

No Lead Brass and Bronze Alloys

Many no lead brass and bronze alloys are available today and more are being developed to meet the growing demand for no lead products. Most plumbing valves and fittings are made with brass and bronze alloys that contain lead. Lead is added to the alloys for the purpose of improving the efficiency of the manufacturing process. As a consequence; eliminating the trace amounts of lead currently found in brass and bronze alloys dramatically slows the manufacturing process, causes premature tool wear, and increases the rejection rate of production run. As a result no lead products may costs as much as 50% more than traditional products. All current no lead alloys are affected by this change.

In order to comply with the new no lead federal law, the lead content in the alloy has to be greatly reduced. Therefore, another element must be used as a substitute to facilitate the advantages lead provides to any alloy during the manufacturing processes. The most common alloys are silicon brass/bronze, bismuth brass/bronze and binary brasses.

Legend utilizes all three alternatives dependent upon the product and its intended application. This assures the proper product performance for our customers, at the most competitive prices.

Below you will find a brief definition for each of the alternative materials:

Silicon Brass/Bronze

Bismuth Brass/Bronze

Binary Brasses

Silicon Brass/Bronze

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. Eco-Brass™* is a popular type of silicon brass.

Advantages: Provides good manufacturing capabilities for casting, forging, and machining. Copper silicon alloys are naturally corrosion resistant and readily pass new dezincification requirements resulting in some manufacturers allowing direct burial of products made from these materials. High temperature performance is very good.

Disadvantages: 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.

**Eco-Brass is the registered trademark of Mitsubishi Shindoh Co., Ltd.*

Bismuth Brass/Bronze

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.

Advantages: 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.

Disadvantages: 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.

Binary Brasses

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.

Advantages: 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.

Disadvantages: 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.