




PRODUCTS | INFORMATION



There's
a way
to do better...
find it.

Thomas Alva Edison

(1847-1931),

American

inventor

PECOLIT

COMPANY



PECOLIT is one of the world's leading manufacturers of high-quality fiber-reinforced plastic flat-sheets (FRP) in the vehicle and construction sector. Affiliates and distribution companies on all five continents, as well as agencies in more than 30 countries, ensure a comprehensive customer service. With more than 50 years of knowledge gained from hands-on experience and a steadily growing product range, we're looking towards the future together with our customers.

RAW MATERIALS



FRP is the collective term for plastics that are mainly reinforced with glass fiber. PECOLIT uses the following raw materials in their production:

Resins

Unsaturated polyester or vinylester resins serve as binding components. They are applied as matrix resin. For certain flatsheets, a surface layer which is called a gelcoat layer can be added to improve the surface finish. Using these polyester resins, products can be designed to give pre-determined properties, including flexibility, impact strength and surface characteristics of the FRP laminate.

Reinforcing materials

We use mainly glass fiber reinforcing because it is available in a wide range of formats, each offering known physical properties.

These are processed into chopped strand mats, woven roving mats and tissue. The structure of these mats can be varied by weight.

The thermal and mechanical properties of the sheets can be modified by using unique combinations of resins and glass fiber mats or other reinforcing materials.

The reinforcing materials are classified as follows:

Tissue

The inclusion of a tissue improves the appearance of the laminate surface, by reducing the fiber pattern.

Chopped strand mat

These consist of non-aligned (random) glass fibers and produce the desired physical properties and thermal characteristics.

Woven roving

This consists of aligned glass fibers (warp and weft), providing better mechanical properties in the main axes.

TECHNICAL CHARACTERISTICS

textura

without woven roving

with woven roving

without gelcoat

PECOLIT
STANDARD

product composition

gelcoat	no
chopped strand mat	yes
tissue	no

PE-ST

material thickness	mm	1.0	1.5	2.0	2.5
tensile strength	N/mm ²	70	67	75	75
modulus of elasticity	N/mm ²	7198	7065	7365	7335
glass content	%	23,9	24,3	23,9	24,4
weight per unit area	g/m ²	1360	2055	2720	3375
residual styrene content	%	0.45	0.1	0.1	< 0.1

PECOLIT
SPECIAL

product composition

gelcoat	no
chopped strand mat	yes
tissue	yes

PE-SP

material thickness	mm	1.0	1.5	2.0	2.5
tensile strength	N/mm ²	70	76	75	80
modulus of elasticity	N/mm ²	6676	7528	7553	7627
glass content	%	26.2	26.5	25.0	25.3
weight per unit area	g/m ²	1379	2025	2740	3400
residual styrene content	%	0.2	0.35	< 0.1	0.1

PE-STGW

1.5	1.8	2.0	2.5
101	100	105	102
9431	8880	9509	8738
29.6	29.6	33.0	27.3
2115	2538	2880	3475
0.25	0.1	< 0.1	< 0.1

PE-SPGW

1.5	2.0	2.5	3.0
97	106	90	93
9188	9225	8796	7608
30.8	34.0	28.2	27.8
2145	2900	3500	4170
0.25	< 0.1	0.2	0.1

with gelcoat

PECOLIT
GELCOAT

product composition

gelcoat	yes
chopped strand mat	yes
tissue	yes

PE-GE

material thickness	mm	1.5	2.0	2.5	3.0
tensile strength	N/mm ²	57	74	71	74
modulus of elasticity	N/mm ²	5715	7029	6893	7018
glass content	%	18.1	24.7	24.9	25.0
weight per unit area	g/m ²	1995	2776	3464	4140
residual styrene content	%	0.4	0.25	0.2	0.3

X₂TERIO

product composition

gelcoat	yes
chopped strand mat	yes
tissue	yes

PE-X₂T

material thickness	mm	2.0	2.5	3.0
tensile strength	N/mm ²	65	66	64
modulus of elasticity	N/mm ²	5726	5895	6790
glass content	%	18.3	20.5	21.4
weight per unit area	g/m ²	2660	3350	4020
residual styrene content	%	0.9	1.2	1.2

PECOLIT
NT₂

product composition

gelcoat	yes
chopped strand mat	yes
tissue	yes

PE-NT₂

material thickness	mm	1.3	1.5	1.8	2.0
tensile strength	N/mm ²	55	54	65	61
modulus of elasticity	N/mm ²	5449	5831	6797	6231
glass content	%	20.4	18.0	21.8	19.9
weight per unit area	g/m ²	1768	2010	2456	2693
residual styrene content	%	0.4	0.3	0.35	0.3

PE-GE_{GW}

1.5	1.8	2.0	2.5
100	88	90	88
8632	8308	8206	8027
31.0	30.3	27.9	28.0
2130	2591	2820	3525
0.5	0.5	0.35	0.4

PE-X₂T_{GW}

2.0	2.5	3.0
92	91	84
7878	7461	7051
27.7	28.0	24.0
2840	3525	4110
1.0	1.2	1.2

PE-NT₂GW

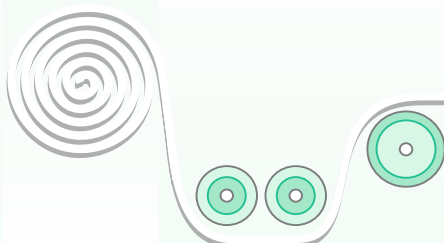
1.5	1.8	2.0
104	105	92
8456	9081	8272
31.0	30.3	27.9
2130	2592	2820
0.5	0.5	0.2

PRODUCTION FILM

GELCOAT APPLICATION

HEAT LINE

MATRIX RESIN APPLICATION



TECHNICAL CHARACTERISTICS

Special products

PECOLite

product composition	
gelcoat	yes
chopped strand mat	yes
tissue	yes
woven roving	yes

PE-RVSP

material thickness	mm	4.0	4.0
tensile strength	N/mm ²	60	57
modulus of elasticity	N/mm ²	5500	5267
glass content	%	22.7	21.2
weight per unit area	g/m ²	4660	4647
residual styrene content	%	0.9	0.9

PE-RVGE

EMBOSSER

product composition	
gelcoat	yes
chopped strand mat	yes
tissue	no
woven roving	possible

PE-EMGE

material thickness	mm	1.8	2.0	2.3	3.0
tensile strength	N/mm ²	62	79	74	72
modulus of elasticity	N/mm ²	6200	6700	6600	6200
glass content	%	21.6	24.6	25.0	24.0
weight per unit area	g/m ²	2260	2570	2950	3875
residual styrene content	%	0.3	0.1	0.3	0.25

hydrex

product composition	
gelcoat	possible
chopped strand mat	yes
tissue	possible
woven roving	possible

HYVE*

material thickness	mm	1.5	3.0	5.0	7.0
tensile strength	N/mm ²	99	99	99	85
modulus of elasticity	N/mm ²	7630	7152	7815	6300
glass content	%	27.7	23.8	27.8	26.5
weight per unit area	g/m ²	1935	3930	6600	8820
residual styrene content	%	0.73	1.3	1.3	1.4

SAF@FIRE

product composition	
gelcoat	yes
chopped strand mat	yes
tissue	yes
woven roving	possible

PE-SF

material thickness	mm	2.2
tensile strength	N/mm ²	110
modulus of elasticity	N/mm ²	9057
glass content	%	26.2
weight per unit area	g/m ²	4001
residual styrene content	%	< 0.1

STYBOND

This product is suitable for bondings with resin.
Several PECOLIT products are available in this format on request.



double-sided, sanded material without defined physical properties.

* Vinyl ester resin is particularly suitable for use in the area of waste water drainage.

The stated product characteristics are average values measured using random samples and do not apply for material which has been ground down.

The material data can vary depending on the raw materials.

We reserve the right to make changes

FEEDING OF REINFORCEMENT MATERIALS



CALENDERING



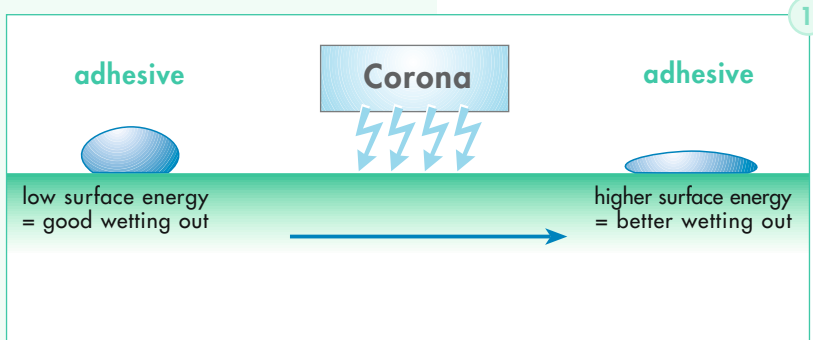
HEAT AND TEMPERING LINE



PROCESSING

PECOLIT flatsheets can be bonded without further pre-treatment, for example, in the production of composite panels.

In addition to this, the surface can be further modified or optimized. Surface preparation time can be reduced by not having to use primers.



Surface properties

smooth

The back of the sheet is as smooth as the face and free of dust.

Corona

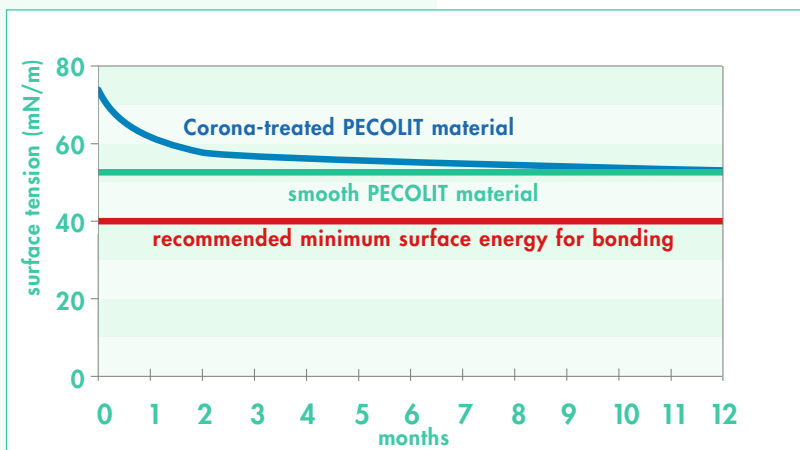
Corona treated material shows no visible difference to smooth material but exhibits a higher surface energy. (fig. 1).

sanded

Bonding surface roughening by mechanical pre-treatment, with directed structure on the backside. (fig. 2).



The effect of time on FRP material with and without Corona treatment



Bonding methods

In general, PECOLIT flatsheets can be bonded with the usual one or two-component adhesives:

polyurethane (PU)

epoxy (EP)

acrylates

MS Polymer

double-faced adhesive tapes

reactive hot melt adhesives (PU)

Back-foaming with PU foam

VISUAL CHECK

SIDE-TRIMMING

SURFACE PRE-TREATMENT
(CORONA OR SANDING)



Styrene content

Styrene is an essential component within the resin, but this monomer solvent can affect bonding characteristics.

A residual styrene content of about two to three percent can cause distortion within the cohesive behavior of the adhesives and can even cause swelling.

When insulated composite panels are produced using non-solvent-resistant foams, delamination may occur.

PECOLIT products stand out from the crowd with their very low residual styrene content (<1%). For bonding with laminating resin, PECOLIT offers products with a higher residual styrene content which have been developed for this purpose. => Stybond

Thermal expansion

When compared with metallic structural materials, FRP exhibits greater thermal expansion. By engineering the glass content and the product configuration, thermal expansion coefficients of ca. $18.6 \cdot 10^{-6}$ 1/K to $40 \cdot 10^{-6}$ 1/K can be achieved with PECOLIT flatsheets.

Visual characteristics / Gelcoat layer

Yellowing takes place about three times slower than non gelcoated products.

Temperature stability

Deflection temperature under load < 56°C.

Maximum temperature without load is stable up to 120°C.

Mechanical processing

PECOLIT products can be processed using common mechanical machining operations, namely cutting, sawing, drilling, sanding and bending, among others.

Painting

PECOLIT products provide an excellent surface to be painted. Paint manufacturer's preparation advice should be followed as this will vary in accordance with the type of finish to be applied. We recommend the following paint system: primer, filler, intermediate abrading, 2-component finishing topcoat or base paint (+ 2-component clear coat). The surface must be thoroughly cleaned of all dust prior to the application of the next coat. Vinyl primers are not necessary.

Certificates and external tests

	PE-ST2,0	PE-ST2,0EG	PE-STGW2,0	PE-STGW2,0EG	PE-SP	PE-GE	PE-GEGW2,0	PE-NT2	PE-FR	SAF@FIRE
Certified according to Food compliance and Commodities Law	•					•	•	•	•	
Examination of linear expansion coefficient	•	•								
Certified for fire safety according RL 95/28			•	•			•			
Fire safety examination according to DIN standard 53752-A			•	•			•			
Water diffusion test		•								
BS476-Part 7 Class 1										•
E DIN 5510-2 S4										•
NF P92-507 M2										•

Further information is offered as follows

- Chemical resistance list
- Research bonding behavior
- Vacuum table construction
- FRP surface pre-treatment
- Composite panel production
- Sandwich elements for vehicle construction
- How to repair FRP sheets
- How to repair composite panels and FRP sheets
- How to paint PECOLIT products, painting tips
- Bonding of composite panels
- Rigid polyurethane foam for vehicle construction
- How to bond and seal FRP composite materials
- Product information and safety data sheet
- We are certified according to DIN ISO-9001

COILING STATION





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