

COMPORTEMENT MECANIQUE ET RUPTURE DU HDPE SOUS ENVIRONNEMENTS CONTROLES

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Abstract : Nowadays, the high density polyethylene resins (HDPE) are generally transformed into pipes and assemblies on a large scale to build the natural gas distribution and transmission systems. The polymeric materials are largely used by various industrial applications like the transport of liquids under pressure. Several researches are centred on the development of new resistant and durable resins in the aggressive environments. It is the case of the high-density polyethylene. This study relates to the preparation and the test of the standards specimens machined under specific conditions. The adopted norm is ISO 527. The effect of the corrosive conditions like solvents containing benzene and the bases is discussed according to the exposure times. The results are expressed in the form of mechanical properties standards (E , ϵ_y , ϵ_{CD} , ϵ_u , ϵ_y). It arises that deterioration is significant and varies proportionally at the exposure time. Attenuation of E and E , ϵ_y , can arrive up to 25% of the starting value. On the level mechanisms, it is advanced the degradation of the molecular chains (segmentation) and also the hardening under the effect of external forces.

Keywords : polyethylene, Pipe, mechanical properties, pipe wall, aggressive environment, degradation