

# **WF-RepTool Guidance document – issues of harmonization**

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## Introduction

This Guidance document has been put together to sum up some principle questions discussed in the WF-RepTool expert group and to list issues of harmonization.

The issues of harmonization come from a cross-check of WF-RepTool reports created by the treatment partners of the WEEE systems<sup>1</sup> of the WF-RepTool expert group members done in summer 2014.

This Guidance document shall be seen as a **working document** for an **'ongoing update'**. It may be updated with new findings and if new questions are coming up in the future.

You may understand the following document better (or only ...) if you have already created or checked WF-RepTool reports.

All details on 'how to create a report' are described in detail in the user manual for the WF-RepTool (see 'user manual - reporter level') which you may download from the WF-RepTool website (see [www.wf-reptool.org](http://www.wf-reptool.org) > 'Information' > 'User manuals').

At the website you may also find FAQs (see [www.wf-reptool.org](http://www.wf-reptool.org) > 'Information' > 'FAQ'), which are answered there with brief answers.

We will not repeat all these details in this Guidance document.

In this Guidance document the **TOP** marking has been set for very important issues and/or for issues done the wrong way often. You may search for this marking (search 'top' – search for whole words only) but please consider that all points described in this Guidance document should be considered when creating or controlling a report.

If you have any questions or remarks, please use the 'Contact us' option at the WF-RepTool website and let us know.

*the WF-RepTool expert group*

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<sup>1</sup> or by staff members of the WEEE systems on behalf of/for their treatment partners

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## A. Principles on the use of WF-RepTool

### Ownership & access

*Questions often asked regarding ownership, access, visibility of data, etc.*

The WF-RepTool has been developed on behalf of and is owned by the WEEE Forum (see [www.weee-forum.org](http://www.weee-forum.org)).

The WF-RepTool is provided to WEEE Forum members (WEEE systems) and third party users ('clients') (see [www.wf-reptool.org](http://www.wf-reptool.org) > 'Purchase').

The WF-RepTool may be installed at a server of the WEEE system or 'client', a hosting of WF-RepTool installations is available at a WF-RepTool server (at dedicated sectors).

WEEE systems or 'clients' act as administrators of their WF-RepTool installation.

Access to the WF-RepTool is provided by the WEEE systems or 'clients'<sup>2</sup>.

WF-RepTool data are only visible to the WF-RepTool administrator and 'his' treatment partners (not visible to other administrators or the WEEE Forum).

The WF-RepTool standard language is English (see [www.wf-reptool.org](http://www.wf-reptool.org) > 'Information' > 'Translations').

### Principles on use

*The WF-RepTool is an IT application. The functions of this IT application are described in detail in the user manuals for this tool - see user manuals 'system level' and 'reporter level' (see [www.wf-reptool.org](http://www.wf-reptool.org) > 'Information' > 'User manuals') and questions often raised are answered in the FAQs (see [www.wf-reptool.org](http://www.wf-reptool.org) > 'Information' > 'FAQ').*

*However, how to use this IT application can be decided by the WEEE system / client. As the WF-RepTool expert group we tried to come to an agreement on the **general principles on the use** and we try to give proposals based on our experiences.*

*Kind and the level of data to be provided are pre-determined by the WEEELABEX standard 'Treatment' and/or the CENELEC standard EN50625-1. The WF-RepTool provides the option to aggregate those data.*

### ➤ General

National laws can always supersede general principles of the WF-RepTool (e.g. providing more details on acceptors).

The WF-RepTool has been developed for the reporting of de-pollution results and for the reporting and calculation of recycling and recovery rates.

Separate WF-RepTool reports shall be provided per site and treatment process and after an important change in the treatment process.

The first step treatment operator [in most cases this will be the 'contracted partner'] is responsible to provide the WF-RepTool report for all treatment steps until final fractions and final technologies used<sup>3</sup>.

The use of the WF-RepTool (including the obligation to provide data until final technologies of WEEE fractions) should be part of the contract between the WEEE system and the treatment partner [= 'contracted partner'].

The 'contracted partner' shall fill in the report (→ call him 'reporter'). In case - on decision of the WEEE system - the WEEE system or any charged expert may elaborate reports.

The 'contracted partner' has to provide a WF-RepTool report at least once a year for each WEEE input category treated by him, shorter periods may be agreed<sup>4</sup>.

<sup>2</sup> *General principles and proposals are mainly addressed to WEEE systems using the WF-RepTool. These principles should also be followed by third party users / clients*

<sup>3</sup> *remark: he is the party who knows where fractions are forwarded to*

WF-RepTool codes do not necessarily have to be used in other documents<sup>5</sup>.

WF-RepTool assigns the classification<sup>6</sup> of the use of WEEE fractions resp. their shares in final technologies regarding preparing for re-use, recycling, other recovery or disposal. This classification is based on European laws and regulations.

The WF-RepTool provides the option for a 'national classification'. If this 'national classification' shall be applied, this 'national classification' has to be approved by individual documents.

### ➤ **Tasks**

'Tasks' shall only be set if no other option of data aggregation is available/possible/given. We propose to limit the use of the task function (e.g. allow only in special cases).

For hazardous wastes 'task' answers in the 'confidential mode' (black box feature) should not be allowed (see acceptors and technologies have to be given).

The treatment partner may ask for WF-RepTool access for 'his' acceptor of any of 'his' fractions to hand over a 'task' to him. The WEEE system / WF-RepTool access administrator decides about giving this access (or not) and with this - from version 4.1 (Jan. 2014) - about the option for handing over tasks to him.

### ➤ **Proof of data**

The 'reporter' is responsible for keeping documented proof for reported data.

The WLX / EN standard provides the minimum burden of proof.

The WEEE system may provide a more specific or more detailed 'national burden of proof' that states what has to be proved by the 'contracted partner' and how it shall be proven.

The responsibility for keeping documented proof shall be a part of the contract between the WEEE system and the 'contracted partner'.

For 'contracted partners' it is advisable to put the need for documented proof of downstream information into contracts with their downstream acceptors.

### ➤ **Control**

A control of the WF-RepTool report shall be done as a minimum once a year. We propose to give a clear feedback (e.g. improvements to be done, see controller tools).

We propose to do an additional on-site audit to verify the WF-RepTool report (process, output fractions achieved, documented proof for data).

Advise: Controlling a WF-RepTool report in detail (incl. plausibility of fractions achieved, check of all technologies used, details on classifications of use) might be a quite comprehensive work. It might be done before or as a separate part of an audit on keeping technical standards<sup>7</sup> but it should all the time be seen as additional, separate work.

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<sup>4</sup> Advise: see FAQ 'Which period shall I choose to fill in WF-RepTool reports?', not to choose monthly reports – this will mislead treatment partners to copy/paste whole reports – see page 22

<sup>5</sup> e.g. transport documents, if you use other codes in other documents you may insert these codes under 'internal codes' to the WF-RepTool

<sup>6</sup> the WF classification = WEEE Forum classification

<sup>7</sup> see limited time for audits and many other issues to be checked, often only random checks, in transition period WLX check of downstream data only for hazardous wastes and for fractions with > 20 % of input

## B. Principles on creating a WF-RepTool report

Options on how to generate a WF-RepTool report are described in detail in the **'user manual - reporter level'** (see [www.wf-reptool.org](http://www.wf-reptool.org) > 'Information' > 'User manuals'). For questions often raised see the FAQs (see [www.wf-reptool.org](http://www.wf-reptool.org) > 'Information' > 'FAQ').

When looking at WF-RepTool report done by different users, we saw quite some differences. One of the goals of the WF-RepTool expert group is to come to a **more unified and harmonized structure and contents** of WF-RepTool reports. Please find our proposals based on our experiences.

Kind and the level of data to be provided are pre-determined by the WEEELABEX standard 'Treatment' and/or the CENELEC standard EN50625-1. The WF-RepTool provides the option to aggregate those data. You may see those data as minimum information to be provided and you are of course free to collect more downstream information to achieve a higher level of data transparency.

### Structure and principles to be followed in a report

#### ➤ Exclude non-WEEE fractions from reports

A **'delivery report'**<sup>8</sup> can be done including municipal waste, packaging material, wrongly allocated WEEE appliances<sup>9</sup>, WEEE parts or non-WEEE materials separated by sorting and losses (see option to deduct).

**'Treatment reports'** should be done **excluding** municipal waste, packaging material, wrongly allocated WEEE appliances WEEE parts or non-WEEE materials, losses and additional amounts<sup>10</sup> as these fractions should **not count to recycling & recovery rates** achieved. So if they are mentioned, the 'option to deduct' must be used.

#### ➤ Stepwise approach

A WF-RepTool report shall be created by using a **'stepwise approach'** for **each relevant treatment step** (in case by using several process steps). Relevant treatment steps are for example:

- manual de-pollution,
- shredding/granulation including accompanied separation steps and
- a separate, next step separation/conditioning of fractions (e.g. heavy media separation, plastics separation plant).

If all these treatment steps are done at **one site/location** (e.g. in different factory buildings), you may consider them as different plant components = 'houses' (**'house approach'**).

**Each downstream operator / acceptor** must be reported as individual treatment step.

**Waste collectors, traders and brokers** are **not** to be considered as **acceptors** doing a treatment step, only treatment operators doing the **physical treatment** are to be considered as acceptor = treatment operator.

The waste collector, trader and broker may be indicated in the entry field for 'Trading steps'<sup>11</sup> (e.g. for cross-checking pick-up/transport/delivery documents).

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<sup>8</sup> e.g. for total amounts of WEEE delivered to any treatment operator

<sup>9</sup> e.g. cooling and freezing appliances in the WEEE input category 'large household appliances' or screens & monitors in 'small appliances'

<sup>10</sup> e.g. material added for treatment

<sup>11</sup> to be agreed between the WEEE system/the WF-RepTool administrator and the treatment partner

➤ **Don't lose the hazardous waste attribute (\*)**

TOP

Every material stream considered as **hazardous waste** = marked with an **asterisk (\*)** must be followed by at least one yield material stream marked with an asterisk (\*).

The hazardous waste characteristic may not disappear!

Examples:

*Plastics with flame retardants separated*

*Fractions achieved from treatment of circuit boards*

*Fluorescent coating material from CRT glass (front glass)*

*Hg of/from fluorescent coating material*

⇒ min.1 fraction or residues with hazardous waste marking (\*)

⇒ in case give a remark where the hazardous waste fraction will be included (e.g. internal name 'incl. xxx'<sup>12</sup>, e.g. *non-ferrous metals incl. circuit boards*)

➤ **Follow the treatment chain until the final technology is applied**

To get information about the **final technology used** for any **final fraction** is a crucial element for the WF-RepTool (see on base of the final technology applied the use of the final fraction / component of the final fraction will be classified – see Chart 1, page 5).

The final technology chosen has to be reported on base of information about the final acceptors (see remarks on 'Names of acceptors', following at page 8). **Exemptions** are:

- a) for **1-kind<sup>13</sup> 'pure' metal fractions** the final technology chosen (steel mill, Cu smelter etc.) may be **estimated** on base of the kind of the metal,
- b) for fractions having reached the **end-of-waste status** the **'intended'** final technology has to be given. This will be especially relevant for plastics fractions which will have to be distinguished as plastics fractions for plastics recycling/for products (> recycling) or plastics fractions for the 'use as fuel' (> energy recovery)<sup>14</sup>.

For **all other fractions** the final technology used has to be determined on base of data collected (see Chart 1, page 5). At the beginning of work – and if no real data are available - best estimations may be done (see point 'No data available', page 9).

For the correct **choice** of the **use** of a **final fraction / any component** of a final fraction in any **final technology** (see 'use in final technology') we advise to **cross-check with examples** given in/as technologies<sup>15</sup>.

If you **don't find** the technology you are looking for/you apply, choose the use in a **similar** or **comparable** technology (see 'Choose 'use' in 'final technology', page 21).

In several cases of use (e.g. use as 'reducing agent' or 'feedstock substitution as/in') please consider advices that **approvals** shall be given (see 'Examples technology' contains the remark 'to be approved'). This means that you should get information from the final acceptor about the technology used and/or the products achieved (see point 'Approval of/from technologies requested', page 24 and point 'Approval of products requested', page 27).

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<sup>12</sup> please consider the ban on mixing/diluting hazardous wastes

<sup>13</sup> if not 1-kind metal, the 2<sup>nd</sup> metal may be transferred to the slag (not recovered as metal) → classification on base of use of slag

<sup>14</sup> for CRT glass the end-of-waste status is not foreseen by the relevant regulation (see COMMISSION REGULATION (EU) No 1179/2012 – only for e.g. flat glass) but the option to consider it as end-of-waste is foreseen in the WLX standard, take care: only to be applied for glass used in the production of glass substances or re-melting in glass manufacturing facilities.

<sup>15</sup> see 'Treatment of ...' – page → 'Composition of final fraction' → Use in final technology' > choice with  > 'List of available components use in final technology' → find / filter in 'Example technology contains' = enter the technology you look for (e.g. also parts of the name of the technology – e.g. 'incin' of all kinds of incinerators)



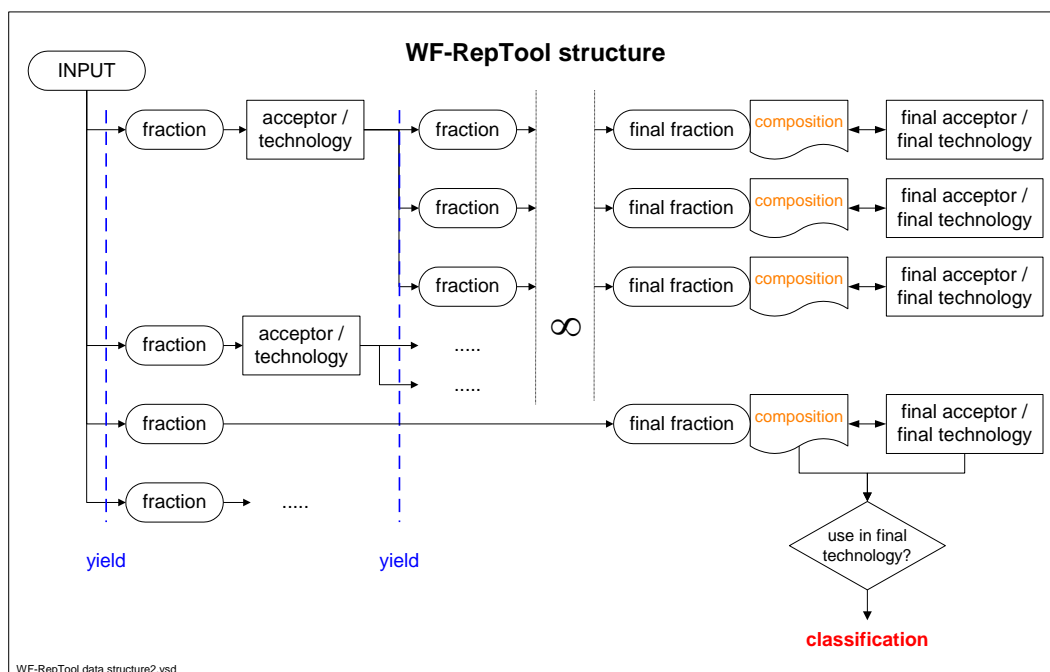


Chart 1: Follow the treatment chain to final technologies used

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## ➤ Target of use approach

TOP

To go for the 'target of use approach' is one of the 'simplifications' of the WF-RepTool<sup>16,17</sup>. It was all the time the target that a treatment operator may (start to) elaborate a WF-RepTool report with information about WEEE fractions he may determine in 'his house' (e.g. handpicking analysis) and/or with experience data.

We did expect that WEEE fractions from (in case smaller) WEEE treatment operators will be mixed with other fractions by waste/metal collectors.

Based on this we ask '**what will be the target of use**' of the individual fraction (the component of the fraction) in the final technology (see Chart 1)?

We all the time pointed out, that we **do not ask** for the **yield** of iron in the steel mill or the yield of Cu in the Cu smelter. Parallel to this we do not ask for the yield of slag in the steel mill / smelter and what will happen with it<sup>18</sup>.

➤ Otherwise we would have to **determine the output fractions** achieved from **each WEEE fraction in each of the final technology plants** ... and this is realistically not possible!

This 'approach' is mainly relevant for **WEEE fractions**

- going to **steel mills** or **smelters** - especially circuit board fraction, non-ferrous metals fraction (see also 'Apply the target of use approach', page 23 and the option 'Use of data from analysis for circuit board fractions, page 31)
- going to **incineration processes** (see also 'Slag and ashes', page 35 and 'Metals separated from slag / ashes', page 38).

<sup>16</sup> beside the 2 % impurity option for 'pure' fractions, not quality or environmental classification of recycling options

<sup>17</sup> see WF-RepTool general presentation (2014).ppt at [www.wf-reptool.org](http://www.wf-reptool.org) > 'Information' > 'Presentations).

<sup>18</sup> in principle the WF-RepTool might be changed to the 'output of final technologies approach' but then we would have to follow for all fractions, not only for them for which we expect 'better results'

In both cases above and in all other cases we **do not ask for the yield** = output fractions **from the final technologies** (and/or the use of these output fractions achieved<sup>19</sup>).

This means you shall list the component/s of the **final input fraction** to **any final technology** and choose the **planned use** of this component within the final technology - see advise on 'the correct choice of the use of a final fraction / any component in any final technology' in the point before, see 'Choose 'use' in 'final technology', page 21 and see Chart 2 below which shall give you a simple example.

⇒ see 'Apply the target of use approach', page 23

final fraction	component / composition		final technology	use in final technology	classification
iron fraction 'not pure'	Fe	95%	steel mill 'traditional'	Fe > Fe recovery	⇒ R
	organic residues	5%		organic residues > no definite use in smelter	⇒ TD

Chart 2: Classify use of 'iron fraction 'not pure'' delivered to a traditional steel mill

⇒ see discussions about leaving the 'Target of use approach' – Discussion box at page 37

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## ➤ Recycling definition

For classifying the use of final fractions (their components) in final technologies we follow the definitions of the European law<sup>20</sup>. This means that for:

- 'model 1' of the WF-RepTool we apply definitions given by the **WEEE Directive 2002**,
- 'model 2' of the WF-RepTool we apply definitions given **Waste Framework Regulation 2008**<sup>21</sup> (following short WFD 2008) (see WEEE Directive 2012 refers to it<sup>22</sup> and does not provide own definitions).

Main differences are given for the definition of 'recycling'.

- in the WEEE Directive 2002 'recycling' is defined as - '*recycling' means the **reprocessing in a production process** of the waste materials for the original purpose or for other purposes, but **excluding energy recovery** ...*
- in the WFD 2008 'recycling' is defined as - '*recycling' means any recovery operation by which **waste materials** are **reprocessed into products**, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does **not include energy recovery** and the reprocessing into materials that are to be used as fuels or for **backfilling operations**;*

Based on the more stricter definition of 'recycling' we changed the WF-classification for the following main points from 'recycling' to 'other material recovery':

- waste fractions used as **reducing agent** but **not reprocessed into products** - relevant for:
  - plastics used as reducing agent in e.g. steel mills (C as CO<sub>2</sub> emission)
  - metals used as reducing agent but slag not classified as by-product or as defined product (metal oxides to slag → slag not by-product or defined product)

<sup>19</sup> see exemption for target use of slag from smelters – see page 29

<sup>20</sup> deviating national classifications may be applied by the 'national classification' – see user manual

<sup>21</sup> see DIRECTIVE 2008/98/EC on waste

<sup>22</sup> see WEEE Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) (recast), Article 3, clause 2

- waste fractions (e.g. glass) used as **slag forming component** but **no definite use of slag** – relevant for:
  - Cu smelter - slag not classified as by-product slag or used as defined product
  - Pb smelter - slag as waste for landfill disposal

**Backfilling** operations are definitely **excluded** from the classification as ‘recycling’ (see above) but are falling under the ‘recovery’ definition.

The backfilling application and also the **use** of any WEEE waste fractions with **no specified quality classes** and only using the **volume and/or physical properties** in **other construction purposes** – i.e. other than road construction (here defined products as requirement) and defined construction purposes (here defined product qualities as requirement) - we also classified as ‘**other material recovery**’. Examples listed are:

- as unspecified construction material for dams, for fills and filling of shafts
- as cover material at landfill sites
- for driveway construction at landfill sites<sup>23</sup>

For more information please see the document '**What's new with model 2**' and a detailed comparison of the 'old' and 'new' WF-RepTool model classification in '**WF-classification 2013-final - model 1&2.xls**' available for download from the WF-RepTool website (see [www.wf-reptool.org](http://www.wf-reptool.org) > 'Information' > 'Guidance documents').

⇒ see also ‘*Approval of products requested*’, page 27

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## ➤ ‘Purpose of the plant’ of municipal waste incineration

TOP

Based on a judgement of the European Court (Case C-458/00 - 13 February 2003) and the therein mentioned ‘purpose of the plant’ **any input** of material to a **municipal waste incineration** will be quoted as ‘**thermal disposal**’ even if any kind of energy (e.g. electrical energy, steam etc.) is produced (see option for national classification / ‘upgrading’ in user manual). Based on this we classify

- ⇒ **any input** to an **municipal waste incinerator** as ‘**disposal**’ (TD)
- ⇒ **any input** to an **hazardous waste incinerator** as ‘**disposal**’ (TD)  
also ‘purpose of the plant’ waste destruction
- ⇒ **all output fractions** as thermal disposal, also if any metals are separated from the slag (see also ‘*Metals separated from slag / ashes*’, page 38)

Given by the Waste Framework Directive 2008 (WFD 2008) there is a **R1<sup>24</sup>** **classification** of municipal waste incinerators possible if energy **efficiency limits** are kept<sup>25</sup>

- ⇒ see option for ‘municipal waste incineration - high energy efficiency’ in point ‘*Approval of/from technologies requested*’, page 24

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<sup>23</sup> see exception for ‘defined quality classes’

<sup>24</sup> R 1 **Use principally as a fuel** or other means to **generate energy** (\*)

<sup>25</sup> (\*) This includes incineration facilities dedicated to the processing of municipal solid waste only where their energy efficiency is equal to or above:

— 0,60 for installations in operation and permitted in accordance with applicable Community legislation before 1 January 2009,  
— 0,65 for installations permitted after 31 December 2008,

## Names of acceptors

The name of the acceptor has to be given to be able to **check the plausibility** of the **technology used** mentioned.

For **hazardous wastes** (with asterisk \*) **all downstream information** (technologies used, acceptors) must be reported in the WF-RepTool report (including names of all acceptors).

For wastes classified as **non-hazardous waste** we propose also to document all names of acceptors (full downstream monitoring).

In case of **confidentiality 'problems'**, the names of downstream acceptors don't have to be reported in the WF-RepTool but should be kept internally (plus clear allocation procedure proposed: e.g. 'TP1' in WF-RepTool report + internal list of acceptors 'TP1' = name xyz) for the option to cross-check delivery documents.

Beside this we propose the following approach<sup>26</sup>:

- a) for fractions having reached the **end-of-waste status** the name of the acceptor does **not** have to be given (but see the 'intended' final technology has to be given - see page 4),
- b) for **1-kind 'pure' metal fractions** the technology chosen may be estimated (see page 4) and this **technology** may be used in the **name** for the acceptor (e.g. 'diff. steel mills', 'diff. Cu smelters etc.').
- c) for all final technologies called as **special** technologies (e.g. Cu smelter 'special', municipal waste incineration - high energy efficiency, technology xxx – special use... – see also 'Example technology contains 'approve'<sup>27</sup>) the **name** of the acceptor **must** be documented (at least internally<sup>28</sup>) to **proof technologies** reported (see point 'Approval of/from technologies requested', page 24),
- d) for all final technologies where it is mentioned that a **defined product** is achieved (see also 'Example technology' contains 'defined product'<sup>29</sup>) the **name** of the acceptor **must** be documented (at least internally<sup>30</sup>) to be able to check & proof **products reported** (see point 'Approval of products requested' page 27),
- e) for fractions not being used for any recovery = use classified as **disposal**, the name of the acceptor does **not** have to be given<sup>31</sup>, the **technology** may be used in the **name** for the acceptor (e.g. use 'diff. landfills', 'diff. municipal waste incinerators').

For '*anonymous*' acceptors from options above at least the **market region** should be reported in the WF-RepTool<sup>32</sup> to be able to sum up results regarding exports. You may distinguish between: national market, EU / EFTA market, outside EU / EFTA market or the individual countries within these regions.

If **no name** of the acceptor is provided by the waste collector, trader or separator, see proposal in point '*Name of acceptor*', page 12.

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<sup>26</sup> consider national requirements or requirements of the WEEE system

<sup>27</sup> see 'Use in final technology' > choice with  > find/ filter in 'Example technology contains' - enter 'approve'

<sup>28</sup> consider national requirements or requirements of the WEEE system

<sup>29</sup> see 'Use in final technology' > choice with  > find/ filter in 'Example technology contains' - enter 'defined product'

<sup>30</sup> consider national requirements or requirements of the WEEE system

<sup>31</sup> but see & consider requirements to provide all downstream information for hazardous wastes

<sup>32</sup> consider national requirements or requirements of the WEEE system

## Stored amounts

If there are stored amounts of WEEE fractions<sup>33</sup>, we propose following approach:

- stored amounts of **non-hazardous wastes** (without asterisk\*) may be **estimated**,
- stored amounts of **hazardous wastes** (marked with an asterisk\*) must be **determined** by **weighing** at the end of the reporting period.

In the case that WEEE fractions are **stored** for **several years** (e.g. fluorescent coating material - e.g. waiting for an appropriate technology to recover substances), take care to consider the amounts stored at the beginning of the period (i.e. deduct amount stored at the beginning of the year/period) and use only the 'difference amount' separated/achieved in the relevant year.

Regarding **data** to be used for **stored amounts** of WEEE fractions we propose following approach (see also in FAQ's): If WEEE fractions

- a) **have been delivered** to any acceptor **before** and this acceptor shall be chosen **again**, you may use data **from last delivery**,
- b) **shall be delivered** to a dedicated acceptor = there are already **agreements** where to deliver, you may provide **planned results**,
- c) are 'open' = there are **no plans** what to do with, you must use any **worst case** scenario (disposal option).

We propose to use any **uniform term** in the **name** for the acceptor e.g. 'stock'. Advantage: you may sort the list of 'Final fractions' to find these 'stocks' and to adapt results when data are provided.

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## Losses

Losses of **above 5 %** in yield data for any fraction (e.g. batches, special treatment) shall **not be accepted**. The batch and/or other determination of results has to be repeated (see also WLX C.3.4<sup>34</sup>)

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## No data available

If OUTPUT fractions are delivered to any (trader or) acceptor not being ready to provide forwarding and/or treatment data,

- 1) you should **choose** any **other acceptor** being ready to provide information
- 2) first WF-RepTool reports may be generated on base of / with:
  - a) **similar results** from comparable acceptors,
  - b) on base of best **estimation**,
  - c) inserting **WF general packages**.

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<sup>33</sup> output fractions not delivered from the site at the end of the report period

<sup>34</sup> C.3.4 Any reasons for material input/output differences exceeding 5 percent of the total input amount during the batch process shall be checked. If there is no plausible reason, the batch shall be repeated. Breakdown or malfunctions of equipment during the batch shall be documented (see clause C.5).

### Do not copy/paste whole report

The option to copy/paste a report has been mainly foreseen to copy/paste the structure of a report. You have to consider ...

⇒ after copy/paste **check** and **insert actual data**  
e.g. **real de-pollution results** in the given period and/or  
**actual acceptors** with their technologies

- ⇒ that the copy/paste option was mainly foreseen for **shredding/separation results** of:
- **shredder input fractions** (e.g. large or small appliances after de-pollution) and/or
  - **fractions** which are **further treated** (e.g. CRT tubes, plastics fractions, cables etc.)
- to be able to use the option to use (batch) results for longer periods

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## C. Issues of harmonisation

Options on how to generate a WF-RepTool report are described in detail in the 'user manual - reporter level' (see introductions to chapters before). When looking at WF-RepTool report done by different users, we saw some differences in the use and mistakes done several times. Please find our proposals on harmonization based on our experiences.

### Names of/for fractions

- ☒ Don't use fraction **names with 'dismantling'** (code 16 xx xx) for fractions from **shredding** and/or **separation**

⇒ follow the structure of WF-RepTool codes as explained in the user manual:<sup>35</sup>

**16 xx xx** for (sorting and) **dismantling** fractions  
**19 10 xx** for (mixed) fractions from (first) **shredder** operations  
**19 12 xx** for fractions from further (mechanical) **separation**

- ☒ Use name of fraction **'pure'**

⇒ use only for fractions with **< 2 % impurities**  
 (!cross-check with composition data, see page 16)

- ☒ Check the use of the fraction name of **'non-ferrous metals'**

⇒ set **priority** to use a name of **Cu-** and/or **Al fraction** (main component)

⇒ only if **'real mixtures'** of non-ferrous metals or rest of non-ferrous metals (beside Cu-, Al fractions), then use name for/as non-ferrous metals fraction

- ☒ Don't use the name **circuit board fraction** for all fractions where some CBs<sup>36</sup> are included (example: 1x for sieving fraction + CBs, 1x for plastics fraction + CBs, 1x for Cu fraction + CBs + cables)

⇒ choose name of fraction from the **main component** of the fraction

⇒ indicate the content of circuit boards with the **choice of name of fraction**  
 (with components to be removed)

⇒ do a remark on the content of circuit boards in **internal name**  
 (e.g. incl. circuit boards)

- ☒ Don't call all 'rest/remainder' fractions as **residues** fraction (consider traceability, understanding)

⇒ check if there are **more specific names**  
 e.g. sieving material, shredder light fractions, any fines,...

⇒ use the name from the **main component** (e.g. plastics)

- ☒ Don't use **one fraction** for **fractions of different composition** and then split to different acceptors with different yield resp. composition data

⇒ choose (names for) **fractions as 'they are leaving the house'** as **separate fractions** (in case use several times the fraction with the same name)

⇒ only if the **same fraction** is delivered to **different acceptors**, use one fraction and the option to split to acceptors

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<sup>35</sup> see user manual 'reporter level' point 2.3.2.1

<sup>36</sup> circuit boards (CBs)

## Name of acceptor


- ☒ See **names** of the **acceptors** have to be given (see page 8).
- ☒ The **name** of the acceptor must be the name of the **physical operator** (not the name of the waste collector, trader)
  - ⇒ provide the name of **physical operator** (who is doing the treatment) (the name of the waste collector, trader may be given as additional information – separate field ‘Trading steps’)
- ☒ Do not use the **same name** of the treatment operator at **different levels** (e.g. name shredder/separators also used as e.g. steel mill, Cu smelter, plastics recycler and landfill operator) if the treatment operator **does not physically run** these different technologies.
 

This is **not the case** in many cases, instead of filling in wrong information:

  - ⇒ keep the name for the acceptor **empty**, or use any **general term** like ‘n.d.’, ‘no info’<sup>37</sup>
  - ⇒ see example for **uniform term** for **no data achieved** in next sub point
- ☒ **No name of acceptor/s provided** by the waste collector, trader or separator (even if tried)
  - ⇒ if the **name/s** of acceptor/s (next or final step treatment technology) is/are **not provided** by the waste collector, trader or separator, do **not** use the **‘wrong’ name** of the waste collector/trader/separator, instead ...
  - ⇒ use any **uniform term** in the **name** for the acceptor e.g. **‘no information from acceptor’**, advantage: you may sort the list of ‘Final fractions’ to find these entries and to adapt results when data are provided<sup>38</sup>
  - ⇒ see options for final technologies under ‘*No information on final technology*’, page 23

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## Technology used by the acceptor

- ☒ See the **technology used** by the **acceptor** shall to be given (see page 4)
- ☒ How to **find & choose** the correct **technology** for the acceptor?
  - ⇒ see the **scroll-down** for technologies used, see
    - ‘interim’ technologies in upper area of list and
    - ‘final’ technologies in lower area of list
  - ⇒ see the **list of available technologies** (open with  beside ‘technology used’) and **check the remarks** given in the list of available technologies on the use of **correct use** of different technologies - see find/filter options for ‘Technology contains’ and ‘Remarks contains’

*examples – enter in ‘Technology contains’ or ‘Remarks contains’*

  - ‘incin’ for different kinds of incinerators
  - ‘plast’ for different technologies of plastics conditioning, plastics recycling or production of other products of/with plastics
  - ‘glass’ for different technologies applicable for CRT glass and other glass

<sup>37</sup> advantage: you may sort the list of ‘Final fractions’ to find these entries and to adapt results when data are provided

<sup>38</sup> of course efforts shall be continued to get the name of the (final) acceptor stated. This interim solution shall show that efforts are taken already and no miss-leading information is given



⇒ cross-check what **companies** are **really doing** and choose the technology **for this**, don't use the wording how they '**call themselves**'

examples:

- technology '**plastics recycling**' is very often **plastics conditioning**, or in case only a trader, see remark in 'First step fraction is final fraction', page 14 or 'First step fraction goes 100 % to products / recycled – most time NOT', page 15

☒ **Don't use** the option for '**other**' technologies (as you don't want to search for options).

⇒ to prepare and to pick from a **unified 'list of technologies used'** was one the core issues of the WF-RepTool group to unify the terms to be used in the WF-RepTool (see list of available technologies above)

⇒ for your guidance examples of/for technologies are also given in the 'List of available components use in final technology'<sup>39</sup>

⇒ choose from given options – see point above

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### Plausibility of the chosen technology

see also 'Approval of/from technologies requested', page 24

#### ➤ To classify 100 % 'recycled' – cases of most time NOT

☒ **Plastics** from 1<sup>st</sup> step treatment to technology **plastics recycling** – most time not!

⇒ **plastics** from 1<sup>st</sup> step treatment (dismantling, shredding) will be **conditioned** (cut, cleaned, separated),

i.e. interim technology with yield of fractions - see points following:

'First step fraction is final fraction – most time NOT', page 14 and/or

'First step fraction goes 100 % to products / recycled – most time NOT', page 15

☒ CRT glass fractions to **CRT glass production** – most time not!

⇒ cross-check with e.g. **delivery approvals**, CRT glass production is nearly finished (see also 'CRT glass', page 33)

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### Yield of fractions

☒ If an **interim technology** has been chosen, you will be asked to provide **data on the yield** of fractions

⇒ see remarks on '**Names of/for fractions**' (see page 11)

⇒ with regard to the **traceability** of data ask for/give information in '**source of data**' (see remarks at page 30)

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<sup>39</sup> see footnote 15, page 4

## Plausibility of yield of fractions

### ➤ Missing fractions

#### ☒ Missing yield fractions from 1st step treatment / de-pollution or next steps

*examples*

- 'typical' 1st fractions / de-pollution fractions are missing (e.g. batteries from small household appliances)
- 'typical' sorting fractions are missing (e.g. NH<sub>3</sub>-appliances for input cooling & freezing appliances, cabinets with not-PU insulation)
- any residue fractions missing

⇒ **check with real data** achieved (e.g. paper documentation)

⇒ cross-check with **experience data** / results from other treatment partners

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### ➤ A-typical yield results

#### ☒ In case of an **a-typical result of yield data** (e.g. special WEEE input stream, special WEEE fraction)

⇒ give a **remark** in the **input remarks** (for the whole report = WEEE input fraction) or in the **internal name** (for the fraction treated)

⇒ give **information** in the '**source of data**' (see remarks at page 30)

#### ☒ (Very) **High** yield / share of **metals** from WEEE input category or WEEE fractions (e.g. cables)?

⇒ see above 'a-typical result'

⇒ compare with **results from other treatment partners**

⇒ cross-check with **experience data**<sup>40</sup>

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### ➤ First step fraction is final fraction – most time NOT

#### ☒ **Dismantling fraction / 1st fraction** goes **direct** to **final technology** with classification of use as '**recycling**' - most time NOT:

⇒ in most cases dismantling fractions / 1<sup>st</sup> fractions will be forwarded to further **shredding/grinding** and/or **separation** or **conditioning steps** (= interim technologies with yield of fractions)

⇒ for '**low level recycling options**' ask for **approval** about **which products** are achieved – see next point

*examples further separation:*

- **CRT glass 'parts'** direct to e.g. CRT production or other glass production? NO: CRT glass 'parts' from dismantling will be forwarded to **CRT glass grinding/cleaning** – see next point not 100 % products
- **plastics** from **1<sup>st</sup> step** treatment (dismantling, shredding) direct to plastics recycling / products? NO: plastics fractions from dismantling and/or coarse shredder treatment (incl. shredder for cooling & freezing appliances) will be forwarded to further **separation/conditioning steps** – see next point not 100 % products
- **concrete 'parts'** from dismantling to e.g. road construction? NO: concrete 'parts' from dismantling will be forwarded to **mineral conditioning** → yield of concrete 'pieces' or 'fines' which may be forwarded to road construction; in case of concrete parts from washing machines often/also Fe-fraction separated
- **flat glass 'parts'** from dismantling → most times go to 'other glass conditioning'

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<sup>40</sup> ask in case at WF-RepTool expert group if data are available

➤ **First step fraction goes 100 % to products / recycled – most time NOT**

TOP

- ☒ **Dismantling fraction / 1st fraction goes 100 % to product = 100 % 'recycled'** - most time NOT:

⇒ in most cases dismantling fractions / 1<sup>st</sup> fractions will be forwarded to **further separation** steps (see point before) where at least **some % of residues** fractions will be separated for any more 'low level' use (e.g. incineration or landfilling of residues)

⇒ for **'low level recycling options'** ask for **approval** about **which products** are achieved

examples:

- **CRT glass 'parts'** direct to e.g. CRT production or other glass production, 100 % glass to product? NO: CRT glass 'parts' from dismantling will be forwarded to **CRT glass grinding/cleaning, different kinds or qualities of glass** will be separated being forwarded to different technologies, additionally some % of **residues** will be separated, most time forwarded to any 'lower level' use or to landfill, consider also remarks on technologies/use for CRT glass – see point 'CRT glass', page 33 plus: check for fraction/s with fluorescent coating material – see 'Don't lose the hazardous waste attribute (\*)', page 4
- **plastics from 1<sup>st</sup> step** (dismantling, shredding) direct to plastics recycling, 100 % plastics to products? most time NO : plastics fractions from dismantling and/or shredder treatment will be forwarded **to further separation = conditioning steps**, most time **different qualities of plastics** will be separated (different next step technologies and uses, e.g. high quality plastics to granulated, lower quality plastics to other products), **some % of residues** will be separated and most time forwarded to any 'lower level' use (e.g. incineration (different options) or landfill) – see point 'Plastics from shredder processes', page 32

examples 'low level recycling options':

- **plastics from 1<sup>st</sup> step** treatment (dismantling, shredding) may be forwarded to any 'production of other products of/with plastics' like park benches etc., also in this case there is most time a **further separation / conditioning** step before, and some % of residues are separated – see point above; if the next step treatment operator insists on **100 % product yield**, ask for any **approval** about **which products** are achieved and give a remark in the internal name and/or under 'use in final technology' (see 'Approval of products requested', page 27, see 'Plastics from shredder processes', page 32).

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**Examples for not plausible yield fractions from dedicated fractions?**

➤ **Yield fractions from circuit board fractions**

- ☒ Fraction of **hard plastics** (pieces) from **circuit board fractions / circuit board chassis** from dismantling – NO:

⇒ a yield fraction<sup>41</sup> of **hard plastics** (pieces) is **not plausible**

⇒ quite often this is the **circuit board fraction** (pieces of circuit boards) from mechanical treatment and separation (code 19 12 xx), this fraction is often separated as to be forwarded to Cu smelters  
→ use **this name** for the fraction and **components** of Cu, other metals, organic +/- inorganic residues for the composition

⇒ see 'Circuit board fractions', page 31

⇒ see 'Circuit board chassis / non-ferrous metals mixtures to smelters', page 30

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<sup>41</sup> see later: 'plastics' also not plausible as composition data

### ➤ Yield fractions from cables

- ☒ Very high yield of metals – e.g. **70 % Cu fraction** from cables – NO:
  - ⇒ possible yield of **Cu** see **experience data** (e.g. regular cables 35 – 42 % Cu), in very special cases – see ‘*A-typical yield results*’, page 14
- ☒ Only **Cu fraction** and (cable) **plastics** fraction for **plastics recycling** – NO:
  - ⇒ you should expect a **residue fraction** of plastics not going to plastics recycling
- ☒ If only **Cu fraction** and **cable plastics** as yield data?
  - ⇒ fraction of **cable plastics** should be **further separated** at the acceptor, some % residues from separation beside any plastics going to products, not plausible that 100 % to plastics recycling
    - ⇒ see ‘*Cable plastics*’, page 33

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### Components of final fractions<sup>42</sup>

- ☒ **Cross-check** name of fraction (see ‘*Names of/for fractions*’, page 11) with **composition data**
  - ⇒ for ‘**pure**’ fractions (< 2 % impurities’) **100 %** of the **main component** is possible & ‘allowed’, you may give more detailed information (e.g. 1 % organic residues’),
    - ⇒ for fractions ‘**not pure**’ **other shares** of the composition have to be shown (e.g. organic or inorganic residues)
- ☒ Use of **component** of ‘**other metals**’?
  - ⇒ set **priority** to provide information/shares of **components Fe, Cu, Al**, only for the ‘rest of metals’ (e.g. Zn, Sn, Pb, etc. ) use ‘other metals’ TOP
- ☒ Use of **component** of ‘**residues**’?
  - ⇒ use composition ‘**residues**’ (organic or inorganic) only for ‘**impurities**’ in/of other fractions (the ‘non-target’ material of this fraction)<sup>43</sup> TOP
    - ⇒ set **priority** to use:
      - a) ‘**fractions**’ (e.g. plastics, other organic fractions, glass, other inorganic fractions) for fractions separated as ‘**target fractions**’ (e.g. target to separate any plastics fraction, wood fraction etc.) (→ see more options to split & characterize the ‘use’ later)
      - b) you may use ‘**mixed fractions – disposal**’ for mixed fractions separated and forwarded to a disposal process (for fractions going to landfill, ‘regular’ MWI) – see next point

<sup>42</sup> fractions delivered to final technologies / final processes; ‘Components’ coming from composition, not from components dismantled/removed

<sup>43</sup> see exemption asked for by Recupel to ask for separate information on plastics

☒ Use of component/composition of **'mixed fractions – disposal'**?

- ⇒ use composition 'mixed fractions – disposal' for **mixed fractions separated and forwarded** to a **disposal process** (for fractions going to landfill, 'regular' MWI)
  - ⇒ **don't use** as composition data for any **impurity** in another 'target fraction' of e.g. metals or plastics fractions, use in this case **'residues'** – see point before
- ⇒ beside 'mixed fractions – disposal' you **don't need** to give information on any **other components** and/or any **residues** in this fraction<sup>44</sup>

☒ **Residue or waste fractions** are **not necessarily 100 % organics!** (see when e.g. input to any co-incineration or MWI - high energy efficiency (R1))

- ⇒ determine **real composition data** (organics <> not organics) e.g. by rough estimation by view analysis or any sampling results
- ⇒ see also point '*Classification of use of plastics or organic shares*', page 22

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### Plausibility of composition data of final fractions

#### ➤ General composition data, a-typical results

☒ For many WEEE fractions experience data on the composition of final fractions are available<sup>45</sup>. In case of an **a-typical results of composition data**

- ⇒ give a **remark** in the **internal name** for the final fraction
- ⇒ give **information** in the **'source of data'** (see remarks at page 30)

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### Examples for not plausible composition data of final fractions

#### ➤ Composition of circuit board fractions

☒ **Circuit board fractions do not consist of 100 % other metals!**

TOP

- ⇒ see **experience data** – circuit board fractions **consist of** (Fe – if chassis), Cu, Al, other metals [see '*priority to provide information/shares of components Fe, Cu, Al*' at page 16] organic residues, inorganic residues (if high quality, e.g. glass fibre reinforced)

- ⇒ see '*Circuit board fractions*', page 31
- ⇒ see '*Use of data from analysis for circuit board fractions*', see page 30

☒ **Circuit board fractions do not consist of hard plastics**<sup>46</sup>

- ⇒ use **organic residues** instead – see this is a target fraction of Cu, other non-ferrous metals and precious metals and organic shares are the 'impurities' [see remarks on *use composition 'residues'* at page 16]

- ⇒ see '*Circuit board fractions*', page 31

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<sup>44</sup> see exemption asked for by Recupel to ask for separate information on plastics

<sup>45</sup> in case ask the WF-RepTool expert group for

<sup>46</sup> see also no yield fraction of hard plastics – page 15

## Use general data or data for WEEE input category or fraction?

- ☒ **Which data** - data (composition data or yield of fractions) from/for an **individual WEEE treatment stream** ↔ **general data** for a **'mix' forwarded from the plant** (e.g. non-ferrous metals fraction, plastics fraction) – shall be used?

options:

- **data** for the delivery of a **'mixed fraction'** forwarded from the plant of the treatment operator to the acceptor (e.g. is mixture of WEEE stream A, B, C +/- other material)
- **analysis** for fractions from **WEEE treatment stream** – even by handpicking, small scale analysis

⇒ **data** for the **fraction** from/for the **WEEE treatment stream** shall be used (e.g. analysis for a batch from SHHA, not for the 'mix' of the regular delivery)

TOP

⇒ ad **metal fractions**: priority for analysis from acceptor but if 'mixed delivery' to acceptor and no option to get data for the WEEE treatment stream, internal sorting analysis or chemical analysis preferred;

⇒ ad **plastics fractions**: first priority for analysis from acceptor but if 'mixed delivery' to acceptor and no option to get data for the WEEE treatment stream, internal analysis for material from WEEE treatment stream BUT under consideration of the target plastics of the acceptor, options of separation by the acceptor and technologies chosen by the acceptor for the fractions achieved.

- ☒ Use of **general data/analysis** for **input material** for/to accepting plant?

examples:

- 2/several different fractions delivered to same accepting plant, same yield data as information?
- general information for different circuit board fractions delivered to smelters?

⇒ no, **yield** or **composition data** should give a picture of the **individual fraction**

⇒ if **no individual data** are **available**, i.e. general data for a mix have to be used, you should give a **remark** (e.g. in the internal name 'data for xxx' or in 'source of data' - see remarks at page 30)

⇒ data/analysis of accepting treatment partners should be **checked** for **plausibility** for the **fraction delivered**

(consider: not only the existence of a downstream statement should be checked, also the content should be checked!)

- ☒ **Total yield** of the **accepting plant?** (e.g. plant which is processing quite some other input material too, e.g. shredder or (plastics, mineral,...) conditioning plant, incineration plant)

⇒ no, **possible** - even estimated - **yield** with or **use** of components of the **individual fraction** from the **WEEE treatment stream**

(e.g. view analysis or handpicking analysis of the individual WEEE fraction and estimate yield or use of components on base of the technology used)

examples:

- CRT glass 'pieces' and CRT glass 'fines' are delivered to same plant/same process → same yield of fractions?: NO
- general slag/ash yield from incinerator?: NO ... and use of slag as xyz?: NO  
see points 1) 'Target of use approach', page 5 & 'Apply the target of use approach', page 23 and 2) 'Slag and ashes', page 35

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## Pre-treatment step or final treatment step to be used for classification?

### ☒ Example **PU foam** used as '**oil binding material**':

⇒ we understand the technology and the use '**production of / use as oil binding material**' as a technology where 'real oil binding material' is produced as a **defined product** (e.g. definite quality specifications), packed in bags and used e.g. by the fire brigade, at car workshops etc. to bind/suck off oil spillages coming from (work) accidents,

⇒ we understand the **mixing of PU foam** with liquid wastes (used colours, paints, solvents, resins,...) for the later use in co-incineration processes as '**conditioning of high caloric material**' (interim technology) and the **co-incineration** plant is the final technology (e.g. 'used for fuel substitution' → ER)<sup>47</sup>

### ☒ **Other WEEE fraction** used for '**stabilisation**':

⇒ also for other WEEE fraction used for '**stabilisation**' = conditioning of other wastes (e.g. paints) for incineration (e.g. also hazardous wastes incineration) only the **classification** of the **use** in the **final technology** may apply which means in case of following examples:

- e.g. 'plastics > used for fuel substitution' in 'co-incineration - with ER': ER
- e.g. 'other organic fractions > incineration with high energy efficiency (R1)' in 'municipal waste incineration - high energy efficiency (R1) (to be approved)': ER
- e.g. 'all other organic fractions > fuel substitution but 'purpose of plant' waste incineration' in 'hazardous waste incineration': TD  
(see '*Purpose of the plant*' of municipal waste incineration, page 7)

### ☒ Use of fractions from **cracking** [fractions from cracking of plastics (and oil) have been foreseen in the new list of OUTPUT fractions (2013) (fuels and solid residues)]:

⇒ the **cracking process** is seen as **interim technology**, the use of the fractions achieved will be classified according to the **final technology** applied

- fuels: expected as<sup>48</sup> to be used for fuel substitution in co-incineration plants: ER
- solid residues: expected as<sup>49</sup> to be disposed off at landfills: LD

### ☒ Delivery to any **R4<sup>50</sup> or R5<sup>51</sup> acceptor/operator** to be seen as **100 % recycling**?

⇒ **no**, the WFD 2008, Annex II sets out a non-exhaustive list of recovery operations only

⇒ R4 or R5 operators may also **only** do a **separation of fractions** - see also an acceptor running a shredder technology may be seen as R4, 'his' results will not be fractions, which will be classified as recycling per se ...

⇒ the question on **which technology** is applied has to be raised and the **yield** and/or the **composition of fractions** have to be determined [of course for the individual WEEE fraction delivered - see point '*Total yield of the accepting plant*', page 18]

<sup>47</sup> see also recycling definition (see page 5) '*... does not include energy recovery and the reprocessing into materials that are to be used as fuels ...*'

<sup>48</sup> to be cross-checked with final technologies applied in reality

<sup>49</sup> to be cross-checked with final technologies applied in reality

<sup>50</sup> R 4 Recycling/reclamation of metals and metal compounds

<sup>51</sup> R 5 Recycling/reclamation of other inorganic materials (\*\*\*), (\*\*\*). This includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials.

- ⇒ **final fractions achieved** by the separation or conditioning (or the mixing) have to be determined and to be used for the classification, i.e. 'their' composition and the **use in the final technology**<sup>52</sup> [see also 'Approval of products requested', page 27]

examples:

- mineral fraction, sieving or filter material (incl. organic residues) going to 'mineral conditioning' (acceptor classified as R5) → apply approach mentioned above!; in case apply technology 'road construction and defined construction purposes' or 'other construction purposes' as final technologies for fractions achieved but not wrongly for the total input to him/the R5 acceptor

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### Technologies or use not to be accepted

Technologies or uses not to be accepted shall be limited by regulations or standards (see WLX / EN standard) In the following list we give some examples mentioned.

- ☒ **Compressors** from cooling and freezing appliances shall **not be prepared re-used**<sup>53</sup>.
- ☒ For **PU foam > 0.2 % (H)CFC** no use of the fraction classified as **recycling** [(M)R] shall be chosen<sup>54</sup>.
- ☒ **Cleaned CRT** glass must be **recycled or recovered** (may not be disposed of) when exported **outside EU / EFTA**<sup>55</sup>.

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<sup>52</sup> see also Judgment of the Court '**Mayer Parry**': Case C-444/00 - 19 June 2003, Mayer Parry Recycling Ltd <> Environment Agency (UK)

Question: processing (here: shredding and separation) of metal packaging material to defined input materials for smelters to be quoted as recycling operation?

1. Recycling within the meaning of Article 3(7) of European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste is to be interpreted as not including the reprocessing of metal packaging waste when it is transformed into a secondary raw material such as material meeting the specifications of Grade 3B, but as covering the **reprocessing** of such waste when it is used to **produce ingots, sheets or coils of steel**.

2. That interpretation would be **no different** if the concepts of recycling and waste referred to by Council Directive 75/442/EEC of 15 July 1975 on **waste** were taken into account.

Summary of the Answer of the Court (Fifth Chamber): "treatment operations" like shredding and separation are **NOT** to be quoted as 'recycling' → '**final**' **production process** are to be quoted as recycling (or recovery)

<sup>53</sup> see WLX standard treatment – requirements cooling & freezing appliances point 1.3, Step 1, point 6: Compressors shall not be re-used.

<sup>54</sup> see WLX standard treatment – requirements cooling & freezing appliances point 1.3, Step 2, point 3: After treatment PU-fractions shall **contain not more** than 0.2 % CFC, HCFC, and HFC

<sup>55</sup> see WLX standard treatment – requirements Specific requirements for the treatment of CRT display appliances point 5.3.6 Export of cleaned CRT glass outside the EU and EFTA territory is only permitted for the purpose of recycling or recovery.



**Choose 'use' in 'final technology'**

TOP

The 'final technology' is the technology applied by the final acceptor.

☒ Choosing the '**use**' of any fraction/component in the 'final technology' is the **core element** to come to the **classification** as recycling and recovery.

☒ How to **find & choose** the correct 'use in final technologies'?

- ⇒ see the **scroll-down** of 'Use in final technology' for **pre-selected uses** for the given component (quick choice for experienced/advanced users) ... or
- ⇒ if you are **not sure** which use to choose or **to check** the options of the scroll-down, search the **list of available uses**<sup>56, 57</sup> and **cross-check** the **given technology** (i.e. the final technology of the acceptor) with **examples of technologies** given in the list under 'Examples technology' (e.g. use the find/filter option with/in 'Examples technology contains')
  - ⇒ If you **don't find** the technology you are looking for/you apply, choose the use in a **similar or comparable technology** but ...
  - ⇒ consider the **technical / technological properties** in the technology (see '*Dedicated metal recovery in dedicated smelters*', next point)

☒ **Don't use** the option for '**other use**' (e.g. as you don't want to search for options)

- ⇒ **choose from given options**
- ⇒ to prepare a '**list of available uses**' was the **core element** of work for the WF-RepTool development (i.e. to investigate, select, find a common wording for the possible options of use) and - with this - the **classification** as recycling and recovery
- ⇒ amounts/shares with the choice of 'other use' **will not be counted to total results** under the **WF-classification**<sup>58</sup> (as the WF-RepTool expert group could not agree on & pre-set the classification of use), results will not be comparable with other data

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**Classification of use not to be accepted****➤ Dedicated metal recovery in dedicated smelters**

☒ There are **dedicated metal smelters** for the recovery of **dedicated metals** ...


- ⇒ take care **not to use options** which are **technological not possible!**
- ⇒ see option to use **simplification** '*Summary result - output to different smelters*' (see page 40) under restrictions

examples:

- **NO Fe recovery in a Cu smelter!** – see option for Fe as reducing agent, Fe-oxides go to slag, 'model 2' – different options for use of slag
- **NO Cu recovery in a steel mill!** – see very low limits of Cu for input of scrap to regular steel mill, in case of special steel mills/special steel, use as alloy material
- **NO Al recovery in a Cu smelter!** – see low limits, Al will burn off in regular smelter → Al-oxides not 'liked' in slag and/or products (technical properties), see separation of Al from circuit board fractions or similar fractions before Cu smelter (see page 31)

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<sup>56</sup> see link: 'List of available components use in final technology'

<sup>57</sup> to be opened with the -button beside 'Use in final technology' scroll down

<sup>58</sup> you may only set a national classification

➤ **Regular municipal waste incinerators – NO use of components!**

TOP

- ☒ For **regular municipal waste incinerators** (MWI and HWI) ...
  - ⇒ **no use of components** may be chosen – see ‘**purpose of the plant**’ (see page 7)
  - ⇒ **use of organics** for classification as ER **only** if **R1 approval** (see next point) or ‘**special use**’ in the plant (see remarks under ‘*Approval of/from technologies requested*’ at page 25)
  - ⇒ for **non-organic** shares the ‘**purpose of the plant**’ approach has to be followed
    - ⇒ yield & application of **slag not** to be **judged** (see also ‘*Slag and ashes*’, page 35)
    - ⇒ yield/separation/use of **metals** separated **from slag not** to be **judged** (see also ‘*Metals separated from slag / ashes*’, page 38)

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➤ **Classification of use of plastics or organic shares**

- ☒ For **plastics**, other organic fractions or **organic shares** of wastes an use of the fraction/share classified as **ER** (energy recovery)<sup>59</sup> may **not** be chosen for ‘**regular**’ **municipal waste incinerators**.
  - ⇒ see point above
  - ⇒ only if the incinerator may be classified as ‘**municipal waste incineration - high energy efficiency**’ and an **R1 approval** is provided (see remarks under ‘*Approval of/from technologies requested*’ at page 25)
- ☒ The classifications of use ‘**used for fuel substitution**’ or ‘**incineration with high energy efficiency (R1)**’ (see classification as ER (energy recovery)) may **not** be used in all cases for the **total input** of the fraction...
  - ⇒ use only for the **organic share** of the fraction (i.e. not for any inorganic material (fractions or residues), metals) and classify according to the ‘*Target of use approach*’ (see page 5) and ‘*Apply the target of use approach*’ (see next headline point, page 23)
  - ⇒ see also ‘*Total yield of the accepting plant*’, page 18
- ☒ For **plastics** or organic shares of wastes an use of the fraction/share classified as **ER (energy recovery)** or **(M)R ((material) recycling)** or **OMR (other material recovery)** [model 2] may **not** be chosen in ‘**traditional**’ **smelters**
  - ⇒ see ‘Use in final technology’: ‘**no definite use** in smelter’ = TD (see ‘list of available uses’ in ‘*Choose ‘use’ in ‘final technology*’, page 21)
  - ⇒ only if approval as ‘**special**’ **smelters** (see ‘*Approval of/from technologies requested*’, page 24)

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<sup>59</sup> ‘used for fuel substitution’ or ‘incineration with high energy efficiency (R1)’

## Apply the target of use approach

TOP

### ☒ Provide 'target of use' data or output fractions from final technologies?

- ⇒ Apply the '**Target of use approach**' (see page 5)  
*[short: you shall list the component/s of the input fraction to any final technology and the planned use of this component in the final technology]*  
 and **not** the
- **output** of/from the **final technology**  
 (e.g. as fraction mentioned as component) and **not**
  - the **use** of this **output fraction** in it's **application**  
 (e.g. slag = mineral fraction being used for road construction and giving this information in case under the 'use' in the smelter)

examples:

- **Fe fraction** or other 'pure' & '**1-kind** metal fraction' – 'target of use' of Fe is Fe recovery, not the yield of Fe from the steel mill is asked, no share of slag data!
- '**circuit board fraction/s**' – 'target of use' of the components of the fraction, not the output of Cu, metals, slag from the smelter! → estimate the composition (or e.g. small scale analysis) and apply the target of use approach; see option 'Use of data from analysis for circuit board fractions', page 31
- **fractions** forwarded to **incineration processes** – 'target of use' of components of the fraction, not the output of the incinerator!
  - clear (and 'welcome') for plastics, other organic fractions, organic shares (residues) → used for fuel substitution (see exception for regular MWI, page 22) <> not the real 'efficiency' of the plant of incineration of the input fraction, you will not mention the fraction CO2 as output!
  - but also not to determine ashes, slag or metal yields and the use of these fractions – see point before under 'Regular municipal waste incinerators – NO use of components', page 22, 'Slag and ashes', page 35, 'Metals separated from slag / ashes', page 38; see also 'Total yield of the accepting plant', page 18

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## No information on final technology

- ☒ See the **final technologies** have to be given (see page 4).
- ☒ **No information** on the **final technology** used is provided by the waste collector / trader and/or treatment operator (e.g. separator) **at all**:
  - ⇒ first step option: start with **best estimations** and give a **remark** (e.g. 'technology estimated')
- ☒ Special case - information stops at '**pure**' **1-kind metal fractions**:
  - ⇒ the **final technology** (steel mill, Cu smelter etc.) may be **estimated** on base of the **kind of the metal** (see exception under '*Follow the treatment chain until the final technology is applied*', page 4)
- ☒ Special case - information stops at the **sorter / separator** and only **yield data** of fractions are available – options:
  - ⇒ use the **yield data** of fractions and **estimate** the **final technologies** on base of information on the **fractions achieved**  
*(for names of acceptors use e.g. 'no information from acceptor' - see 'Name of acceptor', page 12)*  
 and give a **remark** that chosen technologies are estimations (e.g. in internal name)

⇒ use the **yield data** (of sorting / separation) as **composition data** and **apply** one of the options of '**simplifications**'<sup>60</sup>

- a) for sorting/separation results of '**pure metal mixtures**' you might apply the option '*Summary result - output to different smelters*' (see page 40), in this case you have to give the **remark** 'summary result - output to different smelters' in the **internal name**<sup>61</sup> (consider limit values, see page 40)
- b) for sorting/separation results of '**not pure**' **metal mixtures**' you might apply the option '*Summary result - output to different applications*' (see page 39), in this case you have to give the **remark** 'summary result - output to different applications' in the **internal name**<sup>62</sup> (consider limit values, see page 40)

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## Approval of/from technologies requested

### ➤ Approvals of (Cu) smelters

- Use of organics** (fractions or shares/residues) in '**special**' **smelters** – **TOP**  
requirements:

⇒ the definite **use of organics / organic shares** (e.g. organic residues of circuit boards) in smelters as 'used for fuel substitution' or 'used as reducing agent' **must be approved** (this is also the base to call (and choose) smelters as 'special' smelters)

⇒ the **approval** shall be given by an **independent study**; any public information of the smelters (e.g. brochures, environmental reports or internet information) might be used as a start-up information only

- Slag as by-product or definite product** - requirements:

⇒ generating a **slag by-product** should be **approved** by the smelter

⇒ the **approval** shall be given by a **written document** of the treatment operator which approves the **technology** to achieve the slag by-product and the **by-product** achieved;

any public information of the smelters (e.g. brochures, environmental reports or internet information) might be used as a start-up information only

⇒ for approval/s of **definite product/s** of/from/with slag see '*Slag from (Cu) smelters as defined product/s*', page 29

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<sup>60</sup> agree with the WEEE system / WF-RepTool administrator

<sup>61</sup> this is the base for an interpretation of this result as correct - see recovery of all metals in one smelter would not be plausible (see also '*Dedicated metal recovery in dedicated smelters*' page 18)

<sup>62</sup> see footnote 61 above – this is the base for an interpretation of this result as correct= to accept component data as fractions going to different applications

## ➤ Approvals of MWI as R1 plants and/or as plants with special use

- ☒ Use of **organic fractions** or **shares** in **municipal waste incinerators** with **R1 approval**
  - ⇒ **'regular' municipal waste incinerators** (for residual or household waste) are classified as **disposal process** by a judgement of the European Court (see 'purpose of the plant', see page 7).
  - ⇒ given by the Waste Framework Directive 2008 (WFD 2008) there is a **R1<sup>63</sup> classification possible**, if **energy efficiency limits** are kept<sup>64</sup> - in this case ...
    - ⇒ an **R1 approval** should be kept from the MWI plant/s being used as **delivery destination/s** (see name of the acceptor is necessary!)
      - ⇒ this **R1 approval** should be an **official approval** given by
        - the relevant **authority** or
        - any **independent study**
        - done for any plant or plants of a region (see overview NL)
    - ⇒ in this case the use **'incineration with high energy efficiency (R1)'** may be applied
- ☒ Use of **organic fractions** in **municipal waste incinerators** for **special use**
  - ⇒ in special cases/special plants a **special use** of organic fractions in (regular) **municipal waste incinerators** has been reported (e.g. to heat up plant)
    - ⇒ this **special use** has to be **approved** by the treatment operator (see name of the acceptor is necessary!)
  - ⇒ the **approval** shall be given by a **written document** of the treatment operator which approves **possible input fractions** (e.g. plastics of definite quality classes) for this special use and the **technology** to use the organic fractions (e.g. injection facilities); any public information of the incinerator (e.g. brochures, environmental reports or internet information) might be used as a start-up information only

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## ➤ Approvals of HWI as R1 plants and/or as plant with special use

- ☒ Use of **organic fractions** or **shares** in **hazardous waste incinerators** with **R1 approval**
  - ⇒ **'regular' hazardous waste incinerators** are classified as **disposal process** by a judgement of the European Court (see 'purpose of the plant', see page 7).
  - ⇒ given by the Waste Framework Directive 2008 (WFD 2008) there is a **R1<sup>65</sup> classification possible**, if **energy efficiency limits** are kept<sup>66</sup> - in this case ...
    - ⇒ an **R1 approval** should be kept from the HWI plant/s being used as **delivery destination/s** (see name of the acceptor is necessary!)

<sup>63</sup> R 1 Use principally as a fuel or other means to generate energy (\*)

<sup>64</sup> (\*) This includes incineration facilities dedicated to the processing of municipal solid waste only where their energy efficiency is equal to or above:

— 0,60 for installations in operation and permitted in accordance with applicable Community legislation before 1 January 2009,

— 0,65 for installations permitted after 31 December 2008,

<sup>65</sup> see footnote 63

<sup>66</sup> see footnote 64

⇒ at present there are **no HWI plants with R1 approval** known to the WF-RepTool expert group, if this would change, the **same requirements** as for **MWI plants** would apply – see point before

☒ Use of **organic fractions** in **hazardous waste incinerators** for **special use**

⇒ in special cases/special plants a **special use of organic fractions in hazardous waste incinerators** might be possible (e.g. to heat up plant)

⇒ this **special use** has to be **approved** by the treatment operator  
(see name of the acceptor is necessary!)

⇒ the **approval** shall given by a **written document** of the treatment operator which approves **possible input fractions** (e.g. plastics of definite quality classes) for this special use and the **technology** to use the organic fractions (e.g. injection facilities); any public information of the incinerator (e.g. brochures, environmental reports or internet information) might be used as a start-up information only

☒ Use of **glass (or other) fractions** in **hazardous waste incinerators** for **special use**

⇒ in special cases/special plants a **special use of glass fractions in hazardous waste incinerators** has been reported (e.g. to use glass as slag forming component to build up a protective layer in the drum of the HWI plant)

⇒ this **special use** has to be **approved** by the treatment operator  
(see name of the acceptor is necessary!)

⇒ the **approval** shall given by a **written document** of the treatment operator which approves **possible input fractions** (e.g. glass of definite quality classes), the **technology** to use the glass fraction as well as the kind and weight of **material otherwise** to be applied as slag forming component (e.g. approved by former delivery documents);

any public information of the incinerator (e.g. brochures, environmental reports or internet information) might be used as a start-up information only

⇒ the **classification of use** 'glass > used for feedstock substitution as slag forming component > slag not as by-product or as defined product for use' may only be **OMR (not R)** (for OMR see recovery definition)

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## Approval of products requested

See based on the 'new' *'Recycling definition'* given by the WFD 2008 (see page 6), reaching the **product attribute** has to be **approved**.

In the WFD 2008 (see Article 6) there are options given to achieve the '**end-of-waste status**' for waste fractions. This 'end-of-waste status' would make it easy to exclude these 'end-of-waste products' from the waste attribute and to classify them as 'recycled' or on base of the 'intended' final technology e.g. as used for 'energy recovery' (see '*Follow the treatment chain until the final technology is applied*', page 4).

But for quite some fractions achieved from WEEE treatment the end-of-waste attribute<sup>67</sup> may not be achieved at least in a short time period (see CRT glass excluded from EOW criteria for glass, no end-of-waste regulation for special mineral fractions 'in sight').

The way how to determine '**product characteristics**' is quite complicated (see e.g. REACH, ISO 14025) but should of course be the **target for the future ...**

We try to use a **simplified approach** to work '**now**' with the WF-RepTool taking into account the **end-of-waste criteria** from WFD 2008, Article 6 (see *following*) as guidance to find the **product attribute**:

- (a) *the substance or object is **commonly used** for **specific purposes**;*
- (b) *a **market** or **demand** exists for such a substance or object;*
- (c) *the substance or object **fulfils the technical requirements** for the specific purposes and meets the existing legislation and standards applicable to products; and*
- (d) *the use of the substance or object **will not lead to** overall **adverse environmental** or **human health impacts**.*

We distinguish WEEE fractions to be used as 'products' **directly = without** or **after** further treatment (e.g. mixing/conditioning/separation...) – see following.

Based on the '*Recycling definition*' (see page 6) we also have to distinguish the use for '**backfilling**' operations and other applications where only **volume and/or physical properties** are used as they are excluded from the classification as 'recycling' (see page 7).

The '**proof** of products (meeting product specifications and other proofs see following sub points) shall **not be necessary** if already pure, **separated fractions** are achieved and the **typical technology** for this fraction is applied.

### examples

- *separated kinds of plastics (e.g. ABS, PS, PE/PP, PVC) after plastics conditioning (in case limitation to: separated by a well known plastics conditioning company)*
- *separated mixed plastics after plastics conditioning (i.e. separation of 'bad plastics', other material, fines, residues) by a well known plastics conditioning company and data of plastics conditioning are available and plausible*
- *mineral fraction of concrete 'pieces' forwarded to e.g. concrete production*
- *CRT glass forwarded to CRT glass production –but check the name of the acceptor, see 'CRT glass', page 33*
- *all 'pure' 1-kind metal fractions forwarded to the applicable smelters*

*This list of examples may be further developed.*

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<sup>67</sup> see Council or Commission regulations for end-of-waste status are only available for iron/steel, aluminum, copper, glass cullets – see [http://ec.europa.eu/environment/waste/framework/end\\_of\\_waste.htm](http://ec.europa.eu/environment/waste/framework/end_of_waste.htm) and follow link to JRC reports

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➤ **Defined products** from WEEE fractions **without** further treatment

TOP

- ☒ For '**defined products**' from **WEEE fractions without** further treatment (WEEE fractions are ready for application when forwarded from the site of the treatment operator = delivery next step = to final application/final technology) ...

*examples (positive and negative)*

- *mineral fraction of concrete 'fines' ('sand') e.g. separated from filter material (incl. organics) as e.g. 'technical sand' for e.g. road construction, in case for road construction or defined construction purposes at landfill sites*
- *CRT glass fractions as road construction material – see also 'CRT glass', page 33*
- *CRT glass fractions for other defined construction purposes, in case for defined construction purposes at landfill sites (e.g. draining material) – see also 'CRT glass', page 33*
- *plastics fractions as construction material, in case for defined construction purposes at landfill sites*

...the following **proofs** should be asked:

⇒ **product specification** – including

- limit values given for the fraction (e.g. organic shares, metal content, etc.)
- average results achieved for the limited values
- approval of meeting **product specific technical requirements** or **requirements of standards** (e.g. like for certified recycling construction materials like e.g. freezing stability, pressure stability, temperature stability, gas and water permeability or percolation factors)

⇒ **approval of application** by the acceptor (take care on a statement that material is solely and exclusively used for the application mentioned (not 'beside other applications ...'))

⇒ any **product / brand name** for this material (not obligatory)

⇒ information about the **price/revenue** or necessary **payment** to the acceptor and/or **difference** to other options (e.g. also negative market value possible) (not obligatory, indicator for 'higher value' than other options)

These 'proofs' may be further developed.

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➤ **Defined products** from WEEE fractions **after** further treatment

TOP

- ☒ For '**defined products**' from **WEEE fractions after** further treatment (WEEE fractions are further processed at the next treatment operator) ...

*examples*

- *CRT glass, glass or other fines etc. for concrete blocks, tiles, ...*
- *fines e.g. to construction purposes*
- *plastics products from plastics from 1<sup>st</sup> step treatment / shredder processes (see pages 15 and 32)*
- *plastics products from cable plastics (see page 33)*
- *all other products of with plastics, other products of with plastics and other products of with glass*

... the following **proofs** should be asked:

⇒ **product specification** – including

- information on **which share (%)** of the forwarded WEEE fraction **is applied** in the **product** or in the **process** (see next point)
- information about **meeting of technical specifications/requirements**, take care: including information **that with** and **the given share (%)** of the **WEEE fraction**



- any **leaching tests** with the product achieved (especially CRT glass) (including information on test material e.g. size, test method e.g. pH value), take care: including information on **that with** and **the given share (%)** of the **WEEE fraction**

⇒ **process description**

- information about any **further separation** of the delivered WEEE fraction, including yield data
- information about in **which process step/s** the WEEE fraction(s) is(are) applied, in **which shares**,...

⇒ **product / brand name/s** for product/s achieved should be given (not obligatory)

⇒ information about the **price/s/revenue/s** for **delivery of WEEE fraction** and/or **difference** to other options (e.g. also negative market value possible, see further processing necessary) (not obligatory, indicator for 'higher value' than other options)

These 'proofs' may be further developed.

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➤ **Slag from (Cu) smelters as defined product/s**<sup>68</sup>

☒ Slag as **defined product/s** of/from/with slag from (Cu) smelters

⇒ generating a **defined product** of/from slag or the **use of slag in any definite product** should be **approved** by the smelter

⇒ the **approval** shall given by a **written document** of the treatment operator which approves **defined product** achieved (e.g. any insulation material)

[for the use **use of the slag in any definite product** – see discussion under point '*Slag from (Cu) smelters*' (page 36) and the discussion box at page 37]

any public information of the smelters (e.g. brochures, environmental reports or internet information) might be used as a start-up information only.

⇒ for **by-products** see '*Approval of/from technologies requested*', sub point '*Approvals of (Cu) smelters*', page 24

☒ Slag used for **backfilling** application

⇒ if the **slag** of the smelter is used for **backfilling application** (see 'backfilling' excluded from definition of 'recycling' (see page 7)), this may **not** be considered as defined product for use and not be **classified** as '**recycling**' (the use 'slag not as by-product or as defined product for use' has to be chosen → classification as OMR only!)

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<sup>68</sup> see remark **Fehler! Textmarke nicht definiert.**

## Source of data

☒ Ask for the **source of data** provided for all results but especially if **critical** (see e.g. 'To classify 100 % 'recycled' – cases of most time NOT', page 13, 'Approval of/from technologies requested', page 24 or 'Approval of products requested', page 27) or **a-typical results** (see page 14) are provided. Take care on:

⇒ **'kind of data'** – see choices, e.g. real yield data, data from a batch etc.; check & give information **how data** have been **determined** (please distinguish, not every piece of paper is an 'analysis')  
proposal: for a-typical results (see page 14) don't accept experience data;

⇒ **'date of data'** - this should be the **date/period** when **data** have been **determined**, target is to show the actuality of data (do not use the date when information 'came in')

⇒ **'data provided by'** – information should be the company (+/- name of the person) who **treated** the material and **provided data**, in case the name of the trader who provided experience data (not the person within the company who organized or collected or stores data)

As long as there is no separate remark field available<sup>69</sup>, you may also give information here, **for which (special) kind of fraction** the following yield or composition **data** are given (e.g. data for mix of xyz) (hint: use preferably the internal name for it = more quickly to be seen)

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## Remarks on typical WEEE fractions

### ➤ Circuit board chassis / non-ferrous metals mixtures to smelters

Circuit board chassis (typically dismantled from CRT appliances) and other non-ferrous metals fractions with high shares of Fe and/or Al will normally be shredded & separated before the input to any Cu smelter (even if the Cu smelter acts as direct acceptor, he will often do it internally as pre-treatment step). Typical fractions of this treatment are:

- Fe fraction
- Al fraction
- circuit board fraction

Normally:

- the Al fraction will be forwarded (to further separation or Al smelters)
- the Fe fraction may be forwarded (e.g. to steel mills) or may be used in the smelter itself (used as reducing agent)
- the circuit board fraction is the fraction of most interest for the Cu smelter – see point below

⇒ ask for and show the **process steps applied**

⇒ get information or estimate the **composition** of the final fractions

⇒ ask for and show the **real final technologies** and choose the correct use

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<sup>69</sup> will come in any next version of the WF-RepTool

## ➤ Circuit board fractions

Depending on the quality, the circuit board fraction will consist of:

- the circuit board fraction itself / the circuit board base material
- Fe frames
- Al components
- other components
- printed circuit board tracks

If the share of **Fe** and/or **Al** is **high**, they will be - most of the time - mechanically pre-treated and separated before the input to the (Cu) smelter - see point '*Circuit board chassis*' above.

The circuit board fraction +/- components and circuit board tracks will normally consist of:

- Cu
- (only low shares of Fe, Al)
- other metals (see '*priority to provide information/shares of components Fe, Cu, Al*', page 16)
- organic residues
- inorganic residues (if high quality, e.g. glass fibre reinforced)

⇒ **check** composition data if **these components** are given and you may in case continue with data from analysis – see the next point

⇒ you may go back to '*Composition of circuit board fractions*', page 17

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## ➤ Use of data from analysis for circuit board fractions

TOP

When developing the WF-RepTool, we did not expect to get data from analysis for circuit board fractions → see '*Target of use approach*', page 5.

Today, more and more treatment operators - especially those who achieve high volume of material or high value materials - ask for analysis and do want to use these results gathered in the WF-RepTool.

But what we see in results is, that partly the **shares of metals** given are **incredible high** and classified as **metal recovery (= 'recycling')**.

These data should be **checked** for **plausibility** and for the 'mistake' that in case all metals, also those ones going to the slag (see smelter analysis results as metal-oxides) are classified as metal share/s and the use of metal recovery has been chosen (even for the total share of metal-oxides ...).

⇒ see also '*Composition of circuit board fractions*', page 17

We recommend the following '**Proposal on the 'simplified' use of results from smelting analysis**':

Data / steps	Use in final technology	classification
➤ use the content of the <b>target metals</b> (e.g. Cu, other metals) which are mentioned as <b>recovered</b> (+/- are paid ...)	metal recovery	R
➤ ask additionally for the <b>glowing loss</b> to determine the <b>share of organics</b>	depending on smelter technology <sup>70</sup>	ER or TD <sup>1)</sup>
➤ estimate (simplification) the <b>rest/difference</b> as <b>inorganic residues</b> going to the <b>slag</b>	depending on slag products and/or use of slag <sup>71</sup>	R or OMR <sup>1)</sup>

1) if **no approval** of the smelter technology or slag products is given (see footnotes), the **worse classification** has to be applied (worst case scenario)

Chart 3: 'Proposal on the 'simplified' use of results from smelting analysis'

For this **simplified approach** ...

- ⊗ realize and concede that you will **lose information** on **non-target metals** (in analysis of Cu smelters e.g. Al as Al-oxide, Fe as Fe-oxide)
- ⇒ you might **provide this share of metals** in the WF-RepTool results, but take care on the calculation of metal-oxides <> share of metals

From **Fe- and Al-'rich'** fractions Fe and Al will be separated at or on behalf of the Cu smelter before the input to the smelter - see '*Circuit board chassis / non-ferrous metals mixtures to smelters*', page 30 ...

- ⇒ these **separation results** must be **integrated** to the report
- ⇒ **only** the smelting analysis for **Fe- and Al-'low'** fractions should be used in this way

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### ➤ **Plastics from shredder processes**

As output fraction from large shredders - but also from shredders for cooling & freezing appliances – and medium shredders (e.g. chain shredders) plastics fractions are still mixed (different kinds of plastics) and/or include fines. These fractions have to go to the technology of '**plastics conditioning**' ...

- ⇒ see '*First step fraction goes 100 % to products / recycled – most time NOT*', page 15 and expect **different kinds/qualities** of plastics fractions and **some % of residues** with different applications/final technologies
- ⇒ consider the remark on 'low level recycling options' from there ... that if the next step treatment operator for mixed plastics from shredders insists on **100 % product yield**, ask for any **approval** about **which products** are achieved and give a **remark** in the internal name and/or under 'use in final technology' (see also '*Approval of products requested - Defined products from WEEE fractions after further treatment*', page 28).

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<sup>70</sup> the use of the organics has to be determined on base of **kind of smelter used** – see approval as '*special smelter for the use of organics / organic shares* – see '*Approval of/from technologies*', page 21'

<sup>71</sup> the use of the slag as by-product or as defined product must to be approved – see '*Approval of/from technologies*', page 21 resp. '*Slag from (Cu) smelters as defined product/s*', page 24

## ➤ Cable plastics

Depending on the quality of cables treated and the quality of separation at the fine shredder (respectively cable shredder) cable plastics will - most time - need a further separation before the production of for plastics products (technology 'plastics recycling').

- ⇒ see 'Yield fractions from cables', page 16 and expect **different kinds/qualities of plastics fractions** and **some % of residues** with different applications/final technologies
- ⇒ consider the remark given under 'First step fraction goes 100 % to products / recycled – most time NOT', page 15 on 'low level recycling options' ... that if the next step treatment operator for **mixed cable plastics** insists on **100 % product yield**, ask for any **approval** about **which products** are achieved and give a **remark** in the internal name and/or under 'use in final technology' (see also 'Approval of products requested' – 'Defined products from WEEE fractions after further treatment', page 28).

### ☒ Question 'Cable plastics for horse riding areas?'

(Based on information from a cable shredder who checked it out & does this process in low volume in daily practice ...) There is a further separation of cable plastics necessary to use them for horse riding areas. Plastics of low density (e.g. PE) must be separated (they would 'swim up' at horse riding areas, and do have a smell horses don't like, ...). Only the 'heavy' plastics like mainly PVC may be applied for this purpose.

- ⇒ for the use of (mixed) cable plastics for **horse riding areas** they have to be further separated - expect **different kinds/qualities of plastics fractions** and **some % of residues** with different applications/final technologies
- ⇒ **cross-check** with **information** given by the acceptor of cable plastics

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## ➤ CRT glass

When checking information provided on the application of CRT glass fractions you should consider:

- ☒ **CRT glass production** nearly stopped ...
  - ⇒ cross-check the **name** of the acceptor if a **delivery** to this option is chosen
- ☒ **Road construction** to be scrutinized – see technical properties ...
  - ⇒ see 'Approval of products requested', page 27
- ☒ **Other defined construction purposes** ...
  - ⇒ see 'Approval of products requested', page 27
- ☒ Question / special case **defined construction purposes at/for landfill** sites (e.g. draining material) ...
  - ⇒ see 'Approval of products requested', page 27

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## Questions on special fractions from WEEE treatment

(At present) The WF-RepTool is designed for (and WF-RepLists are provided for) the 'regular' WEEE treatment and WEEE fractions. We do not focus on the treatment of batteries or other specific fractions separated from WEEE for which very other processes of separation and/or final treatment are applied. Treatment options and possible fractions achieved might be included in the future (but this is not the case at present). Please see following entries as examples on how to tackle.

### ➤ Oil fractions

Oil fractions (e.g. compressor oil from cooling & freezing appliances) will be – depending on the quality – often separated by cracking (oil refinery process). Applicable for this the new 'interim' technology 'pyrolysis, cracking or similar' has been introduced in 2013<sup>72</sup>.

Results of this cracking process will be different oil fractions, partly used for new oil and/or partly used for incineration purposes and in case some % of residues.

⇒ provide **yield data** and **technologies used**

⇒ as this fraction is in many cases a '**minor fraction**', you may agree to use the technology 'production of 'new oil'' (final technology) and a **simplified summary result** (see '*Summary result - output to different applications*', page 39

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### ➤ Batteries

☒ **Batteries** as mixtures from dismantling from WEEE and sorting from WEEE fractions or dedicated batteries/accumulators separately collected will follow different treatment processes than WEEE (e.g. smelting-separation, treatment of Ni-Cd accumulators and its fractions, separation of Pb batteries etc.<sup>73</sup>). For this the WF-RepTool would have to be adjusted in principles (interim and final technology at one step) and the WF-RepTool is - at present - not prepared for these technologies and fractions.

⇒ there should be a special 'project'<sup>74</sup> to determine & include the WF-RepLists (see specific input and output fractions, technologies used, classification of use) necessary for batteries → separate '**WF-RepTool batteries**'

⇒ for the meantime we propose to work with '**average**' results' as they are e.g. provided by the **battery system/s** – options are:

a) **yield data** - e.g. x % of Fe fraction to steel mill → Fe-recovery,  
x % of other metals to different smelter → metal recovery,  
x % of residues → no definite use in smelter

b) as this fraction is in many cases a '**minor fraction**', you may agree to use the technology 'battery recycling' (final technology) and a **simplified summary result** (see '*Summary result - output to different applications*', page 39

☒ For **acids** from separation of **lead batteries** (see introduction for this point and remark to of 'Batteries' above) the only technology foreseen in the WF-RepTool is 'chemical / physical treatment as disposal process' (i.e. no (interim) separation or neutralisation technology, no fractions from separation or neutralisation like salts, water...) and the only option for the use is '*all other inorganic fractions > no use - 'cold technologies'*'; we

<sup>72</sup> mainly for the upcoming technology of cracking of plastics fractions

<sup>73</sup> to the WF-RepTool expert group: we need **experience data** and/or **packages** for Pb, Ni/Cd, NiMH, Li-ion, alkaline batteries or to go on with WF-RepTool batteries (see different technologies, fractions,...)

<sup>74</sup> ... as several times discussed for WEEE systems also taking over the responsibility for batteries collection and treatment

agreed within the WF-RepTool expert group that this will stay like it is and no adaptation of the WF-RepTool for this minor factor will be done ...

- ⇒ we propose to use the technology 'chemical / physical treatment as disposal process', choose for the composition of this fraction 100 % 'other inorganic fractions'<sup>75</sup> and classify the use as 'no use' – 'cold technologies' (see above)

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## ➤ NH3-CrO4-mixture

### ☒ NH3-CrO4-mixture

*example:*

- *discussed as to be used for fuel substitution in co-incineration → ER - NO!!!*

This is water solution classified as hazardous waste which has to be treated by chemical precipitation or neutralized (or treated in any other special way); in the WF-RepTool the only technology foreseen is 'chemical / physical treatment as disposal process' (see acids above) and the only option for the use is '*all other inorganic fractions > no use - 'cold technologies'*'; we agreed within the WF-RepTool expert group that this will stay like it is and no adaptation of the WF-RepTool for this minor factor will be done ...

- ⇒ we propose to use the technology 'chemical / physical treatment as disposal process', choose for the composition of this fraction 100 % 'other inorganic fractions'<sup>76</sup> and classify the use as 'no use' – 'cold technologies' (see above)

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## ➤ Slag and ashes

### ☒ Ashes and slag from (co-) incineration processes

*example:*

- *discussed as to be used for feedstock substitute in e.g. cement industry e.g. used to produce clinker → MR - NO*

⇒ **yield and use** of ashes and slag **not** to be **determined** and **judged**

⇒ for **MWI/HWI** see that the '**purpose of the plant**' is a **disposal process** (see page 7) [see also '*Regular municipal waste incinerators – NO use of components!*' (page 22)]

⇒ for **co-incineration** processes follow the '*Target of use approach*' (see page 5) [see also '*Apply the target of use approach*' (see page 23)]

Consider further:

⇒ the ashes or slag **yield** of the **individual WEEE fraction** would have to be determined!

⇒ this will not be done as the WEEE fraction will be a **minor part** of the **regular input material** of the (co-)incineration **process**

⇒ the fraction delivered to the (co-)incineration process will be - in many/most cases - a **mixture fraction** of e.g. all waste fractions from any (**WEEE**) **treatment plant** = not to be traced to an individual WEEE input category/treatment stream

⇒ the **mass balance** of any (co-)incinerator will be **total yield** of the plant <> **not representative** for dedicated WEEE input fraction/ [see '*Total yield of the accepting plant*', page 7]

<sup>75</sup> or '*mixed fractions – disposal*'

<sup>76</sup> or '*mixed fractions – disposal*'

☒ **Slag from (Cu) smelters**

example:

- discussed as slag to be used for road construction - these data in composition (mineral fraction) & use data for input fraction to Cu smelter - NO

⇒ for the **input of WEEE fractions** to any (Cu) **smelter** follow the 'Target of use approach' (see page 5)

[see also 'Apply the target of use approach', page 23]

⇒ in general the **yield** and **use** of slag does **not** have to be **determined** and **judged**

⇒ **never** use the **total yield** of the (Cu) **smelter** as result for WEEE fractions

<> **not representative** for dedicated WEEE input fraction/s  
[see 'Total yield of the accepting plant', page 7]

⇒ see option 'Use of data from analysis for circuit board fractions', page 31

Under the 'target of use approach' there are options given to distinguish the use of **components** (of the input fraction) with regard to the question if they would **end up** in the **slag** and a further **distinction** if the **slag** will be used as **by-product** or as **defined product**.

Component	Use in final technology	Examples technology	WF-class.
inorganic residues	inorganic residues > used as slag forming component > slag as by-product or as defined product for use	Cu smelter - slag as by-product or as defined product for use (to be approved) steel mill - slag as by-product or as defined product for use (to be approved) stainless steel works - slag as by-product or as defined product for use (to be approved)	R
	inorganic residues > used as slag forming component > slag NOT as by-product or as defined product for use	Cu smelter - slag NOT as by-product or as defined product for use steel mill - slag NOT as by-product or as defined product for use stainless steel works - slag NOT as by-product or as defined product for use [consider: inorganic residues serve for an useful purpose by replacing other materials & fulfil a particular function (recovery definition)] [consider: only weight of material otherwise to be applied as slag forming component may be counted]	OMR

1) if **no approval** on the slag product/s is given, the **worse classification** as OMR has to be applied (worst case scenario)

Chart 4: Example – distinguish use of slag

⇒ for **by-products** of (Cu) smelters see 'Approval of/from technologies requested', sub point 'Approvals of (Cu) smelters' (see page 24)

⇒ for **defined products** of slag **from** (Cu) smelters (i.e. the principle **as defined product**) see 'Slag from (Cu) smelters as defined product/s' (see page 29), requirements given under 'Approval of products requested', sub point 'Defined products from WEEE fractions without further treatment (see page 28) apply

⇒ the option of **products** produced **with slag** from (Cu) smelters (i.e. 'in a **defined product**') has to be further discussed when this question is raised for reporting – see following discussion box

- if the question is coming up, requirements given under 'Defined products from WEEE fractions after further treatment' (see page 28) might be applied as an interim solution (please inform us/the WF-RepTool expert group about applications used)



Discussion:

**'Target of use approach' <> determine use of output fractions from final technologies'**

in principle:

- the final technology of e.g. a smelter could be changed to a **semi-final technology** → a share of the input fraction is 'final' treated (e.g. organic shares are burned), a share of the input material is separated = 'interim' technology by 'hot separation' (e.g. metals to metals or metal alloys, metals to slag, etc. inorganic residues to slag etc.) (IT development, change of classification of technologies in WF-RepLists)
- output fractions from semi-final technologies could be determined (research work, development of WF-RepLists)
- options for technologies and for the use of output fractions from semi-final technologies have to be added (development of WF-RepLists)
- for products achieved with final fractions from (semi-)final technologies requirements given under '*Approval of products requested*' might apply (see page 27 and sub points following)

but we have to consider that:

- with this step we would leave the 'Target of use approach' ...
- beside for products with slag from a Cu smelter (see point where we enter from) ...
- you might wish to apply this option for ashes / slag from co-incineration processes too<sup>77</sup> – see options in footmark (see equivalence of technologies) ... but ...
- we would have to change to the **determination** of the **output from all treatment options** (see equivalence of technologies) – not only for those ones where result would be shifted to a 'positive' direction (e.g. also real metal yields, efficiency of e.g. incineration)

∑ a lot of development work necessary, partly negative influence on total R&R results expected, need to determine each (semi-)final acceptor by name (see need to collect and option for a plausibility check of yield data), this will not be possible for quite some fractions being forwarded via traders, fractions being mixed for the input to (semi-)final technologies ...

This topic must be further discussed & decisions have to be found before any action! Until other decisions, we stay with the 'Target of use approach' (including the target use of slag from smelters).

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<sup>77</sup> ashes and slag from (co-) incineration processes: for dedicated fractions of **high volume** (case plastics to cement kiln) an analysis of this fraction (ash content) might be done - + approval that ash as/in product xyz  
Options:

a) work with existing options + remark like 'OUTPUT fraction ash in internal name ... see 'summary result - output to different applications', page 38

b) insert ash and slag fractions .... technologies of application → development of IT and WF-RepLists necessary  
! for **low volume fractions** --- see all remarks under ashes and slag from (co-) incineration processes

! for other applications - smelters, steel mills, incinerators → big development of IT and WF-RepLists necessary + see remark that we would have to apply for all technologies and options !!!

see option for slag products from (Cu) smelters already provided, see e.g. 'summary result - output from smelters', page 40

➤ **Metals separated from slag / ashes**

- ☒ **Metals** recovered from **slag / ashes** from municipal waste incineration (**MWI**) / hazardous waste incineration (**HWI**)

*example:*

- *discussed as to be calculated as sent to steel mills / smelters → MR - NO*

⇒ **yield and use** of metals **not** to be **determined** and **judged**

⇒ see MWI and HWI are **disposal processes**  
(see '*Purpose of the plant*' of municipal waste incineration, page 7),  
purpose of the plant is the destruction of waste → classification as disposal  
(see also '*Regular municipal waste incinerators – NO use of components!*', page 22)

⇒ only an **R1 option** is given,  
this R1 option may only be applied for **organic wastes or shares**  
(and if this R1 approval is given)  
(see '*Approvals of MWI as R1 plants and/or as plants with special use*', page 25)

⇒ **no counting of metals** from slag / ashes from MWI / HWI!

- ☒ **Metals** recovered from **slag / ashes** from **co- incineration** processes

⇒ – see 'consider' arguments for 'Ashes and slag from (co-) incineration processes'  
under '*Slag and ashes*' (page 35)

⇒ see discussion box at page 37

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## D. Options for simplifications

In some cases the amount of fractions will get very low and/or further downstream data are very difficult (up to not possible) to be determined. To avoid to have wrong data in WF-RepTool reports (which would have to be mentioned by the controller of the reports) we did think about 'simplifications' to be applied. In general these are 'options', the WEEE systems and/or WF-RepTool administrators and/or the relevant authorities may decide if these options may be applied by the reporter.

### Summary results

#### ➤ Summary result - output to different applications

example / background:

- in some cases **mixed metal fractions** of very low amounts/shares are **further sorted / separated** by the acceptor 'far away' (e.g. in Far East), there is no 'reliable' tracing of final destinations possible

Under this option **yield data** of **fractions** from any **sorting / separation** step may be provided as **composition/component data** under the name of the to-be sorted / separated fraction and under the **final technology** for the (to-be) sorted / separated **yield fraction** with (e.g.) the **highest share**.

The **use** of the (to-be) sorted / separated **yield fractions** may be given under the 'use in final technology' as the use **would be given** in the **different final technologies** (see example in Chart 5).

This option **may be applied** with **restrictions** only:

- a) **with a limit** for **mixed metal fractions** which will be further sorted / separated → the **limit value** should be set **low** at – as a proposal - **1 %<sup>78</sup>** of the **total input**. Following ...

⇒ for the **yield / share** of (estimated as 'pure') **metal fractions** the **technology** may be estimated **on base** of the **metal**

⇒ for the **yield / share** of **non-metal fractions** the **worst case scenario** has to be applied

(see if the yield fractions and acceptors / technologies are known, you should apply the 'general WF-RepTool approach'! (yield fraction, technology, use → classification)

19 12 03 / 02-1	mix of non-ferrous metals 'not pure'	summary result - output to different applications	5,0000%	xxx kg	1,0000%
Name of sorter/seperator	Cu smelter 'traditional'	F	100,0000%		
Cu	Cu > Cu recovery	<i>Cu and brass - estimate Cu smelter</i>	60,0000%	xx kg	xx%
Al	Al > Al recovery	<i>Al - estimate Al smelter</i>	20,0000%	xx kg	xx%
other metals	other metals > metal recovery	<i>total of other NF metals - estimate NF smelters</i>	3,0000%	xx kg	xx%
other metals	other metals > metal recovery	<i>Pb - estimate Pb smelter</i>	2,0000%	xx kg	xx%
plastics	all plastics > no use - 'cold technologies'	<i>hard plastics - # estimate landfill of residues</i>	8,0000%	xx kg	xx%
organic residues	inorganic residues > no use - 'cold technologies'	<i>foils, foam,... - # estimate landfill of residues</i>	2,0000%	xx kg	xx%
inorganic residues	inorganic residues > no use - 'cold technologies'	<i>stone, glass,... - # estimate landfill of residues</i>	5,0000%	xx kg	xx%
		<i>data e.g. from handpicking analysis + estimations, # worst case scenario</i>			

*\*) text in blue: remarks to explain = you may enter them under [R] for the 'use in final technology', not shown like this in reports*

Chart 5: Example – summary result - output to different applications

- b) **without a limit** on the share of total input if this fraction is a **not typical WEEE fraction** (see introduction to 'Questions on special fractions from WEEE treatment', page 34). This option may be agreed and applied for e.g.:

⇒ **oil fractions**

⇒ **lead batteries** and **other batteries** - for dismantling, mechanical separation

<sup>78</sup> limit may be further discussed, may be set lower by the WEEE system/WF-RepTool administrator

When using this option, the remark **'summary results - output to different applications'** must be given in the **internal name** (see example in Chart 5). This is the pre-condition to see this result as correct – see as the given uses may not happen in the final technology mentioned, see *'Dedicated metal recovery in dedicated smelters'*, page 21.

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### ➤ Summary result - output to different smelters

examples / background:

- in some cases / especially for **metal fractions** which are **further separated** by the acceptor (often Cu smelter giving a remark that Fe, Al will be separated) only the Cu smelter is given as acceptor, results of the separation of metal fractions and the delivery to different smelters is given as component data – this is **not following the approach of providing separation results** and the final acceptors / final technology for these fractions → see *'Circuit board chassis / non-ferrous metals mixtures to smelters'*, page 30
- **'pure' metal fractions** further sorted / separated

Under this option information on **fractions** as **'estimated as separated'** may be provided as results. Like under the summary option above, **'estimated' yield data** of fractions from any **sorting / separation** may be provided as **composition/component data** under the name of the to-be sorted / separated fraction and under the **final technology** for the (to-be) sorted / separated **yield fraction** with (e.g.) the **highest share**.

The use of the **'estimated as separated' yield fractions** may be given under the **'use in final technology'** as the use **would be given** in the **different final technologies** (see Chart 6).

19 12 03 / 01-2	non-ferrous metals with iron 'pure'	summary result - output to different smelters	2,0000%	xxx kg	0,1000%
Name of sorter/seperator	Cu smelter 'traditional'	F	100,0000%		
Cu	Cu > Cu recovery	<i>Cu and brass - estimate Cu smelter</i>	60,0000%	xx kg	xx%
Fe	Fe > Fe recovery	<i>Fe +/- steel - estimate steel mill</i>	10,0000%	xx kg	xx%
Al	Al > Al recovery	<i>Al - estimate Al smelter</i>	20,0000%	xx kg	xx%
other metals	other metals > metal recovery	<i>other NF metal A - estimate NF smelters</i>	6,0000%	xx kg	xx%
other metals	other metals > metal recovery	<i>other NF metal B - estimate NF smelters</i>	4,0000%	xx kg	xx%
		<i>data e.g. from handpicking analysis + estimations</i>			

*\*) text in blue: remarks to explain = you may enter them under [R] for the 'use in final technology', not shown like this in reports*

Chart 6: Example – summary result - output to different smelters

This option **may be applied** with **restrictions** only:

a) for **'pure' metal fractions** if the **amount** of this **'estimated as to be separated'** fraction (take care: in total, not the separation results) is **< 0,1 %<sup>79</sup>** of the **total input**. Following ...

⇒ for the **yield / share** of (estimated as **'pure'**) **different metal fractions / metals** the **technology** may be estimated on base of the **metal**

When using this option, the remark **'summary result - output to different smelters'** must be given in the **internal name** (see example in Chart 6). This is the pre-condition to see this result as correct (i.e. to be able to do the interpretation of this result as fraction going to different smelters) as the given uses may not happen in the same smelter, see *'Dedicated metal recovery in dedicated smelters'*, page 21.

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<sup>79</sup> limit may be further discussed, may be set by the WEEE system/WF-RepTool administrator

➤ **Summary result - output from smelters**

**Agree first** if to use this option - see discussion box at page 37.

See output from smelters will be

- metals pure, metal alloys, ferromanganese, ...
- filter material with metals – further separated
- slag, different slag, ashes
- etc.

This option might be agreed and applied for e.g.:

- ⇒ **all metals**
- ⇒ **non-ferrous metals mixtures**
- ⇒ **circuit boards / circuit board fractions**
- ⇒ **batteries – battery recycling by smelters**

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