Anatomy of a good solder joint by Rob.

Notes: You may want to wear suitable gloves when performing this task. The addition of a scratch free pair of safety glasses also if you wish. Copper pipe although not toxic can leave a hard to remove smell on your hands as can flux. The latter is particularly pungent and should not be in contact with the skin as it is an irritant and will sting if it gets into any breaks in the skin. Always wash your hands properly afterwards.

1. Having cut the pipe and obtained a suitable elbow fitting make sure both are clean and corrosion free. Use a fine wire wool to clean oxidised pipe to make it bright in appearance. Clean all traces of wire wool from the pipe as this could cause it to fail when soldered
2. De burr the external and internal edge after cutting (A pipe slice will create an inward curve on the pipe as you will see) this will allow full water flow and will reduce noise in the system.
3. Apply flux with a brush to the pipe not the fitting, this will allow you to see exactly how much flux you need to use. Don’t overuse flux as it is an acid.
4. Always use lead free solder as it’s environmentally approved and safe. Lead solder is not approved for potable water as it is poisonous and can cause serious illness if ingested over a period of time.
5. Before you solder get your reel of solder and torch ready, as once the torch is lit it will be difficult to make these adjustments without risk.
6. Place you pipe and fitting securely in the bench so that you can apply heat without burning the bench. Be careful not to crush the pipe in the bench jaws. Heat mats are an option where the above is impossible but these a rarely needed as they burn through after a few uses.
7. Unwind the solder from the reel by the length of your hand. This will allow you to keep some distance from the flame. Place the solder down on the bench.
8. Pick up your torch and open the valve to allow the gas to come out, then press the red ignition button to light the gas. There is a lockdown button but unless you are experienced then keep the button depressed with your finger or thumb. It will allow you to instantly shut off the gas should there be a problem. Be careful to direct the flame away from yourself and anyone else near. NOTE if you are right handed hold the torch in your left hand as you need to be more accurate with the solder, hold that in your right. Vice versa for left handed.
9. Pick up the solder and hold it in a fist with the extension protruding between your second and third finger.(This is for beginners not seasoned plumbers)
10. Direct the torch to the fitting so that it is equidistant from the pipe inserts that way the heat will draw the solder into the fitting by capillary action. Never heat the pipe always the fitting.
11. With the heat on the fitting at a distance of 30mm count to 10 in seconds(15mmpipe) and introduce the solder to one of the joints, it should start to soften and run. Do both joints in quick succession to avoid over heating the joint.
12. Be careful not to overheat the joint as this will cause the flux to burn away and the solder will not take, then the copper will discolour and you will have to allow it to cool and start again which may compromise the whole fitting.
13. Always solder the complete fitting, for example on an **Elbow** there are two solder points and on a **Tee** there are three.
14. Never go back to solder the other terminal it can cause the first soldered joint to fail due to the re heat process also unused flux on a copper pipe will corrode and may not seal if you attempt to solder at a later date.
15. Do not immerse the just soldered joint in water to cool it you may well cause it to fail due to the sudden cooling down of the pipe and fitting. Allow it to cool naturally.
16. Although the pipe is set when the gloss effect has turned matt on the solder you must beware the pipe and fitting may stay hot for up to 15 mins. Wear material not rubber gloves if you must pick it up, ideally a pair of water pump pliers would better accomplish the task.
17. Once cool to the touch wipe any flux residue from the pipe with a rag. This will stop it developing a green appearance and prevent corrosion.
18. Sometimes you will get small lumps of solder on the bottom of the fitting these can be removed with a file but its purely a cosmetic touch.

If your fitting the pipe to a system don’t forget to flush it through to remove debris and flux, fit an inhibitor to the system if it is for heating.