

## 7. SOFT SOLDERING WITH ELECTRICAL DEVICES

**CFH-soldering irons** are available with a power output of 15 to 100 watts. Devices with a power output of 15 to 60 watts are recommended for light soldering work. Devices with a higher power output (up to 100 watts) have a wider tip and are therefore ideal for large electrical soldering jobs. Tin the soldering tip before using the device for the first time, to ensure flawless soldering and heat transfer. Tinning is coating the tip with solder. Never use a file to remove solder or corrosion residues from the soldering tip. For the user, the benefit of a **soldering gun** is that the soldering tip reaches the soldering temperature within approx. 10 to 12 seconds after pressing the switch.

For particularly sensitive components, we recommend our **digital soldering station** 48 W. This device is infinitely adjustable from 150 to 420° C.

The mobile **CFH-battery operated soldering iron** is very versatile and can be used for delicate soldering work in electronics, model making and hobbies.

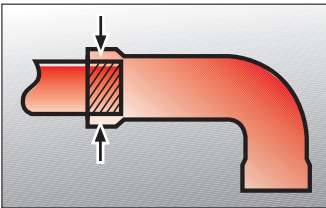
**TIP!** Do not use more solder than is absolutely necessary. Superfluous solder can penetrate into the tube socket, jam switches and cause short circuits. Tin the wires before soldering, especially when soldering stranded wires. Twist the strands, heat them and tin them with solder. Soldering is easier if you tin the wires first. The result is a smooth, electrically-flawless solder joint.

When working with old solder joints, first remove the solder. Heat the solder and use the suction of the **CFH-desoldering pump** for this purpose. Then add new solder.

Also: You can easily clean soldering iron tips with the **CFH-salmiak stone-sand** and the **CFH-cleaning fleece**.

## 8. AVOID THE FOLLOWING ERRORS WHEN SOLDERING

- a) The soldering gap between pipe and fitting must not be greater than 0.2 to 0.4 mm. This is a hair-thin soldering gap. Not even a pin would fit into it. This is the only way to ensure the capillary effect. The liquid solder is sucked into the soldering gap through the capillary effect.



- b) If it is too hot, the flux will burn. The solder cannot wet and immediately drips off again.
- c) The pipe end and fitting are not bare metal. The solder will not wet and bind..
- d) The pipe end has not been carefully deburred on the inside and outside, the metal-shavings have not been removed.

## 7. WHICH SOLDER FOR WHICH METAL

Article no. Description	Steel	Copper	Brass	Nickel	Gunmetal	Malleable cast iron	Cast iron	Tinplate	Bronze	Copper alloy	Nickel alloy	Zinc alloy	Fine zinc	Galva- nized sheet steel
SOFT SOLDERING	Only for delicate soldering in electronics (printed circuit boards etc.) and electrical engineering.													
	General soldering work – not suitable for electronics.													
	Delicate soldering of copper wires (cable strands/telecommunications, etc.)													
	227°C													
	Melting range													
	227°C													
	250°C	●	●	●	●	●		●	●	●	●			
	200°C	●	●							●			●	●
	200°C		●							●				
HARD SOLDERING	Working temperature													
	670°C	●	●	●	●			●		●	●			
	730°C		●	●		●								
	900°C		●	●	●				●	●				
	910°C	●			●		●			●	●	●		●

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# SOLDERING MANUAL

HOW TO SOLDER PROPERLY – READ ON!

## 1. WHAT IS SOLDERING?

Soldering means joining metals together using heat.

In other words, two or more metal parts are joined together by adding an additional metal (the solder). This added metal melts, then hardens when it cools down, connecting the parts together.

## 2. WHAT DO I NEED TO SOLDER PROPERLY?

A heat source is required for the solder connection. This would be a CFH soldering device, for example, with an open flame (gas cartridge soldering device/gas bottle soldering device or a CFH soldering device without a flame - e.g. electric soldering device). It is also important to have a cleaning fleece to ensure quick cleaning of the solder joint. A flux or soldering lubricant (solvent for metal oxides) and solders suitable for the metal connection are also required.

## 3. SOFT SOLDERING/HARD SOLDERING

For soft soldering, the melting temperature of the solder is below 450 °C, while for hard soldering it is above 450 °C.

The soldering temperature for soft soldering in pipe installation is about 250 °C, while for hard soldering the temperature is between 670 °C and 730 °C.

**Hard soldering** must be used for gas installations, hot water heating installations with a flow temperature above 110° C, and for heating oil pipes.

**Soft soldering** must be used for pipes for drinking water installations with an outer diameter of up to 28 mm.

In all other cases, both hard and soft soldering can be used, provided the correct solder is used. The steps for hard soldering largely correspond to those in soft soldering.

Hard soldered connections are typically 10 times stronger than soft soldered connections.

### Soft soldering errors:

- If the temperature is too high, the flux burns. The solder cannot wet properly and it drips off.
- The wrong solder or flux was used for the parts to be joined.
- The parts to be connected have not been properly cleaned. The solder cannot bind.

### Note:

Use only cadmium-free and lead-free solders when soldering drinking water pipes.

### Temperature and power output:

Do not confuse the working temperature and the flame temperature specified on your soldering device.

**F** The **flame temperature** is the measured temperature in the flame cone. It is a statement about the output of the soldering device.

**A** The **working temperature** is the temperature at which the solder used wets, flows and binds. The working temperature is close to the upper melting point of a solder. The working temperature is particularly important when hard soldering. The working temperature of the solder to be used must not be higher than that of the soldering torch. If the power output of the soldering torch is too low, the solder does not melt, and it does not wet the copper pipe to be connected.

## 4. FLUX AND ITS IMPORTANCE IN SOLDERING

The solder is only able to wet, run and bind on clean metallic surfaces. In general, therefore, we also need a flux when soldering (exception: copper/copper compounds with phosphorus-containing solders). Fluxes remove metal oxides/oxide films from the soldering surfaces and keep them oxide-free during soldering. This is the only way to achieve a flawless solder connection.

**Soft solder paste** also contains flux and metal powder. When this melts, it means the correct working temperature has been reached. Now add the correct soft soldering wire (solder) while turning the flame away. When connecting copper pipes, the solder will in this case be visible at the solder joint. When the soldering gap is filled, just let it cool down and remove any flux residues.

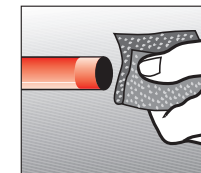
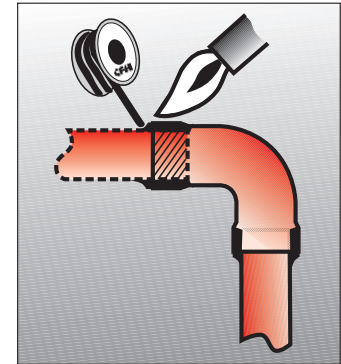
When **hard soldering**, also apply the flux evenly (exception: copper connections with phosphorus-containing hard solders), join the pipe and fitting, heat the solder joint evenly and quickly until the materials are red hot and glowing. Melt the hard solder until the soldering gap is filled. Use the flame to keep the copper pipe glowing for just a moment longer.

## 5. WHAT MATERIALS CAN BE SOLDERED?

All metallic materials can be permanently connected by means of soldering. Soldering is therefore an ideal technology for connecting copper with copper, gunmetal, brass and steel.

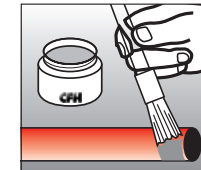
## 6. FOR SOLDERING COPPER PIPES

Copper pipes are durable and hygienic. Working with copper pipes is quite simple. This is why copper pipe has proven its worth in industry over many centuries. Copper pipes can be connected by either soft soldering or hard soldering. Ultimately, the two methods are equivalent. The difference lies in the working temperature and thus also in the solder used.



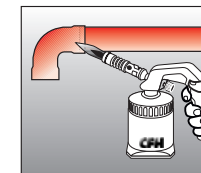
### Cleaning fleece

The parts to be connected are rubbed metallurgically bright using the cleaning fleece. Above all, clean the ends thoroughly. This is important for making a secure connection.



### Soldering paste

Apply the flux to the end of the pipe evenly. This removes the oxide films on the soldering surfaces and prevents new oxide films from forming. The solder is only able to wet the metals to be joined properly on clean metallic surfaces (these should be free of dust and grease).



### Soldering

Push the fitting firmly onto the pipe end, then heat the solder joint evenly until the flux has a silvery shine. Start at the bottom, because heat rises.

The solder is applied directly onto the solder joint. The correct working temperature has been reached when the solder melts when making contact with the metal. The solder will now flow into the joint and connect the parts thanks to the capillary-effect. Add solder until a drop forms on the underside of the pipe. The parts must remain fixed in place until the solder has hardened.

