

Since downhole conditions can be extreme, certain packers need to be able to withstand the stresses induced by relatively high differential pressures and high temperatures found within such wellbore environments. The assignee of the present disclosure discovered that when using larger packer type tools, or when using packer type tools in higher temperature and/or higher differential pressure environments, such as those having nominal diameters exceeding six (6) inches, temperatures exceeding 250°F, or differential pressures exceeding 10,000 psi, there was a possibility for the segmented packer element back-up shoes, also referred to as back-up rings, to allow the packer element to extrude through gaps that are formed between the packer OD and the tubing or casing ID when the packer element was activated. Upon certain conditions, the larger OD packer elements, and smaller OD packer elements upon being subjected to elevated pressures and temperatures, were subject to being extruded through these gaps thereby possibly damaging the packer element and possibly jeopardizing the integrity of the seal between the wellbore and the packer element. Also, in the high expansion field, the risk of unwanted extrusion is even higher. This is where the back-up rings are not able to provide much resistance to extrusion of the elastomeric element between the large gap formed between the OD of the packer and the tubing or casing ID given the substantial differences in these diameters in such applications.

Thus, there remains a need in the art for packers having back-up elements that prohibit, or at least significantly reduce, unwanted extrusion of packer elements into the annulus formed between the tubing string and wellbore.

### **SUMMARY OF INVENTION**

According to a first aspect of the present invention, there is provided an annular sealing assembly, comprising: a mandrel; an expandable element disposed around the mandrel having a generally tubular shape and oppositely disposed longitudinal ends; a generally ring-shaped guide ramp disposed around the mandrel adjacent one of the longitudinal opposite ends of the expandable element; a back-up element having a plurality of pivoting blades circumferentially secured in a ring, the back-up element being disposed around the mandrel adjacent the generally ring-shaped guide ramp and being capable of radially expanding and contracting upon longitudinal movement along, and engagement with, the generally ring-shaped guide ramp; and a guide ring disposed around the mandrel adjacent the back-up element, the guide ring being capable of guiding the back-up element longitudinally along the generally ring-shaped guide ramp and providing structural support to the base of the expandable back-up element.

According to a second aspect of the present invention, there is provided a method of sealing an annulus between a mandrel and a tubing string, comprising: expanding an expandable element disposed around the mandrel until it contacts an inner diameter of the tubing string; expanding a back-up element disposed adjacent to the expandable element from a retracted position to an expanded position, the back-up element having a plurality of pivoting blades circumferentially secured in a ring, the blades in the expanded position coming in contact with the inner diameter of the tubing string and preventing the expandable element from extruding outward into the annulus beyond the back-up element.