Compendium of Indian Standards on CNG – Vehicles

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Introduction

Compressed Natural Gas (CNG) and Bio-CNG have emerged as cleaner, cost-effective alternatives to conventional fuels in the automotive sector. With the rapid adoption of these fuels in India, ensuring the safety, reliability, and interoperability of fuel system components has become critical. To address these needs, the Bureau of Indian Standards (BIS) has formulated a comprehensive set of standards covering materials, components, test methods, and installation practices. This compendium provides a structured overview of these standards—categorized under Product Standards, Test Methods and Vocabulary, and Code of Practice—serving as a ready reference for manufacturers, regulators, and industry professionals involved in the design, certification, and deployment of CNG fuel systems in vehicles.

For detail of standards, stakeholders are encouraged to visit www.bis.gov.in.

I. Product Standards

1. IS 15490: Stainless Steel Cylinder

Scope

Specifies the requirements for seamless steel cylinders intended for onboard storage of CNG in automotive vehicles, covering construction, performance, and testing.

Key Provisions

- High-strength seamless steel construction
- Hydrostatic and burst pressure testing
- Threading, marking, and neck design requirements
- Material compatibility and corrosion resistance
- Periodic inspection and requalification guidelines

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2. IS 15935: Composite Cylinder

Scope

Specifies requirements for composite cylinders used for onboard storage of CNG in vehicles. Applies to various fiber-wrapped and liner-based constructions.

Key Provisions

- Non-metallic liners and fiber-reinforced design
- Ageing, thermal, and cyclic tests
- Impact and bonfire testing
- Cylinder neck design and label durability

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3. IS 16988: Cylinder Mounted Valve

Scope

Covers solenoid-integrated valves for CNG cylinder systems that are remotely controlled.

Key Provisions

- Fail-safe operation and tight shutoff
- Leakage and overpressure protection
- Functional test of solenoid operation

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4. IS 15712: Automatic Valve (Solenoid Valve)

Scope

Specifies the requirements and testing procedures for automatic valves (solenoid type) used in CNG/Bio-CNG fuel systems.

Key Provisions

- Not for Fuel Container Mounted Valves, Only for Fuel System Compoents.
- Hydrostatic strength test at 4x working pressure
- 50,000 cycle endurance
- Insulation resistance and leakage testing
- Vibration and corrosion resistance
- Valve must close when de-energized

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5. IS 15713: Pressure Regulator

Scope

Covers requirements for pressure regulators used in onboard CNG/Bio-CNG systems under variable conditions.

Key Provisions

- Leakage tests at multiple temperature levels
- Pressure impulse and freeze resistance
- 50,000 operational cycles

- Lock-up pressure stability
- Electric solenoid tests and corrosion resistance

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6. IS 15714: Gas/Air Mixer

Scope

Specifies requirements and test methods for gas/air mixers in CNG and Bio-CNG systems.

Key Provisions

- 100,000 cycle endurance for moving parts
- Hydrostatic test (min. 4x working pressure or 600 kPA, whichever is greater.)
- Leakage tests at –20 °C, 27 °C, 120 °C
- Marking and documentation requirements
- Different designs covered (venturi, variable orifice)

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7. IS 15715: Ventilation Hose/Pipe

Scope

Requirements for ventilation hoses/pipes used to safely vent CNG/Bio-CNG gases from enclosed compartments.

Key Provisions

- 30 kPa pressure test
- Pull resistance and leak tightness
- UV degradation and flammability test
- Spectroscopy method for UV testing
- Identification markings (batch, size, etc.)

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8. IS 15716: High Pressure Fuel Line (Rigid)

Scope

Covers rigid steel or stainless-steel high-pressure fuel lines with end connections for CNG/Bio-CNG systems.

Key Provisions

- Minimum 70 MPa burst pressure
- Cold drawn tubing materials
- Salt mist corrosion test
- Identification marking (part number, pressure rating)

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9. IS 15717: Petrol Valve (Auto/Manual)

Scope

Specifies requirements for petrol valves used in dual-fuel CNG/Bio-CNG fuel systems.

Key Provisions

- Leakage test at 1.5x working pressure
- 6,000 ON/OFF cycles under pressure
- Voltage compatibility for solenoid valves
- Clear manufacturer and model marking

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10. IS 15718: High Pressure Fuel Line (Flexible Hose)

Scope

Requirements for high-pressure flexible hoses with end fittings used in CNG/Bio-CNG vehicles.

Key Provisions

- Burst, proof pressure, and leakage tests
- Resistance to ozone, oil, and bending
- Change-in-length and cold bend testing
- Two hose types (Type A, Type AT)
- Permanent marking with rating and batch

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11. IS 15719: Electrical Wiring Kit

Scope

Specifies safety, design, and test requirements for electrical wiring used with CNG/Bio-CNG components.

Key Provisions

- Spark resistance test
- Saltwater immersion and flammability testing
- Markings: manufacturer, part number, batch
- Taping/clipping requirements for secure routing
- Re-approval needed for modified kits

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12. IS 15720: Compartment/Sub-compartment

Scope

Requirements for structural compartments/sub-compartments housing CNG components onboard.

Key Provisions

- Operable under 60 kgf without leakage
- Cold bend test at –35 °C
- Flammability and UV degradation resistance
- Hydrostatic leakproof test at 30 kPa
- Clear identification markings

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13. IS 15721: Fire Retardant Material

Scope

Covers interior materials like seats, upholstery, roof, and linings for CNG/Bio-CNG-equipped vehicles.

Key Provisions

- Self-extinguishing and low burn rate
- Compliance with horizontal flame tests
- Manufacturer name, trademark, part number markings

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14. IS 15722: Flexible Fuel Line with End Connections

Scope

Specifies flexible, low-pressure CNG fuel lines for vehicles, typically under 2.15 MPa.

Key Provisions

- Tested for burst, tensile, kink, vacuum collapse
- Resistant to fuel, oil, ozone, and heat
- Markings every 300 mm with pressure rating
- Classification by temp and pressure levels

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15. IS 15723: Current Limiting Devices

Scope

Requirements for fuses used in the electrical systems of CNG/Bio-CNG vehicles.

Key Provisions

- Must withstand 110% of rated current for 60 min
- Must blow within 60 sec at 135% current
- Manufacturer name, rating, and IS code required
- Safe operation and consistent fuse timing

II. Test Methods and Vocabulary

1. IS 15710: General Requirements and Definitions

Scope

Defines basic construction and terminology for CNG/Bio-CNG fuel system components.

Key Provisions

- Material compatibility and temperature range (–20 °C to 120 °C)
- Electrical safety with automotive wiring
- Corrosion and sealing performance
- Marking and maintenance documentation
- Multifunctional components must be tested per use

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2. IS 15711: Performance and General Test Methods

Scope

Outlines general test methods and performance validation for CNG/Bio-CNG fuel components.

Key Provisions

- Hydrostatic, leakage, and bending tests
- Corrosion, vibration, immersion, ageing validation
- Overvoltage test for electrical parts
- Ammonia test for brass parts
- Gas compatibility and pressure scaling

III. Code of Practice

1. IS 15870: CNG System Code of Practice

Scope

Covers installation and safety practices for CNG fuel systems in internal combustion vehicles.

Key Provisions

- Guidelines for cylinder mounting, piping, valves
- Electrical insulation and mechanical protection
- Labelling, retrofitting, and technician training
- Periodic inspection and user safety procedures

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2. IS 16299: Cylinder Periodic Inspection Code

Scope

Requirements for requalification of onboard and cascade steel CNG cylinders.

Key Provisions

- Visual inspection and hydrostatic testing
- Applies to CNG and HCNG cylinders
- Marking and tracking post-testing
- Re-inspection intervals and rejection criteria