

## How to inspect the welding/brazing quality of liquid cooling plates?



### Visual inspection

#### Test content

Inspect the weld seam for continuity and uniformity, and check for defects such as cracks, undercutting, dents, or oxidation.

#### Core Tools

Visual inspection with the naked eye, optical magnifying glass, and endoscope.

#### Key Notes

The first line of quality control is to rapidly screen out obviously nonconforming products.



### Dimension and flatness

#### Test content

The overall flatness, flow channel flatness, and spatial positional accuracy of each interface were measured.

#### Core Tools

Digital display caliper, height gauge, Coordinate Measuring Machine (CMM).

#### Key Notes

Ensure the product meets mechanical assembly requirements, as dimensional errors directly impact heat dissipation performance.



### Airtightness/Leakage Detection

#### Test content

High-pressure pressure holding test and high-precision helium mass spectrometry vacuum leak detection test.

#### Core Tools

Pressure testing bench, helium mass spectrometry leak detector, and sparkling water tank.

#### Key Notes

The most critical test item ensures absolute leak-free performance of the product under high-pressure operating conditions.



### Non-destructive testing (NDT)

#### Test content

Internal bonding rate was measured by ultrasonic C-scanning, and X-ray fluoroscopy was used to examine pores and blockages.

#### Core Tools

Ultrasonic C-scanner, industrial CT, X-ray flaw detector.

#### Key Notes

Without damaging the product, identify internal invisible defects and scientifically evaluate weld integrity.



### destructive testing

#### Test content

Weld seam cutting inspection, tensile/shear strength testing, and pressure burst test.

#### Core Tools

Precision sawing machine, universal tensile testing machine, and blasting test bench.

#### Key Notes

Primarily used for process validation and pilot-scale testing, it serves as the most intuitive basis for quality assessment.



### Thermal performance testing

#### Test content

Steady-state thermal resistance testing, thermal shock cycling, and pressure pulse fatigue testing.

#### Core Tools

Thermal performance test bench, environmental test chamber, and data acquisition system.

#### Key Notes

The final validation assesses the products actual heat dissipation performance and service life under extreme operating conditions.