BALL AND SEAT VALVE FOR HIGH TEMPERATURE AND PRESSURE APPLICATIONS

TECHNICAL FIELD

This disclosure relates generally to equipment utilized and operations performed in conjunction with a subterranean well and in one example described below more particularly, provides a ball and seat valve capable of withstanding high temperature and high pressure applications.

BACKGROUND

Hydrocarbons, such as oil and gas, are commonly obtained from subterranean formations that may be located onshore or offshore. The development of subterranean operations and the processes involved in removing hydrocarbons from a subterranean formation typically include a number of different steps such as, for example, drilling a wellbore at a desired well site, treating the wellbore to optimize production of hydrocarbons, and performing the necessary steps to produce and process the hydrocarbons from the subterranean formation.

As oil and gas wells increase in depth to find sustainable reserves, the resultant reservoir pressures and temperatures have increased significantly. For example, at depths of 30,000 feet, it is not uncommon to experience temperatures over 350°F and pressures over 10,000 psi. These increased downhole conditions have placed increased demands on downhole equipment, including, Isolation Barrier Valves. Current Isolation Barrier Valves utilize a simple spherical ball and seat arrangement as the closure device. In order to meet the current performance demands, the choice of materials to manufacture the ball and seat is becoming restricted and may be nearing the limits of currently approved materials.

The present disclosure is directed to an improved ball and seat valve which incorporates thermally fitted sleeves into the ball and/or the seat to allow greater pressures and temperatures due to the resultant stresses left within the parts due to interference.

SUMMARY OF INVENTION

According to a first aspect of the present invention, there is provided a valve, comprising: a ball having a flow passage formed therein; a support sleeve formed in the flow passage of the ball; and a seat disposed adjacent to and in engagement with the ball.

According to a second aspect of the present invention, there is provided a valve, comprising: a ball having a flow passage formed therein; a seat disposed adjacent to and in engagement with the ball; and a support sleeve disposed around at least a portion of the seat.