ENDF MT Values

The ENDF format uses MT numbers to define reaction types, and some additional MT numbers are used for special sections, such as the descriptive data, or the resonance parameters. In the following tables, "z" stands for any of the particles, *i.e.,* n, p, d, t, He-3, a, or photonuclear gamma.

MT	Reaction	Description	Comments
1	(n,total)	Neutron total cross section. Sum of MT=2, 4, 5, 11, 16-18, 22-26, 28-37, 41-42, 44-45, and 102-117.	Redundant. Undefined for incident charged particles.
2	(z,z_0)	Elastic scattering cross section for incident particles.	
3	(z,nonelastic)	Nonelastic cross section. Sum of MT=4, 5, 11, 16-18, 22-26, 28-37, 41-42, 44-45, 102-117.	Redundant. For photon production only.
4	(z,n)	Production of one neutron in the exit channel. Sum of MT=50-91.	Redundant. For incident neutrons, this is total inelastic scattering (MT=50 is undefined for neutrons).
5	(z,anything)	Sum of all reactions not given explicitly in another MT number. This is a partial reaction to be added to obtain MT=1.	Each particles can be identified and its multiplicity given in File 6. Not allowed in Files 4, 5.
6-9		Not allowed in version 6.	^{9}Be(n,2n) in version 5.
10	(z,continuum)	Total continuum reaction; exclues all discrete reactions.	Redundant; to be used for derived files only.
27	(z,abs)	Absorption. Sum of MT=18 and MT=102-117.	Redundant. Rarely used.
101	(z,disap)	Disappearance. Sum of MT=102-117.	Redundant. Rarely used.

Neutron-Producing Continuum Reactions

MT	Reaction	Description	Comments
11	(z,2nd)	Production of two neutrons and a deuteron, plus a residual.	
16	(z,2n)	Production of two neutrons, plus a residual.	
17	(z,2n)	Production of three neutrons, plus a residual.	
18	(z,fission)	Total fission. Equal to the sum of MT=19, 20, 21, and 38, if present.	Redundant if MT=19 is present. Basic otherwise.
19	(z,f)	First-chance fission.	
20	(z,nf)	Second-chance fission.	
21	(z,2nf)	Third-chance fission.	
22	(z,na)	Production of a neutron and alpha particle, plus a residual.	
23	(z,n3a)	Production of a neutron and three alpha particles, plus a residual.	
24	(z,2na)	Production of two neutrons and an alpha particle, plus a residual.	
25	(z,3na)	Production of three neutrons and an alpha particle, plus a residual.	
28	(z,np)	Production of a neutron and a proton, plus a residual.	
29	(z,n2a)	Production of a neutron and two alpha particles, plus a residual.	

30	(z,2n2a)	Production of two neutrons and two alpha particles, plus a residual.	
32	(z,nd)	Production of a neutron and a deuteron, plus a residual.	
33	(z,nt)	Production of a neutron and a triton, plus a residual.	
34	(z,n^{3}He)	Production of a neutron and a ^{3}He particle, plus a residual.	
35	(z,nd2a)	Production of a neutron, a deuteron, and two alpha particles, plus a residual.	
36	(z,nt2a)	Production of a neutron, a triton, and two alpha particles, plus a residual.	
37	(z,4n)	Production of four neutrons, plus a residual.	
38	(z,3nf)	Fourth-change fission.	
41	(z,2np)	Production of two neutrons and a proton, plus a residual.	
42	(z,3np)	Production of three neutrons and a proton, plus a residual.	
44	(z,n2p)	Production of a neutron and two protons, plus a residual.	
45	(z,npa)	Production of a neutron, a proton, and an alpha particle, plus a residual.	

Neutron-Producing Discrete Reactions

MT	Reaction	Description	Comments
50	(z,n$_0$)	Production of a neutron, leaving the residual nucleus in the ground state.	Not allowed for incident neutrons. Use MT=2.
51	(z,n$_1$)	Production of a neutron, leaving the residual nucleus in the first excited state.	
52	(z,n$_2$)	Production of a neutron, leaving the residual nucleus in the second excited state.	
	...		
90	(z,n$_{40}$)	Production of a neutron, leaving the residual nucleus in the 40th excited state.	
91	(z,n$_c$)	Production of a neutron in the continuum not included in the above discrete representation.	

Reactions That Do Not Produce Neutrons

MT	Reaction	Description	Comments
102	(z,gamma)	Radiative capture.	
103	(z,p)	Production of a proton, plus a residual. Sum of MT=600-649, if they are present.	For incident protons, this is inelastic scattering, and MT=600 is undefined (use MT=2).
104	(z,d)	Production of a deuteron, plus a residual. Sum of MT=650-699, if they are present.	For incident deuterons, this is inelastic scattering, and MT=650 is undefined (use MT=2).
105	(z,t)	Production of a triton, plus a residual. Sum of MT=700-749, if they are present.	For incident tritons, this is inelastic scattering, and MT=700 is undefined (use MT=2).
106	(z,^{3}He)	Production of a He particles, plus a residual. Sum of	For incident ^{3}He particles, this is inelastic scattering, and

		MT=750-799, if they are present.	MT=750 is undefined (use MT=2).
107	(z,a)	Production of an alpha particle, plus a residual. Sum of MT=800-849, if they are present.	For incident alphas, this is inelastic scattering, and MT=800 is undefined (use MT=2).
108	(z,2a)	Production of two alphas, plus a residual.	
109	(z,3a)	Production of three alphas, plus a residual.	
111	(z,2p)	Production of two protons, plus a residual.	
112	(z,pa)	Production of a proton and an alpha particle, plus a residual.	
113	(z,t2a)	Production of a triton and two alphas, plus a residual.	
114	(z,d2a)	Production of a deuteron and two alphas, plus a residual.	
115	(z,pd)	Production of a proton and a deuteron, plus a residual.	
116	(z,pt)	Production of a proton and a triton, plus a residual.	
117	(z,da)	Production of a deuteron and an alpha particle, plus a residual.	

Charged-Particle-Producing Discrete Reactions

MT	Reaction	Description	Comments
600	(z,p_0)	Production of a proton, leaving the residual nucleus in the ground state.	Not allowed for incident protons. Use MT=2.
601	(z,p_1)	Production of a proton, leaving the residual nucleus in the first excited state.	
602	(z,p_2)	Production of a proton, leaving the residual nucleus in the second excited state.	
	...		
648	(z,p_{48})	Production of a proton, leaving the residual nucleus in the 48th excited state.	
649	(z,p_c)	Production of a proton in the continuum not included in the above discrete representation.	
650	(z,d_0)	Production of a deuteron, leaving the residual nucleus in the ground state.	Not allowed for incident deuterons. Use MT=2.
651	(z,d_1)	Production of a deuteron, leaving the residual nucleus in the first excited state.	
	...		
698	(z,d_{48})	Production of a deuteron, leaving the residual nucleus in the 48th excited state.	
699	(z,d_c)	Production of a deuteron in the continuum not included in the above discrete representation.	
700	(z,t_0)	Production of a triton, leaving the residual nucleus in the ground state.	Not allowed for incident tritons. Use MT=2.
701	(z,t_1)	Production of a triton, leaving the residual nucleus in the first excited state.	
	...		

748	(z,t_{48})	Production of a triton, leaving the residual nucleus in the 48th excited state.	
749	(z,t_c)	Production of a triton in the continuum not included in the above discrete representation.	
750	(z,$^3He_0$)	Production of a ^{3}He particle, leaving the residual nucleus in the ground state.	Not allowed for incident ^{3}He particles. Use MT=2.
751	(z,$^3He_1$)	Production of a ^{3}He particle, leaving the residual nucleus in the first excited state.	
	...		
798	(z,$^3He_{48}$)	Production of a ^{3}He particle, leaving the residual nucleus in the 48th excited state.	
799	(z,^3He_c)	Production of a ^{3}He particle in the continuum not included in the above discrete representation.	
800	(z,a_0)	Production of an alpha particle, leaving the residual nucleus in the ground state.	Not allowed for incident alphas. Use MT=2.
801	(z,a_1)	Production of an alpha particle, leaving the residual nucleus in the first excited state.	
	...		
848	(z,a_{48})	Production of an alpha particle, leaving the residual nucleus in the 48th excited state.	
849	(z,a_c)	Production of an alpha particle in the continuum not included in the above discrete representation.	

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