



SECOND
TARGET
STATION

CV Uncooled Shield Block Thermal Analysis

Hogan Knott

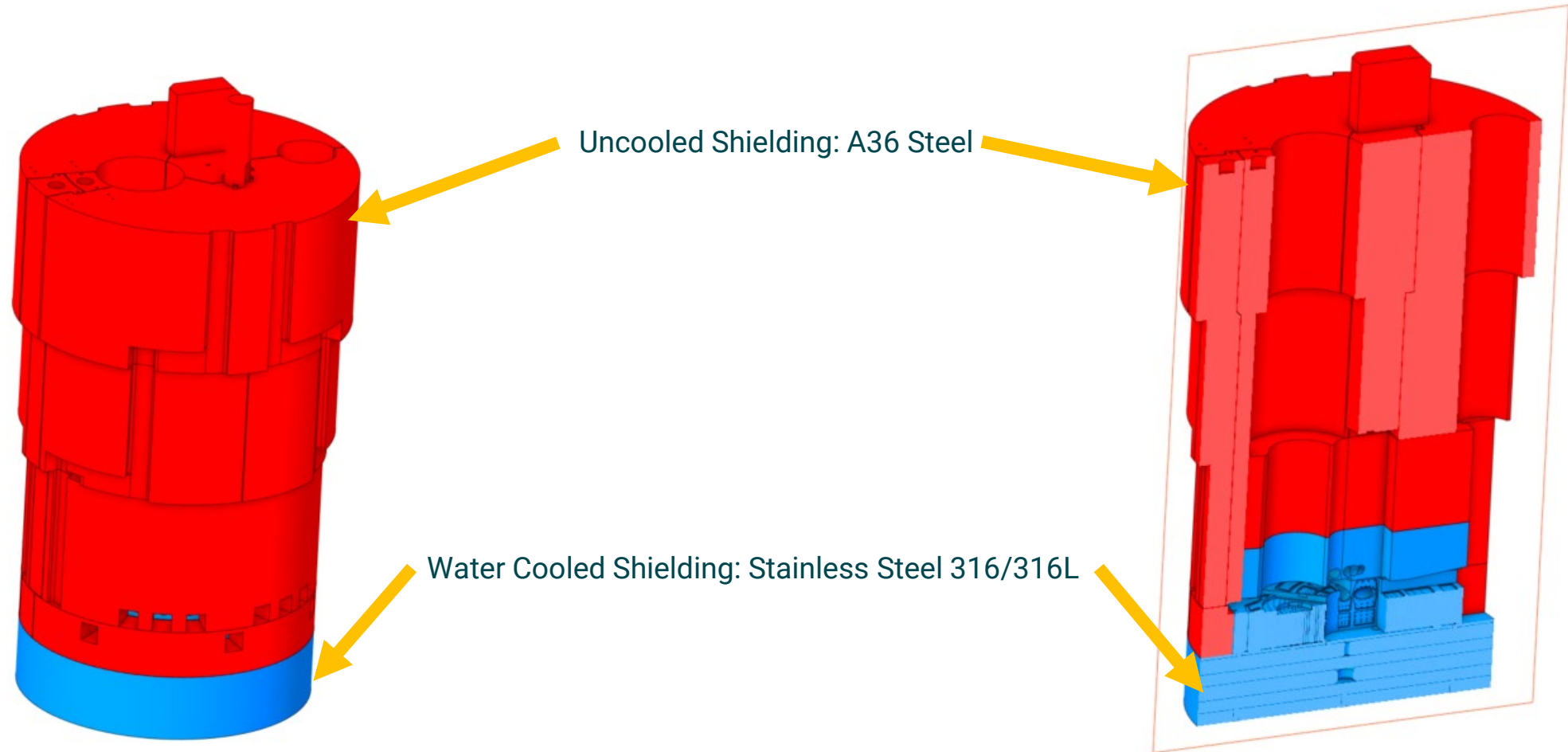


U.S. DEPARTMENT OF
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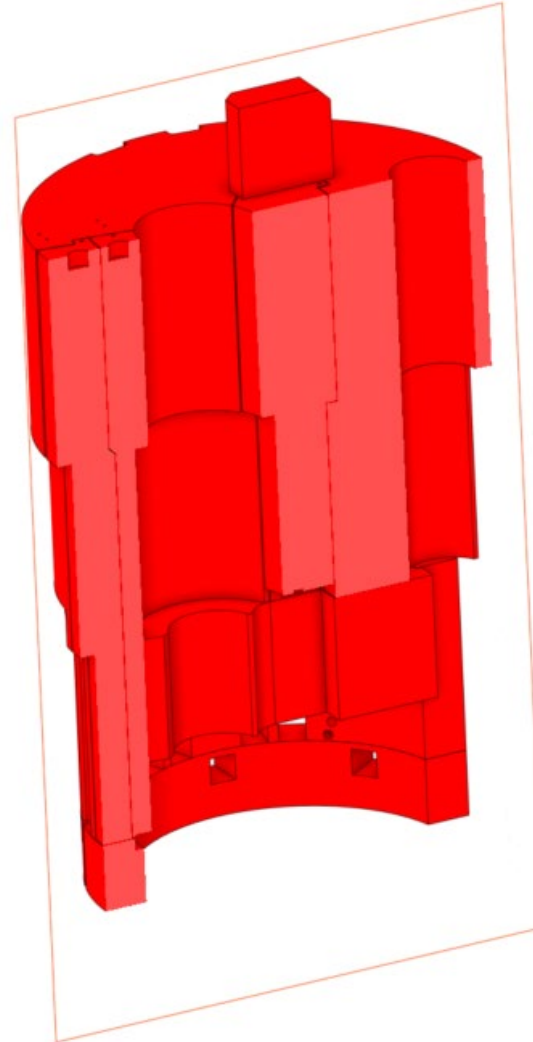
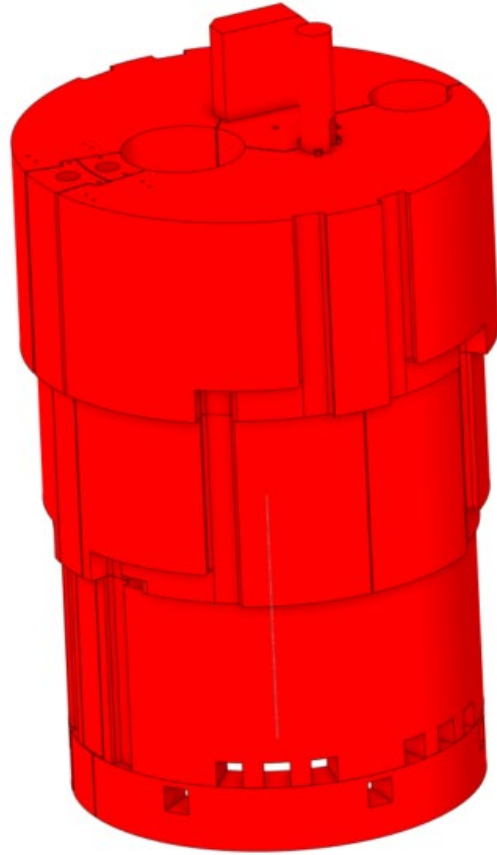
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Vessel Shielding Area Definition



Thermal Model Geometry: Remove Cooled Shielding



Thermal Model Boundary Conditions

Assume surfaces contacting stainless steel are maintained at 35°C

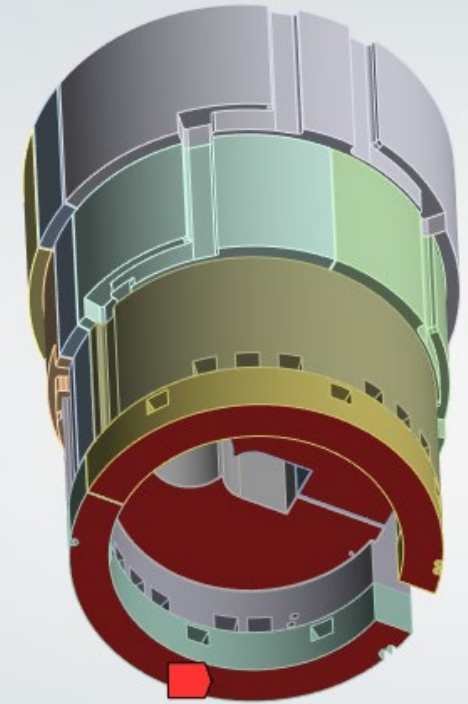
B: Uncooled Blocks

Steady-State Thermal

Time: 1. s

4/9/2025 12:51 PM

Temperature: 35. °C

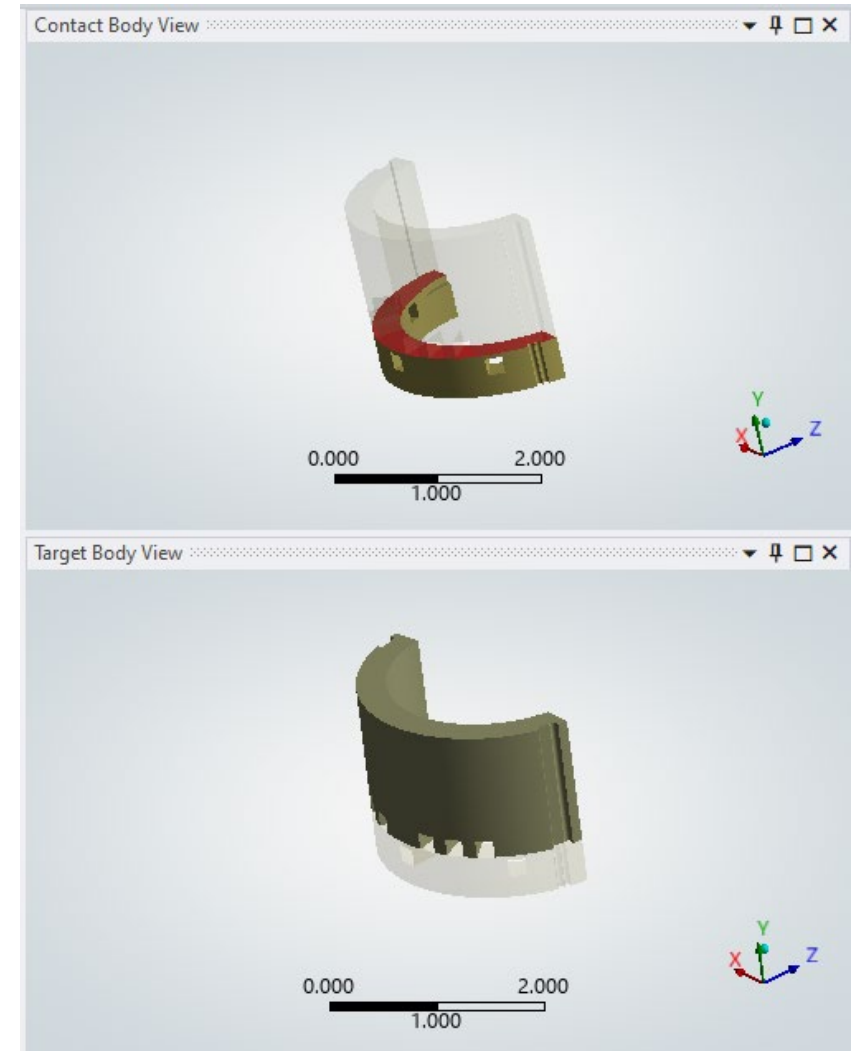


Thermal Model Boundary Conditions

Assume thermal contact resistance of $R''_{t,c} = 0.0025 \text{ m}^2\text{K/W}$ between all contacting resting surfaces [1]

Conservative assumption for stainless steel contact under vacuum conditions

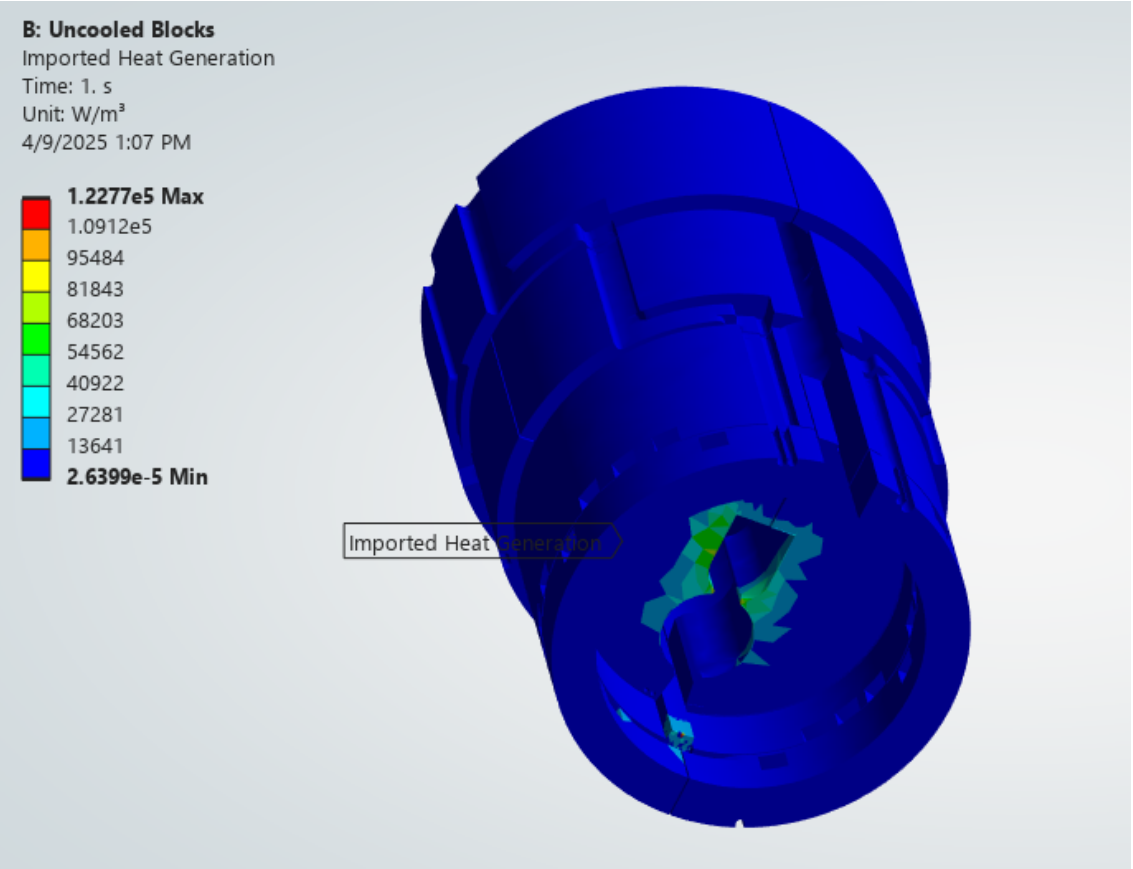
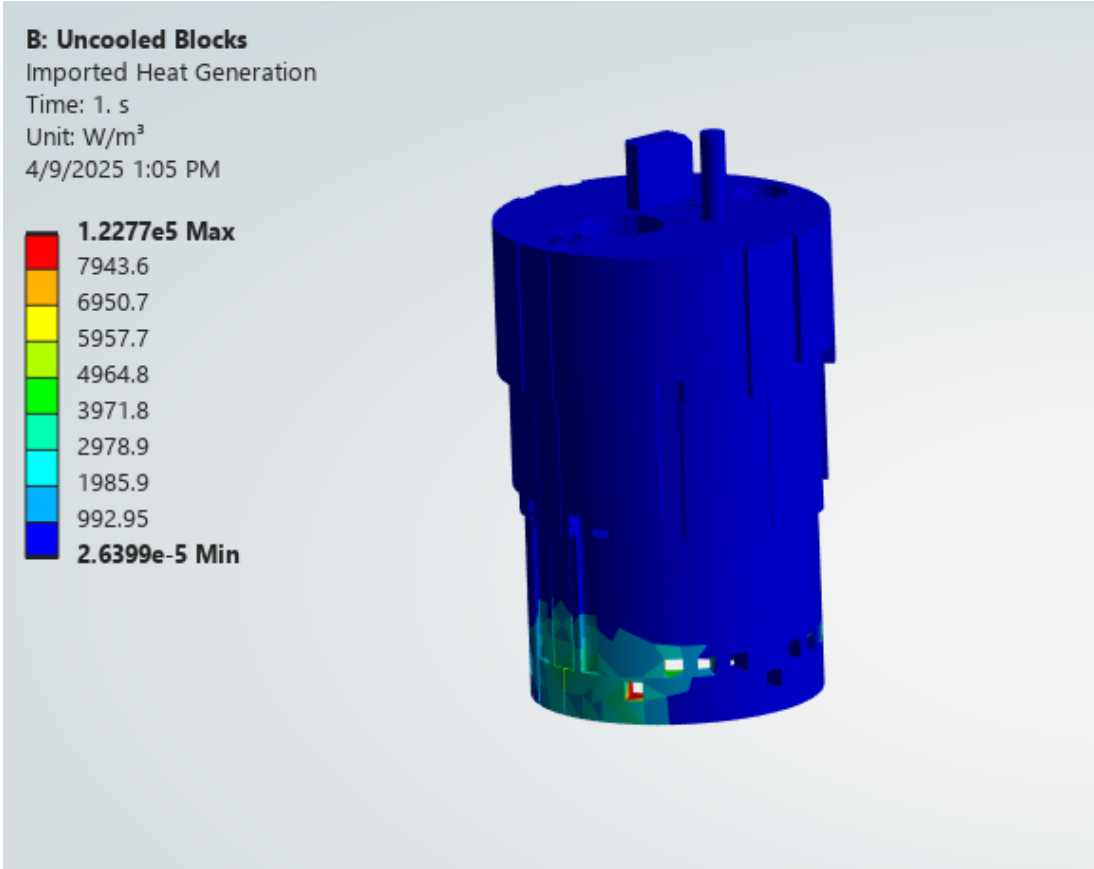
No convective or radiative effects applied



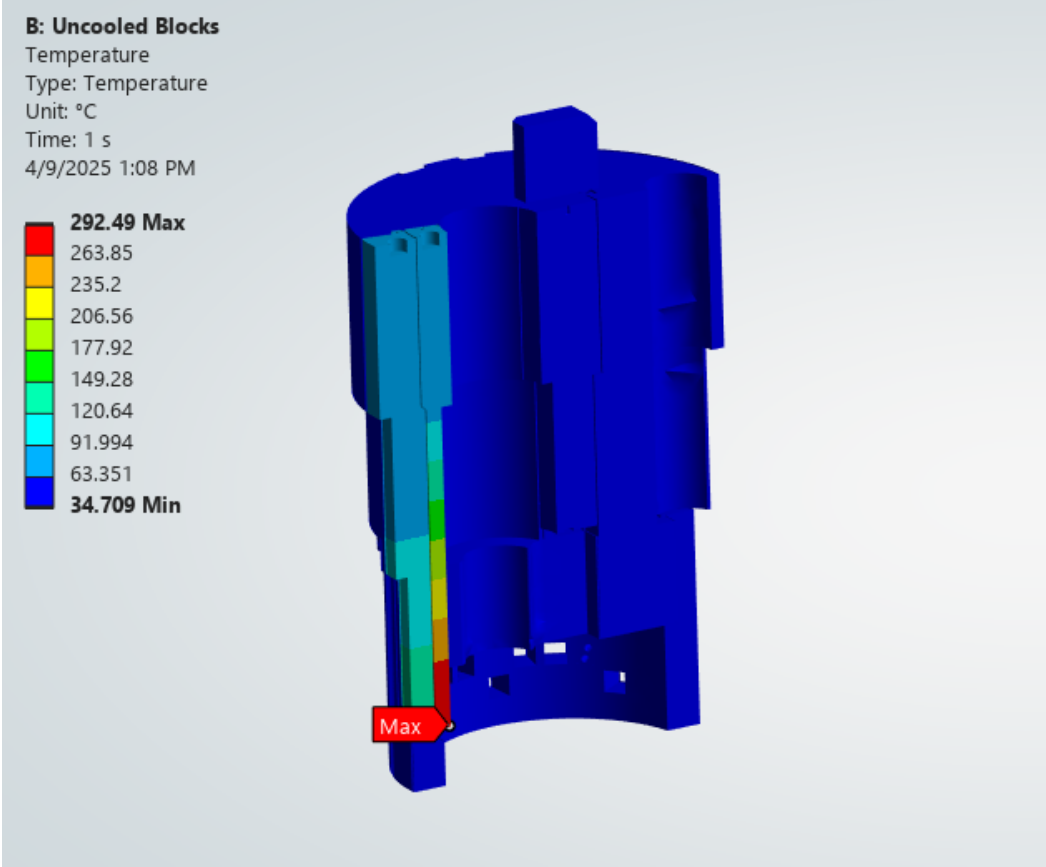
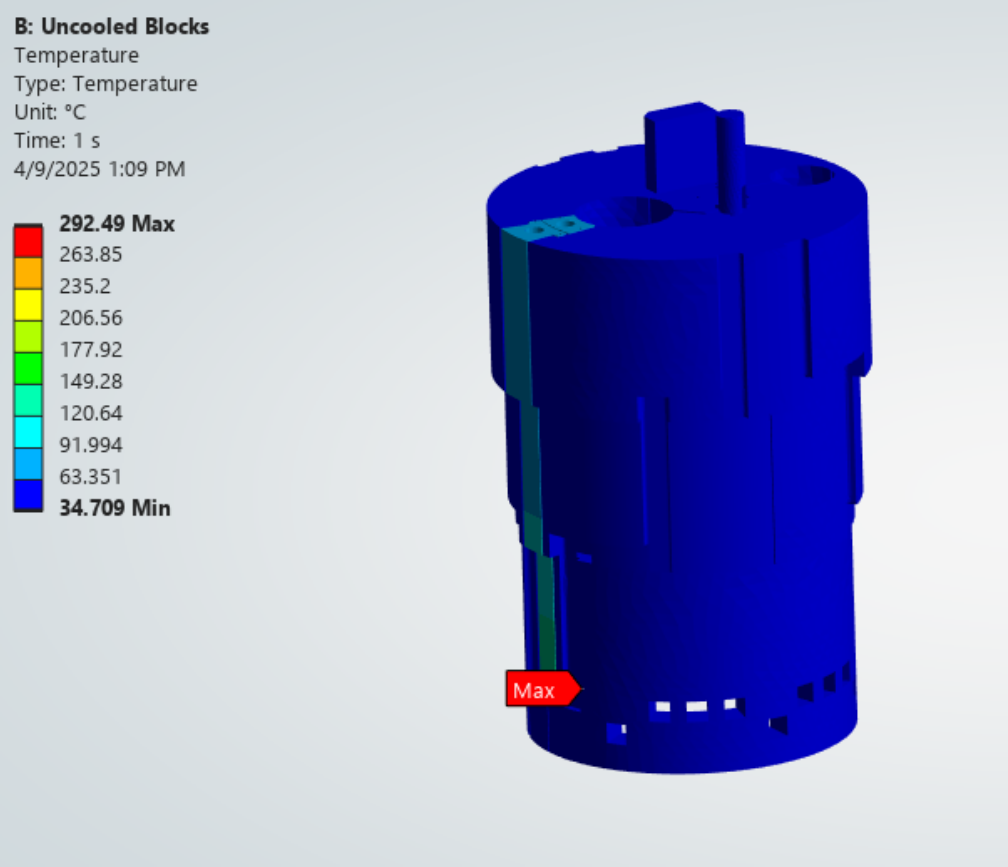
Apply Heat Generation Plot

Results:

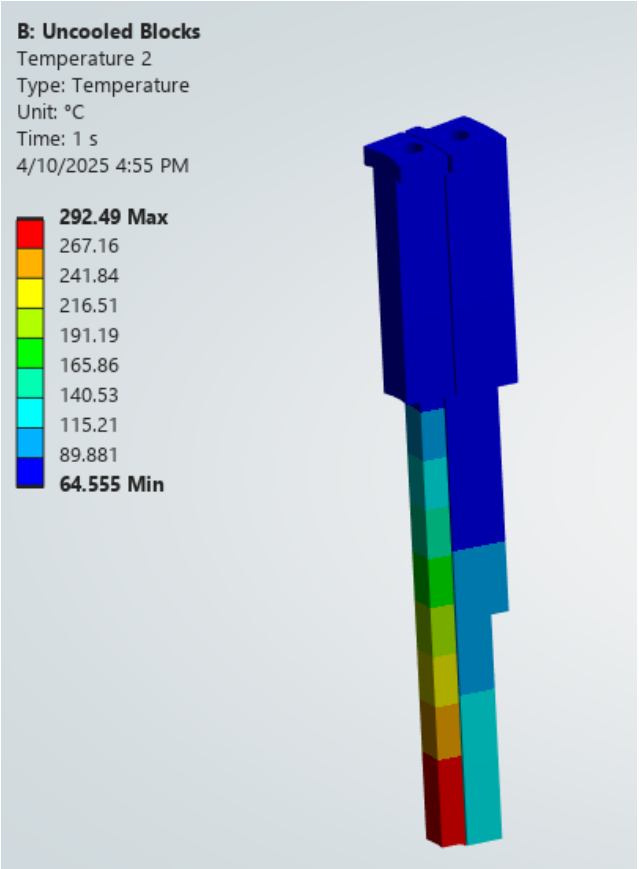
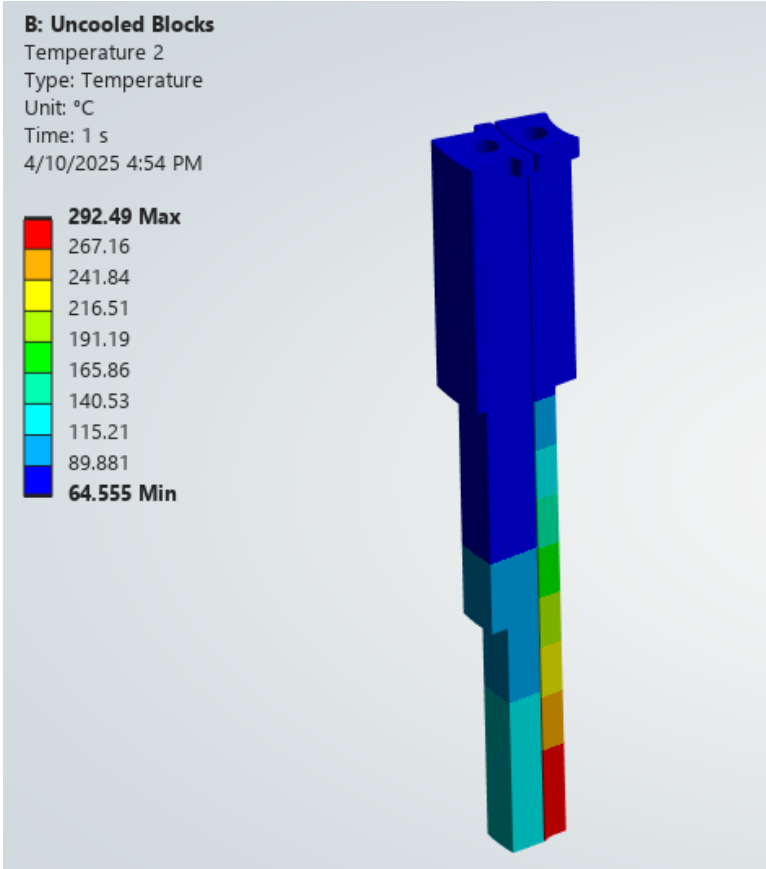
Row	Target
	Total Heat Rate (W)
1	5844.8



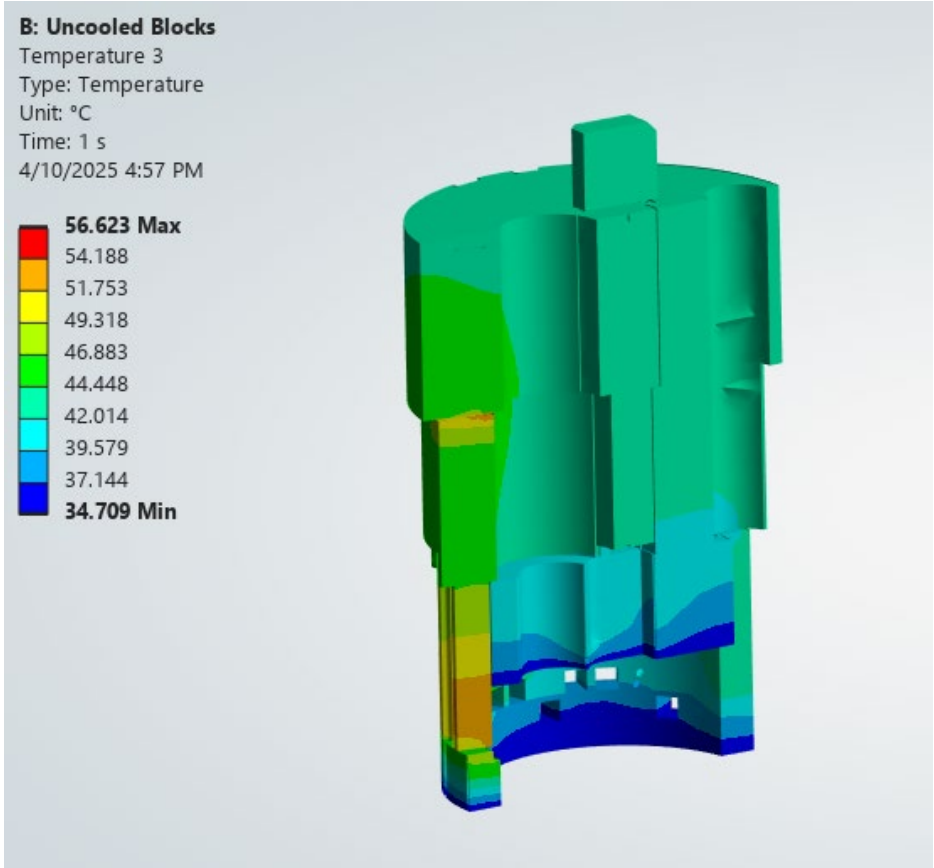
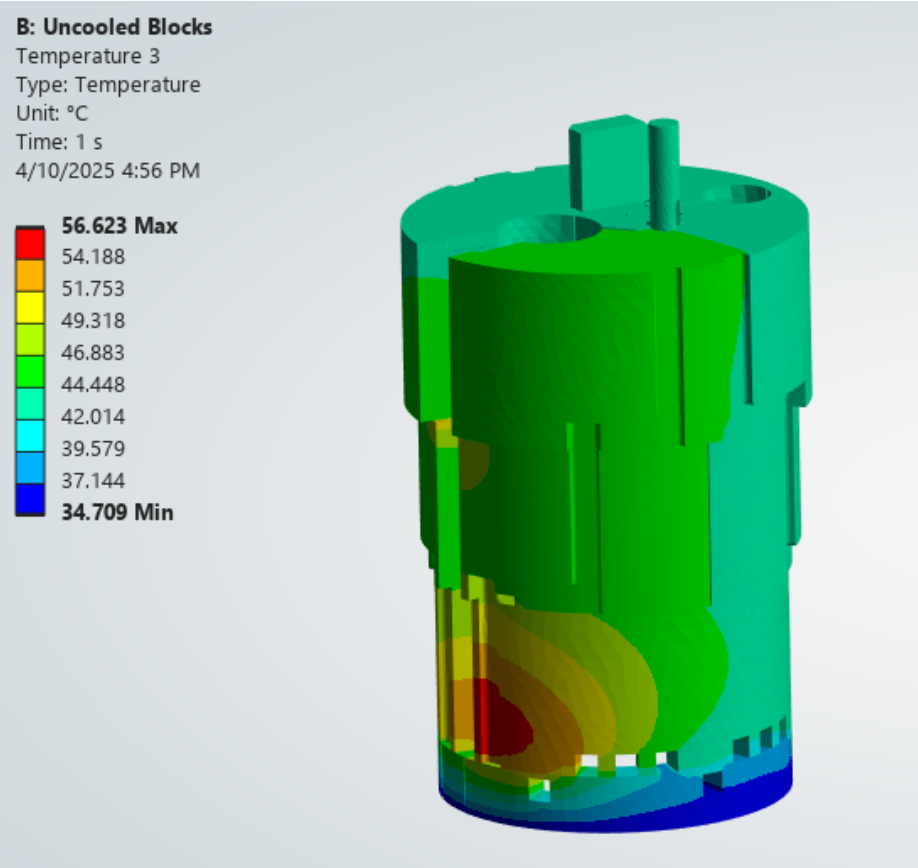
Temperature Results



Temperature Results Removable Blocks



Temperature Results Stationary Blocks



References

1. Fried, E., “Thermal Conduction Contribution to Heat Transfer at Contacts,” in R.P. Tye, Ed. , Thermal Conductivity, Vol. 2, Academic Press, London, 1969.