Aerospace tooling and section mating

aerospace-fixture

SHANGHAI MICROCRE OPTICS-MECH TECH CO.,LTD

Telephone: 400-812-7833 | 021-58391850

Address: 1478 Nanfeng Road, Fengcheng Town, Fengxian District, Shanghai, China | Postal code: 201411

Contact email: shanghai@yr17.net

Service email: rockwei@yr17.net

Application template; not a claim of a completed customer project.

Scope

Datum establishment, mating alignment and contour checks for aircraft sections, wing fixtures and final assembly tooling.

Equipment and configuration guidance

• Laser tracker or photogrammetry

• Targets and tooling nests

• Temperature and foundation logs

Principle and calculation

Transfer residuals show frame consistency; evaluate mating deviation normal and tangential to the interface.

On-site checklist

• Transfer closure

• Key points repeated

• Thermal gradient logged

• Before/after

Limitations

Uncertainty grows with distance; tooling stiffness and foundation settlement affect long-term consistency.

Detailed teaching example

Worked frame-transfer residual and interface deviation example

Scenario and task

Teaching example: a laser tracker measures one fixture from two stations with a transfer residual of 60 μm; interface deviations are 100 μm normal and 40 μm tangential.

Preparation and measurement steps

01. Confirm tooling datum, mating interface and tolerances.

02. Establish the global frame with multi-station transfer and closure checks.

03. Measure key intersections, mating faces and contour points.

04. Adjust tooling and re-measure, checking transfer residuals.

Teaching example readings

• Transfer residual 60 μm from six common points.

• Normal deviation 100 μm, tangential 40 μm.

• Combined radial deviation 108 μm.

Calculation procedure

Radial = √(100² + 40²) = 108 μm. The transfer residual describes frame consistency and is not added to the interface deviation.

Example result and interpretation

The transfer residual is acceptable, so the frames agree; the larger normal deviation points to shimming or fitting at the joint.

Example verification checklist

• Common points must span the volume; clustering amplifies extrapolation error.

• Log temperature and sunlight; long distances are gradient-sensitive.

• Report normal and tangential separately; the combined value is informational.

Document generated: 2026-11-16