

## Gold Coin Plunger Tip

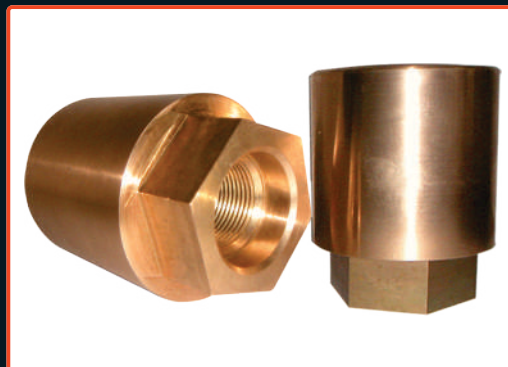
**Beryllium Copper Electron Beam Welded with Chromium Zirconium Copper**  
Old Design/ Existing Plunger Tip



Cast Iron Material

Problems:

- \* Gives lowest cost efficiency (cost of Plunger Tip/ Number of shots is highest).
- \* Lowest number of shots compared with any other material.
- \* Lowest thermal conductivity leading to longest cycle time.

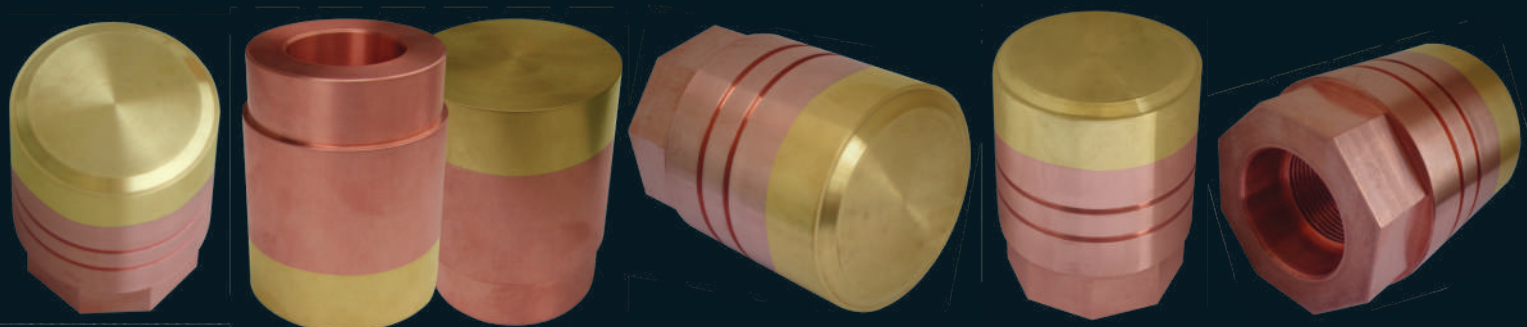


Beryllium Copper Material

Problems:

- \* Beryllium Copper is a costly material, hence cost efficiency is less (cost of Plunger Tip/ Number of shots is high)

## New Developed Plunger Tip/ Gold Coin Plunger Tip



**Beryllium Copper Electron Beam Welded with Chromium Zirconium Copper**

- \* Composite Plunger Tip is of two different materials. Beryllium Copper Electron Beam Welded (EBW) to Chromium Zirconium Copper to form a composite Plunger Tip.
- \* Chromium Zirconium Copper + 2% Beryllium Copper joined with Electron Beam Welding (EBW).
- \* Gives highest cost efficiency (cost of Plunger Tip/ Number of shots is low).
- \* Advantage of using Beryllium Copper without increasing cost much.
- \* Use of Beryllium Copper & Chromium Zirconium Copper increases thermal conductivity thereby reducing cycle time.

# Gold Coin Plunger Tip

Beryllium Copper Electron Beam Welded with Chromium Zirconium Copper

Before EB Welding



EB Welding Process

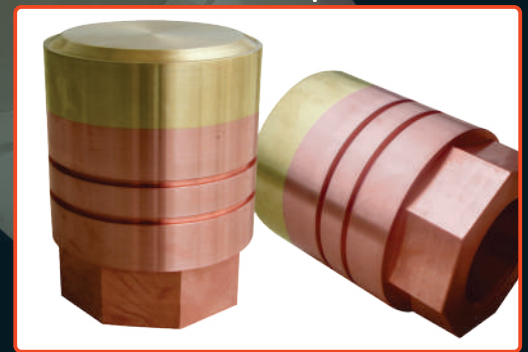


After EB Welding



## 2% Beryllium Copper + Cr Zr Cu (Gold Coin Plunger Tip)

Alloy	UNS No	Typical Composition	Hardness	Thermal Conductivity at 20°C
Mipalloy 3ZR (Cr Zr Cu)	C18150	Cr: 0.5-1.5% Zr: 0.05 - 0.25% Rest: Cu	70 - 83 HRB	355 W/m <sup>2</sup> k
Mipalloy 4 (2% Be Cu)	C17200	Be: 1.8-2.0%, Co: 0.2% min Si: 0.2%, Al: 0.2% Cu: Remaining.	36 - 44 HRC	107 W/m <sup>2</sup> k



Fully Machined Plunger Tip



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Complete Competence in Copper



ISO 9001 : 2015

ISO 14001 : 2015

OHSAS 18001 : 2007

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