

Biobe Bpac assortment

Scrubber / Absorber products -
Products for flue gas desulphurization
Process Tower internals, packings and process applications



Biobe AS is an experienced supplier with a wide range of process applications. The company has served the industry worldwide in this field for more than 25 years giving us a unique experience and competitive edge. Biobe has delivered approx. 60 CO₂ and SO₂ projects over the last 20 years.

Biobe does not only supply packings, but also a complete range of tower internals manufactured from thermoplastics and thermosets materials to suit towers of any practical diameter

Our Internals are used for fractionation, absorption and various stripping operations in power plant exhaust gas, refinery and chemical plants among others. The products are well established and offers a good choice for environments with a high degree of corrosion resistance

Bpac assortment



For better performance in new and existing towers

Industries

Cleaning of gasses from coal and oil based industrial scrubbers. I.e. collecting of gasses from fossil-fuel fired power stations, waste plants and maritime industries

Applications

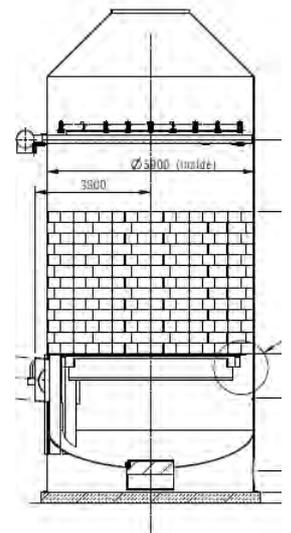
Flue gas cleaning columns
Seawater scrubber
SO₂ scrubber
CO₂ scrubber
Air separation plant direct contact cooler

Biobe is one of the most comprehensive suppliers of product solutions, using multiple varieties of plastic material.

The Bpac assortment - Advantages

Bpac - Structured
Bpac - Random
Bpac - Cover
Bpac - Support
Bpac - Demister
Bpac - Gratings
Bpac - Distributor
Bpac - Pipes
Bpac - accessories

The Bpac range is suitable for some of the most demanding corrosive applications. Its advantages are light weight, easy to assemble on site and to perform maintenance and repair. The Bpac assortment is made with competitive materials which provides a great potential for capex reduction



Tackling climate change CO₂ Capture

Background - Carbon Capture and Storage (CCS) is a technology that can capture up to 90% of the carbon dioxide (CO₂) emissions produced from the use of fossil fuels in electricity generation and industrial processes, preventing the carbon dioxide from entering the atmosphere.

The first stage in the CCS process is the capture of CO₂ released during the burning of fossil fuels, or as a result of industrial processes such as making cement, steel or in the chemical industry.

Capture technologies separate carbon dioxide from gases in electricity generation and may be done in at least three different ways: pre-combustion capture, post-combustion capture and oxy-fuel combustion. Similar methods are also used for industrial processes.

Common for all methods are the need for installation of scrubbers for cleaning the gasses. A service Biobe may offer.

EUs roadmap for 2050 estimates that a total of 70 billion tonnes of CO₂ must be captured and stored.

Researchers around the world are working to find proper methods for CO₂ Capture and pumping it down below the ground where it can last for several thousand years. **Norway is among the frontrunners in this development and Biobe is connected as an industrial partner for the required internals and infrastructure.**



Biobe contributes - Tackling the climate change



SO₂ & CO₂ Capture

The market - Capture

Biobe has experience from cleaning SO₂ / SO₃ / SO₄ and this knowledge we are together with int. research agencies using for developing CO₂ Capture solutions.

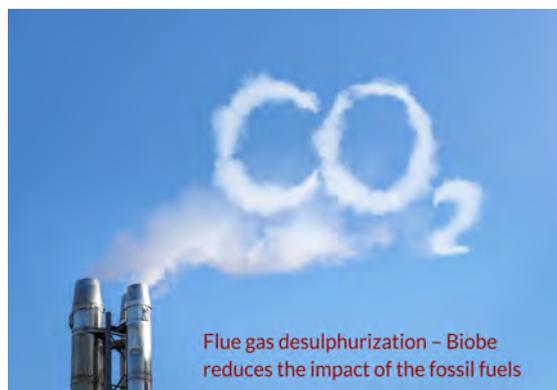
Biobe may calculate the CO₂ capture effect and recommend the applicable design for the individual facility. **The Biobe Bpac product range delivers the internals and packings inside the scrubber.**

Our involvement together with international recognised scientist facilities will determine to which extent we need to adapt our products based on typically SO₂ gasses to the CO₂ environment. The current situation indicates that the majority of the applications can be used for both gasses. This is good news for the market due to the competitiveness of the current Biobe thermosets and thermoplastics solutions.



The market - Transport

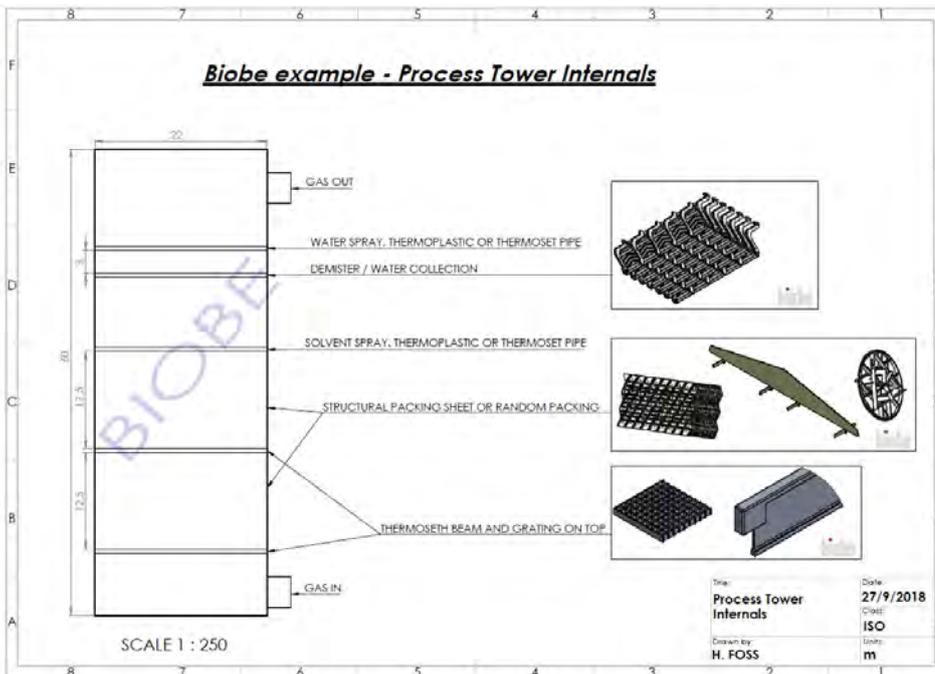
Once captured, carbon dioxide (CO₂) must then be transported by pipeline or ship for storage at a suitable site. Following it will be a need for **pipes with local adaptations, a service Biobe offers (Bpac - Pipes).**



SO₂ & CO₂ Capture

Example of a Biobe absorber design - Combined SO₂ and CO₂ cleaning - post-combustion

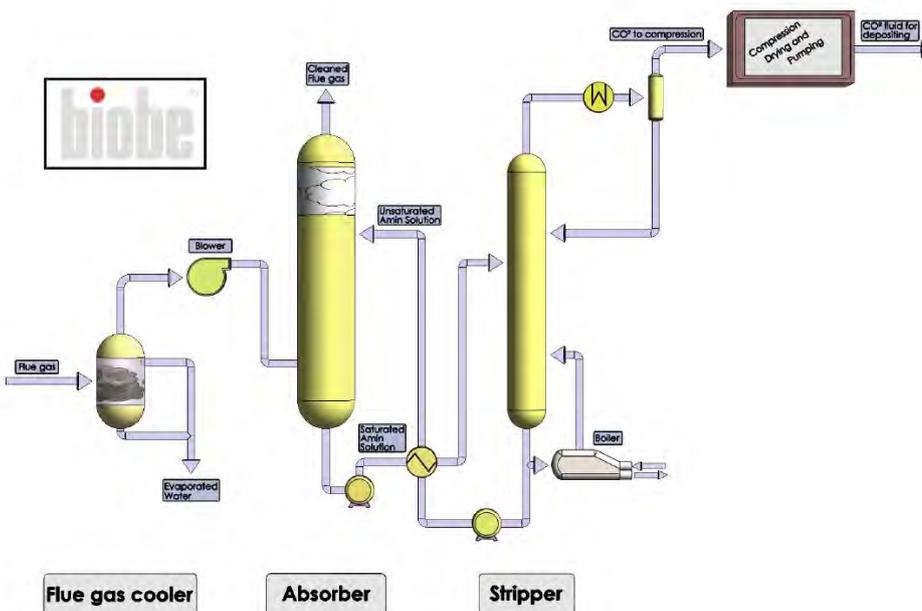
The first scrubber does the cleaning of fluid gas from SO₂. The second scrubber cleans and collects CO₂ in the amine system, the so-called afterburning technology principle.



The technical description of the Carbon dioxide scrubber - cleaning procedure for CO₂

Performance; amine gas treating, also known as amine scrubbing, gas sweetening and acid gas removal

- This refers to a group of processes that use aqueous solutions of various alkylamines (simply amines) to remove H₂S and CO₂ from gases
- It is a common unit process used in refineries, and is also used in petrochemical plants, natural gas processing plants and other industries
- The most commonly used amines in industrial plants are alkanolamines DEA, MEA and MDEA
- These amines are also used in many oil refineries to remove sour gases liquid hydrocarbons such as lignified petroleum gas (LPG)



Maritime carbon capture

Maritime regulation

A global approach to improve effective emission control is needed as sea transport will continue growing apace with world trade. There are mandatory measures to reduce emissions from international shipping.

Controlling CO₂ emission is crucial to mitigate global warming and Carbon dioxide from ships at sea. The world's shipping industry has now, defined its commitment to tackle climate change. **A promising way to tackle the problem is to capture the CO₂ from the ship's exhaust gases and storing it onboard until the ship reaches a port where the CO₂ can be unloaded.**



Carbon capture onboard the vessels will reduce the CO₂ emissions

Weight and CAPEX for Equipment + amine + CO₂ storage tanks

With the **implementation of well-proved light weight cost effective plastics internals and packings from Biobe inside the maritime scrubber**, the weight is acceptable.

Cheaper and lighter plastic materials of construction will reduce the CAPEX and have a positive impact on the fuel consumption.



Manufacturing Expertise



Expertise in Products Moulded in Thermoplastics and Glass Reinforced Composites

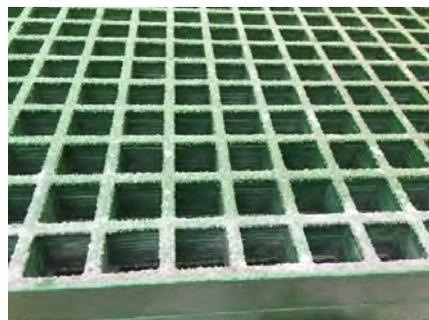
SMC Moulding gives the designer the freedom to style and develop complex, highly accurate mouldings consolidating a number of parts into a single component, with a high strength to weight ratio, excellent temperature stability and finish. SMC is a type of reinforced composite plastic, which principally consist of a thermosetting resin, glasfibre reinforcement and filler. SMC products offers good mechanical properties, excellent chemical resistance, temperature stability, low smoke and toxicity, electrical insulation and good paint ability among others.

Resin Transfer Moulding (RTM) is a low pressure moulding process, where a mix of resin and catalyst are injected into a closed mould containing a fibre pack or preform. When the resin has cured, the mould can be opened and the finished component removed.

R&D /Time to Market. Our team offers customers product development, prototyping, engineering and project management. New technologies like 3D printed tools is also a part of our workflow giving us a leading edge within quick time to market manufacturing.

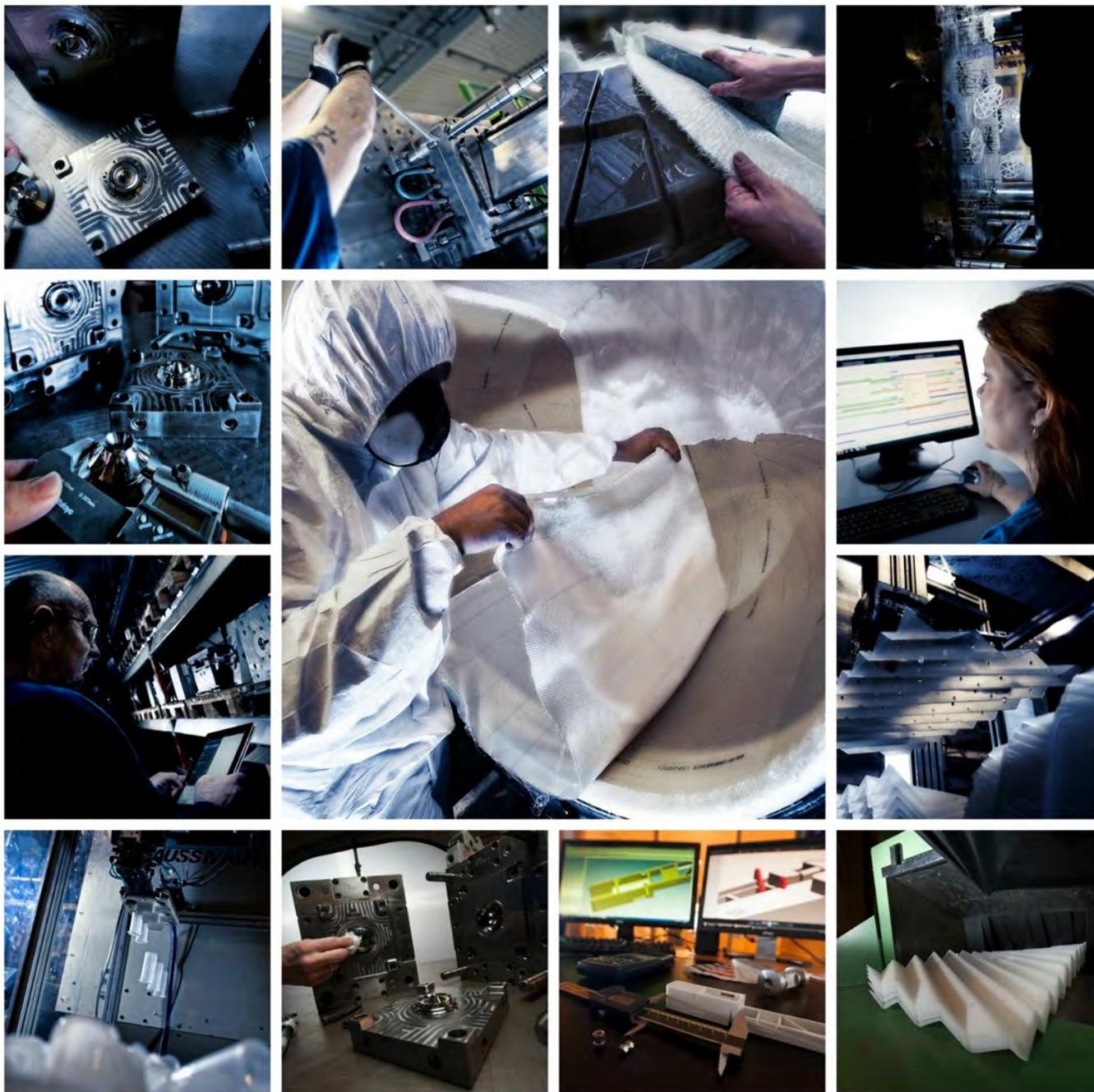
Injection Moulding of Thermoplastics is a well-established process for manufacturing products with a wide range of styles, shapes and technical requirements. Injection Moulding offers high cycle time and competitive pricing for a large selection of different materials. The company has a full range of injection moulding machines from 25 and up to 500 tons clamping force offering thermoplastic products up to 1,5 kg weight.

Engineering and Development - In order to improve the products Biobe is together with universities and research organisations continuously analysing and optimising the process.



Biobe Bpac - Range for Process Tower Internals

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Expertise in **plastics**



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