



**SonFlow**

# Instruction Manual

## Brazed Plate Heat Exchanger



# Foreword

The information in this instruction manual has been compiled to provide the operator with knowledge to operate the Brazen Plate Heat Exchanger (BPHE). Study this manual thoroughly and understand the precautions regarding the safety of the BPHE and its functions before handling the equipment. Should a malfunction occur, please consult a SonFlow representative.

## Introduction

Installation and maintenance must only be performed by persons who have knowledge and authorization according to local regulations. SonFlow can not be held responsible for incorrect installation or operation damages. Failure to comply with the warnings and instructions contained herein may void any warranty.

At the end of use, the unit must be disposed, according to local environmental legislation regulations. Besides the equipment, any hazardous residues from the process liquid must be considered and dealt with adequately.

## Safety

The BPHE shall be used and maintained in accordance with this instruction manual. Incorrect handling may result in serious consequences with body injuries or property damage. In such cases, SonFlow must be indemnified.

The BPHE should only be used in accordance with the specified configuration of material, media types, temperatures, and pressure.

## Warranty Conditions

Unless otherwise agreed in writing, SonFlow standard warranty applies. Find SonFlow's General Terms and Conditions of Sales and Delivery online: [www.SonFlow.dk](http://www.SonFlow.dk).



### CAUTION

Protective gloves should always be worn when handling the heat exchanger to avoid hand injuries caused by sharp edges.

## Published by

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# 1. General

## 1.1 Nameplate

The nameplate gives important information about the design of the BPHE. This information is related to the design and approval of the unit. The values on the nameplate may not be exceeded.

This plate is fitted on the BPHE and provides information about:

- Heat exchanger type
- Manufacture number
- Year
- Marking
- Ps max working pressure
- Ps max testing pressure
- Fluid group
- Volume in L
- Ts min working temperature
- Ts max working temperature

	
<b>SonFlow Brazed</b>	
Type: <input type="text"/>	Year: <input type="text"/>
Manufacturer no.: <input type="text"/>	Marking: <input type="text"/>
Ps max working pressure:	<input type="text" value="PRODUCT/MEDIUM"/>
Ps max testing pressure:	<input type="text" value="PRODUCT/MEDIUM"/>
Fluid group:	<input type="text"/>
Volume in L:	<input type="text"/>
Ts min working temperature (°C):	<input type="text"/>
Ts max working temperature (°C):	<input type="text"/>
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*Example of CE metallic name plate*

# 2. Construction

The BPHE consist of a package of thin corrugated metal plates, surrounded by two thicker stabilizing plates. A thin copper foil placed between each of the thin metal plates melts and seal the BPHE during a vacuum brazing process.

We calculate each solution based on the customer's requirements to ensure an ideal pressure drop and flow rate. And at the same time, the unit becomes energy-efficient and environmentally friendly. Based on the individual task, we also determine the number of plates and the size of the unit.

## 2.1 Plates

The design of the corrugated plates optimizes heat transfer by providing a large but compact total surface area whereby the heat can be drawn from one liquid or gas to another.

The plates are optimised to meet specific temperature demands and capacities.

# 3. Connections

## 3.1 Screw Connections/Pipe Installation

Use a torque wrench when connecting the pipe and observe the specified limits. Make sure that the unit is not over tightened on the threaded connections as this may damage the internal soldering of the connections. The threads provided are parallel. The unit can be tightened by using an O-ring or a circular gasket placed at the end of the connections, alternatively, the use of the thread tape is equally acceptable. However, be extremely careful not to over tighten the fitting.



### IMPORTANT

To prevent leaks, it is extremely important that no welding is carried out on the unit.

## 3.2 Brazed Connections

All connections are brazed to the BPHE in the vacuum brazing process, sealing the connection to the cover plate.



### WARNING

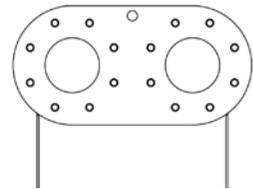
Risk of damaging the connection. Do not join the counterpart with such force that the connection is damaged.

The connection options available depend on the application. It is important to select the correct international or local standard of connection, as they are not always compatible.

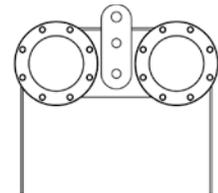
## Connections overview

	SFB 21	SFB 31	SFB 32	SFB 61	SFB 81	SFB 101
3/4" inside pipe thread ISO7-R	x	x	x			
1" pipe thread ISO7-R	x	x	x			
1 1/4" pipe thread ISO7-R		x	x			
1 1/2" pipe thread ISO7-R		x	x			
Ø 22,3 pipe for brazing		x	x			
Ø 28,2 pipe for brazing		x	x			
2" outside pipe thread ISO7-R				x		
2 1/2" pipe thread ISO7-R				x		
Ø 54,2 pipe for brazing				x		
Ø 70,2 pipe for brazing				x		
DN80 / 3" - PN25 Flanges					x	
DN100 PN16: 8x M16 Ø180						x
DN100 PN25: 8x M20 Ø190						x

## Flanges



Mickey Mouse Flanges



Compact Flanges

# 4. Installation

## 4.1 Lifting Instruction

Lifting instructions for larger brazed heat exchangers:

1. Place straps
2. Lifting in vertical position
3. Lower the BPHE slowly to vertical position and place it on its feet
4. Remove the straps
5. Tighten the BPHE to the floor



**Use straps when lifting. Never lift only by the connections or any of the studs.**



**Be careful and keep clear of the heat exchanger during lifting to avoid personal injuries.**

Upon receipt of the BPHE, control that all components are included according to the specifications and that all parts are undamaged – especially the connections. If damage is extensive, notify the carrier immediately.

Before installing the BPHE, remove all plugs and shipping covers and inspect all openings for foreign material.

Provide vent valves for the BPHE so they can be purged to prevent or relieve vapour or gas binding.

Install proper relief valves and temperature alarms to ensure that the BPHE isn't subject to conditions beyond the intended design.



SFB 61



SFB 81 and SFB 101

## 4.2 Mounting

It is recommended to mount the BPHE on the floor, on feet or on the wall. Do not weld or braze brackets or attachments directly to the body of the unit. SonFlow BPHE must be mounted in a vertical position, or horizontal position with all connections facing up. If you wish to vary from these positions, please consult a SonFlow representative.

To support the BPHE, it is advisable to use a mounting bracket fitted at the bottom of the unit, however, other methods that protects against vibration and thermal shock are acceptable.

The space between adjacent BPHE, walls, and other components, should be at least 100 mm. Enough space around the unit is mandatory for service and maintenance.

When the pipe system is connected with the BPHE make sure that no piping loads (including torque effects) are transferred from the piping system to the BPHE. The pipe system must be isolated against pressure pulsations, vibrations and any thermal shock when connected to the BPHE.

## 4.3 Installation for Liquid/Liquid Operation

The connection must always be connected in counterflow. H1 at H4 and H3 at H2 or according to the thermal calculation made for the task in question.



#### 4.4 Installation of Refrigerants/Steam

Refrigerant is normally connected at the left side and the water/brine medium at the right side of the BPHE. Left and right are defined by installing the unit vertically with the connections turned towards you. Furthermore, H2 and H3 are containing an additional cooling channel securing that the cold medium is kept departed from the heads/followers.

#### 4.5 Insulating Jackets

For cooling tasks, the insulation jacket of 20 mm EPDM or an insulating jacket made of mineral wool is suitable.

If the BPHE will be operated at a very hot or very cold temperature, take protective actions, such as insulation, to avoid injuries. Be certain to follow all local regulations.

Be aware that the temperature limits of insulation and the BPHE can be different.

#### 4.6 Start Up

If there is a need to pressure test the whole system, where the BPHE is installed, make sure testing pressure and procedure is following PED testing requirements. During the installation and operation, BPHE pressure shall never exceed the maximum allowable design pressure.

##### Start-up sequence

1. Close all valves connected to the BPHE
2. Fill up the coldest side first
3. Open the valves gradually and start the circulation pump. Keep open the valves gradually until they are fully open
4. Repeat on the hot side
5. Start the automatic control

##### During operation, control that:

- Media temperatures and pressures are within the limits stated on the nameplate
- No leakages appear due to faulty tightening of the connections.



#### WARNING

Always consider personal protection when installing.

The surface of the BPHE might reach a extremely hot temperature equal to the temperature of the working media.

The BPHE provides, in most cases, the best heat transfer performance, when it is connected so that the media flows through the BPHE in opposite directions (in counter-current flow).

##### Steam

Drain the steam side before the steam valves are opened. This precaution reduces the probability of a water hammer. (Water hammer and thermal shock can damage the BPHE and void any warranty). We recommend only slow opening/closing steam control valves be used on this system.

#### 4.7 Filter

To prevent clogging of the BPHE by different mechanical particles or other foreign particles,

we recommend using a filter as protection for the primary as well as the secondary side. Filth accumulated in the BPHE may cause a low output resulting in a big pressure loss and/or freezing of the heat exchanger. If you have any doubt concerning the maximum particle size, please consult your SonFlow Representative.

## 4.8 Operation

Protection against thermal or pressure stress should be ensured during the operation of the BPHE.

Adjustment of flow rate should be done slowly to prevent extreme changes of pressure and temperature. To avoid water hammers don't use quick closing valves.

BPHE's must be protected against:

- Blockage
- Freezing over
- Steam or water hammer
- Thermal shock
- Vibration and /or Pressure spikes.

## 4.9 Shutdown Procedure

1. Close the hot side through slow adjustment of the control valve.  
Full flow on the cold side must be kept.
2. When the control valve is closed, stop the pump
3. Slowly close down the cold side and stop the pump
4. Close all shut-off valves
5. If the BPHE is shut down for a long period, it should be drained, when the device is cold.

Bear in mind the risk of freezing at low temperatures. BPHE that are not in operation should be emptied and blown dry whenever there is a risk of freezing.

## 4.10 Storage

If the BPHE must be stored, keep the unit in a protective environment away from corrosive substances and dust which may affect its performance. Storage temperature should be between -20°C to + 60°C and humidity between 30% to 90%.

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# 5. Maintenance

The normally very high degree of turbulence in a BPHE produces a self-cleaning effect in the channels. However, in some working situations the fouling risk can be very high, e.g., by hard water and high temperatures. It is always possible to clean a BPHE by circulating a cleaning liquid within the system (CIP-Cleaning in place). Choose a cleaning compound based on the type of contamination inside the BPHE. Make sure selected cleaning compounds are not damaging the materials of the BPHE. Use a detergent with a weak acid, 5% phosphorus,

or 5% oxalic acid if the heat exchanger is cleaned regularly. Circulate the detergent through the BPHE. To obtain an optimal cleaning effect, the detergent must be circulated by at least 1.5 times the normal flow rate. The best result will be obtained by opposite flow direction. Reverse the flow direction every 30 min if possible. Rinse thoroughly with clean water to remove the acid from the system after cleaning. Cleaning intervals depends on factors such as media and temperatures.

## About SonFlow A/S

DanPumps A/S changed its company name to SonFlow A/S in 2019 and started manufacturing plate heat exchangers - it signals new investments and new missions as we want to focus on process technology, energy and the environment. SonFlow A/S works hard to ensure the philosophy of innovation and advancement by delivering best in quality products and good service.

We strive our best to safeguard the environmental processes and adapt modern friendly approaches in product design and production processes. DanPumps centrifugal pumps are still being marketed under the brand name DanPumps.



## Plate heat exchangers as a complementary product

SonFlow A/S offers plate heat exchangers as a complementary product to DanPumps centrifugal pumps, which opens new markets. The engineering team of SonFlow is developing new designs and customized process equipment's based on many years of experience.

We are ISO 9001 certified and provide plate heat exchangers and pumps to all industries - we are continually expanding and diversify the business responding with innovative high-quality products and services.

## Manufacture of plate heat exchangers and pumps

SonFlow A/S is specialized in manufacturing centrifugal pumps within all industries and plate heat exchangers to use in thermal processes.

SonFlow offers a broad range of products for different applications - you can rely on SonFlow specialists to take a professional approach to your specific challenge and solve difficult pumping and plate heat exchanger applications.



Aage Sondergaard Nielsen  
Founder & CEO