DIABON® Economizer

The Eco-Friendly Heat Exchangers for Recovering Flue Gas Energy

Process Technology

Broad Base. Best Solutions.
SGL Group is one of the leading manufacturers of carbon-based products and has the broadest product and technology portfolio, a global sales network and state-of-the-art production sites in Europe, North America and Asia.

Carbon has unique properties. It is indispensable in the production of steel, aluminum and solar energy systems. Carbon increases the performance of wind turbines and reduces the weight of airplanes, cars and sports equipment.

Process Technology

The Business Unit Process Technology is a premium technology provider for chemical and related industry process systems, equipment and after sales services. Our focus are high-tech materials for demanding chemical applications. With smart and sustainable solutions for an increasing number of industry we give proof of our strong innovation culture.

Broad Base

Our range of materials:
- graphite
- SiC
- PTFE
- reactive metals
- steel

Our range of services:
- process design
- engineering
- project management
- production and assembly
- commissioning
- after sales services.

With 9 manufacturing sites in 8 countries and a continually growing worldwide sales and service network, we are always close to our customers.
In a business that strongly depends on reliability we never compromise on quality and safety. Our products deliver dependable results; our services are fast and competent. The long-standing loyalty of our customers proves that we keep our promises – on-time, on-spec, on-budget.

Tailor made, innovative solutions and an integrated approach on chemistry, materials, technology and design, ensure outstanding efficiency and improved customer value: higher yields, lower operating cost, lower service and maintenance cost, longer service intervals and less downtimes, and the extended product lifetime sum up to significant lower total cost of ownership and to a higher return on investment for our customers.

In all industries that deal with resource- and energy-consuming processes sustainability is of crucial importance. Based on innovative solutions, more than 60% of our sales contribute to the saving of resources and energy and to the reduction of greenhouse gases.

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**DIABON® Economizer – the Heat Exchanger that Saves Energy**

The temperature of exhaust gases produced by millions of modern heating systems is typically above 160°C. The thermal energy involved is normally released unused into the atmosphere. It can, however, be recovered with an economizer.

SGL Group’s economizer is a DIABON exhaust gas heat exchanger designed for the eco-friendly recovery of exhaust gas energy.

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**Advantages of DIABON economizers**

- High cost-effectiveness due to great thermal efficiency, cut in heating costs
- Ease of incorporation in existing plants
- Compact design
- High corrosion resistance
- Long service life
- Cut in carbon dioxide emissions through savings in primary energy
  - Reduced greenhouse effect
  - Favorable influence on global warming

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DIABON® module for a heat exchanger output of up to 33 kW

DIABON® economizer
Fields of Use
for DIABON® Economizers

- Low-temperature heating cycles of floor and wall heating systems in living areas; convenient solutions for swimming pools, garages and cellar areas

- Ventilation/air conditioning systems for a better indoor environment in private households and hotels

- Forced ventilation/air conditioning systems in industrial and commercial buildings, small business workshops, horticultural nurseries, laboratories, public buildings and amenities, health care centers

- Service water for private households and facilities or industries with a high hot water consumption, such as the food and beverage industries
SGL Group’s DIABON economizer is a flue gas heat exchanger for extracting further heat from boiler exhaust gases. Organic fossil fuels such as natural gas or oil, or renewable raw materials such as wood consist largely of carbon/hydrogen compounds, which produce the desired heat when combusted. The combustion products generated during this conversion of organic molecules are carbon dioxide and water, which are released as exhaust gas. If the exhaust gas is cooled down below the dew point of water to around 50 – 60°C, the previously gaseous water molecules change to the liquid state (calorific value technology).

The associated energy can be almost completely recovered by integrating a DIABON economizer in the exhaust gas stream. This energy may amount to as much as 20% of the entire calorific value, depending on the fuel involved.
Advantages of DIABON economizers

A typical problem encountered in conventional economizers is the dust produced during the combustion of renewable raw materials such as wood or wood pellets in particular. In DIABON economizers, however, any such dust is washed from the graphite surface by the condensation water. As a result, the heat exchangers remain clean.

DIABON economizers are universal systems for use with all sorts of fuels. They reduce the risk of incrustations and are therefore almost maintenance-free. Owing to their outstanding material properties, they are also noted for their extremely long service lives.

Schematic illustration of assembly variants

- Plant layout without DIABON® economizer
  - Release of unused flue gases
  - Poor utilization of energy efficiency

- Preheating of high-temperature cycle
  - Utilization of exhaust gas energy for floor heating

- Air preheating or cooling
  - Heating of
    - swimming pools
    - greenhouses
    - winter gardens
  - Operation of cold storage houses
Corrosion Resistance of DIABON® Economizers

Graphite is a material with ceramic properties. Because of its excellent thermal stability and chemical resistance, it is widely used in engineered thermal process equipment. The applications of this material are determined primarily by its chemical and physical properties, but also by its suitability as a construction material for process equipment.

DIABON process equipment graphite is noted for the following benefits:
- Excellent corrosion resistance
- High thermal conductivity
- Low density
- Low thermal expansion
- Ease of machining with standard machine tools
- Simple joining technique by cementing
- Favorable price/performance ratio

For more than 70 years, graphite has been used successfully for the most demanding applications in the chemical industry. It is totally resistant to any aggressive products such as sulfuric and hydrochloric acid present in combustion gases.

As a result, DIABON process equipment graphite has also proved highly efficient in the exhaust gas systems of heating facilities.

Owing to their material properties, DIABON economizers can be used in various fields of heating technology:
- Heating systems employing oil, gas or wood
- Co-generation units
- Heating systems employing wood chips and pellets
- Biogas plants
Overview of DIABON® Economizer Types

Optimum dimensions to match any heating system size
This is the overriding factor governing the modular design of different economizer types. The heat exchanger output can be matched to any thermal output by combining several modules of basic type 0-1 equipment. This modular design cuts capital expenditure costs, and this in turn benefits the consumer.

<table>
<thead>
<tr>
<th>Type</th>
<th>Output (kW)</th>
<th>Field of use</th>
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<tbody>
<tr>
<td>0-1</td>
<td>33</td>
<td>Combustion of wood, gas or oil</td>
</tr>
<tr>
<td>1-3</td>
<td>198</td>
<td>Combustion of wood, gas or oil</td>
</tr>
<tr>
<td>2-3</td>
<td>100</td>
<td>Co-generation units</td>
</tr>
<tr>
<td>3-5</td>
<td>1000</td>
<td>Co-generation units</td>
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Quality Management

Continuous quality assurance is an integral part of the SGL Group corporate philosophy.

Our quality management system is certified in accordance with ISO 9001:2008. In order to guarantee consistently high quality to our customers, we work according to a key performance indicator orientated quality management system.

Depending on specifications we are able to meet specific requirements like the Pressure Equipment Directive 97/23/EC Annex III, Module H/H1, AD 2000 Merkblatt N2 as well as ASME “U” Stamp, Section VIII, Part UIIG.

Quality Management and After Sales Service

After Sales Services – Anytime and Everywhere

We take care of our products during the entire operational lifetime. We aim to provide the best customer service anytime and everywhere.

- Maintenance – genuine spare parts supply, failure analysis, repair, field service
- Fast emergency support
- Start-up assistance
- Consulting for continuous improvement

Our service specialists as well as our service centers work in a global network to support you best.
Process Technology

Our Products

System Solutions
- Syntheses
- Distillation and concentration
- Purification
- Dilution
- Absorption
- Desorption
- Thermal destruction and recycling
- Reactors and converters
- Heat storage
- ...

Equipment Solutions
- Graphite and SiC heat exchangers – shell & tube, block and plate type
- Columns and internals
- Vessels
- Quenchers
- Pumps
- Rupture discs
- PTFE piping and bellows
- PTFE hoses
- ...

After Sales Services
- Maintenance
- Emergency support
- Start-up assistance
- Consulting
- ...

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The data contained herein represent the current state of our product knowledge and are intended to provide general information on our products and their application spectra. In view of the variety and large number of application possibilities, these data should be regarded merely as general information that gives no guarantee of any specific properties and/or suitability of those products for any particular application. Consequently, when ordering a product, please contact us for specific information on the properties required for the application concerned. On request, our technical service will supply a profile of characteristics for your specific application requirements without delay.