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Memo CP-E/044

Date: June 11, 2004
To: Distribution
From: OTSUKA Naohiko
Subject: Quantities and units for thick/thin target yields
Reference: CP-C/334, CP-C/340, CP-C/344, CP-D/397

I appreciate the addition of codes with “TT” into the table of CP-D/397. I would like to propose further small corrections.

General remarks

- First, let us confirm the dimension codes for thick target quantities because the definition for double differential quantities are contradicted among memos.

Types of data compiled (CP-C/334)		1	d/dA	d/dE	d2/dA/dE
1)Saturated thick/thin-target yield		TTY	TDA	TDE?	TD2
2)Production thick/thin-target yield		TTT	TTDA	TTTE	
3)Physical thick/thin-target yield					
4a)Thick target product yield	as a function of incident beam number	YLD	1 / A	1 / E	1 / AE
4b)Thick target yield multiplicity	as a function of incident beam current	PYT	PYTA		PYT2

- Expansions are little different between CP-C/334 and CP-C/344. For example, “ , TTY / PY ” is “Thick target product yield” in CP-C/334, but “Saturated thick/thin target product yield” in “CP-C/344”. I prefer to use the same expansions both in LEXFOR and in the dictionary if the differences are meaningless. In the tables shown below, I assume that the terminology of newer memo CP-C/344 is correct, and I add “Saturated” and “/thin” for some codes. These words should be added to the draft of LEXFOR (CP-C/334) if we need them, otherwise “Saturated” and “/thin” should be removed from the expansions of codes proposed below.
- In the table below, some pairs have same expansions, e.g. both “ , PY , , TT ” and “ , TTY / PY ” are expanded as “Saturated thick/thin target product yield. Additional explanation (e.g. “as a function of incident beam number/current”) may be needed.

- “PY , ,DT” is not defined in LEXFOR, so I do not know the correct dimension code for it (now YLD).
- No correction is made for *thick target cross section* and its differentials, because I do not understand the definition of thick target cross section.

**Tables from CP-C/344 with
comments by NDS (in *red bold italic*)
and comments by JCPRG (in *green bold italic*)**

Quantity Dictionary

These were found on database or recently proposed.

(CUM) , TTY	TTY	Saturated <i>thick/thin</i> target yield (assumed cumulative)
(M) , TTY	TTY	Saturated <i>thick/thin</i> target yield (uncert. if isom. trans. incl)
, TTY	TTY	Saturated thick/thin target yield
, TTY , ,DT	TTT	Production thick/thin target yield
, TTY , ,PHY	TTT	Physical thick/thin target yield
, TTY/DA	TDA	Saturated thick/thin target yield d/dA <i>So far used only with REL (entry M0036), no corresponding units exist in dict. 25</i>
, TTY/DE , ,DT	TTTE	Production thick/thin target yield d/dE
, TTY/MLT	PYT	Saturated thick/thin target yield multiplicity
, TTY/MLT/DA	PYTA	Saturated thick/thin target <i>yield</i> multiplicity d/dA
, TTY/MLT/DA , G	PYTA	Saturated thick/thin multiplicity d/dA (gammas)
, TTY/MLT/DA/DE	(TD2) <i>PYT2</i>	Saturated thick/thin target <i>yield</i> multiplicity d2/dA/dE <i>Unit dimension code will be changed to PYT2 (because it's the double-differential form of PYT)</i>
, TTY/PY	PYT	Saturated thick/thin target product yield
, TTY/PY/DA	PYTA	Saturated thick/thin target product yield d/dA
, TTY/PY/DA/DE	(TD2) <i>PYT2</i>	Saturated thick/thin target product yield d2/dA/dE <i>Unit dimension code will be changed to PYT2</i>
CUM , TTY	TTY	Cumulative saturated thick/thin target yield
CUM , TTY , ,DT	TTT	Cumulative production thick/thin target yield
IND , TTY ?	TTY	Independent saturated thick/thin target yield <i>Will be added to dict.36</i>
IND , TTY , ,DT	TTT	Independent production thick/thin-target yield
IND/M+ , TTY	TTY	Independent saturated <i>thick/thin</i> target yield incl. isom. transit.
IND/M+ , TTY , ,DT	TTT	Independent production <i>thick/thin</i> target yield incl. isom. transit.
M+ , TTY	TTY	Saturated <i>thick/thin</i> target yield incl. isom. transit.
M+ , TTY , ,DT	TTT	Production <i>thick/thin</i> target yield incl. isom. transit.
PAR , TTY	TTY	Partial saturated <i>thick/thin</i> target yield
PAR , TTY/MLT/DA	PYTA	Partial saturated <i>thick/thin</i> target <i>yield</i> multipl. d/dA
PAR , TTY/MLT/DA , G	PYTA	Partial saturated <i>thick/thin</i> target multipl. d/dA (gammas)

This found only for C0108 and C0118; both corrected to PAR, TTY/MLT/DA (both given as REL); make quantity obsolete. **Found also in A0388 with (P,X)0-G-0 and obsolete units G/PT/SR. REACTION should be changed to PAR,PY/DA,,TT and units to PRD/INC/SR.**

PAR, TTY/DA	(TDP) TDA	Partial saturated thick/thin target yield d/dA Will be made obsolete
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This found only for A0527 and C0838; both should be corrected to , TTY/PY/DA/DE; make quantity obsolete. **A0527 is a different case, giving (N,X)0-NN-1 in obsolete units N/PT/MEVSR. REACTION should be changed to PY/DA/DE,,TT and units to P/IN/MEVSR.**

, TTY/DA/DE	(1/AE)* TD2	Saturated thick/thin target yield d/dA/DE Will be made obsolete
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* If not deleted, correct unit code.

This found on entry O0530; should be coded as IND, PY, , DT, or more correctly giving authors original data in KBQ/MUAHR: IND, TTY, , DT

IND, PY, , DT	YLD?	Independent product yield per unit time Will be made obsolete
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These were not found on library; may be removed if not needed.

All these codes will be made obsolete:

(CUM), TTY, , DT	TTT	Production thick/thin target yield (assumed cumulative) (Used in superseded subentry B0084008)
, TTY/DA, , DT	TTDA	Production thick/thin target yield d/dA
, TTY/DE	(1/E)* TDE	Saturated thick/thin target yield d/DE
, TTY/RAT	NO	Saturated thick/thin target yield ratio
CUM, TTY/RAT	NO	Cumul. saturated thick/thin target yield ratio
CUM/(M), TTY	TTY	Cumul. saturated thick/thin target yield (uncert. isom. trans. Incl.)
CUM/M-, TTY	TTY	Cumul. saturated thick/thin target yield, excl. isom. trans
EM, TTY/DA/DE	(1/AE)* TD2	Saturated thick/thin target yield for emission d/dA/dE
IND, TTY/RAT	NO	Independent saturated thick/thin target yield ratio
M-, TTY	TTY	Saturated thick/thin target yield, excl. isom. trans.
PAR, TTY, G	TTY	Partial saturated thick/thin target gamma yield
SEQ, TTY	TTY	Saturated thick/thin target yield for specif. reaction seq.

* If not deleted, correct unit codes.

These were not found on library; may be removed if not needed.

Not correct in any case; SF6 should be , TTY/PY; units should be PYT.

Both these codes will be made obsolete:

, PY, , DT	YLD?	Product yield per unit time (Made obsolete in last dictionary transmission) Used in entries B0167 and B0175, either with REL or with units MUCI/MUAHR. REACTION should be changed to , TTY,,DT
CUM, PY, , DT	YLD?	Cumulative product yield per unit time Used in B0175.002 with units MUCI/MUAHR. REACTION should be changed to CUM, TTY,,DT

Units Dictionary

CI / AHR / MEV	Curie/Ampere-hour/MeV <i>In dict.36 there is no quantity yet with this unit-dimension. See proposed new quantity ,TTY,,TM in memo CP-D/396</i>	TTTE
DPS / MUAHR	decays per sec/micro-Ampere-hour	TTT
GBQ / COUL	Giga-Becquerel/Coulomb	TTT
GBQ / MUA	Giga-Becquerel/micro-Ampere	TTY
KBQ / MUAHR	Kilo-Becquerel/micro-Ampere-hour	TTT
MBQ / MUA	Mega-Becquerel/micro-Ampere	TTY
MBQ / MUAHR	Mega-Becquerel/micro-Ampere-hour	TTT
MCI / MUA	milli-Curie/micro-Ampere	TTY
MCI / MUAHR	milli-Curie/micro-Ampere-hour	TTT
MUCI / HRMEV	micro-Curie/micro-Ampere-hour/MeV <i>Not introduced, same as CI/AHR/MEV (see CP-D/388)</i>	TTTE
MUCI / MUA	micro-Curie/micro-Ampere	TTY
MUCI / MUAHR	micro-Curie/micro-Ampere-hour	TTT
P / MEVMUCSR	particles/(MeV muC sr) <i>Dimension code changed to PYT2</i>	(TD2) PYT2
PART / MUAHR	Particles/micro-Ampere-hour <i>Obsolete, replaced by PRT/MUAHR which has dimension PYT</i>	(TTY) PYT
PRD / MUAHR	products/micro-Ampere-hour	PYT*
PRD / MUC / SR	products/micro-Coulomb/steradian	PYTA
PRD / MUCOUL	products/micro-Coulomb	PYT
PRT / MUAHR	particles/micro-Ampere-hour	PYT
PRT / MUC / SR	partcles/micro-Coulomb/steradian	PYTA
(PPRT / MUCOUL) PRT / MUCOUL	particles/micro-Coulomb	PYT

* Unit code corrected.

Thick target quantities not listed in CP-C/344 with comments by JCPRG (in *green bold italic*)

These are all quantities with SF8 = TT. These have the same units dimension as the corresponding quantities with blank SF8. Nevertheless it is important to include them in the list of thick target quantities (also in LEXFOR) for reference.

The following quantities are used in the database or in a PRELIM file or were proposed recently in a memo.

Quantity	Type	Dim.	Expansion
, DA , , TT	DA	DA	Diff. cross section d/dA for thick target
, DA / DE , , TT	DAE	DAE	Double-diff. cross section for thick target
, MLT , , TT	*	YLD	<i>Saturated thick/thin target yield multiplicity (Used in C0596.002 correctly. Can be replaced by ,PY,,TT for the other cases.</i>
, MLT , N , TT	*	YLD	<i>(See below)</i>
, MLT / DA , , TT	DA*	1 / A	<i>(See below)</i>
, MLT / DA , , TT / IPA	DA*	YLD	<i>(See below)</i>
, MLT / DE , , TT	DE	(YLD) 1/E	<i>Saturated thick/thin target yield multiplicity d/dE Dim. to be corrected to 1/E</i>
, PY , , TT	PY	YLD	<i>Saturated thick/thin target product yield</i>

,PY/DA,,TT	(PY+) PYA	1/A	<i>Saturated thick/thin target product yield</i> d/dA React. type to be corrected to PYA
,PY/DA,,TT/IPA	PYA	YLD	<i>Saturated thick/thin target product yield</i> d/dA, int. ang. range
,PY/DA/DE,,TT	PY2	1/AE	<i>Saturated thick/thin target product yield</i> d2/dA/dE
,SIG,,TT	CS	B	Cross section for thick target
,SPC,,TT	SP	YLD	Gamma spectrum for thick target
IND,PY,,TT	PY	YLD	Independent <i>saturated thick/thin target product yield</i>
PAR,DA,,TT	DAP	DA	Thick-target angular distr., partial reaction
PAR,PY,,TT	PYP	YLD	Partial <i>saturated thick/thin target product yield</i>
PAR,PY,G,TT	PYP	YLD	<i>Saturated thick/thin target product yield</i> for a given gamma
PAR,PY/DA,,TT	PYA	1/A	Partial <i>saturated thick/thin target product yield</i> d/dA
PAR,DA,G,TT	DAP	DA	Diff. partial gamma emission cross section for thick target
PAR,SIG,G,TT	CSP	B	Partial gamma emission cross section for thick target

The following quantity's deletion was requested in CP-C/340. Since it is used (correctly, I believe) in entries E1756 and E1759, it will be kept. **Yes. But “,MLT/DA/DE,,TT” in E1756 and E1759 was replaced by “,PY/DA/DE,,TT” in PRELIM.E028 along the draft of LEXFOR (CP-C/334). So I propose to delete this code (or make obsolete).**

,MLT/DA/DE,,TT	(D2*) YAE	1/AE	<i>Saturated thick/thin target yield multiplicity</i> d2/dA/dE React. type to be corrected to YAE
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The following quantities were used in E1756 and E1759. But these were replaced by “,PY/DA,,TT” and “,PY/DA,,TT/IPA” in PRELIM.E028 along the draft of LEXFOR (CP-C/334, see also CP--E/040). So I propose to delete these codes (or make obsolete).

,MLT/DA,,TT	DA*	1/A	<i>Saturated thick/thin target yield multiplicity</i> d/dA
,MLT/DA,,TT/IPA	DA*	YLD	<i>Saturated thick/thin target yield multiplicity</i> d/dA int. ang. range

This found only for C0115.005 with 4-BE-9(A,N)6-C-12,,MLT,N,TT. This N is redundant and REACTION can be changed to MLT,,TT.

,MLT,N,TT	*	YLD	<i>Saturated thick/thin target neutron yield multiplicity</i> (Will be made obsolete)
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The following quantities were introduced in 2003 or before but were so far not used.

CUM,PY,,TT	PY	YLD	Cumulative <i>saturated thick/thin target product yield</i>
CUM/M-,PY,,TT	PY	YLD	Cumul. <i>saturated thick/thin target product yield</i> excl. isom. transit.
M+,PY,,TT	PY	YLD	<i>Saturated thick/thin target product yield</i> , incl. via isom. transit

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