

## Soldering Lead-free Brass

Uponor “Lead-free”<sup>1</sup> brass transition fittings and valves are manufactured from a dezincification-resistant, lead-free brass material, classified as C69300 by the Unified Numbering System (UNS). While this material is rated Excellent in soldering suitability<sup>2</sup>, it is important to recognize that lead-free brass is more sensitive to soldering conditions than traditional leaded (i.e., yellow) brass. Therefore, strict adherence to good soldering practices is paramount.

Lead-free brass has a lower thermal conductivity compared to leaded brass, as well as unique corrosion resistance due to its natural oxidative barrier, making for an exceptional lead-free brass product. Lead-free brass requires following proper brass soldering techniques to enable a good plumbing joint connection. See below for tips and techniques for soldering lead-free brass.

### Soldering Tips and Techniques

**Good preparation and cleaning** — All metals should be properly cleaned prior to soldering, but because of the natural oxidative barrier of lead-free brass, a clean surface is imperative to help remove oxide films and achieve a sound and uniform quality-soldered joint. Fluxing alone cannot substitute for adequate cleaning. Adequate cleaning requires the use of a mechanical abrasive product, such as a wire brush, sandpaper or a sanding cloth. Also, be sure to apply a sufficient coat of flux prior to soldering. Fluxing and soldering should be done immediately after cleaning as oxide films tend to reform quickly on the cleaned surfaces.

**Flux with chloride compounds** — Use only flux that contains chloride compounds. While most flux does contain chloride compounds, there is still some flux available without chloride compounds; however, it should not be used with lead-free brass.

**Lead-free solder** — Use only lead-free solder, preferably a 95/5 mix of tin/antimony.

**Uniform heating** — Uniform heating around the entire perimeter of the fitting/pipe juncture is critical to making a good joint. When soldering any brass, it is always good practice to heat the component gradually, using a smaller tip, and continually moving the location of the flame around the joint. This is also true with lead-free brass.

**Avoid excess heat** — It is especially important not to overheat the metal. Lead-free brass will turn a distinctive brown color when overheated. This discoloration is an indicator that flux may have been burned out of the solder joint, resulting in a lack of complete solder coverage. If this condition occurs, the joint must be disassembled and the “good preparation” procedure reapplied.

**Cool properly** — Over-heating the joint and the subsequent delay in cooling (due to the low thermal conductivity of lead-free brass) may actually allow solder to weep from the joint, or allow the joint to be disrupted after soldering. Cooling the joint with a wet cloth immediately after soldering will speed the transfer of heat, reducing the risk of disrupted joints.

**Note:** The information contained herein is made available for use as an example for soldering techniques which may be used with Uponor lead-free brass products. However, the installer must take into account other variables involved with each particular installation, many of which cannot be foreseen or anticipated by Uponor. Neither Uponor nor any other agency or entities thereof, assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, product or process disclosed in this document.

<sup>1</sup> Per NSF Annex G, lead-free products contain less than or equal to 0.25% weighted average lead content on wetted surfaces.

<sup>2</sup> “Properties of Wrought and Cast Copper Alloys.” Copper Development Association. Web. 22 Sep. 2009.

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