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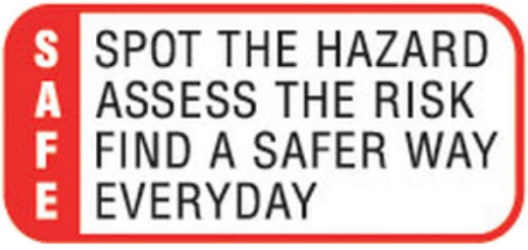

Risk Element

- Uncontrolled release of energy (explosion).

Precautions to Eliminate/reduce Risk

- Clear all non essential personnel from the risk area;
- The nitrogen used for pressure testing is an asphyxiant, so the area around the system should be well-ventilated;
- Operator(s) to wear correct protective personal equipment;
- Nitrogen cylinders must be properly secured to prevent the cylinders from being knocked over;
- Never use a nitrogen bottle without the correct regulator and relief valve;
- When venting nitrogen ensure the area is well ventilated.

Action in an Emergency

- Close off cylinder(s) at isolating valve;
- Clear area;
- Isolate leak if without risk;
- Release pressure from system slowly and safely.

Safe Working Method

Refer to the systems Name Plate for the Tightness and Strength Test Pressures.

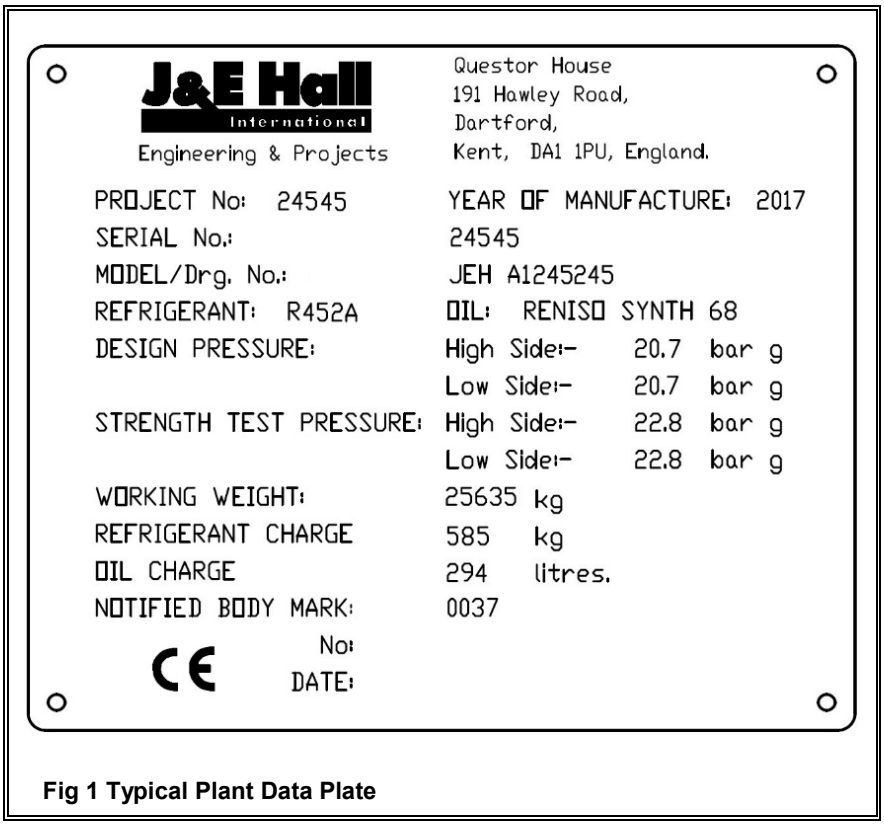

Fig 1 Typical Plant Data Plate

System Testing

- Oxygen free nitrogen shall be used as the test medium.
- Prior to testing, sensitive gauges, controls and instruments that may be damaged by excess pressure must be isolated from the system;
- Relief valves shall be removed and the openings capped and plugged. Solenoid valves, pressure regulating valves and other control valves must be opened as necessary and the circuit(s) checked to ensure all relevant parts of the system can be pressurised;
- Test pressure shall not exceed that applied to the components by the manufacturer of the particular component. This may require the testing of the low pressure side of the system separately from the high pressure side;
- Before carrying out the pressure test, precautions shall be taken to evacuate all personnel from the area of risk and post notices advising that the system or equipment is under pressure;
- Pipework under pressure must be suitably labelled while the test is progressing and after if the systems are left under standing pressure;
- Increase the pressure to approximately 5 bar g and check for leaks using leak detection spray at this pressure initially many leaks will be identified at this pressure so you will not waste nitrogen and time. Once the test pressure is reached, the nitrogen cylinder(s) should be closed off and isolated from the system under test;
- The Strength Test should be held for at least 15 minutes.

Reduce the pressure to the Tightness Test Pressure. To complete the tightness test you should either:

- Check each joint with leak detection spray;
- Hold the test pressure for a period of at least 24 hours, checking that the pressure has not dropped during this time.

  NOTE: That if the ambient temperature changes by 5 °C the nitrogen pressure will change by 0.7 bar. Therefore an increase in ambient could mask a drop in pressure due to a leak. You should record the ambient temperature as well as the pressure at the start and finish of the tightness test.
- If any leaks are present, the fault(s) should be corrected and the system re-tested (repairs involving welding or brazing shall not be carried out on any system, part of system or component while it is still under pressure).

  NOTE: Under the Pressure Equipment Regulation, this strength test might need to be witnessed by a notified body.

Equipment Required

Equipment required to be used for pressure testing:

- A suitable pressure regulator;
- Pressure testing will be in accordance with Standard EN378-2 and HSE Guidance Notes GS4 (Third Edition) The record card shall be signed and dated by the fitter undertaking the test operation;
- Only competent, authorised persons are permitted to carry out test procedures.

The tester will ensure all the precautions have been complied with before the test is commenced as follows:

- Ensure test equipment has been set up in accordance with this Safe Code of Practice;
- The Person carrying out the test is supplied with the required PPE;
- Warning sign, “PRESSURE TEST IN PROGRESS, KEEP AWAY” affixed to the front & rear of the plant room. The area around the plant room to be coned off and warning signs posted. Tester to keep the plant room in view when a test is being carried out.

  NOTE: All pressure gauges used for the test shall be identifiable to a valid calibration certificate, registered in the J & E Hall’s calibration system.