

1. What is CFA ?

New material, CFA is an Alloy of Copper and Iron.

It is a new material combined by characteristics of copper and steel.

It is general common sense that the copper having very good electric conductivity and iron having a good magnetic strength is very difficult to make an alloy more than 3% of iron in the past due to quite different special gravity and melting point each other.

But, free percentage of alloy with copper(10%–95%) and steel (90%–5%)has been developed and produced by special production technology.

Copper–iron alloy(CFA) has the characteristics of both copper and iron.

That is, CFA has characteristics of copper like as good conductivity & elongation and characteristics of steel like as magnetic force and strength at the same time.

Elasticity are required to increase screen(shield) effect but it was easy to wear,

the other hand, eventhough conductivity is increased, strength is weak.

CFA could solve such a conflicting problems happened on increase any factors of material.

And it can be widely applied to the industrial fields such as the electronic, electricity and machines.

Especially, it has been spotlighted as excellent electromagnetic shield effect and then the application is increasing more and widely.

CFA has excellent characteristics as following

- *. Shielding efficiency against electromagnetic waves
- *. Elasticity
- *. Conductivity
- *. Strength
- *. Radiating property

2. Shape of CFA

- * Rod / Bricks for mould
- * Sheet
- * Strip (Foil / Tape)
- * Wire (For welding)
- * Powder



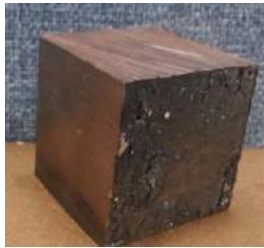
Rod



Sheet



Strip(Foil/Tape)



Brick for moulds



Welding wire



Powder

3. Difference between CFA and other copper alloys

1) Other copper alloys like as BeCu, phosphorous bronze, cupronickel have weak points in following factors.

- a) Stress corrosion
- b) Aging
- c) Reduction of elasticity
- d) Lower conductivity

But, such a problems are not happened in CFA because it contain iron.

2) CFA have higher strength and conductivity than other copper alloys.

Example of CFA90(Copper 90%, Iron 10%): Strength:700N/ Conductivity: over 60%

3) For same effect, smaller Q'ty of CFA is required than other copper alloys

4) CFA has higher wear resistance than Chrome-copper but don't wear opposite material

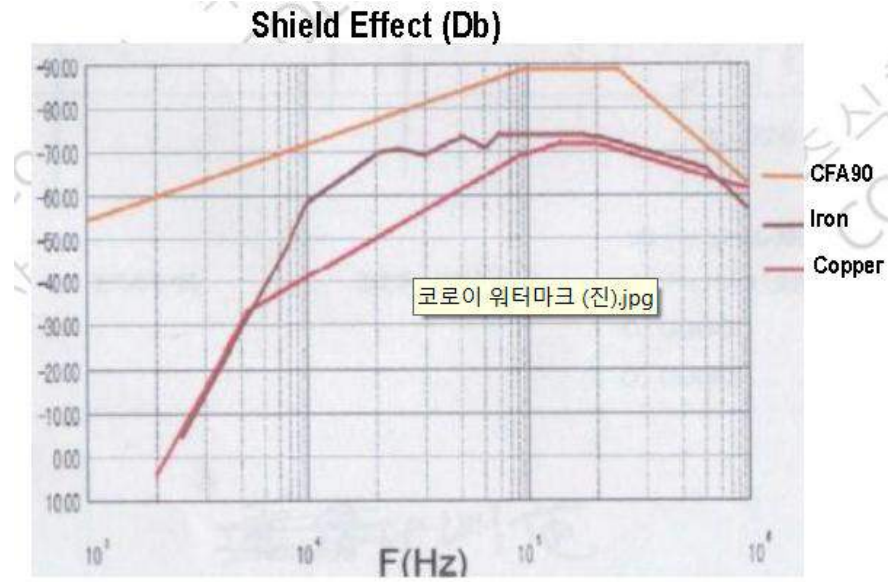
5) CFA can be simply welded with other copper alloys and steel (including stainless steel).

6) CFA is the most suitable for soldering tip because it has good thermal conductivity and surface hardness

7) CFA can be used as strong shield material since it has magnetic property

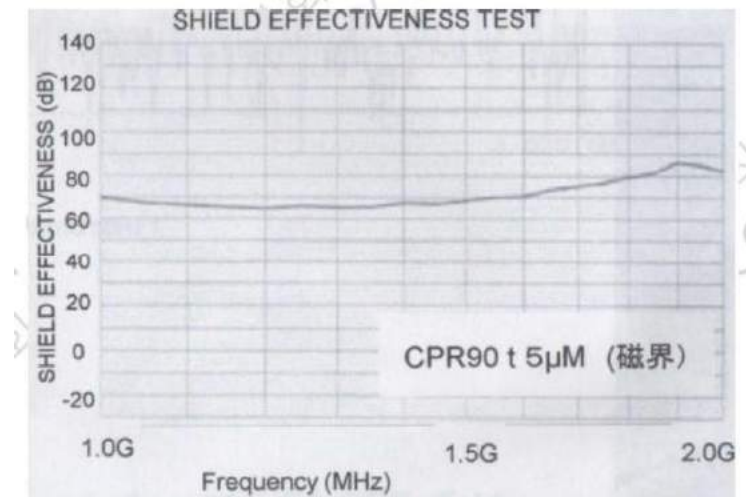
Electromagnetic Shield

Electromagnetic shielding materials should be restricted both electric field and magnetic field. However, copper iron alloy(CFA) can achieve the both fields shielding . Shield Effect (Db)



All sample's thickness is the same as 30 μ m.

However, the effect of the CFA90 (Cu: 90%, Fe:10% wt.)is higher than others.



The electromagnetic effect of the CFA 90 (t: 5 μ m)comes out almost 1000 times higher than normal shield materials, which shows 70 to 90 dB even with 120 μ m thickness in the high frequency range from 1.0G to 2.0G.

4. Application of CFA

A: For shielding effect by CFA90 / CFA 95 :

- 1) Automobile(Electrical Vehicle: EV), PC, Electrical / Electronics items, Industrial M/C, robot control units etc.. CFA is used to avoid malfunction resulted from electromagnetic waves.
- 2) Prevention of noise and electromagnetic interference for communication devices and equipments
(It can be simply prevented by panel box made with CFA)
- 3) Shielding material for medical device and equipments
- 4) Shielding tape(foil) for coaxial cables, power cables, communication cables.
(Steel and copper tapes are taped with many layers for shielding of cables in the past.
But, cable manufacturers can do shielding procedure by one layer of taping with CFA simply)
- 5) Housing(cover) of electronic items to avoid electromagnetic interference

B: For good conductivity and thermal conductivity

- 1) Moulds : Partial radiation of heat is important for big size of mould for plastic goods and glass items.
Moulds made by CFA has better efficiency and productivity than existing steel moulds.
- 2) Welding electrode(rod) : It was impossible to weld copper and steel until now.
But, welding of copper and steel is possible by using of CFA welding rod.
- 3) Related semi-conductor : CFA can be used as lead frame and basic material of laser diod.
Adhesion of copper, steel and silver require high cost and low productivity but CFA can solve such problems.
- 4) Related automobile : CFA can be used for engine and piston (Upper Aluminum parts)
- 5) Using of Beriryum-Copper(BeCu) for connectors, switchs, relays and other parts of electronic items like as mobile phone is prohibited due to pollution.
Accordingly, CFA (CFA90 and CFA95) shall be substitute material of BeCu for connectors, switchs, relays for mobile phones and other electronic items.

5. Composition of Cu-iron for CFA : Percentage of alloy with copper and steel can be adjusted simply.

CFA	No	Cu %	Fe %	Total	Density
"	10	10	90	100	7.98
"	20	20	80	100	8.07
"	30	30	70	100	8.18

"	40	40	60	100	8.29
"	50	50	50	100	8.39
"	60	60	40	100	8.49
"	70	70	30	100	8.61
"	80	80	20	100	8.72
"	90	90	10	100	8.84

6. Features and characteristics of CFA are as followings.

1) For Welding

CFA Tig Wire	
Welding Method	Tig Welding (Tungsten Inert Gas Welding)
Feature of welding	Direct welding without pre-heating
Applicable materials	Steel, Stainless steel, Brass, Phosphor Bronze, Copper
Range of product (Size)	Diameter: 1.2mm / 1.6mm / 2.0mm / 2.4mm / 3.2mm Length : 1,000mm. Packing unit: 5Kg/Box

CFA 95						
Name of commodity			CFA 95 –Tig Wire			
Elements	Cu	Fe	Hg	Pb	Cd	Cr
Chemical Composition(%)	94-96	6-4	-	-	-	-
Mechanical property						
Tensile Strength(N/m ²)			Spec	Min	355	
				Max	364	
Elongation (%)			Spec	Min	22	
				Max	23	

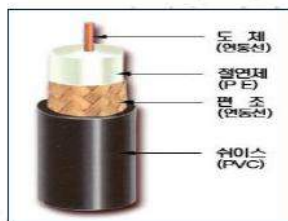
CFA 90						
Name of commodity			CFA 90 –Tig Wire			
Elements	Cu	Fe	Hg	Pb	Cd	Cr

Chemical Composition(%)	89-91	9-11	-	-	-	-
Mechanical property						
Tensile Strength(N/m ²)	Spec	Min	370			
		Max	390			
Elongation (%)	Spec	Min	19			
		Max	22			

7. Application examples of CFA



Communication Antenna



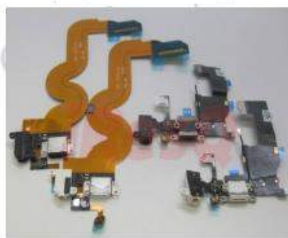
Coaxial Cable



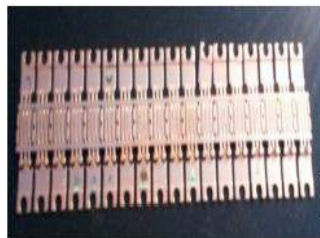
Smart Phone Case



MRI Room



Smart Phone's internal
connector



Lead Frame



Connector parts



Rotary Switch



Copper Iron alloy Powder

this powder is used for all kinds of purpose for electromagnetic shield, even painting components.



EMI/EMC shield Fabric



Precision guided missiles



Engine control unit



Electronics parts for Aircraft



Molds



Welding bar



Motor



Kitchen ware

