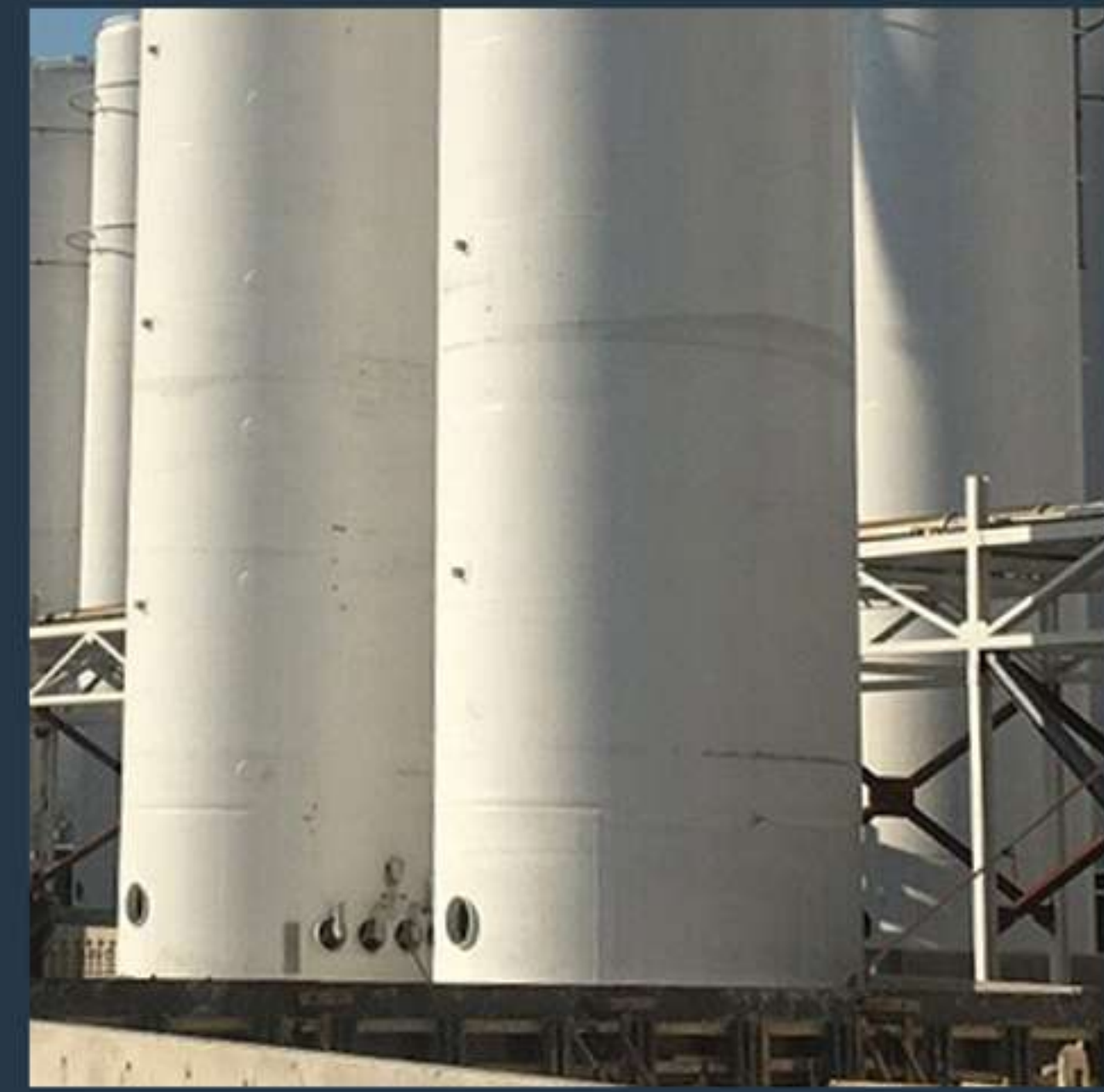
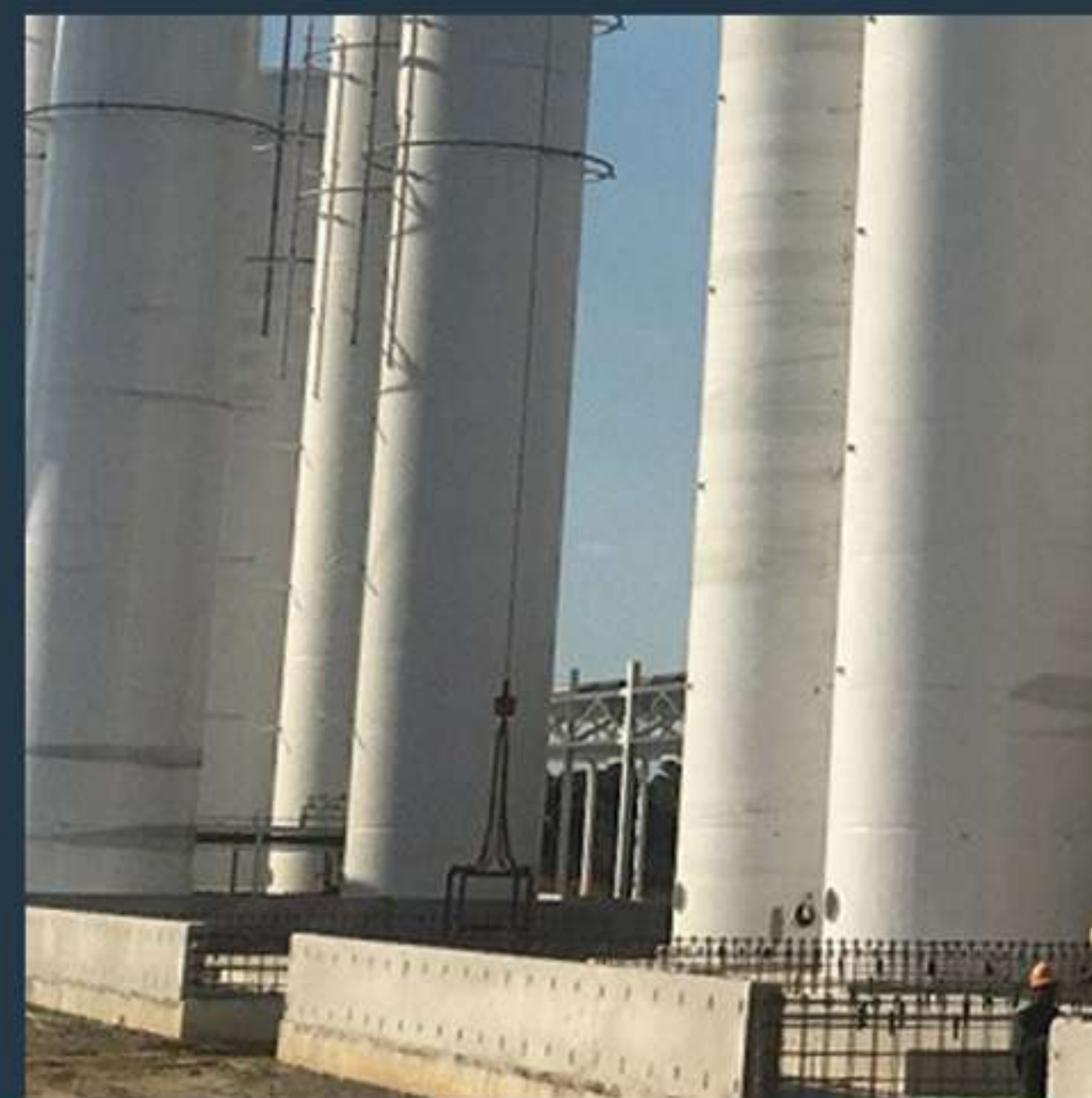


Cryogenic Standard Tanks

LOX, LAR, LIN, CO₂, LNG

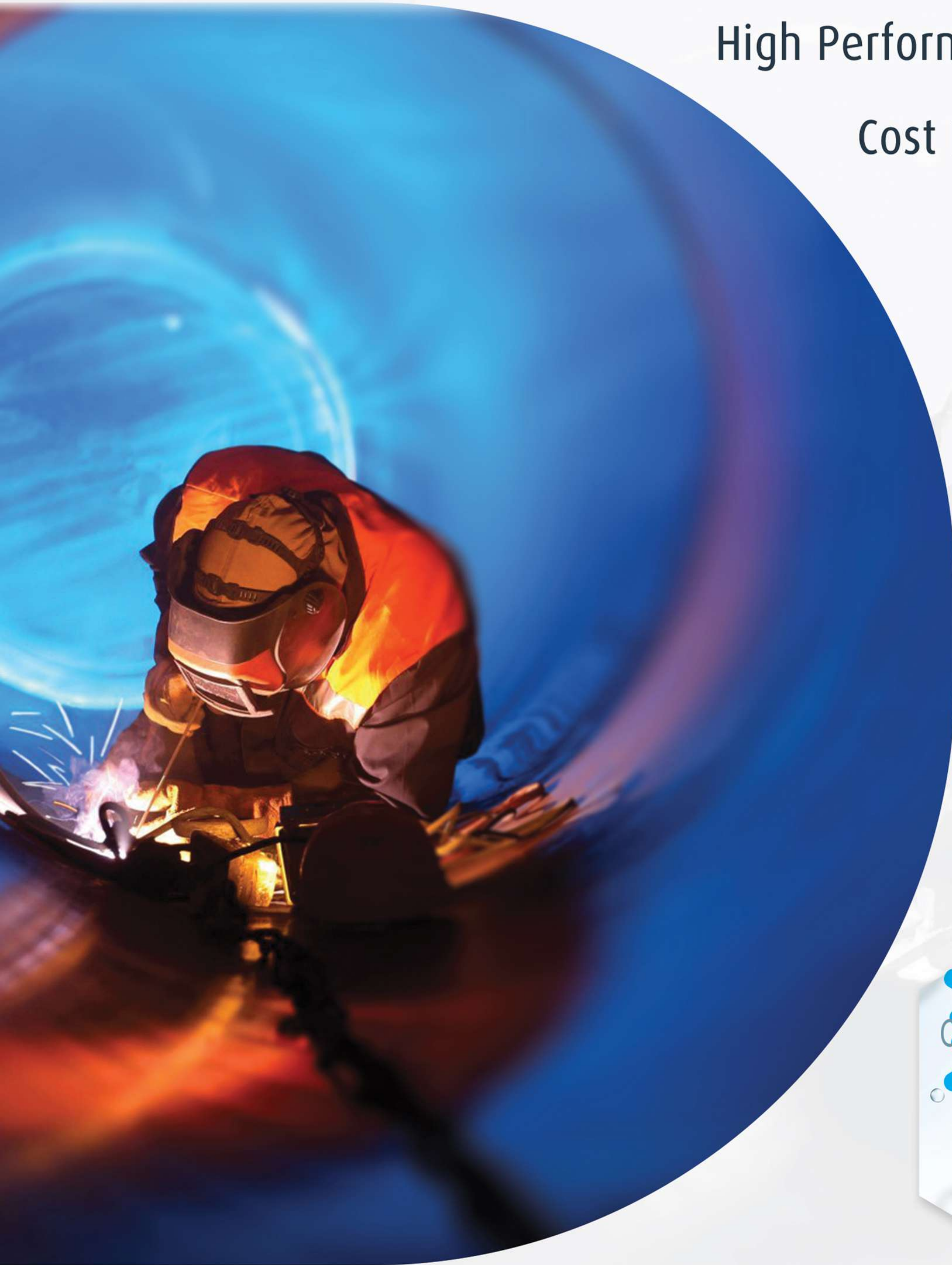


The aim is to allow for the productions characterized by;

High Quality

High Performance

Cost Effectiveness



Cryogenic is basically a technology which deals with the behavior of extreme low temperatures. Cold converts is a kind of a pressure vessel which is meant for storage of liquid oxygen and nitrogen or argon under required pressure conditions. All technologies used for this equipment are in highest resolutions.

This catalogue briefly describes the HATCO Industrial Gas and Cryogenic Equipment available as a result of condensing information in this catalog, some highly technical and special application material has been omitted. Proper application, installation and maintenance of the product is essential. Buyers should obtain further information if there are any doubts or questions. All information contained in this catalog is subject to change by HATCO without notice. Additional product information is available from HATCO or authorized product distributors. Illustrations and drawings of individual products are representative of "product groups" and all products within a product group are similar in construction.

Introduction:

Cryogenics refers to the entire phenomenon occurring below -150 or 123 o K. Cryogenics engineering involves the design and development of systems and components which produce, maintain, or utilize low temperatures.

Cryogenics vessels are designed for storage and transport of liquid gases at sub-zero temperatures. Manufacturing of cryogenic tanks requires special technical and sophisticated fabrication techniques.

HATCO has developed the necessary technology and is manufacturing these cryogenic equipment like cryogenics vessels as a pioneer in domestic market.

We provide a comprehensive range of high-pressure tanks for liquefied Nitrogen, Oxygen and Argon from 5 to 320 m3 as follows:

Normative: PED

Design temperature -196°C

Thermal insulation: Perlite + vacuum

Materials: inner vessel stainless steel, outer vessel: carbon steel

Main Advantages

- Intrinsically SAFE design and operation
- Robust and reliable design, fitted for long service life
- Uncontestable price to quality relationship
- Competitive delivery time
- Flexibility in terms storage capacity design
- Good thermal insulation performance
- Flexible choice of options

Our Solution:

HATCO products are completely applicable for the efficient, safe and long-term storage of cryogenic liquefied under pressure gases LIN, LOX and LAR thanks with various design pressures and standard capacities.

Structure of Cryogenic Storage Vessel

The cryogenic storage vessel is designed in such a way that it has two different shells, first one is called the inner shell or product container and the other is called as outer shell and it is also known as vacuum jacket.

Multilayer insulation, powder insulators and fabric materials are used as insulators in large capacity cryogenic containers. The effectiveness of the storage vessel depend on the insulation hence it is very important parameter that should be considered in the design of the cryogenic storage vessels.

And these two shells (tanks) are connected by a support blocks, these support blocks will acts as a stiffeners and it helps in maintaining structural stability of the vessel it absorbs the stresses and it keep the product shell securely.

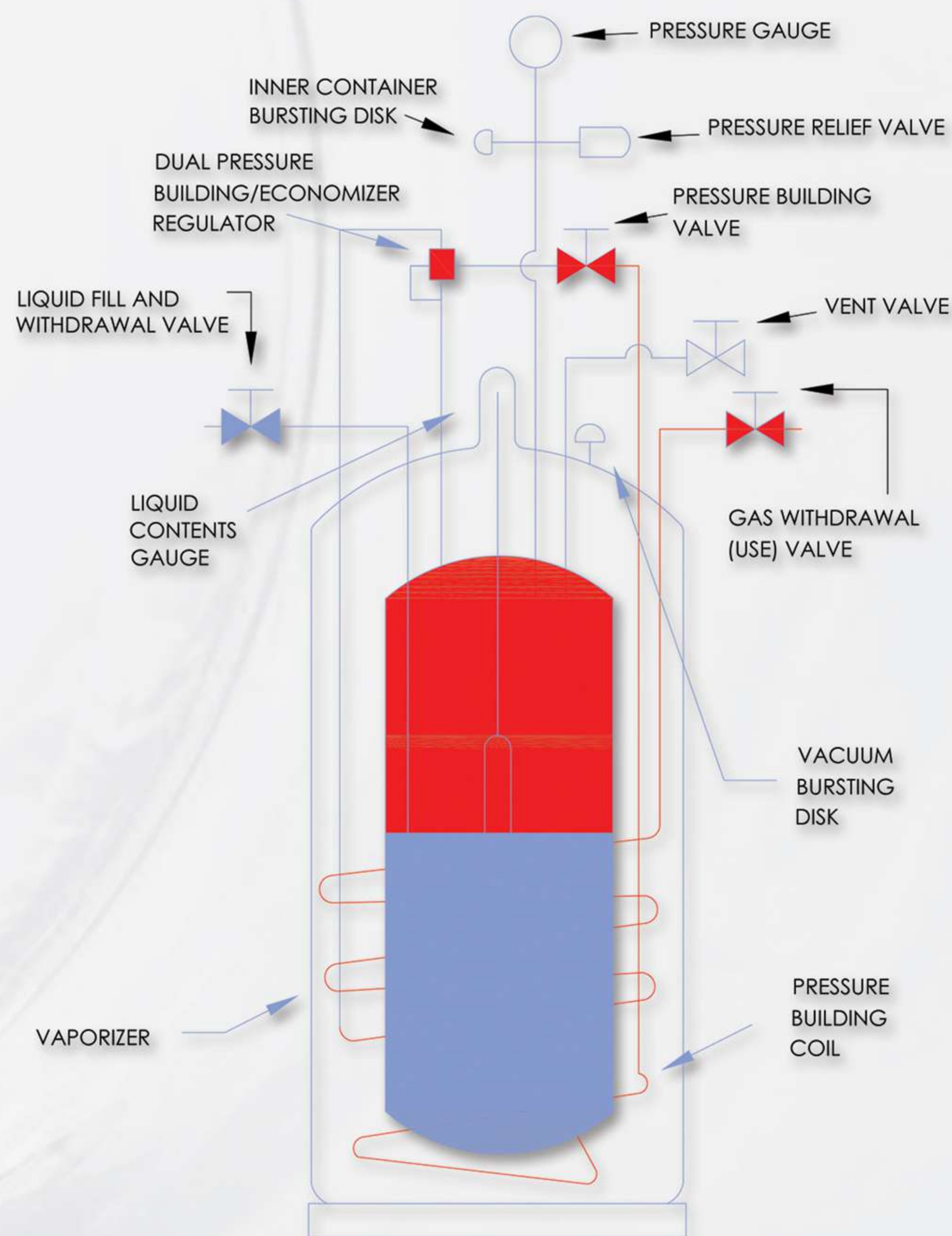
Standard Vacuum Insulated Tanks:

The standard LIN, LOX, LAR tanks come in gross nominal water capacities from 3,160 litre to 61,620 litre. The maximum allowable working pressure for the inner vessels is 18, 22 or 36 bar gauge for design temperatures ranking from -196°C up to 20°C. All standard tanks have vertical configuration, requiring little space for installation.

Furthermore HATCO proposes customized-engineered tanks up to 500,000 Liter as well (for large scales).

Each tank can also be equipped with a tank mounted (clip-on) air-heated vaporizer to supply product in gaseous form at ambient temperatures and flow rates up to 120 Nm³/h.

Depending on client's requirements additional features and options are available.



Standard carbon dioxide tanks are very similar to the tanks for air gases. As a function of the application and customer's request you have here the choice between an inner vessel either manufactured from a low temperature resistant austenitic steel or a fine grain carbon steel. The insulation system is equal to the system which is used for the air gas tanks.

CO₂-tanks, equipped with an inner vessel made out of a low temperature resistant austenitic steel can therefore also be used as multi-purpose storage for other industrial gases.

Standards and Configuration

Quality Standards

Our products for various working pressures from 5 – 42 bar tanks Certified according to:

- EN ISO 9001/2015
- European Directive 2014/68/EU on Pressurized Equipment (CE marking) and harmonized standards for the mentioned directive (for example, EN 13445).
- ASME (U, U2, R-Stamp)

Components

HATCO versatility addresses the full spectrum of cryogenic installations.

The various components of cold convertor are as follows:



Shells

The shells of cold converter are of cylindrical sections. These are mainly two shells named as inner shells and outer shells. The inner shell is made up of stainless steel where the outer shell is made up of carbon steel. The annular space between the shells is evacuated and is perlite insulation.



Dish Ends

These form the end closer to cold converters. In the dished ends a sudden change in direction is avoided at the junction of cylindrical shell and formed end with a gradual change in shape reduces the local discontinuity stresses at the junction. The dished end may be hemi-spherical, tori-spherical or ellipsoidal.



Skirt / Legs

It provides support to the entire vessel. The skirt is usually welded directly to the vessel either to the bottom dished end or outside of the cylindrical shell. The bottom of the skirt of the cold converter must be securely anchored to the concrete foundation by means of anchor bolts embedded in the concrete to prevent overhauling from the bending moments induced by wind and seismic loads.



Nozzles

Nozzles are connections through which the vessel is connected to the piping instrumentation and other control equipment. These are welded to the shell. Nozzles can be from seamless pipes, forged hollow bars. These are connected by means of flanges, screw type connections or directly welded. Pressurization coil The unit consists of aluminum star fins by the side of tank and is gravity fed by valve and the desired pressure can be obtained. Its output is controlled by the regulator (pressure control valve).



Pipelines

Vacuum super insulated transfer lines, flexible and rigid versions

Safe and reliable piping is essential for the storage and transport of cryogenic products. Due to very low temperatures, cryogenic pipes face unique corrosion and deterioration challenges.

To ensure that the gases travel from the containers to the point of use with minimum vaporization losses, CryoHAT offers vacuum super insulated transfer piping systems and corresponding equipment.

We support the customer from the outset to help you implement the project as quickly as possible, and allow you to enjoy the economic benefits immediately. We will collaborate with you in planning, designing and installing the cryogenic piping system customized for your requirements.

A modular system specially developed for all applicable sizes in DIN, ANSI, ASME, etc. which is suitable for a wide range of tasks and available ex stock in standard lengths of 3, 6 and 12 meters.

General design features

- Welded construction made of anti-magnetic, highly corrosion-resistant stainless steel
- Rigid or flexible versions
- Super insulated couplings for flexible expansion and combination
- Coupling types: Quick release plug-in couplings and permanently installed welded couplings
- Long service life of the insulating vacuum via use of absorption material and special getter
- Quality control in every manufacturing phase
- Leak tests of the inner and outer pipes

High thermal quality

- Via computer-aided optimized thermal design and multi-layer Vacuum Super Insulation between the inner and outer pipes.

Advantages of flexible and rigid piping systems

- Aesthetically pleasing
- Made of anti-magnetic, highly corrosion-resistant stainless steel, can therefore be used in clean rooms and in the foodstuff industry
- Easy to expand and combine with plug-in couplings
- Long service life of the vacuum via use of absorption material and special getters. This reduces your gas consumption and the maintenance intervals



Valves and Instrument

The different gauges and valves which are used in the cryogenic vessel are vapored, liquid container gauge, vacuum bursting disk, vent valve, pressure building valve, pressure building coil, pressure relief valve, Pressure gauge, inner container bursting disk, liquid fill and withdraw valve, economical regulator, vent valve, etc.

These equipment are required to monitor and stabilize the cryogenic vessel and have a precise measuring capability, otherwise smallest change in the pressure variations can leads to trouble. Hence different parameters of the vessel are continuously monitored.

The important components in the cryogenic storage vessel are the pressure gauge and the pressure relief valve, because the pressure in storage vessel should always have to be maintained at a required pressure level and if it is not maintained then the storage vessel may leads to malfunction.

All gauges and valves have the capability to work even at the higher pressure environments without any malfunction.



Control cabinet (Optional)

The valves gauges and fittings required for the operating the convertor are located in light alloy shelter mounted on the outer shell. For example: vacuum gauge, rupture disc, inlet and outlet valves etc.

All these components could be monitored and regulated through of the PLC.



Perlite Cryogenic Insulation

Perlite insulation is an essential step for the cryogenic plants or low temperature use, exhibits low thermal conductivity throughout a range of densities; the normal recommended density range is 48 to 72 kg/m³. In addition to its excellent thermal properties, Perlite insulation is cost efficient, easy to handle and install, non-combustible and meets fire regulations, lowers insurance rates, does not shrink, swell, warp or slump.

Cryogenic Grade Perlite is transferred into the void by a pneumatic pump combined with conveying pipes. Vibrating equipment is used to ensure correct settlement within the annulus and nozzle spacing.

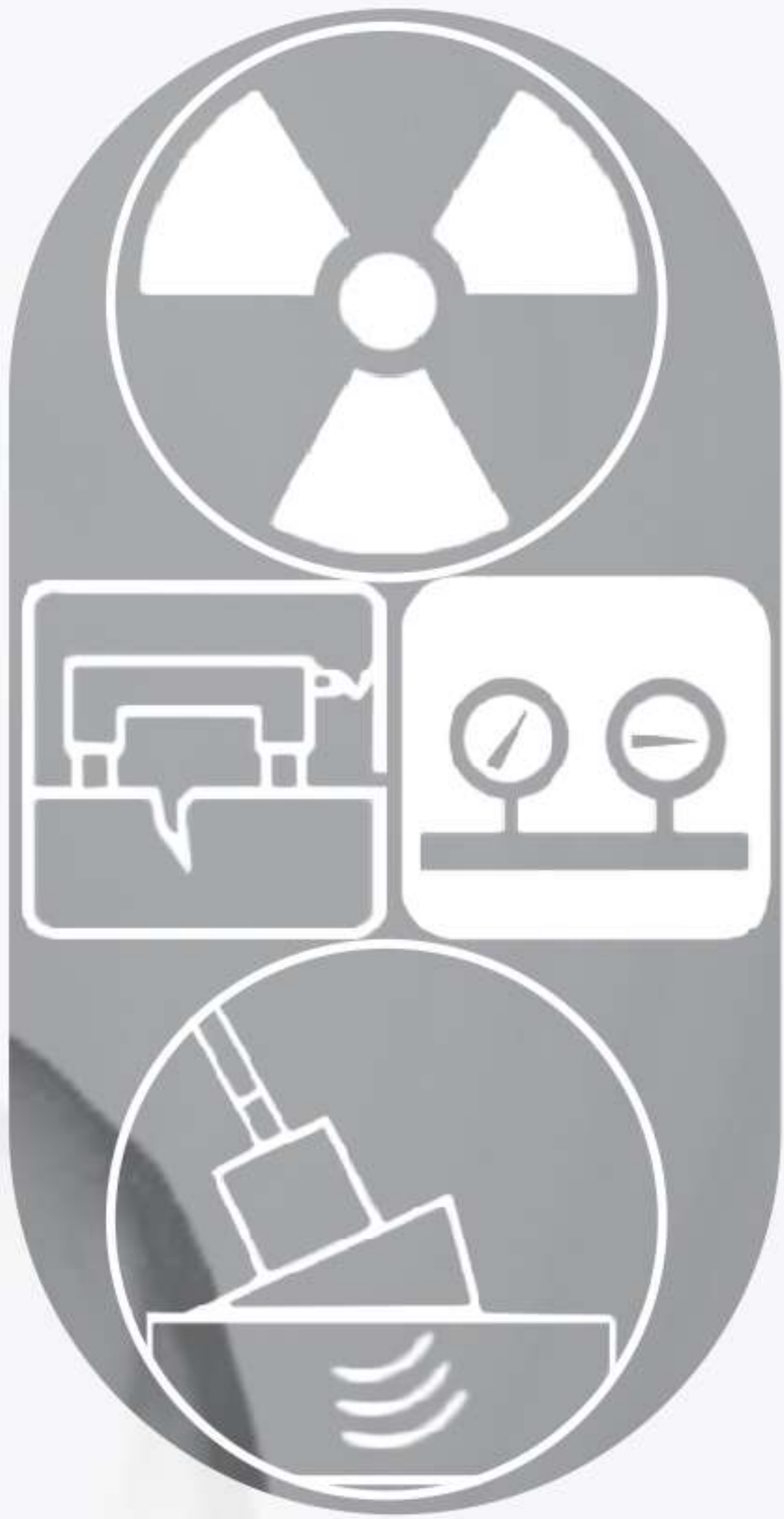
HATCO boasts a specialized team of Engineers and Technicians in cryogenic Perlite installation offers to the clients in the region turn-key solutions in Cryogenic Perlite insulation, combining expertise and fast deliveries from brand new state-of-the-art Perlite.



Cryogenic Ambient Air Vaporizer

Ambient air vaporizers require no external source of energy; and enables vaporization through exchange of heat with the surrounding air. The liquefied gas is vaporized, and warmed to almost the surrounding temperature, and finally led to the users in its gaseous state.

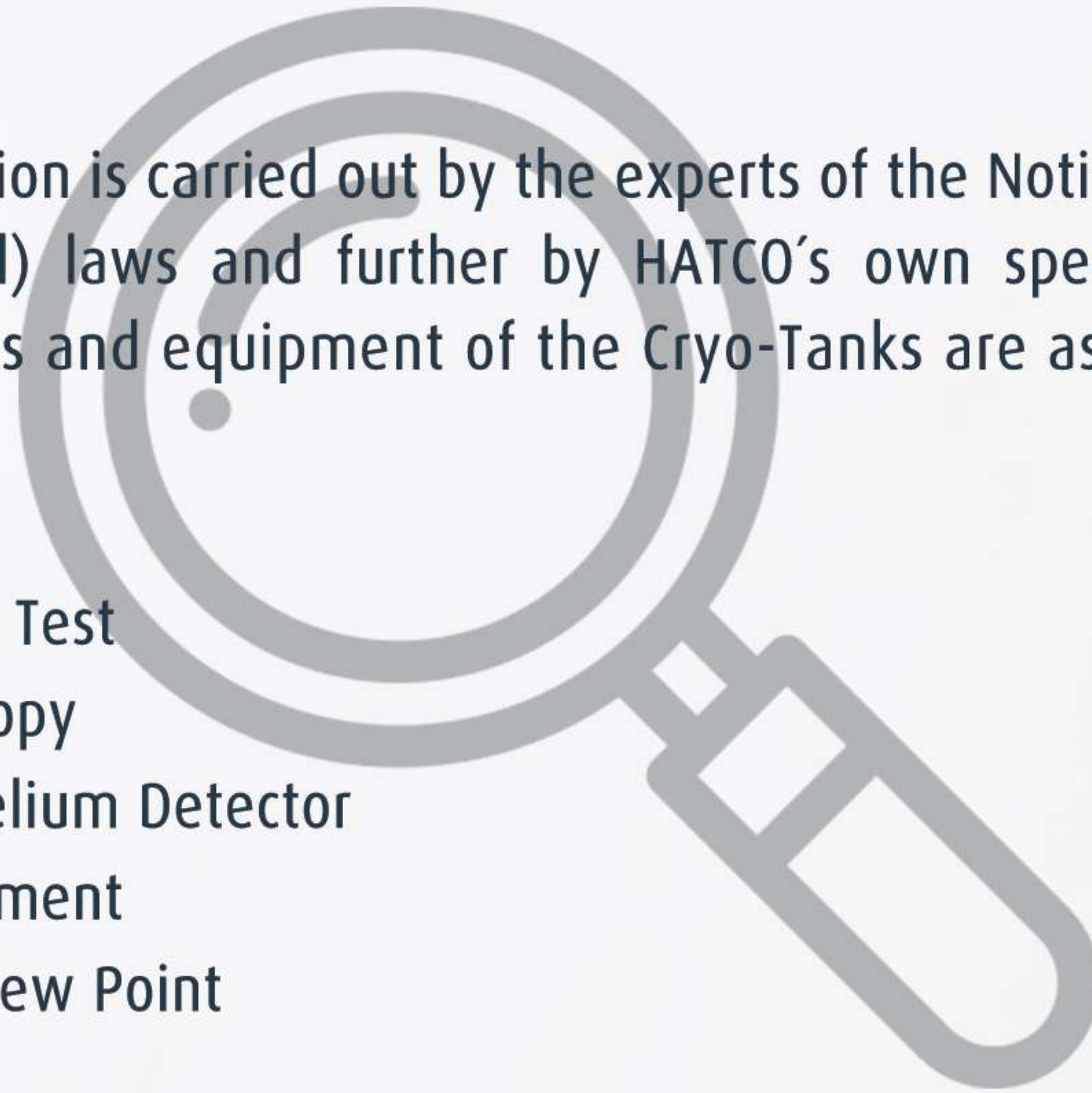
The vaporizers are for use with liquid: Nitrogen, Oxygen, Argon, Carbon Dioxide, Nitrous Oxide and LNG.



Inspection

Acceptance inspection is carried out by the experts of the Notified Body acc. to the valid (international) laws and further by HATCO's own specialists. A brief list inspection methods and equipment of the Cryo-Tanks are as follows:

- X-Ray
- Ultrasonic Test
- Magnetic Particle Test
- Industrial Endoscopy
- Leak Test with Helium Detector
- Vacuum Measurement
- Hygrometry for Dew Point
- UV Lamp
- Pickling & Passivation



Optional standards for enhanced quality:

Quality degree	Technical detail	Applications
HQ (Degree for media with purity >5.0)	<ul style="list-style-type: none"> • Inner vessel stainless steel • Inner vessel and pipes pickled • Stainless steel cryogenic valves below sealed 	High demands in semiconductor industry and research
IQ (Degree for corrosive industrial environment)	<ul style="list-style-type: none"> • Inner vessel stainless steel • Stainless steel cryogenic valves with stuffing box 	Corrosive environment

Ambient Air Heated Vaporizer

HATCO offers a standard range of the vaporizers to maintain tank pressure during liquid withdrawal to match the customer flow requirement to avoid low-temperature gas entering the product pipeline.

All to meet the customer flow requirement:

- tank mounted units (to be installed underneath the storage tank)
- stationary unit (to be installed next to the storage tank)

General Specifications

- Designed in compliance with EN13445 and AD2000, ASME on request.
- Maximum allowable working pressure 40 bar and an allowable operating temperature range (TS) of -269°C/+50°C.
- Optimized external and internal surfaces for optimum convection
- Cleaned for oxygen service
- Seismic requirements accuracy to uniform building code-zone 4
- Low pressure drops
- Efficient fin tube design
- Clip-on standard design*

* It means the vaporizer without frame. Upon customer request on tank mounted categories, a mounting kit for installation on tank is available.

Vaporizer Type	Dimensions Approx. [m] depth - width - height	Empty Weight [kg]	Nominal Capacity * N2 [Nm ³ /h]	Connections (Inlet/Outlet Stainless Steel) [mm]
L40 - 8F 2,5	1,67 x 0,516 x 2,733	140	120	Screwed: M40 x 2 Pipe: DN 15 (21,3 x 1,5) Socket welding end: ø18,2
L40 - 4F 2,5	1,67 x 0,276 x 2,733	74	60	
L40 - 2F 2,5	0,69 x 0,276 x 2,709	37	30	

* The capacity is based on an ambient temperature of 20 °C, 70 % rel. humidity, 15 °C temperature difference between ambient and gas outlet temperature at a continuous 8-hours operation

Explanation of type designation:

L = air heated

40 = max. permissible working overpressure: 40 bar

8 F = number of Finned tubes: 8

2,5 = length of single finned tube: 2,5 m

For bigger flows, custom-made pressure building vaporizers are available.



Options

- **Fin-tube formal vaporizers**

The heat exchanger tubes are part of an all aluminum-finned extrusion. These fins provide a large surface collecting the ambient heat and as such provide energy for vaporization. No visible corrosion will appear on customer site.

- **Fan-assisted vaporizers**

In order to increase sent out capacity, HATCO offers forced draft design with fan(s) installed on top of the vaporizers. These fans forces down an increased air flow which will also result in less fog production which might be an issue for the larger sent out capacities.

- **Stainless steel lined design**

HATCO also offers vaporizers with stainless steel lining. As such, all gas wetted parts are from stainless steel which makes this design suitable for use in the semiconductor industry.

Design conform to ASME VIII

In addition to natural draught ambient air vaporizers we also have forced draught (fan assisted) vaporizers to generate a higher capacity.

Highly effective operation

Two service valves provide an exchange possibility for the filling valves even if the tank is filled. Integrated pressure building coil for standard discharge capacities (service valves see flow diagrams: valve 2 pressure building and valve 13 gas shut-off). The tank also has an optimized design to reduce ice formation.



The control cabinet is Atex and PED stamped, as well as all-in-inox



Ergonomically position of controls and instruments

The piping system is designed from pre-assembled standard modules which can be combined in order to meet customers' requirements for a better performance and enhanced reliability.



Safety

In case that the safety valves will release product, the medium will be blown off to a safe place.



Easy operation

All valves required for operation are set in one line



Feat

To ensure safety
performance, trust H
bring a customized s

ures

y and maximum
ATCO's experience to
olution for benefits.



A dedicated team

From the P&ID (Piping and Instrumentation Diagram) to the DFP (Detailed Functioning Plan), our team ensures that the customer has all the equipment operations knowledge in hand.

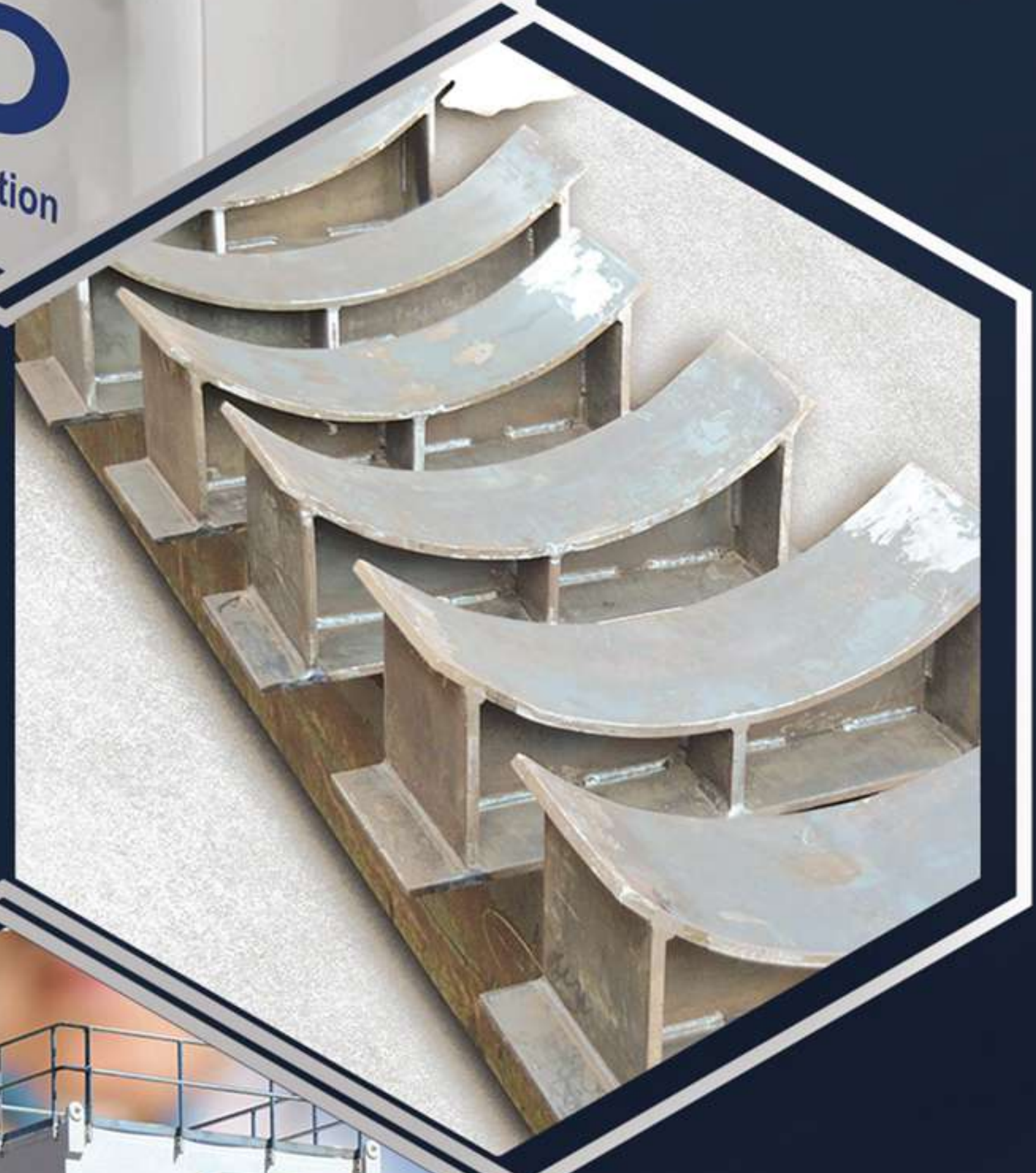


Designed to resist to strong seismic and wind constraints



Quality finish

The painting procedures and techniques offered by HATCO ensure a longer lifespan and high resistance to corrosion.



Non-corroding transport and lifting devices

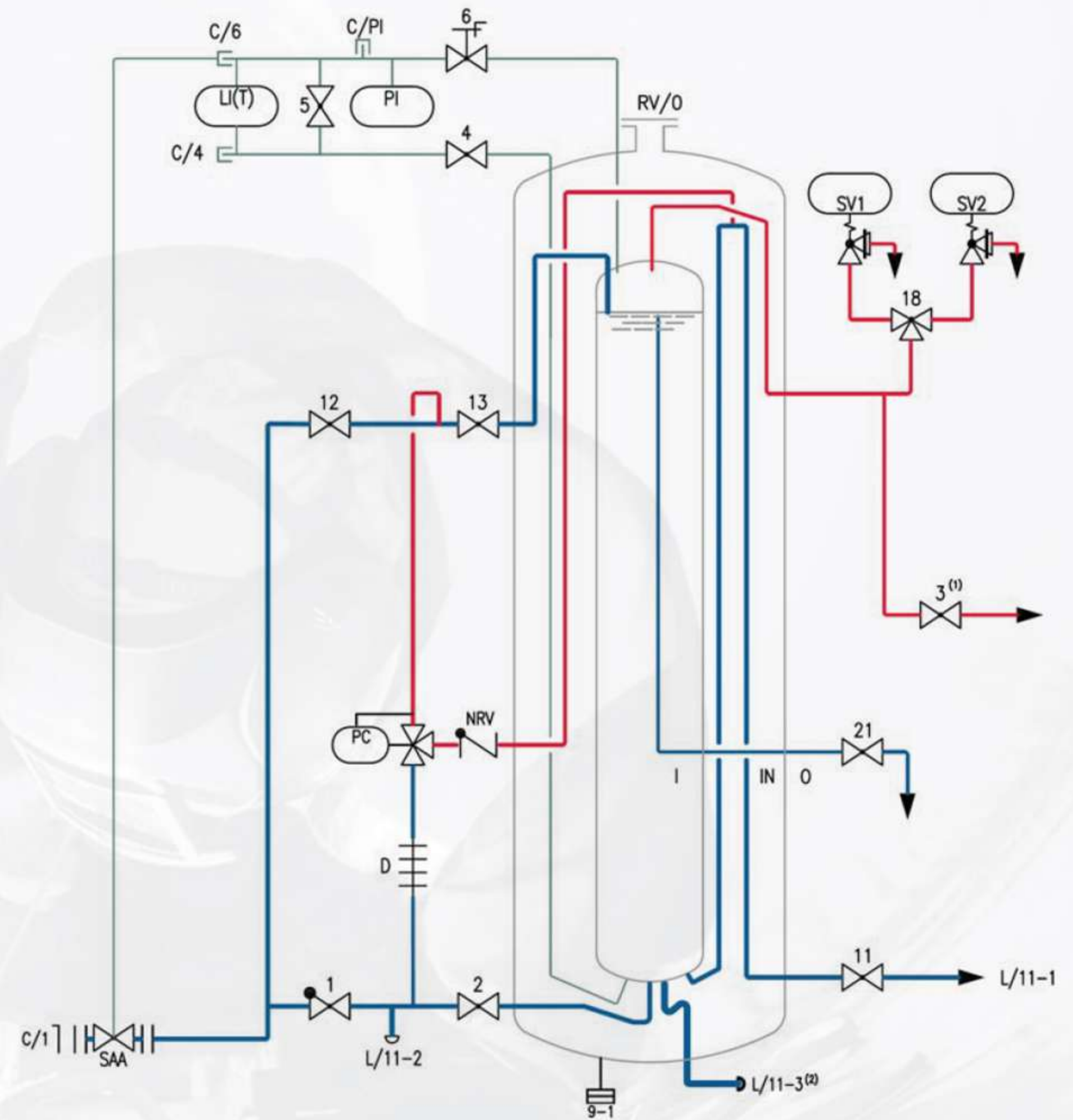
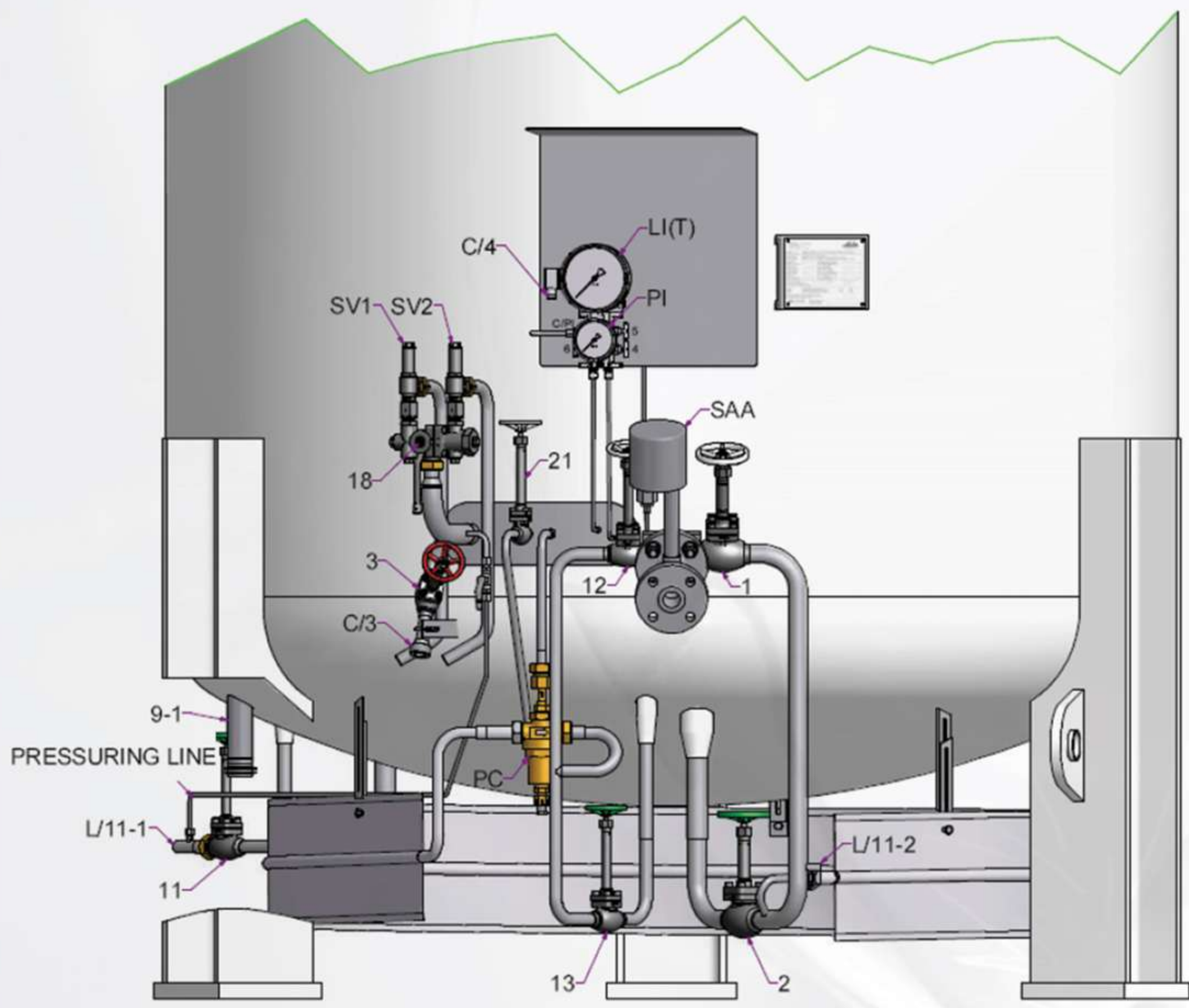


Maintenance and repair program

On request, our team proposes a maintenance and repair program to optimize customer's operational costs on the cryogenic equipment to guarantee its longevity.

Technical Data - Tanks for Air Gases LIN, LOX, LAR.

Size		30	60	110	200	300	490	610	800
Working Pressure									
Max. allowable working pressure		Air gases: 18 bar, 36 bar							for LIN
Capacity									
Gross capacity	approx. liter	3,160	6,365	11,535	20,355	30,205	49,020	61,620	80,360
Net capacity	approx. liter 18 bar	3,000	6,050	10,960	19,340	28,700	46,570	58,540	76,340
Net capacity	approx. liter 36 bar	2,840	5,730	10,380	18,320	27,180	44,120	55,460	
Filling Ratio									
18 bar	kg LIN	2,425	4,890	8,855	15,630	23,190	37,630	47,300	61,680
95%, 1 bar	kg LOX	3,425	6,910	12,530	22,090	32,885	53,180	66,850	
	kg LAR	4,185	8,440	15,290	26,980	40,040	64,965	81,660	
36 bar	kg LIN	2,300	4,630	8,390	14,800	21,970	35,650	44,810	
	kg LOX	3,250	6,540	11,850	20,920	31,050	50,390	63,340	
	kg LAR	3,970	7,990	14,480	25,560	37,920	61,550	77,370	
Boil-Off Rate; 1 bar 15°C A.T. referred to total capacity vacuum < 2 x 10⁻² mbar									
	%/d LIN	0.67	0.58	0.44	0.31	0.30	0.21	0.20	0.19
	%/d LOX	0.42	0.37	0.29	0.20	0.19	0.13	0.12	
	%/d LAR	0.46	0.40	0.32	0.21	0.21	0.15	0.14	
Discharge Capacity; with standard pressure building coil at 0,7 x MAWP and 8 hours operating time									
18bar	m ³ /h(1bar,15°C)LIN	150			300	600	600	600	600
	m ³ /h(1bar,15°C)LOX	190			380	750	750	750	
	m ³ /h(1bar,15°C)LAR	190			380	750	750	750	
36bar	m ³ /h(1bar,15°C)LIN	140			140	280	280	280	
	m ³ /h(1bar,15°C)LOX	180			180	260	360	360	
	m ³ /h(1bar,15°C)LAR	180			180	260	360	360	
Safety Capacity; Capacity of onesafety valve at 1.1 x MAWP/ cold condition									
18bar	kg/h LIN			1,090	1,090	1,090			1,070
	kg/h LOX			1,010	1,010	1,010			
	kg/h LAR			1,240	1,240	1,240			
36bar		140			140	280	280	280	
		180			180	260	360	360	
		180			180	260	360	360	
Insulation									
Insulating powder (perlite), vacuum < 5 x 10 ⁻² mbar (tank in operation), status of delivery: 5 mbar									
Material									
Inner vessel: low temperature resistant austenitic steel									
Outer vessel: carbon steel									
Dimensions (cm)									
Overall diameter		1,600	1,600	2,000	2,400	2,400	3,000	3,000	3,000
Overall height		4,150	7,150	7,350	8,350	11,550	11,550	14,150	18,050
Weight (kg)									
	18 bar type	2,510	4,910	5,940	9,840	13,920	19,300	23,370	29,650
	36 bar type	2,600	5,220	7,180	12,310	17,090	24,570	30,260	



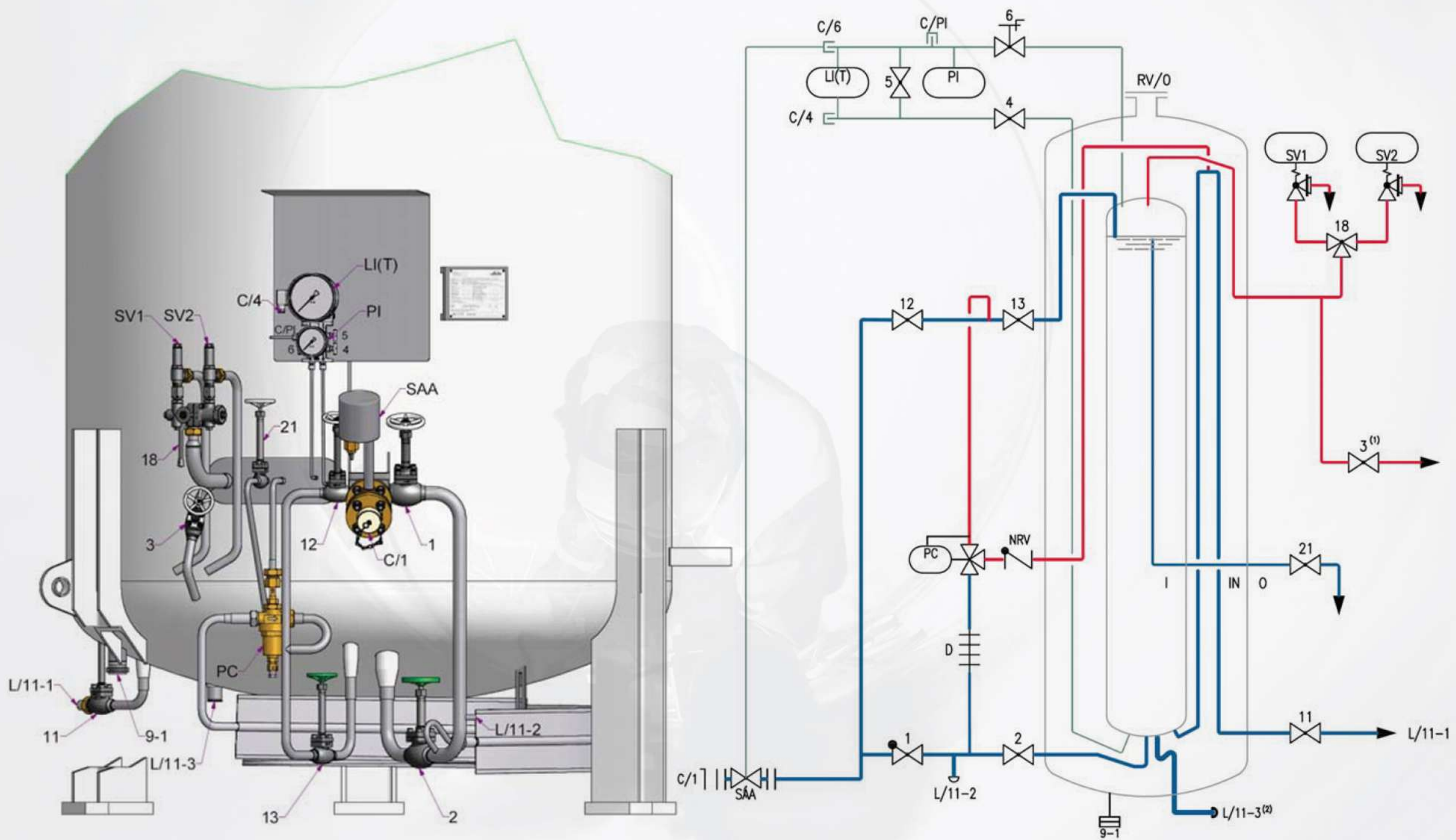
FLOW DIAGRAM – TANKS FOR NITROGEN, OXYGEN AND ARGON

LIST OF STANDARD ITEMS

Instrumentation and equipment	Valves	Options
C/1	1	SAA
C/4, C/6	2	LI(T)
C/PI	3	LI(T) control line for SAA
D	4	LI(T) Level indicator incl. instrument panel and std. programming, extra programming of acc. to customer requirements
I	5	LI(T) Level indicator with transmitter output 4 - 20 mA
IN	6	
LI	9-1	
L/11-1	11	
L/11-2	12	
L/11-3	13	
NRV	18	
O	21	
PC		
PI		
RV/O		
SV1, SV2		

Technical Data - Tanks for CARBON DIOXIDE

Size (m ³)		30	60	110	200	300	490	610
Max. Allowable Working Pressure								
	CO ₂ : 22 bar							
Capacity								
Gross capacity	Approx. liter	3,160	6,365	11,535	20,355	30,205	49,020	61,620
Net capacity	Approx. liter	2,940	5,920	10,730	18,930	28,090	45,590	57,310
Filling Ratio								
93%, 1 bar	kg CO ₂	3,120	6,280	11,370	20,065	29,780	48,330	60,740
Boil-off rate								
1 bar, 15°C A.T. referred to total capacity vacuum < 2 x 10 ⁻² mbar	%/d CO ₂	0.22	0.19	0.14	0.10	0.10	0.07	0.06
Discharge capacity								
With standard pressure building coil at 0.7 x MAWP and 8 hours operating time	kg/h(1bar,15°C)CO ₂	70	70	140	140	280	280	280
Capacity of one safety valve at 1.1 x MAWP/cold condition								
	kg/h, CO ₂					975		
Insulation								
	Insulating powder (perlite), vacuum < 5 x 10 ⁻² mbar tank in operation) status of delivery: 5 mbar)							
Material								
	Inner vessel: low temp. resistant austenitic steel Outer vessel: carbon steel							
Dimensions (cm)								
	Overall diameter	1,600	1,600	2,000	2,400	2,400	3,000	3,000
	Overall height	4,150	7,150	7,350	8,350	11,550	11,550	14,150
Weight (kg)								
	22 bar Type	2,510	4,910	6,300	10,250	14,500	20,500	24,800



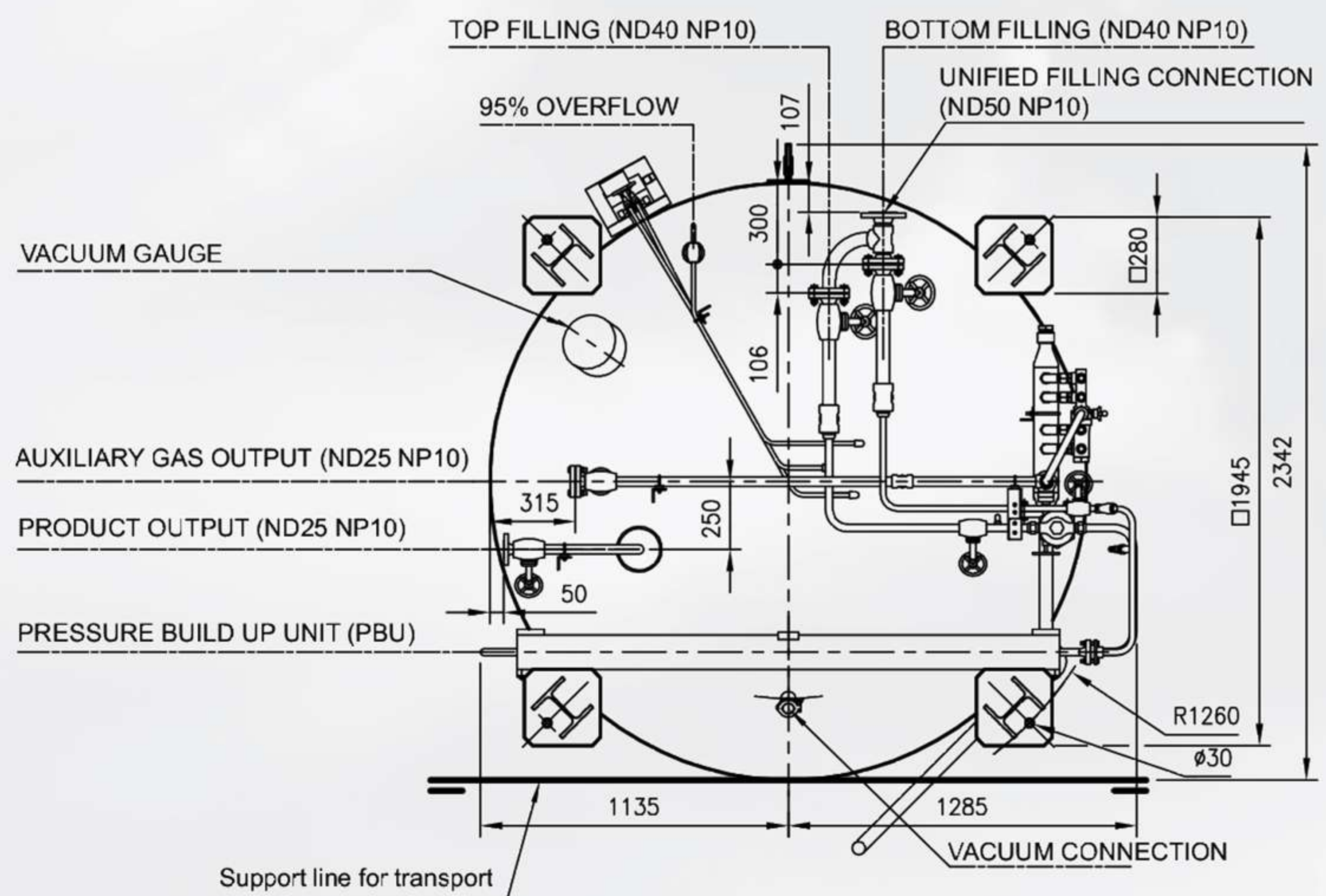
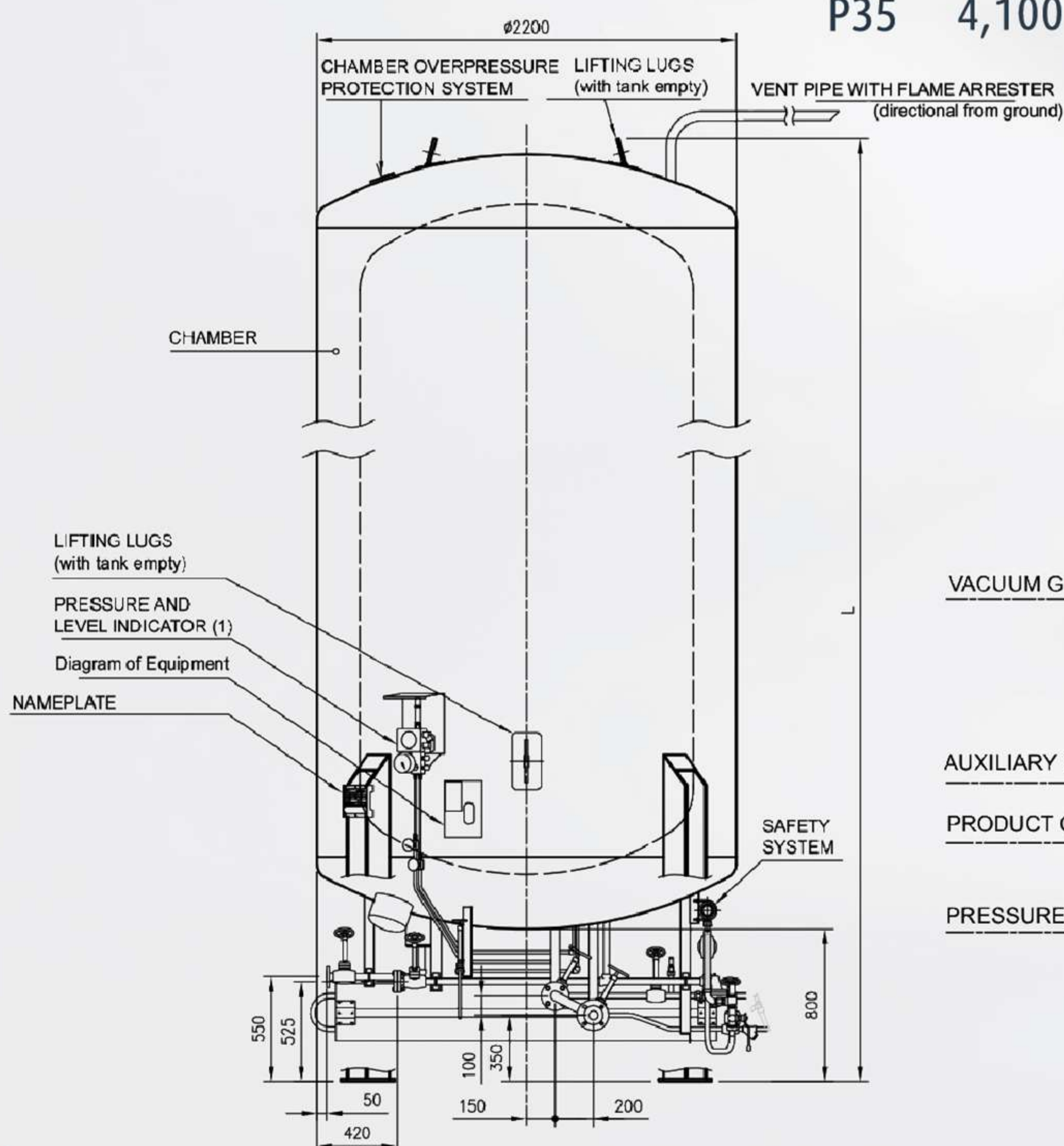
FLOW DIAGRAM – CARBON DIOXIDE TANKS

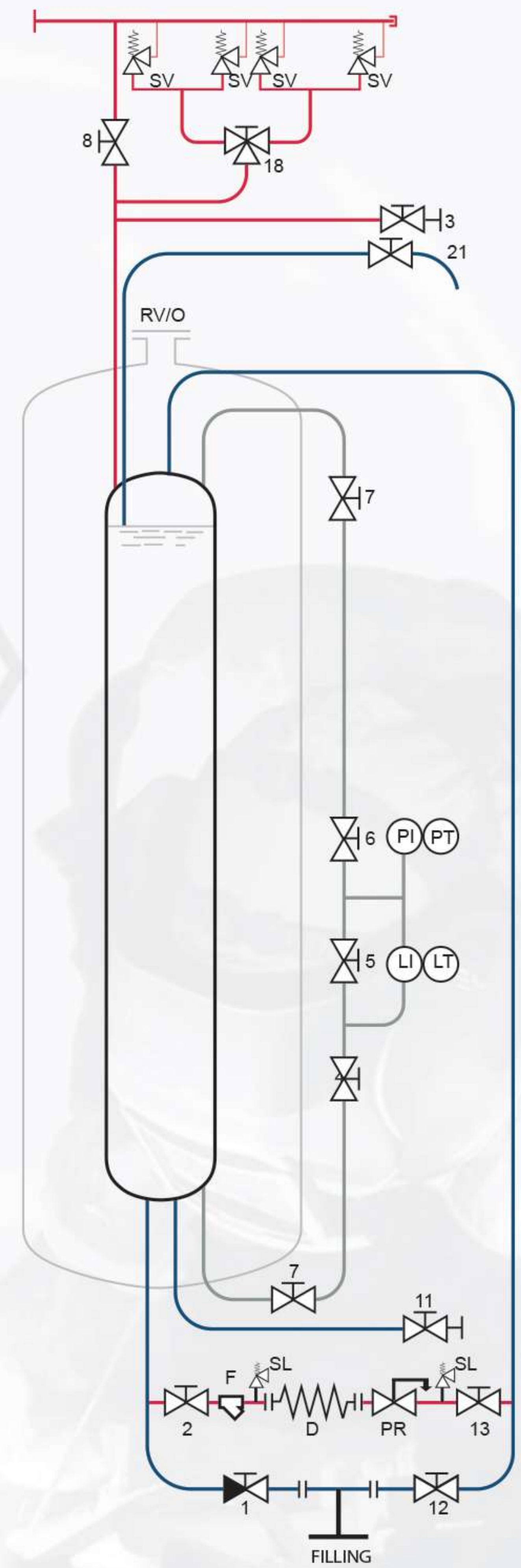
LIST OF STANDARD ITEMS

Instrumentation and equipment		Valves		Options	
C/3	Vent coupling	1	Filling	SAA	Safety shut-off valve,
C/4, C/6	Connection adds. transmitter	2	Pressure building	LI(T)	control line for SAA
C/PI	Test connection pressure indicator	3	Vent	LI(T)	Level indicator incl. instrument panel and standard programming, extra programming of acc. to customer requirements
D	Pressure building coil	4	Bottom gauge (+)	LI(T)	Level indicator with transmitter output 4 - 20 mA
I	Inner vessel	5	Gauge bypass		
IN	Insulation	6	Top gauge (-)		
LI	Level indicator	9-1	Evacuation connection		
L/11-1	Pipeline discharge	11	Discharge		
L/11-2	Pipeline discharge (plugged)	12	Top filling		
NRV	Non return valve	13	Gas shut-off		
O	Outer vessel	18	Change over		
PC	Pressure controller	21	Trycock		
PI	Pressure indicator	26	Pressuring		
RV/O	Relief valve-outer vessel				
SV1, SV2	Safety valve				

Technical Data - Tanks for LNG CVZ1 Series

Size		50	60	110	160	200
Working Pressure						
Maximum working pressure		05, 09, 13, 16, 22, 28, 35 bar				
Capacity						
Gross capacity	m ³	5.0	6.0	11.0	16.0	20.0
Net capacity	m ³	4.9	6.2	10.9	15.7	19.9
Filling Ratio						
LNG USEFUL CAPACITY (95%, 1 bar)	Kg	2,100	2,700	4,800	6,900	8,700
Discharge Capacity						
PRESSURE BUILD UP UNIT (PBU) CAPACITY (for NG consumption at 3 bar) ³	Nm ³ h	400	400	400	400	400
Insulation						
Insulating powder (perlite), vacuum < 5 x 10 ⁻² mbar (tank in operation), status of delivery: 5 mbar						
Material						
Inner vessel: low temperature resistant austenitic steel						
Dimensions (cm)						
L: total length including valves		383	435	635	835	1,013
D: total width		234.2	234.2	234.2	234.2	234.2
H: total height including vent pipe		242	242	242	242	242
Weight (kg)						
Approx. tare when empty	P05	3,000	3,500	4,800	6,000	7,300
(tank with full equipment)	P09	3,000	3,500	4,800	6,000	7,300
	P13	3,100	3,600	5,000	6,200	7,700
	P16	3,200	3,700	5,200	6,500	8,000
	P22	3,600	4,100	5,800	7,300	8,900
	P28	3,800	4,400	6,300	7,900	9,700
	P35	4,100	4,700	6,700	8,500	10,500



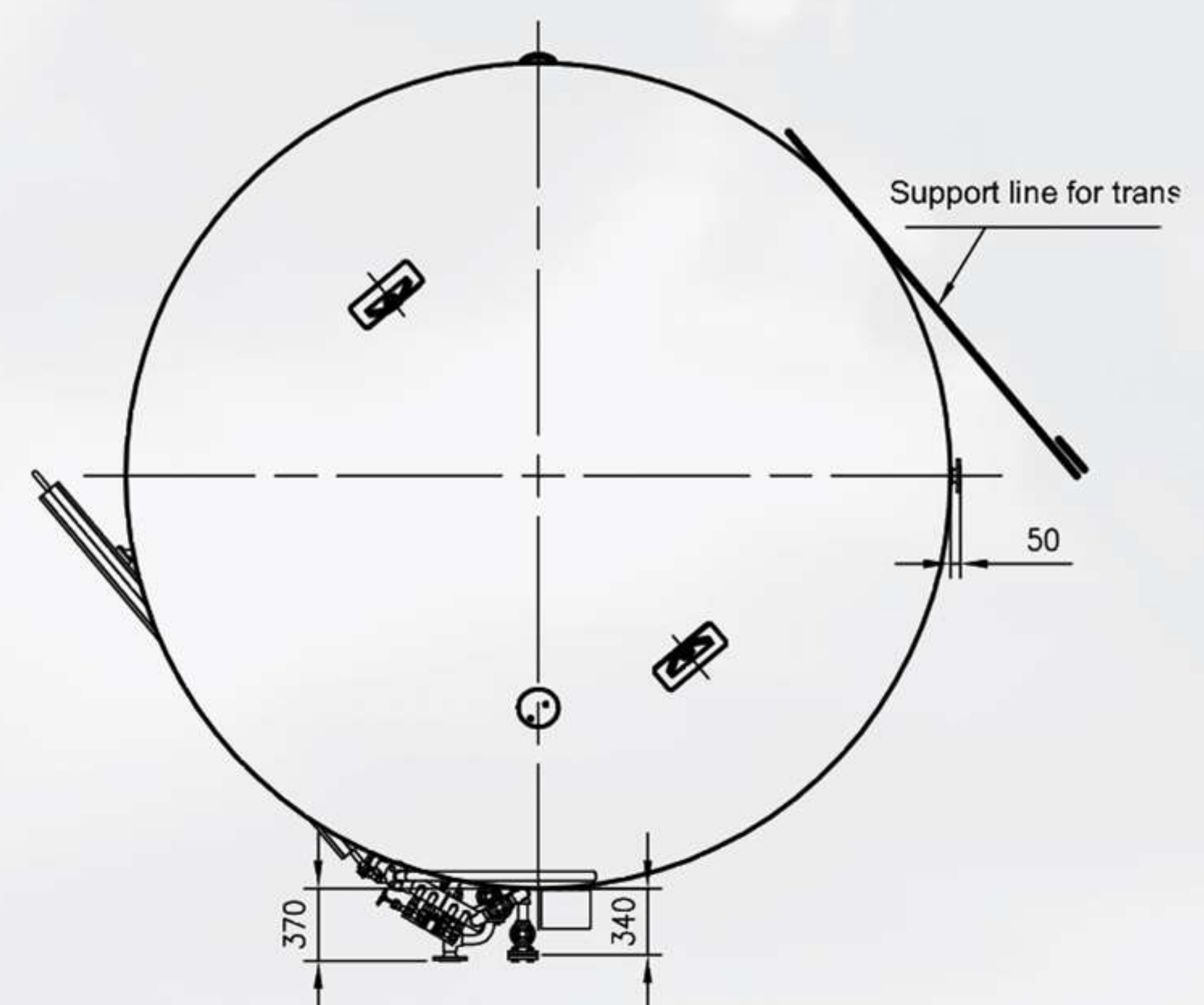
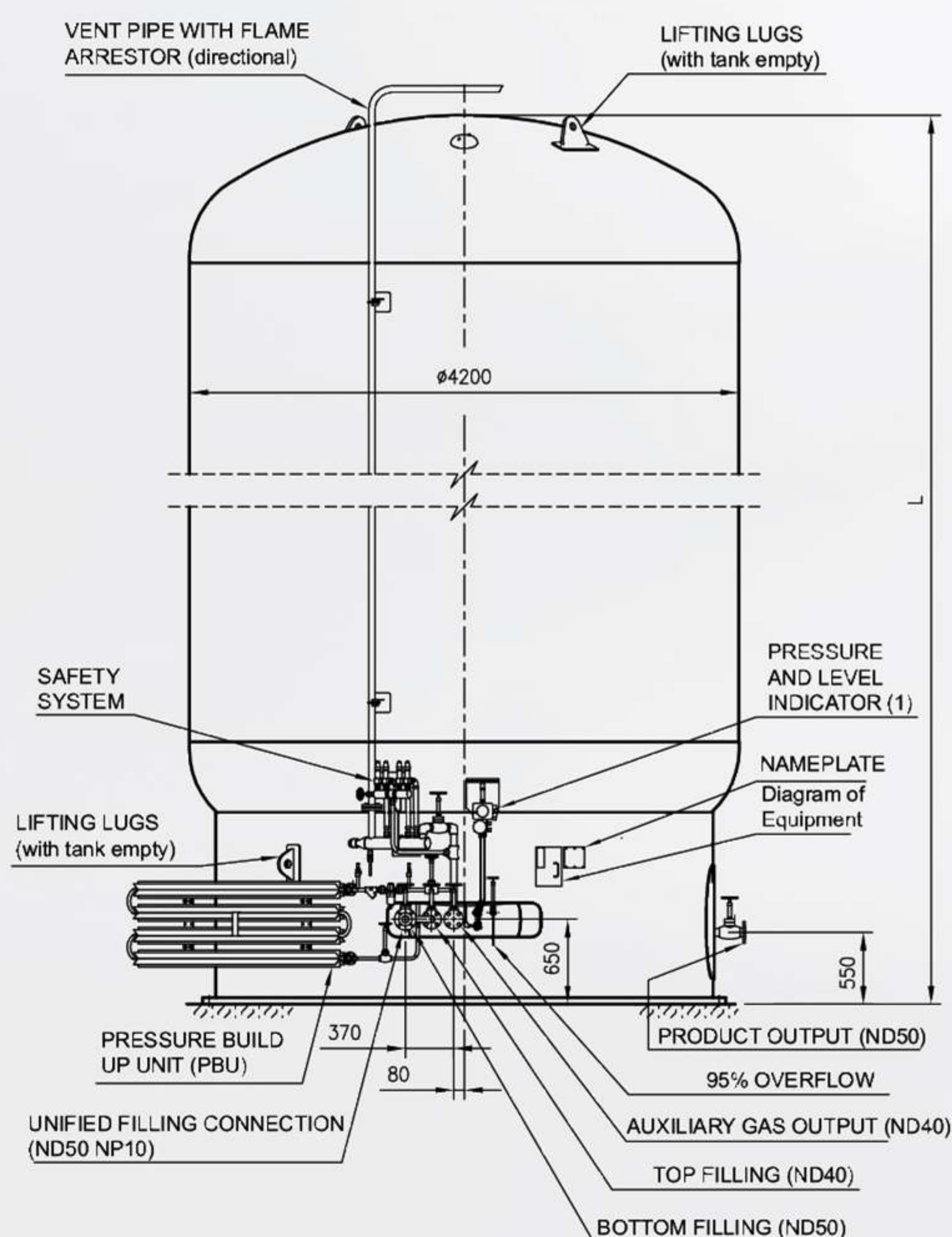


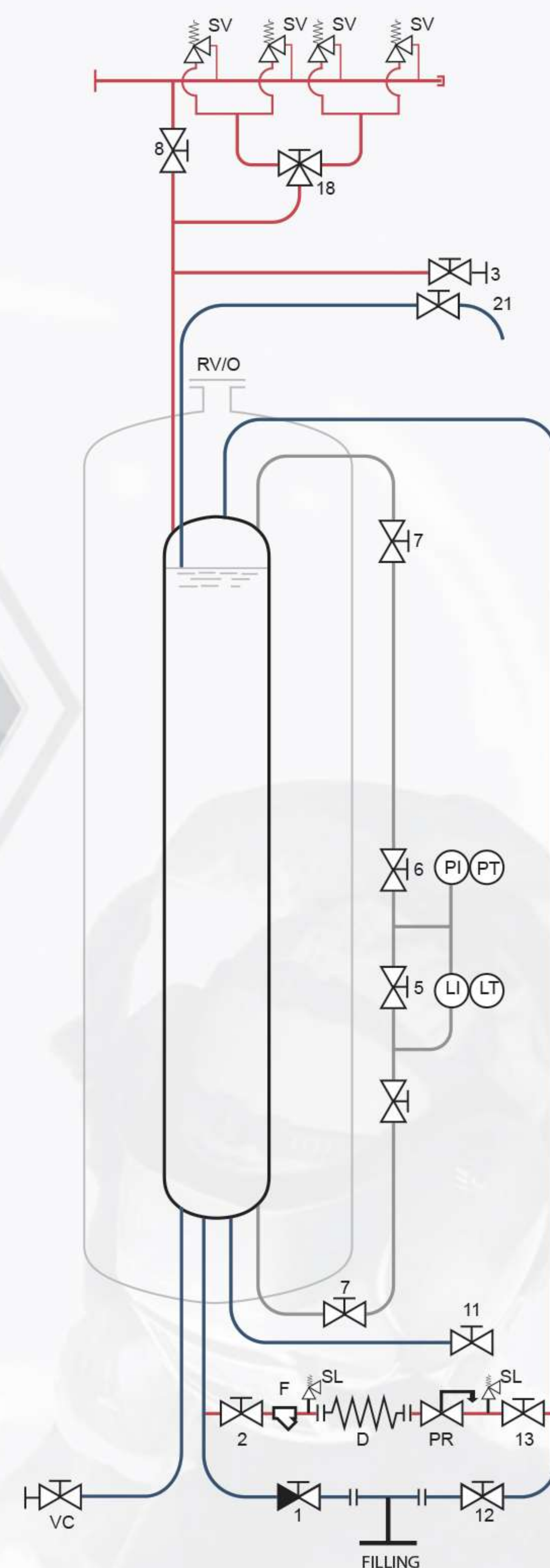
LIST OF STANDARD ITEMS

Instrumentation and equipment		Valves		Options
D	Pressure building coil	1	Filling	External economizer kit pressure regulator, filter and shut-off valve Internal economizer: ND20 Pressure build up unit: PBU/ other capacities Valves pneumatically driven Level indicator with transmitter output 4-20 mA Pressure indicator with transmitter output 4-20 mA Double filling valve High point: double
I	Inner vessel	2	Pressure Building	
IN	Insulation	3	Vent	
LI	Level indicator	4	Bottom gauge	
LT	Level transmitter	5	Gauge bypass	
O	Outer Vessel	6	Top gauge	
PI	Pressure indicator	7	Level isolating	
PT	Pressure transmitter	8	Pressure relief	
RV/O	Relief valve-outer vessel	11	Discharge	
SV	Safety valve	12	Top filling	
PR	Pressure regulator	13	Gas shut-off	
F	Filter	18	Change over	
SL	Line safety valve	21	Overflow	

Technical Data - Tanks for LNG CZV2 Series

Size		200	300	400	500	600
Working Pressure						
Maximum working pressure		05, 09, 16, 20, 24, 30, 38bar				
Capacity						
Gross capacity	m ³	20.0	30.0	40.0	50.0	60.0
Net capacity	m ³	19	30.6	39.9	49.9	59.8
Filling Ratio						
LNG USEFUL CAPACITY (95%, 1 bar)	Kg	8,300	13,400	17,400	21,800	26,100
Discharge Capacity						
PRESSURE BUILD UP	Nm ³ h	1,000	1,000	1000	1000	1000
UNIT (PBU) CAPACITY (for NG consumption at 3 bar) ³						
Insulation						
Insulating powder (perlite), vacuum < 5 x 10 ⁻² mbar (tank in operation), status of delivery: 5 mbar						
Material						
Inner vessel: low temperature resistant austenitic steel						
Dimensions (cm)						
L: total length including valves		578	814.4	101.44	122.14	141,44
D: total width		300	300	300	300	300
H: total height including vent pipe		304	304	304	304	30,
Weight (kg)						
Approx. tare when empty	P05	9,000	10,500	13,400	15,900	18,400
(tank with full equipment)	P09	9,000	10,500	13,400	15,900	18,400
	P16	10,000	11,700	14,900	17,600	20,300
	P20	10,700	12,600	16,100	19,000	22,000
	P24	11,400	13,600	17,200	20,400	23,700
	P30	12,300	14,900	18,900	22,400	26,100
	P38	13,400	16,400	20,800	24,700	28,700



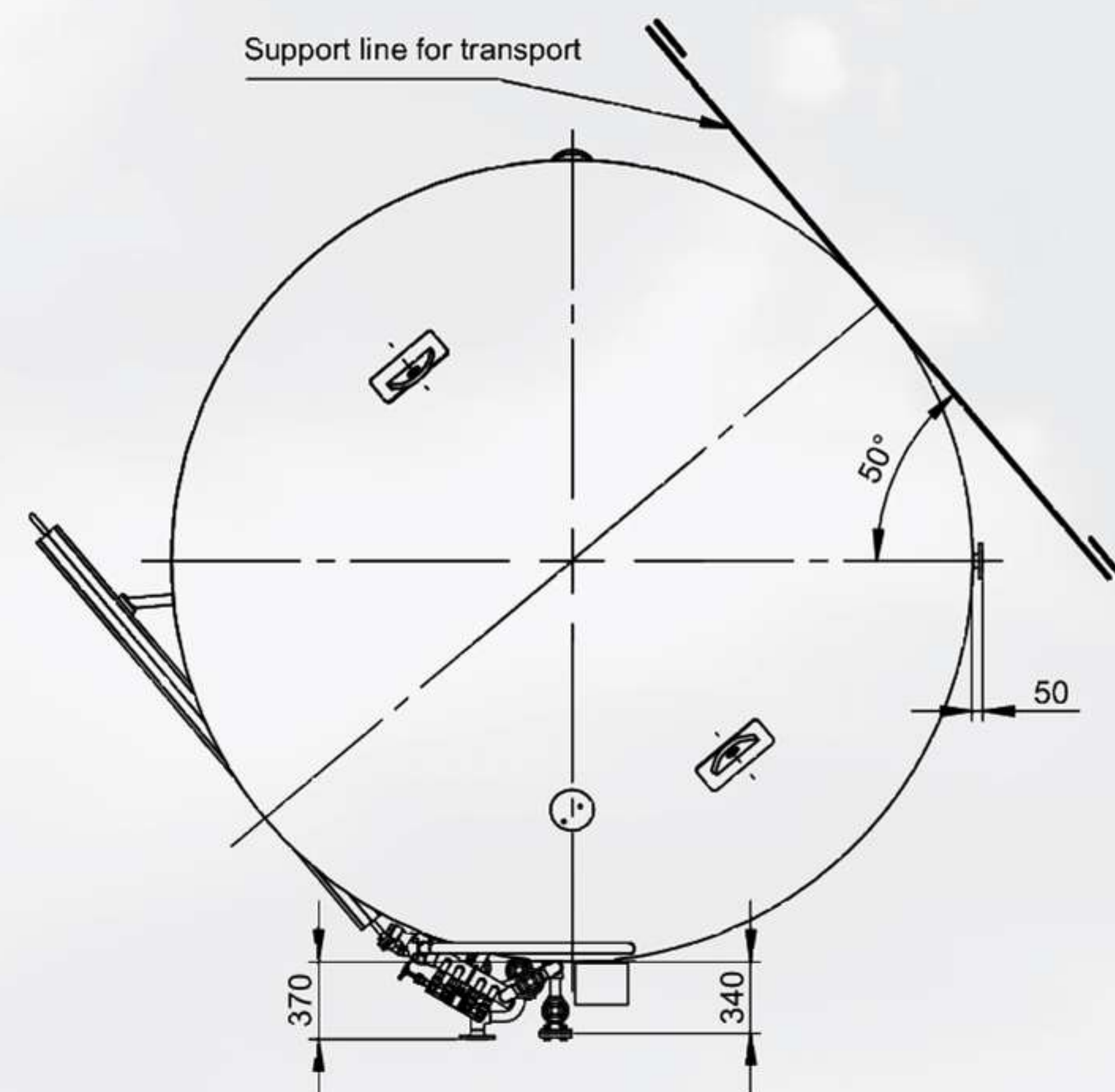
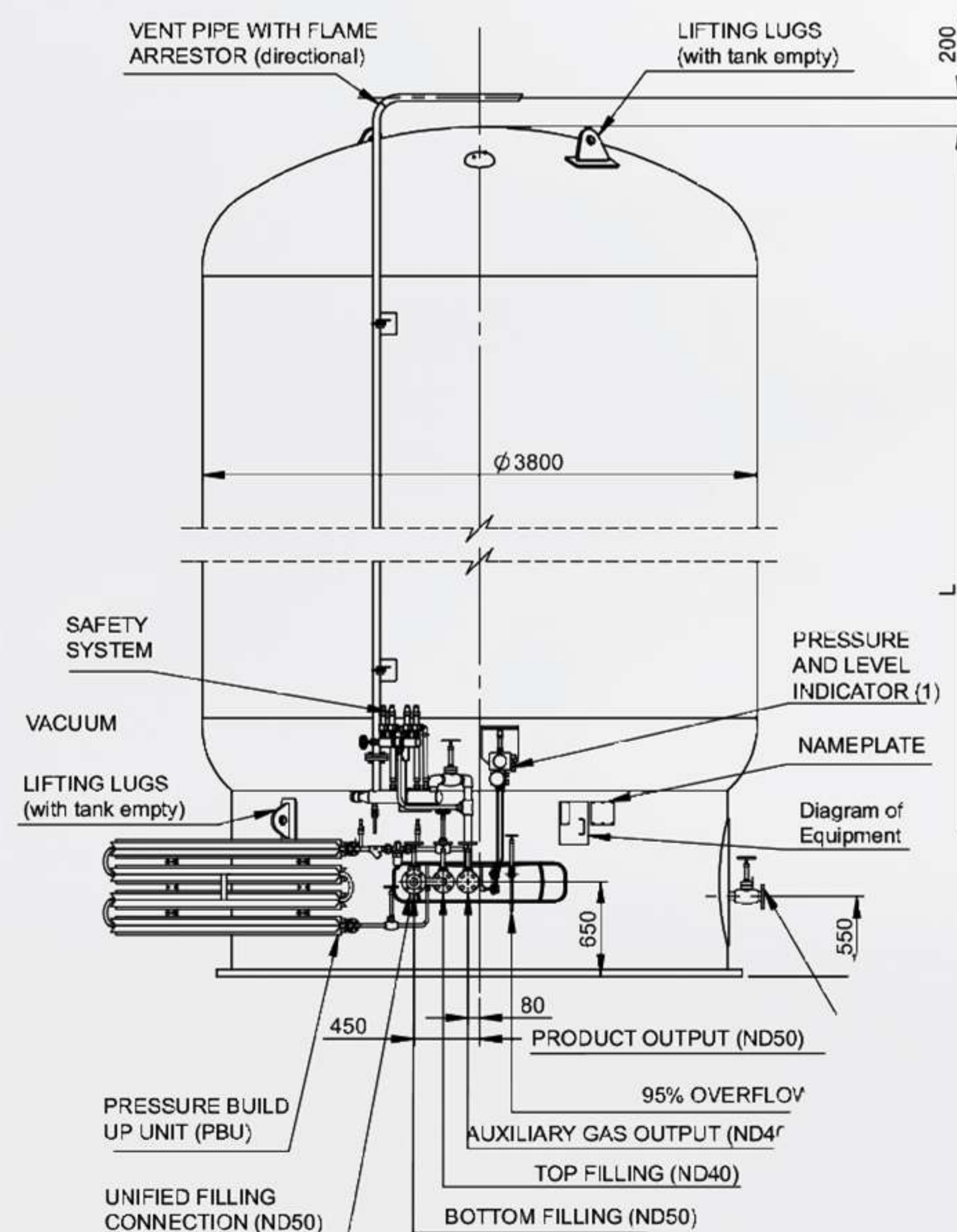


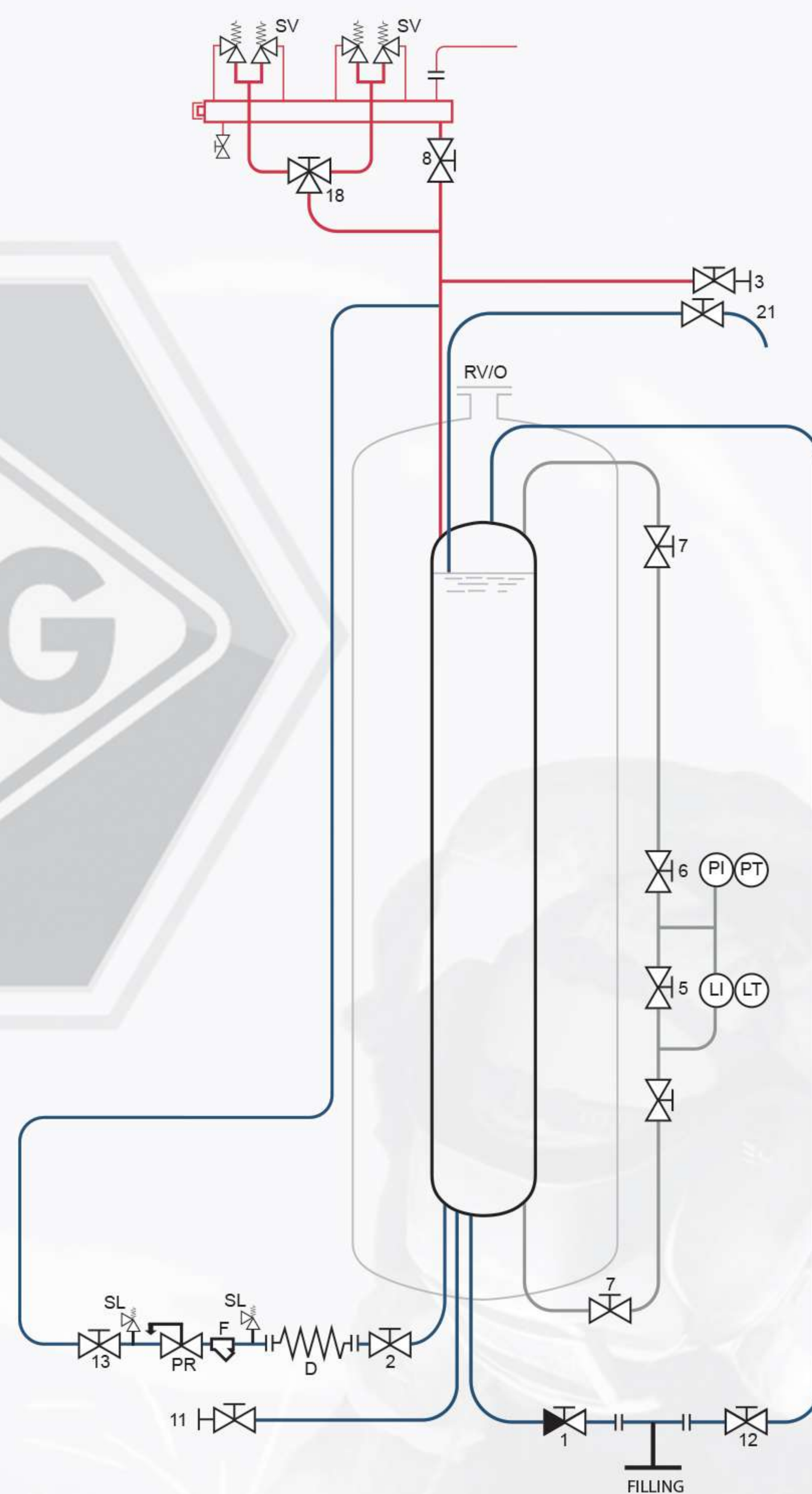
LIST OF STANDARD ITEMS

Instrumentation and equipment		Valves		Options
D	Pressure building coil	1	Filling	External economizer kit pressure regulator, filter and shut-off valve Internal economizer: ND20 Pressure build up unit: PBU/ other capacities Valves pneumatically driven Level indicator with transmitter output 4-20 mA Pressure indicator with transmitter output 4-20 mA Double filling valve High point: double
I	Inner vessel	2	Pressure Building	
IN	Insulation	3	Vent	
LI	Level indicator	4	Bottom gauge	
LT	Level transmitter	5	Gauge bypass	
O	Outer Vessel	6	Top gauge	
PI	Pressure indicator	7	Level isolating	
PT	Pressure transmitter	8	Pressure relief	
RV/O	Relief valve-outer vessel	11	Discharge	
SV	Safety valve	12	Top filling	
PR	Pressure regulator	13	Gas shut-off	
F	Filter	18	Change over	
SL	Line safety valve	21	Overflow	

Technical Data - Tanks for LNG CVZ3 Series

Size		800	1070	1200	1500	2000
Working Pressure						
Maximum working pressure		05, 09, 14, 17, 22, 27, 30, 34 bar				
Capacity						
Gross capacity	m ³	80	107	120	150	200
Net capacity	m ³	79.9	107.4	118.6	154.6	199.6
Filling Ratio						
LNG USEFUL CAPACITY (95%, 1 bar)	Kg	34,900	46,900	51,800	67,600	87,200
Discharge Capacity						
PRESSURE BUILD UP	Nm ³ h	1,000	1,000	1,000	1,000	1,000
UNIT (PBU) CAPACITY (for NG consumption at 3 bar) ³						
Insulation						
Insulating powder (perlite), vacuum < 5 x 10 ⁻² mbar (tank in operation), status of delivery: 5 mbar						
Material						
Inner vessel: low temperature resistant austenitic steel						
Dimensions (cm)						
L: total length including valves		1,092	1394.5	1519.5	1919.5	2419.5
D: total width		381	381	381	381	381
H: total height including vent pipe		381	381	381	381	381
Weight (kg)						
Approx. tare when empty	P05	21,900	27,500	30,200	36,600	45,300
(tank with full equipment)	P09	21,900	27,500	30,200	36,600	45,300
	P14	23,700	29,700	32,600	39,700	49,200
	P17	25,400	31,900	35,000	42,800	53,100
	P22	27,900	35,000	38,400	47,300	58,800
	P27	30,700	35,500	42,300	52,100	64,900
	P30	32,400	40,700	44,700	55,200	68,800
	P34	34,200	42,900	47,100	58,300	72,800



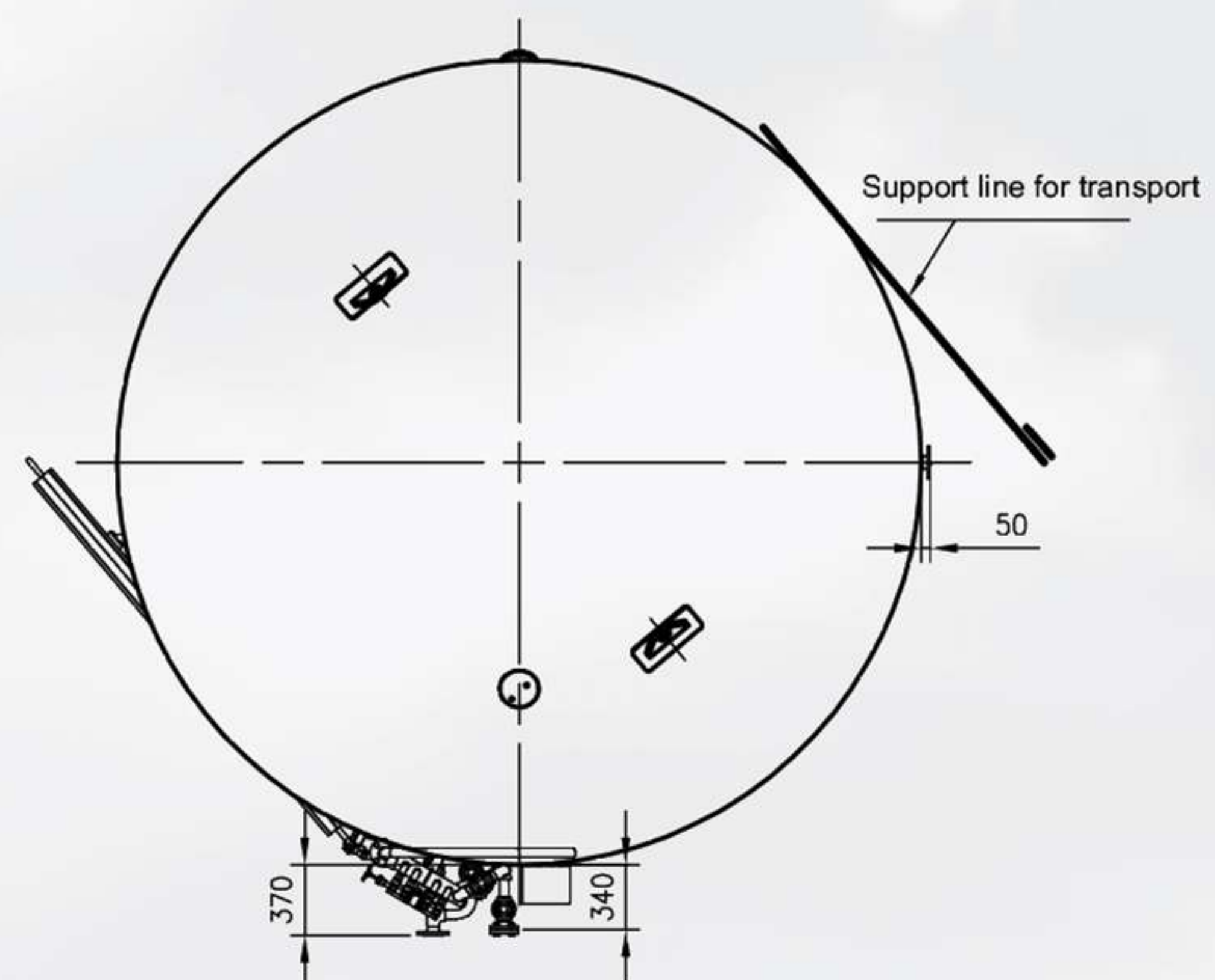
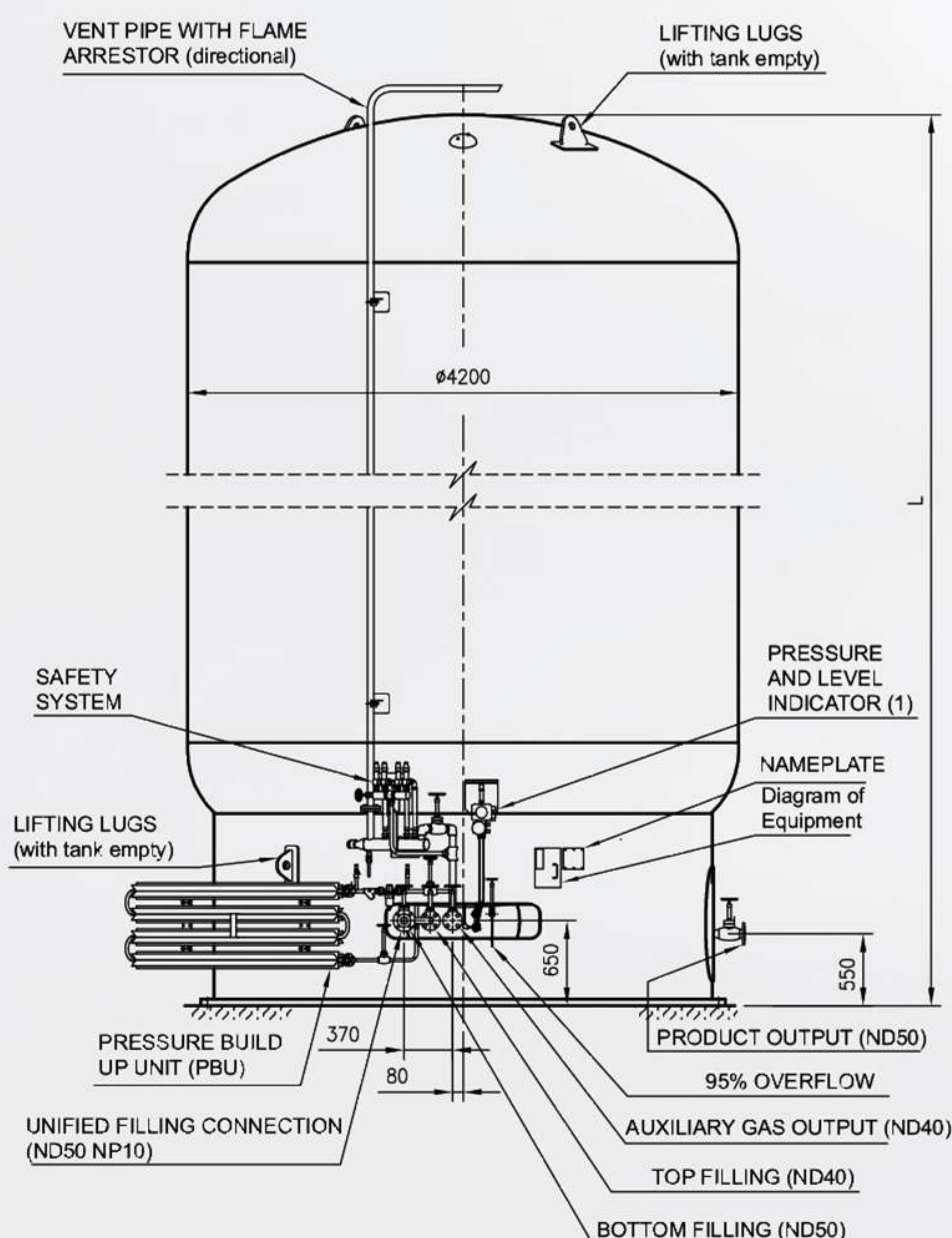


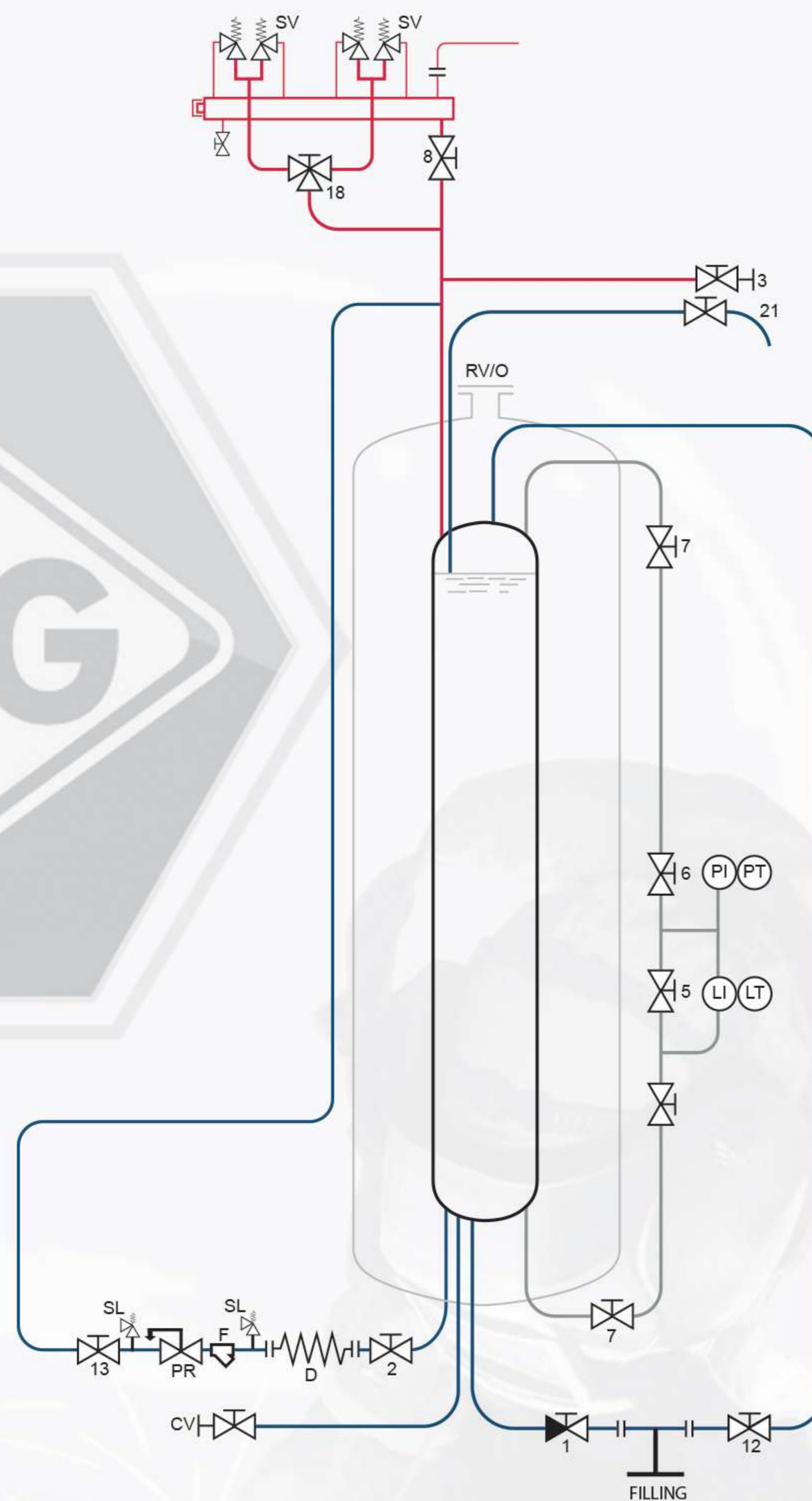
LIST OF STANDARD ITEMS

Instrumentation and equipment		Valves		Options
D	Pressure building coil	1	Filling	External economizer kit pressure regulator, filter and shut-off valve Internal economizer: ND20 Pressure build up unit: PBU/ other capacities Valves pneumatically driven Level indicator with transmitter output 4-20 mA Pressure indicator with transmitter output 4-20 mA Double filling valve High point: double
I	Inner vessel	2	Pressure Building	
IN	Insulation	3	Vent	
LI	Level indicator	4	Bottom gauge	
LT	Level transmitter	5	Gauge bypass	
O	Outer Vessel	6	Top gauge	
PI	Pressure indicator	7	Level isolating	
PT	Pressure transmitter	8	Pressure relief	
RV/O	Relief valve-outer vessel	11	Discharge	
SV	Safety valve	12	Top filling	
PR	Pressure regulator	13	Gas shut-off	
F	Filter	18	Change over	
SL	Line safety valve	21	Overflow	

Technical Data - Tanks for LNG CVZ4 Series

Size		1950	2400	2850	3070	3180
Working Pressure						
Maximum working pressure		05, 09, 13, 16, 22, 28, 35 bar				
Capacity						
Gross capacity	m ³	195	240	285	307	318
Net capacity	m ³	195	240	285	307	318
Filling Ratio						
LNG USEFUL CAPACITY (95%, 1 bar)	Kg	85,200	104,900	124,500	134,200	13,900
Discharge Capacity						
PRESSURE BUILD UP UNIT (PBU) CAPACITY (for NG consumption at 3 bar) ³	Nm ³ h	2,000	2,000	2,000	2,000	2,000
Insulation						
Insulating powder (perlite), vacuum < 5 x 10 ⁻² mbar (tank in operation), status of delivery: 5 mbar						
Material						
Inner vessel: low temperature resistant austenitic steel						
Dimensions (cm)						
L: total length including valves		1,958	23,580	2,758	2,958	3,058
D: total width		421	421	421	421	421
H: total height including vent pipe		421	421	421	421	421
Weight (kg)						
Approx. tare when empty	P05	47,000	55,700	64,300	68,700	71,100
(tank with full equipment)	P09	47,000	55,700	64,300	68,700	71,100
	P12	50,600	60,000	69,300	74,100	76,700
	P15	54,100	64,300	74,300	79,500	82,200
	P20	59,100	70,000	81,600	87,600	90,300
	P24	64,600	77,000	89,400	95,600	98,900
	P27	68,100	81,300	94,400	101,000	104,500
	P30	71,600	85,500	99,400	106,400	110,100





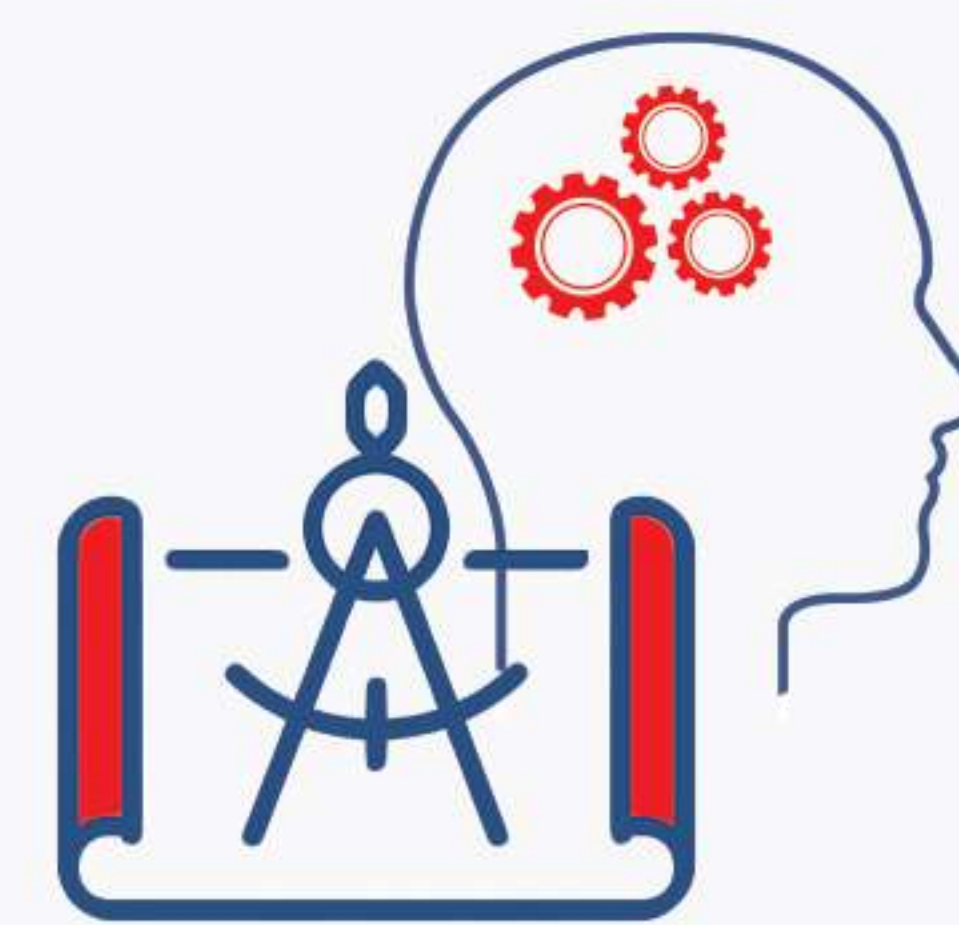
LIST OF STANDARD ITEMS

Instrumentation and equipment		Valves		Options	
D	Pressure building coil	1	Filling	External economizer kit	
I	Inner vessel	2	Pressure Building	pressure regulator, filter and	
IN	Insulation	3	Vent	shut-off valve	
LI	Level indicator	4	Bottom gauge	Internal economizer: ND20	
LT	Level transmitter	5	Gauge bypass	Pressure build up unit: PBU/	
O	Outer Vessel	6	Top gauge	other capacities	
PI	Pressure indicator	7	Level isolating	Valves pneumatically driven	
PT	Pressure transmitter	8	Pressure relief	Level indicator with transmitter	
RV/O	Relief valve-outer vessel	11	Discharge	output 4-20 mA	
SV	Safety valve	12	Top filling	Pressure indicator with	
PR	Pressure regulator	13	Gas shut-off	transmitter output 4-20 mA	
F	Filter	18	Change over	Double filling valve	
SL	Line safety valve	21	Overflow	High point: double	

Engineering Division

Our experts develop extensive know-how engineering in range of products what are comprised as bellows:

- Instrument air plants
- Compression gas-processing plants
- Cryogenic air separation plants
- Nitrogen & oxygen generation packages by PSA
- Hydrogen purification package by PSA



More than 2,000 successes is identified our leading position in the respect of project execution capabilities as well as in the turnkey plants.

Manufacturing Facilities

At the Parand Industrial Town, in a dedicated workshop over indoor 10.000 m² and the similar square outdoor yard facility, 70 skilled engineers and workers manufacture components and complete modules for numerous applications in process plants such as instrument air systems, Air Separation Plants in Cryogenic or PSA technologies (H₂, N₂, O₂...).

The full spectrum of required equipment and infrastructure are provided to support a wide range of fabrication and inspection activities as much as need. Production capacity totals approx. 1 million tons per year.



Services:

HATCO provides various kinds of services from technical assistance to site services e.g. field installation and advice on operation and maintenance program to satisfy customer's needs. We have dedicated engineers and technicians with extensive experience and expertise for each service.

We have a special service organization for Punch Clear works that may rise after plant delivery at site for our own products and the other parts which are supplied by other vendors as well (if any).

Major Services;

- Factory acceptance test
- Site acceptance test
- Punch Clear services
- Commissioning services
- Spare Parts
- Warranty Claim
- Customer Training



HATCO is "Where Complexity Becomes Simplicity."

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