

## BRASS AND BRONZE CASTINGS

Many foundries only run a handful of common alloys. At Warner Bros. Foundry Company our reputation is on running a wide range of aluminum and copper based alloys. If you don't see any alloy of interest, listed below, please let us know. We are happy to quote other alloys.

Only the highest quality Certified Ingot is used for the production of our Brass and Bronze casting, continue reading to learn about the properties of these alloys.

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### Bronze & Brass Alloys

| Typical Bronze & Brass Alloys |         |                            |                    |                     |                             |                    |                               |                                                    | ...                      | Suitability for being joined by: | ...       | ...                                                | ...                                             | Typical Mechanical Properties                   |                       |                     |                                 |                     |                                            |                                                |                     |                           |
|-------------------------------|---------|----------------------------|--------------------|---------------------|-----------------------------|--------------------|-------------------------------|----------------------------------------------------|--------------------------|----------------------------------|-----------|----------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-----------------------|---------------------|---------------------------------|---------------------|--------------------------------------------|------------------------------------------------|---------------------|---------------------------|
| CA#                           | Ingot # | Previous Trade Name        | Alloy Name         | Nominal Composition | ASTM                        | Federal            | Former Federal                | Military                                           | Approx. Weight, lb./in.3 | Soldering                        | Brazing   | Castability (Ranked 1-8, 1 is the best or highest) | Fluidity (Ranked 1-8, 1 is the best or highest) | Machinability Rating (Free Cutting Brass = 100) | Tensile Strength, ksi | Yield Strength, ksi | Elongation, Percentage in 2 in. | Shear Strength, ksi | Fatigue Strength (100 million cycles), ksi | Brinell Hardness (500-kg Load) *(3000-kg Load) | Shrinkage Allowance | Pattern Maker's Shrinkage |
| 836                           | 115     | Red Brass                  | Composition Bronze | 85-5-5-5            | B30, B62, B271, B505, B584  | QQ-C-525, QQ-C-390 | QQ-B-1005, QQ-C-390, QQ-L-225 | MIL-C-11866, MIL-C-15345, MIL-C-22087, MIL-C-22229 | 0.318                    | Excellent                        | Good      | 2                                                  | 6                                               | 84                                              | 37                    | 17                  | 30                              | ...                 | 11                                         | 60                                             | 5.70%               | 5/32 to 3/16 in./ft       |
| 844                           | 123     | Semi-Red Brass             | Valve Composition  | 81-3-7-9            | B30, B271, B505, B584       | QQ-C-525, QQ-C-390 | QQ-B-1005, QQ-C-390, QQ-L-225 | ...                                                | 0.314                    | Excellent                        | Good      | 2                                                  | 6                                               | 90                                              | 34                    | 15                  | 26                              | ...                 | ...                                        | 55                                             | 2%                  | 3/16 in./ft               |
| 862                           | 423     | High Strength Yellow Brass | Manganese Bronze   | 90,000 Tensile      | B30, B22, B271, B505, B584  | QQ-C-523, QQ-C-390 | QQ-B-726, QQ-C-390            | MIL-C-11866, MIL-C-22229                           | 0.288                    | Poor                             | Poor      | 6                                                  | 2                                               | 30                                              | 95                    | 48                  | 20                              | ...                 | ...                                        | 180                                            | 2%                  | ...                       |
| 863                           | 424     | High Strength Yellow Brass | Manganese Bronze   | 110,000 Tensile     | B30, B22, B271, B505, B584  | QQ-C-523, QQ-C-390 | QQ-B-726, QQ-C-390            | MIL-C-11866, MIL-C-15345, MIL-C-22087, MIL-C-22229 | 0.283                    | Poor                             | Poor      | 6                                                  | 2                                               | 8                                               | 119                   | 83                  | 18                              | ...                 | 25                                         | 225                                            | 2.30%               | ...                       |
| 865                           | 421     | High Strength Yellow Brass | Manganese Bronze   | 65,000 Tensile      | B30, B176, B271, B505, B584 | QQ-C-523, QQ-C-390 | QQ-B-726, QQ-C-390            | MIL-C-15345, MIL-C-22087, MIL-C-22229              | 0.301                    | Fair                             | Fair      | 6                                                  | 2                                               | 26                                              | 71                    | 28                  | 30                              | ...                 | 20                                         | 100                                            | 1.90%               | 1.65% to 2.15%            |
| 903                           | 225     | Navy G                     | Tin Bronze         | 88-8-0-4            | B584, B271, B505, B30       | QQ-C-390, QQ-C-525 | QQ-B-1005, QQ-C-390, QQ-L-225 | MIL-C-11866, MIL-C-15345, MIL-C-22087, MIL-C-22229 | 0.318                    | Excellent                        | Excellent | 3                                                  | 6                                               | 30                                              | 45                    | 21                  | 30                              | ...                 | ...                                        | 70                                             | 1.5% to 1.8%        | ...                       |

|     |      |                |                        |              |                            |                    |                               |                                                    |       |           |           |   |   |    |    |    |    |     |     |      |       |             |
|-----|------|----------------|------------------------|--------------|----------------------------|--------------------|-------------------------------|----------------------------------------------------|-------|-----------|-----------|---|---|----|----|----|----|-----|-----|------|-------|-------------|
| 922 | 245  | Navy M         | Tin Bronze             | 86-6-1.5-4.5 | B584, B61, B271, B505, B30 | QQ-C-390, QQ-C-525 | QQ-B-1005, QQ-C-390, QQ-L-225 | MIL-B-16541, MIL-B-15345                           | 0.312 | Excellent | Excellent | 3 | 6 | 42 | 40 | 20 | 30 | ... | 11  | 65   | 1.50% | 3/16 in./ft |
| 923 | 230  | Leaded Navy G  | Tin Bronze             | 87-8-1-4     | B584, B271, B505, B30      | QQ-C-390, QQ-C-525 | QQ-B-1005, QQ-C-390, QQ-L-225 | MIL-C-15345                                        | 0.317 | Excellent | Good      | 3 | 6 | 42 | 40 | 20 | 25 | ... | ... | 70   | ...   | 3/16 in./ft |
| 932 | 315  | Bearing Bronze | High Leaded Tin Bronze | 83-7-7-3     | B584, B271, B505, B30      | QQ-C-390, QQ-C-525 | QQ-B-1005, QQ-C-390, QQ-L-225 | MIL-C-15345                                        | 0.322 | Excellent | Good      | 1 | 6 | 70 | 35 | 18 | 20 | ... | 16  | 65   | ...   | 7/32 in./ft |
| 952 | 415A | Ampco A1       | Aluminum Bronze        | 88-3-9       | B30, B148, B271, B505      | QQ-B-675, QQ-C-390 | QQ-B-671, QQ-C-390            | MIL-C-22887, MIL-C-22229                           | 0.276 | Good      | Good      | 8 | 5 | 50 | 80 | 27 | 35 | 40  | 22  | 110* | 1.60% | 2%          |
| 954 | 415C | Ampco C3       | Aluminum Bronze        | 85-4-11      | B30, B148, B271, B505      | QQ-B-675, QQ-C-390 | QQ-B-671, QQ-C-390            | MIL-C-11866, MIL-C-15345                           | 0.269 | Good      | Good      | 8 | 5 | 60 | 85 | 35 | 18 | 47  | 28  | 175* | 1.60% | 1.60%       |
| 955 | 415  | Ampco D4       | Aluminum Bronze        | 81-4-4-11    | B30, B148, B271, B505      | QQ-B-675, QQ-C-390 | QQ-B-671, QQ-C-390            | MIL-C-11866, MIL-C-15345, MIL-C-22087, MIL-C-22229 | 0.272 | Good      | Good      | 8 | 5 | 50 | 95 | 50 | 5  | ... | 31  | 195  | 1.60% | 1.60%       |

## Typical Bronze & Brass Alloys

| CA# | Ingot # | Previous Trade Name        | Alloy Name             | Nominal Composition | Applications                                                                                                                                                                                |
|-----|---------|----------------------------|------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 836 | 115     | Red Brass                  | Composition Bronze     | 85-5-5-5            | Good general-purpose casting alloy. For castings requiring moderate strength, soundness, and good machinability, such as lowpressure valves, pipe fittings, general plumbing hardware       |
| 844 | 123     | Semi-Red Brass             | Valve Composition      | 81-3-7-9            | Low-pressure valves and fittings, general hardware fittings, plumbing supplies and fixtures.                                                                                                |
| 862 | 423     | High Strength Yellow Brass | Manganese Bronze       | 90,000 Tensile      | Marine castings, gears, gun mounts, bushings and bearings.                                                                                                                                  |
| 863 | 424     | High Strength Yellow Brass | Manganese Bronze       | 110,000 Tensile     | Extra-heavy duty, high strength alloy for gears, cams, bearings, screw-down nuts, bridge parts, hydraulic cylinder parts. (Not to be used in marine, ammonia or high corrosive atmospheres) |
| 865 | 421     | High Strength Yellow Brass | Manganese Bronze       | 65,000 Tensile      | Propeller hubs, blades and other parts in contact with salt and fresh water, gears, liners.                                                                                                 |
| 903 | 225     | Navy G                     | Tin Bronze             | 88-8-0-4            | Bearings, bushings, pump impellers, piston rings, valve components, seal rings, steam fittings, gears                                                                                       |
| 922 | 245     | Navy M                     | Tin Bronze             | 86-6-1.5-4.5        | Component castings of valves, flanges and fittings, oil pumps, gears, bushings, bearings                                                                                                    |
| 923 | 230     | Leaded Navy G              | Tin Bronze             | 87-8-1-4            | Strong general-utility structural bronze for use under severe conditions; valves expansion joints, high pressure pipe fittings, steam pressure casting                                      |
| 932 | 315     | Bearing Bronze             | High Leaded Tin Bronze | 83-7-7-3            | General-utility bearings and bushings                                                                                                                                                       |
| 952 | 415A    | Ampco A1                   | Aluminum Bronze        | 88-3-9              | Acid-resisting pumps, bearings, bushings, gears, valve seats, guides, plungers, pump rods, nonsparking hardware                                                                             |
| 954 | 415C    | Ampco C3                   | Aluminum Bronze        | 85-4-11             | Pump impellers, bearings, gears, worms, bushings, valve seats and guides, rolling mill slippers, slides, nonsparking hardware                                                               |

|     |     |          |                 |           |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----|-----|----------|-----------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 955 | 415 | Ampco D4 | Aluminum Bronze | 81-4-4-11 | A heavy duty, dense, high-strength alloy, with hardness equal to that of manganese bronze, and excellent resistance to corrosion and fatigue. Has good wearing qualities for elevated temperature uses. For gun slides and mountings, for worm wheels and gears, valve seats, bearings and bushings, propeller blades and hubs, liners, and bearing plates subjected to heavy loads, and shaft sleeves in highly stressed shafting. |
|-----|-----|----------|-----------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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