Draft **Indian Standard**

ROAD VEHICLES COMPRESSED NATURAL GAS (CNG) / BIO CNG FUEL SYSTEM COMPONENTS - GAS-TIGHT HOUSING AND VENTILATION HOSE/PIPE

1. SCOPE

1.1 This standard specifies definitions, test methods and requirements of gas-tight housing and ventilation hose/pipe, of CNG /Bio CNG onboard fuel system components intended for use on motor vehicles defined in IS 14272:2011.

1.1.1 This standard is applicable to CNG /Bio CNG fuel system components intended to be used on vehicles using compressed natural gas (mono-fuel, bi-fuel or dual-fuel applications).

1.1.2 It is not applicable to the following:

a) Liquefied Natural Gas (LNG) fuel system components located upstream of, and including, the vaporizer;
b) Fuel containers;
c) Stationary gas engine s; and
d) container mounting hardware;
e) electronic fuel management;
f) Refueling receptacles.

NOTE 1: It is recognized that miscellaneous components not specifically covered herein can be examined to meet the criteria of this standard and tested according to the appropriate functional tests.

NOTE 2: All references to pressure in this standard are to be considered gauge pressures unless otherwise specified.

NOTE 3: This standard is based upon a service pressure for natural gas as a fuel of 20 MPa (200 bar) settled at 15 °C. Other service pressures can 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

2. REFERENCE:

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
14272:2011	Automotive vehicles - Types Terminology

I5710 : XXX	Automotive Vehicles – Compressed Natural Gas (CNG) fuel system components – General requirements and definitions
15711: XXX	Automotive Vehicles – Compressed Natural Gas (CNG) fuel system components – Performance and General test methods:

3. DEFINITIONS

For the purpose of this standard, following definition in addition to those given in IS 15710 shall apply.

4. TYPE TESTS (TYPE APPROVAL)

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

Table 1

Test	**Applicable**	**Test procedure as required by ISO 15711**	**Specific test requirements of this standard**
Leakage	X	X	X (see 4.2)
Excess torque resistance	Xa	X	
Bending moment			
Continued operation			
Corrosion resistance	Xb	X	
Oxygen ageing	X	X	
Ozone ageing	X	X	
Heat Ageing	X	X	
Automotive Fluids	X	X	
Electrical over-voltages			
Non-metallic synthetic immersion	X	X	
Vibration resistance	Xa	X	

Brass material compatibility			
Pull-off	X		X (see 4.3)
[a] Applicable only to rigid components. [b] Applicable to metallic parts or components.			

4.2 Leakage

Test the gas-tight housing according to the procedure for leakage specified in IS 15711, at the temperatures and pressures given in Table 2.

Table 2 — Test temperatures and pressures

Temperature °C	**Pressure** MPa [bar]
-40 or -20 (as applicable)	0,05 [0,5]
20	0,05 [0,5]
85	0,05 [0,5]

4.2.1 External leakage

This external leakage test is intended for ventilation hoses and gas-tight housings. Ventilation hoses and gas-tight housings shall be leak-tight when tested at the pressures and temperatures given in Table 2.

Atmospheric passages and other connections shall be connected or plugged as recommended by the manufacturer for normal service.

4.2.2 External Leakage, of pressure retaining ventilation passages

This external leakage test is intended for ventilation passages of pressure retaining components.

Ventilation passages of pressure retaining components shall meet the requirements of the following tests.

4.2.2.1 Plug the ventilation passage outlets and pressurize the ventilation passages to the maximum pressure the vent passage is expected to be exposed to in service as specified by the manufacturer. The component shall be leak-tight other than through the intended vent passage.

4.2.2.2 Allow the vent passage to vent normally. Remove or damage the worst case high pressure sealing component and pressurize the relevant high pressure portions of the component to a high enough pressure to create 0.5 g/s nitrogen leak, but not more than service pressure. The component shall be leak-tight other than through the intended vent passage.

4.2.3 Venting ability and pressure retention

The venting ability and pressure retention test is intended for gas-tight housings and ventilation hoses.

Install the component as recommended by the manufacturer for normal service, including typical components between the high pressure component and the final atmosphere port.

Apply a 0.5 g/s nitrogen or dry air source to the interior or inlet of the component to simulate a pressure retaining component leak.

The gas-tight housing or ventilation hose shall not retain more than 50 kPa pressure during leakage of the high pressure component.

4.3 Pull-off

Test the ventilation hose, attached by a suitable connection device to the gas-tight housing and to any other connecting point used, according to the following procedure and acceptance criterion. Place the test specimen in an appropriate test fixture, then statically apply a tensile load along the ventilation hose axis at a maximum rate of 100 N/min until the ventilation hose separates from its connecting points.

The force required to pull the ventilation hose apart from its connecting points shall be not less than 100 N.

5. MARKING

5.1 Each conduit (ventilation hose) shall be permanently marked with:

a) Manufacturer's name, trade-mark or symbol;
b) Part No. or unique identification mark;
c) IS No. of this standard;
d) Size; and
e) Batch number.

5.2 BIS Certification Marking

Each conduit (ventilation hose) may also be marked with the Standard Mark.

5.2.1 The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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:

a) Name of the manufacturer;
b) Manufacturing plant address;
c) Part number;
d) Inner diameter (ID);
e) Outer diameter (OD); and
f) Drawings: Detailed dimensional assembly drawing in A3 size in duplicate shall contain information like drawing No., Rev. No., part numbers, bill of material (comprising grade for metallic part s, generic name and compound number for non-metallic parts used in the conduit), and details of the marking on the component with proper authentication.

7. NUMBER OF SAMPLES FOR TESTING

Minimum 6 number of 500 mm length conduits (ventilation hose) along with end plugs and hose clips shall be submitted to the test agency for testing. One end plug shall have provision to connect pneumatic pipe of 8 mm inner diameter.

8. CHANGES IN TECHNICAL 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 test agency, based on the justification provided by the component manufacturer and reviewed by the test agency, which has granted type approval.