CINDA

Memo 4C-3/342

31 October 1989

To: Distribution

From: M. Lammer

Subject: CINDA: Combination of Energy Codes

Vicki McLane, Simon Webster and I had an exchange of several e-mail messages about the old restrictions on combinations of alphabetic energy codes and of alphabetic with numeric codes in the minimum and maximum energy field of CINDA entries. The conclusion is that the restrictions are no more required by CINDA processing and checking programs and can be dropped.

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We agreed on the following new rules and additions to the chapter on neutron energy in the CINDA manual:

1. Combinations of numerical values:

Addition under "a) General rule for numerical values", manual page II.9.1:

The value entered in the minimum energy field must always be less than the value entered in the maximum energy field.

2. Combinations of alphabetic codes:

Any combination of alphabetic codes is permitted as long as E-MIN ≤ E-MAX (but see 3. below!) is observed, with the following exceptions:

"NDG" in the E-MIN field should not be combined with any other code.
"TR" in the E-MIN field can only be combined with a numeric code or "UP" in the E-MAX field.

3. Energy equivalent for sorting:

For consistency reasons, the following combinations (with presently the same numerical equivalent) should not be permitted in reverse order:

E-MIN	E-MAX
SPON	COLD
MAXW	PILE
FAST	FISS

Therefore, the following numerical energy equivalents are proposed:

SPON	zero	
COLD	0.001	eV
MAXW	0.025	eV
PILE	0.05	eV
FAST	0.5	MeV
FISS	1	MeV

4. Combinations of alphabetic with numeric codes:

Any combination of alphabetic with numeric codes is permitted as long as E-MIN ≤ E-MAX is observed, with the following restriction:

If E-MIN = E-MAX, then the alphabetic code has to be entered in the E-MIN field to maintain consistency with the old entries coded under the previously valid restrictions.

5. Changes in the CINDA Manual:

In addition to the changes introducing the new rules outlined above, the subsections of section g), starting on manual page II.9.5, should be rearranged as follows:

Energy equivalent for sorting (should be a separate subsection).

Combinations of alphabetic codes.

Combinations of alphabetic with numeric codes.

Examples of combinations of codes.

The title of this last subsection should be changed to "Examples ...". The combination "PILE25-2" should be eliminated, and "TR UP" be moved to page II.9.4, following "TR", as "UP" cannot be combined with anything else. (Theoretically, this is not explicitely excluded in the manual, but should be, and does not occur in the master file).

The revised Manual pages are attached (where I also introduced, on page II.9.1, "E-MIN" and "E-MAX" for simplicity).

Attachments

revised

NEUTRON ENERGY

move whole paragraph to left margin (equivalent to paragraph on alphabetic codes below)

Format

Columns 19-26	Minimum (columns 19-22: "E-MIN" field) and maximum (columns 23-26: "E-MAX" field) neutron energy in electron volt.

Numerical values in floating point form : mantissa n.m., exponent ± x. The decimal point is included implicitly between columns 19 and 20 (minimum), and 23 and 24 (maximum energy).
Enter only the sign of the exponent in columns 21 and 25.

Alphabetic codes are also used to describe quantities averaged over typical neutron spectra.

Coding Rules

a) **General rule for numerical values**

Both minimum and maximum incident neutron energies should be given, where E-MIN < E-MAX must always be observed.

new → no paragraph

If the incident neutrons are monochromatic, enter the energy in the minimum energy field only.

Examples of coding :

Energy	Code
34 keV	34+4
0.025 eV (2200 m/s)	25-2
14 MeV	14+7

b) **Negative resonance energies**

Column 19 contains a negative sign. The decimal point is unchanged between columns 19 and 20. A single digit value is entered in column 20 with exponent in columns 21 and 22.

-3 eV (-0.3×10^{1} eV) is coded as -3+1

g) Alphabetic Energy Codes for Spectrum Averages

These codes are intended to describe quantities averaged over typical neutron spectra. They may occasionally be combined with numerical codes or with other alphabetic codes to indicate that both values are given. For instance, a code MAXW 25-2 should be used when both a maxwellian spectrum average and a value for monochromatic neutrons are given.

Code (left adjusted)	Expansion in CINDA Book	Description
COLD	Cold	Subthermal neutron spectrum
MAXW	Maxwl	Maxwellian neutron spectrum at a temperature of 293°K or reactor temperature.
PILE	Pile	A reactor spectrum with a non-Maxwellian energy distribution
FAST	Fast	A Fast-reactor spectrum
FISS	Fiss	An unmoderated fission neutron spectrum
Non spectrum codes		
NDG	None	No data given
SPON	Spont	Spontaneous fission (use only for quantities NU, NUD, NUF, SFN, SFG, FPG, FPB, NFY, FRS, CHG)
TR	Thrsh	Threshold energy (if possible a numerical value should be given instead), together with a numerical value for E-MAX, or
TR UP	Thrsh up.	if no upper limit is specified above the threshold (if possible, a numerical limit should be given or estimated).

move to left and compress lines

revised wording

inserted here

For other neutron spectra, when none of the alphabetic codes applies, a numeric energy value is entered corresponding to the kT value of the spectrum, with an explanation in the free text (e.g. MAXW., KT=30KEV). Such entries should, however, not be combined with or blocked to entries for monoenergetic neutrons.

whole page revised

Energy equivalent for sorting

For internal sorting processes, the alphabetic energy codes are assigned numerical energy equivalents:

SPON	zero	
COLD	0.001 eV	
MAXW	0.025 eV	
PILE	0.05 eV	
FAST	0.5 MeV	
FISS	1 MeV	
TR	0.5 MeV	--> 5 Mev
TR UP	0.5 MeV	--> 10 Mev

Combinations of alphabetic codes

Any combination of alphabetic codes is permitted as long as E-MIN≤E-MAX is observed, with the following exceptions:

"NDG" must be entered in the E-MIN field and should not be combined with any other code.

"TR" must be entered in the E-MIN field and can only be combined with a numeric code or "UP" (no blank!) in the E-MAX field.

Combinations of alphabetic with numeric codes

Any combination of alphabetic with numeric codes is permitted as long as E-MIN≤E-MAX is observed, with the following restriction:

If E-MIN=E-MAX, then the alphabetic code has to be entered in the E-MIN field.

If in a paper both a spectrum average as well as a range of monochromatic neutron values are given, two separate entries should be made.

Examples of combinations of codes

MAXW25-2	**Maxwl 2.5-2**	**Maxwellian spectrum and 0.025 eV monochromatic neutrons**
delete **PILE25-2**	**Pile 2.5-2**	**Pile spectrum and 0.025 eV monochromatic neutrons**
MAXW PILE	**Maxwl Pile**	
MAXW FISS	**Maxwl Fiss**	**Both indicated spectrum averages**
MAXW FAST	**Maxwl Fast**	**are given**
SPON MAXW	**Spont Maxwl**	