

Nuclear Data Tables[†]

Thermal (0.0253 eV) Data for Fuel Nuclides
[Excerpts from Tables 3.2, 3.4 & 6.3]

Nuclide	A	σ_a	σ_f	α	η	ν
U-233	233.04	578.8	531.1	0.0899	2.287	2.492
U-235	235.04	680.8	582.2	0.169	2.068	2.418
U-238	238.05	2.7	-	-	-	-
Pu-239	239.05	1011.3	742.5	0.362	2.108	2.871
Pu-241	241.06	1377	1009	0.365	2.145	2.927

Data for Various Moderators at 20°C
[Excerpts from Tables 5.2, 5.3, 6.6 & II.3]

Moderator	A	σ_a	ρ , g/cm ³	D, cm	Σ_a , cm ⁻¹	L_T^2 , cm ²	τ_T , cm ²
H ₂ O	18.015	0.664	1.00	0.16	0.0197	8.1	27
D ₂ O	20.028	0.00133	1.10	0.87	2.9×10^{-5}	3.0×10^4	131
Be	9.012	0.0092	1.85	0.50	1.04×10^{-3}	480	102
Graphite	12.011	0.0034	1.60	0.84	2.4×10^{-4}	3500	368

Bucklings and Fluxes for Critical Bare Reactors ($P = \phi_{avg} V E_R \Sigma_f$)

[Excerpts from Table 6.2]

Geometry	Dimensions	Geometric Buckling, B_g^2	Reactor Flux Distribution	ϕ_{max}	$\frac{\phi_{max}}{\phi_{avg}}$
Parallelepiped	$a \times b \times c$	$\left(\frac{\pi}{a}\right)^2 + \left(\frac{\pi}{b}\right)^2 + \left(\frac{\pi}{c}\right)^2$	$\phi(x, y, z) = \phi_{max} \cos\left(\frac{\pi x}{a}\right) \cos\left(\frac{\pi y}{b}\right) \cos\left(\frac{\pi z}{c}\right)$	$\frac{3.87 P}{V E_R \Sigma_f}$	3.88
Spherical	Radius R	$\left(\frac{\pi}{R}\right)^2$	$\phi(r) = \frac{\phi_{max} R}{\pi r} \sin\left(\frac{\pi r}{R}\right)$	$\frac{\pi^2 P}{3V E_R \Sigma_f}$	3.29
Cylindrical	Radius R Height H	$\left(\frac{\pi}{H}\right)^2 + \left(\frac{2.405}{R}\right)^2$	$\phi(r, z) = \phi_{max} J_0\left(\frac{2.405 r}{R}\right) \cos\left(\frac{\pi z}{H}\right)$	$\frac{3.63 P}{V E_R \Sigma_f}$	3.64

Fast Neutron Data for Fuel Nuclides

[Excerpts from Table 6.1]

Isotope	σ_c	σ_f	σ_a	ν	η
U-235	0.25	1.4	1.65	2.6	2.2
U-238	0.16	0.095	0.255	2.6	0.97
Pu-239	0.26	1.85	2.11	2.98	2.61

[†] Source: J.R. Lamarsh, Introduction to Nuclear Engineering, Addison-Wesley, 1983.