

**GRP pipes and fittings
made of fire resistant polyester resin
(for marine applications)**

***VEMAR FIRE ISO6 SL
VEMAR FIRE VIN6 SL***

5	29-01-2007	GENERAL REVISION - ADD RATING PN16	LM	--	NP
4	05-07-2004	REVISED WHERE INDICATED	NP	MDM	MDM
3	11-04-2002	REVISED WHERE INDICATED	NP	GR	GR
2	02-11-2000	REVISED WHERE INDICATED	NP	GR	GR
1	27-06-2000	GENERAL REVISION	NP	GR	GR
Rev.	Date	Description	Prepared	Checked	Approved

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1. Scope

The document describes the main characteristics of the GRP piping systems fire resistant series manufactured by NSguassero SpA suitable for marine applications and classified as VEMAR FIRE SL.

2. References

- IMO RESOLUTION A.753(18)
- doc. n° PD-01-SP-013 (VEMAR catalogue)
- doc. n° PD-01-SP-033 (Tolerances for manufactured products)
- doc. n° PD-01-DS-011 (Bell & spigot joint installation standard)
- doc. n° PD-01- DS-012 (Sleeve joint installation standard)
- doc. n° PD-01- DS-025 (Conical joint standard – V series)
- doc. n° PD-01- DS-026 (Conical joint standard – F series)

3. Applications

The components describe in this specification have been designed for the services classified “0” and “L3” according to IMO standard; with reference to the standard IMO A.753(18), the services for which these components can be used are indicated in the following table.

Piping systems	Location							
	Machinery spaces of category A	Other machinery spaces and pump-rooms	Ro-ro cargo holds	Other dry cargo holds	Ballast water tanks	Cofferdams, void spaces pipe tunnels and ducts	Accommodation, service and control spaces	Open decks
Ballast	x	X	x		x	x		
Bilge	x	x	x	x	x	x	x	x
Cooling water	x	x			x	x	x	x
Sea cooling water	x	x			x	x		
Potable water	x	x	x	x	x	x	x	x
Hot and cold wash water	x	x	x	x	x	x	x	x
Technical water	x	x	x	x	x	x	x	x
Conditioning cold water	x	x	x	x	x	x	x	x
Conditioning hot water	x	x	x	x	x	x	x	x
Grey waters	x	x	x	x	x	x	x	x
Vacuum drains	x	x	x	x	x	x	x	x
Sounding and vents in tanks	x	x	x	x	x	x	x	

4. Product coding

The VEMAR SL components are identified with the following classification:

VEMART-FIRE-AAAA-BB-SL

where:

T = N (not conductive)

C (conductive)

AAAA = ISO6 (isophthalic resin - temperature T80class)

VIN6 (vinylester resin - temperature T90 class)

only for VEMARC-FIRE series

BB = EC (externally conductive)

FC (full conductive)

5. System performances

- maximum design pressure: + 16 bar / full vacuum
- design temperature: - 20 / + 90 °C
- maximum fluid speed: 5,5 m/s
- fire resistance according to standard IMO RESOLUTION A.753(18) L3

6. Resins

The VEMAR FIRE SL components can be produced with the following resins:

- Isophthalic resins for ISO6 product series: Synolite N-268, Ares P255 N20, Synolite N-266, Ares P205 N20 and Palatal A400-01;
- Vinylester resins for VIN6 product series: Atlac580, Atlac590, Derakane 411-350, Derakane 470-300 and Palatal A430-01;

Note: other resins with similar characteristics could be used.

7. Pipes and fittings thickness

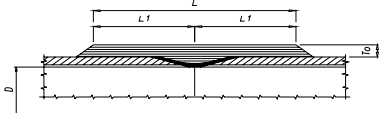
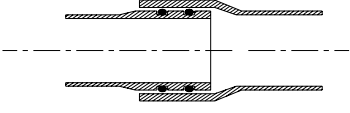
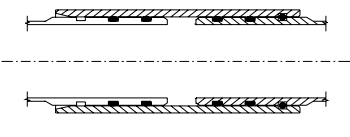
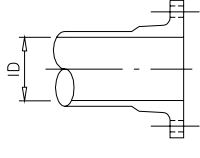
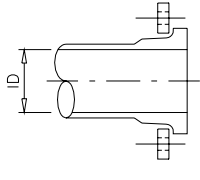
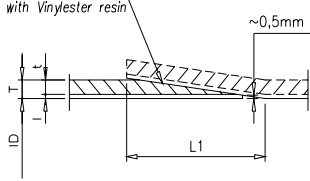
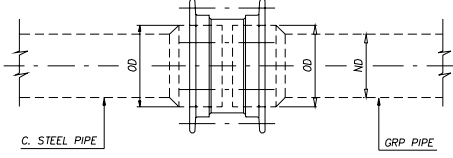
The pipes and fittings thickness (in millimetres) for each pressure class are indicated in the following table.

DN	PN1	PN6		PN10 / Full Vacuum		PN12 / Full Vacuum		PN16 / Full Vacuum	
	Pipe	Pipe	Fitting	Pipe	Fitting	Pipe	Fitting	Pipe	Fitting
50	-	5,1	4,1	6,0	7,4	6,0	7,4	6,0	7,4
65	-	5,1	4,1	6,0	7,4	6,0	7,4	6,0	7,4
80	-	5,1	4,1	6,0	7,4	6,0	7,4	6,0	7,4
100	5,0	5,1	4,1	6,0	7,4	6,0	7,4	6,0	7,4
125	5,0	5,1	4,1	6,0	7,4	6,0	7,4	6,0	7,4
150	5,0	5,1	4,1	6,0	7,4	6,0	7,4	6,0	7,4
200	5,0	5,1	4,1	6,0	7,4	6,0	10,5	6,0	10,5
250	5,0	5,1	5,4	7,1	7,4	7,1	12,1	7,1	12,1
300	5,0	5,1	5,4	8,2	9,0	8,2	13,7	-	-
350	5,0	6,3	6,7	9,3	10,5	9,3	16,9	-	-
400	5,9	6,3	6,7	10,4	12,1	10,4	18,5	-	-
450	5,9	7,5	8,0	10,4	13,7	11,5	20,0	-	-
500	6,7	7,5	8,0	11,5	13,7	12,6	21,6	-	-
550	6,7	7,5	9,1	12,6	15,3	13,7	24,8	-	-
600	6,7	8,3	9,1	13,7	16,9	14,8	26,4	-	-
650	7,6	8,3	10,2	14,8	18,5	15,9	28,0	-	-
700	7,6	8,3	11,3	15,9	20,0	17,0	29,5	-	-
800	8,4	9,0	12,4	18,1	21,6	19,2	34,3	-	-
900	9,3	-	-	-	-	-	-	-	-
1000	10,2	-	-	-	-	-	-	-	-

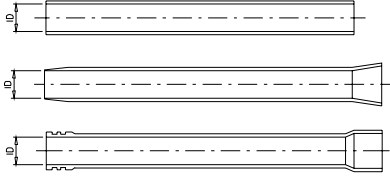
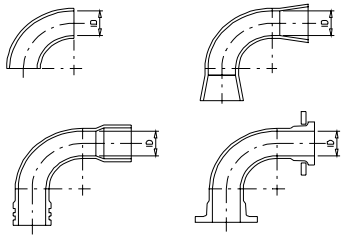
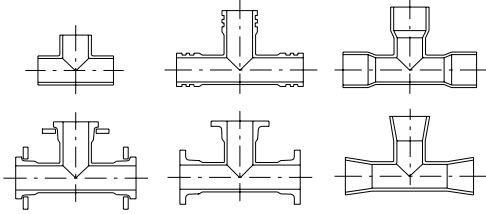
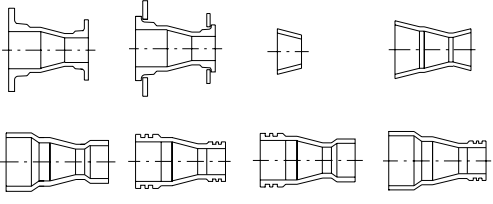
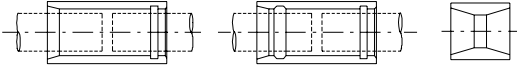
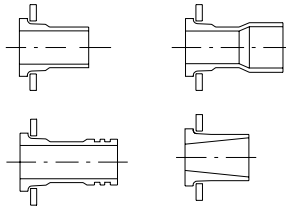
- Notes:
- the thicknesses includes the internal liner (1,3mm) and external liner (0,2mm);
 - fabrication tolerances according to doc. n° PD-01-SP-033;
 - the GRP components are designed and manufactured according to the internal fabrication instructions and to the technical specifications foreseen in our Quality Control System;
 - for design temperature greater than 65°C could be necessary apply a derating factor to reduce the pressure ratings indicated in the table.

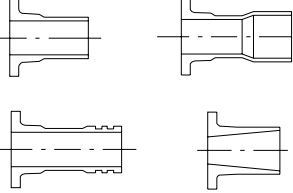
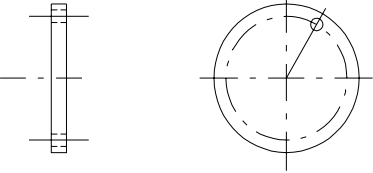
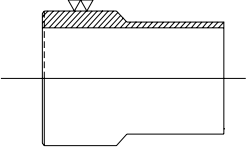
8. Joining systems and components

The types of joints available are shown in the following table.

<p>BUTT & STRAP WELDING JOINT</p>	
<p>BELL & SPIGOT JOINT</p>	
<p>SLEEVE COUPLING JOINT</p>	
<p>FIXED FLANGE JOINT (Flat face)</p>	
<p>LOOSE FLANGE JOINT</p>	
<p>TAPERED CONICAL GLUED JOINT (1) available up to DN600</p>	<p><i>Incollaggio con resina Vinilestere To be glued with Vinylester resin</i></p> 
<p>MECHANICAL JOINT</p>	

The following table shows the GRP components available related to all possible kinds of joints.

<p>PIPES</p>	
<p>ELBOWS 30° ÷ 90°</p>	
<p>EQUAL AND REDUCED TEES</p>	
<p>CONCENTRIC AND ECCENTRIC REDUCERS</p>	
<p>SLEEVE COUPLINGS</p>	
<p>STUB ENDS AND ADAPTERS With steel loose flange made of Fe430 B FN 7070 ASTM A-105 (hot galvanised);</p>	

<p>WELDING NECK FLANGES AND ADAPTERS</p>	
<p>BLIND FLANGES</p>	
<p>MACHINING ENDS FOR MECHANICAL JOINTS</p>	

- Notes:
- fabrication tolerances according to doc. n° PD-01-SP-033;
 - the GRP components are designed and manufactured according to the internal fabrication instructions and to the technical specifications foreseen in our Quality Control System.