



Deficiencies in ENDF/B-VII.0

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List of ENDF/B-VII.0 deficiencies

www.nndc.bnl.gov/exfor/4web/VII.0-deficiencies.html

NNDC National Nuclear Data Center **BROOKHAVEN NATIONAL LABORATORY**

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Evaluated Nuclear Data File (ENDF)

Database version of December 15, 2006
ENDF/B-VII.0 officially released

Core nuclear reaction database containing evaluated (recommended) cross sections, spectra, angular distributions, fission product yields, thermal neutron scattering, photo-atomic and other data, with emphasis on neutron-induced reactions. All data are stored in the internationally adopted format (ENDF-6) maintained by CSEWG.

Basic Retrieval | Extended Retrieval | Advanced Retrieval | Help | **Sigma Retrieval**

Target
56fe; fe-56; 26-fe-56; fe*

Reaction
n,*; n,tot; n,g; n,f; n,inl; n,nu*

Quantity
sig; da; de; da/de; res; cov*

Library
 All Selected Reset

- ENDF/B-VII.0 (USA, 2006)
- JEFF-3.1 (Europe, 2005)
- JENDL-3.3 (Japan, 2002)
- ENDF/B-VI.8 (USA, 2001)

Submit Reset

Database Manager: Michal Herman, NNDC, Brookhaven National Laboratory (mwherman@bnl.gov)
Web and Database Programming: Viktor Zerkov, NDS, International Atomic Energy Agency (V.Zerkov@iaea.org)
Web Programming: Boris Pritychenko, NNDC, Brookhaven National Laboratory (nndoweb@bnl.gov)
Data Source: CSEWG (www.nndc.bnl.gov/csewg/) and NEA WPEC (www.nea.fr/html/science/wpec/)

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Deficiencies in ENDF/B-VII.0 library				
Material	Deficiency	Detailed description	Reported by	Reported on
Neutron sublibrary				
Al-27	MT=32, 33, and 45 to be removed?	The MT = 32, 33 and 45 cross-section files from 27Al in ENDF/B-VII.0 are very strange looking. In all three cases, there is only one non-zero point in the cross-section table and that non-zero point is very small (5.2e-4 for MT=32, 4.3e-7 for MT=33 and 4.7e-12 for MT=45) and always at 20 MeV. In all three cases, the threshold for the reaction is very close to 20 MeV, and there is a point just after the 20 MeV point with zero cross-section. I recommend removing all of the MT = 32, 33 and 45 files from 27Al	dave brown <brown170@lanl.gov>	02/08/08
Am-242	Angular distributions (MF4/MT18) missing	242Am (mat 9546) does not have angular distribution data (mf=4, mt=18) for the prompt fission neutrons, as required by Section 4.4.3 of the ENDF manual.	"Skip Kahler" <akahler@lanl.gov>	09/21/07
B-7	Line numbers	All MT sections in B7 start at line number 0 instead of 1.	"Koning A.J." <koning@nrg.nl.com>	02/22/07
Be-7	Energy range too short	The entire 7Be evaluation ends at 8.1 MeV.	dave brown <brown170@lanl.gov>	11/06/07
Be-7	No MT=1	I found that the Be7 evaluation does not have MT=1	KAWANO Toshihiko <kawano@lanl.gov>	03/17/08
Ca-46	Unphysical shape of elastic	Ca-46 has a natural abundance of 0.004% so it is unlikely to be important when modeling Ca in concrete, tuff, and other materials. We noticed the problem because the evaluation violated some of the ENDF-6 rules we check in our processing codes. I would be satisfied with repairing the evaluation, but would prefer the elastic scattering cross section to have a shape that makes physical sense in this energy range. The JENDL-3.3 Ca-46 evaluation has a sig_es(2200)=2.93252b and would appear to be a reasonable evaluation to compare the repaired Ca-46 evaluation against for reasonableness.	Zerkle, Mike" <zerkleml@bettis.gov>	10/26/06
Cd-106, Cd-108	Missing resonances	In a number of evaluations groups of resonances are missing - ZA=48106 - all resonances between about 600 eV and 2.6 keV are missing. ZA=48108 - all resonances between 350 eV and 2.6 keV are missing. S. Mughabghab response: Do not get scared! If you consult the Atlas of Neutron Resonances for Cd-106 and Cd-108, you will notice that there are energy gaps from 879 eV to 2647 eV for Cd-106 and 337 eV to 2590 eV for Cd-108 where measurements of neutron resonance parameters are not carried out as yet! To reflect this situation, a note in the ENDFVII documentation should have been included.	Dermott E. Cullen <RedCullen1@comcast.net>	01/04/07
Cd-113	Thermal capture	Replacing the isotopic Cd cross sections from beta-3 with the elemental Cd cross sections from ENDF/B-V but keeping beta-3 cross sections for everything else produces a value of 0.9976 for k-eff for this case, and a ratio of 0.366 for Cd captures to U-235 fissions. The value for k-eff differs from the benchmark value of k-eff (1.0012 +/- 0.0019) by more than 1 standard deviation, but even so it is approximately 0.006 delta-k higher than the pure beta-3 result. Furthermore, the ratio of Cd captures to U-235 fissions is effectively the same as from the pure ENDF/B-V results quoted previously.	Russ Mosteller <mosteller@lanl.gov>	11/14/06
Cm-242	Hole in the CCCCR NJOY module output	The output that I get for Cm242 using NJOY shows a "hole" in part of the CCCCR module output. Unless I did something wrong, it looks to me as if there is some problem with the file (carried over from ENDF/B-VI).	Arnie Aronson" <aronson1@bnl.gov>	03/28/07
Eu-153	Negative distributions in MF6/MT91	Mike, take a look at Eu-153, MF6/MT91, line 1532? It looks like you are putting out negative values for		



G Forge – a way to go in future

Features:

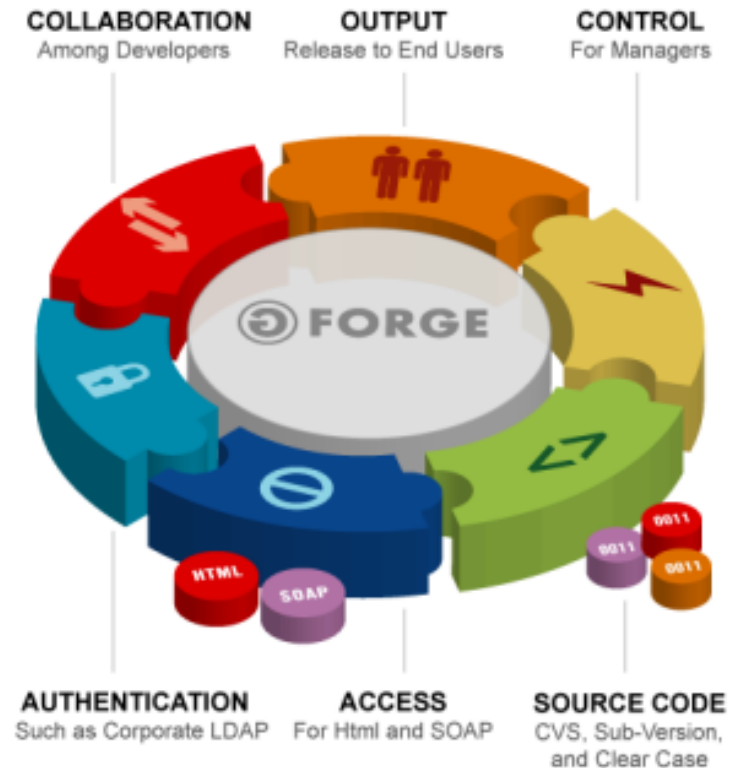
- Manage File Releases
- Document Management
- News announcements
- Surveys for users and admins
- Issue tracking
- Task management

Implementation at NNDC well advanced:

- Link to Apache web server
- Deficiency tracking
- Mailing system
- Source file managing system (cvs)
- File uploading/downloading
- Forum, mailing list

Need to do:

- Customization
- Tunneling through BNL firewall



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Overview of VII.0 deficiencies

47 deficiency entries

- 37 in neutron sublibrary (45+ materials)
- 3 in charged particle sublibrary (4 materials)
- 2 in thermal scattering sublibrary (3 materials)
- 5 in decay sublibrary (3+ materials) ▫ ▫

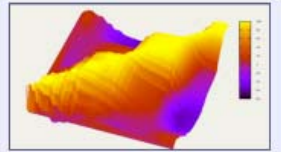
Most serious issues

- Negative cross sections, distributions, multiplicities
- Energy range too short
- Wrong cross section
- RR region overextended
- Typo in the nu-bar exponent (!)
- Energy balance
- Too coarse fission spectra
- Fission beta spectra 40% lower than in VI.8 (decay sublib.)
- Target meta states not indicated

ENDF/-VII.0 benchmarking page

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Benchmarking ENDF/B-VII.0

- Benchmarking ENDF/B-VII.0, S.C. van der Marck, [Nuclear Data Sheets 107\(2006\)2931](#)
- Be benchmarks by [R. MacFarlane](#)
- Benchmarking ENDF/B-VII.0 files (comparison with JEFF-3.1) by [Jean Christophe Sublet](#)
- Comparison of ENDF/B-VII.0 versus ENDF/B-VII beta2 by [R. MacFarlane](#)
- Comparison of criticality benchmarks using ENDF/B-VIIb3 and ENDF/B-VI.8 by [R. MacFarlane](#) and [A. Kahler](#)
- Comparison of keff calculated with ENDF/B-VII.0 against experimental data by [R. MacFarlane](#) and [A. Kahler](#)
- Comparison of Results for the MCNP Criticality Validation Suite Using ENDF/B-VII.0 and Other Nuclear Data Libraries by [Russell D. Mosteller](#)
- Critical benchmarks from IHBCSBEP including the MOX criticals by [Harish C. Huria](#)
- ENDF/B-VII.0 Data Testing for Three Fast Critical Assemblies by [D.E. Cullen](#) [August 28, 2007]
- ENDF/B-VII.0 Results for Unreflected Plutonium Solutions and MOX by [Russ Mosteller](#)
- Energy Balance of ENDF/B-VII.0 by [R. MacFarlane](#)
- Fast systems calculated with LLNL codes by [D. Brown](#)
- Kritz, LCT026, LCT032, LCT062, and LCT065 benchmarks by [H. Huria](#)
- POINT2007 by [D. Cullen](#) [October 18, 2007]
- Systematics of U233-Water Criticality With ENDF/B-VII by [Bob MacFarlane](#) and [Skip Kahler](#)
- TRIPOLI-4.4.1 ICSBEP+ criticality validation using JEFF-3.1 and ENDF/B-VII.0 by [Jean Christophe Sublet](#)

Web: [Boris Pritychenko](#), NNDC, Brookhaven National Laboratory
Last Modified: October 18, 2007