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# Phosphor Bronze C

## ♦ INTRODUCTION

Aufhauser Phosphor Bronze C filler metal is used quite extensively for surfacing applications. The higher tin content, at 7.0-9.0%, gives Phos-Bronze C weld deposits greater hardness and higher tensile/yield strength than C518 (Phos-Bronze A). When gas tungsten arc welding with Phos-Bronze C, preheating is recommended.

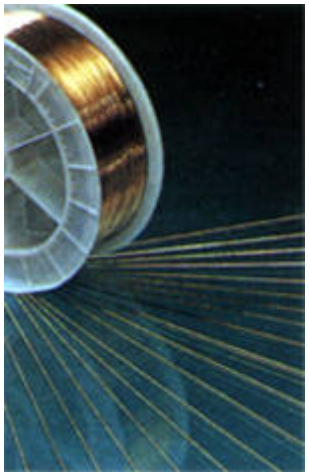
## ♦ APPLICATIONS

- Joining brass and bronze alloys and joining cast iron to carbon steel.
- It is harder and stronger than Phos Bronze A, and should be used for welding phosphor bronzes, high strength bronzes and brasses. The alloy's color matches phosphor bronze well.

## ♦ CHEMICAL COMPOSITION

| Copper | Iron | Lead | Phosphorus | Tin | Al | P | Zn |
|---|---|---|---|---|---|---|---|
| Remainder | 0.10 | .05 | 0.05-0.35 | 7.0-9.0 | 0.01 | 0.03-0.35 | 0.20 |

Note: Copper + Sum of named elements = 99.5% min.



## ♦ PHYSICAL and MECHANICAL PROPERTIES

| | |
|---|---|
| Melting Point: | 1880°F (1027°C) |
| Solidification: | 1620°F (882°C) |
| Density at 68°F: | .318 lb/in$^3$ |
| Electrical Conductivity, at 68°F: | 13% IACS |
| Thermal Conductivity, at 68°F: | 36.0 btu |
| Electrical Resistivity at 68°F: | 79.8 ohms-cmil/ft |
| Modulus of Elasticity – Tension: | 16,000 ksi |
| Modulus of Rigidity: | 6,000 ksi |
| Specific Heat Capacity: | 0.09 btu/lb/°F at 68°F |
| Specific Gravity: | 8.8 |
| Elongation, in 2 in.: | 33% |
| Rockwell B Hardness: | 85 |

## ♦ SPECIFICATIONS MEET or EXCEED

- N/A

## ♦ STANDARD SIZES AND DIAMETERS

| Size | Cast (12" spool) | Helix (12" spool) |
|---|---|---|
| 3/32 or 1/8 x 36" rod | N/A | N/A |
| .035" dia. X 30 lb. spl | 15-40" | < 1" |
| .045" dia. X 30 lb. spl | 15-40" | < 1" |
| .062" dia x 30 lb. Spl | 15-40" | < 1" |

## ♦ FABRICATION PROPERTIES

| Joining Technique | Suitability |
|---|---|
| Soldering | Excellent |
| Brazing | Excellent |
| Oxacetylene Welding | Fair |
| Gas Shielded Arc Welding | Good |
| Coated Metal Arc Welding | Fair |
| Spot Weld | Good |
| Seam Weld | Fair |
| Butt Weld | Excellent |
| Capacity for Being Cold Worked | Good |

*Copper and its alloys require a relatively high heat input with shortened welding time. Higher preheat temperatures and faster welding rates than for steel are necessary.*

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| | |
|---|---|
| Capacity for Being Hot Formed | Poor |
| Machinability | 20 |

♦ **RECOMMENDED WELDING PARAMETERS:**

***GMAW (MIG) Parameters** (DC Reverse Polarity) Electrode Positive Spray transfer

| Wire Diameter | Amps | Volts | Argon (cfh) | Wire Feed (ipm) |
|---|---|---|---|---|
| 0.030 | 130-140 | 25-26 | 25 | 340-450 |
| 0.035 | 140-160 | 26-27 | 30 | 280-400 |
| 0.045 | 165-185 | 27-28 | 30 | 200-300 |
| 1/16 | 285-335 | 28-30 | 40 | 150-210 |

***GTAW (TIG) Parameters** (DCSP) [2] Electrode negative or ACHF

| Material | 2% Thoriated[2] | Filler Wire Size | Amps (DC) | Amps (AC) | Gas Cup | Argon (cfh) |
|---|---|---|---|---|---|---|
| 1/16” | 1/16” | 1/16” | 100-120 | 100-120 | 3/8-1/2 | 15 |
| 3/32”-1/8” | 3/32” | 3/32” | 185-205 | 165-195 | 7/16-1/2 | 15 |
| 3/16” | 1/8” | 3/32”-1/8” | 300-350 | 255-300 | 7/16-1/2 | 20 |
| 1/2” | 3/16” | 1/8” | 615-640 | 440-485 | 1/2 | 25 |

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