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## TECHNICAL SPECIFICATION

**Doc No: DSF-SPC-INS-006**

Rev. 1

Page 1 of 11

### HIGH PRESSURE (HP) TRANSMISSION SYSTEMS

## GAS REGULATOR VALVES

JUNE 2021

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## TECHNICAL SPECIFICATION


**Doc No: DSF-SPC-INS-006**

Rev. 1

Page 2 of 11


## REVISION HISTORICAL SHEET

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<b>Doc No: DSF-SPC-INS-006</b>	Rev. 1	Page 3 of 11

## Table of Contents

1. SCOPE .....	6
2. GENERAL REQUIREMENTS .....	6

 <p><b>Hellenic Gas Transmission System Operator S.A.</b>  357-359 Messogion Av., GR 152 31 Halandri  Tel.: 213 088 4000  Fax: 210 674 9504  Email: desfa@desfa.gr</p>	<b>TECHNICAL SPECIFICATION</b>
<b>Doc No: DSF-SPC-INS-006</b>	Rev. 1  Page 4 of 11

## REFERENCES DOCUMENTS

Job Spec. DSF-SPC-INS-002 [General Instrumentation]

Job Spec. DSF-SPC-MEC-006 [External Painting]

Job Spec. DSF-SPC-QAC-005

[Shop Inspection of Equipment and Materials for NGT Project]

EU DIRECTIVE 2014/68/EU PED

[Pressure Equipment Directive]

EU DIRECTIVE 2014/34/EU ATEX

[Equipment Explosive Atmospheres Directive]

EN 334

Gas Pressure Regulators for Inlet Pressures up to 100 bar]

EN ISO 16810

[Non-destructive testing - Ultrasonic testing - General principles]

EN ISO 17638

[Non-destructive testing of welds - Magnetic particle testing]

EN ISO 17636-1

[Non-destructive testing of welds. Radiographic testing. X- and gamma-ray techniques with film]

EN ISO 17636-2 [Non-destructive testing of welds. Radiographic testing. X- and gamma-ray techniques with digital detectors]

EN 10213

[Technical Delivery Conditions for Steel Castings for Pressure Purposes, Parts 1 and 2]

EN 10222

[Steel forgings for pressure purposes]

EN 60529

[Degrees of Protection provided by Enclosures (IP Code)]

EN ISO 8434

[Metallic tube connections for fluid power and general use]

DIN 2353



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## **TECHNICAL SPECIFICATION**

**Doc No: DSF-SPC-INS-006**

Rev. 1

Page 5 of 11

[Non-soldering compression fittings with cutting ring - Complete fittings and survey]

All standards or codes mentioned in this specification are valid in their latest version or by the relative superseded edition.



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**Doc No: DSF-SPC-INS-006**

Rev. 1

Page 6 of 11

## **1. SCOPE**

### **1.1 ITEM**

Regulator valves (Pressure Control Valves).

### **1.2 SERVICE**

Non corrosive gas.

### **1.3 APPLICATION**

Maintain an outlet pressure set point, along with flow override function (Flow control overrides pressure control). Alternatively, maintain an outlet flow rate set point, along with pressure override function (Pressure control overrides flow control).

## **2. GENERAL REQUIREMENTS**

### **2.1 LEGISLATION AND STANDARDS**

- EN 334
- EU DIRECTIVE 2014/68/EU PED
- EU DIRECTIVE 2014/34/EU ATEX

### **2.2 UNITS**

Metric.

### **2.3 PATTERN**

Manufacturer's standard.

Valve body shall be provided with an indication of the flow direction.

	<b>Hellenic Gas Transmission System Operator S.A.</b> 357-359 Messogion Av., GR 152 31 Halandri Tel.: 213 088 4000 Fax: 210 674 9504 Email: desfa@desfa.gr	<b>TECHNICAL SPECIFICATION</b>
<b>Doc No: DSF-SPC-INS-006</b>	Rev. 1	Page 7 of 11

## 2.4 CONSTRUCTION

### 2.4.1 GENERAL

The regulator valve consists of the regulator body, actuator, casing of actuator, control member, set point controller and the pilot assembly (only in pilot controlled regulators). Indirect acting, pilot controlled gas pressure regulators shall preferably be used, according to **EN 334**.

The regulator valve shall be gas operated. It shall be self-actuated according to a set point value using the pipeline gas as a source of control energy unassisted by any external power source.

Gas used in normal operation shall be returned to the piping downstream of the regulator. The gas shall pass a filter before entering the pilot assembly. At the regulator's pilot impulse lines, a suitable preheating device must be installed so that ice formation (due to Joule-Thomson effect) in these lines is avoided and the regulators could be operating at its design temperature range.

In case of breakdown of a diaphragm etc. the design shall ensure that gas does not enter the room in which the regulator is installed.

### 2.4.2 MAIN CONTROL VALVE DESIGN

Internal valve assemblies shall be exchangeable to allow uprating / downrating of the flow range.

The regulator shall be equipped with a position transmitter / local travel indicator.

### 2.4.3 SILENCER

The regulator valve shall be designed to minimize the sound pressure level emitted, e.g. by using an integral silencer or otherwise to a maximum of 85 dBA.

Depending on the area type a lower noise figure may be required.


### 2.4.4 FLANGES

Flanges shall conform to the relevant piping specifications (**Job Specifications DSF-SPC-PIP-033, DSF-SPC-PIP-034**).

### 2.4.5. SEAT SEALING

Soft seats.

### 2.4.6 ACTUATOR/PILOT ASSEMBLY/EXTERNAL CONNECTIONS

	<b>Hellenic Gas Transmission System Operator S.A.</b> 357-359 Messogion Av., GR 152 31 Halandri Tel.: 213 088 4000 Fax: 210 674 9504 Email: desfa@desfa.gr	<b>TECHNICAL SPECIFICATION</b>
<b>Doc No: DSF-SPC-INS-006</b>	Rev. 1	Page 8 of 11

Shall be designed for at least the same pressure rating as the valve body.

#### **2.4.7 SETPOINT CONTROLLER WITH AUXILIARY DEVICES**

The controller and the main control valve may be of two separate units.

The controller shall facilitate the adjustment of the set point of the controlled variable, i.e. the outlet pressure. A diaphragm may be used as a detective element for the controlled variable.

It shall be possible to adjust the set point during operation.

The regulator shall be equipped with a facility for remote adjustment of the pressure set point and the flow set point.

#### **2.4.8 AUXILIARY PIPING AND CONNECTIONS**

Auxiliary piping and fittings shall be made of stainless steel. Fittings shall conform to **DIN 2353** and **EN ISO 8434**.

If the specified fittings are not supplied, then adaptor fittings shall be delivered.


#### **2.4.9 PRESSURE GAUGES**

Locally mounted, pressure gauges for inlet, loading and downstream pressures shall be in accordance with **Job Specification DSF-SPC-INS-002**.

#### **2.4.10 ELECTRICAL PARTS**

All electrical devices [position transmitter, electro-pneumatic pilot, (if used)], shall be suitable for use in a hazardous area and in accordance with its classification study. The applicable norm shall be the EU Directive **2014/34/EU ATEX**. Connections and enclosures shall have a minimum protection class of IP 65 (**EN 60529**), as far as outdoor installations are concerned. For indoor installations, IP 54 protection class can be accepted.



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<b>Doc No: DSF-SPC-INS-006</b>	Rev. 1	Page 9 of 11

## 2.5 MATERIALS

### 2.5.1 GENERAL

Only materials conforming to recognized material standards shall be used. Attention is drawn to **Job Specification DSF-SPC-QAC-005** for shop inspection of Equipment and Material for the Project, where the material certification requirements are specified.

### 2.5.2 VALVE ACTUATOR AND SILENCER BODY

Normalized carbon steel, e.g.:

- Castings to grade GP240GH according to **EN 10222** or equivalent.
- Forging to grade P280GH according to **EN 10213** or equivalent.

### 2.5.3 CONTROLLER AND AUXILIARY DEVICES

Steel or Stainless Steel.

### 2.5.4 SOFT SEATS, SEALS, DIAPHRAGMS

Suitable elastomers.

### 2.5.5 SURFACE TREATMENT

Refer to **Job Specification DSF-SPC-MEC-006**.


## 2.6 NON DESTRUCTIVE EXAMINATION

### 2.6.1 BODY AND COVER

All exterior and accessible interior surfaces of bodies and covers shall be magnetic particle examined according to **EN ISO 17638**.

### 2.6.2 WELDS (IF ANY)

All joints shall be radiographed and found acceptable in accordance with **EN ISO 17636**. However, where radiography is unfit for detection of defects, joints shall be ultrasonically examined according to **EN ISO 16810**.

	<b>Hellenic Gas Transmission System Operator S.A.</b> 357-359 Messogion Av., GR 152 31 Halandri Tel.: 213 088 4000 Fax: 210 674 9504 Email: desfa@desfa.gr	<b>TECHNICAL SPECIFICATION</b>
<b>Doc No: DSF-SPC-INS-006</b>	Rev. 1	Page 10 of 11

Where both radiography and ultrasonic examinations are unfit for detection then magnetic particle examination may be used.

## 2.7 TYPE TEST

The type test according to **EN 334** clause 7.3.

## 2.8 FACTORY TEST

Each regulator valve shall pass a series of factory tests conforming to **EN 334**.

### 2.8.1 STRENGTH TEST

As per **EN 334**.

### 2.8.2 EXTERNAL TIGHTNESS TEST

As per **EN 334**.

### 2.8.3 INTERNAL SEALING AND SET POINT TESTS

Check of internal sealing, setting and lock-up pressures in accordance with **EN 334**.

### 2.8.4 FUNCTIONAL TEST


The characteristic line for outlet pressure and valve stroke shall be determined by recording outlet pressure as a function of valve stroke for opening and closing movements, respectively.

Graphic representation of the outlet pressure as a function of the volumetric flow rate (performance curve) will also be considered, including a family of performance curves, depicting the effect of the variation of the inlet pressure to the performance curve.

The functional test method and the evaluation criteria shall be those described in **EN 334**.

## 2.9 MARKING

Each item shall be fitted with a stainless steel marker plate, indicating all relevant technical data, as per **EN 334** section 9. The item shall additionally be marked with the contract and item tag numbers.

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<p><b>Doc No: DSF-SPC-INS-006</b></p>	<p>Rev. 1</p>	<p>Page 11 of 11</p>

## 2.10 DELIVERY

The regulator valves shall be delivered completely assembled. All outlets shall be capped and protected against corrosion.

## 2.11 INSPECTION AND CERTIFICATION

Inspection will be performed by Projects' Accredited Inspection Body appointed by Owner. Inspection requirements are defined in the following documents:

- a. Material Requisition.
- b. Job Specification DSF-SPC-QAC-005.
- c. Relevant project specifications.
- d. Inspection clauses of applicable codes.

## 2.12 COMPLIANCE WITH THE EU DIRECTIVES

All parts that comply with the "New Approach" directives shall be provided with:

- a. A physical CE marking and other information as required by the relevant EU directives.
- b. A declaration of conformity, which lists all the directives with which the product complies.
- c. Any other information specified by the directive, e.g. user instructions.