



GRE PIPE DIVISION

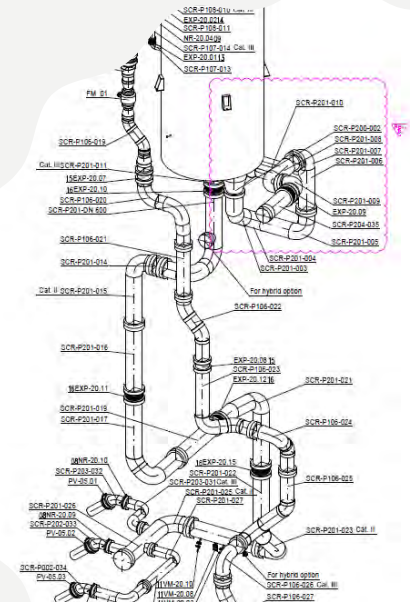
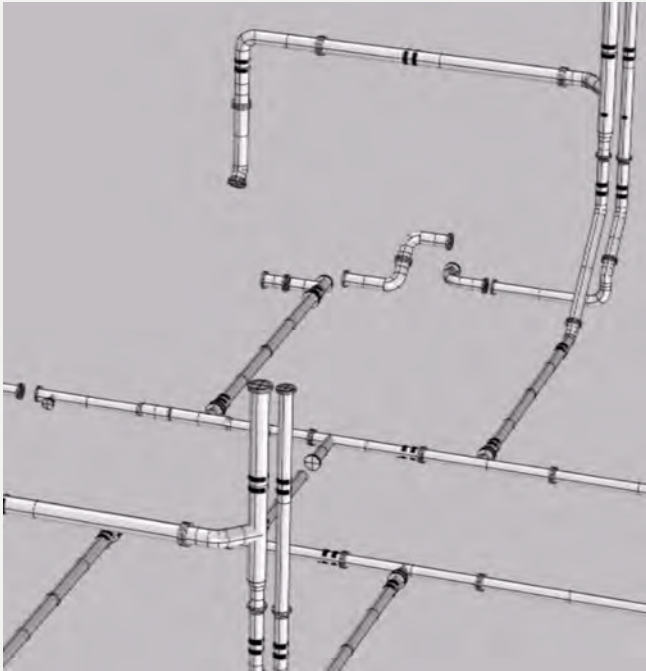


# SUPERVISION

PERO MILEVSKI

Former FIBERSOL  
instructor

# PRE FABRICATION ACCORDING TO ISOMETRIC DRAWINGS









# WORKSHOP

PRE-FABRICATION OF GRE PIPES





# WORKSHOP

TUZLA





WORKSHOP





# WORKSHOP

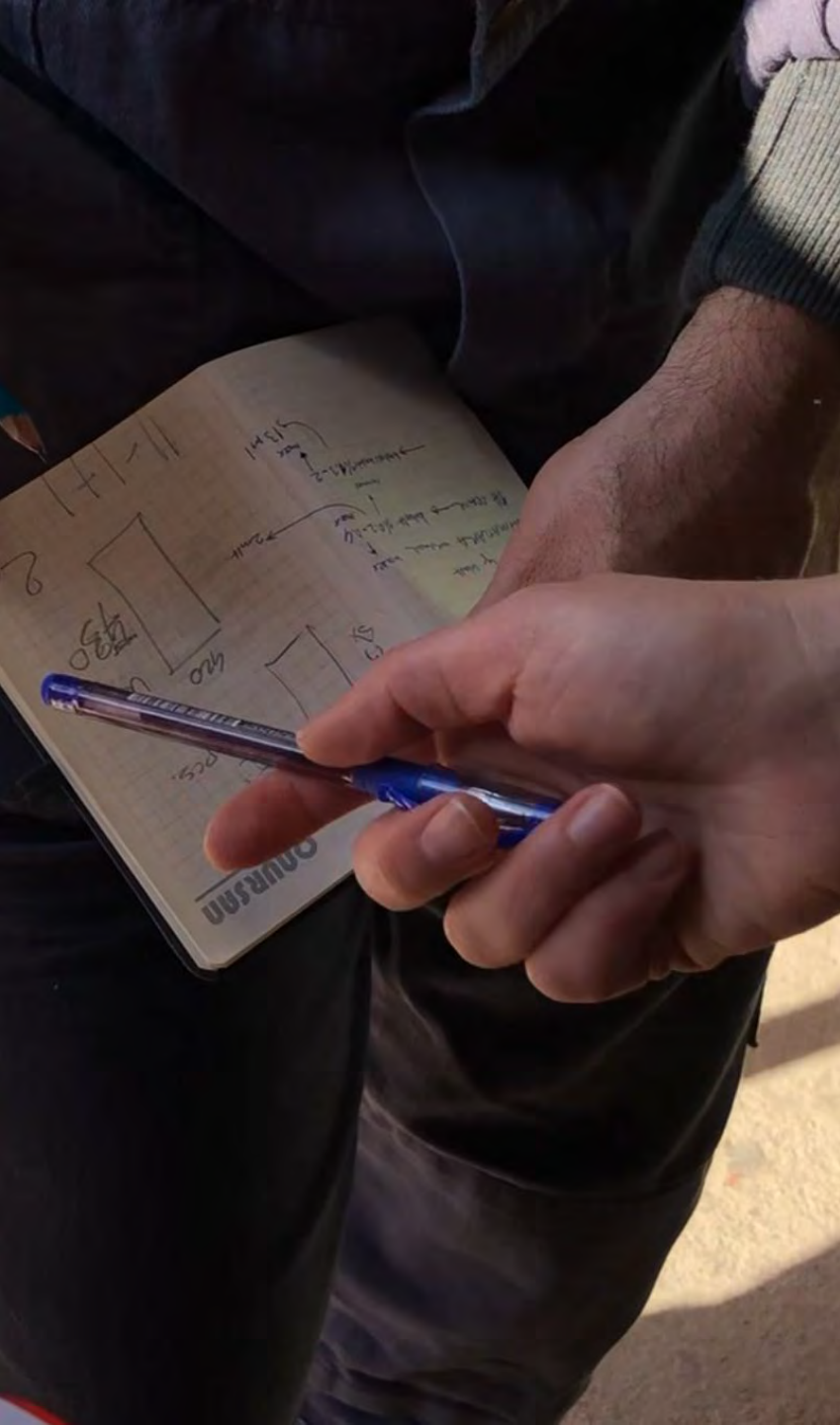


**GEPA**



# GEP 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**





# R0/R0 '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

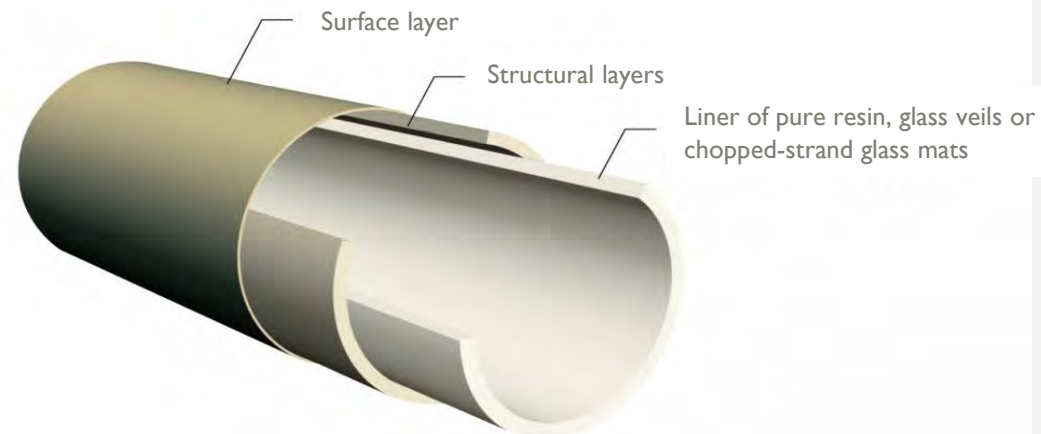
## 2-3 Product Specification

### HGP E9C

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

### HGP E16C

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



# *GRP / GRE Production*

## *2-7 JOINT METHOD*



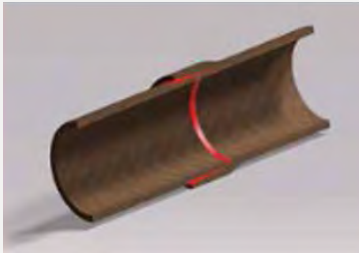
### **BUTT & WRAP**

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)



Connect to pipe or fitting

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




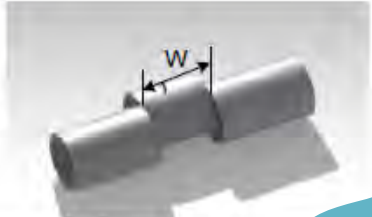
### 7. Fit Layer





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.



# 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;	
<b>3. Severe damage on the pipe &amp; Cutting</b>	
	
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
<p>Heating Pad</p> <p>Finishing lamination with adhesive by schedule, curing by heating pad during</p> <p>check curing condition and remove the heating pad.</p>			
<p>5. Main lamination. (Mat-380 &amp; Woven roving)</p> <ul style="list-style-type: none"> <li>- Continue with correct type of Mat-380 and woven roving type 570 g/m<sup>2</sup>, determined layers according to pipe thickness by maker standard schedule (Refer to attached lamination schedule.)</li> </ul>			
<p>6. Final de-airing after all structural lamination.</p> <ul style="list-style-type: none"> <li>- 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.</li> </ul>			
<p>5. Curing by Heating Pad (2<sup>nd</sup> curing time)</p> <p>After finishing lamination with epoxy by lamination schedule, curing by heating pad during</p> <p>check curing condition and remove the</p>			



### **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**