IAEA-NDS-31
(Rev. 3)

INTERNATIONAL ATOMIC ENERGY AGENCY

NUCLEAR DATA SERVICES

DOCUMENTATION SERIES OF THE IAEA NUCLEAR DATA SECTION

INDL/V (85)

IAEA Nuclear Data Library for various neutron data evaluations in ENDF-5 format

Contents and Documentation

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Abstract: INDL/V is a computerized library for evaluated neutron reaction data from varying origin compiled in ENDF-5 format. The data are available costfree on magnetic tape from the IAEA Nuclear Data Section. This document summarizes the contents of the library in its version of March 1985.

June 1985

IAEA NUCLEAR DATA SECTION, P.O. BOX 100, A-1400 VIENNA

Contents

Introduction

INDL/V is the IAEA Nuclear Data Library for Various neutron data evaluations in ENDF-5 format. Other evaluated neutron data libraries compiled by the IAEA Nuclear Data Section are

INDL/A - Actinide evaluations in the formats ENDF-5, ENDF-4, KEDAK, UKNDL

IRDF - The International Reactor Dosimetry File in ENDF-5 format

INDL/F - evaluations for INTOR fusion calculations in ENDF-5 format

EXFOR/V - evaluations in EXFOR format

The previous version of INDL/V that had been issued in May 1982 (IAEA-NDS-31 Rev. 2) is herewith superseded. Since then almost all evaluations have been revised and several new ones have been added. In the summary documentation on the following pages "new" in the left hand margin indicates that the evaluation was added to INDL/V after May 1982, and "unchanged" means that the evaluation is still in the same version as in May 1982. All other evaluations have been revised. Consequently, each evaluation is to be identified and cited by:

- the library name INDL/V
- the accession-number (MAT-nr.)
- and the revision number

as for example: INDL/V-4110 Rev.1. This information is given in record 6 of each evaluation after the keyword "IDENTIFIER". (The first two digits of the accession-number (MAT) are identical with the atomic number Z of the target nucleus; the third and fourth digit is arbitrary.)

INDL/V is not a comprehensive file of recommended and consistent evaluations but it is a collection of available evaluations of varying origin and purpose. INDL/V includes only few evaluations which are "complete" in the sense that they are suitable for neutron transport calculations. Most evaluations in INDL/V cover selected reactions only or data in a limited energy range.

The IAEA Nuclear Data Section

- either compiled the data in ENDF/B-5 format,
- or converted the data from another format into the ENDF/B-5 format,
- and/or checked the data by means of graphical plotting and the programs CHECKER and PLOTCON.

Thus, the IAEA Nuclear Data Section assumes some responsibility for the formal correctness of the files, whereas the data evaluations remain under the responsibility of the authors.

Evaluations included in this library may, at the same time, be part of another library. Corresponding cross-references are included in this document.

Those evaluations which contain resonance-parameters, can be made available, if so requested, as point data produced by the code RECENT. All evaluations are available in ENDF-5 standard format but can be made available also in edited output format.

Recipients of the data are requested to report to the IAEA Nuclear Data Section any deficiencies encountered when using the data.

INDL/V contains evaluations from the following institutions that are identified in this document by the following "Lab" codes:

AUSIRK	Institut für Radiumforschung und Kernphysik, Wien, Austria
CCPFEI	Fiziko-Energeticheskij Institut, Obninsk, USSR
CCPIJE	Inst. Jadern. Energ. Ak. Nauk BSSR, Minsk, USSR
CPR	China, People's Republic
DDRROS	Zentralinstitut für Kernforschung, Rossendorf, German Democratic Republic
DDRTJD	Technische Universität Dresden, German Democratic Republic
FR BRC	C.E.N. Bruyères-le-Châtel, France
FR CAD	Centre d'Etudes Nucléaires, Cadarache, France
FR SAC	Centre d'Etudes Nucléaires, Saclay, France
IAEA	IAEA Nuclear Data Section, Vienna, Austria
ITYBOL	E.N.E.A., Bologna, Italy
POLIBJ	Inst. Badan Jadr., Warszawa, Swierk, Poland
RUMPIT	IRNE, Inst. of Nucl. Power Reactors, Pitesti, Romania
UK HAR	AERE Harwell, UK
USABNL	Brookhaven National Laboratory, USA
USALLL	Lawrence Livermore National Laboratory, USA

The references quoted in this document are cited in the style of CINDA. Copies of the references quoted are available costfree upon request.

History of INDL/V

Started August 1980 with BOSPOR-78, documented in IAEA-NDS-31 Rev.0.

Contents of July 1981 documented in IAEA-NDS-31 Rev.1, including the accession-numbers 2100, 2200, 9200, 1220, 1520, 2410, 2420, 2610, 2620, 2810, 2820, 2830, 2920, 3010, 3020, 4020, 4110, 4120, 4520, 5310, 6810, 6820, 5830, 5840, 5850, 6360, 8110, 9210, 9410, 9420, 9430, 9510, 9610.

Changes until May 1982

BOSPOR-78 removed as superseded, BOSPOR-80 with 144 threshold reactions on 93 nuclides added.

Dosimetry reactions added: 1120, 2110, 9509.

Actinide evaluations added: 9421 (replacing 9420), 9431 (replacing 9430), 9440, 9450.

Revised: 4110 (above 9.75 MeV), 2810 (correction of a miss punch).

Version of May 1982 documented in IAEA-NDS-31 Rev. 2.

Changes until June 1985

The entire library was thoroughly checked and corrected, so that nearly all files were revised.

Newly included were 67 materials so that the entire library now includes 195 materials. Among the newly included evaluations are:

- SOKRATOR evaluations (GDR/FEI) on Si and Fe and an improved file on Nb
- 12 Chinese evaluations from CENDL
- 10 French evaluations from 1974/76
- several actinide evaluations which are the same as in INDL/A(83) plus a more recent file on Cm-248 from Bologna
- some new activation reactions needed for IRDF-85 or for the Activation Handbook to be published by IAEA, including Al-27(n,α); Si-28(n,p); Ni-58(n,2n); Cu-63(n,α); Ag-109(n,α) plus eight more reactions from the Obninsk BOSPOR file
- Romanian evaluations for (n,c.p.) reactions on 7 Mo isotopes
- Obninsk evaluations for (n,2n) and (n,3n) for 20 actinide isotopes

SUMMARY of INDL/V CONTENTS (June 1985)

INDL/V MAT_Nr/Rev	Nuclide	Reactions	No. of records	Lab	Year	Original Library	Documentation

SUMMARY of INDL/V CONTENTS (June 1985)

	INDL/V MAT-Nr/Rev	Nuclide	Reactions	No. of records	Lab	Year	Original Library	Documentation
	130/1.	1-D-2	(n,2n)	101	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
	210/1.	2-He-3	many up to 15 MeV ang. distr.	285	"	1976	SOKRATOR	"
unchanged	220	2-He-4	tot.,el. up to 15 MeV ang. distr. (el)	200	"	1976	SOKRATOR	"
	330/1.	3-Li-6	(n,2n), (n,p)	152	"	1980	BOSPOR-80	INDC(CCP)-147
	430/1.	4-Be-9	(n,2n)	105	"	"	"	"
	530/1.	5-B-10	(n,t)	107	"	"	"	"
new	540/1.	5-B-10	many up to 20 MeV, cross-sections, ang. and en. distr. of secondary neutrons	2448	CPR	1982	CENDL	IAEA-NDS-61
new	520	6-C-12	all up to 20 MeV angular distr. of secondary neutrons and photons	2166	FR BRC	1975	France	INDC(FR)-7 (1975)
	630/1.	6-C-12	(n,p)	64	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
	730/1.	7-N-14	(n,α), (n,2n)	145	"	"	"	"
	830/1.	8-O-16	(n,p), (n,α)	139	"	"	"	"
unchanged	920	9-F-19	(n,2n), covariances	101	AUSIRK	"	-	Physik-Daten 13-2
	930/1.	9-F-19	(n,2n),(n,p),(n,α)	196	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
unchanged	1120	11-Na-23	(n,2n), covariances	82	POLIBJ	1979	-	INR-1809, 9, 1979
	1130/1.	11-Na-23	(n,2n),(n,p),(n,α)	183	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147

	INDL/V MAT-Nr/Rev	Nuclide	Reactions	No. of records	Lab	Year	Original Library	Documentation
new	1210/1.	12-Mg-nat	many up to 20 MeV, cross-sections, ang. and en. distr. of secondary neutrons	5121	CPR	1983	CENDL	IAEA-NDS-61
	1220/1.	12-Mg-24	(n,p), covariances	270	AUSIRK	1979	EXFOR-V	Physik-Daten 13-1
	1230/1.	12-Mg-24	(n,p)	92	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
new	1320	13-Al-27	(n,α), covariances	258	AUSIRK	1980	-	Physik-Daten 13-3
	1330/1.	13-Al-27	(n,p), (n,α)	157	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
		Note: (n,α)	13-15 MeV confirmed by Csikai (82 Antwerp)					
		(n,p)	13-15 MeV too low compared to Csikai (82 Antwerp)					
new	1410/1.	14-Si-nat	many up to 20 MeV, cross-sections, ang. and en. distr. of secondary neutrons	4122	CPR	1983	CENDL	IAEA-NDS-61
new	1415/1.	14-Si-nat	all reactions 0-20 MeV, res.pars, ang. and en. distr., photons	6519	DORTUD	1981	SOKRATOR -2015	INDC(GDR)-20
	1430/1.	14-Si-28	(n,p)	96	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
new	1450	14-Si-28	(n,p)	78	POLIBJ	1983	-	INDC(POL)-12 p.1
	1520/1.	15-P-31	(n,p), covariances	172	AUSIRK	1980	-	Physik-Daten 13-2
	1530/1.	15-P-31	(n,2n),(n,p),(n,α)	197	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
	1630/1.	16-S-32	(n,2n),(n,p),(n,α),(n,t)	226	"	"	"	"
	1640/1.	16-S-34	(n,α)	95	"	"	"	"
	1730/1.	17-Cl-35	(n,α),(n,2n),(n,2n)m	164	"	"	"	"

	INDL/V MAT-Nr/Rev	Nuclide	Reactions	No. of records	Lab	Year	Original Library	Documentation
	1930/1.	19-K-39	(n,2n),(n,p),(n,α)	203	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
	1940/1.	19-K-41	(n,p),(n,α)	161	"	"	"	"
	(2024)	superseded by 9440						
	(2025)	superseded by 9450						
	2030/1.	20-Ca-42	(n,p)	99	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
	2040/1.	20-Ca-44	(n,p),(n,α)	141	"	"	"	"
unchanged	2110	21-Sc-45	(n,γ) with res. pars. from ENDF/B-5=6426, (n,2n) added	375	USABNL	1981	-	Priv. Com. Magurno
	2130/2.	21-Sc-45	(n,2n),(n,2n)m,(n,p), (n,α)	215	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
new	2200	22-Ti-nat	total, elastic, (n,γ) up to 20 MeV, no res.pars.	8165	FR BRC	1976	-	CEA-R-4883 (1977)
	2230/1.	22-Ti-46	(n,p) (n,2n) Note: (n,2n) 13-15 MeV confirmed by Csikai (82 Antwerp)	131	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
	2240/1.	22-Ti-47	(n,p)	108	CCPFEI	1980	BOSPOR-80	"
	2250/1.	22-Ti-48	(n,p)	95	"	"	"	"
	2260/1.	22-Ti-49	(n,p)	101	"	"	"	"
	2270/1.	22-Ti-50	(n,p)	85	"	"	"	"
	2330/1.	23-V-51	(n,p),(n,α)	99	"	"	"	"
	2410/1.	24-Cr-nat	many cross-sections up to 15 MeV	1692	"	1977	SOKRATOR	77KIEV, 4, P.91, 1977
	2420/3.	24-Cr-52	(n,p) (n,2n)	123	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
	2440/1.	24-Cr-50	(n,2n)	67	"	"	"	"
	2530/1.	25-Mn-55	(n,2n)	76	"	"	"	"
new	2533	25-Mn-55	(n,α)	27	"	"	"	"

	INDL/V MAT-Nr/Rev	Nuclide	Reactions	No. of records	Lab	Year	Original Library	Documentation
	2535	25-Mn-55	(n,p)	30	USALLL	1982	ACTL-82	IAEA-NDS-55
	2610/3.	26-Fe-54	(n,2n),(n,p),(n,α)	195	CCPFEI	1980	BOSPOR	INDC(CCP)-147
	2620/3.	26-Fe-56	(n,p) (n,2n)	136	"	"	"	"
new	2640/1.	26-Fe-nat	many up to 15 MeV, cross-sections, res. pars., ang. distr. of sec. neutrons	3734	"	1982	SOKRATOR -2021	YK, 36(1), 65, 1980
	2730/1.	27-Co-59	(n,2n),(n,p),(n,α)	197	"	1980	BOSPOR-80	INDC(CCP)-147
	2810/1.	28-Ni-nat	many cross-sections up to 15 MeV	1344	"	1977	SOKRATOR	77KIEV, 4, P.91, 1977
	2820/3.	28-Ni-58	(n,2n), (n,p), (n,d), (n,α)	259	"	1980	BOSPOR-80	INDC(CCP)-147, 6/80
		Note: (n,2n) 13-15 MeV confirmed by Csikai (82 Antwerp)						
new	2825	28-Ni-58	(n,2n), covariances	38	AUSIRK	1983	-	INDC(AUS)-9, 6/83
	2830/3.	28-Ni-60	(n,p)	101	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147, 6/80
	2840/1.	28-Ni-62	(n,α)	35	"	"	"	"
(n,α) new	2920/1.	29-Cu-63	(n,2n), (n,α) covariances	248	AUSIRK	1979 1982	EXFOR-V	Physik-Daten 13-1
	2930/1.	29-Cu-65	(n,2n), (n,p)	142	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147, 6/80
		Note: (n,2n) 13-15 MeV confirmed by Csikai (32 Antwerp)						
(n,α) new	2940/2.	29-Cu-63	(n,2n), (n,α)	86	CCPFEI	"	"	"
	3010/3.	30-Zn-64	(n,2n), (n,p)	140	"	"	"	"
unchanged	3020	30-Zn-64	(n,p), covariances	223	AUSIRK	1979	EXFOR-V	Physik-Daten 13-1

	INDL/V MAT-Nr/Rev	Nuclide	Reactions	No. of records	Lab	Year	Original Library	Documentation
	3040/1.	30-Zn-66	(n,2n), (n,p)	135	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
new	3070/1.	30-Zn-68	(n,α)	49	"	"	"	"
	3130/1.	31-Ga-69	(n,2n)	76	"	"	"	"
	3140/1.	31-Ga-71	(n,2n)	79	"	"	"	"
	3230/1.	32-Ge-70	(n,2n)	72	"	"	"	"
	3240/1.	32-Ge-76	(n,2n)	79	"	"	"	"
	3330/1.	33-As-75	(n,2n),(n,p),(n,α)	187	"	"	"	"
	3430/1.	34-Se-74	(n,2n)	70	"	"	"	"
	3440/1.	34-Se-75	(n,2n)	73	"	"	"	"
	3450/1.	34-Se-78	(n,2n)	76	"	"	"	"
	3460/1.	34-Se-80	(n,2n)	78	"	"	"	"
	3470/1.	34-Se-82	(n,2n)	81	"	"	"	"
	3530/1.	35-Br-79	(n,2n)	75	"	"	"	"
	3540/1.	35-Br-81	(n,2n),(n,2n)m	114	"	"	"	"
	3730/1.	37-Rb-85	(n,2n)	76	"	"	"	"
	3740/1.	37-Rb-87	(n,2n)	77	"	"	"	"
	3830/1.	38-Sr-84	(n,2n)	71	"	"	"	"
	3840/1.	38-Sr-88	(n,2n)m	73	"	"	"	"
new	3850/1.	38-Sr-86	(n,p)	49	"	"	"	"
new	3920	39-Y-89	(n,2n)	60	FR BRC	1974	France	CEA-R-4636 (1975)
	3930/1.	39-Y-89	(n,2n)	72	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
new	4010/1.	40-Zr-nat	keV range up to 20 MeV, cross-sections, ang. and en. distr. of sec. neutrons	4604	CPR	1983	CENDL	IAEA-NDS-61

	INDL/V MAT-Nr/Rev	Nuclide	Reactions	No. of records	Lab	Year	Original Library	Documentation
	4020/1.	40-Zr-90	(n,2n), covariances	153	AUSIRK	1979	EXFOR-V	Physik-Daten 13-1
	4030/1.	40-Zr-90	(n,2n) (n,p)	132	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147, 6/80
		Note: (n,2n) 13-15 MeV confirmed by Csikai (82 Antwerp)						
new	4070/1.	40-Zr-94	(n,α)	48	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147, 6.80
new	4080/1.	40-Zr-92	(n,α)	49	"	"	"	"
unchanged	4110/1.	41-Nb-93	many, 20 keV to 20 MeV ang.dist., en.dist. Rev.1 (1982): elastic, abs., (n,t) revised above 9.75 MeV	1582	DDRROS	1982	SOKRATOR	KE, 20, (6), 166, 1977
		Note: (n,2n)m 13-15 MeV slightly too high compared to Csikai (82 Antwerp)						
new	4111/2.	41-Nb-93	many, 0 to 20 MeV	1668	DDRROS IAEA	1985	SOKRATOR et al.	unpublished
		Note: Compiled by V. Goulo, IAEA, based on MAT-4110/1., supplemented by resonance region based on JENDL-2 and supplemented by energy spectra for (n,n') and (n,2n) between 4 and 20 MeV computed with STAPRE code.						
unchanged	4120	41-Nb-93	(n,n')m, covariances	207	AUSIRK	1980	-	Physik Daten 13-2
	4130/1.	41-Nb-93	(n,2n), (n,2n)m	125	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147, 6/80
		Note: (n,2n)m 13-15 MeV slightly too high compared to Csikai (82 Antwerp) though agreement within experimental uncertainty						
new	4140	41-Nb-93	(n,2n), (n,2n)m	96	FR BRC	1974	France	CEA-R-4676 (1975)
	Note: perhaps superseded by revised evaluation in CEA-N-1875 142 (1976)							
new	4210	42-Mo-nat	keV-range up to 20 MeV, cross-sections, ang. and en. distr. of sec. neutrons	871	CPR	1983	CENDL	IAEA-NDS-61

	INDL/V MAT-Nr/Rev	Nuclide	Reactions	No. of records	Lab	Year	Original Library	Documentation
new	4222	42-Mo-92	(n,np), (n,p), (n,d)	70	RUMPIT	1984	-	unpublished
new	4224	42-Mo-94	"	63	"	"		"
new	4225	42-Mo-95	"	63	"	"		"
new	4226	42-Mo-96	"	63	"	"		"
new	4227	42-Mo-97	"	63	"	"		"
new	4228	42-Mo-98	"	60	"	"		"
new	4229	42-Mo-100	"	58	"	"		"
	4230/1.	42-Mo-92	(n,2n)	68	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147, 6/80
	4520/1.	45-Rh-103	(n,n')m, covariances	229	AUSIRK	1980	EXFOR-V	Physik Daten 13-2
	4530/1.	45-Rh-103	(n,2n)	79	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
new	4730	47-Ag-109	(n,p)	49	"	"	"	"
new	4736	47-Ag-109	(n,α)	26	USALLL	1982	ACTL-82	IAEA-NDS-55
	4830/1.	48-Cd-106	(n,2n)m	73	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
	4840/1.	48-Cd-111	(n,p)	87	"	"	"	"
	4850/1.	48-Cd-112	(n,α)	81	"	"	"	"
	4860/1.	48-Cd-116	(n,2n)	82	"	"	"	"
	4930/1.	49-In-113	(n,2n)	79	"	"	"	"
	4940/1.	49-In-115	(n,2n),(n,2n)m	124	"	"	"	"
	5030/1.	50-Sn-112	(n,2n)	74	"	"	"	"
	5040/1.	50-Sn-118	(n,α)	82	"	"	"	"
	5130/1.	51-Sb-121	(n,2n)	80	"	"	"	"
	5140/1.	51-Sb-123	(n,2n)	81	"	"	"	"
	5310/3.	53-I-127	(n,2n)	31	"	"	"	"
	5530/1.	55-Cs-133	(n,2n)	80	"	"	"	"

	INDL/V MAT-Nr/Rev	Nuclide	Reactions	No. of records	Lab	Year	Original Library	Documentation
	5830/1.	58-Ce-140	(n,2n),(n,2n)m	122	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
	5840/1.	58-Ce-142	(n,2n)	88	"	"	"	"
	5930/1.	59-Pr-141	(n,2n)	80	"	"	"	"
	6030/1.	60-Nd-142	(n,2n)	78	"	"	"	"
	6040/1.	60-Nd-146	(n,2n)	86	"	"	"	"
	6050/2.	60-Nd-148	(n,2n)	87	"	"	"	"
	6060/2.	60-Nd-150	(n,2n)	63	"	"	"	"
	6230/1.	62-Sm-144	(n,2n)	75	"	"	"	"
	6240/1.	62-Sm-148	(n,2n)	34	"	"	"	"
	6250/1.	62-Sm-150	(n,2n)	85	"	"	"	"
	6260/1.	62-Sm-152	(n,2n)	83	"	"	"	"
	6270/1.	62-Sm-154	(n,2n)	85	"	"	"	"
	6810/1.	68-Er-162	res.pars.,tot,(n,γ),el. diff. el, diff. inel.	455	CCPFEI	1976	SOKRATOR	YK-21 (1976) English summary see
	6820/1.	68-Er-164	"	469	"	"	"	INDC(CCP)-111 (1978)
	6830/1.	68-Er-166	"	597	"	"	"	"
	6840/1.	68-Er-167	"	694	"	"	"	"
	6850/1.	68-Er-168	"	591	"	"	"	"
	6860/1.	68-Er-170	"	536	"	"	"	"
new	6920	69-Tm-169	(n,2n)	75	FR BRC	74/9	France	CEA-R-4712 (1974)
	6930/1.	69-Tm-169	(n,2n)	84	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
	7130/1.	71-Lu-175	(n,2n)	85	"	"	"	"
new	7220	72-Hf-176	many up to 15 MeV	578	FR SAC	1974	France	J. Krebs et al.,
new	7230	72-Hf-177	res. pars, ang. dist.	749	"	"	"	*unpublished*
new	7240	72-Hf-178	and energy dist. of	561	"	"	"	"
new	7250	72-Hf-179	secondary neutrons	668	"	"	"	"
new	7260	72-Hf-180		563	"	"	"	"

	INDL/V MAT-Nr/Rev	Nuclide	Reactions	No. of records	Lab	Year	Original Library	Documentation
new	7310/1.	73-Ta-181	keV-range up to 20 MeV, cross-sections, ang. and en. distr. of sec. neutrons	1322	CPR	1982	CENDL	IAEA-NDS-61
	7330/1.	73-Ta-181	(n,2n),(n,2n)m,(n,p) Note: (n,2n)g 13-15 MeV confirmed by Csikai (82 Antwerp)	176	CCPrEI	1980	BOSPOR-80	INDC(CCP)-147
new	7410	74-W-nat	1 keV to 20 MeV, cross-sections, ang. and en. distr. of sec. neutrons	397	CPR	1983	CENDL	IAEA-NDS-61
	7730/1.	77-Ir-191	(n,2n)	83	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
	7740/1.	77-Ir-193	(n,2n)	84	"	"	"	"
new	7910/1.	79-Au-197	5 keV to 20 MeV, cross-sections, ang. and en. distr. of sec. neutrons	1703	CPR	1983	CENDL	IAEA-NDS-61
	7930/2.	79-Au-197	(n,2n)	55	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
	8110/3.	81-Tl-203	(n,2n)	85	"	"	"	"
	8140/1.	81-Tl-205	(n,2n)	85	"	"	"	"
new	8209	82-Pb-nat	1 keV to 20 MeV, cross-sections, ang. distr. of sec. neutrons	1385	CPR	1979	CENDL	IAEA-NDS-61
	8230/1.	82-Pb-204	(n,2n)	82	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
	8240/1.	82-Pb-208	(n,2n)	81	"	"	"	"
	8330/1.	83-Bi-209	(n,2n)	86	"	"	"	"

	INDL/V MAT-Nr/Rev	Nuclide	Reactions	No. of records	Lab	Year	Original Library	Documentation
	(9010)	(90-Th-232) accession-number assigned to India						
	(9020)	(90-Th-233) " " "						
(n,3n) new	9030/2.	90-Th-232	(n,2n), (n,3n)		CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
new	9090/3.	90-Th-232	all up to 20 MeV, res. pars. dist., en. dist.	2337	ROMPIT	1982	INDL/A	INDC(ROM)-10
		Note: In MF/MT = 3/457 containing radioactive decay data, there are some invalid records that could not yet be clarified.						
	(9110)	(91-Pa-233) accession-number assigned to India						
new	9130	91-Pa-231	(n,2n), (n,3n)	50	CCPFEI	1980	-	YK-42 (1981)
new	9140	91-Pa-233	(n,2n), (n,3n)	52	"	"	-	"
new	9193/1.	91-Pa-233	all up to 20 MeV, res. pars., ang. dist., en. dist.	1093	ROMPIT	1981	INDL/A	INDC(ROM)-12
		Note: In MF/MT = 8/457 containing radioactive decay data, there are some invalid records that could not yet be clarified.						
unchanged	9210	92-U-235	all reactions up to 15 MeV res.par., ang. dist., en. dist. (new evaluation in progress!)	2002	CCPIJE	1975	SOKRATOR -2022	YK-20, 1975 75KIEV, 2, 43, 1975
new	9220	92-U-235	1 keV to 20 MeV, cross-sections, ang. distr. of elastic neutrons	813	CPR	1979	CENDL	IAEA-NDS-61
	9230/1.	92-U-238	(n,2n)	91	CCPFEI	1980	BOSPOR-80	INDC(CCP)-147
new	9260	92-U-233	(n,2n), (n,3n)	48	"	"	-	YK-42 (1981)
new	9270	92-U-234	"	53	"	"	-	"
new	9280	92-U-235	"	55	"	"	-	"

	INDL/V MAT-Nr/Rev	Nuclide	Reactions	No. of records	Lab	Year	Original Library	Documentation
new	9290/1.	92-U-238	0 to 20 MeV, res.pars., cross-sections, ang.dist. of elastic neutrons	1321	CPR	1979	CENDL	IAEA-NDS-61
new	9337/1.	93-Np-237	all	1831	FR CAD		INDL/A	INDC(FR)-42
new	9340	93-Np-237	(n,2n), (n,3n)	53	CCPFEI	1980	-	YK-42 (1981)
unchanged	9410	94-Pu-238	Res. par., (n,f),(n,γ)	114	CCPFEI	1973	SOKRATOR	73KIEV, 1, 246, 1977
new	9415	94-Pu-239	1 keV to 20 MeV, cross-sections, ang.dist. of elastic neutrons	633	CPR	1979	CENDL	IAEA-NDS-61
	(9420)	superseded by 9421						
	9421/3.	94-Pu-239	all reactions up to 15 MeV, res. pars., ang. dist., en. dist. (supersedes the 1974 evaluation INDL-9420/ SOKRATOR-2021)	2301	CCPIJE	1981	INDL/A	INDC(CCP)-166
	(9430)	superseded by 9431						
	9431/2.	94-Pu-240	all reactions up to 15 MeV, res. pars., ang. dist., en. dist. (supersedes the 1978 evaluation INDL-9430/ SOKRATOR-2023)	1790	CCPIJE	1981	INDL/A	INDC(CCP)-215
new	9438/2.	94-Pu-238	all up to 14 MeV	834	FR CAD	1982	INDL/A	INDC(FR)-57
unchanged	9440	94-Pu-241	all reactions up to 15 MeV, res. pars., ang. dist., en. dist., (supersedes the 1979 version INDL/A-2024/ SOKRATOR/2024)	2511	CCPIJE	1981	INDL/A	INDC(CCP)-142

	INDL/V MAT-Nr/Rev	Nuclide	Reactions	No. of records	Lab	Year	Original Library	Documentation
unchanged	9450/2.	94-Pu-242	all reactions up to 15 MeV, res. pars., ang. dist., en. dist., (supersedes the1979 version INDL/A-2025/ SOKRATOR/2025)	1554	CCPIJE	1981	INDL/A	INDC(CCP)-150
new	9470	94-Pu-239	(n,2n), (n,3n)	50	CCPFEI	1980	-	YK-42 (1981)
new	9480	94-Pu-240	"	52	"	"	-	"
new	9490	94-Pu-241	"	54	"	"	-	"
new	9495	94-Pu-242	"	53	"	"	-	"
unchanged	9509	95-Am-241	(n,f) at 300K	693	UK HAR	1980	INDL/A	Stuttgart conversion from UKNDL-1009-B
unchanged	9510	95-Am-243	Res. par. (n,f),(n,γ)	138	CCPFEI	1973	SOKRATOR	73KIEV, 1, 246
new	9530	95-Am-243	all	1439	UK HAR	1981	INDL/A	Lynn et al. unpublished
new	9541	95-Am-241	all	1481	FR CAD	1981	INDL/A	Fort et al. unpublished
unchanged	9610	96-Cm-244	Res. par., (n,f), (n,γ)	147	CCPFEI	1973	SOKRATOR	73KIEV, 1, 246
new	9630	96-Cm-241	(n,2n), (n,3n)	48	CCPFEI	1980	-	YK-42 (1981)
new	9640	96-Cm-242	"	50	"	"	-	"
new	9648	96-Cm-248	all reactions up to 15 MeV	306	ITYBOL	1983	Suppl. to INDL/A	TIB/FICS-(83)-4
new	9650	96-Cm-243	(n,2n), (n,3n)	50	CCPFEI	1980	-	YK-42 (1981)
new	9660	96-Cm-244	"	51	"	"	-	"
new	9670	96-Cm-245	"	50	"	"	-	"
new	9680	96-Cm-246	"	53	"	"	-	"
new	9690	96-Cm-247	"	52	"	"	-	"
new	9695	96-Cm-248	"	52	"	"	-	"

Notes on specific libraries included in INDL/V

Austrian Evaluations for IRDF-82/85

Evaluated data for neutron threshold reactions from threshold to 20 MeV, Institut fur Radiumforschung und Kernphysik, Wien, Austria

The authors developed a methodology for evaluations of neutron cross sections based as much as possible on available experimental information which was critically reviewed. Theoretical calculations were used in energy regions where experimental data are lacking. The data have a relatively coarse group structure. Covariance matrices are included.

Documentation:

S. Tagesen, H. Vonach and B. Strohmaier,

Physik Daten/Physics Data Nr. 13-1 (1979):
Description of the procedures used and detailed documentation of the reactions $^{24}Mg(n,p)^{24}Na$, $^{64}Zn(n,p)^{64}Cu$, $^{63}Cu(n,2n)^{62}Cu$ and $^{90}Zr(n,2n)^{89}Zr$

J. Phys. G8, 1233 (1982): revision of $^{90}Zr(n,2n)$

Physik Daten/Physics Data Nr. 13-2 (1980):
Documentation of the reactions $^{19}F(n,2n)^{18}F$, $^{31}P(n,p)^{31}Si$, $^{93}Nb(n,n')^{93m}Nb$ and $^{103}Rh(n,n')^{103m}Rh$

Physik Daten/Physics Data Nr 13-3 (1981):
$^{27}Al(n,\alpha)^{24}Na$

INDC(AUS)-9 (1983): $^{63}Ni(n,2n)$

G. Winkler, Nucl. Sci. Eng. 73, 415 (1981): $^{63}Cu(n,\alpha)$

The work was supported by an IAEA research contract. The data were initially compiled in the EXFOR-V library and then coded in ENDF/B-5 format by the IAEA Nuclear Data Section. The data are included in the International Reactor Dosimetry File IRDF-85, where they are, however, in group data format. For graphical plots and spectrum averaged values see IAEA-NDS-41.

BOSPOR-80

Evaluated threshold neutron reaction data from the USSR Nuclear Data Centre at F.E.I. Obninsk. 142 threshold reactions on 98 nuclides in the energy range from threshold up to 20 MeV in steps of 100 keV. The data were obtained as a result of critical analysis of the experimental data based on theoretical models of nuclear reactions.

The detailed description of the evaluation is given in the reports

- INDC(CCP)-147, by K.I. Zolotarev, V.M. Bychkov, A.B. Pashchenko et al., "Comparative Analysis of Recommended Threshold Reactions Cross-Sections on the Basis of Integral Experiments". This report is an IAEA translation from Jadernye Konstanty 32 (1), p. 105 (1979).

- INDC(CCP)-145, by V.M. Bychkov, V.N. Manokhin, A.B. Pashchenko, V.I. Pljaskin, "Cross-Sections for the Threshold Reactions (n,p), (n,α) and (n,2n)". This report is an IAEA translation of a series of four articles published in Jadernye Konstanty, 32 (1), 33 (2), 35 (4) all in 1979.

- INCD(CCP)-183, by V.M. Bychkov, K.I. Zolotarev, A.B. Pashchenko, V.I. Pljaskin, "Establishment of the BOSPOR-80 machine library of evaluated threshold reaction cross-sections and its testing by means of integral experiments". IAEA translation from Jadernye Konstanty 3 (42) 1981 p. 60.

The data were received at the IAEA in July 1981 and converted to ENDF-5 format by the IAEA Nuclear Data Section (V. Pronyaev). Integral data obtained from BOSPOR-80 for three different fission neutron spectra are included on the magnetic tape in the text section (MF/MT=1451).

In June 1985 additional BOSPOR reactions were added to INDL/V. These became available in connection with the Nuclear Activation Handbook to be published by the IAEA Nuclear Data Section.

SOKRATOR

Evaluated neutron reaction data from F.E.I. Obninsk.

Definitions, conventions and laws for the representation of data in SOKRATOR were described by V.E. Kolesov and M.N. Nikolaev in the SOKRATOR Manual, INDC(CCP)-97, (1977) = English translation from Jadernye Konstanty 9 (1972) and 16 (1974). For contents and documentation of the original SOKRATOR Library see CINDU-11 p.77 (1976) and CINDU-11, Suppl.1, p.38 (1977).

The SOKRATOR data were converted by the IAEA Nuclear Data Section into ENDF/B-5 format. For the unresolved resonance region of the nuclides U-235, Pu-239 and Pu-240, two fission channels were given in SOKRATOR. As this is not provided in the ENDF/B format, the resulting ENDF/B data differ by about 10% from the original SOKRATOR data.

More recent USSR evaluations are issued directly in ENDF-5 format. See the evaluations of Pu-239, 240, 241, 242. For a summary of tabular data of these Plutonium evaluations see the book by G.V. Ancipov, V.A. Konshin, E.Sh. Sukhovickij, Jadernye Konstanty dlja Izotopov Plutonija (=Nuclear Data for Plutonium Isotopes), Minsk 1982.

See also the evaluations of Si, Fe, Nb.

CENDL

Evaluated neutron reaction data from several institutes in the People's Republic of China.

The start of a Chinese Evaluated Neutron Data Library was prepared in China in the year 1978-1983 in ENDF-4 format. It was then checked and corrected by Liang Qi-Chang and Shen Lin-Xing during a stay 1984/85 at the IAEA Nuclear Data Section, see document IAEA-NDS-61. It contains 12 materials with varying completeness with respect to energy range and differential data.

The CENDL file was then converted to ENDF-5 format at the IAEA Nuclear Data Section by V. Goulo and included in INDL/V.

INDL/A

INDL/A contains actinide evaluations in different formats (i.e. ENDF-4, ENDF-5, KEDAK, UKNDL. See document IAEA-NDS-12 Rev. 7. The ENDF-5 formatted evaluations from INDL/A are also included in INDL/V. Some more actinide evaluations are being converted from other formats into ENDF-5 format and will then be added to INDL/V.