भारतीय मानक
Indian Standard

IS 16043 : 2017
(Superseding IS 11323 and 11335)

समुद्री प्रयोग हेतु कॉपर एलॉय, कास्ट आयरन, सफरॉयडल/नोडयूलर कास्ट आयरन और कास्ट स्टील के फलेंज सहित गेट वाल्व — विशिष्टि

Copper Alloy, Cast Iron, Spheroidal/Nodular Cast Iron and Cast Steel Gate Valves, Flanged, for Marine Application — Specification

ICS 23.060.30; 47.020.30

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Shipbuilding Sectional Committee, TED 17

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Shipbuilding Sectional Committee had been approved by the Transport Engineering Division Council.

The design and manufacture of gate valves has made rapid strides in the country. However, the sizes, overall dimensions and pressure ratings of valves being made by various manufacturers bear no symmetry. With the aim of rationalizing the sizes, pressure ratings and dimensions to bring interchangeability of valves, this standard has been formulated.

This standard supersedes IS 11323:1984 'Specification for steel gate valves for use in marine pipe work system' and IS 11335:1995 'Cast iron gate valves for use in marine pipe work system (*first revision*)'.

Hence IS 11323 and IS 11335 shall be withdrawn.

While formulating this standard due consideration has been given to the practices being followed internationally.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

COPPER ALLOY, CAST IRON, SPHEROIDAL/ NODULAR CAST IRON AND CAST STEEL GATE VALVES, FLANGED, FOR MARINE APPLICATION — SPECIFICATION

1 SCOPE

This standard specifies requirements for copper alloy, cast iron, spheroidal/nodular cast iron and cast steel, bolted bonnet, double flanged end connection gate valves from 25 to 400 mm nominal sizes of the following types used for shipboard, sea water, fresh water, fuel oil, lub oil, hydraulic oil and bilge services.

NOTES

1 Gate valves inside screw non rising stem from 25 to 400 mm are as shown in Fig. 1.

2 Gate valves outside screw, rising stem, non rising hand wheel from 40 to 400 mm are as shown in Fig. 2.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
210 : 2009	Grey iron castings — Specification (*fifth revision*)
318 : 1981	Specification for leaded tin bronze ingots and castings (*second revision*)
320 : 1980	Specification for high tensile brass rods and sections (Other than forging stock)
1030 : 1998	Carbon steel castings for general engineering purposes (*fifth revision*)
1363	Hexagon head bolts, screws and nuts of product grade 'C':
(Part 1) : 2002	Hexagon head bolts [size range M 5 to M 64 (*fourth revision*)]
(Part 3) : 2002	Hexagon nuts (size range M 5 to M 64) (*fourth revision*)
1865 : 1991	Iron castings with spheroidal or nodular graphite (*third revision*)
3444 : 1999	Corrosion resistant high alloy steel and nickel base castings for general applications — Specification (*third revision*)
4854 (Part 1) : 1969	Glossary of terms for valves and their parts: Part 1 Screw down stop check and gate valve and their parts
5414 : 1995	Gaskets and packing — Gland packing jute and hemp — Specification (*first revision*)
6392 : 1971	Steel pipe flanges
6603 : 2001	Stainless steel bars and flats — Specification (*first revision*)
7008 (Part 3) : 1988	ISO Metric trapezoidal screw threads: Part 3 Basic dimensions (*first revision*)

3 TERMINOLOGY

For the purpose of this standard the definitions given in IS 4854 (Part 1) shall apply.

4 NOMINAL PRESSURE

Valves shall be designated by nominal pressure (PN) defined as the maximum permissible gauge working pressure in MPa for the sizes indicated as follows :

Nominal Pressure (PN) MPa	*Nominal Sizes* mm
1.0	Up to and including 200
0.6	250 - 400

5 NOMINAL SIZES

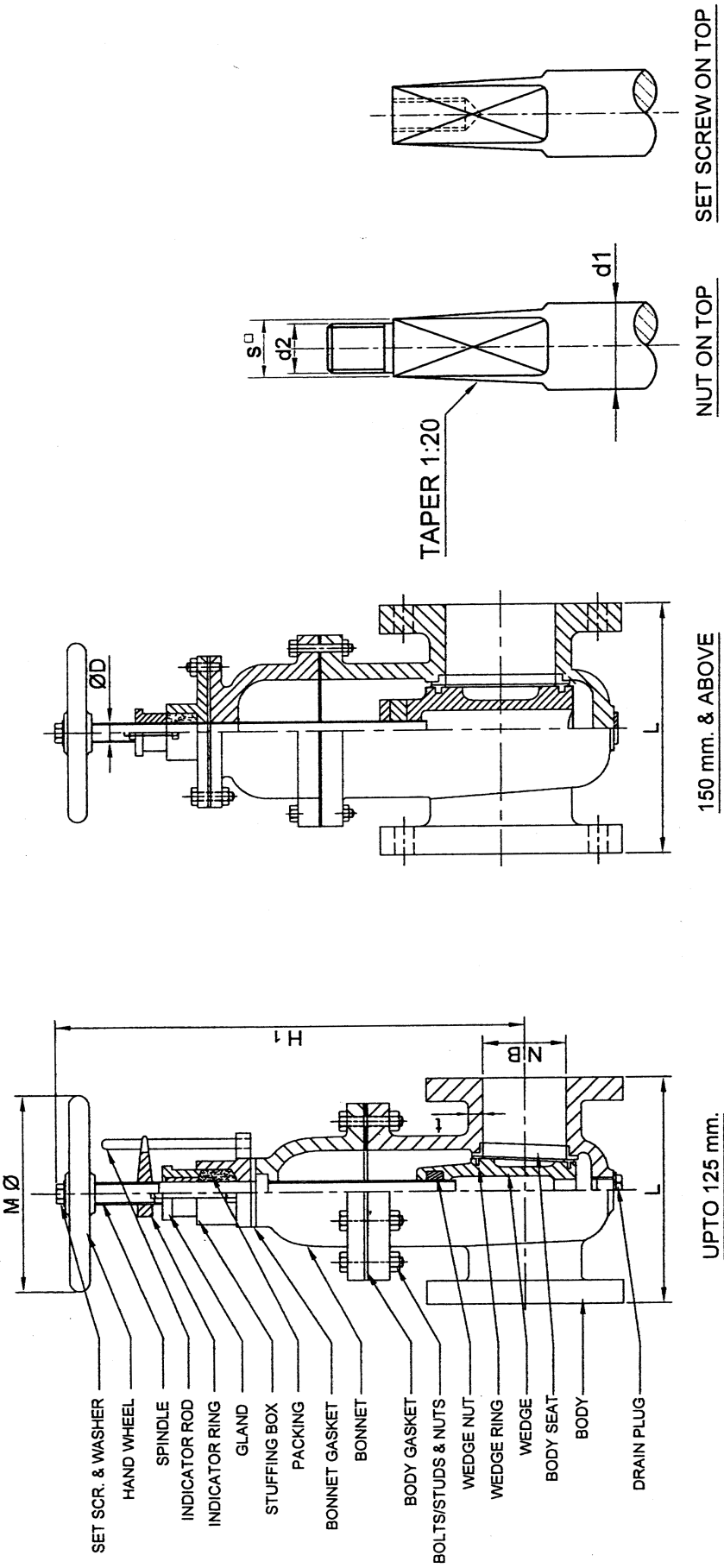
5.1 Gate valves shall be of the following nominal sizes:

25, 32, 40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 350 and 400.

5.1.1 The nominal size shall refer to the nominal bore of the waterway, in mm.

6 MATERIAL

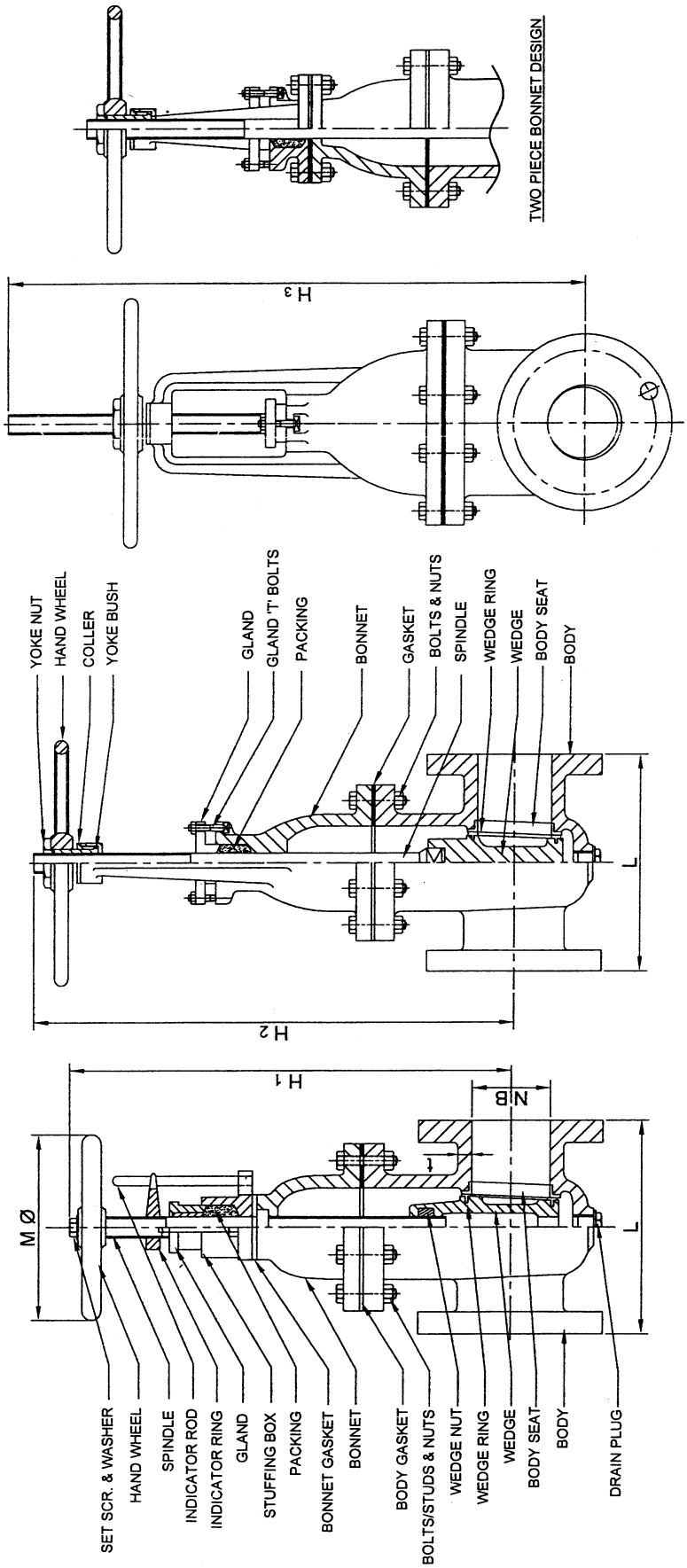
Materials used for manufacture of different components of gate valves shall conform to the requirements given in Table 1.



Type A - INSIDE SCREW
NON-RISING HANDWHEEL

NOTE — The shape of the component parts shown in the figure are only illustrative but the dimension and minimum requirements where specified are binding.

FIG. 1 TYPICAL SKETCHES OF GATE VALVE



NOTE — The shape of the component parts shown in the figure are only illustrative but the dimension and minimum requirements where specified are binding.

FIG. 2 TYPICAL SKETCHES OF GATE VALVE

Table 1 Materials for Components of Gate Valves
(*Clause* 6.1)

Sl No.	Component	Material	Ref to, Indian Standard	Grades or Designation
(1)	(2)	(3)	(4)	(5)
i)	Body, bonnet, stuffing box wedge, back seat (Integral), hand wheel	a) Leaded tin bronze	IS 318	LTB 2 or LTB 1
		b) Cast iron	IS 210	Gr. FG 200
		c) Spheroidal or nodular C.I	IS 1865	Grade 500/7
		d) Cast steel	IS 1030	230-450W
ii)	Stem, indicator rod, yoke nut, drain plug	a) High tensile brass	IS 320	HT1 or HT2
		b) Stainless steel	IS 6603	X 04Cr19 Ni10 or X 04Cr17Ni12MO2
iii)	Bolt and nut, set screw, gland T bolt and eye bolt	a) Stainless steel	IS 6603	X 04Cr19 Ni10 or X 04Cr17Ni12 MO2
		a) High tensile brass	IS 320	HT1 or HT2
	Alternate:			
	a) Screw (stud)bolts (cadmimum plated)	Carbon steel	IS 1363 (Part 1)	—
	b) Nut (cadmium plated)	Carbon steel	IS 1363 (Part 3)	—
iv)	Yoke bush, body seat, wedge ring, wedge nut, indicator ring, back seat bush (Separate)	a) Leaded tin bronze	IS 318	LTB 2 or LTB 1
		b) Corrosion resistant high alloy steel	IS 3444	Grade 3 or Grade 4
v)	Body gasket, bonnet gasket	Asbestos free	—	—
vi)	Packing	a) Greasy hemp	IS 5414	—
		b) Asbestos free	—	—

NOTES

1 For sea water surface stainless steel trim to be avoided as stainless steel is not suitable for sea water.

2 Grey cast iron shall not be used for, a) ship side valves (Hull valves); b) boiler blow down valves; c) valves fitted on collision bulkhead and valves subjected to shock and vibration; and d) outlet valves of fuel and lubricating oil tanks with static head.

7 MANUFACTURE

7.1 Bodies

The area of the body and ports shall not be less than the area of a circle of diameter equivalent to the nominal size of the valve.

7.2 Bonnet to be one piece design up to 300 mm. Bonnet may be two piece design from 250 mm to 400 mm as shown in Fig. 2. Manufacturer may also use bonnet in two piece design for gate valve above 250 mm in two piece design as shown in Fig. 2.

7.3 Body Ends

The dimensions and drilling of flanges shall conform to IS 6392. Flanges shall be machined flat, that is, without a raised joint face unless otherwise specified. Minimum thicknesses of flanges shall be as per Table 2. Valves may be supplied with other forms of end connection by agreement between the purchaser and the manufacturer.

7.4 Body Bonnet Connection

The attachment of the bonnet to the body shall be bolted with minimum 04 bolts and minimum diameter of the bolt shall be 12 mm.

7.5 Glands

The gland to be of one piece design and bolted to the stuffing box by ‘T’ headed bolts, eye bolt or stud and nut.

7.6 Body Seats

7.6.1 Body seat ring shall be renewable type. The seat ring shall be either press fitted or screwed. Threaded rings shall be so designed to facilitate removal. Body seat rings shall be so fitted as to avoid their becoming loose in service.

7.6.2 The dimensions of the body seat rings is left to the manufacturer.

7.7 WEDGE

Valves shall be fitted with double faced wedge made in one piece. The wedge for cast iron, spheroidal/ nodular cast iron and cast steel shall have two machined facing rings securely fixed into machined recesses in the wedge. Wedge of copper alloy gate valve shall not have any separate face ring.

7.8 Back Seat

When specified, valves shall have an integral back

seating in the bonnet and stuffing box with a corresponding seat on the stem when the valve is fully open. When a separate back seat bushing is provided it shall comply with the trim specification.

7.9 Stems

The stems shall be of following types :

a) Inside screw non rising stem type having the actuating thread interior to the bonnet ; and
b) Outside screw rising stem and having actuating thread exterior to the bonnet and Stuffing Box.

7.10 Threads

The stems shall have square or trapezoidal threads, and shall conform to IS 7008 (Part 3).

7.11 Hand Wheel

7.11.1 The valves shall be closed by turning the hand wheel in a clockwise direction when facing the hand wheel.

7.11.2 Where practicable, the hand wheels shall be marked 'CLOSE' or 'SHUT' with an arrow to indicate the direction of closure. In addition, hand wheels may be marked 'OPEN' with an arrow to indicate the anticlockwise direction of opening. Alternatively, these markings may be shown on a plate secured below the hand wheel nut.

7.11.3 Hand wheels shall be fitted in such a way that, whilst held securely, they may be removed and replaced, when necessary.

7.11.4 The diameter of handwheel is given in Table 2.

7.11.5 The handwheel do not rise for both inside screw non rising stem and outside rising stem type valves.

7.12 Indicator

An indicator shall be provided to show both 'OPEN' and 'SHUT' positions as shown in Fig.1 only for inside screw non rising stem type valves.

7.13 Drain Plug

Drain plug shall be provided, if specified by the purchaser preferably for sizes 125 mm and above.

7.14 Stuffing Box

The depth of stuffing box shall be such to accommodate at least five turns of packing.

7.15 Height of Valves

The overall heights of the valves shall not exceed the values specified in Table 2.

7.16 Interchangeability

All valve parts shall be interchangeable between units of the same material, size and type from any one manufacturer.

7.17 Face to Face Dimensions

The face to face dimensions of gate valves shall be as given in Table 2.

8 CLEANING

Body, cover, wedge and gland shall be shot blasted or sand blasted.

9 COATING

After completion of testing of the valves, the valves may be painted as per colour code specified by the purchaser.

10 TESTING

10.1 Each valve shall be subjected to hydrostatic test as described in Table 3 to the test pressure for a duration as stated in Table 3 and the valve shall show no sign of leakage under these tests.

10.2 The manufacturer shall carry out hydrostatic test and dimensional check. Any other tests may also be carried out as agreed to between the manufacturer and the purchaser.

11 MARKING

11.1 The following information shall be cast on each valve body in raised letters:

a) Manufacturer's name or trade-mark;
b) Nominal pressure rating (PN);
c) Size of valve; and
d) Material specification designation.

11.2 BIS Certification Marking

The product may also be marked with Standard Mark.

11.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

12 PACKING AND STORAGE

Packing and storage shall be done as given below :

a) *Packing* — All valves shall be supplied with their wedges closed. Valves with smooth finished flanged joint faces shall be suitably

Table 2 Dimension of Valves

(*Clauses* 7.3, 7.11.4, 7.15 *and* 7.17)

All dimensions in millimetres.

Sl No.	Particulars (Nominal Size)	Dimensions													
		25	32	40	50	65	80	100	125	150	200	250	300	350	400
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
i)	Face to face dimensions	120	130	140	150	170	180	190	200	210	230	250	270	290	310
ii)	Diameter of stem (d1)	14	14	18	20	20	22	24	24	24	28	32	32	32	36
iii)	Pitch of thread	4	4	4	4	4	4	4	4	6	6	6	6	6	6
iv)	Body thickness for copper alloy valves	4	4	4.5	5	5.5	6	6	6.5	7	7.5	8	9	10	11
v)	Body thickness for other valves	6	6	7	7	8	8	8	9	9	9	10	12	12	14
vi)	Flange thickness for copper alloy valves	10	10	11	11	13	14	17	19	22	25	25	28	30	32
vii)	Flange thickness for other valves	14	18	18	20	20	22	24	26	26	26	28	28	30	32
viii)	Hand wheel diameter	120	140	160	160	180	180	180	200	200	200	250	250	360	360
xi)	a) Height (H1)	180	200	230	255	295	325	395	415	485	600	725	815	875	1 000
	b) Height (H2)	—	—	290	310	400	420	480	580	620	780	930	1 080	1 320	1 470
	c) Height (H3)	—	—	350	360	490	520	600	720	800	1 000	1 200	1 410	1 700	1 900
x)	Square on top of stem (d2)	9	9	14	17	17	17	17	17	17	24	24	24	24	26
xi)	Size of set screw for security hand wheel (S)	M6	M6	M8	M10	M10	M10	M10	M10	M10	M12	M12	M12	M12	M16
xii)	Size of stem nut	M8	M8	M10	M12	M12	M12	M12	M12	M12	M16	M16	M16	M16	M16

protected against dust and damage by blanking the end connection by plastic caps or suitable board.

b) *Storage* — Valves shall be stored in roofed stores away from dust.

13 OPERATION

13.1 Means

Unless otherwise specified, valves shall be designed to be directly operated by a hand wheel.

13.2 Direction

Unless otherwise specified, manually operated valves shall be closed by turning the shaft in a clockwise direction when facing the end of the operating shaft.

13.3 Extended Spindle Arrangement

The valve may be provided with extended spindle for remote operation as specified by the purchaser.

13.4 Gear Operation

If gear operation is required, the type of gearing and its arrangement shall be as specified in the enquiry or order.

13.5 Actuator Operation

If actuator operation is required, the details of the actuator and its power supply together with the design, maximum pressure differential across the valve shall be specified by the purchaser.

Table 3 Test Pressure of Valves
(*Clause* 10.1)

Sl No.	Hydrostatic Test Pressure Gauge	Body/Seat		Test Duration
	MPa			min
(1)	(2)	(3)		(4)
i)	1.0	a) Body/Back seat	1.5	2
		b) Seat	1.0	1
ii)	0.6	a) Body/Back seat	0.9	2
		b) Seat	0.6	1

NOTES

1 *Back seat test* — If specified.

2 Seat to be subjected to test pressure from both sides.

Bureau of Indian Standards

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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