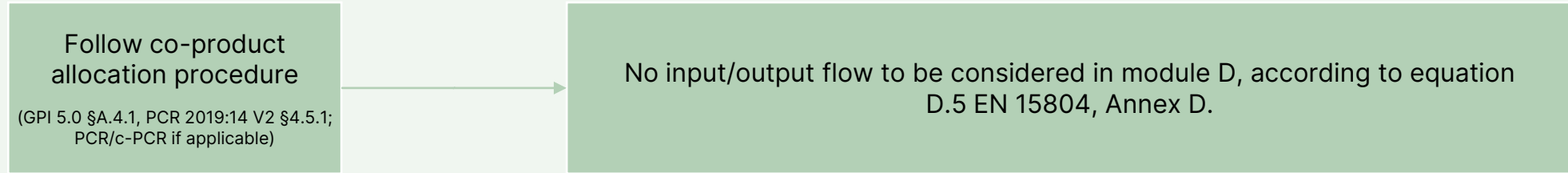


Module D calculations for co-product input/output



A co-product generated from a previous product system is used in the product system under study with an assigned environmental burden:

- 1,000 kg of concrete using 800 kg of virgin materials and 200 kg of fly ash (treated as a co-product from previous product system).
- 900 kg of the concrete rubble is successfully recovered, crushed, and reaches the end-of-waste state to be used as a secondary aggregate in future road construction.
- Net output flow: $900 \text{ kg} - 0 \text{ kg} = +900 \text{ kg}$
- If primary concrete production emits $0.05 \text{ kg CO}_2\text{eq/kg}$ and the recycling process emits $0.01 \text{ kg CO}_2 \text{ eq/kg}$, the net benefit is $-0.04 \text{ kg CO}_2 \text{ eq/kg}$
- The environmental benefit related to net output of secondary materials is $-36 \text{ kg CO}_2 \text{ eq}$ in module D.

A co-product generated from the product system under study is used in the subsequent product system with an assigned environmental burden:

- A steel mill produces 1,000 kg of steel (the main product) and generates 300 kg of blast furnace slag as an output.
- The slag is treated as a co-product and 'carries' an allocated burden to the subsequent product system (e.g., cement production) when it is used as an input.
- Blast furnace slag is not declared as an output indicator (i.e., MFR) and is not considered in module D calculations.