भारतीय मानक **IS 15712 : 2024**

Indian Standard

सड़क वाहन — संपीड़ित प्राकृतिक गैस (सीएनजी)/जैव-संपीड़ित प्राकृतिक गैस (जैव-सीएनजी) — ईंधन प्रणाली के घटक — स्वचल वाल्व (सोलीनोयड वाल्व)

(पहला पुनरीक्षण)

Road Vehicles — Compressed Natural Gas (CNG)/Bio-compressed Natural Gas (Bio-CNG) — Fuel System Components — Automatic Valve (Solenoid Valve)

(First Revision)

ICS 43.060.40

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November 2024 **Price Group 5**

Automotive Vehicles Running on Non-Conventional Energy Sources Sectional Committee, TED 26

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Vehicles Running on Non-Conventional Energy Sources Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was first published in 2006 to specify tests and requirements of automatic valve (solenoid valve) of CNG on board fuel system components, intended to use on motor vehicles defined in IS 14272. In this revision, bio-CNG is added to the scope of this standard keeping in view the technological advancements that have taken place since its last publication. This standard also incorporates the amendment issued to the standard in 2012. Clause **5** has been suitably renumbered to incorporate requirement of the amendment (leakage test to be done in accordance with **6** of IS 15711).

In the formulation of this standard considerable assistance has been derived from the following standards issued by the Automotive Research Association of India and the International Organization for standardization respectively:

AIS 024 (Rev 1) (Part A) — Safety and procedural requirements for type approval of gaseous fuelled vehicles — Part A (Automotive application)

AIS 024 (Rev 1) (Part B) — Safety and procedural requirements for type approval of gaseous fuel agricultural tractors — Part B (Agricultural tractors application)

AIS 024 (Rev 1) (Part C) — Safety and procedural requirements for type approval of gaseous fuel vehicles — Part C (CEV's application)

AIS 028 (Rev 1) (Part A) — Code of practice for use of gaseous fuels in internal combustion engine vehicles — Part A (Automotive application)

AIS 028 (Rev 1) (Part B) — Code of practice for use of gaseous fuels in internal combustion engine agricultural tractors — Part B (Agricultural tractors application)

AIS 028 (Rev 1) (Part C) — Code of practice for use of gaseous fuels in internal combustion engine construction equipment vehicles (CEV's) — Part C (CEV's application)

ISO 15500-6 : 2020 Road vehicles — Compressed natural gas (CNG) fuel system components — Part 6: Automatic valve

This standard deviates from ISO 15500-6 : 2020 with respect to following:

a) The hydrostatic strength test pressure is changed from 100 MPa to four time the working pressure;

b) Considering Indian climate conditions, the low temperature test of gas/air mixer to - 20 °C instead of - 40 °C as specified in ISO Standard; and

c) Testing at room temperature shall be done at 27 °C ± 5 °C instead of 20 °C as specified in ISO Standard.

This standard is one of the series of Indian Standards published on CNG/bio-CNG onboard fuel system components. Other standards in the series are:

IS No.	*Title*
15710 : 2024	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG) fuel system components — General requirements and definition

(*Continued on third cover*)

Indian Standard

ROAD VEHICLES — COMPRESSED NATURAL GAS (CNG)/BIO-COMPRESSED NATURAL GAS (BIO-CNG), FUEL SYSTEM COMPONENTS — AUTOMATIC VALVE (SOLENOID VALVE)

(First Revision)

1 SCOPE

1.1 This standard specifies tests and requirements of automatic valve (solenoid valve) of CNG/bio-CNG on board fuel system components, intended to use on motor vehicles defined in IS 14272.

1.2 This standard is applicable to CNG/bio-CNG fuel system components intended to use on vehicles using compressed natural gas/bio-compressed natural gas in accordance with IS 15320 (Part 1) (mono-fuel or bi-fuel applications or dual fuel applications). This standard is not applicable to the following:

a) Liquefied natural gas (LNG) fuel system components upstream of, and including, the vaporizer;

b) Fuel containers;

c) Stationary gas engines;

d) Container mounting hardware;

e) Electronic fuel management;

f) Refulling receptacles;

g) CNG/bio-CNG fuel systems components for the propulsion of marine craft; and

h) hydrogen natural gas blend (HCNG) fuel system components;

1.3 This standard is based upon a service pressure for compressed natural gas/bio-compressed natural gas as a fuel at 20 MPa (200 bar) settled at 15 °C. Other service pressures could be accommodated by adjusting the pressure by the appropriate factor (ratio). For example, a 25 MPa (250 bar) service pressure system will require pressures to be multiplied by 1.25. All references to pressure are to be considered gauge pressures unless otherwise specified.

2 REFERENCES

The standards given below 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 edition of these standards:

IS No.	*Title*
IS 14272 : 2011	Automotive vehicles — Types — Terminology (*first revision*)
IS 15320 (Part 1) : 2012/ISO 15403-1 : 2006	Natural gas — Natural gas for use as a compressed fuel for vehicles: Part 1 Designation of the quality (*first revision*)
IS 15710 : 2006/ISO 15500-1 : 2015	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG) fuel system components — General requirements and definitions
IS 15711 : 2006/ ISO 15500-2 : 2016	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG) fuel system components — Performance and general test methods

3 TERMS AND DEFINITIONS

For the purposes of this standard, the terms and definitions given in IS 15710 and the following shall apply:

3.1 Automatic (Solenoid) Valve — Device that electrically or pneumatically stops the flow of high-pressure gas from the cylinder.

4 CONSTRUCTION AND ASSEMBLY

4.1 The automatic valve shall comply with the

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https://www.services.bis.gov.in/php/BIS_2.0/bisconnect/knowyourstandards/Indian_standards/isdetails/

applicable provisions of IS 15710 and IS 15711 and with the tests specified in 5. All automatic valves, including solenoid valves, cylinder valves and valves with manual by-pass, shall comply with the tests specified in 5.

4.2 An automatic valve shall be closed when de-energized.

4.3 An automatic valve with manual by-pass shall meet the minimum requirements of this standard.

5 TESTS

5.1 Applicability

The tests required to be carried out are indicated in Table 1.

5.2 Hydrostatic Strength

Test the automatic valve according to the procedure for testing hydrostatic strength specified in IS 15711. The test pressure shall be four times the working pressure.

5.3 Continued Operation

Test the automatic valve in accordance with the procedure for testing continued operation given in IS 15711, for 50 000 cycles, but lower the downstream pressure of the test fixture to less than 0.5 MPa (5 bar), and perform the leakage test in accordance with **6** of IS 15711.

5.4 Insulation Resistance

This test is designed to check for a potential failure of the insulation between the two-pin coil assembly and the automatic valve casing. Apply 1 000 V d.c. between one of the connector pins and the housing of the automatic valve for at least 2 s. The minimum allowable resistance shall be 240 kΩ.

Table 1 Tests Applicable

(*Clauses* 5.1 *and* 10)

Sl No.	Test	Applicable Tests on Automatic Valves (Solenoid valves)	Tests for Which Procedure is Given in IS 15711	Specific Tests/Test Conditions Required for this Standard
(1)	(2)	(3)	(4)	(5)
i)	Hydrostatic strength	X	X	X (*see* 5.2)
ii)	Leakage	X	X	—
iii)	Excess torque resistance	X	X	—
iv)	Bending moment	X	X	—
v)	Continued operation	X	X	X (*see* 5.3)
vi)	Corrosion resistance	X	X	—
vii)	Oxygen ageing	X	X	—
viii)	Electrical over-voltages	X		—
ix)	Non-metallic synthetic immersion	X	X	—
x)	Vibration resistance	X	X	—
xi)	Brass material compatibility	X	X	—
xii)	Insulation resistance	X	—	X (*see* 5.4)
xiii)	Minimum opening voltage	X	—	X (*see* 5.5)

5.5 Minimum Opening Voltage

The minimum opening voltage for automatic valve (solenoid valve) at room temperature shall be ≤ 6 *v* for a 12 *v* system and ≤ 16 *v* for a 24 *v* system.

6 MARKING

6.1 Each Automatic valve shall be legibly and indelibly marked with the following:

a) Manufacturer's name, trade-mark or symbol;

b) Part No. or unique identification mark;

c) Working pressure and temperature range or service pressure; and

d) Date of manufacture or batch number.

NOTE — Not applicable if it is the integral part of pressure regulator and on which appropriate marking exists.

6.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the product may be marked with the Standard Mark.

7 TECHNICAL INFORMATION TO BE SUBMITTED BY THE COMPONENT MANUFACTURER

Technical information to be submitted by the component manufacturer for component type test (type approval) shall contain at least following information:

a) Name of the manufacturer;

b) Manufacturing plant address;

c) Part number;

d) Type No./model No.;

e) Working pressure;

f) Rated voltage of the solenoid coil;

g) Operating temperatures; and

h) Drawings with relevant dimensions and materials.

8 NUMBER OF SAMPLES FOR TESTING

Minimum 7 numbers of the automatic valve (solenoid valve) assemblies shall be submitted to the test agency for complete type testing along with minimum 10 numbers each of the non-metallic parts used in the automatic valve (solenoid valve) assembly. Each non-metallic part shall be submitted separately in the packets mentioning details like part name, part no. and quantity.

9 TYPE TEST (TYPE APPROVAL)

For type approval automatic valve (solenoid valve) shall meet the requirements as specified in this standard.

10 ACCEPTANCE TEST (CONFORMITY OF PRODUCTION)

For the purpose of acceptance test, automatic valve (solenoid valve) manufactured shall conform to following test requirements as specified in relevant clauses of this standard (*see* Table 1).

a) Hydrostatic strength test;

b) Leakage test;

c) Corrosion resistance test;

d) Non-metallic synthetic immersion test;

e) Oxygen ageing;

f) Brass material compatibility; and

g) Over voltage test.

NOTE — Frequency of tests will depend upon the duration of tests.

11 SPECIFICATIONS OF A TYPE APPROVED COMPONENT AND EXTENSION OF APPROVAL

Any modification in technical specification of already type approved component shall require re-type test/extension of approval at the discretion of certification authority, based on the justification provided by the component manufacturer and reviewed by the certification authority, which has granted type approval.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Automotive Vehicles Running on Non-Conventional Energy Sources Sectional Committee, TED 26

Organization	*Representative(s)*
Automotive Research Association of India (ARAI), Pune	DR S. S. THIPSE **(*Chairperson*)** SHRI A. D. DEKATE
A B Process Technologies, Pune	SHRI KUNAL CHOPDE
Ashok Leyland Ltd, Chennai	SHRIMATI SUCHISMITA C. SHRI MUTHUKUMAR N. (*Alternate*)
Automotive Component Manufactures Association of India, New Delhi	SHRI SANJAY TANK SHRIMATI SEEMA BABAL (*Alternate*)
Bajaj Auto Ltd, Pune	SHRI MILIND J. PAGARE SHRI ARVIND V. KUMBHAR (*Alternate*)
Bosch Limited, Bengaluru	SHRI BHARADWAJ M. KRISHNAMURTHY SHRI VIKRAM K. (*Alternate*)
Central Institute of Road Transport, Pune	SHRI SAMIR SATTIGERI SHRI V. V. JOSHI (*Alternate*)
Central Pollution Control Board, New Delhi	SHRI A. SUDHAKAR SHRI SUNEEL DAVE (*Alternate* I) SHRI KEDARNATH DASH (*Alternate* II)
CLH Gaseous Fuel Applications Ltd, Gurgaon	SHRI SHISHIR AGRAWAL SHRI GAGAN AGRAWAL (*Alternate*)
Delhi Transport Corporation, New Delhi	SHRI VIKAS BATRA
GAIL (India) Limited, New Delhi	SHRI ASHISH KUMAR MITTAL SHRI LOKESH MEHTA (*Alternate*)
Indian Auto LPG Coalition, Faridabad	SHRI SHISHIR AGRAWAL SHRI SUYASH GUPTA (*Alternate*)
Indian Institute of Petroleum, Dehradun	SHRI WITTISON KAMEI SHRI ROBINDRO LAIRENLAKPAM (*Alternate*)
Indian Institute of Science, Bengaluru	PROF R.V. RAVIKRISHNA
Indian Institute of Technology Ropar, Rupnagar	SHRI DHIRAJ KUMAR MAHAJAN DR DEBAPRASAD MANDAL (*Alternate*)
Indian Oil Corporation Ltd., (R & D Centre), Faridabad	DR M. SITHANANTHAN
Indian Rubber Manufacturers Research Association, Thane, Mumbai	DR K. RAJ KUMAR DR BHARAT KAPGATE (*Alternate*)

Organization	*Representative(s)*
International Centre for Automotive Technology (ICAT), Manesar	SHRI VAIBHAV PRASHANT YADAV SHRI VIJAYANTA AHUJA (*Alternate*)
Mahindra & Mahindra Ltd (Truck and Bus Division), Pune	SHRI V. G. KULKARNI
Mahindra & Mahindra Ltd, Mumbai	SHRI RAJAMANI PARTHIBAN SHRI SHAILESH KULKARNI (*Alternate*)
Maruti Suzuki India Limited, Gurugram	SHRI GURURAJ RAVI SHRI ARUN KUMAR (*Alternate*)
Minda Emer TechnologiesLimited, Gurugram	SHRI VIVEK JAIN SHRI BIBHUTI KUMAR (*Alternate*)
Ministry of New and Renewable Energy, New Delhi	SHRI DIPESH PHERWANI
Petroleum and Explosive Safety Organization, Nagpur	SHRI D. K. GUPTA SHRI VIVEK KUMAR (*Alternate*)
Petronet LNG Ltd, New Delhi	SHRI PANKAJ WADHWA (*Alternate*)
Prodair Air Products India Private Ltd, Pune	SHRI RAVI SUBRAMANIAN SHRI ARUN KURUVANGATTIL (*Alternate*)
Renault India Private Limited, Mumbai	SHRI RAJENDRA KHILE SHRI VIJAY DINAKARAN (*Alternate*)
Rohan BRC Gas Equipment Pvt Ltd, Ahmedabad	SHRI STEFANO DE CAROLIS SHRI PARTHIV SHUKLA (*Alternate*)
Society of Indian Automobile Manufacturers, New Delhi	SHRI P. K. BANERJEE DR SANDEEP GARG (*Alternate*)
Swagelok – Bombay Fluid System components Pvt Ltd, Mumbai	SHRI SACHIN KOULGI SHRI HARISH TAKKE (*Alternate*)
Tata Motors Ltd, Pune	SHRI P. S. GOWRISHANKAR SHRI SHAILENDRA DEWANGAN (*Alternate*)
TVS Motor Company Ltd, Hosur	SHRI V. PATTABIRAMAN SHRI K. M. SRIKANTH (*Alternate*)
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Member Secretary
SHRI GAURAV JAYASWAL
SCIENTIST 'C'/DEPUTY DIRECTOR
(TRANSPORT ENGINEERING), BIS

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IS No.	*Title*
15711 : 2024	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG) fuel system components — Performance and general test methods
15713 : 2024	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG) fuel system components — Pressure regulator
15714 : 2024	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG) fuel system components — Gas air mixer
15715 : 2024	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG)/ Liquefied petroleum gas (LPG) Fuel system components — CNG/bio-CNG/LPG Conduit (ventilation hose/pipe)
15716 : 2024	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG) fuel system components — CNG/bio-CNG high pressure fuel line (rigid) with end connections (having pressure exceeding 2.15 MPa)
15717 : 2024	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG)/ Liquefied petroleum gas (LPG) Fuel system components — Petrol valve (automatic/manual)
15718 : 2024	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG) fuel system components — CNG/bio-CNG high pressure fuel line (flexible hose) with end connections (having pressure exceeding 2.15 MPa)
15719 : 2024	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG)/ Liquefied petroleum Gas (LPG) fuel system components — Electrical wiring kit
15720 : 2024	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG) /Liquefied petroleum gas (LPG) fuel system component — Compartments sub-compartments
15721 : 2024	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG)/ Liquefied petroleum gas (LPG) fuel system components — Fire retardant material for seat, upholstery, roof and side lining
15722 : 2024	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG) fuel system components — CNG/bio-CNG flexible fuel line with or without end connections (having pressure not exceeding 2.15 MPa)
15723 : 2024	Road vehicles — Compressed natural gas (CNG)/bio-compressed natural gas (bio-CNG) /Liquefied petroleum gas (LPG) fuel system components — Current limiting devices

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

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 test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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