



# Composites Div.

## A, Parabeam 3D woven glass fabrics for composites

ITC is the sole distributor of Parabeam BV (The Netherlands) in Japan and South East Asian countries, and have managed for around 30 years.

### 1, What's Parabeam 3D

Parabeam 3D was developed by Parabeam BV (The Netherlands) in 1988 as a core material of composites. It is made from 100% E-glass yarn and is three dimensional continuous hollow structural woven fabrics. Its features are 'super light weight', 'high bending rigidity', 'continuous hollow structure'.

### 2, How to make Parabeam 3D composites

Put the thermo-setting resin on to the Parabeam 3D fabrics and impregnate the resin by roller. Then the fabrics will automatically stand up itself caused by mutual action of spring back feature of E-glass and the capillary phenomenon of resin.

You can see the real impregnating operation by below video.

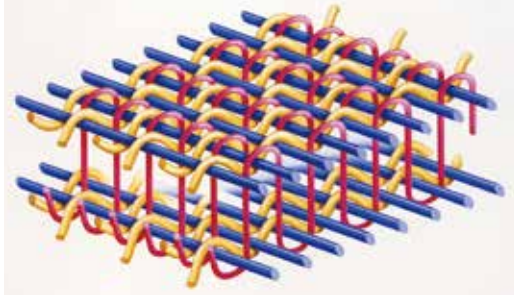
\*Thermo-setting resin: epoxy, vinylester, phenolic, unsaturated polyester etc.,

### 3, style number and specification

style No.	PG3 (86050)	PG5 (86051)	PG8 (86052)	PG10 (86053)
thickness (mm)	3	5	8	10
width (mm)	1270	1270	1270	1270
weight (g/m <sup>2</sup> )	780	840	930	1010
length (m/roll)	39.4	39.4	39.4	39.4
area (m <sup>2</sup> /roll)	50	50	50	50

### Parabeam 3D

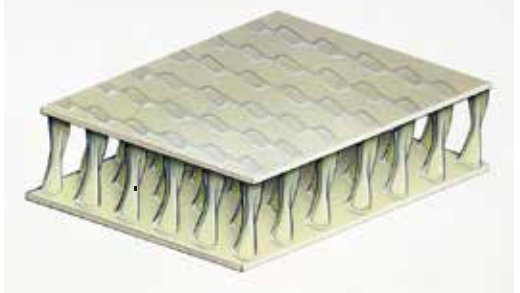
fabric conceptual diagram



### 4, physical property of laminated Parabeam 3D

style No.	86050	86051	86052	86053
thickness (mm)	3	5	8	10
weight (g/m <sup>2</sup> )	1.64	1.76	1.95	2.12
compressive strength (N/mm <sup>2</sup> )	8.1	4.6	1.6	1.3
shear strength (N/mm <sup>2</sup> )	1.8	1.6	0.7	0.4
shear modulus (Mpa)	12.2	11.1	8.7	5.2
bending stiffness (Nm <sup>2</sup> )	1.1	3.5	8.8	12.7
flexural modulus (Gpa)	11.4	14.8	19	21.9

molding product



\* Final sandwich thickness may vary due to tolerance of dry fabric thickness, pile angle, resin type, laminating process as well as working condition.  
All given value are average values by Parabeam BV.

## 5, Application

### Super light weight / High bending rigidity / Insulation

- Interior : Aircraft, Bullet train, Ship, Automobile,
- Air spoiler : Truck,
- Exterior of automobile :Bonnet(hood), Bus, Camping car, Camper van, Snow wagon, Machine cover,
- Incinerator : Scrubber,
- Boat material : Bulkhead, Deck, Cabin,
- Architectural material : Back-up of marble stone,

### High bending rigidity / Continuous hollow structure

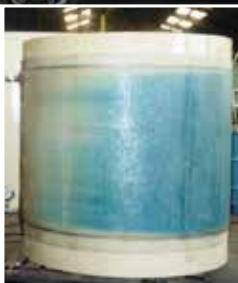
- Heat changer : Sake tank jacket, Chemical tank jacket,
- Heater : FRP mould,
- Leak detection system : Wasted liquid tank, FF double wall gasoline tank,

### Super light weight / High bending rigidity / Insulation / Sound absorbability

- Camper van, Machine cover,

### Super light weight / High bending rigidity / High radar transmission efficiency

- Radome





## B, Carbon fiber woven fabrics and prepreg

ITC is a distributor of Formosa Plastics Corp (CF yarn), and Formosa Taffeta Co., Ltd.(CF woven fabrics and prepreg) (Taiwan).

### 1, products

(Yarn)

yarn type	number	tensile strength	tensile modulus	elongation	density	filament diameter
		(Mpa)	(Gpa)	(%)	(g/cm <sup>3</sup> )	( $\mu$ )
TC33	1.5K	3450	230	1.5	1.8	7
	3K	3450	230	1.5	1.8	7
	6K	3450	230	1.5	1.8	7
TC35	3K	4000	240	1.7	1.8	7
	6K	4000	240	1.7	1.8	7
	12K	4000	240	1.7	1.8	7
	24K	4000	240	1.7	1.8	7
	48K	4000	240	1.7	1.8	7
TC36	12K	4900	250	2	1.8	7
	24K	4900	250	2	1.8	7
TC42	12K	5690	290	2	1.81	5.1
	24K	5690	290	2	1.81	5.1
TC55	12K	4400	380	1.2	1.79	5
	24K	4400	380	1.2	1.79	5

(Cloth) (plain:1/1) : width- 100cm

style No.	warp		weft		weight g/m <sup>2</sup>	thickness mm
	yarn	number	yarn	number		
EC2C	1.5K	18	1.5K	18	144	0.165
EC2E	1.5K	18	K(1000d)	18	151.9	0.198
EC3C	3K	12.5	3K	12.5	200	0.27
ECTC	3K	12.5	3K	12.5	200	0.2
EC3W	3K	13	3K	13	280	0.28
EC3L	3K	12.5	3K	12.5	200	0.26
EC01	3K	13	K(1500d)	13	190.8	0.29
EC08	3K	13	K(1500d)	13	190.8	0.29
EC13	3K	13	G(285T)	13	252.2	0.286
EC16	3K	13	K(1500d)	17	217.6	0.34
ECCK	12K	9.375	12K	9.375	600	0.73
ECCM	12K	6.25	12K	6.25	400	0.588
ECCF	12K	6.5	G(55T)	6.25	221	0.43
ECCH	12K	9.5	G(55T)	4.5	313.9	0.498

\*K : Kevlar, G : Glass Fiber

(Twill:2/2) : width-100cm

style No.	warp		weft		weight g/m <sup>2</sup>	thickness mm
	yarn	number	yarn	number		
EC2D	1.5K	18	1.5K	18	144	0.162
EC3K	3K	13	3K	14	216	0.28
EC3M	3K	13	3K	18	248	0.28
EC3X	3K	13	3K	13	208	0.28
ECTD	3K	12.5	3K	12,5	200	0.3
EC3Y	3K	13	3K	14	216	0.288
EC04	3K	13	K(1500d)	13	190.8	0.29
EC05	3K	13	K(1500d)	13	190.8	0.32
EC09	3K	13	G(285T)	18	309.2	0.339
EC42	3K	13	K(1500d)	13	190.8	0.307
ECCL	12K	9.375	12K	9.375	600	0.73
ECCN	12K	6.25	12K	6.25	400	0.575

(Multi axial) : width- 127cm

style No.	axial number	direction	weight (g/m <sup>2</sup> )	stitch yarn (g/m <sup>2</sup> )	length (m)
ECMT01	2	+45/-45	157	7	50
ECMT03	3	+45/90/-45	232	7	50
ECMT06	2	+45/-45	207	7	50
ECMT08	3	+45/90/-45	307	7	50
ECMT11	2	+45/-45	257	7	50
ECMT13	3	+45/80/-45	382	7	50
ECMT16	2	+45/-45	307	7	50
ECMT18	3	+45/90/-45	457	7	50
ECMF21	2	+45/-45	407	7	50
ECMF23	3	+45/90/-45	607	7	40
ECMF25	4	0/+45/90/-45	807	7	30
ECMF36	2	+45/-45	607	7	40
ECMF38	3	+45/90/-45	907	7	30
ECMF40	4	0/+45/90/-45	1207	7	30

## C, Carbon fiber braid and sleeve

ITC is a distributor of Siltex Braiding Co., Ltd (Germany) which is producing braid and sleeve using carbon fiber, glass fiber, aramide fiber, basalt fiber and other technical yarn for industrial use.

### 1, Products

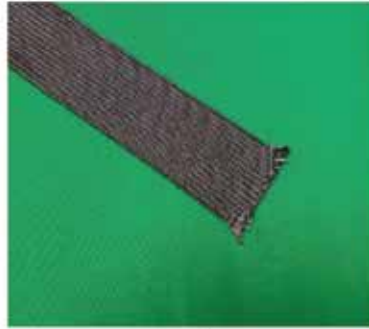
Braid and Sleeve

\*Products are decided by multi factor on demand from the application.

\*Key factor ; yarn type /yarn thickness/number of yarn, density and thickness of fabrics, structure etc.



Carbon braid



Carbon tape



Carbon cord



Carbon/Glass braid



Silicone coated glass braid



Stretch carbon tape

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### 2, Application

Industrial use : Medical equipment, Artificial leg, Pipe, Electric device etc.

Automobile : Car wing, Frame, Motorcycle wheel, Bike parts etc.

Sports : Tennis racket, Golf shaft, Bicycle frame, Hockey stick, Snow board, Mast etc.



Hockey-Stick



Rotor blade



Bycycle frame



Motorcycle-Wheel



Reference



Car wing



Automotive-coach

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