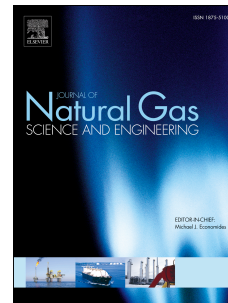


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# The influence of rubber material on sealing performance of packing element in compression packer

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## Abstract

Compression packer is a core component for multi-stage fractured horizontal well. Its performance is critical for controlling the horizontal well fracturing technology. Mainly due to an unreasonable selection of rubber material for elastomeric packing element, sealing failure commonly occurs in compression packer in the field. In order to analyze the influence of rubber material on sealing performance of packing element in compression packer, the constitutive experiments were carried out and constitutive models for three types of rubber materials were optimized based on the hyperelastic constitutive theory for rubber. The finite element model of the packing element system has been established with the light of the finite element method to study the influence of the rubber material on sealing performance of packing element in compression packer with different casing thickness under different setting pressure. The results reveal that the sealing-performance coefficient  $K$ , the maximum Mises stress, shoulder extrusion and compressive deformation magnitude of B75, A70 and E65 materials all climb with an increase of setting pressure during the setting process. Under given working conditions, the sealing performance of B75, A70 and E65 successively decreases. Therefore, in the design of compression packer, B75 is recommended. The research in this paper provides a reference for the selection of rubber material of packing element in compression packer. It has important engineering significance for successful implementation of horizontal well multi-stage fracturing.

**Keywords:** Compression packer; Packing element; Fracturing; Rubber material; Finite element method; Sealing performance.

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