

COMPARISON BETWEEN BS 5351 : 1986 AND ISO 17292 : 2004						
SI No	Topic / Aspect	BS 5351 : 1986 (with Amendments 1, 2 and 3)		BS EN ISO 17292 : 2004		Remarks
		Clause No	Details	Clause No	Details	
	Title		Steel Ball Valves for the petroleum, petrochemical and allied industries.		Metal Ball Valves for petroleum, petrochemical and allied industries	
1	Bore	1	Full bore and reduced bore	1	Full bore, reduced bore and double reduced bore	
2	Nominal size	4	DN 8 - DN 400 (1/4" - 16") Flanged & butt weld end - DN 15 - 400 (1/2" - 16") Socket weld end, extended weld end only for DN 15 - 50 (1/2" - 2") Threaded end for DN 8 - 50 (1/4" - 2")	1	DN 8 - 500 (NPS 1/4 - 20) Flanged & butt weld end - DN 15 - 500 (NPS 1/2 - 20) Socket weld & threading end - DN 8 - 50 (NPS 1/4 - 2)	
3	Pressure designation	5	PN 10, 16, 25,40 & Class 150, 300, 600 Class 800 for socket weld end, extended weld end & threaded end	1	PN 16, 25, 40 & Class 150, 300, 600 Class 800 for reduced bore valves with threaded & socket weld ends	
4	Pressure/temperature ratings	6	Seat ratings indicated in Table 3	4.3	Seat ratings given in Table 1 for PTFE and RPTFE	There is a difference in the values of seat ratings given in both the standards.
			Shell ratings as per BS:1560 Part 2 (Class rated), BS:4504 Part 1 (PN rated)	4.2	Shell ratings as per ASME B16.34 (Class rated), EN 1092-1 (PN rated)	
5	Flanged end valves	7.1.1	Flanges as per BS:1560 Part 2 (Class rated), BS:4504 Part 1 (PN rated)	5.2.2.1	Flanges as per ASME B16.5 (Class rated), EN 1092-1 (PN rated)	
		7.1.2	Face-to-face dimensions as per BS:2080	5.2.2.2	Face-to-face dimensions as per ASME B16.10 (Class designated), ISO 5752, Basic series 1, 14 and 27 (PN designated)	
6	Butt welding end valves	7.2	No requirement, but typical weld preparations given in Appendix B	5.2.3.1	In accordance with Figure 1 and Table 4, unless otherwise specified by purchaser	There is a difference in the value of the width of flat land at the butt weld end (1.6+/-0.8 in BS:5351 and 1.5 +1.0/-0.5 in ISO 17292).
			End-to-end dimensions specified in Table 6 for PN 10, 16, 25, 40 and Cl. 150,300 and as per BS:2080 for Cl.600		End-to-end dimensions as per ASME B16.10 (Class designated) and EN 12982 (PN designated)	There are no changes in the end-to-end dimensions.
7	Socket weld end valves	7.3	Dimensions specified in Table 7. Outside dia of end specified in table 7.	5.2.4	Dimensions specified in Table 5, end wall thickness specified in Table 6. End-to-end dimensions shall be established by manufacturer.	
8	Extended weld end valves	7.4	Overall length with extended ends shall be 400 mm. Ends to be square or prepared for welding for DN 15 - 40. For DN 50 and above, ends shall be bevelled as per Appendix B or as specified by purchaser	-	Not covered.	
9	Threaded end valves	7.5	Internal taper threads as per ASME B1.20.1 / BS 21 Outside dia of end specified in table 8.	5.2.5	Taper threads as per ISO 7-1 (PN designated) and ASME B1.20.1 (Class designated) - to be gauged as per ISO 7-2 / ASME B1.20.1. End wall thickness is specified in Table 6. End-to-end dimensions shall be established by manufacturer.	
10	Body & ball port diameter	7.6 & 7.7	Minimum values specified in table 9 for full bore and reduced bore valves.	5.1	Minimum values specified in Table 2 for full bore, reduced bore and double reduced bore valves.	There is a slight reduction in bore for some sizes / bore type.
11	Body construction	8.1	Bodies shall be of one-piece or split construction. Bolted covers shall be provided with not less than 4 bolts, stud-bolts, studs or socket head cap or hexagon headed screws.	5.2.14	No requirement on number of pieces. Shell joints can be bolted body-to-cap joints, threaded body-to-cap joints, bolted cover joints and threaded cover joints. Bolted body-to-cap joint shall be secured by a minimum of 4 bolts of sizes specified. Design requirements for bolted / threaded shell joints specified.	
12	Shell wall thickness	8.2	The minimum wall thickness of the pressure containing shell shall be as per table 10. Operations contributing to reduction in effective thickness below permitted value are not allowed.	5.2	The minimum valve body thickness shall be as specified in table 3. Thickness requirements are measured from internally wetted surface. Local areas having less than permissible wall thickness are acceptable provided they pertain to the conditions of clause 5.2.1.3. Manufacturer is responsible for determining if larger wall thickness is needed.	There is a slight reduction in wall thickness in the ISO standards. For class 800, only valves having reduced ball ports are within the scope of ISO 17292.
13	Drain tapping	8.3	Provision shall be made in the design of valves DN 50 and larger for the incorporation of a drain tapping, the position of which, is shown in fig. 2 a. Actual dimensions given in table 11. Tapping threads shall be in accordance with BS 21 taper or ANSI/ASME B 1.20.1.	NM	No specification for a drain tapping arrangement is given.	
14	Flanged ends	8.4	End flanges shall be cast or forged integral with the body or end piece of split body design, or attached by butt welding, complying to BS 2633 or BS 4677. Necessary heat treatment to be performed.	5.2.2.1	Body end flanges shall comply to ASME B16.5 for class designated valves and EN 1092-1 for PN designated valves. RF end flanges shall be provided, unless specified by the purchaser.	Flanged end details given more elaborately in ISO 17292. End flange facing finish requirements also given in ISO 17292.
				5.2.2.2	Face to face dimensions shall be in accordance with ASME B 16.10 for class designated valves or ISO 5752, basic series 1,14 and 27 for PN designated valves, with appropriate tolerance as specified in standards.	
				5.2.2.3	Butt welding shall be in accordance with ASME-BPVC, section IX or the rules of ISO 9606-1 and ISO 15607, 15609 1, 15614-1, 15614-2 and 15610.	Precautions to be taken during the welding process have also been mentioned in ISO 17292.
15	Stems, ball shanks and stem extensions	8.5	These shall be provided with permanent means of indicating port position and shall be designed to prevent misorientation.	5.2.9	Valve design should be such that if a failure occurs at any part of the stem within the pressure boundary, no portion of the stem is ejected when valve is under pressure. Torsional strength requirement of stem has been specified in clause 5.2.9.3	More stringent requirements in ISO 17292 than those in BS:5351. Basis for manufacturers' recommended torque has also been given.
16	Stem retention	8.6	The amendment made to the BS standard specifies the need for an anti blow-out stem.	5.2.8	Similar requirements as in BS: 5351.	
17	Gland	8.7	Internally screwed stuffing box not permitted. Screwed cap type glands not to be used for sizes greater than DN 50. Vertically split glands shall not be used.	5.2.12	Adjustable packing glands shall allow for online maintenance. Packing glands threaded into bodies shall not be used. Vertically split glands are not allowed.	
18	Body seat rings	8.8	Body seat rings must be renewable except in the case of one-piece welded construction.	NA	No mention of body seat ring.	
19	Ball	8.9	Full bore valves shall have cylindrical port. Solid construction, sealed cavity type, cored cavity type and hollow balls are allowed.	5.2.10	Ball shall have a cylindrical bore and shall be of solid one-piece or two-piece construction. Other types of ball construction such as cored cavity, sealed cavity or hollow ball may be furnished only if agreed to by the purchaser.	
20	Wrenches and handwheels	8.10	Wrenches and handwheels shall be designed to withstand a force not less than that given in table 12.	NM	NM	Given in ISO 17292 under "Operating Means"
21	Antistatic design	8.11	Valves shall incorporate an antistatic feature that ensures electrical continuity between stem and body of valves DN50 or smaller, or between ball, stem and body of larger valves. Use of conductive packing is permitted if it satisfies conditions given in clause 8.11.	5.2.7	The antistatic feature shall have electrical continuity across the discharge path with a resistance not exceeding 10 ohms from a power source not exceeding 12V DC.	Similar requirements found in both standards. Amendment in BS:5351 carries complete details of the antistatic requirements
22	Fire-tested design	8.12	All valves shall be of fire-tested design. Refer amendment for full details.	NM	No details furnished	
23	Operation	9.2	Length of wrench or diameter of handwheel for direct or gear operated valves should require a maximum force of 350N only, to open or close the valve under the maximum differential pressure recommended by the manufacturer.	5.2.11.3	The length of the lever type handle or diameter of the manual gear handwheel shall be sized so that the applied input force to open or close the valve does not exceed 360N at the torque value specified in clause 5.2.9.3	
		9.7	Dimensions of the actuator attachment flanges shall comply with BS 5840- part 1.	NM	No mention of the dimensions of actuator attachment flanges.	Most clauses under the two standards are the same.

24	Materials	10.1	Shell material shall be selected from BS1560:part 2 or BS 4504:part 1. For smaller valves made from bar stock, table 13 of the BS 5351 standards gives the supplementary materials. Plate material shall have the same nominal composition as the body material. Carbon content of all pressure containing parts involved in welding has been specified. Chemical composition of the body drain plug and body shall be the same. CI plugs not to be used.	6.1	Material for shell to be selected from ASME B 16.34 for class designated valves or in EN 1092-1 for PN designated valves. No additional list of materials given. However, a mention has been made about shell material repair.	No details furnished about the carbon content requirements in ISO 17292.
		10.2	Trim materials are not a requirement of this standard.	6.3	The trim material shall have equivalent or greater corrosion resistance than the shell material	Purchaser may also specify materials having greater corrosion resistance or higher strength for these parts.
		10.3	The material used for body seat rings shall comply with the minimum pressure/ temperature ratings given in table 3. Unless specified, PTFE seats without fillers shall be provided.	NM	NM	No specific mention of the body seat rings.
		10.4	Material for stem seals, body seals and gaskets shall be suitable for use at the maximum temperature rating applying to the valve.	6.6	Material for stem seals, body seals and gaskets shall be suitable for use at the maximum temperature rating and its corresponding pressure rating applied to the valve by the manufacturer.	The amendment made to the BS standard specifies that the purchaser should specify in the order about any special requirements.
		10.5	Bolting material for pressure containing purposes shall comply with BS 4882. The use of carbon steel for bolting is restricted to conditions specified in the amendment to clause 10.5	6.5	Unless otherwise specified by the purchaser, bolting material shall comply with ASTM A 193-B7 or EN 10269, material grade no. 1.7225, 42CrMo4 and nuts shall be in accordance with ASTM A194-2H or EN 10269, material grade number 1.1191, C45E.	For service temperatures below -29 deg. C, the purchase order shall specify the bolting material.
		10.6	The wrench or handwheel shall be of steel, malleable CI or nodular graphite CI.	NM	NM	
		10.7	Wrench or handwheel nut material shall have a melting point above 955 deg. C and shall be corrosion resistant, if made of carbon steel.	NM	NM	
		10.8	A one-piece gland or any gland flange shall be of steel.	NM	NM	
		10.9	For valves of size DN 150 and larger, the identification plate shall be of 18/8 Ni steel or nickel alloy, attached to the valve by pins of similar material or by spot welding on carbon steel or austenitic stainless steel valves.	NM	NM	
25	Pressure testing	11	All valves shall be pressure tested in accordance with BS 6755: part 1 and for the minimum test durations given in table 14. Additional requirements given in Amendment 6271.	8.1	Each valve shall be given a pressure test, a seat closure test and a shell pressure test in accordance with ISO 5208, with certain modifications that have been listed in the ISO 17292 standards.	The testing procedure and parameters are given in full detail in the ISO standards. The testing time given in table 14 of the BS standards is more than that specified by the ISO standards.
26	Fire testing	12	Amendment 5836 of the BS standards requires that valves be type-tested in accordance with either BS 6755: part 2 or appendix A of BS 5146: part 1: 1974.	NA	NA	Complete details of the testing requirements have been furnished in the amendment 5836 of the BS standards.
27	Antistatic testing	13	Amendment 5836 of the BS standards requires that the valves shall be type-tested, the test being carried out on new, dry, as-built valves of each type after pressure testing. The test for electrical continuity shall be carried out after the test valve has been operated at least five times.	NA	NA	BS standards specify that electrical continuity must exist with a resistance not exceeding 10 ohms from a power source not exceeding 12V.
28	Marking	14.1	Valves shall be clearly marked in accordance with BS 5418, except as given in 14.2, 14.3 and 14.4.	7.1	Valves shall be clearly marked in accordance with ISO 5209, except that the requirements of this clause shall apply.	
29	Body marking	14.2	Body marking shall be integral with the body or on a plate securely fixed to the body. The details to be included in the marking have been given as separate items in the same clause. Also, amendment 5527 carries a different requirement for marking the nominal size of reduced bore valves.	7.2	The mandatory body marking shall contain the manufacturer's name or trademark, the body material, the pressure rating and the nominal size, as given in the clause. The format of the body marking has also been given.	
30	Identification plate marking	14.3	Identification plate shall be marked with the number of this British standard, the manufacturer's figure or number identifying the valve in all respects, seat material designation, ball material designation and any pressure or temperature constraints imposed by the manufacturer. Amendment 5527 refers to the identification plate marking. Details of each mark on the plate have been furnished.	7.3	Each valve shall have an identification plate with the manufacturer's name, pressure rating, manufacturer's identification number, max./ pressure at 38 deg C, limiting temperature and associated pressure if applicable, limiting differential pressure and temperature if applicable, trim identification and pipe thread identification. The number of this international standard may be given, if all its applicable requirements have been met.	
31	Additional markings	14.4	Details of additional markings have been listed in this clause. Any further markings made shall be the option of the manufacturer, provided they don't conflict any of the standards.	7.5	This clause specifies the requirement of a clear marking in the case of a unidirectional valve that identifies the unidirectional seat.	A requirement of the ring joint marking has been made in the ISO standard.
32	Omission of markings	14.5	On valves smaller than DN 50, it is permissible to omit the body markings in a specified order, provided that the omitted details have been furnished on the identification plate.	7.2.2	The same applies here, except that the omission does not include the manufacturer's name or trademark.	Table 15 of the BS standards specify the typical material symbols to be used.
33	Preparation for storage and transportation	15, 16	After testing, each valve shall be drained of the test liquid, cleared of any extraneous matter and suitably protected in preparation for storage and transportation. Painting is not a requirement of this standard, but any painting needed, has to be specified by the purchaser. All valves shall have body ends sealed to exclude foreign matter during transit and storage.	9	The same applies here. In addition, the ISO standard specifies the need for a rust preventive coating in clauses 9.2 and 9.3. Protective covers of wood, wood fibre or plastic shall be securely affixed to valve ends of flanged and butt-welding end valves. Protective plugs of similar material shall be inserted into valve ends of socket welding and threaded end valves. Ball to be in open position at the time of shipment.	Special packaging needs shall be specified by the purchaser according to the ISO standard.

NOTE 1: DETAILS OF INSPECTION (Clause 8.2), EXAMINATION (Clause 8.3) AND SUPPLEMENTARY EXAMINATION (Clause 8.4) HAVE BEEN INCLUDED ONLY IN ISO 17292. NO SUCH DETAILS ARE AVAILABLE IN BS:5351.