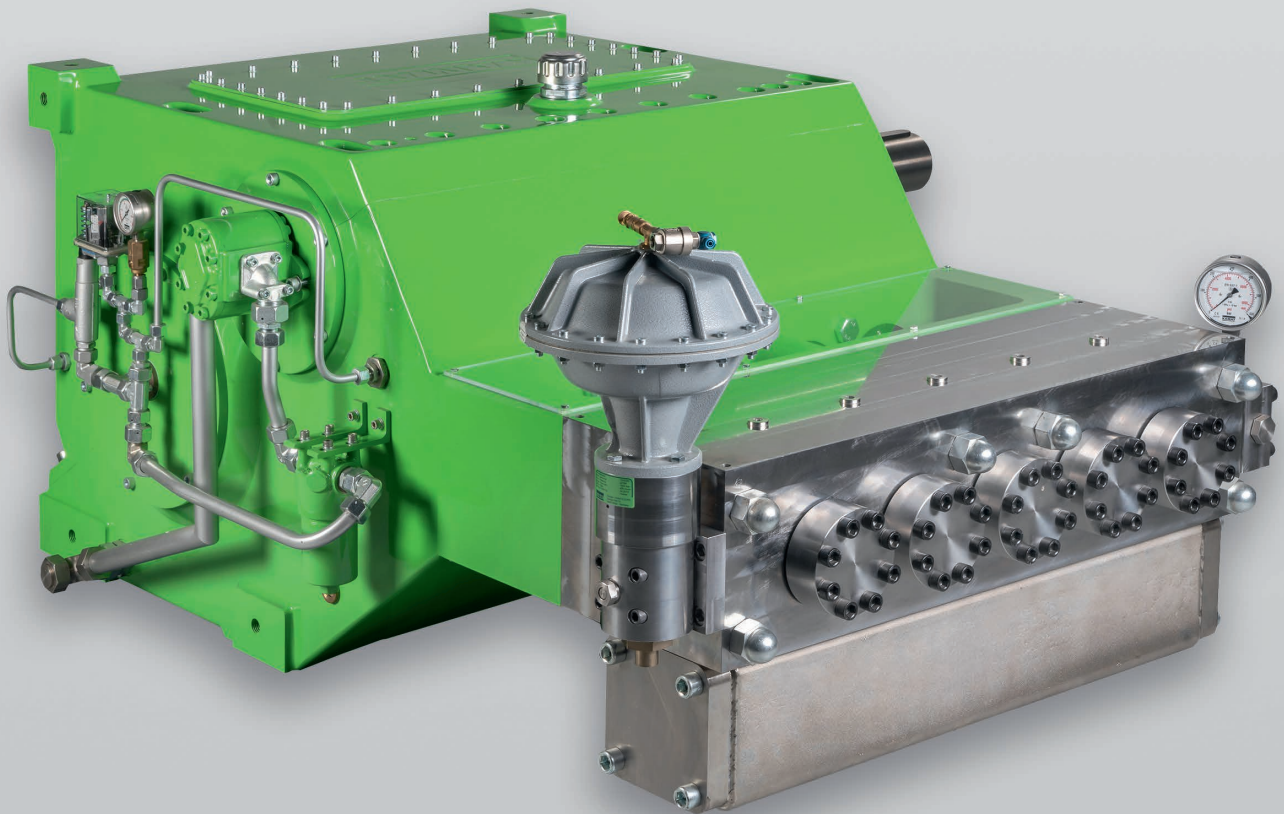




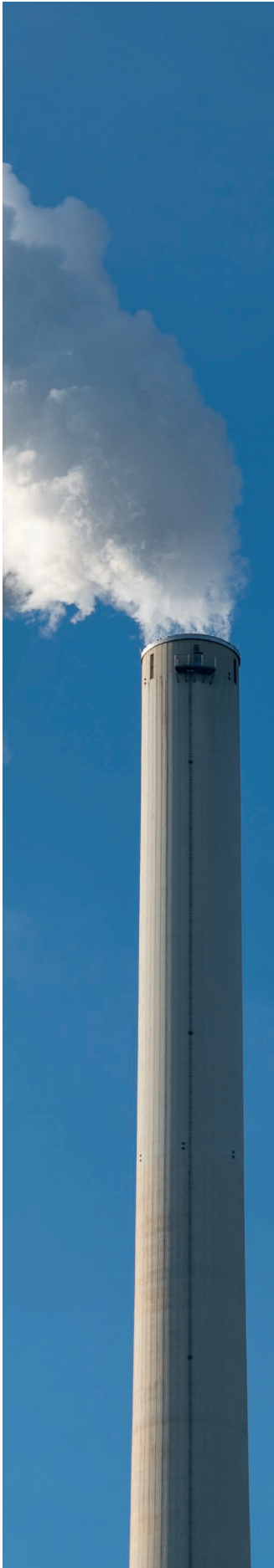
since 1974



KAMAT HIGH-PRESSURE TECHNOLOGY

# **CARBON CAPTURE AND STORAGE**

Geological Storage | Deep Sea Storage



## CARBON AND CLIMATE CHANGE

Global warming refers to the relationship between the increase in CO<sub>2</sub> levels in the atmosphere and the warming of the Earth's surface. Human activities such as the burning of fossil fuels release CO<sub>2</sub>, which amplifies the greenhouse effect and leads to an increase in average temperature. This has far-reaching effects on the climate and requires measures to reduce CO<sub>2</sub> emissions.

### HOW CAN KAMAT HIGH-PRESSURE PUMPS CONTRIBUTE TO THE FIGHT AGAINST CLIMATE CHANGE?

Countries around the world, industries, communities and individuals are trying to reduce their carbon footprint (CO<sub>2</sub> footprint). Certainly, nothing helps more than reducing the production of CO<sub>2</sub>. However, once produced, there are several ways to remove CO<sub>2</sub> from the atmosphere, such as pumping the gas phase into the deep sea or making dry ice and sinking it into the deep sea. A common method is to pump CO<sub>2</sub> in its liquid phase under pressure, for example into caverns, old oil and gas reservoirs. This involves pumping carbon dioxide (CO<sub>2</sub>) 'underground' in a process known as carbon capture and storage (CCS) or carbon sequestration.

Underground storage of CO<sub>2</sub> is a practical way of achieving CO<sub>2</sub> reductions, particularly for industries where complete decarbonisation is difficult to achieve in the short term.

**Long-term storage:** Underground storage also offers a long-term solution for removing CO<sub>2</sub>. Once stored underground in geological formations such as depleted oil and gas reservoirs or deep (>100 metres) saline aquifers, CO<sub>2</sub> can remain there for thousands of years, effectively isolated from the atmosphere.

**Carbon offsets:** Some companies and organisations invest in carbon offset projects, where they remove CO<sub>2</sub> from the atmosphere and store it underground to offset their own emissions. This helps them meet their carbon neutrality targets.

### BENEFITS OF CO<sub>2</sub> STORAGE AT A GLANCE

**Mitigating climate change:** One of the main reasons for storing CO<sub>2</sub> underground is to mitigate climate change. CO<sub>2</sub> is a greenhouse gas that contributes to global warming when released into the atmosphere. Capturing and storing CO<sub>2</sub> underground prevents it from entering the atmosphere and contributing to the greenhouse effect.

**Reducing industrial emissions:** Many industrial processes, such as power plants, cement production and chemical manufacturing facilities, emit significant amounts of CO<sub>2</sub>. Underground storage of CO<sub>2</sub> helps to neutralize emissions and makes these industries more environmentally friendly if the generation of CO<sub>2</sub> cannot be sufficiently prevented.

**Enhanced oil recovery (EOR):** In some cases, CO<sub>2</sub> is injected underground for enhanced oil recovery. By injecting CO<sub>2</sub> into oil reservoirs, additional oil can be extracted that would otherwise be difficult to recover. This technique not only increases oil production, but also stores CO<sub>2</sub> underground.

## KAMAT HIGH-PRESSURE PLUNGER PUMPS ARE THE PERFECT CHOICE FOR PUMPING CO<sub>2</sub>

- KAMAT pumps:
  - operate at high inlet pressures. To keep the CO<sub>2</sub> in the liquid phase, it must be subjected to high inlet pressures.
  - deliver a high volume flow, which is essential for carbon storage efficiency. Liquid volumes in excess of 9 m<sup>3</sup>/min are possible, equivalent to more than 400 tonnes per hour.
  - very low maintenance and can be left in place for service. Seals can be changed quickly without dismantling major components.
  - operate over a wide temperature range (-50 to 200°C) if required.
  - have ceramic pistons. They are perfectly matched to an aramid carbon fibre packing sealing system. Secondary seals are provided to make the pump virtually hermetic and to detect any leakage over time.
  - can be driven by any type of drive. For areas without a suitable power supply, low-emission industrial diesel engines are suitable.
  - are very energy efficient
- KAMAT pump heads are made of forged stainless steel, the internal parts are not coated, all components are made of solid material.



### KAMAT Pressure Limiting Valves

KAMAT pressure limiting valves are specially designed for use with high-pressure plunger pumps. They ensure that the optimum working pressure is maintained at all times. This is particularly important for the safe and efficient operation of the system.

KAMAT's pressure limiting valves offer a high degree of flexibility by allowing the pressure to be regulated pneumatically by remote control. This is particularly useful in applications where pressure may vary or precise control is required.

With their high precision and reliability, Our pressure limiting valves are an ideal solution for applications where accurate and constant pressure is required. They ensure smooth system operation and help to extend component life.

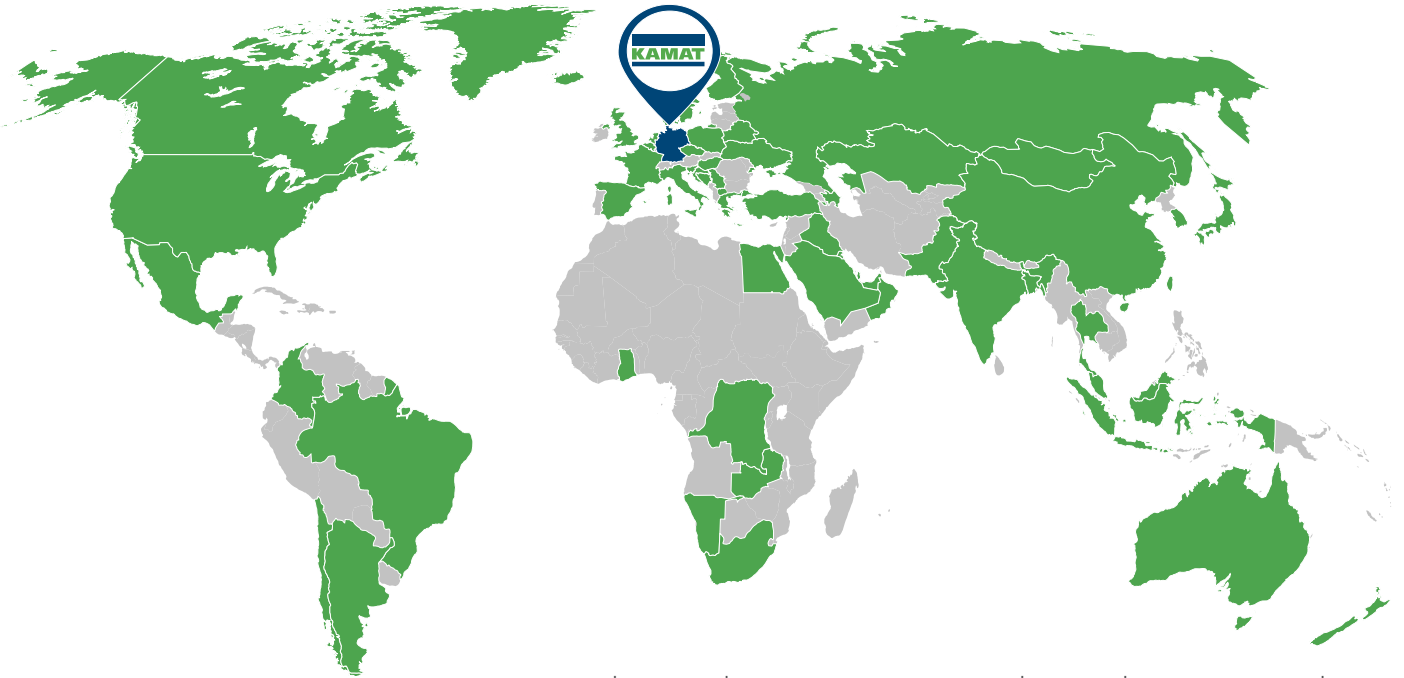
## KAMAT SCOPE OF DELIVERY

- |                                                             |                                                                |
|-------------------------------------------------------------|----------------------------------------------------------------|
| ■ KAMAT high-pressure plunger pump                          | ■ Pump control                                                 |
| ■ Stainless steel suction line for high-pressure            | ■ Motor starter                                                |
| ■ Suction flow stabilizer                                   | ■ Frequency inverter                                           |
| ■ Drive system (hydraulic, electric, engine)                | ■ Baseframe with damping feet                                  |
| ■ Flexible coupling, easy separatable with protective cover | ■ Pressure limiting valve with bypass against suction pressure |

## ABOUT KAMAT

Since 1974, the name KAMAT has stood for experience and expertise in the design and manufacture of high-pressure plunger pumps and systems, made in Germany. Now in its second generation, we develop and manufacture customised high-pressure solutions in Witten, Germany, which are used in many industrial applications worldwide.

# KAMAT WORLDWIDE



**EUROPE:** Belarus | Belgium | Bosnia and Herzegovina | Croatia | Czech Republic | Denmark | Finland | France | Germany | Great Britain | Greece | Hungary | Iceland | Italy | Netherlands | North Macedonia | Norway | Poland | Serbia | Slovenia | Spain | Sweden | Ukraine

**ASIA:** Azerbaijan | China | India | Indonesia | Israel | Japan | Kazakhstan | Malaysia | Mongolia | Russia | South Korea | Taiwan | Turkey | Thailand | United Arab. Emirates

**AFRICA:** Dem. Rep. Congo | Egypt | Ghana | Namibia | South Africa | Zambia

**NORTH AMERICA:** Canada | Mexico | United States of America

**SOUTH AMERICA:** Argentina | Brazil | Colombia | Chile

**OCEANIA:** Australia | New Zealand

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