Trade of Plumbing

Module 2: Domestic Hot and Cold Water Service

Unit 2: Copper Pipe Jointing – Compression Fittings

Phase 2



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Document Release History

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June 2006	V.1.0	
17/02/14	2.0	SOLAS transfer

Module 2 – Domestic Hot and Cold Water Service

Unit 2 – Copper Pipe Jointing – Compression Fittings

Duration – 8 Hours

Learning Outcome:

By the end of this unit each apprentice will be able to:

- Describe the various jointing methods for copper pipe.
- Describe the various types of compression fittings for copper pipe.
- Joint and assemble copper pipework projects using compression fittings.

Key Learning Points

RK	Copper pipe sizes, grades and applications.
Р	Jointing methods for copper pipe.
RK Sk	Types and identification of compression fittings.
RK Sc	Corrosion and protection of copper pipe.
RK Sk	Tools for copper pipework.
RK H	Cutting, de-burring, pre-compressing and jointing copper pipe with compressed fittings.
Sk	Copper pipework assembly.
Р	Communication and planning.
Sk	Preparation of materials lists.
Sk	Interpretation of drawings.
Sk M	Measurements, tolerances.
RK Sk	Bracketing and levelling copper pipework.
P	Working independently, good working practice.

Training Resources

- Classroom facilities.
- Information sheets.
- Sample copper pipe and compression fittings.

Exercise

Answer the samples questions below:

- 1. Identify compression fittings numbers on Exercise No. 2.2.2b in the curriculum document.
- 2. Define the terms cupro-solvency, oxidation, electrolytic corrosion.
- 3. Construct copper pipe project, as in Exercise No. 2.2.2a in the curriculum document.

Key Learning Points Code

M = MathsD = DrawingRK = Related Knowledge Sc = ScienceP = Personal SkillsSk = SkillH = Hazards

MATERIAL LIST COPPER PIPE EXERCISE

MACHINE AND SPRING BENDING:

- 1 13mm 310
- 1 19mm 310
- $1-19mm \ X \ 13mm \qquad 310$
- 1 25mm X 19mm 310
- 2 13mm 315
- 1 19mm 315
- 1 25mm X 19mm X 13mm 318
- 1 25mm X 13mm X 19mm 318
- 1 19mm 318
- 4 19mm X 19mm X 13mm 318
- 1 19mm X 13mm X 19mm 318
- 1 19mm X 13mm 348
- 4 13mm 351
- 2 19mm 351
- 1 25mm 351

Copper tubing is supplied in three different forms to the plumbing industry, each one suitable for a different application.

• LIGHT GAUGE TUBING: is supplied in half hard temper in 6m lengths and is suitable for all above ground hot and cold water services and central heating pipework. Half hard temper means that it normally has to be annealed before bending by spring. It is normally jointed by means of non-manipulative compression fittings, capillary soldered fittings and bronze welding.

It is available in the following sizes, all in m:-

13, 19, 25, 32, 50, 63, 75, 100, 150, etc

• **KUTERLON COPPER TUBING**: is supplied in 18m and 36m coils in dead soft Temper and is suitable for underground mains water pipework applications. Dead soft temper means that it is normally jointed by means of manipulative compression joints and is available in the following sizes, all in mm:-

13, 19, 25, 32, 38, 50.

• **O.D. COPPER TUBING**: is supplied in 10m and 30m coils in dead soft temper and is suitable for micro, mini and small central heating applications. It is easily bent by hand due to its dead soft temper and small diameter but an external spring is available for making sharp bends and bends in confined spaces. It is normally jointed by means of non-manipulative compression fitting and capillary soldered joints. It is available in the following sizes, all in mm:-6, 8, 10 and 12

Note: The letters O.D. stand for outside diameter.

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Figure 1. Instantor Fittings Catalogue Numbers

Joining Copper Pipes

The joining of copper pipes may be carried out using compression, capillary or bronze welding joints.

Compression joints fall into two distinct groups:

- Non-manipulative fittings (Fig 1)
- Manipulative fittings (Fig 2)

Non-manipulative fittings only require the ends of the pipe to be cut square before being inserted into the fitting. The joint is made watertight by a soft copper or brass compression ring being compressed into the space between the inside of the fitting and the outside of the pipe by means of tightening a nut.

Manipulative fittings require the end of the pipe to be flared or open up with a drift in order that part of the fitting can be inserted into the end of the pipe. It is then secured in that position by tightening a nut onto the body of the fitting. Because this type of fitting cannot pull off the tube, most water authorities insist on their use for copper pipe fixed underground.



Figure 2. Manipulative and Non-Manipulative Fittings

Cooper Tube Assembly

To fit a compression fitting to a copper tube, the tube end must first be cut square with a hacksaw. Any external or internal burrs should be removed with a file. If using a copper pipe cutters remove the burr with the integral reamer.



Figure 3. Copper Tube Assembly - Cutting

The compression nut and ring are fitted over the tube end in that order and the tube is inserted into the fitting, until it reaches the tube stop.



Figure 4. Copper Tube Assembly

A smear of boss white is applied to the compression ring before the nut is tightened by hand onto the fitting.

<u>N.B.</u> Ensure the nut starts on the right thread.

The joint is completed by tightening the nut with the correct size spanner.



Figure 5. Copper Tube Assembly

Self Assessment

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