

Analysis of Force Convection in Bandung Triga Reactor Core Plate Types Fueled Using Coolod-N2

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Abstract : Any pretensions to stop the production of TRIGA fuel elements by TRIGA reactor fuel elements manufacturer should be anticipated by the operating agency of TRIGA reactor to replace the cylinder type fuel element with plate type fuel element, that available on the market. This away was performed the calculation on U3Si2Al fuel with uranium enrichment of 19.75% and a load level of 2.96 gU/cm³. Maximum power that can be operated on free convection cooling mode at the BANDUNG TRIGA reactor fuel plate was 600 kW. This study has been conducted thermalhydraulic characteristic calculation model of the reactor core power 2MW. BANDUNG TRIGA reactor core fueled plate type is composed of 16 fuel elements, 4 control elements and one irradiation facility which is located right in the middle of the core. The reactor core is cooled using a pump which is already available with flow rate 900 gpm. Analysis on forced convection cooling mode with flow from the top down from 10%, 20%, 30% and so on up to a 100% rate of coolant flow. performed using the COOLOD-N2 code. The calculations result showed that the 2 MW power with inlet coolant temperature at 37 °C and cooling rate percentage of 50%, then the coolant temperature, maximum cladding and meat respectively 64.96 oC, 124.81 oC, and 125.08 oC, DNBR (departure from nucleate boiling ratio)=1.23 and OFIR (onset of flow instability ratio)=1:00. The results are expected to be used as a reference for determining the power and cooling rate level of the BANDUNG TRIGA reactor core plate types fueled.

Keywords : TRIGA, COOLOD-N2, plate type fuel element, force convection, thermal hydraulic characteristic

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