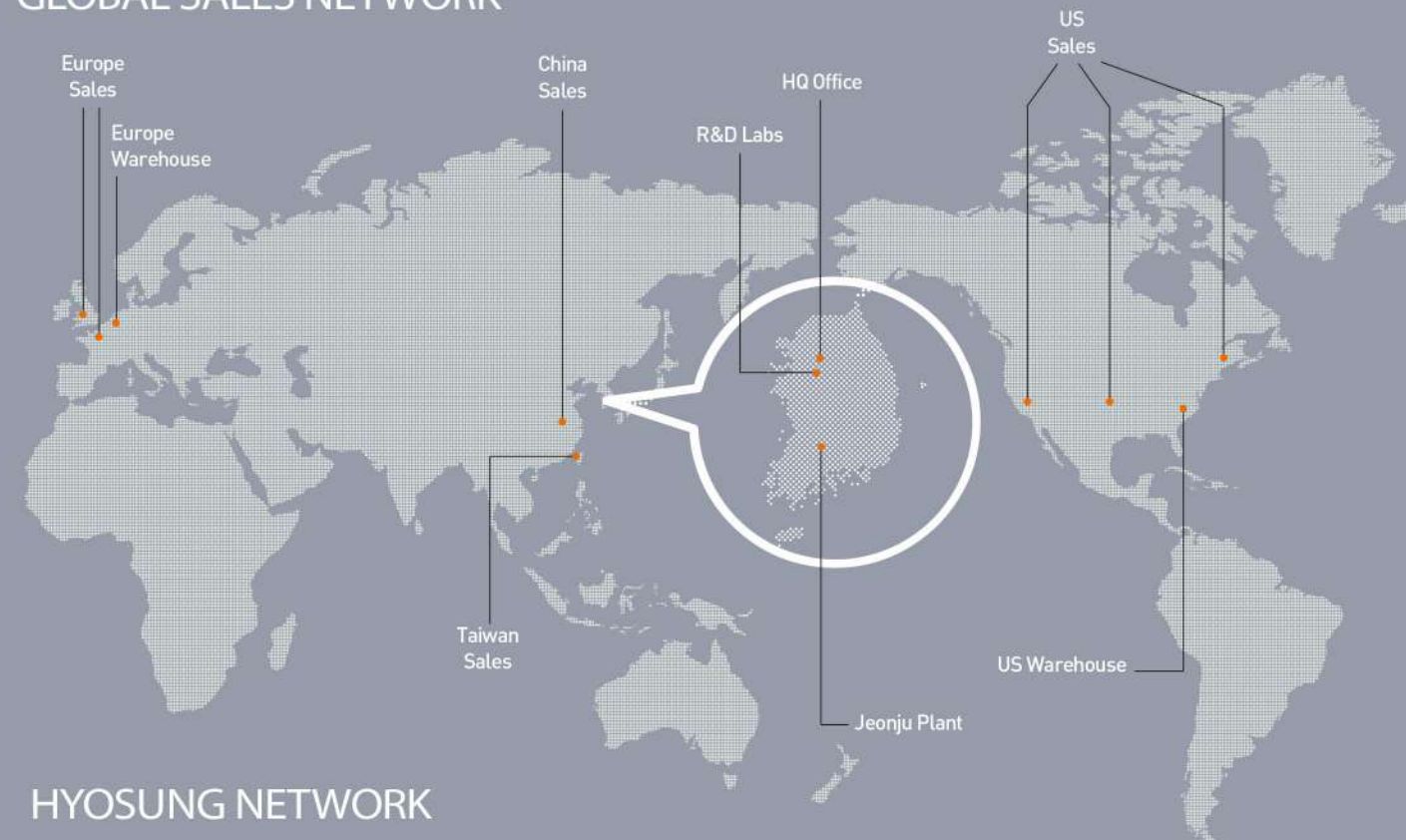


GLOBAL SALES NETWORK



Ver. 2017/09

Carbon Fiber for a Better World



by HYOSUNG

HYOSUNG NETWORK

Headquarters
119, Mapo-daero, Mapo-gu, Seoul, Korea
Tel. 82-2-707-4317 Fax. 82-2-707-4319
E-mail. kshan@hyosung.com / jason@hyosung.com
dennis@hyosung.com / andrewkim@hyosung.com
blue3@hyosung.com

Hyosung Jeonju Plant
886 Girin-daero, Deokjin-gu, Jeonju-si,
Jeollabuk-do, Korea 561-320

Hyosung R&D Labs
74, Simin-daero, Dongan-gu, Anyang-si,
Gyeonggi-do, Korea 431-080
Tel. 82-31-428-1000 Fax. 82-31-454-0089
Website : research.hyosung.co.kr

Hyosung USA, Inc. (Warehouse)
15800 John J. Delaney Drive Suite 250 Charlotte, NC 28277
Tel. 1-704-790-6104 Fax. 1-704-790-6109
E-mail. sj.yim@us.hyosung.com

Hyosung Corporation Shanghai Office
Room No. 1115, Shanghai International Trading Center
No. 2200 Yan An Xi Road, Shanghai, China
Tel. 86-21-6209-0123 Fax. 86-21-6209-3008
E-mail. yhlee@hyosung.com / tonyzhu@hyosung.com

Hyosung Corporation Taipei Office
1714, 17F, International Trade Building, No. 333, Sec1
Keelung Road, Taipei 110, Taiwan, R.O.C.
Tel. 886-2-2758-4636 Fax. 886-2-2729-6410
E-mail. jaewon1203@hyosung.com

Hyosung Corporation Frankfurt Office
Siemensstr. 14, 61352 Bad Homburg, Germany
Tel. (+49)-(0)6172-8553220
E-mail. ingekim@hyosung.com

Hyosung Wire Luxembourg S.A (Warehouse)
8, Route de Bissen Roost, Luxembourg (Post Code L 7759)
Tel. 352-26818-203 Fax. 352-26818-208
E-mail. Laurent.MEURISSE@hyosunglux.com
Hyunah.Park@hyosunglux.com

Hyosung Europe S.R.L
Via del Teccione 34, 20098 San Giuliano Milanese(MI), Italy
Tel. 39-02-9886-251 Fax. 39-02-9828-2481
E-mail. anna.introzzi@hyosung.com

Hyosung Corporation Istanbul Office
Buyukdere Caddesi Noramin Is Merkezi No:237kat:3
Daire:306 34398 Maslak Istanbul, Turkey
Tel. 90-212-284-1601 Fax. 90-212-284-1609
E-mail. omeruykse@hyosungist.com

SALES NETWORK

Central USA
HP Fibers, LLC
Brian Bishop
Office, 1-614-348-9686
E-mail. brbishop@mac.com

East / West Coast USA
Materials Application Development, LLC
Paul Kennedy
Office, 1-603-964-4152 Cell, 1-603-682-8178
E-mail. pkennedy@madllc.net

Europe Region
Andrew Kim
Cell. 82-10-8597-1034
E-mail. andrewkim@hyosung.com

China
Room No. 1115, Shanghai International Trading Center
No. 2200 Yan An Xi Road, Shanghai, China
Tel. 86-21-6209-0123 Fax. 86-21-6209-3008
E-mail. tonyzhu@hyosung.com
blue3@hyosung.com

Taiwan
Waykey Co., Ltd.
Bob Cheng
Office, 886-2-2551-3885 Cell. 886-937-837-635
E-mail. waykey.taiwan@msa.hinet.net
jaewon1203@hyosung.com

HYOSUNG www.tansome.co.kr

119 Mapo-daero, Mapo-gu, Seoul, Korea 04144
Tel : +82-2-707-4313 / Fax : +82-2-707-4319
E-mail : tansome@hyosung.com



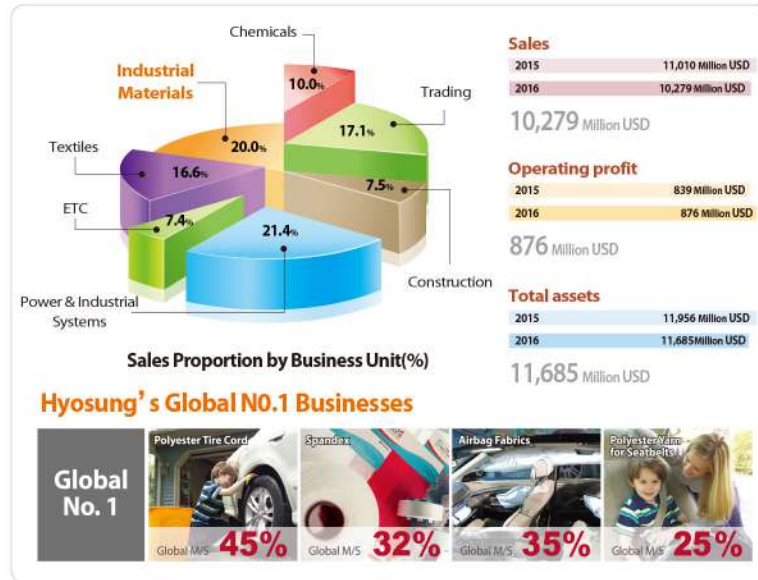
Note:

Carbon fiber and its related products are subject to control under export/import regulations of each country



HYOSUNG

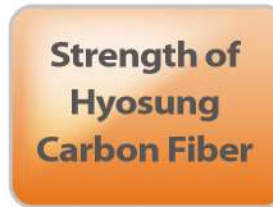
Hyosung Corporation



Hyosung Corporation, founded in 1966, develops, produces, and distributes products for various applications in the industrial materials, power systems, machinery, chemical, and textile industries. Hyosung is the worldwide leader in polyester tire cord production, spandex, airbag and seatbelt fabrics.

Hyosung Corporation, with sales of approximately \$12 billion USD, is headquartered in Seoul, South Korea. South Korea is also home to Hyosung's 11 manufacturing facilities and 4 R&D facilities. Globally, Hyosung Corporation, has 66 sales facilities that reach Asia, North America, South America and Europe providing service to customers in over 130 countries. Hyosung employs over 25,000 employees in 27 countries worldwide.

Hyosung Carbon Fiber - The Number 1 High Strength Carbon Fiber in the World



- ① Produces own precursor - Hyosung's own Technology
- ② Fully controlled continuous process from raw material to carbon fiber
- ③ Technology development capability
- ④ Customer technical support
- ⑤ High Strength carbon fiber
- ⑥ High Translation of fiber properties



Typical Tow Properties

Fiber Type	Number of Filaments	Tensile Strength		Tensile Modulus		Elongation	Density	Filament Diameter	Yield	Sizing Level	
		SI Unit	US Unit	SI Unit	US Unit						
High Strength, Standard Modulus	6000	5,516 MPa	800 Ksi	250 GPa	36.3 Msi	2.2%	1.80 g/cm ³	7.0 μm	400 g/km	1.0%	
	12000	5,516 MPa	800 Ksi	250 GPa	36.3 Msi	2.2%	1.80 g/cm ³	7.0 μm	800 g/km	1.0%	
	24000	5,516 MPa	800 Ksi	250 GPa	36.3 Msi	2.2%	1.80 g/cm ³	7.0 μm	1,650 g/km	1.0%	
High Strength, Intermediate Modulus	H3055	12000	5,516 MPa	800 Ksi	290 GPa	42.1 Msi	1.9%	1.80 g/cm ³	6.6 μm	725 g/km	1.0%

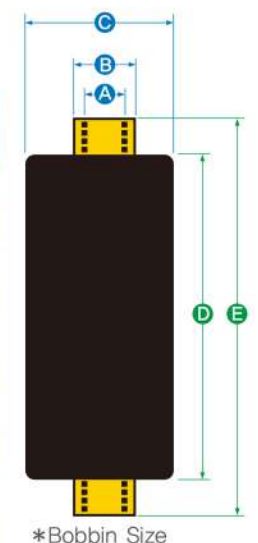
Typical Composite Properties

Fiber Type		H2550						H3055		Test Method
		6K		12K		24K		12K		
		SI Units	US Units	SI Units	US Units	SI Units	US Units	SI Units	US Units	
Tensile Properties	0° Tensile Strength	2,950 MPa	428 Ksi	2,950 MPa	428 Ksi	2,950 MPa	428 Ksi	2,950 MPa	428 Ksi	ASTM D3039
	0° Tensile Modulus	140 GPa	20.3 Msi	140 GPa	20.3 Msi	140 GPa	20.3 Msi	155 GPa	22.5 Msi	ASTM D3039
	0° Tensile Strain	2.00%		2.00%		2.00%		1.80%		ASTM D3039
Compressive Properties	0° Compressive Strength	1,450 MPa	210 Ksi	1,450 MPa	210 Ksi	1,450 MPa	210 Ksi	1,500 MPa	217 Ksi	ASTM D3410
Flexural Properties	0° Flexural Strength	1,800 MPa	261 Ksi	1,800 MPa	261 Ksi	1,800 MPa	261 Ksi	1,800 MPa	261 Ksi	ASTM D790
	0° Flexural Modulus	125 GPa	18.1 Msi	125 GPa	18.1 Msi	125 GPa	18.1 Msi	150 GPa	21.8 Msi	ASTM D790
ILSS	Strength	90 MPa	13.1 Ksi	90 MPa	13.1 Ksi	90 MPa	13.1 Ksi	90 MPa	13.1 Ksi	ASTM D2344

The above properties do not constitute any warranty or guarantees. These values are for material selection purposes only.

Standard Packaging

Fiber Type	Number of Filaments	Spool Net Weight (kg)	Bobbin Size (mm)					Spool Per Case (kg)	Case Net Weight (kg)	Pallet Net Weight (kg)
			A	B	C	D	E			
High Strength, Standard Modulus	6000	1.0	76	84	110	250	280	12	12	360
			76	84	123	250	280	8	16	480
	12000	2.0	76	84	125	250	280	8	16	480
			76	84	154	250	280	6	24	720
			76	84	180	250	280	4	24	720
			76	84	165	250	280	6	24	720
24000	4.0	76	84	195	250	280	4	24	720	
		76	84	220	250	280	80	640	640	
		76	84	155	250	280	6	24	720	
High Strength, Intermediate Modulus	H3055	12000	76	84	131	250	280	8	16	480
			76	84	155	250	280	6	24	720



Hyosung Carbon Fiber - History

2008~ Development Stage	2011~ Marketing Stage	2013~ Commercial Production Stage	~2025 Expansion Stage
<p>2008 Started Carbon Fiber Development</p> <p>2010 Successfully Developed H2550 Precursor & Carbon</p> <p>2011 Approved Corporate Investment Plans for the Commercial Production Line Established Semi-Commercial Line in Jeonju, Korea (CF Capa. : 500MT/y)</p>	<p>2011 Started Global Product Marketing</p> <p>2012 Successfully Developed H3055 Precursor & Carbon</p>	<p>2013 Established Commercial Plant in Jeonju, Korea (CF Capa. : 2,000MT/y)</p> <p>"The 1st Korean company to produce High Performance Carbon Fiber & PAN Precursor"</p>	<p>~2025 Carbon Fiber Capa. : 14,000 MT/y Precursor Capa. : 28,000 MT/y</p>

Application



Factory Site

