NEWSLETTER WINTER 2021

December 2021

63 m^3 storage tank for the Polyols Complex has been commissioned

We designed, delivered and installed a 13-meter-high storage tank with a 2,8m diameter at the chemical plant in Brzeg Dolny. It was a Turn-key assembly, because in addition to the construction of the tank at our production plant in Gdynia, we carried out disassembly works of the existing tank, installed a new tank, provided new technological pipelines, connected product and auxiliary media pipelines , and provided complete insulation of the tank at the PCC plant.

The next stage of the research project

Introducing new productsto the market, properly tested and proven in operation in various conditions, is demanding and requires many hours of work.
We have completed the industrial research stage of the INNOSHIP project and we are introducing the experience gained at this stage to the next stage, which is work on prototype.

Titanium heat - exchanger certified by PRS

The exchanger with a titanium tube bundle has been officially accepted by the PRS Classification Society for compliance with the Pressure Equipment Directive 2014/68/EU. Below you can find a photo of the heat exchanger and the certificate.

In this issue:

Gas cooler with titanium tube bundle

CERTYFIKAT ZGODNOŚCI UE (MODUŁ G)
EU CERTIFICATE OF CONFORMITY (MODULE G)

Nr CW/PED/3/10/2021

ZAŚWIADCZA SIĘ, ŻE
Polski Rejestr Statków S.A. (PRS) przeprowadził procedurę weryfikacji egzemplarza wymienionego niżej wyrobu i stwierdził, że został on wykonany zgodnie z zatwierdzoną dokumentacją oraz spełnia wymagania określone w dyrektywie 2014/68/UE, urządzenia ciśnieniowe.

THIS IS TO CERTIFY THAT
Polski Rejestr Statków S.A. (PRS) did undertake the verification procedure for the piece of the product identified below which was found to be manufactured in conformity with the approved documentation and meets the requirements of Pressure Equipment Directive 2014/68/EU.

Wnioskodawca / Applicant: CLIMAREM Sp. z o.o. 81-963 Gdynia, ul. Hutnicza 4

Producent / Manufacturer: CLIMAREM Sp. z o.o. 81-963 Gdynia, ul. Hutnicza 4

Wyrób / Product: Gas Cooler Q=11kW

Zastosowane normy / Specified standards: PN-EN 13445-3:2014-11 + PN-EN 13445-3:2014-11/A8:2019-08
EN 13445-3:2014 + EN 13445-3:2014/A8:2019

Certyfikat jest ważny do / This certificate is valid until: —

Niniejszy certyfikat straci ważność po wprowadzeniu zmian lub modyfikacji w wyrobie bez pisemnego zawiadomienia i zgody PRS.
This certificate becomes invalid after changes/modifications to the product, which have not been notified to and agreed with the PRS.

Zastępca Dyrektora Pionu Certyfikacji
Certification Division Deputy Director

Gdańsk, 2021.10.20.

Przemysław Gałka

Nr jednostki notyfikowanej / No. of notified body: 1463

Polski Rejestr Statków S.A. al. Gen. Józefa Hallera 126 80-416 Gdańsk, Poland

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Form. 1(PCW-01/PED 2020.05.26)

1/2

During the pressure test

Caution, high pressure!

Resently at CLIMAREM have been manufactured and tested U-tube exchangers, which are intended for a research installation for the production of methanol based on a stream of hydrogen and carbon dioxide in the presence of a solid catalyst. The afo-rementioned heat exchangers will be the part of the technical installation where tests of methanol synthesis from CO_2 and H_2 will be carried out.

Work parameters

High-temperature heat - exchanger	**Medium-temperature heat - exchanger**	**Low-temperature heat - exchanger**
Design pressure— shell: 5 bar, tubes: 400 bar **Temperature**—shell: +350/-50 °C, tubes: +550/-50 °C **Pressure test**— shell: 8 bar, tubes: **725 bar**	**Design pressure**— shell: 5 bar, tubes: 400 bar **Temperature**—shell: +50/-50 °C, tubes: +200/-50 °C **Pressure test**— shell: 8 bar, tubes: **573 bar**	**Design pressure**— shell: 5 bar, tubes: 400 bar **Temperature**—shell: +150/-50 °C, tubes: +60/-50 °C **Pressure test**— shell: 8 bar, tubes: **573 bar**
Process medium— shell: oil tubes: carbon dioxide, hydrogen	**Process medium**— shell: water tubes: methanol, water, hydrogen	**Process medium**— shell: water tubes: carbon dioxide

Construction details

Tube plates and other structural elements are made of stain-less steel 1.4404 (AISI 316L).

The process pipes (U-pipes) used in the presented heat ex-changers are made of acid-resistant steel grade 1.4571. The shell pipes were also selected in grade 1.4571 (AISI 316Ti).

Increased resistance to corrosion and pitting corrosion cau-ses that 316Ti steels are used in the chemical industry, nuc-lear energy, vacuum technology, reactor instrumentation, submarine construction, furnace construction, wine and pharmaceutical industries.

Heater, condenser, evaporator and cooler

New industrial installation

Manufacturing and assembly of a 63m^3 tank

The task was to design, manufacture and assemble a 63 m^3 tank on the existing foundation and to provide supports for the pipelines. CLIMAREM was responsible for the foundation of the tank, its connection to the process pipelines and all approvals related to the assembly and installation on site

Tank dimensions:

Tank capacity - 63,000 l (10 l coil)
Empty tank weight: 14,530 kg

63 m^3 storage tank at the Polyol Complex

Diameter: 2800mm
Height: 12975mm

Tank parameters:

Design pressure - 0.1 bar (coil - 6 bar)
Permissible temperature - tank: + 150 / -20 oC, coil: + 300 / -20 oC

The tank was equipped with communication ladders, a platform was made at the level of the upper head of the tank, allowing the necessary access to the measuring nozzles.

The temperature in the tank is kept at 50°C by means of a heating coil powered by superheated steam. The tank is equipped with temperature, pressure and level measurement.

The tank is secured with a hydraulic closure and a breathing valve, preventing the pressure from being exceeded. Additionally, in the event of underpressure in the tank, nitrogen is supplied to the system to equalize the pressures.

Bulk Tanks

We produce various tanks for Bulk Handling Systems systems for ship and offshore systems. In cooperation with the Classification Society, we prepare a pressure tank design for approval and certify the tanks.

LRS certified tanks for Cement Carrier

The order of the Swedish contractor included a set of six tanks, four with a diameter of 2200 mm and two with a diameter of 1000 mm. Two tanks were equipped with conical bottoms, the others with ellipsoidal bottoms.
The tanks are intended for cement carriers built in the Netherlands.

Parameters

Design pressure: 4 bar

Pressure test: 6 bar

Working temperature: 100°C

Approval: LRS Classification Society

Tank modules

We manufacture large-size pressure vessels and tank modules for bulk cargo loading installations.

Tanks are used for reloading such cargo as cement, barite, bentonite.

The modules include storage tanks, cyclones and dust collectors.

Large Bulk tank

The largest Bulk Tank built in our plant was a dedicated for ***ULSTEIN VERFT AS Hull no 302***.

Tank capacity: 116 m3

Design pressure: 5.8 bar

Working temperatures: 0 / + 50oC

Diameter: 6 m

Height: 5.35 m

Weight: 27 tons

Approval: ABS Maritime Society

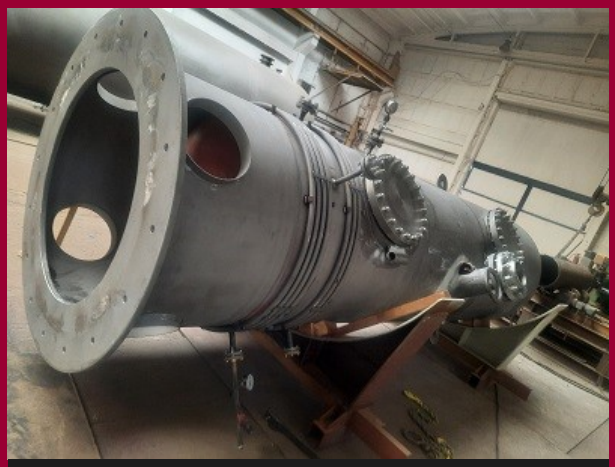
Equipment for natural gas technological installations

We make pressure equipment for gas separation, purification and drying, for the development of natural gas exploration wells.

Tube plate during welding

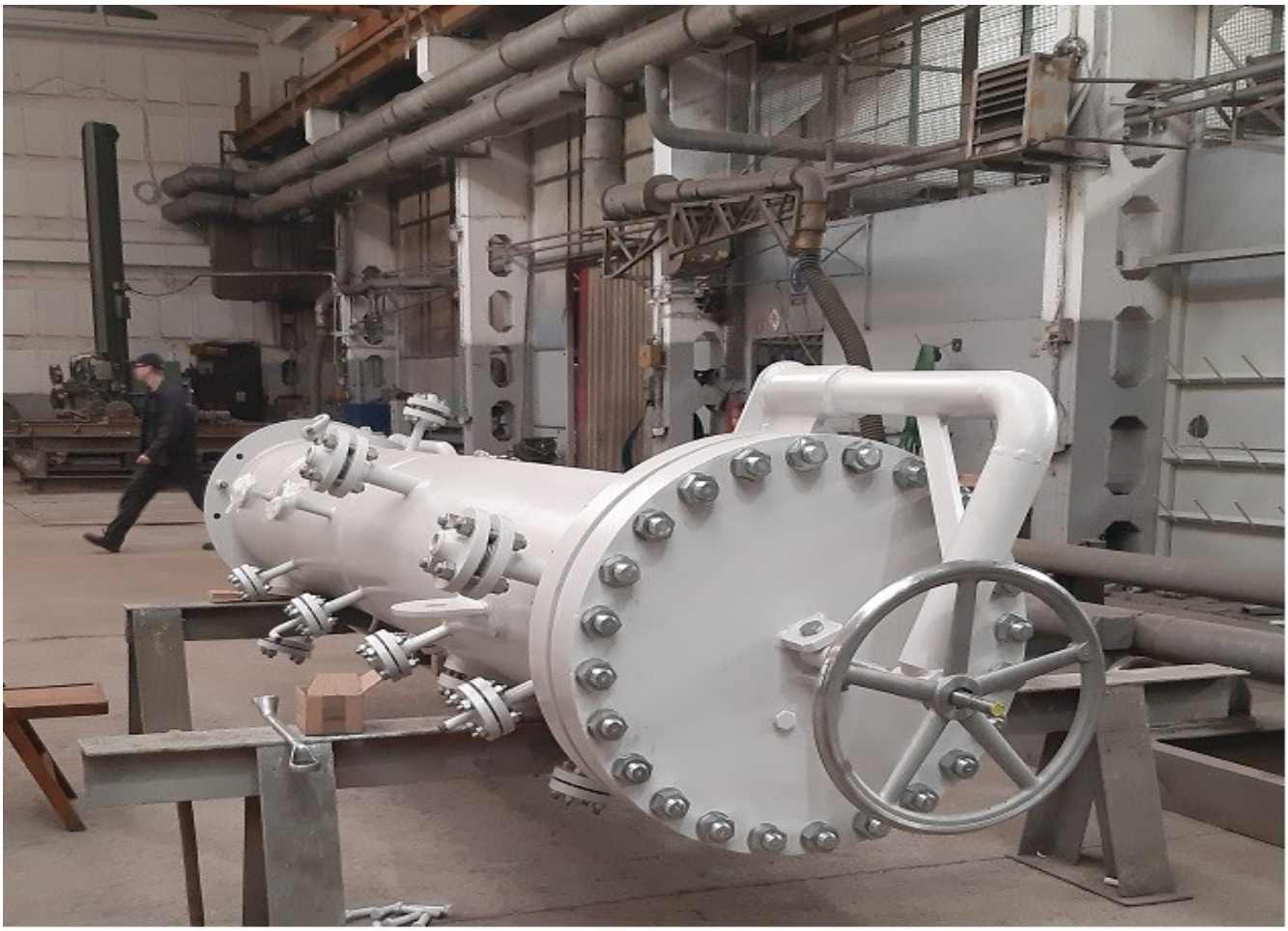
WE OFFER:

* SEPARATORS
* STORAGE TANKS
* DEGASSES
* GAS HEATERS
* SEPARATORS
* DRAIN TANKS
* CONDENSATE TANKS
* DISTILLATION COLUMNS



Separator with the shell coil

Heat exchanger insulated with mineral wool and a sheet metal mantel



Separator

Pressure tests

The recently manufactured separators at CLIMAREM have been designed to operate at pressures of 290 bar and 320 bar, hence the requirement to perform pressure tests at the level of 415–458 bar.

Gas pre-separators and mercury vapor adsorption column

Development of the Turkowo exploration well

The capacity to produce gas from the Turkowo-2 well has been estimated at approximately 20 million cubic meters per year.
The borehole, 3,155 meters deep, is located near Turkowo in the Kuślin commune, Nowy Tomyśl district, in the Pniewy-Stęszew concession area.

The Turkowo-2 is located in the deposits of the Rotliegend Group. It is a very promising formation, which is why PGNiG has been conducting intensive exploration work there for several years. The drilling site for the Turkowo-2 well was selected on the basis of an analysis of the results of the three-dimensional Chraplewo 3D seismic image. In 2018, PGNiG documented over 5 billion cubic (as high-methane gas equivalent) in the Polish Lowlands new gas resources.

Gas pre-separators - technical data

Design pressure: 290 bar and 320 bar
Hydraulic test pressure: 415 bar and 458 bar
Capacity: 470 l
Weight: 3100 kg
Design temperature: -29 / + 60^{o}C

Mercury removal from natural gas

Gas is a fuel less harmful to the environment than coal or crude oil, as much less CO_2 is produced when natural gas is burned. Nevertheless, some gas fields contain toxic mercury.
In natural gases, mercury is present in both the gas phase (mercury vapor) and the liquid phase (mercury microdroplets). The main form of mercury in natural gas is elemental mercury. Presumably in small amounts there are also inorganic (HgCl2), organic ((CH3) 2Hg, (C2H5) 2Hg) and organo-ionic (CH3HgCl) mercury compounds in the gas. The need to remove mercury from gases is due to the following reasons: the harmfulness of mercury to humans and the reaction of mercury with aluminum which is the cause of the so-called mercury corrosion in gas transport and processing installations. Therefore, the standard specifies the maximum allowable mercury vapor content in the gas (30 µg / m^3).

Gas purification uses the ability of mercury to sorption on porous solids with high adsorption capacity and its amalgam-forming properties.
The effectiveness of mercury removal from gas streams depends on the gas composition and mercury vapor concentration, the presence of higher hydrocarbons, water and other contaminants, temperature, pressure, gas flow rate, and contact time with the adsorbent. In the degreasing processes by adsorption methods, active carbon coated with sulfur, metal sulphide or a mixture of sulphides and other sorbents (zeolites) with elemental sulfur or metal, e.g. Ag, are most often used. When mercury vapor in the gas stream passes through the adsorbent, they adsorb on its surface, and then combine with sulfur to form mercury (II) sulfide. Carbon adsorption is carried out until the mercury vapor breaks through the carbon bed. The spent coal is regenerated by heating. At the elevated temperature, HgS is oxidized and the mercury thus obtained is withdrawn in a gas stream and then condensed. As the breakthrough moment of carbon is difficult to predict, mercury compounds removal installations are usually equipped with a glass fiber filter and an activated carbon adsorbent with deposited sulfur. The filter captures microdroplets of mercury as well as glycol and liquid hydrocarbons, thanks to which the micropores of carbon are not clogged and the adsorption properties are not lost.

It should be noted that the adsorption properties of the sulfur impregnated coal depend on the quality of the coal itself and the technique used to apply the sulfur. Sulfur or sulphide impregnated adsorbents can be used to clean dry and water-containing gases. During the operation of the carbon adsorbent, especially at higher temperatures, poorly deposited sulfur may be entrained by the flowing gas stream. Moreover, when wet gas is cleaned, capillary condensation of water in the carbon micropores may occur. The mentioned processes have a negative impact on the efficiency and properties of carbon adsorbents.

Based on an article by Dr. Paweł Muszyński "Mercury in natural gas"

Mercury vapor adsorption column

CLIMAREM'S production

Design pressure: 84 bar

Hydraulic test pressure: 121 bar

Capacity: 910 l

Weight: 2300 kg

Adsorber bed: active carbon

Separator DN1400

The separator 1400 is a shell-and-tube exchanger in which natural gas flows with the formation water in the shell and the heating water in the coil. Separator will be used in natural-gas processing plant to purify and dry raw natural gas.

Parameters

Tank:

Design pressure: 63 bar

Hydraulic test pressure: 91 bar

Design temperatures: -29°C / + 49°C

Medium: natural gas + formation water

Coil:

Design pressure: 2.5 bar

Hydraulic test pressure: 4bar

Design temperatures: -29°C / + 100°C

Medium: water

Capacity: 7570l.

Weight: 7200 kg

Heat exchangers with an outside coil

This type of exchanger is relatively common in industry. It consists of a reservoir that holds or passes through a fluid. The heating element is a coil, which is a coiled pipe inside the tank, or a jacket installed outside. The fluid inside the tank is heated or cooled at the expense of the fluid flowing through the coil or jacket. The heating medium is usually steam. Water is most often used as a cooling medium. Chemical reactors are an example of a jacketed tank. When an exothermic reaction takes place in the reactor, it is necessary to remove the heat generated by the reaction. When the reaction is endothermic, energy must be supplied. From the chemical point of view, such a tank is an isothermal reactor.
Coil tanks are used, for example, in fluidized beds.

LTS heat exchanger

Construction

Due to the excessive length, the LTS exchanger was made of two segments stacked on top of each other.

Parameters

Design pressure: 82 bar
Hydraulic test pressure: 118 bar
Design temperatures: -29 / 110 ^{o}C
Thermal power: 121 kW
Heat exchange surface: 183 m^{2}

The apparatus is intended for the installation of low-temperature separation in the Bystrowice natural gas processing plant.

Horizontal liquid separator

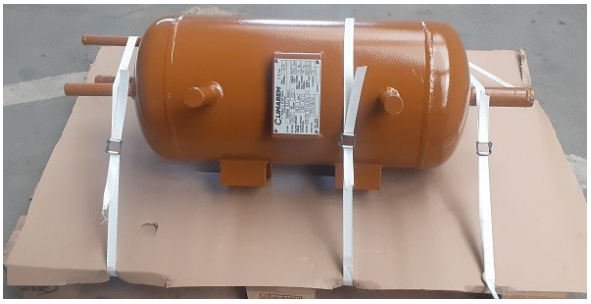
Tanks for ammonia systems

We offer design, approval, production, commissioning and certification of NH_3 liquid separators for refrigeration systems. The tanks are made in accordance with the following regulations:

Pressure equipment directive: 97/23 / EC,

Regulations of marine Classification Societies

Regulations: PN - EN 13445: 2009



Other components of ammonia refrigeration systems

We also manufacture oil separators, liquid ammonia storage tanks, shell and tube condensers as well as shell and tube evaporators.

Sea water coolers

Box coolers are a specific product delivered to ships for RSW installations.

Anodizing

Anodizing is the electrolytic treatment of metal, mainly aluminum and its alloys, i.e. it leads to the formation of an aluminum oxide layer on it. An object immersed in an electrolyte bath acts as an anode, and the electrolyte is sulfuric acid. Details made of aluminum containing minimal amounts of alloying additives are covered with a colorless layer of oxide, while those made of aluminum, which contain large amounts of additives such as manganese, silicon or copper, are covered with a gray-tinged oxide layer, and by adding coloring substances to the electrolyte, you can obtain indelible, colored coatings on the surface.

Anodized coatings are usually sealed to improve their anti-corrosion properties by filling or wetting the pores in columns with hot water, chromates or acetates. The columns can also be filled with an ultrafine water dispersion of PTFE, thus improving the frictional properties and abrasion resistance of the coating as well as its anti-corrosive properties. The densest coatings are made of pure aluminum alloys. The presence of alloying elements such as copper and silicon makes the coating macroporous, reducing its anti-corrosion properties.

New fire protection installation

We have completed a thorough replacement of the fire protection system in our premisses in terms of adaptation to fire safety conditions, recommended by the City Commander of the State Fire Service in Gdynia.
As part of the reconstruction were made the following

* Improving the width of escape routes in buildings
* Installation of warning and anti-smoke devices
* Replacement of fire-fighting water supply pipelines
* The current fire protection circuit breakers have been adapted to the latest regulations
* Appropriate fire protection was provided in the production halls
* Evacuation lighting was made
* The ventilation system and ventilation ducts have been checked and adjusted to the latest guidelines

Buffer tank with a coil

In our company are manufactured different liquid CO_2 tanks for cooling systems, fire extinguishing systems, dry ice production systems and other technological installations.

Tank parameters

Capacity: 3000 l

Working pressure: 25 bar

Test pressure: 36 bar

Permissible temperature: -40 / + 40 oC

The tank is equipped with a coil.

Właz

New welding technologies in 2021

No	Approval	Scope
1	TÜV	Sheet metal, material group 1.2 (thickness range 3 - 16 mm), metal 135/121, impact strength - 50
2	TÜV	Tube, diameter> 50 mm, th. mat. 1.2 (range of thicknesses 3 - 24 mm), met. 135/136, impact strength - 50
3	TÜV	Tube, diameter> 20 mm, th. mat. 1.2 (range of thicknesses 3 - 20 mm), met. 141, impact strength - 50
4	DNV	Forging + PWHT, gr. Mat. 1.2 (range of thickness 20 - 80 mm), met. 121
5	DNV	Forging / Sheet + PWHT, gr. Mat. 1.2 (range of thickness 20 - 80 mm), met. 121
6	TÜV	Sheet + PWHT, th. mat. 1.2 (range of thickness 15 - 60 mm), met. 135/121, one-side welding
7	TÜV / BV	Titanium
8	TÜV	Straight connection, material group 1.2, Tube diameter> 50 mm (range 3 - 24 mm), Sheet metal (range 15 - 60 mm) met. 141
9	TÜV	Tube plate, material group 8.1, Tube diameter> 13 mm (range thickness 1.5 - 6 mm), Sheet> 10 mm met. 141
10	TÜV	Tube, diameter> 40 mm, th. mat. 8.1 (range 10 - 40 mm), met. 141/136,
11	TÜV	Tube, diameter> 24.3 mm, th. mat. 8.1 (range of thicknesses 3 - 14.3 mm), met. 141
12	TÜV	Tube, diameter> 12.5 mm, th. mat. 8.1 (range of thickness 1 - 4 mm), met. 141

Ventilation and air conditioning at ORP Arctowski

Our company has provided PGZ Stocznia Wojenne with a comprehensive delivery and assembly service on the ORP Arctowski Navy ship:

* General ship ventilation system
* Gym ventilation system
* Ventilation and air conditioning installation system
* Special ventilation system
* Heating system

The scope of the order included disassembly works of the HVAC system and in its place installation of new air handling units, ventilation ducts, replacement of electrical installations, switchboards, fans, dampers, diffussers, heaters and pipelines of the air conditioning system.
CLIMAREM provided full design service for HVAC installations, including technical design and working documentation, on-board supervision and quality documentation.

Podpis zdjęcia

Condensing unit for cold stores

CLIMAREM refrigeration units on the BC Ferry's „Salish Heron"

We have equipped next, fourth "Salish" class ferry with chillers, air conditioning units, air-conditioning units, and we have made ventilation and air-conditioning systems on the vessel.

The newly built ferry will replace the Mayne Queen and will operate, together with the Queen of Cumberland, on the Swartz Bay - Southern Gulf Islands line in British Columbia in western Canada. These are large in their class (107 m long, 138 vehicles and 600 passengers), containing innovative technical solutions, environmentally friendly, two-way passenger and car ferries with dual fuel engines - with the possibility of running on traditional diesel fuel, but mainly intended for combustion of natural gas (stored as liquefied gas - LNG).

WCH 300 chiller

Industrial air coolers

We have made a set of air coolers with dimensions: more than 10m length and 3 m width.

Technical characteristics of the coolers

Allowable pressure: 25.5 bar

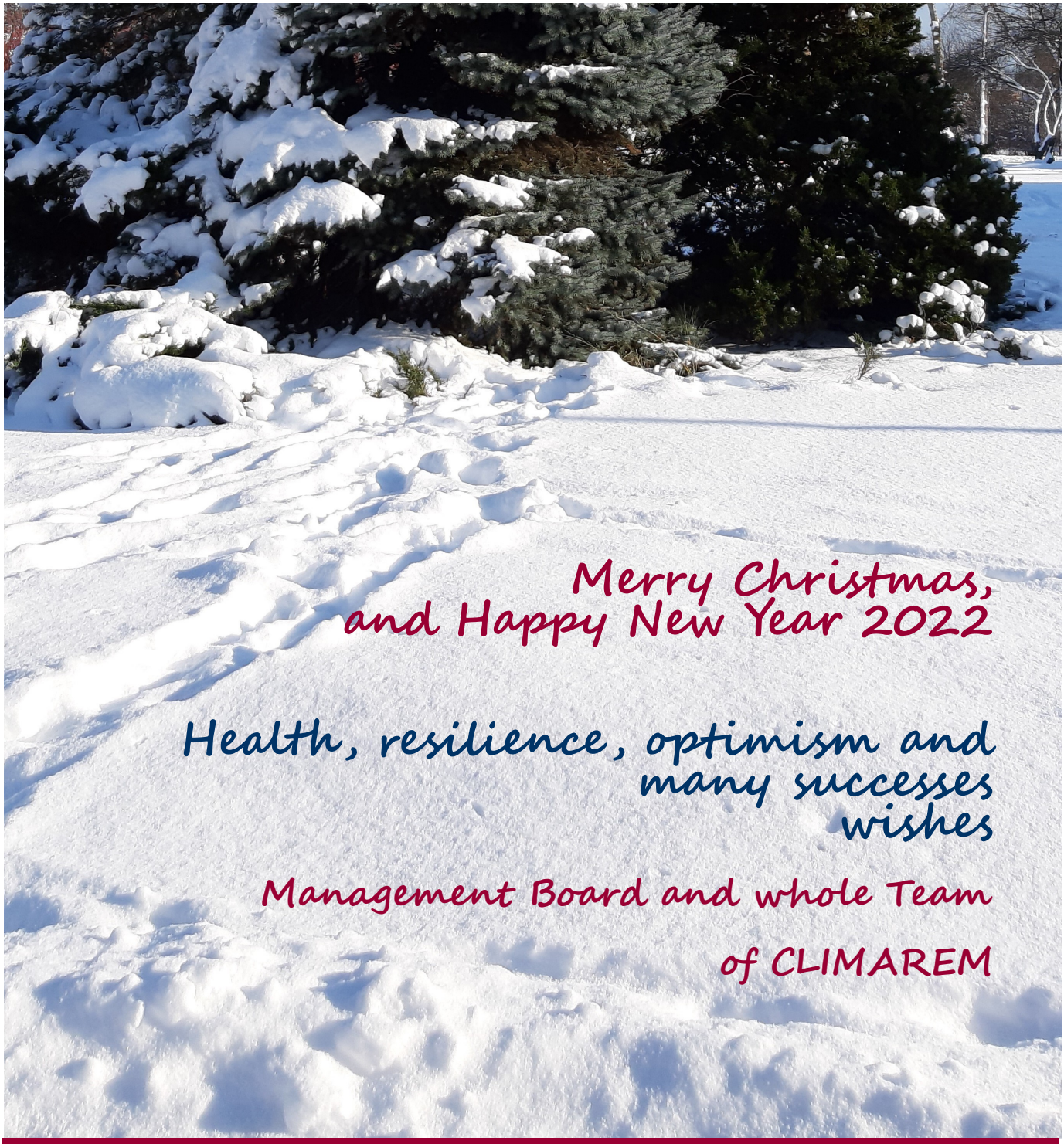
Hydraulic test pressure: 39.6 bar

Permissible temperature: -25 / 150oC

Weight when empty: 6128 kg

Medium: hydrocarbons

Hot dip galvanized frame elements



Merry Christmas, and Happy New Year 2022

Health, resilience, optimism and many successes wishes

Management Board and whole Team

of CLIMAREM

Wesołych Świąt

Merry Christmas

Frohe Weihnachten

Счастливого Рождества

Joyeux Noël

CLIMAREM - Twój dostawca urządzeń ciśnieniowych i HVAC

OUR OFFER:

I HFC / HFO / R744 refrigeration equipment:

- condensing units
- chillers
- shell and tube evaporators
- shell and tube condensers
- gas coolers
- refrigerant receivers
- autonomous air conditioners
- coolers

II Components for refrigeration systems on R717 (NH3)

- separators
- shell and tube evaporators
- shell and tube condensers
- intermediate coolers
- receivers
- filters

III Process equipment

- shell and tube heat exchangers
- pressure vessels
- high pressure vessels
- titanium pressure equipment
- heaters
- boiler heat exchangers

IV Pressure equipment for glycol

- glycol coolers
- distillate coolers
- deaerators
- regenerators
- tanks
- filters
- absorption columns

V Equipment for gas installations

- three-phase separators
- two-phase separators
- linear heaters
- shell and tube heat exchangers
- tube-in-tube exchangers
- distillation columns
- boilers
- absorption columns

VI Hyperbaric chambers

VII HVAC equipment

- ducts
- fans
- heaters
- dampers, fire dampers, louvers
- ventilation cabinets, diffusers
- ventilation grilles
- air handling units
- fan coil units

Contact us

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