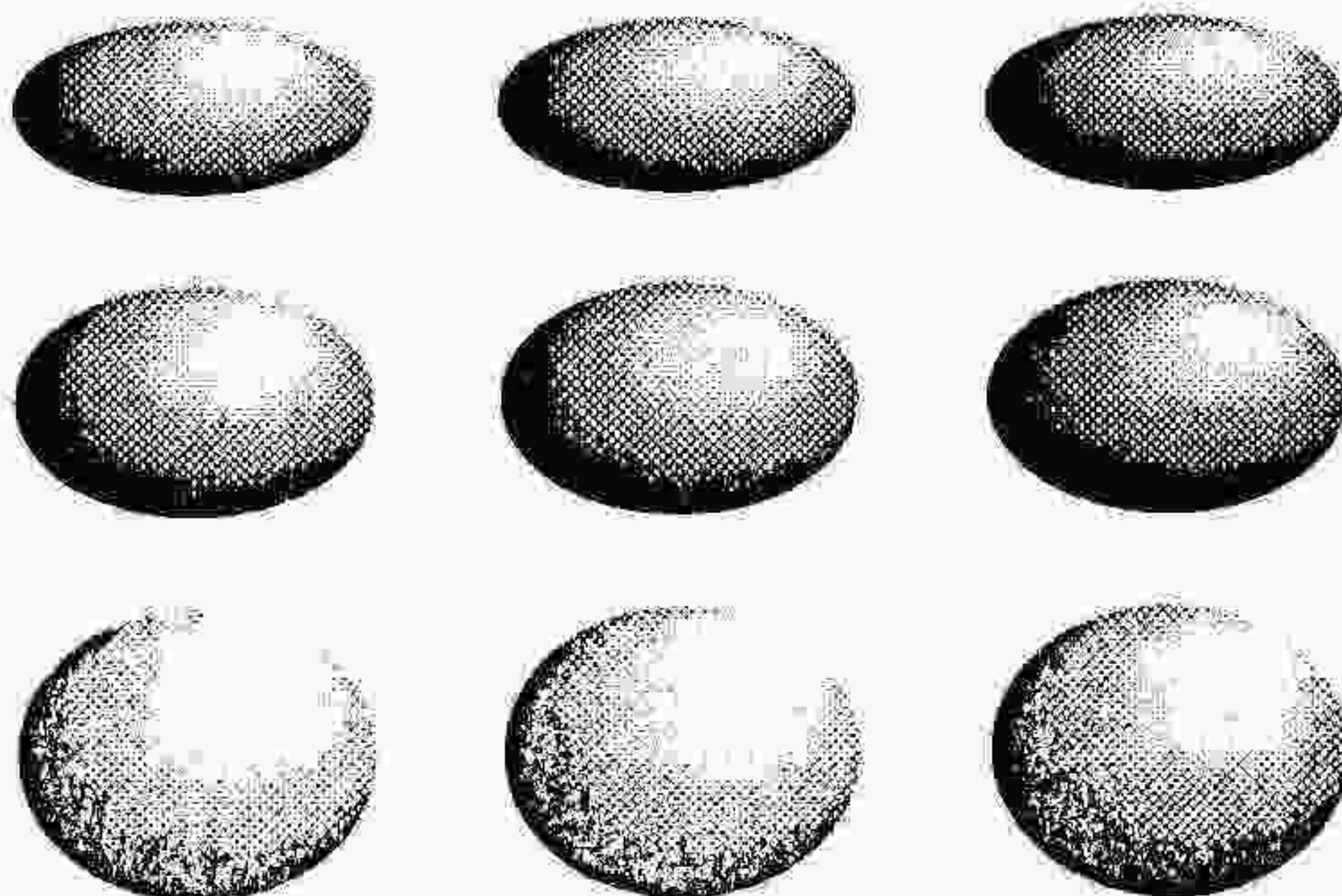


FUJI PRESCALE PRESSURE MEASUREMENT FILM

APPLICATION MANUAL



Accurate pressure information at a glance with the world's first pressure measurement film

Fuji Prescale Film is a film for precisely measuring pressure. With this unique product, manufacturers from a wide variety of fields can improve quality, increase productivity and reduce the cost of mass-production items, as well as troubleshoot by analyzing problems in the production process.

Although Prescale Film is currently being used in numerous industries, we believe that it has not yet received the recognition it deserves. We have therefore prepared this manual to help optimize its potential. Moreover, Fuji Prescale Film has been improved and the applications for which it may be used have been expanded. This manual details some of the valuable ways Prescale Film is currently being used. We hope you find it useful in introducing Prescale Film to new markets.

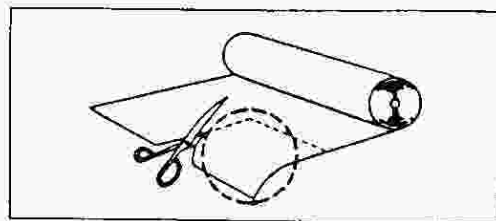
Fuji Prescale Film

—Multi-purpose pressure measurement film

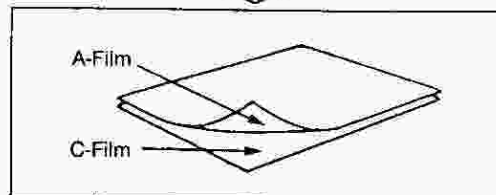
The composition of 2-sheet Prescale Film is similar to that of non-carbon paper. The A-Film is coated with a layer of micro-capsules containing color-forming material, and the C-Film is coated with material that captures and develops the color. When the two surfaces are brought together and pressure is applied, the micro-capsules burst, the color-forming material reacts with the color-developing material, and color is produced.

To measure the amount of pressure accurately, Prescale Film is extremely thin. However, some users require an even thinner film. Therefore, we also offer a single-sheet Prescale Film, with both the color-forming material and color-developing material on the same base. When pressure is applied, color is generated in the same way as with 2-sheet prescale film.

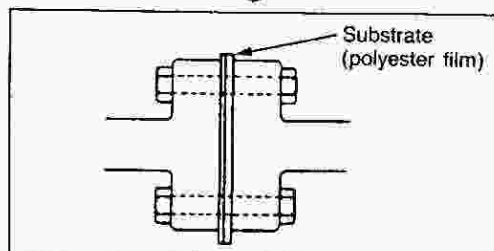
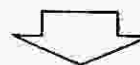
Prescale Film is extremely easy to use!



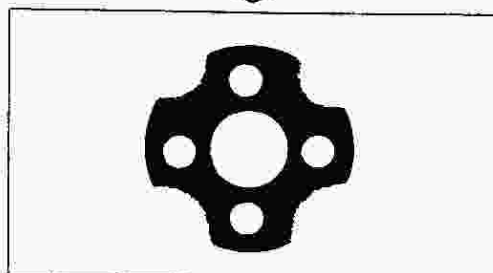
- 1.** Cut the Prescale Film into the required shape from each roll.



- 2.** Sandwich the A- and C-Films with the coated sides facing each other.



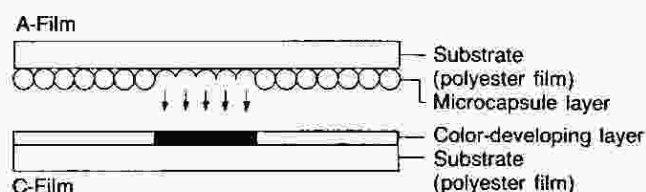
- 3.** Insert the "sandwiched" film into the place to be measured and apply pressure.



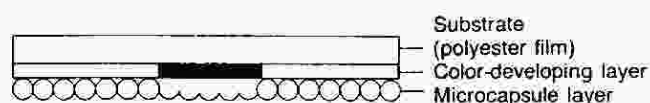
- 4.** Withdraw the film. The pressure distribution is readily observable by the color density pattern formed on the C-Film.

Structure

Two-sheet type: Prescale Film is composed of an A-Film, which contains a layer of micro-encapsulated color-forming material, and a C-Film, which contains a layer of color-developing material.



Single-sheet type: The color-developing agent has been deposited on a substrate made of polyester film, and the micro-encapsulated color-forming agent is layered on top of this.



How It Works

When pressure is applied, the micro-capsules are broken and the color-forming material that is released reacts with the color-developing material to generate color. Through Particle Size Control (PSC) technology, the micro-capsules are designed to react to various degrees of pressure, releasing their color-forming agent at a density that corresponds to the pressure.

Properties

	Two-sheet type	Single-sheet type
Accuracy	±10% or less (density measurement)	±10% or less (density measurement)
Temperature range	5°C ~ 35°C	5°C ~ 35°C
Humidity range	20%RH ~ 90%RH	20%RH ~ 90%RH

Types

Film Rating	Applicable pressure range	Product size	Type
Ultra Super Low Pressure (LLLW)	2 ~ 6kgf/cm ²	270mm(W) × 4m(L)	Two-sheet type
Super Low Pressure (LLW)	5 ~ 25kgf/cm ²	270mm(W) × 5m(L)	Two-sheet type
Low Pressure (LW)	25 ~ 100kgf/cm ²	270mm(W) × 10m(L)	Two-sheet type
Medium Pressure (MW)	100 ~ 500kgf/cm ²	270mm(W) × 10m(L)	Two-sheet type
Medium Pressure (MS)	100 ~ 500kgf/cm ²	270mm(W) × 10m(L)	Single-sheet type
High Pressure (HS)	500 ~ 1300kgf/cm ²	270mm(W) × 10m(L)	Single-sheet type

*By using Super Low Pressure film and the Prescale mat, it is possible to take measurements from 100gf/cm² ~ 5kgf/cm²

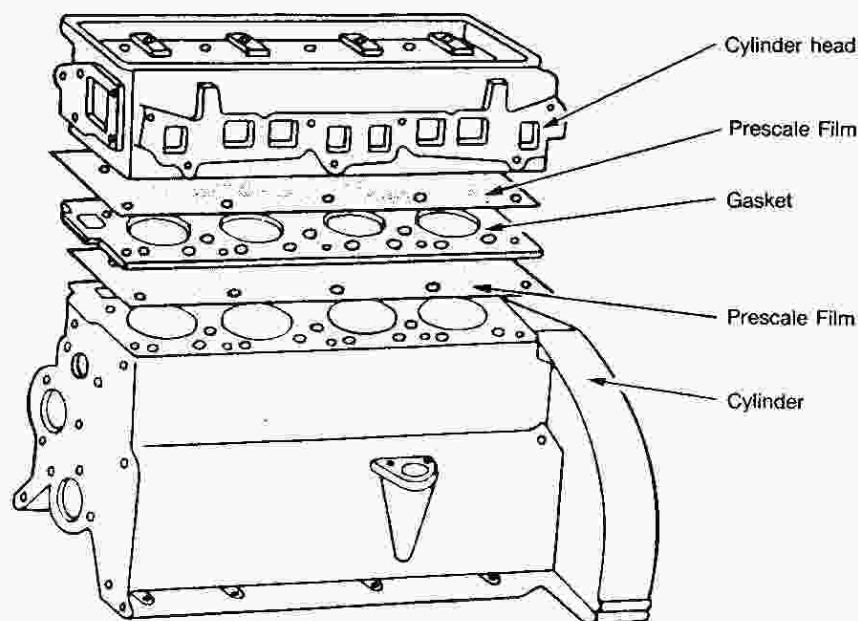
Applications

Engine Cylinder Heads

Since its introduction, Prescale Film has been an effective and valuable tool for the automotive industry, especially for companies that need to measure the pressure distribution and pressure values during cylinder gasket tightening on an automobile engine. The cylinder gasket is responsible for ensuring the complete separation of the coolant, lubrication oil and fuel in the engine without leakage. For this reason, maintaining surface pressure is extremely important. In the past, some parts of the

pressure could not be expressed numerically, but Prescale Film enables the user to quantitatively measure the pressure, allowing a great advance in quality stabilization.

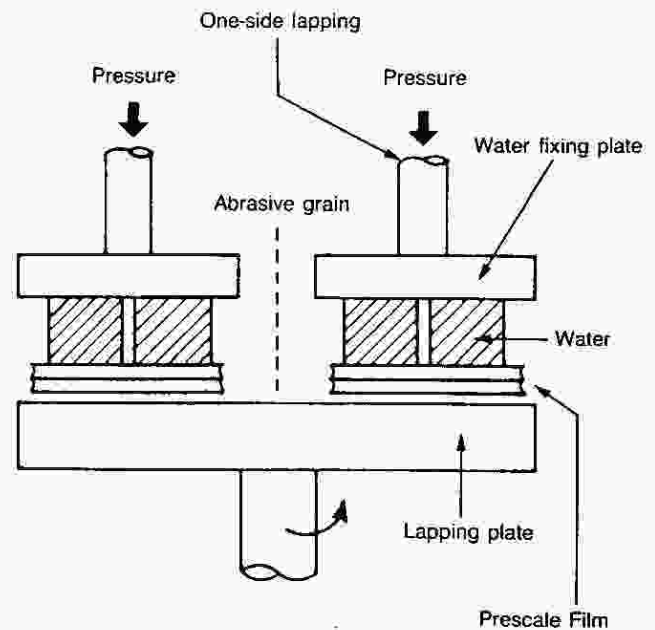
Recommended film types: LW, MW, MS, HS



Thick IC Printing

In thick IC printing, checking and correcting squeegee pressure is perhaps the most important aspect of quality control. Prescale Film instantly reveals the pressure balance in the front-rear and left-right directions of the squeegee so that corrections can be made. In addition, Prescale Film can be used to detect changes in paste viscosity and pressure changes caused by swelling of the squeegee rubber, both of which occur during high-volume printing.

Recommended film types: LLLW, LLW

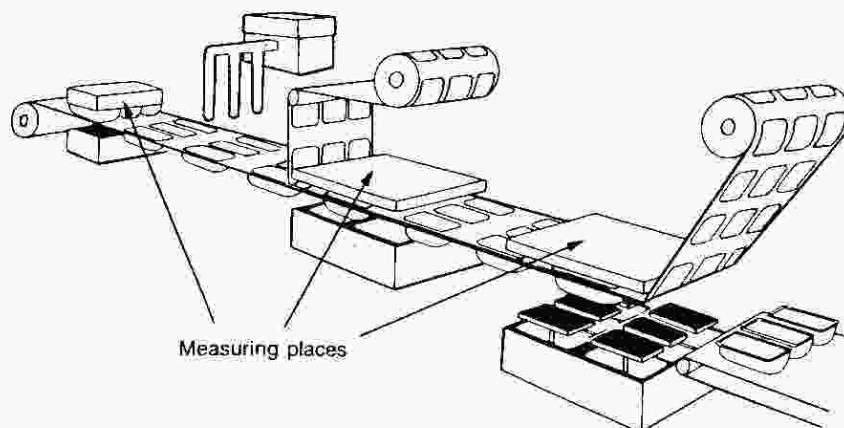


Automatic Packing Machines

The proper seal pressure and alignment of foodstuff or chemical packaging has conventionally been determined by looking at the product after sealing. With Prescale Film, however, the pressure value and alignment can

be determined instantly by using the film on the automatic packaging machine. Prescale Film enables the user to numerically control the pressure, greatly improving quality control.

Recommended film types: LLLW, LLW



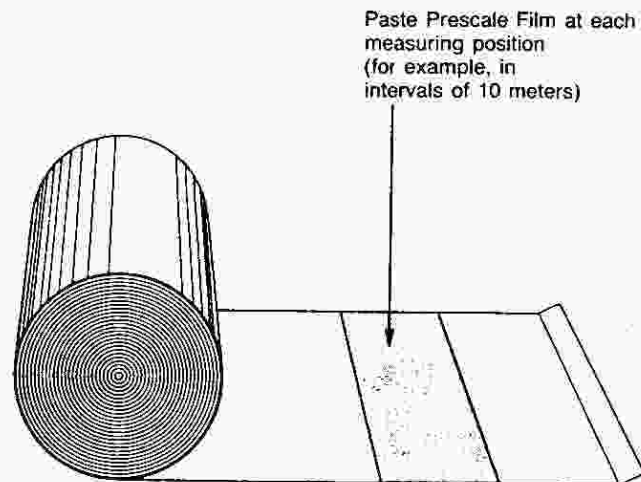
Applications

Steel Plates

Measurement of the appropriate rolling tension of a steel plate has been difficult in the past. In many cases, tension and speed have been determined based on experience, and the rolled result has often been poor, as the central part sometimes swells up. If Prescale Film sheets are inserted in a rolling steel sheet and later removed, the pressure distribution can quickly be observed. Speed and tension adjustments can be numerically standardized using the data obtained from the Prescale Film. This reduces finish loss and

equalizes the steel plate rolling coil.

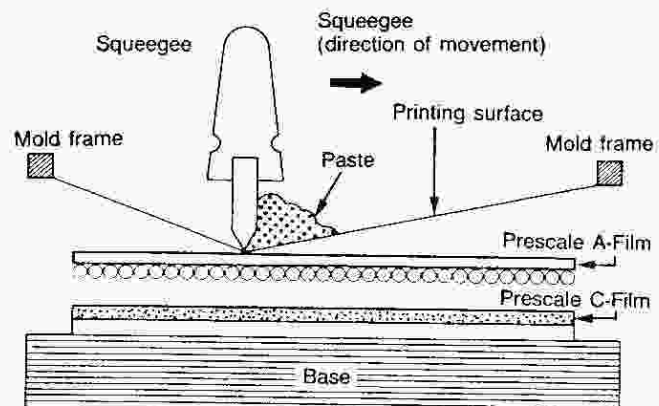
Recommended film types: LLW, LW



Screen Printing

Checking and correcting the squeegee pressure during continuous screen printing greatly enhances the degree of uniformity in dyeing, and reduces the amount of dyeing paste required. When Prescale Film is used, the pressure balance of the squeegee in the forward-rear and left-right directions is immediately known, facilitating squeegee pressure adjustments and uniform polishing of the squeegee.

Recommended film types: LLLW, LLW

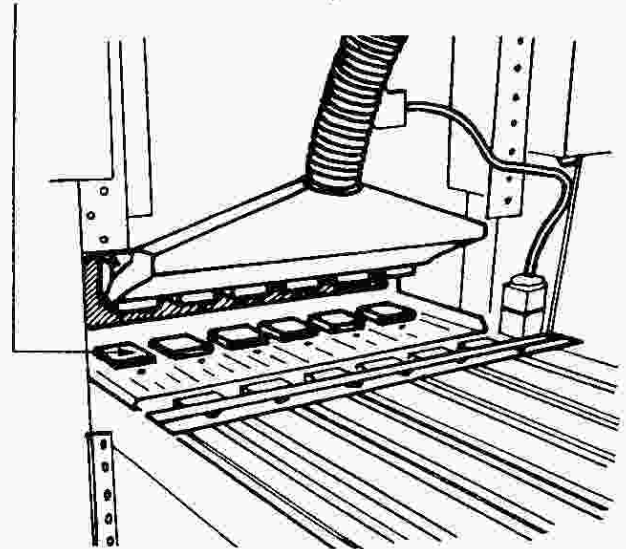


Tile Products

Because wall and floor tiles are produced by a baking process, the final product is smaller than the mold. How small it becomes depends on the moisture content and filling density of the material. The key factor in making an exactly square tile is uniformity of the filling density. In the past, filling density was controlled based on experience and intuition. However, Prescale Film allows the uniformity of the filling density to be checked easily, improving the dimensional accuracy of the finished product.

Recommended film types: MW, MS

Cut Prescale Film to fit here and place



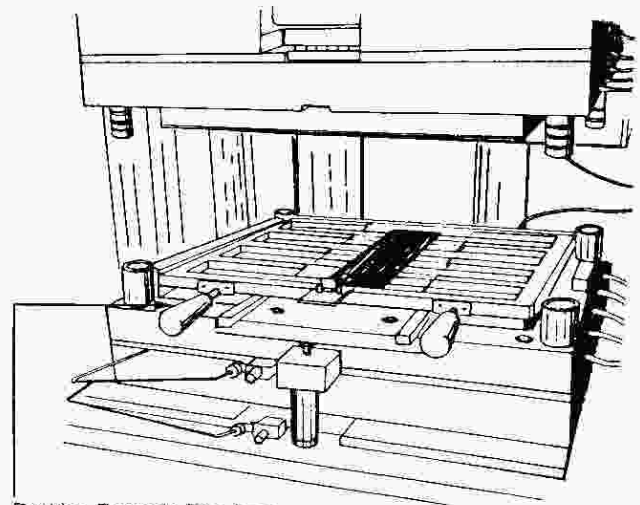
IC Packaging

When starting IC packaging with a mold, the best way to increase the yield is to check the contact with the mold. In the past, the contact has been checked either by using carbon paper or after using the actual products several times. If the actual products are used, several hundred pieces may be lost. If carbon paper is used, the strength of the contact is not clearly determined.

With Prescale Film, the density of the film color reveals any tendency to generate burrs. This makes it possible to check and, if necessary, make corrections

quickly and easily.

Recommended film types: LLW, LW



Position Prescale Film here

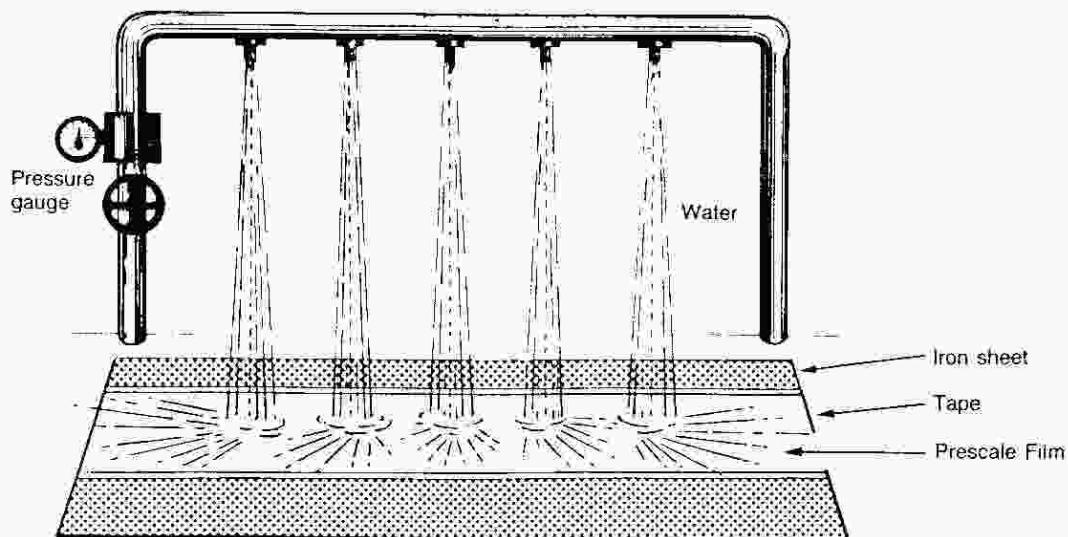
Applications

Ingot Rolling

When an ingot is rolled, iron oxide is removed by water pressure. In conventional processing, the water pressure is adjusted using a water pressure gauge attached to the valve. However, it has not been possible to measure either the water pressure actually applied to the ingot from the nozzle or the pressure distribution. When the temperature of the machine decreases while the machine is stopping, Prescale Film wrapped in polyethylene film can be pasted to the iron sheet. When water jets out from the nozzle, the water

pressure colors the Prescale Film red, accurately indicating the water pressure and its distribution. Based on the degree of redness, the water pressure can be adjusted, thus enabling the operator to completely remove the iron oxide.

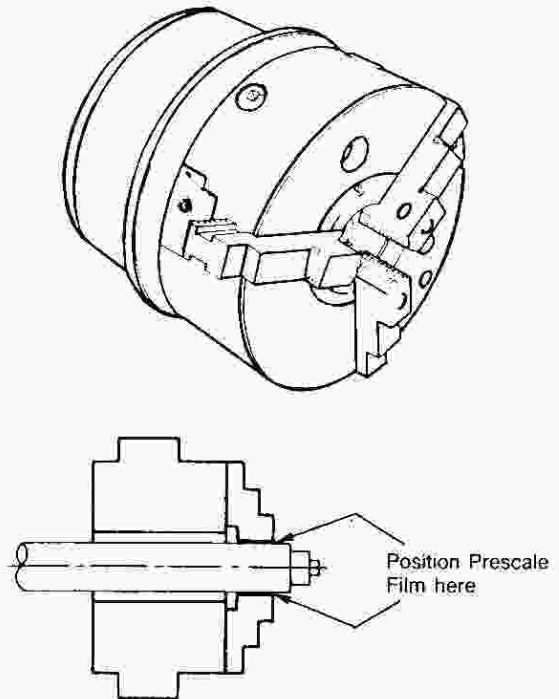
Recommended film types: LLW, LW



Lathe Chucking

In lathe chucking, tightening the pressure of the chuck can cause uneven wearing of the nib or warping of the alignment. This can result in dimensional errors and thus a defective product, as well as create a danger to the operator. By periodically using Prescale Film to measure the chucking pressure, the nib can be accurately adjusted, and stable quality of the product can be assured.

Recommended film types: LW, MW, MS

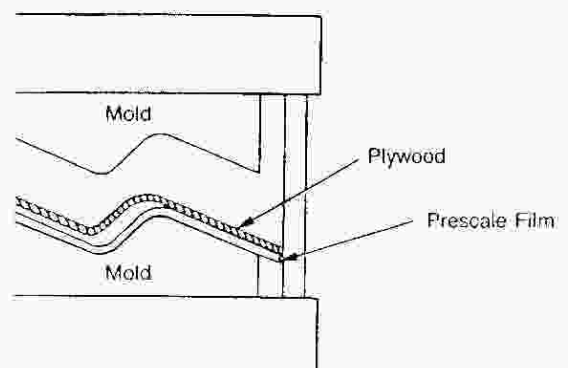


Manufacturing of Musical Instruments and Furniture

With bonded curved parts, the quality of the mold greatly influences the quality of the bond. Conventionally, the quality of the bond could only be checked through experience and intuition. However, if Prescale Film is pressed together with the bonding material, the pressure value and pressure distribution of the entire surface of the bonding part can be accurately determined. Thus the quality of the mold can be easily determined, and product reliability improved. With roller pressing or curved surfaces, the roller pressure can easily be

measured with Prescale Film and the time required to make changes can be substantially shortened.

Recommended film type: LLW

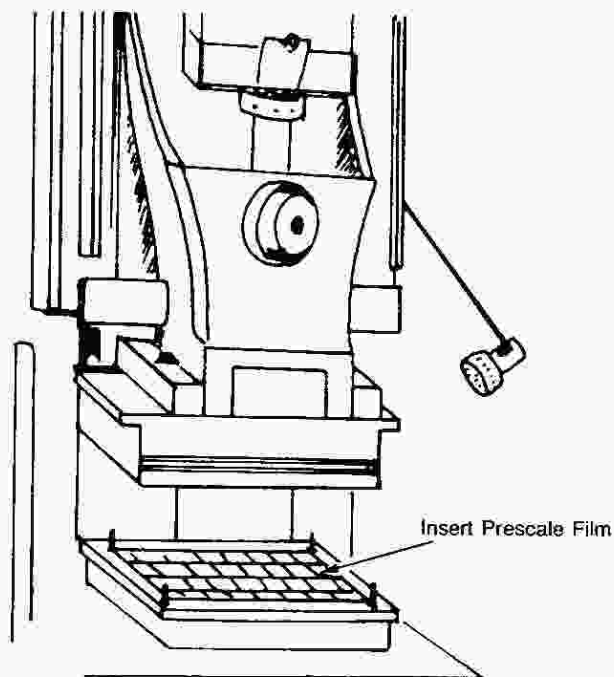


Applications

Printed Circuit Boards

It is often difficult to obtain uniform pressure in the blanking (mainly compound mold) of circuit boards. However, when blanking is done with Prescale Film, the pressure distribution and capacity of the press machine is easily determined. Unevenly applied pressure can be immediately corrected, ensuring stable production, as well as extending the service life of the mold and reducing production costs.

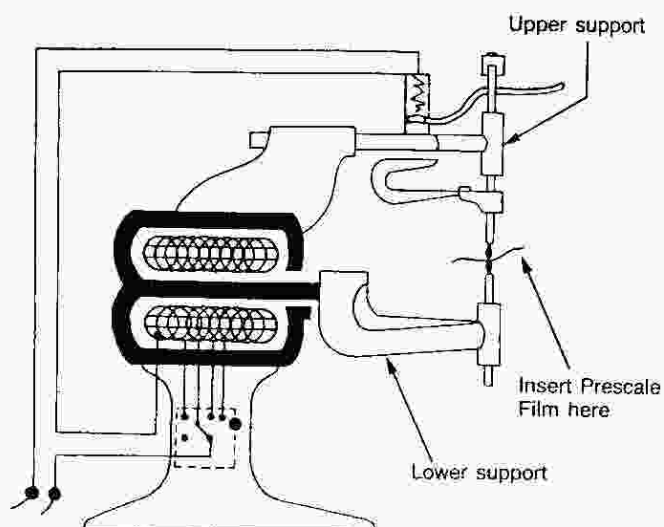
Recommended film types: LLW, LW



Welding

Pressing force, along with current and conducting time, is one of the three major elements of resistance welding. Prescale Film can be used in spot welding, projection welding and seam welding to control the pressing force. If Prescale Film is used, the pressing force and alignment can be determined simultaneously. Prescale Film is especially useful for electrode plate checks on multi-spot or seam welding.

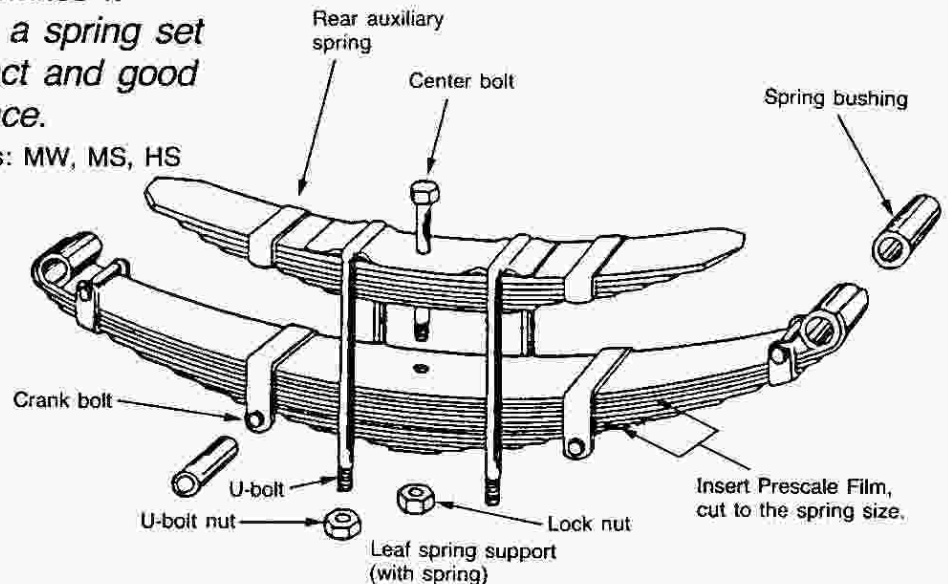
Recommended film type: LLW



Spring Set Design

By inserting Prescale Film between leaf springs, the pressure value and pressure distribution at the contact part are immediately determined. This makes it possible to design a spring set with uniform contact and good cushion performance.

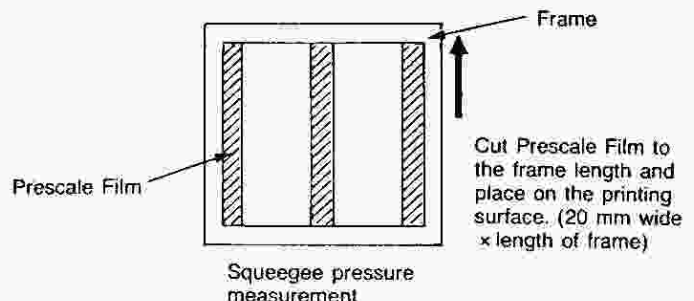
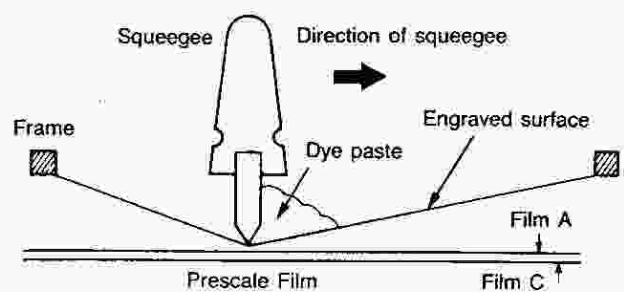
Recommended film types: MW, MS, HS



Dyeing

Mangle roller pressure during continuous dyeing can easily be checked and corrected with Prescale Film. This makes it easy to equalize the balance between the left and right sides of the mangle rollers, and to detect uneven wear of the rollers. Prescale Film enables the operator to periodically check the rollers.

Recommended film types: LLLW, LLW

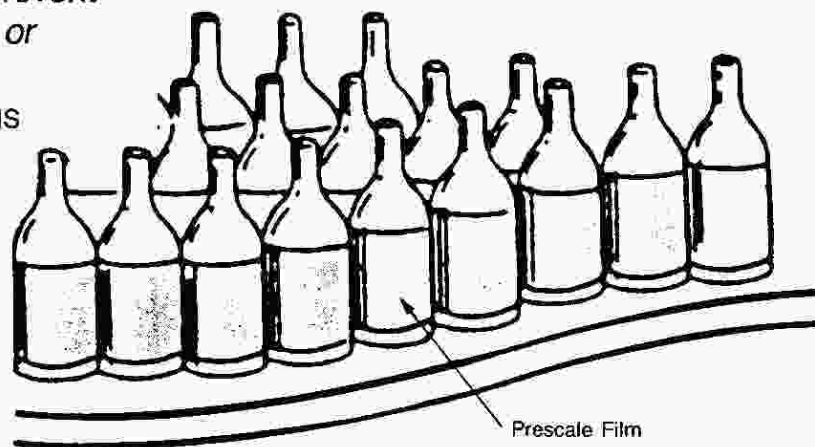


Applications

Contact Pressure between Bottles

In bottling, empty bottles are placed on a conveyor belt and filled, then pasted with a label. Prescale Film allows the operator to check the pressure between bottles at the point where they are capped. This helps prevent the bottles from bursting or cracking.

Recommended film types: MW, MS



Shoemaking

With Prescale Film, the press that is used to join the soles to the body of the shoe can be checked for even application of pressure.

Recommended film type: LLLW

