Parallelism inspection plan for injection moulding machine platens

injection-platen-parallel

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

Scope

For parallelism of the fixed and moving platens of an injection moulding machine in the clamped state (900×900 mm clamping face, example/teaching data). In the open state, measure each platen face flatness on a grid; under low-pressure clamping, evaluate parallelism from the four-corner gap difference. Fix the clamping force level and repeat clamping three times.

Equipment and configuration guidance

• Photoelectric autocollimator (0.1″ class) with 150 mm reflector base (example)

• Four equal-length gap sensors or dial indicators for corner gaps

• Clamping force level confirmation and logging tools

• Temperature logger

Principle and calculation

Parallelism angle α≈arctan(Δg/D), with Δg the diagonal gap difference and D the corner spacing; single-face flatness is the peak-to-valley after tying the grid to its datum. With D=900 mm, 1″≈4.36 μm gap equivalent (example/teaching data).

On-site checklist

• Clamping force level identical across runs

• Scatter of three clamping repeats recorded

• Before/after tie-bar adjustment versions kept in pairs

Suggested records

• Single-face flatness data of both platens

• Clamped corner gaps and parallelism result

• Tie-bar adjustment log and re-measurement comparison

Limitations

Low-pressure clamping results do not represent platen deformation at rated clamping force; hot-state mould deformation needs re-measurement at operating temperature. Clamping-unit stiffness and part quality are not assessed.

Detailed teaching example

Injection Moulding Platen Parallelism Inspection · Tutorial Case

Scenario and task

Teaching demonstration, not a real customer project: segmented angular measurement preceding parallelism inspection of fixed and moving platens; data are instructional settings.

Workflow overview

State check → Axis set → Horizontal steps → Read angles → Parallelism check

Preparation and measurement steps

01. Clamping unit in free state, platen faces cleaned

02. Autocollimator on a stand beside the moving platen, optical axis parallel to the tie bars

03. Move a 200 mm bridge horizontally across the platen face step by step

04. Record the angular reading per segment

05. Cumulate three segments to convert the parallelism component

Teaching example readings

• Bridge span L=200 mm; segment 1 autocollimator reading θ□=+1.5″

• Segment 2 autocollimator reading θ□=-1″

• Segment 3 autocollimator reading θ□=+1.5″

Calculation procedure

Height conversion: Δh = L·tan(θ·π/648000)×1000 (μm). Segment 1: 200×tan(+1.5″)=+1.45 μm; Segment 2: 200×tan(-1″)=-0.97 μm; Segment 3: 200×tan(+1.5″)=+1.45 μm. Cumulative heights: 0→+1.45→+0.48→+1.93 μm; peak-to-valley PV=+1.93−(+0.00)=+1.93 μm.

Example result and interpretation

Tutorial result PV≈1.93 μm, demonstrating segmented evaluation of platen parallelism.

Example verification checklist

• Tie bar pretension states are uniform

• Bridge avoids mould mounting holes

• Survey all four generatrices (top/bottom/left/right) for cross-check

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