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Copper Alloy Globe Valves

Technical Terms of Delivery

Iran Transformer Research Insutute
موسسه تحقیقات ترانسفورماتور ایران

VALID / معتبر
آر و شبو تحقیق و توسعه

ITS

IRAN TRANSFO STANDARD
Research & Development Department

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FOREWORD

The Iran Transfo Standard (ITS) is a group of documents for standardization of Iran-Transfo Company requirements. Their preparation is entrusted to technical committees; any committee interested in the subject dealt with may participate in this preparatory work.
Preparation of this standard has been incepted in R&D Department and discussed in Mechanical technical committee.

All users should ensure that they have the latest edition of this publication.

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1 Scope

These technical terms of delivery applies to copper alloy globe valves according to BS 5154 , for air bags side of transformer.

Flanged connection is according to EN 1092-3.

The range of nominal size of globe valve is only DN 25.

The range of pressure designations covered is PN 10 according to BS 5154.

2 Designation Code and Dimensions

A copper alloy globe valve with nominal size of DN 25 with rated pressure 10 bar shall be designated as follows:

ITS-ME04-07 – DN25 – PN10 – Copper Alloy Globe Valve

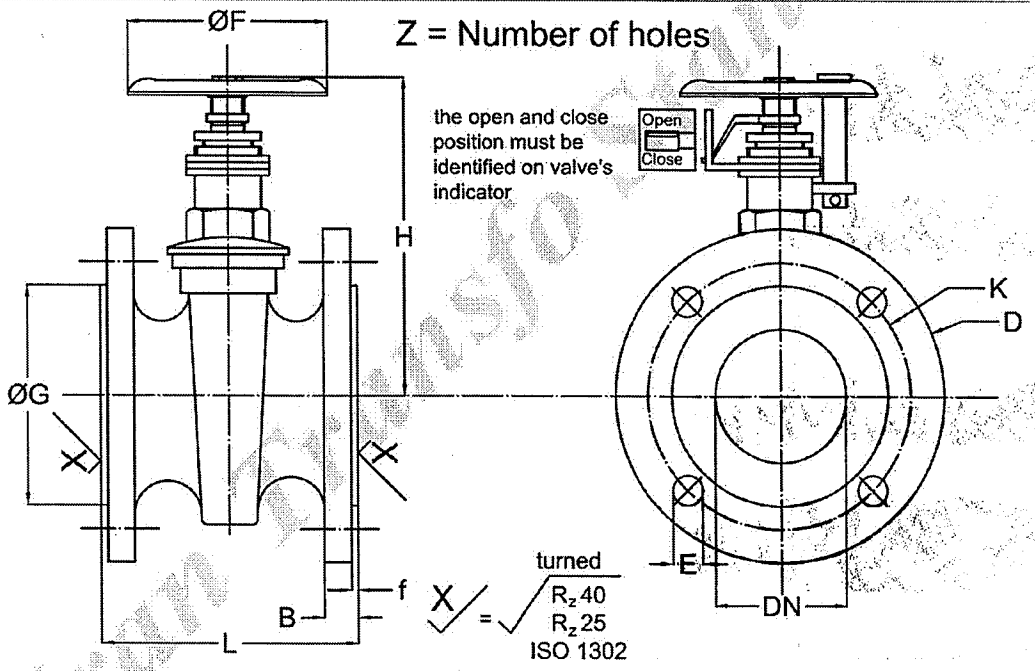

Table 1: Dimensions (dimensions in mm)

DN	ØD	ØG	f	B	E	H Max.	ØK	L (face-to-face)	Z	bolts Size	Lock
25	115	65	2	12	14	145	85	80	4	M12	Pin

2.1 Flange dimension Tolerances

Flange dimension tolerances is according to EN 1092-3 table 10.

2.2 Sizing of the operating element

Size of the hand wheel shall be determined in accordance with EN 12570. The hand wheel shall be selected such that the valve can be operated when the line pressure is equal to the maximum allowable pressure at 20°C and can be seated or unseated against a differential pressure of not less than the maximum allowable pressure at 20°C.

3 Design

Valve shall be properly designed incorporating appropriate safety margins and taking all relevant operating factors into account in order to ensure that they will be safe throughout their intended life cycle. The construction details shall be the responsibility of the manufacturer.

3.1 Materials

The materials of construction of the valve shall be in accordance with table 2.
The materials of non-metallic seating and sealing components and the material of body end components not in contact with the service fluid are the responsibility of the manufacturer.

NOTE The use of materials or combinations of materials which may be subject to galvanic (electrolytic) corrosion in service should be avoided.

The materials of non-metallic seating and sealing components and the material of body end or other components in contact with the transformer oil shall have no potential mixing or corrosion with that fluid.

Table 2

Component	Form	Standard	Alloy designation	
			Symbol	Number
Body bonnet	Casting	DIN 17660 EN 1982	CuZn25Al5Fe2Mn2P CuZn39Mn1AlPbSi CuZn39Sn1 CuZn40Mn1Pb1-AlFeSn1 CuAl10Fe2-C CuAl10Fe5Ni5-C CuSn5Zn5Pb5-C CuSn7Zn2Pb3-C CuSn6Zn4Pb2-C	CW705R CW718R CW719R CW721R CC331G CC333G CC491K CC492K CC498K
Obturator Obturator seat ring Body seat ring	Casting	DIN 17660 EN 1982	Alloy designations specified for body and bonnet	
	Bar	EN 12163 EN 12164		
	a	Nickel-copper alloys having 30% Nickel minimum		
	a	Stainless steels of the 13% chromium and 18/8 chromium/nickel types		
Stem Stem bushing	Forging	EN 12420	CuAl6Si2Fe CuAl10Ni5Fe4	CW301G CW307G
	Bar	EN 12163 EN 12164	CuSn6 CuSn8 CuZn25Al5Fe2Mn2P b CuZn39Mn1AlPbSi CuZn39Sn1 CuZn40Mn1Pb1AlFeSn1	CW452K CW453K CW705R CW718R CW719R CW721R
	a	Stainless steels of the 13% chromium and 18/8 chromium/nickel types		

a Form not specified.
b Not all alloy designations listed are available in this standard.

3.2 Pressure/temperature ratings

The valve should be made with materials work properly with transformer oil at 105°C temperature and 10 bar pressure in any horizontal or vertical position

4 Technical Requirements

The valve should work properly with 100°C transformer oil according to IEC 60296 at 10 bar pressure in any mounting position (shutter axis on horizontal or on vertical or with any slant).

The working degree of the contact surfaces between shutter and relevant seats has to allow the perfect sealing of the valves at the required conditions (see clause 5).

Proper gaskets, 100°C oil resistance, located in such a way to be easily replaced and provide a proper sealing between valve body and obturator and driving stem.

The flanges should be casted with the valve body simultaneously. Welding and mechanical connection is not permitted.

Gaskets must be set with synthetic rubber (material NBR), resistance to 105°C transformer oil and pressed not less than 30% of their thickness according to ITS-MG01-01. Other materials for sealing can be used with agreement.

Valve stem seals shall be capable of replacement in service without draining the transformer oil. The valve should be provided with a non-rising stem.

All screws should be stainless steel (A4-70) and protected against corrosion.

Hand wheel's color of the valve should be green.

Each valve should be marked with a serial number, which begins by the letter "A".

5 Inspection and Tests

The purchaser reserves the right to carry out any test to ascertain the globe valves suitability. The check can be carried out also while valves manufacturing.

5.1 Visual Inspection

The visual inspection is aimed at ascertaining the absence, in all valve components, of any macroscopic defects such as: Repairs or faulty manufacturing, manufacturing or casting burrs, blowholes, inclusions, indentations, foreign matters, excessive roughness and unevenness of the surfaces.

5.2 Dimensional Check

All dimensions should be checked according to clause 2.

5.3 Tightness Test

The gate valves have to withstand a continuous pressure of 100 kPa with transformers oil at 105°C without any leaks or tightness faults.

In addition to procedure 11 and 12 of EN 12266-1 the following tests are required to the gate valves.

5.3.1 Seat Tightness

With the obturator in closed position:

Leak test with air at a pressure of 200 kPa and ambient temperature for 15 minutes

The test has to be carried out by applying the required pressure by means of an air compressor connected to a flange mounted on one side of the valve being the other side left open. The gate shall be closed and the seat cavity of gate shall be filled with water and no bubbles or leakage shall be observed. The test has to be carried out on both sides of the gate valve and performed routinely.

Leak test with transformer oil at a pressure of 250 kPa and ambient temperature for ½ hour

The test has to be carried out by applying the required pressure by means of a pump connected to a flange mounted on one side of the valve being the other side left open. The gate shall be closed and no leakage shall be observed. The test has to be carried out on both sides of the gate valve and performed routinely.

Leak test with transformer oil at a pressure of 250 kPa and a temperature of 90°C for ½ hour

The test has to be carried out by applying the required pressure by means of a pump connected to a flange mounted on one side of the valve being the other side left open. The gate shall be closed and no leakage shall be observed. The test has to be carried out on both sides of the gate valve and conducted on 2% of the shipment as a random sample.

Vacuum Test

The valve must be vacuum-rated, and the vacuum test procedure for the valve is as follows: The valve should be connected to a vacuum chamber with absolute vacuum pressure of 200-300 mbar, equipped

with a vacuum gauge. During the test period, which lasts for 24 hours, the vacuum pressure in the chamber must remain unchanged. This test must be conducted on 2% of the shipment as a random for each production batch, and in the presence of an inspector, the test should also be performed on one sample for a duration of 30 minutes.

5.3.2 Shell Tightness

With the obturator in open position:

Leak test with air at a pressure of 200 kPa and ambient temperature for 15 minutes

The test has to be carried out on both sides closed by blind flanges, the air introduced through a joint. During the test, the valve should be submerged in water and no bubbles or leakage shall be observed. This test has to be carried out routinely.

Leak test with transformer oil at a pressure of 250 kPa and ambient temperature for ½ hour

The test has to be carried out on both sides closed by blind flanges, the oil introduced through a joint. During the test, no leakage shall be observed. This test has to be carried out routinely.

Leak test with transformer oil at a pressure of 250 kPa and a temperature of 90°C for ½ hour

The test has to be carried out on both sides closed by blind flanges, the oil introduced through a joint. During the test, no leakage shall be observed. This test has to be carried out randomly on 2 percent for each shipment.

5.4 Sealing Gasket Materials Test

All Sealing materials should be tested according to Iran-Transfo standard: ITS-MG01-01.

6 Documents

Test certificate

Every batch have to include a test certificate. The test certificate must contain test results of 5.3.1 and 5.3.2.

Packing list

Serial numbers of valves should be announced in packing list.

7 Delivery

7.1 Packing

Each valve should be delivered with proper standard packing protected mechanical damages and dust penetration on the inside of the valves.

7.2 Labeling

Every batch should be identified by attached labeling and marked with following data:

- Manufacturer name and factory mark
- Valve Size (DN)
- Pressure rate of valve (PN)
- Order Number
- Quantity
- Gross and net weight

8 Normative References

The following referenced documents are indispensable for the application of this document:

EN 12288:2010, Industrial valves –Copper alloy valves

EN 19:2002, Industrial valves — Marking of metallic valves

EN 558:2008, Industrial valves — Face-to-face and center-to-face dimensions of metal valves for use in flanged pipe systems — PN and Class designated valves

EN 736-1, Valves — Terminology — Part 1: Definition of types of valves

EN 736-2, Valves — Terminology — Part 2: Definition of components of valves

EN 736-3, Valves — Terminology — Part 3: Definition of terms

EN 1057, Copper and copper alloys — Seamless round copper tubes for water and gas in sanitary and heating applications

EN 1092-3:2003, Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 3: Copper alloy flanges

EN 1759-3:2003, Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, Class designated — Part 3: Copper alloy flanges

EN 1982:2008, Copper and copper alloys — Ingots and castings

EN 12163:1998, Copper and copper alloys — Rod for general purposes

EN 12164:1998, Copper and copper alloys — Rod for free machining purposes

EN 12167:1998, Copper and copper alloys — Profiles and rectangular bar for general purposes

EN 12168:1998, Copper and copper alloys — Hollow rod for free machining purposes

EN 12266-1:2003, Industrial valves — Testing of valves — Part 1: Pressure tests, test procedures and acceptance criteria — Mandatory requirements

EN 12266-2:2002, Industrial valves — Testing of valves — Part 2: Tests, test procedures and acceptance criteria — Supplementary requirements

EN 12420:1999, Copper and copper alloys — Forgings"

EN 12449, Copper and copper alloys — Seamless, round tubes for general purposes

EN 12516-3, Valves — Shell design strength — Part 3: Experimental method

EN 12570, Industrial valves — Method for sizing the operating element

EN ISO 228-1:2003, Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)

EN ISO 5210:1991, Industrial valves — Multi-turn valve actuator attachments (ISO 5210:1991)

ISO 7-1:1994, Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation

ISO 1302:2002, Geometrical Product Specifications (GPS) – Indication of surface texture in technical product documentation

ASME B1.20.1 1983, Pipe threads, general purpose (inch)

IEC 60296 ed4.0, Fluids for electro technical applications - Unused mineral insulating oils for transformers and switchgear

BS 5154, Specification for copper alloy globe, globe stop and check, check and gate valves