

**Proposed amendments to ECE REGULATION No. 110****UNIFORM PROVISIONS CONCERNING THE APPROVAL OF:**

- I. SPECIFIC COMPONENTS OF MOTOR VEHICLES USING COMPRESSED NATURAL GAS (CNG) IN THEIR PROPULSION SYSTEM;**  
**II. VEHICLES WITH REGARD TO THE INSTALLATION OF SPECIFIC COMPONENTS OF AN APPROVED TYPE FOR THE USE OF COMPRESSED NATURAL GAS (CNG) IN THEIR PROPULSION SYSTEM**

**A. Proposal****Annex 5. clause 2. Applicable test procedures amend to read**

In table 5.1 below the applicable test procedures dependent on the Classification are shown.

Table 5.1

Test	Class0	Class 1	Class 2	Class 3	Class 4	Paragraph
Overpressure or strength	X	X	X	X	O	5A
External leakage	X	X	X	X	O	5B
Internal leakage	A	A	A	A	O	5C
Durability tests	A	A	A	A	O	5L
CNG compatibility	A	A	A	A	A	5D
Corrosion resistance	X	X	X	X	X	5E
Resistance to dry heat	A	A	A	A	A	5F
Ozone ageing	A	A	A	A	A	5G
Burst/destructive tests	X	O	O	O	O	5M
Temperature cycle	A	A	A	A	O	5H
Pressure cycle	X	O	O	O	O	5I
Vibration resistance	A	A	A	A	O	5N
Operating temperatures	X	X	X	X	X	5O

X = Applicable

O = Not applicable

A = As applicable

**Remarks:**

- Internal leakage:** Applicable if the Class of the component consists of internal valve seats that are normally closed during engine 'OFF' condition.
- Durability test:** Applicable if the Class of the component consists of integral parts that will move repeatedly during engine operation.
- CNG Compatibility, Resistance to Dry heat, Ozone ageing:** Applicable if the class of the component consists of synthetic / non-metallic parts.
- Temperature Cyclic test:** Applicable if the class of the component consists of synthetic / non-metallic parts.
- Vibration Resistance test:** Applicable if the Class of the component consists of integral parts that will move repeatedly during engine operation.

## **Annexure 5 A “ Over Pressure Test ( Strength Test) amend to read**

1. A CNG containing component shall withstand without any visible evidence of rupture or permanent distortion a hydraulic pressure of 1.5-2 times the maximum working pressure during minimal **3 minute** at room temperature with the outlet of the high pressure part plugged. Water or any other suitable hydraulic fluid may be used as a test medium.

## **Annexure 5E “Corrosion Resistance test” Para 1 ‘Test Procedures’**

1. A metal CNG containing component shall comply with the leakage tests mentioned in annexes 5B and 5C and after having been submitted to 144 hours salt spray test according to ISO CD 15500-2, with all connections closed.

Test procedure:

~~Before the test the component shall be cleaned according to the instructions of the manufacturer. All the connections shall be closed off. The component shall not be operated during the test. Subsequently the component shall be submitted during 2 hours to spraying with a solution of salt, containing 5 per cent NaCl (mass per cent) with less than 0.3 per cent contamination and 95 per cent distilled or demineralised water, at a temperature of 20 EC. After the spraying the component is stored at temperature of 40 EC and 90-95 per cent relative humidity for 168 hours. This sequence shall be repeated 4 times. After the test the component shall be cleaned and dried during 1 hour at 55 EC. The component shall now be conditioned to reference conditions during 4 hours, before submitting it to further testing.~~

## **Annex 5L DURABILITY TEST (CONTINUED OPERATION)**

### **Test method**

The component shall be connected to a source of pressurised dry air or nitrogen by means of a suitable fitting and subjected to the number of cycles specified for that specific component (**number of cycles for pressure regulator shall be 50000 cycles as per ISO 15500 part 9 clause 6.4**). A cycle shall consist of one opening and one closing of the component within a period of not less than  $10 \pm 2$  seconds.

\* \* \*

## **B. Justification**

### **Justification for Annex 5. clause 2. Applicable test procedures:**

Remarks for applicability of tests (i.e., Internal leakage, Durability, CNG compatibility, Ozone ageing, resistance to dry heat, temperature cyclic test, vibration resistance, etc) are added for more clarity. This will avoid different interpretation of applicability of tests by various test agencies.

### **Justification for Annexure 5 A “ Over Pressure Test ( Strength Test)**

This clause stipulates test duration for hydrostatic strength test to be 1 minute which is Contradictory to the clause for test duration for hydrostatic strength tests (Page no 131 Clause no 3.3 “**General Requirements**” which stipulates “Test period for leakage & hydrostatic strength tests shall not be less than **3 minutes**” To avoid contradiction, test duration shall be amended to 3 minutes. (ISO 15500 also stipulates 3 minute duration for this test)

**Justification for Annexure 5E “Corrosion Resistance test” Para 1 ‘Test Procedures’**

Annexure 5E mentions two different test procedures for corrosion resistance test. (i.e. ISO CD 15500-2 for test duration of 144 hrs and corrosion Test as per clause 1 for test duration of 672 hrs) It proposed to retain only one test procedure i.e as per ISO CD 15500-2 & to delete the Test procedure defined under clause “Test procedure for 672 hours” the text of which is striked out as shown above.

**Justification for Annex 5L DURABILITY TEST (CONTINUED OPERATION)**

For durability test number of cycles are not specified for components i.e. Pressure regulator, Injector, Gas flow adjuster etc.

The number of cycles should be defined in the standard for the applicable components. India is following ISO: 15500 standard for CNG regulator testing, which prescribe 50000 cycles. For other components advice may be sought from GRPE experts.

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