**TED 26 (15014) F**

***भारतीय मानक***

***Indian Standard***

**IS 15716: 2024**

**संपीड़ित प्राकृतिक गैस (सीएनजी) / जीविक संपीडित प्राकृतिक गैस (बायो सीएनजी) — ईंधन प्रणाली के घटक — सिरा कनेक्शनों सहित उच्च दाब ईंधन लाईन (द्रढ) [ 2.15 मैगापास्कल (21.5 बार) से अधिक दाब की]**

(पहला पुनरीक्षण)

**ROAD VEHICLES — COMPRESSED NATURAL GAS (CNG) / BIO- COMPRESSED NATURAL GAS (BIO- CNG) FUEL SYSTEM COMPONENTS - HIGH PRESSURE FUEL LINE (RIGID) WITH END CONNECTIONS [HAVING PRESSURE EXCEEDING 2.15 MPA (21.5 BAR)]**

(*First Revision*)

ICS 43.060.40

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भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARDS

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 **JUNE 2024 Price Group**

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 the definitions, test methods and requirements of CNG high pressure fuel line (Rigid) with end connections having pressure exceeding 2.15 MPa (21.5 bar), of CNG on board fuel system component intended for use on motor vehicles as 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.

In the formulation of this standard considerable assistance has been derived from the following AIS Standards issued by the Automotive Research Association of India:

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).

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 & definition.

15711: 2024 Road vehicles - Compressed natural gas (CNG) /Bio-Compressed
 natural gas (Bio-CNG) fuel system components – Performance and
 general test methods

15712: 2024 Road vehicles - Compressed natural gas (CNG) /Bio-Compressed
 natural gas (Bio-CNG) fuel system components – Automatic valve

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)

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 at 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 a 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.

*Indian Standard*

**ROAD VEHICLES — COMPRESSED NATURAL GAS (CNG) / BIO- COMPRESSED NATURAL GAS (BIO- CNG) FUEL SYSTEM COMPONENTS - HIGH PRESSURE FUEL LINE (RIGID) WITH END CONNECTIONS [HAVING PRESSURE EXCEEDING 2.15 MPA (21.5 BAR)]**

**1 SCOPE**

**1.1** This standard specifies definitions, test methods and requirements of CNG / Bio - CNG high pressure fuel line (Rigid) with end connections having pressure exceeding 2.15 MPa (21.5 bar), of CNG / Bio- CNG on board fuel system components, intended for 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 or dual fuel applications).

**1.3** This standard is not applicable to the following:

1. Liquefied natural gas (LNG) fuel system components located upstream of, and including, the vaporizer;
2. Fuel containers;
3. Stationary gas engines;
4. CNG / Bio - CNG fuel systems components for the propulsion of marine craft; and
5. Hydrogen Natural Gas Blend (HCNG) Fuel system components.

**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* |
| 9000 (Part 11): 1983 | Basic Environmental Testing Procedures for Electronic and Electrical Items: Part 11 Salt Mist Test  |
| 14272: 2011 | Automotive Vehicles - Types - Terminology  |
| [15320 (Part 1): 2012](https://www.services.bis.gov.in:8071/php/BIS_2.0/bisconnect/query_portal/Query_portal_control/show_document?ID=MjE1NjM%3D) | Natural gas - Natural gas for use as a compressed fuel for vehicles: Part 1 designation of the quality *(First Revision)* |
| IS 15710: 2024 | Road Vehicles - Compressed Natural Gas (CNG) / Bio- Compressed Natural Gas (Bio-CNG) ̶ Fuel System Components - General Requirements and Definitions |

**3 DEFINITIONS**

For the purpose of this standard, definitions given in IS 15710 shall apply.

**4 TYPE TESTS (FOR TYPE APPROVAL)**

**4.1 Material**

Rigid piping and its end connections for use with pressures exceeding 2.15 MPa (21.5 bar) shall be made up of Cold Drawn Steel/SS for use with CNG/Bio-CNG.

**4.2 Burst Pressure**

Rigid piping and its end connections shall have a minimum burst test pressure of 70 MPa (700 bar).

**4.3 Salt Mist Test**

CNG/ Bio-CNG high pressure fuel line with end connections shall be effectively protected against corrosion. When tested for 24 h in accordance with the procedure given in IS 9000 (Part 11) (except damp heat test), the piping with fittings shall not show any sign of corrosion.

**5 ACCEPTANCE TEST (CONFORMITY OF PRODUCTION)**

For the purpose of acceptance test, rigid piping manufactured shall conform to requirements as

specified in *clause* **4.1** to **4.3.**

**6 TECHNICAL INFORMATION TO BE SUBMITTED BY THE COMPONENT MANUFACTURER**

Technical information to be submitted by the component manufacturer for component type

Approval/type test shall contain at least following information:

1. Name of the manufacturer;
2. Manufacturing plant address;
3. Part number or unique identification mark;
4. Pipe inner diameter (ID);
5. Pipe outer diameter (OD); and
6. Drawings with relevant dimensions and materials.

**7 NUMBER OF SAMPLES FOR TESTING**

Minimum 3 numbers of 1 m length CNG / Bio-CNG high pressure fuel line (Rigid) with end connections shall be submitted to the test agency for testing.

**8 CHANGES IN TECHNICAL SPECIFICATIONS OF A TYPE APPROVED / CERTIFIED COMPONENT AND EXTENSION OF APPROVAL/CERTIFICATION**

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

**9 MARKING**

**9.1** Each CNG/Bio-CNG high pressure fuel line (Rigid) with end connections shall be legibly and indelibly marked with the following for every 1-meter length:

a) Manufacturers name, trade-mark or symbol;

b) Part number or unique identification mark;

c) Working Pressure; and

d) Date of manufacture or batch number.

**9.2 BIS Certification Marking**

This product may also be marked with the standard mark.

**9.2.1** The use of the standard mark is governed by the provisions of the *Bureau of Indian Standards Act*, 2016 and the rules and regulations made there under. the details of conditions under which the license for the use of the standard mark may be granted to manufacturers or producers may be obtained from the bureau of Indian standards.

**ANNEX A**(*Foreword*)

**COMMITTEE COMPOSITION**

|  |  |
| --- | --- |
| ***Organization*** | ***Representative(s)*** |
| Automotive Research Association of India (ARAI) | Dr S. S. Thipse (***Chairperson***) Shri A D Dekate  |
| Ashok Leyland Ltd. | Ms. Suchismita C. Shri Muthukumar N (*Alternate*) |
| Automotive Component Manufactures Association of India (ACMA) | Shri Sanjay Tank Ms. Seema Babal (*Alternate*) |
| A B Process Technologies | Shri Kunal Chopde |
| Bajaj Auto Ltd., Pune | Shri Milind J. Pagare Shri Arvind V. Kumbhar (*Alternate*)Shri Abhay Kumar (*Young Professional*) |
| 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 | Shri A Sudhakar Shri Suneel Dave (*Alternate*)Shri Kedarnath Dash (*Alternate-II*) |
| CLH Gaseous Fuel Applications Ltd, Gurgaon | Shri Shishir Agrawal Shri Gagan Agrawal (*Alternate*) |
| Delhi Transport Corporation | 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, Punjab | Shri Dhiraj Kumar Mahajan Dr. Debaprasad Mandal (*Alternate*) |
| Indian Oil Corporation Ltd., (R & D Centre), Faridabad | Dr. M Sithananthan (*Alternate*) |
| Indian Rubber Mfrs. Research Association, Thane, Mumbai | Dr. K Raj Kumar Dr. Bharat Kapgate (*Alternate*) |
| International Centre for Automotive Technology (ICAT) | Shri Vaibhav Prashant Yadav  Shri Vijayanta Ahuja (*Alternate*) |
| Mahindra & Mahindra Ltd., Mumbai | Shri Rajamani Parthiban Shri Shailesh Kulkarni (*Alternate*) |
| Mahindra & Mahindra Ltd. (Truck and Bus Division) | Shri V G Kulkarni (*Alternate*) |
| Maruti Suzuki India Limited, Gurgaon | Shri Gururaj RaviShri Arun Kumar (*Alternate*)Shri Rajesh Kumar (*Young Professional*) |
| Minda Emer TechnologiesLimited, Gurgaon | Shri Vivek Jain Shri Bibhuti Kumar (*Alternate*) |
| Ministry of New and Renewable Energy, NewDelhi | 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*)Shri Jebin Jowhar (*Young Professional*) |
| 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. | Shri Sachin Koulgi Shri Harish Takke (*Alternate*) |
| Tata Motors Ltd. | Shri P. S. Gowrishankar Shri Shailendra Dewangan (*Alternate*) |
| TVS Motor Company Ltd, Hosur | Shri V Pattabiraman Shri K M Srikanth (*Alternate*) |
| Vanaz Engineers Ltd. Pune | Shri S J Vispute Shri J S Dhumal (*Alternate*) |
| Volkswagen India Pvt. Ltd. | Shri Joreg Bouzek Shri Pankaj Gupta (*Alternate*) |
| BIS Directorate General | Shri Deepak Agarwal, Scientist ‘F’/ senior director and head (transport engineering) [representing director general (ex-officio)] |

Member Secretary

Shri Gaurav Jayaswal

Scientist ‘C’ / Deputy Director

(transport engineering), BIS