

Regional Heat Skills Competition brief:

The competition involves 2 tasks.

Task	Title	Hours
A	Refrigeration system refrigerant replacement and electrical test	2.5
B	Pipe work fabrication and pressure test	2.5

A. Refrigeration system electrical fault find and component replacement

Competitors are provided a vapour compression system and are required to perform the following:

1. Safe isolation
2. Refrigerant recovery to FGas cat 1 standards
3. Break into system and repair component.
4. Pressure test to EN378 standards
5. Evacuate to standards
6. Charge refrigerant and record completion
7. Use electrical meter to investigate / diagnose a basic electrical wiring fault
8. Reinstall wiring according to wiring diagram
9. Check voltage, resistance and current.
10. Check superheat, sub-cooling and set point.
11. Complete records

B. Refrigeration pipe work fabrication

1. Competitors are to fabricate and flame braze copper/copper/brass pipe work and fittings according to a detailed diagram

Safe Working:

Candidates must follow the local risk assessment control measures, a generic risk assessment is available on the competition web site.

Skills & Knowledge to be demonstrated:

- Interpreting detailed drawings including location dimensions
- Measuring, fitting and use of materials in an efficient way
- Installation of components using general hand tools
- Copper Pipe fabrication
- Flame brazing similar and dissimilar materials using a range of gases
- Installation of non-permanent mechanical copper pipe joints (flare)
- Use of weigh scales
- Recovery of refrigerant
- Legislative record completion
- Pressure testing & evacuation testing
- Charging and recovery of refrigerants according to FGas category 1 procedures
- Use of electrical testing equipment
- Reading wiring diagrams to fault find control circuits
- Connection of wiring conductors to components

Standards

- Measurements should be within +/- 2mm of the specification
- Angles to be within +/- 2 degree of the specification
- Brazed joints to be full all around, with no parent metal loss, no excess alloy on exterior, with flux removed
- Oxygen Free Nitrogen used during all flame brazing activities
- All components to be positioned and laid out flat according to diagram
- FGas regulations / BSEN378:2016
- Evacuation below 2000micron and not rise above 2000micron during 10 minute rise test
- Wiring terminations to be tight and without conductors showing when viewed at 90°
- All components to be earthed
- Electrical instruments used to test & prove the control circuit is safe to energise (judge to sign off)
 - Polarity 'dead' test
 - Earth continuity
 - Short circuit test
- Superheat between 5 &10K (using dew point)
- Sub-cooling between 3 & 8K (using bubble point)
- Adherence to risk assessment and safe work practice always

The competition judges will mark the work of each competitor according to a detailed mark scheme. The summary marking scheme is provided below.

Marking Scheme and Weighting Summary

Weighting	Aspect	Criteria	Maximum mark
6	A	PIPE WORK FABRICATION	22
2	B	REFRIGERANT RECOVERY	16
5	C	ELECTRICAL WIRING & CONTROL FAULT FINDING	12
1	D	PRESSURE TESTING & EVACUATION	14
3	E	REFRIGERANT ADDITION	16
4	F	REFRIGERATION SYSTEM COMMISSIONING	20
	Total marks		100