

JB

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

JB/T 8577-1997

**Internal combustion engines - Water radiators - Technical
specifications**

内燃机 水散热器 技术条件

(English Translation)

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1 Scope

This standard specifies the terms and definitions, technical requirements, test methods, inspection rules, as well as marking, packaging, transportation, storage of water radiators for internal combustion engines.

This standard applies to brazed tube-piece type, tube-belt type, seal type, expansion type air-cooled water radiators for internal combustion engines (hereinafter referred to as radiators).

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document;

for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

GB/T 2423.17 Environmental testing for electric and electronic products - Part 2:

Test method - Test Ka: Salt mist

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

JB/T 10408 Internal combustion engines - Heat exchangers. Reliability test method

JB/T 11798 Internal combustion engines - Heat exchangers - Wind tunnel test equipments

3 Terms and definitions

The terms and definitions as defined in JB/T 11798, as well as the following terms and definitions, apply to this document.

3.1 Water passage area

The cross-sectional area of the passage when water flows through the inside of the frequency of 20 Hz, 30 Hz, 40 Hz, 50 Hz for 3 hours each, for a total of 12 hours. The vibration direction is vertical up and down. After 12 hours of vibration, the radiator is not allowed to leak or have parts damaged.

4.4 Pressure alternating cycle resistance

The radiator cavity is subjected to an alternating pressure from below 25 kPa to 150 kPa, at a pressure alternating cycle of 1 s ~ 6 s. After 3x10⁴ pressure cycles, the radiator is not allowed to have leakage, desoldering, permanent deformation.

4.5 Heat shock resistance

The inlet temperature difference of the radiator is 85 °C ± 2 °C. After 3x10³ cold-hot alternating cycles, the radiator is not allowed to have leakage and part damage.

4.6 Static pressure strength

Apply static pressure of 250 kPa to the radiator cavity for 3 min. The radiator is not allowed to have leakage and permanent deformation.

4.7 Torsional vibration resistance

One side of the radiator is subjected to synchronous reverse motion at both ends, at a frequency of 6 Hz and a torsion angle of ±22.5'. At the same time, circulate hot water at 90 °C ± 5 °C inside the radiator. After 5x10⁵ torsional vibrations, the radiator is not allowed to have mechanical damage such as cracks, desoldering, water leakage. After the test, it shall meet the sealing performance requirements specified in 4.2.2.

4.8 External corrosion resistance

After 200 h of neutral salt spray corrosion, the radiator shall not have any coating peeling phenomenon. After the test, it shall meet the sealing performance requirements specified in 4.2.2.

4.9 Internal corrosion resistance (applicable to aluminum radiators)

A special OY solution is passed into the radiator. After 7 cycles, the radiator is not allowed to leak.

4.10.1 Heat dissipation

The heat dissipation of the radiator shall comply with the provisions of the product drawing or supply agreement.

4.10.2 Resistance

The air resistance and internal resistance of the radiator shall comply with the provisions of the product drawing or supply agreement.

4.11 Working performance of compound water inlet cover

The opening pressure of the air inlet valve and steam outlet valve of the radiator's compound water inlet cover shall comply with the provisions of the product drawing.

4.12 Assembly and matching dimensions

The assembly dimensions of the radiator and the main machine, as well as the matching dimensions of the water inlet and the water inlet cover shall comply with the requirements of the product drawings.

4.13.1

The length difference between the two diagonals of the radiator core shall comply with the following requirements:

- a) When the core diagonal length is not greater than 800 mm, the diagonal length difference shall not be greater than 3 mm;
- b) When the diagonal length is greater than 800 mm, the diagonal length difference shall not be greater than 5 mm.

4.13.2

The total number of fins of the tube-fin radiator shall comply with the requirements of the drawing; its limit deviation is $\pm 1\%$ of the total number of fins specified in the drawing. The number of wave peaks of each heat dissipation belt of the tube-belt radiator shall comply with the requirements of the drawing; its limit deviation is ± 2 .

4.13.3

The maximum deviation of the fin spacing of the tube-fin radiator is ± 0.2 mm; the two fins shall not be pressed together. The maximum deviation of the wave peak spacing of the tube-belt radiator is ± 0.5 mm.

4.13.4

The fins (belts) on the two sides of the radiator shall not curl, fall over, or have broken edges; the difference between them shall not exceed 1 mm.

4.13.5

There shall be no floating solid residue inside the radiator.

4.13.6

There shall be no obvious solder accumulation on all welds of the radiator.

4.13.7

The anti-corrosion layer on the surface of the radiator shall be uniform and beautiful; there shall be no coating shedding.

4.13.8

The number of blocked heat dissipation pipes in the radiator shall not exceed 1% of the total number of heat dissipation pipes.

5.7.1 Test conditions

The test conditions for the comprehensive performance test of the radiator are as follows:

- a) The test piece for the comprehensive performance test of the radiator is the finished radiator;
- b) The test water must be clean and must not contain sand, rust or other debris;
- c) The test device shall comply with the provisions of JB/T 11798.

5.7.2.1 Preparation before test

Preparation shall be carried out according to the following requirements before the test:

- a) After the radiator is installed on the test bench, first check the water circuit and the connection between the test piece and the wind tunnel. The circuit shall be unobstructed and leak-free;