

Temperature Indicating Materials General Product Catalog



NiGK Corporation

Ever since 1965, NiGK Corporation has been responding to diverse market needs by developing products that use color change to convey temperature, UV and dew levels at a single glance.

Our products can be largely divided into categories according to purpose: temperature indicating materials; temperature indicating materials for food sterilization process; temperature indicating materials for cold chains; UV detection products; and dew detection products.

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Temperature Indicating Materials

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Product Functionality

Reversible	Changes color when a certain temperature is reached then changes back when the temperature drops. Can be used repeatedly.	For checking the current temperature
Irreversible	<ul style="list-style-type: none"> • Changes color when a certain temperature is reached, but does not change back even if the temperature drops. • Changes color when UV intensity increases, but does not change back even in dark places. • Changes color due to moisture from dew, but does not change back even if dry. 	For checking temperature history For detecting UV light For checking for dew
Semi-irreversible	Changes color as the temperature rises then changes back with moisture when the temperature drops.	For temperature measurement

Cautions on Use

Temperature label[™], Thermo Tape[™], Thermo Sheet[™] and Thermo Wappen[™]

Characteristics and usage methods of products presented in this catalog vary from type to type. To ensure proper use, please read carefully beforehand the cautions in this section and cautions given with product descriptions, as well as usage instructions provided with the product. Please direct any questions to NiGK Corporation Sales.

Color Changes

- In this catalog, color-change temperature and color-change accuracy refer to the temperature and degree of accuracy at completion of a color change after heating from room temperature at a rate of between 2 and 3°C/min under normal pressure. The actual color-change temperature may differ under particular heating conditions.
- Reversible temperature indicating materials that change color at 50°C (low-temperature color: yellow) may change to an other color if exposed to direct sunlight. This is a temporary phenomenon and the color will lighten over time. Temperature detection capability will not be affected.
- Reversible temperature indicating materials change color with an accuracy of $\pm 2^\circ\text{C}$ when the temperature is increasing. However, when the temperature decreases, causing a change from the high-temperature color to the low-temperature color, the color change will occur at around 15°C below the temperature given in the catalog due to hysteresis.
- Temperature-indicating pigment of reversible temperature indicating materials may react to Bakelite surfaces, resulting in an inaccurate color change.
- The performance of irreversible temperature labels which change color at 130°C or hotter may be affected if exposed to high temperatures for more than 1 hour.
- The temperature-indicating element of irreversible temperature labels may show slight coloration even before the temperature increases, but performance will not be affected and it will be obvious when the color changes at the specified temperature.

Affixing Labels

- Make sure to clear the surface of all water, oil, rust, dust and dirt. Dirty or uneven surfaces could result in the label falling off or an inaccurate color change.
- To affix the label, peel off the release liner and apply the label to the surface on which the temperature is to be measured, gently pressing down on it with your finger or a cloth. Avoid strong rubbing, which may scratch the label or cause other damage affecting the ability of the product to indicate temperature properly.
- Where possible, affix the label to a flat surface as curved surfaces and corners could lead to an inaccurate color change.
- Do not alter the shape of a label. Modifying a label, for example by cutting it with a utility knife, may affect the label's durability or lead to an inaccurate color change. (This does not apply to Thermo Tape[™].)

Usage and Storage Environments

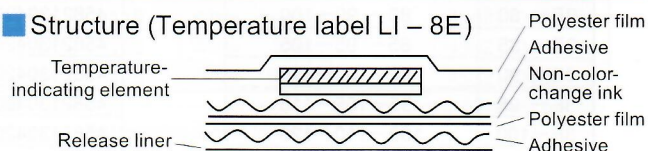
- Do not use products in high-pressure or high-vacuum environments, or in microwave ovens or other induction heating applications, as it could lead to an inaccurate color change.
- Store in a cool dark place prior to use. Products specified as requiring cold storage should be kept refrigerated.
- Products specified for indoor applications should be used indoors. Using these products in conditions where they are exposed to the effects of substances such as water, oil, solvents and plasticizers (e.g. through surface adhesion, soaking from underneath, or in atmospheres consisting of such substances) may lead to an inaccurate color change.
- NiGK Corporation will not accept any liability for damages incurred as a result of using the product or applying measurements given by the products.

●Period of Effectiveness of Temperature Indicating Materials

Product	Type	Indoor use	Outdoor use
Temperature label	LI · F · 3E 4E · 5E · 8E	5 years	3 years
	VL	1 year	Not suitable
Temperature label	5S	3 years	Not suitable
Temperature label Super mini	1K · 3K · 3R		
Temperature label Mini	No.		
Combination label	A · TB · O	5 years	3 years

Product	Type	Indoor use	Outdoor use
Thermo Tape [™]	TR	5 years	3 years
Thermo Sheet [™]	P · C		
Number Thermo Wappen [™]	WR		

■ Structure (Temperature label LI – 8E)

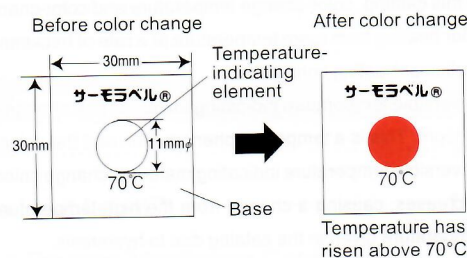
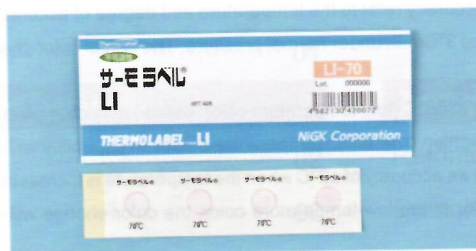


Features

- This temperature label changes color sharply at the specified temperature. It is an irreversible temperature indicator, meaning that once the color changes it will not return to its original state.
- The color-changing temperature-indicating element employs the melting point of the refined and stable melting pigment. Temperature-indicating accuracy is therefore high.
- The temperature-indicating element is sealed by heat-resistant film, protecting it from water, chemicals, oil and the surrounding atmosphere. (LI, F, 3E, 4E, 5E, 8E, and Combination)
- The backing of the temperature label is coated with heat-resistant adhesive, meaning the release liner simply needs to be peeled off before affixing the label to the area where the temperature is to be measured.

■ LI

- Single temperature indicating model



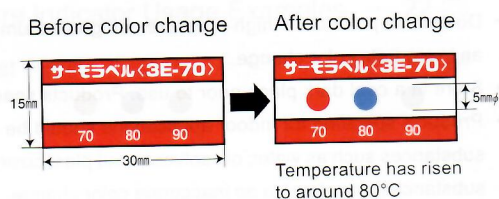
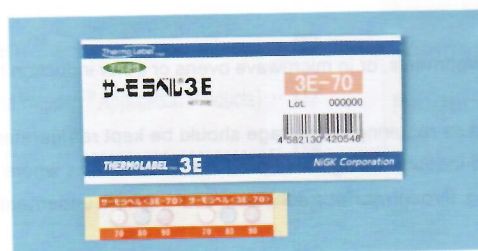
* The diameter of the temperature-indicating element is 11mm for LI-40 to 105, and 8mm for LI-110 to 250.

Type	Color-change temperature °C	Before color change	After color change	Color-change accuracy	JAN code
LI-40	40	White	Blue	±2°C	4582130420010
LI-45	45	White	Black		4582130420027
LI-50	50	White	Red		4582130420034
LI-55	55	White	Deep indigo		4582130420041
LI-60	60	White	Green		4582130420058
LI-65	65	White	Black		4582130420065
LI-70	70	White	Red-orange		4582130420072
LI-75	75	White	Dark red		4582130420089
LI-80	80	White	Blue		4582130420096
LI-85	85	White	Deep indigo		4582130420102
LI-90	90	White	Red	±3°C	4582130420119
LI-95	95	White	Black		4582130420126
LI-100	100	White	Dark red		4582130420133
LI-105	105	White	Green		4582130420140
LI-110	110	White	Deep indigo		4582130420157
LI-115	115	White	Red-orange		4582130420164
LI-120	120	White	Blue	±2°C	4582130420171
LI-125	125	White	Black		4582130420188
LI-130	130	White	Black		4582130420195
LI-140	140	White	Black		4582130420201
LI-150	150	White	Black		4582130420218
LI-160	160	White	Black		4582130420225
LI-170	170	Yellowish gray	Black		4582130420232
LI-180	180	Pale yellow	Black		4582130420249
LI-190	190	Pale yellow	Black		4582130420256
LI-200	200	Pale yellow	Black		4582130420263
LI-210	210	Pale yellow	Black	±3°C	4582130420270
LI-220	220	Pale yellow	Black		4582130420287
LI-230	230	Pale yellow	Black		4582130420294
LI-240	240	Pale yellow	Black		4582130420300
LI-250	250	Pale yellow	Black		4582130420317

40 labels per box

■ 3E

- 3 temperatures at 10°C intervals



* Label dimensions are 15×30mm for 3E-40 to 110, and 17×32mm for 3E-120 to 230.

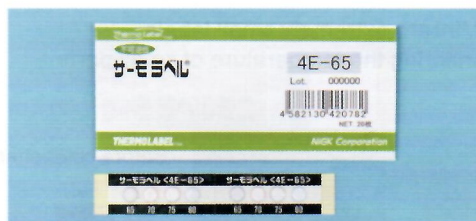
Type	Temperature combination (°C)	Color-change accuracy	JAN code
3E-40	40-50-60	±2°C	4582130420485
3E-45	45-55-65		4582130420492
3E-50	50-60-70		4582130420508
3E-55	55-65-75		4582130420515
3E-60	60-70-80		4582130420522
3E-65	65-75-85		4582130420539
3E-70	70-80-90		4582130420546
3E-75	75-85-95		4582130420553
3E-80	80-90-100		4582130420560
3E-85	85-95-105		4582130420577
3E-90	90-100-110	±2~3°C	4582130420584
3E-95	95-105-115		4582130420591
3E-100	100-110-120		4582130420607
3E-105	105-115-125		4582130420614
3E-110	110-120-130	±2°C	4582130420621
3E-120	120-130-140		4582130420638
3E-130	130-140-150		4582130420645
3E-140	140-150-160		4582130420652
3E-150	150-160-170		4582130420669
3E-160	160-170-180		4582130420676
3E-170	170-180-190		4582130420683
3E-180	180-190-200		4582130420690
3E-190	190-200-210	±3°C	4582130420706
3E-200	200-210-220		4582130420713
3E-210	210-220-230		4582130420720
3E-220	220-230-240		4582130420737
3E-230	230-240-250		4582130420744

* Color changes at each temperature are the same as for LI.

20 labels per box

■4E

- 4 temperatures at 5°C intervals



Before color change



Temperature has risen to around 70°C

After color change



* Color changes at each temperature are the same as for temperature label LI.

Type	Temperature combination (°C)	Color-change accuracy	JAN code
4E-50	50-55-60-65	±2°C	4582130420751
4E-55	55-60-65-70		4582130420768
4E-60	60-65-70-75		4582130420775
4E-65	65-70-75-80		4582130420782
4E-70	70-75-80-85		4582130420799

Type	Temperature combination (°C)	Color-change accuracy	JAN code
4E-75	75-80-85-90	±2°C	4582130420805
4E-80	80-85-90-95		4582130420812
4E-85	85-90-95-100		4582130420829
4E-90	90-95-100-105		4582130420836
4E-95	95-100-105-110		4582130420843

20 labels per box

■5E

- 5 temperatures at 5°C or 10°C intervals



Before color change



Temperature has risen to around 80°C

After color change



* Label dimensions are 15×43mm for 5E-50 to 100, and 17×45mm for 5E-125 to 210.

Type	Temperature combination (°C)	Before color change	After color change	Color-change accuracy	JAN code
5E-50	50-55-60-65-70	White	Black	±2°C	4582130420850
5E-75	75-80-85-90-95	White	Black		4582130420867
5E-100	100-105-110-115-120	White	Black		4582130420874

Type	Temperature combination (°C)	Before color change	After color change	Color-change accuracy	JAN code
5E-125	125-130-140-150-160	White	Black	±2°C	4582130420881
5E-170	170-180-190-200-210	Pale yellow	Black	±2~3°C	4582130420898
5E-210	210-220-230-240-250	Pale yellow	Black	±3°C	4582130420904

20 labels per box

■8E

- 8 temperatures at 10°C intervals



Before color change



Temperature has risen to around 80°C

After color change



* Color changes at each temperature are the same as for temperature label LI.

Type	Temperature combination (°C)	Color-change accuracy	JAN code
8E-50	50-60-70-80-90-100-110-120	±2°C	4582130420911
8E-90	90-100-110-120-130-140-150-160		4582130423196

20 labels per box

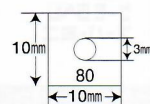
■F

- For small spaces on indoor/outdoor equipment



Before color change

After color change



Temperature has risen above 80°C



Type	Color-change temperature °C	Before color change	After color change	Color-change accuracy	JAN code
F-50	50	White	Red	±2°C	4582130420324
F-55	55	White	Deep indigo		4582130420331
F-60	60	White	Green		4582130420348
F-65	65	White	Black		4582130420355
F-70	70	White	Red-orange		4582130420362
F-75	75	White	Dark red		4582130420379
F-80	80	White	Blue		4582130420386
F-85	85	White	Deep indigo		4582130420393

Type	Color-change temperature °C	Before color change	After color change	Color-change accuracy	JAN code
F-90	90	White	Red	±2°C	4582130420409
F-95	95	White	Black		4582130420416
F-100	100	White	Dark red		4582130420423
F-105	105	White	Green		4582130420430
F-110	110	White	Deep indigo		4582130420447
F-115	115	White	Red-orange		4582130420454
F-120	120	White	Blue		4582130420461
F-125	125	White	Black		4582130420478

40 labels per box

Applications

- Indoor/outdoor monitoring of heat generation/heating temperature
- Monitoring of heat treatment
- Inspection of heat generation by power substation equipment/plant machinery
- Temperature monitoring during distribution

Irreversible

Temperature label Super mini

RoHS Compliant

POINT!! For temperature monitoring of small parts

Features

- Temperature label Super mini and Mini are extremely small labels.
- These labels are widely used for monitoring the temperature of small parts.

1K

- Mini-sized labels (5×5mm)
- Single temperature indicating model



Before color change

After color change



Temperature has risen to around 70°C

* The white dot disappears when the color-change temperature is reached (same for 1K, 3K and 3R)

Type	Color-change temperature °C	Color-change	Color-change accuracy	JAN code	Type	Color-change temperature °C	Color-change	Color-change accuracy	JAN code
1K-40	40	White ↓ Black	±2°C	4582130420928	1K-85	85	White ↓ Black	±2°C	4582130421017
1K-45	45			4582130420935	1K-90	90			4582130421024
1K-50	50			4582130420942	1K-95	95			4582130421031
1K-55	55			4582130420959	1K-100	100			4582130421048
1K-60	60			4582130420966	1K-105	105			4582130421055
1K-65	65			4582130420973	1K-110	110			4582130421062
1K-70	70			4582130420980	1K-115	115			4582130421079
1K-75	75			4582130420997	1K-120	120			4582130421086
1K-80	80			4582130421000	1K-125	125			4582130421093

200 labels per box

3K

- Mini-sized 3-temperature type



Before color change

After color change



Temperature has risen to around 85°C

Type	Temperature combination (°C)	Color-change	Color-change accuracy	JAN code
3K-40	40-45-50	White ↓ Black	±2°C	4582130421109
3K-50	50-55-60			4582130421116
3K-65	65-70-75			4582130421123
3K-80	80-85-90			4582130421130
3K-95	95-100-105			4582130421147
3K-110	110-115-120			4582130421154
3K-130	130-140-150			4582130421161

20 labels per box

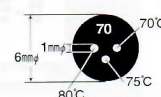
3R

- Round mini-sized 3-temperature type



Before color change

After color change



Temperature has risen to around 75°C

* The first color-change temperature in the combination is represented by the white dot on the right-hand side beneath the indicated number. The temperatures continue in clockwise order.

Type	Temperature combination (°C)	Color-change	Color-change accuracy	JAN code
3R-40	40-45-50	White ↓ Black	±2°C	4582130421178
3R-50	50-55-60			4582130421185
3R-60	60-65-70			4582130421192
3R-70	70-75-80			4582130421208
3R-80	80-85-90			4582130421215
3R-90	90-95-100			4582130421222
3R-100	100-105-110			4582130421239
3R-110	110-115-120			4582130421246
3R-120	120-125-130			4582130421253
3R-130	130-140-150			4582130421260

20 labels per box

Applications

- Monitoring for abnormal heat generation of electronic parts such as transistors, ICs, LSIs, resistors, capacitors, and inductors
- Inspection of heat generation by small motors such as circuit cooling fan motors and drive motors
- Checking the ambient temperature during product transportation or use

Irreversible

Temperature label Mini

RoHS Compliant

POINT!! Single temperature indicating model

Mini

- Ideal for monitoring the temperature of small parts



Before color change



After color change

90

Temperature has risen above 90°C

Type	Color-change temperature °C	Color-change	Color-change accuracy	JAN code
No.50	50	White ↓ Red	±2°C	4582130421277
No.55	55			4582130421284
No.60	60			4582130421291
No.65	65			4582130421307
No.70	70			4582130421314
No.75	75			4582130421321
No.80	80			4582130421338
No.85	85			4582130421345

Type	Color-change temperature °C	Color-change	Color-change accuracy	JAN code
No.90	90	White ↓ Red	±2°C	4582130421352
No.95	95			4582130421369
No.100	100			4582130421376
No.105	105			4582130421383
No.110	110			4582130421390
No.115	115			4582130421406
No.120	120			4582130421413
No.125	125			4582130421420

200 labels per box

Irreversible

Temperature label S

RoHS Compliant

POINT!! 5-temperature stepped indication at 5°C intervals

Features

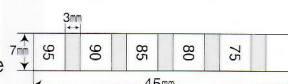
- Temperature indicator label 5S has 5 temperatures on a single label, making it ideal for temperature measurements in test situations.

5S

- Ideal for monitoring the temperature of small parts



Before color change



After color change



Temperature has risen to around 85°C

* Color changes at each temperature are the same as for LI.

Type	Temperature combination (°C)	Color-change accuracy	JAN code
5S-50	50-55-60-65-70	±2°C	4582130421437
5S-55	55-60-65-70-75		4582130421444
5S-60	60-65-70-75-80		4582130421451
5S-65	65-70-75-80-85		4582130421468
5S-70	70-75-80-85-90		4582130421475
5S-75	75-80-85-90-95		4582130421482
5S-80	80-85-90-95-100		4582130421499
5S-85	85-90-95-100-105		4582130421505
5S-90	90-95-100-105-110		4582130421512
5S-95	95-100-105-110-115		4582130421529

20 labels per box

Caution on Use

- Super mini, mini and S are designed for indoor use and therefore should be used only in indoor environments. Using these products in conditions where they are exposed to the effects of substances such as water, oil, solvents and plasticizers (e.g. through surface adhesion, soaking from underneath, or in atmospheres consisting of such substances) may lead to an inaccurate color change.

Reversible

Thermo Tape™

Non-RoHS compliant

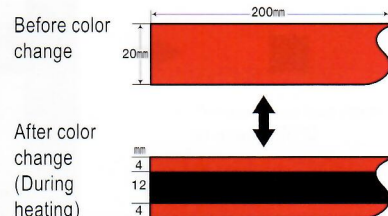
POINT!! Strips showing the current temperature

Features

- Thermo Tape™ is a reversible indicator that changes color at the specified temperature and reverts to its original color when cooled. It can be used repeatedly.
- Both sides of the tape retain the original color (before changing), making any color change due to a rise in temperature obvious at a single glance.
- As a tape, it can be cut into strips of any length.

TR

- Single temperature indicating model



Type	Color-change temperature°C	Low-temperature color	High-temperature color	Color-change accuracy	JAN code
TR-40	40	Reddish yellow	Reddish orange	±2°C	4582130421536
TR-50	50	Yellow	Yellowish orange		4582130421543
TR-60	60	Bright yellowish red	Dark brown-purple		4582130421550
TR-70	70	Red	Dark brown-purple		4582130421567

25 labels per box

Reversible

Thermo Sheet™

Non-RoHS compliant

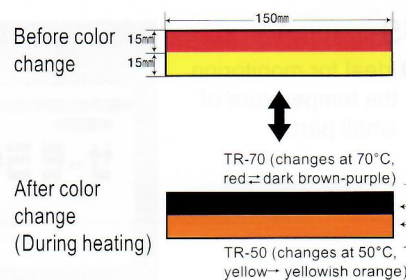
POINT!! Temperature-indicating sheet

Features

- Sheets with a combination of reversible temperature indicating materials. There are two types: 2-temperature and 5-temperature.
- The 2-temperature sheet is suitable for indicating warning and danger temperatures. (P5·7)
- The 5-temperature sheet is suitable for measuring temperature and checking for temperature increases. (C)
- Color-change temperatures and color-change tones are the same as for Number Thermo Wappen™.

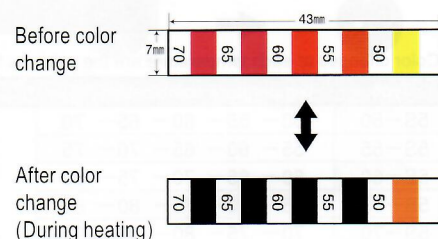
P5·7

- 2-temperature type



C

- 5-temperature type



* Color changes and color tones are the same as for Number Thermo Wappen™

Type	Color-change temperature°C	Qty per box	Color-change accuracy	JAN code
P-5·7	50-70	30	±2°C	4582130421574
C	50-55-60-65-70	100		4582130421581

Applications

- Preventing burns during heating processes
- Monitoring of warning and danger temperatures

Reversible

Number Thermo Wappen™

Non-RoHS compliant

POINT!!

Number of heating temperature appears

Features

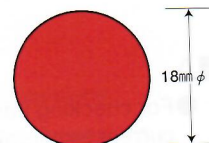
- Number of heating temperature appears.
- The number disappears when the temperature drops, allowing repeated use.

WR

- Temperature appears in digital format

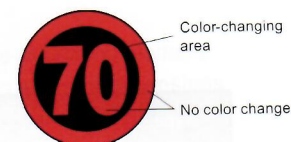


Before color change



18mm φ

After color change (During heating)

Color-changing area
No color change

Type	Color-change temperature °C	Low-temperature color	High-temperature color	Color-change accuracy	JAN code
WR-40	40	Reddish yellow	Reddish orange	±2°C	4582130421598
WR-45	45	Yellowish orange	Bright yellowish red		4582130421604
WR-50	50	Yellow	Yellowish orange		4582130421611
WR-55	55	Yellowish red	Dark brown-purple		4582130421628
WR-60	60	Bright yellowish red	Dark brown-purple		4582130421635
WR-65	65	Red	Dark brown-purple		4582130421642
WR-70	70	Red	Dark brown-purple		4582130421659
WR-Mixed	50~70				4582130421666

* WR-40 to 70: 120 labels of the same temperature per box
 * WR-Mixed: 24 labels each for 50°C, 55°C, 60°C, 65°C and 70°C (120 labels per box)

Reversible

Customized Thermo Wappen™

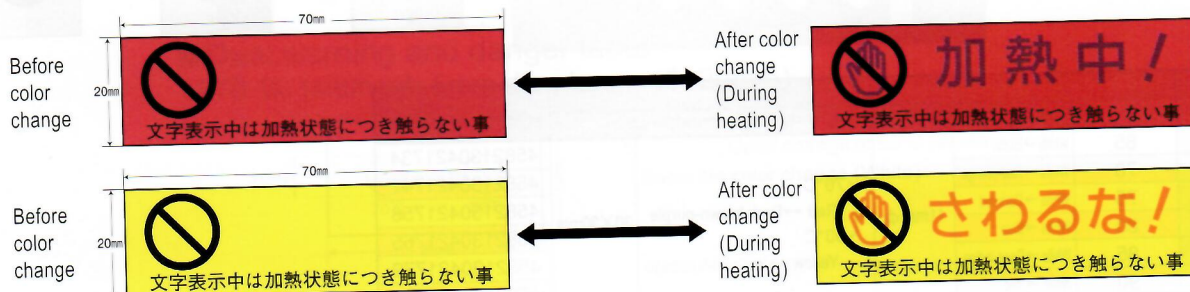
Non-RoHS compliant

POINT!!

Application Product

Create your own original design

Warning Wappen

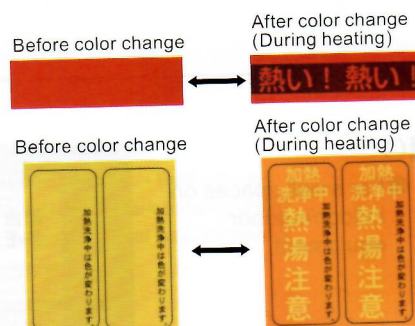


Features

- Besides standard Thermo Tape™, Thermo Sheet™ and Number Thermo Wappen™ products, we also manufacture products featuring your own designs.
- Color-change temperatures and color changes are the same as for Number Thermo Wappen™.
- This item is made to order. The price varies according to the design and quantity. Please inquire for details.

Usage Examples

- Temperature gauge: When the color changes, the words "Warning!" or "Stop!" appear.
- Burn prevention sticker: When the color changes, the words "Danger!" or "Don't Touch!" appear.



Note on Thermo Tape™, Thermo Sheet™, Number Thermo Wappen™ and Customized Thermo Wappen™

- The following are guidelines for heat resistance and durability.

Parameter	Heat resistance	Water resistance	Oil resistance
Performance	1,000 hours continuous heating at 90°C (20×30mm test specimen)	1 month submerged in water at room temperature	1 month submerged in oil at room temperature

Irreversible
+
Reversible

Combination label

Non-RoHS compliant

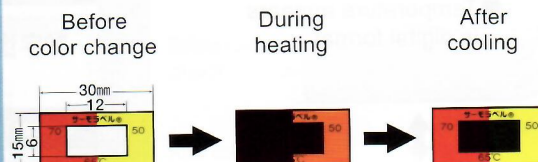
POINT!! Check temperature history and current temperature

Features

- This combination label consists of an irreversible temperature-indicating element (temperature label) at the center of a reversible Thermo Sheet™ base.
- Trace temperature history with the irreversible label and current temperature with the reversible sheet.

■ A

- For checking past and current temperature

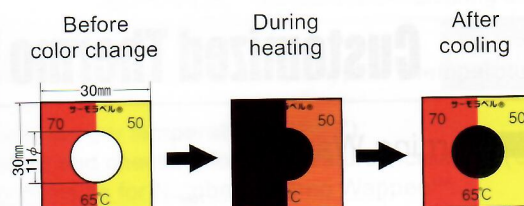


Type	Temperature-indicating element (irreversible)			Base (reversible)		JAN code
	Color-change temperature °C	Color-change	Size	Color-change temperature (Low-temperature color ↔ high-temperature color)	Size	
A-65	65	White → Black	6×12mm	70°C Red ↔ Dark brown-purple 50°C Yellow ↔ Yellowish orange	15×30mm	4582130421673
A-70	70	White → Red-orange				4582130421680
A-75	75	White → Dark red				4582130421697
A-80	80	White → Blue				4582130421703
A-85	85	White → Deep indigo				4582130421710
A-90	90	White → Red				4582130421727

80 labels per box

■ TB

- For checking past and current temperature

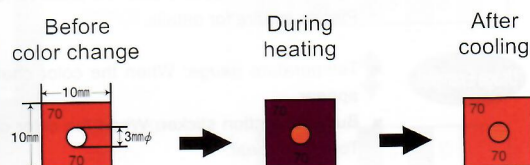


Type	Temperature-indicating element (irreversible)			Base (reversible)		JAN code
	Color-change temperature °C	Color-change	Size	Color-change temperature (Low-temperature color ↔ high-temperature color)	Size	
TB-65	65	White → Black	11mm φ	70°C Red ↔ Dark brown-purple 50°C Yellow ↔ Yellowish orange	30×30mm	4582130421734
TB-70	70	White → Red-orange				4582130421741
TB-75	75	White → Dark red				4582130421758
TB-80	80	White → Blue				4582130421765
TB-85	85	White → Deep indigo				4582130421772
TB-90	90	White → Red				4582130421789

40 labels per box

■ O

- For small spaces on indoor/outdoor equipment



Type	Temperature-indicating element (irreversible)			Base (reversible)		JAN code
	Color-change temperature °C	Color-change	Size	Color-change temperature (Low-temperature color ↔ high-temperature color)	Size	
O-70	70	White → Red-orange	70	Red ↔ Dark brown-purple	70	4582130421796
O-80	80	White → Blue				4582130421802
O-90	90	White → Red				4582130421819
O-100	100	White → Dark red				4582130421826

40 labels per box

Features

- The customized label or combination label can be created to suit varying applications with different dimensions and temperature combinations to the standard products.

Please place an order based on the following specifications.

- Element : (irreversible color-changing area): Specify color-change temperature, after-change color, and dimensions.
- Base: For customized combination temperature labels, specify color-change temperature (reversible) and dimensions. For customized Thermo Label products, specify dimensions.
- Color-change temperature printing Color-change temperatures of the temperature-indicating element and base will be shown on the base. Please specify the position of this printing, or specify that this printing is not required.
- Dimensions and temperatures: Please specify base dimensions at least 3 times larger than temperature-indicating element dimensions when using elements for 40°C to 105°C, or at least 4 times larger than temperature-indicating element dimensions when using elements for 110°C to 250°C.
- * For temperature-indicating element temperature specifications and after-change colors, use the standard temperature label LI as a reference. For customized combination label products, specify element temperatures between 40°C and 125°C. For base (reversible area) specifications, use the standard Thermo Tape™ as a reference.

* Products employing reversible labels are not RoHS compliant.

Usage Examples

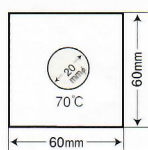
Customized temperature label

- Large label for monitoring from a distance

LI-70 (element: 20mm dia.; base: 60×60mm)

Temperature specification of element

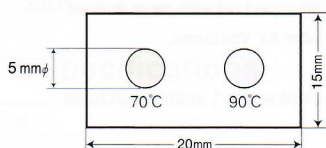
At least 3 times larger than the element



- Element: Color change at 70°C (White → Red)
Standard color of Red-orange is changed to Red
- Base: No color change (White)
The normal color is white.
Please inquire about other colors.

Dual warning and danger label

LI-70·90 (element: 5mm dia.; base: 15×20mm)



- Element: Color change at 70°C (White → Blue)
Color change at 90°C (White → Red)
- Base: No color change (White)

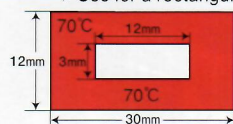
Usage Examples

Customized Combination temperature label

- Single base temperature indication

A-70-7 (element: 3×12mm; base: 12×30mm)

Temperature specification of base
Temperature specification of element
Use for a rectangular element

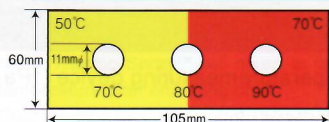


- Element: Color change at 70°C (White → Red-orange)
- Base: Color change at 70°C (Red → Dark brown-purple)
- * Colors for the base color change cannot be customized.

Combination with multiple temperature levels

TB-70·80·90-5·7 (element: 11mm dia.; base: 60×105mm)

Temperature specification of base
Temperature specification of element
Use for a round element



- Element: Color change at 70°C (White → Red-orange)
Color change at 80°C (White → Blue)
Color change at 90°C (White → Red)
- Base: Color change at 50°C (Yellow ↔ Yellowish orange)
Color change at 70°C (Red → Dark brown-purple)

Temperature label for Vacuums

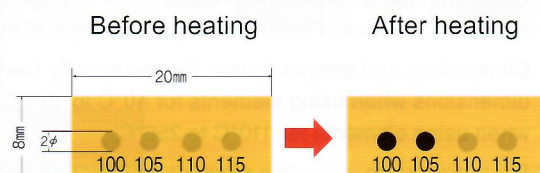
Irreversible

 RoHS Compliant

POINT!! Check temperature in 1Pa to normal pressure environments at a single glance

Features

- Temperature monitoring labels for use in 1Pa to normal pressure environments.
- Monitor temperature without wires or power simply by affixing the label to the area where temperature is to be monitored.
- The temperature-indicating part changes color irreversibly from pale yellow to black when the specified temperature is reached, allowing the temperature history to be traced.
- Measurements with color-change accuracy of $\pm 2-4^{\circ}\text{C}$ are possible even under reduced pressure.
- Labels are made using low-outgassing materials to reduce the release of outgas.



* We can see the area has been heated to around 105°C .

Type	Temperature combination $^{\circ}\text{C}$	Before color change	After color change	Color-change accuracy	JAN code
VL-40	40-45-50-55	Pale yellow	Black	$\pm 2^{\circ}\text{C}$	4582130423202
VL-60	60-65-70-75	Pale yellow	Black		4582130423219
VL-80	80-85-90-95	Pale yellow	Black		4582130423226
VL-100	100-105-110-115	Pale yellow	Black		4582130423233
VL-120	120-125-130-135	Pale yellow	Black		4582130423240
VL-140	140-150-160-170	Pale yellow	Black	$\pm 4^{\circ}\text{C}$	4582130423257
VL-180	180-190-200-210	Pale yellow	Black		4582130423264

10 labels per box

Caution on Use

- Do not cut or modify the labels in any other way before use as it may affect color-changing performance and durability.
- Use only in temperatures up to 230°C . Use in temperatures above 230°C could lead to unanticipated levels of outgassing.
- Remove labels quickly with tweezers or a similar utensil once the area has cooled to around room temperature (20°C). Labels are harder to remove once the temperature drops below room temperature or if left affixed for a long period of time. After removing the label, residual adhesive on the surface where it was affixed can be wiped off with paint thinner.
- For more details, refer to the technical brochure for temperature label for Vacuums.

Storage and Use-by Date

- Products should be stored in a cool, dark place under 30°C and used within 1 year of purchase.

Applications

- Temperature monitoring for etching, vacuum deposition or manufacturing processes



The color-change temperature measuring device (1Pa to normal pressure) for temperature label for Vacuums.

Features

- Thermo Spray™ is a special paint that changes color according to the temperature.
- No brushes, diluting fluid or other troublesome materials are required.
- Can be applied quickly across a wide area.
- A small spray can that provides excellent portability.
- Easy monitoring of temperature by simply spraying onto the area where the temperature is to be measured.



* Colors shown are approximate colors.

	Type	Color-change temperature °C	Before color change	After color change	JAN code
Semi-irreversible	No.7	70°C	Light pink	Bright bluish purple	4582130423134
	No.13	130°C	Light red-purple	Blue-purple	4582130423141
Irreversible	No.26	260°C	Light greenish blue	Reddish gray	4582130423158
	No.33	330°C	Light blue-green	Gray-black	4582130423165
	No.46	460°C	Dark green	Yellow-greenish white	4582130423172

How to Use Thermo Spray™



Shake the can well before use.



Spray onto the surface to be coated from a distance of around 20cm.



Wait until the coating is sufficiently dry before using for monitoring temperature.



Before color change (No.13)

Heating



After color change (No.13)

Thermo Spray™ Specifications

Content	100ml
Application area	Approx. 0.2m ²
Size	134mm × 45mm dia.
Place of use	Indoors

- Color-change (final) temperature during temperature increase (heating rates: 0.5-20°C/min.)

Type	Heating rate (°C/min.)					
	0.5	1	2.5	5	10	20
No.7	68	70	73	75	77	79
No.13	119	123	128	132	136	140
No.26	238	246	257	266	274	282
No.33	305	314	326	336	345	354
No.46	442	453	467	478	489	500

- Color-change temperature during isothermal heating (heating times: 1-500 min.)

Type	Heating time (1-500 min.)								
	1	2	5	10	20	50	100	200	500
No.7	74	72	71	69	68	66	64	63	61
No.13	135	132	128	125	122	118	115	112	108
No.26	276	267	254	245	236	221	214	205	193
No.33	348	339	326	317	308	295	286	277	264
No.46	562	531	491	460	444	420	402	384	360

- Time required for color of semi-irreversible Thermo Spray™ to revert (related to relative humidity)

Type	Relative humidity (at 20°C)				
	22%	36%	54%	76%	88%
No.7	12 hours	2 hours	20 min.	10 min.	5 min.

Caution on Use

- Intended for indoor use. Provide proper ventilation during use.
- As this is a special paint, it may take some time to stir.
- Color-change temperature varies depending on the effects of heating rate and time, pressure, and reactive gases.
- Do not spray directly onto high-temperature (above 40°C) surfaces.
- No. 7 Thermo Spray™ will revert to its original color due to moisture in the air if left in room temperature after changing color.
- Contact between the coated surface and reactive gases (e.g. hydrogen sulfide, hydrogen chloride, chlorine, ammonia, and sulfur dioxide) may have adverse effects.
- For more details, refer to the technical brochure for Thermo Spray™.

Applications

- Checking the temperature of electrical wire connections
- Checking the heat distribution of molds or dies

Non-RoHS compliant
ReversibleRoHS Compliant (some non-compliant)
Semi-irreversible + Irreversible

Thermo Paint™

POINT!! Temperature-indicating paint

Features

- Temperature-indicating paint for monitoring the temperature of large and uneven surfaces.

R Non-RoHS compliant

- For repeated use



Reversible

Changes color at the specified temperature then reverts to the original color when cooled. Can be used repeatedly with a single application.

No. RoHS Compliant (some non-compliant)

- For checking temperature history



Semi-irreversible

Changes color clearly as the temperature rises then reverts to the original color with moisture.

Irreversible

Changes color clearly as the temperature rises. Once changed, it does not revert to the original color.

* Colors shown are approximate colors.

	Type	Color-change temperature (°C)	Low-temperature color	High-temperature color	JAN code
Reversible	★ R-4	40	Reddish yellow	Reddish orange	4582130421833
	★ R-5	50	Yellow	Yellowish orange	4582130421840
	★ R-6	60	Bright yellowish red	Dark brown-purple	4582130421857
	★ R-7	70	Red	Dark brown-purple	4582130421864

Temperature accuracy is $\pm 2^{\circ}\text{C}$. ★ Designated non-medical poisonous products 250g per glass bottle

* Related supplies (sold separately)

< JAN code >

Primer	100g can	4582130422069
Special primer (set)	Base	150g can 4582130422076
	Hardener	50g can 4582130422076
Thinner (for reversible)	200g can	4582130422083
Finishing varnish	100g can	4582130422090

* Colors shown are approximate colors.

	Type	Color-change temperature (°C)	Original color	Color-change	JAN code	
Semi-irreversible	No.5	50	Light pink	Bright blue	4582130421871	
	No.7	70	Light pink	Bright bluish purple	4582130421888	
	No.8	80	Light pink	Bright purple	4582130421895	
	No.9	90	Light pink	Bright purple	4582130421901	
	No.11	110	Light green	Bright bluish purple	4582130421918	
Irreversible	For low temperatures	No.13	130	Light red-purple	Blue-purple	4582130421925
		✱☆No.14	140	Bluish green	Light purple	4582130421932
		No.16	160	Light blue	Dark gray	4582130421949
		No.18	180	Red-purple	Brown-black	4582130421956
		No.20	200	Light yellow-orange	Blue-purple	4582130421963
	For high temperatures	☆No.22	220	White	Gray-black	4582130421970
		☆No.25	250	Light greenish blue	Reddish gray	4582130421987
		☆No.29	290	Light pink	Black	4582130421998
		☆No.31	310	Bright bluish gray	Brown-black	4582130422007
		☆No.33	330	Light blue-green	Gray-black	4582130422014
		✱No.36	360	White	Orange	4582130422021
		No.41	410	Blue	Brown-white	4582130422038
		No.44	440	White	Light yellow-brown	4582130422045
		No.45	450	Purple	White	4582130422052

★ Designated non-medical deleterious products ☆ Non-RoHS Compliant 200g per glass bottle

* Related supplies (sold separately)

< JAN code >

Thinner (for irreversible/semi-irreversible, low temperatures)	200g can	4582130422106
Thinner (for irreversible, high temperatures)	200g can	4582130422113

Cautions for Thermo Paint™

- Before using a product, consider its characteristics (reversible, semi-irreversible or irreversible).
- Clean the surface to be coated properly before applying.
- Stir well with a thin stick before use as the pigment sinks to the bottom.
- Color-change temperature is the temperature at completion of the color change when heated at $2-3^{\circ}\text{C}/\text{min}$.
- Drying takes 4-5 min. at room temperature.
- The solvent is flammable and volatile. After use, close the lid tightly and store inside its box in a cool, dark place with good ventilation and away from fire.
- Products should be used within 1 year of purchase.
- Some products are pursuant to Japan's Poisonous and Deleterious Substances Control Act

Cautions for Reversible Types

- Use the special primer for aluminum surfaces. Use the primer for other metal surfaces.
- Apply a finishing coat to enhance durability and resistance to chemicals and gases.
- Apply approx. 140-160g per square meter. Apply with a brush.
- R-5 may react if exposed to direct sunlight and take on a blackish tone. This will in no way affect performance.
- Color changing from a high-temperature color to a low-temperature color as the temperature decreases will occur at around 15°C below the temperature given in the catalog.

Cautions for Semi-Reversible/Irreversible Types

- Color-change temperature may vary slightly due to the effects of parameters such as heating rate, heating time, pressure and reactive gases. For more details, refer to the technical brochure for irreversible Thermo Paint™.
- Apply approx. 80-100g per square meter. Apply with a brush.
- Semi-irreversible types are not suitable for repeated use.

Color-Change Temperature Data (Reference Data)

Color-change temperature during heating with temperature increase

〈Quick Reference Table〉

(°C)

Type	Heating rate (°C/min.)					
	0.5	1.0	2.5	5.0	10.0	20.0
Semi-irreversible	No. 5	46	48	51	53	55
	No. 7	68	70	73	75	77
	No. 8	78	80	83	85	87
	No. 9	88	90	93	95	97
Irreversible	No.11	108	110	113	115	117
	No.13	119	123	128	132	136
	No.14	130	135	141	145	150
	No.16	155	158	162	165	168
	No.18	170	175	181	185	190
	No.20	185	192	201	207	214
	No.22	208	215	224	230	237
	No.25	229	238	249	257	266
	No.29	270	279	291	301	310
	No.31	290	299	311	321	330
	No.33	305	314	326	336	345
	No.36	329	340	354	364	375
	No.41	386	398	414	426	439
	No.44	429	434	441	446	451
	No.45	440	445	451	455	460
						465

Color-change temperature during isothermal heating

〈Quick Reference Table〉

(°C)

	Type	Heating time(sec)					Heating time(min)							
		2	5	10	30	1	2	5	10	20	50	100		
Semi-irreversible	No. 5	75	69	65	58	53	52	50	48	47	45	43		
	No. 7	114	103	95	82	74	72	71	69	68	66	64		
	No. 8	122	112	104	92	84	82	81	79	78	76	74		
	No. 9	134	123	115	101	93	91	88	86	84	81	79		
	No.11	156	144	135	121	112	110	107	105	103	100	98		
Irreversible	No.13	165	157	151	141	135	132	128	125	122	118	115		
	No.14	182	172	164	153	145	139	131	126	120	113	107		
	No.16	195	187	181	171	165	161	157	153	149	145	141		
	No.18	230	219	211	198	190	183	173	166	159	149	142		
	No.20	256	243	234	219	210	202	193	185	178	168	160		
	No.22	293	280	270	254	244	234	220	210	201	190	181		
	No.25	338	321	309	289	276	267	254	245	236	223	214		
	No.29	372	355	343	323	308	299	287	278	269	257	248		
	No.31	396	379	367	347	332	323	310	301	292	279	270		
	No.33	411	394	382	362	348	339	326	317	308	295	286		
	No.36	486	458	436	402	378	366	350	338	326	310	298		
	No.41	599	561	532	486	457	435	406	384	371	355	342		
	No.44	579	547	522	483	458	445	428	415	406	395	386		
	No.45	509	497	487	472	462	452	440	430	424	416	410		

Irreversible

Thermo Proof

RoHS Compliant

(some non-compliant)

Features

- Thermo Paint™ in label form.
- Special adhesive on the backing enables affixing to surfaces.



Before color change

After color change



* Colors shown are approximate colors.

Type	Indication	Color-change temperature	Original color	Color-change	JAN code
G-1	25	250°C	Light greenish blue	Black	4582130422120
	29	290°C	Light pink	Black	
	31	310°C	Bright bluish gray	Black	
	33	330°C	Light blue-green	Brown-black	
G-2	36	360°C	White	Brownish gray	4582130422137
	41	410°C	Blue	Brown	
	44	440°C	White	Greenish gray	
	45	450°C	Purple	White	

* Non-RoHS Compliant

10 labels per box

Caution on Use

- For color-change characteristics, refer to the technical brochure for irreversible Thermo Paint™.
- Store in a dark place at room temperature.
- At temperatures below 20°C, the flexibility of labels may deteriorate, causing cracks to appear.
- At temperatures below 15°C, the adhesive power of labels may deteriorate and they may no longer stick. In such instances, adjust the temperature of both the label and target surface to around 25°C.
- The adhesive power of labels deteriorates over time. You are advised to use the labels as soon as possible after purchase.
- Products should be used within 1 year of purchase.

Reversible

Digital Thermo Tape™

RoHS Compliant

POINT!!

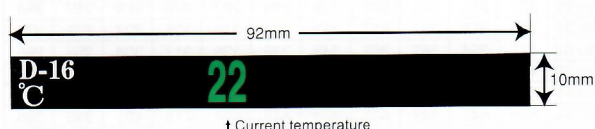
Show current temperature as a number (in green)

Features

- Encapsulated liquid crystals are printed to polyester film using a special technique.
- Color changing occurs as numbers appear and disappear. Simply take the green number as the current temperature.
- The numbers change color in this order as the temperature rises: black → red-brown → green → blue → navy blue.
- As the temperature decreases, the numbers return to their original color in reverse order.

D

- Ascertain the current temperature from a liquid-crystal indicator



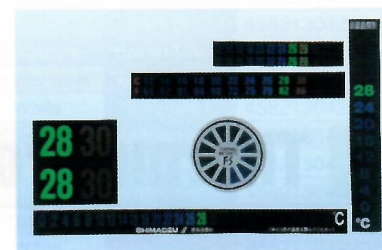
↑ Current temperature

Type	Temperature range °C	Temperature interval	Color-change accuracy	JAN code
D-M20	-20 ~ 0	2°C	±1.0°C	4582130422656
D-M6	-6 ~ 14		±0.5°C	4582130422663
D-06	6 ~ 34			4582130422670
D-16	16 ~ 36			4582130422687
D-38	38 ~ 58	5°C	±2.0°C	4582130422694
D-50	50 ~ 100			4582130422700

30 labels per box



Food hygiene cards



Example of a customized design

Reference Data

1. Heat resistance

D-M20 to D-50 (continued heating at 60°C): 1,000 hours at 60°C

D-50 (continued heating at 120°C): 10 hours at 120°C

(continued heating at 110°C): 30 hours at 110°C

(continued heating at 100°C): 60 hours at 100°C

2. Water resistance (submersion in water)

Up to 3 hours

3. Weather resistance

Accelerated weathering test with weather meter

D-M20: 50 hours

D-06: 20 hours

D-38: 50 hours

D-M6: 20 hours

D-16: 20 hours

D-50: 50 hours

4. Humidity resistance (below 70% relative humidity)

No problems

Water, heat and weather resistance can be enhanced by laminating with non-permeable film.

5. Response speed

Up to 1 sec.

Caution on Use

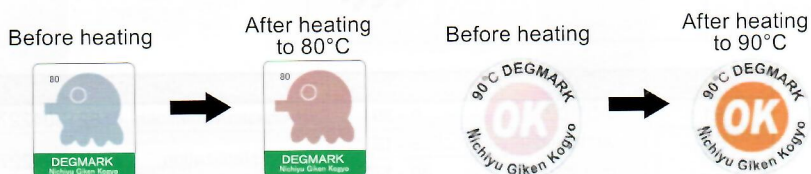
- If Digital Thermo Tape™ is left for long periods in areas exposed to direct sunlight or areas of high humidity, the UV light or moisture may affect the properties, and therefore the color-changing capability, of the liquid crystals.
- Digital Thermo Tape™ has no resistance to acids and alkalis.
- Avoid contact with organic solvents.
- With D-50, the numbers may start to pale if heated for around 10 hours at 100°C, but color-changing performance will not be affected.
- Also, green numbers may appear simultaneously in low- and high-temperature areas during temperature decrease. In this case, the higher temperature is the current temperature.
- As a guideline, this product should be used indoors and for up to 3 years.

Features

- The color changes if heated to above the specified temperature.
- Available at a lower price depending on the quantity ordered.
- Color-change temperature, color tones and designs can be modified to suit the application. (See table below)
- Designs can have either colors that appear when heated or colors that disappear.

Degmark™ with Appearing Colors

Examples



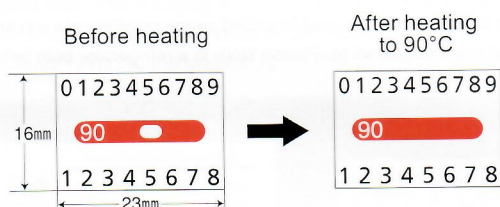
Degmark™ with Disappearing Colors

Examples

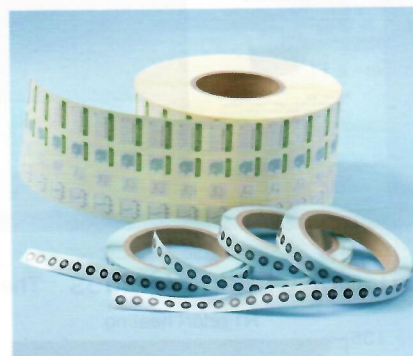


Indicators for Hand Labeler

Examples



* Please use the Duobeler 220 hand labeler manufactured by SATO Corporation



Color-change temperature (°C)	Size	Style	Product format	Order Quantity
40~150	5mm×5mm~800mm×1200mm	Sticker or Card	Roll or Sheets	From 50,000

- Some color-change temperature settings may not be available depending on the design, base material and usage environment.
- This product is customized to suit your particular requirements. Please contact us to discuss options.

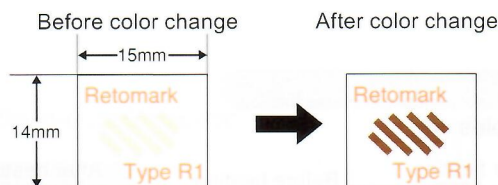
Irreversible **Retomark™** RoHS Compliant

Features

- Three types available for high-temperature retort sterilization down to low-temperature boiling sterilization. Color tones also vary depending on heating temperature and time, allowing different conditions to be detected with the same type. Select a Retomark™ according to your intended conditions.
- As it is heated, the color of the indicator gradually turns from cream to brown.



Sticker type

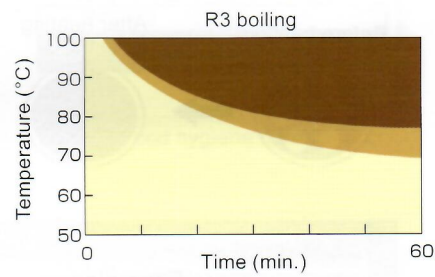
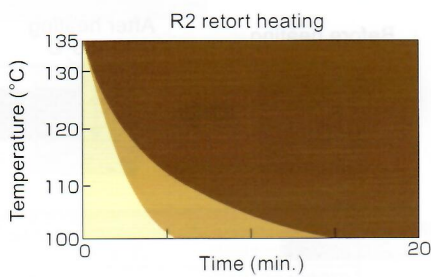
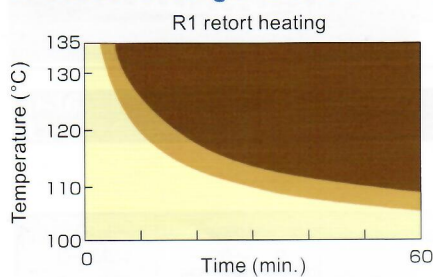


Type	Color-change temperature (°C)	Heating time (min.)	Applications	JAN code
R1	AC110-134	5 - 30	High-temperature retort sterilization	4582130422748
R2	AC100-120	5 - 15	Retort sterilization	4582130422755
	Boil 90-100	30 - 120		
Re	Boil 70-100	3 - 60	Boiling sterilization	4582130422762

500 labels per box

Color-Change Guides

The guides below show color tone changes when heated at a specific temperature.



Caution on Use

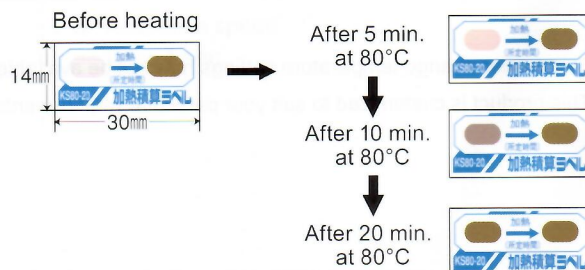
- Actual color tones may differ from the above guides. Please confirm color tones under your intended usage conditions in advance.
- Retomark™ gradually turns brown if stored for a long period of time at room temperature. Please store in a refrigerator both before and after use.

Irreversible **Cumulative Heat Label™** RoHS Compliant

POINT!! For dry or moist heating

Features

- Suitable for both dry and moist heating.
- As it is heated, the pale-colored indicator on the left-hand side gradually changes until it is the same color as the color on the right-hand side.



Type	Color-change temperature (°C)	Heating time (min.)	JAN code
KS-80-20	80	20	4582130422724
KS-90-20	90	20	4582130422731

Applications: Checking heating processes

200 labels per box

Caution on Use

- The Cumulative Heat Label™ gradually turns brown if stored for a long period of time at room temperature. Please store in a refrigerator both before and after use.

Irreversible

Sterilization Process Monitoring Card

RoHS Compliant

POINT!!

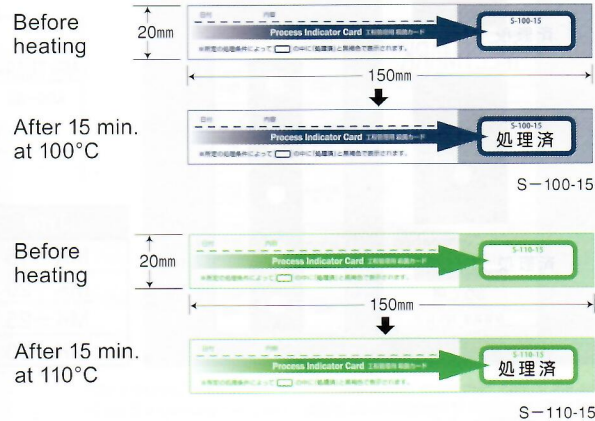
Check process status at a single glance

Allows simple determination of whether or not process conditions have been reached. When the process conditions are reached, the words "Process Complete" appear in black-brown Japanese text. Once changed, the color will not revert to the original color. Use by inserting between the items to be sterilized.



250 cards per box

Type	Conditions	Size	JAN code
S-100-15 (for food)	15 min. at 100°C	20×150mm	4560126090041
S-110-15 (for food)	15 min. at 110°C	20×150mm	4560126090034



Irreversible

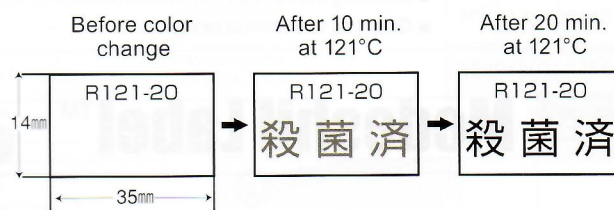
Retort Sterilization Label

RoHS Compliant

POINT!!

Retort sterilization status is clear at a single glance

Allows simple determination of whether or not retort sterilization process conditions have been reached. When the sterilization conditions are reached, the words "Sterilization Complete" appear in black-brown Japanese text. The backing is coated with adhesive for affixing to the item on which the temperature is to be measured. Once changed, the color will not revert to the original color. (Store in a refrigerator.)



Type	Conditions	Size	JAN code
R-90-5	5 min. at 90°C	14×35mm	4560126090225
R-95-5	5 min. at 95°C	14×35mm	4560126090232
R-121-20	20 min. at 121°C	14×35mm	4560126090249

1000 labels per box

Irreversible

Meltmark™

RoHS Compliant

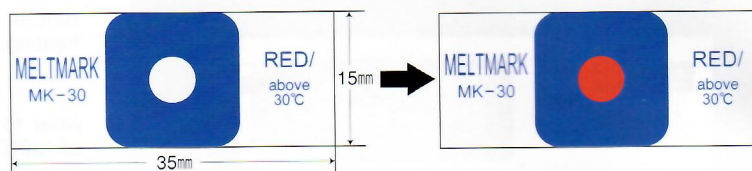
■ **POINT!!** Check the history of temperature increases**Features**

- The indicator turns from white to red above the specified temperature, allowing temperature increases to be ascertained at a single glance.
- The indicator is irreversible and therefore does not return to its original color once changed. This enables confirmation of past temperature increases.
- Adhesive on the backing enables affixing to items for ease of use.



Before color change (white)

After color change (red)



Type	Color-change temperature (°C)	Low-temperature color → High-temperature color	Size	JAN code
MK-15	15	White → Red	15×35mm	4582130422786
MK-20	20			4582130422793
MK-25	25			4582130422809
MK-30	30			4582130422816

50 labels per box

Caution on Use

- The label is sensitive to body heat. Take care to avoid touching the indicating area in the center when handling the case or labels.
- To prevent color changing during storage, maintain the storage temperature (MK-15, 20: below 0°C; MK-25, 30: below 10°C).
- The label may come unstuck if the target surface is wet, dirty, uneven or curved. Please affix to clean, smooth surfaces.

Applications

- Monitoring temperature during low-temperature transportation
- Checking temperature inside warehouses
- Preserving and monitoring food freshness
- Checking the condition of pharmaceuticals or reagents during distribution/storage
- Checking operation of refrigerators

Reversible

Medeshil Label™

RoHS Compliant

■ **POINT!!**

Ideal for refrigeration/freeze temperature zones

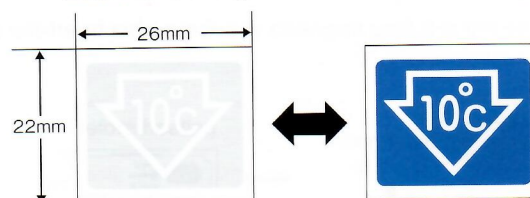
NEW**Features**

- Color appears below the color-change temperature and disappears above the color-change temperature.
- As a sticker, it can be affixed almost anywhere.
- It is a reversible indicator and can be used repeatedly.
- Easier to use than a contact thermometer.



Before color change

After color change



Type	Color-change temperature (°C)	high-temperature → low-temperature	Size	JAN code
MD-0	0	White → Blue	22×26mm	4582130423271
MD-5	5			4582130423288
MD-10	10			4582130423295

50 labels per box

Caution on Use

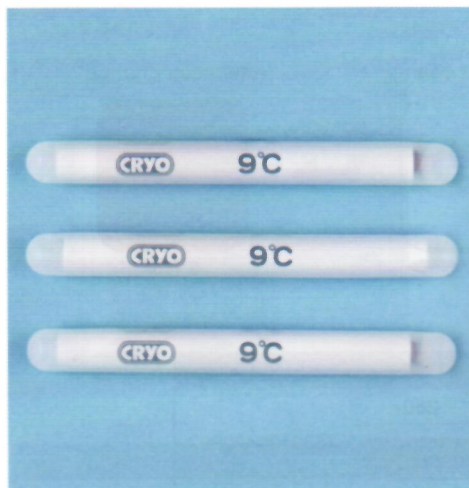
- UV light will affect the color-changing capability. Please take this into account during use/storage.

Applications

- Checking the temperature of items requiring freezing or refrigeration during transportation/storage
- Checking temperature inside refrigerators

Features

- Detects temperature rise in freezer or refrigerator temp. zone and provides indication by a color change to red.
- Designed to be frozen before use and bent with supplied tool for activation.
- Simple activation even in a frozen environment.
- Easier to use than a data logger.

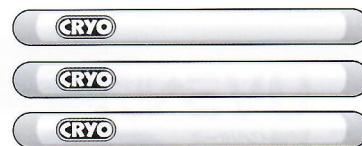


Form of packing

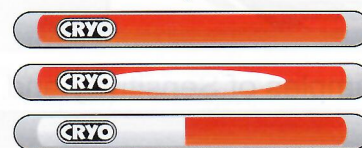
* An activation tool is attached.



OK



Overheated

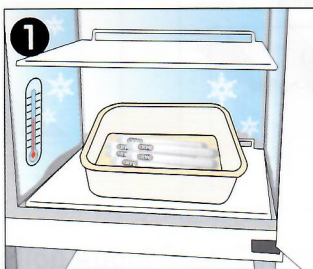


*CRYOMARK™ is judged "overheated" when more than half of the area inside the capsule turns red. Slight color-change to red right after the activation happens once in a while, which is not from overheat or rise of temperature.

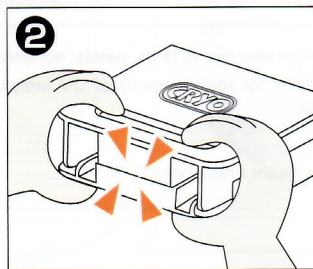
Type	Color-change temperature (°C)	Precool condition	Color change	Condition of color change		Size	JAN code
CM—9	9	—18℃ × 12 hours	White to Red	Within 1 hour at 11℃	No change for 28 days at 4℃ lower than the specified temperature	75mm×7.5φ	4582130423301
CM—3	3			Within 2 hours at 5℃			4582130423318
CM—M 4	— 4			Within 1 hour at -2℃			4582130423325
CM—M10	— 10			Within 3 hours at -8℃			4582130423332
CM—M15	— 15	—40℃ × 12 hours		Within 2 hours at -13℃	No change for 28 days at -19℃		4582130423349
CM—M20	— 20			Within 1 hour at -19℃	No change for 28 days at -25℃		4582130423356

50pcs/box

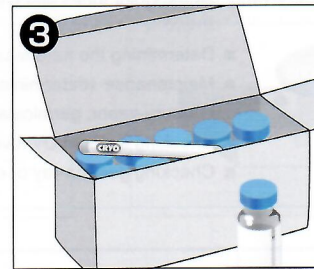
【How to use】



1. Remove CRYOMARK™ from bag and precool at designated temperature and time (-18°C for at least 12 hours/-40°C for at least 12 hours)



2. Use supplied tool to bend CRYOMARK™.



3. Place CRYOMARK™ near product whose temperature is to be monitored.

Precaution for use

- To activate the CRYOMARK™ temperature indicator, use always the dedicated activation tool. If you activate CRYOMARK™ with a different procedure, it may not function normally.
- Please use this tool at the designated temperature ranges (-40°C to 40°C) at ordinary pressure.
- Please do not disassemble products to take contents.
- Please do not repeat freeze/thaw cycles. The indicator may be unintentionally activated.
- CRYOMARK™ which has already changed color may be discolored by the effect of temperature and UV-rays. The leakage may happen if the colored CRYOMARK™ is stored for a longer period at room temperature. Please dispose of it after the color change.
- CRYOMARK™ may not change color in a short-time temperature rise less than 1 hour.
- CRYOMARK™ may not be used in liquid such as antifreeze liquid, water, and oil, nor at certain conditions, such as in pressurized or depressurized area, a microwave oven, boiling water and fire.
- Unused products can change color if dropped off or get an impact.
- The color-change is tested under the test conditions of us. The color-change or no color-change of CRYOMARK™ do not provide any guarantees on the quality of the products which are packed in the same box.
- The expiry date is three years after production date.
- The validated period is 28 days after activation.

Irreversible

UV Label™

RoHS Compliant

POINT!! Confirm UV irradiation using color

Features

- Changes from a non-colored state to a colored state when exposed to UV light.
- The change in color can be used to confirm the level of UV irradiation.
- Once changed, the color is irreversible and will not disappear.
- Four types of varying sensitivity are available for different purposes.
- Adhesive on the backing allows easy affixing to diverse surfaces.



Before color change



UV light

After color change



S Type

Examples of Sensitivity and Color Changes

Type	Irradiation level (mJ/cm ²)						JAN code
S Super-high sensitivity	0	5	15	50	100	250	4582130422823
H High sensitivity	0	50	250	500	1000	2000	4582130422830
M Medium sensitivity	0	250	500	1000	2000	3000	4582130422847
L Low sensitivity	0	1000	3000	6000	10000	15000	4582130422854

* Color tones and UV levels are examples from color changes and measurements observed during in-house tests using mercury-vapor lamps. Color tones and UV levels may vary according to the irradiation conditions.

100 labels per box

Applications

- Determining the hardness of UV-curable resins (inks, paints, adhesives, etc.)
- Maintenance (determining the time for replacement) of UV lamps (metal-halide, mercury-vapor, germicidal lamps)
- Checking sunlight UV levels
- Checking gamma-ray or electron beam irradiation (S, H)

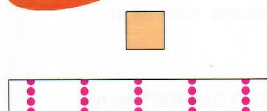
Irreversible

Customized UV Label™

Application Product

Features

- We customize sizes, shapes and designs at your request.
- In general, sensitivity and color changing tone will be the same as for the standard product.
- Price and delivery dates vary according to design and quantity. Please inquire for details.

Examples

Tape: For use together with a labeler in monitoring an irradiation line

Ultra-compact size: For small target areas (e.g. 5×5mm)

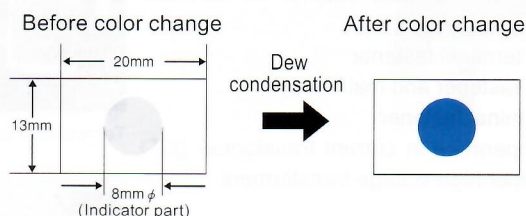
Other: Large size for checking UV dose distribution (e.g. A4 size)

Caution on Use

- Color tones will vary according to the irradiation conditions. Please confirm color changes before use.
- The labels change color even from exposure to room lighting. Avoid exposing unused labels to light.
- For S and H types, colors may fade if the color change is insufficient.
- Do not apply directly to skin.

Features

- Uses color changes to confirm the presence of dew.
- The color change is irreversible. Once changed, the color will not return to the original color, even if dried.
- Adhesive on the backing allows easy affixing to diverse surfaces.
- Labels with customized sizes and designs can be supplied on request.



* Color changing varies according to the dew conditions (surrounding temperature/humidity, surface temperature/heat capacity of the object, wind conditions, etc.). Too much water deposited on the label may result in the pigment running and no color appearing.

Type	Color-change	JAN code
D-1	Gray → Blue	4582130422861

200 labels per box

Pigment Leak Example



Usage Examples

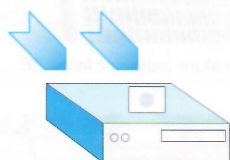
①

Affix to area susceptible to dew condensation.



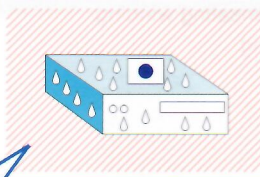
②

The temperature of the object drops if located beside an air conditioner during summer, or outside during winter.



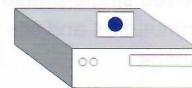
③

When the air conditioning is turned off, or the object is brought into a warm room, the difference in temperature between the environment and the object causes condensation.



④

Even if the object dries after adjusting to the surrounding temperature, the color remains changed and it is ascertained at a single glance that dew was present.



Information About Dew (Condensation)

Dew condensation is the phenomenon whereby moisture from water vapor settles on an object when its surface temperature is lower than the dew point* of the environment. This condensation always occurs where there is humidity and differences in temperature. Dew Label™ can be used for the detecting of dew, which is a cause of corrosion, mold and equipment breakdowns.

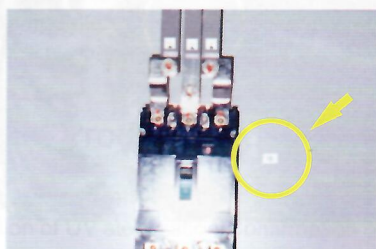
* Dew point: The temperature within a certain environment at which dew condensation will occur (the temperature at which water vapor in the environment is saturated)

Example..... Air temperature: 30°C; Relative humidity: 80% → Dew point: 26.1°C

Air temperature: 20°C; Relative humidity: 40% → Dew point: 6.0°C

Usage Examples

Monitoring and controlling dew condensation inside power-receiving cubicles



Caution on Use

- Do not touch or rub the indicator area directly as it may cause the color to change.
- Too much water deposited on the label may lead to the pigment running into surrounding areas.
- Avoid using outdoors or exposure to direct sunlight as it may cause color fade.

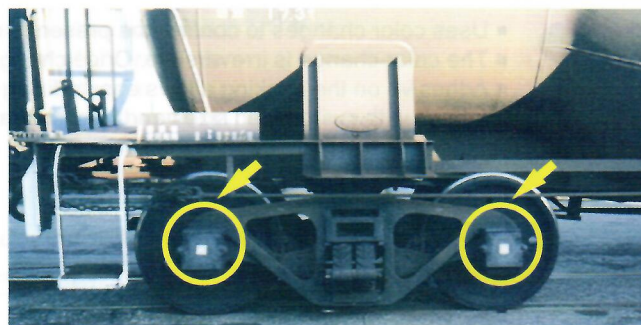
Temperature Indicating Materials – Usage Examples

For maintenance of electrical/electronic equipment

1. Power Transforming Equipment

Monitoring abnormal temperatures in electric power equipment and terminal connections

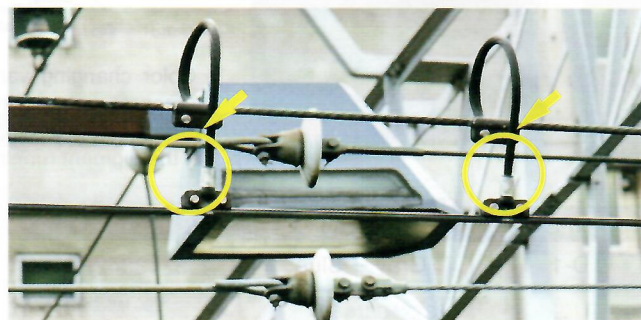
- Line switch (LS) fixed contact exterior
- Disconnect switch (DS) fixed contact exterior or movable contact
- Oil circuit breaker (OCB) terminal fastener
- Transformer (Tr) terminal fastener and main body
- Silicon capacitor (SC) terminal fastener
- Monitoring abnormal temperature in current transformer (CT) terminal fasteners and super high-voltage transformers



Temperature indicator label LI

2. Power Distribution Equipment

- Monitoring abnormal temperatures in busbars, circuit breakers and MBB connections inside power-receiving cubicles
- Pole-mounted transformer load management
- Monitoring abnormal temperatures in power capacitors, arc suppression resistors and terminals and blade parts of circuit breakers



Customized temperature indicator label

3. Control Equipment

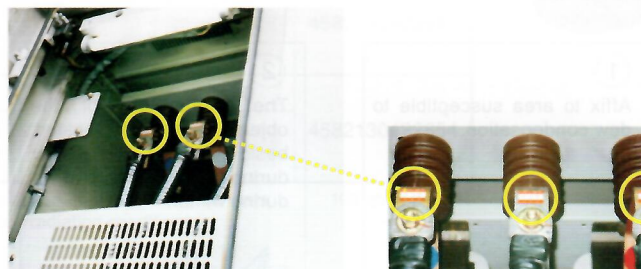
Temperature monitoring of electromagnetic switches, electromagnetic contactors, electromagnetic relays, knife switches, high-voltage circuit breakers, high-voltage load break switches, power capacitors (parallel, high-voltage, series), surge arresters, inductive reactors, and magnetic amplifiers

4. Rotating Electrical Equipment

Temperature monitoring of motors

Temperature monitoring of rotating machine parts

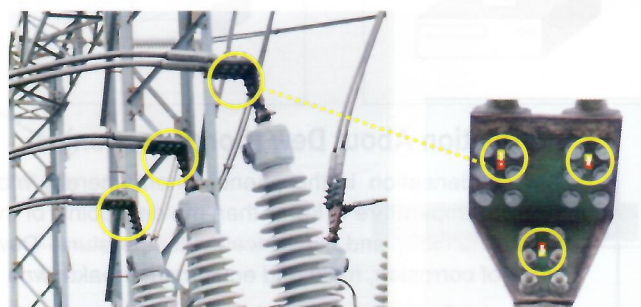
- Stator windings/insulated rotor windings
- Armature windings with commutators
- Resistive field winding and compensating winding
- Exposed single-phase field winding
- Commutators and slip rings
- Bearings



Temperature indicator label 3E

5. Electronic Components

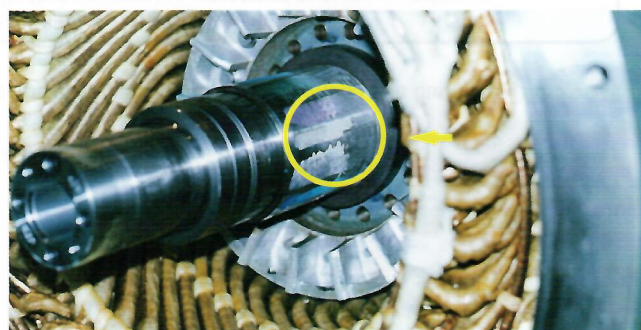
- Circuit components:
Temperature monitoring of capacitors, resistors, coils and integrated circuits
- Vibrating components:
Temperature monitoring of crystal oscillators, mechanical filters and reed selectors
- Mechanical components:
Temperature monitoring of electromagnetic relays, connectors, plugs, jacks and switches
- Semiconductor devices:
Temperature monitoring of transistors, diodes, thyristors and integrated circuits



Combination temperature indicator label

6. Power Transmission Equipment

- Monitoring for abnormal heat generation in jumper compression sockets and sleeves
- Temperature monitoring of terminals for feeder lines, negative feeder lines, overhead lines, support lines, feed branch connectors, jumper connectors, branch connectors, feed ears, connectors, and feeder switches.



Thermo Paint™

Temperature Indicating Materials – Usage Examples

For monitoring household items

- Gas water heater water temperature sensing and burn prevention
- Temperature sensing for hot plates and frying pans
- Temperature sensing for hot sake bottles
- Monitoring/measurement of temperature inside refrigerators
- Room temperature monitoring/measurement
- Temperature sensing for electric moxibustion utensils
- Confirmation of body warmer ignition
- Temperature sensing for hair irons/hair curlers
- Temperature indication for vacuum cleaners with mite-removing function

For monitoring temperature in manufacturing processes

1. Mining

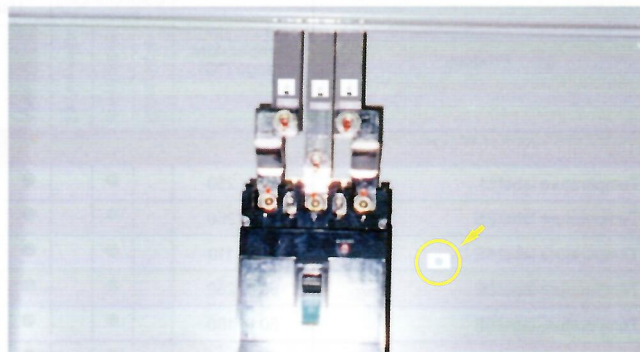
- Temperature monitoring of metal melting furnaces
- Determining completion of refining during electrorefining of copper
- Temperature monitoring for heat treatment
- Temperature monitoring of bucket conveyors

2. Automobiles/Shipbuilding

- Temperature monitoring during paint baking
- Confirmation of brake shoe adhesive hardening conditions
- Temperature monitoring of molds and dies
- Confirmation of engine internal temperature
- Confirmation of preheating temperature during welding

3. Electrical/Electronic/Communication Equipment

- Temperature monitoring during light bulb manufacturing
- Checking light bulb life
- Checking temperature increases inside electrical machinery
- Checking temperature increases of printed circuit boards



Dew Label™

- Checking temperature in heat treatment for copiers
- Determination of heating factuality in response to complaints
- Temperature monitoring for heat treatment of heat-shrinkable tubes for communication cables

4. Food

- Level gauges for brewing tanks
- Checking temperature in heat processing during manufacturing
- Checking temperature in heat processing of udon noodle heating
- Confirmation of temperature during breadmaking
- Checking temperature rise during transportation

5. Textiles

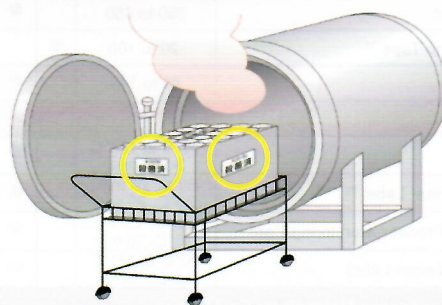
- Temperature monitoring during printing

6. Schools

- Checking the temperature of sterilizing cabinets for school lunch utensils
- Checking heat transfer for educational materials

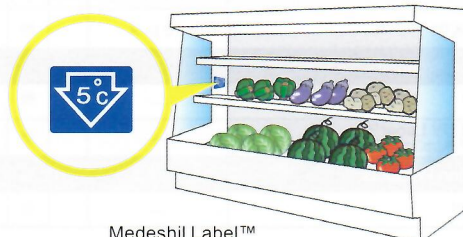
Temperature Indicating Materials for Food Sterilization Process – Usage Examples

- Confirmation of processes for retort-packaged food/Checking completion of heating processes during canned food manufacturing
- Checking the temperature of utensil sterilizing cabinets for school lunches
- Confirmation of autoclave sterilization



Temperature Indicating Materials for Cold Chains – Usage Examples

- Temperature monitoring during transportation/storage of pharmaceuticals, chemicals and frozen food
- Temperature monitoring during low-temperature transportation
- Temperature monitoring inside warehouses
- Food freshness maintenance
- Checking temperature history during transportation of chocolate
- Checking the temperature inside refrigerators



Medeshil Label™

UV Detection Products – Usage Examples

- Assessing UV lamp effectiveness/Assessing hardening of UV-curable resin
- Confirmation of UV sterilization/Confirmation of sunlight UV level

Product Types

Product	Temperature range (°C)	Color-changing function			Usage method				Features	Page	
		Reversible	Irreversible	Semi-irreversible	Affix	Paint	Draw	Place			
Temperature Indicating Materials											
Temperature label LI	40 to 250		●		●				Single temperature indicating model	02	
Temperature label 3E	40 to 250		●		●				3 temperatures at 10°C intervals	02	
Temperature label 4E	50 to 110		●		●				4 temperatures at 5°C intervals	03	
Temperature label 5E	50 to 250		●		●				5 temperatures at 5°C or 10°C intervals	03	
Temperature label 8E	50 to 160		●		●				8 temperatures between 50°C and 160°C at 10°C intervals	03	
Temperature label F	50 to 125		●		●				Small single temperature indicating model	03	
Temperature label Super Mini 1K	40 to 125		●		●				Mini-sized single temperature indicating model	04	
Temperature label Super Mini 3K	40 to 150		●		●				Mini-sized type with 3 temperatures at 5°C or 10°C intervals	04	
Temperature label Super Mini 3R	40 to 150		●		●				Round mini-sized type with 3 temperatures at 5°C or 10°C intervals	04	
Temperature label Mini	50 to 125		●		●				Single temperature indicating model	05	
Temperature label 5S	50 to 115		●		●				5 temperatures at 5°C intervals	05	
Thermo Tape™	40 to 70	●			●				Current temperature indication on strips	06	
Thermo Sheet™ P5-7	50 to 70	●			●				Checking current temperature above 50°C and 70°C	06	
Thermo Sheet™ C	50 to 70	●			●				Current temperature between 50°C and 70°C, 5 temperatures at 5°C intervals	06	
Number Thermo Wappen™	40 to 70	●			●				Number of heating temperature appears	07	
Customized Thermo Wappen™ (Thermo Wappen™ Application Product)	—	●			●				Create your own original design	07	
Combination label A	50 to 90	●	●		●				Rectangular type for checking past and current temperature	08	
Combination label TB	50 to 90	●	●		●				Round type for checking past and current temperature	08	
Combination label O	70 to 100	●	●		●				Compact type for checking past and current temperature	08	
Customized temperature indicator label (Application product of temperature label)	—	●	●		●				Create your own original design	09	
Temperature label for Vacuums	40 to 210		●		●				Check temperature in 1Pa to normal pressure environments at a single glance	10	
Thermo Spray™	70 to 460		●	●		●			Spray-type indicator for temperature monitoring over a wide area	11	
Thermo Paint™	40 to 70	●				●			For monitoring the current temperature of large and uneven surfaces	12	
	50 to 450		●	●		●			For monitoring the temperature history of large and uneven surfaces	12-13	
Thermo Proof	250 to 450		●		●				4 types of paint on a single sticker	13	
Digital Thermo Tape™	-20 to 100	●			●				Show current temperature as a number (in green)	14	
Degmark™	40 to 140		●		●				For design flexibility and low cost	15	
Temperature Indicating Materials for Food Sterilization Process											
Retomark™	70°C to 134°C 3-120 min.		●		●				For monitoring retort and boiling sterilization	16	
Cumulative Heat Label™	80°C, 20 min. 90°C, 20 min		●		●				Suitable for both dry and moist heating	16	
Sterilization Process Monitoring Card	100°C, 15 min. 110°C, 15 min.		●					●	Check if process monitoring conditions have been reached at a single glance	17	
Retort Sterilization Label	90°C to 121°C 5-20 min.		●		●				Retort sterilization status is clear at a single glance	17	
Temperature Indicating Materials for Cold Chains											
Meltmark™	15 to 30		●		●				For temperature monitoring during low-temperature transportation	18	
Medeshil Label™	0 to 10	●			●				For checking the temperature inside refrigerators	18	
CRYOMARK™	-10 to 9		●					●	Can be stored at room temperature before activated with the dedicated activation tool	19	
UV Detection Products											
UV Label™	—		●		●				Changes color with UV light	20	
Customized UV Label™ (UV Label™ Application Product)	—		●		●				Create your own original design	20	
Dew Detection Products											
Dew Label™	—		●		●				Color change indicates the presence of dew	21	

Please inquire about usage environments

Separate technical brochures are available for Thermo Paint™, Thermo Spray™ and Temperature label for Vacuums.
Specifications of products presented in this catalog may change without prior notice.
Indicator color changes in this catalog are printed and may differ slightly from actual colors.
Please also feel free to contact us about chemical indicators, which are not included in this catalog.
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ISO 9001 Certified

NiGK Corporation products undergo rigorous quality management in accordance with the ISO 9001 standard before delivery to the customer.

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■ Manufacturer

—— From the Ocean to Outer Space ——
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