



Pipeline Fracture Resistance Testing

Materials used for pipelines must be capable of resisting a propagating fracture to prevent an uncontrolled propagating fracture resulting in a major hazard to the environment and loss of the pipeline asset. Both polymers and steel pipeline materials can be tested for their fracture resistance at Spadeadam.

Plastic pipe materials up to 700mm diameter can be tested at full scale in a facility incorporating a chilled trench. Tests can be conducted in accordance with Transco standard PL2 or appropriate National Standards or the draft European Standard prEN1555.



Steel transmission pipeline materials can also be tested for fracture resistance. An existing facility for 36" diameter pipe allows for tests up to 190bar involving natural gas or rich gas mixtures. A recirculation system also allows for elevated or below ambient gas mixtures to be used. Extensive instrumentation allows the measurement of crack growth and gas decompression during the experiments that are initiated using shaped explosive charges.

If testing is required to satisfy an operational safety case further scientific measurements can be made to give information on:

- Overpressure generated during a fracture
- Variation of incident thermal radiation with distance for the ensuing fireball or
- If the release is not ignited, the gas concentration at specific locations around the pipeline



Test examples:

- Two tests on 36" diameter steel transmission pipelines conducted using rich gas mixtures at elevated temperature for a pipeline constructed by Alliance Pipeline of Canada.
- In 2001 two tests on high strength (X100) steel as part of a joint industry product.
- Plastic pipe testing with typically 20 tests conducted annually.

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