

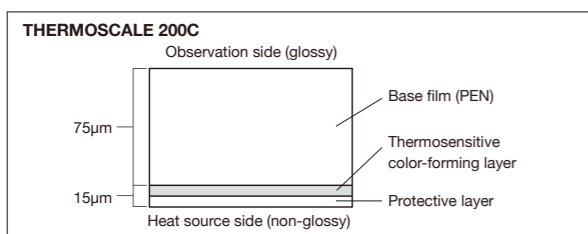
Heat Distribution Measurement Film

THERMOSCALE

THERMOSCALE is a revolutionary new film that enables anyone to measure heat distribution easily by observing the variation in density and hue.

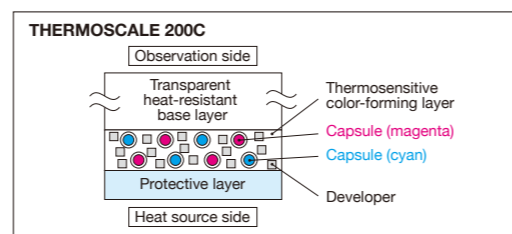
Structure

The base film is coated with a thermosensitive color-forming layer and a protective layer. This is the non-glossy surface that comes into direct contact with the heat source. The glossy side of the sheet is used to observe the color patterns that represent heat distribution.

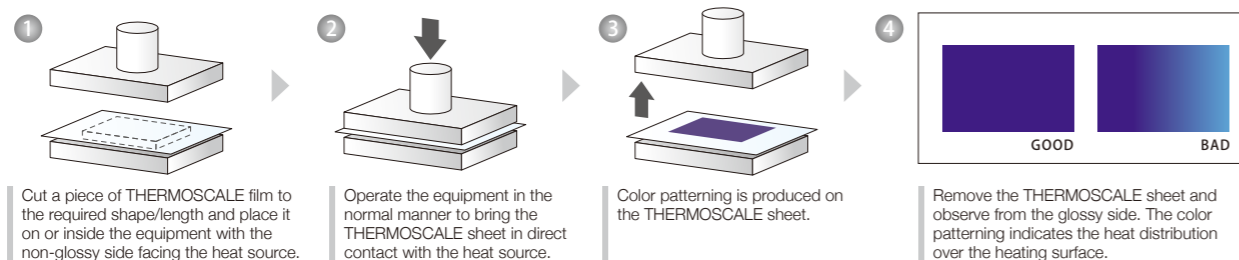


How It Works

Heat melts the developer and makes the microcapsule walls permeable, allowing developer to enter the microcapsules, where it reacts with the color-forming agent to produce color.



How to Use



Features

THERMOSCALE 200C

The extent of color change depends on the temperature of the heat source and the contact time. A shorter contact time produces paler colors with a blue tint. As the contact time increases (at the same temperature), the colors become deeper and take on a red tint. Note that the color change is also influenced by factors such as the type of material on the opposite side (i.e., the non heat source side), thermal characteristics, contact pressure and air flow (see below).

| | 150 | 160 | 170 | 180 | 190 | 200 | 210 °C |
|------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Contact for 1 second | [Light blue] | [Light blue] | [Light blue] | [Light blue] | [Light blue] | [Light blue] | [Light blue] |
| Contact for 10 seconds | [Light blue] | [Light blue] | [Light blue] | [Light blue] | [Light blue] | [Light blue] | [Light blue] |
| Contact for 60 seconds | [Light blue] | [Light blue] | [Light blue] | [Light blue] | [Light blue] | [Light blue] | [Light blue] |

* Note: The above sample colors were produced by Fujifilm under test conditions. Calibration should be performed under actual usage conditions to ensure temperature correspondence.
 Recommended temperature range: 15°C-30°C Recommended humidity: 35% RH-80% RH

THERMOSCALE 100

| | 80 | 85 | 95 | 105 °C |
|------------------------|--------------|--------------|--------------|--------------|
| Contact for 1 second | [Light grey] | [Light grey] | [Light grey] | [Light grey] |
| Contact for 10 seconds | [Light grey] | [Light grey] | [Light grey] | [Light grey] |
| Contact for 60 seconds | [Light grey] | [Light grey] | [Light grey] | [Light grey] |

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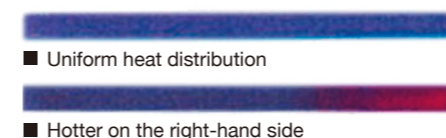
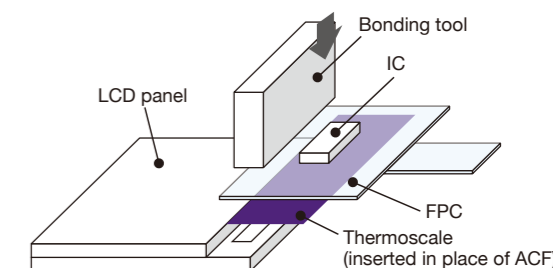
Color of THERMOSCALE sheet turns black when coming in contact with the heat source. A shorter contact time produces paler colors. As the contact time increases (at the same temperature), the colors become deeper. Note that the color change is also influenced by factors such as the type of material on the opposite side (i.e., the non-heat source side), thermal characteristics, contact pressure and air flow (see below).

Typical Applications

THERMOSCALE 200C

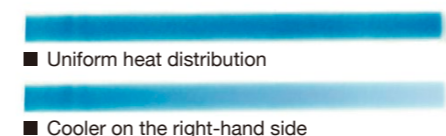
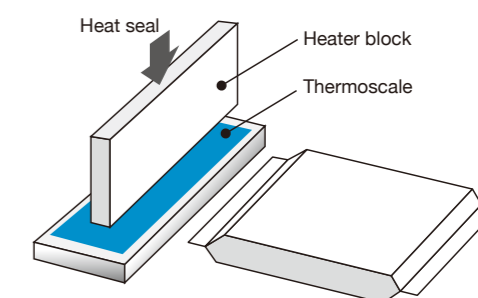
1 ACF compression bonding in LCD panels

In LCD panel production, ACF (anisotropic conductive film) is used to attach the driver IC by holding the part under pressure and applying heat via the bonding tool. If heat is unevenly distributed across the bonding surface (i.e., hotter in some places and cooler in others), the ACF may not bond properly. THERMOSCALE provides an easy-to-read visual map for evaluating the uniformity of heat distribution.



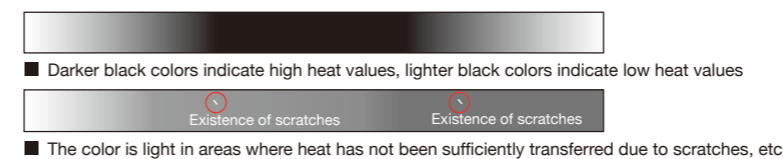
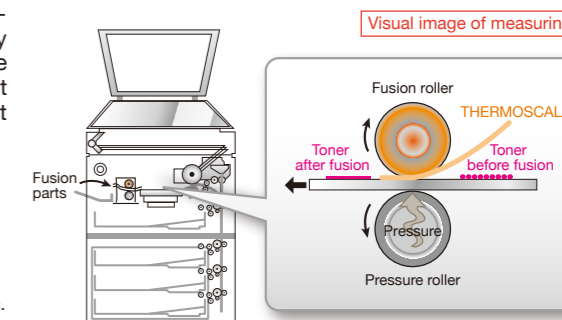
2 Heat-sealed packages

Heat sealers are commonly used to seal packages for foodstuffs, medical supplies and products such as Li-ion batteries. A heater block applies strong heat to the end of the package to seal the plastic. If heat is distributed unevenly across the heat seal surface or the heater block, or if the packaging is not heated sufficiently, the seal may not be formed properly. THERMOSCALE can be used to evaluate the quantity of heat applied to the package.



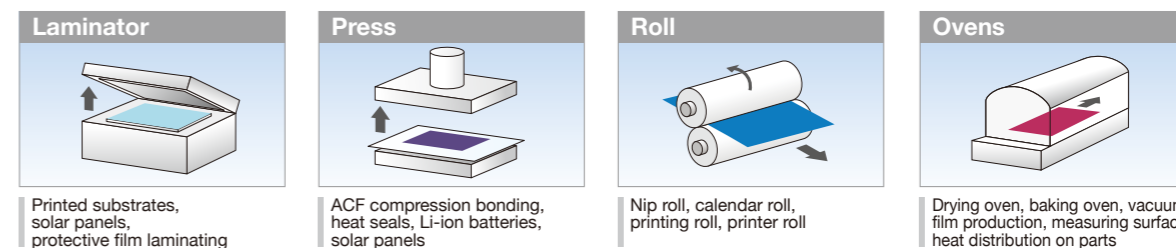
Copier: Heat fusion

In general laser copiers (multifunction printers) used in offices, fusion rollers—which are heated—use heat to melt toner and fuse it to paper to portray letters and pictures, etc. However, if heat is unevenly distributed or if there are scratches on the surface of the fusion roller, copying cannot be carried out properly. By using THERMOSCALE, you can determine if there are any heat irregularities or slight scratches on the surface of the fusion roller.



Uses

THERMOSCALE uses special technology that regulates color intensity and hue in accordance with heat value to generate a highly accurate depiction of heat values over a wide range. THERMOSCALE is ideal for applications involving analysis of heat distribution during press, roll, and laminate processes and within drying ovens.



Specifications

| Product | Temperature range | Base layer | Thickness | Size | |
|------------------|-------------------|------------|-----------|----------------------------|-----------------------------|
| | | | | Roll Type (width × length) | Sheet Type (height × width) |
| THERMOSCALE 200C | 150°C-210°C *1 | PEN | 0.09mm | 270 mm × 5 m | 270 mm × 200 mm (5 sheets) |
| THERMOSCALE 100 | 80°C-105°C *2 | PET | | 297 mm × 10 m | — |

* Actual temperature range depends on conditions of use including contact time, materials, pressure, and air flow. *1 Contact time = 5-20 sec *2 Contact time = 1-10 sec