

Screen Printer Donut Probe

The Essential Tool for Perfect Curing



Stop blaming the ink for washouts — undercured prints are the real culprit. This tool gives you hard data, not guesswork, and ensures every print reaches full cure.

Moving from Guesswork to Verifiable Industrial Standards



Legacy methods like “heat tapes” or visual judgment are unreliable.



Professional shops use technical thermal profiling to ensure washfastness with hard data, not estimates.

The primary cause of ink failure is under-curing, where ink fails to reach its required chemical cross-linking temperature.

The Goal: Achieve a verifiable industrial standard for every print.

The Tools of the Trade: Surface Guess vs. Internal Fact

The Old Way



Infrared (IR) Temperature Gun

Measures only radiant surface energy.

Critical Flaw: Readings are skewed by ink color and garment texture, leading to false-positives.

Reads

15°C to 37°C HIGHER
60°F to 100°F

...than the actual internal ink temperature.

The Professional Way



Donut Probe (Thermoprobe)

A K-type thermocouple designed for direct immersion into the wet ink film.

Critical Advantage: Tracks the true internal thermal profile throughout the entire dryer cycle.

**Measures the actual
core temperature.**

...where chemical cross-linking occurs.



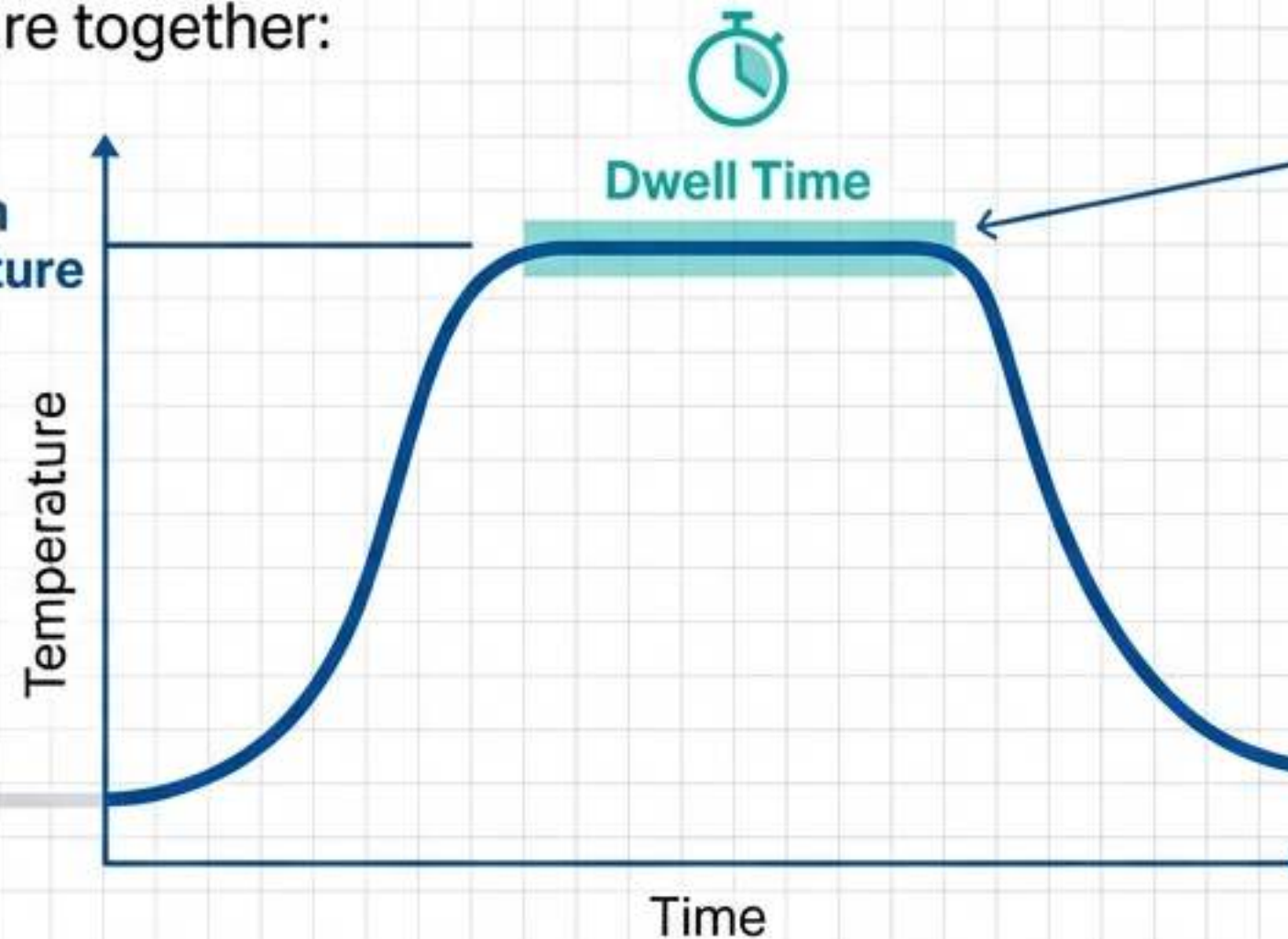
The Science of a Perfect Cure: Temperature and Time

A full cure depends on two factors that only a donut probe can accurately measure together:

1. Internal Temperature:

The ink film's core must reach its fusion temperature for chemical cross-linking.

Fusion
Temperature



2. Dwell Time:

The ink must remain at that fusion temperature for a specific duration.

Plastisol Inks

Core temp of **160°C (320°F)** maintained for **1.5 to 3 seconds**.

Water-Based/Discharge Inks

Sustained temp of **160°C (320°F)** for **60 to 90 seconds** to ensure water evaporation and pigment fixation.

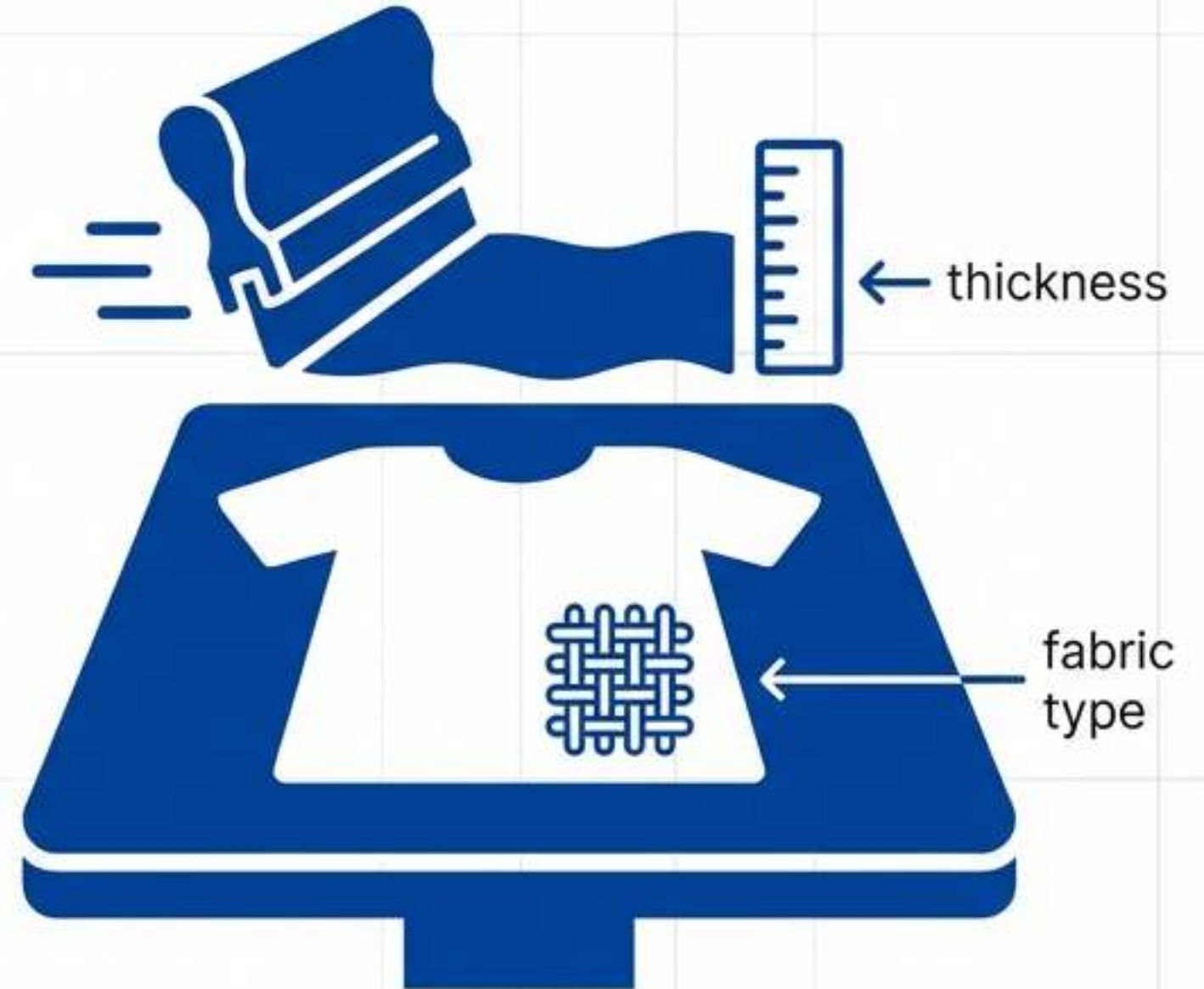
The 5-Step Protocol for Verifiable Curing

1

Substrate Preparation

To ensure accurate data, your test must mirror your production run. Print a test garment using the exact production-level ink thickness and the specific fabric type (e.g., 180 GSM cotton).

Rationale: Testing with the wrong variables will produce misleading cure data.



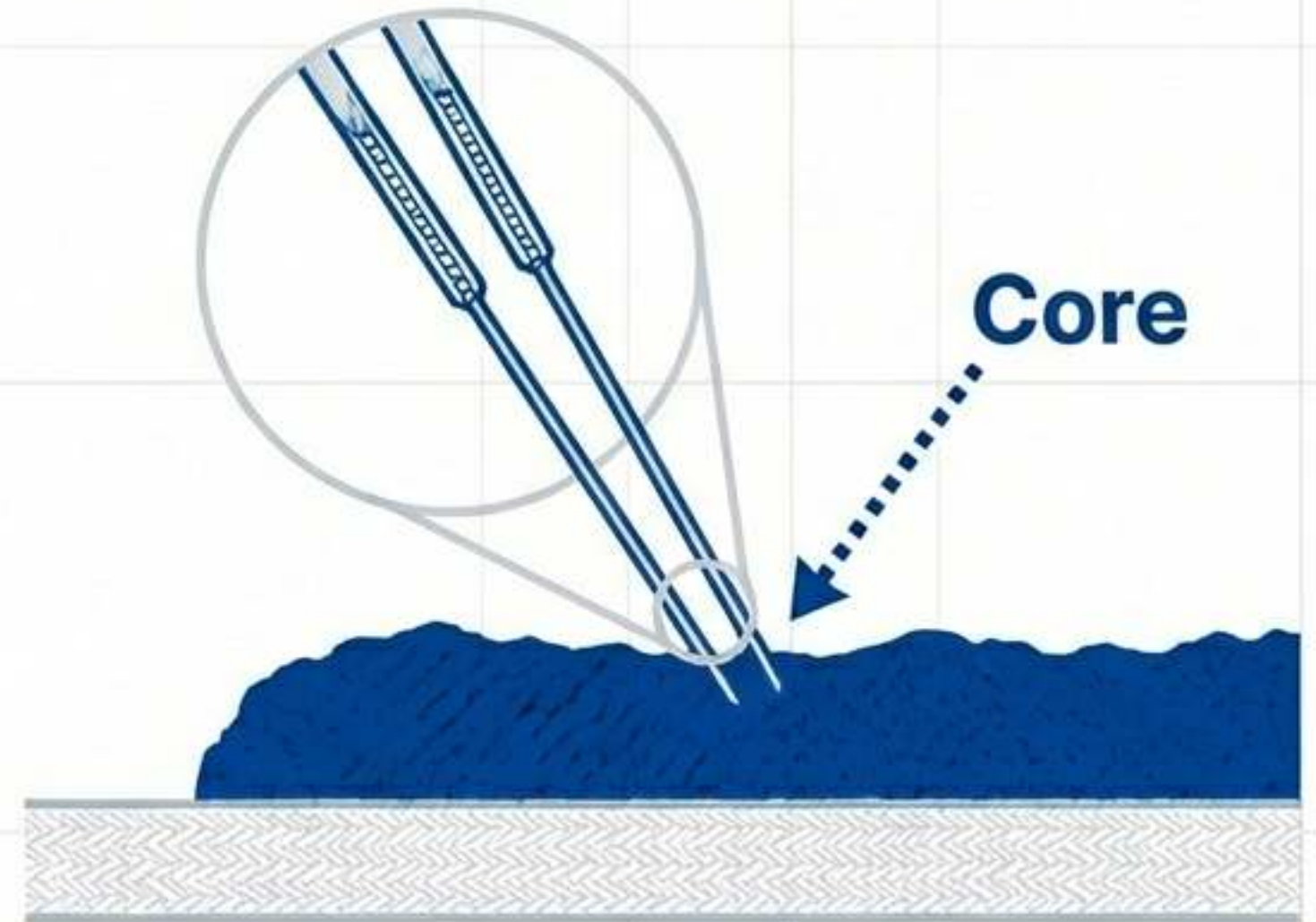
The 5-Step Protocol for Verifiable Curing

2

Sensor Placement

Carefully press the K-type thermocouple wires directly into the thickest area of the wet ink deposit.

Rationale: This ensures the probe measures the core temperature of the ink film, which is the last area to reach the target temperature.



The 5-Step Protocol for Verifiable Curing

3

Cycle Monitoring Setup

Connect the probe to the digital data logger. Place the logger's insulated heat shield over the device and place the entire assembly on the conveyor belt alongside the test garment.

Recommended Hardware:

Cooper Atkins AquaTuff 35200K digital data logger.



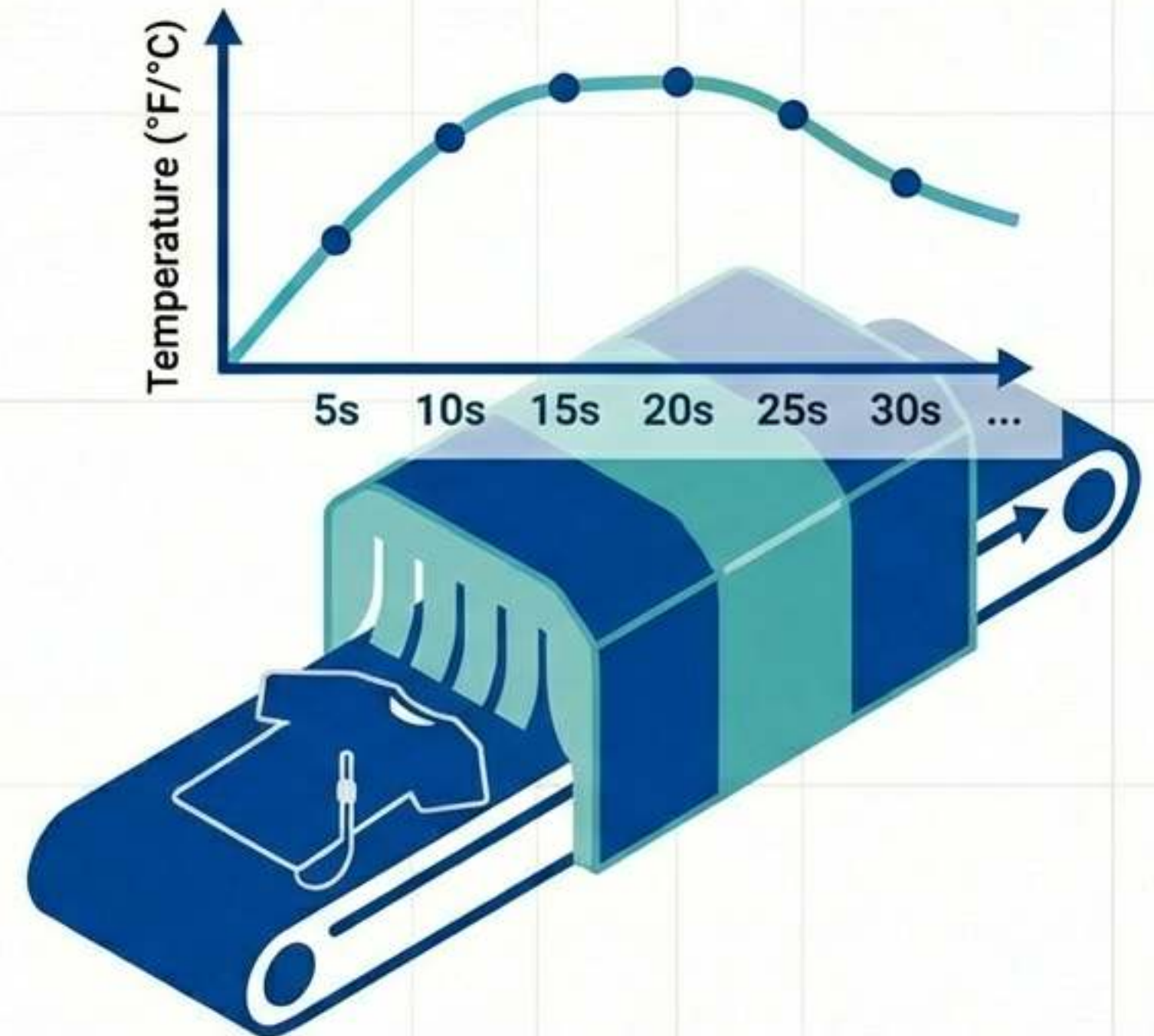
The 5-Step Protocol for Verifiable Curing

4

Thermal Tracking

Set the dryer to the designated production belt speed. As the probe assembly traverses the dryer tunnel, record the temperature at 5-second intervals.

Goal: To capture the complete thermal profile, including the ramp-up time, dwell time at peak temperature, and cool-down phase.



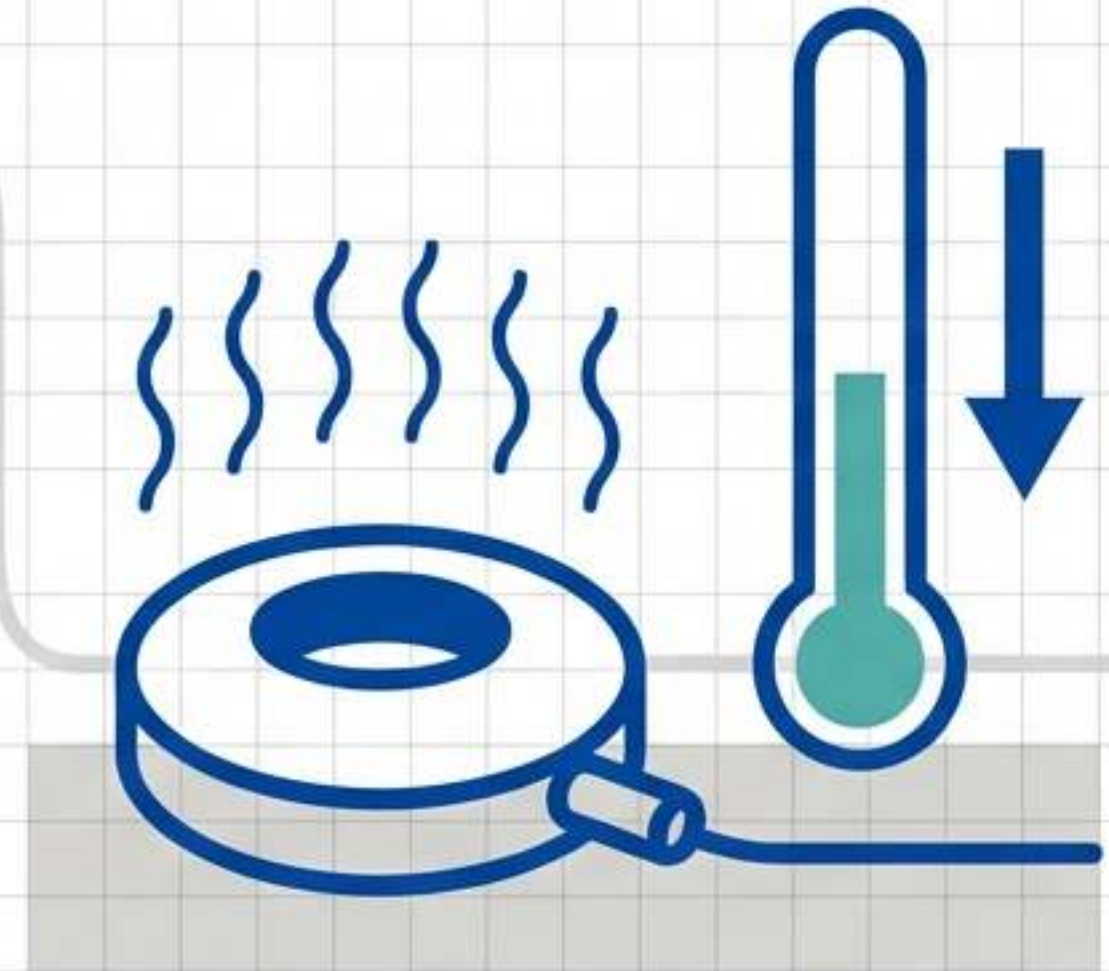
The 5-Step Protocol for Verifiable Curing

5

Cool-Down Phase

After the probe exits the dryer, allow the probe and the thermocouple the thermocouple plug to return to ambient temperature before handling.

Rationale: This prevents thermal shock and potential damage to the sensitive thermocouple sensor, ensuring long-term accuracy and reliability.

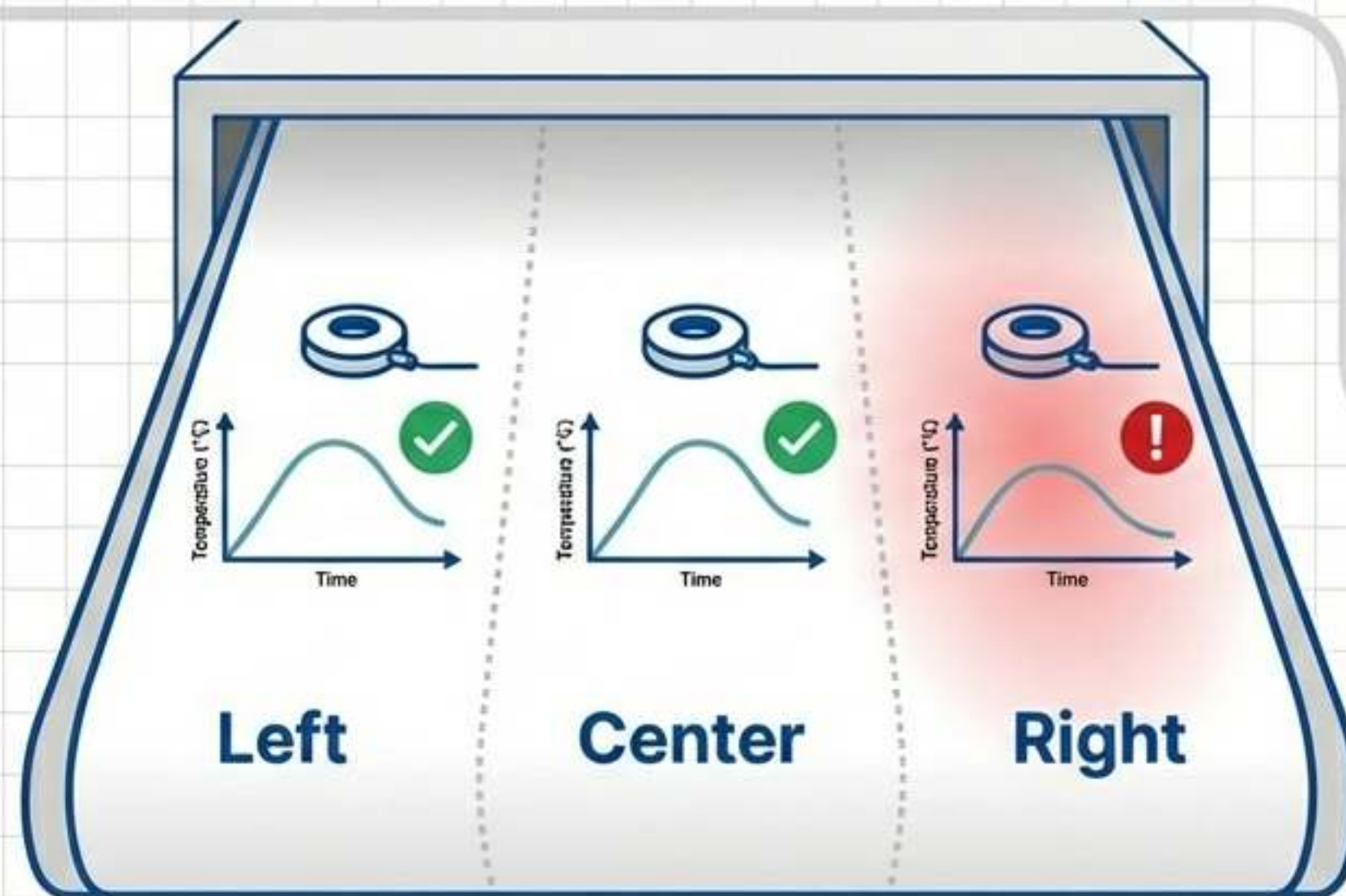


Mastering Your Machine: Dryer Mapping for Thermal Consistency

Conveyor dryers rarely have uniform heat distribution. Dryer mapping is the process of using the **donut probe** to identify localized thermal failure points (“cold spots”) across the belt.

Mapping Procedure:

1. Run the 5-step probe protocol on the **left** side of the belt.
2. Repeat for the **center** of the belt.
3. Repeat for the **right** side of the belt.



Failure Indicator:

A thermal discrepancy of **5°C (10°F)** or more between any two points indicates failing heating elements, airflow blockages, or uneven air distribution.

The Unbeatable ROI of Precision Curing



The Investment

A professional donut probe kit requires a capital investment of approximately

\$380 to \$480



The Risk

A single failed production run of 200 garments (at \$2.50/blank) results in a

\$500 LOSS

...in materials alone, excluding labor, shipping, and reputational damage.

Conclusion: The donut probe provides a positive ROI by eliminating the financial liabilities of a single washfastness failure. It is an insurance policy against catastrophic production errors.

Frequently Asked Questions



Q1: Why is a donut probe more accurate than an IR gun?

A: An IR gun reads surface heat, which is skewed by emissivity. The probe measures the actual internal ink temperature and the critical dwell time at that temperature.



Q2: Can a donut probe detect dead heating zones?

A: Yes. By recording and comparing temperature curves across different belt positions (dryer mapping), the probe pinpoints underperforming heat elements or airflow fans.



Q3: Is a donut probe necessary for water-based inks?

A: Absolutely. Water-based inks are highly dependent on a long dwell time (60-90 seconds) to ensure all water evaporates before the cure begins. The probe is the only way to verify this.

Technical Resource Hub: Your Toolkit for Precision

For industrial-grade reliability, the following components are recognized as the industry standard:

Recommended Components

- **Digital Thermometer:** Cooper Atkins AquaTuff 35200K (Waterproof, K-type compatible)
- **Thermocouple Probe:** 50008-K Surface Thermocouple or specialized donut-carrier probe.

Downloadable Tools



Technical Manual: Donut Probe Operational Guide



Thermal Log: Dryer Mapping Spreadsheet Template

Monthly dryer maps serve as documented proof of cure, satisfying the quality audit requirements of major apparel brands.