Paper and film roll parallelism

paper-machine-rolls

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

Scope

Roll parallelism, elevation and level on paper, film and coating lines to reduce wrinkles and thickness variation.

Equipment and configuration guidance

• Autocollimator or laser tracker

• Roll-surface targets

• Span and elevation tools

Principle and calculation

Parallelism is the end-to-end centre distance difference: $\Delta = L \cdot \tan\theta$ over roll length L.

On-site checklist

• Tension logged

• Both ends measured

• Before/after

• Temperature and speed logged

Limitations

Heat and tension change parallelism in running state; static results need interpretation.

Detailed teaching example

Worked roller parallelism example over 6000 mm

Scenario and task

Teaching example: two 6000 mm rollers with a 120 μm centre-distance difference, converted to a cross-roll angle. Synthetic data.

Preparation and measurement steps

01. Confirm roll layout, wrap angle and tension state.

02. Measure elevation and level at both ends of each roll.

03. Measure adjacent-roll parallelism as end-to-end distance difference.

04. Adjust bearing housings and re-measure, checking tension.

Teaching example readings

• Centre-distance difference 120 μm, larger on the drive side.

• Angle 4.13″, about 20 µm of taper per metre.

• One mid-span check separates parallelism error from roll bending.

Calculation procedure

θ = arctan(0.12/6000) = 4.13″. A mid-span deviation from the end-to-end line means bending, handled separately.

Example result and interpretation

A 4.13″ angle changes the gap by 120 µm across the web, affecting tension profile.

Example verification checklist

• Cleanliness and ink residue change the measured centre distance.

• Running and static states differ; state the temperature of heated rollers.

• Report parallelism separately from roundness.

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