



INDIAN STANDARDS ON IC ENGINE COMPONENTS

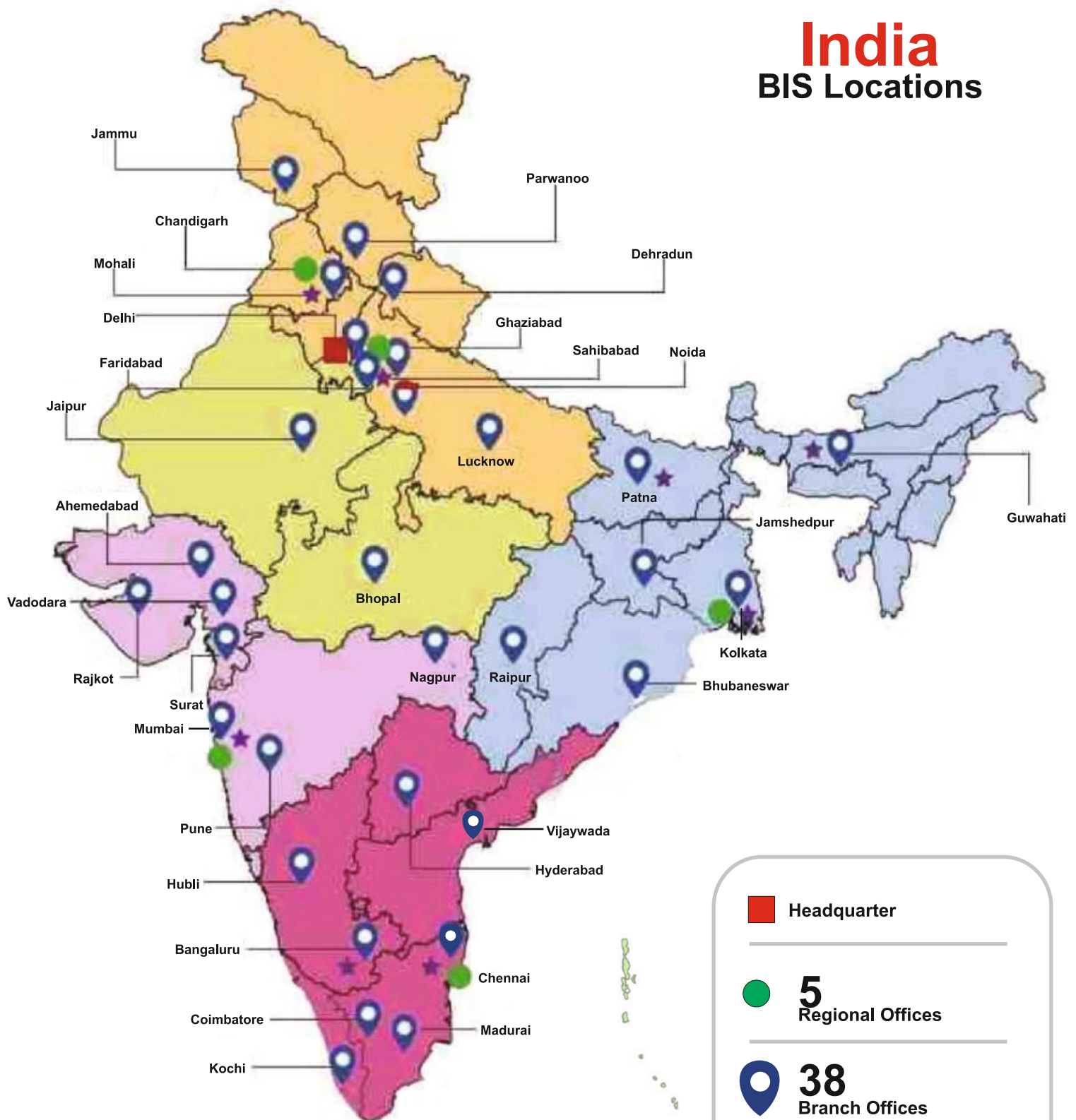
BUREAU OF INDIAN STANDARDS

Ministry of Consumer Affairs,
Food and Public Distribution,
Government of India

भारतीय मानक ब्यूरो
उपभोक्ता मामले, खाद्य और
सार्वजनिक वितरण मंत्रालय
भारत सरकार

India

BIS Locations



-  **Headquarter**
-  **5** Regional Offices
-  **38** Branch Offices
-  **8** Laboratories
-  **Training Institute (NITS)**





ABOUT BIS

Bureau of Indian Standards (BIS), the National Standards Body (NSB) of India was established under the *BIS Act, 1986* and came into existence on 1 April 1987 assuming the functions of the erstwhile Indian Standards Institution (ISI). The ISI was established on 6 January 1947. *The BIS Act, 2016* came into force on 12 October 2017 superseding *BIS Act 1986*. *The BIS Act, 2016* provides for the establishment of a national standards body for the harmonious development of the activities of standardization, conformity assessment and quality assurance of goods, articles, processes, systems and services and for matters connected therewith or incidental thereto.

BIS through its core activities of standardization and conformity assessment, has been benefiting the national economy by providing safe, reliable and quality goods; minimizing health hazards to consumers; protecting the environment; controlling over proliferation of varieties; promoting exports and imports substitutes, etc. The standardization and conformity assessment schemes of BIS apart from benefitting the consumers and industry also support various public policies especially in areas of product safety, consumer protection, food safety, environment protection, building and infrastructure development, etc.

BIS also represents India in international standards bodies like International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) and participates actively in the international standardization work undertaken by these bodies. BIS presents the national viewpoints on new areas taken up for international standardization and on various draft international standards during the process of development of these standards so that the country's interest is protected and reflected in these standards. This also enables the BIS technical committees to consider adoption of the international standards as Indian Standards, with or without modifications, in order to enable our products and services to integrate with global trade and commerce.

What are Standards?

Standard is a document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

Importance of Standardization

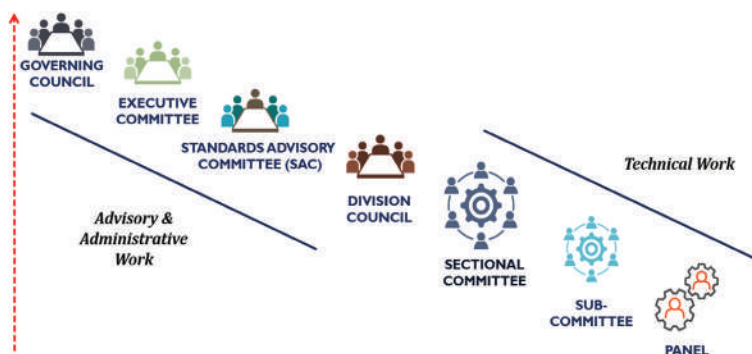
Standardization is the process of developing technical standards through consensus of different parties. This standardization aims to address one or all of compatibility, interchangeability, variety control, safety, environment protection, product protection and fitness for purpose. Standards provide numerable benefits to the technologists, producers, consumers and traders besides defining purpose for each of these entities.

Standards can be formulated at various levels ranging from an individual through National (IS) to International level (ISO). Also, depending on the subject in hand, standards can be made on various aspects such as terminology, specification, sampling, testing, code of good practice, systems and services.

STANDARDIZATION ACTIVITY OF BIS

Standardization Structure

There are 16 Technical Departments formulating standards in various subject areas. Corresponding to these departments, 16 division councils exist. Each division council has several sectional committees working under it. The standards cover important segments of economy and help the industry in upgrading the quality of their goods and services.

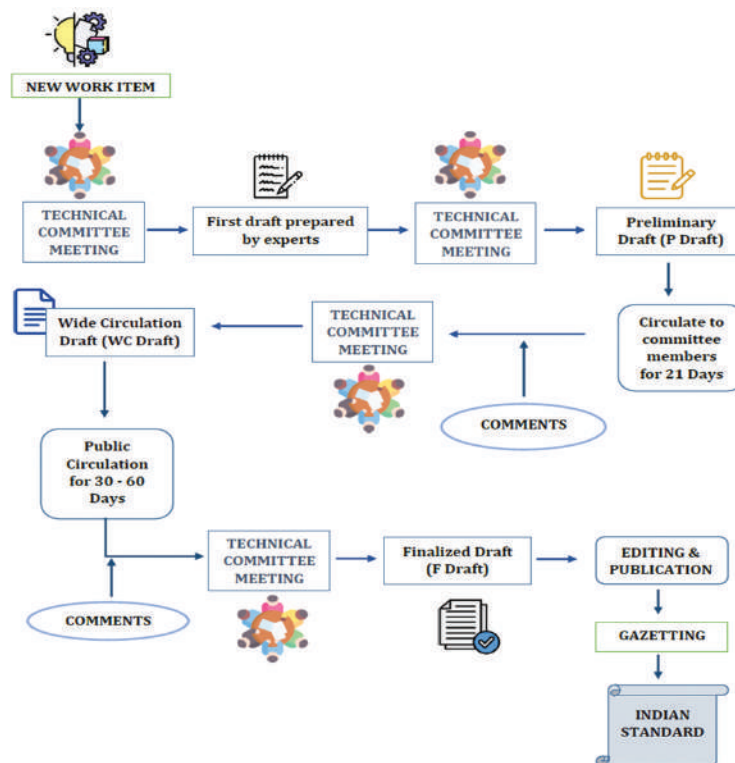
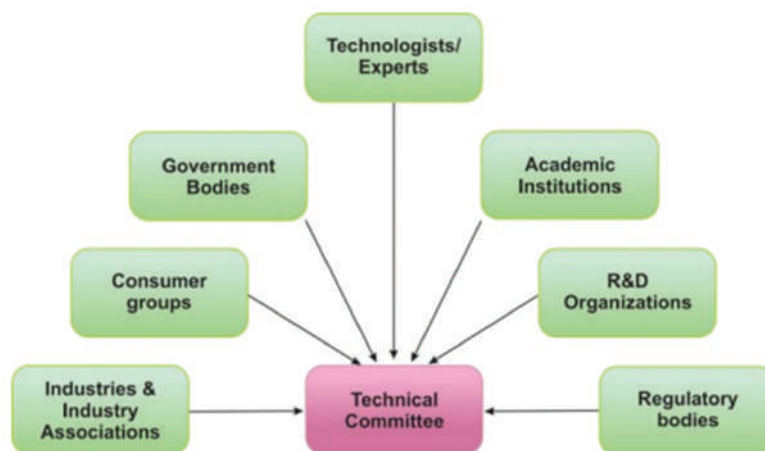


Ayush Division Council (AYDC)	Chemical Division Council (CHDC)	Civil Engineering Division Council (CEDC)	Electro-Technical Division Council (ETDC)
Electronics & Telecommunication Division Council (LITDC)	Food and Agriculture Division Council (FADC)	Mechanical Engineering Division Council (MEDC)	Management and Systems Division Council (MSDC)
Metallurgical Engineering Division Council (MTDC)	Medical Equipment & Hospital Planning Division Council (MHDC)	Petroleum, Coal & Related Products Division Council (PCDC)	Production and General Engineering Division Council (PGDC)
Transport Engineering Division Council (TEDC)	Textile Division Council (TXDC)	Water Resources Division Council (WRDC)	Service Sector Division Council (SSDC)

Standards Formulation Process

The Indian Standards are developed by technical committees that are representative of various stakeholders having interest in the relevant subject of standardization under the scope of such committees through a process of consultation so that views of all are given due consideration and a consensus is evolved in formulating a standard. The stakeholders involved in national standardization can broadly be categorized as industry, consumers/users, technologists (R&D and scientific institutions, academia, individual subject experts, etc) and government departments/regulators.

The process of standards development of BIS is aligned with accepted international best practices that are based on the core principles of openness, transparency, impartiality and consensus. The process begins with the identification of the standardization needs of the given sector or subject following which the development of the standard is taken up and planned by the relevant technical committee. Apart from consultation within the technical committees, draft standards are also open for public views/comments.



Standards Development Process Flow



TRANSPORT ENGINEERING DEPARTMENT (TED)

TED is one of the 16 technical departments of BIS with the scope “Standardization in the field of transport engineering including air, water, road and rail transport; diesel engines for stationary application, freight containers, transport packaging; road and transport safety, etc”

TEDC is division council of TED department.

The aspect wise breakup of the standards formulated by TEDC as on 15 September 2023 is given below:

Aspect	No. of Standards
Product	461
Code of Practices	105
Methods of Test	211
Terminology	65
Dimensions	72
System Standard	7
Safety Standard	10
Others	253
Service Specification	3
Process Specification	1
Unclassified	73
Total	1709

TED, BIS is a ‘P’ member in 59 committees and ‘O’ Member in 30 committees of ISO.

LIST OF TECHNICAL COMMITTEES WORKING UNDER TED

Under TED, there are 21 Sectional Technical Committees working in various subject areas. List of committees with their scope is as follows:

Technical Committee Number	Technical Committee Name	SCOPE
TED 02	Automotive Primemovers, Transmission Systems and Internal Combustion Engine Sectional Committee	Standardization relating to automotive engines and transmission, components, stationary internal combustion engines for agriculture.
TED 04	Automotive Braking Systems, Vehicle Testing, Steering and performance Evaluation Sectional Committee	Standardization of automotive braking systems, steering systems and their components, testing of vehicles as a whole for performance evaluation and road worthiness

TED 06	Automotive Body, Chassis and Accessories Sectional Committee	Standardization of chassis assembly, aerodynamics and ergonomic aspects of vehicles and the body, body fittings, seats, vehicle accessories and garage equipments etc.
TED 07	Automotive Tyres, Tubes And Rims Sectional Committee	Standardization of automotive tyres, tubes, rims and related
TED 11	Automotive Electrical Equipment and Instruments Sectional Committee	Standardization relating to electrical and optical equipments, instruments and their related components including electronics for automotive vehicles
TED 14	Air and Space Vehicles Sectional Committee	Standardization of systems, accessories, fittings, test method, performance requirements of aircraft and space vehicles, aircraft electrical and allied equipment, air cargo handling and specialized ground handling equipment
TED 16	Bicycles Sectional Committee	Formulation of standards for bicycles including electric bicycles, bicycle parts and accessories, glossary of terms, etc.
TED 17	Shipbuilding Sectional Committee	Standardization work relating to ships and their systems-accessories and fittings (other than main propulsive machinery) performance, testing, terminology, codes of practice, marine environment, ship management and quality assurance, off-shore
TED 18	Inland, Harbour Crafts And Fishing Vessels Sectional Committee	Standardization of hull and deck fittings for inland vessels dredgers, tugs, hopper barges, launches, water barges and constructional practices, performance requirements, trials, machinery and equipments for fishings vessels and trawlers.
TED 19	Marine Engineering And Safety Aids Sectional Committee	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 fire fighting, fire protection and detection etc; magnetic and gyro compasses and connected items; signalling 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
TED 22	Transport Tractors, Trailers And Industrial Trucks Sectional Committee	Standardization work of transport, industrial tractors trailers (including trailers for carrying rail and sea freight containers) and powered industrial trucks, their attachments, related components and testing, safety code for operation and maintenance and other connected
TED 24	Transport Packages, Packaging Codes and Pallets Sectional Committee	Standardization of Transport packages, their testing, intensities of tests, to prepare packaging codes for packaging of light engineering items and components, Performance Requirements and Methods of Tests for Pallets.

TED 26	Automotive Vehicles Running on Non-Conventional Energy Sources Sectional Committee	Standardization of Fuel System Components for Automotive Vehicles using New and Renewable Energy Sources such as Compressed Natural Gas (CNG), Liquefied Petroleum Gas (LPG), Bio-Gas, Hydrogen/Methane Blends, Bio-diesel/diesel blends, alcohol (Ethanol/Methanol)-petrol blends Hydrogen, Fuel Cell and their installation requirements.
TED 27	Electric And Hybrid Vehicles Sectional Committee	Standardization of Electric and Hybrid vehicles and their components
TED 28	Intelligent Transport Systems Sectional Committee	Standardization of information, communication and control systems in the field of urban and rural surface transportation, including intermodal and multimodal aspects thereof, traveller information, traffic management, public transport, commercial transport, emergency services and commercial services in the intelligent transport systems
TED 29	Passive Safety Crash Protection Systems Sectional Committee	Standardization in the field of passive safety crash protection systems and impact test procedures.
TED 31	In service Vehicle Inspection, Certification and Garage Equipment Sectional Committee	Standardization in the field of inspection and certification of vehicles including visual inspection for periodical technical inspection and associated garage equipment.
TED 32	Unmanned Aerial Vehicles Sectional Committee	Standardization in the field of Unmanned Aircraft Systems (UAS) including, but not limited to, classification, design, manufacture, operation (including maintenance), insurance and safety management of UAS operations for Civil, Medical, Military, Agricultural and other purposes.
TED 33	Freight Containers Sectional Committee	Standardization of Freight Containers including General and Specific Purpose Containers, Methods of Tests to be performed, Performance requirements, Identification, Marking and Communication requirements along with Safety and related Handling and Securing Equipment.
TED 34	Springs and Suspension Systems Sectional Committee	Standardization of Shock Absorbers & Springs including Automotive springs containing engine rocker arm springs and suspension systems.
TED 35	Road Safety Sectional Committee	Standardization in the field of Road safety, associated equipment and accessories and Management system related to Road Safety

IC ENGINE COMPONENTS

Automotive Primemovers, Transmission Systems and Internal Combustion Engine Sectional Committee-sectional committee, TED 02 is one of the 21 sectional committees working under TEDC with the scope “Standardization relating to automotive engines and transmission, components, stationary internal combustion engines for agriculture”.

This committee has formulated total **131** standards. Complete list of standards formulated by this committee has been placed below.

Sl. No.	IS No.	Title
1.	IS 3175 : 2013	Internal combustion engine - Sealing washers for pipe unions - Specification (Second Revision)
2.	IS 16057 : 2013	LPG operated internal combustion engines - Safety and performance requirements - Specification
3.	IS/ISO 8528-1 : 2018	Reciprocating Internal Combustion Engine Driven Alternating Current Generating Sets Part 1 Application, Ratings and Performance (First Revision)
4.	IS/ISO 8528-4 : 2005	Reciprocating internal combustion engine driven alternating current generating sets: Part 4 control gear and switchgear
5.	IS/ISO 8528-5 : 2018	Reciprocating Internal Combustion Engine Driven Alternating Current Generating Sets Part 5 Generating Sets (First Revision)
6.	IS/ISO 8528-10 : 1998	Reciprocating Internal Combustion Engine Driven Alternating Current Generating Sets: Part 10 Measurement of Airborne Noise by the Enveloping Surface Method
7.	IS/ISO 8528-12 : 1997	Reciprocating internal combustion engine driven alternating current generating sets: Part 12 emergency power supply to safety services
8.	IS/ISO 8528-6 : 2005	Reciprocating internal combustion engine driven alternating current generating sets: Part 6 test methods
9.	IS/ISO 8528-7 : 2017	Reciprocating Internal Combustion Engine Driven Alternating Current Generating Sets Part 7 Technical Declarations for Specification and Design (First Revision)
10.	IS/ISO 8528-8 : 2016	Reciprocating internal combustion engine driven alternating current generating sets: Part 8 requirements and tests for low - Power generating sets (First Revision)
11.	IS/ISO 8528-9 : 2017	Reciprocating Internal Combustion Engine Driven Alternating Current Generating Sets Part 9 Measurement and Evaluation of Mechanical Vibrations (First Revision)
12.	IS 10000 (Part 10) : 1980	Methods of tests for internal combustion engines: Part 10 tests for smoke levels, limits and corrections for smoke levels for variable ,speed compression ignition engines
13.	IS 10000 (Part 1) : 1980	Methods of tests for internal combustion engines: Part 1 glossary of terms relating to test methods
14.	IS 10000 (Part 11) : 1980	Methods of tests for internal combustion engines: Part 11 information to be supplied by the purchaser to the manufacturer and information to be supplied by the manufacturer along with the engine
15.	IS 10000 (Part 13) : 2002	Methods of tests for internal combustion engines: Part 13 recommendations on nature of tests required for functional changes in critical components
16.	IS 10000 (Part 2) : 1980	Methods of tests for internal combustion engines Part 2 standard reference conditions

17.	IS 10000 (Part 3) : 1980	Methods of tests for internal combustion engines: Part 3 measurements for testing - Units and limits of accuracy
18.	IS 10000 (Part 5) : 1980	Methods of tests for internal combustion engines: Part 5 preparation for tests and measurements for wear
19.	IS 10000 (Part 6) : 1980	Methods of tests for internal combustion engines: Part 6 recording of test results
20.	IS 10000 (Part 7) : 1980	Methods of tests for internal combustion, engines: Part 7 governing tests for constant speed engines and selection of engines for use with electrical generators
21.	IS 10000 (Part 8) : 1980	Methods of tests for internal combustion engines Part 8 performance tests
22.	IS 10000 (Part 9) : 1980	Methods of tests for internal combustion engines: Part 9 endurance tests
23.	IS 10001 : 1981	Performance Requirements for Constant Speed Compression ignition (diesel) engines for general purposes (up to 20 kW)
24.	IS 10002 : 1981	Specification for performance requirements for constant speed compression ignition (Diesel) engines for general purposes (Above 20 KW)
25.	IS 10105 : 1982	Specification for fittings for cylinder pressure indicators for internal combustion engines
26.	IS 10323 : 2019	Crank and chain wheel for moped - Specification (First Revision)
27.	IS 10478 : 2018ISO 6519:2015	Diesel engines - Fuel injection pumps - Tapers for shaft ends and hubs (Second Revision)
28.	IS 10533 : 1983	Specification for valve guides for internal combustion engines
29.	IS 10651 : 2019	Hub axle, front for moped - Specification (First Revision)
30.	IS 10652 : 2019	Pedal assembly for moped - Specification (First Revision)
31.	IS 10653 : 2019	Hub axle, rear, for moped - Specification (First Revision)
32.	IS 11139 : 2019	Adjusters for control cables for moped - Specification (First Revision)
33.	IS 11170 : 1985	Specification for 1 performance requirements for constant speed compression ignition (Diesel) engines for agricultural purposes (Up To 20 KW)
34.	IS 11509 (Part 1) : 2012/ISO 4548-1:1997	Methods of test for full - Flow lubricating oil filters for internal combustion engines: Part 1 differential pressure/flow characteristics (First Revision)
35.	IS 11509 (Part 2) : 2012/ISO 4548-2:1997	Methods of test for full - Flow lubricating oil filters for internal combustion engines: Part 2 element by - Pass valve characteristics (First Revision)
36.	IS 11509 (Part 3) : 2012/ISO 4548-3:1997	Methods of test for full - Flow lubricating oil filters for internal combustion engines: Part 3 resistance to high differential pressure and to elevated temperature (First Revision)

37.	IS 11838 : 1986	Recommendations for measurement of quality characteristics of gudgeon pins
38.	IS 12025 : 1987	Recommendations for measurement of quality characteristics for pistons
39.	IS 12352 : 1988	Specification for fuel injection pump mounting bolts
40.	IS 12404 : 1988	Specification for couplings for driving fuel injection pumps
41.	IS 12455 : 1988	Performance requirements of aircooled spark ignition automotive engines
42.	IS 12460 : 1988	Automotive vehicles - Transmission systems - Manual control sequence in automatic transmissions - Recommendations
43.	IS 12499 : 1988	Specification for two stage, 0.5 litre diesel fuel filters
44.	IS 12500 : 1988	Specification for 0.2 litre diesel fuel filters
45.	IS 12535 (Part 1) : 1988	Automotive vehicles - Transmission systems - Glossary: Part 1 general definitions
46.	IS 12535 (Part 2) : 1991	Automotive vehicles - Transmission systems - Glossary: Part 2 universal joints and driveshafts
47.	IS 12535 (Part 3) : 1991	Automotive vehicles - Transmission systems - Glossary: Part 3 drive axles definitions
48.	IS 12587 : 1989	Automotive vehicles - Transmission system - Gear arrangement - Recommendations
49.	IS 12902 : 1990/ISO 7646:1986	Commercial vehicles and buses - Gearbox flanges - Type A
50.	IS 12903 : 1990/ISO 7647:1986	Commercial vehicles and buses - Gearbox flanges - Type S
51.	IS 12904 : 1990/ISO 7648:1987	Flywheel housings for reciprocating internal combustion engines - Nominal dimensions and tolerances
52.	IS 12905 : 1990/ISO 7653:1985	Commercial Vehicles-couplings Between Power Take-offs (PTO's) and Ancillary Driven Units
53.	IS 12972 : 1990/ISO 7707:1986	Commercial road vehicles - Connections for rear - Mounted power take - Offs (PTO)
54.	IS 12973 : 1990/ISO 7804:1985	Commercial road vehicles - Side openings for truck power take - Offs (PTO)
55.	IS 12978 : 2006/ISO 8667:1992	Commercial vehicles and buses - Cross - Tooth gearbox flanges, type T (First Revision)
56.	IS 12996 : 1990	Internal combustion engines radiator pressure caps - Specification
57.	IS 13016 : 1991	Internal combustion engines - Radiator drain cocks - Specification
58.	IS 13018 : 1990	Internal combustion of test for pressure engines - Method charged engines
59.	IS 13029 : 1991	Internal combustion engines - setting ignition timing in spark ignition engines - Code of practice
60.	IS 13050 : 1991	Internal combustion engines - Valve seat inserts - Specification
61.	IS 13051 : 1991	Internal combustion engines radiator fans - Specification



62.	IS 13052 : 1991	Internal combustion engines - Cylinder liners - Quality characteristics
63.	IS 13090 : 2018	Automotive vehicles - Commercial vehicles - Clutch housings - Dimensions (First Revision)
64.	IS 13686 : 1993	Internal combustion engines radiators - Methods of test
65.	IS 13687 : 1993	Internal combustion engines - Radiators - Heat dissipation performance - Method of test
66.	IS 13824 : 1993	Internal combustion engines - Method of verification of emission of crankcase gases for vehicles powered with four stroke spark ignition engines
67.	IS 14273 : 1999	Automotive vehicles - Exhaust emissions - Gaseous pollutants from vehicles fitted with compression ignition engines - Method of measurement
68.	IS 14511 (Part 1) : 2007/ISO 8984-1:1993	Diesel engines - Testing of fuel injectors: Part 1 hand - Lever - Operated testing and setting apparatus (First Revision)
69.	IS 14511 (Part 2) : 2007/ISO 8984-2:1993	Diesel engines - Testing of fuel injectors: Part 2 test methods (First Revision)
70.	IS 14553 : 2008	Automotive vehicles - Apparatus for the measurement of opacity (Smoke) of exhaust gas from vehicles equipped with compression ignition engines - Specification (First Revision)
71.	IS 14599 : 1999	Automotive vehicles - Performance requirements (Measurement Of Power, SFC, Opacity) of positive and compression ignition engines - Method of test
72.	IS 14600 : 1999	Automotive vehicles - Exhaust emissions - Gaseous pollutants from vehicles equipped with internal combustion engines - Method of measurement
73.	IS 1543 : 1964	Specification for single cylinder fuel injection pumps (Revised)
74.	IS 2765 : 1982	Specification for radiator hose (First Revision)
75.	IS 3169 : 1991	Internal combustion engines - Two stage, one litre, diesel fuel filters (First Revision)
76.	IS 3170 (Part 1) : 2006/ISO 2697:1999	Internal Combustion Engines - Fuel Injection Nozzles Part 1 Injection Nozzles - Size 'S'
77.	IS 3170 (Part 2) : 2006/ISO 4010:1998	Internal combustion engines - Fuel injection nozzles: Part 2 calibrating nozzle, delay pintle type (First Revision)
78.	IS 3171 (Part 1) : 1997/ISO 2699:1994	Internal Combustion Engines - Fuel Injection Nozzle Holders - Part 1 : Flange Mounted Fuel Injectors Size 'S' Types 2, 3, 4, 5 and 6
79.	IS 3171 (Part 2) : 2006/ISO 7026:1997	Internal Combustion Engines - Fuel Injection Nozzle Holders - Part 2 : Screw-in Injection Nozzle Holders, Types 20, 21, 21.1 and 27 for Pintle Nozzle Size 'S', Type B

80.	IS 3171 (Part 3) : 1997/ISO 7030:1987	Internal combustion engines - Fuel injection nozzle holders: Part 3 screw mounted injection nozzle holders, types 12,13,14,15,16,17,18 and 19
81.	IS 3172 : 1997	Internal combustion engines - Fuel injection equipment - Single and double ended pipe unions (Single And Double Ended Banjo) - Specification (Second Revision)
82.	IS 3173 : 1965	Specification for high pressure connections for fuel injection equipment for diesel engines
83.	IS 3174 : 1974	Specification for pipe union bolt (First Revision)
84.	IS 3351 : 2006/ISO 4020:2001	Road vehicles - Fuel filters for diesel engines - Test methods (Second Revision)
85.	IS 3649 : 2018	Automotive vehicles - Clutch facing for automotive transmission - Specification (First Revision)
86.	IS 5791 : 2006/ISO 6621-3:2000	Internal combustion engines - Piston rings - Material specifications (Third Revision)
87.	IS 6740 : 1985	Specification for gudgeon pins for internal combustion engines (First Revision)
88.	IS 6750 : 1985	Specification for cylinder liners for internal combustion engines (First Revision)
89.	IS 7347 : 1974	Specification for performance of small size spark ignition engines
90.	IS 7449 (Part 1) : 1974	Glossary of terms for IC engines: Part 1 fuel injection equipment
91.	IS 7451 (Part 1) : 2020/ISO 2710-1:2017	Reciprocating Internal Combustion Engines — Vocabulary Part 1 Terms for Engine Design and Operation (Second Revision)
92.	IS 7451 (Part 2) : 2006/ISO 1204:1990	Reciprocating internal combustion engines: Part 2 designation of the direction of rotation and of cylinders and valves in cylinder heads, and definition of right - Hand and left - Hand in - Line engines and locations on an engine (First Revision)
93.	IS 7611 : 1993	Internal combustion engines radiators - Specification (First Revision)
94.	IS 810 : 1991	Internal combustion engines - Engine valves - Specification (Second Revision)
95.	IS 8118 : 2008	Automotive vehicles - Opacity (Smoke) of exhaust gas from vehicles equipped with compression ignition engines operating under free acceleration - Method of measurement (Third Revision)
96.	IS 8422 (Part 4) : 1977	Specification for piston rings for IC engines: Part 4 napier oil scraper rings from 30 up to 200 mm nominal diameter N - Rings
97.	IS 8422 (Part 5) : 1977	Specification for piston rings for IC engines: Part 5 stepped oil scraper rings from 30 up to 200 mm nominal diameter Z - Rings
98.	IS 8422 (Part 6) : 1977	Specification for piston rings for IC engines: Part 6 slotted oil control rings from 50 up to 200 mm nominal diameter S - Rings

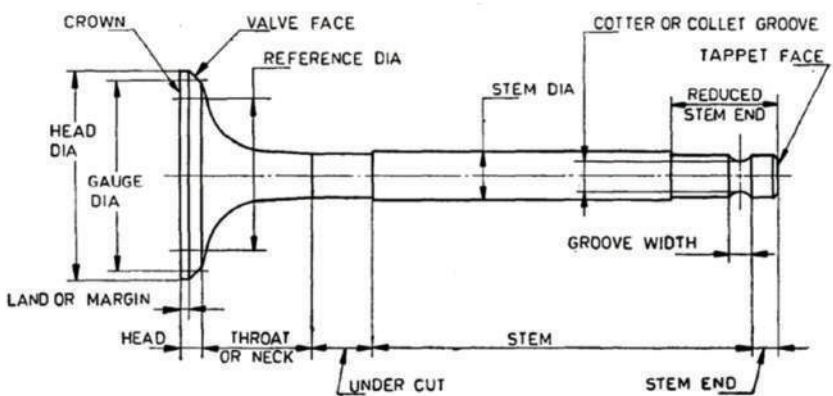


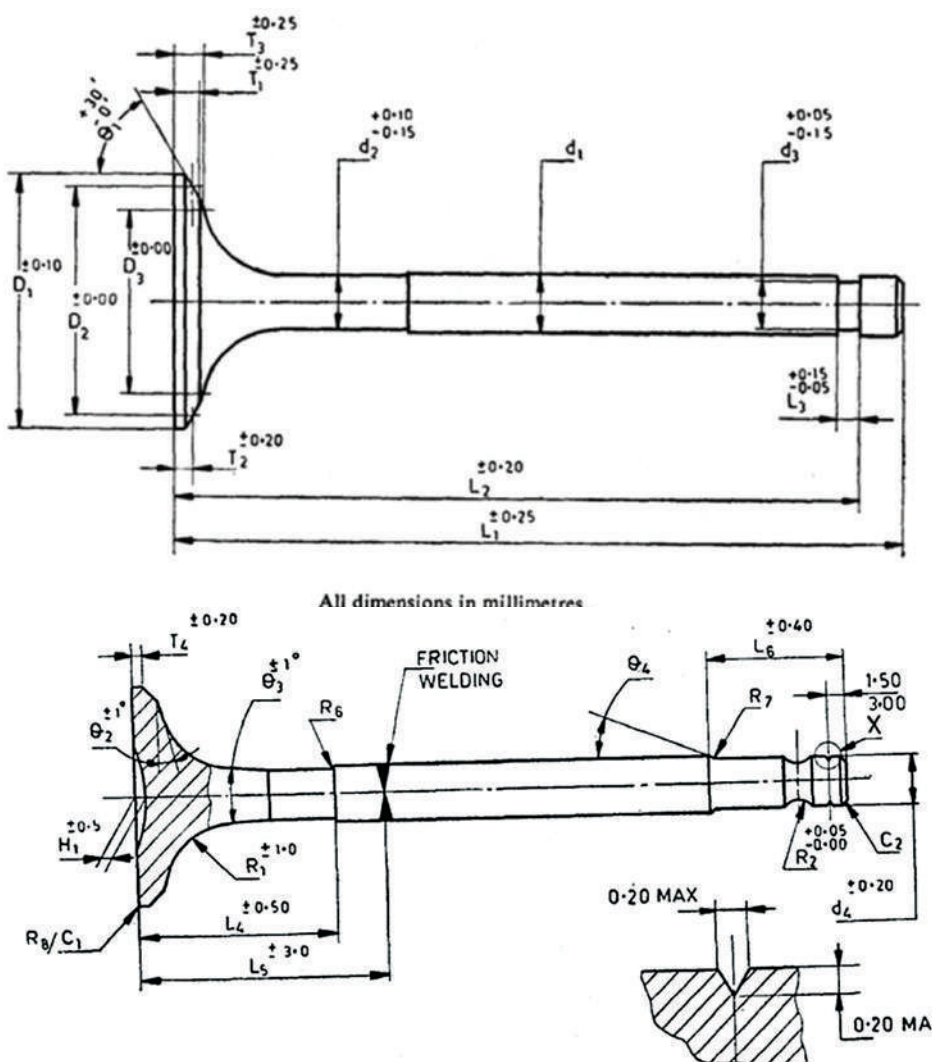
99.	IS 8422 (Part 7) : 1977	Specification for piston rings for IC engines: Part 7 double bevelled slotted oil control rings from 50 up to 200 mm nominal diameter G - Rings
100.	IS 8422 (Part 8) : 1977	Specification for piston rings for IC engines: Part 8 narrow land slotted oil control rings from 50 up to 200 mm nominal diameter D - Rings
101.	IS 3175 : 2013	Internal combustion engine - Sealing washers for pipe unions - Specification (Second Revision)
102.	IS 8503 : 1986	Technical supply conditions for aluminium alloy pistons for internal combustion engines (First Revision)
103.	IS 9262 : 1979	Recommendations for gear positions for road vehicles
104.	IS 9418 : 1980	Dimensions for mounting flanges for in - Line fuel injection pumps for multi - Cylinder compression ignition engines
105.	IS 9420 (Part 1) : 1988	Specification for feed pumps for diesel fuel injection equipment: Part 1 external dimensions (First Revision)
106.	IS 9420 (Part 2) : 1988	Specification for feed pumps for diesel fuel injection equipment: Part 2 types of drives
107.	IS 9465 : 1980	Mounting dimensions for in - Line injection pump assemblies for fuel injection equipment for multi - Cylinder compression ignition engines
108.	IS 10000 (Part 12) : 1980	Methods of tests for internal combustion engines: Part 12 specimen test certificates
109.	IS 10000 (Part 4) : 1980	Methods of tests for internal combustion engines: Part 4 declaration of power, efficiency, fuel consumption and lubricating oil consumption
110.	IS 7451 (Part 6) : 2007/ISO 2261:1994	Reciprocating internal combustion engines: Part 6 hand - Operated control devices - Standard direction of motion (First Revision)
111.	IS 7657 (Part 1) : 1975	Specification for starter ring gears for internal combustion engines: Part 1 gears for inertia and solenoid pre - Engaged starters
112.	IS 7657 (Part 2) : 1975	Specification for starter ring gears for internal combustion engines: Part 2 gears for axial and coaxial starters
113.	IS 8422 (Part 1) : 1977	Specification for piston rings for IC engines: Part 1 plain compression rings from 30 up to 200 mm nominal diameter R - Rings
114.	IS 8422 (Part 2) : 1977	Specification for piston rings for IC engines: Part 2 taper faced compression rings from 30 up to 200 mm nominal diameter M - Rings
115.	IS 8422 (Part 3) : 1977	Specification for piston rings for IC engines: Part 3 keystone rings from 82 up to 200 mm nominal diameter T - Rings 15
116.	IS H10001 : 1981	Specification for performance requirements for constant speed compression ignition (Diesel) engines for general purposes (Up To 20 Kw)

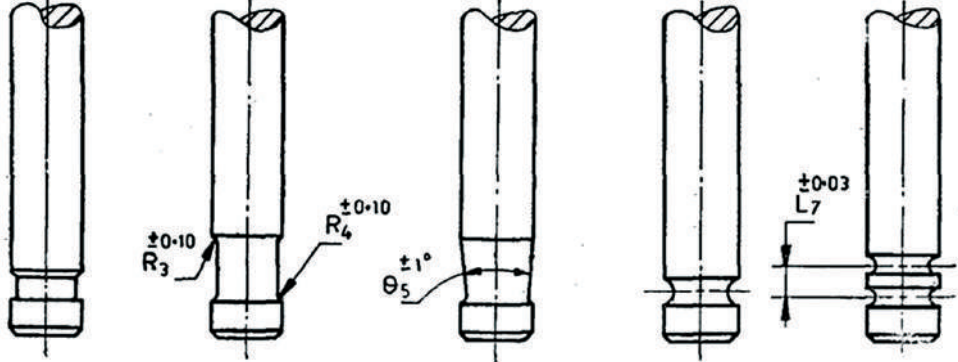
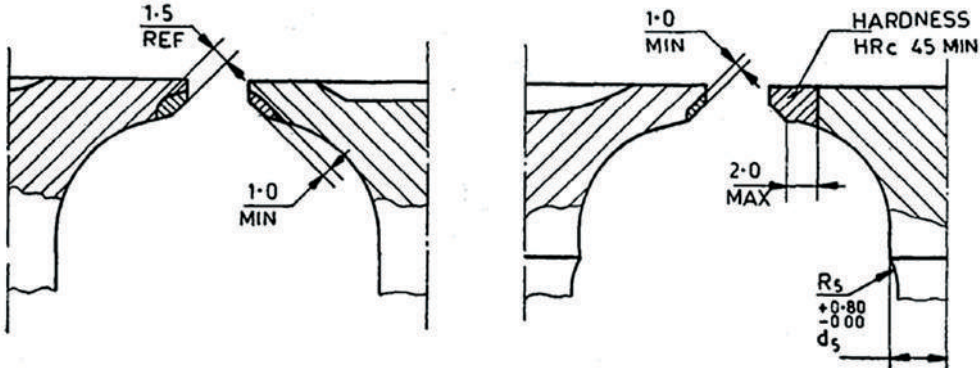
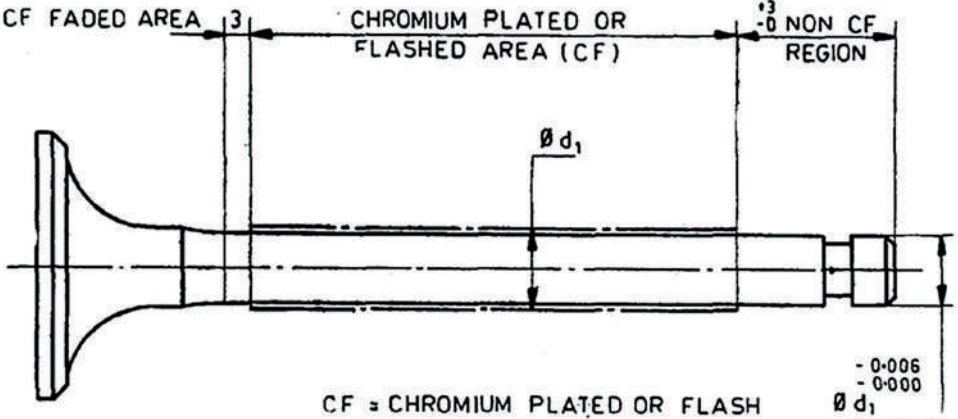
117.	IS/ISO 8178-7 : 2015	Reciprocating internal combustion engine - Exhaust emission measurement: Part 7 engine family determination (First Revision)
118.	IS/ISO 6621-1 : 2018	Internal Combustion Engines — Piston Rings Part 1 Vocabulary (First Revision)
119.	IS 17458 : 2018/ISO 6826:1997	Reciprocating internal combustion engine - Fire protection
120.	IS 17019 : 2018	Gear / gerotor oil pump for motorcycle / scooter / moped - Specification
121.	IS 17042 (Part 4) : 2018/ISO 22241-4	Diesel Engines â”” NOX Reduction Agent AUS 32 Part 4 Refilling Interface
122.	IS 17042 (Part 5) : 2018/ISO 22241-5	Diesel engines - Nox reduction agent aus 32: Part 5 refilling interface for passenger cars
123.	IS/ISO 8178-8 : 2015	Reciprocating internal combustion engines - Exhaust emission measurement: Part 8 engine group determination
124.	IS/ISO 8528-2 : 2018	Reciprocating internal combustion engine driven alternating current generating sets - Part 2: Engines
125.	IS 15653 : 2021/ISO 2710-2:2019	Reciprocating internal combustion engine - Vocabulary - Terms for engine maintenance
126.	IS/ISO 8178-9 : 2019	Reciprocating internal combustion engines - Exhaust emission measurement - Part 9: Test cycles and test procedures for measurement of exhaust gas smoke emissions from compression ignition engines using an opacimeter
127.	IS/ISO 8178-3 : 2019	Reciprocating internal combustion engines - Exhaust emission measurement - Part 3: Test procedures for measurement of exhaust gas smoke emissions from compression ignition engines using a filter type smoke meter
128.	IS/ISO 6621-2 : 2020	Internal combustion engines - Piston rings - Part 2: Inspection measuring principles
129.	IS/ISO 8528-3 : 2020	Reciprocating internal combustion engine driven alternating current generating sets Part 3: Alternating current generators for generating sets
130.	IS/ISO 8178-1 : 2023	Reciprocating internal combustion engines Exhaust emission measurement Part 1: Test bed measurement systems of gaseous and particulate emissions
131.	IS/ISO 8178-4 : 2020	Reciprocating internal combustion engines Exhaust emission measurement Part 4: Steady-state and transient test cycles for different engine applications

Some of the important standards formulated by this committee are explained in brief in this handbook.

IS 810 — INTERNAL COMBUSTION ENGINES - ENGINE VALVES – SPECIFICATION

SCOPE	This standard specifies the general requirements for inlet and exhaust valves for all internal combustion engines other than for aircraft use. Sodium filled valves, phosphate valves, shrouded valves and valves with more than 100 mm head diameter are not covered by this standard. The methods of test for quality characteristics of engine valves are covered in IS 12969: 1990.
TERMINOLOGY	1) Crown - The extreme upper surface of the valve head. 2) Valve Face % Coned surface of the valve that sits on the corresponding seat surface of the cylinder head or cylinder block, as the case may be. 3) Head - That part of the valve from the crown through the valve face. 4) Throat or Neck - That part of the valve connecting the valve head to valve stem. 5) Stem - The cylindrical part of the valve including the valve guide sliding portion. 6) Stem Undercut - In addition to the thread or neck, a reduced portion as shown in the Fig. 1 may be used to connect the valve head to the stem. This reduction in size is with reference to the stem diameter. 7) Cotter (Collet) Groove or Grooves - That part of the valve meant for the insertion of cotter (collet). 8) Stem End - That portion of the valve stem between the groove and tappet face. 9) Reduced Stem End - That portion of the stem near the tappet face which is reduced below the stem diameter. 10) Tappet Face - The extreme end of the stem that comes in connect with the tappet, the rocker arm or the valve cap as the case may be. 11) Land Or Margin - That part of the valve between the crown and the valve face. 12) Gauge Diameter - An imaginary geometrical contact diameter between the valve face and seat. 13) Reference Diameter - A nominal value, designated to enable measurement of head thickness against a fixed reference.
	 FIG. 1 TERMINOLOGY

TYPES OF VALVES	Type of Construction Single piece Two piece (bimetallic) Tappet End Treatment Untreated Hardened button welded and hardened hard faced Untreated hardened Seat Untreated Hard faced induction hardened Untreated hard faced Surface Untreated hard chrome-plated Plated stem soft nitrided Untreated hard chrome-plated stem
DIMENSIONS	Major Dimensions  All dimensions in millimetres. Minor Dimensions

LOCKING ARRANGE- MENTS	 All dimensions in millimetres.
HARD FACING AND INDUCTION HARDENING	 All dimensions in millimetres.
SURFACE TREATMENT: HARD CHROMIUM PLATING	 CF = CHROMIUM PLATED OR FLASH
TESTS	➤ Macro Etch Examination ➤ Crack Detection Test ➤ Microstructure Test Macro Etch Examination % Valves shall be subjected to a grain flow detection test by hot etching in hydrochloric acid, cold etching in Marble's Reagent, or by any other

	approved method of macro etching. The etching shall be done so as not to cause excessive pittings and corrosion of the sample. The grain flow shall be continuous and shall generally follow the throat contour. Crack Detection Test % Valves when tested for crack detection by the magnetic crack detection, the colour, dye penetrant, the fluoroscopic dye penetrant or by any other approved method as agreed to ' between the purchaser and the supplier, shall, be found free from cracks (see 1s 3 703 : 1980 and IS 3658 : 1981) Microstructure Test % Valves shall be subjected to a microstructure test by an approved method of specimen preparation and the structure so observed shall correspond to the type of steel or alloy used and the heat-treatment carried out on the valve. The three types of heat treatment conditions for valve material are: - Hardened and tempered structure for the martensitic steels, - As-rolled and annealed structure, or - Solution treated structure for the austenitic alloys.
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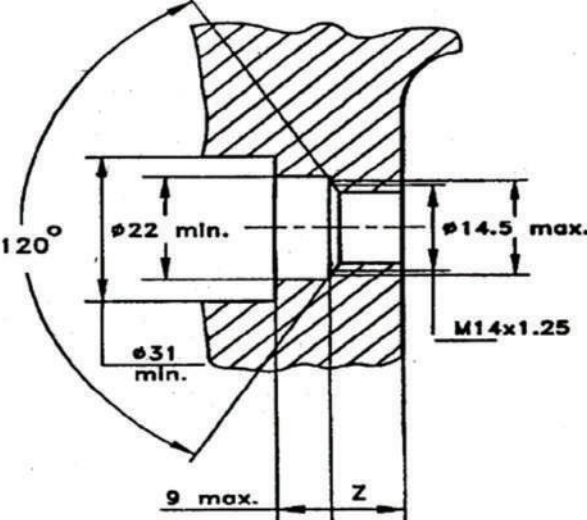
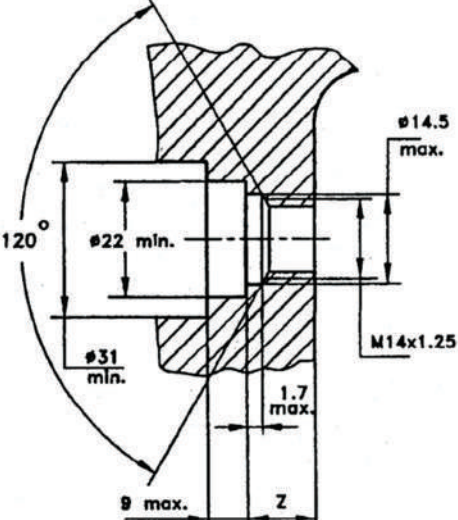
IS 1063 — AUTOMOTIVE VEHICLES – M 14 X 1.25 SPARK PLUGS WITH FLAT SEATING AND THEIR CYLINDER HEAD HOUSING – SPECIFICATION



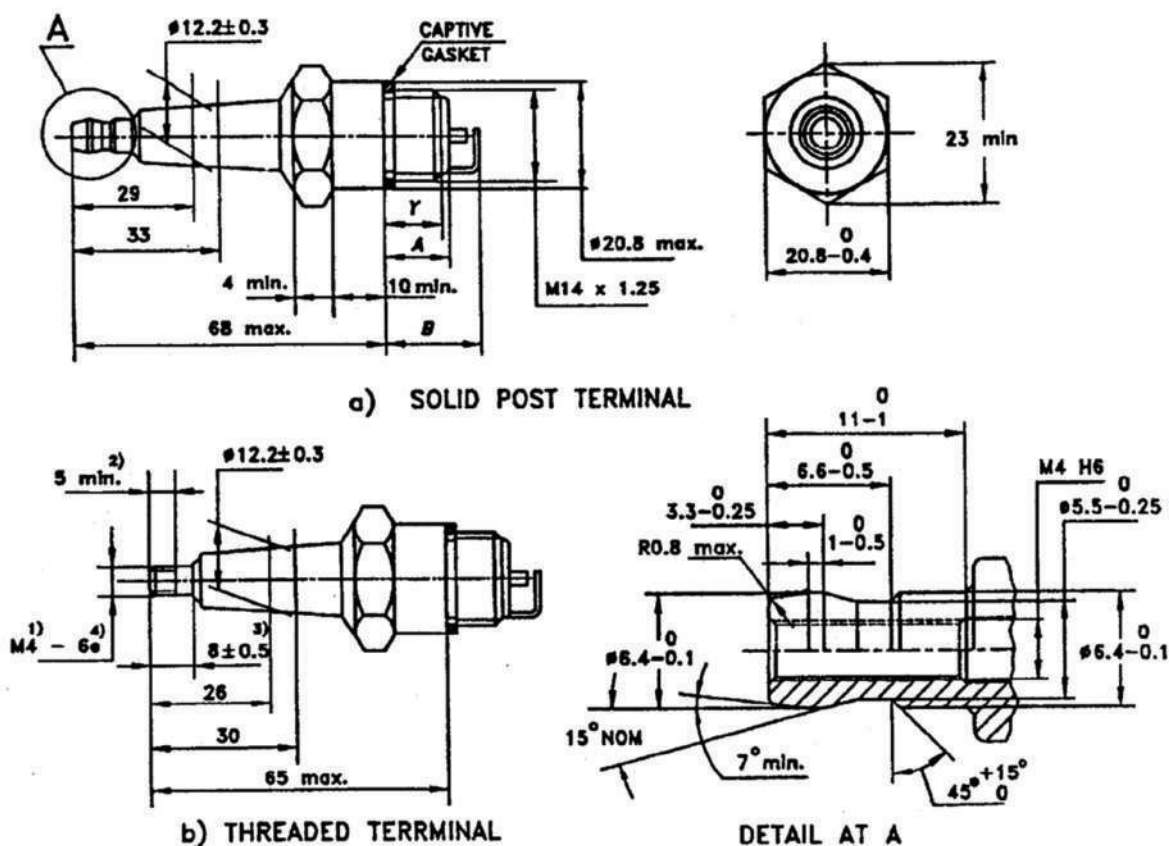
SCOPE	This standard specifies the main characteristics of M14 x 1.25 spark plugs with flat seating with short, normal or long reach and their cylinder head housing, for use with spark ignition engines.																																			
TERMINALS	The spark plug terminal may be either threaded or the solid post type. If nuts are used they shall have the same external dimensions as those of solid post terminals [see Fig 1(a) and 1(b)].																																			
SPARK PLUG REACH	<table><tr><td colspan="4">Table 1 Dimensions of Reach of Spark Plugs</td></tr><tr><td colspan="4">(Clause 3.2.1)</td></tr><tr><td colspan="4">All dimensions in millimetres.</td></tr><tr><td>Type of Reach</td><td>A ± 0.2</td><td>B, Max</td><td>Y ± 0.3</td></tr><tr><td>Short reach</td><td>9.5</td><td>17.5</td><td>9.2</td></tr><tr><td>Normal reach</td><td>12.7</td><td>21</td><td>11.7</td></tr><tr><td>Long reach</td><td>19</td><td>27</td><td>18</td></tr><tr><td colspan="4">NOTE — Dimension A may be increased for special applications.</td></tr></table>				Table 1 Dimensions of Reach of Spark Plugs				(Clause 3.2.1)				All dimensions in millimetres.				Type of Reach	A ± 0.2	B, Max	Y ± 0.3	Short reach	9.5	17.5	9.2	Normal reach	12.7	21	11.7	Long reach	19	27	18	NOTE — Dimension A may be increased for special applications.			
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GASKET	When the spark plugs have been tightened with a torque of 30 Nm, on threads that are clean, smooth and dry, the gaskets shall be 1.3 mm to 2 mm thick. If the gasket thicknesses are different, a corresponding adjustment to dimension A, B and Y shall be made. Non-captive gaskets may be used in special cases.																														
THREADS	The threads M14 x 1.25 of spark plugs and the corresponding tapped holes in the cylinder head shall conform to IS 4218 (Part 1 to 5).																														
LIMITING DIMENSIONS	Table 2 Dimensions of M14 × 1.25 Thread Profile (Clause 3.2.3.2) All dimensions in millimetres. <table><tr><th>Dimension</th><th>Plug Thread (on Finished Plug)</th><th>Tapped Hole in Cylinder Head</th><th>Not specified</th></tr><tr><td>Major diameter</td><td>Max</td><td>13.937</td><td>Not specified</td></tr><tr><td></td><td>Min</td><td>13.725</td><td>14</td></tr><tr><td>Pitch diameter</td><td>Max</td><td>13.125</td><td>13.368</td></tr><tr><td></td><td>Min</td><td>12.993</td><td>13.188</td></tr><tr><td>Minor diameter</td><td>Max</td><td>12.404</td><td>12.912</td></tr><tr><td></td><td>Min</td><td>12.181¹⁾</td><td>12.647</td></tr></table> ¹⁾ With a root radius e'' 0.125 mm (0.1P).			Dimension	Plug Thread (on Finished Plug)	Tapped Hole in Cylinder Head	Not specified	Major diameter	Max	13.937	Not specified		Min	13.725	14	Pitch diameter	Max	13.125	13.368		Min	12.993	13.188	Minor diameter	Max	12.404	12.912		Min	12.181 ¹⁾	12.647
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TOLERANCE CLASSES	The thread tolerance classes for finished M14 x 1.25 spark plugs and of the corresponding tapped holes in the cylinder head shall be as follows: 6e for spark plugs (see Note 1) 6H for tapped holes in the cylinder head. NOTES 1) In order that spark plugs complying with this standard can be fitted in exisiting cylinder heads also in extreme cases, the value for the maximum truncation of the minor diameter of the spark plug base has been slightly reduced with respect to the ISO value. This maximum value of the minor diameter is calculated from a distance of H/6 for the maximum truncation according to the formula given below. Instead of the value given by the formula in the standard. Minor diameter, Max = d1-es-2(H/4-H/6) = 12.647-0.063-0.180 = 12.647-0.243 = 12.404 The value for the basic profile remains the same as for the ISO thread (12.647-0.063= 12.584). 2) The initial clearance (e =F 0.063 mm) between the pitch diameters of the thread and of the tapped hole is intended to prevent the possibility of seizure, as a result of combustion deposits on the bare threads, when removing the spark plugs. This clearance is also intended to enable spark plugs with threads in accordance with this standard to be fitted in exisiting tapped holes																														

REQUIREMENTS FOR SPARKING	SI No. Test	Requirement
PLUGS	i) Sparking under pressure	Sparking shall be regular and of equal intensity
	ii) Insulation resistance Under heat, <i>Min</i>	1 megohm
	iii) Gas leakage under room temperature, <i>Max</i>	5 ml per min
	iv) Gas leakage under heat, <i>Max</i>	50 ml per min
	v) Thermal shock test	There shall be no crack on the insulators
	vi) Mechanical impact strength of insulator	
	a) Impact energy, the plugs shall sustain, <i>Min</i>	15 kgf. cm
	b) Breaking impact energy, average	33 kgf. cm
	vii) Torque strength	No breakage at the throat
HOUSING OF SPARK PLUG IN CYLINDER HEAD	 All dimensions in millimetres.	
HOUSING OF SPARK PLUG IN CYLINDER HEAD – Optional Configuration	 All dimensions in millimetres.	

TESTS AND PASSING CRITERIA	S.No.	Test	Requirement
	i)	Sparking under pressure	Sparking shall be regular and of equal intensity
	ii)	Insulation resistance Under heat, <i>Min</i>	1 megohm
	iii)	Gas leakage under room temperature, <i>Max</i>	5 ml per min
	iv)	Gas leakage under heat, <i>Max</i>	50 ml per min
	v)	Thermal shock test	There shall be no crack on the insulators
	vi)	Mechanical impact strength of insulator	
	a)	Impact energy, the plugs shall sustain, <i>Min</i>	15 kgf. cm
	b)	Breaking impact energy, average	33 kgf. cm
	vii)	Torque strength	No breakage at the throat

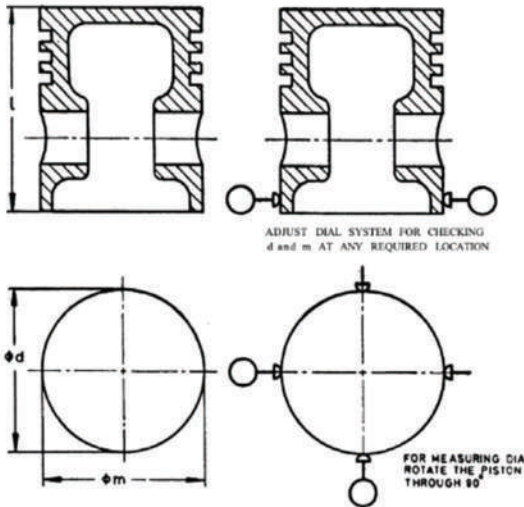
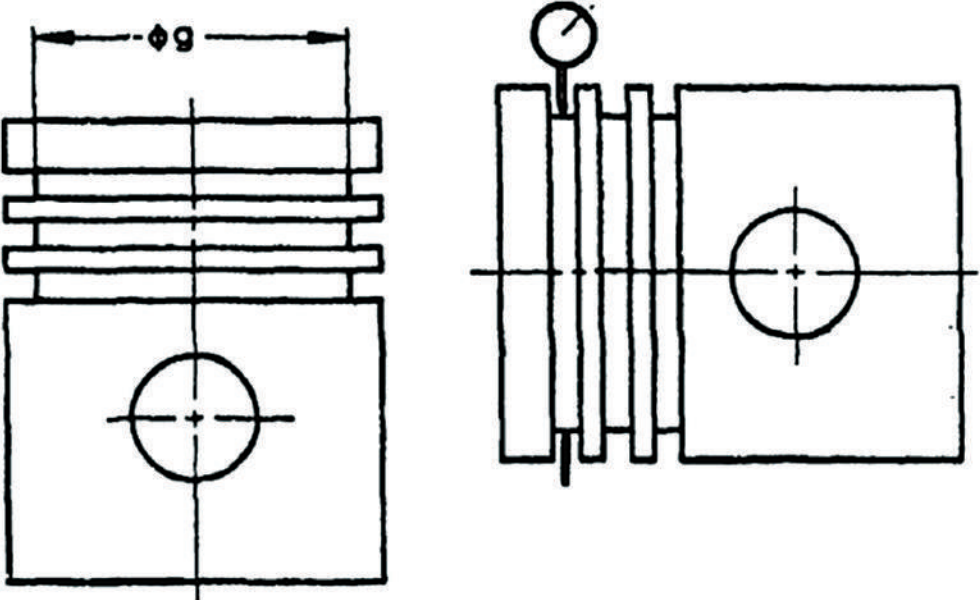


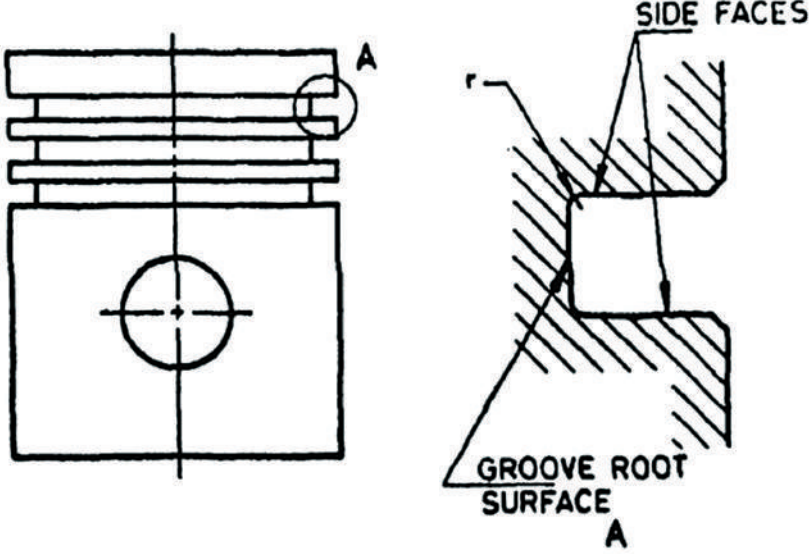
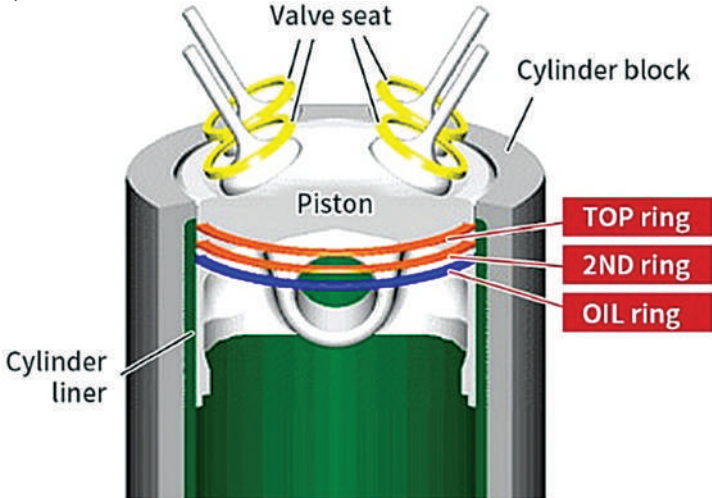
- 1) 0.7 mm pitch complying with ISO 68 and with ISO 261.
- 2) Length of usable thread.
- 3) Cylindrical part.
- 4) Depending on manufacturing processes, class 7e is acceptable on the finished product.
- 5) Other dimensions: see Fig. (a).

All dimensions in millimetres.

FIG 1 M14 x 1.25 SPARK PLUG WITH FLAT SEATING – TERMINAL REQUIREMENT

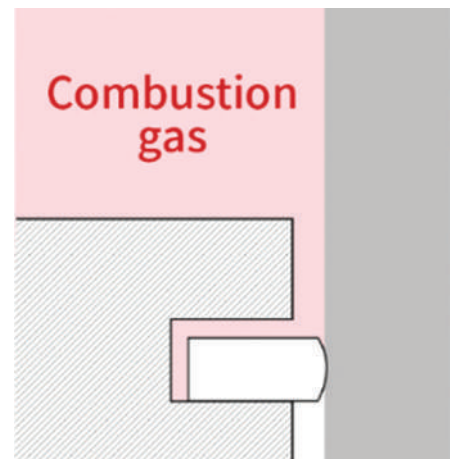
IS 12025 — RECOMMENDATIONS FOR MEASUREMENT OF QUALITY CHARACTERISTICS FOR PISTONS

SCOPE	This Standard covers in two sections, the recommended practices for dimensional measurements of pistons as applicable to internal combustion engines.i) Section 1 Pistons and Ring Grooves & ii) Section 2 Measuring ProceduresUnless otherwise agreed upon between the manufacturer and the purchaser the dimensional measurements are applicable prior to coating.
MEASUREMENT OF PISTON DIAMETER	 ADJUST DIAL SYSTEM FOR CHECKING d and m AT ANY REQUIRED LOCATION FOR MEASURING DIA ROTATE THE PISTON THROUGH 90°
MEASUREMENT OF GROOVE ROOT DIAMETER	Groove root diameter is the diameter of the groove root surface.Measurement may be done by supporting the piston over a straight edge inserted into the piston groove. A mechanical comparator with least count of 00 1 mm shall be used. 

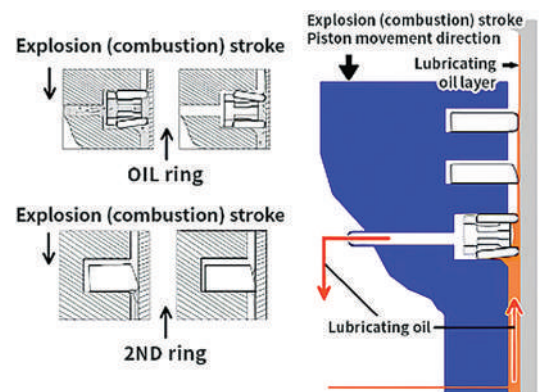
MEASUREMENT OF GROOVE ROOT RADIUS	Measurement of radius shall be done either with a suitable radius gauge or through a shadowgraph or with a tool-maker's microscope 
SECTION 2 (MEASURING PROCEDURES)	MEASURING PROCEDURES GIVEN FOR: 1) Ring groove width H1 (in mm) or by Height master/3D co-ordinate machines; 2) Keystone Ring Groove Width H3 (in mm); 3) Keystone ring groove included angle (in degrees minutes); 4) Ring Groove Root Concentricity (in mm); 5) Waviness (in mm) or form testing machine can be used for measurement; 6) Wind (squareness) (in mm); 7) Parallelism (in mm); 8) Ring Groove Run (in mm); and Radii in Corners
PISTON RINGS	Four stroke (Three rings): Top two are compression rings (sealing the compression pressure in the cylinder) and the third is an oil ring (scrapes excessive oil from the cylinder walls) Two Stroke: Most two stroke engines utilize only two piston rings (one compression and one scraper). 

IMPORTANT FUNCTIONS OF PISTON RINGS

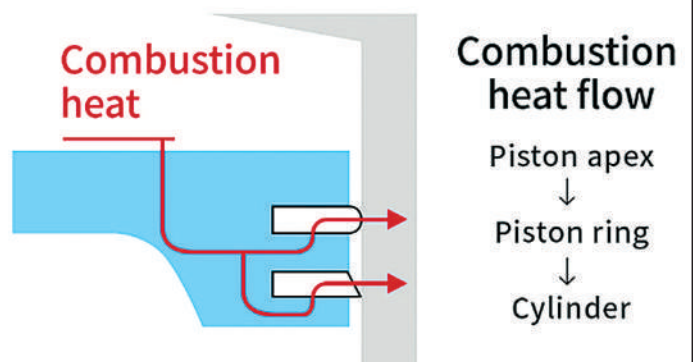
1) Function 1: Seal for combustion gas



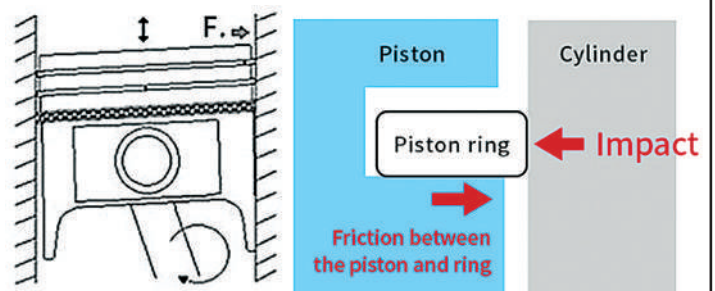
2) Function 2: Control lubricating oil



3) Function 3: Heat conduction function



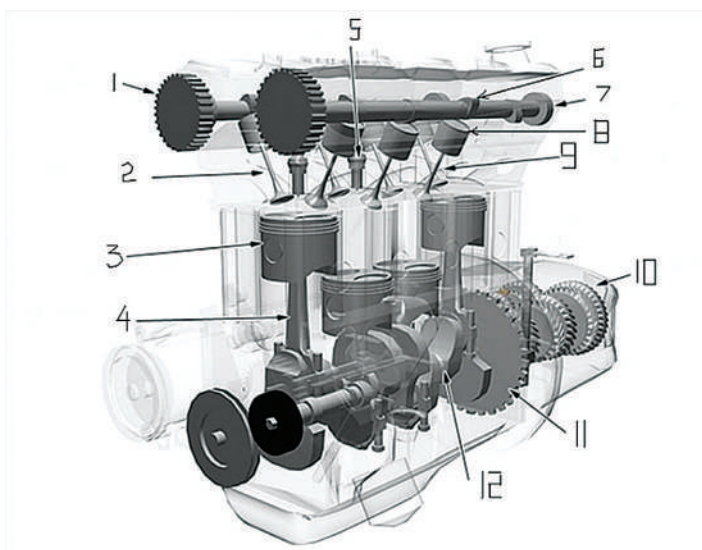
4) Function 4: Piston attitude support

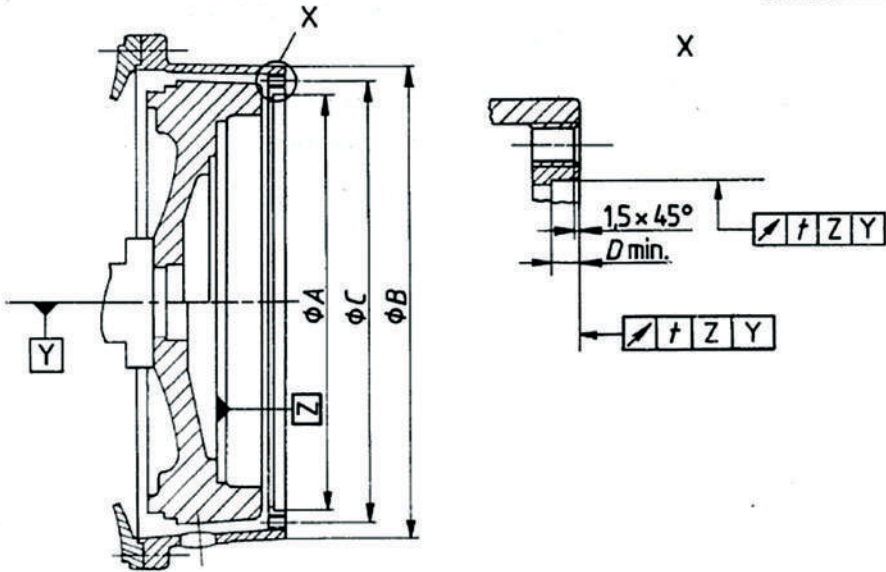
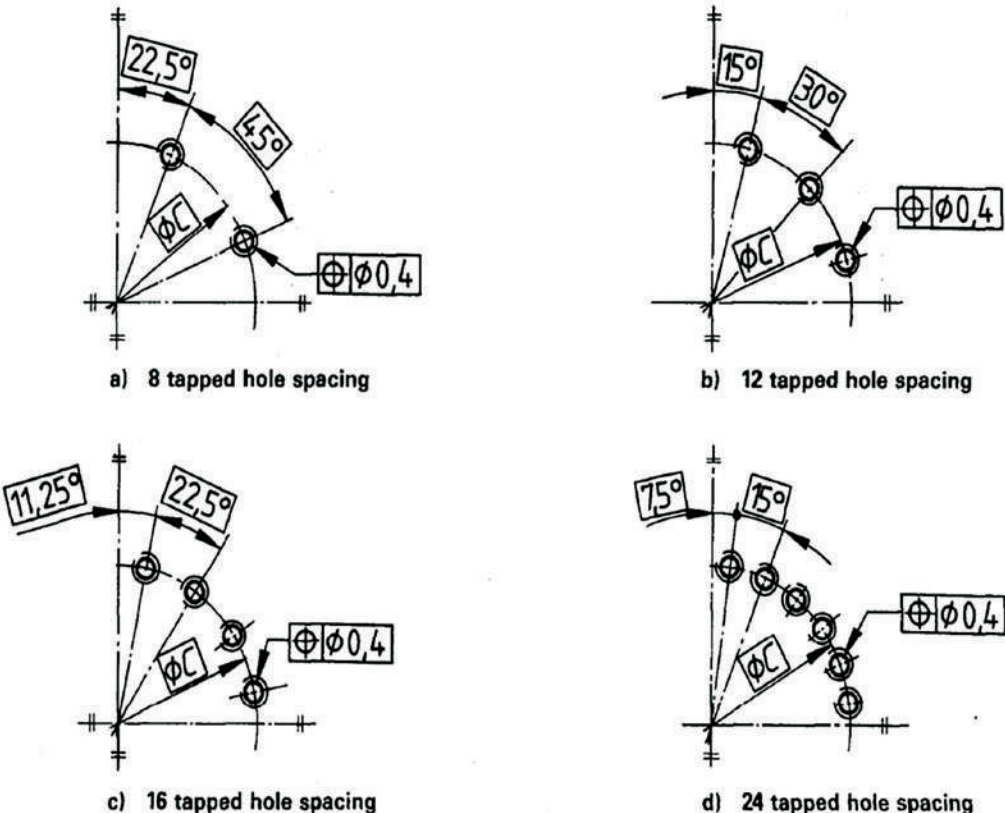


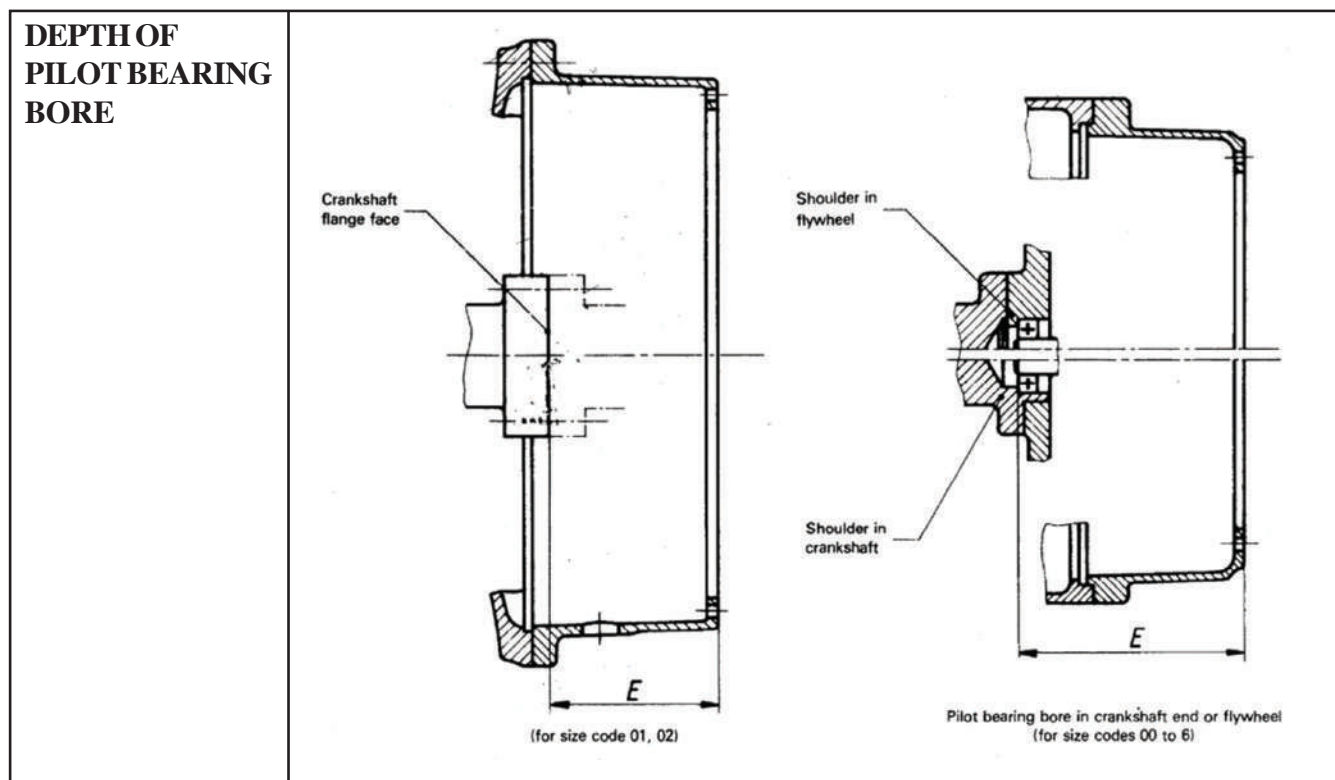
BIS Standards for Piston Rings

IS No.	IS Title
IS/ISO 6621-1	Internal Combustion Engines — Piston Rings Part 1 Vocabulary (First Revision)
IS/ISO 6621-2	Internal combustion engines - Piston rings - Part 2: Inspection measuring principles
IS 5791 /ISO 6621-3	Internal combustion engines - Piston rings - Material specifications (Third Revision)
IS 8422 (Part 1)	Specification for piston rings for IC engines: Part 1 plain compression rings from 30 up to 200 mm nominal diameter R - Rings
IS 8422 (Part 2)	Specification for piston rings for IC engines: Part 2 taper faced compression rings from 30 up to 200 mm nominal diameter M - Rings
IS 8422 (Part 3)	Specification for piston rings for IC engines: Part 3 keystone rings from 82 up to 200 mm nominal diameter T - Rings 15
IS 8422 (Part 4)	Specification for piston rings for IC engines: Part 4 napier oil scraper rings from 30 up to 200 mm nominal diameter N - Rings
IS 8422 (Part 5)	Specification for piston rings for IC engines: Part 5 stepped oil scraper rings from 30 up to 200 mm nominal diameter Z - Rings
IS 8422 (Part 6)	Specification for piston rings for IC engines: Part 6 slotted oil control rings from 50 up to 200 mm nominal diameter S - Rings
IS 8422 (Part 7)	Specification for piston rings for IC engines: Part 7 double bevelled slotted oil control rings from 50 up to 200 mm nominal diameter G - Rings
IS 8422 (Part 8)	Specification for piston rings for IC engines: Part 8 narrow land slotted oil control rings from 50 up to 200 mm nominal diameter D - Rings

IS 12904 — FLYWHEEL HOUSINGS FOR RECIPROCATING INTERNAL COMBUSTION ENGINES - NOMINAL DIMENSIONS AND TOLERANCES



SCOPE	This Standard specifies the nominal dimensions and tolerances of flywheel housings for reciprocating internal combustion engines, in particular those which affect interchangeability with mating parts. It applies to reciprocating internal combustion engines except engines for aircraft and passenger cars. Flywheel housings of size codes 1 to 4 are recommended for commercial vehicles and buses.
FLYWHEEL HOUSING	Dimensions in millimetres 
SPACING REQUIREMENTS FOR BOLT OR SCREW HOLES	 a) 8 tapped hole spacing b) 12 tapped hole spacing c) 16 tapped hole spacing d) 24 tapped hole spacing

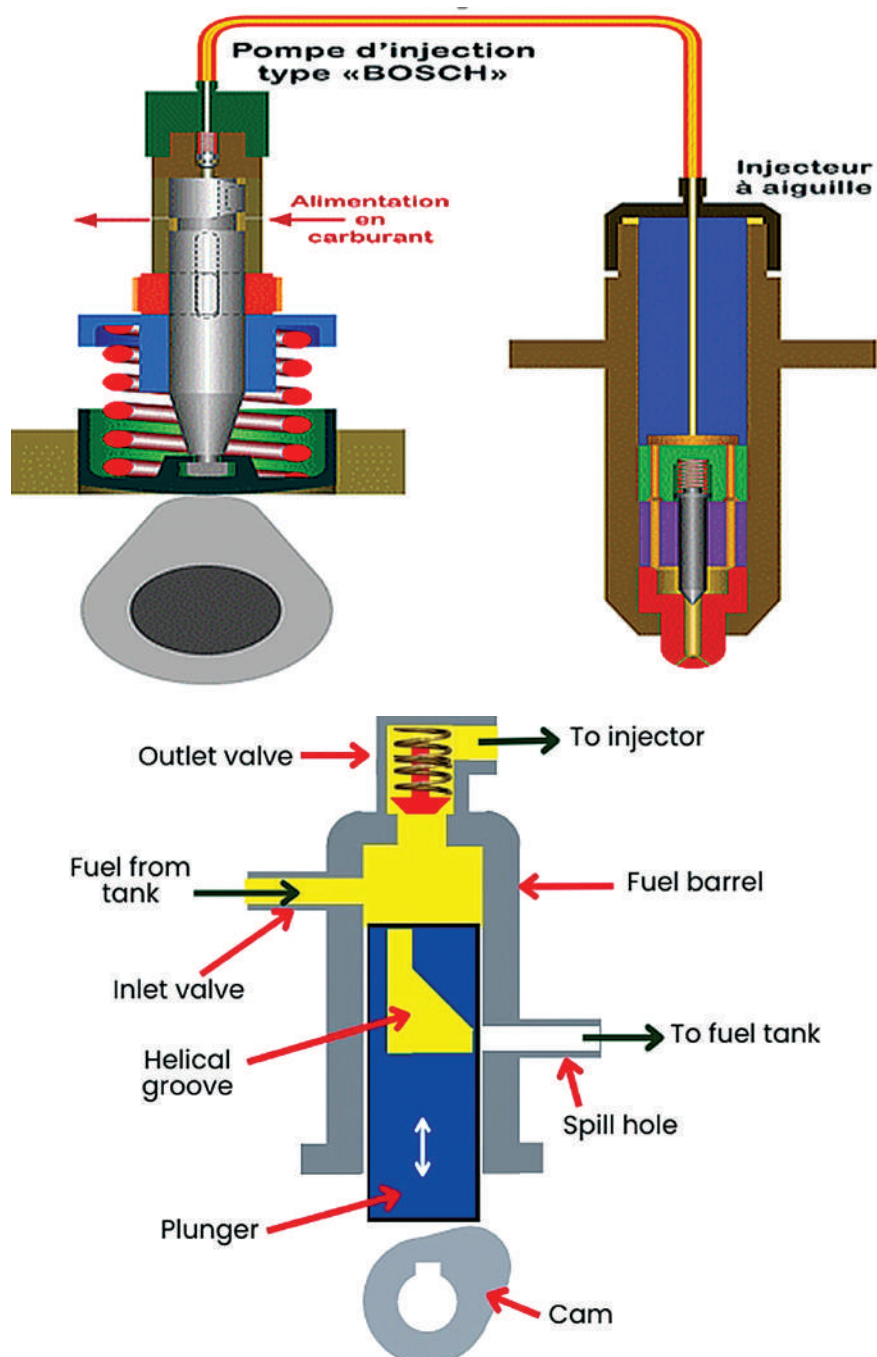


Flywheel housing dimensions and tolerances

Sizecode	nom.	tol.	Run-out (assembled flywheel housing) <i>t</i>	<i>B</i> nom.	<i>D</i> *min.
02	$1245_{+0}^{+0.25}$	$\left. \begin{array}{l} +0.250 \\ +0.250 \end{array} \right]$	not applicable	1400	10
01	1010.00	1165	10		
00	787.40	0.47	883	8	
0	647.70	0.39	711	8	
1/2	584.20	0.35	648	8	
1	511.18	0.31	553	8	
2	447.68	0.27	489	8	
3	409.58	0.25	451	8	
4	361.95	0.25	404	8	
5	314.32	0.25	356	8	
6	266.70	0.25	308	8	

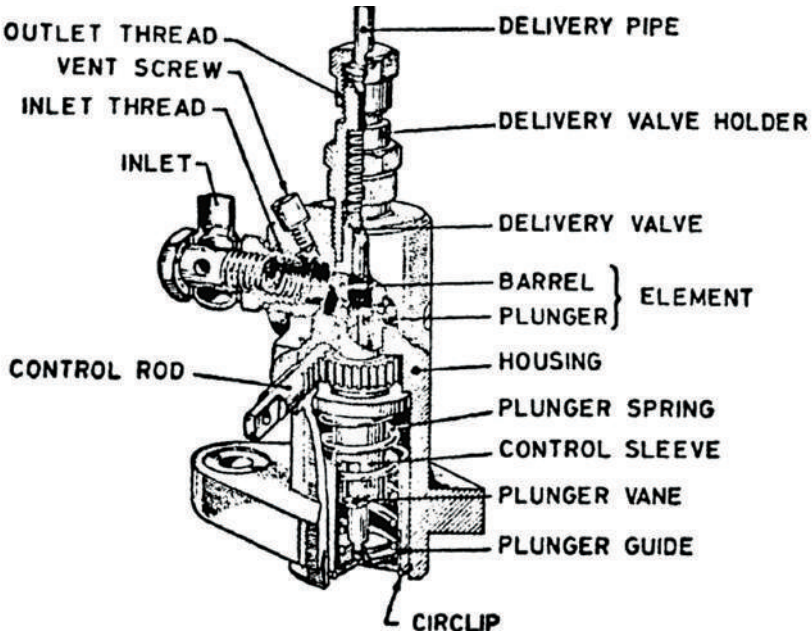
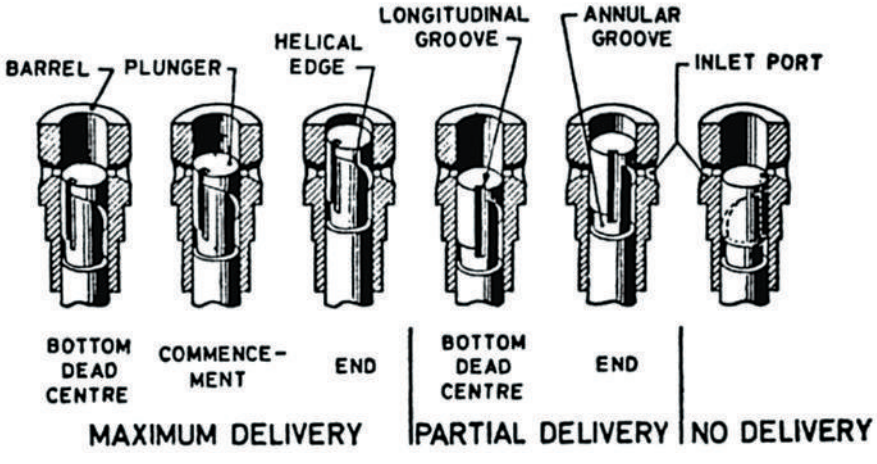
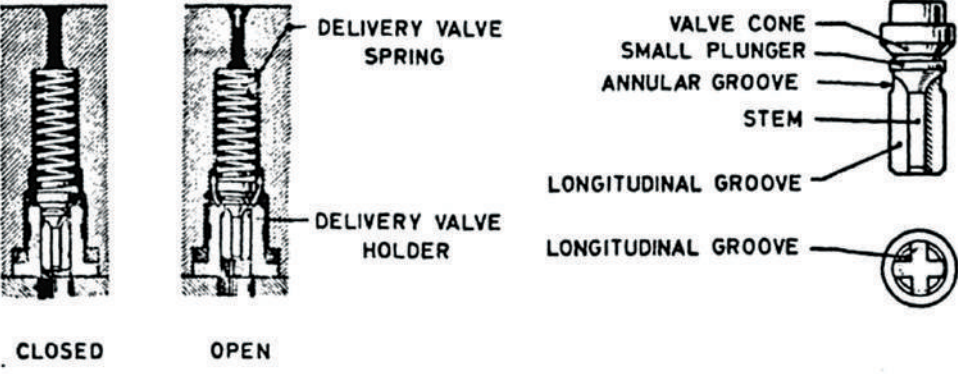
IS 1543 — SPECIFICATION FOR SINGLE CYLINDER FUEL INJECTION PUMPS

A fuel pump is a component used in liquid-fuelled engines (such as petrol/gasoline or diesel engines) to transfer the fuel from the fuel tank to the device where it is mixed with the intake air.



In this standard, those dimensions which are essential for ensuring the interchangeability between fuel pumps of different makes have been specified.

The methods for testing the pumps for proper functioning have also been included. In order to allow scope for development and improvement, requirements of materials for the different components and their design details have been left to the manufacturer.

SCOPE	This standard covers the requirements for three types of single cylinder, constant stroke, fuel injection plunger pumps without integral camshafts.
SECTIONAL VIEW OF FUEL PUMP	
TYPICAL SECTIONAL VIEW OF PUMP ELEMENT	
SPECIFICATION OF DELIVERY VALVE	

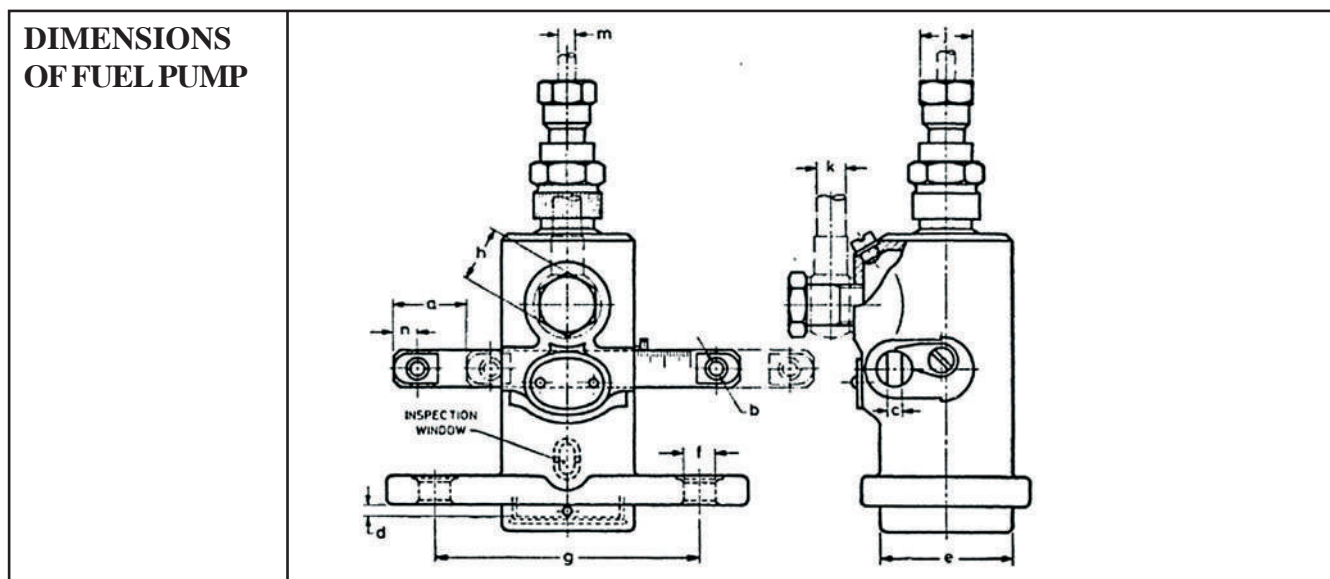


Table 1 Dimensions of Fuel Injection Pumps
(Clause 4.1 and 6.3 and Fig. 4)

ALPHA-BETICAL REFERENCE IN FIG. 4 (1)	PARTICULARS (2)	DIMENSIONS FOR		
		Type A (3) mm	Type B (4) mm	Type C (5) Mm
—	Pitch of plunger helix	15	20	40
—	Plunger diameter	5, 6, 7, 8 & 9	5, 6, 7, 8, 9, 10 & 11	10, 11, 12, 13, 14, 15, 16, 17 & 18
—	Inlet threads	M14 × 1.5	M14 × 1.5	M 18 × 1.5
—	Outlet threads	M12 × 1.5	M14 × 1.5	M 18 × 1.5
<i>a</i>	Control rod travel	21	25	36
<i>b</i>	Diameter of connecting hole in control rod			
<i>c</i>	Thickness of control rod connecting end	5.00+0	5.00+0	6.00+0
<i>d</i>	Distance between flange seating and bottom dead centre of plunger guide after mounting	3.20 ± 0.4	9.70 ± 0.5	5.50 ± 0.5
<i>e</i>	Mounting sleeve diameter			
<i>f</i>	Diameter of mounting holes	8.5	11.0	18.0
<i>g</i>	Distance between centres of mounting holes	60.00 ± 0.1	90.00 ± 0.1	112.00 ± 0.1
<i>h</i>	Width across flats of the hexagon of the inlet pipe connection			
<i>j</i>	Width across flats of the hexagon of the inlet pipe connection			
<i>k</i>	Inlet pipe outside diameter diameter (nominal)	10	10	15
<i>m</i>	Outlet pipe outside diameter (nominal)	6	6	8
<i>n</i>	Distance from the centre line of hole in the control rod to the end of control rod	6	8	8

*It shall be permissible to use a 12.0-mm hole instead, during the period of transition.



BIS CARE APP

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