

1. What is CFA(Cu-Fe Alloy) welding rod(Electrode)?

CFA is a new material of alloy with copper and iron

CFA TIG or MIG welding rod has been developed for welding purposes of copper and copper, copper and copper alloys, copper and steel, copper and stainless steel, copper alloys and steel, copper alloy and stainless steel, copper alloy and copper alloy.



**Photos of welding for :**

**Copper and Copper, Copper and Copper alloy, Copper and Steel, Copper and Stainless steel ,  
Copper alloy and Steel, Copper alloy and Stainless steel, Copper alloy and Copper alloy**

**2. Feature of CFA welding rod:**

- \* Welding is possible **without pre-heating**
- \* Melting flow is good and **welding efficiency is high** due to fast welding speed
- \* Adjustment of tensile strength for welding rod is possible by adjustment of content of copper and iron. ( 200N/mm<sup>2</sup> - 600N/mm<sup>2</sup> )
- \* Multilayer welding of thicker plates is possible and **multilayer of improvement is possible**
- \* Welding to merge many kinds of copper-based or iron-based metals are also possible



Welding of copper and steel, copper and stainless steel was impossible without the silver solder. However, By using CFA material, direct welding without silver solder has been possible. The strength of CFA is bigger and very stable, and it is possible to reflect into the design.

**3. Chemical composition and mechanical property of CFA welding rod**

Many kinds of CAF are available according to composition of copper and iron.

CFA 90 : Cu 90%. Fe:10%

CFA 95 : Cu 95%, Fe:5%

Please see following tables:

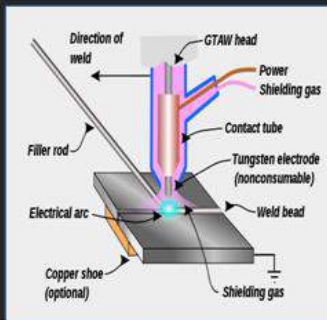
| <b>CFA Tig Wire</b>     |  |
|-------------------------|--|
| Welding Method          | Tig Welding (Tungsten Inert Gas Welding)   |
| Feature of welding      | <b>Direct welding without pre-heating</b>  |
| Applicable materials    | Copper, Copper alloy( Brass, Phosphor Bronze, Chrome Copper, BeCu, Cu-Ni )<br>Steel, Stainless steel.  |
| Range of product (Size) | Diameter: 1.0mm / 1.2mm / 1.6mm / 2.0mm / 2.4mm / 3.0mm / 4.0mm<br>Length : 1,000mm.<br>Packing unit: 5Kg/Box : 1.0mm(1,150pcs), 1.2mm(515pcs), 1.6mm(285pcs)<br>2.0mm(180pcs), 3.0mm(80pcs), 4.0mm(45pcs) |
|                         |  |
|                         |  |

**CFA 90**

|                         |                  |         |                          |     |     |    |
|-------------------------|------------------|---------|--------------------------|-----|-----|----|
| Name of commodity       |                  |         | CFA 90 -Tig Welding Wire |     |     |    |
| Elements                | Cu               | Fe      | Hg                       | Pb  | Cd  | Cr |
| Chemical Composition(%) | Min 89<br>Max 90 | 9<br>11 | -                        | -   | -   | -  |
| Mechanical property     |                  |         |                          |     |     |    |
| Tensile Strength(N/mm2) |                  |         | Spec                     | Min | 370 |    |
|                         |                  |         |                          | Max | 390 |    |
| Elongation (%)          |                  |         | Spec                     | Min | 19  |    |
|                         |                  |         |                          | Max | 22  |    |













**CFA 95**

|                         |                  |        |                  |     |     |    |
|-------------------------|------------------|--------|------------------|-----|-----|----|
| Name of commodity       |                  |        | CFA 95 -Tig Wire |     |     |    |
| Elements                | Cu               | Fe     | Hg               | Pb  | Cd  | Cr |
| Chemical Composition(%) | Min 94<br>Max 95 | 5<br>6 | -                | -   | -   | -  |
| Mechanical property     |                  |        |                  |     |     |    |
| Tensile Strength(N/mm2) |                  |        | Spec             | Min | 355 |    |
|                         |                  |        |                  | Max | 364 |    |
| Elongation (%)          |                  |        | Spec             | Min | 21  |    |
|                         |                  |        |                  | Max | 23  |    |

**TIG Welding****1 KG Packing****5 KG Packing**

Tensile strength test for each material  
(TIG DC, Welding current: 30-60A, Fe5% Wire)

Tested by :Korea institute of  
production technology

| Test material                    | Tensile strength (N/mm <sup>2</sup> ) | Pictures   |   |
|----------------------------------|---------------------------------------|--|---|
|                                  |                                       | Welded state   | After tensile strength test   |
| Copper+Copper                    | 209                                   |  |  |
| Copper +Brass                    | 230                                   |  |  |
| Copper+Phosphor Bronze           | 205                                   |  |  |
| Brass+Brass                      | 322                                   |  |  |
| Phosphor Bronze +Phosphor Bronze | 385                                   |  |  |
| Brass+Phosphor Bronze            | 316                                   |  |  |

4. Welding condition

- 1) Welding method: TIG DCSP
- 2) Arc voltage : 30-40V
- 3) Welding current :60-100A per 1mm of welding rod diameter

5.Welding condition for thick plates

| Thickness of plate(mm) | Diameter of welding rod(mm) | Current  | Flow volume of Argon gas(Liter/Min) |
|------------------------|-----------------------------|----------|-------------------------------------|
| ~1                     | 1                           | 100~200A | 4~5                                 |
| 1~2                    | 1.6                         | 150~250A | 4~5                                 |
| 2~3                    | 2~3                         | 200~300A | 5~6                                 |
| 3~4                    | 3~4                         | 250~350A | 5~6                                 |
| 4~5                    | 4~5                         | 300~400A | 5~6                                 |
| 5~6                    | 5~6                         | 350~450A | 5~6                                 |

## 6. Welding procedure

\* Welding procedure by CFA welding wire is complying with welding method for steel

\* In case welding of copper and steel, copper and stainless steel, direction of arc shall be toward copper and make molten metal flow toward steel.

\* Recommendation for welding of thin plates :

1) On starting of Tig, don't melt the basic metal for longtime and insert the welding rod at the same time when the arc is generated.

2) Make clearance between polar of Tig and basic material as 1.5-2mm.

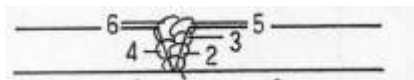
3) It will be better to use outer gas

\* Recommendation for multi-layer welding

1) 1'st plate : 100A per 1mm diameter of welding rod

2) 2'nd plate : 80A per 1mm diameter of welding rod

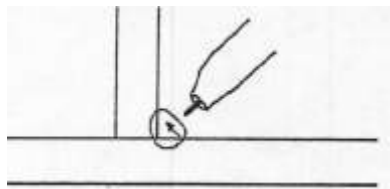
3) 3'rd plate : 70A per 1mm diameter of welding rod



Steel or  
Stainless steel      1      Copper

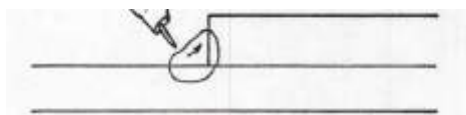
\* In case multi-layer welding, promotional welding with copper should be done firstly.

Steel or Stainless Steel



Copper

Steel or stainless steel



Copper

## 7. Application of CFA welding rod

### Heat Exchanger

#### 열교환기류



### Piping & Plumbing

#### 배관부속류



Repairing of screw

스크류 보수



Parts for machinery

기계부품

