File : Materials

Neutron and thermal shielding

S U M M A R Y

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Cancels and replaces note N MAT NTE DC 13A rev. 2

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0	C. Bochard	F. Labergri	D. Sanchette	Jan.16, 2001

1. PURPOSE

This technical note gives the general characteristics of ROBATEL neutron absorbing material called "compound No. 22".

2. USE

This neutron absorbing material is derived from compound No. 21. Its properties are independent of any confinement. It is generally molded to suitable shape and dimensions, and it can, if necessary, be machined. It allows to produce neutron shielding equipment with a good mechanical strength. Its efficiency, slightly lower than that of compound No. 21, is counterbalanced by a very good thermal resistance.

This material has been tested by irradiation up to an integrated flux of 1.4 10^{18} thermal neutrons/cm². No apparent damage has been noted except for graduation of color.

3. CHEMICAL COMPONENTS (elementary composition)

Normal conditions : density = 1.25 kg/dm^3

Elements	% mass	g/cm^3	10^{24} atoms/cm^3
Aluminum	11.07	1.328 10^{-1}	2.963 10^{-3}
Boron	0.85	1.018 10^{-2}	5.664 10^{-4}
Calcium	1.10	1.320 10^{-2}	1.983 10^{-4}
Carbon	43.43	5.211 10^{-1}	2.612 10^{-2}
Chlorine	7.02	8.424 10^{-2}	1.430 10^{-3}
Hydrogen	7.46	8.957 10^{-2}	5.339 10^{-2}
Oxygen	27.84	3.341 10^{-1}	1.257 10^{-2}
Miscellaneous	1.23	1.476 10^{-2}	0

4. PROPERTIES

Density	1.20 to 1.25	kg/dm^3
Limit temperature	130	°C
Mechanical strength (rupture) :		
- compression	28	MPa
- flexion	6.2	MPa.