

Development of load specifications for the design of the breeding blanket system

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The Breeding Blanket (BB) system with a volume of about 1700 m³ and a plasma front surface of about 1400 m² represents the largest In-Vessel component of DEMO reactor. For its position and for its key functions (e.g. tritium production, power removal and shielding performance), the BB is also one of the most critical component. The single loads acting on the BB can be of different nature (inertial, pressure, thermal and electromagnetic loads, for instance) and their combination may produce high stresses jeopardizing the BB structural integrity if not carefully taken into account during the design. For these reasons, within the EUROfusion consortium, the development of BB system load specifications has been pursued since the early design stage.

The main goals of this work are: (i) to list of all relevant single loads and load combinations to be considered to verify the BB structural integrity, and the categorization of these relevant load combinations, (ii) to identify the short list of load combinations relevant to the pre-conceptual design review phase in sight of 2020 Gate Review. Particular emphasis is also given to the most representative postulated initiating events, which drive the design of the BB, providing their respective load combination.

Keywords: DEMO, Breeding Blanket, load specifications, postulated initiating events

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