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MAIN OBJECTIVE

This study aims to assess the fracture initiation and toughness of pipeline materials under hydrogen conditions utilizing pre-cracked compact tension (CT) specimens, the main goal is to determine safety thresholds, develop assessment tool, and recommend best industry practices based on findings from standardized tests such as ASTM E1820."

METHODOLOGY

- Reactor Setup.
- Sample Introduction.
- Apply Tensile Load:
- Data Collection and Analysis

SAFETY PRECAUTIONS

- Controlled Hydrogen Exposure.
- Personal Protective Equipment (PPE).
- Ventilation.
- Hydrogen Detectors & Sensors.
- Alarm Systems.
- Emergency Protocols.

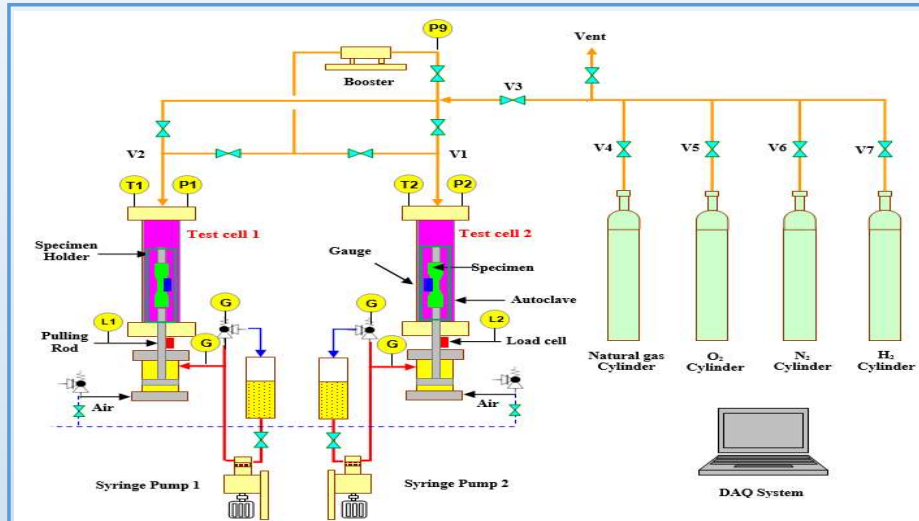


Figure 1 : Process Design

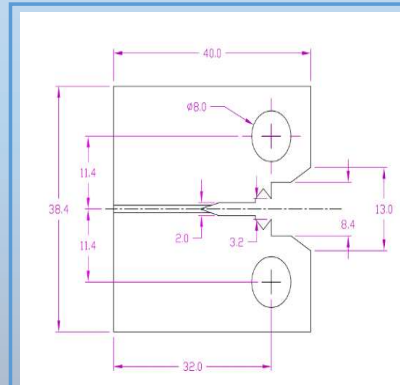


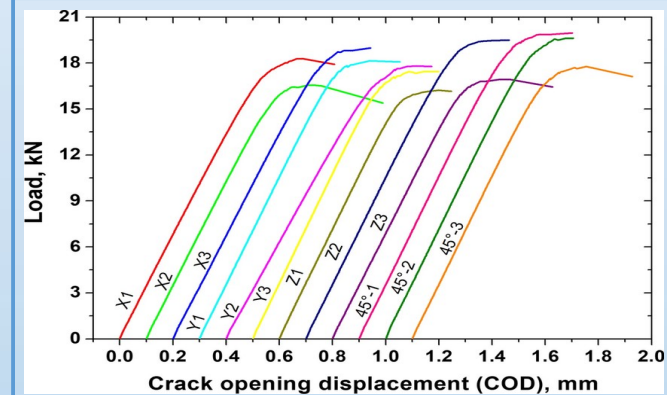
Figure 3 compact tension specimen



Figure 2 : Experimental Setup

EXPECTED OUTCOMES

- Anticipated determination of (K_{IC}) values for hydrogen-embrittled materials per ASTM E1820 guidelines.
- Expected variation in crack displacement (Δa) under high-pressure gas conditions.
- Load vs. displacement analysis to be conducted, yielding crucial fracture toughness parameters, followed by microscopy examination.



CONCLUSION

Through our rigorous evaluation using ASTM E1820 standards on compact tension specimens, we anticipate elucidating the fracture behavior of pipeline materials under hydrogen conditions, paving the way for enhanced industry safety protocols.

ACKNOWLEDGEMENT

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