

# PRESSURE MEASUREMENT FILM PRESCALE

**EXTREME LOW PRESSURE  
4 LW  
(TWO-SHEET TYPE)**

## 1 LINE UP

Nine types of Prescale are supplied according to Eight pressure level. Select the appropriate Prescale range.

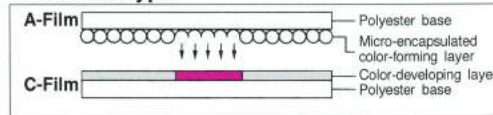
type	Film type	Pressure range[MPa]		1MPa ≒ 10.2kgf/cm <sup>2</sup>						
		0.006	0.05	0.2	0.5 0.6	2.5	1.0	50	1.30	300
		0.87	7.3	29	73 87	363	1450	7250	18850	43500
		Pressure range[psi]		1psi ≒ 6895Pa						
Two-sheet type	Ultra Extreme Low Pressure (5LW)	[Diagram showing pressure range 0.006 to 0.05 MPa]								
	Extreme Low Pressure (4LW)	[Diagram showing pressure range 0.05 to 0.2 MPa]								
	Ultra Super Low Pressure (LLLW)	[Diagram showing pressure range 0.2 to 0.5 MPa]								
	Super Low Pressure (LLW)	[Diagram showing pressure range 0.5 to 0.6 MPa]								
	Low Pressure (LW)	[Diagram showing pressure range 0.6 to 2.5 MPa]								
	Medium Pressure (MW)	[Diagram showing pressure range 2.5 to 1.0 MPa]								
Mono-sheet type	Medium Pressure (MS)	[Diagram showing pressure range 1.0 to 50 MPa]								
	High Pressure (HS)	[Diagram showing pressure range 50 to 1.30 MPa]								
	Super High Pressure (HHS)	[Diagram showing pressure range 1.30 to 300 MPa]								

\* Film type W:Two-sheet  
S:Mono-sheet

## 2 STRUCTURE AND HOW IT WORKS

**Structure** The two-sheet type film is composed of two polyester bases. One is coated with a layer of micro-encapsulated color forming material (A-film) and the other with a layer of the color developing material (C-film). Use both films by facing the coated sides towards each other.

### Two-sheet type



**How it works** When pressure is applied, the microcapsules are broken and the color-forming material reacts with the color-developing material to make red color. The microcapsules are designed to break according to the pressure, so the color density corresponds to the pressure.

## 3 PROPERTIES

	Two-sheet type
Precision	±10% or less (measured by densitometer at 23°C/73.4°F, 65%RH)
Recommended temperature range	15°C~30°C(59°F~86°F)
Recommended humidity range	20%RH~75%RH

## 4 HOW TO USE

### Preparation

Remove the A-film from its wrapped black poly film. Rotating both octagonal flanges, unwind the film with the inner side of the roll (the color-forming material side) facing up. Cut the film to the required length. **When doing this, take extra care not to touch or bend the color-forming material side.** Then, cut off the rubber spacer from both edges of the film and cut the film to the size required for the measurement. Remove the C-film from its blue poly sack. Cut the film to the required size in the same way as the A-film.

### Pressurization

Place the two films together with the color-forming material side of the A-film and the color-developing material side of the C-film facing each other. (The color-forming material side and the color-developing material side have rough surfaces like frosted glass, while the polyester bases have a smooth surface.) Insert the films where you wish to measure the pressure and then apply pressure.

### Inspection

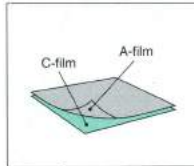
Peel off the A-film. See and check the pressure distribution by observing the color density on the C-film. Place the film on a sheet of white paper or the like, and observe the film from the polyester base side (the smooth surface) in a well lit area. Use the pressure analysis system if you wish to obtain quantitative pressure values. (Contact us for details on the pressure analysis system.)



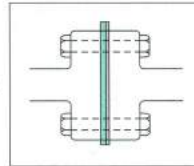
(1) Cut a sheet from the roll of A-film.



(2) Cut off the spacer rubber from both edges of the A-film.



(3) Cut the A-film and the C-film to the required shape and place the two films together with the rough surfaces of each film facing each other.



(4) Insert cut Prescale Film into area to be measured and apply pressure.



(5) Remove film and observe pressure distribution.

**Do not touch, rub, or bend the color-forming material side.**

## 5 PACKAGING AND FILM COLOR

〈Package〉

The two-sheet type is composed of two rolls. A-film is wrapped in the black poly film and rolled with the coated side facing in and with a rubber spacer attached along both edges of the film to prevent any contact between the film surfaces. C-film is in the blue poly sack and rolled with the coated side facing out.

〈Film Color〉

Film color is as follows.

Two-sheet type	A-film	C-film
Ultra Extreme Low Pressure (5LW)	Translucent white	Whitish
Extreme Low Pressure (4LW)	Translucent white	Whitish
Ultra Super Low Pressure (LLLW)	Creamy	Whitish
Super Low Pressure (LLW)	Yellowish	Whitish
Low Pressure (LW)	Bluish	Whitish
Medium Pressure (MW)	Reddish	Whitish

## 6 STANDARD CONDITIONS FOR APPLYING PRESSURE

〈Continuous Pressure〉

Gradually increase the pressure to the required level in five seconds and maintain the pressure for another two minutes. The pressure maintained at this level is referred to as continuous pressure.

〈Momentary Pressure〉

Apply pressure for five seconds and maintain the pressure for another five seconds. The pressure maintained at this level is referred to as momentary pressure.

## 7 HOW TO DETERMINE THE PRESSURE LEVEL

### Pressure distribution check by Prescale alone

When pressure is applied, red patches appear on Prescale. The red color density of Prescale changes depending on the amount of pressure applied. The area with deep red color indicates that the pressure applied was high and conversely the area with light red color indicates that the pressure applied was low. Place the Prescale on a few white sheets of paper with its smooth surface on top and check the result in the light.

### Pressure values determination by using the pressure chart

In order to roughly determine the pressure values, use the Prescale standard color sample and the pressure chart.

Taking the temperature, the humidity and the pressure condition into consideration, you can determine the pressure values to a certain extent by selecting a pressure curve from the standard pressure chart. Place the Prescale on a few white sheets of paper with its smooth surface on top and check the result in the light.

## PRECAUTIONS ON USE

- 1) A-film reacts sensitively even to minute pressure. Don't hold tight or rub it before use.
- 2) To protect the product, A-film is rolled with rubber spacer attached along both edges of the film to prevent any contact between the film surfaces. Pressing or bending the center of the roll could result in erroneous color forming. Hold both octagonal flanges when removing the film from its storage case or when carrying the film.
- 3) Contact with the micro-encapsulated color-forming layer or rubber spacer of A-film for long periods may cause a skin reaction in sensitive individuals. It is recommended to wear protective gloves during handling.
- 4) Clean the measuring place beforehand. Water, oil or dust if present on the surface of Prescale, will hinder proper color density development.
- 5) Avoid friction between A and C-films. The films should be bound together at the edge if shearing force is expected during the measurement.
- 6) Use the Prescale at a temperature between 15°C~30°C (59°F~86°F) and a humidity between 20%RH~75%RH. The result of measurement may not be accurate outside of this region.
- 7) Prescale is not reusable.
- 8) Do not drop the product.
- 9) Use Prescale within the given shelf life.

Color density development of Prescale may significantly vary depending on the temperature, humidity, pressurization and other conditions of use.

## PRECAUTIONS ON STORAGE

- 1) Keep Prescale under cool (below 15°C) and dark room, avoid direct sunlight and heat.
- 2) Don't contact Prescale with the following items:  
Diazo copying papers and carbon papers, water, oil, solvent and other chemicals, vinyl products and adhesive tapes, rubber products, papers written by marker pens.
- 3) Keep unused A-film wrapped in the black poly film and unused C-film in the blue sack and store them in the box.
- 4) Avoid exposing C-film to the light for extended periods of time.
- 5) Avoid having used C-films stack each other. (To insert copying papers among C-films is preferable)



EXTREME LOW PRESSURE

# 4 L W

(TWO-SHEET TYPE)

Measurement range

0.05 to 0.20 MPa

• Pressurization conditions

Pressure measurement reached in: 5 seconds

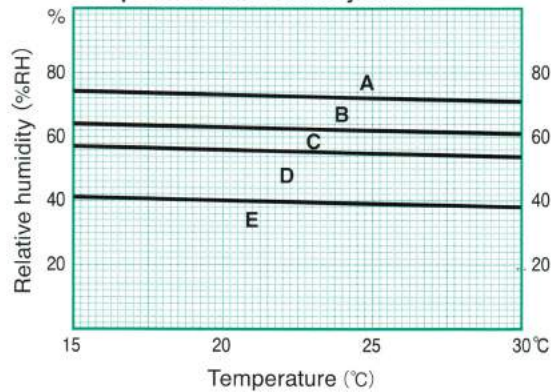
Pressure measurement maintained for: 2 minutes

Check which curve in the above chart meet the temperature and humidity conditions during pressurization.

For example, a room temperature of 25°C and humidity of 60% would be located in Zone C. The pressure value is derived from Curve C in the standard chart.

## Continuous pressure standard chart

Temperature and humidity chart



Standard color samples

1.0



0.8



0.6



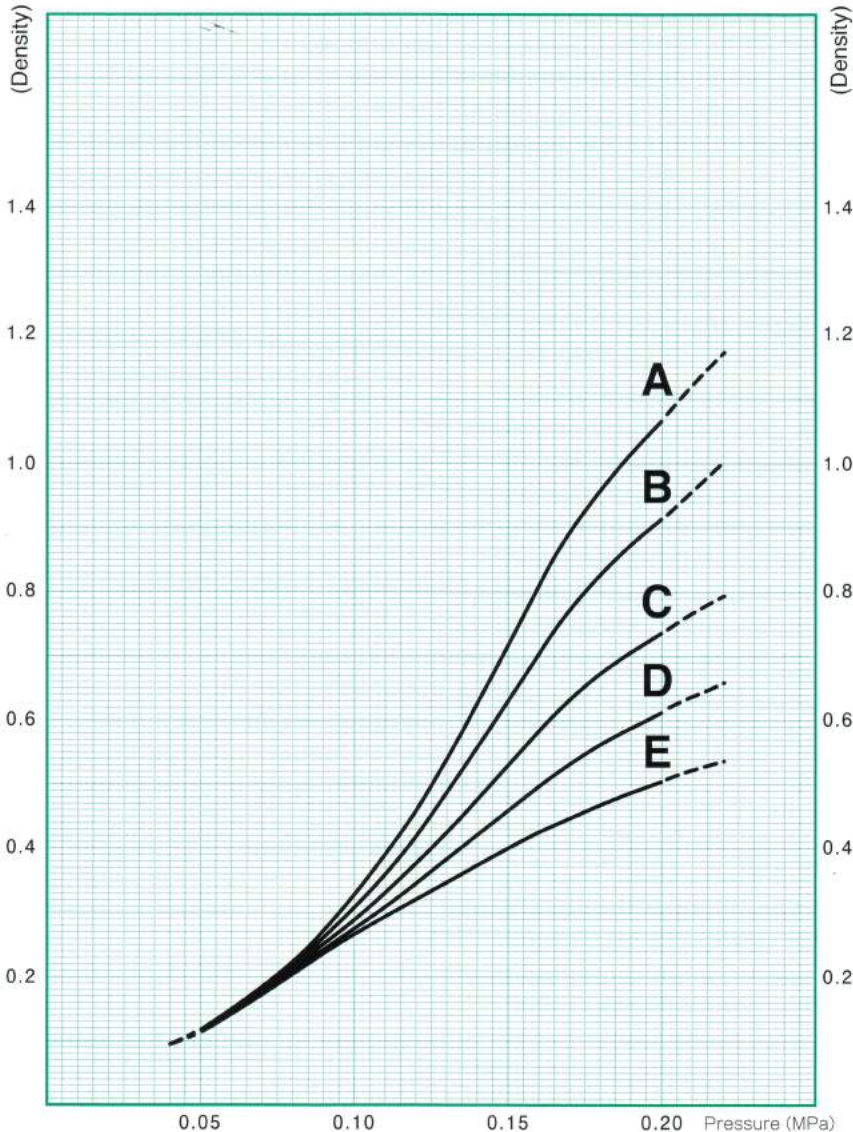
0.4



0.2



0.1



\* These curves show results obtained by allowing film to develop colors under certain pressurization conditions, in a certain environment, and with certain devices. The film is left in the same environment for 30 minutes and measurements are then taken. These characteristics may change under different conditions. Values indicated with a broken line may exceed the tolerable error range, and the pressure values should be used for reference only.



# Momentary pressure standard chart

Measurement range  
0.05 to 0.20 MPa

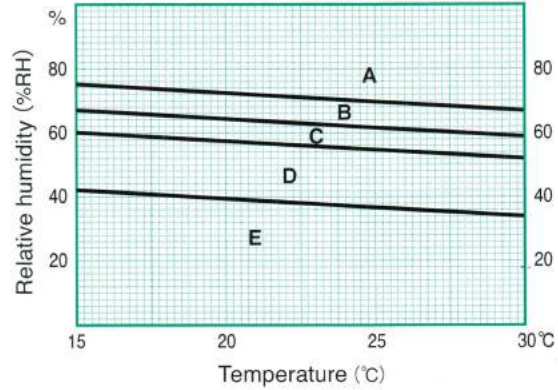
• Pressurization conditions

Pressure measurement reached in: 5 seconds

Pressure measurement maintained for: 5 seconds

Check which curve in the above chart meet the temperature and humidity conditions during pressurization. For example, a room temperature of 25°C and humidity of 60% would be located in Zone C. The pressure value is derived from Curve C in the standard chart.

Temperature and humidity chart



Standard color samples

1.0



0.8



0.6



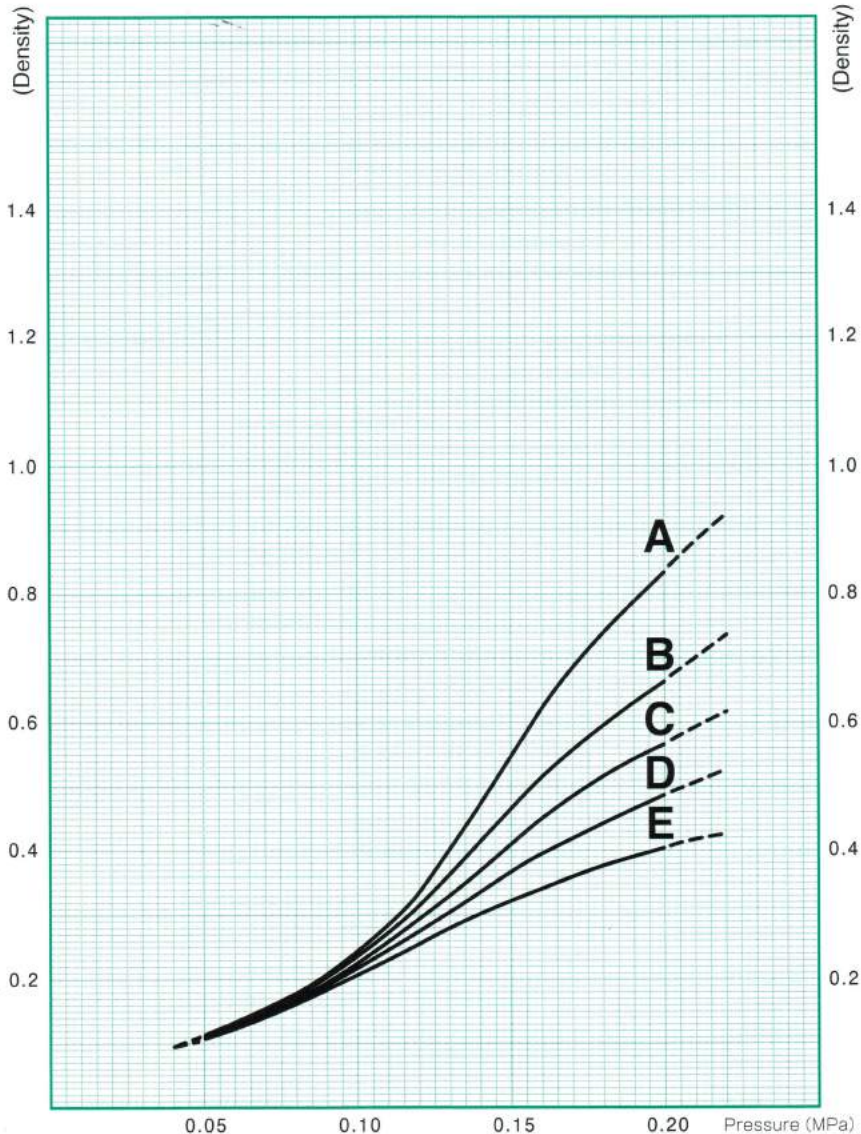
0.4



0.2



0.1



\* These curves show results obtained by allowing film to develop colors under certain pressurization conditions, in a certain environment, and with certain devices. The film is left in the same environment for 30 minutes and measurements are then taken. These characteristics may change under different conditions. Values indicated with a broken line may exceed the tolerable error range, and the pressure values should be used for reference only.