

IMPROVING PERFORMANCE IN  
**FUEL CELLS AND  
ELECTROLYSERS**

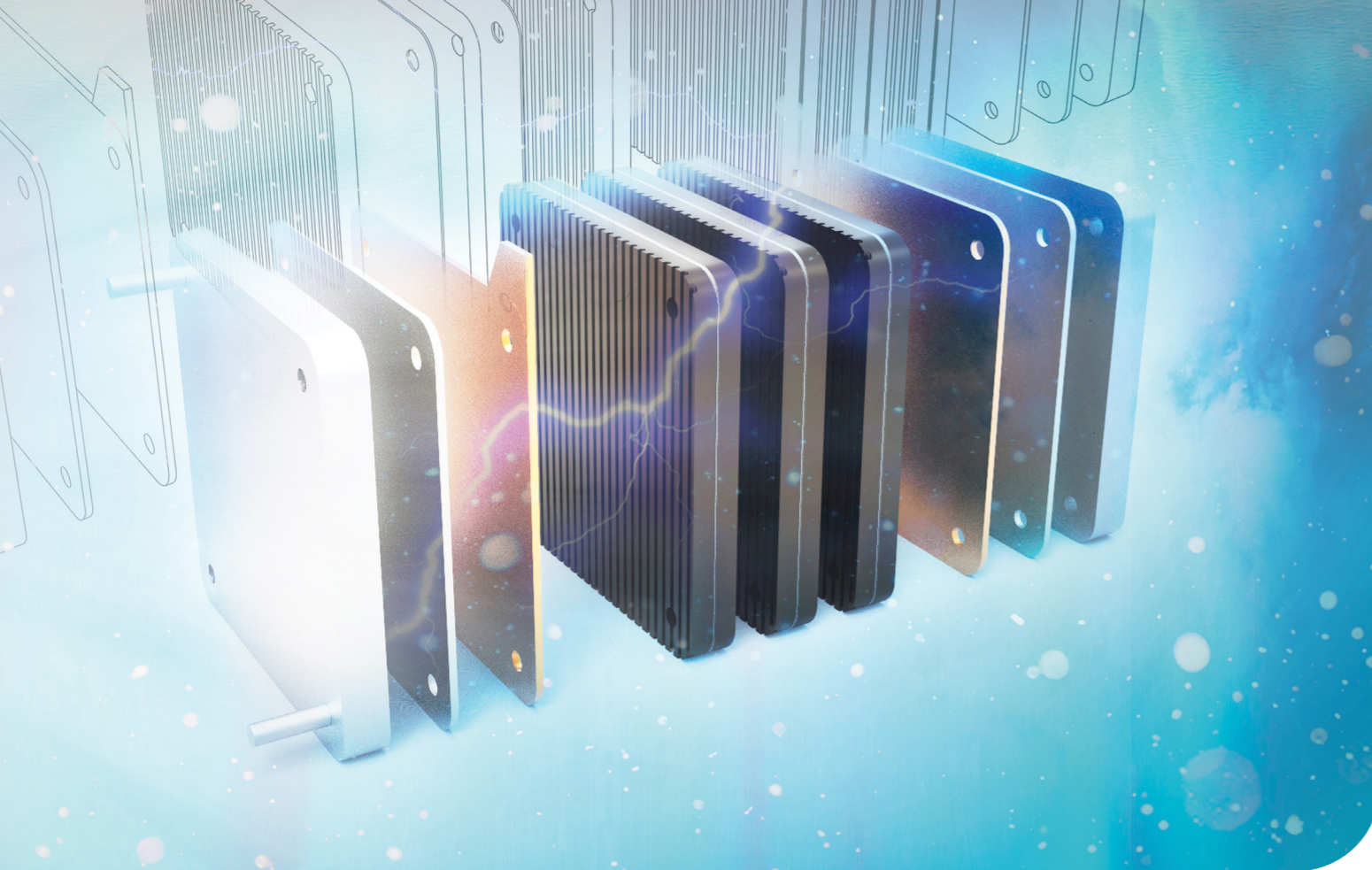
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Partnerships that inspire.  
Materials that perform.

**versiv**





Partnerships that inspire.  
Materials that perform.

Versiv is a recognised expert in high-performance, technology-driven materials. With over 40 years of expertise focused on film, fabrics, and composite materials, we offer worldwide proven solutions tailored to customers across the hydrogen industry.

Designed, and manufactured with the most demanding applications in mind, our composite materials provide a combination of high mechanical strength, smooth surface, excellent dielectric properties, and outstanding release behaviour even at elevated temperatures and where exposed to aggressive chemicals.

**DIFFERENTIATION AND CO-DEVELOPMENT:**

- Technical and applications engineering to solve the most demanding applications and help customers
- Significant focus and investment in developing solutions for hydrogen technology
- Rigorous environmental, durability, reliability and application-specific assessments
- Tailored customer service from drawing board to testing, analysis, production and post-production

**OUR CAPABILITIES:**

- Film casting, extrusion and dip-coating
- Gravure, slot die, and reverse roll coating
- Material science and R&D
- Multi-material lamination
- PTFE & silicone coating and lamination
- Mechanics structure impact
- Up-scaling and industrialisation
- Precision converting

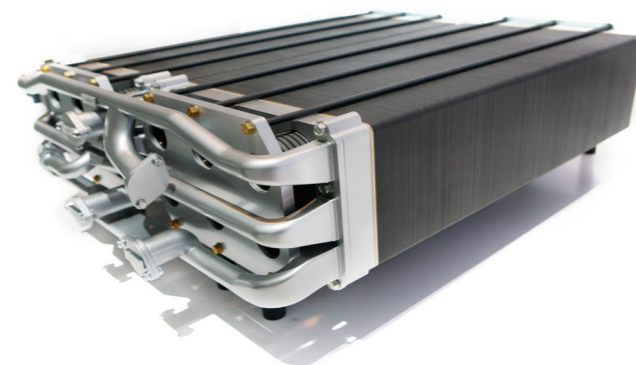
## SOLUTIONS AND COMPONENTS FOR H2 FUEL CELLS AND ELECTROLYSERS

Hydrogen electrolysis and fuel cells are increasing sources of sustainable clean energy and will form the foundation of a new era of energy usage.

The environmental benefits of hydrogen – its abundance, superior energy efficiency, and cleanliness – make it a strong candidate for becoming our main source of energy over the coming decades, as the world grapples with climate change and clean energy target achievement.

**Electrolysis** is currently the leading process for hydrogen production, as it can result in zero greenhouse gas emissions, depending on the source of electricity used.

Hydrogen **fuel cells** provides a clean and efficient way to store and transport energy for use in homes, businesses, and vehicles.



WITH VERSIV COMPOSITE MATERIALS, YOU CAN ACHIEVE:

High chemical resistance

Excellent electrical insulation

Cleaner solutions

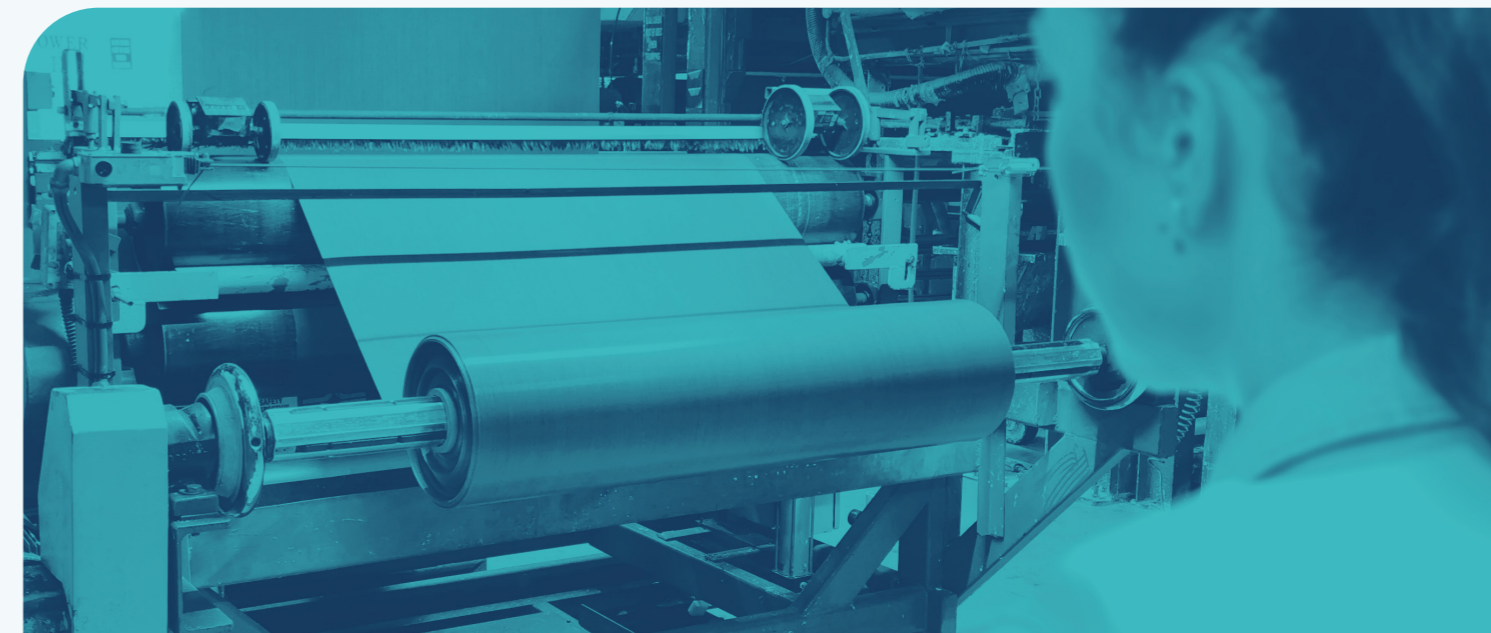
Lower risk of failure due to chemical inertness

Low permeability

High-temperature resistance

Smaller and lighter parts

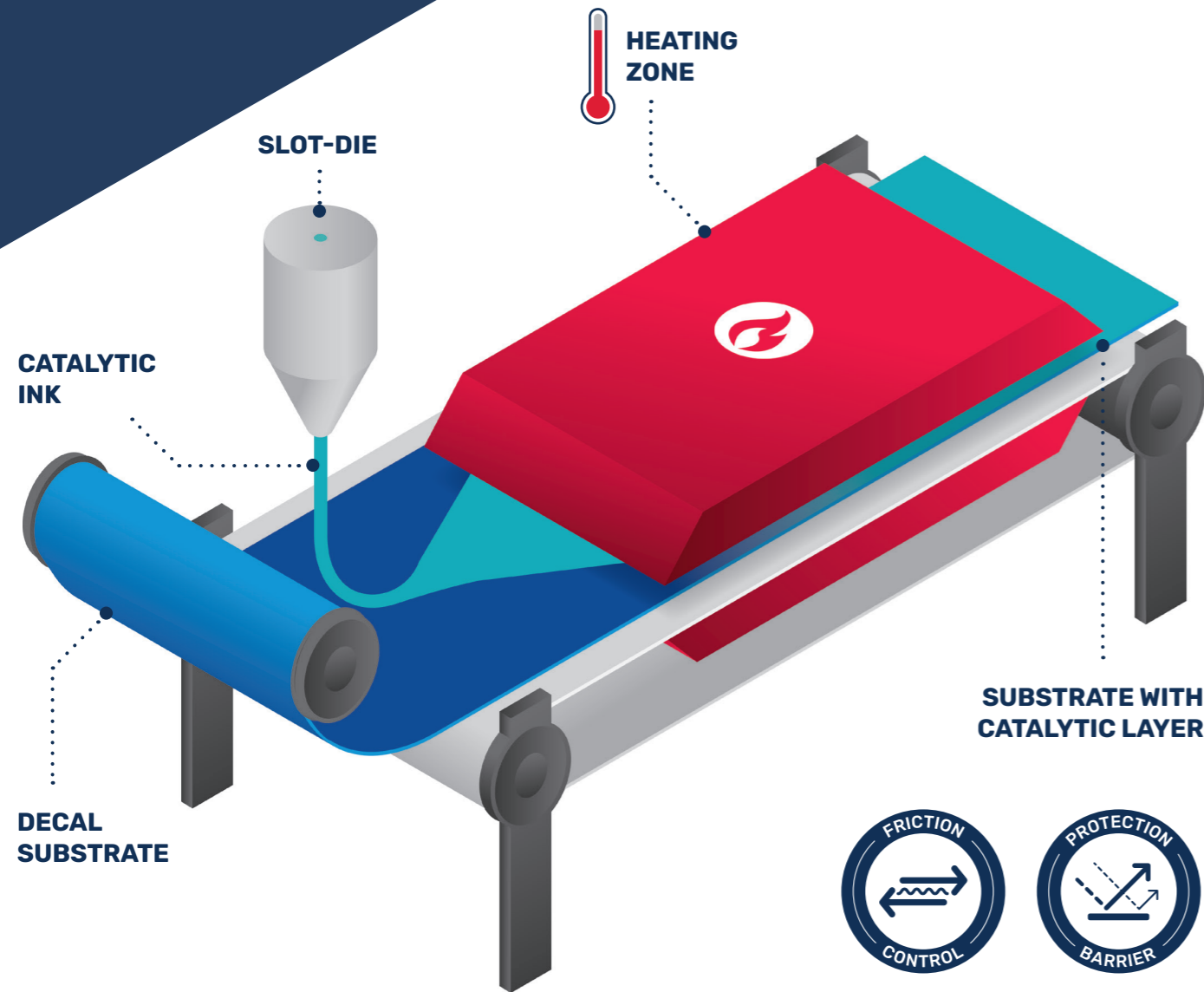
Improved and consistent production processes





# RELEASE SOLUTIONS FOR DECAL

Versiv films and coated fabrics are used as release liners and protective solutions for production of catalytic layers and lamination of catalyst coated membranes (CCMs) by Decal Transfer.



## Effective release for high speed decal processes and homogenous catalytic layers.

Versiv release solutions work as effective processing aids for the decal process in the production of catalytic layers for energy efficient fuel cells.

Used as processing belts and release sheets for thermal curing and lamination processes, they are a very flat, smooth and mechanically stable substrate surface upon which the catalytic ink can be evenly distributed in a controlled manner. They have excellent thermal stability, up to 260°C / 500°F, and because of their hysteresis behaviour are suitable for most decal processes even under challenging conditions.

At the final stage of the production of the Catalyst Coated Membrane (CCM) by decal transfer method, the substrates can easily be removed, allowing 100% transfer of the catalytic layer.

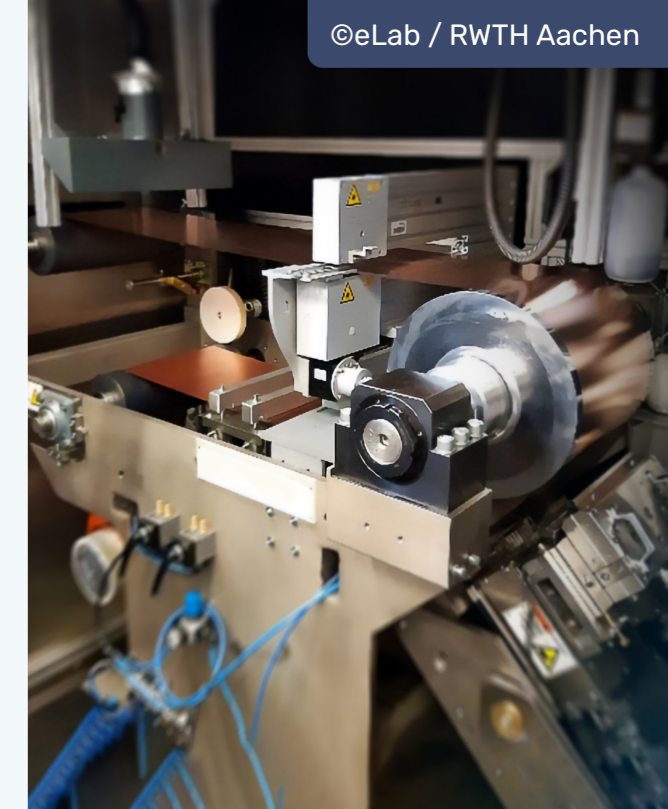
Extremely thin and light, our release liners carry the finished CCM during winding-up, allowing customers to have more CCM on each roll for increased productivity.

## CASE STUDY: INCREASING THE CCM OUTPUT BY THREEFOLD

### Improved productivity and cost effectiveness

After switching to our solution, one of our customers reported a threefold increase in his output of CCM per roll.

Used as the carrier belt for their CCM wind-up, our film showed exceptional tensile strength – which in combination with a release coating, allowed the customer to go significantly thinner with the carrier – therefore optimising the ratio of carrier vs CCM on the roll. We are committed to working in partnership with our customers and developing customised solutions – while utilising our wide range of different material options available in various thicknesses to identify the best solution for customer needs.



## VERSIV PRODUCTS OF CHOICE

<b>SRF206</b>	Smooth surface and durable release for <b>decal substrates</b> .
<b>DF100</b>	Smooth, uniform surface with superior release properties for <b>decal substrates</b> .
<b>DF2919</b>	Surface allowing wettability and release in combination to strong material properties; low thermal hysteresis.
<b>CF205</b>	Surface allowing wettability and release in combination to exceptional smooth surface, and reduced thermal hysteresis

## APPLICATIONS:

Processing aids for catalyst coating and lamination of Membrane Electrode Assemblies (MEA).

## FEATURES:

- Excellent non-stick surface
- Excellent dielectric properties
- Superior chemical resistance
- Excellent smooth surface
- Configurable for any required size
- Low thickness tolerance
- High temperature resistance up to 260°C / 500°F
- Excellent heat transfer
- Low shrinkage/hysteresis

## BENEFITS:

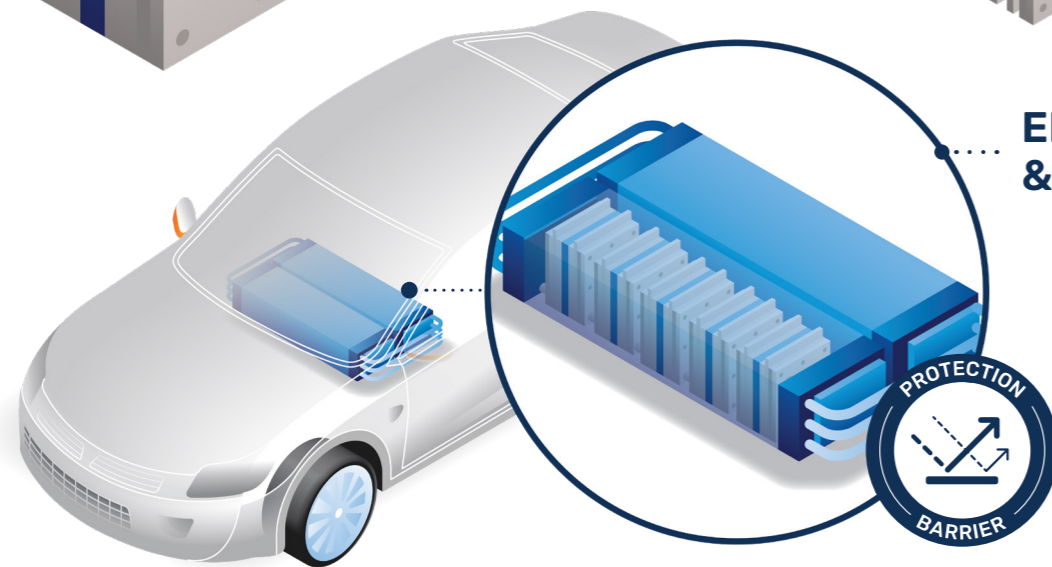
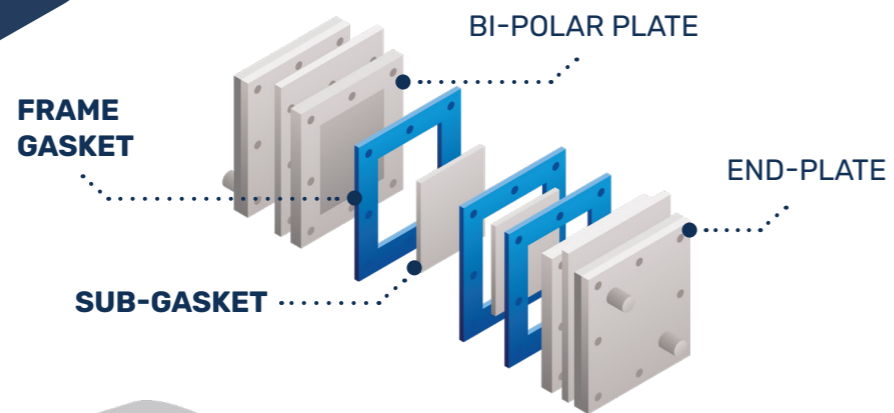
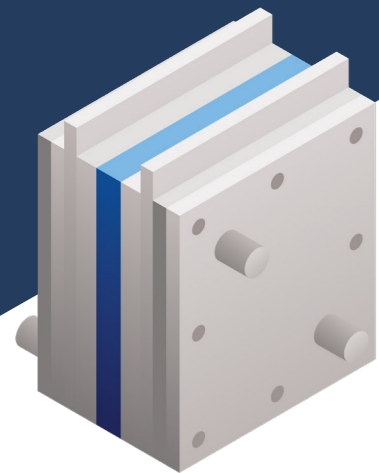
- Improved productivity due to higher process speed
- Optimal release, allowing both wettability and release
- Low risk of creasing
- Less downtime
- Consistent production processes
- Low risk of failure due to chemical inertness
- Increased cell efficiency by thinner catalyst layers





# GASKETS FOR ELECTROLYSERS AND FUEL CELLS

Versiv films and composite materials are incorporated as the frame and subgaskets within the Proton-Exchange Membrane (PEM), alkaline and phosphoric acid fuel cell and electrolyser systems.



## ELECTROLYSIS & FUEL CELL

### Chemical and thermal protective barrier within fuel cell systems Reliable electric insulation in stack-separating anode and cathode

Multi-functional, reliable and robust, Versiv composites are used as seals and separator component parts within the fuel cell system. Suitable as sub-gaskets or frame gaskets, they ensure the energy efficiency of the fuel cell stacks and provide modularity to the system.

One of the critical features of Versiv gasket and seal components solutions are their reduced material creep and excellent tensile strength. This strength provides long-lasting performance in fuel cells, which are often operating in very challenging environments.

The Versiv range of materials for sub-gaskets and gaskets can be supplied as sheets or roll-to-roll process, or we can diecut to your requirements.

Versiv multi-material composites also work as protection and barrier solutions within fuel cell systems. They can perform well in the presence of multiple stress factors or challenging conditions, accommodating peak excursions up to 300°C / 570°F, frequent flexing, elevated pressures, as well as multiple exposures to chemicals. Their non-burning characteristics are paramount even in the presence of fire.

All of our protection barrier solutions are components, capable of being customised and configured for many new developments in the energy sector.



### VERSIV PRODUCTS OF CHOICE

#### DF100

Thinner gauges, uniform, pinhole and crack-free, isotropic product with low permeability for **frame gaskets**.

#### MODIFIED PTFE FILM

High dielectric break down strength, weldable and low permeability for **frame gaskets**.

#### DF2919N

Smooth surface and good friction properties for **sub-gaskets**.

### APPLICATIONS:

Frame and sub-gaskets for:

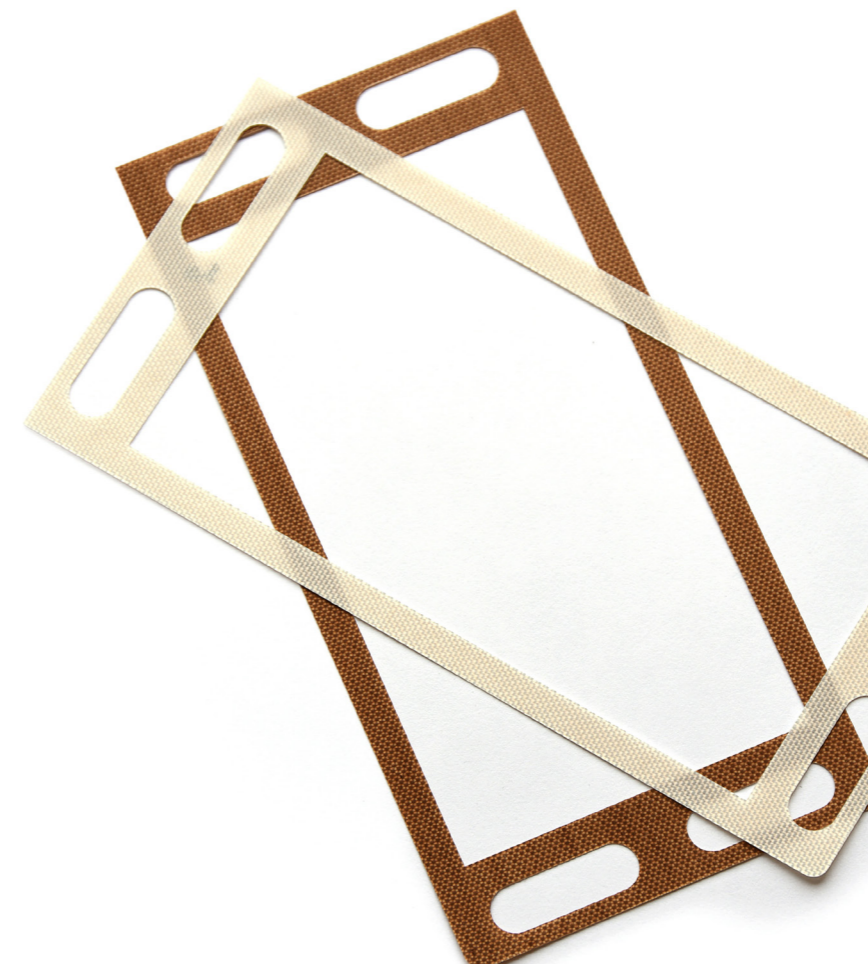
- AEM Fuel Cells + Electrolysers
  - PEM electrolyzers
  - PEM fuel cell systems
  - Alkaline electrolyzers
  - Alkaline fuel cell systems
- PAFC (phosphoric acid)

### FEATURES:

- Excellent non-stick surface
- Excellent dielectric properties
- Superior chemical resistance
- Excellent smooth surface
- Configurable for any required size
- Low thickness tolerance
- High temperature resistance up to 260°C / 500°F
- Excellent heat transfer
- Low shrinkage/hysteresis

### BENEFITS:

- Low permeability
- Low risk of failure due to chemical inertness
- Durable sealing properties
- Providing multiple gasketing functions
- Usable in harsh environments
- Reliable mechanical protection
- Bondability to the PEM
- Tight seal under pressure holding the PEM in place







# versiv

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**Materials that perform.**

Versiv is a recognised expert in high-performance, technology-driven materials. With expertise focused on film, fabrics, and composite materials, we offer proven products, customised solutions, and complete systems to customers in various industries.

Our goal is to create innovative materials that offer protection, easy release, insulation, and friction control. We are committed to adapting and collaborating with our partners to push the boundaries of what is possible.

## CONTACT US

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