

NO LEAD

# SOLDERING NO LEAD BRASS ALLOY PRODUCTS



No Lead Brass alloys are much more similar than different to the traditional cast and forging brass alloys that are commonly used to manufacture valves. To meet no lead requirements, three major types of alloys have been developed: binary brass, bismuth brass and silicon brass.

When proper solder techniques are followed, valves and fittings made from any of the three no lead brass alloys may solder as well as those made from traditional brass. Soldering a valve or fitting constructed of silicon brass alloy does require strict adherence to solder techniques (in particular joint preparation and flux application) due to the properties of the silicon. Whereas, soldering valves constructed of either binary or bismuth brass alloy material perform the same as those made from traditional brasses.

Legend uses binary brasses for the 1001, 1002 and 2000 Series Ball Valves and for most other Legend products due to several advantages the alloys offer, including the ease of soldering. Bismuth brass alloys are utilized for the valves and fittings for which their applications are optimized by the properties of the alloy.

For more information please visit [www.legendnolead.com](http://www.legendnolead.com) or call Legend Customer Service at 1-800-752-2082.



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Binary Brasses	Bismuth Brass / Bronze	Silicon Brass / Bronze
<p>Binary brasses are made from primarily two elements: copper and zinc. There are no additional materials added to aid in the machining process. These materials have been proven effective from their widespread use in Europe over a long period of time. Examples are UNS C46400 and UNS C46500. Europe material specified alloys include CW509L, CW510L, and CW511L.</p>	<p>Bismuth brass/bronze materials are also copper alloys that remove lead from the compound, substituting a small amount of bismuth (0.5%-4%) to aid in the processes during manufacturing. There are over 20 ASTM specified material listings for approved bismuth brass/bronze alloys. Examples include UNS C89830, UNS C89833, UNS C89836 and UNS C89844.</p>	<p>Silicon brass/bronze materials are copper alloys that remove lead from the material and add a small amount of silicon (2%-4%) to improve the performance of the alloy during the manufacturing processes. Examples include UNS C87600, UNS C87850 and UNS C69300.</p>
<p><b>Advantages:</b></p> <p>Binary alloys offer very good, high temperature performance and have excellent soldering capability, the same as standard brasses. Recycling is a non-issue and these materials can be mixed and recycled with standard brasses and bronzes.</p>	<p><b>Advantages:</b></p> <p>Provides good manufacturing capabilities for casting, forging, and machining. Bismuth alloys also solder just like standard brasses and bronzes. Recycling is easier than with materials containing silicon, but separation from standard brasses is recommended.</p>	<p><b>Advantages:</b></p> <p>Provides good manufacturing capabilities for casting, forging, and machining. Copper silicon alloys are naturally corrosion resistant. High temperature performance is very good.</p>
<p><b>Disadvantages:</b></p> <p>Because of the lack of additional elements to aid in the machining process, these materials by nature are difficult to machine. Special manufacturing equipment and additional items (chip breakers) may be required.</p>	<p><b>Disadvantages:</b></p> <p>Performance at high temperatures can be an issue with bismuth materials. Legend avoids this issue in our products by specifying very low amounts of bismuth in our alloys and utilizing alternative materials for finished goods that are likely to encounter heat during use.</p>	<p><b>Disadvantages:</b></p> <p>There can be issues in soldering silicon brass materials; special care needs to be used to produce good soldered joints. Although performing very well in most other desired attributes, silicon brasses are more expensive than other no lead alternatives. There are also some recycling issues as silicon brasses cannot be mixed with their non-silicon counterparts, thus increasing production costs.</p>

