POLIMER *Cooperation and support*

Engineering. Manufacturing. Service.

Example projects

November 2024

The typical process of performing a contract is as follows:

1. Enquiry
2. Consultation with the client, if needed: technical, technological, legal requirements, potential modernisation proposals, etc.
3. Offer
4. Contract signing
5. Engineering & Design
6. Project review by the client
7. Project approval by an independent Inspection Body
8. Manufacturing – NDT – between-stages inspections by an independent Inspection Body
9. Strength / leak tests in the presence of a representative of an independent Inspection Body
10. Acceptance by the independent Inspection Body
11. Anti-corrosion treatment operations: coating, glass blasting, Säkaphen heat-cured coatings, aluminium cladding, etc.
12. Transport / Installation
13. Commissioning
14. Warranty service

- This schema can be adjusted to the needs of the client and implemented in accordance with the contracts.
- The client can visit the plant and receive written reports, the Inspection and Test Plan, photographs and videos on the progress of work at any stage of order processing.
- NDT and DT are conducted as needed at every stage of production.
- Quality control is conducted at every stage of implementation.

POLIMER *Cooperation and support*
Engineering. Manufacturing. Service.

Polimer Tech **design, manufacture and assembly pressure and non-pressure equipment** making up industrial installations in the **refinery, chemical, petrochemical, mining, fertiliser and energy sectors**:

- Shell and tube heat exchangers;
- Air coolers;
- Pressure vessels;
- Reactors;
- Pipelines / piping;
- Columns;
- Boilers;
- Storage tanks;
- Electric heaters;

and a variety of other elements of industrial installations not listed above, as well as all kinds of steel structures.

We provide our products and services mainly to **End Users** and **EPC** (Engineering, Procurement & Construction) companies.

We are **a good fit for any company** looking for a trusted partner to ➔ design, install, exchange, repair, modernise, or optimise ➔ individual devices, systems or whole installations ➔ especially for corrosive, toxic, flammable and explosive media ➔ especially under high pressure and extreme temperatures ➔ especially when using non-standard materials.

We manufacture equipment in accordance with Pressure Equipment Directive 2014/68/EU, ASME Boiler and Pressure Vessel Code, (W)UDT and GOST (EAC) marks.

You can choose from a **comprehensive range of services** – engineering, procurement, manufacturing, installation, commissioning, or entrust us with completing **a specific stage** of works.

Our **competitive advantage** lies in our ability to carry out non-standard projects requiring:

- Understanding of the specific requirements and needs of our clients;
- Excellent work organisation in cooperating with our clients;
- Extensive engineering and manufacturing knowledge and experience;
- In-depth knowledge of the global market for non-standard materials;
- A wide array of skills, authorisations and certificates.

„Cooperation and support" represents the essence of our company.
Take a look at some of our **example projects.**

Acetic acid condenser – steam generator

End user: Refinery plant
Location: Poland
Design code: EN 13445, 2014/68/UE
Weight: 23,060 kg
Pressure: 19 bar
Temperature: 175 °C
Medium flammable
Materials: Titanium (Gr. 1 – UNS R50250 – 3.7025 / Gr. 2 – UNS R50400 – 3.7035), austenitic stainless steels, carbon steels

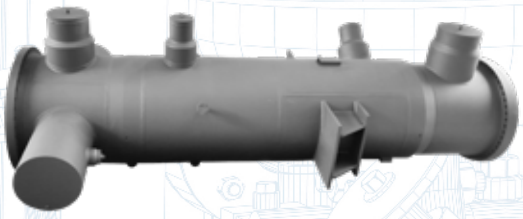
Process: Condensing reaction gas (acetic acid) and utilising the steam produced in this process by transporting it to the turbine.

Additional description:

- Tubesheets, heads, and conical and cylindrical chambers were explosively cladded (titanium with carbon steel). Polimer developed its own butt welding technology for connecting titanium-cladded carbon steel plates to ensure hermeticity.
- 2330 titanium tubes of 7000 mm length were applied, and eddy current tested after production and assembly.
- A helium leak test was performed, and the maximum leakage recorded was 10-7 Pa*m³/s.
- Lens expansion joint.

Boiler for potassium washing

End user: Zakłady Azotowe „Puławy"
Location: Puławy
Plant: Gas preparation plant at the Ammonia Division
Design code: EN 13445, 2014/68/UE, TEMA R
Weight: 17,900 kg
Pressure: 30 bar
Temperature: 150 °C
Medium toxic, flammable, explosive
Materials: Austenitic stainless steels, carbon steels
Process: Heating caustic potash with process gas to concentrate the solution and obtain steam.



Secondary Waste Heat Boiler

End user: Nitrogénművek
Location: Pétfürdő, Hungary
Design code: ASME BPVC Sec. VIII Div. 1, TEMA R
Weight: 43,350 kg
Pressure: 120 bar
Temperature: 450 °C
Materials: Chromium-molybdenum steels (SA–387 Gr. 11/12, Cl. 2 – UNS K11789/K11757 / SA–182 Gr. F11, Cl. 2 – UNS K11572 / SA–213 Gr. T11 – UNS K11597 – EN 1.7335 – 13CrMo4-5), carbon steels
Additional description: We modernised the equipment by designing an insulation system for the hot tubesheet to reduce its operating temperature.

Steam boiler unit: Reactor sulphur condenser

End user: Refinery plant
Location: Poland
Plant: Claus
Quantity: 3
Design code: WUDT (Conditions of the Office of Technical Inspection)
Weight: 3 szt. x 80,100 kg
Pressure: 22 bar
Temperature: 290 °C
Medium toxic, flammable, explosive
Materials: Carbon steels, austenitic stainless steels, chromium-molybdenum steels (SA-182 Gr. F12 – UNS K11564 – EN 1.7335 – 13CrMo4-5)
Additional description: We designed a thermal expansion compensation system to prevent damage to the brickwork lining on the hot tubesheet; heat-resistant brickwork lining on the tubesheet.

Process gas cooler

End user: Zakłady Azotowe „Kędzierzyn"
Location: Kędzierzyn, Poland
Design code: EN 13445, 2014/68/EU
Weight: 67,950 kg
Pressure: 93 bar
Temperature: 460 °C
Process: cooling of process gas with the generation of process steam
Materials: chromium molybdenum boiler steel for elevated temperatures (13CrMo4-5 – UNS K11564 – EN 1.7335, SA182 F11 CL2 – UNS K11572), SA266 Gr.3
Dodatkowy opis:

- Shell ø1708×74, total length ~15620 mm;
- Safety fittings to prevent pressure rise above the permissible pressure;
- Disassembly of the existing equipment and assembling of new equipment, including piping;
- Management of foundation repair. Connecting the apparatus to the grounding and lightning protection system with measurement protocols.

Neutralisation vapour condenser

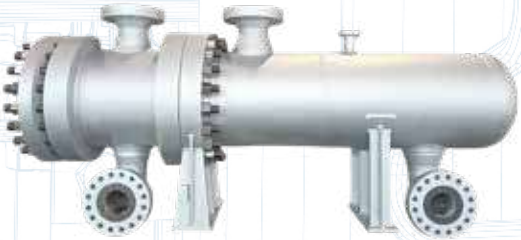
End user: Zakłady Azotowe „Puławy"
Location: Puławy
Design code: EN 13445, 2014/68/UE
Weight: 19,100 kg
Pressure: 2/-1 bar
Temperature: 160 °C
Medium toxic, flammable, explosive
Materials: Austenitic-ferritic stainless steels (Duplex – UNS S31803 – 1.4462 – X2CrNiMoN22-5-3), austenitic stainless steels, carbon steels

Reactor feed heater

End user: Refinery plant
Location: Poland
Plant: Pyrolysis petrol hydrogenation plant PGH
Design code: ASME BPVC Sec. VIII Div. 1, API 660, TEMA, 2014/68/EU
Weight: 27,104 kg
Pressure: 69.2 bar
Temperature: 400 °C
Medium toxic, flammable, explosive
Additional description: Shell wall thickness: 40 mm.
Materials: Chromium-molybdenum steels (SA–387 Gr. 12, Cl. 2 – UNS K11757 / SA–182 Gr. F12, Cl. 2 – UNS K11564 – EN 1.7335 – 13CrMo4-5), stainless steels

Syngas water cooler

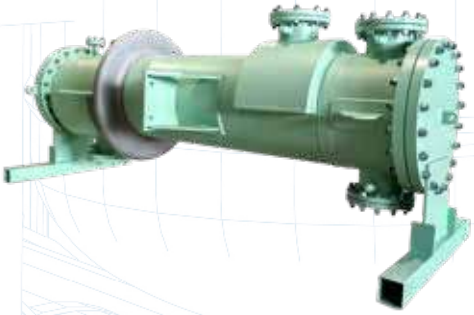
End user: Zakłady Azotowe „Puławy"
Location: Puławy
Plant: Ammonia Division, Synthesis Section
Quantity: 5 pcs
Design code: EN 13445, 2014/68/UE, TEMA R
Weight: 5 pcs. x 7,615 kg
Pressure: 360 bar
Temperature: 100 °C
Medium toxic, flammable, explosive
Materials: Austenitic-ferritic stainless steels (Duplex – UNS S31803 – 1.4462 – X2CrNiMoN22-5-3), stainless steels, carbon steels
Additional description: Hair-pin and gland joint, to facilitate installation we replaced regular bolts with super-bolts, which allowed us to reduce bolt assembly tension from 6800 Nm to 380 Nm



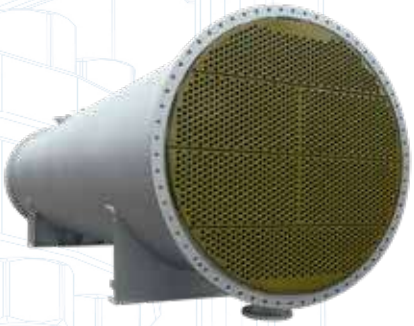
Boiler Feed Water Preheater

Client: Hyundai Heavy Industries Power Systems
Plant: Olefins
Design code: EN 13445, 2014/68/EU
Weight: 15,600 kg
Pressure: 173 bar
Temperature: 280 °C
Materials: Low-vanadium steels Cr-Mo-(Ni) (1.6308 – 18MnMoNi5-5), 16Mo3 – 1.5415
Additional description: post weld heat treatment (PWHT) of weldments.

Heat exchanger SV12 B010



End user: Mariehamns Energi AB
Location: Mariehamn, Aland Islands, Finland
Design code: EN 13445, 2014/68/UE
Weight: 1,900 kg
Pressure: 16 bar
Temperature: 100 °C
Materials: Austenitic stainless steels, carbon steels
Additional description: Thermal expansion compensation (fixed tubesheets) using a lens expansion joint.



Extractive distillation column condenser

End user: Refinery plant
Location: Poland
Plant: Extractive distillation plant
Design code: ASME BPVC Sec. VIII Div. 1, TEMA R
Weight: 24,200 kg
Pressure: 7/-1 bar
Temperature: 65 °C
Materials: Carbon steels
Medium toxic, flammable, explosive
Additional description: The tube side (tubes, tubesheets, chamber, head) was protected against corrosion with a phenolic epoxy-based coating (Säkaphen coating).

Ammonia evaporator

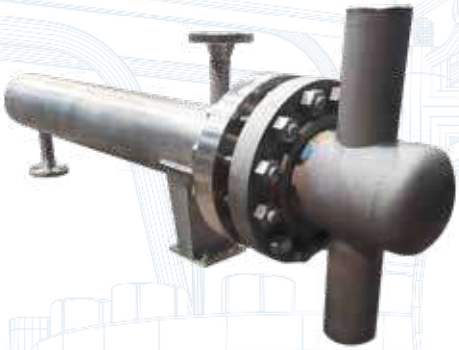
End user: Zakłady Azotowe „Puławy"
Location: Puławy
Plant: Nitrogen gas neutralisation plant
Design code: EN 13445, 2014/68/UE, TEMA R
Weight: 21,110 kg
Pressure: 25/-1 bar
Temperature: 60 °C
Medium toxic
Materials: Austenitic stainless steels, carbon steels
Additional description: Evaporation of liquid ammonia by heating water.

Process gas cooler

End user: Refinery plant
Location: Poland
Design code: ASME BPVC Sec. VIII Div. 1, EN 13445
Weight: 1,950 kg
Pressure: 17 bar
Temperature: 145 °C
Medium toxic, flammable, explosive
Materials: Titanium (gr. 2 / F2 – UNS R50400 – 3.7035 / Gr. 1 – UNS R50250 – 3.7025 – Ti), austenitic stainless steels, carbon steels
Additional description: Titanium-cladded tubesheets by explosive cladding method, lens expansion joint.

Vapour condenser

End user: Zakłady Azotowe „Puławy"
Location: Puławy
Design code: EN 13445, 2014/68/UE
Weight: 5,350 kg
Pressure: 2/-1 bar
Temperature: 200 °C
Medium toxic, flammable, explosive
Materials: Austenitic-ferritic stainless steels (Duplex – UNS S31803 – 1.4462 – X2CrNiMoN22-5-3), austenitic stainless steels, carbon steels



Natural gas preheater using hydrogen gas

End user: Refinery plant
Location: Poland
Plant: Hydrogen Plant
Design code: ASME BPVC Sec. VIII Div. 1
Weight: 260 kg
Pressure: 25 bar
Temperature: 625 °C
Medium toxic, flammable, explosive
Materials: Nickel-chromium-molybdenum alloys (Alloy 601 – UNS N06601 – 2.4851 – NiCr23Fe), austenitic stainless steels.
Additional description: We increased the heat resistance of the tube side by diffusion coating with aluminium of tubesheet surface and the inner surface of the process tubes and chamber.

Steam boiler condenser

End user: Refinery plant
Location: Poland
Plant: Claus
Design code: WUDT (Conditions of the Office of Technical Inspection), 2014/68/UE
Weight: 80,100 kg
Pressure: 22 bar
Temperature: 350 °C
Medium toxic, flammable, explosive
Materials: Carbon steels, austenitic stainless steels, chromium--molybdenum steels (EN 1.7335 – 13CrMo4-5)
Additional description: Lens expansion joint, pickling

Cyclohexanone vapour condenser

End user: Zakłady Azotowe „Puławy"
Location: Puławy
Quantity: 2 pcs
Design code: EN 13445, 2014/68/UE
Weight: 2 pcs x 17,200 kg
Pressure: 1/-1 bar
Temperature: 100 °C
Medium toxic, flammable, explosive
Materials: Carbon steels
Additional description: Design, manufacturing and installation.

Syngas air cooler

End user: Zakłady Azotowe „Puławy"
Location: Puławy
Plant: Ammonia synthesis loop
Quantity: 2 units
Design code: EN 13445, 97/23/WE
Weight: 42,000 kg / 1 unit
Pressure: 312.7 bar
Temperature: 42 °C
Materials: Carbon steels + tubes with extruded aluminium fins
Additional description: The cooling process in the cooler is intensified by installing four fans for continuous operation in the open space in a supply configuration with anti-explosive electric engines, equipment and frequency converters. The rotor diameter is ø 3048 mm. Fan capacity: 4 × 171,000 m³/h.

Air coolers for steam+CO_2+H_2S / butane / Leam Mea / propane

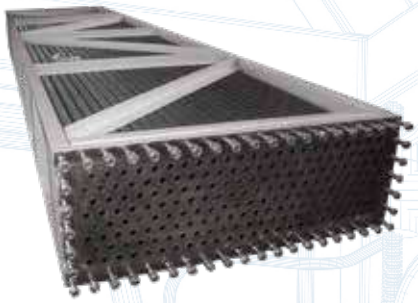
End user: Warri Refining and Petrochemical Company
Location: Warri, Nigeria
Quantity: 9 pcs
Design code: ASME BPVC Sec. VIII Div. 1.
Weight: 6 pcs x 6,500 kg, 1 pc x 5,500 kg, 1 pc x 2,100 kg, 1 pc x 5,300 kg
Pressure: 22.9 bar
Temperature: 130 °C
Materials: Carbon steels + tubes with extruded aluminium fins

Air cooler for circulating water

End user: Refinery plant
Location: Poland
Quantity: 4 pcs
Design code: ASME BPVC Sec. VIII Div. 1
Weight: 4 pcs x 11,850 kg
Pressure: 12 bar
Temperature: 100 °C
Materials: Carbon steels + tubes with extruded aluminium fins

Nitrogen air cooler

End user: Alkat (AirLiquide group)
Location: Dąbrowa Górnicza
Design code: EN 13445, 97/23/WE
Weight: 18,000 kg
Temperature: 180 °C
Materials: Carbon steels + tubes with extruded aluminium fins
Additional description: The modernisation design according to which we manufactured the cooler was intended to increase the flow of the medium to 26,000 Nm3/h.



A41 fraction air cooler

End user: Refinery plant
Location: Poland
Plant: Fractional distillation plant
Quantity: 2 pcs
Design code: EN 13445, WUDT (Conditions of the Office of Technical Inspection)
Weight: 2 pcs x 3,600 kg
Pressure: 4 bar
Temperature: 150 °C
Medium toxic, flammable, explosive
Materials: Brass / copper and zinc alloys (CuZn3 explosive cladding on tubesheet, CuZn20Al2 exchanger tubes + extruded aluminium fins, carbon steels)
Additional description: Brass-cladded tubesheets by explosive cladding method.

Argon air cooler

End user: Alkat (AirLiquide group)
Location: Dąbrowa Górnicza
Design code: WUDT (Conditions of the Office of Technical Inspection)
Weight: 7,500 kg
Pressure: 8 bar
Temperature: 550 °C
Materials: Austenitic stainless steels
Additional description: We used austenitic steel lamella fins (instead of extruded aluminium fins) increasing the performance and durability of equipment – our own production technology.

Air cooler for warm water

End user: Zakłady Chemiczne „Kędzierzyn"
Location: Kędzierzyn-Koźle
Plant: Aldehyde Division of JB OXOPLAST
Quantity: 2 pcs
Design code: WUDT (Conditions of the Office of Technical Inspection)
Weight: 2 pcs x 4,276 kg
Pressure: 20 bar
Temperature: 220 °C
Medium toxic, flammable, explosive
Materials: Carbon steels + tubes with extruded aluminium fins

Deflegmator

End user: Refinery plant
Location: Poland
Quantity: 4 pcs
Design code: ASME BPVC Sec. VIII Div. 1
Weight: 4 x 7,650 kg
Pressure: 0.35 bar
Temperature: 121 °C
Materials: carbon steels + tubes with extruded aluminium fins

Process gas air cooler

End user: LNG Silesia
Location: Hard coal mine in Suszec
Plant: LNG liquefaction plant
Design code: ASME BPVC Sec. VIII Div. 1 / 97/23/WE
Weight: 1,643 kg
Pressure: 2.5 bar
Temperature: 40 °C
Materials: Austenitic stainless steels + extruded aluminium fins.
Additional description: In addition to manufacturing, the project involved thermal balance analysis, selection of materials, fan and technologies.

Light vacuum gas oil cooler

End user: Refinery plant
Location: Poland
Plant: Soft asphalt hydro-desulphurization plant
Quantity: 2 pcs
Design code: ASME BPVC Sec. VIII Div. 1
Weight: 2 x 17,120 kg
Pressure: 23 bar
Temperature: 170 °C
Materials: carbon steels

Light vacuum gas oil cooler

End user: Refinery plant
Location: Poland
Plant: Soft asphalt hydro-desulphurization plant
Quantity: 2 pcs
Design code: ASME BPVC Sec. VIII Div. 1
Weight: 2 x 15,900 k
Pressure: 38.2 bar
Temperature: 285 °C
Materials: carbon steels

Air cooler for heavy diesel oil

End user: Refinery plant
Location: Poland
Plant: Fractional distillation plant
Quantity: 6 pcs
Design code: AD 2000-Merkblatt, WUDT (Conditions of the Office of Technical Inspection), 97/23/WE
Weight: 6 pcs x 2,748 kg
Pressure: 4.5 bar
Temperature: 180 °C
Materials: Carbon steels + tubes with extruded aluminium fins

Deaerator with column

End user: Refinery plant
Location: Poland
Plant: Claus
Design code: EN 13445, 2014/68/UE
Weight: 13,150 kg
Pressure: 1 bar
Temperature: 160 °C
Materials: Carbon steels

Nitric acid reflux tank

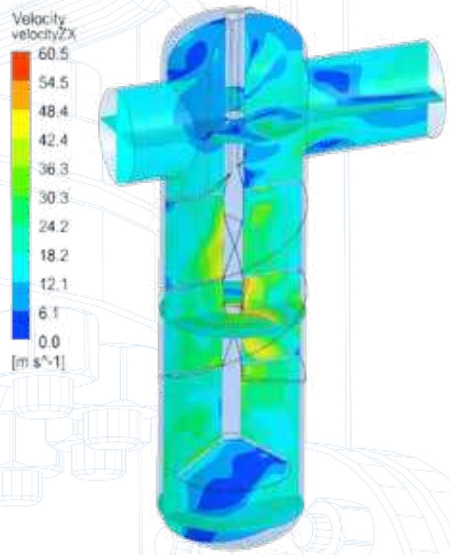
End user: Zakłady Azotowe „Puławy"
Location: Puławy
Design code: EN 13445, 2014/68/UE
Weight: 3,980 kg
Pressure: 5/-1 bar
Temperature: 170 °C
Medium toxic
Materials: Austenitic stainless steels

Intermediate tank for resin solution

End user: Synthos
Location: Oświęcim
Design code: EN 13445, 2014/68/UE
Weight: 2,165 kg
Pressure: 14 bar
Temperature: 250 °C
Medium toxic i flammable
Materials: Nickel-chromium-molybdenum alloys (Alloy C22 – UNS N06022 – 2.4602 – NiCr21Mo14W), stainless steels.

Boiler water tank – degassing system

End user: Zakłady Azotowe „Puławy"
Location: Puławy
Plant: Nitric acid plant
Design code: EN 13445, 2014/68/EU.
Weight: 13,000 kg
Pressure: 3.5 bar
Temperature: 270 °C
Materials: Carbon steels
Process: Degassing boiler feed water.
Additional description: We provided the technological, process and mechanical designs for the degassing system using Computation Fluid Dynamics (CFD) and the Finite Element Method (FEM)



Steam condensate separator

End user: Refinery plant
Location: Lithuania
Design code: ASME BPVC Sec. VIII Div. 1
Weight: 1,671 kg
Pressure: 16 bar
Temperature: 250 °C
Materials: Carbon steels
Additional description:

- A design maintaining the maximum pressure drops provided by the client
- Analysis using the Finite Element Method (FEM)
- Analysis using Computational Fluid Dynamics (CFD)

Nitrous gas separator

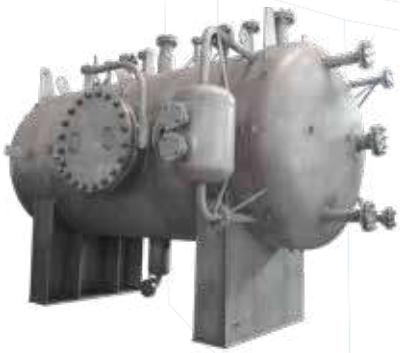
End user: Zakłady Azotowe „Puławy"
Location: Puławy
Plant: Nitric acid plant
Design code: ASME BPVC Sec. VIII Div. 1, TEMA R
Weight: 6,000 kg
Pressure: 4.8 bar
Temperature: 100 °C
Medium toxic, flammable, explosive
Materials: Austenitic stainless steels
Additional description: We selected the internal particle separation system.

Neutralisation steam saturator

End user: Zakłady Azotowe „Puławy"
Location: Puławy
Plant: Nitric acid neutralisation plant
Design code: EN 13445, 2014/68/UE
Weight: 3,600 kg
Pressure: 13/-1 bar
Temperature: 270 °C
Materials: Austenitic stainless steels

Evaporation steam saturator

End user: Zakłady Azotowe „Puławy"
Location: Puławy
Plant: Nitrogen gas neutralisation plant
Design code: EN 13445, 2014/68/UE
Weight: 2,900 kg
Pressure: 13/-1 bar
Temperature: 270 °C
Materials: Nickel-chromium-molybdenum alloys (904L – UNS N08904 – 1.4539 – X1NiCrMoCu25-20-5), austenitic stainless steels



Autoclave (1311)

End user: Larkis
Location: Dobczyce
Process: Vulcanisation of rubber components.
Design code: EN 13445, 2014/68/UE
Weight: 4,925 kg
Pressure: 8/-1 bar
Temperature: 200 °C
Materials: Carbon steels
Additional description: Turnkey project; the design of a whole pressure set, including the vessel, automatics, hydraulics & electrics. Commissioning and personnel training.

Reactor for rosin disproportionation

End user: Synthos
Location: Oświęcim
Design code: EN 13445, 97/23/WE
Weight: 3,240 kg
Pressure: 6 bar
Temperature: 320 °C
Medium toxic, flammable
Materials: Nickel-chromium-molybdenum alloys (Alloy C22 – UNS N06022 – 2.4602 – NiCr21Mo14W), austenitic stainless steels, carbon steels

Steam boiler unit: Combustion chamber

End user: Refinery plant
Location: Poland
Plant: Claus
Quantity: 3
Design code: WUDT (Conditions of the Office of Technical Inspection)
Weight: 3 pcs x 19,160 kg (without brickwork lining)
Pressure: 1.5 bar
Temperature: 350 °C
Medium toxic, flammable, explosive
Materials: Carbon steels, stainless steels, chromium-molybdenum steels (SA–387 Gr. 12 – UNS K11757 – EN 1.7335 – 13CrMo4-5)
Process: Burning of hydrogen sulphide gas and ammonia in the presence of oxygen enriched air.
Additional description: Equipped with burners and a heat-resistant brickwork lining in chambers.

Autoclave (689)

End user: Hannecard Polska
Location: Kraków
Design code: EN 13445, 97/23/WE
Weight: 9,000 kg
Pressure: 8/-1 bar
Temperature: 175 °C
Materials: Carbon steels
Process: Vulcanisation of rubber and ebonite coatings applied to machine and equipment parts: in steam or a mixture of air and steam.
Additional description: An autoclave with full mechanics and a hydraulic control system: trolleys, actuators, head opening system.

Heterogeneous catalyst drying installation for hydrogenation reactors – turnkey project

End user: PCC MCAA
Location: Brzeg Dolny
Plant: Monochloroacetic acid production plant
Design code: EN 13445, 97/23/WE
Pressure: 12.5 bar
Temperature: 220 °C
Materials: Austenitic stainless steels, carbon steels

Additional description:
We designed and completed a turnkey project for a catalyst drying system in an ultra-pure monochloroacetic acid production plant.
The process of drying the heterogeneous catalyst was divided into two stages:

- Steam drying system: Pre-drying using superheated steam at 150 °C i and pressure of 2 bar(g).
- Nitrogen drying system: Nitrogen heated to 150 °C circulating in a closed system was used for the second stage.

Range of works:

- Technological preparation and design for construction of the installationi
- The manufacturing and supply of shell and tube heat exchangers: Water cooler for steam, nitrogen heater, steam condenser; Roots DR240T 55kV blowers; pipelines; tubing; control and measurement instrumentation
- Registration of equipment in the Office of Technical Inspection (UDT)
- Plant assembly
- Plant start-up

Benzoyl peroxide plant – turnkey project

End user: Novichem
Location: Chorzów
Range of work:

- Design documentation: mechanical, technological, automatics, electrical, drencher, structural, construction, fire detection and alarm system (SAP)
- Prefabrication and installation of process pipelines and steel structures
- Supply and installation of the electrical section, drencher system, fittings, reactors and engines
- Construction work connected with modernising the industrial wastewater plant, unloading station, transport routes, ground hardening
- Construction works involving the construction of new buildings: holding tank for industrial wastewater along with connection
- Plant start-up

Nitric acid loading station

End user: Zakłady Azotowe „Puławy"
Location: Puławy
Range of work: Turnkey project of a nitric acid loading station on the premises of Zakłady Azotowe "Puławy". The project included industrial valves, control systems, loading arm, and the systems of absorption and purification of vapours generated in the process of loading. Polimer performed a full range of earthworks including plumbing installations, maintenance surveying, foundations, dispensing tray, prefabrication, installation and construction of steel pipelines, insulation and electrical works, instrumentation and automation works. The loading arm was registered with the Transport Technical Inspection (TDT) as per the applicable regulations. We performed the test run and start-up of the entire system.

Cryogenic pipeline

End user: Alkat (AirLiquide group)
Location: Dąbrowa Górnicza
Quantity: 240 m x DN65
Materials: Austenitic stainless steels
Description: Supply and assembly of a DN 65 vacuum-insulated cryogenic pipeline for transporting liquid nitrogen.

Depropaniser

End user: Refinery plant
Design code: ASME BPVC Sec. VIII Div. 1, TEMA R
Medium: hydrocarbons, HF acid (toxic, caustic)
Weight: 15,400 kg
Pressure: 24.6 bar/FV
Temperature: 135°C
Materials: Carbon steels
Additional description: The depropaniser is used to recover isobutane from the propane fraction. It is a two-diameter column with Ø1250 mm lower part diameter and Ø950 mm upper part diameter. The column contains 36 distillation trays. The materials used are carbon steels SA516 Gr. 70, SA106 Gr. B, SA350 Gr. LF2, S235JR. The lower part of the column houses a heater which supplies heat for distillation. The equipment was designed to operate with a toxic and caustic medium at pressures up to 24.6 bar and temperatures up to 135°C.

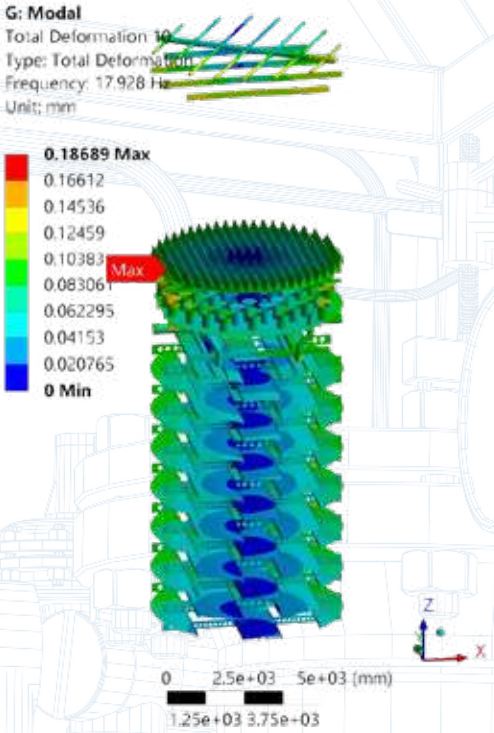
Gas scrubber

End user: Refinery plant
Plant: HF Alkylation
Design code: ASME BPVC Sec. VIII Div. 1., 2014/68/EC
Weight: 34,600 kg
Pressure: 10.6/3.5 bar
Temperature: 145°C
Medium hydrocarbons and HF acid (toxic, caustic)
Materials: nickel-copper alloys, carbon steels
Additional description: The discharge gas scrubber is used to neutralise gases fed to the acid discharge unit. An appropriate control system is used to control the level of caustic potash in the scrubber. Due to the medium applied, chemical-corrosion resistant materials were used: SB127 UNS N04400, SA516 Gr.70 and SA106 Gr.B. Alloy 400 is resistant to HF acid in concentrations of 85 to 95%, including anhydrous, in a wide range of temperatures, oxygen- and sulphur-dioxide free.

Acid stripper

End user: Refinery plant
Design code: ASME BPVC Sec. VIII Div. 1., 2014/68/EC
Medium: propane, HF acid (toxic, flammable, caustic)
Weight: 4,380 kg
Pressure: 26 bar
Temperature: 120°C
Materials: carbon steels, Monel
Additional description: The purpose of the acid stripper is to remove potential hydrogen fluoride from propane in the process of distillation occurring on 20 trays. The column has two diameters: Ø600 mm in the lower part, and Ø437 mm in the upper part. The lower part of the column houses a steam heater supplying additional heat to the process. Materials: SA516 Gr. 70, SA106 Gr. B, SA350 Gr. LF2, S235JR, UNS N04400.

Expert survey and determination of the causesof column vibrations



Conducting an expert survey of the column in connection with its periodic undesirable vibrations during operation. The survey was performed to:

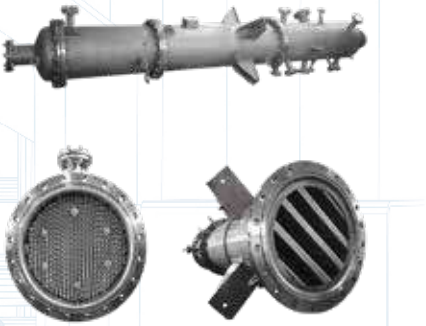
- Determine the reasons for column vibrations.
- Assess the possible actions aimed at eliminating or reducing vibrations and potentially reducing the time of exposure to them.
- Analyse the influence of vibration loads on the level of wear of the column and its foundation.
- Draw up final recommendations, including the safe usage methods and conditions for the column.

The following were performed:

- Static structural analysis
- Static FEM analysis
- Modal analysis
- CFD flow calculations
- Analysis of building design correctness for the foundation

Vent scrubber – column

End user: Zakłady Azotowe „Puławy"
Location: Puławy
Design code: EN 13445, 2014/68/UE
Materials: Austenitic stainless steels
Weight: 1,600 kg
Pressure: 2/-1 bar
Temperature: 190 °C
Additional description: Equipped with a demister, Thormann trays and liquid distributor.



Bleaching tower

End user: Grupa Azoty Zakłady Azotowe „Puławy"
Location: Puławy
Plant: Nitric Acid
Quantity: 2
Design code: EN 13445, 2014/68/EU
Weight: 5015 kg
Pressure: 5 bar
Temperature: 200°C
Medium Toxic
Materials: Austenitic stainless steels (Sandvik 2RE10 - UNS S31002 – 1.4335 – X1CrNi25-21)
Additional description: the scope of performance included the design, manufacturing and installation at the plant.

Superheated steam boiler Babcock- tube bundle

End user: fertilizer producer
Location: Poland
Plant: Gas Preparation Unit A-11
Design code: EN 13445, WUDT (Conditions of the Office of Technical Inspection)
Weight: 39, 300 kg
Pressure: 130 bar
Temperature: 461°C
Medium: toxic, flammable
Materials: Nickel-chromium-molybdenum alloys (Alloy 600 - UNS N06600 - 2.4816 - NiCr15Fe8), NF A 49-213 15CD2-05
Additional description:

- Collector and process pipes made of material 15-CD2-05. The parts exposed to high temperatures protected with Alloy 600 covers.
- Alignment of welded pipe joints with a deviation of no more than 1mm/1m.
- Plumbing process performed - diameter control along the entire length of the apparatus using a ring.
- Refractory lining in the dome (bottom) and outer casing of the insert was performed.
- Chemical etching was performed.
- 100% RT, PMI and PWHT

Rotodynamic compressor cooler – tube bundle

End user: Kompania Węglowa
Location: Rybnik
Plant: Combined heat and power plant
Materials: Austenitic stainless steels, copper
Additional description: We used copper exchanger tubes with copper lamella fins made with our own technology.

Syngas water coolers – tube bundles

End user: Zakłady Azotowe „Puławy"
Location: Puławy
Plant: Synthesis Plant at the Ammonia Division II
Quantity: 2 pcs
Design code: EN 13445
Weight: 2 pcs x 5,600 kg
Pressure: 314 bar
Temperature: 100 °C
Medium toxic, flammable, explosive
Additional description: Pressure test at 449 bar.
Materials: Austenitic-ferritic stainless steels (duplex – UNS S31803 – UNS S32205 – F51 – F60 – 1.4462 – X2CrNiMoN22-5-3)

CO_2 stripper shift effluent reboiler – u-tube bundles

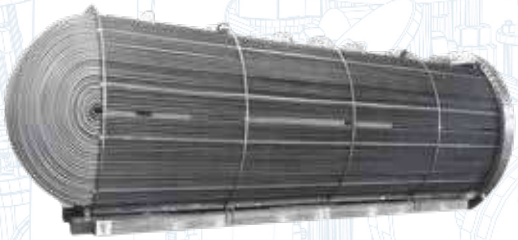
End user: Nitrogénművek
Location: Pétfürdő, Hungary
Quantity: 2 pcs
Design code: EN 13445
Weight: 2 pcs x 21,970 kg
Pressure: 33 bar
Temperature: 300 °C
Materials: Austenitic stainless steels (1.4541), 2 pcs x 891 U-tubes

Evaporator – U-tube bundle

End user: Refinery plant
Location: Poland
Plant: Hydrocracking plant
Design code: WUDT (Conditions of the Office of Technical Inspection)
Weight: 15,820 kg
Pressure: 10 bar
Temperature: 240 °C
Materials: Austenitic stainless steels (1.4541), 712 U-tubes
Process: Supplying heat to the stripping column through the partial evaporation of the circulating amine at the expense of heat of the condensing vapour.

Syngas water coolers – tube bundles

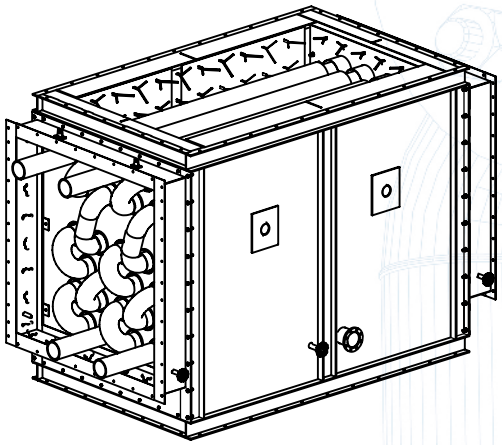
End user: Zakłady Azotowe „Puławy"
Location: Puławy
Plant: Synthesis Division at the Ammonium Nitrate Production Centre
Quantity: 3 pcs
Design code: EN 13445
Weight: 1 pc x 1,800 kg, 1 pc x 968 kg, 1 pc x 462 kg
Pressure: 498 bar
Temperature: 150 °C
Medium toxic, flammable, explosive
Materials: Austenitic-ferritic stainless steels (duplex – UNS S31803 – UNS S32205 – F51 – F60 – 1.4462 – X2CrNiMoN22-5-3)



Evaporator – U-tube bundle

End user: Refinery plant
Location: Poland
Plant: Isomerisation plant
Weight: 21,442 kg
Pressure: 10 bar
Temperature: 220 °C
Materials: carbon steels
Additional description: We used low-finned tubes to increase the heat exchange area.

Oven convection box



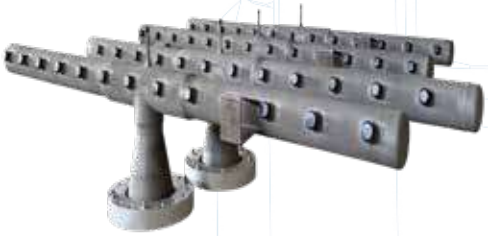
End user: Oil refinery
Location: Poland
Plant: diesel oil hydrodesulphurisation
Design code: WUDT (Conditions of the Office of Technical Inspection)
Weight: 17,200 kg
Pressure: 42 bar
Temperature: 400°C
Materials: chromium molybdenum boiler steel for elevated temperatures (A335 Gr.P11 – EN 1.7335 – 13CrMo4-5), heat-resistant ferritic steels H13JS – EN 1.4724 – X10CrAlSi18
Additional description:

- The coil consists of 16 process pipes Ø168.3×10.97 studded over a length of 2576 mm and 8 smooth pipes Ø168.3×11, connected by elbows to form two circuits, each with a separate inlet and outlet.
- Insulating concrete lining with an operating temperature of up to 1100 °C.
- Anti-corrosion coating.
- Heat treatment of welded joints (PWHT) on our own machines.

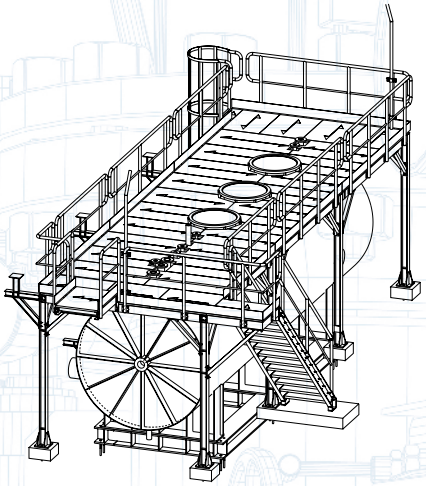
Electric nitrogen heater 400 kW

End user: AirLiquide
Location: Kraków
Materials: Austenitic stainless steels, carbon steels
Additional description: The works involved the heater and the thermocouple.
Weight: 750 kg

Sub-manifolds for a natural-gas steam reforming furnace



End user: Chemical plant
Location: Włocławek
Plant: Natural gas preparation plant
Quantity: 9 pcs
Design code: ASME BPVC Sec. VIII Div. 1
Weight: 9 pcs x 775 kg
Pressure: 37 bar
Temperature: 815 °C
Materials: Nickel-iron-chromium (UNS N08810)
Additional description:
– We selected a material (centrifugally-cast tubes of Group 45 material) to meet the anti-corrosion requirements (planned operation time of equipment at least 100,000 h) at an extremely high (815 °C) allowable temperature of the device
– Two cycles of simulated post weld heat treatment (SPWHT)



Sulphuric acid circulation tank

End user: Grupa Azoty (Tarnów)
Location: Tarnów
Plant: Acid absorption station at the WKS and SHA department
Quantity: 1
Design code: EN 13445
Weight: 8519 kg
Pressure: 0.48 bar
Temperature: 65°C
Medium Toxic & caustic

Materials: Nickel-chromium-molybdenum alloys (904L – UNS N08904 – 1.4539 – X1NiCrMoCu25-20-5), austenitic stainless steels.
Process: the circulation tank is used in the processing system of sulphuric acid for drying towers.

Scope of performance:

- The design and manufacturing of a circulation tank for sulphuric acid
- The design and manufacturing of platforms for the tank
- Repairing the foundations and acid-resistant brick tray
- Replacement of the circulation tank along with the construction, removal and installation of piping and pumps

Drainage for a pump

End user: Jordan Phosphate Mines
Location: Amman, Jordania
Weight: 3,000 kg
Materials: Nickel-iron-chromium alloys (Sanicro 28 – UNS N08028 – 1.4563 – X1NiCrMoCu31-27-4), nickel-chromium-molybdenum alloys (904L – UNS N08904 – 1.4539 – X1NiCrMoCu25-20-5), austenitic stainless steel

Boiler feed water preheater

End user: Fatima Group Pakarab Fertilizers
Location: Multan, Pakistan
Quantity: 4 pcs
Design code: ASME BPVC Sec. VIII Div. 1
Weight: 4 pcs x 828 kg
Pressure: 16,7/-1 bar
Temperature: 270 °C
Materials: Titanium (gr. 1 – UNS R50250 – 3.7025 – Ti), nickel-chromium-molybdenum alloys (Alloy C22 – UNS N06022 – 2.4602 – NiCr21Mo14W), austenitic stainless steels (Sandvik 2RE10 – UNS S31002 – 1.4335 – X1CrNi25-21)
Additional description: Titanium inner shell.

Components for a kerosene and hydrogen heat exchanger

End user: Refinery plant
Location: Lithuania
Weight w sumie: 1,150 kg
Medium toxic, flammable, explosive
Additional description: All components made of chromium--molybdenum steel SA 336 Gr. F11 Cl.2 / 1.7335 and cladded by welding with austenitic steel 19 9 Nb Si – 347Si). The works covered the reversal chamber, connectors and flanges.

HP Reaction Water Condenser

End user: Nitrogénművek
Location: Pétfürdő, Hungary
Design code: EN 13445
Weight: 15,850 kg
Pressure: 11.66 bar
Temperature: 121 °C
Materials: Tubes – titanium (SB–338 Gr. 2 – UNS R50400 – 3.7035 – Ti), other: austenitic stainless steels, carbon steels
Additional description: 2083 tubes ø 25,4×1,2

Column's courses made of Noram SX

End user: Uralchem
Location: Berezniki, Russia
Quantity: 2 courses
Design code: EN 13445, GOST
Weight: 1,650 kg + 1,350 kg
Pressure: 0.87 bar
Temperature: 100 °C
Materials: Sandvik Noram SX / SA-312 / SA-240 UNS S32615
Additional description: Following testing we picked the material for the medium (nitric acid, 99%) to extend the product life of the courses.

Toluene condenser – middle part

End user: Refinery plant
Location: Poland
Design code: AD 2000-Merkblatt, 97/23/WE, EN 13445
Weight: 6,850 kg
Pressure: 10 bar
Temperature: 150 °C
Materials: carbon steels
Additional description: The tube side surfaces (tubes, tubesheets) were protected against corrosion with a phenolic epoxy-based coating (Säkaphen coating).

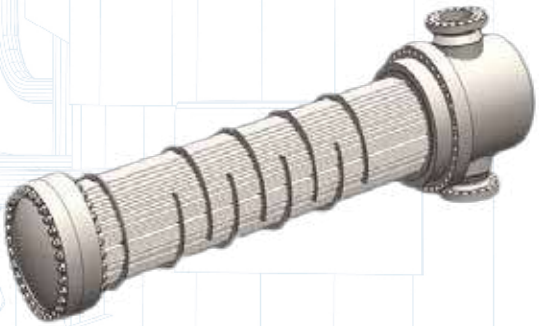
Boiler membrane walls

End user: Power plant
Location: Greece
Quantity: 10 pcs
Materials: 16Mo3 – 1.5415
Additional description:
Welded tubes 20 pcs, longitudinal sets.
Pressure tests of each set.
Dimensions: Width: 1210 mm.
Tube diameter: 38 mm.

Oxidation plant beehive grate

End user: Grupa Azoty Zakłady Chemiczne „Kędzierzyn"
Location: Kędzierzyn-Koźle
Plant: Nitric Acid Department, Fertiliser Production Unit
Quantity: 2
Diameter: 5000 mm x 1 pc, 3700 mm x 1 pc
Materials: Nickel-chromium-molybdenum alloys (INCONEL 601H – SB-168 UNS N06601 - 2.4851 - 60Ni-22Cr-1.2Al-0.02C)
Additional description: Grate divided into segments. The contact points of grate segments are welded from both sides with an edge weld.

TK-106 exchanger components



End user: Refinery plant
Location: Lithuania
Quantity: 2 pcs
Design code: EN 13445, 97/23/WE
Weight: 2 pcs x 10,300 kg
Pressure: 91.1 bar
Temperature: 400 °C
Medium toxic, flammable, explosive
Materials: Chromium-molybdenum steels (SA-387 Gr.11 Cl2, SA-182 Gr. F11 Cl2, SA-213 Gr. T5)
Additional description: All components made of chromium-molybdenum steel and the internal surfaces of chambers were cladded by welding with Cr25Ni13. PWHT. The manufactured components included a tube bundle with the chamber and floating head.

Steel structures

End user: ArcelorMittal
Location: Kraków
Prefabrication of eaves purlins for the extension of the ArcelorMittal hall in Kraków. General contractor: SKANSKA. In total, we provided 60 tonnes of ready-made elements.

Cladding by welding of flanges with Inconel 625 – 2.4856

Client: Naftoremont
Location: Poland
Additional description: Inconel 626 – 2.4856 cladding + mechanical processing for final dimensions.

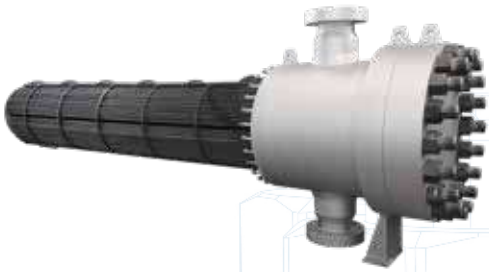
Vessel for filter with external coil

End user: Oil rafinery
Location: Poland
Design code: ASME VIII Div.1
Weight: 20,800 kg
Pressure: 98 bar
Temperature: 335 °C
Materials: nickel-molybdenum-chromium alloys with addition of tungsten (Hastelloy C276), carbon steels (SA-266 Gr. 4 S13, SA-516 Gr. 70 S5), stainless steel TP321/347

- The repair of the filter tank consisted of making a new lower part – the tank – to replace the worn-out part of the apparatus.
- The inner space was additionally coated with stainless steel using the explosive surfacing and plating method.
- On the outside of the apparatus was made a carbon steel coil.

Syngas water intercooler

End user: Chemical Plant
Location: Police
Quantity: 4 pcs
Design code: ASME BPVC Sec. VIII Div. 1
Weight: 4 pcs x 10,200 kg
Pressure: 186 bar
Temperature: 193 °C
Materials: Carbon steels
Additional description: Chamber shell thickness: 90 mm.



Foundation frames of gas compressors

End user: Siemens
Quantity: 3 pcs
Weight: 3 szt. x 10, 000 kg
Materials: Carbon steels

www.polimer.tech

Polimer Tech, ul. Ujastek 5b, 31-752 Kraków, Poland