How to extract Boron yield/cross sections from B4C targets (at least how I do it).

MC yield:

For the MC yield, we need the number of Boron nuclei/cm^2

Number of B4C scatterers (#/cm^2) = N_A(#/mole) t_{B4C}(g/cm^2)/M_{B4C}(g/mole) → call this "targetfac"

I use this quantity when calculating the MC yield – except each B4C has 4 boron nuclei, so that yield is multiplied by **4.0.**

Using the above in the MC assumes that I have already subtracted the carbon contribution from the experimental B4C yield.

Carbon subtraction:

YB4 (counts/mC/scatterer)= $N_{B4C}/(Q_{B4C}*\text{targetfac}_{B4C}) - N_C/(Q_C*\text{targetfac}_C)$
YB4 (counts/mC) = $N_{B4C}/Q_{B4C} - N_C/Q_C * \text{targetfac}_{B4C}/\text{targetfac}_C$
$= N_{B4C}/Q_{B4C} - N_C/Q_C * t_{B4C}/t_C *(M_C/M_{B4C})$

Useful numbers:
t_{10B4C} = 0.5722 g/cm^2
t_{11B4C} = 0.6348 g/cm^2
t_C = 0.5244 g/cm^2

M_{10B4C} = 52.062 g/mole
M_{11B4C} = 56.048 g/mole
M_C = 12.0107 g/mole

$\text{Targetfac}_{10B4C}/\text{targetfac}_C$ = 0.2517
$\text{Targetfac}_{11B4C}/\text{targetfac}_C$ = 0.2594

Note that I apply this as a correction to the effective charge from the carbon target, so actually use the inverse:
$Q_{eff} = Q_C/(\text{targetfac}_{B4C}/\text{targetfac}_C)$