FUJIFILM

PRESCALE

instruction sheet

FUJI PRESCALE PRESSURE MEASURING FILM

LW - *Low Pressure Range* (two sheet type)

Type of Prescale Film available ranges

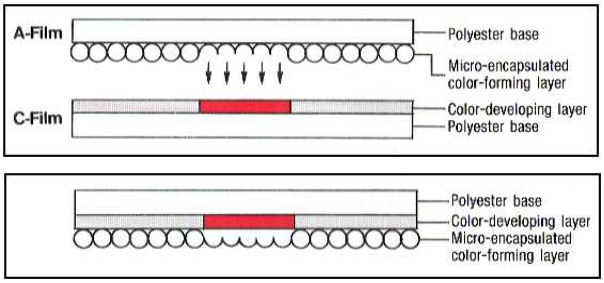
Fuji Film manufacture up to eight types of *Prescale Films*, available to cover a very wide range of pressure (five ranges are as two sheet type xxxx**W**; three ranges are as mono sheet type xx**S**).

Left side shown a list of existing ranges with related film sizes.

Film type	Pressure range[MPa] (0.05 0.2 0.5 0.6 2.5 10 50 130 300)	Product size W(mm)×L(m)
Extreme Low Pressure (LLLLW)		310×3
Ultra Super Low Pressure (LLLW)		270×5
Super Low Pressure (LLW)		270×6
Low Pressure (LW)		270×12
Medium Pressure (MW)		270×12
Medium Pressure (MS)		270×12
High Pressure (HS)		270×12
Super High Pressure (HHS)		270×12

Structure of Prescale film - how it works (Prescale LW is a two sheet type)

As explained, and depending from its measuring range, *Prescale Film* is available by two possible formats, one based on two sheets (A + C), and another as a mono sheet.



Two sheets film - *Prescale* is composed of an A film (made of a PET base) which is coated with a micro encapsulated colour forming material, and a C film (made of a PET base), which is coated with a colour developing material. When used, the two films should be placed with the coated (rough and opaque) surfaces facing each other.

Mono sheet film – A first colour forming layer is coated on polyester film base. A further micro encapsulated colour forming material is layered on the top of film.

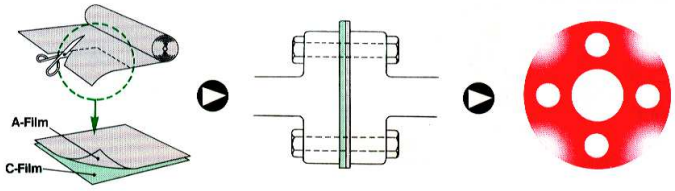
How it works - When pressure is applied on the film, microcapsules are broken with distribution and "density" of magenta colour depending by true pressure distribution and magnitude. When microcapsules are broken, their material is released and it react with the colour developing material and this process will cause magenta colour forming. Through PSC technology (*Particle Size Control*), microcapsules are designed to react to various degrees of pressures, releasing their colour forming material at a density that correspond to specific levels of applied pressure.

Properties of Prescale Film

- typical accuracy: ±10% or better (with densitometers @ 23°C (73.4 °F), 65% RH); up to ±15% (by "human eye " on colour sample table & charts basis)
- recommended temperature range: from 20°C up to 35 °C (from 68°F up to 95°F)
- recommended humidity range: from 35% RH up to 80% RH

Method of use of Prescale Film (two sheet type shown by side picture)

Cut *Prescale Film* into required shape and size (both A-film and C-film).
With two sheets film format make sure that coated (rough and opaque) sides on both A film (kept in the black poly sack) and C film (kept in the blue poly sack), are facing each other. Insert shaped *Prescale Film* into area to be measured and then apply pressure or force phenomenon.
Remove impressed film and observe pressure distribution and magnitude.



Typical conditions for applying under measurement pressure to Prescale Film

By mean of *Prescale Film* both extended and momentary measurement and analysis of pressure phenomenon are possible.

Extended (continuous) pressure measurements - With extended pressure method, applied pressure is increased gradually up to the given level, and it will be maintained continuously at that level. In order to get the best and accurate results (and where it is possible and applicable), preferably pressure should be applied gradually up to its highest value by a 2 minutes time basis, and it should be maintained at the highest level for other 2 minutes.

Momentary pressure measurements - If necessary *Prescale Film* could be also used for impact pressure measurements, with application time depending from application itself. When possible (and where applicable) preferably pressure should be applied gradually up to its highest magnitude by a 5 seconds time basis, and it should be maintained at the highest level for other 5 seconds.

Determining the pressure level and distribution over a two sheet type film

As explained, with pressure applied, *Prescale Film* turn into a several level of magenta colour (red), whose intensity (density), is directly proportional to the amount of pressure being applied. Where high pressure was applied, dark magenta will be shown. Conversely where low pressure was applied, a light magenta colour will be on the film areas. The correct interpretation of described results will be performed by three basic steps:

Step 1 - Peel off A-film. Compare exposed *Prescale* C-film to magenta's sample table shown on the back side of present data sheet. Each magenta sample correspond to a specific density figure so take a note of it; if exposed film colour is between samples, interpolate it. To read place the impressed C-film over few sheets of white paper or the like, and observe the film from the polyester base side (the smooth surface), in a well lit area.

Step 2 - With reference to followings temperature and humidity smaller chart, determine the ambient condition of your experience and try to recognize the type of area (A, B, etc.) that better match your true experiment conditions; be accurate as possible since for each working area a specific density curve (A, B, etc.) will be related on next step.

Step 3 - by type of performed pressure exposition (*Extended* or *Momentary*), and using the proper curve recognized as the closest to experiment ambient condition (see step 2), it should be possible to locate point corresponding to where recorded density intersects the curve previously determined. From this point of intersection and following the line down to X axis where is possible to obtain the actual pressure value in *MPa*.

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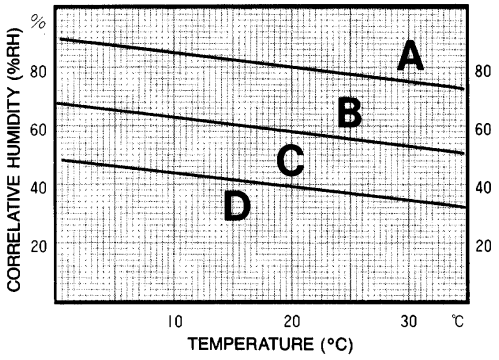
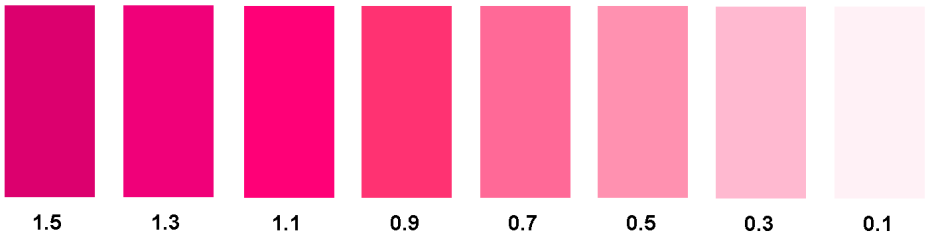
Graph of temperature and humidity *(*)*

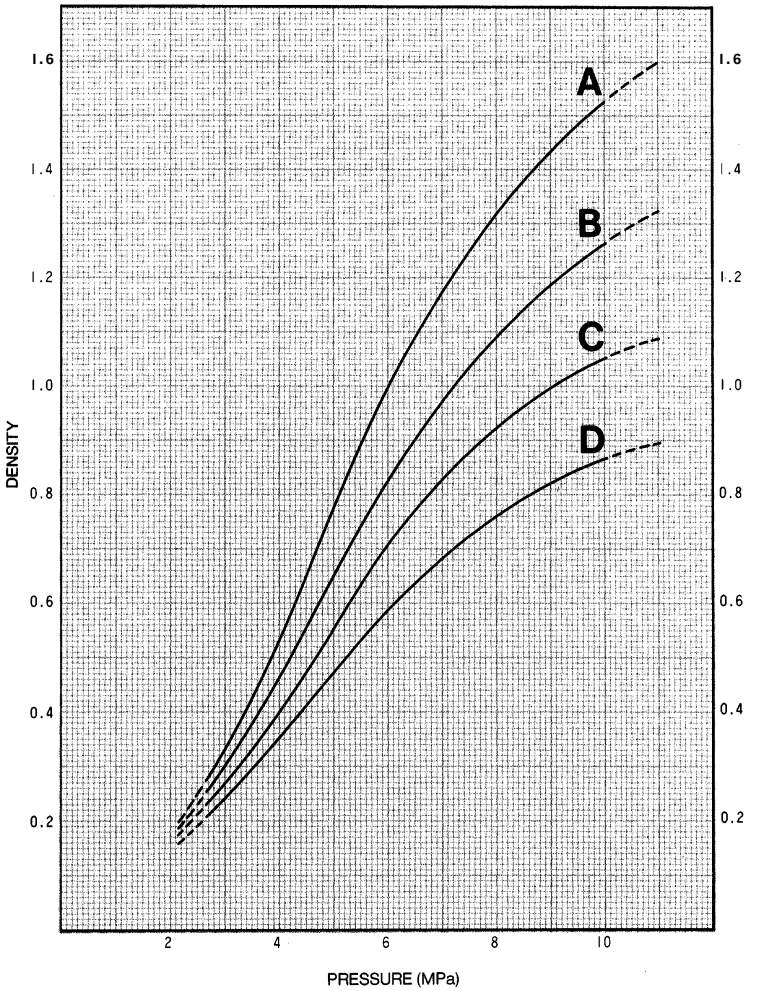


Magenta's samples table

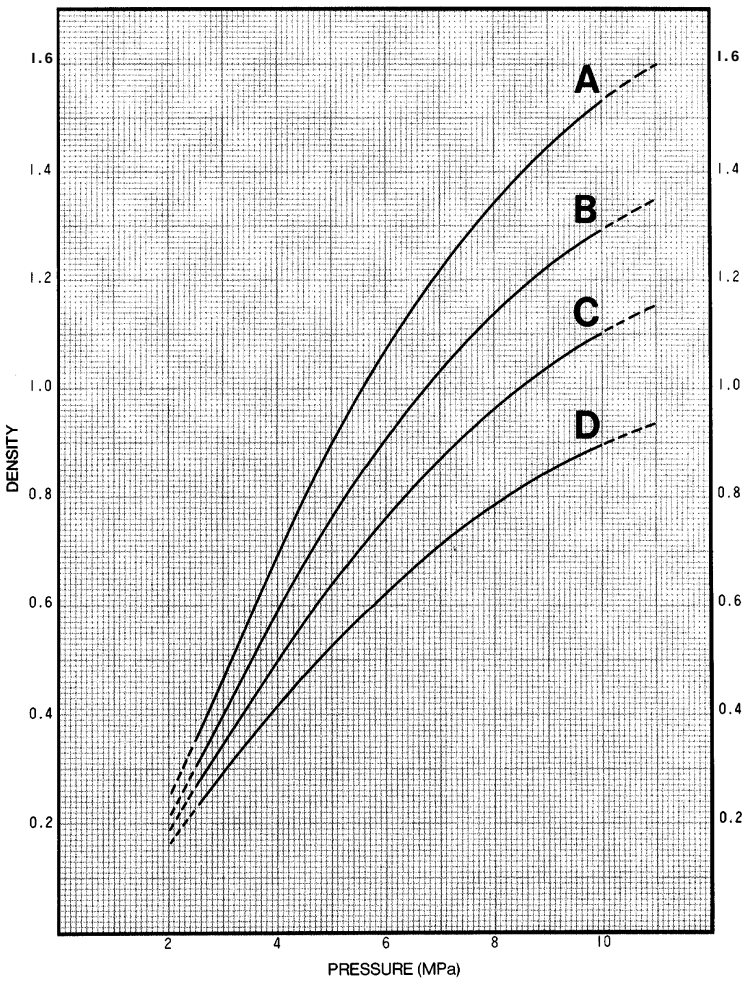


Even if *Prescale* can offer a "visual" direct imaging of pressure distribution and magnitude, better results are achievable by mean of shown standard charts and magenta's colour table. In choosing the proper curve *(*)*, check for ambient temperature and humidity conditions and make sure which area is the closest to your experiment (see side chart). For example, if the room temperature is 25°C and the humidity factor is 60% RH, acquire the pressure using the B curve in standard charts.

LW (2.5÷10 MPa) - *Extended* pressure chart



LW (2.5÷10 MPa) - *Momentary* pressure chart



As the pressure ranges indicated by the broken lines in the above graphs may exceed the permissible error range, they should be used for reference only.

Precautions on use and storage

A film (on two sheets film format) react with high sensitivity even to minute pressure. Do not hold tight or rub it before use. Wipe the surfaces to be measured before use. Water, oil or dust, if present on coated surfaces of films, will hinder proper colour development. Avoid friction between A and C films. The films should be bound together at the edge before to start the test (if shearing force is expected) and not shifted later. Use *Prescale Film* at temperatures within 20 °C to 35 °C (68 ÷95 °F), and an humidity range of 35% RH up to 80% RH. Measurements performed outside this region could be not accurate. *Prescale Film* is not reusable. It should be also utilized within the given shelf life. Be particularly careful in handling single sheet *Prescale Film* types (xx**S**) as they are self colour developing and could easily develop on their own. Avoid film exposure to sunlight or in location close to fire or excessive heating. During storage avoid film contact with carbon paper, Diazo copying paper, solvents, water, oil or other chemicals, vinyl plastic or adhesive tapes, rubber products or with papers written by marking pens. Unused films should be placed in the original polyethylene bags and stored in the original box. Keep used C film in a paper bag. After development, avoid storing of the impressed C film (or the mono sheet type film) with the colour developer material sides making contact with each other.

Please be aware that Fuji Prescale film could be also "measured" by more capable and repeatable means like colour densitometers and specific software facilities based on a calibrated A4 format scanner (quantitative pressure values). Please contact our sales department for any further detail. Spare can also offer you several further diagnosis tools and instrumentation. Please submit us your application details as we will check the more cost effective and the best "requirements tailored" solution.

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