Iran-Transfo

ITS-ME04-03

Edition 1.0 2015-09

Copper Alloy Gate Valves for Oil Filled Transformers

Technical Terms of Delivery

ITS

IRAN TRANSFO STANDARD
Research & Development Department

Compiled:
S.Bigdeli

J.Afsari

M.Bazhrang

Edited:
M.Akbari

Approved:
A.Bagheri

VALID
۱۳۹۴/۱۱/۰۵

Number of Pages: 8

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. Eventually, by approve of following members issued.

✓ J.Afsari	✓ M.Esmaeili	✓ M.Mozaffari	✓ S.Bigdeli
✓ M.Adiban	✓ V.Ansari	✓ Z.Abdollahi	✓ M.Bazhrang

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

VALID
۱۳۹۴/۸/۰۵

CONTENTS

VALID

1 Scope

These technical terms of delivery applies to copper alloy gate valves according to EN 12288, for oil filled transformer use having flanged body ends.

Flanged connection according to EN 1092-3, for oil filling, oil drainage or connection of transformer pipelines.

The range of nominal sizes is DN 25 to DN 300 and of nominal diameters is 25 mm to 300 mm.

The range of pressure designations covered is PN 10; PN 16.

For the applicability of each nominal size/diameter and each pressure designation to the different types of valve body end, see EN 12288 clause 4.1.

2 Designation Code and Dimensions

A copper alloy Gate Valve with nominal size of DN 80 with rated pressure 16 bar shall be designated as follows:

ITS-ME04-03 – DN80 – PN16 – Copper Alloy Gate Valve

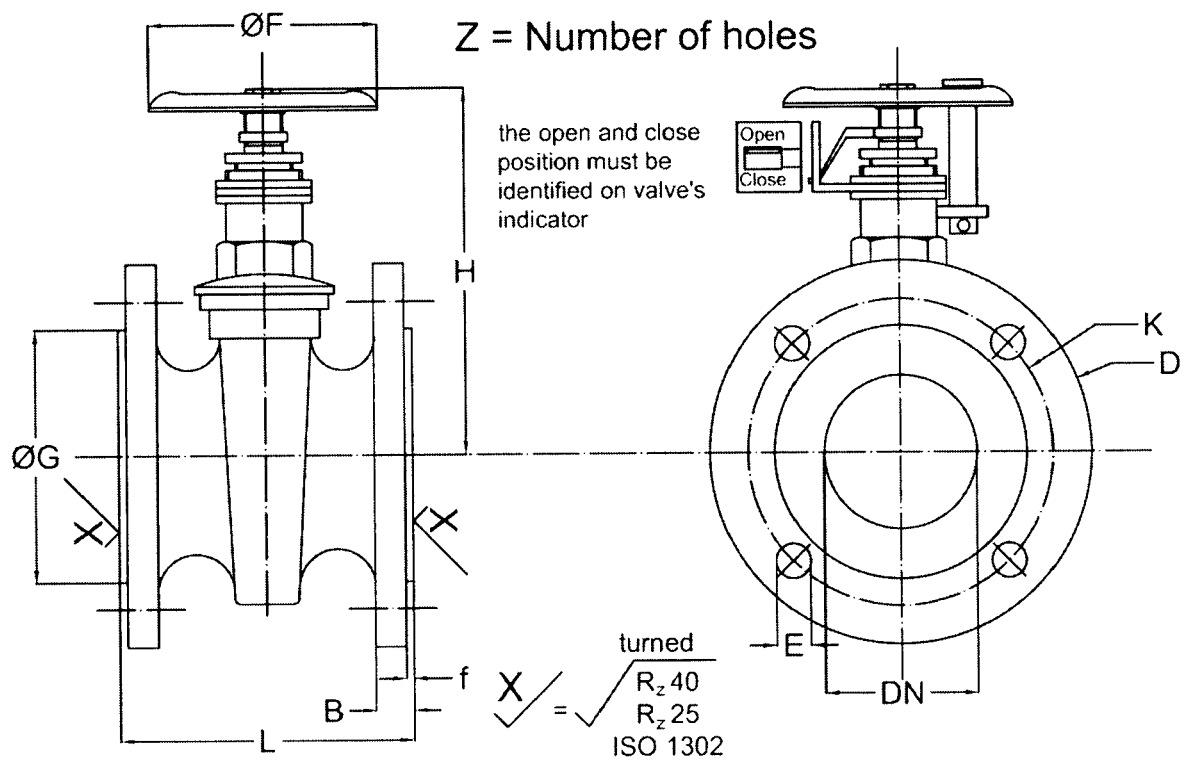


Figure 1

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	
40	150	84	2	14	18	185	110	100	4	M16	
50	165	99	2	16	18	215	125	110	4	M16	Lock
65	185	118	2	16	18	250	145	130	4	M16	
80	200	132	2	18	18	280	160	150	8	M16	
100	220	156	2	20	18	350	180	160	8	M16	
125	250	Without sealing strip		22	18	425	210	200	8	M16	
150	285			22	22	490	240	210	8	M20	
200	340			26	22	650	295	230	8	M20	Chain
250	395			28	22	820	350	250	12	M20	
300	445			28	22	850	400	270	12	M20	

2.1 Flange dimension Tolerances

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

2.2 Sizing of the operating element

Size of the handwheel shall be determined in accordance with EN 12570. The handwheel 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

Valves 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.

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.

Table 2: material and standard

Component	Form	Standard	Alloy designation	
			Symbol	Number
Body bonnet	Casting	EN 1982	CuAl10Fe2-C CuAl10Fe5Ni5-C CuSn5Zn5Pb5-C CuSn7Zn2Pb3-C CuSn6Zn4Pb2-C	CC331G CC333G CC491K CC492K CC498K
Obturator Obturator seat ring Body seat ring	Casting	EN 1982	Alloy designations specified for body and bonnet	
	Bar	EN 12163 EN 12167	CuSn6 CuSn8	CW452K CW453K
	a	Nickel-copper alloys having 30% Nickel minimum		
	a	Stainless steels of the 13% chromium and 18/8 chromium/nickel types		
Stem Stem bushing	Casting	EN 1982	Alloy designations specified for body and bonnet	
	Forging	EN 12420	CuAl6Si2Fe CuAl10Ni5Fe4	CW301G CW307G
	Bar	EN 12163 EN 12164	CuSn6 CuSn8 CuZn25Al5Fe2Mn2Pb 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.
c Not all alloy designations listed are available in both these standards.

3.2 Pressure/temperature ratings

The valves should be made with copper alloy material work properly with transformer oil at 120°C temperature and 5 bar pressure in any horizontal or vertical position.

VALID
۱۳۹۴/۸/-۵

4 Technical Requirements

The valve should work properly with 120°C transformer oil according to IEC 60296 at 10 bar pressure (for PN10 valves) and 16 bar pressure (for PN16 valves) 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 gate valves at the required conditions (see Checks and Tests).

Proper gaskets, 120°C oil resistance, located in such a way to be easily replaced and provide a proper sealing between valve body and body and driving stem.

The gaskets have to withstand the transformers thermal treatment carried out in air and/or under vacuum at 120°C for 30 days.

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 120°C transformer oil and pressed not less than 30% of their thickness according to ITS-MG01-01.

The valves with size > DN80 should have shutter guide in order to keep it against dynamic pressure influences.

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 and protected against corrosion.

5 Inspection and Tests

The purchaser reserves the right to carry out any test to ascertain the gate 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

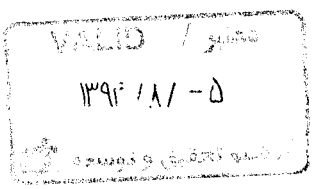
All dimensions should be checked according to clause 2.

5.3 Tightness Test

The gate valves have to withstand a continuous pressure of 100 kPa with transformers oil at 120°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: 250 kPa pressure with 90°C transformers oil 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 test has to be carried out on both sides of the gate valve



5.3.2 Shell Tightness

With the obturator in open position: 800 kPa pressure with transformers oil at 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.

5.4 Screws Test

All the screws exposed to the atmosphere shall be stainless steel or brass and should be successfully passed condensation test according to ASTM D 4585.

5.5 Sealing Gasket Materials Test

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

6 Delivery

6.1 Packing

The unit should be delivered with proper standard packing protected mechanical damages and water penetration on the inside of the valves.

6.2 Labeling

Each packing 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

7 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 centre-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

VALID

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 electrotechnical applications - Unused mineral insulating oils for transformers and switchgear

VALID / معتبر
۱۳۹۴/۸/۰۵
آزمایشگاه تحقیق و توسعه