

Draft of revised EXFOR Formats Manual

(N. Otsuka, 2022-04-22, Memo CP-D/1044, A5;
M. Mikhailiukova, 2022-06-09, Memo 4C-4/0232)

This paper seeks an approval of the revised EXFOR Formats Manual (submitted as an appendix of CP-D/1044) including the items not listed under NRDC 2021 Action 5

Memo CP-D/1044

In fulfilment of Action 5 of the NRDC 2021 meeting, I prepared a draft of the updated EXFOR Formats Manual (IAEA-NDS-0207). All conclusions from NRDC 2016 to 2021 meetings are considered. The draft will be further revised by the end of May as per your comments.

Among the items listed under NRDC2021 A5, NRDC2018 C4 is for journal scanning responsibility, and this should create an additional action for NRDC Protocol update.

NRDC2017 C9 (Dictionary 227 description) and NRDC2019 C12 (creation of Dictionary 38) should create an additional action for EXFOR/CINDA Dictionary Manual update.

NRDC2019 C14 concludes only two keywords SUPPL-INF and HISTORY are allowed in the BIB section providing the supplemental information. However, the draft of LEXFOR "Supplemental Information" (WP2019-21) approved in the same conclusion also includes STATUS. Therefore the third item of SUPPL-INF description in the EXFOR Formats Manual Chapter 7 was reformulated to: "The subentry having this keyword must be with NOCOMMON and NODATA, and without keywords other than STATUS and HISTORY."

Updates of items listed under NRDC 2021 Action 5

Paper	Concl.	Memo	Title	Chapt.	Remark
WP2016-28	C12	CP-D/0874	EXFOR Formats "DECAY-DATA" and "RAD-DET"	6	
WP2016-29	C13	CP-D/0880(Rev.)	REACTION SF2=0 and nuclear quantities (NQ)	6	
WP2016-30	C15	CP-D/0882	Field identifier of LEVEL-PROP	7	
WP2016-32	C17 C18	CP-D/0894(Rev.)	Non-informative description under ERR-ANALYS	7	
WP2016-33	C19	CP-D/0896	Two additions to LEXFOR "Isomeric flag"	6	Originally proposed for addition in LEXFOR
WP2016-34	C20	CP-D/0899	EXFOR Formats Manual "Facility"	7	
WP2017-08	C7	CP-C/0452	Update of EXFOR Formats Manual, Page 7.26	7	
WP2017-09	C8	CP-D/0915	Update of EXFOR Formats Manual "STATUS"	7	
WP2017-31	C20	CP-D/0932	Headings for incident projectile energy resolution (EN-RSL etc.)	7	
WP2017-33	C7	CP-D/0920	Update of EXFOR Formats Manual "REFERENCE"	7	Implementation of NRDC 2016 C22
WP2018-08	C8	CP-D/0953(Rev.)	Revision of Formats Manual and LEXFOR	7	Implementation of NRDC2017 C21.
WP2018-09	C9	CP-D/0942	EXFOR Formats Manual "BIB section"	3	
WP2018-12	C12	CP-N/0143	EXFOR Formats Manual "Reaction specification"	6	

WP2019-08	C6	CP-D/0964	LEXFOR "Sums" and EXFOR Formats "Sample"	7	
WP2019-21	C14	CP-D/0965(Rev.)	New keyword - SUPPL-INF (supplemental information)	7	
WP2019-27	C17	CP-C/0393	Usage of RAD-DET and its relation to DECAY-DATA and PART-DET	7	Same proposal in WP2016-28
WP2021-08	C9	CP-D/1011(Rev.)	Revision of EXFOR Formats Manual	6, 7	
WP2021-10	C11, C12, C13	CP-D/1014	Combination of particle codes and their order in REACTION SF7	6, 7	
WP2021-12	C15	CP-D/0982	Presence of keyword ANALYSIS when REACTION SF9=DERIV	7	
WP2021-34	C43	CP-D/0993(Rev.)	Combination of process and other codes in REACTION SF3	6	See also CP-D/1036.

Other major updates

Chapter 2: BIB section

(Addition of NRDC2019 Conclusion 18)

The BIB section contains the bibliographic information (*e.g.*, reference, authors), descriptive information (*e.g.*, neutron source, method, facility), and administrative information (*e.g.*, history) associated with the data presented. It is identified on an exchange file as that information between the system identifiers BIB and ENDBIB.

The length of a BIB section should not be increased when neither additional information nor a better explanation is offered - this makes the entry less user friendly. Redundant information should be included only when there is a good reason specific to the entry.

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Chapter 3: Coded (machine-retrievable) information

(Replacement with more realistic examples)

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Embedded blanks. For many information-identifier keywords, embedded blanks are explicitly forbidden in the codes. With those exceptions, embedded blanks in the coding are allowed if they follow a code from the dictionary. They are not permitted preceding any code except for the keywords AUTHOR, INSTITUTE and DECAY-DATA.

Examples: ~~STATUS~~ (~~DEP~~)
~~STATUS~~ (~~DEP~~ ,COREL)
METHOD (ACTIV)
DETECTOR (MAGSP ,MWPC)
AUTHOR (V.Sebastian, L.Weissman)

Forbidden: ~~STATUS~~ (~~COREL~~ ,~~DEP~~)
DETECTOR (MAGSP, MWPC)
STATUS (DEP, 10048007)

Chapter 4: COMMON Section

(Two sentences copied from the description on DATA section)

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In the common data table, only one value is entered for a given field, and successive fields are not integrally associated with one another. If more than six fields are used, the point data is

continued on successive records (maximum of 3 records or 18 fields). The following record or records are then associated with the next point.

Chapter 6: Reaction field

(Removal of “of 2” added in Rev. 2011/01 by mistake)

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Coding: This subfield contains one of the following:

- a) A process code from Dictionary 30, e.g., TOT.

For coding of SF3 in the case of scattering see **LEXFOR, Scattering**.

- b) A particle code from Dictionary 33 with an “allowed SF3 flag” (3) ~~of 2~~, which may be preceded by a multiplicity factor with a value of 2→99.

A few other conclusions (e.g., NRDC2012 C13) are considered as well.

Chapter 6: Reaction field (SF3)

(Addition of NRDC 2019 Conclusion 22)

SF3. Process. In general, this field contains a process code or the particle(s) produced in the reaction with the exception of the reaction product (which is given in SF4), or a combination of the two (see Coding rules, following). **SF3 must be different from SF2**.

Chapter 6: Reaction combination

(Move of “Descriptions of frequently occurring REACTION combination” to LEXFOR “Sums” and “Ratios”)

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Note that the reaction combination formalism is not used for certain frequently occurring sums, ratios, and products for which specific quantity codes have been introduced (see LEXFOR, Ratios, Sums, Products).

Examples (Frequently occurring REACTION combination):

Data for natural target = Sum data for all contributing target nuclides

~~(46-PD-106 (P, 2P) 45-RH-105-G, CUM, SIG, , A) +~~
~~(46-PD-108 (P, X) 45-RH-105-G, CUM, SIG, , A) +~~
~~(46-PD-110 (P, X) 45-RH-105-G, CUM, SIG, , A)~~
 → (46-PD-0 (P, X) 45-RH-105-G, CUM, SIG)

Production = Sum of processes

~~(46-PD-102 (P, D) 46-PD-101, CUM, SIG) +~~
~~(46-PD-102 (P, N+P) 46-PD-101, CUM, SIG)~~
 → (46-PD-102 (P, X) 46-PD-101, CUM, SIG)

Scattering = Elastic scattering + inelastic scattering

~~(3-LI-7 (N, EL) 3-LI-7, , SIG) +~~
~~(3-LI-7 (N, INL) 3-LI-7, PAR, SIG)~~
 → (3-LI-7 (N, SCT) 3-LI-7, PAR, SIG)

Alpha value = Capture cross section / fission cross section

~~(92-U-235 (N, C) 92-U-236, , SIG) /~~
~~(92-U-235 (N, F) , , SIG)~~
 → (92-U-235 (N, ABS) , , ALF)

Resonance strength (Capture kernel)

~~$(82-PB-208(N, EL),, WID,, C) * (82-PB-208(N, C),, WID) /$~~
 ~~$(82-PB-208(N, TOT),, WID)$~~
 ~~$\rightarrow (82-PB-208(N, C),, WID/STR)$~~

Chapter 7: DECAY-DATA

(Replacement of “abundance” with “intensity” according to NRDC 2021 Conclusion 22 thoroughly)

Chapter 7: REFERENCE

(Addition of NRDC 2012 Conclusion 13)

1. Presence is compulsory with coded information, with or without free text.

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7. The issue#, month and day are preferably omitted unless they are essential to identify the article.

Chapter 7: REFERENCE (Type A, B, C, J and K)

(Addition of NRDC 2018 Conclusion 17)

Page (paper number) subfield: If omitted, ~~the following comma is also omitted~~ the absence must be indicated by including the separating comma.

Memo 4C-4/232 (Extraction)

Comments for LEXFOR and EXFOR format manuals (updated in memos CP-D/1044 & CP-D/1045) are given below in the form: page#: text => comment.

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EXFOR Format Manual

- 6.6: If a parameter is defined with several particles considered => Replace with “If a parameter code is repeated for a particle code and particle codes combined by +”.
- 7.3: the data heading or root¹ => The footnote for superscript “1” is missing.
- 7.3: linear-momentum data heading => Replace with “secondary angle heading”
- 7.13: correlation coefficient => Replace with “correlation flag”
- 7.33: => Add coding examples for SUPPL-INF.