

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

QC/T 552-2025

**Engines for automobile and motorcycle - Casting aluminium
pistons
(English Translation)**

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1 Scope

This document specifies the terms and definitions, names of various parts, technical requirements, inspection methods, inspection rules, marking, packaging, transportation and storage of casting aluminium pistons for the engines for automobile and motorcycle.

This document is applicable to the manufacture of casting aluminium pistons for the engines for automobile and motorcycle with cylinder diameters less than or equal to 160 mm.

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 1031 Geometrical product specifications (GPS) - Surface texture. Profile method - Surface roughness parameters and their values

GB/T 1148 Internal combustion engines - Aluminum pistons

GB/T 2828.1 Sampling procedures for inspection by attribute - Part 1. Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection

GB/T 10610 Geometrical Product Specifications (GPS) - Surface texture. Profile method - Rules and procedures for the assessment of surface texture

JB/T 14615 Internal combustion engine - Piston assembly - Cleanliness limits and measurement

QC/T 283 Automobile engine - Piston with ring carrier

QC/T 553 Metallographic inspection of casting aluminum piston for engines of automobile and motorcycle

3 Terms and Definitions

The terms and definitions defined in GB/T 1148 are applicable to this document.

4.1 General

4.1.1

The casting aluminium pistons (hereinafter referred to as the "pistons") shall be manufactured in accordance with product drawings and technical documents approved through the prescribed procedures.

4.1.2 In addition to meeting the following technical requirements, the remaining technical

requirements for pistons shall comply with the provisions of GB/T 1148.

4.1.3 The technical requirements for casting aluminium pistons with ring carrier shall be implemented according to QC/T 283.

4.2.1 Material composition

The piston body is made of cast aluminum-silicon alloy. The material grade or composition shall be specified in the product drawings.

4.2.2 Mechanical properties and stability of volume

4.2.2.1

The piston shall be heat-treated, and its mechanical properties and stability of volume (residual expansion of piston diameter D) shall meet the requirements of Table 1.

4.2.2.2

The hardness difference of the same piston shall be less than or equal to 10 Brinell hardness units, and the hardness difference of pistons in the same batch shall be less than or equal to 30 Brinell hardness units.

4.2.3 Metallographic structure

The metallographic structure shall meet the requirements of QC/T 553.
specifications.

4.9.3 The printing markings for product mass grouping shall conform to the product drawing specifications.

4.10 Piston Cleanliness

Piston cleanliness shall meet the requirements of JB/T 14615.

5 Inspection Methods

5.1

The inspection methods for tensile strength, hardness, and stability of volume shall be performed in accordance with GB/T 1148.

5.2

Metallographic structure inspection shall be performed in accordance with the provisions of QC/T 553.

5.3

Inspection of casting surface defects and machined surface defects shall be performed by visual inspection or the methods specified in the technical documents.

5.4

Surface texture quality inspection shall be performed in accordance with GB/T 1031 and GB/T 10610.

5.5

Inspection of dimensional tolerances and geometric tolerances shall be performed in accordance with GB/T 1148.

5.6

Piston mass inspection shall be performed using the direct weighing method.

5.7

Piston cleanliness inspection shall be performed in accordance with JB/T 14615.

6 Inspection Rules

6.1

Pistons shall be inspected and approved by the quality inspection department of the manufacturing enterprise before leaving the factory.

6.2

Sampling for piston inspection shall be performed in accordance with the provisions of GB/T 2828.1. The inspection items, batching principles, sampling protocol, as well as judgment and re-inspection rules shall be agreed upon by both the supply and demand sides.

7.1 Marking

7.1.1

Each product package shall be marked with, but is not limited to, the following.

- a) Manufacturing enterprise's name code or trademark;
- b) Specification marking and dimension group code;
- c) Mass or mass group code;
- d) Ex-factory serial number, batch number, or manufacturing date (may also be noted on the certificate of conformity);
- e) Orientation markings for piston installation (for pistons with asymmetrical structures).

7.1.2

Markings shall be permanent. The location, dimensions, and method of marking shall conform to the product drawing specifications, but shall not damage the product or affect its