

Universal curve of G_{res} – Formulae

E. Martinho, I.F. Gonçalves, J. Salgado: *Universal curve of epithermal neutron resonance self-shielding factors in foils, wires and spheres*. Applied Radiation and Isotopes **58** (2003) 371-375

I.F. Gonçalves, E. Martinho, J. Salgado: *Extension to cylindrical samples of the universal curve of resonance neutron self-shielding factors*. Nuclear Instruments and Methods in Physics Research B **213** (2004) 186-188

$$G_{res}(z) = \frac{0.94}{1 + (z/2.70)^{0.82}} + 0.06$$

with

$$z = \Sigma_{tot}(E_{res}) \cdot y \cdot \sqrt{\frac{\Gamma_{\gamma}}{\Gamma}}$$

where y is given by:

Geometry (dimension)	y (cm)
Foils (thickness = t)	$y = 1.5 t$
Wires (radius = R)	$y = 2 R$
Spheres (radius = R)	$y = R$
Cylinders (radius = R ; height = h) ($1 \leq h/R \leq 3$)	$y = 1.65 \frac{Rh}{R + h}$

$\Sigma_{tot}(E_{res})$ = total macroscopic cross-section at the resonance peak

Γ_{γ} = resonance width for the (n, γ) reaction

Γ = total resonance width ($\Gamma = \Gamma_{\gamma} + \Gamma_n$)

Γ_n = resonance width for the (n,n) reaction.