



COOL UNDER PRESSURE?

SkillFRIDGE In House Skills Competition

General Information

Competition requirements:

- Each potential competitor should complete the competition task.
- The college tutor should mark the work of each competitor according to the marking scheme overleaf.
- The competitor with the highest score should be entered into SkillFRIDGE competition process.

We recommend the test should take 2 hours to complete.

The test is carried out in refrigeration quality copper and associated materials, and is designed to test the following skills:

- Interpreting detailed drawings including pipe dimensions.
- Measuring, fitting and use of materials in an efficient way.
- Marking out, cutting/flaring of copper tube to dimensions
- Bending copper tube using standard machine tooling
- Jointing of copper fittings by flame brazing (map gas) methods
- Safe and correct use of Pressure testing equipment.

Infrastructure Guide

Workshop with benches, vices, Nitrogen supply and pressure test hoses, regulators, gauges, spare map gas torches, tools as required and necessary health and safety observance and equipment

Standards

The standard of work required to gain maximum marks are:

- The measurements should be within +/- 2mm of the specifications
- The bends should be 90° within +/- 1° of the specifications.
- The flame brazed joints should be full, and have no drips.
- All flame brazed joints should have capillary penetration at least 80%. The cut & inspection are to be at the 19mm end cap fitting, by the tutor, after pressure test.
- 6mm flares should be made to sit within the flare nut, not snag on the nut thread and there should be no burrs or splits at the end of the flared pipe.

Safe Working

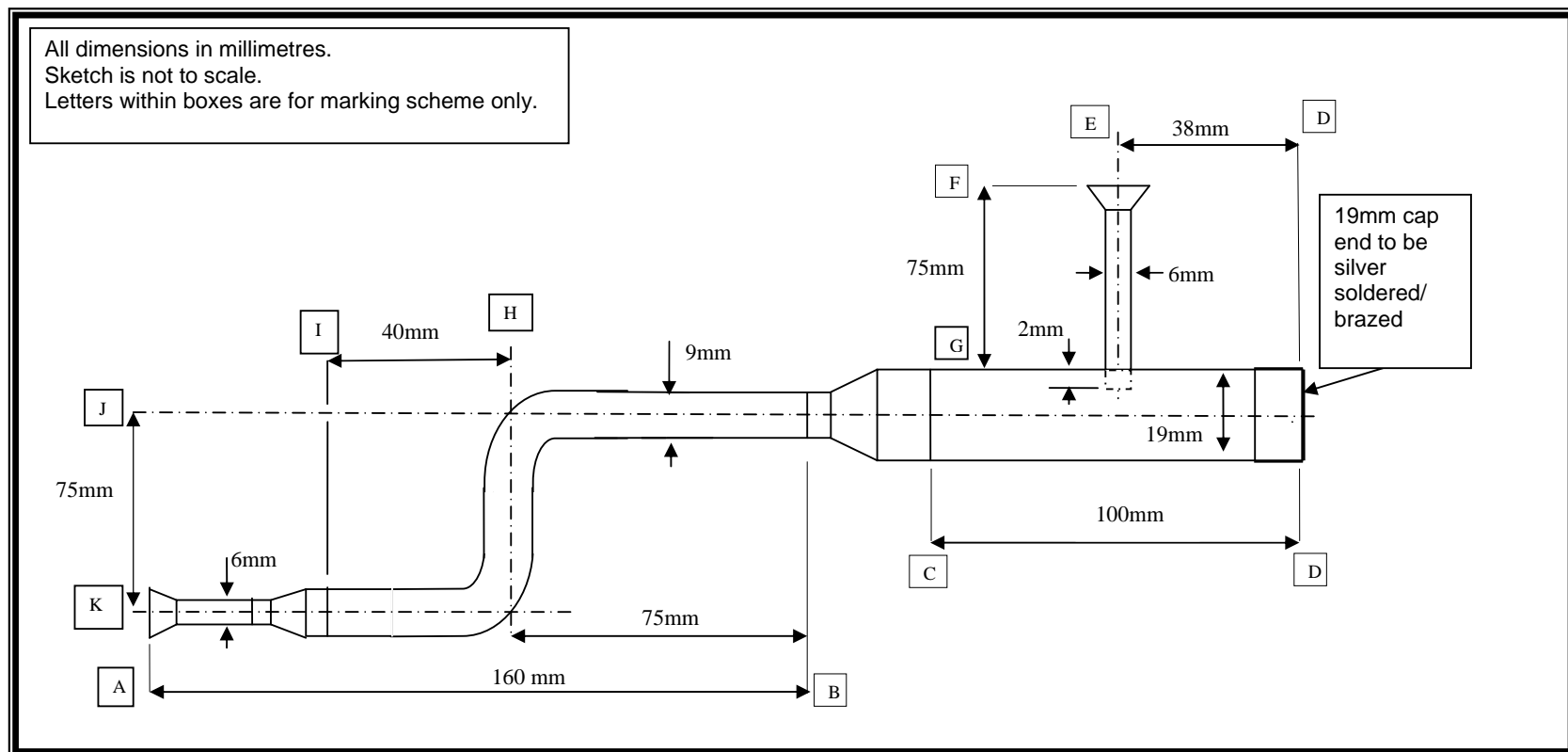
Candidates must work safely at all times and take the appropriate precautions when working with any tools that have a potential safety hazard. No power tools to be used with the exception of a battery powered drill. Pressure test time is 10 minutes, submerged fully in container of water.

Required Materials

130mm x 19mm tube, 250mm x 9mm tube, 150mm x 6mm tube
2 x 6mm Flare nuts, 1 x 19mm to 9mm socket reducer, 1 x 9mm to 6mm socket reducer, 1 x 19mm cap end, 1 stick Silver Solder rod, 1 stick Cuprol or similar brazing rod, flux to suit.

SkillFRIDGE

Detailed Pipe Work and Brazing Test



Nitrogen test rig set up at point K, establish test pressure by fitting test gauge at point E,

Marking Schedule

Max Mark	Measurement Criterion (+/- 2mm)	Result or Actual Value	Mark Awarded
1.0	Are the bends at 90°	Both = 1.0 One = 0.5	
1.0	Tube length A to B 160mm	2mm to 4mm = 0.5	
1.0	Tube length C to D 100mm	2mm to 4mm = 0.5	
1.0	Tube length D to E 38mm	2mm to 4mm = 0.5	
1.0	Tube length F to G 75mm	2mm to 4mm = 0.5	
1.0	Tube length H to I 40mm	2mm to 4mm = 0.5	
1.0	Tube length B to K 75mm	2mm to 4mm = 0.5	
1.0	Tune length K to J 75mm	2mm to 4mm = 0.5	
1.0	6mm pipe depth into 19mm tube	>2mm = 0.5	
1.0	6mm Flares no burrs or splits	Burrs = 0	
1.0	6mm Flare fit within nut	Tight = 0	
Total marks (max 11)			

Max Mark	Brazing Criterion (filled with no drips)	Result or Actual Value	Mark Awarded
1.0	Reducer to 19mm tube at C		
1.0	Reducer to 9mm tube at B		
1.0	19mm Blank cap		
1.0	6mm stub to 19mm tube		
1.0	Reducer to 9mm tube I		
1.0	Reducer to 6mm tube		
2.0	19mm end cap depth of braze penetration	< 80% = 0.5	
2.0	Always used nitrogen during brazing	Always = 1.0 Sometimes = 0.5	
Total marks (10)			

Max Mark	Tools & Materials Criterion	Result or Actual Value	Mark Awarded
1.0	Correct use of bending tool		
1.0	Correct set up and use of pressure test equipment to 1500kPa		
1.0	Less than 5% pressure drop when pressure tested to 1500kPa for 10 minutes	5-10% pd= 0.5 Greater pd = 0	
2.0	Efficient use of materials	Additional materials required = 0.5	
Total marks (5)			

Max Mark	Safety Criterion	Result or Actual Value	Mark Awarded
1.0	Use of safety glasses for working	Always =1.0 Sometimes = 0.5	
1.0	Use of the correct safety clothing when required?	Always =1.0 Sometimes = 0.5	
1.0	Did the competitor always use safe practices?	Always =1.0 Sometimes = 0.5	
1.0	Work area clean and tidy?	Always =1.0 Sometimes = 0.5	
Total marks (4)			

College / Training Provider:

Competitors Name:

**Assessors Name
& Signature:**

Final Score (max 30):