# Susceptibility to stress corrosion cracking of α-β' brass in nitrate solutions

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Ruptures of gas transfer valves for gas network constitute a major security issue. Currently, the risk prevention is based on accelerated tests performed on gas transfer valves to determine their susceptibility to stress corrosion cracking (SCC). However, a lack of reproducibility of the results and representativity of the damage generated by accelerated tests compared to service life is often observed. A new test was developed in laboratory based on exposure to a nitrate solution under constant anodic polarization and a constant mechanical applied load. Experiments were performed on α,β' brass CuZn40Pb2 (CW617N) specimens. Electrochemical methods were combined to surface analyses, scanning electron microscope observations and electron backscatter diffraction analyses to better understand both the initiation and propagations stages of the SCC mechanisms. Results led to the development of a new test which proved to be reproducible and representative of damage service life and to the identification of critical metallurgical parameters.