

Radiation Levels and Radiation Tolerance Criteria in Tile Cal Boards

Name of the board	Location ¹			Simulated Radiation Level ²		
	Z _{min}	Z _{max}	R _{min}	R _{max}	SRL _{mid}	SRL _{sec}
HV micro	210,0	210,0	400,0	400,0	(1 MeV n cm ⁻² 10 y) 6,41E-01	(> 20 MeV, h cm ⁻² 10y) 1,76E+09
HV opto	200,0	200,0	400,0	400,0	8,80E-01	1,27E+09
Mother board	275,0	275,0	410,0	410,0	2,54E+00	5,66E+10
Barrel-NEW	270,0	280,0	410,0	420,0	2,00E+00	5,06E+10
EXTENDED BARREL	340,0	350,0	410,0	420,0	0.908E+00	6.43E+10
Integrator	210,0	210,0	410,0	410,0	5,20E-01	2,80E+09
Adder	260,0	260,0	410,0	410,0	1,22E+00	2,33E+10
EXTENDED BARREL	340,0	350,0	410,0	420,0	0.908E+00	6.43E+10
Digitizer PC	275,0	275,0	410,0	410,0	2,54E+00	5,66E+10
Barrel-NEW	270,0	280,0	410,0	420,0	2,00E+00	5,06E+10
EXTENDED BARREL	340,0	350,0	410,0	420,0	0.908E+00	6.43E+10
Interface	150,0	150,0	410,0	410,0	2,25E-01	6,32E+08
EXTENDED BARREL	470,0	480,0	410,0	420,0	2.69E-01	4.15E+08
3-in-1 cards	275,0	275,0	410,0	410,0	2,54E+00	5,20E+09
Mezzanine	232,0	232,0	410,0	410,0	2,54E+00	7,00E+9

Remark:

- ♦ The 3-in-1 cards are equally spaced in z along a TileCal electronics drawer, and the fluence drops exponentially with decreasing z. The value of 5,2E+09 represents the average hadron fluence (E>20 MeV). The maximum fluence for the outermost 3-in-1 card is 5,66E+10.

¹ Units for R and Z: cm

² : see "ATLAS Policy on Radiation Tolerant Electronics" rev.2 pp.9-10. Units for SRL_{mid}: Gray / 10 years; units for SRL_{nei}: 1 MeV equivalent n.cm⁻² / 10 years; units for SRL_{sec}: >20 MeV hadron.cm⁻² / 10 years.