



Exploration & Production

## GENERAL SPECIFICATION

### HVAC

#### GS EP HVA 236

#### Balancing Valves for HVAC Installations

|      |         |             |
|------|---------|-------------|
|      |         |             |
|      |         |             |
|      |         |             |
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## 1. Scope

The purpose of this specification is:

- to define the characteristics of balancing *valves* to use on chilled water piping and hot water piping for *HVAC* installations,
- to specify the minimum requirements for installations and operating of balancing *valves*.

The words and expressions in CAPITAL characters and *italic* are defined inside the general specification **GS EP HVA 801**.

When other words require a definition only to be used in the present document, then the definition is given in a dedicated paragraph of the present document and the defined word, when used, is marked in small and *italic* letters.

## 2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the effective date of the CONTRACT.

Order of precedence of documents is defined in **GS EP HVA 100**.

### Notes:

- In case of discrepancy between documents (whatever the documents and / or whatever origins), the most expensive solution must be quoted by the *BIDDER*. During the studies (Basic Engineering and / or Detailed Engineering) *CONTRACTOR*(s) shall raise the discrepancy in question to the *COMPANY*'s *HVAC SPECIALIST* who will then review and advise which document(s) is (are) to be specified for the project.
- The *HVAC VENDOR* or *CONTRACTOR* may propose proven improvements to the reference documents but must obtain written approval of the *COMPANY* prior to implementation.
- An International Standard is a good "engineering practice" which shall be recognised and taken into consideration by *VENDOR*, *SUPPLIER*, *MANUFACTURER* and/or *CONTRACTOR*. If required, the translation of the standards must be included into *HVAC* scope.

The latest revision of Standards, codes, regulations and the published errata if any must be used and applied by *VENDOR*, *SUPPLIER*, *MANUFACTURER* and *CONTRACTOR*.

### Standards

| Reference           | Title                                                                                                                                             |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| ASTM A240 / A 240 M | Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications |
| NF EN 1982          | Copper and copper alloys - Ingots and castings                                                                                                    |
| ISO 5752            | Metal valves for use in flanged pipe systems – Face-to-face and center to face dimensions                                                         |

**Professional Documents**

| Reference      | Title |
|----------------|-------|
| Not applicable |       |

**Regulations**

| Reference      | Title |
|----------------|-------|
| Not applicable |       |

**Codes**

| Reference      | Title |
|----------------|-------|
| Not applicable |       |

**Other documents**

| Reference      | Title |
|----------------|-------|
| Not applicable |       |

**Total General Specifications**

| Reference     | Title                               |
|---------------|-------------------------------------|
| GS EP HVA 000 | List of HVAC General Specifications |

**3. Definitions**

Operating: includes the balancing function and the differential pressure measurement.

Valve: device installed on piping allowing a flow adjustment.

**4. Minimum technical requirements for balancing valves technology**

The minimum technical requirements for balancing valves technology are the followings:

- Each balancing valve must be equipped with measurement devices to allow the flow rate measurement passing through the valve. This flow rate measurement must be obtained via a differential pressure loss measure. The measurement devices must be screwed in on balancing valve itself. Extremities of measurement devices must be accessible for measurement tool connection without having to remove the thermal insulation (when exists). It means that length of measurement devices must be selected in accordance with insulation thickness. It is essential to note that measurement pressure must allow a

measurement of flow rate, via adequate measurement tool or via a corresponding differential pressure loss / flow rate table,

- Measuring devices must be self-sealed and protected by caps. For measurement, probe must be inserted through the seal. Caps installed on each valve must be marked by different colours,
- The minimum differential pressure loss required for a correct *operating* of balancing valve must be comprised between 3 kPa and 200 kPa. Maximum pressure loss of balancing valves must be limited to 200 kPa,
- The setting and adjustment of balancing valves must be operated without balancing valve removal from piping,
- Displacement of inside components ensuring the balancing must only result from a manual action from an operator on the valve adjustment handle,
- Position of valve components in contact with the liquid must be the same whatever the value of flow passing through the valve (pump on or pump off). This avoids the risk of valve blocking when the system has been stopped during a long period (stand-by system),
- The sound pressure level due to the balancing valve shall not exceed the surrounding sound pressure level (measured when HVAC equipment is not operating),
- The balancing valve must allow the increasing of flow requested to clean and to flush the piping system, without balancing valve removal,
- The balancing valve must allow a reducing of flow (10% of nominal flow rate is a minimum), in case of pump under-design, in order to again balance the piping network,
- The balancing valve must be equipped with a handwheel to allow the valve setting and the isolation of piping on which it is installed. Type and nominal diameter of valve has to be indicated on handwheel,
- Handwheel must be equipped with an automatic revolution counter. handwheel zero position must be calibrated by the valve *MANUFACTURER*,
- Marking: body must be marked with PN (nominal pressure), DN (nominal diameter), flow direction arrow, material and casting date,
- Materials:

For fresh water:

|         |                      |                              |
|---------|----------------------|------------------------------|
| Body:   | From -10°C to 120°C: | cast iron EN-GJL-250 (GG 25) |
|         | From -20°C to 120°C: | ductile iron EN-GJS-400-15   |
| Bonnet: | DN 20 to DN 150:     | Ametal                       |
|         | DN 200 to DN 300:    | ductile iron                 |
|         | DN 350 – DN 400:     | ductile iron                 |

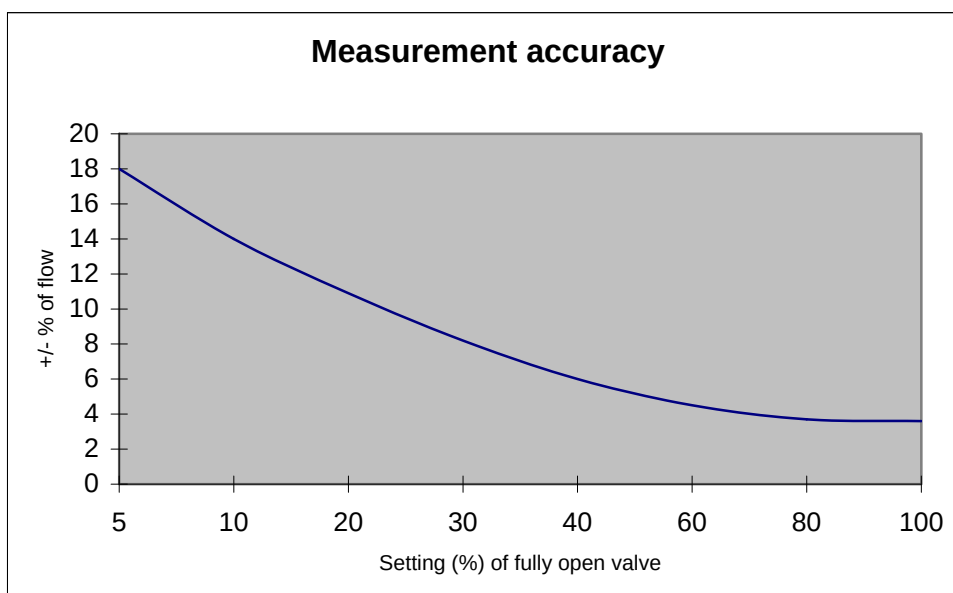
|                    |                   |                                                        |
|--------------------|-------------------|--------------------------------------------------------|
| Restriction cone:  | DN 20 to DN 150:  | Ametal                                                 |
|                    | DN 200 to DN 300: | Bronze                                                 |
|                    | DN 350 – DN 400:  | silicon brass CuZn16Si4-C or<br>brass CuZn35Pb2Al-C-GS |
| Spindle:           | DN 20 to DN 400:  | Ametal                                                 |
| Seat seal:         |                   | cone with EPDM ring                                    |
| Bonnet bolts:      |                   | chromed steel                                          |
| Digital handwhell: |                   | DN 20 to DN 150: polyamide plastic<br>handwheel        |
|                    |                   | DN 200 and more: aluminium                             |
| Surface treatment: | DN 20 to DN 200:  | Epoxy painting                                         |
|                    | DN 250 to DN 400: | Duasolid painting                                      |

For sea water:

|                    |                   |                                                        |
|--------------------|-------------------|--------------------------------------------------------|
| Body:              |                   | Bronze CuSn5Zn5Pb5                                     |
| Bonnet:            | DN 20 to DN 150:  | Ametal                                                 |
|                    | DN 200 to DN 300: | ductile iron                                           |
|                    | DN 350 – DN 400:  | ductile iron                                           |
| Restriction cone:  | DN 20 to DN 150:  | Ametal                                                 |
|                    | DN 200 to DN 300: | Bronze                                                 |
|                    | DN 350 – DN 400:  | silicon brass CuZn16Si4-C or<br>brass CuZn35Pb2Al-C-GS |
| Spindle:           | DN 20 to DN 400:  | Ametal                                                 |
| Seat seal:         |                   | cone with EPDM ring                                    |
| Bonnet bolts:      |                   | chromed steel                                          |
| Digital handwhell: |                   | DN 20 to DN 150: polyamide plastic<br>handwheel        |
|                    |                   | DN 200 and more: aluminium                             |
| Surface treatment: | DN 20 to DN 200:  | Epoxy painting                                         |
|                    | DN 250 to DN 400: | Duasolid painting                                      |

### Measurement accuracy:

Maximum deviation of flow at different settings must equal or lower than the ones indicated in the hereafter curve:



The curve holds, for valves with the correct flow direction, straight pipe distances and normal pipe fittings.

## 5. Location of balancing valves

Balancing valves must be installed at the following location:

- one balancing valve on the main piping, even if piping network does not include branch. The flow through this valve must correspond to pump flow,
- one balancing valve per branch connected to the main piping.

The minimum straight pipe distance between balancing valve and other piping element must be the following:

- downstream a balancing valve: 2 x DN,
- elbow placed upstream a balancing valve: 5 x DN,
- pump, isolating valve, check valve, ...upstream a balancing valve: 10 x DN,
- pump, isolating valve, check valve, ...downstream a balancing valve: 5 x DN,
- branch upstream a balancing valve: 5 x DN
- branch downstream a balancing valve: 3 x DN,