CuNi 90/10 and CuNi 70/30 Welding Instruction

Providing that certain precautions are taken, CuNi 90/10 and CuNi 70/30 welding does not present major difficulty. Inert shielded arc processes (TIG) are particularly appropriate to the welding of these alloys.
The following procedure has been established for CuNi 90/10 and CuNi 70/30 assemblies in tubes and accessories with a thickness of 1.5 to 10mm welded by TIG process.

1. Equipment

To weld under proper working conditions, the welding set should be equipped with a pre-gas, pre-arc and arc fall system.

2. General Welding Conditions

- Direct current with direct polarity (the electrode is connected to the negative pole).
- Electrode : it is made of thorium tungsten or zirconium tungsten.

Its state of cleanliness is most important, influencing the quality of the weld and the stability of the arc.

The diameter of the electrode is dependent on the welding current :

Diameter (mm)	1	1.6	2	3
Current (A)	25 / 70	60 / 150	100 / 200	200 / 300

To achieve a perfectly stable arc and obtain a maximum heat concentration it is advisable to work the electrode a close as possible to the maximum supportable current.

- Protective gas : neutral argon protection is generally sufficient. Torch flow 8 to 12 l/mn.

3. Filler Metal

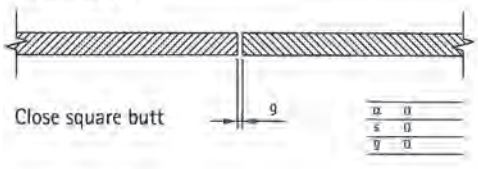
The filler metal generally has a grade identical to that of the parent metal :
CuNi 90/10 - Doga UTP A 389 is recommended.
CuNi 70/30 - Doga UTP A 387 is recommended.
The parent metal filler rods should always be perfectly degreased.

4. Preparation of Joints

In general, all types of joints can be used :
For tubes and accessories with a thickness less than or equal to 2mm, it is not necessary to make a chamfer but it is desirable to break the internal square corner to favour penetration.
For tubes and accessories with a thickness greater than 2mm, chamfer of around 30 to 40 is recommended.

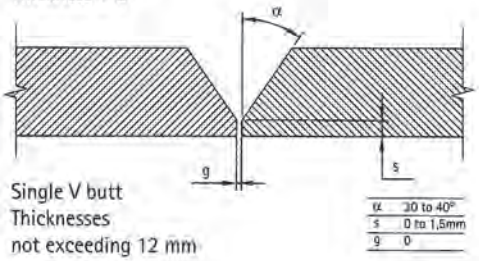
Preparations for butt welded joints on pipes

Thickness ≤ 2



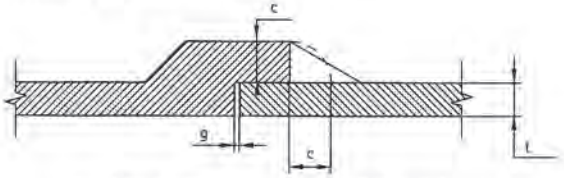
Close square butt

Thickness > 2



Single V butt
Thicknesses
not exceeding 12 mm

Welded joints on couplings



g = 1,5mm approx. c = 1 1/4 t mini

Not recommended for tubes with diameter exceeding 57 mm

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5. Cleaning

This is a most important operation; welding can only be carried out under correct conditions if the parts to be joined together are perfectly clean and free from grease and oxidation. Cleaning can be carried out by mechanical or chemical means.

6. Internal Protection

To avoid oxidation and fluxing on the inside of the joint, it is necessary to ensure internal protection by circulation of neutral gas.

7. Tacking

The parts to be joined together are placed edge to edge and tacked. The spot tacks should be carried out with a lower current than for spot welds. Care should be taken to let the spot tack cool under the jet of argon after breaking of the arc.

8. Welding

Welding position

This material can be welded in any position. Welding to a ceiling is the most delicate; on this case, the pulsed arc gives the best results; the pulse times remain at the operator's initiative.

Welding Conditions

Thickness (mm)	1	1.5	2	2.5	3	4	5
Current (A)	70 / 60	80 / 65	90 / 80	100 / 90	125 / 100	150 / 125	150 / 125
Number of Passes*	1	1	1	2	2	2	3
Rod Diameter (mm)	1.5	1.5	1.5	1.5 / 2	1.5 / 2	1.5 / 2	1.5 / 2.5
Argon Flow L/mm	6	6	7	8	8	8	8

* The number of passes is important; it is necessary to follow this data in order to avoid local overheating which risks causing collaspe of the bead.

A more detailed welding instruction procedure is available upon request.