

Effect of Aggressive Environments on the Strength Characteristics of Glass and Carbon Fiber Composites in the Oil and Gas Industry

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Abstract. The Russian oil and gas pipeline system spans over 290,000 km, transporting water, oil, gas, and petroleum products. While the estimated service life of these pipelines is 30 years, actual durability often ranges from 10 to 20 years due to harsh conditions, with failures occurring even earlier. Enhancing equipment efficiency is crucial, and using innovative materials like metallic and nonmetallic composites could extend operational lifespan. However, the adoption of these materials is hindered by insufficient knowledge of their environmental interactions and a lack of standardized regulatory documentation. In this paper, changes in the strength at break and strain at break of nonmetallic composite materials were investigated after holding of the samples in operating environments with different acidities and chemical compositions, the dependences equations were obtained.

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