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# Market surveillance on Compressors

Catherine Hardy  
HSE Safety Unit



# Compressors market surveillance



- Following complaints about air receivers 10 were tested by HSE to assess compliance with the SPV
- 9 were manufactured in China, 1 in UK
- 7 suppliers involved
  - 5 in UK
  - 1 in Germany
  - 1 in Italy

# The results

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- Of the 10 air receivers tested by HSL, they ALL failed to meet the required standards





# Testing process

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Destructive and non-destructive testing,  
including:

- Pressure test, MPI/DPI, radiographs
- Sectioning of welds to check quality
- Hardness tests
- Multi element chemical analysis of shell
- Tensile test of shell
- Visual examination
- Functionality test
- Document examination



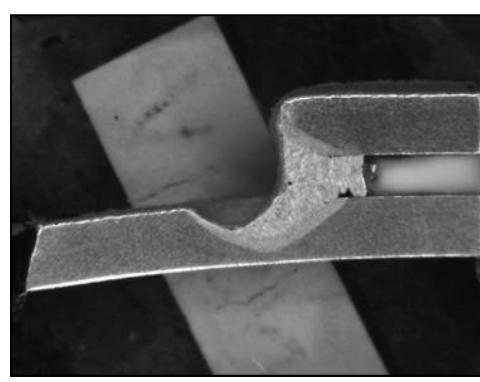
# Compliance

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- Pressure cut-out switches, pressure-relief valves, drain valves and gauges- all worked
- Pressure test at 1.5 x max working pressure- all passed
- Weld tensile strength – all acceptable
- Chemical analysis- all made from low carbon steel- impurity levels OK
- Wall thickness- all acceptable

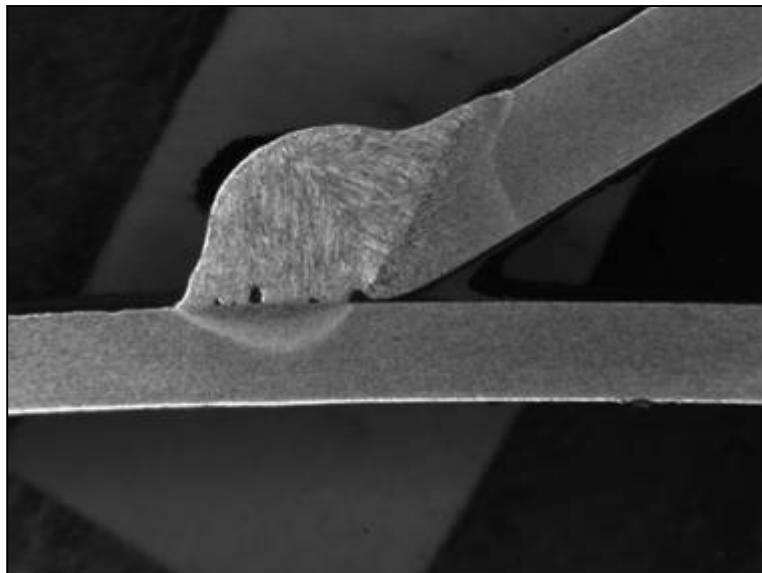
# Non-compliance

- Poor quality welding, eg porosity, slag inclusions, peaking undercut
- Lack of data on ID plate
- No certificate of conformity
- Operation of drain valve and inspection ports
- Shot blasting beads had been left inside one of the vessels
- In another vessel, the drain hole was not at the lowest point of the vessel

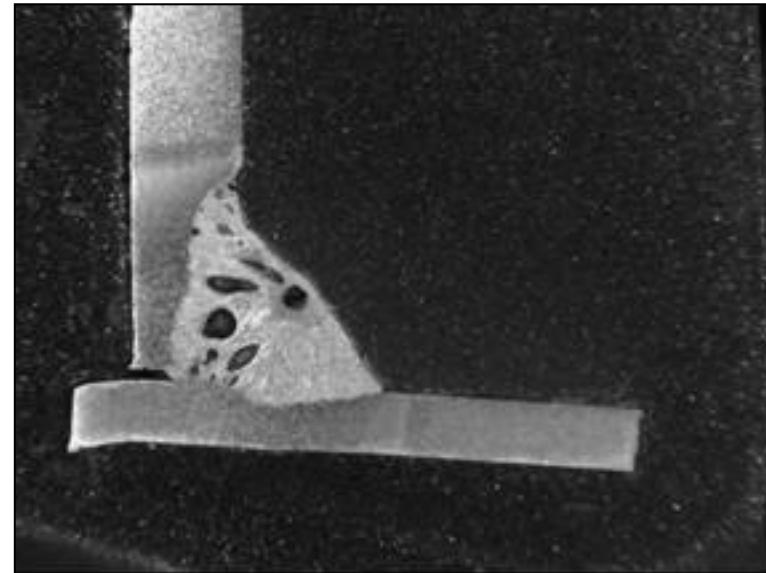


# Weld defects

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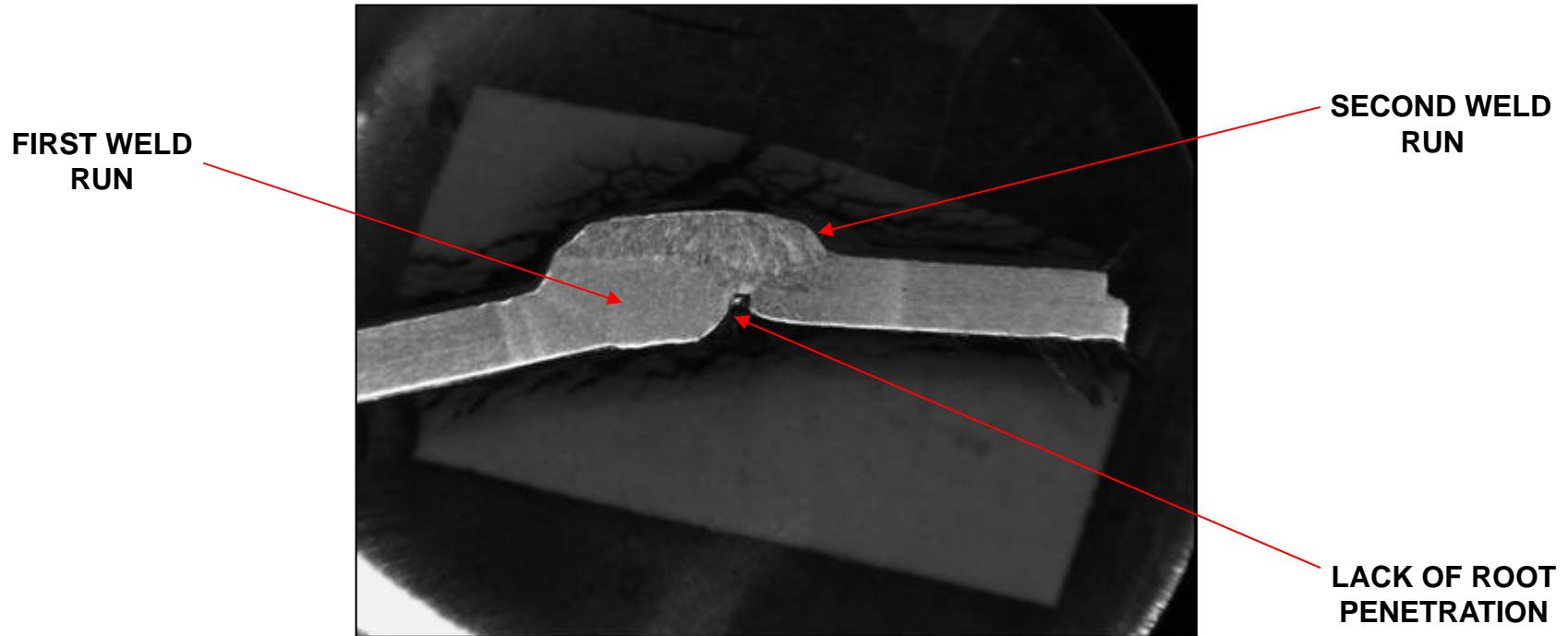


Lack of fusion



Porosity in weld

# Weld defects



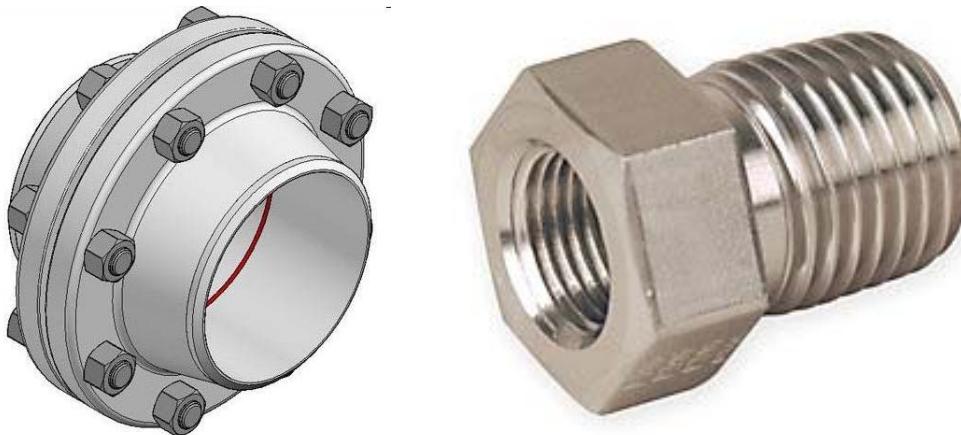
Longitudinal seam weld – lack of fusion and root penetration  
(2 weld runs – one missed the other not penetrated fully)  
Joint also Peaked

# Assessment of safety risks



- More likely to leak than burst
- Relatively small capacities
- Failure along the length of the vessel would be either:
  - progressive deterioration along the weld
  - catastrophic explosion from overpressure or internal reduction in wall thickness (corrosion)

# Assessment of safety risks



- Greater potential for significant release from jointed connections or dome ends
- Rapid change in sectional area
- Failure initiation results in offset loading

# Action from HSE



- Findings were entered on to the EU-wide ICSMS database
- Wrote to the suppliers with the test report, informing them of the findings and asking them to take action
- Non repliers (1) were referred to the local HSE Product Safety Team (PST inspectors) for follow up
- The 2 suppliers based outside the UK (Italy and Germany) were referred to their domestic market surveillance authorities
- Other market surveillance using this intelligence will continue

# Action from Suppliers



- Stopped selling the product (3 suppliers)
- Stopped using the factory (3)
- Increased quality inspections for each batch (2)
- Reviewed procedures (1)
- Raised the issues with the factory (1)
- Reviewed quality controls- more testing of weld quality
- Raised issues with Notified Body (1)
- Improved the instructions supplied with product (1)
- Revised DoC (1)
- Changed data plate to state all required information (1)

# Further work



- Joint enforcement with Ports earlier this year
- Batch of small compressors destined for a popular supermarket were held at the port as part of a larger operation.
- Sampled, tested, and found to be compliant