

PRESCALE / THERMOSCALE / UVSCALE Measuring pressure, heat or UV light easily with each film.

Our technology has realized the visualization of various distribution.

nproving productivit

by measuring surface distribution



Heat Distribution Measurement Film

THERMOSCALE

solutions

Improving quality by confirming color changes

Ultraviolet Light Amount Distribution Measurement Film







PRESCAL



Easily improving work efficiency with film



Pressure measurement film

PRESCALE

The only film that could measure the pressure visually by the color density



"Prescale" is a film that could easily measure the distribution and the amount of pressure. It was created by using the Fujifilm's advanced technology of coating a thin film and it visualizes the pressure distribution of the whole surface by changing its color to red according to the applied pressure. There are nine types of rolls so as to cover the wide range of pressure.

Pressure measurement film

PRESHEET

The sheet-cut type of Prescale



"Presheet" is a sheet type of Prescale that is cut into A4 size beforehand. It is recommended for first-time users and for small-scale applications.

How to use

Just cut and insert the film to the surface you need to measure



Cut Prescale or Presheet to the size you need



Insert Presale between the surfaces you need to measure and apply the pressure *when using two-sheet type, be sure the matt-side of the two films will be put together



Take off and check the color density visually

Type of Prescale

There are 9 types of Prescale and 6 types of Presheet according to the pressure range. Please select the appropriate prescale.

			Pres	sure range	[MPa]	1MPa≒10	.2kgf/cm	2			Chaot Turna	
Product (Code)	0.006	0.05	0.2	0.5 0.6	2.5	10	50	130	300	Product cize	Broduct size	Tuno
11000001 (00000)	0.87~7.3	7.25	29	73 87	363	1,450	7,250	18,850	43,500	W(mm) vI (m)	W(mm) vI (mm)	Type
			I	Pressure ra	inge [psi] 1psi≒6	895pa			W(IIIII)×E(III)		
Super high pressure (HHS)										270 × 10	270 × 200 (5 sheets)	Mono-sheet
High pressure (HS)										270 × 10	270 × 200 (5 sheets)	Mono-sheet
Medium pressure (MS)										270 × 10	270 × 200 (5 sheets)	Mono-sheet
Medium pressure (MW)										270 × 10	-	Two-sheet
Low pressure (LW)										270 × 10	270 × 200 (5 sheets)	Two-sheet
Super low pressure (LLW)										270 × 6	270 × 200 (5 sheets)	Two-sheet
Ultra super low pressure (LLLW)										270 × 5	270 × 200 (5 sheets)	Two-sheet
Extreme low pressure (4LW)										320 × 3	-	Two-sheet
Ultra extreme low(5LW)										320 × 2	-	Two-sheet

Notes: W in the product codes indicates two-sheet type, S indicates mono-sheet type

How it works

Two-sheet type (5LW~MW)

Composed of two kinds of films: A-film and C-film

- A-film: Base material (PET base) coated with a color-forming material (microcapsules)
- C-film: Base material (PET base) coated with a color-developing material

The coated sides of each film (color-forming and color-developing) must face each other. These are the sides with the matt finish. When pressure is applied, the microcapsules are broken and the color-forming material transfers to the color-developing material and reacts, thereby generating a red color.

Mono-sheet type (MS~HHS)

Measurement is possible with a single sheet of film.

• A color-developing material and color-forming material (microcapsules) are coated, one above the other, on a single base material (PET base).

When pressure is applied, the microcapsules are broken and the color-developping material absorbs the color-forming material and reacts, thereby generating a red color.

Prescale color chart (LW)

Can get the value of pressure by referring to the color chart.

Continuous pressure

Measurement pressure range: Low pressure (2.5~10MPa) Pressurized condition: Time to reach the pressure 2min. Time of retention at the pressure 2 min.



As the pressure indicated by the broken line may exceed the permissible error range, please use the

* Select the curve A, B or C according to the condition (temperature and humidity) it is used * For continuous pressure of 5LW, 4LW and LLLW, time to reach pressure is set 5 seconds and time of retention at the pressure is set 2 min.

* For HHS, there is only color chart for continuous pressure.

Accuracy and	recommended tem

	Prescal
Accuracy	±10% or less (when measure
Recommended temperature	
Recommended humidity	
*1 5LW/4LW/HHS: 15°C~30°C	

* 2 5LW/4LW: 20%RH~75%RH * 3 HHS: 35%RH~70%RH



Momentary pressure

Measurement pressure range: Low pressure (2.5~10MPa) Pressurized condition : Time to reach the pressure 5 sec. Time of retention at the pressure 5 sec.



As the pressure indicated by the broken line may exceed the permissible error range, please use the data for reference purpose only.

perature / humidity when used

le (two-sheet type / mono-sheet type)

ed at 23°C, 65%RH by concentration measuring apparatus)

35%RH ~ 80%RH *² *³



Wide Range of Applications and Measurement Techniques

Examples o	f measurement types	Industries	Applications	Measurement methods	
	Nip pressure	 Pulp & Paper Chemical FPDs Touch panels Semicanductor 	 Pressure between nip rolls and calendar rolls, e.g., paper machines, coating machines Pressure between electrophotographic neat fixing parts Pressure between embossing rolls Pressure between lamination rolls Nip pressure of high-performance films 		
	Roll/plate contact pressure	 Office machine PCBs Electronics Li-ion battery 	 Bonding pressure of polarizing plates,OCA or Cover glass Bonding pressure of BG tapes Bonding pressure of DFR lamination Nip pressure of coating machine for electrode Conveyor nip roll pressure 		
	Tightening pressure	 Automobile Machinery Aerospace 	 Pressure of fastened surfaces, e.g., engines, gearboxes, turbines, valves, pumps, hydraulic, cylinders, bolted joints and compressors Sealing performance of gaskets, seals, and O-rings 		Con
F	Contact pressure	AutomobileElectronics	 Contact pressure of brakes, clutch plates, and pistons Contact pressure of spot-welding machines Contact pressure of IC heat sinks 		
	Compression pressure	 PCBs Ceramic devices FPDs Semiconductor Photovoltaics Fuel cell Smartphones Electronics Aerospace Conveyor belt 	 Bonding pressure of laminated print substrates Bonding pressure for laminated ceramic devices Bonding pressure for LCD panels ACF bonding pressure Wafer bonding pressure Press pressure of vacuum laminator Bonding pressure of fuel cell stacks Bonding pressure of smartphones Composite layup pressure 		
	Contact conditions	 Machinery Automobile Packaging Li-ion battery Semiconductor Injection molding Printing 	 Contact condition of press dies Balance checking of press machines Contact condition of heat seal bars Contact condition of press machines for adhesion Contact condition of CMP polishing head Contact condition of suction jig for die bonding Contact condition of molds Blanket cylinder pressure of printing machines 		•
	Support pressure	Automobile	 Support pressure for tires and caterpillar tracks Support pressure for machines, bridge beams, and tanks 		
\sum	Winding pressure	 Pulp & Paper Chemical 	 Winding pressure for high-performance films and paper Winding pressure of coils 		
	Squeegee pressure	 PCBs Ceramic devices Electronics Printing Photovoltaics 	 Squeegee pressure for screen-printing e.g., print substrates, green sheets for ceramic devices 		
	Medical pressure	 Medical 	 Pressure on soles of human feet and on soles of shoes Cavitation pressure Orthopedics Bone plate pressure, bone joint pressure, tooth alignment and pressure, mastication analysis, biomedical, and ergonomics 		
	Impact pressure	 Others 	 Functional testing of equipment for baseball, golf, etc. Package drop testing Impact pressure of water jets Pressure on freight during transportation Impact pressure on bumpers and airbags 		



* Refer to details of Prescale types on the back for measurable pressure range



Pressure Digitizing and Analysis



Colorized Prescale is digitized using a scanner and converted into numerical data by software. Various pressure analyses can be conducted.

The FPD-8010E converts Prescale pressure values into numerical data and is a pressure mapping analysis system that allows various methods of analysis. In order to make Prescale data even more useful, we will meet your requirements for converting to numerical data, saving data and performing data analysis.



Functions



Various data such as average pressure and maximum pressure are displayed.



Pressure distribution on a line passing through a specified point is shown on a line graph.

Partial Enlargement



The specified field is enlarged. (x4,x8,x16) Pin point pressure values can be displayed on the image.



Recommended Software Environment

OS	Windows 7, 8, 8.1, 10 (32 / 64bit)
CPU	more than 2GHz
Memory	more than 2GHz
HDD	available capacity must be more than 2GB
Display	1024×768 60,000 colors or more





The colored pressure bar and the pressure bar boundary can be changed.





Step-by-step pressure values are displayed

in an animated format.

Specifications

Product Name	FUJIFILM PRESSURE DISTRIBUTION MAPPING SYSTEM for PRESCALE
Model	FPD-8010E
Main Functions	Pressure analysis Pressure data output function Partial Zoom function Excess length synthesis function
Scan Sizes	Single Read : 297mm × 210mm (11.7 in × 41.3 in) Maximum : 891mm × 1050mm (35.1 in × 41.3 in)
Resolution	0.125 (200dpi), 0.25 (100dpi), 0.5, 1, 2mm sq.
Scanner	Epson A4 Scanner. Perfection V37/V370, Perfection V600

Visual Evaluation (Reference Chart)

Using Prescale with the reference charts allows visual evaluation. Using the reference charts provided for each product type makes it possible to measure pressure values by viewing the Prescale color density.



color samples

5



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 to use



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.





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).



THERMOSCALE 100



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



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

					Size
Product	Temperature range	Base layer	Thickness	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	0.0311111	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



Drying oven, baking oven, vacuum film production, measuring surface heat distribution on parts

UVSCALE

Visualizes UV light amount distribution by color density

How it works

Structure

One side of the base film has a UV light sensitive layer, with the opposite side having a white-colored layer. The light sensitive layer changes color according to the amount of UV light it receives, so the amount of light distributed on the exposed surface is easily seen by observing a light sensitive layer and white-colored layer are attached to the base. Since the color density of the white-colored layer corresponds to the amount of UV light received, the light amount distribution on the light receiving surface can easily be investigated.



3





After cutting UVSCALE to the

required shape (length), place it on

the location that you want to

measure.





UVSCALE changes color in accordance with the amount of



4

Principle

The color forming

material in the

microcapsules reacts

to the UV light and

changes color.

Check method 1: Visual check with standard color charts

0.75

0.70

0.65

0.60

0.55

0.50

0.45

0.40

0.35

0.30

0.25

Density

surface should be exposed

Standard Color Chart

[High-pressure mercury lamp]

The figure on the right represents color characteristics generated by a high-pressure mercury lamp. However, please note that these color characteristics are values generated by using FUJIFILM light source and devices, so there may be differences in color density for a given amount of light due to difference and variations in individual lamps or environment.

Advantages of visual checks

- Referring to standard color charts makes it possible to visually judge accumulated light amount values in an easy way.
- Providing color samples can significantly reduce the time necessary for checking UV light amount when starting work and switching objects to be exposed.
- *1:Each density is the value measured by FUJIFILM. It is not a warranty of density level.
 *2:The amounts of UV-light are values using a 365 nm UV illuminometer.
 *3:The solid lines on the graph show the recommended measurement range. The broken lines represent values that are not as precise as the solid lines and should be used as a reference only.
 *4:Standard Color Samples show the density range for visual evaluation.

Standard color sample



Typical applications

1 UV painting



2 UV coating

Measuring UV light distribution in the width direction of the coating for roll conveyor systems



B UV bonding

Checking UV light distribution on a conveyer belt during the OCR attachment process of touch panels



4 UV printing



5 UV molding

Measuring the distribution of the Checking the amount areas of UV light hat amount of light irradiated from UV passes through molding dies and reaches resir lamps to molding surfaces nage of finished product UV lamr UV lamp - Die UVSCALE - UVSCALE The UV light amount is distributed on the surface. Sections for which the light amount is large are outside of the appropriate range. Results



Benefits

- Capable of measuring light and checking light amount distribution on three-dimensional objects for which illuminometers cannot be used to measure light, sections into which illuminometers cannot fit, and sections that are moving while light is being irradiated.
- Useful for adjusting how to place products and how to irradiate light because sections that become shadows of three-dimensional objects can be checked with density.

Benefits

- Capable of measuring light amount during roll conveyance in which illuminometers cannot be used to measure light amount.
- Capable of measuring and checking distribution in the width direction immediately (on an entire surface), thus allowing measurement to be completed in one test and the time needed for making adjustments and assessments to be reduced.

Benefits

- Unevenness of UV exposure and decreases in the amount of light can be checked by observing the intensity of the color.
- Allows the height and position of UV lamps to be adjusted when equipment is installed.
- Allows checking of the time for replacing lamps.

Benefits

- Reduction in the accumulated light amount due to degradation of UV lamps and dirt on reflective plates can be easily checked with density, which makes it possible to confirm that the lamps and reflective plates should be replaced and identify causes of problems if they occur.
- Attaching UVSCALE to the roll width direction of sheets and irradiating UV light while feeding the sheets makes it possible to check actual UV light amount distribution in the width direction.

Benefits

- Capable of visualizing light amount distribution on entire molding surfaces, which allows design of lamp placement and judgment to be carried out effectively.
- Capable of measuring the amount of light that passes through dies and irradiates resin, which makes it possible to understand the actual light amount and light amount distribution.



Check method 2: Management by converting colors into numeric values with analysis systems

[Analysis system FUD-7010E]

In this system, exclusive analysis software is used along with a usable scanner.^{**} The system makes it possible to scan color of UV scales, convert it into UV light amount values, analyze UV light amount distribution, and save them.

*Scanners are sold separately and customers are to purchase them on their own.





visually judged can be analyzed. Standardization Internal inspection standards can be set.

Sharing Analysis results can be shared.

Data saving Digitizing data makes it possible to compare it to past data.

[How to use an analysis system]



①Irradiate light to a UVSCALE.

Calibration

②Set UVSCALE on the scanner (recommended model) and scan the color sample.



③Analyze it on a PC in which the exclusive software has been installed.

Setting measurement conditions
Select UVSCALE type used, light source lamp, and sample name to be saved on the new creation screen.

Sample Name	1 sample
Examination Date & Time	· 4/ 7/2014 ⊡* 10 ÷ i 0
Measurement Date & Time	· 4/7/2014 🗊= 10 🛧 · 0
UVSCALE Type	I UNSCALE L
Lamp	High-pressure mercury lamp
Scanning Count	1 10
Correction Value	1 1.00 🔆

Correction Value Setting

Use a calibration sheet to correct variations

caused by differences in scanners and

conditions as much as possible and to

stabilize measurement results.

Entering a correction value can correct differences in light amount values caused by differences in illuminometers, temperature, and other measurement conditions to o



btain an appropriate value.
🗓 🎦 💕 🖬 🎫 🏂 🥄 📕 🗮 🕲 2 J
Correction Value Setting
Correction Value 0.5
OK Cancel
×



[Analysis system measurement features]

Division Color Bar Setup

Light amounts measured are illustrated in a graph by colors. Various settings, such as scale type (log scale, equal magnification scale), upper and lower limits of scale bars, intervals, and color, can be freely set based on measurement conditions.

200	UVSCALEL UVSCALEH UVSCALEH
1988	Equal Magni
50 - 40 -	
×	Set Upper Law
10-8 7 W	Dente 1 Dente 1 Dente No.
5 <u>-</u>	Feed

Measuring light amount

Data imported is converted into numerical values. Measurement data of the entire section and section specified with a rectangle or circle is displayed.







Percentage of the area that is between the displayed lower-limit division color bar and the upper-limit division color bar inclusive
Area where color came out
Average light amount in the measurement range
Maximum light amount in the measurement range
Area of the measurement range
ar beyend ≫ ∱ ? ■ * ● ⑦

Measurement data of the specified section is





Specifications

•UVSCALE specifications

We are offering three types of UVSCALE based on accumulated light amount.

Туре	Product size		LightLoval	Light roduction film	Thicknoss
	Roll type	Sheet type	Light Level		THICKNESS
UVSCALELM			Low	Non-use	0.1mm
	270mm × 5m	270mm × 200mm (5 sheets)	Medium	use	0.1mm×2
UVSCALE H			High	use	0.1mm×2

●Light amount measurement range

Measurable lamp	Туре	Light Level	Effective light amount measurement range $^{\pm1}(mJ/cm)$
		Low (UVSCALE L)	4-200
High-pressure mercury lamp	UVSCALE LM	Medium (UVSCALE M)	50-2000
	UVSCALE H	High (UVSCALE H)	800-40000
		Low (UVSCALE L)	6-200
Metal halide lamp	UVSCALE LM	Medium (UVSCALEM)	30-1000
	UVSCALE H High (UVSCALE H) 700-20	700-20000	
Low-pressure mercury lamp	UVSCALE LM	Low (UVSCALE L)	20-3000
		Low (UVSCALE L)	200-6000
UV-LED lamp (365 nm)	UVSCALE LM	Medium (UVSCALEM)	300-7000
	UVSCALE H	High (UVSCALE H)	5000-100000

%1: The measurement ranges mentioned above is when FUD-7010E is used.

The light amount range that can be visually checked is the density on standard color samples (0.30 to 0.75).

*Applies to wavelengths in the 200 to 420 nm range *This does not guarantee the absolute values of UV light amount values.

●FUD-7010E specifications

Product name	FUJIFILM UV LIGHT DISTRIBUTION MAPPING SYSTEM for UVSCALE
Model	FUD-7010E
Items included	Exclusive software (CD- ROM), Dedicated cover, Calibration sheet
Usable UVSCALE	UVSCALE L, UVSCALE M, UVSCALE H
Measurable UV lamp	High-pressure mercury lamp, metal halide lamp, low-pressure mercury lamp, UV-LED (365 nm)
Main functions	Analyzing UVSCALE images (measuring accumulated light amount, displaying light amount distribution, saving data, data export)
Scan size	Depending on the scanner used
Resolution	0.125mm (200dpi) 0.03125mm (800dpi)

•System requirements (software)

OS	Windows 7, 8, 8.1, 10 (32 / 64bit)
CPU	more than 2GHz
Memory	more than 2GHz
HDD	Disk space: 2 GB or more
Display	1024 x 768 60,000 colors or more

•Scanner used for FUD-7010E

please ask your dealer or fujifilm for the information of recommended scanner type Scanner

*Scanners are sold separately and customers are to purchase them on their own.

*Please note that the specifications and performance stated in this catalog may change without prior notice as a result of improvements. The diagrams used are schematic, and differ from those for actual measurements. *Microsoft Office Excel is a registered trademark of Microsoft US.





Examples of Use for Specific Purposes



Examples of Use in Specific Industries





Jitraviolet Light Am	ount Distribution Measur	ement Film
UVSCALE A	pplication Exa	mples No.1
Measured objects	e interior materials/ serts c products /building materials	To check the UV light amount/ light distribution when UV paint imadiated with UV light
Cutine of use Cut the UVSC imadiate unde UV light imad can easily be	ALE to an appropriate size, place on th r normal conditions. Remove the UV2 ation coverage, and any decrease in I (hecked.	e product to be invadiated with UV light, CALE and observe its coloring, gitt volume due to degradation of the is
Acceptable	Tube example 1) Checking the da	tribution of UV light applied to automobile p
The whole product is invalided averly with the control amount of UV light.		0
Defective	Use example 21 Otecking the distribution of UV light applied to smartphones	EUse example 30 Overing the datribution of UV light appli builting materials (Rean and main) and for
UV light madetum is weak in some anset.		22
Due to degradation of the lang, the connect volume of light has not been applied.		
Benefits of UVSCALE	executives, of light amount and light dolt used, in locations where flucturements, can a shade of color can be used to check the pol the product, or the configuration for age	button in solid objects (for which illuminowher of the placed, and on musing objects, illustration of shadhwe card by solid objects, th ying the light, can be adjusted accordingly.
	nyole can dalby determine the correct los of 20 bpt exposure equipment can be o	conditions for the UV paint, adjustment an involutional
INSCAL BURN	+++ http://www.hutflim.com/pro	Auto Industrial products invecaie/

