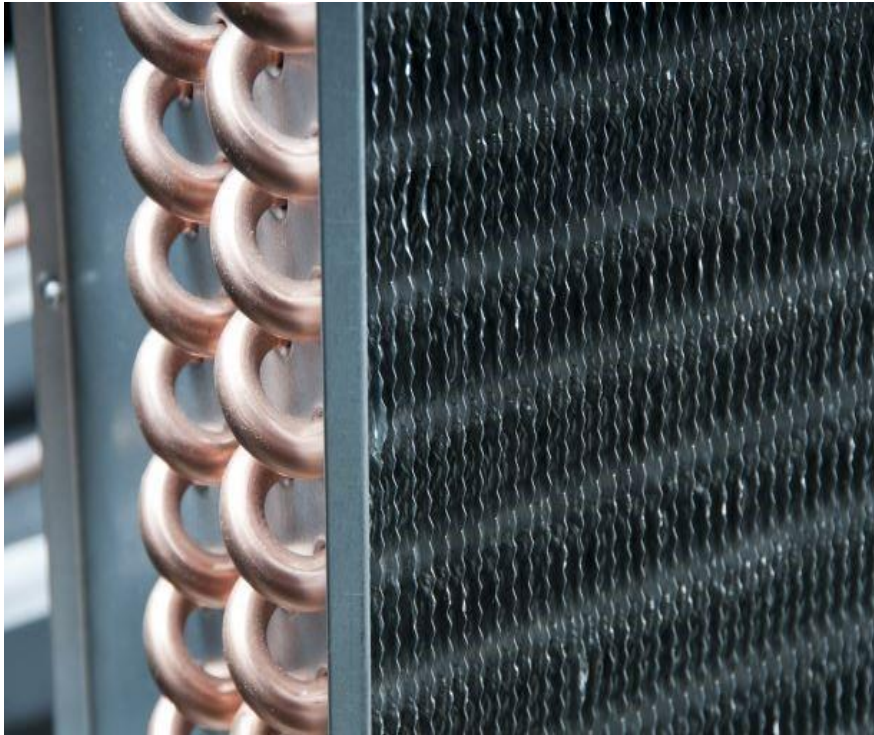


WorldSkills UK RACHP

Pre-Registration Selection (Fabrication 1)



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Introduction

The pre-registration selection requires the collaboration of colleges, training providers or employers to identify candidates who they believe to have the correct skills, knowledge, aptitude and behaviours to progress throughout the competition.

A pipework fabrication requires to be produced within a fixed time to identify the candidate's skillset, this pre-registration selection will be administered and self-marked by the colleges, training providers or employers.

To facilitate the pre-registration selection, a pipework fabrication drawing, marking schedule(s), tools and material list are provided, this will allow a consistent approach to be applied. It is recommended that candidates scoring 60% and above can be put forward for registration for the World Skills UK competition.

Completed marking schedules for candidates that are being put forward for registration require to be retained for a period of 6 months from the date of the pre-registration selection. Completed marking schedules may be requested by WorldSkills UK or the Competition Organising Partner at any point during the competition.

Guidance on the process

1. All candidates require to complete the pre-registration selection at a single sitting and in a maximum of a 2 hour timeframe
2. A responsible person from the colleges, training providers or employers mark the finished pre-registration selection in accordance with the provided marking schedule
3. It is recommended that candidates achieving 60% and above can be put forward for registration for the WorldSkills UK competition

Working Safely

Candidates require to work safely at all times and apply the appropriate precautions as identified by a current risk assessment and method statement for the associated task.

Overview

The pre-registration selection task requires to be conducted in refrigeration quality copper pipe and associated materials, and the skills event is designed to demonstrate the following skills and knowledge:

- Interpreting detailed drawings
- Measuring, fitting and efficient use of materials
- Marking out, cutting and flaring of copper pipe
- Bending copper pipe utilising standard tooling
- Safe and correct use of flame brazing equipment to permanently join copper pipe and dissimilar metals
- Safe and correct use of pressure testing equipment
- Application of EN378 standards

Standards

To achieve maximum marks the identified standards of work are:

- Measurements to be within +/- 2mm of the specification
- Bends to be within +/- 2° of 90°
- Flame brazed joints to be full and have no visible drips or sharp points
- Flame brazed joints to have capillary penetration of a minimum of 80%.
 - N.B. Cut & inspection to be carried out at the ¾" end cap fitting once pressure testing has been completed
- ¼" flares require to sit within the flare nut with no snagging on the nut thread
- No burrs or splits visible at the end of the flared pipe
- Isolated pressure test to be carried out in accordance with EN378 standards for refrigeration systems

Infrastructure, equipment and Tools

Required infrastructure, equipment and tools are:

- Suitable workshop/work area
- Work bench to include vice
- Flame brazing equipment
- Oxygen Free Nitrogen pressure test rig or equivalent test equipment, OFN flow meter
- Hand tools such as, tube cutters, reamers, hacksaws, flaring/swaging kit, files, tube expanders
- Personal protective equipment in accordance with risk assessment and method statement

Materials

The required materials are:

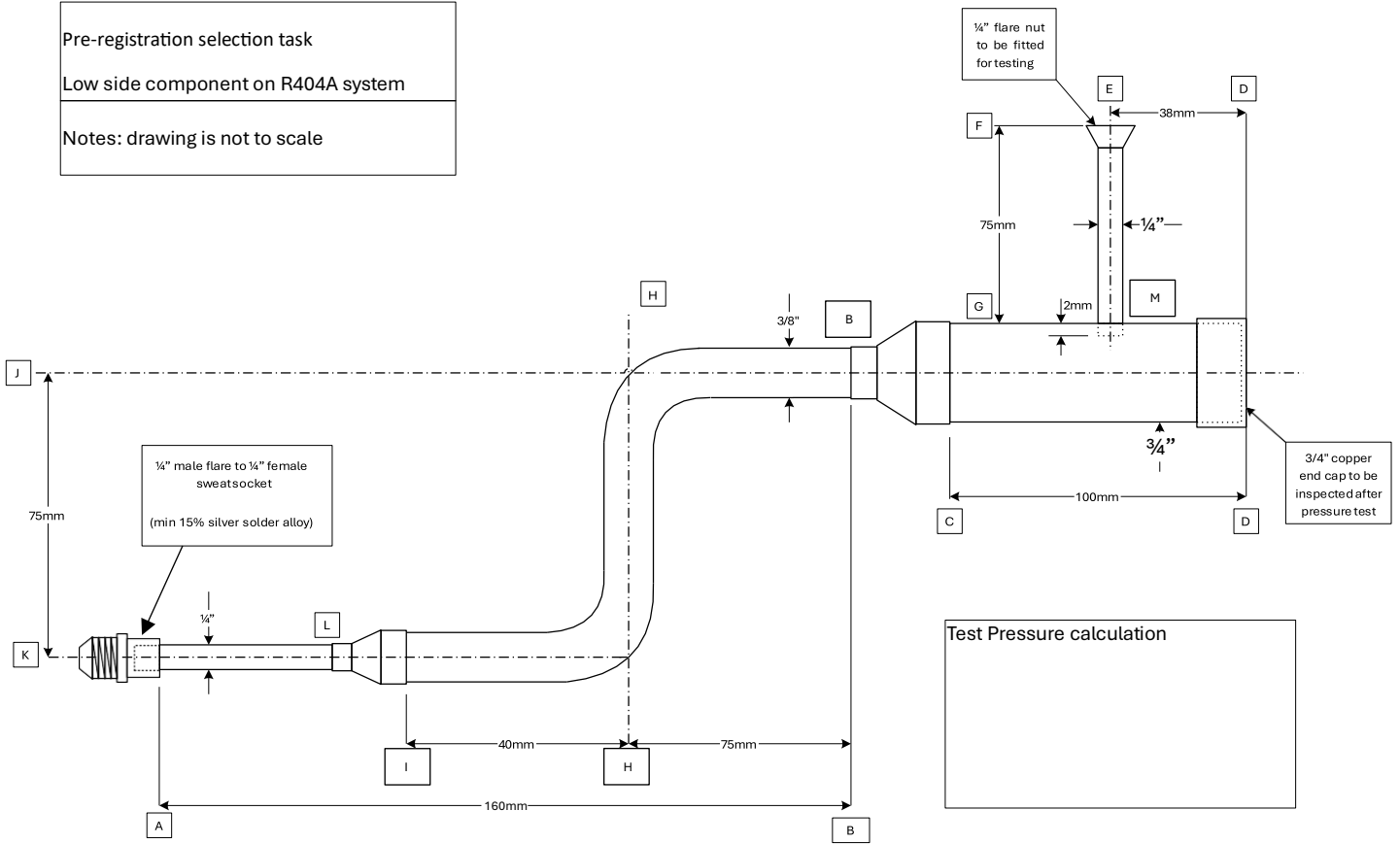
- Copper pipe; 150mm of ¾" OD, 250mm of ¾" OD, 150mm of ¼" OD
- 1 N°, ¼" SAE flare nut
- 1 N° ¾" to ¾" socket reducer, 1 N° ¾" to ¼" socket reducer, 1 N° ¾" cap end, 1 N° ¼" male flare to ¼" female sweat socket
- Flame brazing gases, suitable and appropriate to equipment
- Oxygen free nitrogen
- 1 N° stick of 15% (min) Silver Solder alloy and flux to suit
- 1 N° stick of brazing alloy, Rolot or similar

Pipework Fabrication Drawing

Pre-registration selection task

Low side component on R404A system

Notes: drawing is not to scale



N.B. Oxygen Free Nitrogen pressure test rig or equivalent test equipment connected at point K, pressure test gauge connected at point E to establish test pressure

Marking Schedules (to be completed by the responsible person)

Safety Criteria	Maximum Mark	Result Criteria	Mark Awarded
Used the correct PPE throughout task	2	Yes/No	
Always used the correct tool(s) and work practices	1	Yes/No	
Kept work area clean and tidy without trip hazards	1	Yes/No	
Total marks for criteria (maximum 4)			

Measurement Criteria	Maximum Mark	Result Criteria	Mark Awarded
Bends are set at 90°	1	Tolerance +/- 2° Both = 1 One = 0.5	
Measurement from A to B, is 160mm	1	Tolerance +/- 2mm	
Measurement from C to D, is 100mm	1	Tolerance +/- 2mm	
Measurement from D to E, is 38mm	1	Tolerance +/- 2mm	
Measurement from F to G, is 75mm	1	Tolerance +/- 2mm	
Measurement from H to I, is 40mm	1	Tolerance +/- 2mm	
Measurement from B to H, is 75mm	1	Tolerance +/- 2mm	
Measurement from K to J, is 75mm	1	Tolerance +/- 2mm	
¼" Flares are to standard and fit in the flare nut without snagging	1	Both = 1 One = 0.5	
Fabrication is as per the drawing, straight and level when laid flat	1	Yes/No	
Total marks for criteria (maximum 10)			

Brazing Criteria	Maximum Mark	Result Criteria	Mark Awarded
Joint for ¾" blank end cap, to standard	1	Yes/No	
Joint for reducer to ¾" tube at C, to standard	1	Yes/No	
Joint for reducer to ¾" tube at B, to standard	1	Yes/No	
Joint for ¼" stub to ¾" tube at M, to standard	1	Yes/No	
Joint for reducer to 3/8" tube at I, to standard	1	Yes/No	
Joint for reducer to ¼" tube at L, to standard	1	Yes/No	
¾" end cap joint - depth of braze penetration	2	80 – 100%	
Correct filler material used for end cap braze	1	Yes/No	
Always used oxygen free nitrogen during brazing	1	Yes/No	
Total marks for criteria (maximum 10)			

Tools, Materials & Knowledge Criteria	Maximum Mark	Result Criteria	Mark Awarded
Correct use of brazing equipment	1	Yes/No	
Correct test pressure calculation for low side component on R404A system @32°	1	13.91barg	
Correct set up and use of pressure test equipment	1	Yes/No	
Zero pressure drop when pressure tested to the standard, held for 10 minutes	2	+/- 0.1bar change allowed	
Efficient use of materials (no request for additional materials due to errors)	1	Yes/No	
Total marks for criteria (maximum 6)			



Marking Schedules Summary

Criteria	Maximum Marks	Marks Awarded
Safety	4	
Measurement	10	
Brazing	10	
Tools, Materials & Knowledge	6	
Overall Total Marks (maximum 30)		

College/Training Provider/Employer: _____

Date Skills Test Held: _____

Responsible Person

Name: _____ Signature: _____

Candidate

Name: _____ Signature: _____