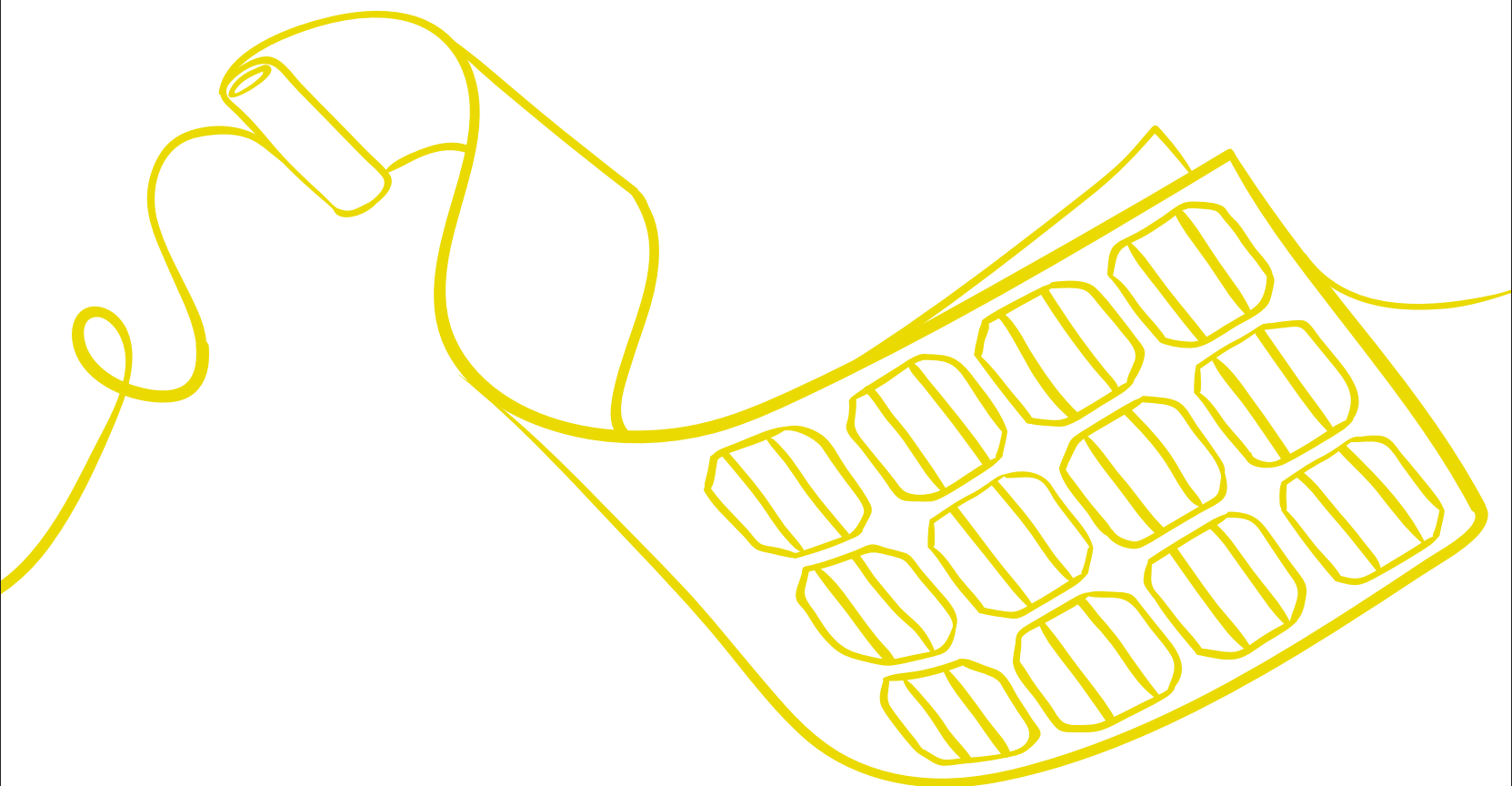


# COVEME PHOTOVOLTAIC

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*Backsheet for PV modules*

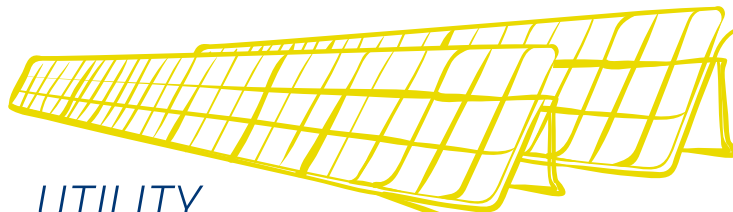
**COVEME**

THE VALUE OF INNOVATION

# **HIGH QUALITY BACKSHEETS FOR:**

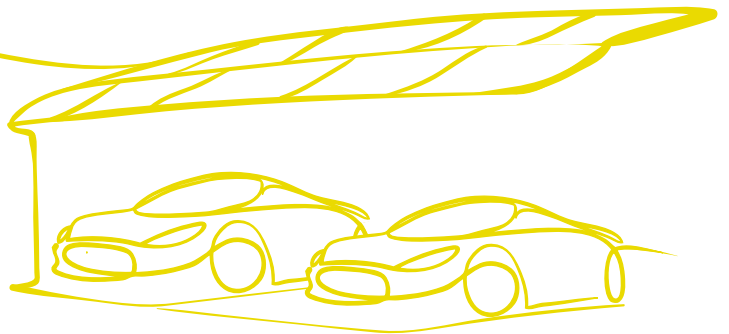


*ROOFTOP*



*UTILITY*

*COMMERCIAL*



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# COVEME TODAY



# ***BIGGEST IN HOUSE 18 GW BACKSHEET PRODUCTION CAPACITY WORLDWIDE***



## **OVER 50 YEARS**

of know-how in converting polyester film.



## **OVER 40 GW OF BACKSHEET**

sold worldwide.



Worldwide

## **COMMERCIAL AND LOGISTIC NETWORK**



## **HIGH TECH R&D LABS**

in Europe and Asia.



## **CERTIFIED QUALITY, SAFETY AND ENVIRONMENTAL**

standards.



# PRODUCTION

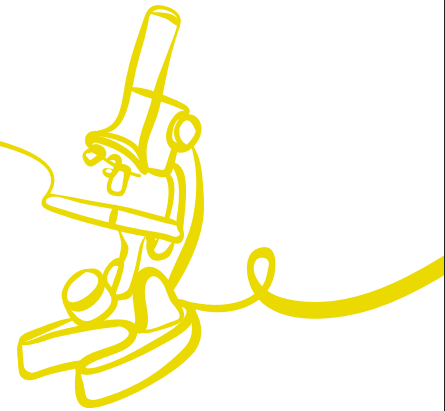
Coveme has been converting polyester film for over 20 years and has successfully developed sophisticated technologies in the production of high-tech films for various industries. Clients' specifications are defined individually and monitored throughout the whole production chain, including suppliers, logistics and service process.



- ✓ **18 GW BACKSHEET** proprietary production capacity
- ✓ **FULLY AUTOMATED** processes
- ✓ **CUSTOMIZED** rolls, sheets and **PUNCHED** formats
- ✓ **12** production lines
- ✓ **LAMINATION, SURFACE TREATMENT, HEAT STABILIZATION, COATING, SLITTING**

# RESEARCH & DEVELOPMENT

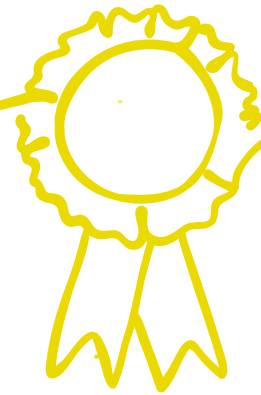
Our laboratories have always been one of the most advanced and strong points of the company, where our technological and operative know how is at complete disposal of the clients' needs. Coveme's research in photovoltaics focuses on products that guarantee our customers higher productivity, maximum module output and the best cost efficiency.



- ✓ Strong academic and industrial **PARTNERSHIPS**
- ✓ Proprietary **R&D LABS** in Europe and Asia.
- ✓ Dedicated **INNOVATION TEAM**
- ✓ **STATE-OF-THE-ART** equipment
- ✓ **CUSTOMIZED RESEARCH PROJECTS** for clients

# QUALITY

The value for money of a PV investment is strongly influenced by initial cost (investment) and the return of the investment (profit) which depends on performances (energy output), time and costs for maintenance. The right choice of the backsheet material strongly influences all these parameters, which is why Coveme does not compromise in quality.

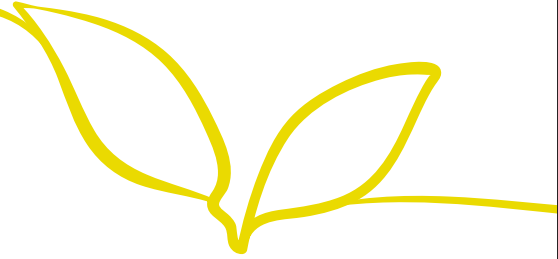


- ✓ **LONG HISTORY OF HIGH QUALITY** standard backsheet
- ✓ **SEVERE QUALITY INSPECTION** and production control in each critical phase of the process
- ✓ **QUALITY INDICATORS SHOW BETTER PERFORMANCE Y/Y**
- ✓ High quality backsheets means **HIGH ROI**
- ✓ **CONSTANT INVESTMENT** in new machinery - new technology - new process - dedicated and highly skilled personnel



# CORPORATE SOCIAL RESPONSIBILITY

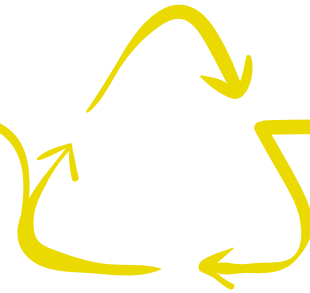
Coveme is well aware of its responsibility in terms of environment and social wellbeing. This is reflected not only in what we produce but also how we produce, which means a lean and green production technology and strategic partnerships with our customers and suppliers. The company continuously optimizes its emission treatments, waste disposal and energy resources and actively pushes forward sustainability and social issues inside and outside the company.



- ✓ **WHITE CERTIFICATES** achievement
- ✓ Active **CARBON FOOTPRINT** balancing
- ✓ Long-standing **SPORTS SPONSORSHIPS**
- ✓ Regular **CHARITY** donations
- ✓ **ROHS** and **REACH** compliance

# GREEN PHOTOVOLTAICS

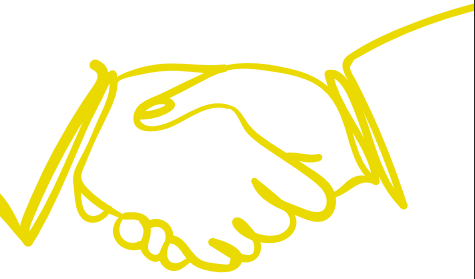
PV panel waste presents an environmental challenge which can be transformed into an economic opportunity if addressed seriously and on time. Upcoming global and restrictive laws might determine PV module components and consider the chemical composition of backsheet for its impact on disposal costs and environment. Coveme firmly believes in the values of a green economy and continuously invests in End of Life (EOL) and Life Cycle Assessment (LCA) activities.

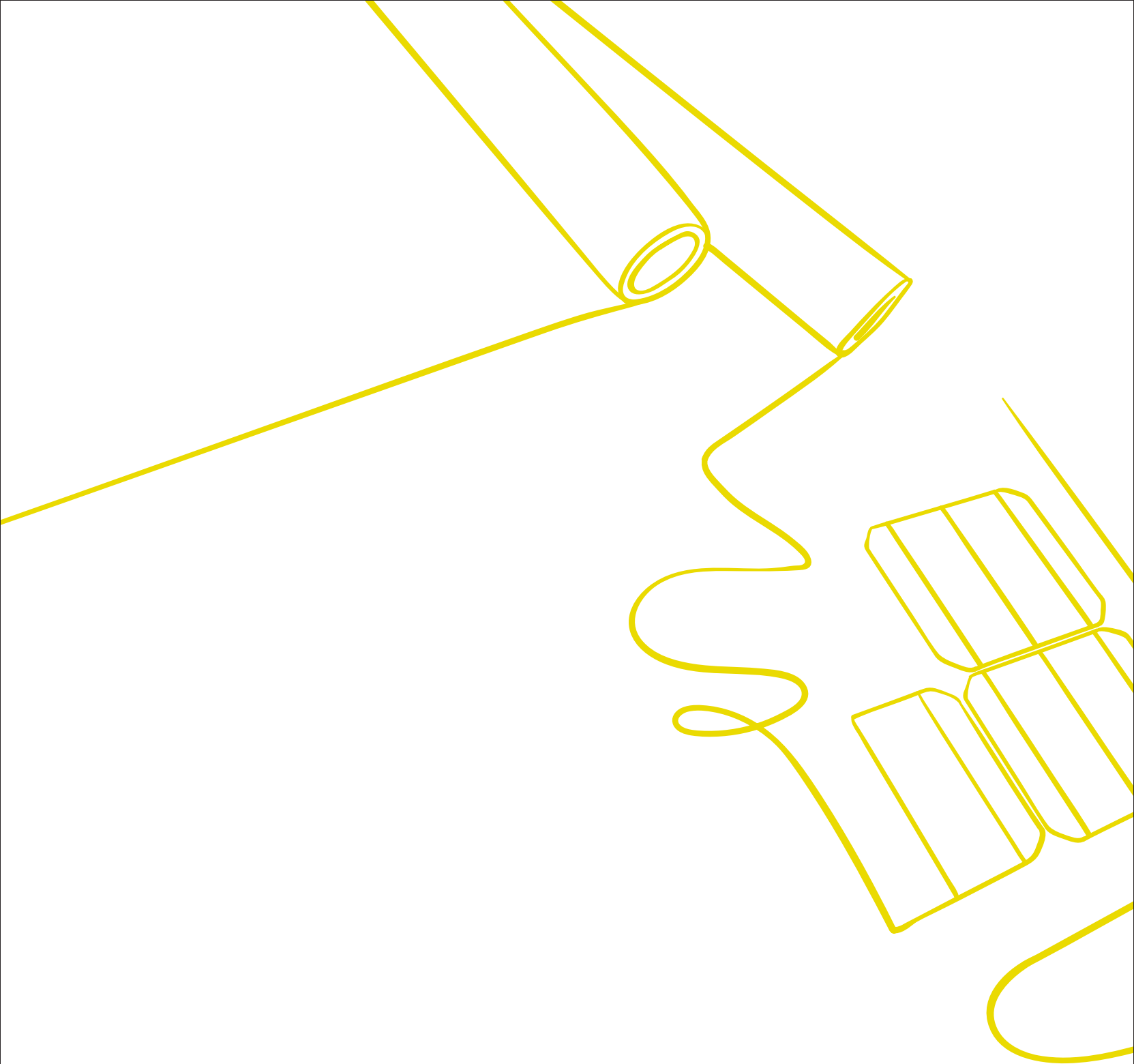


- ✓ Coveme backsheets **100% ECO-FRIENDLY** high grade polyester based
- ✓ **COMPLIANT WITH ALL EXISTING REGULATIONS**
- ✓ In house **R&D ACTIVITY FOR EOL AND LCA** value creation
- ✓ Participation in **SCIENTIFIC AND INSTITUTIONAL TASK FORCES** worldwide
- ✓ **PARTNERSHIPS WITH RENOWN RESEARCH INSTITUTES** for new studies

# MEMBERSHIPS

Coveme is honoured to be member of the most prestigious associations in the photovoltaic industry around the globe. With its deep know-how in specialty films and its long-standing presence in the PV market Coveme is pleased to give its contribution to the growth of these associations, believing strongly in the benefit of a continuous cross-fertilization among peers.





# PRODUCT RANGE

## **dyMat® 1000 VDC BESTSELLER 14**

PYE SPV - SPV-L  
PYE SPV L 305  
PYE SPV L SHR 305  
PYE 3000 - 3000L

## **dyMat® 1000 VDC SPECIALTIES 16**

APYE  
APYE SHR  
BK PYE SPV L

## **dyMat® 1000 VDC MONOLAYER 18**

PYE MONO L  
PYE MONO LD  
PYE MONO L SHR  
CLRPYE MONO

## **dyMat® 1500 VDC 20**

HDPYE SPV L  
CLR HDPYE L

## **dyMat® TEDLAR BASED 22**

TSL 50/250  
TSL 50/350

## **EBfoil® BACKCONTACT 24**

BYS  
SYS

## **dyMat® ACCESSORIES 28**

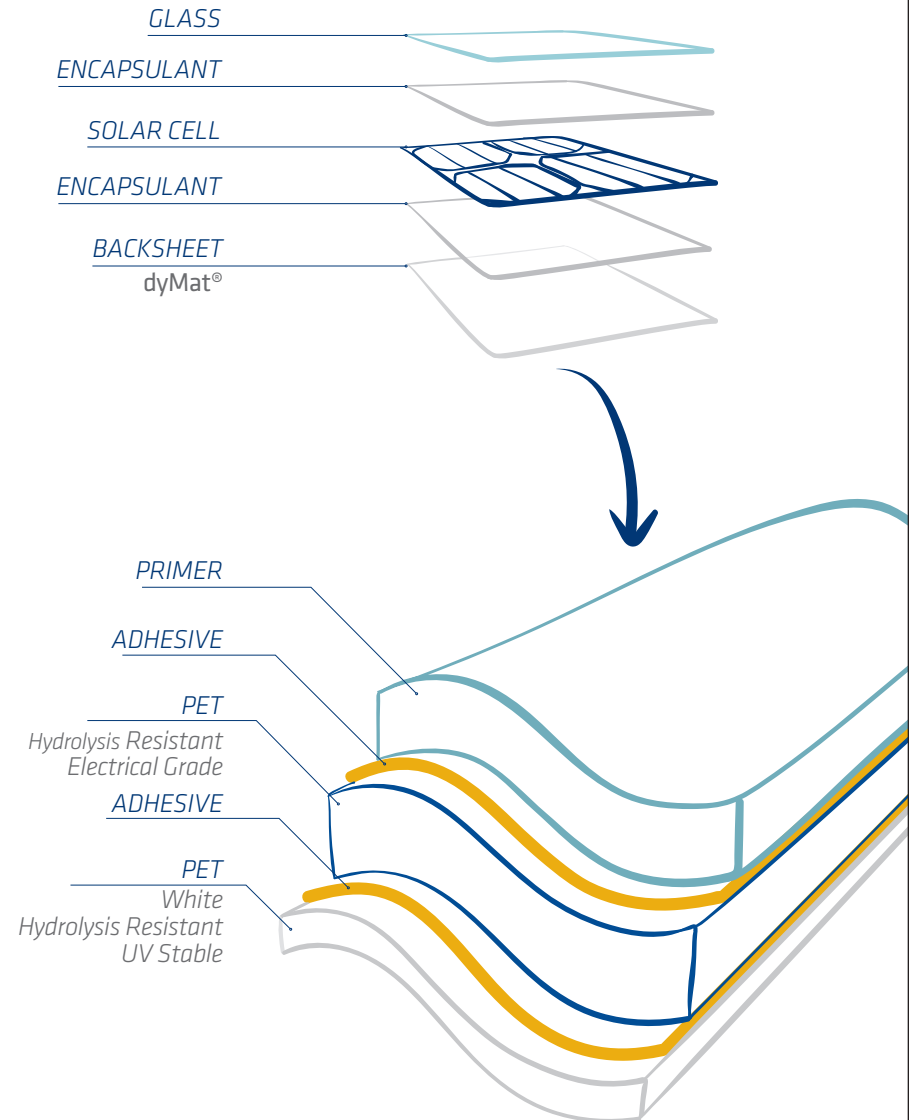
EPE  
E

# DYMAT® BACKSHEETS

Coveme has a long history of high quality standard backsheet and can assist in the right choice to maximize the profit and minimize the risk. To choose the proper high quality backsheet, with the best balance in performances and price means getting high ROI.

- ✓ **HIGHLY PERFORMING**  
in hydrolysis and UV resistance
- ✓ **MAXIMUM PROTECTION FOR SOLAR CELLS**  
from humidity and harsh physical and chemical environments.
- ✓ **SOLUTIONS** for 1500 VDC, BIPV, HIT, IBC, Bifacial and PERC technology.
- ✓ **SPECIAL FEATURES**  
for extra high module output.
- ✓ **CERTIFIED RELIABILITY AND DURABILITY**  
by major authorities in the photovoltaic business and beyond (TÜV, UL, JET etc)

## PV MODULE STRUCTURE

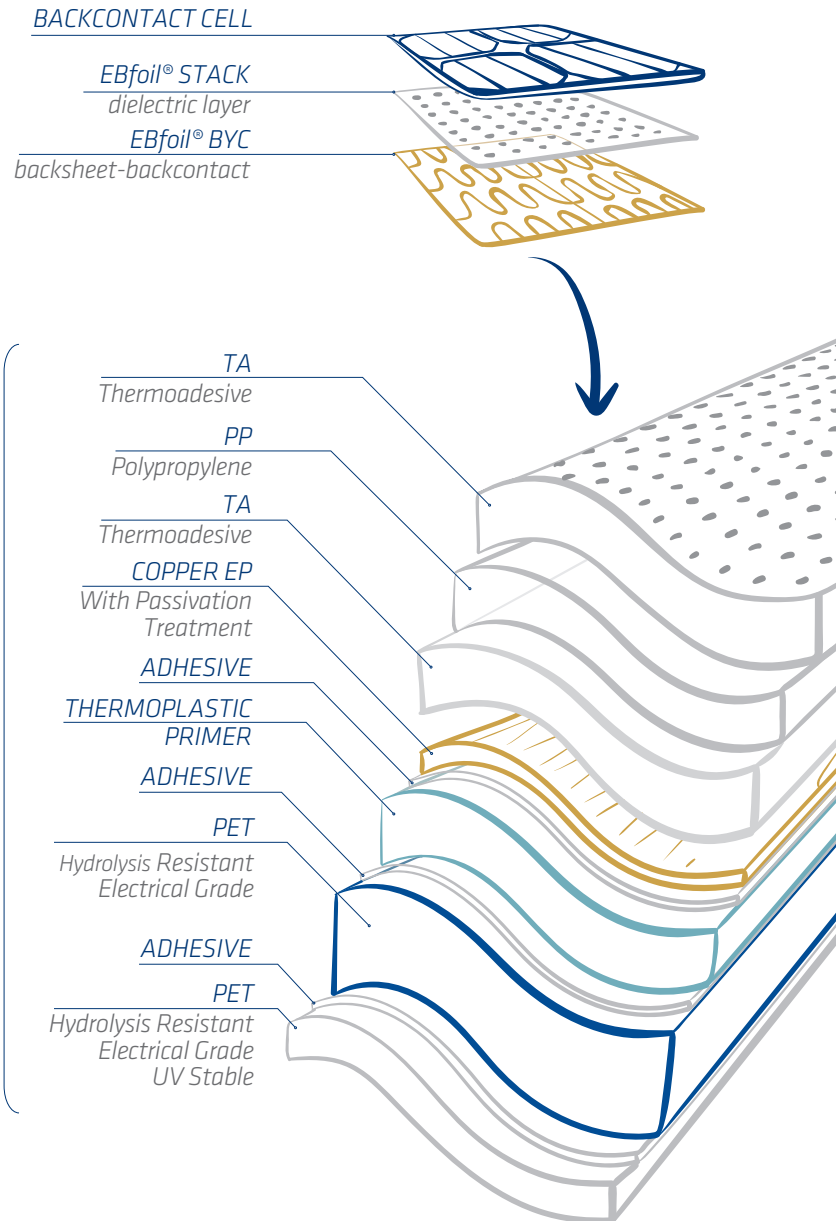


# EB-FOIL® BACKCONTACT

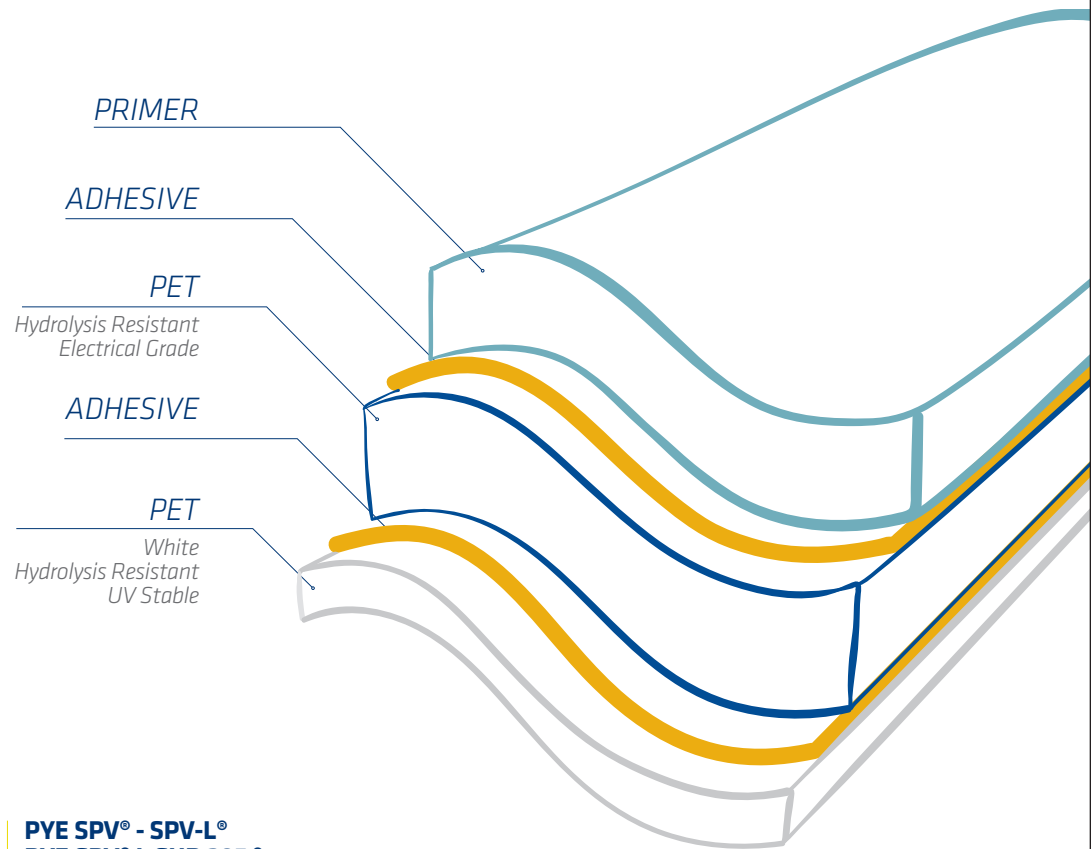
Coveme's EBfoil® is a highly innovative laminate that features a flexible electronic circuit printed according to the customer's pattern and functions as a conductive element between the backcontact cells (MWT, EWT, IBC).

- ✓ **SOLUTIONS FOR BOTH** backsheet based (EBfoil® BYS) and glass-glass modules (EBfoil® SYS)
- ✓ **REDUCTION OF PRODUCTION COST** through innovative module production process and high-efficiency cells
- ✓ Near to zero cells breakage thanks to **AUTOMATION OF PRODUCTION PROCESS**
- ✓ **NEAR TO ZERO CELL TO MODULE LOSS.** Higher output of the panel.
- ✓ Available in **BLACK, WHITE OR TRANSPARENT** version

## BACKCONTACT MODULE STRUCTURE



# 1000 VDC PET BASED



**PYE SPV® - SPV-L®**  
**PYE SPV® L SHR 305®**  
**PYE SPV® L 305**

**PYE 3000®**  
**PYE 3000 L®**



# dyMat® BESTSELLER

These are Coveme's strongest selling backsheets, with an unbeaten price-quality ratio. They are all guaranteed for 2500h of DHT, 72h PCT and over 400 kwh/sqm of UV irradiation resistance, snail trail free, and feature excellent hydrolysis resistance and enhanced adhesion with encapsulants.

**200M m<sup>2</sup> sold worldwide**



**No 1 selling  
backsheet**

**PYE SPV® - SPV-L®**



**UL Type 1 > 300μ**

**PYE SPV® L 305**



**Extra high  
reflectance**

**PYE SPV® L SHR 305®**



**DHT > 3000h**

**PYE 3000® - 3000L®**



# 1000 VDC PET BASED



**PRIMER**

**ADHESIVE**

**PET**

Hydrolysis Resistant  
Electrical Grade

**ADHESIVE**

**AL**

Aluminium foil providing  
high water vapor barrier

**ADHESIVE**

**PET**

White  
Hydrolysis Resistant  
UV Stable

**BLACK PRIMER**

**ADHESIVE**

**PET**

Hydrolysis Resistant  
Electrical Grade

**ADHESIVE**

**PET**

Black  
Hydrolysis Resistant  
UV Stable

**APYE®  
APYE® SHR**

**BK PYE SPV L®**

# dyMat<sup>®</sup> SPECIALITIES

These are Coveme's backsheets for specific applications and modules, such as BIPV, Thin Film and HIT-IBC-PERC. They are all guaranteed for 2500h of DHT, 72h PCT and over 400 kWh/sqm of UV irradiation resistance, and feature excellent hydrolysis resistance and enhanced adhesion with encapsulants.



*Extra low  
WVTR*

**APYE<sup>®</sup>**



*Extra low  
WVTR*



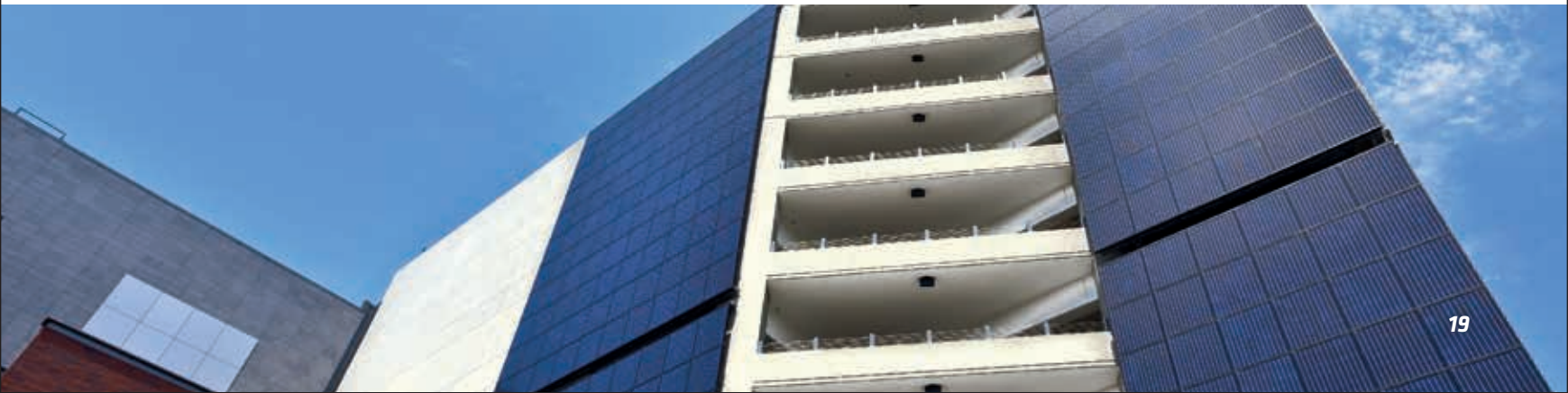
*Extra high  
reflectance*

**APYE<sup>®</sup> SHR**



*Totally black*

**BK PYE<sup>®</sup> SPV L**



# 1000 VDC PET BASED



**PRIMER**  
High Reflective

**ADHESIVE**

**PET**  
UV and HR stabilization  
across whole width

**PRIMER**  
Transparent

**ADHESIVE**

**PET**  
Transparent PET  
Hydrolysis Resistant

**ULTRA PROTECTIVE COATING**  
UV Resistant

**PYE<sup>®</sup> MONO L**  
**PYE<sup>®</sup> MONO L SHR**  
**PYE<sup>®</sup> MONO LD**

**ClrPYE<sup>®</sup> MONO**

# dyMat<sup>®</sup> MONOLAYER

A new generation of backsheet developed by Coveme to fulfill the request of the market for a low cost and high reflective solution using a different structure. They are all guaranteed for 2500h of DHT, 72h PCT and over 400 kwh/sqm of UV irradiation resistance, snail trail free, and feature excellent hydrolysis resistance and enhanced adhesion with encapsulants.



*High  
reflectance*

**PYE<sup>®</sup> MONO L**



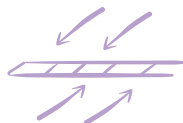
*Extra low  
WVTR*

**PYE<sup>®</sup> MONO LD**



*Extra high  
reflectance*

**PYE<sup>®</sup> MONO L SHR**

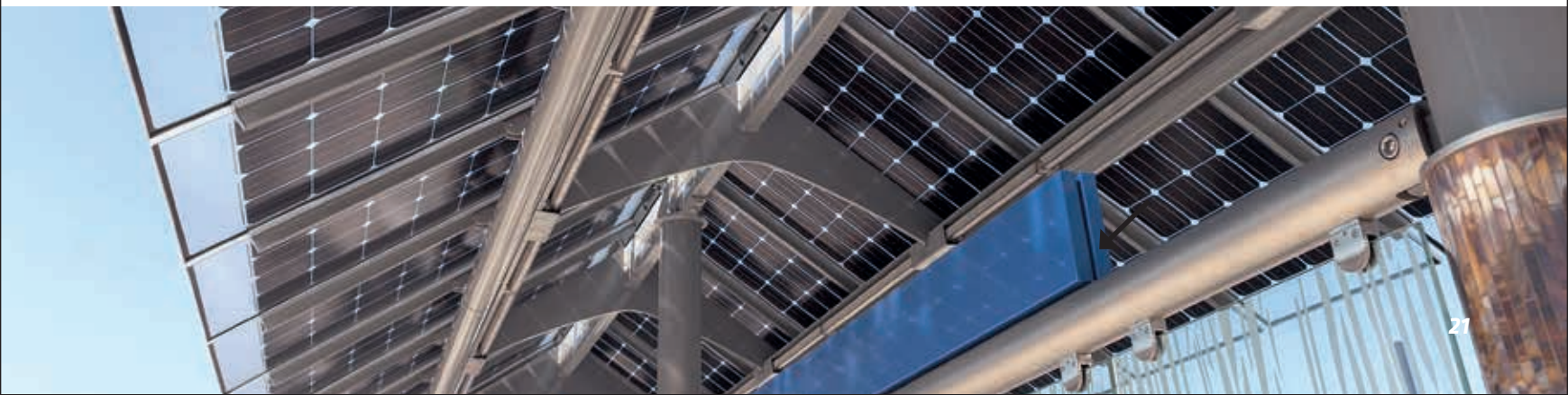


*Bifacial  
Cells*



*Totally  
Transparent*

**ClrPYE<sup>®</sup> MONO**



# 1500 VDC PET BASED



PRIMER

ADHESIVE

PET  
Hydrolysis Resistant  
Electrical Grade

ADHESIVE

PET  
White  
Hydrolysis Resistant  
UV Stable

PRIMER  
Transparent

ADHESIVE

PET  
Transparent PET  
Hydrolysis Resistant (HR)  
Electrical Grade

ADHESIVE

PET  
Transparent PET  
Hydrolysis Resistant

ULTRA PROTECTIVE COATING  
UV Resistant

**HDPYE® SPV L**

**Cir® HDPYE L**

# dyMat<sup>®</sup> 1500 VDC

These Coverne backsheets have a proven track being employed in the world's first 1500 VDC project and further major ongoing 1500 VDC plants. They are specifically designed for this purpose and contribute to the high ROI of this application. They are all guaranteed for 2500h of DHT, 72h PCT and over 400 kwh/sqm of UV irradiation resistance, snail trail free, and feature excellent hydrolysis resistance and enhanced adhesion with encapsulants.

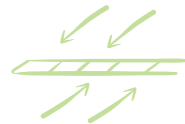


**Extra low  
WVTR**



**PDT > 1500 VDC  
(in oil)**

**HDPYE<sup>®</sup> SPV L**



**Bifacial  
Cells**



**Totally  
Transparent**



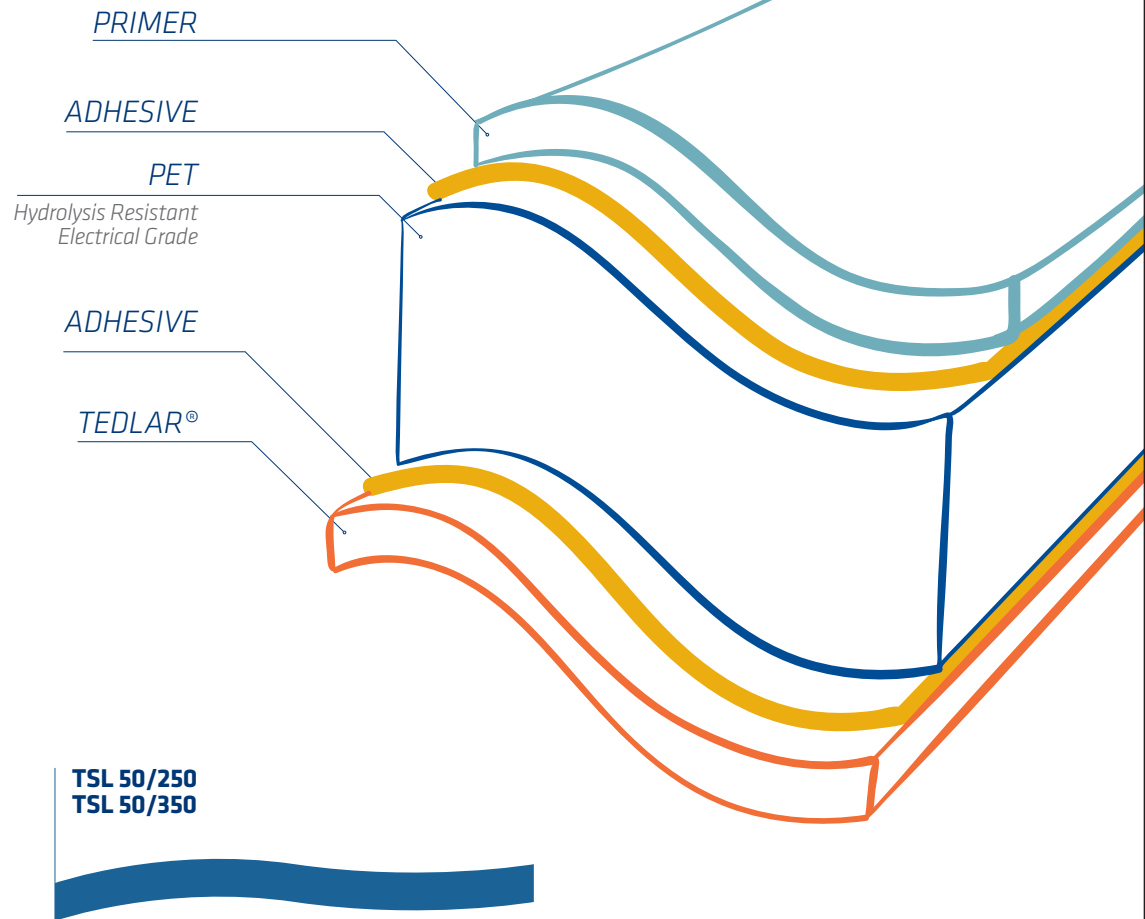
**PDT > 1500 VDC  
(in oil)**

**Clr<sup>®</sup> HDPYE L**

1500 VDC



# TEDLAR BASED





# TEDLAR BASED

Coveme's Tedlar based backsheets feature excellent resistance to atmospheric agents, a strong barrier to oxygen and humidity, high voltage insulation and long term resistance to the hydrolysis of adhesives.

Tedlar® film is available in 38 $\mu$  thickness and 25 $\mu$  thickness. Also the inner PET layer is available in several thickness: 125/190/250 $\mu$ .

The thickness of the laminate is designed to guarantee the best combination in terms of electrical insulation and weathering resistance.



*PDT > 1000 VDC*

**TSL 50/250**



*PDT > 1500 VDC  
(in oil)*

**TSL 50/350**



# EBfoil® BYS

EBfoil® STACK

TA  
Thermoadhesive

PP  
Polypropylene

TA  
Thermoadhesive

COPPER EP  
With Passivation  
Treatment

ADHESIVE

THERMOPLASTIC PRIMER

EBfoil® BYC

ADHESIVE

PET  
Hydrolysis Resistant  
Electrical Grade

ADHESIVE

PET  
Hydrolysis Resistant  
Electrical Grade  
UV Stable

# BACKCONTACT BACKSHEET

To allow easy module assembly EBfoil BYC<sup>®</sup> consists of the back-contact backsheet EBfoil<sup>®</sup> BYC preassembled with the suitable dielectric encapsulant EBfoil<sup>®</sup> STACK. EBfoil<sup>®</sup> BYC is a multilayer laminate of high performance Polyester layers, a primer layer and an electroplated copper conductive layer.

The copper conductive layer is passivation treated for enhanced conductivity and adhesion, and ensures corrosion protection and high solderability with conductive pastes or adhesives. EBfoil<sup>®</sup> STACK is a dielectric encapsulant that guarantees a strong and stable bonding to the substrate not covered by conductors, to the conductive layers itself and to the back of the cells. Its stable and stiff behaving makes handling easy, and maintains a dielectric property also after lamination thanks to the innovative inner layer.

Specifically designed process manufacturing in sheets, dry environment and at low temperatures guarantees superior planarity and dimensional stability of EBfoil<sup>®</sup> BYC.

✓ ***Two components, EBfoil<sup>®</sup> BYC and EBfoil<sup>®</sup> STACK are combined together as preassembly***

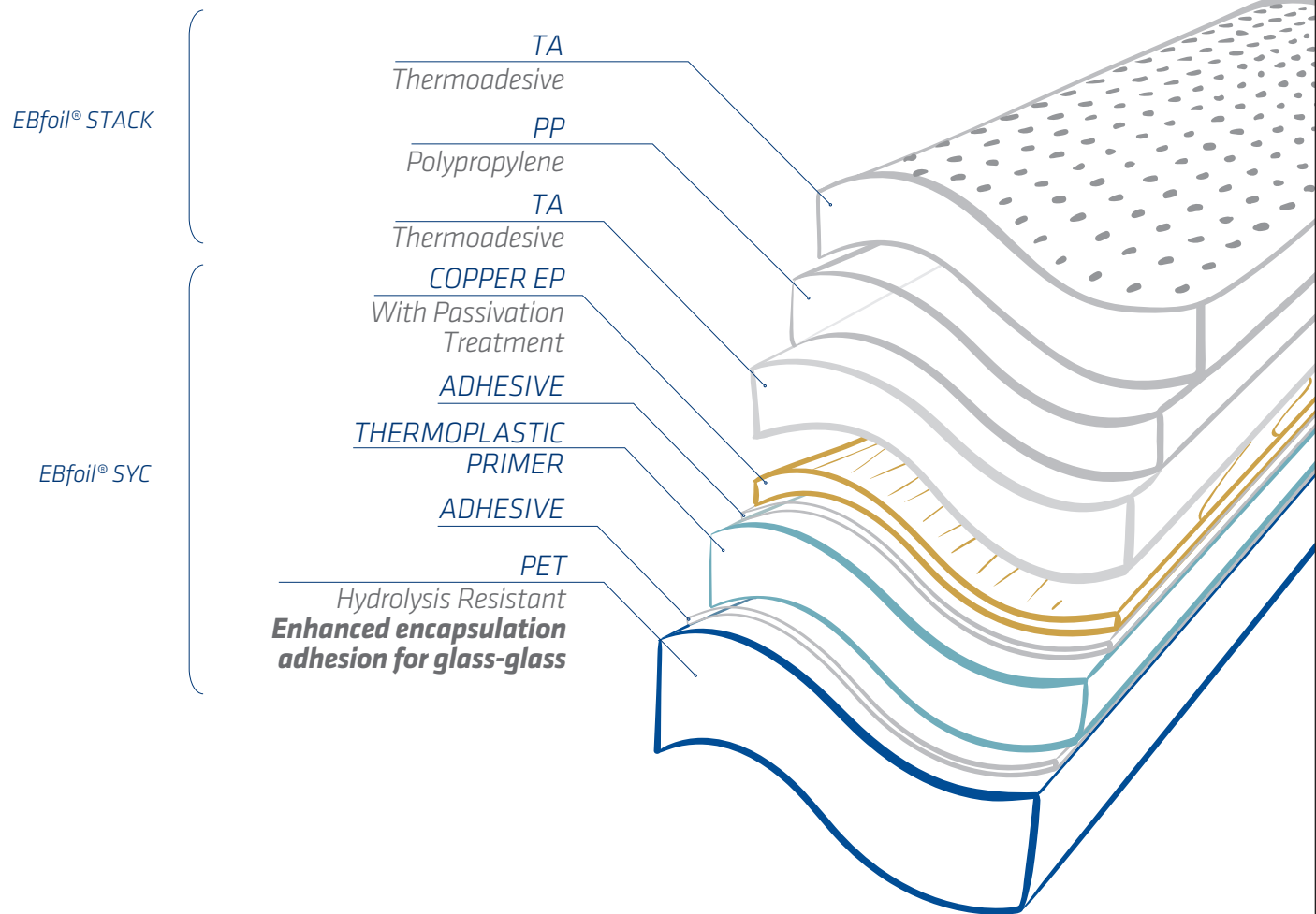
✓ ***Doesn't interfere with vacuum evacuation during lamination while is a precursor of the used pretagging to avoid ECA and cells floating***

✓ ***Connection is made pretagging the components one to the other***

✓ ***Fiducials can be made on both BYC and STACK, to allow camera alignment for ECA deposition***



# EBfoil® SYS



# BACKCONTACT GLASS-GLASS

To allow easy module assembly EBfoil SYS<sup>®</sup> consists of the Interconnection patterned foil EBfoil<sup>®</sup> SYC preassembled with the suitable dielectric encapsulant EBfoil<sup>®</sup> STACK. EBfoil<sup>®</sup> SYC is a laminate of high performance Polyester, and an electroplated copper conductive layer. The copper conductive layer is passivation treated for enhanced conductivity and adhesion, and ensures corrosion protection and high solderability with conductive pastes or adhesives. EBfoil<sup>®</sup> STACK is a dielectric encapsulant that guarantees a strong and stable bonding to the substrate not covered by conductors, to the conductive layers itself and to the back of the cells. Its stable and stiff behaving makes handling easy, and maintains a dielectric property also after lamination thanks to the innovative inner layer. The outer side of the SYC and SYS products includes a special surface treatment to guarantee an high and stable adhesion to the back encapsulant using standard lamination process for glass-glass modules. Specifically designed process manufacturing in sheets, dry environment and at low temperatures guarantees superior planarity and dimensional stability of EBfoil<sup>®</sup> SYS.

- ✓ ***Two components, EBfoil<sup>®</sup> SYC and EBfoil<sup>®</sup> STACK are combined together as preassembly***
- ✓ ***Doesn't interfere with vacuum evacuation during lamination while is a precursor of the used pretagging to avoid ECA and cells floating***
- ✓ ***Connection is made pretagging the components one to the other***
- ✓ ***Fiducials could be made on both SYC and STACK, to allow camera alignment for ECA deposition***

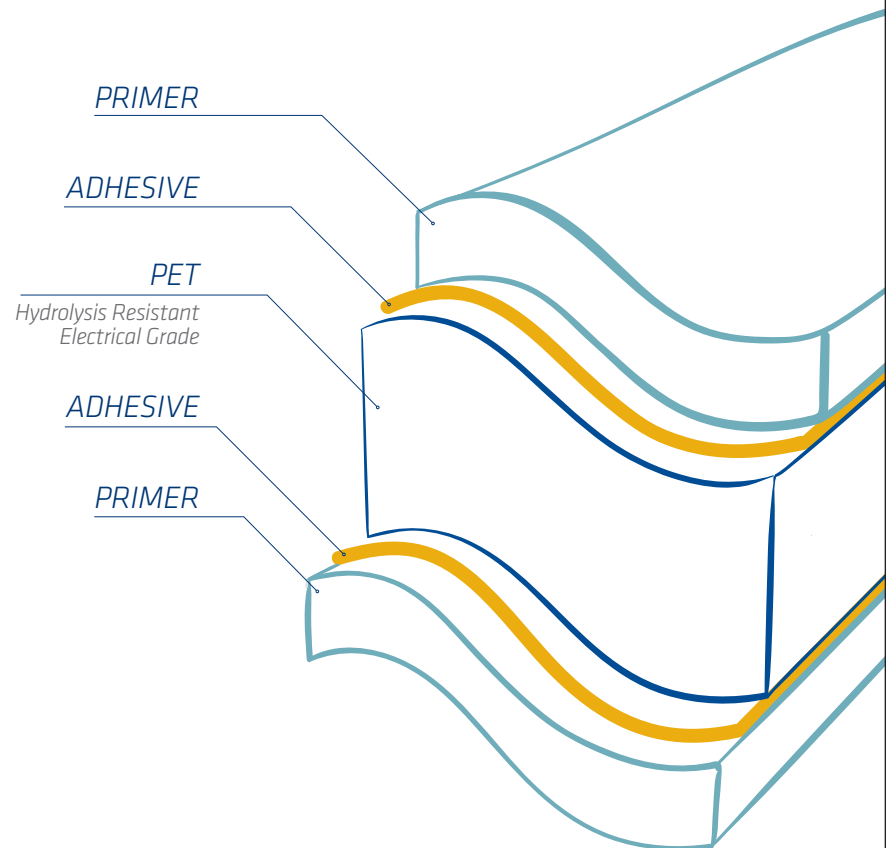


# ACCESSORIES

## dyMat EPE®

dyMat EPE® is designed to be used as electrical insulator in between ribbons and bus bars in PV module fabrication. The material has a perfect bonding with both encapsulation EVA and whichever backsheet, thanks to its structure with a double layer of Primer.

- ✓ **Multilayer component made of PRIMER/PET/PRIMER**
- ✓ **Enhanced adhesion with encapsulation thanks to a special primer**
- ✓ **High reflectance**

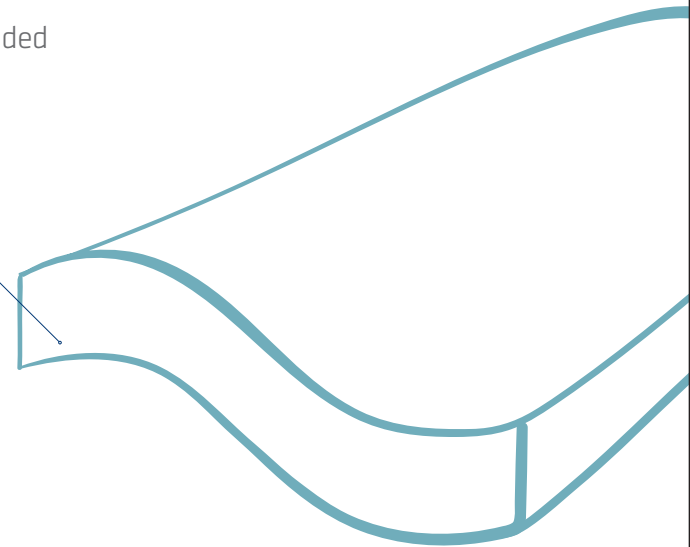


# dyMat E<sup>®</sup>

Transparent adhesive tape made of EVA. It is used to fix components such as cells, ribbons etc. during PV module fabrication. In the lamination process the substrate melts and becomes totally embedded with encapsulating EVA.

- ✓ ***Avana siliconised paper 90 g/m<sup>2</sup>***
- ✓ ***Transparent EVA***
- ✓ ***Modified acrylic emulsion adhesive***

EVA



# Thank you!

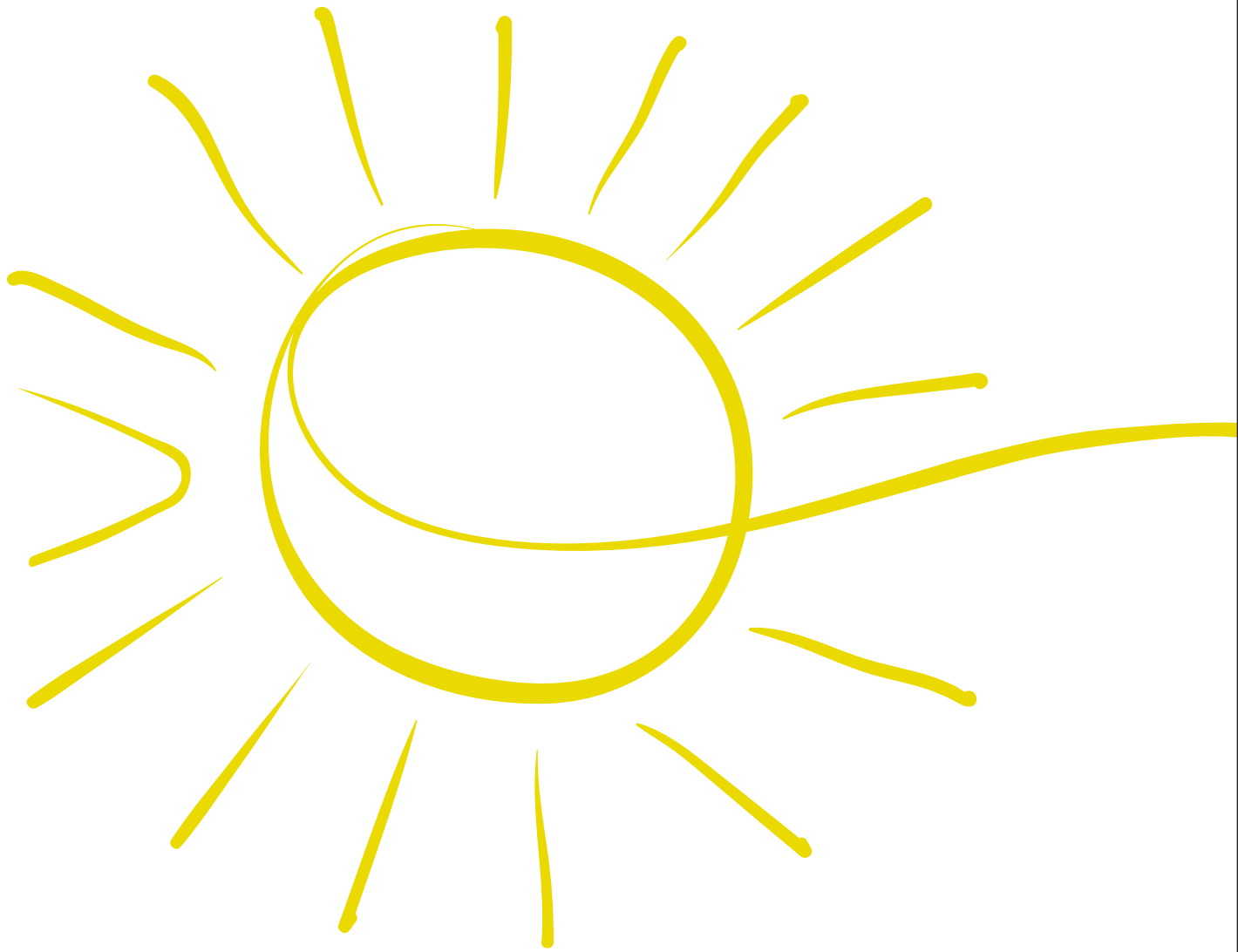


- ✓ **Trina Solar Supplier Award 2017**
- ✓ **Solar World Supplier Award 2015**
- ✓ **Vikram Solar Preferred Partner 2013**

Thanks to our outstanding international team, long-term partnerships with suppliers and last but not least thanks to our clients with whom we share new ideas and technologies in the light of a common quest:

**To make photovoltaics an ever more efficient and profitable renewable energy resource**







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