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**MEMO CP-N/53**

**DATE:** 29 August 2006  
**TO:** See distribution list below  
**FROM:** A. Hasegawa, H. Henriksson, P. Nagel  
**SUBJECT:** CINDA

Dear colleagues,

Below follows a status report on the CINDA book production to be discussed at the NRDC meeting 25-28 September 2006. Please, consider this as a working paper, as some of the issues are discussion points on how to present the NRDC, and the collective effort put into CINDA as well as EXFOR.

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# CINDA Book draft

Prepared by the NEA Data Bank

Date 29 August 2006

## Summary

The present draft contains about:

- 15 pages of introductory pages
- 60 pages of appendix, including journal and reaction code explanations, abbreviations, and parts from LEXFOR
- Z=0-1: 1 pages (book00.pdf)
- Z=1: 113 pages (book01.pdf)
- Z=2-10: 511 pages (book02.pdf)
- Z=10-25: 753 pages (book10.pdf)
- Z=26-50: 1694 pages (book26.pdf)
- Z=51-75: 1110 pages (book51.pdf)
- Z=76- : 1382 pages (book76.pdf)
- **In total** **5564 pages**

This will probably be divided into six volumes of about 920 pages each.

## Background

As we now have a totally different content of the CINDA data base, it was decided to continue the book production of CINDA with a complete “archival” version. The last one was printed in 1990, and since then, it has only been supplement editions. Below follow some comments and questions for discussion on how to present CINDA in the best way.

## CINDA book contents and text

The suggested draft is based on previous versions of the CINDA book. The main difference is of course that CINDA now contains charged-particle data. This causes already a problem in using the full title: “The Index to Literature and Computer files on Microscopic Neutron Data”. The suggested name is instead “Comprehensive Index of Nuclear reaction Data”. We would also like to get rid of the CINDA2001 label, as the format replace/has replaced the old format, why CINDA is enough.

## Introduction

The introduction has been updated with new addresses (please check your center) and an updated foreword.

## Annexes

The Appendices contain all codes used in EXFOR and CINDA, journal codes used in CINDA, and an excerpt of LEXFOR adapted for CINDA.

## CINDA listing

The CINDA book has been split on Z numbers into 25 elements per volume. Sort order for each isotope is: evaluated data, neutron data, photon data, followed by charged-particle data. The compounds for each element follow in the end (not as a separate volume).

The draft of the CINDA book can be found at: <http://www.nea.fr/html/dbdata/data/cindabook/>

The complete text can be found in the two pdf files where all pages are collected: [CINDA2005-intro.pdf](#) and [CINDA2005-annex.pdf](#). Below follows some examples of pages from the draft.

# FOREWORD

CINDA, the **C**omputer **I**ndex of Nuclear Reaction **D**ata, contains bibliographical references to measurements, calculations, reviews and evaluations of neutron cross-sections and other microscopic neutron, gamma and charged particle data; it includes also index references to computer libraries of numerical neutron data available from four regional neutron data centres.

The present archive issue, CINDA Archive 2005, is a complete index to the literature on nuclear reaction data published from 1935 to 2005. This issue, therefore, replaces the previous CINDA issue, CINDA-A (5 volumes, 1990) plus the supplemental issue CINDA 2003, (as well as the accompanying CD-CINDA 2003).

The present issue comes with a DVD with the complete CINDA data base in electronic format, searchable through the program JANIS (included on the DVD), which was first introduced in the CINDA book in replacement of CD-CINDA for the supplement issue CINDA2003. The display program JANIS has been developed at the NEA to facilitate searches in CINDA as well as visualisation and manipulation of experimental and evaluated data. It can be found at [www.nea.fr/janis](http://www.nea.fr/janis) for free download.

The compilation and publication of CINDA are the result of worldwide co-operation involving the following four data centres. Each centre is responsible for compiling the CINDA entries from the literature published in a defined geographical area given in brackets below:

- The USA National Nuclear Data Center (NNDC) at the Brookhaven National Laboratory, USA (United States of America and Canada).
- The Russian Nuclear Data Centre (RNDC) at the Fiziko-Energeticheskij Institut, Obninsk, Russian Federation (former USSR countries).
- The OECD Nuclear Energy Agency Data Bank (NEADB) in Paris, France. (European OECD member countries in Western Europe and Japan).
- The International Atomic Energy Agency (IAEA) Nuclear Data Section in Vienna, Austria (all other countries in Eastern Europe, Asia, Australia, Africa, Central and South America; as well as IAEA publications and translation journals).

Besides the published CINDA books and CDs/DVDs, up-to-date computer retrievals for specified CINDA information can be obtained via direct access to the on-line services as described on page I.8.

For USA and Canada:

Dr. P. Obložinský  
National Nuclear Data Center  
Brookhaven National Laboratory  
P.O. Box 5000  
Upton, N.Y. 11973-5000  
USA  
INTERNET: SERVICES@BNL.GOV

For other OECD countries:

Mr. C. Nordborg  
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For former USSR countries:

д-р В.Н.Манохин  
Центр ядерных данных  
Физико-энергетический институт  
Площадь Бондаренко  
249020 Обнинск, Калужская область,  
РОССИЙСКАЯ ФЕДЕРАЦИЯ,  
INTERNET: MANOKHIN@IPPE.OBNINSK.RU

For all other countries:

Dr. A.L. Nichols  
IAEA Nuclear Data Section  
P.O. Box 100  
A-1400 Vienna  
AUSTRIA  
INTERNET:SERVICES@IAEAND.IAEA.OR.AT

## ON-LINE ACCESS

Computer networks make it possible for more CINDA users to have direct access to the CINDA computer files at one of the CINDA centres, using the on-line retrieval system or the respective centres' web site.

National Nuclear Data Center: world wide web: <http://www.nndc.bnl.gov>

NEA Data Bank, Paris: world wide web: <http://www.nea.fr>

Nuclear Data Section, IAEA: world wide web: <http://www-nds.iaea.org>

Nuclear Data Section, IAEA,  
mirror site IPEN (Brazil): world wide web: <http://www-nds.ipen.br>  
mirror site BARC (India): world wide web: <http://www-nds.indcentre.org.in/>

Russian Nuclear Data Centre: world wide web: <http://rndc.ippe.obninsk.ru>  
telnet retrieval: [acjd.ippe.rssi.ru](http://acjd.ippe.rssi.ru)

When using the on-line telnet access, the user is guided through the procedures by instructions. However, potential users of the telnet retrieval system should contact one of the data centres for documentation. The CINDA web database contains links to the experimental data compiled in EXFOR/ CSISRS. The NNDC, NEADB and IAEA web pages contain also links to evaluated data (ENDF) and to selected journal abstracts.

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### CINDA Entries

Elements or isotopes, Z=0-20 .....	1
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## **VOL. 2**

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Elements or isotopes, Z=71-85 ..... 1

## **VOL. 6**

Elements or isotopes, Z=86-110  
Collective entries (fission products and many isotopes) 1

## A BRIEF INTRODUCTION TO CINDA

The CINDA bibliography allows its users to find the references to specific types of cross-section information or other microscopic data from neutron- and charged-particle induced reactions, for any given target nucleus.

CINDA entries are sorted in this publication: first by element and mass number followed by incident particle (except for evaluated data, that comes first for each isotope), and then by cross-section or other quantity. Within these isotopes and quantity groups, the entries are sorted by date of publication.

References relating to the same work are listed in block form. The first line of a block refers usually to one of the main publications. In subsequent lines belonging to the same block, the codes for quantity and laboratory are omitted, and, if a line is identical to the previous line, the energy range, the work type and the name of the first author are also omitted. When a preliminary publication (e.g. a progress report or an abstract) becomes superseded by a more recent or final paper, it is often eliminated from the book. These entries are, however, kept in the CINDA master file and are also accessible via on-line retrievals (see preceding page).

The centres would appreciate notice of any errors of omission or commission that users may find, so that the entries concerned can be corrected before the next cumulation.

To obtain the maximum amount of information from CINDA, it is suggested that users read the detailed description given in the Annex. However, the format of CINDA is rather simple and most of the conventions can be easily guessed. For the majority of uses to which CINDA can be put, the brief description on the following two pages is all one needs.

Below follows an explanatory listing of CINDA example entries on  $^3\text{H}$  and Benzene, with references to where more information can be found in this book.:

ISOTOPE:  $^3\text{H}$   
(See the Annex for details)

### 1 Hydrogen 3

Reaction	$E_{min}$ $E_{max}$	Lab	Type	Documentation	Date	Author, Comments
(α,t)	8.8+6 1.1+7	SC	Exp	Jour NIM/B 219-220 317	04	Browning+
	8.8+6 1.1+7			Data EXPORC1356.004	Nov 05	17pt
(α,Elastic)	3.6+6 1.3+7	CAL		Jour PR,163(4),964	Nov 67	Spiger+
	3.6+6 1.3+7			Data EXPORA1094.002	Mar 99	188pt
	8.2+6 1.1+7			Data EXPORA1094.004	Mar 99	50pt
	1.3+7 1.8+7			Data EXPORA1094.003	Mar 99	97pt
5.1+6 1.1+7	5.1+6 1.1+7	CBR		Jour NP/A,110(2),441	Mar 68	Ivanovich+
	5.1+6 1.1+7			Data EXPORA1014.008	Mar 99	138pt
	5.1+6 1.1+7			Data EXPORA1014.009	Mar 99	281pt
1.1+7 1.1+7	1.1+7 1.1+7	IJI		Jour IZV,56(3),192	92	Geprnich+
	1.1+7 1.1+7			Data EXPORA1314.002	Mar 99	37pt
8.8+6 1.1+7	8.8+6 1.1+7	SC		Jour NIM/B 219-220 317	04	Browning+
	8.8+6 1.1+7			Data EXPORC1356.004	Nov 05	17pt

BLOCK: (Same Experiment)

COMPOUND: BENZENE  
(See Table 1 in the Annex)

### 1 Hydrogen BNZ

Reaction	$E_{min}$ $E_{max}$	Lab	Type	Documentation	Date	Author, Comments
(n,x)	1.0-4 +3	KUR	Eval	Rept YK-4(43) 24	81	Abagyan+ KORT LIBRARY,THR REACTS.NDG
	1.0-4 +3			Rept INDC(CCP)-185	Aug 82	ENGLISH OF YK-4(43),PAGE 24
(n>Total)	1.8-4 3.6-2	MUN	Exp	Jour ZP 163 218	May 61	Heinloeh. CRV'S AT VRS TEMPS
	7.8-3 3.6-2		Revw	Coaf 60VIENNA,,63	Oct 60	Malerleibnitz,CURVE REL TO TEMPRTR
	1.8-4 3.6-2		Exp	Data EXPOR21341.003	Feb 80	8PTS.SIGMA.

III

**Reaction** or class of data: (see more on )  
Example:  
(α,t) -  $^3\text{H}$  prod α-induced reac.  
(n,Total) - total cross section data

**Energy** range (in eV): (see more in Annex A.2)  
Example:  
8.8+6 1.1+7 8.8 to 11 MeV  
1.0-4 +3 0.0001 eV to the order of 1 keV  
Maxwl Therm. Maxwellian energy spec.

**Laboratory** or institute where the work was performed, or what was given in the paper for the first author. (see more on )  
Example:  
SC Sandia Nat. Lab, Albuquerque, USA  
MUN Techn. Universitaet Muenchen, Germany

**Type of work (A.3)**  
EXP Exper. data  
EVAL Evaluation

**Type of ref. (A.3)**  
Jour Journal  
Rept Report

**Date of reference:**  
Month and year (two-digits)

**Reference:** (see more on )  
Example:  
NIM/B Nucl. Instrum & Methods,  
Section B (Vol and Page follows)  
ZP Zeitschrift fuer Physik (Vol and Page follows)  
EXFOR Data from reference exist in the database  
EXFOR, (Entry and subentry number follows)

**Comments:** (see more on )  
Browning+ Authors Browning et al.  
Heinloeh.TOF:SIG-TOT THERM.GVN Author Heinloth, Time-of-flight measurements: Total cross sections at thermal temperatures given