

HLB

THE COMPLETE GRE PIPING SYSTEM



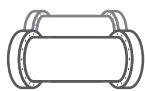


COMPANY PROFILE

The HLB Company was established in 1975 in Korea and has grown as a leading industrial group. We have been challenging the various businesses on the basis of lifeboat business, and driven to a global standard. Utilizing its accumulated technologies, HLB made its way into GRE PIPE manufacturing business in 2009 and acquired the first international marine pipe certificate in Korea. With steady technical development, HLB has positioned itself favorably in the marine plant market domestic and abroad. Going forward, HLB is now striving to become a global leading composite material manufacturer combining the strength of world-leading technologies and highly-skilled human resources.



VISION



MISSION

GRE Pipe and Engineering Service Provider for Offshore & Marine vessels with the best quality



CORE VALUES

Challenge and enthusiasm
Technology and quality
Communication and Collaboration




PHILOSOPHY

Creative and progressive corporate culture
Flexible organization
Innovation through enhanced enterprise capabilities

HISTORY OF HLB



- 
- 1975** Established 'Kyungil Ind. Ltd.', a subsidiary of Hyundai Group and commenced Producing GRO sailing yachts and open-type lifeboats
 - 2000** Established 'Hyundai Lifeboats Co., Ltd.' to specialize in production of lifeboats and succeeded to Hyundai Precision
 - 2001** Moved to Onsan National Industrial Complex
 - 2008** Established 'Hyundai Yachts Co., Ltd.'
 - 2008** Started the GRP pipe development
 - 2008** Established 'Bada Heavy Industry'
 - 2009** Established 'HLB Networks Co., Ltd.'
 - 2009** Entered the GRP pipe market
 - 2013** Merged 'HLB Co., Ltd.', as listed company on the stock market
Obtained the international classification certificates for GRP pipe
 - 2015** Built the 2nd factory
 - 2016** Obtained NET (New Technology Certification) for GRP pipe
 - 2017** GRE Inert Gas line,1st shipment delivered to Japan, Sasebo shipyard
 - 2018** GRE SOx scrubber line, production for Japan, SHI / Oshima / Tsuneishi / Namura
Pantheon Tankers Management Ltd.(Greece)'s retrofit
 - 2019** 300 Vessels contracted
 - 2020** 400 Vessels contracted

MATERIALS & METHOD



MATERIALS GLASSFIBER +RESIN

HGP pipe series is mainly made of glass fiber and resin. Both materials primarily decide properties of the HGP.

Depending on resins types, we supply;

- **GRP** (Glass-fiber Reinforced Polyester)
- **GRVE** (Glass-fiber Reinforced Vinyl ester)
- **GRE** (Glass-fiber Reinforced Epoxy)

GRE pipe is consisted of E/C-glass, Glass fiber and Resin.

METHOD FILLAMENT WINDING

HGP PIPE series is manufactured by the self-developed winding machine. The mandrel installed with machine is wound with E/C-glass and the impregnated glass fiber with resin at an angle of 54 degrees. In the GRE standards, DN is GRE pipe's Inner diameter and mandrel's out diameter. Curing, de-molding and machining progresses are then performed. These processes are important to ensure uniformity of a high grade in HLB's GRE pipe.



HGP Series

1. HGP-E9C	Vessel / Offshore plant	9bar / L3 / Conductive
2. HGP-E16C	Vessel / Offshore plant	16bar / L3 / Conductive
3. HGP-E25C	Offshore plant	25bar / L3 / Conductive
4. HGP-P5~10N	Offshore plant / Onshore plant	5~10bar / X / Non Conductive
5. HGP-V5~10N	Offshore plant / Onshore plant	5~10bar / X / Non Conductive
6. HGP-V16~18N	Offshore plant / Onshore plant / Firefighting	16~18bar (K.F.I Cert)
7. HGP-E23N	Onshore plant / Firefighting	23bar (K.F.I Cert)
8. HGP-E16NW	Potable Water / Water & Sewage	16bar
9. HGP-V16NW	Potable Water / Water & Sewage	16bar

ADVANTAGES

In all pipe system lifetime and weight issues have arose from various applications. Steel pipe is easy to get rusted than GRE one. This rust causes leakages and deteriorates flow velocity of plumbing, whereas there is no corrosion on GRE materials and it is lightweight. So, there is no necessity for coating or separate reaction inhibitor on GRE's surface in order to lengthen pipe's lifetime, and light weight makes construction time and cost reduced. As below, HGP has many strengths, compared with steel pipe.



Dimensional stability

- The thermal expansion occurs simultaneously in the circumferential and axial directions during manufacture, and the two directions cancel each other's dimensional deformation.

Corrosion/Chemical resistance

- Lower reactivity than steel's one
- No chemical reaction with oil, seawater, sewage, chemicals, etc.
- Reducing maintenance cost by long periodic replacement

Wide range of production

Variety of diameters (Ø25~ Ø900)
and pressure classes (25 bar)



• **Lightweightness**

- ¼ of weight of steel pipe
- Easy installation to construction worker
- Reducing construction time and cost

• **Low friction loss**

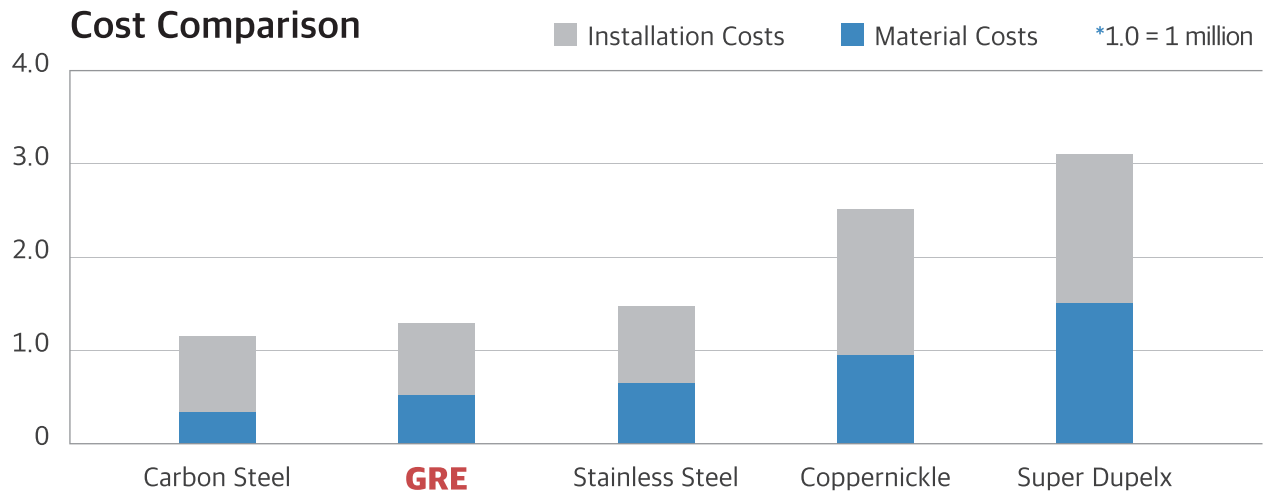
- Smooth surface of GRE pipe has 43% of steel pipe's friction loss
- Superior fluid flow
- Reducing the amount of pump on pipe system

• **Low installation cost**

- Cheaper and easier joint method than weld method
- Reducing transport cost

ADVANTAGES

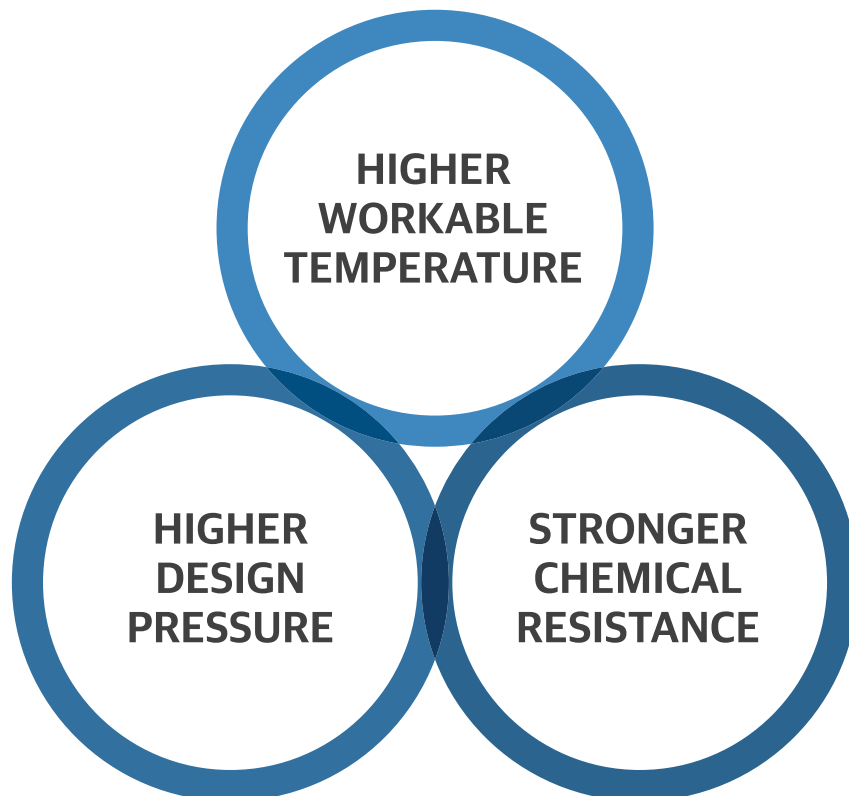
Low life-cycle cost



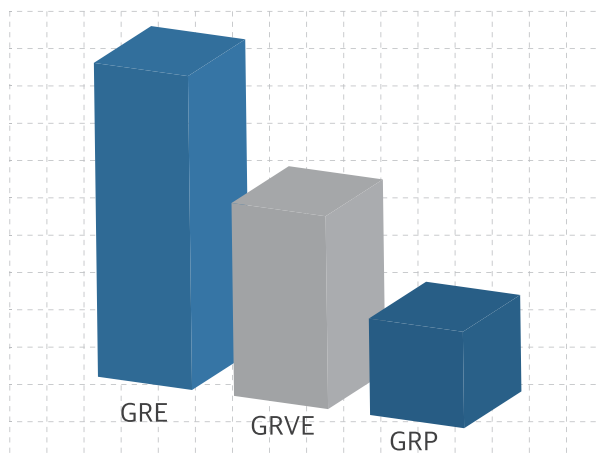
Ballast lines	Bilge piping	Sox scrubber	Inert gas line
Firewater systems	Sprinkler system	Salt water supply lines	Fresh water lines
Cooling water	Wide range of application		Sanitary lines
Waste lines	Scuppers	Potable water	Vent lines
Process lines	Electronic cable protection	Cargo lines	Wellhead flatfrom

Superiority of GRE PIPE

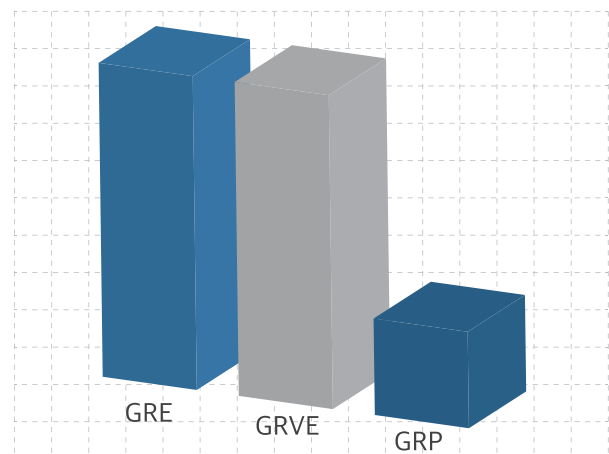
The GRE pipe has superior properties to GRP and GRVE pipe. GRE PIPE is used in oil field and marine industry that require high design pressure, up to 25 bar. Also, GRE PIPE typically allows higher operating temperature ranging up to 108°C.



Physical resistance



Chemical resistance



A worker wearing a white hard hat with the HLB logo, safety glasses, and a white respirator mask is inspecting a large black pipe. The worker is wearing a dark vest over a grey long-sleeved shirt. The background shows a warehouse with metal shelving units and another worker in the distance. The pipe has white markings and numbers written on it.

COMPETITIVENESS OF HLB CO., LTD

The main Key that enabled HLB to successfully enter the GRE pipe market was our PROACTIVE RESPONSE to our customer.

Our passionate engineers always support your requests to achieve CUSTOMER SATISFACTION.

Active and speedy responses

- Response about A/S and additional production within 24 hr.
- Additional delivery and engineer dispatching as soon as possible (in case of domestic : with in a week)

Various Certificates

- HGP (PN 1.6 and 1.8 MPa) authorized by Korea Fire Industry Technology Institute
- Various certificates of international classification associations such as DNV, RINA, Lloyd, NK, KR, BV and ABS for 9~25bar

Quick delivery

- Factory located in industrial zone
- Contiguous to international port/airport
- Max. 3 hours-distance to domestic shipbuilders
- Location in the traffic hub city

CUSTOMER SATISFACTION

Only one KOREA company

- Unique domestic company manufacturing GRE pipe certified by international classifications

State support for tech

- We are participating in the government research project as a company with the technical prospect.

Professional manpower

- Retention of skillful pro engineers with special knowledge and flexibility with years of projects.
- Analyzing Stress and Surge

CERTIFICATES

On the basis of the autonomously patented filament winding facility, HGP is certified by many international ship classifications associations. For marine and offshore, HGP's certified spec. are PN 25bar and fire resistance Level 3. And for firewater, HGP's certified spec. are PN 23bar. Also, the work range of HGP's design, manufacturing and repairing are ISO accredited.



Certificates



PN 9 bar
PN 16 bar
PN 25 bar



PN 9 bar
PN 16 bar



PN 9 bar
PN 16 bar



PN 9 bar
PN 16 bar
PN 25 bar



PN 9 bar
PN 16 bar



PN 9 bar



PN 9 bar



PN 23 bar



ISO 9001
ISO 14001



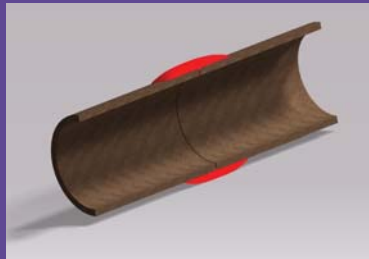
PATENT NO. 10111964
PATNET NO. 10111965



New Excellent Technology Certification



JOINT METHOD



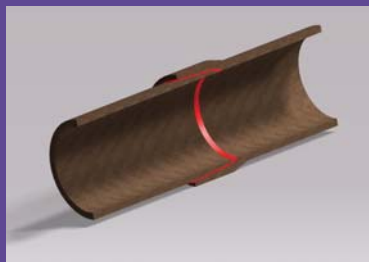
BUTT & WRAP

This joint method applies laminating on the both ends meet, for GRE pipe system requiring resistance force against inner pressure.



FLANGES

It is the same as steel pipe's flange joint type applying ANSI, JIS and DIN standards. This type allows pipes with different materials to be connected.



Bell & Spigot

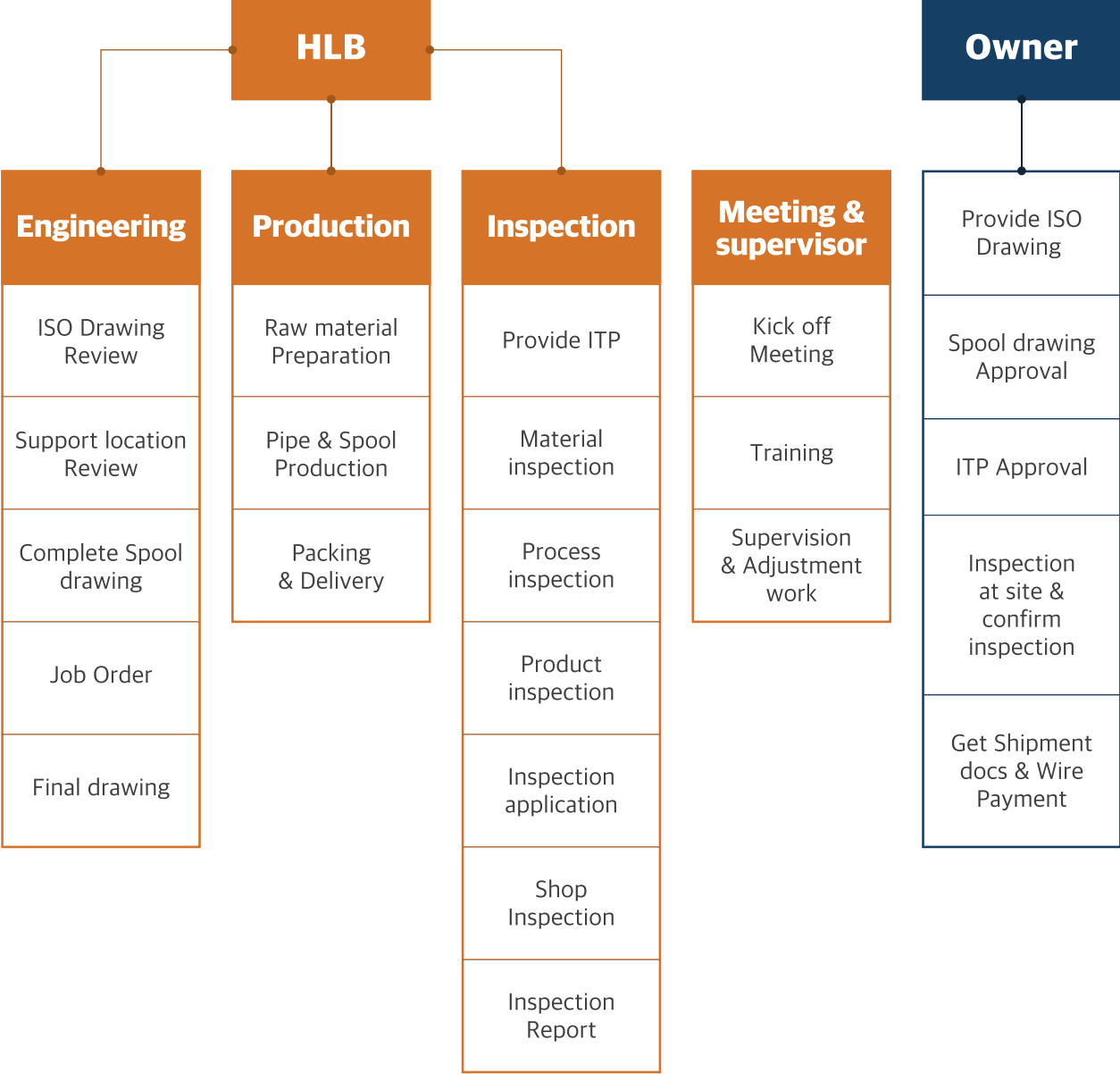
This joint method is to connect the bell shaped end and the tapered end with adhesive. It is suitable for the complex installation and the GRE pipe system loaded by longitudinal direction.



DOUBLE O-RING EXPANSION COUPLING

Double O-rings and Lock-key are inserted in an expansion adaptor. This joint method is suitable to absorb excessive expansion and contraction on piping system by Hull's moving condition.

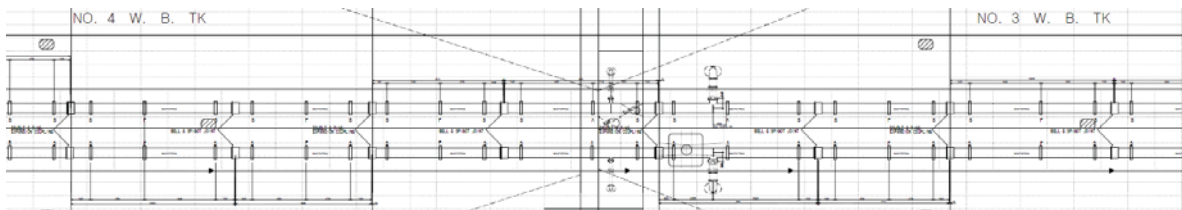
HLB WORK FLOW CHART



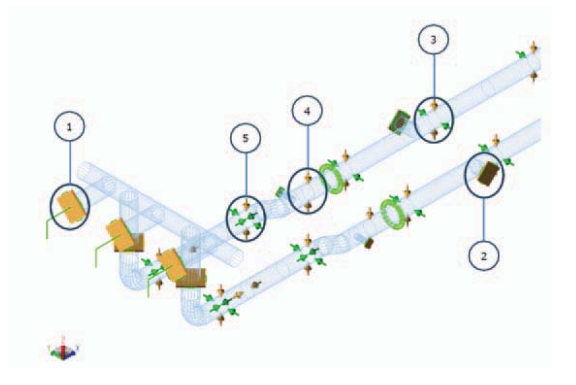
ENGINEERING

HLB provides outstanding design technology.
Services includes such as support review, stress analysis, making spool drawing.

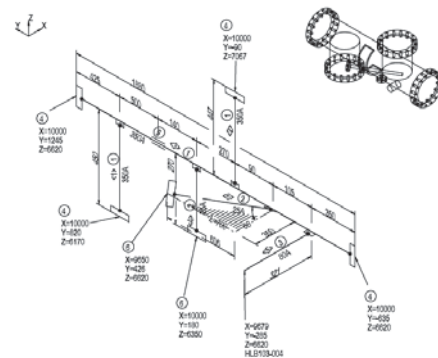
GA or ISO drawing Review



Stress Analysis



Spool drawing



PRODUCTION

We have equipped 5 Filament winding machine and more than 20 of Curing Oven, Demolding machine, OD cutter and various production machines.

With these well equipped and organized production process can provide products to our customer on time. The products mainly used for SOx Scrubber In-let and Out-let pipes can withstand the chemical corrosion from SOx emission & Sea water.

We experienced about 40 projects of OPEN TYPE SOx SCRUBBER, 10 projects of CLOSED TYPE, 20 projects of Ballast line and more various applications of GRE pipes.

Equipment

No.	Equipment Name	Quantity
1	Winding machine	5 Set
2	Curing Oven & Processing machine	20 Set



Design Pressure System



Annual Production Capacity

ITEM TYPE	STANDARD (INTERNAL DIAMETER)	UNIT	PRODUCTION CAPACITY
PIPE	Under Φ 100	Km	About 100
	Φ 100~500		About 60
	Over Φ 500		About 40
FITTINGS	Under Φ 100	EA	About 8,000
	Φ 100~500		About 6,000
	Over Φ 500		About 4,000

- Size : GRE pipe Φ 25~900
- If you want exact delivery date, please contact HLB manager.

INSPECTION

HLB is one of the certified company with ISO9001 and ISO14001 having its own quality control procedure and inspection to enhance the quality on the completed products. We are trying to have the best product with highest quality.

ISO 9001



ISO 14001



PACKING-DELIVERY

HLB has been delivered to more than 10 countries around the world and can deliver to customers anywhere in the world.



Packing



Delivery



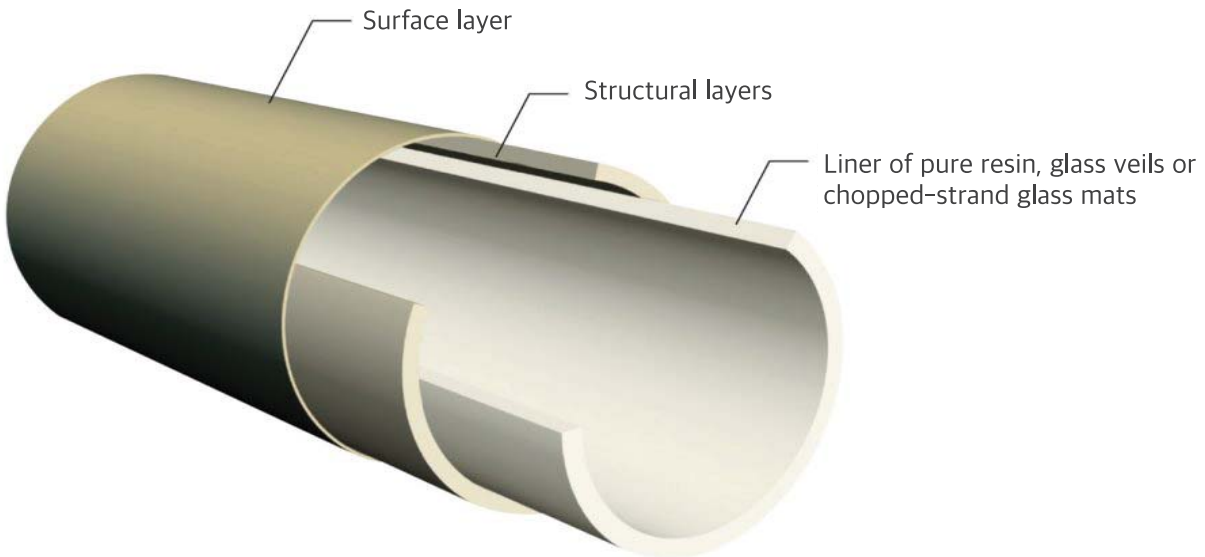
ADJUSTING PIPE

HLB has about 30 skilled supervisors & engineers who are able to travel around the globe and finish the adjusting pipe work neatly with the best service.



PRODUCT SPEC

		HGP E9C	HGP E16C
Cert		ABS, DNV, KR, LR, NK, BV	ABS, DNV-GL, RINA, KR, LR
RANGE		25~900A	25~700A
Application		Sox Scrubber(New-building, Retrofit), Ballast Line(New building, Retrofit), BWTS(Retrofit) etc...	Sox Scrubber(New-building, Retrofit), Ballast Line(New building, Retrofit), BWTS(Retrofit) etc...
Design Pressure		9 BAR (applicable 0~9 bar)	16 BAR (applicable 0~16 bar)
Wall Structure	MCO	Resin rich with Mat inner Layer & Core	Resin rich with Mat inner Layer & Core
	MCU	Resin rich with Mat inner Layer & Core & UV Coating (For external exposure)	Resin rich with Mat inner Layer & Core & UV Coating (For external exposure)
	EX	Extra Wall Structure, Owner Requirement	Extra Wall Structure, Owner Requirement
Joint Method		Butt and Wrap, Bell&Spigot, Flange, Double O-ring Expansion coupling.	Butt and Wrap, Bell&Spigot, Flange, Double O-ring Expansion coupling.
ITEM		PIPE, Elbow, Flange, Tee Reducer, Miter, Bell-mouth, etc..	PIPE, Elbow, Flange, Tee Reducer, Miter, Bell-mouth, etc..



MORE THAN 400 VESSELS

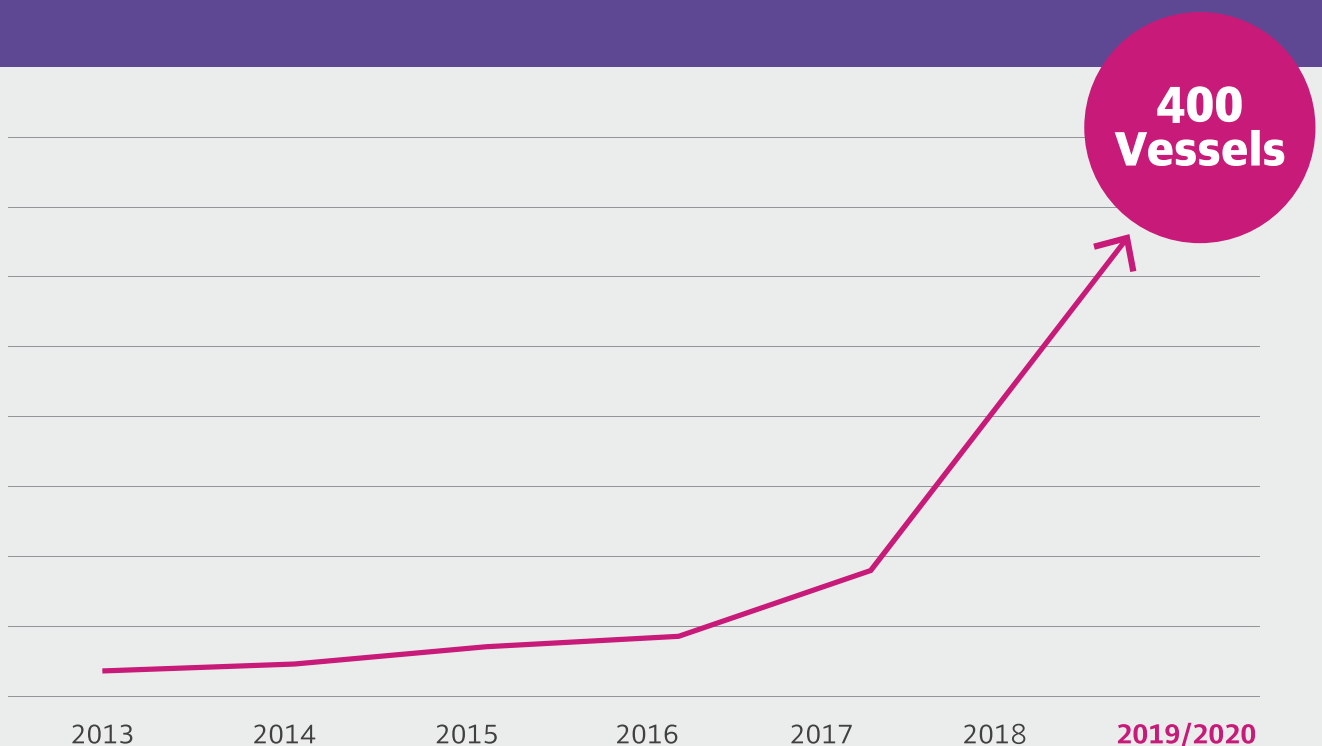
HLB has achieved 350 SOX SCRUBBER LINES and 50 BALLAST LINES contract to date, possessing accumulated technology.

350

Contracted
350 Sox scrubber
lines

50

Contracted
50 Ballast
lines

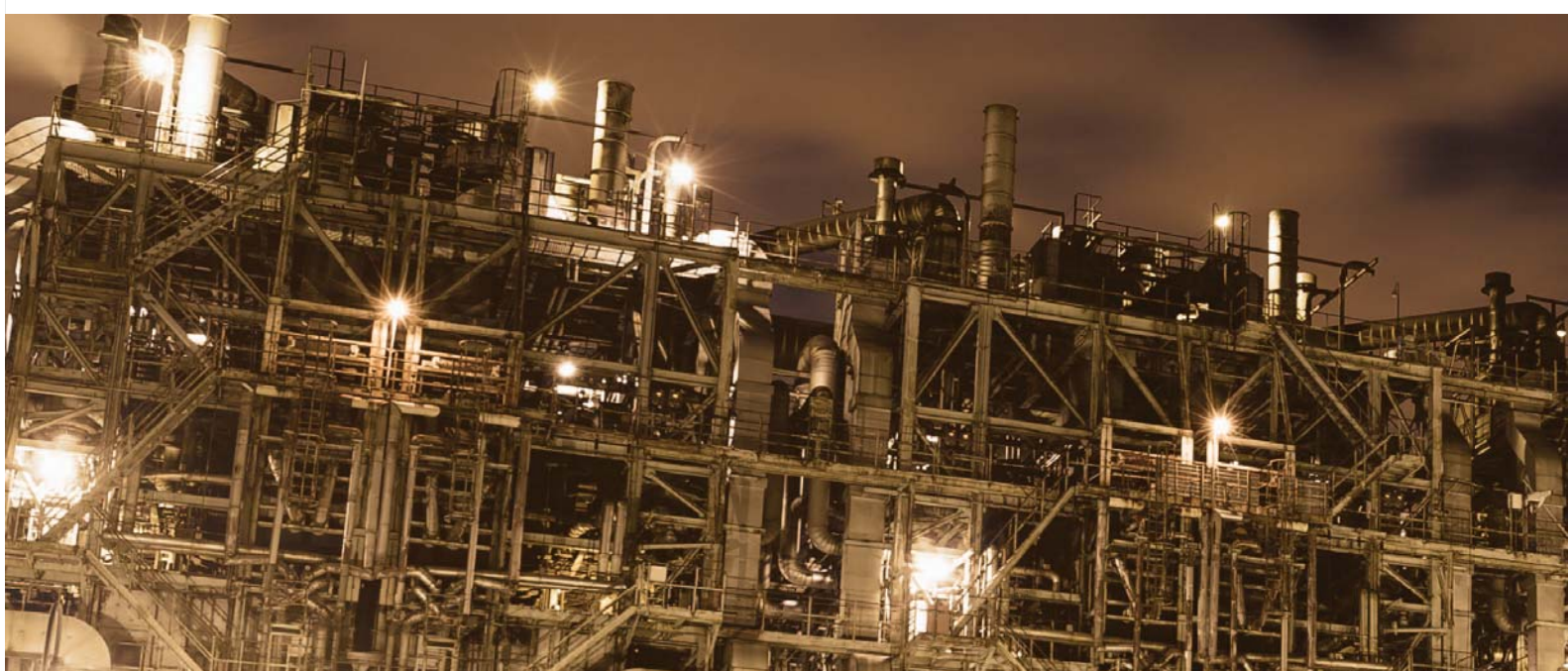
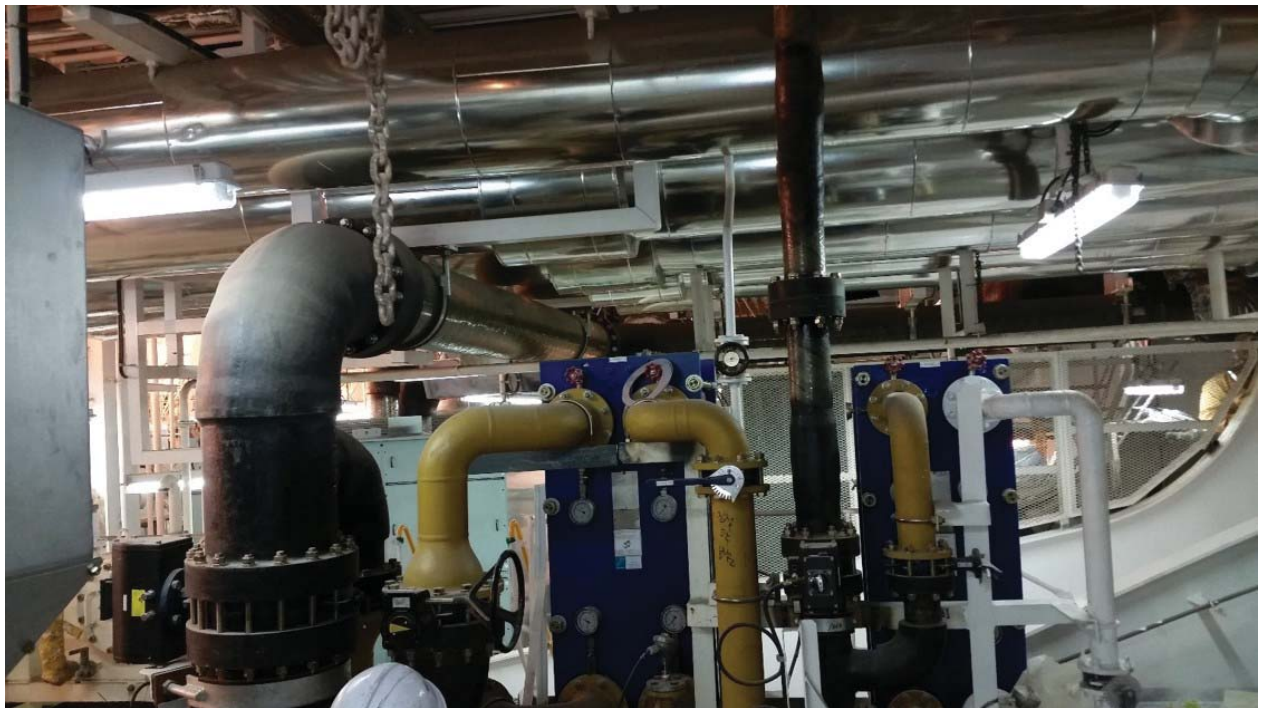


APPLICATION

SOx scrubber line

Sox SCRUBBER is one of the economical ways to meet the IMO regulations and it is recommended to use of GRE pipe which has resin reach layer with corrosion resistance.

HLB has manufactured and supplied about 350 Sox SCRUBBER LINE to date. After installation, we also provide service for the Adjusting work.



APPLICATION

Ballast Line

The ballast line is one of the essential equipment for balancing cargo ships, and since it uses seawater, it is much cheaper to use GRE pipes than steel pipes in the Long-term maintenance perspective. HLB has manufactured and supplied about 50 Ballast LINE to date. After installation, we also provide service for the Adjusting work.

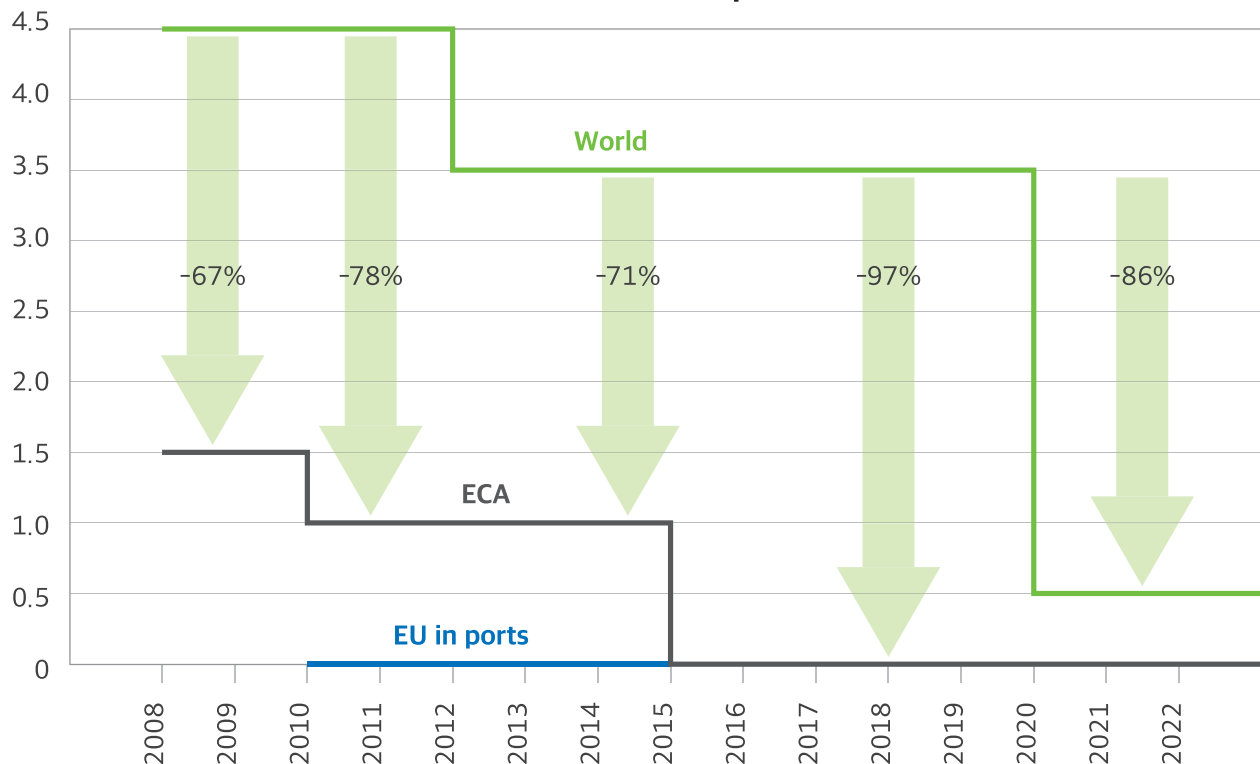


APPLICATION

Retrofit

Since January 2020, the International Maritime Organization (IMO) is a regulation to restrict the sulfur content of ship fuel oil across the world from 3.5% to 0.5%.

IMO Timeline for Reduction in Fuel Sulphur Content



Sox Scrubber

There are three methods for reducing the sulfur content.

1. Use low sulfur fuel
2. Changed to LNG propulsion engine
3. Sox scrubber installation

Among them, installing a sox scrubber is considered the most economical way.

Use of GRE PIPE is recommended because the RESIN REACH layer is well tolerated by the sulfated material.

BWTS (Ballast Water Treatment System)

Ballast water may disrupt the marine ecosystem when any emissions. To prevent such problems, the International Maritime Organization(IMO) has concluded 'Ballast Water Management Convention' in 2004 and requires that all vessels constructed from 2012 are equipped with a ship ballast water treatment system. - It is recommended to use GRE PIPE which is resistant to corrosion.

RETROFIT SOx scrubber line/BWTS

On ships operating in seawater, corrosive piping requires constant replacement. This problem can be solved with GRE pipes of HLB's. We have years of experience in various field, skilled engineers, and several successfully repaired vessels that required repairs. The GRE pipe is not just resistant to corrosion, also lightweight and easy for bonding, making it easy to work in a narrow space.

In conclusion, it can be said that HLB is specialized in retrofit.





GROUP — COMPANIES

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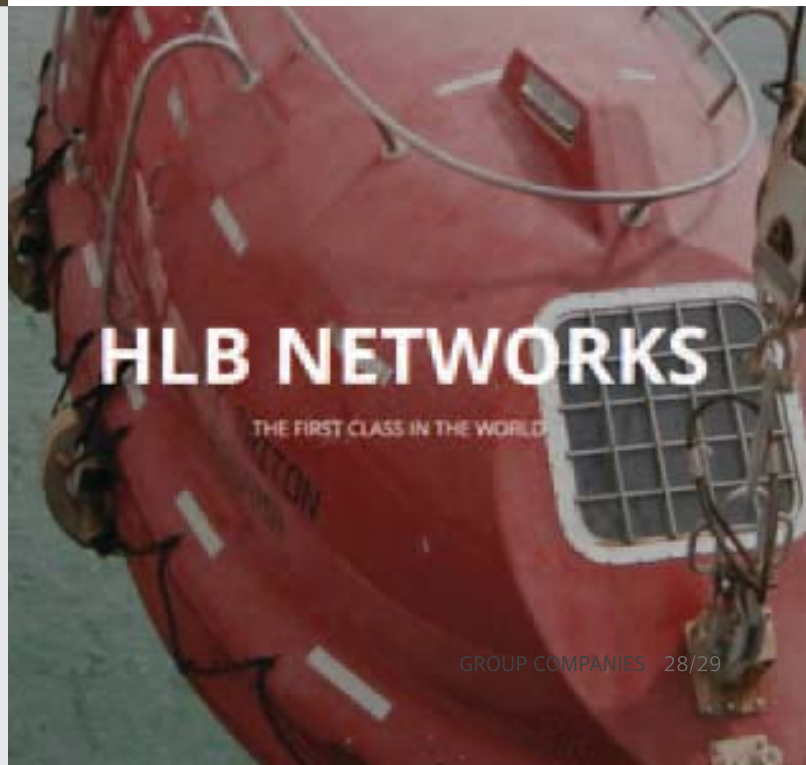
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CLIENT & BRANCH

A Dream of alone is just a dream.
But, a dream of all together will come true.

SHIP YARD



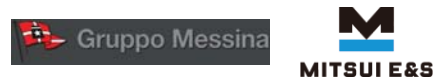
SHIP OWNER



— Korea | Head Office

— Shanghai | Branch Office

Singapore | Branch Office





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Composite Material Division

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