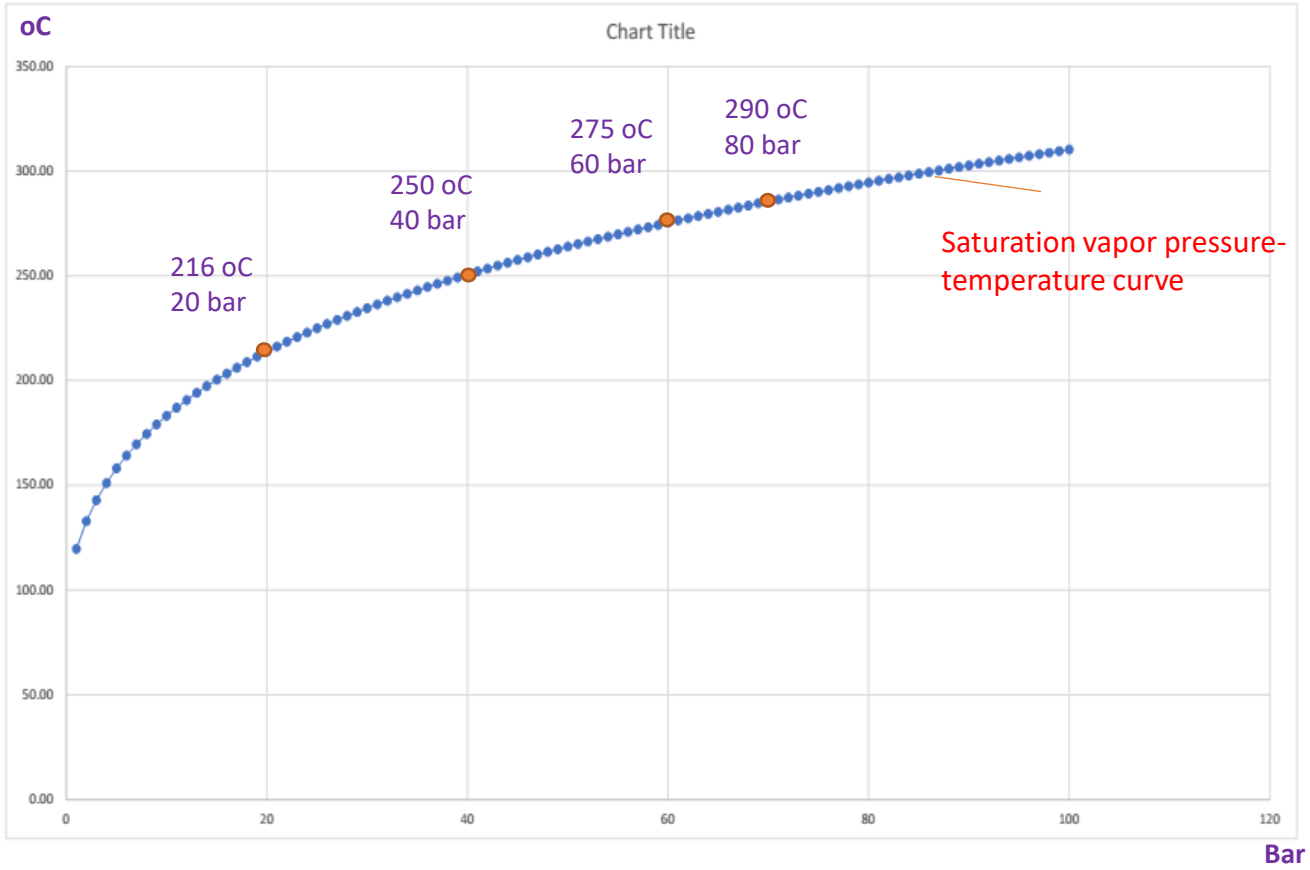
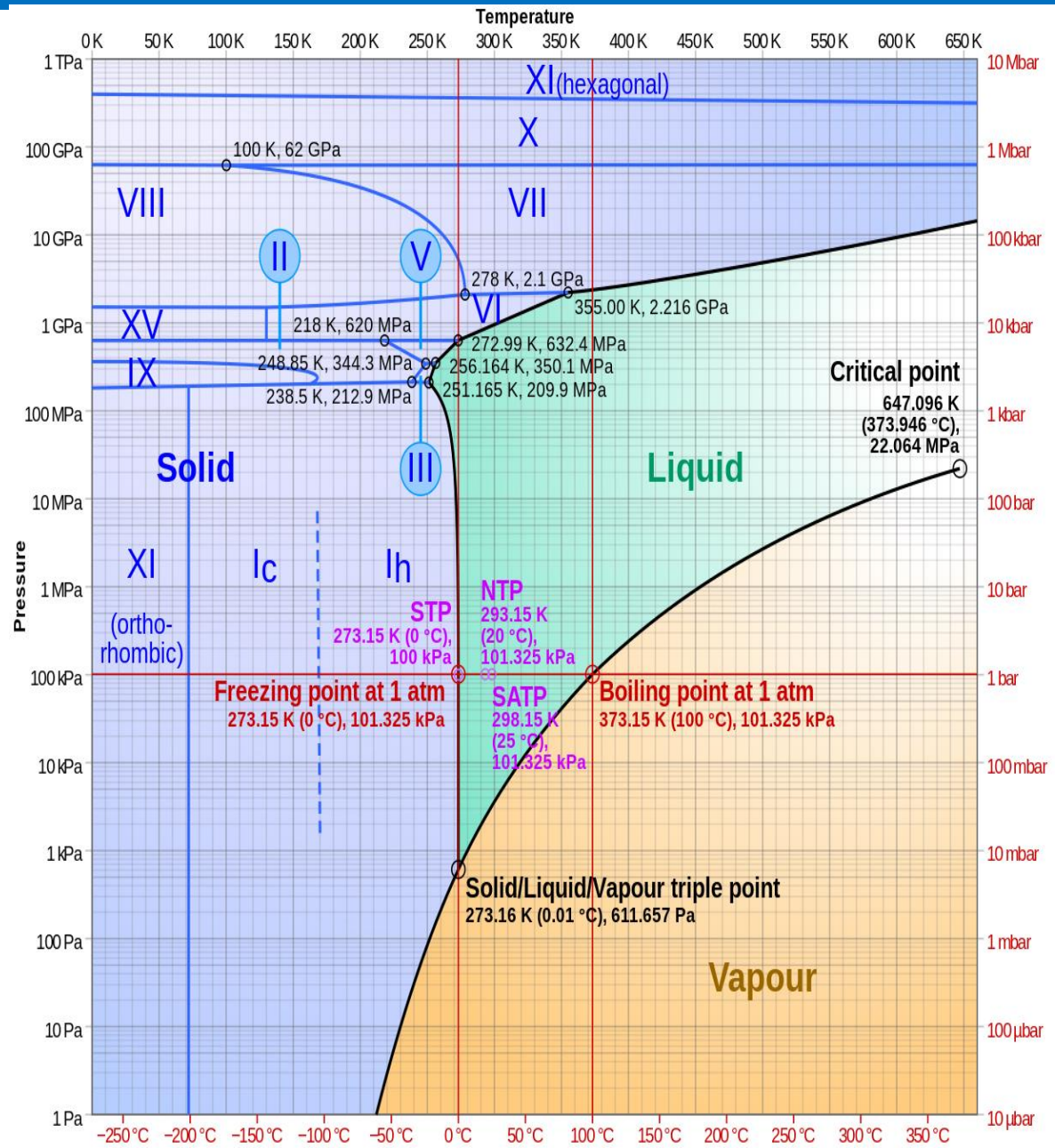
VIETSOVPETRO JOINT VENTURE
MECHANICAL & ENERGY DIVISION

DESIGN AND MANUFACTURE OF A MOBILE STEAM GENERATOR STATION

I. Main specifications of the MSG station:

- The high-pressure steam generation station is used to create a source of saturated high-pressure steam at temperatures up to 295 °C and pressures up to 80 bar/100 bar.
- Purpose: Used for washing paraffin in wells, pipelines, storage tanks, valves, and other oil and gas technology equipment.





I. Main specifications of the MSG station:

- Multifunctional – A multi-purpose device:
  - ✓Cleans pipes, tanks, and heat exchangers using high-pressure steam.
  - ✓Heats pipes, valves, and pumps to prevent oil, paraffin, and hydrate from solidifying.
  - ✓Supports pre-welding processing, maintenance or equipment replacement.
  - ✓Mobile – Ready for operation in any location
  - ✓The mobile design allows for quick deployment between areas on the platform or between different platforms.
  - ✓Independent of fixed steam systems, ensuring high proactivity.
- Effectiveness – Cost and time savings for equipment downtime
  - ✓Quickly address issues of blockages, wax deposition, and hydrates.
  - ✓Limit the use of chemicals, reducing costs and environmental risks.
- Safety – Compliance with international oil and gas standards.
  - ✓Optimal design for harsh offshore environments.
  - ✓Meets safety standards for marine structures.
- Applications:
  - ✓Maintenance of subsea & topside pipelines.
  - ✓Oil and gas processing and petrochemical plants.
  - ✓Offshore drilling rigs, oil and gas extraction platforms.

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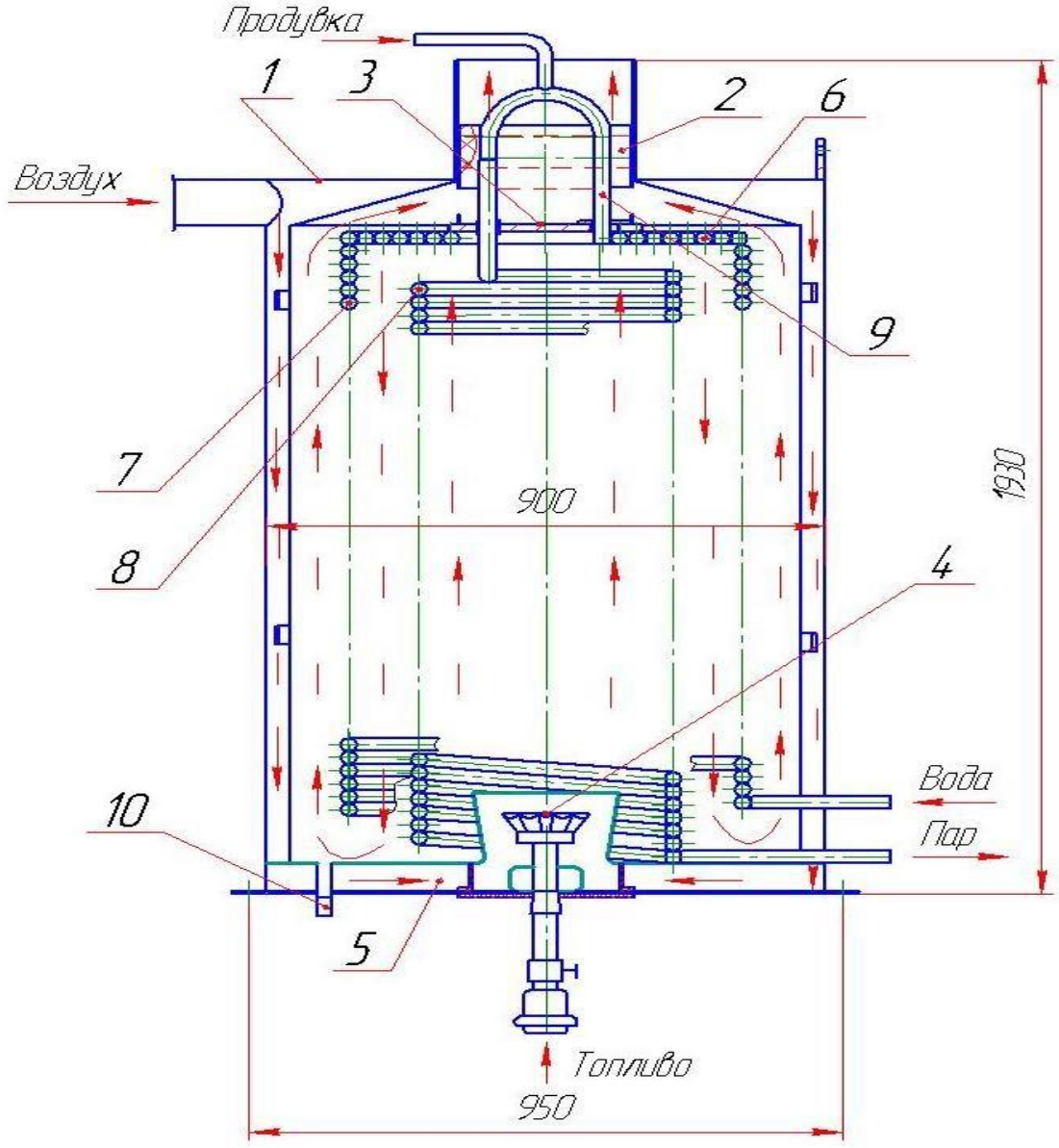
I. Main specifications of the MSG station:



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II. Design and manufacture

- Research on the calculation/design of measurement and control systems, fire prevention as well as actuating devices.
- Calculating the structural framework of metal shells, finding alternative material solutions. Optimizing technological pipelines and equipment to reduce load.
- Replacing the materials used in the construction of metal frames and shells of stations with stainless steel SS-316.
- Find alternative solutions for replacing the equipment and spare parts of the station with goods available on the market.
- Modernize the control system and burners.
- Program optimization to reduce dependence on operator experience.
- Add additional sound alarm warning devices.

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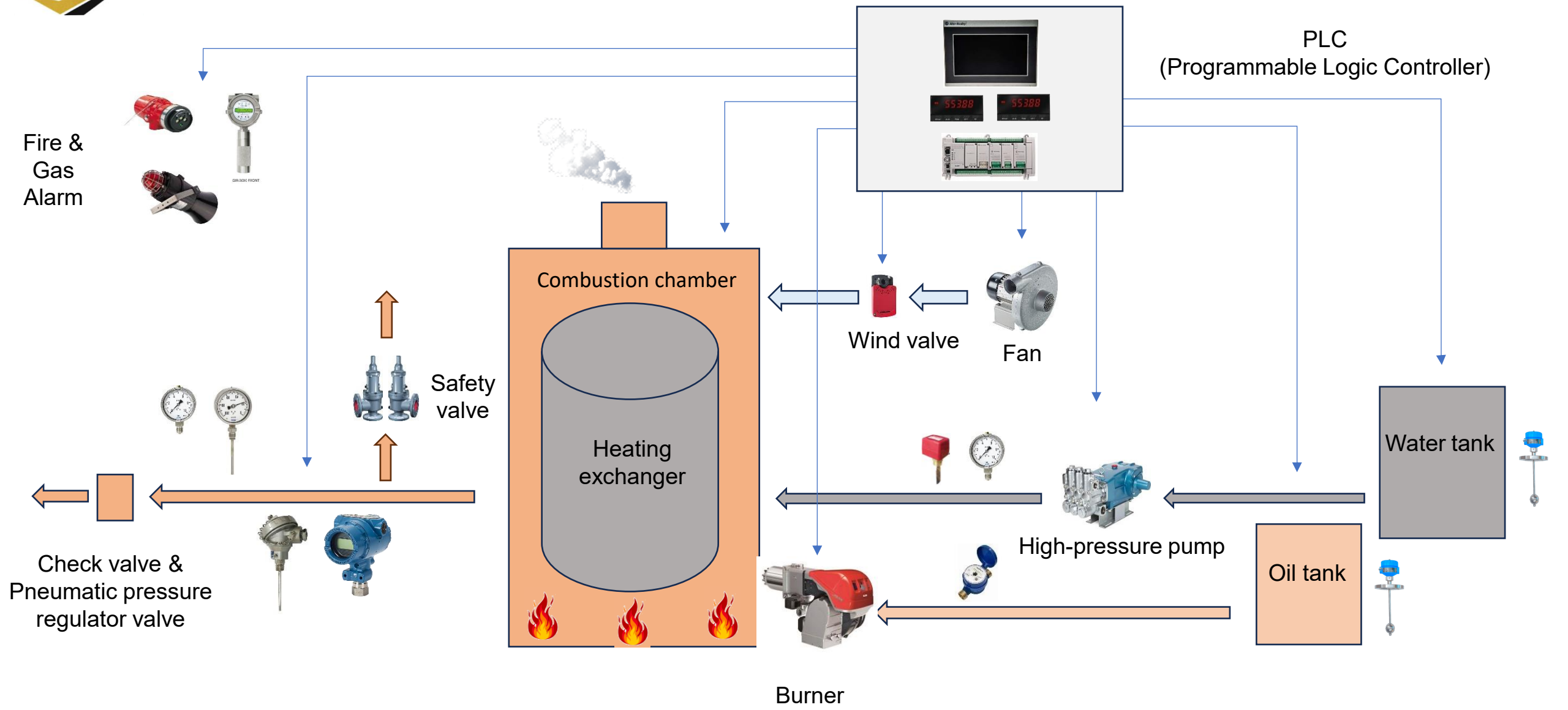
II. Design and manufacture



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II. Design and manufacture,solutions

Calculating equipment selection, internationalizing the country of origin:

No	Decription	MSG made from MED	MSG made from Russia
1	Integrated burner	Manufactorer: Riello Origin: Italy	Hand-controlled burner Origin: Russia
2	Fire sensor	Manufactorer: ESP- Origin: EU/ G7	Not
3	Gas sensor	Manufactorer: Gas sensor- Origin: Singapore	Not
4	Air adjustment valve	Manufactorer: Solon- Origin: China	Not Adjust the air vent manually
5	Water/fuel level indicator	Manufactorer: WIKA- EU/ G7	Not
6	Water/fuel level transmiter	Manufactorer: WIKA- Origin: EU/ G7	Not, only the bouy of low water level Origin: Russia
7	High-press piston pump	Manufactorer: Cat Pump Origin: Europe-G7	Origin: Russia

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II. Design and manufacture,solutions

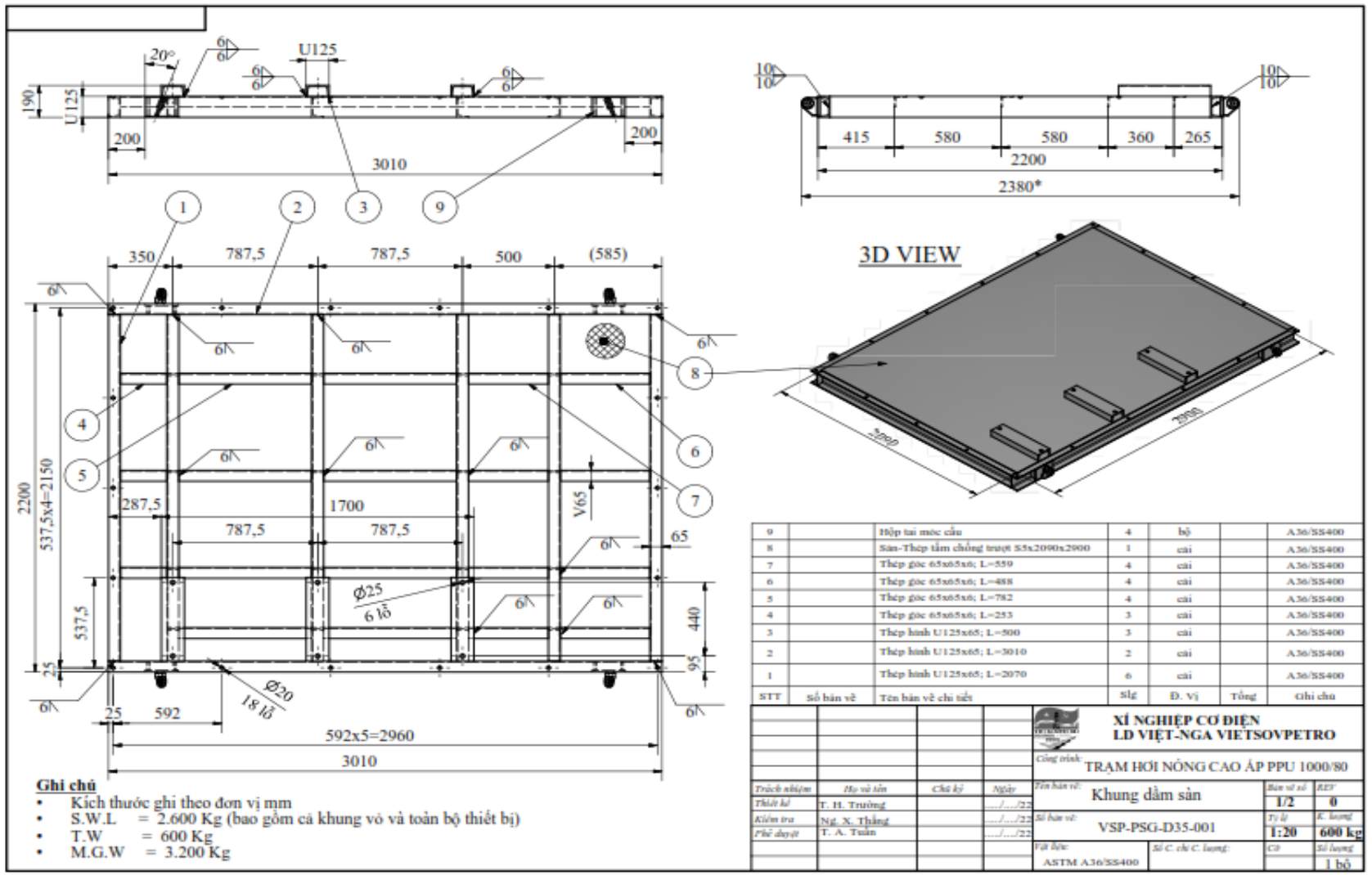
Calculating equipment selection, internationalizing the country of origin:

No	Decription	MSG made from MED	MSG made from Russia
8	Valves's system	Manufactorer: Flour Valve, Fitok, Dklok Origin: Korea	Origin: Russia
9	Steam pressure transmiter	Manufactorer: Rosemount- Origin: Singapore	Not- only Steam pressure gauge
10	Temperature switch	Manufactorer: Wise- Origin: Korea	Origin: Russia
11	Steam pressure switch	Manufactorer: Wise- Origin: Korea	Origin: Russia
12	Water flow meter	Manufactorer: Newflow- Origin: Taiwan	Not - only the low water flow indicator switch.
13	Oil flow meter	Manufactorer: Aquametro- Origin: EU/ G7	Not
14	Programmable logic controller(PLC)	Manufactorer: Rockwell Automation- Origin: Singapore	Not- using a relay control circuit

II. Design and manufacture,solutions

Calculate the selection of combustion power

Calculate the durability of mechanical structures



STT	Số bản vẽ	Tên bản vẽ chi tiết	Slg	Đ. Vị	Tổng	Ghi chú
9		Hộp tai móc cẩu	4	bộ		A36/SS400
8		Sàn-Thép tấm chống trượt S5x2090x2900	1	cái		A36/SS400
7		Thép góc 65x65x6; L=559	4	cái		A36/SS400
6		Thép góc 65x65x6; L=488	4	cái		A36/SS400
5		Thép góc 65x65x6; L=782	4	cái		A36/SS400
4		Thép góc 65x65x6; L=253	3	cái		A36/SS400
3		Thép hình U125x65; L=500	3	cái		A36/SS400
2		Thép hình U125x65; L=3010	2	cái		A36/SS400
1		Thép hình U125x65; L=2070	6	cái		A36/SS400

Ghi chú
- Kích thước ghi theo đơn vị mm
- S.W.L = 2.600 Kg (bao gồm cả khung vỏ và toàn bộ thiết bị)
- T.W = 600 Kg
- M.G.W = 3.200 Kg

Trách nhiệm	Họ và tên	Chữ ký	Ngày
Thiết kế	T. H. Trường		…/…/22
Kiểm tra	Ng. X. Thắng		…/…/22
Phê duyệt	T. A. Tuấn		…/…/22

XÍ NGHIỆP CƠ ĐIỆN
LD VIỆT-NGA VIETSOVPETRO

Công trình: TRẠM HƠI NÓNG CAO ÁP PPU 1000/80

Tên bản vẽ: Khung dầm sàn
Bản số số: 1/2
REV: 0
Số bản vẽ: VSP-PSG-D35-001
Tỷ lệ: 1:20
K. lượng: 600 kg
Vật liệu: ASTM A36/SS400
Số C. chỉ C. lượng:
CD:
Số lượng: 1 bộ

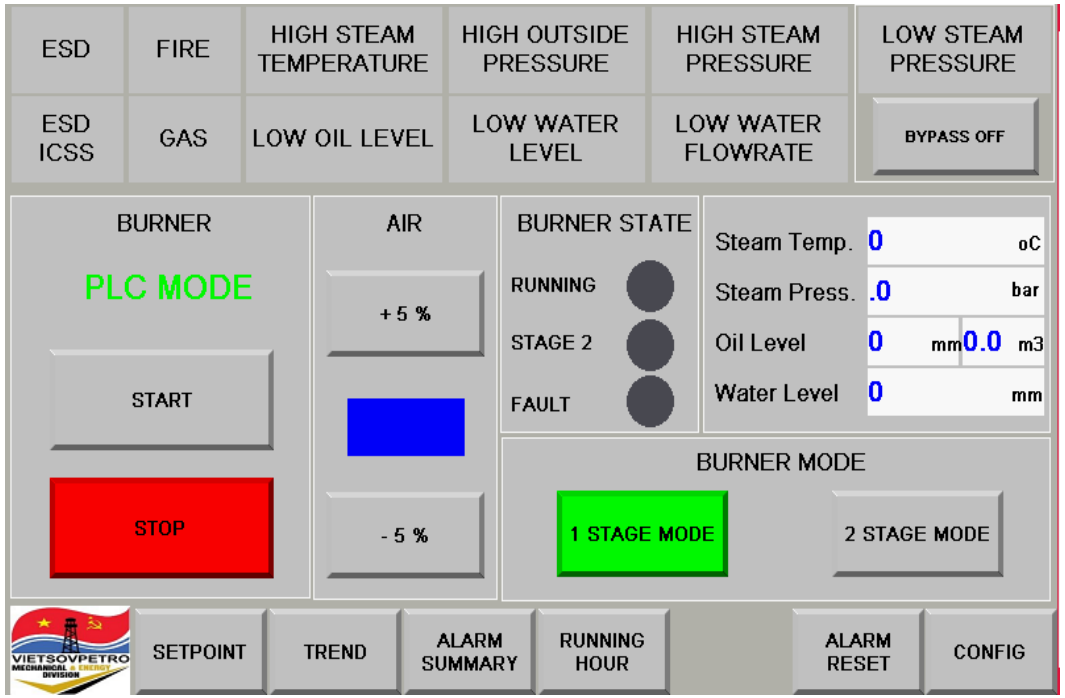
Design drawings, construction/testing procedures, and trial runs

The total documentation for the steam generation station includes structural drawings for the foundation frame, construction and equipment layout drawings, connection drawings for the control system… All design drawings have been reviewed, approved, and certified by the inspection authority.

System control programming

Programming for the control system using PLC with control logic and display screens showing the status of the system:

- Temperature, output steam pressure.
- Levels of oil tanks, water tanks.
- Burner mode (1 nozzle/ 2 nozzles).
- Adjusting air flow.
- Buttons: Start/ stop burner, increase/ decrease air.
- System alerts: High temperature/ pressure, low oil/ water level, fire alarm/ gas alarm…



The process of manufacturing and testing the steam station:

- Manufacturing the frame and shell of the station
- Manufacturing the boiler's internal components
- Installing equipment: water tank, oil tank, pump and motor, burner, heat exchanger assembly
- Installing low-pressure and high-pressure pipelines and shut-off valves, safety valves
- Installing measuring and control devices, control cabinet, protective equipment, alarms...
- Connecting equipment to the control cabinet
- Checking welds, conducting hydraulic tests of the system.

III. Installation and testing process

Testing (FAT) the system:

The MSG is operated and tested in all modes to meet technical requirements and procedures before being put into operation, with the supervision of the inspection agency according to the approved process.

IV.The solution has been implemented to improve quality and optimize product costs.

- Design, procurement of materials, and complete fabrication of a high-pressure steam generator using commonly available goods in both domestic and international markets
- Controlled by PLC and relay (backup) with integrated features to enhance operational safety
- Reduce dependence on the operational experience of the operator
- The burner has been modernized, and the control of pressure and output steam temperature is fully automated, minimizing environmental pollution emissions and minimizing fuel consumption
- The structural materials and the shell of the station are designed using stainless steel SS-316, enabling the steam generation station to operate effectively under real conditions and withstand harsh weather on marine constructions.
- Optimizing the installation of equipment and metal structures helps reduce the load of the station, ensuring safety during lifting operations on marine constructions.

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IV.The solution has been implemented to improve quality and optimize product costs.

No	Specifications	MSG made from MED	Old generation steam station
1	Fuel consumption (kg/hr)	30/ 60-100	35-110
2	Vaporization time (minutes)	5	10
3	Dimentions L x W x H,mm.	3100x2200x2450	4050 x 2350 x 2500
4	Weight (kg).	3200	3900
5	Material	Stainless steel SS316	Carbon steel CT20
6	Measuring device	Pressure, temperature, level measuring devices, fire alarms, gas alarms... for the controller to perform monitoring, control, and protection functions	Not equipped with analog pressure, temperature, and level transmitters. Not equipped with fire/gas alarm devices.
7	Fuel and ignition system	Integrate the fuel system, air supply, and flame detection device into a RL100 burner (Riello) with 2 independent nozzles: - The oil/air ratio is automatically adjusted between combustion modes. - The fuel mode is automatically controlled via PLC. - Optimizes combustion efficiency.	- The fuel valve system, air valve, and flame detection unit are separate components - The fuel mode and air valve are manually adjusted based on experience - Optimal combustion efficiency is fine-tuned by adjusting the amount of air and fuel based on experience.
	Security system	- Equipped with advanced protection features such as fire alarms, gas alarms with sound, remote stop (ICSS), and back pressure from the well.	- Not equipped with advanced protection features.
9	Control system	- Control system using PLC and Relay. - Monitoring the system through the control screen and analog gauges. - Alerts and system parameters displayed visually, easy to	- The control system uses relays, monitoring the system through mechanical gauges (mainly). - Difficult to change the control logic.

V. Effectiveness and service delivery capability:

- MED has completed the manufacture of 08 high-pressure steam generation stations according to the new design (2 stations 1600/100 and 6 stations 1000/80) fully meeting the technical requirements, which have been handed over to the customer, the OGPE and Use on VSP's marine projects.
- Currently, MED continues to manufacture 04 similar steam generation stations (1600/100) in 2025 and 2026.
- MED is ready to manufacture and supply the above products to customers who are other oil and gas companies in Vietnam for the purpose of addressing blockage issues, handling paraffin deposits, or customers who need to use high-pressure steam for other purposes: flushing pipeline systems, tanks, etc.
- Providing rental services for MSG stations that meet customer requirements for cleaning pipelines, storage tanks, heat exchangers using high-pressure steam, heating pipelines, valves, and pumps to prevent oil and paraffin from solidifying....

No	Name equipment	Operation at the site	Type/ Weigth/ Size (LxWxH)cm
1	MSG-18	RC-6	MSG-1000/80 3080 Kg 300 x220 x250
2	MSG-19	RC-5	MSG-1000/80 3200 Kg 310x 220x 245
3	MSG-20	BK-20	MSG- 1000/80 3600 Kg 310X 220x 250
4	MSG- 21	BK-23	MSG-1600/100 6570 Kg 600x 300x 290
5	MSG- 22	BK21	MSG-1000/80 3200 Kg 301x 225x 220
6	MSG- 23	KNT	MSG-1000/80 5000 Kg 400x 300x 270
7	MSG- 24	MSP4	MSG-1000/80 3200 Kg 301x 220x 245
8	MSG- 25	BK24	MSG-1600/100 5820 Kg 400x 300x 270

V. Effectiveness and service delivery capability:

- With proven experience and capability, MED VSP is a pioneer in Vietnam in mastering the entire process of designing - manufacturing - installing - operating - maintaining mobile steam generation stations, which are industrial products with strict requirements for safety and environmental protection certified by classification organizations.
- MED can design and manufacture steam generation stations with larger and more complex power ranges and scales to meet the needs of VSP as well as the market.
- MED VSP is fully capable of being proactive in operation, inspection, and troubleshooting any arising issues/maintenance/repair.
- MED VSP is ready to cooperate and provide the best mobile steam generation station manufacturing solutions for all steam projects that meet the requirements, ensuring compliance with the technical specifications from customers.

Thank You

For Your Attention!

Any Questions