

ENVIRONMENTAL PRODUCT DECLARATION

Brazed Plate Heat Exchangers

SWEP International AB

2017

CHALLENGE EFFICIENCY

SWEP
A DOVER COMPANY

SWEP

SWEP is the world's leading supplier of compact brazed plate heat exchangers (BPHEs). These products are used where heat needs to be transferred efficiently in air conditioning, refrigeration, heating, and industrial applications. SWEP is close to its customers, with representation in more than 50 countries and its own dedicated sales force in more than 20 countries.

SWEP's business mission is to *“Lead the global development, production, and marketing of brazed plate heat exchangers while facilitating conversion to sustainable products and processes.”* At SWEP, we take our role in providing sustainable products and processes seriously. We focus on three main areas to achieve this:

ENERGY EFFICIENCY AND CLIMATE NEUTRALITY

The savings in CO₂ emissions that come from installing our BPHEs in heating/cooling systems. We also have a dedicated range of products developed to use climate-neutral refrigerants such as CO₂.

OUR HEAT EXCHANGERS MAKE EFFICIENT USE OF RENEWABLE ENERGY SOURCES

The renewable energy sources, as defined by the European Union, for which our BPHEs are used. These application areas include wind, solar, heat pumps and municipal waste heat re-distribution via district energy.

MINIMIZING THE ENVIRONMENTAL IMPACT OF OUR BUSINESS

SWEP saves energy and material with “green” operational activities.

Environmental attitude

At SWEP, we work hard to minimize the environmental impact of our operations, production, and products. Every time we are faced with a choice that has an environmental impact, our aim is to move towards a climate-neutral and environmentally friendly solution. We call this GreenStep. Here are some of the things we are doing:



- All our factories are ISO 14001 environmentally approved
- Our goal is to reduce CO₂ from our operations by 20% by the end of 2020
- We use returnable packaging for target customers, saving 50 ton CO₂ per year
- We have replaced wooden crates with cardboard, saving 20.4 ton CO₂ per year
- Our thin plate construction saves on material use while outperforming traditional shell & tube systems in energy efficiency
- Our BPHEs for chillers use environmentally friendly refrigerants such as CO₂
- We are a proud sponsor of WWF

- We strive to minimize the environmental impact of our operations, production, and products
- We aim to make all choices and decisions with climate-neutral and environmentally friendly solutions in mind
- Our Environmental Sustainability program includes internal and external activities leading to more sustainable solutions
- CO₂ emissions per BPHE are highlighted in SWEP Selection Software **SSP G7**, enabling customers to choose more ecological options according to the **carbon footprint** displayed for each type of BPHE

“Carbon footprint” is the total set of greenhouse gas emissions caused directly and indirectly by an individual, organization, event, or product. It is measured by assessing greenhouse gas emissions. At SWEP, the impact on global warming is assessed for the various stages of the heat exchanger’s life cycle, including extraction and processing of raw material, all manufacturing activities, and all transportation until the product is delivered to the customer.

All materials in the BPHE, including connections and accessories, are included in the carbon footprint. The carbon footprint is quantified by the global warming potential (GWP), which measures the contributions of different gases to global warming. For assessing the impact on climate change, the GWP measured over 100 years (GWP 100) is used. The carbon footprint is presented as g CO_{2e} per kg material for each material and activity, as well as the total emissions for the production of one BPHE.

About the product

The BPHE is one of the most efficient ways to transfer heat from one medium to another. A BPHE consists of corrugated plates combined to create complex channels through which a hot medium and a cold medium can be distributed. The media come into close proximity inside the BPHE, on either side of the corrugated plates, without mixing, and energy is transferred from one to the other as they flow side-by-side. The modular product concept, with totally customizable parts, means the right product solution for every application can always be found.



BPHE materials

The most common material combination in SWEP BPHEs is plates in austenitic stainless steel, brazed together with copper. However, various material combinations and designs can be used to achieve optimal qualities.

SWEP purchases raw materials only from certified suppliers that provide first-class quality. Only a very few suppliers are acceptable, because the materials for a SWEP BPHE are subject to rigorous quality requirements. Documentation of all materials in a BPHE allows it to be traced with regard to supplier, date of manufacture, detailed composition, etc. This is a requirement for many of the third-party approvals held by SWEP BPHEs.

Stainless steels

The standard material for channel plates, cover plates, start plates, end plates, and various types of rings and connections for the B-type BPHE is an austenitic-type stainless steel. In 2016, the stainless steel used incorporated 87.1% recycled material.

The typical composition is:

- Iron (Fe), plus
- Chromium (Cr), 10.7%
- Nickel (Ni), 2.2%
- Molybdenum (Mo), 0.04%
- Nitrogen (N)
- Maximum 0.045% carbon (C).

Copper

The standard brazing material (filler material) for copper-brazed SWEP BPHEs is 99.99% pure cadmium-free copper.

Nickel-based filler

The brazing foil for SWEP All-stainless BPHEs is based on nickel plus 15% chromium, 7.25% silicon and 1.4% boron.

Packing material

SWEP imposes strict environmental demands on suppliers of all types of packing material. Materials used for packing are: corrugated cardboard, wooden pallets, pallet collars, wood bolts, wood laths, masonite board, plastic film (PE), and plastic ribbon (PET). Corrugated cardboard is normally produced from recycled paper, with as much as possible sorted and reused at SWEP.

Manufacturing

The main environmental impact during manufacturing comes from electrical energy. SWEP uses electricity mainly for machines, brazing furnaces, hydraulic presses, electric forklifts, ventilation, computers, and lighting. SWEP uses renewable sources of energy.

Transportation

The environmental impact of transportation in connection with the extraction and processing of the raw materials steel, copper, and nickel for BPHEs, as well as the wood for packaging, is included in the emissions data for these materials, which are available in our Life Cycle Assessment.

Usage

SWEP manufactures five main product series for air conditioning, refrigeration, residential heating, district heating, and industrial applications (condensers, evaporators, heat exchangers, and specific solutions). Typical applications are air conditioning, chillers, refrigerant systems, air dryers, heat pumps, boilers, substations, lubricating oil cooling in engines and heating/cooling in various processes.

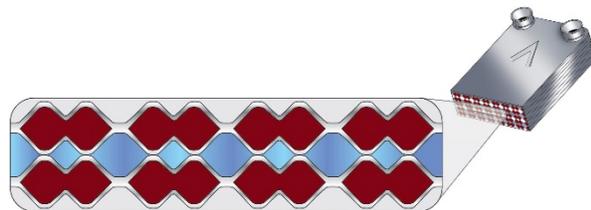
Which and how much material goes into BPHEs depends on the application. However, they generally consist of channel plates in stainless steel alternated with copper (in some cases nickel), and connections in stainless or carbon steel.

Recycling

All the raw material we use for BPHE manufacturing is fully recyclable, so all scrap material is 100% recyclable. All waste from manufacturing, such as stainless steel, copper and nickel, is collected and transferred to a recycling company.

Energy efficiency

Our heat exchangers are highly energy efficient, which leads to a smaller carbon footprint. SWEP BPHEs save energy, enable compact systems, and achieve cost-effective, leak-free, and sustainable installations. Our BPHEs are designed to heat or cool liquids and gases using the least possible energy. We achieve this through smart product design, which delivers BPHEs constructed to maximize energy efficiency. For example, our **AsyMatrix™ technology** exploits asymmetric plate patterns to transfer **more heat using less material**.



End of life

Waste from the product is not hazardous (EU Directive 91/689/EEC). Chemicals must be drained off before any end-of-life treatment and treated in accordance with local regulations.

Certifications and legislation

SWEP products must comply with a wide range of rules, regulations, and standards globally. Often, this requires certification by an independent, third-party organization.

- **ALL SWEP'S PREMISES ARE ISO 9001 AND ISO 14001 CERTIFIED**
 - ISO 9001 is the internationally recognized business standard for quality management
 - ISO 14001 is the internationally recognized business standard for environmental management. It prescribes controls for those activities that have an effect on the environment. These include the use of natural resources, the handling and treatment of waste, and energy consumption
- **COMPLIANCE WITH REACH AND ROHS**
 - In accordance with these regulations, we consider it very important not to use any of the restricted substances. We regularly check updates to the regulations and inform customers accordingly
- **FREE FROM CONFLICT MINERALS**
 - SWEP products, components, parts, and materials are free from conflict minerals mined or produced in the covered countries
 - “Conflict minerals” are tin (cassiterite), tungsten (wolframite), tantalum (columbite-tantalite or coltan), and gold, and the metals derived from these minerals
 - For further information visit <http://www.conflict-minerals.com/>

