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Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड़ नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 15720 (2008): Road vehicles - Compressed natural gas (CNG) fuel system components - Compartments/sub-compartments [TED 26: Automotive vehicles on NCES]

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartrhari—Nitisatakam
"Knowledge is such a treasure which cannot be stolen"
Indian Standard

ROAD VEHICLES — COMPRESSED NATURAL GAS (CNG) FUEL SYSTEM COMPONENTS — COMPARTMENTS/SUB-COMPARTMENTS

ICS 43.060.40

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BUreau of Indian Standards
Manak Bhavan, 9 Bahadur Shah Zafar Marg
New Delhi 110002

June 2008

Price Group 2
FOREWORD

This Indian Standard 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.

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 (Amendment 4 to Version 3) Safety and procedural requirements for type approval of CNG operated vehicles

AIS 028 (Version 3) Code of practice for use of CNG fuel in internal combustion engine vehicles

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

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

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 : 1960 ‘Rules for rounding off numerical values (revised)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.
AMENDMENT NO. 1 JUNE 2012
TO
IS 15720 : 2008 ROAD VEHICLES — COMPRESSED NATURAL GAS (CNG) FUEL SYSTEM COMPONENTS — COMPARTMENTS / SUB-COMPARTMENTS

(First cover page and page 1) — Substitute the following for the existing title:

‘भारतीय मानक
सड़क वाहन — संपीडित प्राकृतिक गैस (सीएनजी) तथा द्रवित पेट्रोलियम गैस (एलपीजी) ईंधन प्रणाली के घटक — कोष्ठ/उप-कोष्ठ

Indian Standard
ROAD VEHICLES — COMPRESSED NATURAL GAS (CNG) AND LIQUEFIED PETROLEUM GAS (LPG) FUEL SYSTEM COMPONENTS – COMPARTMENTS/SUB-COMPARTMENTS’

(Second cover page, Foreword) — Add the following at the end of second para:

‘AIS 025: Safety and procedural requirements for type approval of LPG operated vehicles

AIS 026: Code of practice for the use of LPG fuel in internal combustion engine to power 4 wheeled vehicles and heavy motor vehicles

AIS 027: Code of practice for the use of LPG fuel in internal combustion engine to power 2 and 3 wheeled vehicles’

(Page 1, clause 1.1) — Substitute ‘CNG/LPG’ for ‘CNG’

(Page 1, clause 1.1.1) — Substitute ‘CNG/LPG’ for ‘CNG’ and ‘compressed natural gas/liquefied petroleum gas’ for ‘compressed natural gas’.

1
Amend No. 1 IS 15720:2008

[Page 1, clause 1.1.2(d)] — Substitute ‘CNG/LPG’ for ‘CNG’.

(Page 1, clause 1.1.3) — Substitute the following for the existing:

‘This standard is based upon a service pressure for compressed natural gas as a fuel at 20 MPa (200 bar) and liquefied petroleum gas as a fuel at 1 MPa (10 bar) settled at 15°C.’

(Page 1 clause 4.2) — Substitute ‘pliable material (non-metallic material)’ for ‘pliable material’.

(Page 2, clause 5.1) — Substitute the following for the existing:

‘5.1 Each compartment/sub-compartment shall be legibly and indelibly marked with the following:

a) Manufacturer’s name or trade-mark or symbol;
b) Part No. or unique identification mark; and
c) Date of manufacturer or Batch No.

NOTE — Marking for compartment/sub-compartment shall be applicable if it is a separate component.’

(Page 2 clause 5.2) — Substitute ‘CNG/LPG’ for ‘CNG’.

[Page 2 clause 6(d)] — Substitute the following for the existing:

‘Drawings with relevant dimensions and materials.’

(TED 26)

Reprography Unit, BIS, New Delhi, India

2
1 SCOPE

1.1 This standard specifies definitions, test methods and requirements of compartments/sub-compartments of CNG onboard fuel system components intended for use on motor vehicles defined in IS 14272 (Part 1).

1.1.1 This standard is applicable to CNG fuel system components intended to be used on vehicles using compressed natural gas (mono-fuel or bi-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 engines; and
   d) CNG fuel systems components for the propulsion of marine craft.

1.1.3 This standard is based upon a service pressure for 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 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:

<table>
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</tr>
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<td>15710</td>
<td>Road vehicles — Compressed natural gas (CNG) fuel system components — General requirements and definitions</td>
</tr>
</tbody>
</table>

3 DEFINITIONS

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

3.1 Self-Extinguishing/No Burn Rate (SE/NBR) — The material stops burning before it has burnt for 60 s from the start of timing and has not burnt more than 50.8 mm (2 in) from the point where the timing was started.

4 TYPE TESTS (TYPE APPROVAL)

4.1 Construction

4.1.1 Hatches, covers or construction joints, which may need to be opened or dismantled during maintenance or inspection, shall be capable of being opened at least 10 times without adverse effects on durability.

4.1.2 Hinges and locking devices of hatches and covers shall be designed to prevent the dislodgment of the hatch or cover when in the closed and locked position.

4.1.3 The construction of compartments/sub-compartments shall be such that when subjected to a pushing force of 60 kgf applied at any point on any external face of the sub-compartment, any resultant damage shall not be of a nature to permit gas leakage in the event of pressure testing as per 4.3. The pushing force shall be applied by a measuring instrument having a flat circular face of 20 mm diameter.

4.2 Material

The pliable material of compartments/sub-compartments shall be sufficiently strong to resist mechanical damage, preserve venting integrity, shall not support combustion and shall meet the following minimum criteria.

4.2.1 Resistance to Cold Cracking

The material shall withstand a bend of 180° applied within 0.5 s around a 6 mm diameter former at temperature −35°C without cracking.

4.2.2 Flammability Test

When tested for Horizontal Burning Rate as per Annex A of IS 15061, the material shall be Self-Extinguishing/No Burn Rate (SE/NBR).

NOTE — If the size of component is insufficient for drawal of sample as per standard, then the sample size shall be selected as per mutual agreement between the test agency and the manufacturer.
4.2.3 Resistance to Ultraviolet Degradation

When tested as per Annex A, presence of stabilizer for ultraviolet degradation shall be confirmed.

4.3 Hydrostatic Test

When a compartment/sub-compartment has been subjected to hydrostatic internal pressure of 30 kPa (0.3 bar) applied for 5 min, sealing materials or gaskets shall not be displaced or otherwise lose integrity during the test.

5 MARKING

5.1 The compartment/sub-compartment shall be permanently marked with:
   a) Manufacturer’s name, trade-mark or symbol;
   b) Part No. or Unique Identification Mark;
   c) Date of manufacture or batch number; and
   d) IS Number of this standard.

5.2 BIS Certification Marking

Each compartment/sub-compartment of CNG vehicles 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 the following technical information:
   a) Manufacturer’s name, trade-mark or symbol;
   b) Part No. or unique identification mark;
   c) Model/Type No; and
   d) Drawings: Detailed dimensional drawing of the compartment/sub-compartment in A3 size in duplicate shall contain information like drawing No., Rev. No., part numbers, bill of material (comprising part numbers of individual items, generic name and compound number for non-metallic parts), and details of the marking on the component with proper authentication.

7 NUMBER OF SAMPLES FOR TESTING

Minimum two numbers of compartments/sub-compartments shall be provided with suitable adaptors/plugs for its opening to the test agency for testing.

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.

ANNEX A

(Clause 4.2.3)

TEST METHOD TO DETERMINE THE PRESENCE OF ULTRAVIOLET DEGRADATION AGENT (UV STABILIZER)

A-1 SCOPE

This test method is intended to provide a general technique to determine the presence of ultraviolet degradation agent (UV stabilizer) present in the samples. This method is useful in performing a qualitative analysis.

A-2 SUMMARY OF THE TEST PROCEDURE

This test method consists of a method in which the acetone extract of the sample under test is prepared in the form of thin film or capillary film and its spectrum is collected over IR range of 4 000 to 400 cm⁻¹. The spectrum is then compared with any internationally available library, such as Atlas of Hummel Polymer Library spectra or with the Enhanced Polymer Additives Library such as Saddtler, FDM, Nicolet, RAPRA or any other library spectra.

A-3 APPARATUS

Fourier transform infrared spectrometer, with wave number range of 7 800 to 350 cm⁻¹.

A-4 REAGENTS

Acetone.

A-5 PROCEDURE

The representative test quantity of sample is extracted with acetone solvent for 16 h. The extract is dried and then subjected to FTIR spectrometer test.
The sample prepared from the above techniques is mounted to a suitable sample holder and kept inside sample compartment of optical bench of IR spectrometer and its infrared spectrum is collected keeping the following instrumental parameters according to the nature of the sample:

a) The environmental conditions for equipment are maintained. They are as follows:
   1) Room temperature: 0°C to 35°C, and
   2) Relative humidity: 20 percent to 80 percent.

b) The optical bench is switched on and is allowed to initialize.

c) The resolution is set to 4.0 cm⁻¹, No. of scans to 40, Apodization to Happ-Ganzel and wave number range from 4 000 to 400 cm⁻¹.

d) Background spectrum is collected without the sample in the compartment.

e) The sample spectrum is collected with the prepared sample in the compartment after collecting background spectrum.

f) The sample spectrum collected is baseline corrected and normalized to compare with the standard spectrum from the library using search commands.

A-6 REPORT

The obtained FTIR spectrum is searched in any internationally available library, such as Atlas of Hummel Polymer Library spectra or with the Enhanced Polymer Additives Library such as Saddtler, FDM, Nicolet, RAPRA or any other library spectra for best matching spectrum of ultraviolet stabilizer.

ANNEX B
(Foreword)

COMMITTEE COMPOSITION

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

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<td>Automotive Research Association of India, Pune</td>
<td>SHRI SHRIKANT R. MARATHE (Chairman)</td>
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<tr>
<td>Ashok Leyland Ltd, Chennai</td>
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<td>SHRI T. M. BALARAMAN (Alternate)</td>
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<td>Bombay Environmental Action Group, Mumbai</td>
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<td>Central Pollution Control Board, Delhi</td>
<td>SHRI P. S. CHOPRA (Alternate)</td>
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<td>Centre for Science and Environment, New Delhi</td>
<td>SHRI R. N. DAS</td>
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<td>Force Motors Ltd, Pune</td>
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Organization
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Mahindra & Mahindra Ltd, Nasik
Minda Impco Ltd, New Delhi
Ministry of Non-Conventional Energy Sources, New Delhi
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Shri Shakti LPG Ltd, Hyderabad
Society for Alternate Fuels Aftermarket Conversion, New Delhi
Society of Indian Automobile Manufacturers, New Delhi
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