



GRE PIPE DIVISION

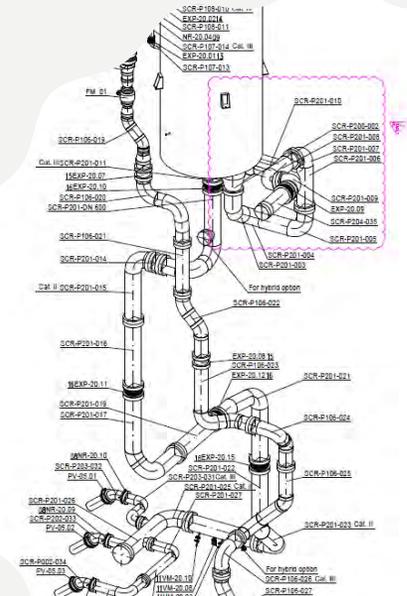
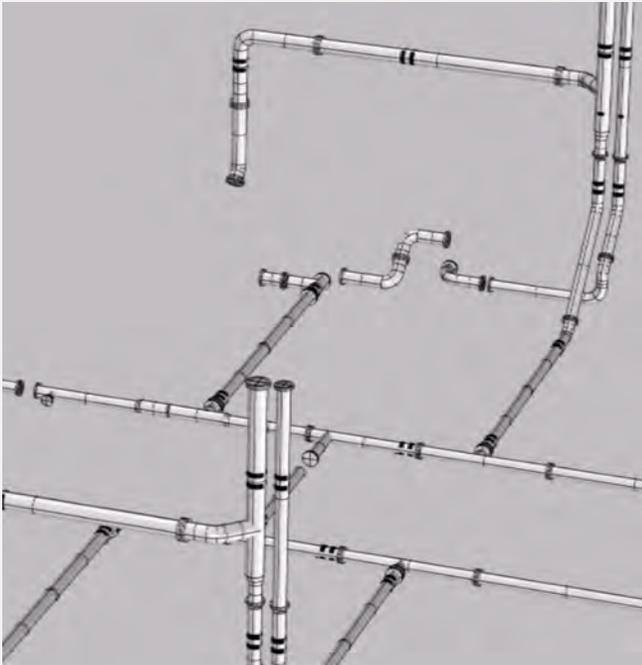


SUPERVISION

PERO MILEVSKI

Former FIBERSOL
instructor

PRE FABRICATION ACCORDING TO ISOMETRIC DRAWINGS







WORKSHOP

PRE-FABRICATION OF GRE PIPES





WORKSHOP

TUZLA



WORKSHOP



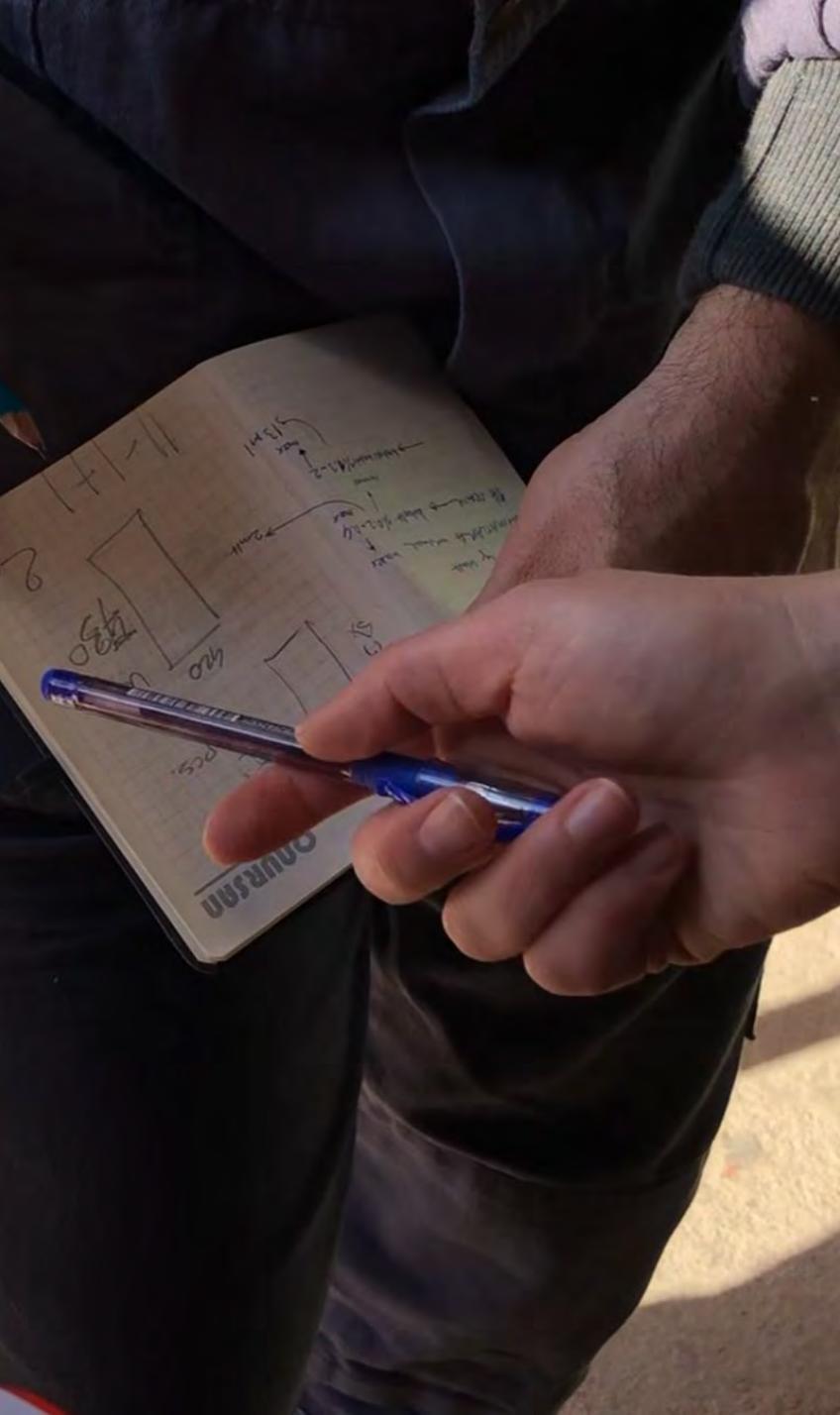
WORKSHOP



GEPA

G E P A





GRP EXPERIENCE

**+20 GRP
TECHNICIANS
+ 25 YEARS OF
EXPERIENCE**





M/T 'MAERSK ETIENNE'

On board GRE vapor line pipe Lamination
Zeyport, ISTANBUL, 13/DECEMBER/2019

REFERENCE PROJECTS



MV 'TOUR -2'

GRE pipe repair on Ballast Water System

Tuzla, PENDIK Shipyard ISTANBUL, 20/NOVEMBER/2019

REFERENCE PROJECTS



RO/RO 'SAFFET BEY'

GRE pipe LAMINATION in workshop

For Scrubber System

Tuzla, KUZHEY STAR SHIPYARD, 28/NOVEMBER/2019

REFERENCE PROJECTS



M/V 'SONGA BONN'

GRE pipe installation & lamination-bonding
For Scrubber System

Tuzla, KUZHEY STAR SHIPYARD, FEBRUARY/2020

REFERENCE PROJECTS

GRP / GRE Production

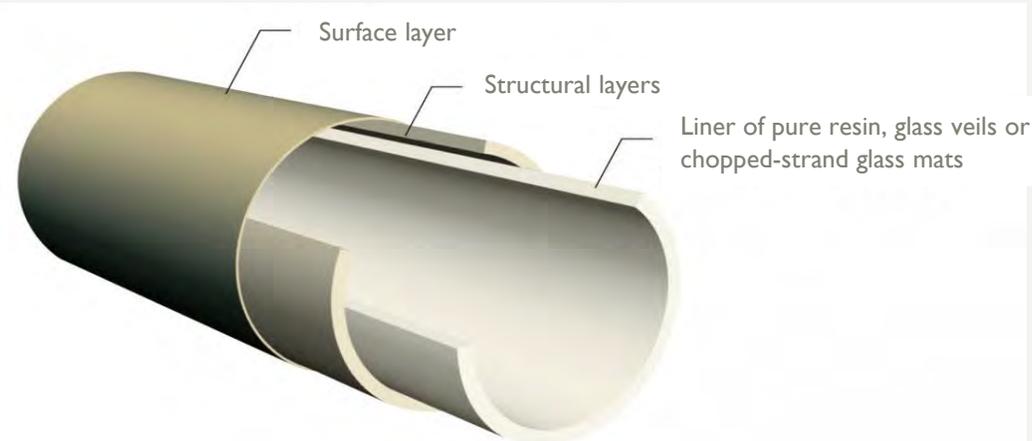
2-3 Product Specification

HGP E9C

Cert	ABS / DNV / KR / LR / NK / BV
Diameter Range	25~900A
Application	Sox Scrubber(New-building, Retrofit)/ Ballast Line(New building, Retrofit), BWTS(Retrofit) etc...
Design Pressure	9 BAR (applicable 0~9 bar)
Wall Structure	<ul style="list-style-type: none"> - MCO : Resin rich with Mat inner Layer & Core - MCU : Resin rich with Mat inner Layer & Core & UV Coating (For external exposure) - EX : Extra Wall Structure, Owner Requirement
Joint Method	Butt and Wrap / Bell & Spigot / Flange / Double O-ring Expansion coupling
Item	PIPE / Elbow / Flange / Tee / Reducer / Miter / Bell mouth etc...

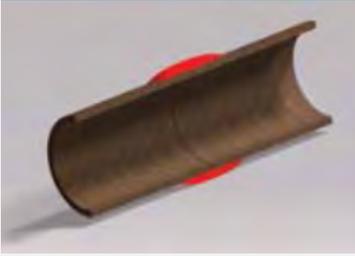
HGP E16C

Cert	ABS / DNV / KR / LR / NK / BV
Diameter Range	25~700A
Application	Sox Scrubber(New-building, Retrofit)/ Ballast Line(New building, Retrofit), BWTS(Retrofit) etc...
Design Pressure	16 BAR (applicable 0~16 bar)
Wall Structure	<ul style="list-style-type: none"> - MCO : Resin rich with Mat inner Layer & Core - MCU : Resin rich with Mat inner Layer & Core & UV Coating (For external exposure) - EX : Extra Wall Structure, Owner Requirement
Joint Method	Butt and Wrap / Bell & Spigot / Flange / Double O-ring Expansion coupling
Item	PIPE / Elbow / Flange / Tee / Reducer / Miter / Bell mouth etc...



GRP / GRE Production

2-7 JOINT METHOD



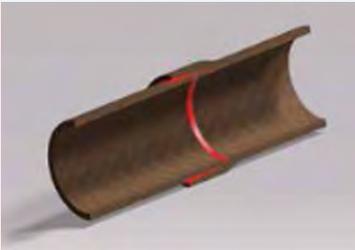
BUTT & WRAP

The joint method is that laminating the met ends. It is apply to the GRP pipe system requiring resistance force against inner pressure



DOUBLE O-RING EXPANSION COUPLING

Double O-rings and Lock-key are inserted in expansion adaptor. It is suitable for the pipe system regarding seal and replacement as important.



BELL & SPIGOT

The joint method is that connecting 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.



FLANGES

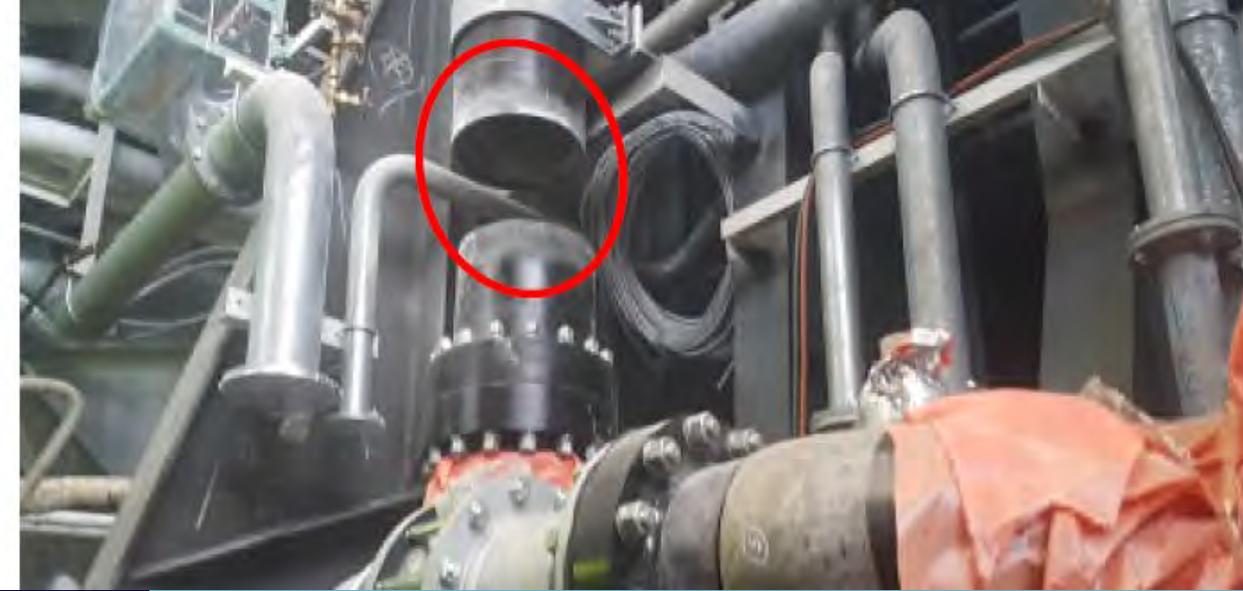
It is same to steel pipe's flange joint type applying ANSI, JIS, DIN standards. This type makes different material pipes be connected.



INSTALLATION ON BOARD

BEFORE & AFTER





BEFORE & AFTER

(Length Size : Pipe size x 3.14 / 30) = mm
(width Size : Pipe size x 3.14 / 20) = mm



3. To maintain the correct ratio, refer to the capacity listed below. and prepare the material below.

Resin (HG3710BT), rapid hardening additive (DMA),
hardener (M60), Glass Fiber Mat (#450)

<Ratio>

Resin (5) : rapid hardening additive (1) Mixing



4. Mix 1% of the hardener in resin.

(It shall be carried out within 30 seconds.)

5. Impregnate the synthetic resin with hardener added to
the fiberglass mat.

(Precautions)

Wear protective gloves (Full coated gloves)



Maximum gap for adjusting pieces

Application size (mm)	Maximum gap (mm) (10 bar Under)	Maximum gap (mm) (10 bar Over)
25A ~ 350A	6	3
400A ~ 700A	7.5	4.5
750A ~ 1400A	10	8
1400A ~ Lager than	12	10

7. Fit Layer

1. Measure the length of the pit layer connection from each specified pipe end and mark it with a pen.
2. Cut the pipe to length and make sure it is perpendicular to the cutting pipe axis.



Connect to pipe or fitting

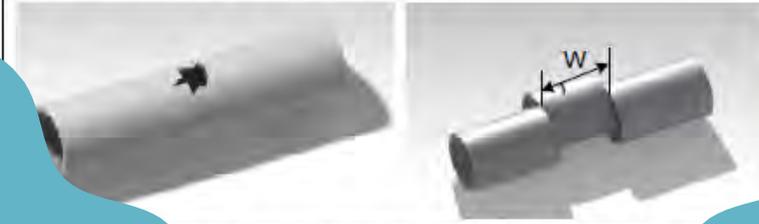
TECHNICAL PROCEDURES

TECHNICAL PROCEDURES



Should severe or larger damage have occurred to existing pipelines, there is a risk of the damaged section should be removed from the pipeline network. The length of cutting on pipe shall be larger than damage area. The length depends on the extent and nature of the damage. A diagram of the repair is shown below;

3. Severe damage on the pipe & Cutting



and this method is that the pipe section containing
Cutting piece of a length "W" shall be over 5

Repair Procedure

HLB-GRE-
TD-RP-
140827

Page 15/15

Heating Pad
finishing lamination with adhesive by
schedule, curing by heating pad during
check curing condition and remove the
heating pad.



5. Main lamination. (Mat-380 & Woven roving)
- Continue with correct type of Mat-380 and woven roving type 570 g/m², determined layers according to pipe thickness by maker standard schedule (Refer to attached lamination schedule.)



6. Final de-airing after all structural lamination.
- A de-airing roller is then used to smooth the weld and remove any air bubbles that may have been trapped beneath the weld when applied.



5. Curing by Heating Pad (2nd curing time)
After finishing lamination with epoxy by
ation schedule, curing by heating pad during
s.
check curing condition and remove the
l.





Curing by Heating Pad

- After finishing lamination with adhesive by lamination schedule, curing by heating pad during 2~3 hours.
- After check curing condition and remove the heating pad.



HYDRO TESTING IN WORKSHOP

THE END

G E P A