere Regulations
CAD/SP/CE/1	Specification for the Design, Construction and Testing of Civil and Structural Works - General
CAD/SP/CE/2	Specification for the Design, Construction and Testing of Civil and Structural Works - Geotechnical, Ground Works and Foundations
CAD/SP/CE/4	Specification for the Design, Construction and Testing of Civil and Structural Works - Equipment Enclosures and Pit Covers
CAD/SP/E/28	The Design of Pressure Regulating Installations with Inlet Pressure not Exceeding 100 Barg
CAD/SP/E/55	Bolting, Jointing, Threading, Fasteners and Gaskets for all Pressure Retaining Joints
CAD/SP/NDT/2	Specification for Non-Destructive Testing of Welded Joints in Steel Pipelines and Pipework
CAD/SP/P/1	Welding of Steel Pipe Designed to Operate at Pressures Not Greater than 7 Bar
CAD/SP/PA/10	Specification for Maintenance Painting at Works and Site for Above Ground Pipeline and Plant Installations
CAD/SP/PW/11 Part 1	Pipework Systems Operating at Pressures Exceeding 7 Barg, Part 1 - Design and Materials

## Appendix B - Minimum Certification and Level of Documentation Required for Components and Materials

**Table B.1 – Minimum Certification Requirements**

Item	Required material Certification to BS EN 10204 or Company request	CAD/SP/E/34 Supplement Section Reference
<b>Materials/Components</b>		
Studs; bolts; washers; nuts	3.1 certification for ASME Class flanges 2.2 certification for PN and Table flanges	Section 10
Gaskets	2.2 certification	Section 10
Flanges	3.1 certification	Section 10
Pipe forged fittings and pipe	3.1 certification	Section 8 Section 11 Section 12
Welding consumables	3.1 certification	Section 14
Stainless steel tube	3.1 certification	Section 9
Stainless steel fittings	2.1 certification *	Section 9
Carbon steel fittings (Screwed)	2.1 certification	Section 9
Malleable iron fittings (Screwed)	2.1 certification	Section 9
Filters	3.1 certification	Section 6
Stream Isolation Valves	3.1 certification or declaration of conformity from the manufacturers	Section 6
Small bore / instrument valves	Declaration of conformity from the manufacturers	Section 16
Regulator equipment	3.1 certification or declaration of conformity from the manufacturers	Section 6
Slam-shut valves	3.1 certification or declaration of conformity from the manufacturers	Section 6
Electrical Hazardous area equipment	ATEX certification of conformity	Section 17
Non-Electrical Hazardous area equipment	ATEX certification of conformity	Section 17
<b>Notes:</b>		
*	Type Traceability - Supplier maintains a system to identify material throughout manufacture, with traceability to a material certificate.	



## Appendix C - Additional Requirements for Stream Isolation Valves Conforming to BS EN 13774

**Table C.1 - Additional Requirements for Stream Isolation Valves Conforming to BS EN 13774**

Valve Manufacture and Delivery Condition	
Valve Supplier / Manufacturer	The supplier and manufacturer shall ensure they operate a quality assurance system in accordance with ISO 9001 or equivalent.
	ASTM, ISO or EN materials of equivalent grades may be proposed for consideration by the gas transporter as variants.
Valve Manufacture <sup>1</sup>	Grey cast iron and spheroidal graphite cast iron may be used for valve shells for valves with a maximum operating pressure (MOP) up to 7 barg sized up to 300 mm.
Delivery Condition <sup>2, 3</sup>	Valves shall be suitable for flange connections conforming to BS EN 1092-1 for steel flanges and BS EN 1092-2 for cast iron flanges, Class PN16.
Additional Material Requirements	
Shell Materials	Spheroidal graphite cast iron shells shall conform to the requirements of BS EN 1563, Grade 400/18/L20.
	Malleable cast iron shells shall conform to the requirements of BS EN 1562, Grade W38-12 or B32-10.
Elastomers <sup>4</sup>	All elastomeric materials shall conform to BS EN 682.
Additional Mechanical Testing Requirements	
Type Testing	Annexes F, G and J of GIS/V7 shall apply in accordance with Section 7 of GIS/V7.
	Annexes B, C, D, E, H and K of GIS/V7 shall be applied in accordance with section 7 of GIS/V7 in preference to the corresponding type testing of components outlined in BS EN 13774.
Production Testing	Annexes B, C, D, E, and K of GIS/V7 shall be applied in accordance with section 8 of GIS/V7 in preference to the corresponding production tests of components outlined in BS EN 13774.
Additional Inspection / Destructive and Non-Destructive Testing Requirements	
Valves Tests	Valve test reports shall be provided by the manufacturer in accordance with section 7.2 of GIS/V7.

Visual Inspection	A final examination shall be conducted on each valve after testing and a written report shall be provided in accordance with section 7.3 of GIS/V7.
<p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1</li> <li>2</li> <li>3</li> <li>4</li> </ol>	<p>Valves shall have a minimum clear bore in accordance with Table 1 of GIS/V7.</p> <p>Materials shall conform to GIS/C5 in Grade 220 or BS EN 1563 in Grade 420/12 as required.</p> <p>The maximum distance between flanges shall be in accordance with Table 1 of GIS/V7.</p> <p>Valve openings shall be protected from dirt and moisture using an appropriate method immediately after the production tests have been completed.</p> <p>Additionally, elastomeric materials shall be tested at <math>-25\text{ }^{\circ}\text{C}</math> in accordance with BS 903, A39 using the pass/fail criteria defined for the <math>-5\text{ }^{\circ}\text{C}</math> compression set test.</p>

## Appendix D - Additional Requirements for PSL 2 Grade Pipe Conforming to API 5L or BS EN ISO 3183

### D.1 Introduction

The additional requirements that shall be met for PSL 2 grade pipe conforming to API 5L or BS EN ISO 3183 for European onshore natural gas transmission pipelines are grouped in accordance with pipe type and outside diameter (OD) range. The corresponding additional requirements for each grouping are given in Table D.2, Table D.3 and Table D.4.

### D.2 PSL 2 Seamless (SMLS) Pipe (15 mm to 450 mm OD)

**Table D.2 – Additional Requirements for SMLS Pipe (15 mm to 450 mm OD)**

	Pipe Manufacture and Delivery Condition
Pipe Supplier / Manufacturer	The supplier and manufacturer shall ensure they operate a quality assurance system in accordance with ISO 9001 or equivalent.
	Pipe shall only be sourced from accredited suppliers (e.g. ASME, API, Lloyds, DNV).
Certification	Minimum of BS EN 10204 3.1 inspection certificate to be supplied.
Steel Making	The steel shall be made to a clean steel practice, using either the basic oxygen steel-making process or the electric-arc furnace steel-making process, and shall be fully killed and be made according to fine grain practice.
Pipe Manufacture	The pipe shall be manufactured from continuously (strand) cast or ingot steel.
Delivery Condition <sup>1, 2, 3</sup>	BS EN ISO 3183 delivery condition to be 'N'.
	Jointers shall not be supplied.
Traceability	Each pipe shall be marked with a unique number so that it can be traced back to applicable material certificate and heat number.
Additional Chemical Composition Requirements	
Composition	The molybdenum content shall not exceed 0.10%.
	The boron content shall not exceed 0.0005%.
CEV Requirement	The Carbon Equivalent Value (CEV) for grade X60 / L415 shall not exceed 0.43%.
Additional Mechanical Testing Requirements	
Charpy Impact Testing <sup>4, 5</sup>	Charpy impact properties shall meet the requirements specified in Clause 5.1.3 and Table 7 of CAD/SP/PW/11 Part 1.
	Parent body minimum average shear area shall be at least 85%.

Additional Inspection / Destructive and Non-Destructive Testing Requirements	
Visual Inspection	<p>Repair of geometric deviations is not permitted.</p> <p>Pipes containing weld repairs are not permitted.</p>
<b>Notes:</b>	<p>Pipe manufactured in accordance with other operator specifications are not permitted unless reviewed and approved by the Company.</p> <p>Any cropped ends to be re-bevelled by machining. The root face shall not be brought into tolerance by grinding or filing.</p> <p>Cropped ends to be subjected to inspection and NDT in accordance with API 5L PSL 2.</p> <p>ASTM A333 Grade 6 is a suitable alternative to API 5L Grade B only, where reviewed and approved by the Company.</p> <p>1 Pipes shall be delivered bare unless a coating is specified by the purchaser.</p> <p>2 Any die stampings shall be protected by a lacquer coating.</p> <p>3 Pipes shall be delivered with end protectors to prevent damage to the pipe ends and weld preparations if specified by the purchaser.</p> <p>4 The Charpy impact test temperature shall be in accordance with Table 7 of CAD/SP/PW/11 Part 1. Testing at a lower temperature than specified is permissible.</p> <p>5 If <math>\geq 5</math> mm sub-sized transverse specimens cannot be removed, <math>\geq 5</math> mm sub-sized longitudinal specimens shall be used.</p>

**D.3 PSL 2 Electric Resistance Welded (ERW) Pipe (150 mm to 600 mm OD)****Table D.3 – Additional Requirements for ERW Pipe (150 mm to 600 mm OD)**

<b>Pipe Manufacture and Delivery Condition</b>	
Pipe Supplier / Manufacturer	The supplier and manufacturer shall ensure they operate a quality assurance system in accordance with ISO 9001 or equivalent.
	Pipe shall only be sourced from accredited suppliers (e.g. ASME, API, Lloyds, DNV).
Certification	Minimum of BS EN 10204 3.1 inspection certificate to be supplied.
Steel Making	The steel shall be made to a clean steel practice, using either the basic oxygen steel-making process or the electric-arc furnace steel-making process, and shall be fully killed and be made according to fine grain practice.
Pipe Manufacture	The coil used shall be rolled from continuously (strand) cast or pressure cast slabs.
Delivery Condition <sup>1, 2, 3</sup>	BS EN ISO 3183 delivery condition to be 'N' or 'M'.
	Jointers shall not be supplied.
	Pipe that has been formed using the "cold forming followed by thermomechanical forming" process shall not be used.
Traceability	Each pipe shall be marked with a unique number so that it can be traced back to applicable material certificate and heat number.
<b>Additional Chemical Composition Requirements</b>	
Composition	The sulphur content shall not exceed 0.008%.
	The molybdenum content shall not exceed 0.10%.
	The boron content shall not exceed 0.0005%.
<b>Additional Mechanical Testing Requirements</b>	
Charpy Impact Testing <sup>4, 5</sup>	Charpy impact properties shall meet the requirements specified in Clause 5.1.3 and Table 7 of CAD/SP/PW/11 Part 1.
	Parent body minimum average shear area shall be at least 85%.
<b>Additional Inspection / Destructive and Non-Destructive Testing Requirements</b>	
Metallographic Testing	Each pipe (except those that have been full body normalised), the heat treatment of the weld shall be verified by metallographic examination.

Hardness Testing	The hardness shall be $\leq 250$ HV10 and the difference between the parent material and weld region shall not exceed 80 HV10.
Visual Inspection	Repair of geometric deviations shall not be permitted.
	Weld repairs to the weld seam and or parent body are not allowed.
<p><b>Notes:</b></p>	<p>Pipe manufactured in accordance with other operator specifications are not permitted unless reviewed and approved by the Company.</p> <p>Cropped ends to be re-bevelled by machining. The root face shall not be brought into tolerance by grinding or filing.</p> <p>Cropped ends to be subjected to inspection and NDT in accordance with API 5L PSL 2.</p> <p>1 Pipes shall be delivered bare unless a coating is specified by the purchaser.</p> <p>2 Any die stampings shall be protected by a lacquer coating.</p> <p>3 Pipes shall be delivered with end protectors to prevent damage to the pipe ends and weld preparations if specified by the purchaser.</p> <p>4 The Charpy impact test temperature shall be in accordance with Table 7 of CAD/SP/PW/11 Part 1. Testing at a lower temperature than specified is permissible.</p> <p>5 If <math>\geq 5</math> mm sub-sized transverse specimens cannot be removed, <math>\geq 5</math> mm sub-sized longitudinal specimens shall be used.</p>

**D.4 PSL 2 Submerged Arc Welded (SAWL) Pipe (150 mm to 1200 mm OD)****Table D.4 - Additional Requirements for SAWL Pipe (150 mm to 1200 mm OD)**

Pipe Manufacture and Delivery Condition	
Pipe Supplier / Manufacturer	The supplier and manufacturer shall ensure they operate a quality assurance system in accordance with ISO 9001 or equivalent.
	Pipe shall only be sourced from accredited suppliers (e.g. ASME, API, Lloyds, DNV).
Certification	Minimum of BS EN 10204 3.1 inspection certificate to be supplied.
Steel Making	The steel shall be made to a clean steel practice, using either the basic oxygen steel-making process or the electric-arc furnace steel-making process, and shall be fully killed and be made according to fine grain practice.
Pipe Manufacture	The plate used shall be rolled from continuously (strand) cast or pressure cast slabs.
	SAWL pipe shall be manufactured with only one weld seam.
Delivery Condition <sup>1, 2, 3</sup>	BS EN ISO 3183 delivery condition to be 'N' or 'M'.
	Jointers shall not be supplied.
Cold Expansion	SAWL pipe shall be mechanically cold expanded.
Traceability	Each pipe shall be marked with a unique number so that it can be traced back to applicable material certificate and heat number.
Additional Chemical Composition Requirements	
Composition	The sulphur content shall not exceed 0.008%.
	The molybdenum content shall not exceed 0.10%, except for L555ME where it shall not exceed 0.25%.
CEV Requirements	The maximum allowable Carbon Equivalent Value (CEV) for L415N and L555M is 0.43%.
Additional Mechanical Testing Requirements	
Charpy Impact Testing <sub>4, 5</sub>	Charpy impact properties shall meet the requirements specified in Clause 5.1.3 and Table 7 of CAD/SP/PW/11 Part 1.
	Parent body minimum average shear area shall be at least 85%.

	Additional Inspection / Destructive and Non-Destructive Testing Requirements
Hardness Testing	The maximum allowed hardness for a single indent shall be 250 HV10 for grade L360, 260 HV10 for grades L415 and L450, 275 HV10 for grade L485 and 300 HV10 for grade L555. The difference between the parent body and HAZ shall not exceed 80 HV10.
Visual Inspection	Repair of geometric deviations shall not be permitted.
	Weld repairs to the weld seam and or parent body are not allowed.
<b>Notes:</b>	<p>Pipe manufactured in accordance with other operator specifications are not permitted unless reviewed and approved by the Company.</p> <p>Cropped ends to be re-bevelled by machining. The root face shall not be brought into tolerance by grinding or filing.</p> <p>Cropped ends to be subjected to inspection and NDT in accordance with API 5L / ISO 3183 and this data sheet.</p> <ol style="list-style-type: none"> <li>1 Pipes shall be delivered bare unless a coating is specified by the purchaser.</li> <li>2 Any die stampings shall be protected by a lacquer coating.</li> <li>3 Pipes shall be delivered with end protectors to prevent damage to the pipe ends and weld preparations if specified by the purchaser.</li> <li>4 The Charpy impact test temperature shall be in accordance with Table 7 of CAD/SP/PW/11 Part 1. Testing at a lower temperature than specified is permissible. The HAZ shall be Charpy tested for all grades.</li> <li>5 If <math>\geq 5</math> mm sub-sized transverse specimens cannot be removed, <math>\geq 5</math> mm sub-sized longitudinal specimens shall be used.</li> </ol>



## Appendix E - Additional Requirements for Flanges and Fittings not conforming to GIS/F7

**Table E.1 - Additional Requirements for Flanges and Fittings not conforming to GIS/F7**

	<b>Fittings / Flanges Manufacture and Delivery Condition</b>
Supplier / Manufacturer	The supplier and manufacturer shall ensure they operate a quality assurance system in accordance with ISO 9001 or equivalent.
	Tubular (butt and socket welded) fittings, flanges and other components for pressure containing applications shall be sourced only from manufacturers that are accredited under the Pressure Equipment Directive (PED).
Certification <sup>1,2</sup>	Steel mill inspection certificates shall be provided for the starting material from the same cast (heat) as that used to manufacture the product and bolting.
	Minimum of BS EN 10204 3.1 inspection certificate to be supplied.
<b>Additional Fitting Requirements</b>	
Butt Welded Pipe Fittings	All butt welded pipe fittings shall meet the requirements within section 6 of GIS/F7 excluding section 6.4 on Markings.
Welded Branch Outlet Fittings	Any welded branch outlet fittings shall meet the requirements within section 10 of GIS/F7 excluding section 10.4 on Markings.
<b>Additional Flange Requirements</b>	
Butt and Fillet Welded Flanges	All butt and fillet welded flanges shall meet the requirements within section 10 of GIS/F7 excluding section 7.5 on Markings.
<b>Notes:</b>	
1	Provided by the seller for all pressure containing products, including butt and socket welding fittings and flanges, in addition to Bolting.
2	If steel mill inspection certificates are not available, it shall be acceptable that the BS EN 10204 3.1 certificates evidence them being performed.

**Appendix F Section A - Module Enquiry Request Form**

<b>MODULE ENQUIRY FORM – Section A – Cadent Request</b> CAD/SP/E34 Supplement - Pressure Regulating Module (Inlet pressure above 75 mbarg up to 7 barg) For Completion by Requester											
<b>REQUESTER DETAILS</b>											
<b>TO:</b>		Name of Qualified Supplier:									
Form Completed By:			Signature:			Date:					
<b>PROJECT DETAILS</b>											
<b>FROM:</b>	Contact Name:										
	Site Address Name:										
	Project Reference:										
	Gas Transporter's Address:										
Telephone No:			Email:								
<b>DESIGN SPECIFICATION</b>											
Process Fluid		Natural Gas		<input type="checkbox"/>		Other (Specify)					
		Minimum		Normal (Design Pressure / Flow Rate)		Maximum					
Inlet Pressure (barg)											
Outlet Pressure (barg)											
Flow Rate (s.m <sup>3</sup> /h)											
PRI Risk Level for Welding NDT Inspection				High		<input type="checkbox"/>		Medium		<input type="checkbox"/>	
Commissioning assistance required		Yes		<input type="checkbox"/>		No		<input type="checkbox"/>		Training Required	
		Yes		<input type="checkbox"/>		No		<input type="checkbox"/>			
Delivery date required by											
Shipping conditions											
Delivery location / Offloading on site											
Page 1 of 3											

FURTHER DESIGN SPECIFICATION (For Requester to Complete if Known)									
Mode of operation	Slamshut + Monitor + Active:				<input type="checkbox"/>	Slamshut + Active:			<input type="checkbox"/>
	Slamshut + 2 Stage Control + Monitor Override:				<input type="checkbox"/>	Monitor + Active:			<input type="checkbox"/>
Number of Streams	(a) Single	<input type="checkbox"/>	(b) Twin	<input type="checkbox"/>	(c) Multiple	<input type="checkbox"/>	If (c) number of streams		
Inlet Connection	Horizontal	<input type="checkbox"/>	Vertical	<input type="checkbox"/>	Outlet Connection	Horizontal	<input type="checkbox"/>	Vertical	<input type="checkbox"/>
Degree of Standby (%)									
Size (compact/wall/kiosk)									
Maximum noise level dBA & dBC									
Telemetry requirements									
Type of control	Fixed Pressure	<input type="checkbox"/>	Volumetric	<input type="checkbox"/>	Variable Set Point	<input type="checkbox"/>	Direct Acting	<input type="checkbox"/>	
	Auxiliary Control	<input type="checkbox"/>	Profile Control	<input type="checkbox"/>	Other (Specify)				
Stream Discrimination	Non-Return Valve (Requires Creep Relief)		<input type="checkbox"/>	Pilot Operated	<input type="checkbox"/>	Other (Specify)			
Creep Relief Required	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	Type:				
COMPONENT SET POINTS, ACCURACY GROUP/CLASS (AG/AC) AND LOCK-UP CLASS (SG) (For Requester to Complete if Known)									
Main Components	Set Point (barg)	AG / AC	SG:	Auxiliary Components			Set Point (barg)		
Slamshut Valve				Load Limit Pilot (J)					
Relief Valve				Auxiliary Relief (J Relief)					
1 <sup>st</sup> Stage / Monitor Regulator				Active Pilot/High Limit Pilot (K1)					
Active Regulator				Profile Control Pilot (DPP)					
				K2 Pilot (If fitted)					
				Low Limit Pilot					
				Other, specify:					
TYPE OF LOAD (For Requester to Complete if Known)									
District	<input type="checkbox"/>	Industrial	<input type="checkbox"/>	Gas Turbine / Boiler	<input type="checkbox"/>				
Other (Specify)									
If Industrial/Turbine/Boilers answer the following questions:									
What is Q <sub>max</sub> before Shutdown?									
What is Time to Start Up/Shutdown?									
Volume of Pipe between PRI & appliance?									
Page 2 of 3									

**ADDITIONAL INFORMATION**

**Appendix F Section B - Module Enquiry Return Form**

<b>MODULE ENQUIRY FORM – Section B – Supplier Quote – Technical Information</b> CAD/SP/E34 Supplement - Pressure Regulating Module (Inlet pressure above 75 mbarg up to 7 barg) For Completion by Supplier											
Name of Qualified Supplier:											
Form Completed By:		Signature:			Date:						
Contact Name:											
Contact Phone Number:											
Contact Email:											
Module Site Address Name:											
Project Reference:											
DESIGN SPECIFICATION											
Process Fluid		Natural Gas		<input type="checkbox"/>		Other (Specify)					
Design Temperature Range (°C)				Assumed Gas Inlet Temperature (°C)				Minimum Gas Outlet Temperature (°C)			
Module Design Specification/s Followed (Tick all that apply)		GIS/E34	<input type="checkbox"/>	CAD/SP/E/34 Supplement	<input type="checkbox"/>	IGEM/TD/13	<input type="checkbox"/>	CAD/SP/E/28	<input type="checkbox"/>		
Additional Module Design Specification/s Followed (Specify)											
Painting Specification Followed		CAD/SP/PA/10		<input type="checkbox"/>		GIS/CW6		<input type="checkbox"/>			
Painting Finish		BS 4800		<input type="checkbox"/>		Other (Specify)					
Paint Colour		10 E 53 (Canary Yellow)		<input type="checkbox"/>		Other (Specify)					
		Minimum		Normal (Design Pressure / Flow Rate)		Maximum					
Inlet Pressure (barg)											
Outlet Pressure (barg)											
Flow Rate (s.m <sup>3</sup> /h)											
MODE OF OPERATION											
Slamshut + Monitor + Active:				<input type="checkbox"/>		Slamshut + Active:				<input type="checkbox"/>	
Slamshut + 2 Stage Control + Monitor Override:				<input type="checkbox"/>		Monitor + Active:				<input type="checkbox"/>	
Number of Streams		(a) Single	<input type="checkbox"/>	(b) Twin	<input type="checkbox"/>	(c) Multiple		<input type="checkbox"/>	If (c) number of streams:		
Inlet Connection		Horizontal	<input type="checkbox"/>	Vertical	<input type="checkbox"/>	Outlet Connection		Horizontal	<input type="checkbox"/>	Vertical	<input type="checkbox"/>
Stream Maximum Capacity %		Stream 1		Stream 2		If >2 Streams List Here:					
Page 1 of 7											

TYPE OF CONTROL										
Fixed Pressure	<input type="checkbox"/>	Volumetric	<input type="checkbox"/>	Variable Set Point	<input type="checkbox"/>	Direct Acting	<input type="checkbox"/>			
Auxiliary Control	<input type="checkbox"/>	Profile Control	<input type="checkbox"/>	Other (Specify)						
COMPONENT SET POINTS, ACCURACY GROUP/CLASS(AG/AC) AND LOCK-UP CLASS(SG)										
Main Components	Set Point (barg)	AG / AC	SG:	Auxiliary Components	Set Point (barg)					
Slamshut Valve				Load Limit Pilot (J)						
Relief Valve				Auxiliary Relief (J Relief)						
1 <sup>st</sup> Stage / Monitor Regulator				Active Pilot/High Limit Pilot (K1)						
Active Regulator				Profile Control Pilot (DPP)						
				K2 Pilot (If fitted)						
				Low Limit Pilot (K3)						
				Other (Specify):						
COMPONENT SPECIFICATIONS										
<b>Stream Isolation Valves</b>	Valve Model				Valve Type					
	Size				Weight (kg)					
	Double Seated Valve	<input type="checkbox"/>	Single Seated Valve	<input type="checkbox"/>						
	Design Pressure (barg)				Turns to Close					
	Standard Followed	GIS/V7-1	<input type="checkbox"/>	BS EN 13774 Supplemented by Appendix C of CAD/SP/E34	<input type="checkbox"/>	BS EN ISO 17292 (Ball Valve)	<input type="checkbox"/>			
	Other (Specify)									
<b>Auxiliary Isolation Valves</b>	Valve Model				Valve Type					
	Size				Weight (kg)					
	Double Seated Valve	<input type="checkbox"/>	Single Seated Valve	<input type="checkbox"/>						
	Design Pressure (barg)				90 ° to close	<input type="checkbox"/>				
	Standard Followed	BS EN 331	<input type="checkbox"/>	GIS/V8	<input type="checkbox"/>					
	Other (Specify)									
<b>Impulse Isolation Valves</b>	Valve Model				Valve Type					
	Size				Weight (kg)					
	Double Seated Valve	<input type="checkbox"/>	Single Seated Valve	<input type="checkbox"/>						
	Design Pressure (barg)				90 ° to close	<input type="checkbox"/>				
	Standard Followed	BS EN 331	<input type="checkbox"/>	GIS/V8	<input type="checkbox"/>					
	Other (Specify)									
<b>Page 2 of 7</b>										

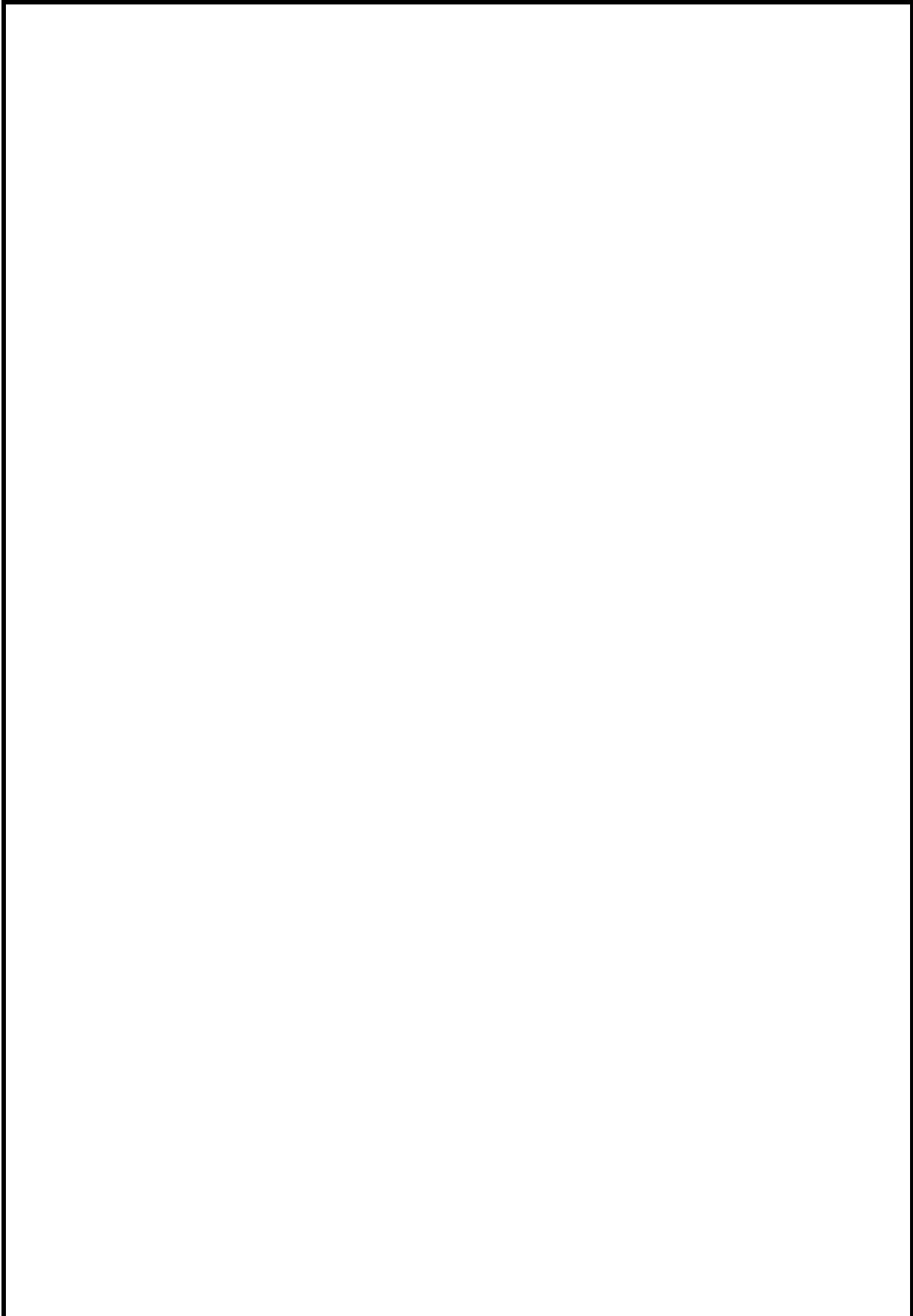
<b>Gas Filtration</b>	Filter Model				Filter Type					
	Material				Design Pressure					
	Weight (kg)				Filter Size (mm)					
	Number of Filters				Filtration Level (µm)					
	Standard Followed	GIS/E13-1	<input type="checkbox"/>	Other (Specify)						
<b>Slamshut Valves</b>	Valve Model				Valve Size					
	Weight (kg)				Spring Colour					
	Pressure Trip Range (barg)									
	Standard Followed	BS EN 334	<input type="checkbox"/>	Other (Specify)						
	Flange Connection	PN 16	<input type="checkbox"/>	Other (Specify)						
<b>Active Pressure Regulators</b>	Regulator Model				Regulator Size					
	Outlet Pressure Range (barg)				Spring Colour					
	Capacity (s.m3/h)				Weight (kg)					
	Standard Followed	BS EN 334	<input type="checkbox"/>	Other (Specify)						
	Flange Connection	PN 16	<input type="checkbox"/>	Other (Specify)						
	Noise Level (dB)	Minimum			Normal			Maximum		
<b>Monitor Pressure Regulators</b>	Regulator Model				Regulator Size					
	Outlet Pressure Range (barg)				Spring Colour					
	Capacity (s.m3/h)				Weight (kg)					
	Standard Followed	BS EN 334	<input type="checkbox"/>	Other (Specify)						
	Flange Connection	PN 16	<input type="checkbox"/>	Other (Specify)						
	Noise Level (dB)	Minimum			Normal			Maximum		
<b>Pilot Pressure Regulator 1</b> (Complete per type if fitted)	Pilot Type (Tick One)	J Pilot	<input type="checkbox"/>	K1 Pilot	<input type="checkbox"/>	K2 Pilot	<input type="checkbox"/>	K3 Pilot	<input type="checkbox"/>	
		Slam Open Pilot	<input type="checkbox"/>	DPP Pilot	<input type="checkbox"/>	Power Pilot	<input type="checkbox"/>			
	Regulator Model				Regulator Size					
	Outlet Pressure Range (barg)				Spring Colour					
	Capacity (s.m3/h)				Weight (kg)					
	Standard Followed	BS EN 334	<input type="checkbox"/>	Other (Specify)						
	Flange Connection	PN 16	<input type="checkbox"/>	Other (Specify)						
	Noise Level (dB)	Minimum			Normal			Maximum		
<b>Page 3 of 7</b>										

<b>Pilot Pressure Regulator 2</b> (Complete per type if fitted)	Pilot Type (Tick One)	J Pilot	<input type="checkbox"/>	K1 Pilot	<input type="checkbox"/>	K2 Pilot	<input type="checkbox"/>	K3 Pilot	<input type="checkbox"/>		
		Slam Open Pilot	<input type="checkbox"/>	DPP Pilot	<input type="checkbox"/>	Power Pilot	<input type="checkbox"/>				
	Regulator Model					Regulator Size					
	Outlet Pressure Range (barg)					Spring Colour					
	Capacity (s.m3/h)					Weight (kg)					
	Standard Followed	BS EN 334	<input type="checkbox"/>	Other (Specify)							
	Flange Connection	PN 16	<input type="checkbox"/>	Other (Specify)							
Noise Level (dB)	Minimum				Normal				Maximum		
<b>Pilot Pressure Regulator 3</b> (Complete per type if fitted)	Pilot Type (Tick One)	J Pilot	<input type="checkbox"/>	K1 Pilot	<input type="checkbox"/>	K2 Pilot	<input type="checkbox"/>	K3 Pilot	<input type="checkbox"/>		
		Slam Open Pilot	<input type="checkbox"/>	DPP Pilot	<input type="checkbox"/>	Power Pilot	<input type="checkbox"/>				
	Regulator Model					Regulator Size					
	Outlet Pressure Range (barg)					Spring Colour					
	Capacity (s.m3/h)					Weight (kg)					
	Standard Followed	BS EN 334	<input type="checkbox"/>	Other (Specify)							
	Flange Connection	PN 16	<input type="checkbox"/>	Other (Specify)							
Noise Level (dB)	Minimum				Normal				Maximum		
<b>Pilot Pressure Regulator 4</b> (Complete per type if fitted)	Pilot Type (Tick One)	J Pilot	<input type="checkbox"/>	K1 Pilot	<input type="checkbox"/>	K2 Pilot	<input type="checkbox"/>	K3 Pilot	<input type="checkbox"/>		
		Slam Open Pilot	<input type="checkbox"/>	DPP Pilot	<input type="checkbox"/>	Power Pilot	<input type="checkbox"/>				
	Regulator Model					Regulator Size					
	Outlet Pressure Range (barg)					Spring Colour					
	Capacity (s.m3/h)					Weight (kg)					
	Standard Followed	BS EN 334	<input type="checkbox"/>	Other (Specify)							
	Flange Connection	PN 16	<input type="checkbox"/>	Other (Specify)							
Noise Level (dB)	Minimum				Normal				Maximum		
<b>Pilot Pressure Regulator 5</b> (Complete per type if fitted. Additional pilot regulators shall be identified in 'Additional Info' Section)	Pilot Type (Tick One)	J Pilot	<input type="checkbox"/>	K1 Pilot	<input type="checkbox"/>	K2 Pilot	<input type="checkbox"/>	K3 Pilot	<input type="checkbox"/>		
		Slam Open Pilot	<input type="checkbox"/>	DPP Pilot	<input type="checkbox"/>	Power Pilot	<input type="checkbox"/>				
	Regulator Model					Regulator Size					
	Outlet Pressure					Spring Colour					
	Capacity (s.m3/h)					Weight (kg)					
	Standard Followed	BS EN 334	<input type="checkbox"/>	Other (Specify)							
	Flange Connection	PN 16	<input type="checkbox"/>	Other (Specify)							
Noise Level (dB)	Minimum				Normal				Maximum		
<b>Stream Discrimination</b>	Type	Non-Return	<input type="checkbox"/>	Pilot Operated	<input type="checkbox"/>	Other (Specify)					
	Creep Relief Fitted?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	If Yes, Type:					
	Conforms with IGEM/TD/13 Appendix 7 Performance Requirements?					Yes	<input type="checkbox"/>	No	<input type="checkbox"/>		




<b>Main Pipework</b>	Standard Followed	GIS/L2	<input type="checkbox"/>	API 5L - PSL 2 CAD/SP/E34 Supplement Compliant				<input type="checkbox"/>
		BS EN ISO 3183 - PSL 2 CAD/SP/E34 Supplement			<input type="checkbox"/>	Other (Specify)		
	Material Type:					Material Grade:		
	Pipe Type	SMLS	<input type="checkbox"/>	ERW	<input type="checkbox"/>	SAWL	<input type="checkbox"/>	
	Pipe Size (mm)	Surface Preparation Technique						
<b>Steel Welded Pipe Fittings 1</b> (Complete per type if fitted)	Type (Tick One)	Elbow	<input type="checkbox"/>	Concentric Reducer	<input type="checkbox"/>	Eccentric Reducer	<input type="checkbox"/>	
		Cap	<input type="checkbox"/>	Reducing Tee	<input type="checkbox"/>	Equal Tee	<input type="checkbox"/>	
	Standard Followed	GIS/F7	<input type="checkbox"/>	BS EN 10253-2 CAD/SP/E34 Supplement Compliant				<input type="checkbox"/>
		ASTM-A234 WPB CAD/SP/E34 Supplement Compliant			<input type="checkbox"/>	Other (Specify)		
	Material Type:					Material Grade:		
Fitting Size								
<b>Steel Welded Pipe Fittings 2</b> (Complete per type if fitted)	Type (Tick One)	Elbow	<input type="checkbox"/>	Concentric Reducer	<input type="checkbox"/>	Eccentric Reducer	<input type="checkbox"/>	
		Cap	<input type="checkbox"/>	Reducing Tee	<input type="checkbox"/>	Equal Tee	<input type="checkbox"/>	
	Standard Followed	GIS/F7	<input type="checkbox"/>	BS EN 10253-2 CAD/SP/E34 Supplement Compliant				<input type="checkbox"/>
		ASTM-A234 WPB CAD/SP/E34 Supplement Compliant			<input type="checkbox"/>	Other (Specify)		
	Material Type:					Material Grade:		
Fitting Size								
<b>Steel Welded Pipe Fittings 3</b> (Complete per type if fitted. Additional fittings shall be identified in 'Additional Info' Section)	Type (Tick One)	Elbow	<input type="checkbox"/>	Concentric Reducer	<input type="checkbox"/>	Eccentric Reducer	<input type="checkbox"/>	
		Cap	<input type="checkbox"/>	Reducing Tee	<input type="checkbox"/>	Equal Tee	<input type="checkbox"/>	
	Standard Followed	GIS/F7	<input type="checkbox"/>	BS EN 10253-2 CAD/SP/E34 Supplement Compliant				<input type="checkbox"/>
		ASTM-A234 WPB CAD/SP/E34 Supplement Compliant			<input type="checkbox"/>	Other (Specify)		
	Material Type:					Material Grade:		
Fitting Size								
<b>Auxiliary Pipework</b>	Standard Followed	BS 6739	<input type="checkbox"/>	ASTM A269	<input type="checkbox"/>	BS EN 10216 – 5	<input type="checkbox"/>	
	Material Type:					Material Grade:		
	Pipe Size							
<b>Impulse Pipework</b>	Standard Followed	BS 6739	<input type="checkbox"/>	ASTM A269	<input type="checkbox"/>	BS EN 10216 – 5	<input type="checkbox"/>	
	Material Type:					Material Grade:		
	Pipe Size							
<b>Auxiliary Fittings</b>	Complete as Applicable	Screwed Fitting Specification						
		Welded Fitting Specification						
	Compression Fittings Specification	GIS/F9	<input type="checkbox"/>	Other (Specify)				
		Single Ferrule	<input type="checkbox"/>	Double Ferrule	<input type="checkbox"/>			
<b>Page 5 of 7</b>								

<b>Impulse Fittings</b>	Complete as Applicable	Screwed Fitting Specification						
		Welded Fitting Specification						
		Compression Fittings Specification	GIS/F9	<input type="checkbox"/>	Other (Specify)			
			Single Ferrule	<input type="checkbox"/>	Double Ferrule	<input type="checkbox"/>		
<b>Flanges</b>	PN Designation	PN 16	<input type="checkbox"/>	Other (Specify)				
	Material Type				Material Grade			
	Raised Face Flange?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>			
	Standard Followed	GIS/F7	<input type="checkbox"/>	BS EN 1092-1 CAD/SP/E34 Supplement	<input type="checkbox"/>			
		BS EN 1092-2	<input type="checkbox"/>	Other (Specify)				
	Bolting Specification	CAD/SP/E/55	<input type="checkbox"/>	Other (Specify)				
	Gasket Specification	CAD/SP/E/55	<input type="checkbox"/>	Other (Specify)				
<b>WELDING, NDT AND INSPECTION STANDARDS</b>								
Welding Standard Followed	BS 2971	<input type="checkbox"/>	CAD/SP/P/1	<input type="checkbox"/>				
NDT Standard Followed	CAD/SP/NDT/2	<input type="checkbox"/>	Other (Specify)					
Radiographic Inspection Standard	BS EN ISO 17636	<input type="checkbox"/>	Other (Specify)			% of Weld Inspection		
Ultrasonic Inspection Standard Followed	BS EN ISO 17638	<input type="checkbox"/>	Other (Specify)			% of Weld Inspection		
Magnetic Particle Inspection Standard	BS EN ISO 17637	<input type="checkbox"/>	Other (Specify)			% of Weld Inspection		
<b>GENERAL CONSTRUCTION</b>								
Standards Followed: (Tick All Applicable)	GD/SP/CE/1	<input type="checkbox"/>	GD/SP/CE/2	<input type="checkbox"/>	GD/SP/CE/4	<input type="checkbox"/>		
	GIS/PRS35	<input type="checkbox"/>	IGEM/SR/25	<input type="checkbox"/>	Other (Specify)			
Pressure Equipment Directive 2014/68/EU Global Conformity Assessment Performed?			Yes	<input type="checkbox"/>	No	<input type="checkbox"/>		
Enclosure Size (mm)	Height			Width			Length	
Minimum Internal Clearance (mm)								
<b>ADDITIONAL INFORMATION</b>								
Page 6 of 7								



**Appendix G - Purchase Order Quality Requirements (POQR) for GIS/E34  
Pressure Regulating Modules**

© Cadent Gas Limited Security Classification: Internal	<b>Central Engineering Team</b>	
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**Purchase Order Quality Requirements (POQR) for  
CAD/SP/E/34**

B	Issued for Use	Daniel Finley	30/11/2020	Mark Atkinson	30/11/2020	Raj Chatha	19/12/20
A	Issued for Internal review	Daniel Finley	30/11/2020	Mark Atkinson	30/11/2020	Raj Chatha	08/12/20
Rev	Reason for Issue	Author	Date	Checked	Date	Approved	Date

Refresh Cycle Code (years)	In line with updates to CAD/SP/E/34
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		A

## 1 Scope

Gas Industry Standard (GIS), GIS/E34:2021 furthermore referenced as GIS/E34 within this document, defines the requirements for the design and construction of pre-assembled, single or multiple stream, regulator modules with inlet pressures of either:

- a) above 75 mbar and not greater than 2 bar;
- b) above 2 bar but not greater than 7 bar.

This document provides checklists for the minimum purchase order quality requirements (POQR) when purchasing or supplying pre-assembled, single or multiple stream, regulator modules in accordance with GIS/E34 and Cadent supplement CAD/SP/E/34. This POQR shall only be applied when one of the below design conditions are required:

- Pressure reduction installations (PRI) with design flow rates greater than 200 m<sup>3</sup>/h
- Installations where main pipework is larger than 50 mm or 2-inch diameter

## 2 Normative references

The following documents are referenced in one or more requirements in this document. For dated references, only the version cited applies. For undated references, the latest version of the referenced document (including any amendments) applies.

*GIS/E34:2021, Specification for GIS/E34 - pressure regulating modules with inlet pressures above 75 mbar but no greater than 7 bar for regulators with design flow rates greater than 6 m<sup>3</sup>/h.*

*CAD/SP/E/34, Supplementary specification for Pressure regulating modules with inlet pressures above 75 mbar but no greater than 7 bar for regulators with design flow rates greater than 6 m<sup>3</sup>/h*

*BS EN 334, Gas pressure regulators for inlet pressures up to 100 bar.*

*BS EN 13774, Valves for gas distribution systems with maximum operating pressure less than or equal to 16 bar — Performance requirements.*

*GIS/F7:2021, Steel welding pipe fittings nominal size 15 mm to 1200 mm inclusive, for operating pressures not greater than 7 bar*

*GIS/E13.1, Specification for gas filters (80 mm nominal size and above) suitable for use in the pressure range above 75 mbar and not exceeding 7 bar.*

*CAD/SP/P/1, Specification for welding of steel pipe operating at pressures not greater than 7 bar*

*CAD/SP/PA/10, Technical specification for new and maintenance painting at works and site for above ground pipeline and plant installations.*

*CAD/SP/E/55, Bolting, Jointing, Threading, Fasteners and Gaskets for all Pressure Retaining Joints*

*CAD/PM/G/17, Management of New Works, Modifications and Repairs*

### 3 Terms and definitions

For the purpose of this document, the following terms and definitions apply:

#### **Company**

Cadent Gas Limited, or other organisation acting as owner, purchaser, or customer as designated in the Purchase Order.

#### **Supplier**

Entity entering into a contract with the Company to provide materials, goods, supplies, equipment, or plant and includes the successors and (or) permitted assigns of such entity.

### 4 Introduction

This document provides checklists for the purchase order quality requirements when purchasing pre-assembled, single or multiple stream, regulator modules in accordance with GIS/E34 and Cadent supplement CAD/SP/E/34.

The requirements are documented as follows:

- Annex A defines the company inspection requirements
- Annex B defines the certification requirements for materials, components and processes
- Annex C defines the minimum documentation required from the supplier

A separate checklist shall be completed and submitted at Part F of the CAD/PM/G/17 for each project. It is acknowledged that in some instances multiple modules may be purchased and therefore surveillance/witness activities may be combined to capture these.

### Annex A - Company minimum inspection requirements

A	REQUIREMENTS <u>PRIOR</u> TO AWARD OF CONTRACT OR ISSUE OF A PURCHASE ORDER	Company Task	Review Responsibility	Date Completed	Completed By
1	Review of Company Purchase Order Quality Requirements (this POQR document) and incorporation into documents for purchase order, supplier ITP & document deliverables	R	Supplier		
2	Review of Purchase order/agreement, ensuring as a minimum all aspects of this POQR have been referenced as well as minimum company standards and specifications, including Cadent supplement to GIS/E34:2021 (CAD/SP/E/34)	H	Supplier		
3	Confirmation that design flow/pressure conditions satisfy network analysis requirements (including Annex A of GIS/E34:2021)	R	Cadent Project Manager		
4	Review all material/component certificates to verify compliance with specifications, including: <ul style="list-style-type: none"> <li>• Valves</li> <li>• Regulators</li> <li>• Pipe</li> <li>• Forged fittings (e.g. bends, tees, flanges)</li> <li>• Filters</li> </ul>	H	Cadent Project Manager		
B	REQUIREMENTS <u>PRIOR</u> TO MANUFACTURE / ASSEMBLY / TESTING	Company Task	Review Responsibility	Date Completed	Completed By
1	Review of test procedures (strength and leak test), confirm the following: <ul style="list-style-type: none"> <li>• Test pressure (IGEM/TD/13 and GIS/E34:2021)</li> <li>• Test duration</li> <li>• Accuracy of equipment proposed for monitoring test parameters</li> </ul>	H	Cadent Project Manager		
2	Welding & Non-Destructive Testing (NDT) procedures and qualifications to be approved by Cadent Welding Engineer	H	Cadent Project Manager		
3	Review of coating procedures	H	Cadent Project Manager		
C	REQUIREMENTS <u>DURING</u> MANUFACTURE / ASSEMBLY / TESTING	Company Task	Review Responsibility	Date Completed	Completed By
1	Verification of materials against drawings before fabrication ( <b>Deliverable:</b> fabrication reports)	S	Supplier		
2	Surveillance during assembly and welding ( <b>Deliverable:</b> weld surveillance reports)	S	Supplier		
3	Surveillance of NDT	S	Cadent Project Manager		
4	Surveillance of coating application and testing	S	Cadent Project Manager		
5	Witness pressure strength testing	W	Cadent Project Manager		
6	Surveillance of joint completion	S	Cadent Project Manager		
7	Surveillance of leak test	S	Cadent Project Manager		
8	Surveillance of Electrical and Instrumentation functional testing	S	Cadent Project Manager		
9	Witness skid dynamic functional test	W	Cadent Project Manager		
D	REQUIREMENTS FOR EQUIPMENT RELEASE AND PURCHASE ORDER COMPLETION	Company Task	Review Responsibility	Date Completed	Completed By
1	Review of component and module marking	H	Cadent Project Manager		
2	Review of delivery condition	H	Cadent Project Manager		
3	Requirements from Annex C (Delivery records) satisfied	H	Cadent Project Manager		



**Key for Company Task:****H - Hold point**

A critical operation or process stage beyond which work shall not proceed without attendance by Company representative and / or written Company approval.

**W - Witness point**

An operation or process that requires witness by the Company representative. The operation or process may proceed without witness only with prior Company approval. Repetitive witnessing activities may be by percentage as specified.

**S - Surveillance**

Periodic review by the Company representative of an activity, operation, process or documentation at Supplier premises. No specific notification is required and the activity, operation or process may proceed if the Company representative is not present.

**R - Review**

Company review of Supplier documentation providing objective evidence of the Supplier's conformance to the Purchase Order requirements. Documentation to be submitted to Company.

### Annex B - Certification Requirements

Item	Certificate type	CAD/SP/E/34 Supplement Section Reference
<b>Materials/Components</b>		
Studs; bolts; washers; nuts	3.1 certification for AMSE Class flanges 2.2 certification for PN and Table flanges	Section 10
Gaskets	2.2 certification	Section 10
Flanges	3.1 certification	Section 10
Pipe forged fittings and pipe	3.1 certification	Section 8 Section 11 Section 12
Welding consumables	3.1 certification	Section 14
Stainless steel tube	3.1 certification	Section 9
Stainless steel fittings	2.1 certification *	Section 9
Carbon steel fittings (Screwed)	2.1 certification	Section 9
Malleable iron fittings (Screwed)	2.1 certification	Section 9
Filters	3.1 certification	Section 6
Stream Isolation Valves	3.1 certification or declaration of conformity from the manufacturers	Section 6
Small bore / instrument valves	Declaration of conformity from the manufacturers	Section 16
Regulator equipment	3.1 certification or declaration of conformity from the manufacturers	Section 6
Slam-shut valves	3.1 certification or declaration of conformity from the manufacturers	Section 6
Electrical Hazardous area equipment	ATEX certification of conformity	Section 17
Non-Electrical Hazardous area equipment	ATEX certification of conformity	Section 17

\* *Type Traceability - Supplier maintains a system to identify material throughout manufacture, with traceability to a material certificate.*

Unless otherwise specified at the time of purchase order issue, the latest editions of referenced standards, including all addenda and revisions, current at the date of the purchase order issue shall apply.

Certificate types are in line with the requirements of BS EN 10204:2004.

### Annex C – Minimum Supplier Document Requirements

A	RECORDS REQUIREMENTS	Company Task	Review Responsibility	Checked by	Check date
1	Supplier document register	R	Cadent Project Manager		
2	Quality Management System (QMS) Certification	R	Cadent Project Manager		
3	BSI Kitemark Certifications (for components and skid)	R	Cadent Project Manager		
4	Quality Plan	R	Cadent Project Manager		
5	Inspection and Test Plan	R	Cadent Project Manager		
6	Name plate photograph	R	Cadent Project Manager		
7	Certificate of Conformity	R	Cadent Project Manager		
8	Enclosure records	R	Cadent Project Manager		
9	<b>Procedures</b> <ul style="list-style-type: none"> <li>• Welding procedure specification (WPS)</li> <li>• Weld procedure qualification records (WPQR)</li> <li>• Non-destructive testing procedures</li> <li>• Pressure test</li> <li>• Functional test</li> <li>• Installation, operation and maintenance manual</li> <li>• Logistics, handling and shipping</li> </ul>	R	Cadent Project Manager		
10	<b>Drawings</b> <ul style="list-style-type: none"> <li>• General arrangement drawing</li> <li>• Interface and connection schedule</li> <li>• Joint schedule (showing bolt / nut / washer / gasket for each joint)</li> <li>• Piping and instrument diagram (P&amp;ID) for main pipework</li> <li>• Piping and instrument diagram (P&amp;ID) with main, impulse and auxiliary pipework</li> <li>• Instrument / electrical panel layout and detail</li> <li>• Instrument / electrical interconnection</li> <li>• Termination wiring</li> <li>• Instrument loop</li> <li>• Lifting arrangement</li> </ul>	R	Cadent Project Manager		
11	Equipment Data List and datasheets for equipment	R	Cadent Project Manager		
12	Instrument termination and hoop up details	R	Cadent Project Manager		
13	Lifting equipment test certificate	R	Cadent Project Manager		
14	Material and component certificates in accordance with Annex B	R	Cadent Project Manager		
15	Fabrication reports and drawings Reports and drawings to show weld references along adjacent pipe/fitting references	R	Cadent Project Manager		
16	Welding records including: <ul style="list-style-type: none"> <li>• Weld map / WPS matrix</li> <li>• Welding surveillance records</li> <li>• Welder qualification records</li> </ul>	R	Cadent Project Manager		
17	NDT reports including operator qualifications	R	Cadent Project Manager		
18	Coating application records including testing, surface preparation	R	Cadent Project Manager		
19	Pressure testing results and certification (strength and leak tests)	R	Cadent Project Manager		
20	Joint completion records	R	Cadent Project Manager		
21	Functional testing results including equipment calibration	R	Cadent Project Manager		
22	Hazardous area equipment <ul style="list-style-type: none"> <li>• Mechanical and electrical ATEX certificates</li> <li>• inspection certificate</li> <li>• technical file</li> </ul>	R	Cadent Project Manager		
23	Register of concessions/deviations	R	Cadent Project Manager		
24	Material Take Off (MTO)	R	Cadent Project Manager		

Refer to Annex A for company task key.

**Document Control**

Document Reviewers

Name	Position	Date
Tim Atkinson	Mechanical Engineer	January 2021
Jake Cross	Senior Mechanical Engineer	January 2021
Jamie Brand	Senior Integrity Engineer	January 2021
Gulraj Chatha	Engineering Manager – A&C	January 2021
Luke Hollis	Principal Mechanical Engineer	January 2021
David Williams	Integrity Engineer	January 2021
Sam Revill	Senior Mechanical Engineer	January 2021
Luke Belcher	Engineering Manager – Mechanical	January 2021
Sam Kershaw	Mechanical Engineer	January 2021
David Ransome	Engineering Services Manager – A2B	January 2021
David Garner	Engineering Services Manager – 2BB	January 2021
Vitalis Ivare	Engineering Integrity Manager – 2BB	January 2021

**Key Changes**

Section	Amendment

**Cadent**

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