Software Requirements Specification for HGHC

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October 9, 2020

Contents

1 Reference Material

This section records information for easy reference.

1.1 Table of Units

The unit system used throughout is SI (Système International d'Unités). In addition to the basic units, several derived units are also used. For each unit, Tab: ToU lists the symbol, a description and the SI name.

Symbol	Description	SI Name
°C	temperature	centigrade
m	length	metre
W	power	watt

Table 1: Table of Units

1.2 Table of Symbols

The symbols used in this document are summarized in Tab: ToS along with their units. The choice of symbols was made to be consistent with the nuclear physics literature and with that used in the FP manual.

Symbol	Description	Units
h_{b}	Initial coolant film conductance	–
h_{c}	Convective heat transfer coefficient between clad and coolant	$\frac{\mathrm{W}}{\mathrm{m}^2{}^\circ\mathrm{C}}$
h_{g}	Effective heat transfer coefficient between clad and fuel surface	$\frac{\mathrm{W}}{\mathrm{m}^2{}^\circ\mathrm{C}}$
h_{p}	Initial gap film conductance	–
k_{c}	Clad conductivity	–
τ_{c}	Clad thickness	–

Table 2: Table of Symbols

2 Specific System Description

This section first presents the problem description, which gives a high-level view of the problem to be solved. This is followed by the solution characteristics specification, which presents the assumptions, theories, and definitions that are used.

2.1 Solution Characteristics Specification

The instance models that govern HGHC are presented in Section: Instance Models. The information to understand the meaning of the instance models and their derivation is also presented, so that the instance models can be verified.

2.1.1 Data Definitions

This section collects and defines all the data needed to build the instance models.

Refname	**DD:htTransCladFuel**
Label	Effective heat transfer coefficient between clad and fuel surface
Symbol	h_{g}
Units	$\frac{\mathrm{W}}{\mathrm{m}^{2\circ}\mathrm{C}}$
Equation	$$h_{\mathrm{g}} = \frac{2k_{\mathrm{c}}h_{\mathrm{p}}}{2k_{\mathrm{c}} + \tau_{\mathrm{c}}h_{\mathrm{p}}}$$
Description	h_{g} is the effective heat transfer coefficient between clad and fuel surface ($\frac{\mathrm{W}}{\mathrm{m}^{2\circ}\mathrm{C}}$) k_{c} is the clad conductivity (Unitless) h_{p} is the initial gap film conductance (Unitless) τ_{c} is the clad thickness (Unitless)

Refname	**DD:htTransCladCool**
Label	Convective heat transfer coefficient between clad and coolant
Symbol	h_c
Units	$\frac{W}{m^2 °C}$
Equation	$$h_c = \frac{2k_c h_b}{2k_c + \tau_c h_b}$$
Description	h_c is the convective heat transfer coefficient between clad and coolant $(\frac{W}{m^2 °C})$ k_c is the clad conductivity (Unitless) h_b is the initial coolant film conductance (Unitless) τ_c is the clad thickness (Unitless)