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QC

**AUTOMOTIVE INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

QC/T 355-2023

**Wheel nuts with conical seat
(English Translation)**

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Table of Contents

Foreword...	3
1 Scope...	4
2 Normative References...	4
3 Terms and Definitions...	4
4 Technical Requirements...	5
5 Test Methods...	7
6 Inspection Rules...	14
7 Marking, Packaging, Transportation and Storage...	15
Appendix A (Informative) Muffler Bench Test Report...	17
References...	21

1 Scope

This document specifies the terms and definitions, technical requirements, test methods, inspection rules, and marking, packaging, transportation and storage of the exhaust muffler assembly of automotive (hereinafter referred to as the "muffler").

This document is applicable to exhaust muffler assemblies for Class M and Class N motor vehicles.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 10125 Corrosion tests in artificial atmospheres - Salt spray tests

GB/T 15173 Electroacoustics - Sound calibrators

GB/T 18297 Performance test code for road vehicle engines

GB/T 20878-2024 Stainless steels - Designation and chemical composition

3 Terms and Definitions

The following terms and definitions are applicable to this document.

3.1 Exhaust System

The entire set of devices that processes the exhaust gas generated when the engine is operating and discharges it outward (the part between the exhaust hot end outlet and the exhaust tail pipe opening).

3.2 Exhaust Muffler Assembly

A device equipped with sound-absorbing materials or special forms of airflow ducts in the exhaust system that can effectively reduce exhaust noise.

NOTE: It generally includes a single muffler, flanges, pipelines, hooks, etc. The single muffler is a component that can independently play a silencing role and form an exhaust muffler assembly.

3.3 Leak Proofness

The degree of sealing of the muffler.

NOTE: It is expressed in terms of exhaust gas leakage rate.

3.4 Exhaust Noise

The sound produced when the exhaust gas generated when the engine is operating is discharged from the exhaust pipe opening.

3.5 Background Noise

The noise of the surrounding environment (including wind noise) when the measured exhaust noise does not exist.

3.6 Insertion Loss

The difference in A-weighted sound pressure level of exhaust noise before and after installing a muffler.

3.7 Power Loss Ratio

The ratio of the difference in power between the engine with a muffler installed and the one with an equal-length exhaust pipe installed instead of a muffler under rated operating conditions to the power when an equal-length exhaust pipe is installed instead of a muffler.

3.8 Exhaust Backpressure

The pressure at the specified measuring point in the exhaust system when the engine is operating.

3.9 Difference of Backpressure

The difference in exhaust backpressure between the situations when a muffler is installed and when an equal-length exhaust pipe is installed instead of a muffler.

4.1 Basic Requirements

4.1.1

Mufflers shall be designed and manufactured in accordance with drawings and technical documents approved through prescribed procedures or in accordance with technical agreements countersigned by both the supply and demand sides.

4.1.2

There shall be no burrs or wrinkles in all parts of the muffler.

4.1.3

The welded part of the muffler shall not have defects such as pores, fractures, poor melting, etc. The contact surface of the muffler connecting flange or bracket and the joint surface of the bolts and nuts shall be smooth and shall not have welding spatter attached.

4.1.4

Under normal driving conditions of the complete vehicle, the muffler shall not have corrosion that affects its function within a mileage of 60 000 km or a driving time of 3 years, and all welded parts shall not have cracks that affect its function.

4.2 Corrosion Resistance

Mufflers shall take appropriate anti-corrosion measures. Carry out the salt spray test in accordance with the provisions of 5.2. The areas of red rust spots on the outer surfaces of the muffler shell and external pipelines shall not exceed 40% of the total outer surface area of the shell and the total outer surface area of the pipelines respectively, or shall not exceed the corrosion situation using the 06Cr11Ti material in GB/T 20878-2024 under the same test conditions.

4.3 Leak Proofness

Carry out the leak proofness test in accordance with the provisions of 5.3. The exhaust gas leakage rate limit of the muffler meets the requirements in Table 1 (excluding the exhaust gas leakage rate of the drainage hole); if it is composed of two or more stages of single

mufflers, the total exhaust gas leakage rate shall not exceed 30 L/min.

Table 1 -- Exhaust Gas Leakage Rate Limit of the Muffler

Muffler edge sealing process form Silencing volume/L Exhaust gas leakage rate requirement/(L/min)

Undercut $V \leq 10 < 8$

$V > 10 < 20$

Welding - < 0.5

NOTE: The undercut process refers to the form in which the bent edge of one layer of plate wraps another layer of plate. The welding process refers to the form in which plates are connected by welding.

4.4 Compressive Strength

Carry out the compressive strength test in accordance with the provisions of 5.4. After the test, the muffler shall be free of damage.

4.5 Internal Pressure Durability

Carry out the internal pressure durability test in accordance with the provisions of 5.5. After the test, the muffler shall be free of damage.

4.6 Natural Frequency

Carry out the natural frequency test in accordance with the provisions of 5.6. The lowest natural frequency of the muffler shell and hooks is greater than 1.3 times the ignition frequency of the maximum engine speed.

Example. Ignition frequency of the four-stroke engine = (Engine speed/60) x (Number of cylinders/2); for example, the maximum speed of a four-stroke 4-cylinder engine is 6

000r/min, and its ignition frequency is 200 Hz, and thus the lowest natural frequency is > 260 Hz.

4.7 Vibration Durability

Carry out the vibration test in accordance with the provisions of 5.7. After the test, there shall be no cracking, desoldering or other damage to any part of the muffler. After the vibration test, the total exhaust gas leakage rate of the muffler shall not increase by more than 20 L/min compared to that before the vibration test.

NOTE 1: The vibration test shall be conducted using Method 1 or Method 2 as described in 5.7.

NOTE 2: If conditions permit, vibration durability verification shall be conducted according to the