



# aqua engineering

System engineering and design



# PROCESS PLANTS ENGINEERING

## Key points

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- Experience in the development and optimisation of plant layout and piping routing, in confined spaces and with severe restraints.
- Conceptual study for the modularization of plants on skids, aimed to facilitate the transportation and installation tasks.
- Competence in the design of local automation and control system
- Detailed study of complex mechanical and structural components. Knowledge of materials for use on corrosive environment and for sour services.

## Process

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- Process optimization and feasibility study
- Process schemes – Block Diagram, Process Flow Diagram (PFD), Piping & Instrument Diagram (P&ID)
- Energy and mass balance
- Sizing and specifications of equipment and instrumentation
- Equipment and packages specification
- Process instrument specification
- Control philosophy and schemes
- Material selection and piping classes
- Operating manuals
- Supervision to commissioning and start-up

## Plant design

# A C T I V I T I E S

- Layouts, Plot plans and general arrangement
- P&ID
- Piping Specification
- Design of equipment, including data sheets and shop drawings
- Pipe routing and isometric schemes, piping supports
- Steel structures
- Basements and foundations
- Material lists
- Stress analysis
- Technical coordination of structural, mechanical, electric and instrumentation tasks
- Installation manual, commissioning and start-up manual, maintenance manual
- 3D Modelling

## Package Soda - Description

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- ❑ Package for the preparation of soda solution, for the washing of ionic exchange columns and the neutralization of acid solutions before treatment
- ❑ Composed on three main skids, transportable by road, and a control panel for central control room
- ❑ Storage capacity of 50% soda solution : 20 m3.
- ❑ Loading batches of 4% soda solutions: 25 batch/day max, 1 m3 each.
- ❑ Storage and transport of acid solutions on PTFE coated tanks and lines
- ❑ Acid solution to be treated: 4500 kg/h.
- ❑ Concentration control through pH-meters and conductivity meters.
- ❑ Location: ENI Centro Olii Val d'Agri (Italy).

Client: Breda Energia S.p.A.

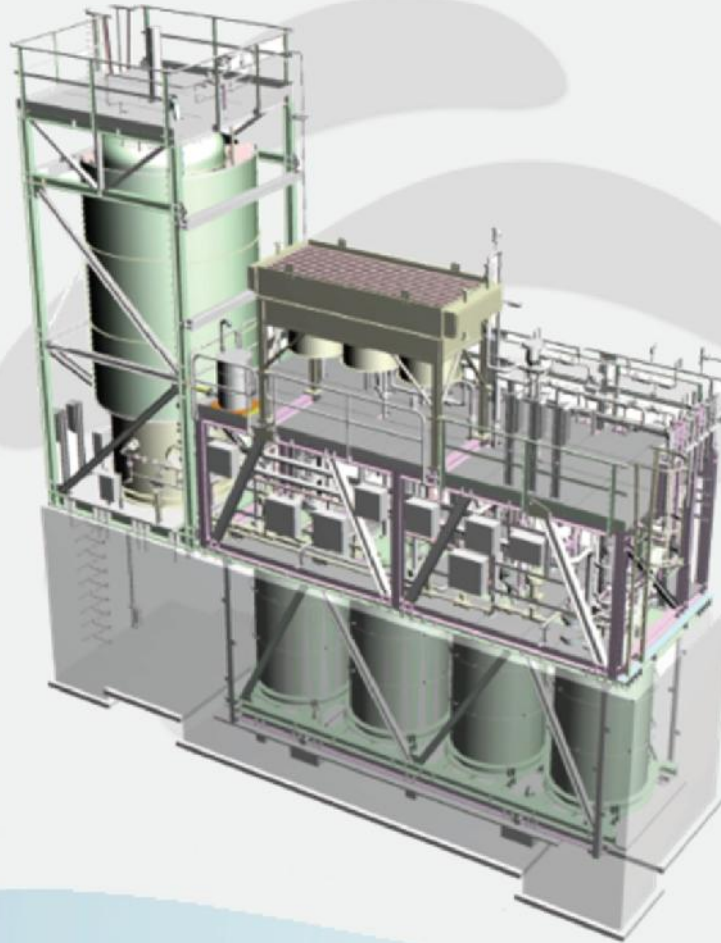
## Package Soda - Activities

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- Basic engineering (PFD, MB, P&ID, control philosophy)**
- Material selection**
- Detail engineering (structural, mechanical, electric and instrumental)**
- Material list (piping and valves, structural, electric and instrumental) and material specification**
- Design of control system**
- Integration schemes**
- Supervision to construction site**
- Manuals**
- Supervision to commissioning and start-up**

## Package Soda – 3D Model

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## Package Soda – Skids

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## Package Soda – Skids



## Floatation package - Description

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- ❑ Package for the treatment of oily waters , coming from the separation of multiphase fluid composed of gas, liquid hydrocarbons and reservoir water
- ❑ Composed on three main skids, transportable by road
- ❑ Treatment capacity: 241 m<sup>3</sup>/h.
- ❑ Floatation technology at induced gas
- ❑ Integrated poly electrolytic dosing system
- ❑ Materials resistant to H<sub>2</sub>S stress induced corrosion
- ❑ Location: ENI Centro Olii Val d'Agri (Italy).

Client: Tecniplant S.p.A.

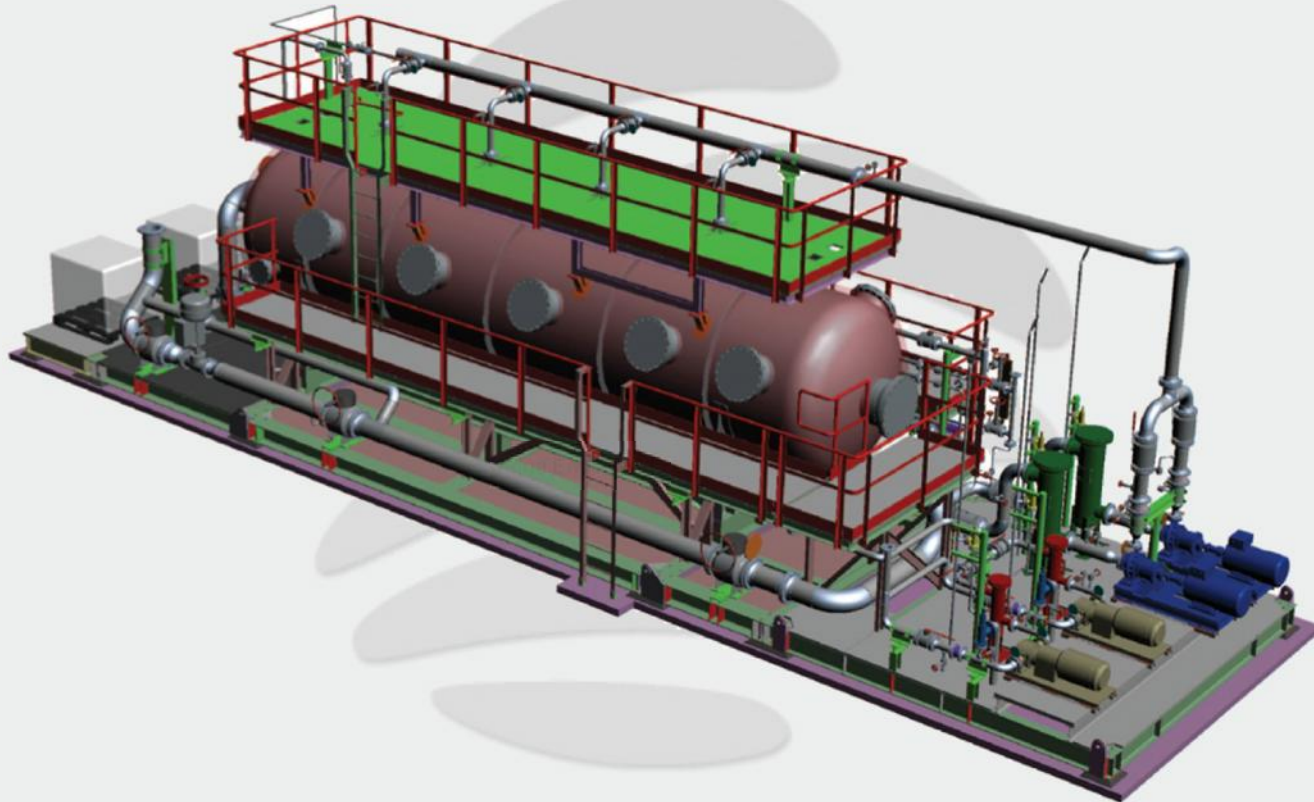
## Flotation package - Activities

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- Basic engineering (PFD, MB, P&ID, control philosophy)**
- Process design of flotation unit**
- Material selection**
- Detailed design (structural and mechanical)**
- Equipment specification**
- Flotation tank mechanical sizing**
- Material list (piping and valves, structural) and material specification**
- Stress analysis**
- FAT & SAT procedure**
- Supervision to construction**
- Manuals**

## Flotation package – 3D Model

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## Manifold SETH - Description

- ❑ Package for gas gathering from 5 subsea production lines (N.3 10" lines and N. 2 6" lines).
- ❑ Integrated blow-down system, controlled by local control panel.
- ❑ High strength materials (Duplex).
- ❑ Location: SETH Platform, 60 km from Port Said (Egypt).

Client: Breda Energia S.p.A.

## Manifold SETH - Activities

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- ❑ P&ID
- ❑ Development of piping layout and isometric schemes
- ❑ Electrical and instrumental detail engineering
- ❑ Material list (structural, piping and valves, electric and instrumental, Fire&Gas)
- ❑ Design of hydraulic control system
- ❑ Skid structural design
- ❑ Stress analysis
- ❑ Specification of construction, test, lifting and installation

## Manifold SETH

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## Pressure reduction stations - Kazakhstan (KSS)

### Description

- ❑ Package including filtration unit, heating and pressure reduction of a gas distribution network for civil use
- ❑ Configuration: 2 x 100% lines and 3 x 50% lines
- ❑ Flow rates: from 0.001 a 0.488 MSm<sup>3</sup>/d
- ❑ Pressure reduction: 60 to 6 barg
- ❑ Location: Karachaganak (Kazakhstan)

Client: Breda Energia S.p.A.

## Pressure reduction stations - Kazakhstan (KSS)

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### Activities

- Pipe routing development
- Isometric schemes
- Equipment and instrument specifications
- Material list
- Skid structural design
- Stress analysis
- Design of electro-instrumental system and control system

Client: Breda Energia S.p.A.

## Pressure reduction stations - Kazakhstan (KSS)

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## Methanol injection skids - Description

- ❑ Stand-alone unit for methanol storage and injection on gas wellheads
- ❑ Methanol storage capacity: 4 m<sup>3</sup>
- ❑ Injection pumps: N. 2 x100% , 0.007 m<sup>3</sup>/h at 250 barg, gas driven.
- ❑ Pneumatic local control panel, driven by produced gas.
- ❑ Installation: Abo Rabah Field (Syria)

Client: Breda Energia S.p.A.

## Methanol injection skids - Activities

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- P&ID
- Pipe routing development
- Isometric schemes
- Equipment and instrument specification
- Material list
- Skid structural design
- Stress analysis
- Integration schemes
- Design of electro-instrumental system and of the control system

Client: Breda Energia S.p.A.

## Methanol injection skid

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## Inlet Manifold Skid Package - Lukoil Activities

- Pipe routing development
- Isometric schemes
- Equipment and instrument specification
- Material list
- Skid structural design
- Stress analysis

Client: Breda Energia S.p.A.

## Inlet Manifold Skid Package - Lukoil

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## Carbon Fiber production plant - Sabic Activities

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- ❑ Basic design of units for polymerization and precursor spinning
- ❑ PFD and energy and mass balance
- ❑ Process P&I
- ❑ Equipment and instrument specifications (for process)
- ❑ Units layouts
- ❑ Operation Manual

Client: Astris Carbon S.r.l.

## Carbon Fiber production plant - Sabic

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