



# Application Datasheet

## Standard Designation for Wrought Copper Alloys

- C20000-C29999: Copper-Zinc Alloys (*Yellow Brasses*)
- C30000-C39999: Copper-Zinc-Lead Alloys (*Leaded Brasses*)
- C40000-C49999: Copper-Zinc-Tin Alloys (*Tin Brasses*)

Revision Date: November 13, 2018

### Brasses (C20000 - C49999)

\* = are alloys registered with the U.S. EPA as Antimicrobial.

| UNS #                              | Cu                  |                     | Pb   |      | Sn   |      | Zn   |      | Fe   |      | P    |      | Other Named Elements |         | Status            |
|------------------------------------|---------------------|---------------------|------|------|------|------|------|------|------|------|------|------|----------------------|---------|-------------------|
|                                    | Min%                | Max%                | Min% | Max% | Min% | Max% | Min% | Max% | Min% | Max% | Min% | Max% | Min%                 | Max%    |                   |
| C20500*<br>Brass                   | 97.0                | 98.0                |      | 0.02 |      |      |      | Rem  |      | 0.05 |      |      |                      |         | inactive<br>03/92 |
| C21000*<br>Gilding, 95%            | 94.0                | 96.0 <sup>(1)</sup> |      | 0.05 |      |      |      | Rem  |      | 0.05 |      |      |                      |         | active            |
| C22000*<br>Commercial Bronze, 90%  | 89.0                | 91.0 <sup>(1)</sup> |      | 0.05 |      |      |      | Rem  |      | 0.05 |      |      |                      |         | active            |
| C22600*<br>Jewelry Bronze, 87-1/2% | 86.0                | 89.0 <sup>(1)</sup> |      | 0.05 |      |      |      | Rem  |      | 0.05 |      |      |                      |         | active            |
| C23000*<br>Red Brass, 85%          | 84.0                | 86.0 <sup>(1)</sup> |      | 0.05 |      |      |      | Rem  |      | 0.05 |      |      |                      |         | active            |
| C23030*                            | 83.5 <sup>(1)</sup> | 85.5                |      | 0.05 |      |      |      | Rem  |      | 0.05 |      |      | 0.20 Si              | 0.40 Si | active            |
| C23400*                            | 81.0                | 84.0 <sup>(1)</sup> |      | 0.05 |      |      |      | Rem  |      | 0.05 |      |      |                      |         | active            |
| C24000*<br>Low Brass, 80%          | 78.5 <sup>(1)</sup> | 81.5                |      | 0.05 |      |      |      | Rem  |      | 0.05 |      |      |                      |         | active            |
| C24080                             | 78.0 <sup>(1)</sup> | 82.0                |      | 0.20 |      |      |      | Rem  |      |      |      |      |                      | 0.10 Al | active            |

| UNS #                               | Cu                  |                     | Pb   |      | Sn   |      | Zn   |      | Fe   |      | P    |      | Other Named Elements            |                                | Status            |
|-------------------------------------|---------------------|---------------------|------|------|------|------|------|------|------|------|------|------|---------------------------------|--------------------------------|-------------------|
|                                     | Min%                | Max%                | Min% | Max% | Min% | Max% | Min% | Max% | Min% | Max% | Min% | Max% | Min%                            | Max%                           |                   |
| C25000*<br>Brass                    | 74.0                | 76.0                |      | 0.05 |      |      |      | Rem  |      | 0.05 |      |      |                                 |                                | inactive<br>03/92 |
| C25600*                             | 71.0                | 73.0 <sup>(2)</sup> |      | 0.05 |      |      |      | Rem  |      | 0.05 |      |      |                                 |                                | active            |
| C26000*<br>Cartridge Brass, 70%     | 68.5 <sup>(2)</sup> | 71.5                |      | 0.07 |      |      |      | Rem  |      | 0.05 |      |      |                                 |                                | active            |
| C26100*<br>Brass                    | 68.5                | 71.5 <sup>(2)</sup> |      | 0.05 |      |      |      | Rem  |      | 0.05 | 0.02 | 0.05 | 0.02 As                         | 0.06 As                        | inactive<br>03/92 |
| C26130*                             | 68.5                | 71.5 <sup>(2)</sup> |      | 0.05 |      |      |      | Rem  |      | 0.05 |      |      | 0.02 As                         | 0.08 As                        | active            |
| C26200*                             | 67.0                | 70.0 <sup>(2)</sup> |      | 0.07 |      |      |      | Rem  |      | 0.05 |      |      |                                 |                                | active            |
| C26380<br>Brass                     | 68.0                | 72.0                |      | 0.30 |      |      |      | Rem  |      | 0.05 |      |      |                                 | 0.10 Ag                        | inactive<br>03/92 |
| C26800*<br>Yellow Brass, 66%        | 64.0                | 68.5 <sup>(2)</sup> |      | 0.09 |      |      |      | Rem  |      | 0.05 |      |      |                                 |                                | active            |
| C27000*<br>Yellow Brass, 65%        | 63.0                | 68.5 <sup>(2)</sup> |      | 0.09 |      |      |      | Rem  |      | 0.07 |      |      |                                 |                                | active            |
| C27200*<br>Yellow Brass             | 62.0                | 65.0 <sup>(2)</sup> |      | 0.07 |      |      |      | Rem  |      | 0.07 |      |      |                                 |                                | active            |
| C27400*<br>Yellow Brass, 63%        | 61.0                | 64.0 <sup>(2)</sup> |      | 0.09 |      |      |      | Rem  |      | 0.05 |      |      |                                 |                                | active            |
| C27450<br>Yellow Brass              | 60.0 <sup>(3)</sup> | 65.0                |      | 0.25 |      |      |      | Rem  |      | 0.35 |      |      |                                 |                                | active            |
| C27451<br>Yellow Brass Yellow Brass | 61.0                | 65.0 <sup>(3)</sup> |      | 0.25 |      |      |      | Rem  |      | 0.35 | 0.05 | 0.20 |                                 |                                | active            |
| C27453<br>Copper Zinc Alloy         | 61.5 <sup>(3)</sup> | 63.5                |      | 0.25 |      | 0.15 |      | Rem  |      | 0.15 |      |      | 0.02 As                         | 0.15 As                        | active            |
| C27460                              | 60.0 <sup>(3)</sup> | 62.0                |      | 0.25 | 0.15 | 0.35 |      | Rem  |      | 0.10 | 0.15 | 0.25 | 0.20 Ni<br>0.080 Al<br>0.060 Si | 0.35 Ni<br>0.16 Al<br>0.090 Si | active            |
| C28000*<br>Muntz Metal, 60%         | 59.0                | 63.0 <sup>(2)</sup> |      | 0.09 |      |      |      | Rem  |      | 0.07 |      |      |                                 |                                | active            |
| C28200<br>Copper Zinc Alloy         | 58.0                | 61.0                |      | 0.03 |      |      |      | Rem  |      | 0.05 | 0.12 | 0.22 |                                 | 0.005 Al<br>0.05 Si            | inactive<br>02/73 |

| UNS #   | Cu                  |                     | Pb   |      | Sn   |      | Zn   |                    | Fe   |      | P    |      | Other Named Elements |   | Status            |
|---|---------------------|---------------------|------|------|------|------|------|--------------------|------|------|------|------|----------------------|---|-------------------|
|   | Min%                | Max%                | Min% | Max% | Min% | Max% | Min% | Max%               | Min% | Max% | Min% | Max% | Min%                 | Max%  |                   |
| C28300*<br>Yellow Brass                             | 58.0 <sup>(4)</sup> | 62.0                |      | 0.09 |      |      | 31.0 | 41.0               |      | 0.35 |      |      | 0.10 S               | 0.20 B<br>0.01 Mn<br>0.65 S<br>0.20 Zr  | active            |
| C28310*<br>Yellow Brass                             | 58.0 <sup>(4)</sup> | 62.0                |      | 0.09 |      |      | 31.0 | 41.0               |      | 0.35 |      |      | 0.01 Mn<br>0.10 S    | 0.20 B<br>0.20 Mn<br>0.65 S<br>0.20 Zr  | active            |
| C28320*<br>Yellow Brass                             | 58.0                | 62.0 <sup>(4)</sup> |      | 0.09 |      |      | 31.0 | 41.0               |      | 0.35 |      |      | 0.10 S               | 0.20 B<br>0.10 C<br>0.20 Mn<br>0.65 S<br>0.30 Ti<br>0.20 Zr                                 | active            |
| C28330*<br>Low-Lead Yellow Brass                    | 58.0                | 62.0 <sup>(4)</sup> |      | 0.09 |      |      | 31.0 | 39.0               |      | 0.35 |      |      | 0.10 Sb              | 0.10 B<br>0.10 C<br>0.20 Mn<br>0.25 S<br>1.5 Sb<br>0.10 Ti<br>0.10 Zr                       | active            |
| C28340  | 61.0 <sup>(3)</sup> | 62.0                | .17  | .25  | .30  | .40  |      | Rem <sup>(5)</sup> |      | .12  |      |      | .07 As<br>.65 Bi     | .20 Ni<br>.17 As <sup>(6)</sup><br>.75 Bi<br>.04 Cd<br>.02 Cr<br>.05 Mn<br>.05 Sb<br>.05 Si | active            |
| C28500<br>Copper-Zinc- Alloy Brass                  | 57.0                | 59.0 <sup>(7)</sup> |      | 0.25 |      |      |      | Rem                |      | 0.35 |      |      |                      |   | active            |
| C28580<br>Brass                                     | 49.0                | 52.0                |      | 0.50 |      |      |      | Rem                |      | 0.10 |      |      |                      | 0.10 Al   | inactive<br>03/92 |
| C29800<br>Copper Zinc Alloy                         | 49.0                | 52.0                |      | 0.50 |      |      |      | Rem                |      | 0.10 |      |      |                      | 0.10 Al   | inactive<br>07/74 |
| C31000<br>Copper Zinc Lead Alloy                    | 89.0                | 91.0                | 0.30 | 0.7  |      |      |      | Rem                |      | 0.10 |      |      |                      |   | inactive<br>07/74 |
| C31200  | 87.5                | 90.5 <sup>(8)</sup> | 0.7  | 1.2  |      |      |      | Rem                |      | 0.10 |      |      |                      | 0.25 Ni   | active            |
| C31400<br>Leaded Commercial Bronze                  | 87.5                | 90.5 <sup>(8)</sup> | 1.3  | 2.5  |      |      |      | Rem                |      | 0.10 |      |      |                      | 0.7 Ni  | active            |
| C31600<br>Leaded Commercial Bronze (Nickel-Bearing) | 87.5                | 90.5 <sup>(8)</sup> | 1.3  | 2.5  |      |      |      | Rem                |      | 0.10 | 0.04 | 0.10 | 0.7 Ni               | 1.2 Ni  | active            |
| C32000<br>Leaded Red Brass                          | 83.5 <sup>(8)</sup> | 86.5                | 1.5  | 2.2  |      |      |      | Rem                |      | 0.10 |      |      |                      | 0.25 Ni   | active            |

| UNS #                                  | Cu                      |                     | Pb   |      | Sn   |      | Zn   |      | Fe   |                     | P    |      | Other Named Elements |         | Status            |
|--|-------------------------|---------------------|------|------|------|------|------|------|------|---------------------|------|------|----------------------|---------|-------------------|
|  | Min%                    | Max%                | Min% | Max% | Min% | Max% | Min% | Max% | Min% | Max%                | Min% | Max% | Min%                 | Max%    |                   |
| C32500<br>Copper Zinc Lead Alloy       | 72.0                    | 74.5                | 2.5  | 3.0  |      |      |      | Rem  |      | 0.10                |      |      |                      |         | inactive<br>07/74 |
| C32510<br>Leaded Brass                 | 69.0                    | 72.0                | 0.30 | 0.7  |      |      |      | Rem  |      |                     |      |      | 0.02 As              | 0.06 As | inactive<br>03/92 |
| C33000<br>Low Leaded Brass (Tube)      | 65.0                    | 68.0 <sup>(8)</sup> | 0.25 | 0.7  |      |      |      | Rem  |      | 0.07                |      |      |                      |         | active            |
| C33100<br>Leaded Brass                 | 65.0                    | 68.0                | 0.8  | 1.5  |      |      |      | Rem  |      | 0.06                |      |      |                      |         | inactive<br>03/92 |
| C33200<br>High Leaded Brass (Tube)     | 65.0                    | 68.0 <sup>(8)</sup> | 1.5  | 2.5  |      |      |      | Rem  |      | 0.07                |      |      |                      |         | active            |
| C33500<br>Low-Leaded Brass             | 62.0 <sup>(8)</sup>     | 65.0                | 0.25 | 0.7  |      |      |      | Rem  |      | 0.15 <sup>(9)</sup> |      |      |                      |         | active            |
| C33530<br>Leaded Brass                 | 62.5                    | 66.5                | 0.30 | 0.8  |      |      |      | Rem  |      | 0.10                |      |      | 0.02 As              | 0.06 As | inactive<br>03/92 |
| C34000<br>Medium Leaded Brass, 64-1/2% | 62.0 <sup>(8)</sup>     | 65.0                | 0.8  | 1.5  |      |      |      | Rem  |      | 0.15 <sup>(9)</sup> |      |      |                      |         | active            |
| C34200<br>High Leaded Brass, 64-1/2%   | 62.0 <sup>(8)</sup>     | 65.0                | 1.5  | 2.5  |      |      |      | Rem  |      | 0.15 <sup>(9)</sup> |      |      |                      |         | active            |
| C34400<br>Leaded Brass                 | 62.0                    | 66.0                | 0.50 | 1.0  |      |      |      | Rem  |      | 0.10                |      |      |                      |         | inactive<br>02/81 |
| C34500                                 | 62.0 <sup>(8)</sup>     | 65.0                | 1.5  | 2.5  |      |      |      | Rem  |      | 0.15                |      |      |                      |         | active            |
| C34700<br>Leaded Brass                 | 62.5                    | 64.5                | 1.0  | 1.8  |      |      |      | Rem  |      | 0.10                |      |      |                      |         | inactive<br>02/81 |
| C34800<br>Leaded Brass                 | 61.5                    | 63.5                | 0.40 | 0.8  |      |      |      | Rem  |      | 0.10                |      |      |                      |         | inactive<br>02/81 |
| C34900<br>Leaded Brass                 | 61.0                    | 64.0                | 0.10 | 0.50 |      |      |      | Rem  |      | 0.10                |      |      |                      |         | inactive<br>02/82 |
| C35000<br>Medium Leaded Brass, 62%     | 60.0 <sup>(8)(10)</sup> | 63.0                | 0.8  | 2.0  |      |      |      | Rem  |      | 0.15 <sup>(9)</sup> |      |      |                      |         | active            |
| C35300<br>High Leaded Brass, 62%       | 60.0 <sup>(3)(10)</sup> | 63.0                | 1.5  | 2.5  |      |      |      | Rem  |      | 0.15 <sup>(9)</sup> |      |      |                      |         | active            |

| UNS #                                     | Cu                  |                     | Pb   |                     | Sn   |      | Zn   |      | Fe   |                     | P    |      | Other Named Elements |         | Status            |
|---|---------------------|---------------------|------|---------------------|------|------|------|------|------|---------------------|------|------|----------------------|---------|-------------------|
|   | Min%                | Max%                | Min% | Max%                | Min% | Max% | Min% | Max% | Min% | Max%                | Min% | Max% | Min%                 | Max%    |                   |
| C35330<br>DZR Brass                       | 59.5                | 64.0 <sup>(3)</sup> | 1.5  | 3.5 <sup>(11)</sup> |      |      |      | Rem  |      |                     |      |      | 0.02 As              | 0.25 As | active            |
| C35340<br>Leaded Brass                    | 60.0                | 63.0                | 1.5  | 2.5                 |      |      |      | Rem  | 0.10 | 0.30                |      |      |                      |         | inactive<br>03/92 |
| C35350<br>Leaded Brass                    | 61.0 <sup>(3)</sup> | 63.0                | 2.0  | 4.5                 |      | 0.6  |      | Rem  |      | 0.4                 | 0.05 | 0.2  |                      | 0.3 Ni  | active            |
| C35600<br>Extra High Leaded Brass         | 60.0 <sup>(3)</sup> | 63.0                | 2.0  | 3.0                 |      |      |      | Rem  |      | 0.15 <sup>(9)</sup> |      |      |                      |         | active            |
| C36000<br>Free-Cutting Brass              | 60.0                | 63.0 <sup>(3)</sup> | 2.5  | 3.0                 |      |      |      | Rem  |      | 0.35                |      |      |                      |         | active            |
| C36010<br>Leaded Brass Free-Cutting Brass | 60.0                | 63.0 <sup>(3)</sup> | 3.1  | 3.7                 |      |      |      | Rem  |      | 0.35                |      |      |                      |         | active            |
| C36200<br>Leaded Brass                    | 60.0                | 63.0                | 3.5  | 4.5                 |      |      |      | Rem  |      | 0.15                |      |      |                      |         | inactive<br>03/92 |
| C36300<br>Copper-Zinc-Lead Alloy          | 61.0                | 63.0 <sup>(3)</sup> | 0.25 | 0.7                 |      |      |      | Rem  |      | 0.15                | 0.04 | 0.15 |                      |         | active            |
| C36500<br>Leaded Muntz Metal, Uninhibited | 58.0 <sup>(8)</sup> | 61.0                | 0.25 | 0.7                 |      | 0.25 |      | Rem  |      | 0.15                |      |      |                      |         | active            |
| C36600<br>Leaded Muntz Metal, Arsinical   | 58.0                | 61.0                | 0.25 | 0.7                 |      | 0.25 |      | Rem  |      | 0.15                |      |      | 0.02 As              | 0.06 As | inactive<br>03/92 |
| C36700<br>Leaded Muntz Metal, Antimonial  | 58.0                | 61.0                | 0.25 | 0.7                 |      | 0.25 |      | Rem  |      | 0.15                |      |      | 0.02 Sb              | 0.10 Sb | inactive<br>03/92 |
| C36800<br>Leaded Brass                    | 58.0                | 61.0                | 0.25 | 0.7                 |      | 0.25 |      | Rem  |      | 0.15                | 0.02 | 0.10 |                      |         | inactive<br>03/92 |
| C37000<br>Free-Cutting Muntz Metal        | 59.0                | 62.0 <sup>(8)</sup> | 0.8  | 1.5                 |      |      |      | Rem  |      | 0.15                |      |      |                      |         | active            |
| C37100                                    | 58.0                | 62.0 <sup>(8)</sup> | 0.6  | 1.2                 |      |      |      | Rem  |      | 0.15                |      |      |                      |         | active            |
| C37700<br>Forging Brass                   | 58.0 <sup>(3)</sup> | 61.0                | 1.5  | 2.5                 |      |      |      | Rem  |      | 0.30                |      |      |                      |         | active            |
| C37710                                    | 56.5 <sup>(3)</sup> | 60.0                | 1.0  | 3.0                 |      |      |      | Rem  |      | 0.30                |      |      |                      |         | active            |

| UNS #                                      | Cu                  |                     | Pb   |      | Sn   |      | Zn   |      | Fe   |      | P     |      | Other Named Elements   |         | Status            |
|--|---------------------|---------------------|------|------|------|------|------|------|------|------|-------|------|------------------------|---------|-------------------|
|  | Min%                | Max%                | Min% | Max% | Min% | Max% | Min% | Max% | Min% | Max% | Min%  | Max% | Min%                   | Max%    |                   |
| C37800<br>Leaded Brass                     | 56.0                | 59.0                | 1.5  | 2.5  |      |      |      | Rem  |      | 0.30 |       |      |                        |         | inactive<br>03/92 |
| C38000<br>Architectural Bronze, Low Leaded | 55.0                | 60.0 <sup>(3)</sup> | 1.5  | 2.5  |      | 0.30 |      | Rem  |      | 0.35 |       |      |                        | 0.50 Al | active            |
| C38010<br>Leaded Brass                     | 55.0                | 60.0                | 1.5  | 3.0  |      |      |      | Rem  |      | 0.30 |       |      | 0.10 Al                | 0.6 Al  | inactive<br>03/92 |
| C38500<br>Architectural Bronze             | 55.0 <sup>(3)</sup> | 59.0                | 2.5  | 3.5  |      |      |      | Rem  |      | 0.35 |       |      |                        |         | active            |
| C38510<br>Leaded Brass                     | 56.0                | 60.0                | 2.5  | 4.5  |      |      |      | Rem  |      |      |       |      |                        |         | inactive<br>03/92 |
| C38590<br>Leaded Brass                     | 56.5                | 60.0                | 2.0  | 3.5  |      |      |      | Rem  |      | 0.35 |       |      |                        |         | inactive<br>03/92 |
| C38600<br>Leaded Brass                     | 56.0                | 59.0                | 2.5  | 3.5  |      |      |      | Rem  |      | 0.35 |       |      |                        | 0.02 Sb | inactive<br>02/82 |
| C40400*                                    |                     | Rem <sup>(2)</sup>  |      |      | 0.35 | 0.7  | 2.0  | 3.0  |      |      |       |      |                        |         | active            |
| C40410*<br>Copper-Zinc-Tin Alloy           | 95.0                | 99.0 <sup>(2)</sup> |      | 0.05 | 0.1  | 0.40 |      | Rem  |      | 0.05 |       |      |                        |         | active            |
| C40500*<br>Penny Bronze                    | 94.0 <sup>(2)</sup> | 96.0                |      | 0.05 | 0.7  | 1.3  |      | Rem  |      | 0.05 |       |      |                        |         | active            |
| C40800*<br>Silicon Brass                   | 94.0                | 96.0                |      | 0.05 | 1.8  | 2.2  |      | Rem  |      | 0.05 |       |      |                        |         | inactive<br>03/92 |
| C40810*                                    | 94.5 <sup>(2)</sup> | 96.5                |      | 0.05 | 1.8  | 2.2  |      | Rem  | 0.08 | 0.12 | 0.028 | 0.04 | 0.11 Ni                | 0.20 Ni | active            |
| C40820*                                    | 94.0 <sup>(3)</sup> |                     |      | 0.02 | 1.0  | 2.5  | 0.20 | 2.5  |      |      |       | 0.05 | 0.10 Ni                | 0.50 Ni | active            |
| C40850*                                    | 94.5 <sup>(2)</sup> | 96.5                |      | 0.05 | 2.6  | 4.0  |      | Rem  | 0.05 | 0.20 | 0.01  | 0.20 | 0.05 Ni                | 0.20 Ni | active            |
| C40860*                                    | 94.0 <sup>(2)</sup> | 96.0                |      | 0.05 | 1.7  | 2.3  |      | Rem  | 0.01 | 0.05 | 0.02  | 0.04 | 0.05 Ni                | 0.20 Ni | active            |
| C40900<br>Copper Zinc Tin Alloy            | 92.0                | 94.0                |      | 0.05 | 0.50 | 0.8  |      | Rem  |      | 0.05 |       |      |                        |         | inactive<br>07/74 |
| C40950*                                    | 91.5 <sup>(2)</sup> | 94.5                |      | .05  | .30  | .8   |      | Rem  |      | .03  | .01   | .08  | .30 Ni <sup>(12)</sup> | .8 Ni   | active            |
| C41000*                                    | 91.0 <sup>(2)</sup> | 93.0                |      | 0.05 | 2.0  | 2.8  |      | Rem  |      | 0.05 |       |      |                        |         | active            |

| UNS #                            | Cu                  |                         | Pb   |      | Sn   |      | Zn   |      | Fe   |       | P     |       | Other Named Elements |  | Status            |
|----------------------------------|---------------------|-------------------------|------|------|------|------|------|------|------|-------|-------|-------|----------------------|--|-------------------|
|                                  | Min%                | Max%                    | Min% | Max% | Min% | Max% | Min% | Max% | Min% | Max%  | Min%  | Max%  | Min%                 | Max%   |                   |
| C41100*<br>Tin Brass             | 89.0                | 92.0 <sup>(2)</sup>     |      | 0.09 | 0.30 | 0.7  |      | Rem  |      | 0.05  |       |       |                      |  | active            |
| C41110*<br>Copper Zinc Tin Alloy | 90.0                | 94.0 <sup>(2)</sup>     |      | 0.05 | 0.10 | 0.50 |      | Rem  |      | 0.05  |       |       |                      |  | active            |
| C41120*                          | 89.0                | 92.0 <sup>(2)</sup>     |      | 0.05 | 0.30 | 0.7  |      | Rem  | 0.05 | 0.20  | 0.01  | 0.35  | 0.05 Ni              | 0.20 Ni  | active            |
| C41125*                          | 86.5 <sup>(3)</sup> | 90.5                    |      | .05  | .50  | .9   |      | Rem  |      | .03   |       | .06   |                      | .8 Ni  | active            |
| C41300*<br>Tin Brass             | 89.0 <sup>(2)</sup> | 93.0                    |      | 0.09 | 0.7  | 1.3  |      | Rem  |      | 0.05  |       |       |                      |  | active            |
| C41500*<br>Tin Brass             | 89.0                | 93.0 <sup>(2)</sup>     |      | 0.09 | 1.5  | 2.2  |      | Rem  |      | 0.05  |       |       |                      |  | active            |
| C41900<br>Tin Brass              | 89.0                | 92.0                    |      | 0.10 | 4.5  | 5.5  |      | Rem  |      | 0.05  |       |       |                      |  | inactive<br>07/74 |
| C42000*                          | 88.0 <sup>(2)</sup> | 91.0                    |      |      | 1.5  | 2.0  |      | Rem  |      |       |       | 0.25  |                      |  | active            |
| C42100*<br>Tin Brass             | 87.5                | 89.0                    |      | 0.05 | 2.2  | 3.0  |      | Rem  |      | 0.05  |       | 0.35  | 0.15 Mn              | 0.35 Mn  | inactive<br>03/92 |
| C42200*                          | 86.0 <sup>(2)</sup> | 89.0                    |      | 0.05 | 0.8  | 1.4  |      | Rem  |      | 0.05  |       | 0.35  |                      |  | active            |
| C42210*<br>Tin Brass             | 86.0                | 89.0 <sup>(2)(13)</sup> |      | 0.01 | 1.1  | 1.6  |      | Rem  |      | 0.035 | 0.001 | 0.010 |                      | 0.5 Ni <sup>(14)</sup><br>0.005 Te <sup>(15)</sup><br>0.005 Se <sup>(15)</sup> | active            |
| C42220*                          | 88.0 <sup>(2)</sup> | 91.0                    |      | 0.05 | 0.7  | 1.4  |      | Rem  | 0.05 | 0.20  | 0.02  | 0.05  | 0.05 Ni              | 0.20 Ni  | active            |
| C42230<br>BW33520                | 87.0 <sup>(3)</sup> | 91.0                    |      | 0.01 | 0.40 | 1.5  |      | Rem  |      | 0.05  |       |       | 0.30 Co<br>0.05 Si   | 1.5 Co<br>0.05 Mn<br>0.30 Si   | active            |
| C42500*                          | 87.0                | 90.0 <sup>(2)</sup>     |      | 0.05 | 1.5  | 3.0  |      | Rem  |      | 0.05  |       | 0.35  |                      |  | active            |
| C42510                           |                     |                         |      |      |      |      |      |      |      |       |       |       |                      |  | inactive<br>12/98 |
| C42520*                          | 88.0 <sup>(2)</sup> | 91.0                    |      | 0.05 | 1.5  | 3.0  |      | Rem  | 0.05 | 0.20  | 0.01  | 0.20  | 0.05 Ni              | 0.20 Ni  | active            |
| C42600*                          | 87.0                | 90.0 <sup>(13)(2)</sup> |      | 0.05 | 2.5  | 4.0  |      | Rem  | 0.05 | 0.20  | 0.01  | 0.20  | 0.05 Ni              | 0.20 Ni <sup>(12)</sup>  | active            |
| C43000*<br>Tin Brass             | 84.0                | 87.0 <sup>(2)</sup>     |      | 0.09 | 1.7  | 2.7  |      | Rem  |      | 0.05  |       |       |                      |  | active            |
| C43200<br>Tin Brass              | 85.0                | 88.0                    |      | 0.35 | 0.40 | 0.6  |      | Rem  |      | 0.05  |       | 0.35  |                      |  | inactive<br>03/92 |

| UNS #                                     | Cu                  |                         | Pb   |      | Sn                  |                     | Zn   |      | Fe   |      | P     |      | Other Named Elements            |  | Status            |
|---|---------------------|-------------------------|------|------|---------------------|---------------------|------|------|------|------|-------|------|---------------------------------|--|-------------------|
|   | Min%                | Max%                    | Min% | Max% | Min%                | Max%                | Min% | Max% | Min% | Max% | Min%  | Max% | Min%                            | Max%   |                   |
| C43400*                                   | 84.0                | 87.0 <sup>(2)</sup>     |      | 0.05 | 0.40                | 1.0                 |      | Rem  |      | 0.05 |       |      |                                 |  | active            |
| C43500*<br>Tin Brass                      | 79.0                | 83.0 <sup>(2)</sup>     |      | 0.09 | 0.6                 | 1.2                 |      | Rem  |      | 0.05 |       |      |                                 |  | active            |
| C43600*                                   | 80.0 <sup>(2)</sup> | 83.0                    |      | 0.05 | 0.20                | 0.50                |      | Rem  |      | 0.05 |       |      |                                 |  | active            |
| C43800*<br>Copper Zinc Tin Alloy          | 79.0                | 82.0                    |      | 0.05 | 1.0                 | 1.5                 |      | Rem  |      | 0.05 |       |      |                                 |  | inactive<br>07/74 |
| C44200*<br>Copper Zinc Tin Alloy          | 70.0                | 73.0                    |      | 0.07 | 0.8                 | 1.2                 |      | Rem  |      | 0.06 |       |      |                                 |  | inactive<br>05/71 |
| C44250*                                   | 73.0 <sup>(8)</sup> | 76.0                    |      | 0.07 | 0.50                | 1.5                 |      | Rem  |      | 0.20 |       | 0.10 |                                 | 0.20 Ni  | active            |
| C44300*<br>Admiralty, Arsenical           | 70.0                | 73.0 <sup>(8)</sup>     |      | 0.07 | 0.8                 | 1.2 <sup>(16)</sup> |      | Rem  |      | 0.06 |       |      | 0.02 As                         | 0.06 As  | active            |
| C44400*<br>Admiralty, Antimonial          | 70.0                | 73.0 <sup>(8)</sup>     |      | 0.07 | 0.8 <sup>(16)</sup> | 1.2                 |      | Rem  |      | 0.06 |       |      | 0.02 Sb                         | 0.10 Sb  | active            |
| C44500*<br>Admiralty, Phosphorized        | 70.0 <sup>(8)</sup> | 73.0                    |      | 0.07 | 0.8                 | 1.2 <sup>(16)</sup> |      | Rem  |      | 0.06 | 0.02  | 0.10 |                                 |  | active            |
| C44710                                    | 65.5 <sup>(2)</sup> | 71.5                    |      | 0.05 | 0.20                | 0.8                 |      | Rem  |      | 0.03 | 0.005 | 0.05 | 1.5 Ni                          | 2.5 Ni   | active            |
| C44730                                    |                     | Rem <sup>(3)</sup>      |      | .05  | .50                 | 1.5                 | 27.0 | 31.0 |      | .6   |       | .05  | .8 Ni <sup>(12)</sup><br>.10 Si | 2.5 Ni<br>.7 Cr<br>.40 Mg<br>.40 Mn<br>.6 Si<br>.40 Zr | active            |
| C44750*<br>Tin Brass                      |                     | Rem <sup>(8)</sup>      |      | 0.05 | 0.30                | 3.0                 | 27.0 | 31.5 | 0.10 | 1.5  |       |      |                                 |  | active            |
| C45450*<br>Tin Brass                      | 65.0                | 66.0                    |      |      | 0.10                | 0.30                |      | Rem  |      |      | 0.10  | 0.30 | 0.20 Al                         | 0.40 Al  | inactive<br>03/92 |
| C45470*<br>Copper-Zinc-Tin Aluminum Alloy | 64.0                | 69.0 <sup>(3)</sup>     |      | .09  | 0.6                 | 0.9                 |      | Rem  |      |      |       |      | 0.30 Al                         | 0.8 Al   | active            |
| C46200<br>Naval Brass, 63-1/2%            | 62.0                | 65.0 <sup>(8)</sup>     |      | 0.20 | 0.50                | 1.0                 |      | Rem  |      | 0.10 |       |      |                                 |  | active            |
| C46210*<br>Tin Brass                      | 61.0                | 64.0                    |      | 0.05 |                     | 1.0                 |      | Rem  |      |      |       |      |                                 | 0.03 Al<br>0.50 Si                                     | inactive<br>03/92 |
| C46250*<br>HONLUX 01                      | 62.0                | 65.0 <sup>(17)(3)</sup> |      | .09  | .50                 | 1.0                 |      | 37.0 |      | .10  | .05   | .15  | .05 Mg                          | .20 Mg   | active            |



| UNS #  | Cu                  |                     | Pb   |      | Sn   |      | Zn   |      | Fe   |      | P    |      | Other Named Elements    |                                  | Status            |
|--|---------------------|---------------------|------|------|------|------|------|------|------|------|------|------|-------------------------|----------------------------------|-------------------|
|  | Min%                | Max%                | Min% | Max% | Min% | Max% | Min% | Max% | Min% | Max% | Min% | Max% | Min%                    | Max%                             |                   |
| C46400<br>Naval Brass, Uninhibited               | 59.0 <sup>(8)</sup> | 62.0                |      | 0.20 | 0.50 | 1.0  |      | Rem  |      | 0.10 |      |      |                         |                                  | active            |
| C46420<br>Tin Brass                              | 61.0                | 63.5                |      | 0.20 | 1.0  | 1.4  |      | Rem  |      | 0.20 |      |      |                         |                                  | inactive<br>03/92 |
| C46500<br>Naval Brass, Arsenical                 | 59.0 <sup>(8)</sup> | 62.0                |      | 0.20 | 0.50 | 1.0  |      | Rem  |      | 0.10 |      |      | 0.02 As                 | 0.06 As                          | active            |
| C46600<br>Tin Brass                              | 59.0                | 62.0                |      | 0.20 | 0.50 | 1.0  |      | Rem  |      | 0.10 |      |      | 0.02 Sb                 | 0.10 Sb                          | inactive<br>03/92 |
| C46700<br>Tin Brass                              | 59.0                | 62.0                |      | 0.20 | 0.50 | 1.0  |      | Rem  |      | 0.10 | 0.02 | 0.10 |                         |                                  | inactive<br>03/92 |
| C46750   | 59.2 <sup>(3)</sup> | 62.5                |      | .25  | 1.00 | 1.80 |      | Rem  |      | .10  | .05  | .15  | .05 Sb                  | .50 Ni <sup>(12)</sup><br>.15 Sb | active            |
| C47000<br>Naval Brass Welding and Brazing<br>Rod | 57.0 <sup>(8)</sup> | 61.0                |      | 0.05 | 0.25 | 1.0  |      | Rem  |      |      |      |      |                         | 0.01 Al                          | active            |
| C47200<br>Copper Zinc Tin Alloy                  | 49.0                | 52.0                |      | 0.50 | 3.0  | 4.0  |      | Rem  |      | 0.10 |      |      |                         |                                  | inactive<br>07/74 |
| C47600<br>Tin Brass                              | 86.0                | 88.0                | 1.8  | 2.2  | 1.8  | 2.2  |      | Rem  |      | 0.05 | 0.03 | 0.07 | 0.05 Mn                 | 0.15 Mn                          | inactive<br>03/92 |
| C47940   | 63.0 <sup>(8)</sup> | 66.0                | 1.0  | 2.0  | 1.2  | 2.0  |      | Rem  | 0.10 | 1.0  |      |      | 0.10 Ni <sup>(12)</sup> | 0.50 Ni                          | active            |
| C48200<br>Naval Brass, Medium Leaded             | 59.0 <sup>(8)</sup> | 62.0                | 0.40 | 1.0  | 0.50 | 1.0  |      | Rem  |      | 0.10 |      |      |                         |                                  | active            |
| C48500<br>Naval Brass, High Leaded               | 59.0 <sup>(8)</sup> | 62.0                | 1.3  | 2.2  | 0.50 | 1.0  |      | Rem  |      | 0.10 |      |      |                         |                                  | active            |
| C48510<br>Tin Brass                              | 59.0                | 62.0                | 1.0  | 2.5  | 0.7  | 1.5  |      | Rem  |      |      |      |      | 0.02 As                 | 0.25 As                          | inactive<br>02/81 |
| C48600<br>DZR Brass                              | 59.0                | 62.0 <sup>(8)</sup> | 1.0  | 2.5  | 0.30 | 1.5  |      | Rem  |      |      |      |      | 0.02 As                 | 0.25 As                          | active            |
| C48640   | 59.0                | 62.0 <sup>(3)</sup> | 1.0  | 3.0  | 0.50 | 2.0  |      | Rem  |      | 0.40 | 0.05 | 0.25 |                         | 0.3 Ni                           | active            |
| C48650<br>Replaced by C48600                     |                     |                     |      |      |      |      |      |      |      |      |      |      |                         |                                  | inactive<br>02/81 |

| UNS #  | Cu                      |                         | Pb   |      | Sn   |      | Zn   |      | Fe   |      | P    |      | Other Named Elements |  | Status            |
|--|-------------------------|-------------------------|------|------|------|------|------|------|------|------|------|------|----------------------|--|-------------------|
|  | Min%                    | Max%                    | Min% | Max% | Min% | Max% | Min% | Max% | Min% | Max% | Min% | Max% | Min%                 | Max%   |                   |
| C49080<br>Tin Brass                                | 49.0                    | 52.0                    |      | 0.50 | 3.0  | 4.0  |      | Rem  |      |      |      |      |                      | 0.10 Al  | inactive<br>03/92 |
| C49100   | 85.5 <sup>(3)</sup>     | 87.5                    |      | .09  |      | .30  |      | 14.5 |      | .30  |      | .10  | .30 Te               | .30 Ni<br>.9 Te  | active            |
| C49250*<br>Copper-Zinc-Bismuth Copper-Zinc-Bismuth | 58.0                    | 61.0 <sup>(3)</sup>     |      | 0.09 |      | 0.30 |      | Rem  |      | 0.50 |      |      | 1.8 Bi               | 2.4 Bi<br>0.001 Cd   | active            |
| C49255<br>Copper-Zinc-Bismuth                      | 58.0 <sup>(3)</sup>     | 60.0                    |      | 0.09 |      | 0.50 |      | Rem  |      | 0.10 |      | 0.10 | 1.7 Bi<br>0.02 Se    | 0.3 Ni<br>2.9 Bi<br>0.0075 Cd<br>0.10 Si<br>0.07 Se            | active            |
| C49260*<br>GEM Brass                               | 58.0                    | 63.0 <sup>(3)</sup>     |      | 0.09 |      | 0.50 |      | Rem  |      | 0.50 | 0.05 | 0.15 | 0.50 Bi              | 1.8 Bi<br>0.001 Cd<br>0.10 Si                                  | active            |
| C49265<br>Low Leaded GEM Brass                     | 58.0 <sup>(13)(3)</sup> | 62.0                    | 0.09 | 0.25 |      | 0.50 |      | Rem  |      | 0.30 | 0.05 | 0.12 | 0.50 Bi              | 1.3 Bi<br>0.001 Cd<br>0.10 Si                                  | active            |
| C49300*<br>Lead-Free Bismuth Alloy Lead-Free       | 58.0 <sup>(3)</sup>     | 62.0                    |      | 0.09 | 1.0  | 1.8  |      | Rem  |      | 0.10 |      |      | 0.5 Bi               | 0.3 Ni<br>2.5 Bi<br>0.0075 Cd<br>0.50 Sb<br>0.10 Si<br>0.20 Se | active            |
| C49340*<br>GEM Brass                               | 60.0                    | 63.0 <sup>(3)(13)</sup> |      | 0.09 | 0.50 | 1.5  |      | Rem  |      | 0.12 | 0.05 | 0.15 | 0.50 Bi              | 2.2 Bi<br>0.001 Cd<br>0.10 Si                                  | active            |
| C49345<br>Low Leaded GEM Brass                     | 60.0                    | 64.0 <sup>(3)(13)</sup> | 0.09 | 0.25 | 0.50 | 1.5  |      | Rem  |      | 0.30 | 0.05 | 0.12 | 0.50 Bi              | 1.3 Bi<br>0.001 Cd<br>0.10 Si                                  | active            |
| C49350*<br>Bismuth Brass Alloy                     | 61.0 <sup>(3)</sup>     | 63.0                    |      | 0.09 | 1.5  | 3.0  |      | Rem  |      | 0.12 | 0.04 | 0.15 | 0.50 Bi<br>0.02 Sb   | 2.5 Bi<br>0.10 Sb<br>0.30 Si                                   | active            |
| C49355*<br>Copper Zinc Bismuth Alloy               | 63.0 <sup>(3)</sup>     | 69.0                    |      | 0.09 | 0.50 | 2.0  | 27.0 | 35.0 |      | 0.10 |      |      | 0.50 Bi<br>1.0 Si    | 0.001 B<br>1.5 Bi<br>0.10 Mn<br>2.0 Si                         | active            |
| C49360*<br>Tin-Eco(bismuth)                        |                         | Rem <sup>(3)</sup>      |      | 0.09 | 1.0  | 2.0  | 19.0 | 22.0 |      |      |      |      | 0.50 Bi<br>2.0 Si    | 1.5 Bi<br>3.5 Si   | active            |

\* = are alloys registered with the U.S. EPA as Antimicrobial.

(1) = Cu + Sum of Named Elements 99.8% min.

(2) = Cu + Sum of Named Elements 99.7% min.

(3) = Cu + Sum of Named Elements 99.5% min.

(4) = Cu + Sum of Named Elements 99.3% min.

- (5) = For optimum DZR properties , Zn should not exceed 38%.
- (6) = P may be substituted for As.
- (7) = Cu + Sum of Named Elements 99.1% min.
- (8) = Cu + Sum of Named Elements 99.6% min.
- (9) = For flat products, the iron shall be 0.10% max.
- (10) = Cu, 61.0% min. for rod.
- (11) = Pb may be reduced to 1.0% by agreement.
- (12) = Ni value includes Co.
- (13) = Cu value includes Ag.
- (14) = Includes Co.
- (15) = Te + Se 0.006% max.
- (16) = For tubular products, the minimum Sn content may be 0.9%.
- (17) = Includes Lanthanum 0.01-0.08