



**Innovation Beyond Composites**

**HANKUK CARBON**



# Hankuk Carbon

Reinventing ourselves into  
a world class company



Established in 1986, specializing in glass fiber fabrication, the company was equipped with a variety of weaving machines to provide suitable fabric forms for final products ranging from general industrial glass fabrics, used in fishing rod, grinder, and general FRP applications, up to sophisticated glass fabrics for aerospace, and electronics applications. Hankuk Advanced Materials is a critical platform that delivers glass fiber fabrics and roving products.





# Hankuk Carbon

## Listening to our customer's voice and adapting to their needs

After entering the composites market in 1984 with the production of carbon prepreg sheets for fishing rods, we grew our business and began contributing to Korea's industrial development by successfully expanding our product line into copper clad laminates for printed circuit boards, insulation panels for liquefied natural gas carriers, glass paper for flooring, and numerous other products.

Hankuk Carbon was able to withstand downturns in the global economy due to the united efforts of all its' members to continuously develop and improve our technology, allowing us to overcome all obstacles created by these economic crises. We remain united in our efforts as a company to continuously push ourselves forward as a leader in an ever-changing world.

Through knowledge management, we will actively develop our creativity in technological innovations. Through customer service, we will maximize value for our customers. Through competitiveness, we will increase our profits for our company. From here forward, we pledge ourselves to use these developments to actively grow our domestic and overseas markets to become the leader in the composites market.

Hankuk Carbon wishes to open up the road to the future for our customers as we hope to continue encouraging and sustaining our customer's loyalty and affection.

Thank you.

HanKuk Carbon, President and CEO

**Cho Moon-Soo**

# Hankuk Carbon

## Specializing in composite materials and parts



### Company History

- 1984. 09 Hankuk Carbon established
- 1985. 02 Carbon Sheet production begins
- 1986. 07 Hankuk Advanced Materials (affiliate) established
- 1987. 06 Copper Clad Laminate production begins
- 1987. 11 Awarded the Government prize for export contribution
  
- 1991. 11 R&D Center established
- 1991. 08 Architecture : Honeycomb Sandwich Panel production begins
- 1995. 07 KOSPI IPO
- 1995. 11 ISO 9002 acquired
- 1999. 08 Photo Resist Film (DFR) business expansion
  
- 2001. 07 Insulation Panel for LNG carriers production begins
- 2002. 09 Glass Paper business expansion
- 2002. 10 Gold Tower Order of Industrial Service Merit
- 2003. 07 ISO 9001 : 2000 acquired
- 2003. 08 ISO 14001 acquired
- 2009. 07 Automotive Composite Part production begins
  
- 2010. 03 Construction business expansion
- 2013. 07 Achieved 1 trillion KRW of LNG Division's accumulated sales
- 2013. 09 OHSAS 18001 : 2007 acquired
- 2013. 10 Awarded the Silver Tower Order of Industrial Service Merit
- 2014. 09 Awarded the Labor-Management Culture Prize 2014
- 2016. 03 Signed a capital partnership agreement with MITSUI & Co., Ltd.
- 2017. 07 Acquired shares of Korea Composites Inc.
- 2017. 10 Signed an agreement on establishment of joint venture with IAI
- 2017. 12 Awarded the Tower of Export 100\$ million



① Seoul Branch ② Head Office / Miryang 1<sup>st</sup> Plant ③ Miryang 2<sup>nd</sup> Plant ④ Hamyang Plant

# Materials

Aerogenerator Blades



Leisure Sports



## Composite Materials

Composite materials consist of at least two materials, each of which contain unique properties, combined together to create a new material with specifically planned properties to meet engineering and design needs. It is the iconic material for 21<sup>st</sup> century science technology.

### Prepreg

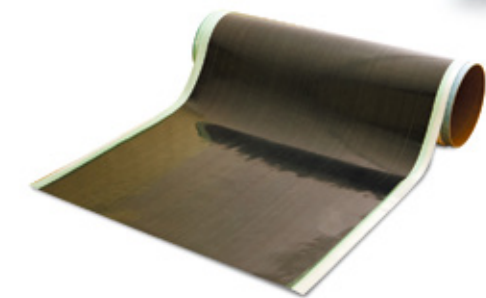
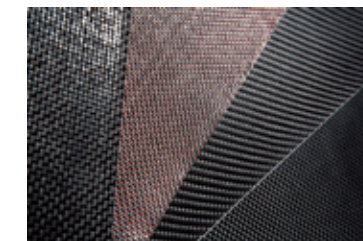
Prepreg, a pre-impregnated material sheet consisting of resin matrix with fiber reinforcement, is an intermediate material for composite parts manufacturing. Stronger than steel and lighter than aluminum, carbon fiber can be applied to various industries as an advanced material.

### Applications

**Sporting Goods:** Yacht mast, Golf shaft, Bicycles, Fishing rods, Hockey sticks, Canoe paddles

**Electronics:** PC cases, Doctor blades, Robot hands for LC panels, Roller/Pipe, X-ray top panel

**Industrial:** Aircraft, Aerogenerator blades



### Fabrics

We produce various patterned and colored fabrics made of carbon fiber, glass fiber and aramid fiber.



# Electronics

Mobile



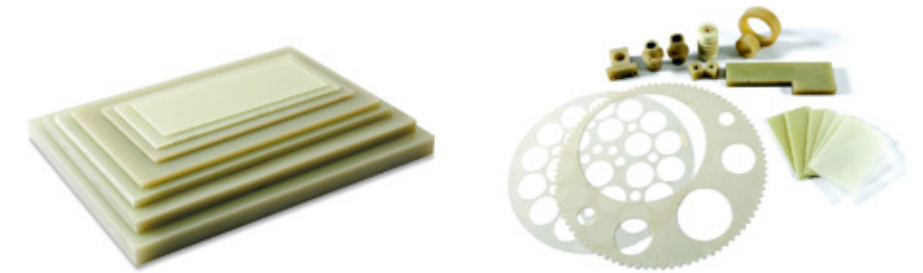
Tablet PC

## Electric, Electronics

Based on technology developed from 1987 for our electric business, we provide Epoxy Laminates for Electric Insulation and Photo Resist Film.

### Epoxy Laminates for Electric Insulation

In places where electric insulation is needed, glass fiber and epoxy resin are used for their excellent electrical properties. Our laminates come in a wide range of thickness from 0.1mm to 150mm.



### Photo Resist Film (DFR)

To guarantee high quality resolution without sacrificing fast production rates, our DFR is manufactured by Japan's largest electronics and chemical company, Asahi Kasei EMD. DFR is used for purposes from general household goods to advanced semiconductor packaging.



# Construction



Bridges



Buildings

## Construction Materials

Hankuk Carbon's composite materials are used for a variety of purposes in construction industry. Glass Paper is the essential materials of flooring and heat resistant panel. Carbon Fiber Fabric for Structural Strengthening is regarded as a new solution for bridges and buildings in need of renovation.

### Industrial Paper

Functional fiber (Glass Fiber, Aramid Fiber, Carbon Fiber) is dispersed in water and processed in paper forms. These industrial papers provide useful properties such as dimensional stability, heat resistance, chemical resistance, and manufacturing flexibility.

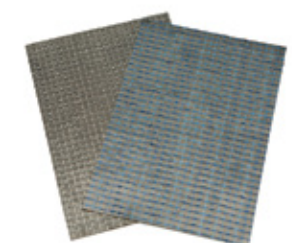
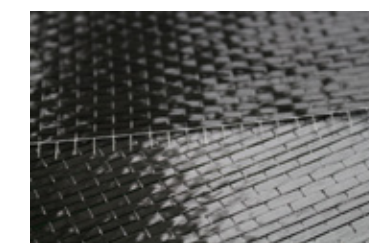
#### Applications

Flooring, Tile Carpet, Heat Resistant Sheet, Roofing, Water Proof Sheet, Filter,



### Carbon Fiber Fabric for Structural Strengthening

It is used to strengthen, repair, and reinforce building structures and bridges, when required, due to the effects of aging or corrosion. It has recently been used in retrofitting existing structures for earthquake proofing. It is made of carbon and it's weight is a quarter the weight of steel yet its' strength is ten times that of steel. Construction, Buliding Structural Materials comes in sheet, rod, or panels.



# Insulation



## Insulation Materials

Because of its low environmental impact, LNG's usage is growing worldwide. As a result, we have chosen to focus on the needs for storage and transportation of LNG by manufacturing insulation panels lined with our own glass fiber reinforced polyurethane foam. This provides the panel with the added value of not only being adiabatically efficient and mechanically high performing, but also environmentally friendly

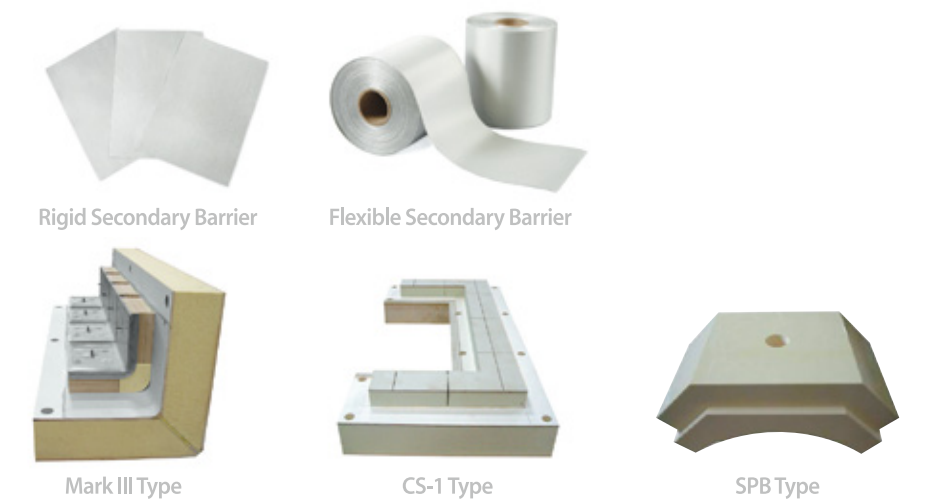
### LNG Storage Tanks / Pipes

We supply insulation materials for LNG industrial storage tanks and pipes.



### LNG Storage Tanks / Pipes

Our Insulation Panels utilize two of our other products. A Secondary Gas Barrier (ESB, ESP), which is used to prevent leakage of LNG and a glass fiber reinforced polyurethane foam that maintains the LNG temperature at -163°C





# Industry



Sailboats



## Industrial Composite Parts

Composite applications are being used to fulfill specialized needs in an ever expanding variety of areas from aeronautical & industrial to simple everyday uses. Hankuk Carbon is extending its' businesses beyond material manufacturing and into manufacturing composite parts for industrial machinery, automobiles, and aircraft.

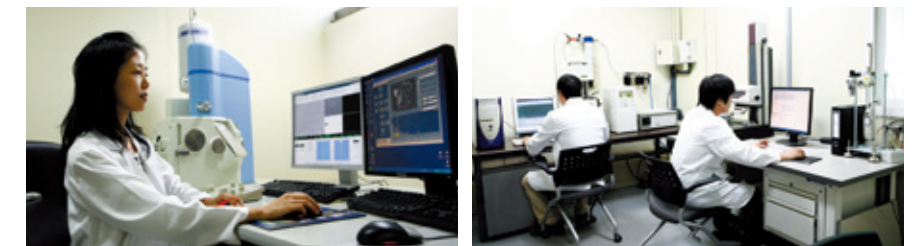


## R&D Center

Playing a pivotal role in keeping us  
on the cutting edge of composite technology

## R&D Center

Established in 1991, the R&D Center incorporates research ability into the development of materials, process technology, and machine technology, enhancing the value of our Hankuk Carbon products. We have performed government supported research and strategy projects. Our human resources include the brightest researchers and developers, working hard on the most advanced research equipment available, establishing a new standard in the composite industry.



### Finished Projects

- Carbon composite materials for sports car bodies for General Motors
- Composite materials for sporting and leisure applications
- Glass fiber reinforced urethane foam
- Glass fiber reinforced aluminum sheet for LNG gas barrier
- Adhesive sheets for sandwich panels
- Electric insulation resin with high heat dissipation for printed circuit board

### Under Development

- Thermoplastic matrix resin for composites
- Heat resistant, highly toughened, non flammable epoxy matrix resin
- Fast curable epoxy matrix resin
- Environment-friendly insulation materials for buildings
- Low thermal expansion coefficient materials for printed circuit board
- New process to be out of inefficient autoclave process
- Design and process development for composite parts for industrial and automotive applications





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