Reconciling recycling at production stage and end of life stage in EN 15804: the case of metal construction products

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What is METALS FOR BUILDING alliance?

- It unites ten European or International metal associations
- It represents the interests of the metal industry to European institutions and promotes the sustainability and recyclability of metals in the building sector.
Metals in Buildings strongly support the circular economy

- High end of life recycling rate: More than 95% of metals used in buildings are specifically collected and recycled at the end of life.

- High economic value for systematic dismantling, collection and recycling.

- Energy savings comprised between 60% and 95% compared to primary metal production.
The End of Life Recycling Rate >> %Recycled Content

- Today, %RC is limited by the metal scrap availability coming from products with decades of service life and due to the market growth.
- The average recycled content in metal supply is significantly lower than the end of life recycling rate because decades ago less metals have been used.
- Module D addresses this complexity and is an essential part of the LCA/EPD of metal building products.
Example for 1 kg of metal sheet

- Module D shall address only the net quantity of scrap generated by the product system,
- e.g. 0.53 kg among 0.95 kg collected for end of life recycling.
## Alu and steel average LCI datasets for potential use in EN15804

<table>
<thead>
<tr>
<th>Module</th>
<th>Formula in EN 15804</th>
<th>Metal datasets corresponding to EN 15804 formula terms assuming 1kg sheet product</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>( M_{VM} \text{ in } \cdot E_{VM} \text{ in } ) ( + ) ( M_{MR \text{ in }} \cdot E_{MR \text{ after } EoW \text{ in }} )</td>
<td>( R_1 \times ) [wrought ingot from pre-consumer scrap or clean post-consumer scrap] ( + ) ((1-R_1) \times ) [primary ingot produced (or used) in Europe - cradle to gate] ( + ) [sheet produced from wrought ingot]</td>
</tr>
<tr>
<td>D</td>
<td>( \left( M_{MR \text{ out }} - M_{MR \text{ in }} \right) ) ( E_{MR \text{ after } EoW \text{ out }} - E_{VMSub \text{ out }} \cdot \frac{Q_{R \text{ out }}}{Q_{Sub}} )</td>
<td>((R_2-R_1) \times ) [ingot from post-consumer scrap] ( - ) [primary ingot produced (or used) in Europe - cradle to gate]]</td>
</tr>
</tbody>
</table>

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\( \text{Aluminium} \) | \( \text{Steel} \)
# Calculation for 3 theoretical products

<table>
<thead>
<tr>
<th>Parameters and process</th>
<th>Module A</th>
<th>Module C</th>
<th>Module D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$R_1$</td>
<td>$E_v$</td>
<td>$E_{\text{recycled}}$</td>
</tr>
<tr>
<td>Unit</td>
<td>%</td>
<td>[UoI]</td>
<td>[UoI]</td>
</tr>
<tr>
<td>P1</td>
<td>40%</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>P2</td>
<td>80%</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>P3 - scenario A - closed loop</td>
<td>80%</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>P3 - scenario B - open loop</td>
<td>80%</td>
<td>30</td>
<td>20</td>
</tr>
</tbody>
</table>
Results for products 1 & 2

Module A

\((1-R_1) \cdot (E_v + R_1 \cdot E_{\text{recycled}} + E_{\text{sheet}})\)

Module C

\(C_3 + C_4\)

Module D

\((R_2 - R_1) \cdot (E_{\text{recycling EoL}} - E_v)\)

[UoI]
Results for Product 3 - $R_1 = 80\%$ & $R_2 = 80\%$

Scenario A - Close loop

Scenario B – down cycling (open loop)

EN15804*

ISO14004**

* $R_1$ is not necessarily considered for the net flow calculation of Module D, ** $R_1$ is considered for the net flow calculation of Module D
Conclusions

• Module D is an essential part of assessing the life cycle of metal building products

• For similar types/qualities of secondary materials entering and exiting the product system, e.g. in case of close loop recycling like it is the case for metals, the net flow of secondary materials shall be used in Module D to avoid double crediting as required in ISO14044,

• For dissimilar types/qualities of secondary materials entering and exiting the product system, e.g. in case of open loop recycling or downcycling, entering flows could be omitted generating misleading results based on double crediting of recycling. This is in contradiction to ISO14044 and creates discrimination against close-loop recycling

• The metal industry recommends to address this issue in a next revision to secure a more robust module D calculation methodology, fully in line with ISO14044