

Installation, Use and Maintenance Manual

Finned Pack Heat Exchangers



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2 Overview:

This user manual defines the main requirements of the heat exchange elements produced by Stefani Spa.

Finned pack exchangers are intended for the heating, dehumidification, refrigeration, air conditioning and process cooling industries and are designed to operate with static, cyclic and dynamic loads as long as they are within the indicated limits.

The main elements that make up the exchanger are:

1. Piping: copper tubes (stainless steel upon request), through which a gas or fluid flows.
2. Finned pack made up of aluminum (copper upon request) fins.
3. Copper U-bends (stainless steel upon request).
4. Copper chambers (stainless steel upon request), which allow for the distribution of gas or a fluid.
5. Structural steelwork of various materials to provide structural strength to the exchanger.

3 Acronyms:

- PS = Maximum allowable pressure (Bar)
- TSmin = Minimum allowable temperature (°C)
- TSmax = Maximum allowable temperature (°C)
- PT or Ptest = Pressure during test/inspection (Bar)
- DN = Nominal size (mm)
- Fluid Group = Group 1: Hazardous fluids Group
2: Non-hazardous fluids

4 Safety regulations:

All dangerous parts must be labelled with a warning notice (Recommendations to be adopted on the system by the user).

The most common risk for these heat exchangers include:

- Hot surfaces
- Sharp areas around the finned packs

Operators must wear safety shoes, gloves, helmet, and protective glasses



Do not touch surfaces containing process fluids. They can reach high temperatures with the risk of scalding or burns.

Before performing any maintenance, make sure that all equipment has been disconnected from any source of thermal/electrical energy.

5 Supply specifications

Stefani Spa produces and designs finned pack heat exchangers for third parties based on the requirements and specifications of use, performance and any functional constraints requested by the Customer.

It is the user's obligation to use the exchangers within the limits of use in terms of PS, TS and fluid group indicated on the exchanger data plate.

5.1 Dimensions and tolerances:

The dimensions of the exchangers and the related tolerances comply with what is specified in the construction drawings. Unless specified in the drawing, the tolerances applied are those defined by ISO 2768-m.

5.2 Traceability:

Stefani Spa ensures the traceability of the materials used for the manufacture of the exchangers, and archives the 3.1 certificates for copper and aluminum and 3.1 or 2.2 for other materials, and these can be provided to the Customer upon request.

5.3 Documentation:

For the design of the exchangers, the refrigerant fluids and gases used are taken into consideration, as are their PED group, application area and operating conditions.

With reference to the PED 2014/68/EU Directive, the products marketed in Europe by Stefani Spa may fall within the scope of Art. 4.3 of the Directive or be classified in PED category I or higher.

In the event that an item falls within the scope of application of Art. 4.3 of the PED, the usage parameters that Stefani Spa warrants are reported in the drawing and on the product identification label.

For all items that must be classified in PED Category I or higher, in addition to having defined the usage parameters indicated on the exchanger label, these parameters will be indicated in the EU Declaration of Conformity.


Stefani Spa accepts no liability in the event of any non-compliant or improper use of the exchangers in a manner that differs from the plate data approved between the parties.

Finned pack heat exchangers do not fall within the scope of the Machinery Directive (2006/42/EC).

5.4 Identification / Labelling:

5.4.1 Label

1. Manufacturer identification
2. PED category and module
3. Fluid group
PS Maximum allowable pressure TS
Minimum allowable temperature
4. Order Number
5. Product description
6. Project ID
7. Serial number
8. Manufacture date

 WWW.STEFANIEXCHANGERS.COM MADE IN ITALY	ORDER N.	4
	MODEL	5
CE CAT: PED MOD. 2 TUV ITALIA 0948	STEFANI CODE	6
FLUID GROUP: PS BAR 3 TS C	SERIAL NUMBER	7
	MANUFACTURED	8

5.4.2 Declaration of Conformity



STEFANI S.p.A.
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 tel. +39 0444 639999 - fax +39 0444 638240
 email: info@stefani-online.it website: www.stefani-online.it

FAC-SIMILE

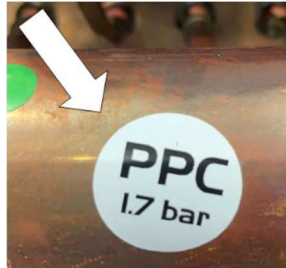
<p>DICHIARAZIONE DI CONFORMITA' STEFANI S.p.A. dichiara che gli scambiatori sono progettati e costruiti in accordo alla Direttiva Europea 2014/68/EU.</p> <p>Le norme, armonizzate e non armonizzate, applicate alla progettazione e costruzione sono:</p>	<p>DECLARATION OF CONFORMITY STEFANI S.p.A. declares that the heat exchangers have been designed and manufactured according to the EU directive 2014/68/EU.</p> <p>The standards, harmonized and not harmonized, applied to the project and construction are the following:</p>
ASTM B68 / ASTM B224 / DIN 1787-1791 / DIN 17670-17671 / CUPROCLIMA UNI 5649 - 3310/1/2/3/4 - 7773/2 / EN 378-2 / EN 14276-2 / EN 12420-12451-12735/1 / EN 10217-7	
<p>Codice Cliente <i>Customer Code</i></p> <p>Codice Stefani <i>Stefani Code</i></p> <p>Descrizione <i>Description</i></p> <p>Matricola <i>Serial Number</i></p>	
<p>Ordine <i>Order</i></p>	<p>O.C. <i>DDT</i></p>
<p>RAPPORTO DI COLLAUDO STEFANI S.p.A. dichiara che tutti gli scambiatori sono stati collaudati con esito positivo e che i requisiti essenziali di sicurezza sono soddisfatti.</p> <p>CATEGORIA P.E.D. 2014/68/EU:</p> <p>GRUPPO FLUIDO:</p> <p>PS (BAR):</p> <p>T (°C):</p>	<p>TEST REPORT STEFANI S.p.A. declares that all the heat exchangers are tested bar with positive result and that the essential requirements of safety are satisfied.</p> <p>CATEGORY P.E.D. 2014/68/EU:</p> <p>FLUID GROUP:</p> <p>PS (BAR):</p> <p>T (°C):</p>

Data / Date

General Manager
 Sig. Michele Belverato


5.5 Nitrogen Precharge:

Stefani Spa supplies finned pack heat exchangers pre-charged with nitrogen, provided that the exchanger configuration allows it. The standard charging pressure is 1.7 Bar (± 0.2) and an example of labelling is shown below:



Nitrogen charging is not envisaged for exchangers with flange and threaded connections.

Stefani Spa ships the units loaded with nitrogen to protect the heat exchangers from the onset of corrosive phenomena and to further ensure that there is no moisture during any storage period.

Any total or partial lack of nitrogen charge on material stored in the warehouse does not necessarily entail damage to the exchanger, but may be due to storage conditions.

5.6 Directives:

Stefani Spa holds the following certifications:

- ISO 9001:2015 – Quality Management Systems
- ISO 14001:2015
- ISO 45001:2015

Stefani Spa products comply with the following directives:

- PED DIRECTIVE 2014/68/EU
- EC 1907/06 Reach Directive
- EC 2015/863 RoHs Directive

for design:

- EN 378-2
- EN 14276-2 2020

6 Usage Specifications:

6.1 Usage Limits:

EXCHANGER FAMILY	OPERATION	PHYSICAL STATE	FLUID TYPE	PS	TS	PED CATEGORY	FLUID GROUP	CLASSIFICATION
WATER / GLYCOL	AR / DC	LIQUID	W	16	-40° / +95°	ART. 4.3	2	X
STEAM	CD	GAS	S	16	-40° / +205°	ART. 4.3 / I	2	X
DIATHERMIC OIL	DR	LIQUID	W	16	-40° / +205°	ART. 4.3	2	X
COMPRESSOR OIL	OC	LIQUID	W	30	-40° / +120°	ART. 4.3	2	X
REFRIGERANT (NON-FLAMMABLE)	DX / CD / HP	GAS	H	30	-40° / +120°	ART. 4.3 / I	2	X
REFRIGERANT (NON-FLAMMABLE: R410A)	DX / CD / HP	GAS	H	45	-40° / +120°	ART. 4.3 / I	2	Y
REFRIGERANT (A2L NON-FLAMMABLE : R32,R454A,R452B)	DX / CD / HP	GAS	H	46	-40° / +125°	ART. 4.3 / II	1	Y
REFRIGERANT (A2L NON-FLAMMABLE : R32,R454A,R452B)	DX / CD / HP	GAS	H	50	-40° / +150°	ART. 4.3 / II	1	Y
AMMONIA / PROPANE	PB / PA	LIQUID	A	23	-40° / +120°	ART. 4.3 / I / II	1	X / Y
CO2 (R744)	DX	GAS	C	60	-40° / +120°	ART. 4.3 / I	2	X / Y
GAS COOLER	CD	GAS	C	120	-40° / +120°	ART. 4.3 / I	2	X / Y

6.2 Storage:

The finned pack heat exchangers are packaged by Stefani Spa taking appropriate precautions to avoid damage during normal handling, transport and storage.

Stefani Spa requests that the units be stored indoors and protected from atmospheric agents, impacts and tampering.

6.3 Handling:

Stefani Spa identifies each package by affixing a shipping identification label and the lifting point that identifies its center of gravity.

Shipping Nr.		Weight (kg.)
Cliente:		
Destinazione:		
Dimensioni (m):		
SLS00		NR 5 KG. 13
 		
		

We recommend handling packages and parts in compliance with the normal requirements set forth by current regulations for safety in the workplace.

6.4 Handling of pallets or iron cages

We produce packaging suitable for normal handling with forklift or pallet truck.

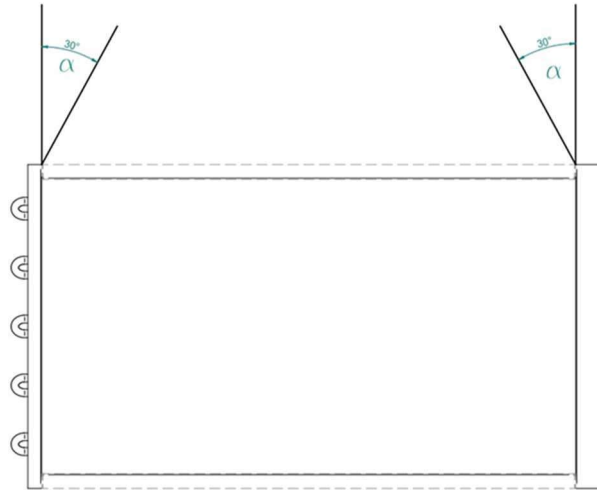


6.5 Handling of finned pack exchangers

We recommend moving finned pack heat exchangers with special lifts (cranes or jibs) equipped with suitable hooks to correctly attach the piece at the ends/supports or lifting points.

- Vertical movement:





- Horizontal movement



- Movement using the eyebolts

These must have a minimum hole diameter of $\varnothing 40$ mm, be positioned coaxially and firmly fastened to the structure in order to ensure the hold during lifting.

The eyebolt hole must protrude from the upper plate to allow the passage of lifting pipes.



The choice of suitable handling means must be made taking into account the characteristics of the piece to be moved and the weights of the exchanger and the packaging (see shipping label).



Never use the chambers or piping as grip handles: this may cause cracks in the welds, resulting in leaks and risks.

6.6 Installation

Stefani Spa recommends always checking to ensure that the CE marking label is present (for items under Art 4.3 there is no CE symbol present as it is not required by the PED Directive). In case of loss or damage of the label, contact Stefani Spa providing the shipping details.

If the finned pack heat exchangers are nitrogen charged, check to verify that the gas is inside the parts before using them. Use a pressure gauge to check. If no gas is present, check to determine if there is any damage due to improper handling. For recommendations and limits of nitrogen charge seals see point 5.5.

Stefani Spa recommends paying the utmost attention during assembly operations, and avoid overheating the braze welds to prevent possible leaks. Stefani Spa is not liable for leaks in its own brazing if additional brazing is carried out at a distance of less than 40mm. The utmost care should be taken during the braze welding phases so as not to damage painted components or alter the protective treatment. Stefani Spa is not responsible for any damage or problems on burnt or obviously overheated painted parts.

Stefani Spa recommends closing the threaded connections by locking the filling hole with a suitable key, in order not to exert stress on the brazed joint and/or on the pipe.

Stefani Spa is not responsible for problems related to improper handling of components during assembly.

6.7 Operating environments:

Flat pack heat exchangers may be subject to external corrosion phenomena, such as the detachment of the protective treatment or the decay of the basic materials, if they come into direct or indirect contact with external substances of a saline, acidic, alkaline nature or in any case capable of causing changes to the pH of the materials making up the assembly. In the above cases Stefani Spa is not responsible for damage caused to the product.

It is recommended that the exchangers do not come into direct or indirect contact with corrosive substances either during the storage period or when in operation with the end user.

6.8 Aggressive environments:

We point out that all substances and foods containing saline, acidic and highly alkaline substances or which become so following temperature changes or degradation can cause damage to the exchangers. Examples of potentially hazardous substances include: tomatoes, onions, fruit and fruit juices, milk and dairy products, vinegar, yeasts, etc.

Stefani Spa recommends washing the exchangers if they come into contact with unpackaged foods, or their products, fumes or condensation (see point 6.6).

Aggressive environments should be considered as all places where there are acid fumes, alkaline fumes, chlorinated and ammonia fumes, saltiness, etc. In such environments, the flat pack heat exchangers should be cleaned at least weekly or even more frequently in severe cases.

In any event, Stefani Spa is not liable for any damage caused by corrosion in aggressive environments.

6.9 Washing and Cleaning

Stefani Spa recommends washing with plenty of water at room temperature for normal cleaning operations following contact with aggressive or unknown liquids or substances.



If the use of detergents is necessary, Stefani Spa recommends the use of neutral detergents that do not alter the pH of the materials and then rinsing with abundant water to eliminate any deposits and residues.



Please avoid the use of products containing the following substances:

- Sodium hypochlorite (Bleach) or chlorinated liquids
- Highly acidic liquids
- Organic solvents such as acetone or trichloroethylene
- Highly basic liquids such as caustic soda and other alkaline substances
- Ammonia or ammonia solutions

All of these substances can damage the paint, if present, or corrode the metal components and damage the exchanger.

To reduce the risk of corrosive triggers, we recommend the use of detergents, including neutral ones, on parts at temperatures $>20^{\circ}$ and in any case we recommend rinsing even if not required by the detergent manufacturer.

7 Safety information

Please follow the requirements of EN378 and/or local authorities regarding safety and environmental protection during the installation, operation, maintenance, repair and disposal of refrigeration systems and appliances and their components.

Finned heat exchangers are designed and tested in agreement with the customer and the technical specifications are indicated on the label. The operating pressure and temperature may not exceed the permissible data indicated on the label. It is the end user's responsibility to ensure that the above limits are not exceeded.

The heat exchanger may explode due to mechanical stress if used in excess of the limits for which it was designed, with risk of possible serious injury. The exchangers should be installed without applying force or placing stress on the piping.

Thermal expansion on the exchangers should not be hindered, the use of flexible connections is recommended to minimize stresses.

The fins are sharp due to their thickness and have sharp edges due to the manufacturing process. Please wear necessary PPE (gloves).

Nitrogen heat exchangers should be handled properly. Any improper handling can cause injury to skin and eyes, so it is recommended that PPE (protective glasses and gloves) be worn when working on the heat exchanger and, in the case of Schrader valves, to vent the residual pressure before completely removing the needle, keeping a safe distance.

8 Dismantling and disposal:

When scrapping the equipment or its parts, disposal must be carried out in an environmentally friendly manner, separating and taking into account the different nature of the components themselves (e.g.: metals, plastic parts, rubber, oils, etc.). The equipment is constructed with material that may be broken down and recycled. Disposal should be carried out in compliance with applicable laws and regulations in the country where it is installed.

In accordance with European Regulation REACH No. 1907/2006, EU Directive 2018/851.

9 Residual Risks:

The table below provides a summary of these occurrences as well as any actions to be taken.

Event	Cause	Consequences	Checks/Actions	Residual risks
Structural loss or damage	Unsuitable design	Possible harm to people or things	The equipment has been designed in compliance with the ASME VIII DIV 1 standard specifically for equipment under pressure.	None
External loads too heavy for the equipment	Improper installation	Deformation, formation of fissures and cracks during use, fluid leaks, explosion.	DO NOT apply any further loads	The user should check to ensure that the equipment is not exposed to any external loads (please see the instructions for use)
Extreme collisions, impacts	Falling due to improper handling	Deformation, formation of fissures and cracks during use, fluid leaks, explosion.	The device is equipped with special lifting points. The position of these lifting points is indicated in the diagram. The product comes with the proper packaging for its transport.	The user should take care to move the equipment properly in compliance with the instructions for use.
Accidental movement of the exchanger while in service	Improper fastening.	Deformation, formation of fissures and cracks during use, fluid leaks, explosion	The device is equipped with a frame that is supported on every side.	The user is required to properly fasten the unit in compliance with the instructions for use.
Contact with surfaces at extremely high temperatures	Unprotected and exposed circuit surfaces	Possible harm to people.	The user should install the unit in areas that are not accessible during operation or that are only accessible by authorized maintenance personnel.	The user is required to install the unit in compliance with the instructions for use.
Structural loss or damage to a component.	Unsuitable operating conditions or fluids	Corrosion, embrittlement, wear and tear, explosion	Check to verify the compatibility of the fluid with the materials used in the construction and the corrosion allowance indicated in the diagram.	Maintenance and integrity checks are the responsibility of the user in compliance with the instructions for use

Corrosion on the external surfaces of the exchanger.	Installation in environments with an aggressive atmosphere.	Damage to the device with possible harm to people and material resources.	The external environment where the equipment is situated should be compatible with the materials utilized in order to prevent the occurrence of corrosion	Maintenance and integrity checks are the responsibility of the user in compliance with the instructions for use
Leaking fluid from the connection to the assembly.	Faulty connection.	Possible harm to people or things	All of the connections made by the user.	Maintenance and integrity checks are the responsibility of the user in compliance with the instructions for use
Explosions breakage, cracks, permanent deformations	Overpressure or exceeding the limit values specified on the plate (pressure; temperature)	Leaking fluid, fragmentation of metallic pieces, harm to people or things.	The user is responsible for ensuring that the minimum and maximum allowable limits specified on the plate affixed to the exchanger are not exceeded when using the exchanger It is the duty of the user to install safety devices.	Maintenance and integrity checks are the responsibility of the user in compliance with the instructions for use
Structural loss or damage	External fire	Harm to people /things.	The user should adopt suitable measures in order to reduce any potential damage in the event of a fire.	Maintenance and integrity checks are the responsibility of the user in compliance with the instructions for use
Structural loss or damage	Breakage of the U-bends or the hairpin jacket located at the bend.	Possible harm to people or things	The material and the thickness used are sufficient. They are determined in compliance with the appropriate construction code	None

Structural loss or damage	Breakage of a joint.	Possible harm to people or things	All joints are made by a third-party manufacturer by qualified operators utilizing strict procedures and are in compliance with appropriate codes. The third-party manufacturer performs non-destructive testing using qualified personnel to verify that the joints have been properly calculated.	None
Structural loss or damage	Inadequate final inspection/testing.	Possible harm to people or things	Final visual inspections and documented test procedures are envisaged, as well as hydraulic and pneumatic pressure tests, in compliance with the appropriate construction code.	None
Installation not compliant with the regulations in force.	Faulty installation	System malfunction, administrative fines and penalties	The allowable usage limits of the equipment are indicated on the marking plate. The user is responsible for instructions and warnings indicated in the instruction manual The installer should be familiar with the regulations in force.	The user is responsible for installing the equipment in compliance with the instructions for use
Maintenance or repair to the device while in operation.	Improperly trained maintenance personnel	Possible harm to people or things	Any maintenance or repair work should be performed with the power turned off, the exchanger not under pressure, and with its internal fluid at room temperature All maintenance and repair operations should be performed by highly qualified personnel	The user is responsible for installing the equipment in compliance with the instructions for use

Structural loss or damage	Improper materials	Possible harm to people or things	The mechanical properties of the materials are in compliance with standard requirements. Materials have been purchased with appropriate inspection certificates, (e.g. 3.1 EN 10204) issued by an ISO 9001 qualified, third-party EC-based manufacturer, and, when necessary, also with an appropriate PMA	None
Malfunctions	Lack of maintenance	Possible harm to people/things.	Perform regular visual inspections based on the amount of use of the equipment.	None