

Training Provider Passive Test

This test can be used to identify competitors to take the Registration Test

General Information

Guidance on the process:

1. Tutors have all eligible students complete the following training task in a maximum of 2 hrs. (you can shorten or lengthen the time by 30minutes)
2. The student self marks the finished work according to the marking scheme overleaf, with the tutor overseeing the scoring and taking ownership of the assessment methodology.
3. The student can practice this test or variations (less time or different dimensions) as many times as they wish.

The next stage is for the tutor to plan an official registration selection test in a fixed 2hr period. The registration test project design document will be provided by the SkillFRIDGE competition organising partner (COP).

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

- 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
- Safe and correct use of flame brazing equipment (MAPP gas, or oxygen & acetylene fuel) to permanently join copper pipe materials together
- Safe and correct use of Pressure testing equipment.
- Knowledge of EN378 standards

Infrastructure Guide: Workshop with benches (incl. vice), Nitrogen supply and pressure test hoses, regulators, gauges, flame brazing kit, hand tools as required and necessary personal protective equipment to comply with your local health and safety risk assessment

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 all around, and have no drips or sharp points.
- All flame brazed joints should have capillary penetration at least 80%. The cut & inspection is to be carried out by the tutor, at the ¾" end cap fitting, after pressure test is passed.
- ¼" 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.
- Isolated Pressure test is to be carried out in accordance with EN378 standards for refrigeration systems

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.

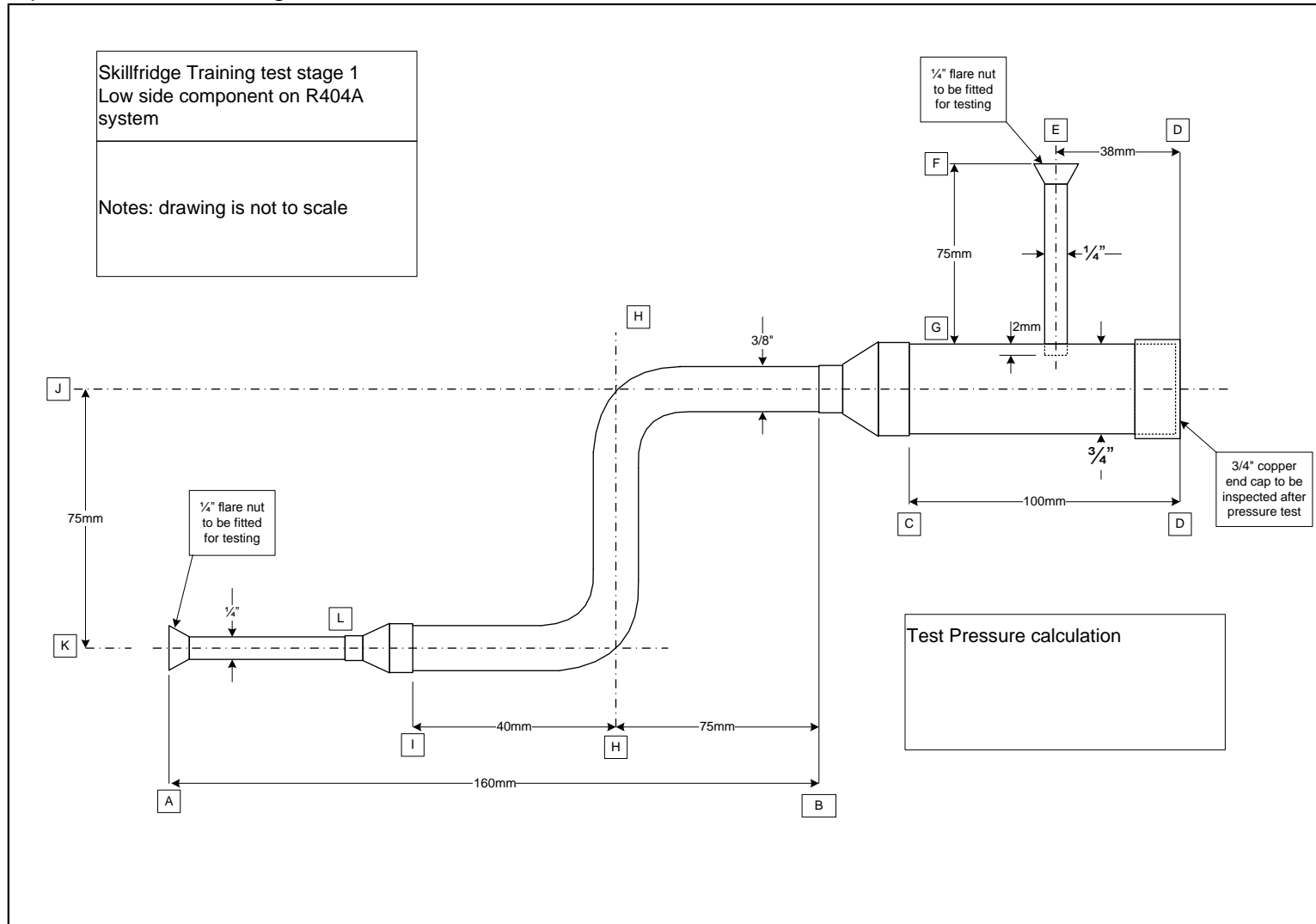
Required Materials

Copper tube: 130mm x ¾"OD, 250mm x 3/8"OD, 150mm x ¼"OD
2 x ¼" SAE Flare nuts,
1 x ¾" to 3/8" socket reducer, 1 x 3/8" to ¼" socket reducer,
1 x ¾" cap end,
flame brazing gases (MAPP gas, Oxygen & Acetylene gas or alternative)
Nitrogen
1 x stick Silver Solder rod and flux to suit.
1 x stick Cuprol or similar brazing rod

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Detailed Pipe Work and Brazing Test



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

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Marking Schedule (to be handed to competitor after test completed)

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	Distance A to B 160mm	Tolerance +/- 2mm	
1.0	Distance C to D 100mm	Tolerance +/- 2mm	
1.0	Distance D to E 38mm	Tolerance +/- 2mm	
1.0	Distance F to G 75mm	Tolerance +/- 2mm	
1.0	Distance H to I 40mm	Tolerance +/- 2mm	
1.0	Distance B to H 75mm	Tolerance +/- 2mm	
1.0	Distance K to J 75mm	Tolerance +/- 2mm	
0.5	Both 1/4" Flares are to standard and fit in the flare nut without snagging	Yes/No	
0.5	Arrangement is as per the diagram, straight and level when lay flat	Yes/No	
1.0	1/4" pipe depth into 3/4" tube 75mm (overall length checked before assembly)	Yes/No	
Total marks (max 10)			

Max Mark	Brazing Criterion (filled with no drips)	Result or Actual Value	Mark Awarded
1.0	Reducer to 3/4" tube at C to standard	Yes/No	
1.0	Reducer to 3/8" tube at B to standard	Yes/No	
1.0	3/4" Blank end cap to standard	Yes/No	
1.0	1/4" stub to 3/4" tube to standard	Yes/No	
1.0	Reducer to 3/8" tube I to standard	Yes/No	
1.0	Reducer to 1/4" tube to standard	Yes/No	
2.0	3/4" end cap - depth of braze penetration	100%	
1.0	Correct filler used for end cap	Yes/No	
1.0	Always used nitrogen during brazing	Yes/No	
Total marks (10)			

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Max Mark	Tools, Materials & Knowledge Criterion	Result or Actual Value	Mark Awarded
1.0	Correct use of brazing equipment	Yes/no	
1.0	Correct set up and use of pressure test equipment as per diagram	Yes/No	
1.0	Pressure leak test carried out to 32°C for R404A	13.91barg	
1.0	Zero pressure drop when pressure tested to the standard for 10 minutes submerged in water	+/- 0.1bar change allowed	
2.0	Efficient use of materials (did not ask for more materials due to mistakes)	Any additional materials required = 0.5	
Total marks (6)			

Max Mark	Safety Criterion	Result or Actual Value	Mark Awarded
1.0	Used safety glasses for cutting, brazing, pressure test	Always =1.0 Sometimes = 0.5	
1.0	Used correct gloves when cutting and brazing?	Always =1.0 Sometimes = 0.5	
1.0	Did the competitor always use the correct tool & work practices?	Always =1.0 Sometimes = 0.5	
1.0	Work area clean and tidy with no trip hazards?	Always =1.0 Sometimes = 0.5	
Total marks (4)			

Criterion	Max Score	Actual Score
Measurement	10	
Brazing	10	
Tools & Materials	6	
Safety	4	
Final Total	30	

College / Training Provider:

Date of Test:

Assessor Name:

Competitor Name:

Assessor Sign:

Competitor Signature: