

## Pressure Measurement Film

# PRESCALE

## Application Examples

[No.18]

### Measured Object



Fuel cell stacks

### Uses

Checking uniformity of cell lamination load distribution

### Benefits

Lower defect rate

Higher quality

Better maintenance

### Industry

Fuel cell manufacture

### Applications

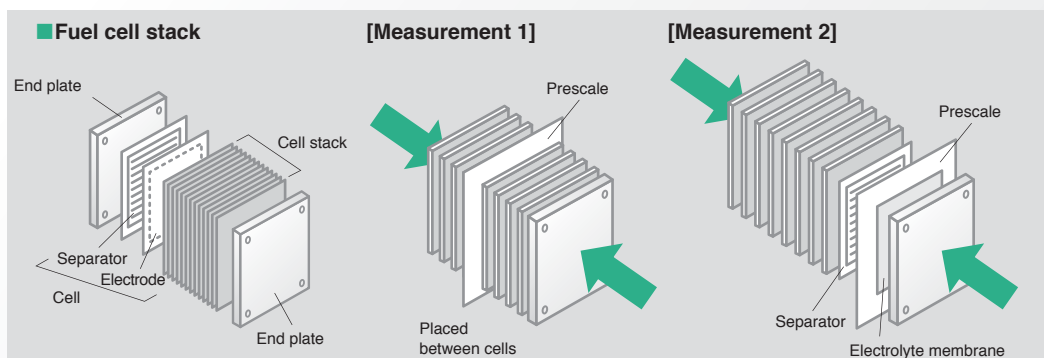
Checking cell lamination load distribution

### Challenges

A fuel cell stack consists of multiple single cells laminated together. In its operating state, a clamp load is applied to the stack by tightening the end plates using the bottles. If the clamp load is too low, contact resistance will increase, resulting in lower power generation efficiency and even fuel leaks. On the other hand, if the clamp load is too high, the fuel cell seal will deteriorate quickly. Although there are many ways to measure the load on an entire cell stack, until now there has been no way to measure the load distribution on an individual cell.

### Measurement

### Product used: Prescale (Extremely low pressure 4LW, Ultra low pressure LLLW)



- (1) Prescale is placed between one cell and another, and a clamp load is applied by tightening the bolts to a specified torque value. Next, the bolts are unscrewed, the Prescale is removed, and the uniformity of the pressure distribution is checked. By changing the clamping position, number, order, and torque value of each bolt and studying the correlation of these factors with the pressure distribution, it is possible to determine the optimal conditions for fuel cell operation. For stable operation, checking and comparing the pressure distribution after installation or maintenance with the pressure distribution at the time of shipping is also recommended.
- (2) Prescale is placed between a separator and electrolyte membrane, and a clamp load is applied using the bolts, as above, to allow the uniformity of the thickness and the density of the separator, electrolyte, electrode, and gas diffusion membrane to be checked.

## Results (images)

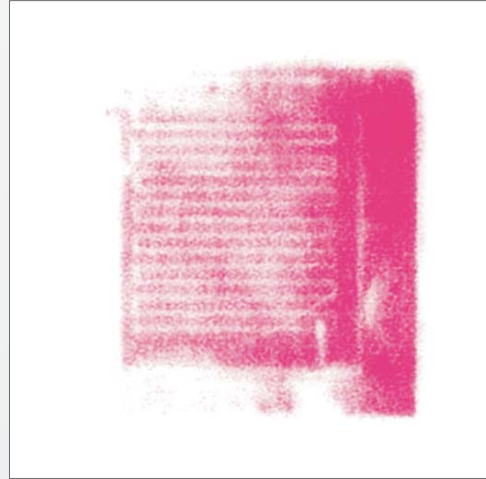
### [Good]

When bolts are clamped properly.



### [Not Good]

After clamping is modified, pressure inconsistency occurs.



## Benefits of Prescale

- Clamping conditions can be optimized.
- Evenness of parts and materials can be checked.

### Without using Prescale

It is not possible to determine the clamping conditions to achieve a uniform load distribution, so the load distribution cannot be optimized. **This results in lower power generation efficiency, the risk of gas (hydrogen or oxygen) leaks, and accelerated deterioration of seal parts and fuel cell materials.**

### With Prescale

**The inadequate performance** posed by unsuitable lamination load and load distribution or the use of non-uniform parts and materials **can be prevented.**

**Any deviation from the initial settings** at the time of installation or maintenance **can also be prevented.**

\*Note that the specifications and performance data described in this catalog are subject to change without notice for the purpose of improvement. Since the images provided are used for illustration purposes, they may differ slightly from actual products.