

# What is No-Lead Brass ...and how does it affect me?

**A.Y. McDonald Mfg. Co. No-Lead Brass** products meet the requirements of UNS Copper Alloy C89833 per ASTM B584-09.

UNS Copper Alloy C89833 Mechanical properties and Chemical composition have been certified by an independent testing agency and are listed in ASTM specification B584-09 Copper Alloy Sand Casting for General Applications (compositions and mechanical properties).

**A.Y. McDonald's No-Lead Brass** contains a high percentage of copper and **3 main alloying elements - Zinc, Tin and Bismuth**.

- ◆ Zinc is a potent alloying element in copper, imparting strength and hardness.
- ◆ Tin is a potent solid-solution strengthener in copper, even more so than zinc. Unlike zinc, tin also improves corrosion resistance.
- ◆ Bismuth acts very much like lead in many respects. Bismuth is lead's neighbor on the periodic chart of elements, making its behavior during casting and solidification similar. Bismuth is nearly insoluble in copper and causes machining chips to break up into small, easily removed particles. Unlike lead, Bismuth is not known to be toxic in humans.

**A.Y. McDonald's No-Lead Brass alloy shall contain not more than nine one hundredths of one percent (0.09% or less) total lead content by weight.**

**Lead composition range:**

85-5-5-5 (C83600) .....	4.00-6.00%
AY No-Lead Brass .....	0.00-0.09%

**\* Yield Strength, min.:**

85-5-5-5 (C83600) .....	14 ksi
AY No-Lead Brass .....	14 ksi

*\* Yield strength shall be determined as the stress producing an elongation under load of 0.5 %, that is, .01" in a gage length of 2.00".*

**Lead leaching** from many Waterworks No-Lead Brass components is virtually zero per the NSF 61 section 8 testing and normalization protocol. A.Y. McDonald has received ANSI accredited certifications. Product certification sheets are available by request.

**WARNING:** Beginning January 1, 2010, it is unlawful in CALIFORNIA and VERMONT to use any product in the installation or repair of any public water system or any plumbing in a facility or system that provides water for human consumption if the wetted surface area of the product has a weighted average lead content greater than 0.25%. This prohibition does not extend to service saddles used in the state of CALIFORNIA.

Machined surface measurements show surface finish and quality on the Bismuth-Selenium and Bismuth No-Lead brass alloys are equal or better than those produced with traditional leaded brasses.

Independent testing agency Corrosion Behavior studies of Bismuth-Selenium and Bismuth red brass alloys have shown them to be equal to that of 85-5-5-5 (C83600). These No-Lead alloys have a significant history of use in Meters, Backflows and underground Waterworks brass products without reported corrosion issues.

Modified Red Brass with Bismuth and Selenium Research information has been published by AFS (American Foundrymen's Society, Inc.). The research was developed by testing agencies and guided by a consortium including AFS, the Copper Development Association along with Ingot manufacturers, metalcasters and copper-alloy casting users.

This research information includes chemical composition variations, Alloy characterization, Foundry trials, Environmental Considerations, Leach data, Machinability and corrosion resistance. A.Y. McDonald has repeated a number of these trials and tests as we have prepared for No-Lead brass production.

“The lead-free alloys were developed to have foundry characteristics (melting and casting) as well as properties (physical and mechanical) similar to existing leaded alloys. In other words, there should be no differences in the foundry practices currently being used for leaded alloys. In addition, the design of the existing components need not be modified to satisfy property considerations.”

--Modern Casting, October 2003

**A.Y. McDonald has been involved in research of No-Lead brass options for well over 10 years. We have been manufacturing No-Lead brass products in excess of 5 years.**



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# No-Lead Brass Legislation ...and what it means to you

**WARNING:** Beginning January 1, 2010, it is unlawful in CALIFORNIA and VERMONT to use any product in the installation or repair of any public water system or any plumbing in a facility or system that provides water for human consumption if the wetted surface area of the product has a weighted average lead content greater than 0.25%. This prohibition does not extend to service saddles used in the state of CALIFORNIA.



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# No-Lead Brass Technical Specifications

## NO-LEAD BRASS FITTINGS AND VALVES

### 1. GENERAL

All brass fittings and valves for service lines shall be provided under this contract.

### 2. PRODUCT

- a. All fittings and valves shall be manufactured in accordance with AWWA Standard C-800, latest revision, and as further specified in these technical specifications.
- a.i Any brass part of the fitting or valve in contact with potable water shall be made of a “No-Lead Brass”, defined for this specification as UNS Copper Alloy C89833 or C89520 in accordance with the chemical and mechanical requirements of ASTM B584. This “No-Lead Brass” alloy shall contain not more than nine one hundredths of one percent (0.09% or less) total lead content by weight. Lead content shall be certified by an ANSI accredited agency.
- a.ii Any brass part of the fitting or valve not in contact with potable water shall be made of 85-5-5 brass as defined for this specification as UNS Copper Alloy C83600 per ASTM B62, ASTM B584 and AWWA C-800.
- b. All brass fittings and valves shall be certified by an ANSI accredited test lab per ANSI/NSF Standard 61, Drinking Water Components – Health Effects, Section 8. Proof of certification is required.
- c. Brass fittings and valves shall comply with the Safe Drinking Water Act, and the U.S Environmental Protection Agency.
- d. All brass fittings and valves shall have the manufacturers name or trademark integrally stamped or cast on it. Another marking identifying the “no-lead” brass alloy, e.g., ‘NL’, shall be cast or stamped on the fitting or valve.

### 3. QUALITY CONTROL AND TESTING

If requested, an affidavit certifying compliance with these standards and specifications shall be signed and submitted by the manufacturing firm’s Quality Assurance or Engineering Manager.

### 4. MANUFACTURER

The brass fittings and valves shall be produced by a North American manufacturer.



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# No-Lead Brass

## ANSI/NSF Drinking Water System Components—Health Effects

### ANSI/NSF 61 Compliance versus Certification

■ ANSI/NSF 61 Certification requires products to be evaluated and tested by an ANSI accredited lab or testing agency. Testing includes organics (rubber seals, plastic components, and/or lubricants), regulated metals, and other inorganics (asbestos, chlorine, nitrates, etc...). In addition to the initial evaluation, testing, and certification process, these agencies audit manufacturers on regular intervals to review records and retest stock products to the NSF requirements.

A compliance claim is not recognized by NSF. It is simply a way for a company to confuse people into believing that they have NSF recognition. These claims may be narrow in scope and can be easily misconstrued.

Products that are ANSI/NSF 61 Certified by a 3rd party certifier leave no question as to whether or not they fully meet the requirements of ANSI/NSF 61. The certification mark will appear on the packaging of the product.



Listed below are the six ANSI accredited agencies currently able to provide the ANSI/NSF 61 certification. Any company's list of products certified to ANSI/NSF 61 can be reviewed through the specific agency certifying their products. See the website links below.

### NSF 61 ANSI Accredited Labs

<b>NSF International</b>	<a href="http://www.nsf.org/Certified/PwsComponents/">http://www.nsf.org/Certified/PwsComponents/</a>
<b>Underwriters Laboratories Inc</b>	<a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a>
<b>Truesdail Laboratories Inc.*</b>	<a href="http://www.truesdail.com/index.html">http://www.truesdail.com/index.html</a>
<b>CSA International</b>	<a href="http://directories.csa-international.org/">http://directories.csa-international.org/</a>
<b>IAPMO</b>	<a href="http://pld.iapmo.org/">http://pld.iapmo.org/</a>
<b>WQA</b>	<a href="http://www.wqa.org/">http://www.wqa.org/</a>

\* - A.Y. McDonald ANSI/NSF 61 certified products are listed with Truesdail Laboratories Inc.

### ANSI / NSF 61 Definition

■ ANSI/NSF 61 is a standard that was created to establish minimum health effect requirements for chemical contaminants and impurities that are introduced into drinking water from products, components, and materials that are used in drinking water systems.



# No-Lead Brass

## ANSI/NSF Drinking Water System Components—Health Effects

- The following are some of the contaminants\* that are tested for per ANSI/NSF 61:

### Organics/Pesticides

- Rubber Seals
- Plastic Components
- Lubricants

### Regulated Metals

- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium

- Copper
- Lead
- Mercury
- Selenium
- Thallium

### Other Inorganics

- Items like asbestos, chlorine, nitrates, etc.

\* See ANSI/NSF 61 for a complete listing of identified contaminants.

### ANSI/NSF 61-4 Pipes and Related Products

- Section 4 of ANSI/NSF 61 applies to pipes and pipe related products.

### ANSI/NSF 61-8 Mechanical Devices

- Section 8 of ANSI/NSF 61 applies to devices, components, and materials that are used in water treatment/transmission/distribution systems, and are in contact with water used for human consumption and/or treatment chemicals.
- **In general, Waterworks Brass products are covered by section 8 of ANSI/NSF 61.** A.Y. McDonald's waterworks line falls under the in-line device classification of ANSI/NSF 61-8. The following products are classified as inline devices: backflow preventers, building valves, check valves, compression fittings, corporation stops, curb stops, expansion tanks, meter couplings, meter stops, pressure regulators, pressure tanks, service saddles, strainers, valves and fittings, and water meters. The following inline devices are specifically excluded from ANSI/NSF 61 requirements: boiler feed valves, drilling and tapping machines, temperature and pressure relief valves, valves with hose thread outlets, and water meter test benches.

### ANSI/NSF 61-9 Mechanical Plumbing Devices

- Section 9 of ANSI/NSF 61 applies to mechanical plumbing devices, components, and materials that are typically installed within the last liter of water distribution systems used for human consumption. These products are also called endpoint devices. Typical devices are faucets, hoses, and small shut off valves. The following endpoint devices are specifically excluded from ANSI/NSF 61 requirements: bath and shower valves, shower heads, Roman tub valves, drains, pre-rinse assemblies, and all endpoint devices not specifically intended to dispense water for human consumption (utility, laundry, laboratory, bidet, and shampoo fittings; faucets with hose thread spout ends or quick disconnect ends; self closing, metering, or electronically activated faucets; and non-lavatory hand wash stations).



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