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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Rubber hoses for automotive turbochargers -- Specification

汽车涡轮增压器用橡胶软管 规范

(English Translation)

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1 Scope

This Standard specifies the requirements for rubber hoses that connect turbochargers, intercoolers and internal combustion engines in automotive turbocharger system. The working temperature is $-40^{\circ}\text{C} \sim +250^{\circ}\text{C}$. The working pressure is $-0.01\text{MPa} \sim +0.5\text{MPa}$. The hoses covered in this Standard can be straight or shaped.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 528, Rubber, vulcanized or thermoplastic - Determination of tensile stress-strain properties (GB/T 528-2009, ISO 37:2005, IDT)

GB/T 1690, Rubber vulcanized or thermoplastic - Determination of the effect of liquids (GB/T 1690-2010, ISO 1817:2005, MOD)

GB/T 3512, Rubber, vulcanized or thermoplastic - Accelerated ageing and heat resistance

tests (GB/T 3512-2014, ISO 188:2011, IDT)

GB/T 5563, Rubber and Plastics Hoses and Hose Assemblies - Hydrostatic

Testing (GB/T 5563-2013, ISO1402:2009, IDT)

GB/T 5567-2013, Rubber and Plastics Hoses and Hose Assemblies -

Determination of Resistance to Vacuum (ISO 7233:2006, IDT)

GB/T 5576, Rubbers and lattices - Nomenclature (GB/T 5576-1997, idt ISO 1629:1995)

GB/T 6031, Rubber, vulcanized or thermoplastic - Determination of hardness (hardness between 10 IRHD and 100 IRHD) (GB/T 6031-1998, idt ISO

48:1994)

GB/T 7528, Rubber and plastics hoses and hose assemblies - Vocabulary (GB/T 7528-2011, ISO 8330:2007, IDT)

GB/T 7762, Rubber, vulcanized or thermoplastic - Resistance to ozone cracking - Static strain testing (GB/T 7762-2014, ISO 1431-1:2004, NEQ)

GB/T 9573, Rubber and plastics hose and hose assemblies - Methods of measurement of dimensions (GB/T 9573-2013, ISO 4671:2007, IDT)

GB/T 9576, Rubber and plastics hoses and hose assemblies - Guidelines for selection, storage, use and maintenance (GB/T 9576-2013, ISO 8331:2007,

IDT)

GB/T 14905, Rubber and plastics hoses - Determination of adhesion between components (GB/T 14905-2009, ISO 8033:2006, IDT)

GB/T 15256, Rubber, vulcanized or thermoplastic - Determination of low- temperature brittleness (multiple test piece method) (GB/T 15256-2014, ISO

812:2011, IDT)

ISO 28702, Rubber and plastics hoses and tubing - Textile-reinforced types

- Sub-ambient temperature crush test

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 7528 as well as the acronyms defined in GB/T 5576 apply.

4.1 Types and levels

According to the predetermined conditions of use, the hoses are classified into three types:

Type A: the hoses that connect air cleaners and turbochargers are used to deliver the filtered air. The working temperature is $-40^{\circ}\text{C} \sim +100^{\circ}\text{C}$. The minimum vacuum pressure is -0.01MPa .

Type B: the hoses that connect turbochargers and intercoolers are used to deliver the compressed hot air. The working temperature is $-40^{\circ}\text{C} \sim +250^{\circ}\text{C}$.

Type B is subdivided into three subtypes according to the working temperature and graded based on the maximum working pressure. The subtypes and levels are shown in Table 1.

Table 1 -- Subtypes and levels of Type B hoses

Type

Working temperature / $^{\circ}\text{C}$

Level

1 2 3 a

Not applicable to EPDM.

7.2.1 Appearance

When using a 1x magnifying glass to observe, the outer layer of the hose and the surface of the inner cavity shall be free of visible defects such as pleats, air holes, air bubbles, debris, damage and scratches. The surface of the cover layer can be processed with watermarks and other processing marks. Except for the end surface of the hose, the reinforcement shall not be exposed.

The delivered hose shall be clean and free of foreign objects, grease or other contaminants that may affect its function.

7.2.2 Vacuum resistance (only for Type A)

When tested in accordance with Method C of GB/T 5567-2013, maintain vacuum pressure of -0.015MPa for 10min. The hose length change (ΔL) shall be 0~5%. The change in outer diameter (ΔD) shall be 0~-8%.

If the length of the tested hose is less than 500mm, the distance BETWEEN

Line A and Line B AND the end of the hose is 25mm.

For shaped hoses, maintain the natural state for test. For shaped hoses with reduced diameter, select the area with the largest outer diameter change during the test as the outer

diameter change measurement point.

7.2.3 Verification pressure (applicable to Type B and Type C)

When tested in accordance with GB/T 5563, under the verification pressure given in Table 11, there shall be no leakage, sharp distortion or other signs of failure.

For shaped hoses, maintain the natural state for test.

7.2.4 Minimum burst pressure (applicable to Type B and Type C)

When tested in accordance with GB/T 5563, the minimum burst pressure of Type B and Type C hoses shall comply with the values given in Table 11.

Annex A (normative)

Fatigue resistance test

WARNING -- Personnel using this Standard shall be familiar with formal laboratory operating procedures. This Standard is not intended to address all safety issues that may arise from the use of this Standard. It is the user's responsibility to develop appropriate safety and health systems and ensure compliance with national regulations.

A.1 General

This test simulates a hose, under the actual operating conditions of which the ambient temperature is $100^{\circ}\text{C}\pm 10^{\circ}\text{C}$, with the help of a circulating pump and drive, to make the hose withstand pulse pressure between 0MPa and 0.25MPa (or 133% working pressure) and withstand vibrations of a certain amplitude and frequency at the same time.

A.2 Test bench

A.2.1 Test bench, for pulse vibration test. If vibration is not required, only pulse test shall be performed.

A.2.2 Protective device, which ensures immediate interruption of test in the event of a leak, blast, or other failure.

A.2.3 Pressure circulation pump, for gas circulation. The circulating medium is compressed air, which flows continuously in the hose.

A.2.4 Driver, which can provide vibration.

A.2.5 Temperature control device, which is to control medium temperature and ambient temperature.

A.2.6 Logger, which can record the number of cyclic pulses and vibrations.

A.3 Steps