



EUROBOILERS

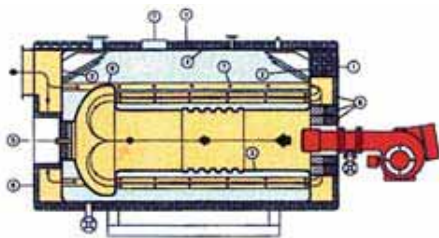
GARIONI AVAL
INDUSTRIAL AND MARINE HEATING SYSTEMS

GPT

THREE PASSES WITH WET BACK STEAM OR PRESSURIZED WATER BOILERS
GENERATORI DI VAPORE O AD ACQUA SURRISCALDATA A TRE GIRI DI FUMO



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- 1 Insulation jacket/isolamento
- 2 Tube plates/piastre tubiere
- 3 Furnace/focolare
- 4 Shell/corpo a pressione
- 5 Fire check/spia fiamma
- 6 Back smoke case/cassa fumi posteriore
- 7 Fire tubes/tubi da fumo
- 8 Wet back/fondo bagnato
- 9 Man hole/passaggio d'uomo

Three passes with wet back steam boilers.
High efficiency and low NOx.
Steam production from 2.000 up to 20.000 Kg/h.

Generatori di vapore a tre giri di fumo con fondo bagnato a piastre risbordate. Alto rendimento e basso tenore di NOx. Produzione da 2.000 a 20.000 Kg/h.





GPT

GN 06/2006

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 GENERATORI DI VAPORE O AD ACQUA SURRISCALDATA A TRE GIRI DI FUMO

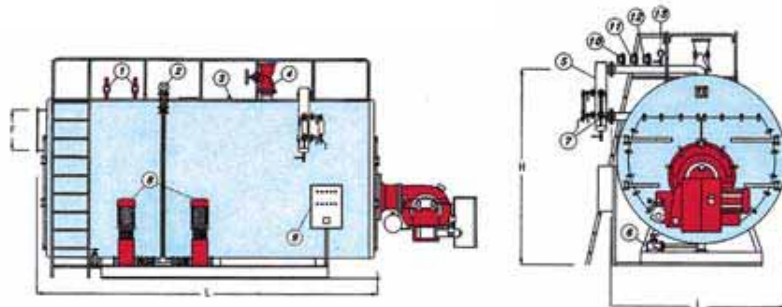
three passes with wet back steam or pressurized water boilers

The fire tube steam boiler **GPT**, of the type with three passes, wet back and bended plates, is technologically the most advanced boiler that can be found on the market. The models from 2 up to 20 ton/h are realized with Fox type furnace. They have been studied to have the highest efficiency and the lowest NOx emissions. They can be supplied with two steps and with fully modulated regulation burner. Efficiency of 90%. Pressure up to 21 bar. Steam production from 2.000 up to 20.000 Kg/h for pressure up to 21 bar. They are equipped with a big water content and are ideal for every heavy duty installation. **GPT** steam and pressurized water generators are the ideal solution in all industries needing high working flexibility and safety, and they grant a perfect running. **GPT** steam generators can use every kind of liquid and gaseous fuel. Ideal for chemical, pharmaceutical, textile and dairy industries and for all those installations where the best quality for the best production is required.

generatori di vapore o di acqua surriscaldata a tre giri di fumo

Il generatore di vapore **GPT**, del tipo a tre giri di fumo, con fondo bagnato e piastre risbordate è quanto di più tecnologicamente avanzato vi sia oggi sul mercato. Nelle versioni da 2 a 20 ton/h è munito di focolare ondulato fox. E' stato accuratamente studiato per garantire il massimo rendimento e le minime emissioni possibili di NOx. La produzione di vapore da 2.000 Kg/h a 20.000 Kg/h. Pressione fino a 21 bar. Il generatore di vapore **GPT**, a grande volume d'acqua e ad alto rendimento, rappresenta la caldaia ideale per tutte le industrie nelle quali sono richieste flessibilità di esercizio, flessibilità di messa a regime, riserva di vapore, sicurezza e continuità di funzionamento. Per combustibili liquidi (Nafta fino a 50°E) o gassosi. Regolazioni a due posizioni (fiamma alta o fiamma bassa) o in versione modulante sia sul combustibile sia sull'acqua di alimento. Rendimento fino a 90%. La caldaia ideale per industrie chimiche, farmaceutiche, lattierocasearie, alimentari e per tutte quelle installazioni in cui si richiede l'assoluta garanzia dei componenti, una costruzione impeccabile e curata nei particolari, oltre ad un dimensionamento che tenga conto di condizioni gravose di esercizio.

- 1 Safety valve/Valvola di sicurezza
- 2 Water inlet valve/Valvola alimentazione acqua
- 3 Low level safety/Sicurezza basso livello
- 4 Steam outlet valve/Valvola a vapore
- 5 Level regulation/Regolazione di livello
- 6 Blow down/Valvola di spurgo
- 7 Level indicator/Indicatore di livello
- 8 Feed water pump/Pompe alimentazione acqua
- 9 Control pannel/Quadro elettrico
- 10 Pressure regulator/Pressostato di regolazione
- 11 Maximum pressure switch/Pressostato di massima
- 12 Safety pressure switch/Pressostato di sicurezza
- 13 Pressure gauge/Manometro



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Type/Modello	GPT	2.000	3.000	4.000	5.000	6.000	7.000	8.000	9.000	10.000	12.000	15.000
Steam production/Prod. di vapore	Kg/h	2.000	3.000	4.000	5.000	6.000	7.000	8.000	9.000	10.000	12.000	15.000
Capacity/Potenzialità	kW	1.395	2.093	2.791	3.488	4.186	4.884	5.581	6.279	6.977	8.372	10.465
Length/Lunghezza	L mm.	3.550	4.000	4.450	4.900	5.200	5.500	5.600	5.750	5.900	6.750	7.250
Width/Larghezza	l mm.	2.100	2.240	2.320	2.350	2.450	2.500	2.600	2.700	2.700	2.850	3.000
Height/Altezza	H mm.	2.400	2.500	2.700	2.750	2.850	2.950	3.000	3.100	3.100	3.300	3.500
Chimney/Camino	F Ø mm.	350	450	500	550	600	650	700	750	800	850	900
Empty weight/Peso a vuoto	Kg	7.000	8.500	11.000	12.500	14.500	16.000	18.000	20.000	21.500	26.500	30.000

For bigger capacities please contact directly our offices. / Per potenze superiori richiedere i dati direttamente ai nostri uffici.

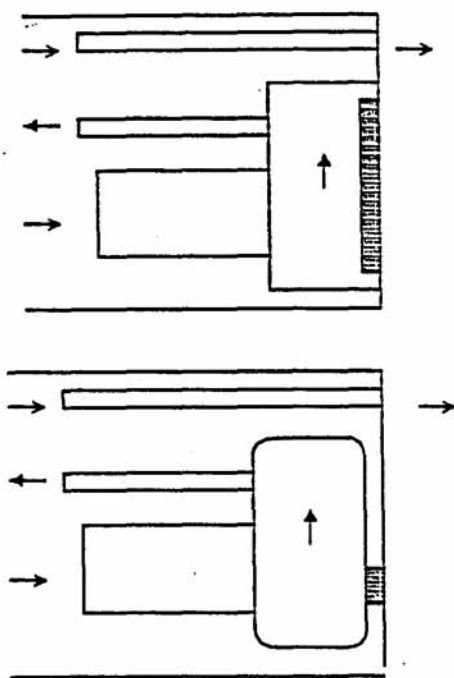


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NEW DEVELOPMENTS IN THREE SMOKE PASSES WITH WET BACK STEAM BOILERS "GPT" SERIE

I would like to illustrate a few results of G-N's R&D dept. regarding fire tube boiler design improvements, in order to manufacture cheaper structures with at least the same efficiency.



The wet back: under this ravishing name you find one of the most important features for fire tube boilers. Compared with dry back, it has a series of advantages, such as:

- reduced amount of refractory concrete
- increased heated surface
- increased boiler lifetime

Price to be paid for that is a more expensive structure both from design, and from manufacturing point of view.

w w w . g a r i o n i n a v a l . c o m

Although a more compact shape of fire tube boilers is theoretically possible from a mere thermal exchange point of view, actual project basis and procedures so as most of design codes don't allow this result. The way must be, therefore, a more cost-effective design approach, that may be resumed in this slogan: **'PUT RESOURCES WHERE IS NEEDED!'**

Here we want to show how the reduction of number of third smoke pass tubes against the increase of their diameter can be realized from a thermal exchange point of view; we shall also let you see how it was possible to simplify the structure of reversal chamber increasing its efficiency: let's begin from the first.

If you cast a glance on the distribution of heat exchange on the different parts of a boiler, you will see that third pass is fundamentally a recovery unit realized in one piece with the boiler itself. In fact, it is well-known that third tube pass contributes rather little to the total heat transfer of the boiler (typically about 10%), really one can say that its main use is allowing gas exit to be at the back. On the other side, third pass tubes give a high contribute to loss of charge since:

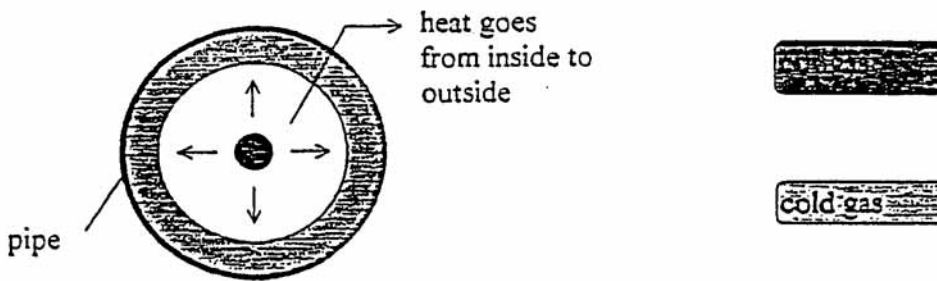
- they are the longest in the boiler, in fact these tubes are as long as the whole pressure body
- gases flowing in them are the densest, in fact they are the coldest.

You should remember that it's impossible to increase diameter and reduce the number of tubes keeping, in the same time, total cross surface and heated surface: this means that one of these two features has to be changed. So, we design boilers letting smokes speed in third pass increase respect to the value before modification: by means of that, we can accept a reduction in heated surface, in fact we partially recover it thanks giving to thermal exchange coefficient increase due to higher speed.

We must underline, so, that exchanged heat does reduce. At any rate, the percentage of this reduction must be considered in respect with the weight of exchanged heat in this pass compared with total quantity of kcal given by boiler and this weight is very little; therefore, we can find that it may be evaluated as acceptable.

On the other side you must consider that number and diameter of tubes are somehow addressed by considerations coming from structure, welding and codes limits, so that we have no large freedom in the choice. Finally, the problem is always in the lower part of the pass, under boiler mid-line, where space for tubes is reduced: tube plates thickness considerations drive to the choice of diameter of tubes.

One of the problems we had to face during the boiler design was that smokes speed and tubes diameter increase can create some problems in heat diffusion inside gas. As we know, most part of heat is exchanged by convection, since the amount of radiation at those temperature where third pass works is very little. So, excluding a little percentage of tubes length at the beginning of tubes themselves, where you have some entrance problem, heat has to move from the centre of gas flow, around tube axis, to the peripheral surface of tube, where it is exchanged with water. So contemporary increase of gas speed and tube diameter reduce time for passing through and raise very much space to cover: we risk that part of the gas goes across the boiler and arrives to the chimney having had nothing to do with water. We resolved this problem by means of some special design turbulators.



Finally, number of third smoke pass tubes reduction against the increase of their diameter reduces very much both the welded length and the quantity of weldings giving a substantial compression to working times for assembling tube plates.

The second matter we want to consider is the new reversal chamber design. Reversal chamber how is usual designed is a sheet-steel belt with two welded plates. We modified this structure by eliminating the belt and changing the back tube plate in a dished elliptic bottom: due to this modification we gained many different advantages.

First of all, reversal chamber shape is closer to the real form of gas flux inside, eliminating those dead water corners in the rear part of it: this drives to a reduction in losses of charge.



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Both for the same reason as above and for the reduced cross surface of reversal chamber, gas flux streams on internal surface of dished bottom with higher speed respect to what happened before on reversal chamber flat back tube plate and a larger area is interested by intact main flux instead of secondary fluxes: this conducts to a higher heat exchange ratio in this part of the boiler.

If we consider the same diameter and the same pressure, elliptic dished bottom is heavily lighter than flat tube plate - about half thickness is needed!: this is due to dished form, which is much stronger than flat one. Normally we choose this element thickness not for resistance reasons due to stresses created by pressure, but for an easy welding to front reversal chamber tube plate, some mm more than the min. required.

Elliptic dished bottom is a standard work for all those workshops producing such a kind of objects, you only have to tell them dimensions and thickness, whereas flat tube plate is a matter realized by a much littler number of companies: this allows the elimination of a critic material with its substitution with a common one.

w w w . g a r i o n i n a v a l . c o m

FIRE TUBE STEAM BOILER TYPE GPT

GPT steam boilers are of the three passes, wet back with banded head plate design type, ideal for the use in difficult situation and in medium/high capacity range, where liability assume the most important rule.

Our max. boiler range is 15 t/h

Furthermore the Steam generator **GPT** distinguish following advantages:

- ⇒ **High efficiency (min. 90%),** due to the perfect and complete use of the high heated surface of the effective three smoke passes where really it is needed from the heat exchange value.
- ⇒ **Banded tube plates** are permitting the pipe and shell expansion without forcing the welding.
- ⇒ **Total absence of corner welding.**
- ⇒ **Minimum use of refractory and insulating concrete.**
- ⇒ **Liability,** due to the low thermal load.
- ⇒ **Easy maintenance,** due to our **four completely hinged and operable front and rear doors** allowing to clean and control the pipes in only a few minutes time, without dismounting any parts of the boiler.
- ⇒ **Low Nox emission,** due to no inversion of the flame in the furnace and a correct dimensioning of the same.
- ⇒ **Quick assistance,** due to the use of first class market burner and to our **world wide net of agents, distributors and service centres** able to reach you everywhere in 24 hours.

**The quality of our steam generator GPT is also guaranteed by
TOTAL QUALITY CERTIFICATION ISO 9001**

SCOPE OF SUPPLY

BOILER BODY

- ⇒ **Pressure Vessel** tested according to international standards. The shell, the furnace and the **banded tube plates** are realised in certified steel, Fe 510.2 kW UNI 5869/75 and welded with submerged arc technology. The pressure vessel is complete with connections for indicators, water in-let, steam out-let, blow-down, man-hole and two hand holes. **Fire Tubes** are in unalloyed steel Fe 35.2 UNI 663 or ASTM 106 B grad schedule 40, tested for wall temperatures up to 450 °C and welded to the head plates.
- ⇒ **Rear Smoke Case** in Aoo steel, thermally insulated and designed with two operable doors and connection for exhaust gas exit.
- ⇒ **Front Smoke Case** in Aoo steel thermally insulated and designed with two hinged doors to inspect the fire tubes and the burner holder plate.
- ⇒ **Front and rear doors** double insulating material made of Kerlite 90 as refractory and of Kerlite 130 as insulating.
- ⇒ No. 1 **Man Hole** for internal inspection on the top part of the boiler.
- ⇒ No. 2 **Hand Holes** for internal inspection on the side lower part of the boiler.
- ⇒ **Insulation** in high density rock wool of 100 mm thickness and density 100 kg/m³ covered by alloy sheets.
- ⇒ **Base Frame** in profile steel to support the boiler body and the accessories complete with expansion joints
- ⇒ **Pressure Vessel Welding** are completely x-ray and ultrasound tested in our high tech x-ray station.

VALVES

- ⇒ Steam outlet valve PN 16.
- ⇒ Blow-down group with valve and cock PN 16.
- ⇒ Valves for level indicator (No. 2).
- ⇒ Flame check valve.
- ⇒ Valves for feed water group.
- ⇒ Check valve for feed water group.
- ⇒ Three way cock with test flange to connect pressure gauge.

REGULATION AND CONTROL SYSTEMS

- ⇒ No. 2 reflection level indicators.
- ⇒ Steam pressure gauge complete with three way check valve and test flange.
- ⇒ Max. pressure switch.
- ⇒ Regulation pressure switch.
- ⇒ Electronic automatic level regulator (Three probes).
- ⇒ Flame check glass.

SAFETY DEVICES

- ⇒ Safety pressure switch.
- ⇒ Level gauges.
- ⇒ Safety valve (No.2).
- ⇒ Low water level safety probe.

ELECTRICAL CONTROL PANEL

- ⇒ General switch
- ⇒ Burner switch
- ⇒ Pump switch
- ⇒ Feed water pump contactor
- ⇒ Automatic level regulation system
- ⇒ Relays
- ⇒ Fuses
- ⇒ Indication lamps
- ⇒ Numerated junction box
- ⇒ Auxiliary transformer 220 V – 24 V
- ⇒ Security block button

FEED WATER GROUP

- ⇒ No. 2 Electric centrifugal pumps complete with motors fitted on the boiler frame.
Capacity and head are according to international norms.
- ⇒ Check valves (No.2)
- ⇒ Connection valves PN 16

Modello-Type	GPT	2000	3000	4000	5000	6000	7000	8000	9000	10000	12000	15000
Produzione vapore-Steam production	kg/h	2000	3000	4000	5000	6000	7000	8000	9000	10000	12000	15000
Potenzialita' termica resa	keal/h	1200000	1800000	2400000	3000000	3600000	4200000	4800000	5400000	6000000	7200000	9000000
Capacity	kW	1395	2093	2791	3488	4186	4884	5581	6279	6977	8372	10465
Rendimento-Efficiency	%	90	89	88	90	89	90	90	90	90	90	90
Capacita' totale-Total capacity	Litri	5080	6825	8701	9390	11420	12760	12780	15215	14670	15350	22274
Capacita' livello medio-Level capacity	Litri	4200	5215	6780	7280	9040	9910	9865	11705	11650	12230	17728
Volume camera vapore-Steam chamber volume	Litri	880	1610	1920	2110	2380	2850	2915	3510	2980	3120	4546
Specchio evaporante-Evaporating mirror	m²	3,60	5,00	6,24	6,72	7,82	8,41	8,69	9,52	9,31	10,35	13,3
Superficie riscaldata-Heated surface	m²	40	61	81	101	121	142	162	182	202	242	294
Produz.spec.vapore-Spec.steam product.	kg/hm³	50	49,2	49,4	49,5	49,6	49,3	49,4	49,5	49,5	49,6	51
Volume cam.comb.-Comb.chamber volume	m³	1,340	1,886	2,541	3,093	3,492	3,910	4,123	4,805	5,323	6,131	9,22
Carico term.cam.comb.-Thermic charge comb.chamber	keal/hm³	995000	1060000	1050000	1077000	1145000	1194000	1294000	1249000	1252000	1305000	1084600
Contropressione cam.comb.-Furnace loss of charge	mm.c.a.	85	75	80	95	110	110	125	115	95	120	150

POTENZA ELETTRICA INSTALLATA AL BRUCIATORE-BURNER INSTALLATION POWER

Metano/gpl - Natural gas/gpl	kW	5,1	9,0	9,0	11,5	11,5	15,5	15,5	17,5	17,5	20,0	30,0
Gasolio - Diesel oil	kW	5,5	5,5	11,2	11,5	11,5	17,2	17,2	20,5	20,5	23,0	35,5
Nafta - Heavy oil	kW	19,5	30,0	39,7	41,5	41,5	45,7	45,7	48,4	48,4	55,0	65,5

POTENZA ELETTRICA INSTALLATA POMPA ACQUA-WATER PUMP INSTALLATION POWER

Motore pompa - Pump motor	kW	3,0	3,0	4,0	5,5	5,5	7,5	7,5	11,0	11,0	15,0	15
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DIMENSIONI-DIMENSIONS

Lunghezza (escl.bruc.)-Length (without burner)	mm	3550	4000	4450	4900	5200	5500	5600	5750	5900	6750	7250
Larghezza-Width	mm	2100	2240	2320	2350	2450	2500	2600	2700	2700	2850	3000
Altezza-Height	mm	2400	2500	2700	2750	2850	2850	3000	3100	3100	3300	3500
Diametro camino-Chimney diameter	mm	350	450	500	550	600	650	700	750	800	850	900
Peso a vuoto-Empty weight	kg	7000	8500	11000	12500	14500	16000	18000	20000	21500	26500	29000
Valvola presa vapore-Steam outlet valve	DN	65	80	100	100	125	125	125	125	150	150	200
Scarico valv.sic.-Safety valve discharge	n°2 Ø	40	40	40	50	50	50	65	65	65	80	80
Valvola di spurgo-Blowdown valve	DN	40	40	40	40	40	40	40	40	40	40	40
Attacco acqua-Water pipe	Ø	1 1/2"	2"	2 1/2"	2 1/2"	2 1/2"	3"	3"	3"	4"	4"	4"

N.B. : Le misure di ingombro sono a filo flangia

P.S. : The overall dimensions are at the flange wire

**TECHNICAL DATA WET BACK
 THREE PASSES STEAM BOILER
 "GPT 12.000 - 12 BAR"**

Pressure	12 bar
External shell diameter	2.650 mm
Furnace length	4.752 mm
Internal furnace diameter	1.120 mm
Furnace surface	16,7 m ²
Inversion chamber length	746 mm
Inversion chamber diameter	1.960 mm
Inversion chamber surface	7 m ²
Total surface	238 m ²
Evaporation surface	11 m ²
Pipes diameter – 2 nd smoke pass	76,1 mm
Pipes diameter – 3 rd smoke pass	88,9 mm
Pipes thickness – 2 nd smoke pass	3,9 mm
Pipes thickness – 3 rd smoke pass	3,9 mm
Number of pipes – 2 nd smoke pass	116
Number of pipes – 3 rd smoke pass	66

**TECHNICAL DATA WET BACK
 THREE PASSES STEAM BOILER
 "GPT 10.000 – Dwg. No. GPT-10.000-A"**

Pressure	15 bar
Shell length	5.100 mm
External shell diameter	2.500 mm
Shell thickness	15 mm
Furnace length	4.220 mm
Furnace internal diameter	1.044 mm
Furnace thickness	18 mm
Furnace surface	13,84 m ²
Inversion chamber length	700 mm
Internal diameter inversion chamber	1.816 mm
Inversion chamber thickness	22 mm
Inversion chamber surface	7,4 m ²
Inferior/lower shell distance – inversion chamber	90 mm
Superior/higher shell distance – inversion chamber	550 mm
Pipes diameter – 2 nd and 3 rd smoke pass	70 mm
Pipes thickness – 2 nd and 3 rd smoke pass	3,2 mm
Number of pipes – 2 nd smoke pass	114
Number of pipes – 3 rd smoke pass	82
Total surface	215 m ²
Front bended plate thickness	18 mm
Rear bended plate thickness	18 mm
Front bended plate thickness – inversion chamber	16 mm
Rear bended plate thickness – inversion chamber	16 mm

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**TECHNICAL DATA WET BACK
 THREE PASSES STEAM BOILER
 "GPT 6.000 – Dwg. No. 121 GPT"**

Pressure	12 bar
Shell length	4.398 mm
External shell diameter	2.240 mm
Shell thickness	12 mm
Furnace length	3.555 mm
Furnace internal diameter	885 mm
Furnace thickness	15 mm
Furnace surface	9,9 m ²
Inversion chamber length	605 mm
Internal diameter inversion chamber	1.574 mm
Inversion chamber thickness	/
Inversion chamber surface	5 m ²
Inferior/lower shell distance – inversion chamber	68 mm
Superior/higher shell distance – inversion chamber	548 mm
Pipes diameter – 2 nd smoke pass	60,3 mm
Pipes diameter – 3 rd smoke pass	88,9 mm
Pipes thickness – 2 nd smoke pass	3,9 mm
Pipes thickness – 3 rd smoke pass	3,9 mm
Number of pipes – 2 nd smoke pass	96
Number of pipes – 3 rd smoke pass	28
Front bended plate thickness	18 mm
Rear bended plate thickness	18 mm
Front bended plate thickness – inversion chamber	13 mm
Rear bended plate thickness – inversion chamber	13 mm

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**TECHNICAL DATA WET BACK
 THREE PASSES STEAM BOILER
 "GPT 5.000 – Dwg. No. 111 GPT"**

Pressure	12 bar
Shell length	4.200 mm
External shell diameter	2.140 mm
Shell thickness	15 mm
Furnace length	3.414 mm
Furnace internal diameter	870 mm
Furnace thickness	15 mm
Furnace surface	9,3 m ²
Inversion chamber length	622 mm
Internal diameter inversion chamber	1.515 mm
Inversion chamber thickness	17 mm
Inversion chamber surface	5,5 m ²
Inferior/lower shell distance – inversion chamber	65,5 mm
Superior/higher shell distance – inversion chamber	495,5 mm
Pipes diameter – 2 nd smoke pass	60,3 mm
Pipes diameter – 3 rd smoke pass	60,3 mm
Pipes thickness – 2 nd smoke pass	3,2 mm
Pipes thickness – 3 rd smoke pass	3,2 mm
Number of pipes – 2 nd smoke pass	56
Number of pipes – 3 rd smoke pass	80
Front bended plate thickness	18 mm
Rear bended plate thickness	18 mm
Front bended plate thickness – inversion chamber	17 mm
Rear bended plate thickness – inversion chamber	17 mm

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**TECHNICAL DATA WET BACK
 THREE PASSES STEAM BOILER
 "GPT 3.500 – Dwg. No. 128 GPT"**

Pressure	10 bar
Shell length	3.156 mm
External shell diameter	1.925 mm
Shell thickness	12 mm
Furnace length	2.486 mm
Furnace internal diameter	752 mm
Furnace thickness	14 mm
Furnace surface	5,9 m ²
Inversion chamber length	520 mm
Internal diameter inversion chamber	1.340 mm
Inversion chamber thickness	16 mm
Inversion chamber surface	4 m ²
Inferior/lower shell distance – inversion chamber	39,5 mm
Superior/higher shell distance – inversion chamber	489,5 mm
Pipes diameter – 2 nd smoke pass	60,3 mm
Pipes diameter – 3 rd smoke pass	48,3 mm
Pipes thickness – 2 nd smoke pass	3,9 mm
Pipes thickness – 3 rd smoke pass	3,6 mm
Number of pipes – 2 nd smoke pass	62
Number of pipes – 3 rd smoke pass	74
Front bended plate thickness	15 mm
Rear bended plate thickness	13 mm
Front bended plate thickness – inversion chamber	12 mm
Rear bended plate thickness – inversion chamber	14 mm

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**TECHNICAL DATA WET BACK
 THREE PASSES STEAM BOILER
 "GPT 8.000 – Dwg. No. 123 GPT"**

Shell length	4.466 mm
External shell diameter	2.300 mm
Shell thickness	12 mm
Furnace length	3.701 mm
Furnace internal diameter	896 mm
Furnace thickness	14 mm
Inversion chamber length	606 mm
Internal diameter inversion chamber	1.574 mm
Inversion chamber thickness	13 mm
Pipes diameter – 2 nd smoke pass	60,3 mm
Pipes diameter – 3 rd smoke pass	168,3 mm
Pipes thickness – 2 nd smoke pass	3,2 mm
Pipes thickness – 3 rd smoke pass	4,78 mm
Number of pipes – 2 nd smoke pass	104
Number of pipes – 3 rd smoke pass	10
Front bended plate thickness	17 mm
Rear bended plate thickness	18 mm
Front bended plate thickness – inversion chamber	13 mm
Rear bended plate thickness – inversion chamber	13 mm

w w w . g a r i o n i n a v a l . c o m

**TECHNICAL DATA WET BACK
 THREE PASSES STEAM BOILER
 "GPT 4.000 – Dwg. No. 108 GPT"**

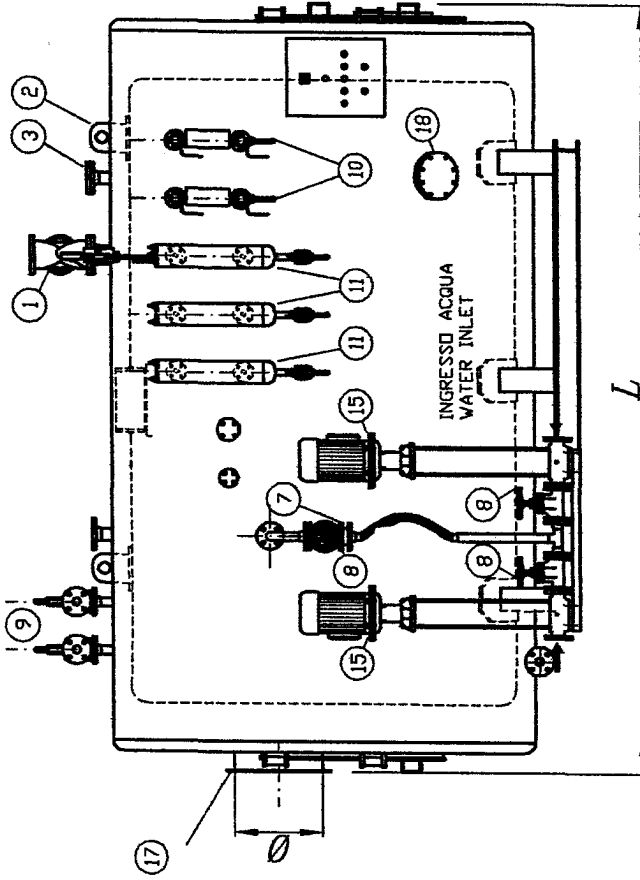
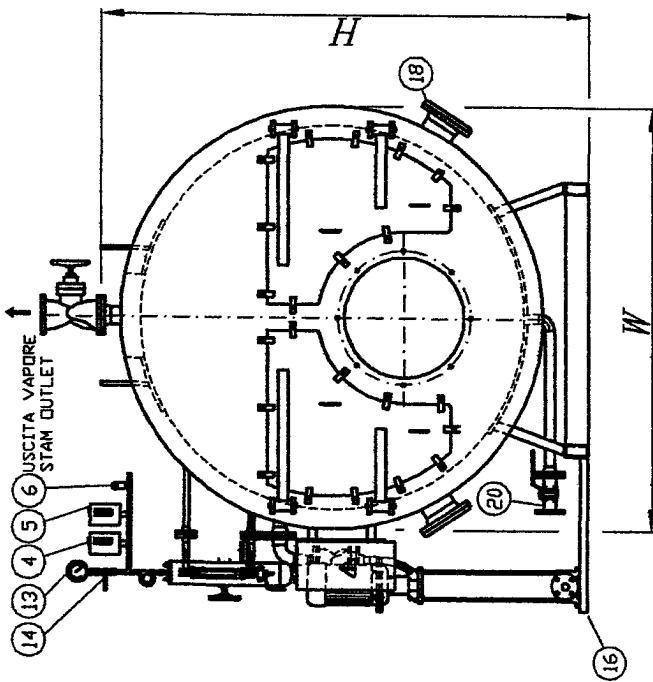
Shell length	3.750 mm
External shell diameter	2.120 mm
Shell thickness	14 mm
Furnace length	3.000 mm
Furnace internal diameter	822 mm
Furnace thickness	14 mm
Inversion chamber length	583 mm
Internal diameter inversion chamber	1.466 mm
Inversion chamber thickness	17 mm
Pipes diameter – 2 nd smoke pass	60,3 mm
Pipes diameter – 3 rd smoke pass	60,3 mm
Pipes thickness – 2 nd smoke pass	3,2 mm
Pipes thickness – 3 rd smoke pass	3,2 mm
Number of pipes – 2 nd smoke pass	70
Number of pipes – 3 rd smoke pass	48
Front bended plate thickness	18 mm
Rear bended plate thickness	17 mm
Front bended plate thickness – inversion chamber	17 mm
Rear bended plate thickness – inversion chamber	17 mm

w w w . g a r i o n i n a v a l . c o m

**TECHNICAL DATA WET BACK
 THREE PASSES STEAM BOILER
 "GPT 3.000 – Dwg. No. 113 GPT"**

Shell length	3.000 mm
External shell diameter	1.980 mm
Shell thickness	14 mm
Furnace length	2.334 mm
Furnace internal diameter	752 mm
Furnace thickness	16 mm
Inversion chamber length	520 mm
Internal diameter inversion chamber	1.340 mm
Inversion chamber thickness	15 mm
Pipes diameter – 2 nd smoke pass	60,3 mm
Pipes diameter – 3 rd smoke pass	48,3 mm
Pipes thickness – 2 nd smoke pass	3,9 mm
Pipes thickness – 3 rd smoke pass	3,6 mm
Number of pipes – 2 nd smoke pass	52
Number of pipes – 3 rd smoke pass	62
Front bended plate thickness	17 mm
Rear bended plate thickness	16 mm
Front bended plate thickness – inversion chamber	17 mm
Rear bended plate thickness – inversion chamber	17 mm

w w w . g a r i o n i n a v a l . c o m



20	1	VALVOLA SFERA SCARICO FANGHI	BALL VALVE DISCHARGE MUD
18	1	PASSALUOMO	MAN HOLE
18	2	PASSATESTA	HEAD-HOLE
17	1	CAMINO	CHIMNEY
16	1	BASAMENTO POMPE	PUMP BASEMENT
15	2	POMPA GRUNDFOS CRS-29	PUMP GRUNDFOS CRS-29
14	1	RUBINETTO PORTAMANOMETRO 3 VIE	VALVE 3 WAY FOR PRESSURE GAUGE
13	1	MANOMETRO 0-20 BAR	PRESSURE GAUGE 0-20 BAR
12	-	-	-
11	3	BARILOTTO PORTASONDE	PROBE HOLDING MANIFOLD
10	2	INDICATORE LIVELLO	LEVEL INDICATOR
9	2	VALVOLA SICUREZZA	SAFETY VALVE
8	3	VALVOLA F.A.	GLOBE VALVE
7	1	VALVOLA RITEGNO	CHECK VALVE
6	1	TRASDUTTORE DI PRESSIONE	PRESSURE TRANSMITTER
5	1	PRESSOSTATO DI LIMITE	LIMIT PRESSOSTAT
4	1	PRESSOSTATO DI SICUREZZA	SAFETY PRESSOSTAT
3	1	ATTACCO AUSILIARIO	AUXILIARY CONNECTION
2	4	GANGIO DI SOLLEVAMENTO	LIFTING LUGS
1	1	VALVOLA PRESA VAPORE	STEAM OUTLET VALVE
DENOMINAZIONE			
REPERITION			

MODELLO	GPT	2000	3000	4000	5000	6000	7000	8000	9000	10000	12000	15000
PRODUZIONE VAPORE / STEAM PRODUCTION	Kg/h	2000	3000	4000	5000	6000	7000	8000	9000	10000	12000	15000
POTENZIALITA'	Kcal/h	1200000	1800000	2400000	3000000	3600000	4200000	4800000	5400000	6000000	7200000	9000000
CAPACITY	Kw	1395	2093	2791	3488	4186	4884	5581	6279	6977	8372	10465
PRESSIONE	bar	12	12	12	12	12	12	12	12	12	12	12
LUNGHEZZA / LENGTH	L mm.	3550	4000	4450	4900	5200	5500	5600	5750	5900	6750	7250
LARGHEZZA / WIDTH	W mm.	2100	2240	2320	2350	2450	2500	2600	2700	2700	2900	3000
ALTEZZA / HEIGHT	H mm.	2400	2500	2700	2750	2850	2850	3000	3100	3100	3350	3500
CAMINO	Ø mm.	350	450	500	550	600	650	700	750	800	850	900
PESO A VUOTO / EMPTY WEIGHT	Kg.	7000	8500	11000	12500	14500	16000	18000	20000	21500	26500	29000

SU RICHIESTA PRESSIONE FINO A 15 bar - PRESSURE UP TO 15 bar ONLY BY REQUEST

P.S. : DATI NON IMPEGNATIVI - INDICATIVE DATA

Passerella e scaletta solo su richiesta
Service stairs & platform only by request

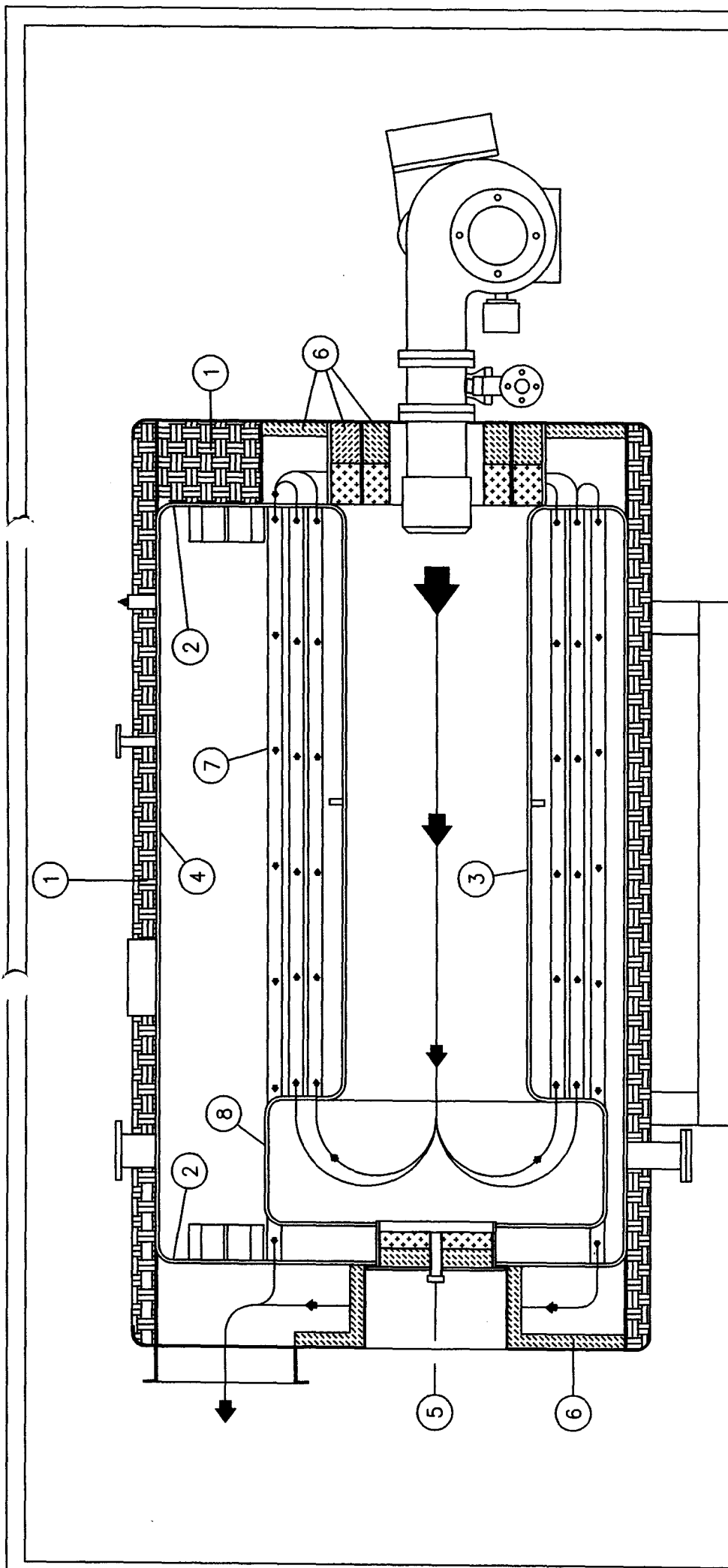
GARIONI NAVAL
 V.le dei Caduti 3
 26030 CASTELMELLA (CR) - ITALY
 Tel. 0300 246141 r.a.
 Fax 0300 246910

DIMENS. EXT GPT-3 GIRI DI FUMO
EXTERNAL GPT-3 SMOKE PASSES

Dimensioni in millimetri
 Dimensions in millimeters
 Dimensioni in pollici
 Dimensions in inches

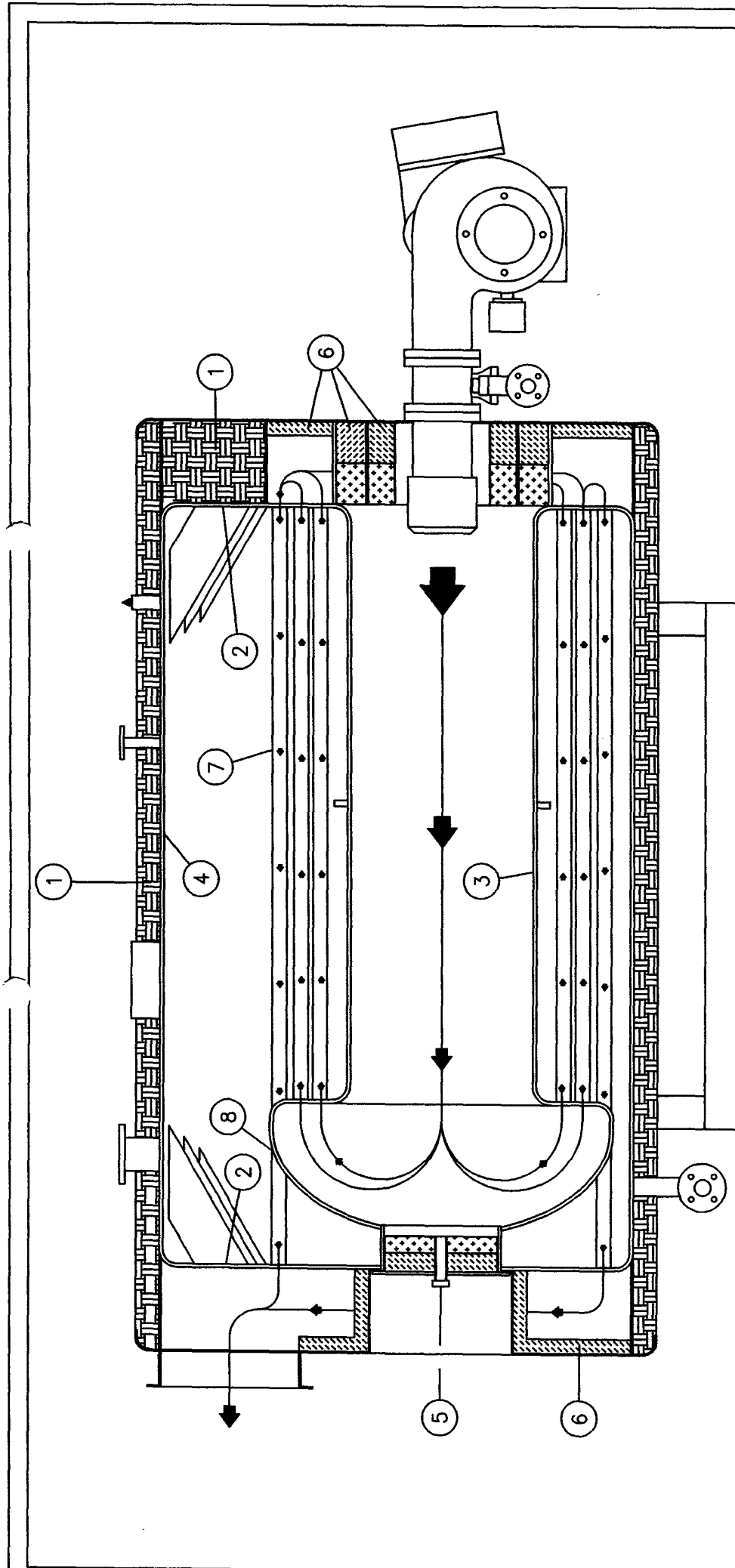
Scaletta / Platform
 Passerella / Service stairs
 Cest. D. / Basket D.
 Cest. F. / Basket F.
 Cest. L. / Basket L.
 Cest. P. / Basket P.
 Cest. R. / Basket R.
 Cest. S. / Basket S.
 Cest. T. / Basket T.
 Cest. U. / Basket U.
 Cest. V. / Basket V.
 Cest. W. / Basket W.
 Cest. X. / Basket X.
 Cest. Y. / Basket Y.
 Cest. Z. / Basket Z.

GARIONI NAVAL
 DIMENS. EXT GPT-3 GIRI DI FUMO
 EXTERNAL GPT-3 SMOKE PASSES
 04/02/04
 04-0029

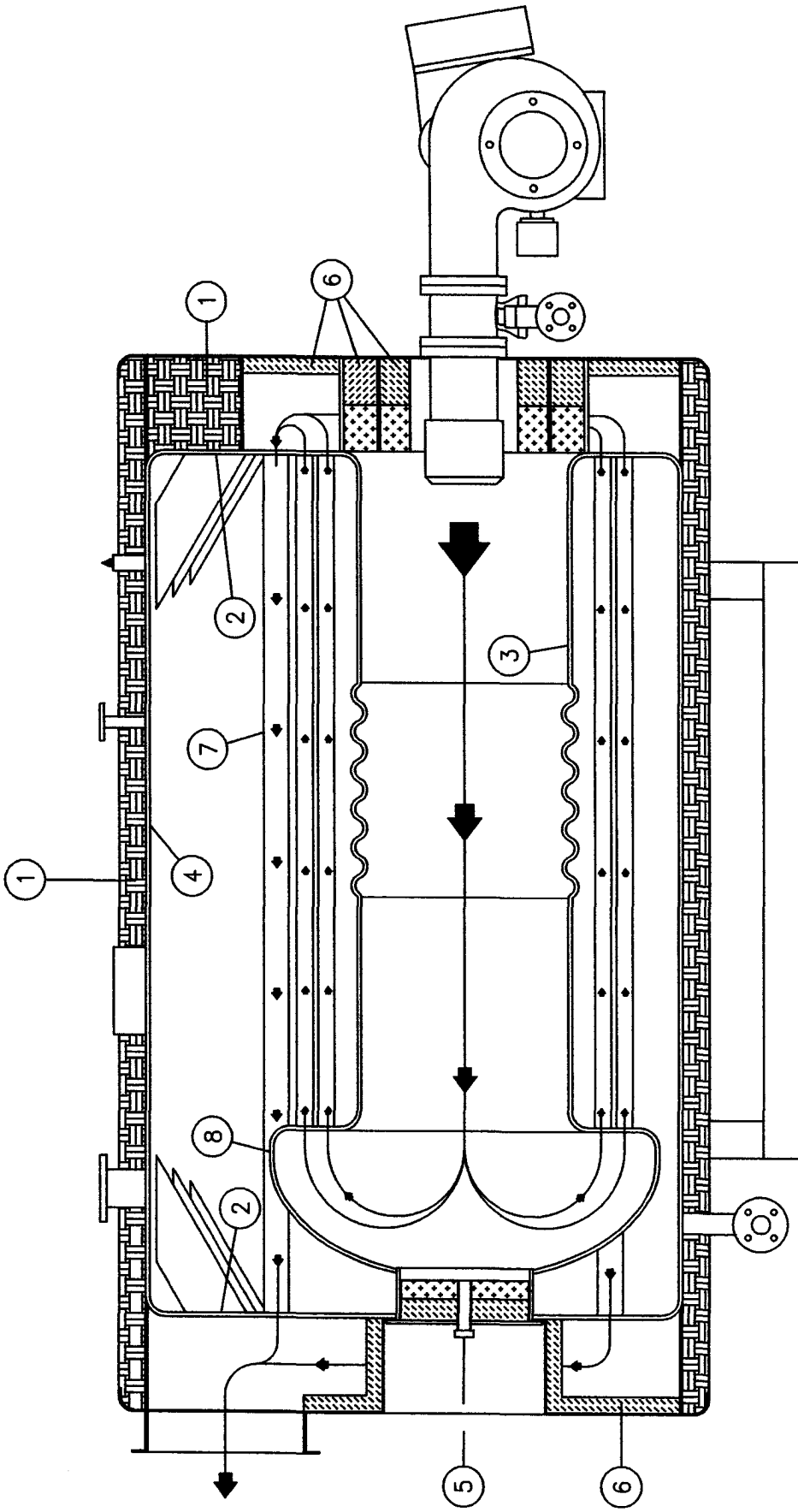


POS.	ABB.	DESCRIZIONE	NOTE
1		LANA MINERALE	
2		PIASTRA TUBIERA ANTERIORE E POSTERIORE	
3		FOCOLARE	
4		FASCIAE	
5		SPIA CONTROLLO FIAMMA	
6		ISOLAMENTO CAMERA FUMO ANTERIORE E POSTERIORE	
7		TUBI FUMO	
8		CAMERA INVERSIONE	
		MINERAL WOOL	
		FRONT AND BACK TUBE PLATE	
		FURNACE	
		SHEEL PLATING	
		FIRE INSPECTION HOLE	
		FRONT AND BACK SMOKE CHAMBER INSULATION	
		SMOKE TUBES	
		INVERSION CHAMBER	
		GARIONI BNAAL	
		GENERATORE DI VAPORE "GPT"	
		SEZIONE INDICATIVA GIRO FUMI	
		SITEM GENERATOR "GPT"	
		SMOKE PASSES INDICATION	
		APPROFONDITO	
		SCALA	
		DATA	17-05-94
		PRODOTTORE	
		PRODOTTORE IN	
		PRODOTTORE ALL	
		DISEGNO N.	GPT-3

QUESTO SCHEMA E' A MERA INDICAZIONE PARAPARTI E' VIGETATO A TORNARE IN LUNGA ESPERIMENTAZIONE DI PROVAZIONE A TUTTE LE SUE PARTI INDICAZIONE

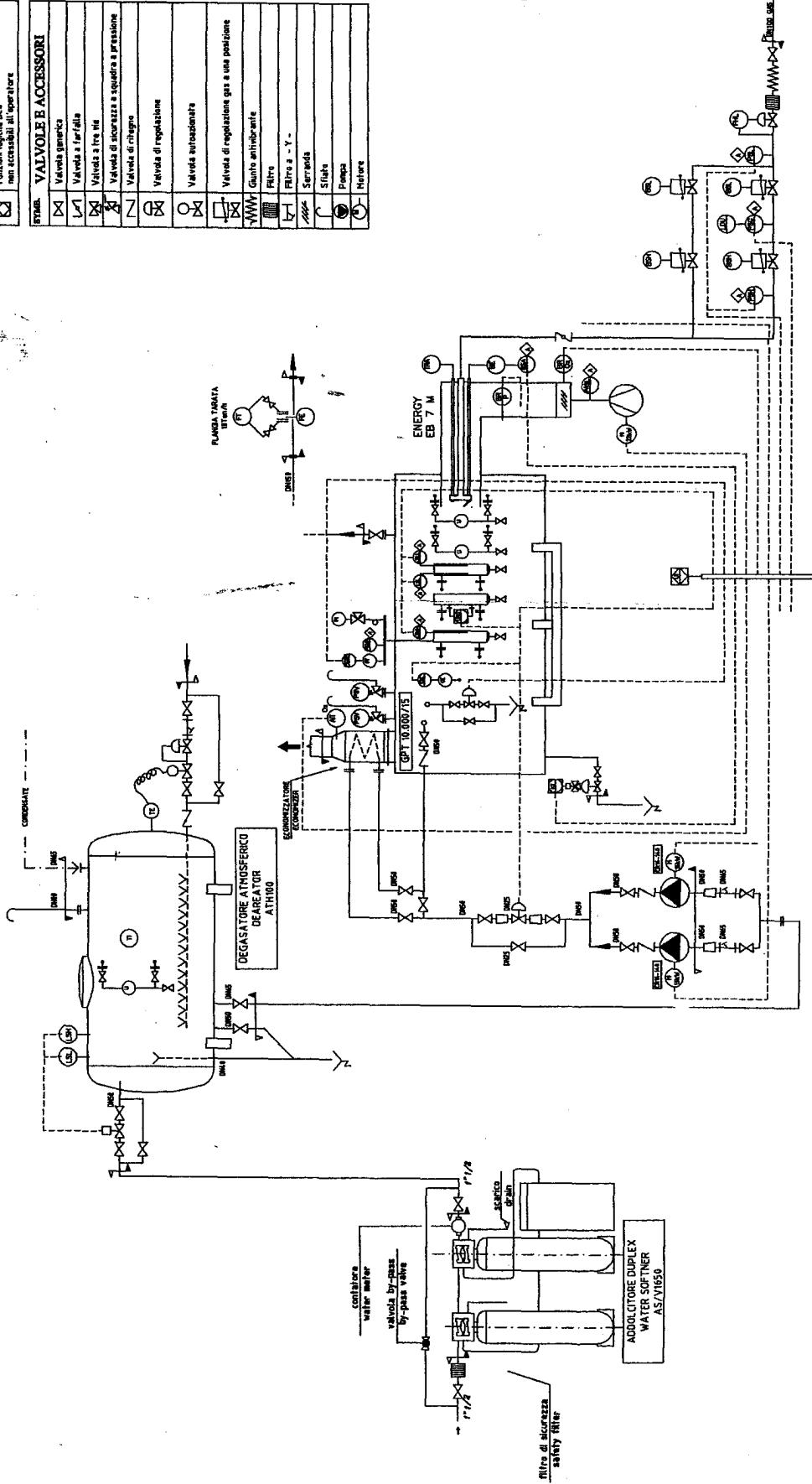


POS.	NO.	DESCRIZIONE	NOTE
1		LANA MINERALE	
2		PIASTRA TUBIERA ANTERIORE E POSTERIORE	
3		FOCOLARE	
4		FASCIAE	
5		SPIA CONTROLLO FIAMMA	
6		ISOLAMENTO CAMERA FUMO ANTERIORE E POSTERIORE	
7		TUBI FUMO	
		MINERAL WOOL	
		FRONT AND BACK TUBE PLATE	
		FURNACE	
		SHEEL PLATING	
		FIRE INSPECTION HOLE	
		FRONT AND BACK SMOKE CHAMBER INSULATION	
		SMOKE TUBES	
		GARIONI NAAL GENERATORE DI VAPORE "GTP" SEZIONE INDICATIVA GIRO FUMI STEAM GENERATOR "GTP" SMOKE PASSES INDICATION APPROVATO Turchiani, Venezia DATA 29-04-99 SCALA DISEGNO N. GTP-62	
		Ed. del Gabelli e Corso Casale, 22 (20133) Tel. (02) 281641 r. 4 Fax (02) 280910 CONDIZIONI DI VENDITA PREZZI IN EURO DATA 29-04-99	



POS.	DEL.	DESCRIZIONE	NOTE
1		LANA MINERALE	Modello del Coibitis 3
2		PIASTRA TUBIERA ANTERIORE E POSTERIORE	25000 CALORIE/ORA (25)
3		FOCOLARE	TEL. (030) 2681641 n. 4
4		FASCIA	FAX (030) 2680910
5		SPIA CONTROLLO FIAMMA	CONDIZIONE
6		ISOLAMENTO CAMERA FUMO ANTERIORE E POSTERIORE	INSTRUMENTI E
7		TUBI FUMO	INSTRUMENTI
8		CAMERA INVERSIONE	INSTRUMENTI AL.
GARIONI NAAI			DISSEGNO N.
GENERATORE DI VAPORE "GTP" SEZIONE INDICATIVA GIRO FUMI STEAM GENERATOR "GTP" SMOKE PASSES INDICATION			GTP-66
AUTOREGOLATORE		APPENDICE	DATA
Torchiotti, Pessio		SCALA	29-04-99
BREVETTO GARIONI E SUO SIMILE IN TUTTI I PAESI E IN TUTTE LE CATEGORIE DI PRODOTTI E SERVIZI E IN TUTTE LE SUE APPLICAZIONI			

MINERAL WOOL
FRONT AND BACK TUBE PLATE
FURNACE
SHELL PLATING
FIRE INSPECTION HOLE
FRONT AND BACK SMOKE CHAMBER INSULATION
SMOKE TUBES
INVERSION CHAMBER



STRUM.	STRUMENTAZIONE	STRUMENTAZIONE
Ar	Strumenti anelli localmente	Amplificatore indicatore trasmettitore D.B.
Ce	Strumenti anelli sul quadro principale	Sonda salinità
Oc	Funzioni analogiche DCS	Controllore indicatore salinità
Sc	Funzioni logiche DCS	Piungia lancia
Sc	Strumenti anelli DCS	Trasmettitore di portata
Sc	Strumenti anelli DCS	Stabilizzatore di pressione gas
Sc	Strumenti anelli DCS	Valvola di sicurezza vapore
Sc	Strumenti anelli DCS	Presentatore di sicurezza gas
Sc	Strumenti anelli DCS	Pressostato bassa pressione gas
Sc	Strumenti anelli DCS	Pressostato bassissima pressione gas
Sc	Strumenti anelli DCS	Pressostato bassissima pressione gas
Sc	Strumenti anelli DCS	Electrovalvola gas metano classe A
Sc	Strumenti anelli DCS	Electrovalvola gas metano classe A
Sc	Strumenti anelli DCS	Nanometro
Sc	Strumenti anelli DCS	Presentatore alta pressione gas
Sc	Strumenti anelli DCS	Regolatore bruciatore
Sc	Strumenti anelli DCS	Pressione aria ventilatore
Sc	Strumenti anelli DCS	Pannello controllo fiamma
Sc	Strumenti anelli DCS	Electrovalvola sonda per controllo fiamma
Sc	Strumenti anelli DCS	Trasformatore accensione
Sc	Strumenti anelli DCS	Indicatore di temperatura
Sc	Strumenti anelli DCS	Sonda di temperatura
Sc	Strumenti anelli DCS	Indicatore di livello
Sc	Strumenti anelli DCS	Bassissimo livello caldaia
Sc	Strumenti anelli DCS	Basso livello caldaia
Sc	Strumenti anelli DCS	Regolatore di livello modulante
Sc	Strumenti anelli DCS	Presentatore di sicurezza vapore
Sc	Strumenti anelli DCS	Trasmettitore di pressione
Sc	Strumenti anelli DCS	Regolatore indicat. di pressione con limite alto
Sc	Strumenti anelli DCS	Sporge temporizzate
Sc	Strumenti anelli DCS	Indicatore parametri di funzionamento
Sc	Strumenti anelli DCS	Separazione di allarme
Sc	Strumenti anelli DCS	Contatore portata

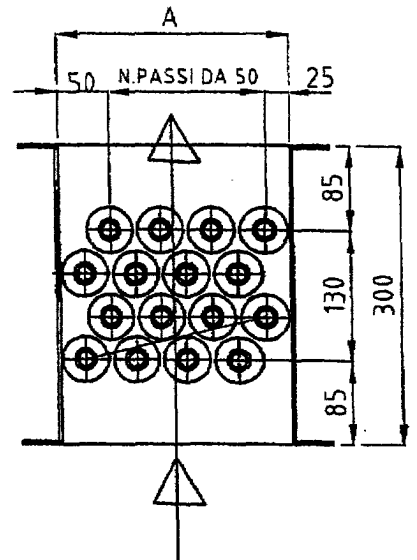
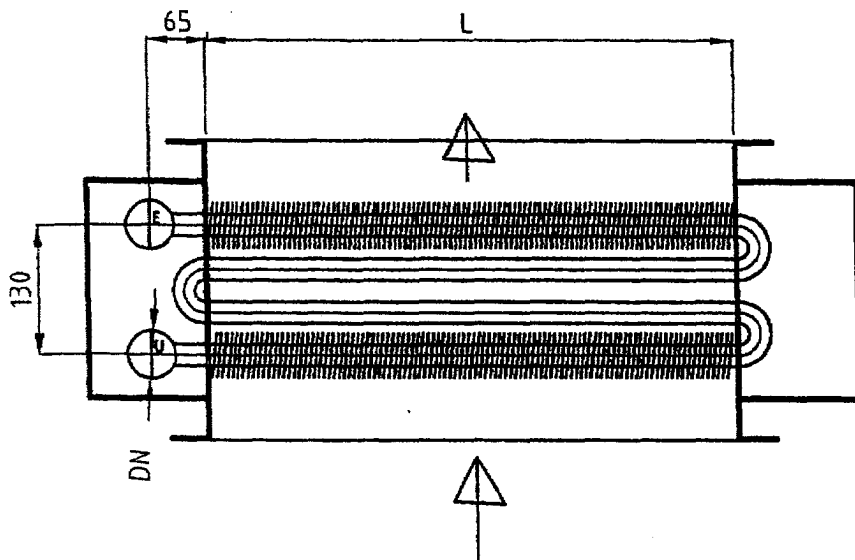
GARIONI NAVAL
 Viale dei Caduti, 3
 25030 CASTELMELLA (BS)
 Tel. (030) 2681541 r.a.
 Fax (030) 2680910

GPT 10.000 P&ID

COMMESSA 151/04
 REVISIONE 1
 SOSTITUISCE IL SOSTITUITO DAL

DESIGNATO S.F.
 APPROVATO C.D.
 DATA 02/04/04
 SCALA /
 DISEGNO N. 04-0080

QUESTO DISEGNO E' DI NOSTRA ESCLUSIVA PROPRIETA' E' VIETATO A PENNA DI LEGGE RIPRODURLO O INVOLGARLO A PERTI SENZA LA NOSTRA AUTORIZZAZIONE



COLLETTORE SCHEDULA 80 MAT. ASTM A 106 GRADO B
 TUBO Øe 21.3 Sp. 2.77 MAT. ASTM A106 GRADO B
 NASTRO 12x0.7 Fe
 ALETTATURA APPOGGIATA 200 ALETTE/MT
 CURVE 0=50
 DISPOSIZIONE TUBI QUICONCE

MODELLO TYPE NG-C	1000	1500	2000	2500	3000	3500	4000	5000	6000
N	3.5	3.5	4.5	4.5	5.5	5.5	5.5	7.5	7.5
A	225	225	275	275	325	325	325	425	425
L	750	750	1000	1000	1200	1200	1400	1400	1600
N. TUBI	16	16	20	20	24	24	24	32	32
DN	40	40	40	40	40	40	40	50	50

MODELLO TYPE GPT	3000	3500	4000	5000	6000	8000	10000	12000	15000
N	5.5	5.5	5.5	7.5	8.5	9.5	11.5	13.5	15.5
A	325	325	325	425	475	525	625	725	825
L	1200	1200	1400	1400	1600	1800	1800	2000	2000
N. TUBI	24	24	24	32	36	40	48	56	64
DN	40	40	40	50	50	50	50	65	65



Viale dei Caduti, 3
 25030 CASTELMELLA (BS)
 Tel. (030) 2681541 r.a
 Fax (030) 2680910

TABELLA ECO NG-C 1000 ÷ 6000 GPT 3000 ÷ 15000			
DISegnATO	APPROVATO	SCALA	DATA
S.F.	Benelli	/	27/04/04

COMMESSA	REVISIONE
-	-
SOSTITUISCE IL	SOSTITUITO DAL
-	-
DISEGNO N. 04-0143	

QUESTO DISEGNO E' DI NOSTRA ESCLUSIVA PROPRIETA' E' VIETATO A TERMINI DI LEGGE RIPRODURLO O DIVULGARLO A TERZI SENZA LA NOSTRA AUTORIZZAZIONE