



Operating Instructions
in compliance with
Pressure Equipment Directive 2014/68/EU

FAS Welding and Solder Flange



Please read these operating instructions carefully to ensure a safe operation and keep the same for further use.

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Safety

The FAS Welding or Solder Flange, hereinafter referred to as flange, is designed for use in refrigeration/air conditioning systems referred to as systems hereinafter. It may only be put into service if installed into the system unchanged in accordance with these instructions and being compliance with the statutory provisions in its entirety.

The flange incorporates state-of-the-art technology and has been built according to the applicable regulations. Great value has been set upon the user's safety.

These operating instructions shall be considered integral part of the contract and kept throughout the entire life of the flange.

Authorized personnel

Only trained and instructed personnel shall be allowed to do any work on the flange and system. As regards the qualification and expertise of the personnel the applicable rules and guidelines shall apply.





Residual dangers

Unavoidable residual dangers may emanate from the flange. Every person working on this device shall therefore read these instructions carefully.

To be observed are for example:

- the generally accepted safety regulations,
- EC directives,
- Norms (e.g. EN 378) and all national provisions.






Symbols used for safety information

	<p>DANGER! Instructions on preventing imminent serious danger to persons. Imminent most serious injuries or death as a possible consequence. Any non-observance may lead to an immediate failure of the flange.</p>
	<p>WARNING! Instructions on preventing potential serious hazard to persons. Avoidable serious to very serious injuries or death as a possible consequence. Any non-observance can cause a failure of the flange.</p>
	<p>CAUTION! Instructions on preventing a minor hazard to persons. Minor, reversible injuries cannot be excluded. Any non-observance may lead to a medium-term failure of the flange.</p>
	<p>ATTENTION! Instructions on preventing potential damage to equipment. Minor, reversible injuries cannot be excluded. Any non-observance may lead to a medium-term failure of the flange.</p>

General safety information

The safety requirements of the DIN EN 378-2 and DIN EN 12284 shall be the basis for these operating instructions.

Instructions to avoid hazards in all cycles of service life:

	<p>DANGER! Risk of bursting if operated beyond the technical parameters. Most serious injuries or death as a possible consequence. Observe the technical parameters.</p>
	<p>WARNING! Damage by improper handling. Serious injuries and system failure possible. Never use the flange as transport, lifting or lashing point.</p>
	<p>WARNING! Any non-observance of the instructions may cause the flange to fail. Avoidable serious to very serious injuries or death possible. Installation and maintenance by authorized trained personnel only.</p>
	<p>WARNING! Risk of service fluid to be released. Depending on the kind of service fluid serious to very serious injuries or death possible. Wear personal protective equipment (e.g. respirators, gloves).</p>
	<p>CAUTION! Very cold or very hot surface temperatures possible. Frostbites/burns possible. Wear personal protective equipment (e.g. gloves, protective clothes).</p>

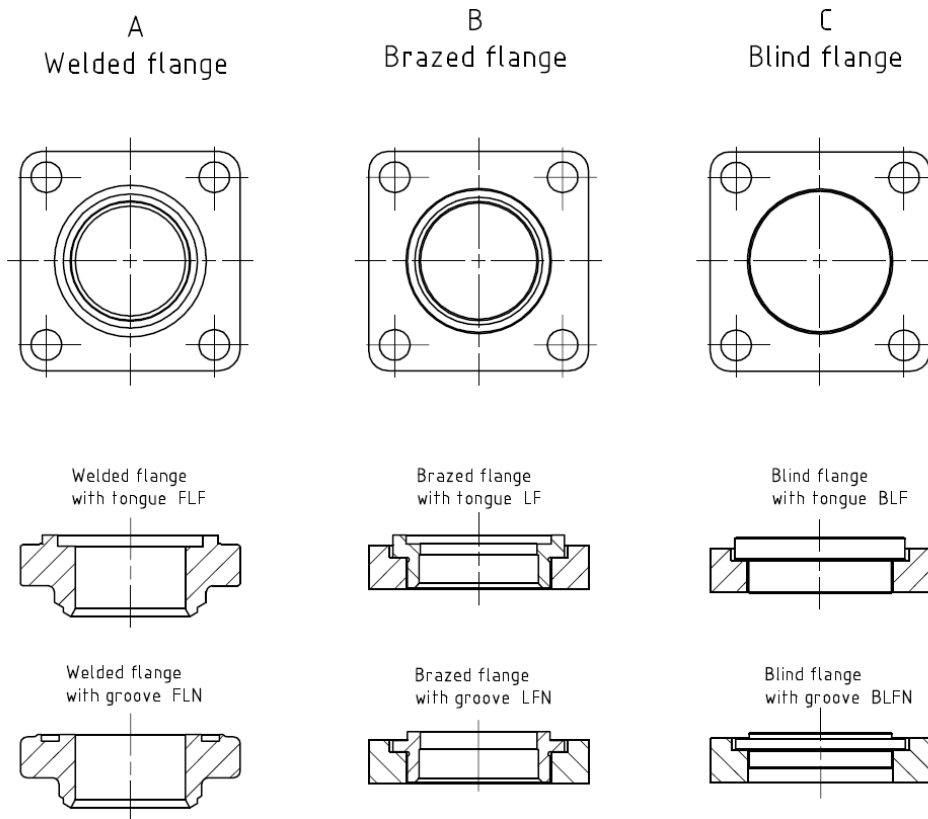
Other information

The information contained herein represents to the best of our belief our knowledge at the time when these instructions were prepared. It shall serve as code of practice to ensure a safe handling of the flange in transport, storage, installation, commissioning, maintenance and dismantling/disposal. A final decision as to whether the flange suits the purpose is to be taken by the user. This information shall not be deemed an assurance of quality or warranty.

Any modification of the flange and operation under other than the prescribed parameters shall not be allowed and will result in the loss of the manufacturer declaration and all liability claims.

Description of Flange

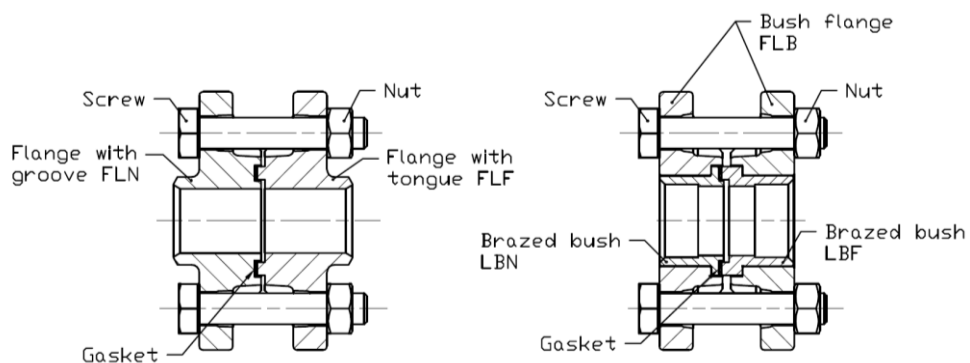
Types (possible combinations of connections)



Installation dimensions can be gathered from the AWA product catalogue and technical documents respectively.

The connecting options A through D are explained in more detail in "Design features".

Operating principle



Product description

Flanges are components in refrigeration/air conditioning systems. They are used as welding and solder flange on valves or other components of the system, as pair of flanges to connect pipes or as blind flange.

The flange has been designed in compliance with the Pressure Equipment Directive 2014/68/EU and the AD2000 Regulations.

Identification

The flange is marked in accordance with DIN EN 12284 by lettering or labelled on the forging part:

Manufacturer's logo
AWA part number or raw material number
Year of manufacture or batch number
Maximum allowable pressure
Nominal size
Material specifications
Special data (e.g. manufacturer's mark of supplier)

Technical parameters

Pressure/temperature:

Depending on the data given in the technical documentation.

Refrigerants according to DIN EN 378-1-2012, PED fluid group 2 and associated refrigerator oils according to DIN 51503-1

On request other refrigerants can be permitted. It is explicitly indicated in the technical documentation.

Leak test, when it is properly installed:

According to DIN 8964-3 (<4.1 g/a R-134a at 10bar)

Classification pursuant to Pressure Equipment Directive (2014/68/EU):

The flange is a pressure-retaining component.

Design Features

- The material of the flange components and the manufacturing method are selected in conformity with the EN12284, the Pressure Equipment Directive 2014/68/EU and applicable information sheets W of the AD 2000 Regulations which guarantee the reliability for the operating range indicated.
- The flanged connection comes with a tongue and groove system with a chambered seal.
- The flanges are made of one of the following materials:
 - Steel with electroplated coating for bush-type flanges
 - Steel without coating for welding flanges
 - On request stainless steel 1.4301 can be supplied
- If agreed, the flanges can be supplied with an acceptance test certificate 3.1 according to EN10204.
- The pairs of welding flanges consist of a flange with tongue (FLF), a flange with groove (FLN), a gasket and 2 or 4 galvanized screws/nuts of strength class 8.8. For low-temperature applications up to -60 °C and stainless steel flange pairs stainless steel screws A2-70 are used.
- The pairs of solder flanges consist of 2 bush-type flanges, 2 solder sockets (tongue [LBF]/groove [LBN]), a gasket and 2 or 4 galvanized screws/nuts of strength class 8.8. Stainless steel screws A2-70 are available on request.
- By combining a welding and a solder flange it is possible to provide a transition from a steel pipe to a copper pipe within the scope of a nominal bore (e.g. DN 25).

- A blind flange consisting of a bush-type flange and a flange disk (with tongue or groove) is offered as a special type used to close the pipe. For connection any time later it is possible to replace the blind flange disk by a solder socket.
- Types of connection:

Because of the design principle the flanges may feature different connections.

Connection "A" – Detachable welding flange connection for use of steel pipe sizes according to DIN EN 10220 for DN 10 through DN 100 pipes. The outside diameters of the welding ends follow DIN EN 12627.

Connection "B" – Detachable brazed capillary connection to render a brazed joint with copper pipes according to DIN EN 12735-1 for dia. 12 to 108mm and relevant inch-type dimensions.

- Flanges come preserved or electroplated. The coating provides for a temporary corrosion protection until installation if transported and stored in dry condition


Transport and Storage

Transport the flange by closed means of transport in the original packing, protected against weather influences, and store it in a dry place.


Mounting

Principles


- The flange shall be arranged in the system so that it can be properly mounted, maintained and repaired if necessary.

	<p>DANGER! Damage of flange possible. Serious injuries and system failure possible during operation. Flange to be installed without additional loads (forces, vibrations). Never use the flange as fixing points of pipes.</p>
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- It must be possible to install the flange components with a torque wrench and at the necessary torques.
- Only authorized personnel shall be allowed to install the flange. Particularly make sure that the sealing surfaces of the tongue and groove system are not damaged.

	<p>CAUTION! Any non-observance of these instructions may cause the flange to fail and the refrigerant to escape. Injuries by contact with refrigerant possible. Mounting by personnel trained in refrigeration systems only.</p>
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- No modifications of the flange are permitted. If modifications become necessary, they have to be agreed with the manufacturer prior to mounting.

	<p>WARNING! Product features may change. Avoidable serious to very serious injuries or death possible. Any modification of the flange has to be agreed with manufacturer in advance.</p>
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Mounting preparation

- For pairs of flanges only: dismantle connecting parts (screws, nuts, flanges, solder sockets, gasket). These components have to be protected from damage until further use.

Connecting the pipe

1. The dimension of the connecting piece must fit that of the flange. If not, use adapters.
2. Prepare the pipe connections so (metallic bright and grease-free) that a high-quality joint can be made.
3. Scavenge the relevant pipe sections with shielding gas during brazing and welding. Then allow the pipe connection to cool down in the air.



WARNING!

Damage to flange / solder socket due to excessive heating possible.
Serious injuries and system failure during operation possible.
Avoid excessive heating of components.



WARNING!

Damage (e.g. crack formation) of pipe connection due to rapid cooling possible.
Serious injuries and system failure during operation possible.
Allow the joint to cool down in the air.

4. Clean the solder connection. Flux residues are very corrosive and may cause long-term damage.



CAUTION!

Risk of increased corrosion and component damage.
Serious injuries and system failure during operation possible.
Thoroughly clean the joint when the work has been finished.

5. Cleaning of the welded connection. For stainless steel flanges observe the general rules for maintaining the material properties (e.g. cleaning, passivation, selection of tools).



CAUTION!

Risk of increased corrosion and component damage.
Serious injuries and system failure during operation possible.
Thoroughly clean the joint when the work has been finished.

6. Connections A & B: Mount the flange with the mating part. Make sure that mounting takes place without any mechanical constraint. Tighten the flanges crosswise in min. 2 steps applying the specified torque (item 7). Especially when stainless steel connections are concerned, observe the engineering rules to avoid fretting (use release agents).



WARNING!

Any excessive torque or non-observance of the mounting order may cause failures.
Serious injuries and system failures possible during operation.
Observe the torques.

7. Depending on the nominal size the following torques shall apply (in Nm):

Nominal size	Screws Pair of flanges
DN 15	M12 85+10
DN 25	M12 85 +10
DN 40	M12 85 +10
DN 50	M12 85 +10
DN 65	M16 120 +20
DN 80	M16 120+20
DN 100	M16 120 +20


Commissioning

Principles


- The flange is a component. The design requires that the flange can only be tested for leakage and strength after assembly and connection.
- The flange and the system into which it is installed, may only be commissioned if they have been checked, with due regard to the intended mode of operation, for proper condition as to assembly, installation, set-up conditions and safe functioning.
- After mounting and initial start-up according to DIN EN 378-2:2012 the end user shall check again for leakage and strength and an effective corrosion protection.


Steps of commissioning

1. Check the system with suitable media (e.g. helium, dry nitrogen) for tightness and pressure resistance.


	<p>DANGER! Danger of flange bursting / breaking. Most serious injuries possible. The test pressure must not exceed the maximum allowable pressure (PS). Strictly observe the safety information (e.g. DIN EN 378).</p>
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2. It is indispensable to apply an anticorrosive coating that meets the operating conditions because the flange comes with a temporary anticorrosive coating only. Make sure that the fabrication data remain legible.


	<p>CAUTION! Delayed failures due to corrosion possible. Serious injuries and system failure during operation possible. Apply a suitable anticorrosive coating.</p>
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	<p>ATTENTION! Loss of product conformity by removal of lettering. Loss of warranty. Lettering must remain legible.</p>
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3. Evacuating and filling the system with refrigerant.

	<p>DANGER! Danger of bursting if operated beyond the technical parameters. Most serious injuries possible. Observe the technical parameters of the flange. Make sure the system is not filled with an excessive amount of refrigerant.</p>
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4. Upon initial start-up check the pipes for any abnormal vibration and record the operating data.

	<p>CAUTION! Cracks by vibration load in pipe system and on the flange possible. Serious injuries and system failure during operation possible. Avoid strong vibrations, take protective measures if necessary.</p>
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Operation, Maintenance and Repair


Principles

- The flange is maintenance-free.
- As part of the regular system inspection the flange should be checked for corrosion/damage and operability and its proper condition restored if necessary.


	<p>WARNING! Media contact possible, contact with hot/cold surfaces. Burns, frostbites Wear personal protective equipment as prescribed by national regulations during maintenance and inspections.</p>
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Repair

- If the flange needs repair, shut down the system, drain the refrigerant from the system (or system section) in an environmentally friendly manner and vent the system.

	<p>DANGER! Refrigerant may escape. Escaping refrigerant may cause most serious injuries. For repairs the system must have the right temperature, free from refrigerant and sufficiently ventilated.</p>
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- For repairs use no other than original spare parts. For mounting/start-up follow these operating instructions. It is indispensable to do a leakage and strength test once again. AWA assumes no warranty for tightness after repairs.

	<p>WARNING! Flange damage due to defective spare parts/mounting. Avoidable serious injuries and system failure possible. Use no other than original spare parts for repairs.</p>
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Dismantling and Disposal

Principles

- To dismantle the flange, shut off the system, remove the refrigerant from the system (or system section) in an environmentally friendly manner and sufficiently ventilate the system (or system section).



DANGER!

Escape of refrigerant possible.
Escaping refrigerant may cause most serious injuries.
For repairs the system must have the right temperature, free from refrigerant and sufficiently ventilated



WARNING!

Media contact possible, contact with hot/cold surfaces.
Burns, frostbites
Wear personal protective equipment as prescribed by national regulations during maintenance and inspections.

- The flange and its components resp. can be recycled:

Welding flange:	steel scrap or stainless steel scrap
Socket flange:	steel scrap
Solder sockets:	brass scrap
Screws/nuts:	steel scrap or stainless steel scrap



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