

MODELS OF CONTINUUM DAMAGE MECHANICS APPLICABLE IN CRYOGENIC CONDITIONS

Cryogenic process pipelines are the one of the basic subsystems used in installations for fundamental research in physics, as well as industrial plants which uses LNG or liquid nitrogen. Significant increase of the cryogenics importance entails the need to explore phenomena having direct impact to the design process of cryogenic systems and its safety systems. These aspects have a high priority due to high investment costs, but mainly because of safety and reliability of service.

One of the issues which require thorough investigations is the fracture of gas pipelines at cryogenic conditions. For this subject, it is important not only when cracks appear, but also how it forms and how quickly it will propagate. Currently, in the literature there is a lack of reliable research in this area. There is often raised as a significant problem for designers, because knowledge in this topic should reflect e.g. in sizing calculations of safety valves for vacuum system.

Presentation of investigation includes fundamental models and concepts of Continuum Damage Mechanics, its impact on the safety systems design process and it will be also shown how research results can improve the selection of safety devices in cryogenics systems in future.

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