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Memo CP-D/522 (Revised)

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To: Distribution
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Subject: **Usage and explanation of uncertainty headings**

1. Usage of uncertainty headings

The current coding rules for major data headings for uncertainties are summarized below (See LEXFOR "Errors" for more details):

Heading	Usage
ERR-T	Total uncertainty which components are also given under ERR-S, ERR-SYS, ERR-*n*, MONIT-ERR etc.
ERR-S	Statistical uncertainty
ERR-SYS	Total systematic uncertainty (partial systematic uncertainties are known or unknown)
ERR-1, ERR-2, …	Partial systematic uncertainty except uncertainty in monitor reaction cross section.
MONIT-ERR	Uncertainty in monitor reaction cross section
DATA-ERR	1. Uncertainty which property (statistical or systematic) is uncertain for the compiler 2. Total uncertainty which components are not given under ERR-S, ERR-SYS, ERR-*n*, MONIT-ERR etc.
DATA-ERR1, DATA-ERR2, …	Similar to DATA-ERR, but more than two components of uncertainties are given by authors.
ERR-DIG EN-ERR-DIG …	Uncertainty due to digitization.

If the uncertainty depends on independent variables, and the minimum and/or maximum of the uncertainty are given, they may not be coded under data headings in the COMMON section. They should be explained under ERR-ANALYS in free text.

2. Explanation of uncertainty headings for independent variables

The EXFOR format manual “ERR-ANALYS” explains that

> “Presence is obligatory, except when not relevant. May contain free text or coded information with free text. However, coded information is obligatory when more than one error field is given in the data set.”

In real compilation, however, we often omit this coded information for uncertainties in independent variable. We would propose that the coded information is optional for uncertainties in independent variables.

> “Presence is obligatory, except when not relevant. May contain free text or coded information with free text. However, coded information is obligatory when more than one error field is given in the data set except uncertainties in independent variables.”

Example 1 (some partial errors are known)

```
…
ERR-ANALYS (ERR-T) Total uncertainty                                X000100100019
                   - Detector efficiency         (0.5%-1.5%)      X000100100020
                   - Statistical uncertainty         (<3.0%)      X000100100021
           (ERR-1) - Standard cross section           (6.0%)      X000100100022
           (ERR-2) – Irradiation geometry             (2.5%)      X000100100023
...
COMMON               2          3                                  X000100100036
ERR-1      ERR-2                                                   X000100100037
PER-CENT   PER-CENT                                                X000100100038
6.0        2.5                                                     X000100100039
ENDCOMMON            3          0                                  X000100100040
DATA                 3          6                                  X000100100009
EN         DATA       ERR-T                                       X000100100010
MEV        MB         MB                                          X000100100011
13.50      1951.      85.                                         X000100100012
13.84      1907.      90.                                         X000100100013
…
```

Example 2 (partial errors are unknown)

```
…
ERR-ANALYS (DATA-ERR) Total uncertainty (no detail is given)       X000200100019
…
NOCOMMON             0          0                                  X000200100036

ENDCOMMON            3          0                                  X000200100040
DATA                 3          6                                  X000200100009
EN         DATA       DATA-ERR                                    X000200100010
MEV        MB         MB                                          X000200100011
13.50      1951.      85.                                         X000200100012
13.84      1907.      90.                                         X000200100013
…
```

Example 3 (Digitized data points without error bars)

```
…
ERR-ANALYS Absolute uncertainty is less than 30%.                  X000300100019
STATUS     (CURVE) Digitized from Fig.3
COMMON               1          3                                  X000100100036
ERR-DIG                                                            X000100100037
PER-CENT                                                           X000100100038
6.0                                                                X000100100039
ENDCOMMON            3          0                                  X000100100040
DATA                 3          6                                  X000300100009
EN         DATA                                                    X000300100010
MEV        MB                                                      X000300100011
13.50      1951.                                                   X000300100012
13.84      1907.                                                   X000300100013
…
```

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