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Polyethylene (PE) materials for piping systems — Determination of resistance to slow crack growth under cyclic loading — Cracked Round Bar test method

Matériaux polyéthylène (PE) pour systèmes de tuyauterie — Détermination de la résistance à la propagation lente de fissures sous un chargement cyclique — Méthode d'essai de la barre ronde fissurée

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Foreword

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The committee responsible for this document is ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 5, *General properties of pipes, fittings and valves of plastic materials and their accessories — Test methods and basic specifications*.

This corrected version of ISO 18489:2015 incorporates the following corrections.

Formula (2) has been revised.

Formulae (A.1), (A.2) and (A.3) have been revised, as well as the corresponding explanation of symbols.

Introduction

Knowledge about the resistance to long-term failure mechanisms as a result of crack initiation and slow crack growth (SCG) is important for the ranking and pre-selection of thermoplastic materials, especially for long-term applications such as pipes and fittings made of polyethylene. Several tests to determine the relevant failure mechanisms are available today where elevated temperatures and also the combination with stress cracking liquids are used to decrease the time frame for testing.

However, developments in modern raw materials have led to a significant increase of resistance of polyethylene to crack initiation and SCG so that testing with available methods exceeds practical time frames. Therefore, new acceleration methods, preferably at application relevant temperatures and without additional time reducing liquids, are required.

This test method achieves a significant decrease of testing time even at ambient temperatures of 23 °C. This is more relevant to the temperature range of many applications and testing at this temperature does not change the structural status of the polymer. Acceleration of material testing is achieved by the specimen geometry and the cyclic loading regime to result in completion of testing in a relatively short time.[2],[3],[4]