

## BUREAU OF INDIAN STANDARDS

### Program of Work

#### TED 19 : Marine Engineering And Safety Aids

**Scope:** a) Standardization of all fittings for main propelling machinery, auxiliary machinery, testing procedures auxiliaries required for the operation of main propulsive machinery, marine internal combustion engine, heat exchanger and fittings; winches, windlasses and steering gears; machinery for dredgers, tugs and other small crafts. Buoyant apparatus; lifebuoy; distress signals and other life-saving equipment lifeboats, life rafts and launching gear; equipment, systems and engineering for firefighting, fire protection and detection etc. magnetic and gyro compasses and connected items; signaling equipment navigation lights and shapes; clinometer, navigational sextant, instruments for chart work etc. auto alarm; auto keying devices; direction finders; electronic equipment for marine navigation. b) Co-ordination of work with ISO/TC 8 and its relevant sub-committees ISO/TC 8/SC 1, ISO/TC 8/SC 4, ISO/TC 8/SC 6 c) Co-ordination of work with IEC/TC 80.

**Liaison:** **IEC TC-80 (P):** *Maritime navigation and radiocommunication equipment and systems*

### Published Standards

S.No	IS No.	TITLE	Reaffirm M-Y	No. of Amds	Eqv.
1	IS 10007:1981 Reviewed In : 2021 IS/ISO 10007:2017	Lifeboats' Steel Blocks	March, 2021	-	Identical under single numbering
2	IS 10492:1983 Reviewed In : 2025	General requirements and testing of anchor cable stoppers	May, 2025	-	Indigenous
3	IS 10746 (Part 1):1983 Reviewed In : 2025	Specification for shell and tube type marine heat exchangers: Part 1 application standard	May, 2025	-	Indigenous
4	IS 10746 (Part 2):1983 Reviewed In : 2025	Specification for shell and tube type marine heat exchangers: Part 2 general requirements	May, 2025	-	Indigenous
5	IS 11125:1984 Reviewed In : 2021	General requirements for plate heat exchangers for marine use	January, 2021	1	Indigenous
6	IS 11608:1986 Reviewed In : 2021	Specification for signalling whistle for life saving appliances for sea - Going ships	March, 2021	-	Indigenous
7	IS 11641:1986 Reviewed In : 2021	General requirements and testing of marine inflatable liferafts	March, 2021	-	Indigenous
8	IS 12156:2006 ISO 9089 Reviewed In : 2021 ISO 9089:1989	Marine structures - Mobile offshore units - Anchor winches (First Revision)	January, 2021	-	Identical under dual numbering
9	IS 12264:1987 Reviewed In : 2021	Signaling Mirror for Lifeboats and Liferafts for Sea-going Ships	March, 2021	-	Indigenous
10	IS B12264:1987 Reviewed In : 2016	Specification for signalling mirror for lifeboats and liferafts for sea - Going ships	March, 2016	-	Indigenous

11	IS H12264:1987 Reviewed In : 2016	Signaling Mirror for Lifeboats and Liferrafts for Sea-going Ships (HINDI)	March, 2016	-	
12	IS 12266:1987 Reviewed In : 2021	international shore connection for use on board ship	March, 2021	-	Indigenous
13	IS B12266:1987 Reviewed In : 2016	Specification for international shore connections for use on board ship	March, 2016	-	Indigenous
14	IS H12266:1987 Reviewed In : 2016	international shore connection for use on board ship (HINDI)	March, 2016	-	
15	IS 12268 (Part 1):1987 ISO 6552 Reviewed In : 2021 ISO 6552:1981	Specification for automatic steam traps for marine use: Part 1 Glossary of terms	March, 2021	-	Identical under dual numbering
16	IS 12268 (Part 2):1988 ISO 6704 Reviewed In : 2021 ISO 6704:1982	Specification for automatic steam traps for marine use: Part 2 classification	March, 2021	-	Identical under dual numbering
17	IS 12268 (Part 3):1989 ISO 6554 Reviewed In : 2025 ISO 6554:1980	Shipbuilding - Automatic steam traps for marine use: Part 3 face - To - Face dimensions	May, 2025	-	Identical under dual numbering
18	IS 12268 (Part 4):1989 ISO 6948 Reviewed In : 2019 ISO 6948:1981	Shipbuilding - Automatic steam traps for marine use: Part 4 performance test	May, 2019	-	Identical under dual numbering
19	IS 12268 (Part 5):1987 ISO 6553 Reviewed In : 2021 ISO 6553:1980	Specification for automatic steam traps for marine use: Part 5 marking	March, 2021	-	Identical under dual numbering
20	IS 12719:1989 ISO 7825 Reviewed In : 2025 ISO 7825:1985	Ship building - Deck machinery - General requirements	May, 2025	-	Identical under dual numbering
21	IS 12794:1989 Reviewed In : 2025	Shipbuilding - Steam traps - Guidelines for selection	May, 2025	-	Indigenous
22	IS 13632:2021 ISO 8728:2014 ISO 8728:2014	Ships and Marine Technology - Marine Gyro-Compasses		-	Identical under single numbering
23	IS 13708 (Part 1):2014 ISO 8729-7 : 2010 Reviewed In : 2025 ISO 8729-1:2010	Ships and marine technology - Marine radar reflectors: Part 1 passive type (Second Revision)	May, 2025	-	Identical under dual numbering
24	IS 13708 (Part 2):2014 ISO 8729-2 : 2009 Reviewed In : 2025 ISO 8729-2:2009	Ships and marine technology - Marine radar reflectors: Part 2 active type (Second Revision)	May, 2025	-	Identical under dual numbering
25	IS 14270 (Part 1):1995 Reviewed In : 2025	Shipbuilding pyrotechnic distress signals for ships: Part 1 general requirements	May, 2025	-	Indigenous
26	IS 14270 (Part 2):1997	Shipbuilding - Pyrotechnic distress signals for ships: Part 2 red flare	March, 2021	-	Indigenous

	Reviewed In : 2021	parachute signal - Specification			
27	IS 14270 (Part 3):1997 Reviewed In : 2021	Shipbuilding - Pyrotechnic distress signals for ships: Part 3 red star rocket signal - Specification	March, 2021	-	Indigenous
28	IS 14270 (Part 4):1997 Reviewed In : 2021	Shipbuilding - Pyrotechnic distress signals for ships: Part 4 white flare signal - Specification	March, 2021	-	Indigenous
29	IS 14270 (Part 5):1997 Reviewed In : 2021	Shipbuilding - Pyrotechnic distress signals for ships: Part 5 white flare parachute signal - Specification	March, 2021	-	Indigenous
30	IS 14270 (Part 8):1997 Reviewed In : 2021	Shipbuilding - Pyrotechnic distress signals for ships: Part 8 orange smoke signal - Specification	March, 2021	-	Indigenous
31	IS 15052:2002 Reviewed In : 2023	Shipbuilding - Diesel propulsion system responsibility - Requirements	January, 2023	-	Indigenous
32	IS 15053:2001 Reviewed In : 2021	Shipbuilding - Hydraulic steering gears for vessels below 500 grt - General requirements	March, 2021	1	Indigenous
33	IS 15324:2003 Reviewed In : 2023	Shipbuilding - Selection and testing of air starting systems - Code of practice	June, 2023	-	Indigenous
34	IS 15632:2018 ISO 16165 : 2013 Reviewed In : 2021 ISO 16165:2013	Ships and marine technology - Marine environment protection - Terminology relating to oil spill response (First Revision)	March, 2021	-	Identical under dual numbering
35	IS 16323:2017 ISO 25862:2009 Reviewed In : 2022 ISO 25862:2009	SHIPS AND MARINE TECHNOLOGY - MARINE MAGNETIC COMPASSES, BINNACLES AND AZIMUTH READING DEVICES	August, 2022	-	Identical under dual numbering
36	IS 17536 (Part 1):2021 ISO 18079-1 ISO 18079-1	Ships and marine technology - Servicing of inflatable life-saving appliances - Part 1: General		-	Identical under dual numbering
37	IS 17536 (Part 2):2021 ISO 18079-2 ISO 18079-2	Ships and marine technology -- Servicing of inflatable life-saving appliances -- Part 2: Inflatable life rafts		-	Identical under dual numbering
38	IS 17536 (Part 3):2021 ISO 18079-3 ISO 18079-3	Ships and marine technology - Servicing of inflatable life-saving appliances - Part 3: Inflatable lifejackets		-	Identical under dual numbering
39	IS 17536 (Part 4):2022 ISO 18079-4 ISO 18079-4	Ships and marine technology -- Servicing of inflatable life-saving appliances -- Part 4: Marine evacuation systems		-	Identical under dual numbering
40	IS 17536 (Part 5):2021 ISO 18079-5 ISO 18079-5	Ships and marine technology - Servicing of inflatable life-saving appliances - Part 5: Inflated rescue boats		-	Identical under dual numbering
41	IS 17564:2021 ISO 15371 ISO 15371	Ships And Marine Technology - Fire-Extinguishing Systems For Protection Of Galley Cooking Equipment		-	Identical under dual numbering
42	IS 3573:2010 Reviewed In : 2025	Sea anchors for lifeboats and liferafts - Specification (First Revision)	May, 2025	-	Indigenous
43	IS 3580:2007	General requirements for distress	January, 2023	-	Indigenous

	Reviewed In : 2023	signals for lifeboats and liferafts (First Revision)			
44	IS 3586:2007 Reviewed In : 2023	Recommendation for lifeboats equipment (First Revision)	January, 2023	-	Indigenous
45	IS 3732:2013 Reviewed In : 2023	Rigid liferafts - Specification (First Revision)	May, 2023	-	Indigenous
46	IS 3947:1994 Reviewed In : 2025	Shipbuilding - Testing, installation and maintenance of marine portable fire appliances - Code of practice (First Revision)	May, 2025	-	Indigenous
47	IS 3979:1998 ISO 3046-2 Reviewed In : 2023 ISO 3046-2:1987	Shipbuilding - Testing of marine diesel engines - Code of practice (First Revision)	October, 2023	-	Modified/Technically Equivalent
48	IS 4549:1968 Reviewed In : 2021	Specification for lifeboat compass - Liquid type	March, 2021	-	Indigenous
49	IS 4550:1968 Reviewed In : 2021	Recommendation for positioning of magnetic compasses in ships	March, 2021	-	Indigenous
50	IS 4551:1968 Reviewed In : 2021	Specification for lifeboat crutches	March, 2021	-	Indigenous
51	IS 4568:2007 Reviewed In : 2023	Lifeboat oars (Wood) - Specification (First Revision)	January, 2023	-	Indigenous
52	IS 4601 (Part 1):1968 Reviewed In : 2019	Navigation lights for large sea - Going power - Driven vessels: Part 1 positioning and screening of lights	May, 2019	-	Indigenous
53	IS 4601 (Part 2):1968 Reviewed In : 2019	Navigation lights for large sea - Going powerdriven vessels: Part 2 oil lanterns	May, 2019	-	Indigenous
54	IS 4602:1968 Reviewed In : 2025	General requirements and testing of lifeboats for less than one hundred persons	May, 2025	-	Indigenous
55	IS 5112:1972 Reviewed In : 2025	General requirements and testing of ac cargo winches (for shipboard use) (First Revision)	May, 2025	-	Indigenous
56	IS 5113:2021 ISO 3730:2012 ISO 3730:2012	Shipbuilding and marine structures - Mooring winches (Third Revision)		-	Identical under single numbering
57	IS 5130:1969 Reviewed In : 2025	Specification for drums fitted to cargo and mooring winches	May, 2025	-	Indigenous
58	IS 5289:1989 ISO 1069 Reviewed In : 2025 ISO 1069:1973	Shipbuilding - Magnetic compasses and binnacles - Glossary of terms (First Revision)	May, 2025	-	Modified/Technically Equivalent
59	IS 5314:1986 Reviewed In : 2021	Specification for graduated drinking vessels for lifeboats and liferafts for sea - Going ships (First Revision)	March, 2021	-	Indigenous
60	IS 5326:2007 Reviewed In : 2023	Life - Buoys - Specification (First Revision)	January, 2023	-	Indigenous
61	IS 5327:1969 Reviewed In : 2025	Specification for rigid bailers for lifeboats	May, 2025	-	Indigenous
62	IS 5376:1969 Reviewed In : 2019	Specification for dioptric lenses for navigational lanterns	May, 2019	-	Indigenous
63	IS 5385:2007 Reviewed In : 2023	Lifeboat accessories - Specification (First Revision)	January, 2023	-	Indigenous
64	IS 5386:1969 Reviewed In : 2021	General purpose Ship's Davit	March, 2021	-	Indigenous
65	IS 6675:1972	Specification for cable lifters for	March, 2021	-	Indigenous

	Reviewed In : 2021	windlasses			
66	IS 6685:2009 Reviewed In : 2019	Life jackets - Specification (First Revision)	March, 2019	-	Indigenous
67	IS 7411 (Part 1):1974 Reviewed In : 2025	Ships' Intermediate Shafts (Integral Flange) - Part I : For Port Crafts	May, 2025	-	Indigenous
68	IS 7411 (Part 2):1974 Reviewed In : 2025	Ships' Intermediate Shafts (Integral Flange) - Part II : For Sea-going Vessels	May, 2025	-	Indigenous
69	IS 7723:1975 Reviewed In : 2021	Ships' Flag Staff	March, 2021	-	Indigenous
70	IS 7937:2012 ISO 4568 Reviewed In : 2022 ISO 4568:2006	Shipbuilding - Sea - Going vessels - Windlasses and anchor capstans (Third Revision)	February, 2022	-	Modified/Technically Equivalent
71	IS 8114:1984 Reviewed In : 2021	Guidelines for machining dimensions of propeller hubs with keyway (First Revision)	January, 2021	-	Indigenous
72	IS 8173:1984 Reviewed In : 2021	Specification for propeller shafts (With Keyway) of diameter 20 to 160 mm (First Revision)	January, 2021	1	Indigenous
73	IS 8650:2015 Reviewed In : 2025 ISO 3828:2008	Shipbuilding and marine structures - Deck machinery - Vocabulary and symbols (Second Revision)	May, 2025	-	Identical under dual numbering
74	IS 8993:2004 ISO 6555 Reviewed In : 2025 ISO 6555:1998	Shipbuilding - Topping (First Revision)	May, 2025	-	Identical under dual numbering
75	IS 8994:2021 ISO 7364:2016 ISO 7364:2016	Ships and marine technology - Deck machinery - Accommodation ladder winches		-	Identical under single numbering
76	IS 9067:2012 ISO 6067 Reviewed In : 2022 ISO 15516:2006	Ships and marine technology - Launching appliances for davit - Launched lifeboats (Second Revision)	February, 2022	-	Identical under dual numbering
77	IS 9464:2024	Horizontal Centrifugal Pumps for Marine Use - Specification		-	Indigenous
78	IS 9837:1981 Reviewed In : 2021	Code for testing of marine centrifugal oil purifiers	March, 2021	-	Indigenous
79	IS 9852:1981 Reviewed In : 2021	General requirements and testing of capstans	March, 2021	-	Indigenous

### Standards under Development

#### Projects Approved

SI. No.	Doc No.	Title
No Records Found		

#### Preliminary Draft Standards

SI. No.	Doc No.	Title
1	TED 19 (28737)	Alcohol Resistant Foam Liquid Concentrate for Fire - Extinguishing of Hydrocarbon and Polar Solvent Fires in Ships Specification

#### Drafts Standards in WC Stage

SI. No.	Doc No.	Title
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No Records Found

### Draft Standards Completed WC Stage

SL. No.

Doc No.

Title

No Records Found

### Finalized Draft Indian Standard

SL. No.

Doc No.

Title

No Records Found

### Finalized Draft Indian Standards under Print

SL. No.

Doc No.

Title

1	TED 19 (18813) Revision of: IS 4551:1968	Lifeboat Crutches - Specification
2	TED 19 (21868) Revision of: IS 5326:2007	LifeBuoys - Specification
3	TED 19 (23070) Revision of: IS 12266:1987	International Shore Connections for Use on Board Ship - Specification First Revision
4	TED 19 (23098) Revision of: IS 12264:1987	SIGANLLING MIRROR FOR LIFEBOATS LIFERAFTS AND RESCUE BOATS FOR SEA-GOING SHIPS SPECIFICATION

Total Published Standards:79 Total Standards Under development:5

### Aspect Wise Report

Product : 52  
Code of Practices : 10  
Methods of Test : 4  
Terminology : 3  
Dimensions : 1  
System Standard : 0  
Safety Standard : 3  
Others : 6  
Service Specification : 0  
Process Specification : 0  
Unclassified : 0

### Annexure-I :List of Indian Standards Withdrawn/Superseded

SL. No.

IS No. & Year

Title

1	IS 11160:1984 Reviewed In : 2000	Guidelines for tools and outfits for ships machinery
2	IS 13708:2004 ISO 8729 Reviewed In : 2009	Shipbuilding and Marine Technology - Marine Radar Reflectors
3	IS 4045:2006 ISO 449 Reviewed In : 2021	Ships and marine technology - Magnetic compasses binnacles and azimuth reading devices - Class a Second Revision
4	IS 4259:1967 Reviewed In : 2019	Code of practice for erection and calibration of direction - Finders Medium Frequency for marine use
5	IS 4562:1997 Reviewed In : 2002	Shipbuilding - Portable Chemical Fire Extinguishers Foam Type for Marine Use
6	IS 8150:1997 Reviewed In : 2010	Shipbuilding - 45 Litre Capacity Chemical Foam Type Fire Engine for Marine Use
7	IS 8638:2006	Shipbuilding - Class A magnetic compasses azimuth reading devices and binnacles - Tests and



	ISO 2269 Reviewed In : 2021 ISO 2269	certifications
8	IS 8638 (Part 13):1989 Reviewed In : 2004	Shipbuilding - Class A magnetic compasses binnacles and azimuth reading devices - Code for testing and certification
9	IS 9966:2006 ISO 613 Reviewed In : 2021	Ships and marine technology - Magnetic compasses binnacles and azimuth reading devices - Class b First Revision

### Annexure-II :List of Indian Product Standards

Sl. No.	IS No. & Year	Title
1	IS 10007:1981 Reviewed In : 2021 IS/ISO 10007:2017	Lifeboats Steel Blocks
2	IS 10492:1983 Reviewed In : 2025	General requirements and testing of anchor cable stoppers
3	IS 10746 (Part 1):1983 Reviewed In : 2025	Specification for shell and tube type marine heat exchangers Part 1 application standard
4	IS 10746 (Part 2):1983 Reviewed In : 2025	Specification for shell and tube type marine heat exchangers Part 2 general requirements
5	IS 11125:1984 Reviewed In : 2021	General requirements for plate heat exchangers for marine use
6	IS 11608:1986 Reviewed In : 2021	Specification for signalling whistle for life saving appliances for sea - Going ships
7	IS 12156:2006 ISO 9089 Reviewed In : 2021 ISO 9089:1989	Marine structures - Mobile offshore units - Anchor winches First Revision
8	IS 12264:1987 Reviewed In : 2021	Signaling Mirror for Lifeboats and Liferrafts for Sea-going Ships
9	IS 12268 (Part 2):1988 ISO 6704 Reviewed In : 2021 ISO 6704:1982	Specification for automatic steam traps for marine use Part 2 classification
10	IS 12719:1989 ISO 7825 Reviewed In : 2025 ISO 7825:1985	Ship building - Deck machinery - General requirements
11	IS 13632:2021 ISO 8728:2014 IEC 62891 : 2020	Ships and Marine Technology - Marine Gyro-Compasses
12	IS 13708 (Part 1):2014 ISO 8729-7 : 2010 Reviewed In : 2025 ISO 8729-1:2010	Ships and marine technology - Marine radar reflectors Part 1 passive type Second Revision
13	IS 13708 (Part 2):2014 ISO 8729-2 : 2009 Reviewed In : 2025 ISO 8729-2:2009	Ships and marine technology - Marine radar reflectors Part 2 active type Second Revision
14	IS 14270 (Part 1):1995 Reviewed In : 2025	Shipbuilding pyrotechnic distress signals for ships Part 1 general requirements
15	IS 14270 (Part 2):1997 Reviewed In : 2021	Shipbuilding - Pyrotechnic distress signals for ships Part 2 red flare parachute signal - Specification
16	IS 14270 (Part 3):1997 Reviewed In : 2021	Shipbuilding - Pyrotechnic distress signals for ships Part 3 red star rocket signal - Specification
17	IS 14270 (Part 4):1997 Reviewed In : 2021	Shipbuilding - Pyrotechnic distress signals for ships Part 4 white flare signal - Specification
18	IS 14270 (Part 5):1997	Shipbuilding - Pyrotechnic distress signals for ships Part 5 white flare parachute signal -

	Reviewed In : 2021	Specification
19	IS 14270 (Part 8):1997 Reviewed In : 2021	Shipbuilding - Pyrotechnic distress signals for ships Part 8 orange smoke signal - Specification
20	IS 15052:2002 Reviewed In : 2023	Shipbuilding - Diesel propulsion system responsibility - Requirements
21	IS 15053:2001 Reviewed In : 2021	Shipbuilding - Hydraulic steering gears for vessels below 500 grt - General requirements
22	IS 16323:2017 ISO 25862:2009 Reviewed In : 2022	SHIPS AND MARINE TECHNOLOGY - MARINE MAGNETIC COMPASSES BINNACLES AND AZIMUTH READING DEVICES
23	IS 17564:2021 ISO 15371 ISO 21720	Ships And Marine Technology - Fire-Extinguishing Systems For Protection Of Galley Cooking Equipment
24	IS 3573:2010 Reviewed In : 2025	Sea anchors for lifeboats and liferafts - Specification First Revision
25	IS 3580:2007 Reviewed In : 2023	General requirements for distress signals for lifeboats and liferafts First Revision
26	IS 3732:2013 Reviewed In : 2023	Rigid liferafts - Specification First Revision
27	IS 4549:1968 Reviewed In : 2021	Specification for lifeboat compass - Liquid type
28	IS 4551:1968 Reviewed In : 2021	Specification for lifeboat crutches
29	IS 4568:2007 Reviewed In : 2023	Lifeboat oars Wood - Specification First Revision
30	IS 4601 (Part 2):1968 Reviewed In : 2019	Navigation lights for large sea - Going powerldriven vessels Part 2 oil lanterns
31	IS 5113:2021 ISO 3730:2012 ISO 13990-1 : 2006	Shipbuilding and marine structures - Mooring winches Third Revision
32	IS 5130:1969 Reviewed In : 2025	Specification for drums fitted to cargo and mooring winches
33	IS 5314:1986 Reviewed In : 2021	Specification for graduated drinking vessels for lifeboats and liferafts for sea - Going ships First Revision
34	IS 5326:2007 Reviewed In : 2023	Life - Buoys - Specification First Revision
35	IS 5327:1969 Reviewed In : 2025	Specification for rigid bailers for lifeboats
36	IS 5376:1969 Reviewed In : 2019	Specification for dioptric lenses for navigational lanterns
37	IS 5385:2007 Reviewed In : 2023	Lifeboat accessories - Specification First Revision
38	IS 5386:1969 Reviewed In : 2021	General purpose Ship s Davit
39	IS 6675:1972 Reviewed In : 2021	Specification for cable lifters for windlasses
40	IS 6685:2009 Reviewed In : 2019	Life jackets - Specification First Revision
41	IS 7411 (Part 1):1974 Reviewed In : 2025	Ships Intermediate Shafts Integral Flange - Part I For Port Crafts
42	IS 7411 (Part 2):1974 Reviewed In : 2025	Ships Intermediate Shafts Integral Flange - Part II For Sea-going Vessels
43	IS 7723:1975 Reviewed In : 2021	Ships Flag Staff
44	IS 7937:2012 ISO 4568 Reviewed In : 2022 ISO 4568:2006	Shipbuilding - Sea - Going vessels - Windlasses and anchor capstans Third Revision
45	IS 8114:1984	Guidelines for machining dimensions of propeller hubs with keyway First Revision



	Reviewed In : 2021	
46	IS 8173:1984 Reviewed In : 2021	Specification for propeller shafts With Keyway of diameter 20 to 160 mm First Revision
47	IS 8650:2015 Reviewed In : 2025 ISO 3828:2008	Shipbuilding and marine structures - Deck machinery - Vocabulary and symbols Second Revision
48	IS 8993:2004 ISO 6555 Reviewed In : 2025 ISO 6555:1998	Shipbuilding - Topping First Revision
49	IS 8994:2021 ISO 7364:2016 ISO 29992:2018	Ships and marine technology - Deck machinery - Accommodation ladder winches
50	IS 9067:2012 ISO 6067 Reviewed In : 2022 ISO 15516:2006	Ships and marine technology - Launching appliances for davit - Launched lifeboats Second Revision
51	IS 9464:2024	Horizontal Centrifugal Pumps for Marine Use - Specification
52	IS 9852:1981 Reviewed In : 2021	General requirements and testing of capstans