
PROBLEM 8-13N QUESTION

Fuel Pin Problem

A fuel pin is operating with solid pellets of 88% theoretical density and outside radius 5 mm such that at the axial location of maximum fuel temperature, the fuel centerline temperature T_{CL} is 2500°C and the fuel surface temperature, T_{fo} , is 700°C . It is desired to raise the pin linear power by 10% by employing one of the following alternative strategies (in each case all the other conditions except the one cited are held constant):

- a) raise the maximum allowable fuel temperature;
- b) use an annular pellet with the center void of dimension R_v , or
- c) increase the pellet density.

For each strategy find the new value of the cited parameter necessary to achieve the desired 10% increase of linear pin power. Sintering effects may be neglected.

Rev September 1, 2000

Cite as: Jacopo Buongiorno, course materials for 22.312 Engineering of Nuclear Reactors, Fall 2007. MIT OpenCourseWare (<http://ocw.mit.edu/>), Massachusetts Institute of Technology. Downloaded on [DD Month YYYY].