

# D7.1 DEFINED SCENARIOS AND DATA INVENTORIES FOR PRELIMINARY SUSTAINABILITY ASSESSMENT WORK PACKAGE 7

Associated Task(s): T7.1 Scenario definition and process flow schemes T7.2 Mass and energy balances



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### CONTENTS

Ρu	blishable	executive summary	5
1.	Introduct	ion	9
2.	Scenario	definition and process flow schemes	9
	2.3 Sce	nario definition	. 10
	2.3.1	Innovative Cases	. 10
	2.3.2	Baseline Scenario	. 11
	2.4 Pro	cess flow schemes	. 12
	2.4.1	Collection and Sorting and Pretreatment	. 16
	2.4.2	Purification option A CreaSolv <sup>®</sup>	. 18
	2.4.3	Purification option B Delamination and Deinking	. 18
	2.4.4	Posttreatment Recompounding	. 20
	2.4.5	Posttreatment Deodorization	. 21
	2.4.6	Laminate production	. 22
	2.4.7	Tracer production	. 24
	2.4.8	Ink and Primer production	. 24
	2.4.9	Food packaging production	. 25
3.	Mass and	l energy balances	26
	3.1 Life	e Cycle Assessment (LCA) Data collection	. 26
	3.2 Life	e Cycle Costing (LCC) Data collection	. 27
4.	Conclusio	on	29
5.	Bibliogra	phy	30
6.	Annex		31
	Loop 1		. 31
	Loop 2		. 32
	Loop 3		. 33
	Collectio	n and SoA sorting and Pretreatment-SUEZ	. 31
	Purificati	on option A CreaSolv®-IVV	. 34
	Purificati	on option B Delamination and Deinking-UGENT	. 35
	Recompo	ounding-UM, SUEZ	. 37
	Deodoriz	ation-KREYEN	. 38
	Laminate	production-AMCOR	. 39
	Tracer pr	oduction-POLY	. 42
	Ink and F	Primer production-Siegwerk	. 43



Food packaging production-Nestle 44	4
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#### PUBLISHABLE EXECUTIVE SUMMARY

In CIRCULAR FoodPack project, the newly developed value chains as part of WP2 and WP3 are assessed by means of a holistic life cycle sustainability assessment (LCSA), taking into account environmental impacts through Life Cycle Assessment (LCA), economic impacts through Life Cycle Costing (LCC) and social impacts through Social LCA (S-LCA).

Within the life cycle thinking approach, four phases are relevant to obtain the assessments:

- a) the goal and scope definition phase,
- b) the inventory analysis phase,
- c) the impact assessment phase and
- d) the interpretation phase (ISO 14044, 2006).

From June 2021 to November 2022, the emphasis was placed on the first two phases. This comprises the definition of the different scenarios which are based on the three use cases that are home packaging (H), personal care packaging (PC) and food packaging (F) including the following six demonstrators/applications: Wet wipes (H1), Detergent tabs (H2), Cosmetics in sachets (PC1), Chocolate powder (F1), Coffee (F2) and Creamer (F3). Regarding the applications, three main loops (loop 1-3) are considered differing for instance in the input of either mixed food-flexibles and non-food flexibles or solely food-flexibles. Another important step was the creation of process flow schemes in close cooperation with the project partners for the following processes:

- (1) Collection, SoA sorting and Tracer-based sorting,
- (2) Pretreatment including Oversorting, Shredding, Washing, Grinding and Float-sink separation,
- (3) Purification with option A-CreaSolv®® and option B-Deinking and Delamination,
- (4) Posttreatment consisting of Recompounding and Deodorization,
- (5) Laminate production and also considering Ink production, Primer production and Tracer production and
- (6) Food packaging production.

Based on this work, data collection for LCA and LCC inventories is completed by the respective partners to obtain the data for the preliminary sustainability assessment. The collection of S-LCA data is not considered in this deliverable as the impact indicators relevant for the system will be selected in a next step.





#### **LIST OF FIGURES**

Figure 1 Life Cycle Sustainability assessment (LCSA) definition adapted by (Kloepffer, 2008) .	9
Figure 2 Loop 1 process flow scheme for NF packaging	14
Figure 3 Loop 2 process flow scheme for F packaging	15
Figure 4 Loop 3 process flow scheme for NF and F packaging	15
Figure 5 Baseline scenario process flow scheme	16
Figure 6 Loop 1 Collection and SoA sorting and Pretreatment process flow scheme	16
Figure 7 Loop 2 Collection and SoA sorting and Pretreatment process flow scheme	17
Figure 8 Loop 3 Collection and SoA sorting and Pretreatment process flow scheme	17
Figure 9 Loop 1-3 Purification option A CreaSolv® process flow scheme	18
Figure 10 Loop 1-2 Purification option B Delamination and Deinking process flow scheme	19
Figure 11 Loop 3 Purification option B Delamination and Deinking process flow scheme	20
Figure 12 Loop 1-3 Recompounding process flow scheme	21
Figure 13 Loop 1-3 Deodorization process flow scheme	21
Figure 14 Loop 1 Wet Wipes Laminate production process flow scheme	22
Figure 15 Loop 1 Detergent Tabs Laminate production process flow scheme	22
Figure 16 Loop 1 Cosmetics Laminate production process flow scheme	23
Figure 17 Loop 3 Tracer production process flow scheme	24
Figure 18 Loop 1-3 Ink production process flow scheme	25
Figure 19 Loop 3 Primer production process flow scheme	25
Figure 20 Loop 2-3 Food packaging production process flow scheme	25
Figure 21 Loop 1 process flow scheme for NF packaging (landscape format)	31
Figure 22 Loop 2 process flow scheme for F packaging (landscape format)	32
Figure 23 Loop 3 process flow scheme for F and NF packaging (landscape format)	33
Figure 24 Loop 1 Collection and SoA sorting and Pretreatment data collection sheet	31
Figure 25 Loop 2 Collection and SoA sorting and Pretreatment data collection sheet	32
Figure 26 Loop 3 Collection and SoA sorting and Pretreatment data collection sheet	33
Figure 27 Loop 1-3 Purification option A CreaSolv®® data collection sheet (data in green the	(bc
	34
Figure 28 Loop 1-2 Purification option B Delamination and Deinking data collection sheet	35
Figure 29 Loop 3 Purification option B Delamination and Deinking data collection sheet	36
Figure 30 Loop 1-3 Recompounding data collection sheet	
Figure 31 Loop 1-3 Deodorization data collection sheet	38
Figure 32 Loop 1 Wet Wipes Laminate production data collection sheet (data in green tbd).	39
Figure 33 Loop 1 Detergent Tabs Laminate production data collection sheet (data in green the	(bc
	40
Figure 34 Loop 1 Cosmetics Laminate production data collection sheet	41
Figure 35 Loop 3 Tracer production data collection sheet	42
Figure 36 Loop 1-3 Ink production data collection sheet	43
Figure 37 Loop 3 Primer production data collection sheet	43
Figure 38 Loop 2-3 Food packaging production data collection sheet	44





### LIST OF TABLES

Table 1 Definition of innovative cases to provide food and non-food packaging	11
Table 2 Involved partners per process step	12
Table 3 Scenarios per loop, purification pathway and application	13
Table 4 Example of Data collection template for Life Cycle Assessment (LCA)	27
Table 5 Data collection template for Life Cycle Costing (LCC)	28





### **ABBREVIATIONS**

Abbreviation	
B2B	Business to business
CAPEX	Capital expenditure
EoL	End of life
F	Food
FP	Food packaging
FU	Functional Unit
HP	Home packaging
IVV	Frauenhofer Institute IVV
KREYEN	Kreyenborg
LCA	Life cycle assessment
LCC	Life cycle costing
LCI	Life cycle inventory
LCSA	Life Cycle Sustainability Assessment
NF	Non-Food
OPEX	Operating expenditure
РСР	Personal care packaging
PCR	Post-consumer recyclates
POLY	Polysecure
S-LCA	Social Life Cycle Assessment
SoA	State of the art
Tbd	To be discussed
TBS	Tracer Based Sorting
UM	Maastricht University





### 1. INTRODUCTION

This Deliverable describes the first part of the Work Package 7 (WP7) work: Comprehensive Sustainability Assessment and Decision-support Tool. More specifically, this report comprises the scenario definition and process flow schemes (Task 7.1) and the Mass and energy balances (Task 7.2).

The objective of WP7 is to assess comprehensively the sustainability of the newly developed value chains (with new technology and packaging design), systematically taking into account the entire life cycle, performed in a holistic way by considering environmental, economic and social impacts. Life cycle assessment (LCA), life cycle costing (LCC) and social life cycle assessment (S-LCA) as part of Life Cycle Sustainability assessment (LCSA), shown in Figure 1, serve as the methodological basis for mapping the respective impacts (Kloepffer, 2008).



#### Figure 1 Life Cycle Sustainability assessment (LCSA) definition adapted by (Kloepffer, 2008)

There are four phases in a LCA study: a) the goal and scope definition phase, b) the inventory analysis phase, c) the impact assessment phase, and d) the interpretation phase (ISO 14044, 2006). These phases also serve as the basis for the LCC modelling structure (Ciroth et al., 2011). The present Deliverable addresses the definition of scenarios in close collaboration with the technology and packaging developers, starting from three defined use cases (loop 1-3), which will be compared to the state of the art (SoA) baseline treatment scenarios. Additionally, the preliminary data collection of LCA and LCC data inventory (for hotspot analysis as a function of intermediate feedback) is also part of the scope, and will be refined in the further course of the project.<sup>1</sup> Therefore, the data collection templates (as shown in chapter 3 and Annex) were provided to the partners.

### 2. SCENARIO DEFINITION AND PROCESS FLOW SCHEMES

The geographical scope of the study is Europe, as the composition of flexible packaging waste was investigated in three sorting facilities in France, Belgium and Germany, which are considered representative for the sorting methods used in many EU countries. The temporal scope of the assessment covers the duration of the project (2021-2024). As functional unit (FU) the comparison of different scenarios through the basket of products approach was chosen. Basket

<sup>&</sup>lt;sup>1</sup> The collection of S-LCA data is not considered in this deliverable as the impact indicators relevant for the system and the partners will be selected in a workshop during the next General Assembly in Nov. 2022.





of product is defined as a selection of product groups (European Commission, 2012). In this study (1) non-food packaging, (2) food packaging and (3) energy and heat recovery from incineration, are considered as basket of products.

#### 2.3 Scenario definition

#### 2.3.1 Innovative Cases

Innovative scenarios are based on three categories of packaging applications, i.e. home packaging (HP), personal care packaging (PCP) and food packaging (FP) including the following six demonstrators/applications:

- **1.** Wet wipes (HP1)
- 2. Detergent tabs (HP2)
- 3. Cosmetics in sachets (PCP1)
- **4.** Chocolate powder (FP1)
- 5. Coffee (FP2)
- 6. Creamer (FP3).

Regarding the applications, three main cascade cases here named as loops (Table 1) are considered differing for instance in the input of either mixed end-of-life (EoL)-food (F) flexibles and EoL-non-food (NF) flexibles or solely EoL-F flexibles. EoL-F flexibles are used, for example, for food sub-categories such as dairy products, coffee, tea, cocoa, bakery products, frozen food or fresh products. EoL-NF flexibles are used, for example, for non-food sub-categories such as collection bags, small bags, secondary packaging films or carrier bags. These examples do not include all the identified subcategories that were part of WP2's work. The full list of food and non-food sub-categories can be found in Deliverable 2.1. The result of each loop is a laminate consisting of a combination of virgin polyethylene (PE) and post-consumer-recyclate (PCR) PE. In the case of food applications (FP1-3), functional barriers are added. In loop 3, which comprises two product cycles as sub scenarios, tracers are added to the laminate.





Cases	Input	Output	Applications
Loop 1	Mixed = EoL F and NF flexibles	<ul><li>Laminate 1: mono-material with</li><li>PE virgin</li><li>PE PCR from F and NF origin</li></ul>	HP1: wet wipes HP2: detergent tabs PCP1: cosmetics in sachets
Loop 2 F flexibles		<ul> <li>Laminate 2: mono-material with</li> <li>PE virgin</li> <li>PE PCR from F origin</li> <li>Functional barriers</li> </ul>	FP1: chocolate powder
Loop 3 cycle 1	Mixed = F and NF flexibles with tracers in F flexibles	<ul> <li>Laminate 3: mono-material with</li> <li>PE virgin</li> <li>PE PCR from F origin</li> <li>Functional barriers and tracers</li> </ul>	FP2: coffee FP3: creamer PCP1: cosmetics in sachets
Loop 3 cycle 2	Mixed = F and NF flexibles with tracers in F flexibles	<ul> <li>Laminate 4: mono-material with</li> <li>PE virgin</li> <li>PE PCR from F origin</li> <li>Functional barriers and tracers</li> </ul>	FP2: coffee FP3: creamer PCP1: cosmetics in sachets

Table 1 Definition of innovative cases to provide food and non-food packaging

#### 2.3.2 Baseline Scenario

For the baseline scenario the following end-of-life options and shares for plastic packaging are taken into consideration (Eunomia & Plastic Recyclers Europe, 2020; Plastic Europe, 2020):

- 17% recycling
- 56.5% incineration with energy recovery
- 26.5% landfilling.

The figures for recycling are based on Eunomia & Plastic Recyclers Europe (2020) and refer specifically to PE films from household packaging. As the Eunomia report does not include corresponding figures for incineration with energy recovery and landfilling, the figures for these two waste management pathways are based on Plastic Europe (2020) figures for plastic packaging including household, commercial and industrial packaging. Here, the used ratio (1:2.1) between landfill and incineration is calculated based on the shares for each pathway, which are 39.50% for incineration with energy recovery and 18.50% for landfill (Plastic Europe, 2020). The ratio (1:2.1) is then applied to the delta (83%) of recycling and the remaining pathways.





#### **2.4 Process flow schemes**

Table 2 shows the partners and one advisory board member involved in relation to the developed processes within this project.

Partners	Process
SUEZ	Collection, SoA sorting and Pretreatment
POLY	Tracer-based sorting and tracer production
UGENT	Purification (Delamination and Deinking)
IVV	Purification (CreaSolv®)
UM, SUEZ	Recompounding
KREYEN	Deodorization
AMCOR	Laminate production(including film production and printing)
SIEGWERK	Ink and primer production
NESTLE	B2B collection + F packaging production
UBESOL <sup>2</sup>	NF packaging production

In order to draw the process flow schemes bilateral meetings were held focusing on the inputs and outputs of each individual process step. System boundaries and process flow schemes were drawn for the following processes:

- Collection
- SoA sorting
- Tracer-based sorting
- Pretreatment
  - Oversorting
  - Shredding
  - Washing
  - Grinding
  - Float-sink separation
- Purification option A-CreaSolv®
- Purification option B-Deinking and Delamination
- Posttreatment Recompounding
- Posttreatment Deodorization
- Laminate production (including film production and printing)

<sup>&</sup>lt;sup>2</sup> UBESOL is part of the advisory board. A first kick- off meeting was organised at the end of November. The creation of process flow schemes and data collection will follow in the next few weeks.





- Ink production
- Primer production
- Tracer production
- F packaging production.

Three different purification pathways are taken into consideration for the preliminary assessment of loop 1-3: (1) Delamination + Deinking, (2) CreaSolv<sup>®</sup>, (3) Delamination + Deinking + CreaSolv<sup>®</sup>

CreaSolv<sup>®</sup> may not be applied in Loop 2 and Loop 3 if the pretreated PE-flakes show a sufficiently high purity and hence do not require additional purification after delamination and deinking. When CreaSolv<sup>®</sup> is applied as a purification step, the last step within the process is a regranulation/recompounding step, so an additional recompounding step is not required. Taking into account the number of loops, purification pathways and applications, thirty different scenarios as shown in Table 3 can be distinguished:

Cases	Purification pathway	Applications	Number of scenarios
Loop 1	<ul> <li>Purification pathway (1)</li> <li>Purification pathway (2)</li> <li>Purification pathway (3)</li> </ul>	HP1: wet wipes HP2: detergent tabs PCP1: cosmetics in sachets	9
Loop 2	<ul> <li>Purification pathway (1)</li> <li>Purification pathway (2)</li> <li>Purification pathway (3)</li> </ul>	FP1: chocolate powder	3
Loop 3 cycle 1	<ul> <li>Purification pathway (1)</li> <li>Purification pathway (2)</li> <li>Purification pathway (3)</li> </ul>	FP2: coffee FP3: creamer PCP1: cosmetics in sachets	9
Loop 3 cycle 2	<ul> <li>Purification pathway (1)</li> <li>Purification pathway (2)</li> <li>Purification pathway (3)</li> </ul>	FP2: coffee FP3: creamer PCP1: cosmetics in sachets	9

Table 3 Scenarios per loop, purification pathway and application	Table 3 Scenarios per	loop, purification	pathway and a	application
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#### **Explanation of terminology:**

Since recompounding has been mentioned above, the difference between pelletizing, regranulation and recompounding is explained below.

- Pelletizing: polymer string is molded and cut into pellets (short parts of the string)
- Regranulation: Extrusion (i.e. melting) and pelletizing of post-consumer plastics
- Recompounding: regranulation incl. adding additives

The process flow schemes per loop (Figure 2-Figure 4) and the baseline scenario (Figure 5) are described below, followed by the detailed process flow schemes of each process step i.e. Collection, Sorting and Pretreatment (Figure 6-Figure 8), Purification (Figure 9-Figure 11),





Posttreatment (Figure 12 and Figure 13), Laminate production (Figure 14-Figure 16), Tracer-, Ink- and Primer production (Figure 17-Figure 19) and F packaging production (Figure 20).

The difference between the loops can be seen in the inputs of the process flow charts. In loop 2, the input comes from commercial consumers (Figure 2), while the input of loop 1 (Figure 1) and 3 comes from households. In loop 3, in addition to state of the art (SoA) sorting, tracerbased sorting (TBS) technology has been introduced to ensure that developed packaging with tracers (shown here in Figure 3 as PE-rich flexible food with tracers) is sorted out of the waste stream. In addition, there is a difference in the output of the loops, as loop 1 produces laminate for non-food applications, while loop 2 and loop 3 produce laminates for food applications. Empty boxes and three dots between the arrows [...] serve as a preliminary illustration and represent that either several process steps, e.g. Oversorting, Shredding, Washing, Grinding, Float-sink separation, have to be considered in the case of Pretreatment or that the final order of the cascade, e.g. whether deodorization takes place before or after Recompounding, has to be finally determined. The flow of unpacked NF or F products (in grey) is listed for illustrative purposes only and is not included in the assessments. A representation of the process flow schemes for loop 1-3 in an enlarged view in landscape format can be found in the Annex.



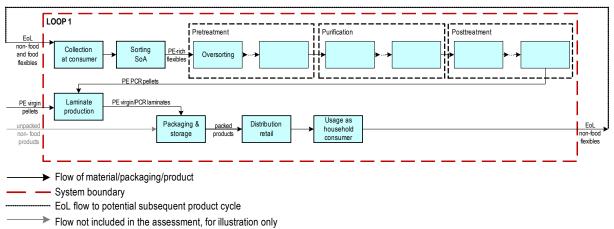


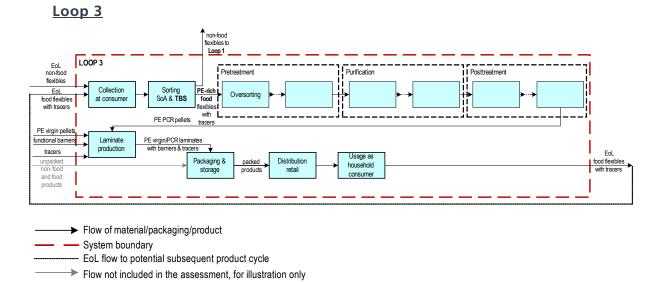
Figure 2 Loop 1 process flow scheme for NF packaging





#### Loop 2 LOOP 2 Purification Posttreatment Pretreatment Collection ij, EoL PE food ļ, Oversorting at busines 11 PE-PCR pel PE virgin pellets Laminate rirgin/PCR laminates with production iers 🗸 EoL Usage as business Packaging & packed products Distribution PE foo lexible storage consumer products Flow of material/packaging/product System boundary - EoL flow to potential subsequent product cycle Flow not included in the assessment, for illustration only

Figure 3 Loop 2 process flow scheme for F packaging





### Baseline scenario

The process flow scheme for the baseline scenario is presented in Figure 5. The current waste treatment (\*) combines incineration with energy recovery, landfilling and open-loop recycling (Plastic Europe, 2020). In open-loop recycling, the properties of the recycled material deviate from those of the virgin material (Huysman et al., 2017). As the waste input, i.e. non-food and food flexible (loop 1), solely food flexibles (loop 2) or non-food and food flexible with tracers (loop 3), differs depending on the respective loop, the baseline scenarios are adapted to the loops accordingly.





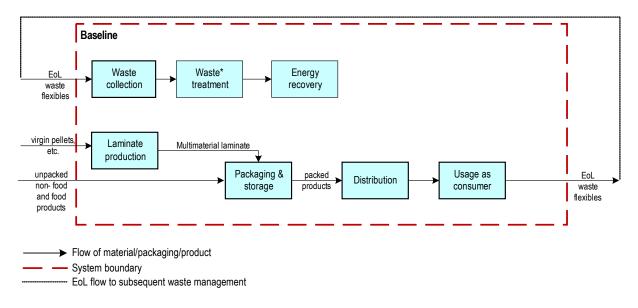


Figure 5 Baseline scenario process flow scheme

In the following the process steps are presented in terms of chronological sequence and loop.

#### 2.4.1 Collection and Sorting and Pretreatment

The process flow scheme for Collection and SoA sorting and Pretreatment within loop 1 is shown in Figure 6 based on information provided by SUEZ. The residues from SoA sorting, Oversorting, Waste water treatment and Float-sink separation are sent to incineration with energy recovery. Data marked in green is preliminary and a final decision must be made accordingly i.e. if the following purification process takes place on the recycling site or whether a transport (T) is required.



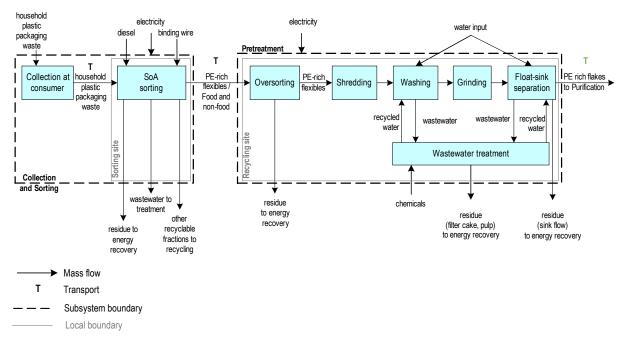


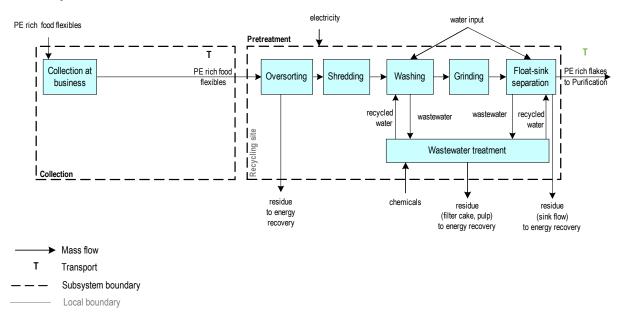
Figure 6 Loop 1 Collection and SoA sorting and Pretreatment process flow scheme







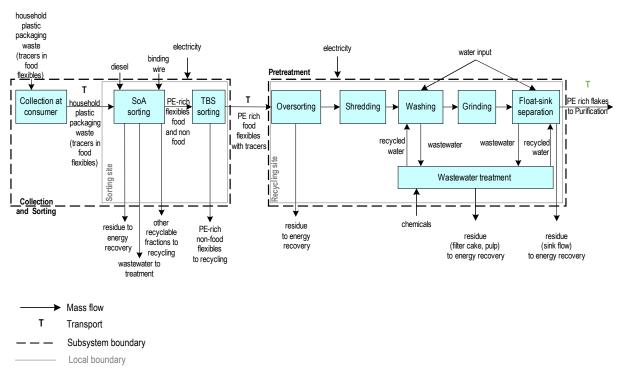
The process flow scheme for Collection and SoA sorting and Pretreatment within loop 2 is shown in Figure 7. The SoA sorting step is omitted because the input material is collected from companies (B2B), resulting in a homogeneous stream that does not require SoA sorting apart from Oversorting.





#### Figure 7 Loop 2 Collection and SoA sorting and Pretreatment process flow scheme

The process flow scheme for Collection and SoA sorting and Pretreatment within loop 3 is shown in Figure 8. An additional TBS sorting step is applied here.



#### Loop 3 including Tracer-based sorting (POLY)

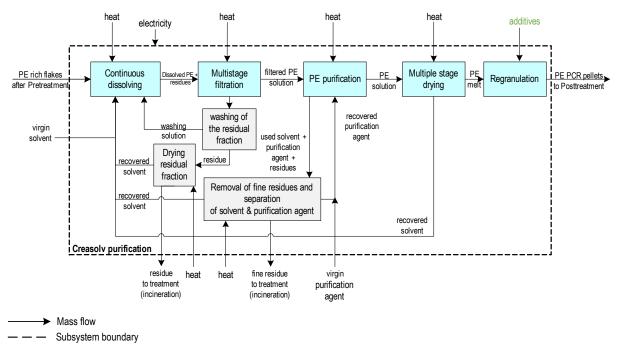
Figure 8 Loop 3 Collection and SoA sorting and Pretreatment process flow scheme





#### 2.4.2 Purification option A CreaSolv®

The process flow scheme for Purification option A CreaSolv<sup>®</sup> within loop 1-3 is presented in Figure 9 based on information provided by IVV. Data marked in green i.e. if additives are added in the regranulation step are preliminary and a final decision must be made accordingly.



Loop 1-3

Figure 9 Loop 1-3 Purification option A CreaSolv® process flow scheme

### 2.4.3 Purification option B Delamination and Deinking

The process flow scheme for Purification option B Delamination and Deinking within loop 1 and 2 is shown in Figure 10 based on information provided by UGENT. Data marked in green i.e. if residues are sent to energy recovery are preliminary and a final decision must be made accordingly.





#### Loop 1 and 2

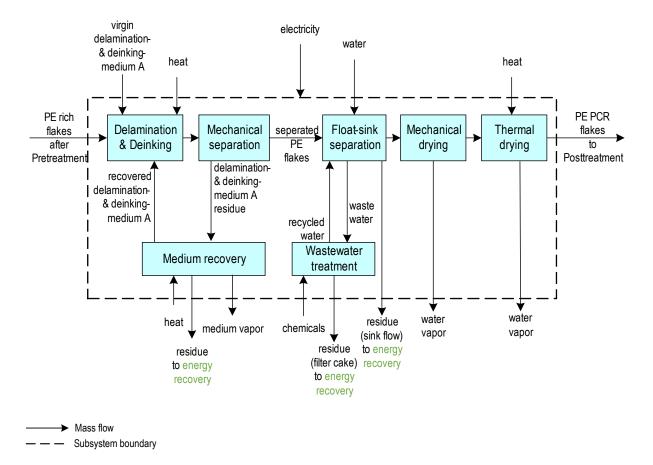


Figure 10 Loop 1-2 Purification option B Delamination and Deinking process flow scheme

The process flow scheme for Purification option B Delamination and Deinking within loop 3 is shown in Figure 11. The delamination and deinking medium B is different from the medium A used in loop 1-2, and medium recovery is not feasible here. Data marked in green i.e. if recycle water can be applied in various steps are preliminary and a final decision must be made accordingly.





<u>Loop 3</u>

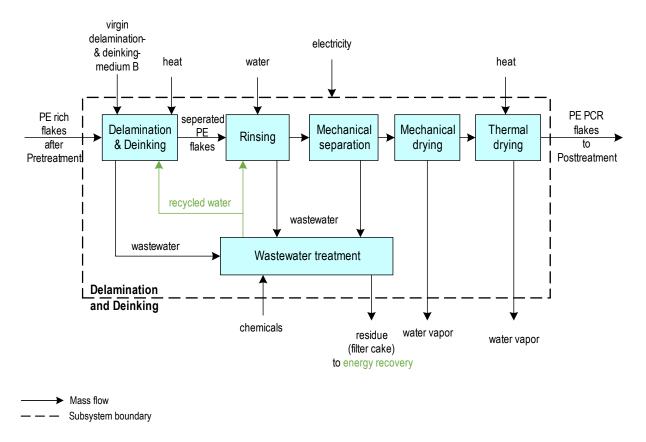


Figure 11 Loop 3 Purification option B Delamination and Deinking process flow scheme

#### 2.4.4 Posttreatment Recompounding

The process flow scheme for Recompounding within loop 1-3 is shown in Figure 12 based on information provided by UM. Data marked in green i.e. if residues are sent to energy recovery and if additives are added are preliminary and a final decision must be made accordingly. Depending on the outcome of the different purification pathways the input (PE PCR flakes) comes either from the Purification option B or from Deodorization, respectively the PE PCR pellets go either to Deodorization or Laminate production.





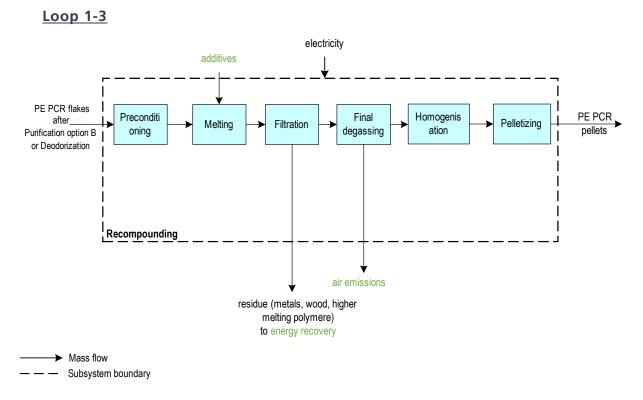
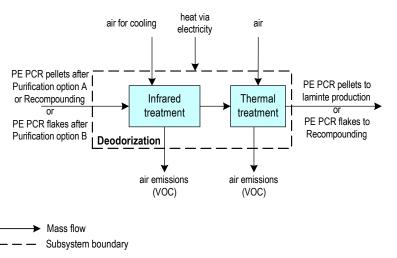


Figure 12 Loop 1-3 Recompounding process flow scheme

### 2.4.5 Posttreatment Deodorization

The process flow scheme for Deodorization within loop 1-3 is presented in Figure 13 based on information provided by KREYEN and consists of infrared and thermal treatment.







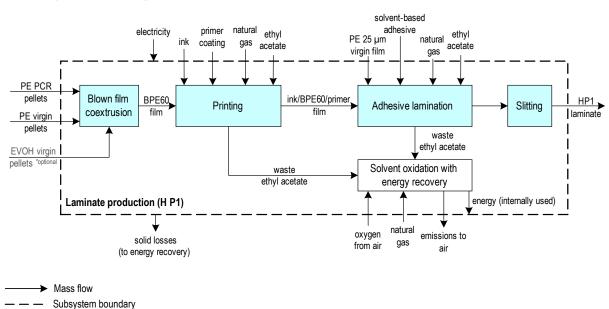
21





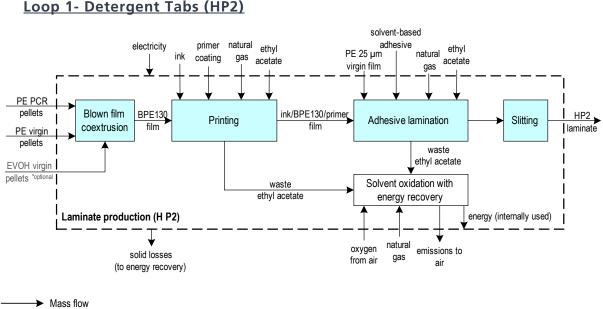
#### 2.4.6 Laminate production

The process flow scheme for Laminate production within loop 1 is presented in Figure 14-Figure 16 based on information provided by AMCOR and is shown for each application i.e. wet wipes, detergent taps and cosmetics in sachets. Laminate production involves, in a first step, the production of films, which are then processed into a printed laminate.



#### Loop 1- Wet Wipes (HP1)

Figure 14 Loop 1 Wet Wipes Laminate production process flow scheme

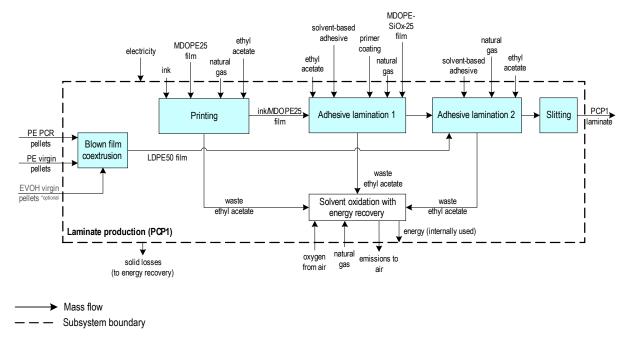


— — — Subsystem boundary

Figure 15 Loop 1 Detergent Tabs Laminate production process flow scheme







#### Loop 1- Cosmetics (PCP1)

Figure 16 Loop 1 Cosmetics Laminate production process flow scheme

The laminates for food packaging for Loop 2 and 3 are likewise manufactured by AMCOR. The exact structure, including functional barriers, primers and inks, is still under development.





#### 2.4.7 Tracer production

The process flow scheme for Tracer production within loop 3 is presented in Figure 17 based on information provided by POLY. Tracers will be implemented in the laminate production of loop 3.

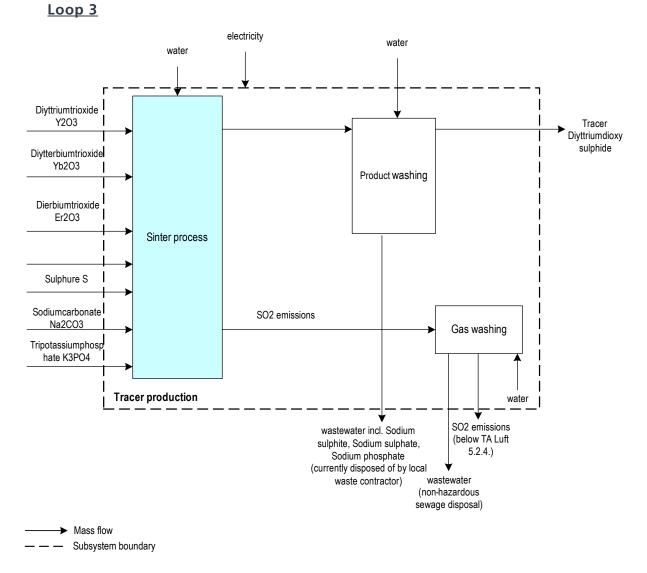


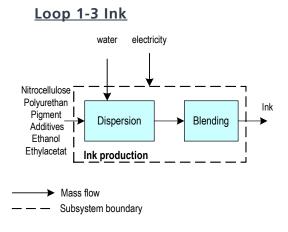
Figure 17 Loop 3 Tracer production process flow scheme

#### 2.4.8 Ink and Primer production

The process flow scheme for Ink production within loop 1-3 is presented in Figure 18 based on information provided by Siegwerk. The process flow scheme for Primer production within loop 2 and 3 is shown in Figure 19. The primers will be implemented in the laminate production of loop 2 and 3 to facilitate the purification step.







25

Figure 18 Loop 1-3 Ink production process flow scheme

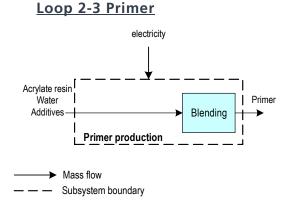
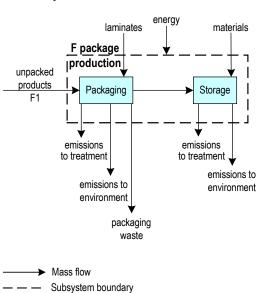


Figure 19 Loop 3 Primer production process flow scheme

### 2.4.9 Food packaging production

The process flow scheme for the Food packaging production within loop 2 and 3 is presented in Figure 20 based on information provided by Nestle.



Loop 2 and 3

Figure 20 Loop 2-3 Food packaging production process flow scheme





#### 3. MASS AND ENERGY BALANCES

"The life cycle inventory analysis phase (LCI phase) is the second phase of LCA. It is an inventory of input/output data with regard to the system being studied. It involves the collection of the data necessary to meet the goals of the defined study" (ISO 14044, 2006). In order to obtain mass and energy balances for the LCA and to collect cost data for the LCC evaluation, templates for data collection were distributed and filled in by the partners.

#### 3.1 Life Cycle Assessment (LCA) Data collection

Table 4 shows an example of a data collection template. The data is collected per process step in order to be able to identify any hotspots within the process flow through the analyses. Data is collected per reference flow, e.g. per year, per tonne of waste processed or per m<sup>2</sup> of laminate produced. The reference flow is the measure of the output of processes in a given product system that is required to fulfil the function expressed by the functional unit (ISO 14044, 2006). The respective unit, e.g. kWh for electricity or kg for input materials, is inserted and the origin of the respective input as well as the destination of the output are given for specification. Any additional information useful for the analysis is provided in the remark section and the source of the information is indicated accordingly.





Process 1								
	Data	per	Data	per				
Inputs	year	-	ton	-	Unit	Origin	Remarks	Source
Input 1								
Input 2								
example:								
Electricity	10 000	)			MWh	Grid Belgium		Excel "xls" or e-
								mail company x on
								02/02
<b>-</b>	Data	per	Data	per				
Outputs	year		ton		Unit	Destination	Remarks	Source
Output 1								
Process 2								
	Data	per	Data	per				-
Inputs	year		ton		Unit	Origin	Remarks	Source
Input 1								
Input 2								
	_		_					
0	Data	per	Data	per	11	Destination	Damarla	<b>C</b>
Outputs	year		ton		Unit	Destination	Remarks	Source
Output 2								
Transport								
(T)								
	<b>.</b>		_					-
T1	Distar	nce	Trans	-	Unit	Truck	Remarks	Source
	Distar	ice	Trans mode	-	Unit	Truck technology		Source
	Distar	ice		-	Unit		please specify truck	Source
	Distar	ice		-	Unit		please specify truck payload e.g. 3,5t-	Source
T1	Distar	ice	mode	2		technology	please specify truck payload e.g. 3,5t- 7,5t; 7,5t-16t, 16t-	Source
	Distar	ice		2	Unit		please specify truck payload e.g. 3,5t-	Source
T1 Input 1			mode Lorry	2	km	technology EURO 6	please specify truck payload e.g. 3,5t- 7,5t; 7,5t-16t, 16t- 32t, >32t	
T1	Distar		mode	port		technology	please specify truck payload e.g. 3,5t- 7,5t; 7,5t-16t, 16t-	Source
T1 Input 1 T2			Lorry Trans mode	port	km Unit	technology EURO 6 Truck technology	please specify truck payload e.g. 3,5t- 7,5t; 7,5t-16t, 16t- 32t, >32t <b>Remarks</b>	
T1 Input 1			mode Lorry Trans	port	km	EURO 6	please specify truck payload e.g. 3,5t- 7,5t; 7,5t-16t, 16t- 32t, >32t	
T1 Input 1 T2			Lorry Trans mode	port	km Unit	technology EURO 6 Truck technology	please specify truck payload e.g. 3,5t- 7,5t; 7,5t-16t, 16t- 32t, >32t Remarks please specifiy truck	
T1 Input 1 T2			Lorry Trans mode	port	km Unit	technology EURO 6 Truck technology	please specify truck payload e.g. 3,5t- 7,5t; 7,5t-16t, 16t- 32t, >32t Remarks please specifiy truck payload e.g. 3,5t-	

Table 4 Example of Data collection template for Life Cycle Assessment (LCA)

### 3.2 Life Cycle Costing (LCC) Data collection

Life cycle costing (LCC) is based on an economic evaluation that takes into account different phases of the life cycle. It is a method that generally includes the costs of a product that are borne directly by a specific actor (Hunkeler et al., 2008). Costs are divided into capital expenditure (CAPEX), operating expenditure (OPEX) and revenues and clustered by cost type





(Taelman et al., 2020), e.g. investment costs for equipment, costs for personnel, material, utilities, transport, emissions, waste or other operational costs for example taxes and insurance (Table 5).

CAPEX, OPEX, Rev	venues						
Type of cost	Cost points	Quantity	Unit	F	Remarks	Sour	ce
Capital costs							
Investment	Land Buildings/ property		€/m² €/m²		e.g. industrial plan	t	
	Equipment/ software		year	or or	e.g. machinery		e.g. Corporate Carbon Footprint (CCF)
	Vehicles		year				e.g. CCF
Operational costs							
Personnel	Salery and wages		€/hour		Please report an necessary	average if	
Services	Fee		€/hour				
Material costs	Raw materials		€/kg or r		-		
	Industrial intermediate goods		€/kg m3	or	e.g. steel, plastic, g	lass, etc.	
Utility costs	Fuel		€/kg; l				
	Freshwater		€/m³;l				
	Electricity		€/kWh				
	Heat		€/MJ				
Transport	Travel and						
	vehicle		6 /lune		e.g. transport of p	eople and	
Emission	expenses Wastewater		€/km €/m³		goods e.g. cost of	waste	
discharge & waste related costs	Wastewater		eym		management wastewater fee	i.e.	
	Emissions		€ per kg release	of	e.g. CO <sub>2</sub> emission t	ах	
Other operational costs	License, legal, 		€/year				
Other operational costs	Maintenance and repairs		€/year				
Other operational costs	Taxes		€/year				

Table 5 Data collection template for Life Cycle Costing (LCC)





Other operationa costs	I	Insurance	€/year	
Revenues/ Positive flows	Cash		-	e.g. Revenues, by sold products, residual value of waste, by-product waste
Selling products	of	Product	€/product	Market prices for secondary products
		Co-product	€/product	Market prices for secondary products
		Fees	€/year	e.g. inhabitants that pay a fee to collect their waste
		Subsidies	€/year	e.g. for setting up a waste recycling management system

#### 4. CONCLUSION

In order to achieve a holistic life cycle analysis of the technologies and concepts developed within the framework of the CIRCULAR FoodPack project, the definition of scenario and process flow schemes as well as first mass and energy balances were set up. The geographical scope of the study is Europe and the temporal scope of the assessment covers the duration of the project (2021-2024). As functional unit (FU) the comparison of different scenarios through the basket of products approach was chosen: In this study (1) non-food packaging, (2) food packaging and (3) energy and heat recovery from incineration, are considered as basket of products.

Scenarios and respective preliminary process flow schemes (according to the loops 1-3 of the project proposal, baseline) were defined as well as individual process steps have been developed in bilateral meetings with the involved parties. This comprises the definition of the different scenarios, which are based on three use cases such as home packaging (HP), personal care packaging (PCP) and food packaging (FP) including the following six demonstrators/applications: Wet wipes (HP1), Detergent tabs (HP2), Cosmetics in sachets (PCP1), Chocolate powder (FP1), Coffee (FP2), Creamer (FP3). Regarding the applications, three main cascade cases (loop 1-3) are considered differing for instance in the input of either mixed F-flexibles and NF-flexibles or solely F-flexibles. Three different purification pathways are taken into consideration for the preliminary assessment of loop 1-3:

(1) Delamination + Deinking, (2) CreaSolv<sup>®</sup>, (3) Delamination + Deinking + CreaSolv<sup>®</sup>. This results in the number of thirty different scenarios as shown in Table 3 Scenarios per loop, purification pathway and application.

Furthermore, the set-up of a framework for the data collection according to the scenarios was done in close cooperation with the project partners. (1) Collection, SoA sorting and Tracer-based sorting, (2) Pretreatment including Oversorting, Shredding, Washing, Grinding, Float-sink separation, (3) Purification for option A-CreaSolv<sup>®</sup> and option B-Deinking and Delamination, (4) Posttreatment consisting of Recompounding and Deodorization, (5) Laminate production including film production and printing, (6) Ink production and Primer production, (7) Tracer production and (8) F packaging production. The data collection templates for LCA and LCC data were created and distributed by UGENT. These tables are to be completed by the respective partners to obtain the data for the final assessment.





As a next step, the environmental impact assessment (LCA) will be conducted by carefully selecting impact categories for a holistic assessment in order to analyse the hotspots of the systems under study. For the economic assessment of the system, certain data gaps need to be filled. To conduct the social assessment, relevant impact indicators are selected through participatory methods, including a workshop with partners during the second General Assembly, which took place in November 2022.

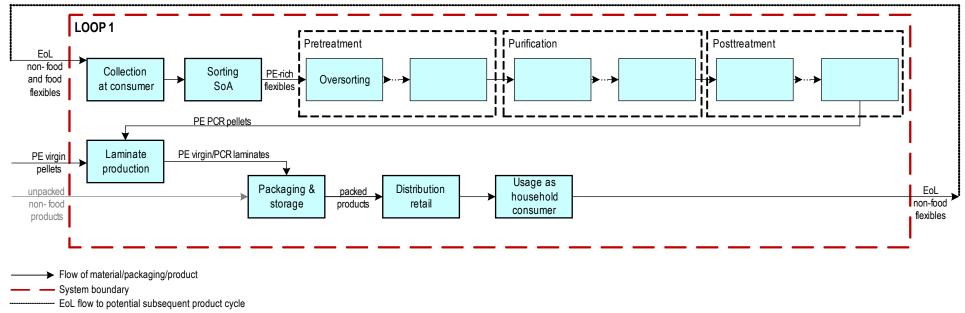
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<u>Loop 1</u>



-----> Flow not included in the assessment, for illustration only

Figure 21 Loop 1 process flow scheme for NF packaging (landscape format)



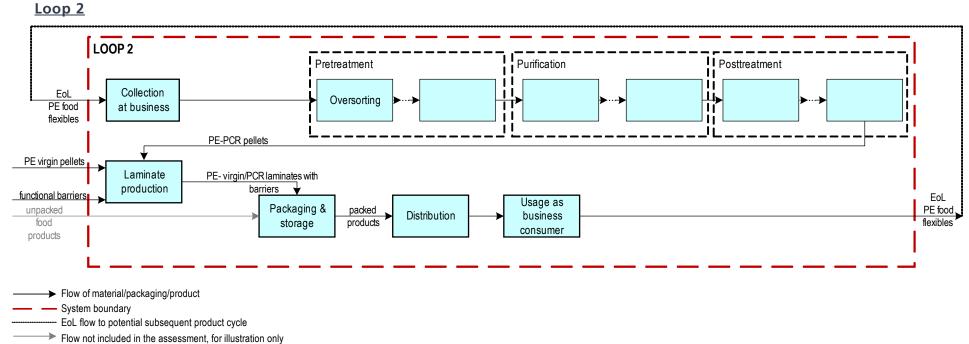
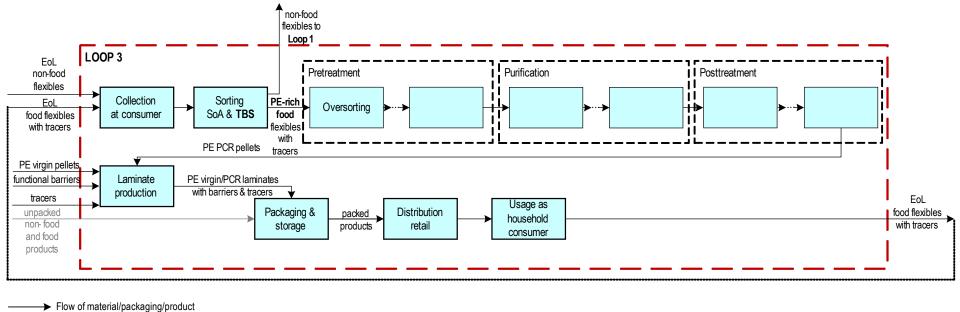


Figure 22 Loop 2 process flow scheme for F packaging (landscape format)





<u>Loop 3</u>



EoL flow to potential subsequent product cycle

Flow not included in the assessment, for illustration only

Figure 23 Loop 3 process flow scheme for F and NF packaging (landscape format)



## Collection and SoA sorting and Pretreatment-SUEZ

<u>Loop 1</u>

Process 1 Collection at consumer	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
conection at consumer	Household plastic packaging waste	Quantity per nour	Unit	Oligin		Jource
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	Household plastic packaging waste	Quality per nour	0	Destinution		Jource
D 2						
Process 2 SoA Sorting	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
	Household plastic packaging waste					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Diesel					
	Binding wire					
	Outputs	Quantity nor hour	Unit	Destination	Remarks	Course
	Outputs PE-rich flexibles/ Food and non-food	Quantity per hour	Unit	Destination	Reinarks	Source
	Residue				please specifiy composition of residue e.g. 10% PP, 20% PET	
	Wastewater					
	Recycalbes				please specifiy composition of recycalbes e.g. 10% PP, 20% PET	
Drocoss 2						
Process 3 Oversorting	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
	PE-rich flexibles/ Food and non-food					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
						-
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flexibles					
	Residue				please specifiy composition of residue e.g. 10% PP, 20% PET	_
Process 4				1		
Shredding	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
	PE-rich flexibles					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flakes	quality per nour	0	Destinution		Jource
Drosocs F						
Process 5 Washing	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
	Inputs PE-rich flakes	Quantity per hour	Unit	Origin	Remarks	Source
	PE-rich flakes Electricity	Quantity per hour	Unit	Origin	Remarks please specifiy e.g. medium voltage, provider, energy mix	Source
	PE-rich flakes Electricity Water				please specifiy e.g. medium voltage, provider, energy mix	
	PE-rich flakes Electricity Water Outputs	Quantity per hour Quantity per hour	Unit	Origin		Source Source
	PE-rich flakes Electricity Water Outputs PE-rich flakes				please specifiy e.g. medium voltage, provider, energy mix	
Process 5 Washing	PE-rich flakes Electricity Water Outputs				please specifiy e.g. medium voltage, provider, energy mix	
Washing	PE-rich flakes Electricity Water Outputs PE-rich flakes				please specifiy e.g. medium voltage, provider, energy mix	
Washing Process 6	PE-rich flakes Electricity Water Outputs PE-rich flakes Wastewater	Quantity per hour	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks	Source
Washing	PE-rich flakes Electricity Water Outputs PE-rich flakes Wastewater Inputs				please specifiy e.g. medium voltage, provider, energy mix	
Washing Process 6	PE-rich flakes Electricity Water Outputs PE-rich flakes Wastewater	Quantity per hour	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks	Source
Washing Process 6	PE-rich flakes Electricity Water Outputs PE-rich flakes Inputs PE-rich flakes Electricity	Quantity per hour	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Source
Washing Process 6	PE-rich flakes Electricity Water Outputs PE-rich flakes Inputs PE-rich flakes Electricity Outputs Outputs	Quantity per hour	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks	Source
Washing Process 6	PE-rich flakes Electricity Water Outputs PE-rich flakes Inputs PE-rich flakes Electricity	Quantity per hour	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Source
Washing Process 6	PE-rich flakes Electricity Water Outputs PE-rich flakes Inputs PE-rich flakes Electricity Outputs Outputs	Quantity per hour	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Source
Washing Process 6 Grinding	PE-rich flakes Electricity Water Outputs PE-rich flakes Inputs PE-rich flakes Electricity Outputs Outputs	Quantity per hour	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Source
Washing Process 6 Grinding Process 7	PE-rich flakes Electricity Water Outputs PE-rich flakes Electricity PE-rich flakes Electricity Outputs PE-rich flakes	Quantity per hour Quantity per hour Quantity per hour	Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy e.g. medium voltage, provider, energy mix Remarks	Source
Washing Process 6	PE-rich flakes Electricity Water Outputs PE-rich flakes Inputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Inputs Inputs	Quantity per hour	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Source
Washing Process 6 Grinding Process 7	PE-rich flakes Electricity Water Outputs PE-rich flakes Uastewater Inputs PE-rich flakes Electricity Outputs PE-rich flakes Inputs PE-rich flakes PE-rich flakes PE-rich flakes	Quantity per hour Quantity per hour Quantity per hour	Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Remarks	Source
Washing Process 6 Grinding Process 7	PE-rich flakes Electricity Water Outputs PE-rich flakes Inputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Inputs Inputs	Quantity per hour Quantity per hour Quantity per hour	Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy e.g. medium voltage, provider, energy mix Remarks	Source
Washing Process 6 Grinding Process 7	PE-rich flakes Electricity Water Outputs PE-rich flakes PE-rich flakes Electricity Outputs PE-rich flakes Electricity Inputs PE-rich flakes Electricity Uutputs PE-rich flakes Electricity Water	Quantity per hour Quantity per hour Quantity per hour Quantity per hour	Unit Unit Unit Unit	Origin Destination	please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Remarks  please specifiy e.g. medium voltage, provider, energy mix	Source Source Source Source
Washing Process 6 Grinding Process 7	PE-rich flakes Electricity Water Outputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Untputs PE-rich flakes Electricity Water Outputs Outputs DE-rich flakes	Quantity per hour Quantity per hour Quantity per hour	Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks Remarks	Source
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Washing Process 6 Grinding Process 7	PE-rich flakes Electricity Water Outputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Untputs PE-rich flakes Electricity Water Outputs Outputs DE-rich flakes	Quantity per hour Quantity per hour Quantity per hour Quantity per hour	Unit	Origin Destination	please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Remarks  please specifiy e.g. medium voltage, provider, energy mix	Source Source Source Source
Washing Process 6 Grinding Process 7 Float-sink separation	PE-rich flakes Electricity Water Outputs PE-rich flakes Vastewater Inputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Unputs PE-rich flakes Electricity Unputs PE-rich flakes Electricity Vater Outputs PE-rich flakes Electricity Vater Outputs PE-rich flakes Residue	Quantity per hour Quantity per hour Quantity per hour Quantity per hour	Unit	Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy e.g. medium voltage, provider, energy mix Remarks	Source Source Source Source
Washing Process 6 Grinding Process 7 Float-sink separation Process 8	PE-rich flakes Electricity Water Outputs PE-rich flakes Wastewater Inputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Water Outputs PE-rich flakes Electricity	Quantity per hour	Unit Unit Unit Unit	Destination Origin Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy composition of residue	Source Source Source Source Source
Washing Process 6 Grinding Process 7 Float-sink separation Process 8	PE-rich flakes Electricity Water Outputs PE-rich flakes Wastewater Inputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity PE-rich flakes Electricity PE-rich flakes Electricity Vastewater Outputs PE-rich flakes Electricity Wastewater Inputs Inputs Inputs Inputs	Quantity per hour Quantity per hour Quantity per hour Quantity per hour	Unit	Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy e.g. medium voltage, provider, energy mix Remarks	Source Source Source Source
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Washing Process 6 Grinding Process 7 Float-sink separation Process 8	PE-rich flakes Electricity Water Outputs PE-rich flakes Wastewater Inputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity PE-rich flakes Electricity PE-rich flakes Electricity Vastewater Outputs PE-rich flakes Electricity Wastewater Inputs Inputs Inputs Inputs	Quantity per hour	Unit Unit Unit Unit	Destination Origin Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy composition of residue	Source Source Source Source Source
Washing Process 6 Grinding Process 7 Float-sink separation Process 8	PE-rich flakes Electricity Water Outputs PE-rich flakes Wastewater Inputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Water Outputs PE-rich flakes Electricity Chemicals	Quantity per hour	Unit Unit Unit Unit Unit	Destination Origin Destination Origin Origin Origin Origin	please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy composition of residue  Remarks  please specifiy type of chemical e.g. Chlorine, add product data sheet if applicable	Source Source Source Source Source Source
Washing Process 6 Grinding Process 7 Float-sink separation Process 8	PE-rich flakes Electricity Water Outputs PE-rich flakes Uastewater  PE-rich flakes Electricity Outputs PE-rich flakes Electricity PE-rich flakes Electricity PE-rich flakes Electricity Vastewater Outputs PE-rich flakes Electricity Wastewater Inputs PE-rich flakes Coutputs Outputs Outputs Outputs Outputs Outputs Outputs	Quantity per hour	Unit Unit Unit Unit	Destination Origin Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy composition of residue  Please specifiy composition of residue  Remarks  Please specifiy type of chemical e.g. Chlorine, add product data sheet if applicable  Remarks	Source Source Source Source Source
Washing Process 6 Grinding Process 7 Float-sink separation Process 8	PE-rich flakes Electricity Water Outputs PE-rich flakes Wastewater Inputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Water Outputs PE-rich flakes Electricity Chemicals	Quantity per hour	Unit Unit Unit Unit Unit	Destination Origin Destination Origin Origin Origin Origin	please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy composition of residue  Remarks  please specifiy type of chemical e.g. Chlorine, add product data sheet if applicable	Source Source Source Source Source Source
Washing Process 6 Grinding Process 7 Float-sink separation Process 8	PE-rich flakes Electricity Water Outputs PE-rich flakes Uastewater  PE-rich flakes Electricity Outputs PE-rich flakes Electricity PE-rich flakes Electricity PE-rich flakes Electricity Vastewater Outputs PE-rich flakes Electricity Wastewater Inputs PE-rich flakes Coutputs Outputs Outputs Outputs Outputs Outputs Outputs	Quantity per hour	Unit Unit Unit Unit Unit	Destination Origin Destination Origin Origin Origin Origin	please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy composition of residue  Please specifiy composition of residue  Remarks  Please specifiy type of chemical e.g. Chlorine, add product data sheet if applicable  Remarks	Source Source Source Source Source Source
Washing Process 6 Grinding Process 7 Float-sink separation Process 8	PE-rich flakes Electricity Water Outputs PE-rich flakes Uastewater  PE-rich flakes Electricity Outputs PE-rich flakes Electricity PE-rich flakes Electricity PE-rich flakes Electricity Vastewater Outputs PE-rich flakes Electricity Wastewater Inputs PE-rich flakes Coutputs Outputs Outputs Outputs Outputs Outputs Outputs	Quantity per hour	Unit Unit Unit Unit Unit	Destination Origin Destination Origin Origin Origin Origin	please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy composition of residue  Please specifiy composition of residue  Remarks  Please specifiy type of chemical e.g. Chlorine, add product data sheet if applicable  Remarks	Source Source Source Source Source Source
Washing Process 6 Grinding Process 7 Float-sink separation Process 8 Waste water treatment Transport (T)	PE-rich flakes Electricity Water Outputs PE-rich flakes Wastewater  PE-rich flakes Electricity Outputs PE-rich flakes Electricity PE-rich flakes Electricity PE-rich flakes Electricity PE-rich flakes Electricity Wastewater Outputs PE-rich flakes Residue Wastewater Inputs Inputs Outputs Residue Outputs Residue Outputs Residue Outputs Residue	Quantity per hour	Unit Unit Unit Unit Unit	Destination Origin Destination Origin Origin Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy composition of residue  Remarks  Please specifiy type of chemical e.g. Chlorine, add product data sheet if applicable  Remarks  Please specifiy composition of residue e.g. 10% filter cake, 20% pulp	Source
Washing Process 6 Grinding Process 7 Float-sink separation Process 8 Waste water treatment Transport (T)	PE-rich flakes Electricity Water Outputs PE-rich flakes Wastewater  PE-rich flakes Electricity Outputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Water Outputs PE-rich flakes Electricity Water Outputs PE-rich flakes Electricity Water Outputs PE-rich flakes Residue Wastewater Chemicals Outputs Residue Inputs Input	Quantity per hour Transport mode	Unit Unit Unit Unit Unit Unit Unit	Destination Origin Destination Origin Origin Origin Destination Origin Destination Truck technology	please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy composition of residue         Remarks         please specifiy type of chemical e.g. Chlorine, add product data sheet if applicable         Remarks         please specifiy composition of residue e.g. 10% filter cake, 20% pulp         Remarks         Please specifiy composition of residue e.g. 10% filter cake, 20% pulp	Source Source Source Source Source Source
Washing Process 6 Grinding Process 7 Float-sink separation Process 8 Waste water treatment Transport (T)	PE-rich flakes Electricity Water Outputs PE-rich flakes Wastewater  PE-rich flakes Electricity Outputs PE-rich flakes Electricity PE-rich flakes Electricity PE-rich flakes Electricity PE-rich flakes Electricity Wastewater Outputs PE-rich flakes Residue Wastewater Inputs Inputs Outputs Residue Outputs Residue Outputs Residue Outputs Residue	Quantity per hour	Unit Unit Unit Unit Unit	Destination Origin Destination Origin Origin Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy composition of residue  Remarks  Please specifiy type of chemical e.g. Chlorine, add product data sheet if applicable  Remarks  Please specifiy composition of residue e.g. 10% filter cake, 20% pulp	Source
Washing Process 6 Grinding Process 7 Float-sink separation	PE-rich flakes Electricity Water Outputs PE-rich flakes Wastewater  PE-rich flakes Electricity Outputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Water Outputs PE-rich flakes Electricity Water Outputs PE-rich flakes Electricity Water Outputs PE-rich flakes Residue Wastewater Chemicals Outputs Residue Inputs Input	Quantity per hour Transport mode	Unit Unit Unit Unit Unit Unit Unit	Destination Origin Destination Origin Origin Origin Destination Origin Destination Truck technology	please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy composition of residue         Remarks         please specifiy type of chemical e.g. Chlorine, add product data sheet if applicable         Remarks         please specifiy composition of residue e.g. 10% filter cake, 20% pulp         Remarks         Please specifiy composition of residue e.g. 10% filter cake, 20% pulp	Source
Washing Process 6 Grinding Process 7 Float-sink separation Process 8 Waste water treatment Transport (1) 11	PE-rich flakes Electricity Water Outputs PE-rich flakes Wastewater  PE-rich flakes Electricity Outputs PE-rich flakes Electricity Outputs PE-rich flakes Electricity Water Outputs PE-rich flakes Electricity Water Outputs PE-rich flakes Residue Wastewater Inputs Nastewater Inputs Nastewater Outputs Residue Nastewater Inputs Nastewater Inputs Residue	Quantity per hour Quantity per	Unit Unit Unit Unit Unit Unit Unit Unit	Destination Origin Destination Origin Origin Destination Origin Destination Origin Truck technology EURO 6	please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy e.g. medium voltage, provider, energy mix  Remarks  Please specifiy composition of residue  Please specifiy type of chemical e.g. Chlorine, add product data sheet if applicable  Remarks  Please specifiy composition of residue e.g. 10% filter cake, 20% pulp  Remarks  Please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	Source

Figure 24 Loop 1 Collection and SoA sorting and Pretreatment data collection sheet



Loop	) 2

Process 1						
Collection at consumer	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
	PE food flexibles					
	Output	Quantity per hour	Unit	Destination	Remarks	Source
	Outputs PE food flexibles	Qualitity per noui		Descritation	Nethanks	Jource
	PETODO HEXIDIES					
Process 2						
Oversorting	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
	PE food flexibles					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flexibles					
	Residue				please specifiy composition of residue e.g. 10% PP, 20% PET	
Process 3	Innute	Questitu ess heur	11-22	Origin	Demarka	Course
Shredding	PE-rich flexibles	Quantity per hour	Unit	Origin	Remarks	Source
	PE-rich flexibles Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	eccordity				prease speering e.g. meurum vortage, provider, energy mix	
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flakes					
Process 4 Washing	Innute	Questitu ess heur		Origin	Demarka	<b>Co</b>
Washing	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
	PE-rich flakes Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Water				please specify e.g. medium vortage, provider, energy mix	
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flakes					
	Wastewater					
Process 5		la un s				-
Grinding	Inputs PE-rich flakes	Quantity per hour	Unit	Origin	Remarks	Source
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Licentry				prease spectry e.g. median vortage, provider, energy mix	
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flakes					
Process 6	Inputs	Outertile and have	Unit	Origin	Remarks	Source
Float-sink separation	PE-rich flakes	Quantity per hour	Unit	Origin	Remarks	Source
	PE-rich flakes Electricity				please specifiy e.g. medium voltage, provider, energy mix	_
	Water				Prese sheer. 1 = 9. Includin sounder, broader, energy mix	
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flakes					
	Residue				please specifiy composition of residue	
	Wastewater					_
D						_
Process 7 Waste water treatment	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
water dedunent	Wastewater	Quantity per hour	Unit	ungin		Jource
	Chemicals				please specifiy type of chemical e.g. Chlorine, add product data sheet if applicable	
				1		
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	Residue				please specifiy composition of residue e.g. 10% filter cake, 20% pulp	_
Transport (T)						_
T1	Inputs	Transport mode	Unit	Truck technology	Remarks	Source
	PE-rich flexibles	Lorry	km	EURO 6	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	Jource
		,				
		Transactionals		ward to do a to a	Remarks	Source
T2	Inputs	Transport mode	Unit	Truck technology	Remarks	
T2	PE-rich flakes	Lorry	km	Truck technology EURO 6	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	Jource

Figure 25 Loop 2 Collection and SoA sorting and Pretreatment data collection sheet



### Loop 3 including Tracer-based sorting

Process 1	Innutr	Quantity per hour	11-14	Origin	Bomster	Source
Collection at consumer	Inputs Household plastic packaging waste	Quantity per hour	Unit	Origin	Remarks	Source
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	Household plastic packaging waste					
Process 2 SoA Sorting	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
Son Son ing	Household plastic packaging waste	easing period	0	- Children		Jource
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Diesel Binding wire					
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flexibles/ Food and non-food	Quality per nou	Unit	Destination	NCHIGINS	Jource
	Residue				please specifiy composition of residue e.g. 10% PP, 20% PET	
	Wastewater Recycalbes				please specifiy composition of recycalbes e.g. 10% PP, 20% PET	
	inceptables				prease specify composition of recyclines e.g. 10011, 2001 er	
Process 3						
TBS Sorting	Inputs PE-rich flexibles/ Food and non-food	Quantity per hour	Unit	Origin	Remarks	Source
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flexibles incl. Tracers/ f. Food					
	PE-rich non-f. Food flexibles				please specifiy composition of residue e.g. 10% PP, 20% PET	
Process 4 Oversorting	Inputs	Quantity per bour	Unit	Origin	Remarks	Source
Oversorung	PE-rich flexibles incl. Tracers/ f. Food	Quantity per hour	Unit	Origin	Remarks	Source
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	1
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flexibles incl. Tracers/ f. Food Residue				please specifiy composition of residue e.g. 10% PP, 20% PET	
	Residue				prease specify composition or residue e.g. 200117, 200121	
Process 5 Shredding	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
	PE-rich flexibles incl. Tracers/ f. Food					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flakes incl. Tracers/ f. Food					
Process 6						
Washing	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
	PE-rich flakes incl. Tracers/ f. Food Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Water					
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flakes incl. Tracers/ f. Food	easing per nour	0	Destination		Jource
	Wastewater					
Process 7						
Grinding	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
	PE-rich flakes incl. Tracers/ f. Food Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flakes incl. Tracers/ f. Food					
Process 8						
Process 8 Float-sink separation	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
	PE-rich flakes incl. Tracers/ f. Food					
	Electricity Water				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	PE-rich flakes incl. Tracers/ f. Food Residue				please specifiy composition of residue	
	Wastewater					
Brocore 9			_			
Process 9 Waste water treatment	Inputs	Quantity per hour	Unit	Origin	Remarks	Source
	Wastewater					
	Chemicals				please specifiy type of chemical e.g. Chlorine, add product data sheet if applicable	
	Outputs	Quantity per hour	Unit	Destination	Remarks	Source
	Residue				please specifiy composition of residue e.g. 10% filter cake, 20% pulp	
Transport (T) T1	Inputs	Transport mode	Unit	Truck technology	Remarks	Source
	Household plastic packaging waste	Lorry	km	EURO 6	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t; 16t-32t; >32t	500.0E
72						5 m
12	Inputs PE-rich flakes incl. Tracers/ f. Food	Transport mode Lorry	Unit km	Truck technology EURO 6	Remarks please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	Source
					· · · · · · · · · · · · · · · · · · ·	

Figure 26 Loop 3 Collection and SoA sorting and Pretreatment data collection sheet





# Purification option A CreaSolv®-IVV

# <u>Loop 1-3</u>

Process 1 Continuous dissolving						
	Inputs	Quantity per kg	Unit	Origin	Remarks	Source
	PE-rich flakes					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix, provider, energy mix	
	Heat Recovered solvent				please specify source of heat e.g. natural gas please specifiy type of solvent, add product data sheet if applicable	
	Virgin solvent	•			please specifiy type of solvent, add product data sheet if applicable	
	Washing solution				please specifiy type of washing solution, add product data sheet if applicable	
	Outputs	Quantity per kg	Unit	Destination	Remarks	Source
	Dissolved PE (incl. Residues)					-
Process 2						-
Multistage filtration	Inputs Dissolved PE (incl. Residues)	Quantity per kg	Unit	Origin	Remarks	Source
	Electricity				please specifiy e.g. medium voltage, provider, energy mix, provider, energy mix	
	Heat				please specify source of heat e.g. natural gas	
						_
						-
	Outputs	Quantity per kg	Unit	Destination	Remarks	Source
	Filtered PE solution					
Process 3.1						
Washing of the residual fraction	Inputs	Quantity per kg	Unit	Origin	Remarks	Source
	Residues				please specifiy composition of residue e.g. 10% PP, 20% PET	
	Electricity				please specifiy e.g. medium voltage, provider, energy mix, provider, energy mix	
	Outputs	Quantity per kg	Unit	Destination	Remarks	Source
	Filtered PE solution					-
	Washing solution					-
Process 3.1.1						
Drying residual fraction	Inputs	Quantity per kg	Unit	Origin	Remarks	Source
	Residues				please specifiy composition of residue e.g. 10% PP, 20% PET	_
	Electricity				please specifiy e.g. medium voltage, provider, energy mix, provider, energy mix	-
	Heat				please specify source of heat e.g. natural gas	-
						_
	0.4mm	0	11.24	B	Provedu	<b>C</b>
	Outputs Filtered PE solution	Quantity per kg	Unit	Destination	Remarks	Source
	Recovered solvent					
Process 3.2						-
PE purification	Inputs	Quantity per kg	Unit	Origin	Remarks	Source
	Filtered PE solution Electricity				please specifiy e.g. medium voltage, provider, energy mix, provider, energy mix	
	Heat				please specify source of heat e.g. natural gas	
	Recovered purification agent				please specifiy type of purification agent, add product data sheet if applicable	
					please specifiy type of purification agent, add product data sheet if applicable please specifiy type of purification agent, add product data sheet if applicable	
	Recovered purification agent Virgin purification agent	2		Destriction	please specifiy type of purification agent, add product data sheet if applicable	
	Recovered purification agent Virgin purification agent Outputs	Quantity per kg	Unit	Destination		Source
	Recovered purification agent Virgin purification agent	Quantity per kg	Unit	Destination	please specifiy type of purification agent, add product data sheet if applicable	Source
	Recovered purification agent Virgin purification agent Outputs	Quantity per kg	Unit	Destination	please specifiy type of purification agent, add product data sheet if applicable	Source
	Recovered purification agent Virgin purification agent Outputs	Quantity per kg	Unit	Destination	please specifiy type of purification agent, add product data sheet if applicable	Source
Process 3.2.1	Recovered purification agent Virgin purification agent Outputs PE solution				please specify type of purification agent, add product data sheet if applicable Remarks	
Removal of fine residues	Recovered purification agent Virgin purification agent Outputs PE solution Inputs	Quantity per kg Quantity per kg		Destination Origin	please specifiy type of purification agent, add product data sheet if applicable	Source
	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture				please specify type of purification agent, add product data sheet if applicable Remarks Remarks	
Removal of fine residues	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity				please specify type of purification agent, add product data sheet if applicable Remarks Remarks please specify e.g. medium voltage, provider, energy mix, provider, energy mix	
Removal of fine residues	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture				please specify type of purification agent, add product data sheet if applicable Remarks Remarks	
Removal of fine residues	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity				please specify type of purification agent, add product data sheet if applicable Remarks Remarks please specify e.g. medium voltage, provider, energy mix, provider, energy mix	
Removal of fine residues	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Upded solvent/purification agent/residues mixture Electricity Heat	Quantity per kg	Unit	Origin	please specify type of purification agent, add product data sheet if applicable Remarks Remarks please specify e.g. medium voltage, provider, energy mix, provider, energy mix please specify source of heat e.g. natural gas	Source
Removal of fine residues	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Outputs		Unit		please specify type of purification agent, add product data sheet if applicable Remarks Remarks please specify e.g. medium voltage, provider, energy mix, provider, energy mix	
Removal of fine residues	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Outputs Recovered solvent	Quantity per kg	Unit	Origin	please specify type of purification agent, add product data sheet if applicable Remarks Remarks please specify e.g. medium voltage, provider, energy mix, provider, energy mix please specify source of heat e.g. natural gas Remarks Remarks	Source
Removal of fine residues	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Outputs	Quantity per kg	Unit	Origin	please specify type of purification agent, add product data sheet if applicable Remarks Remarks Please specify e.g. medium voltage, provider, energy mix, provider, energy mix please specify source of heat e.g. natural gas	Source
Removal of fine residues and separation of solvent & purification agent	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Outputs Recovered solvent	Quantity per kg	Unit	Origin	please specify type of purification agent, add product data sheet if applicable Remarks Remarks please specify e.g. medium voltage, provider, energy mix, provider, energy mix please specify source of heat e.g. natural gas Remarks Remarks	Source
Removal of fine residues and separation of solvent & purification agent Process 4	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Outputs Recovered solvent Residues fine	Quantity per kg Quantity per kg	Unit	Origin Destination	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET	Source
Removal of fine residues and separation of solvent & purification agent	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Outputs Recovered solvent Residues fine Inputs Inputs	Quantity per kg	Unit	Origin	please specify type of purification agent, add product data sheet if applicable Remarks Remarks please specify e.g. medium voltage, provider, energy mix, provider, energy mix please specify source of heat e.g. natural gas Remarks Remarks	Source
Removal of fine residues and separation of solvent & purification agent Process 4		Quantity per kg Quantity per kg	Unit	Origin Destination	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         Remarks	Source
Removal of fine residues and separation of solvent & purification agent Process 4	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Ubded solvent/purification agent/residues mixture Electricity Heat Outputs Recovered solvent Residues fine Inputs PE solution Electricity Electricity	Quantity per kg Quantity per kg	Unit	Origin Destination	please specify type of purification agent, add product data sheet if applicable  Remarks  Remarks  please specify e.g. medium voltage, provider, energy mix, provider, energy mix please specify cource of heat e.g. natural gas  Remarks  please specify composition of residue e.g. 10% PP, 20% PET  Remarks  please specify e.g. medium voltage, provider, energy mix, provider, energy mix	Source
Removal of fine residues and separation of solvent & purification agent Process 4		Quantity per kg Quantity per kg	Unit	Origin Destination	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         Remarks	Source
Removal of fine residues and separation of solvent & purification agent Process 4	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Inputs PE solution Electricity Heat Outputs PE solution Electricity Heat Outputs PE melt Electricity	Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination	please specify type of purification agent, add product data sheet if applicable         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify use of heat e.g. natural gas	Source Source
Removal of fine residues and separation of solvent & purification agent Process 4	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Inputs Input	Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination	please specify type of purification agent, add product data sheet if applicable         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify use of heat e.g. natural gas	Source Source
Removal of fine residues and separation of solvent & purification agent Process 4	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Inputs PE solution Electricity Heat Outputs PE solution Electricity Heat Outputs PE melt Electricity	Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination	please specify type of purification agent, add product data sheet if applicable         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify u.g. medium voltage, provider, energy mix, provider, energy mix         please specify u.g. medium voltage, provider, energy mix, provider, energy mix	Source Source
Removal of fine residues and separation of solvent & purification agent Process 4	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Inputs PE solution Electricity Heat Outputs PE solution Electricity Heat Outputs PE melt Electricity	Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination	please specify type of purification agent, add product data sheet if applicable         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify u.g. medium voltage, provider, energy mix, provider, energy mix         please specify u.g. medium voltage, provider, energy mix, provider, energy mix	Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Inputs PE solution Electricity Heat Outputs PE solution Electricity Heat Outputs PE melt Electricity	Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination	please specify type of purification agent, add product data sheet if applicable         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify u.g. medium voltage, provider, energy mix, provider, energy mix         please specify u.g. medium voltage, provider, energy mix, provider, energy mix	Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Ubded volvent/purification agent/residues mixture Electricity Heat Inputs PE solution Electricity Heat Outputs PE solution Electricity Heat Outputs PE melt Recovered solvent Inputs PE melt Recovered solvent Inputs PE melt Recovered solvent Inputs Input Inpu	Quantity per kg Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination Origin Destination	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks	Source Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Inputs PE solution Electricity Heat Outputs PE solution Electricity Heat Recovered solvent Recovered solvent Electricity Heat PE melt Recovered solvent	Quantity per kg Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination Origin Destination	please specify type of purification agent, add product data sheet if applicable         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify cource of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify ource of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify ource of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix	Source Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Outputs Recovered solvent Residues fine Inputs PE solution Electricity Heat Outputs PE melt Recovered solvent Inputs PE melt Recovered solvent Residues fine PE melt Recovered solvent Residues fine Recovered solvent Residues fine Recovered solvent Residues fine Recovered solvent	Quantity per kg Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination Origin Destination	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks	Source Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Inputs PE solution Electricity Heat Outputs PE solution Electricity Heat Recovered solvent Recovered solvent Electricity Heat PE melt Recovered solvent	Quantity per kg Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination Origin Destination	please specify type of purification agent, add product data sheet if applicable         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify cource of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify ource of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify ource of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix	Source Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Outputs Cectricity Heat Outputs Recovered solvent Residues fine Inputs PE solution Electricity Heat Outputs PE solution Electricity Heat Outputs PE melt Recovered solvent Inputs PE melt Recovered solvent Recovered solvent Input Recovere	Quantity per kg Quantity per kg Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination Origin Ostination Origin Origin	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         Please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas	Source Source Source Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Inputs Recovered solvent Residues fine Inputs PE solution Electricity Heat Doutputs PE melt Recovered solvent Inputs Input Inpu	Quantity per kg Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination Origin Destination	please specify type of purification agent, add product data sheet if applicable         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify cource of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify ource of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify ource of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix	Source Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Outputs Cectricity Heat Outputs Recovered solvent Residues fine Inputs PE solution Electricity Heat Outputs PE solution Electricity Heat Outputs PE melt Recovered solvent Inputs PE melt Recovered solvent Recovered solvent Input Recovere	Quantity per kg Quantity per kg Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination Origin Ostination Origin Origin	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         Please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas	Source Source Source Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Inputs Recovered solvent Residues fine Inputs PE solution Electricity Heat Doutputs PE melt Recovered solvent Inputs Input Inpu	Quantity per kg Quantity per kg Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination Origin Ostination Origin Origin	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         Please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas	Source Source Source Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5 Regranulation/-compounding	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Inputs Recovered solvent Residues fine Inputs PE solution Electricity Heat Doutputs PE melt Recovered solvent Inputs Input Inpu	Quantity per kg Quantity per kg Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination Origin Ostination Origin Origin	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         Please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify source of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas	Source Source Source Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5 Regranulation/-compounding Transport (T)	Recovered purification agent Virgin purification agent Dotaputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Outputs Recovered solvent Residues fine PE solution Electricity PE solution Electricity PE melt Electricity Femelt Femelt Electricity Femelt Femel	Quantity per kg Quantity per kg Quantity per kg Quantity per kg Quantity per kg	Unit	Origin Destination Origin Origin Destination Origin	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify ource of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify ource of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify ource of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify acure of heat e.g. natural gas         Remarks         please specify acure of heat e.g. natural gas	Source Source Source Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5 Regranulation/-compounding Transport (T)	Recovered purification agent Virgin purification agent Outputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Inputs Recovered solvent Residues fine Inputs PE solution Electricity Heat Doutputs PE melt Recovered solvent Inputs Input Inpu	Quantity per kg	Unit Unit Unit Unit Unit	Origin Destination Origin Origin Destination Origin Destination Truck technology	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify cource of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix         please specify e.g. medium voltage         please specify e.g. medium voltage         please specify e.g. medium voltage         please specify e.g	Source Source Source Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5 Regranulation/-compounding	Recovered purification agent Virgin purification agent Dotaputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Outputs Recovered solvent Residues fine PE solution Electricity PE solution Electricity PE melt Electricity Femelt Femelt Electricity Femelt Femel	Quantity per kg Quantity per kg Quantity per kg Quantity per kg Quantity per kg	Unit Unit Unit Unit Unit	Origin Destination Origin Origin Destination Origin	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify composition of residue e.g. 10% PP, 20% PET         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify ource of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify ource of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify ource of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify acure of heat e.g. natural gas         Remarks         please specify acure of heat e.g. natural gas	Source Source Source Source Source
Removal of fine residues and separation of solvent & purification agent Process 4 Multiple stage drying Process 5 Regranulation/-compounding Transport (T)	Recovered purification agent Virgin purification agent Dotaputs PE solution Inputs Used solvent/purification agent/residues mixture Electricity Heat Outputs Recovered solvent Residues fine PE solution Electricity PE solution Electricity PE melt Electricity Femelt Femelt Electricity Femelt Femel	Quantity per kg	Unit Unit Unit Unit Unit	Origin Destination Origin Origin Destination Origin Destination Truck technology	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify cource of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix         please specify e.g. medium voltage         please specify e.g. medium voltage         please specify e.g. medium voltage         please specify e.g	Source Source Source Source Source
Removal of fine residues and separation of solvent & purification agent and separation of solvent & purification agent Process 4 Multiple stage drying Process 5 Regranulation/-compounding Transport (T) 1	Recovered purification agent         Outputs         PE solution         Inputs         Used solvent/purification agent/residues mixture         Electricity         Heat         Outputs         Recovered solvent         Pf solution         Electricity         Heat         Outputs         PE melt         Recovered solvent         Inputs         PF melt         PE PCR pellets         Outputs         PE PCR pellets	Quantity per kg	Unit Unit Unit Unit Unit	Origin Destination Origin Origin Destination Origin Destination Truck technology EURO 6	please specify type of purification agent, add product data sheet if applicable         Remarks         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify source of heat e.g. natural gas         Remarks         please specify composition of residue e.g. 10% PP, 20% PET         Remarks         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, provider, energy mix, provider, energy mix         please specify e.g. medium voltage, please specify e.g. medium voltage, please specify e.g	Source Source Source Source Source Source Source Source Source

Figure 27 Loop 1-3 Purification option A CreaSolv®® data collection sheet (data in green tbd)







#### Purification option B Delamination and Deinking-UGENT

#### Loop 1 and 2

Process 1						
Delamination & Deinking	Inputs	Quantity per ton	Unit	Origin	Remarks	Sour
-	pretreated PE flakes					
	virgin Delamination-Deinking medium	A				
	recovered Delamination-Deinking medi					
	Heat				please specify source of heat e.g. natural gas	
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per ton	Unit	Destination	Remarks	Sou
	seperated/deinked PE flakes					
Process 2						
Mechanical separation	Inputs	Quantity per ton	Unit	Origin	Remarks	Sour
incentanieu separation	seperated/deinked PE flakes	quantity per ton	0	U.B.II		500
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	_
	Outputs	Quantity per ton	Unit	Destination	Remarks	Sou
		Quantity per ton	Unit	Destination	Remains	300
	seperated/deinked PE flakes	du a				_
	Delamination-Deinking medium A Resi	due			to recovery	
Process 2.1					- ·	
Medium recovery	Inputs	Quantity per ton	Unit	Origin	Remarks	Sou
	Delamination-Deinking medium A Resi	due				_
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Heat				please specify source of heat e.g. natural gas	
	Outputs	Quantity per ton	Unit	Destination	Remarks	Sou
	recovered Delamination-Deinking med	ium A				
	Residue				to energy recovery	
Process 3						
Washing	Inputs	Quantity per ton	Unit	Origin	Remarks	Sou
	seperated/deinked PE flakes					
	virgin Water					
	recycled Water					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per ton	Unit	Destination	Remarks	Sou
	seperated/deinked PE flakes					
Process 4	,					
Process 4 Mechanical drying		Quantity per ton	Unit	Origin	Remarks	Sour
	Inputs	Quantity per ton	Unit	Origin	Remarks	Sou
	Inputs seperated/deinked PE flakes	Quantity per ton	Unit	Origin		Sou
	Inputs	Quantity per ton	Unit	Origin	Remarks please specifiy e.g. medium voltage, provider, energy mix	Sou
	Inputs seperated/deinked PE flakes	Quantity per ton	Unit	Origin		Sou
	Inputs seperated/deinked PE flakes Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Inputs seperated/deinked PE flakes Electricity Outputs	Quantity per ton Quantity per ton	Unit	Origin		
	Inputs seperated/deinked PE flakes Electricity Outputs seperated/deinked PE flakes				please specifiy e.g. medium voltage, provider, energy mix Remarks	Sou
Mechanical drying	Inputs seperated/deinked PE flakes Electricity Outputs				please specifiy e.g. medium voltage, provider, energy mix	
Mechanical drying Process 5	Inputs seperated/deinked PE flakes Electricity Outputs seperated/deinked PE flakes Wastewater	Quantity per ton	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks to wastewater treatment	Sou
Mechanical drying Process 5	Inputs seperated/deinked PE flakes Electricity Outputs seperated/deinked PE flakes Wastewater Inputs				please specifiy e.g. medium voltage, provider, energy mix Remarks	
Mechanical drying Process 5	Inputs seperated/deinked PE flakes Electricity Outputs seperated/deinked PE flakes Wastewater Inputs seperated/deinked PE flakes	Quantity per ton	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks to wastewater treatment Remarks	Sou
Mechanical drying Process 5	Inputs seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs Seperated/deinked PE flakes Heat	Quantity per ton	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks to wastewater treatment Remarks please specify source of heat e.g. natural gas	Sou
Mechanical drying Process 5	Inputs Seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs Seperated/deinked PE flakes Heat Electricity	Quantity per ton	Unit	Destination Origin	please specifiy e.g. medium voltage, provider, energy mix Remarks to wastewater treatment Remarks please specify source of heat e.g. natural gas please specifiy e.g. medium voltage, provider, energy mix	Sou
Mechanical drying Process 5	Inputs Seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs Seperated/deinked PE flakes Heat Electricity Outputs	Quantity per ton	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks to wastewater treatment Remarks please specify source of heat e.g. natural gas	Sou
Mechanical drying Process 5	Inputs Seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs Seperated/deinked PE flakes Heat Electricity Outputs Seperated/deinked PE flakes	Quantity per ton	Unit	Destination Origin	please specifiy e.g. medium voltage, provider, energy mix Remarks to wastewater treatment Remarks please specify source of heat e.g. natural gas please specifiy e.g. medium voltage, provider, energy mix	Sou
Mechanical drying Process 5	Inputs Seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs Seperated/deinked PE flakes Heat Electricity Outputs	Quantity per ton	Unit	Destination Origin	please specifiy e.g. medium voltage, provider, energy mix Remarks to wastewater treatment Remarks please specify source of heat e.g. natural gas please specifiy e.g. medium voltage, provider, energy mix	Sou
Mechanical drying Process 5 Thermal treatment	Inputs Seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs Seperated/deinked PE flakes Heat Electricity Outputs Seperated/deinked PE flakes	Quantity per ton	Unit	Destination Origin	please specifiy e.g. medium voltage, provider, energy mix Remarks to wastewater treatment Remarks please specify source of heat e.g. natural gas please specifiy e.g. medium voltage, provider, energy mix	Sou Sou Sou
Mechanical drying Process 5 Thermal treatment Process 6	Inputs Seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs Seperated/deinked PE flakes Heat Electricity Outputs Seperated/deinked PE flakes	Quantity per ton	Unit	Destination Origin	please specifiy e.g. medium voltage, provider, energy mix Remarks to wastewater treatment Remarks please specify source of heat e.g. natural gas please specifiy e.g. medium voltage, provider, energy mix	Sou Sou Sou
Mechanical drying Process 5 Thermal treatment Process 6	Inputs Seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs Seperated/deinked PE flakes Heat Electricity Outputs Seperated/deinked PE flakes Water vapor	Quantity per ton Quantity per ton Quantity per ton	Unit Unit kWh Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks to wastewater treatment Remarks please specify source of heat e.g. natural gas please specifiy e.g. medium voltage, provider, energy mix Remarks	Sou Sou Sou
Mechanical drying Process 5 Thermal treatment Process 6	Inputs Seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs Seperated/deinked PE flakes Heat Electricity Outputs Seperated/deinked PE flakes Water vapor Inputs Input	Quantity per ton Quantity per ton Quantity per ton	Unit Unit kWh Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks to wastewater treatment Remarks please specify source of heat e.g. natural gas please specifiy e.g. medium voltage, provider, energy mix Remarks	Sou Sou Sou
Mechanical drying Process 5 Thermal treatment Process 6	inputs seperated/deinked PE flakes Electricity Outputs seperated/deinked PE flakes Wastewater  inputs seperated/deinked PE flakes Heat Electricity Outputs seperated/deinked PE flakes Water vapor  inputs Wastewater	Quantity per ton Quantity per ton Quantity per ton	Unit Unit kWh Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks to wastewater treatment Remarks please specify source of heat e.g. natural gas please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks Remarks	Sou Sou Sou
Mechanical drying Process 5 Thermal treatment Process 6	Inputs Seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs Seperated/deinked PE flakes Heat Electricity Outputs Seperated/deinked PE flakes Water vapor Inputs Wastewater Chemicals	Quantity per ton Quantity per ton Quantity per ton Quantity per ton	Unit Wh Unit	Destination Origin Destination Origin	please specifiy e.g. medium voltage, provider, energy mix Remarks to wastewater treatment Remarks please specify source of heat e.g. natural gas please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks Remarks	Sou Sou Sou
Mechanical drying Process 5 Thermal treatment Process 6	inputs seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs seperated/deinked PE flakes Heat Electricity Outputs Seperated/deinked PE flakes Water vapor Inputs Wastewater Chemicals Outputs	Quantity per ton Quantity per ton Quantity per ton	Unit Unit kWh Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix         Remarks         to wastewater treatment         Remarks         please specify source of heat e.g. natural gas         please specifiy e.g. medium voltage, provider, energy mix         Remarks         Remarks         please specifiy type of chemical e.g. Chlorine, add product data sheet         Remarks	Sou Sou Sou
Mechanical drying Process 5 Thermal treatment Process 6	Inputs Seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs Seperated/deinked PE flakes Heat Electricity Outputs Seperated/deinked PE flakes Water vapor Inputs Wastewater Chemicals Outputs Residue (sinkflow, filter cake)	Quantity per ton Quantity per ton Quantity per ton Quantity per ton	Unit Wh Unit	Destination Origin Destination Origin	please specifiy e.g. međium voltage, proviđer, energy mix Remarks to wastewater treatment Remarks please specify source of heat e.g. natural gas please specifiy e.g. međium voltage, proviđer, energy mix Remarks Remarks please specifiy type of chemical e.g. Chlorine, add product data sheet	Sou Sou Sou
Mechanical drying Process 5 Thermal treatment Process 6 Waste water treatment	inputs seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs seperated/deinked PE flakes Heat Electricity Outputs Seperated/deinked PE flakes Water vapor Inputs Wastewater Chemicals Outputs	Quantity per ton Quantity per ton Quantity per ton Quantity per ton	Unit Wh Unit	Destination Origin Destination Origin	please specifiy e.g. medium voltage, provider, energy mix         Remarks         to wastewater treatment         Remarks         please specify source of heat e.g. natural gas         please specifiy e.g. medium voltage, provider, energy mix         Remarks         Remarks         please specifiy type of chemical e.g. Chlorine, add product data sheet         Remarks	Sou Sou Sou
Mechanical drying Process 5 Thermal treatment Process 6 Waste water treatment Transport (T)	Inputs Seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs Seperated/deinked PE flakes Heat Electricity Outputs Seperated/deinked PE flakes Water vapor Inputs Wastewater Chemicals Outputs Residue (sinkflow, filter cake) recyled Water	Quantity per ton	kWh Unit Unit Unit	Destination Origin Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix         Remarks         to wastewater treatment         Remarks         please specify source of heat e.g. natural gas please specifiy e.g. medium voltage, provider, energy mix         Remarks         Please specifiy type of chemical e.g. Chlorine, add product data sheet         Remarks         to energy recovery; please specifiy composition of residue	Sou Sou Sou Sou Sou
Mechanical drying Process 5 Thermal treatment Process 6 Waste water treatment Transport (T)	Inputs         seperated/deinked PE flakes         Electricity         Outputs         seperated/deinked PE flakes         Wastewater         Inputs         seperated/deinked PE flakes         Heat         Electricity         Outputs         seperated/deinked PE flakes         Wastewater         Inputs         Seperated/deinked PE flakes         Wastewater vapor         Inputs         Questate         Outputs         Residue (sinkflow, filter cake)         recyled Water         Inputs	Quantity per ton Quantity per ton Quantity per ton Quantity per ton	kWh Unit Unit Unit Unit	Destination Origin Destination Origin Truck technology	please specifiy e.g. medium voltage, provider, energy mix         Remarks         to wastewater treatment         Remarks         please specify source of heat e.g. natural gas         please specify e.g. medium voltage, provider, energy mix         Remarks         Please specifiy type of chemical e.g. Chlorine, add product data sheet         Remarks         to energy recovery; please specifiy composition of residue         Remarks	Sou Sou Sou Sou Sou
Mechanical drying Process 5 Thermal treatment Process 6 Waste water treatment Transport (T)	Inputs Seperated/deinked PE flakes Electricity Outputs Seperated/deinked PE flakes Wastewater Inputs Seperated/deinked PE flakes Heat Electricity Outputs Seperated/deinked PE flakes Water vapor Inputs Wastewater Chemicals Outputs Residue (sinkflow, filter cake) recyled Water	Quantity per ton	kWh Unit Unit Unit	Destination Origin Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix         Remarks         to wastewater treatment         Remarks         please specify source of heat e.g. natural gas please specifiy e.g. medium voltage, provider, energy mix         Remarks         Please specifiy type of chemical e.g. Chlorine, add product data sheet         Remarks         to energy recovery; please specifiy composition of residue	Sou Sou Sou Sou Sou
Mechanical drying Process 5 Thermal treatment Process 6 Waste water treatment Transport (T) T1 (upstream)	Inputs         seperated/deinked PE flakes         Electricity         Outputs         seperated/deinked PE flakes         Wastewater         Inputs         seperated/deinked PE flakes         Heat         Electricity         Outputs         seperated/deinked PE flakes         Heat         Electricity         Outputs         seperated/deinked PE flakes         Wastewater         Chemicals         Outputs         Residue (sinkflow, filter cake)         recyled Water         Inputs         Inputs         Inputs         Pretreated PE flakes	Quantity per ton Distance	kWh Unit Unit Unit Unit Unit Unit km	Destination Origin Destination Origin Destination Truck technology EURO 6	please specifiy e.g. medium voltage, provider, energy mix         Remarks         to wastewater treatment         Remarks         please specify source of heat e.g. natural gas please specifiy e.g. medium voltage, provider, energy mix Remarks         Remarks         please specifiy type of chemical e.g. Chlorine, add product data sheet         Remarks         to energy recovery; please specifiy composition of residue         Remarks         please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	Sou Sou Sou Sou Sou Sou Sou
Mechanical drying Process 5 Thermal treatment Process 6 Waste water treatment	Inputs         seperated/deinked PE flakes         Electricity         Outputs         seperated/deinked PE flakes         Wastewater         Inputs         seperated/deinked PE flakes         Heat         Electricity         Outputs         seperated/deinked PE flakes         Wastewater         Inputs         Seperated/deinked PE flakes         Wastewater vapor         Inputs         Questate         Outputs         Residue (sinkflow, filter cake)         recyled Water         Inputs	Quantity per ton	kWh Unit Unit Unit Unit	Destination Origin Destination Origin Truck technology	please specifiy e.g. medium voltage, provider, energy mix         Remarks         to wastewater treatment         Remarks         please specify source of heat e.g. natural gas         please specify e.g. medium voltage, provider, energy mix         Remarks         Please specifiy type of chemical e.g. Chlorine, add product data sheet         Remarks         to energy recovery; please specifiy composition of residue         Remarks	Sou

Figure 28 Loop 1-2 Purification option B Delamination and Deinking data collection sheet





#### <u>Loop 3</u>

Process 1						
Delamination & Deinking	Inputs	Quantity per ton	Unit	Origin	Remarks	Sourc
	pretreated PE flakes					
	virgin Delamination-Deinking medium B					
	Heat				please specify source of heat e.g. natural gas	
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per ton	Unit	Destination	Remarks	Sourc
	seperated/deinked PE flakes					
Process 2						
Mechanical separation	Inputs	Quantity per ton	Unit	Origin	Remarks	Sourc
	seperated/deinked PE flakes					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per ton	Unit	Destination	Remarks	Sourc
	seperated/deinked PE flakes					
	Residue				to energy recovery	
Process 3				·		
Neutralisation	Inputs	Quantity per ton	Unit	Origin	Remarks	Sourc
	seperated/deinked PE flakes					
	Solution					
	recycled Water					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per ton	Unit	Destination	Remarks	Sourc
	seperated/deinked PE flakes	Quantity per ton	0	Destination	iteritario	boure
Process 4	seperated/deliked PE liakes					
	Innute	Overtite nexten	Unit	Origin	Remarks	Sourc
Mechanical drying	Inputs	Quantity per ton	Unit	Origin	Remarks	Sourc
	seperated/deinked PE flakes					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	-					
	Outputs	Quantity per ton	Unit	Destination	Remarks	Sourc
	seperated/deinked PE flakes					
	Salt					
	Wastewater				to wastewater treatment	
Process 5						
Thermal treatment	Inputs	Quantity per ton	Unit	Origin	Remarks	Sourc
	seperated/deinked PE flakes					
	Heat				please specify source of heat e.g. natural gas	
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per ton	Unit	Destination	Remarks	Sourc
	seperated/deinked PE flakes					
	Water vapor					
Process 6						
Waste water treatment	Inputs	Quantity per ton	Unit	Origin	Remarks	Sourc
	Wastewater					
	Chemicals				please specifiy type of chemical e.g. Chlorine, add product data sheet	
	Outputs	Quantity per ton	Unit	Destination	Remarks	Sourc
		quantity per toll	Unit	Sestination		Joan
	Residue (sinkflow, filter cake)				to energy recovery; please specifiy composition of residue	
Tronon out (T)	recyled Water					
Transport (T)	laanse	Distance	11	Truck to share look	Domaile	Course
T1 (upstream)	Inputs	Distance	Unit	Truck technology	Remarks	Sourc
	pretreated PE flakes		km	EURO 6	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	_
T2 (downstream)	Inputs	Distance	Unit	Truck technology	Remarks	Sourc
	delaminated/deinked PE flakes		km	EURO 6	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	

Figure 29 Loop 3 Purification option B Delamination and Deinking data collection sheet





#### **Recompounding-UM, SUEZ**

### Loop 1-3

Process 1						
Preconditioning	Inputs	Quantity per x kg output	Unit	Origin	Remarks	Source
reconditioning	Pretreated PE flakes	Qualitity per x kg output	Unit	Oligili	INCTITOR INS	Jource
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Liectricity				please speciny e.g. mediain voltage, provider, energy nix	
	Outputs	Quantity per x kg output	Unit	Destination	Remarks	Source
	PE flakes					
	TE Hukes					
Process 2						
Velting	Inputs	Quantity per x kg output	Unit	Origin	Remarks	Source
herung		Qualitity per x kg output	Unit	Oligin	Nettians	Jource
	PE flakes				along an effect of the second data and the second	
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	0.1.1.1.	0		Beerland's a	Para da	<b>6</b>
	Outputs	Quantity per x kg output	Unit	Destination	Remarks	Source
	PE flakes					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
rocess 3						
iltration	Inputs	Quantity per x kg output	Unit	Origin	Remarks	Source
	PE flakes					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per x kg output	Unit	Destination	Remarks	Source
	PE flakes					
	Residue				please specifiy composition of residue e.g. 10% metals, 20% wood, 50% higher melting polymere (i.e. PP, PE,)	
rocess 4						
inal degassing	Inputs	Quantity per x kg output	Unit	Origin	Remarks	Source
	PE flakes					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
					P	
	Outputs	Quantity per x kg output	Unit	Destination	Remarks	Source
	PE flakes	2				
	Air emission				please specifiy	
	All ethission		-		piease specify	
			-			
Process 5						
	Innute	Quantity per x kg output	Unit	Origin	Remarks	Source
lomogenisation	Inputs	Quantity per x kg output	Unit	Ongin	Remarks	Source
	PE flakes					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
						-
	Outputs	Quantity per x kg output	Unit	Destination	Remarks	Source
	PE flakes					
rocess 6						
elletizing	Inputs	Quantity per x kg output	Unit	Origin	Remarks	Source
	PE flakes					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
		Quantity per x kg output	Unit	Destination	Remarks	Source
	Outputs					
	Outputs PE PCR pellets					
rancost (T)						
	PE PCR pellets		linit	Truck technology	Panvér	Source
	PE PCR pellets	Transport mode		Truck technology	Remarks           Interpretentific translandaria = 3.75.755.755.100.105.320.5300	Source
	PE PCR pellets		Unit	Truck technology EURO 5	Remarks please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	Source
1	PE PCR pellets Inputs PE flakes	Transport mode Lorry	km	EURO 5	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	
1	PE PCR pellets Inputs PE flakes Inputs Inputs	Transport mode Lorry Transport mode	km Unit	EURO 5 Truck technology	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t Remarks	Source
Transport (T) 11 12	PE PCR pellets Inputs PE flakes	Transport mode Lorry	km	EURO 5	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	

Figure 30 Loop 1-3 Recompounding data collection sheet





#### **Deodorization-KREYEN**

## <u>Loop 1-3</u>

Process 1						
Infrared treatment	Inputs	Quantity per year	Unit	Origin	Remarks	Source
	PE PCR pellets					
	Air for cooling					
	Heat via electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per year	Unit	Destination	Remarks	Source
	PE PCR pellets					
	Air emissions (VOC)				please specifiy	
Process 2						
Thermal treatment	Inputs	Quantity per year	Unit	Origin	Remarks	Source
	PE PCR pellets					
	Air					
	Heat via electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per year	Unit	Destination	Remarks	Source
	PE PCR pellets deodorized					
	Air emissions (VOC)				please specifiy	
Transport (T)						
T1 (upstream)	Inputs	Transport mode	Unit	Truck technology	Remarks	Source
	PE PCR pellets	Lorry	km	EURO 5	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	
F2 (downstream)	Inputs	Transport mode	Unit	Truck technology	Remarks	Source

Figure 31 Loop 1-3 Deodorization data collection sheet





#### Laminate production-AMCOR

#### Loop 1- Wet Wipes (HP1)

Process 1						
Blown film coextrusion	Inputs	Quantity per m2 of packaging product	11-14	Origin	Remarks	Source
Nown min coextrasion	PE PCR pellets	drauged her und of harreaging brouget	UNIT	ongin	INCTITUTING	Source
	PE virgin pellets					
	EVOH virgin pellets *optional					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Electricity				please specify e.g. medium vortage, provider, energy mix	
	Outputs	Quantity per m2 of packaging product	Unit	Destination	Remarks	Source
	BPE60 film	quantity per miz or packaging product	0	bestindion	including.	Joure
	Solid losses					
	Solid losses					
Process 2						
Printing	Inputs	Quantity per m2 of packaging product	Unit	Origin	Remarks	Source
Finding	BPE60 film	Quantity per m2 of packaging product	Unit	Oligin	Nethans	Jource
	Ink				please specifiy	
	Primer coating					
	Natural gas				please specifiy	
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
					prease specify e.g. medium vortage, provider, energy mix	
	Ethyl acetate					
	Outputs	Quantity per m2 of packaging product	11-14	Destination	Remarks	Source
		drauged her und of harreaging bronget	UNIT	Destination	INCITION NO	Source
	Ink/BPE60/primer film					
	Waste Ethyl acetate					
	Solid losses					
Process 3						
Adhesive lamination	Inputs	Quantity per m2 of packaging product	Unit	Origin	Remarks	Source
	Ink/BPE60/primer film					
	Solvent-based adhesive				please specifiy, add product data sheet if possible	
	PE 25 μm virgin film				please specifiy e.g. medium voltage, provider, energy mix	
	Natural gas					
	Electricity					
	Ethyl acetate					
	Outputs	Quantity per m2 of packaging product	Unit	Destination	Remarks	Source
	Laminate					
					please specifiy composition of residue e.g. 10% PP, 20% PET	
	Waste Ethyl acetate					
	Solid losses					
Process 2./3.1						
		Quantity per m2 of packaging product	Unit	Origin	Remarks	Source
Process 2./3.1 Solvent oxidation with energy recovery	Solid losses	Quantity per m2 of packaging product	Unit	Origin	Remarks	Source
	Solid losses	Quantity per m2 of packaging product	Unit	Origin	Remarks please specifiy e.g. medium voltage, provider, energy mix	Source
	Solid losses Inputs Waste Ethyl acetate Electricity	Quantity per m2 of packaging product	Unit	Origin		Source
	Solid losses Inputs Waste Ethyl acetate	Quantity per m2 of packaging product	Unit	Origin		Source
	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit			
	Solid losses inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs				please specifiy e.g. medium voltage, provider, energy mix	
	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Orygen from air Outputs Energy (internally used)				please specifiy e.g. medium voltage, provider, energy mix	
	Solid losses inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs				please specifiy e.g. medium voltage, provider, energy mix	
	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Orygen from air Outputs Energy (internally used)				please specifiy e.g. medium voltage, provider, energy mix	Source
Solvent axidation with energy recovery	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Orygen from air Outputs Energy (internally used)				please specifiy e.g. medium voltage, provider, energy mix	
Solvent axidation with energy recovery	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Otyputs Energy (Internally used) Emissions to air	Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks	Source
Solvent axidation with energy recovery	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (internally used) Emissions to air Inputs		Unit		please specifiy e.g. medium voltage, provider, energy mix	Source
Solvent axidation with energy recovery	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Oxtputs Energy (internally used) Emissions to air Inputs Laminate	Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks	Sourc
	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (internally used) Emissions to air Inputs	Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks	Sourc
Solvent axidation with energy recovery	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxtygen from air Oxtputs Energy (internally used) Emissions to air Inputs Laminate Electricity	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Source
Solvent axidation with energy recovery	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Oxtputs Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs Outputs	Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks	Source
Solvent axidation with energy recovery	Solid losses Inputs Waste Ethyl acetate Electricity Natural gran air Outputs Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs Hil laminate	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Source
Folivent axidation with energy recovery	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Oxtputs Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs Outputs	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	
Solvent axidation with energy recovery	Solid losses Inputs Waste Ethyl acetate Electricity Natural gran air Outputs Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs Hil laminate	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Source
Solvent oxidation with energy recovery Process 4 Slitting	Solid losses Inputs Waste Ethyl acetate Electricity Natural gran air Outputs Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs Hil laminate	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Source
Solvent axidation with energy recovery Process 4 Siltiting Transport (T)	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (Internally used) Emissions to air Inputs Laminate Electricity Outputs Hå Jaminate Solid losses	Quantity per m2 of packaging product Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit Unit Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix Remarks	Sourc Sourc Sourc
Solvent oxidation with energy recovery	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs Ht laminate Solid losses Inputs Inputs	Quantity per m2 of packaging product Quantity per m2 of packaging product Quantity per m2 of packaging product Transport mode	Unit Unit Unit	Destination Origin Destination Truck technology	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks Remarks Remarks Remarks Remarks	Source
Solvent axidation with energy recovery Process 4 Siltiting Transport (T)	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (Internally used) Emissions to air Inputs Laminate Electricity Outputs Hå Jaminate Solid losses	Quantity per m2 of packaging product Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit Unit Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix Remarks	Sourc Sourc Sourc
Solvent axidation with energy recovery Process 4 Siltiting Transport (T)	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs Ht laminate Solid losses Inputs Inputs	Quantity per m2 of packaging product Quantity per m2 of packaging product Quantity per m2 of packaging product Transport mode	Unit Unit Unit	Destination Origin Destination Truck technology	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks Remarks Remarks Remarks Remarks	Sourc Sourc Sourc
Solvent axidation with energy recovery Process 4 Siltiting Transport (T)	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Oxtputs Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs H1 Jaminate Solid losses Inputs PE PCR pellets	Quantity per m2 of packaging product Quantity per m2 of packaging product Quantity per m2 of packaging product Transport mode	Unit Unit Unit	Destination Origin Destination Truck technology	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks Remarks Remarks Remarks Remarks	Sourc Sourc Sourc
Solvent axidation with energy recovery Process 4 Siltiting Transport (T)	Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Oxtputs Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs Halaminate Solid losses Inputs PE PCR pellets PE virg nellets	Quantity per m2 of packaging product Quantity per m2 of packaging product Quantity per m2 of packaging product Transport mode	Unit Unit Unit Unit	Destination Origin Destination Truck technology EURO 6	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks Remarks Remarks Remarks Remarks	Sourc Sourc Sourc

Figure 32 Loop 1 Wet Wipes Laminate production data collection sheet (data in green tbd)





Process 1						
Blown film coextrusion	Inputs	Quantity per m2 of packaging product	Unit	Origin	Remarks	Source
	PE PCR pellets					
	PE virgin pellets					
	EVOH virgin pellets *optional					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per m2 of packaging product	Unit	Destination	Remarks	Source
	BPE130 film	quantity per me of packaging product	0	Destinution	ite many	50410
	Solid losses					
	Solid losses					
Process 2						
Printing	Inputs	Quantity per m2 of packaging product	Unit	Origin	Remarks	Source
	BPE130 film					
	Ink				please specifiy	
	Primer coating				please specifiy	
	Natural gas					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
					please specify e.g. medium vortage, provider, energy mix	
	Ethyl acetate					
	Outputs	Quantity per m2 of packaging product	Unit	Destination	Remarks	Source
	Ink/BPE130/primer film					
	Waste Ethyl acetate					
	Solid losses					
				-		_
Process 3						
Adhesive lamination	Inputs	Quantity per m2 of packaging product	Unit	Origin	Remarks	Source
	Ink/BPE60/primer film					
	Solvent-based adhesive				please specifiy, add product data sheet if possible	
	PE 25 µm virgin film				please specifiy e.g. medium voltage, provider, energy mix	
	Natural gas					
	Electricity					
	Ethyl acetate					
	Outputs	Quantity per m2 of packaging product	Unit	Destination	Remarks	Source
	Laminate					
	Waste Ethyl acetate				please specifiy composition of residue e.g. 10% PP, 20% PET	
	Solid losses					
Process 2 /3 1						
	Innute	Quantity nor m2 of nocleosing product	11-14	Ordein	Bemarke	Course
	Inputs	Quantity per m2 of packaging product	Unit	Origin	Remarks	Source
	Waste Ethyl acetate	Quantity per m2 of packaging product	Unit	Origin		Source
Process 2./3.1 Solvent oxidation with energy recovery	Waste Ethyl acetate Electricity	Quantity per m2 of packaging product	Unit	Origin	Remarks please specifiy e.g. medium voltage, provider, energy mix	Source
	Waste Ethyl acetate	Quantity per m2 of packaging product	Unit	Origin		Source
	Waste Ethyl acetate Electricity Natural gas	Quantity per m2 of packaging product	Unit	Origin		Source
	Waste Ethyl acetate Electricity Natural gas Oxygen from air				please specifiy e.g. medium voltage, provider, energy mix	
	Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs	Quantity per m2 of packaging product Quantity per m2 of packaging product		Origin Destination		
	Waste Ethyl acetate Electricity Natural gas Oxygen from air <b>Outputs</b> Energy (internally used)				please specifiy e.g. medium voltage, provider, energy mix	
	Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs				please specifiy e.g. medium voltage, provider, energy mix	
	Waste Ethyl acetate Electricity Natural gas Oxygen from air <b>Outputs</b> Energy (internally used)				please specifiy e.g. medium voltage, provider, energy mix	Source
olvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas Oxygen from air <b>Outputs</b> Energy (internally used)				please specifiy e.g. medium voltage, provider, energy mix	
Solvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas Oxygen from air <b>Outputs</b> Energy (internally used)	Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks	
olvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas Oxygen from air <b>Outputs</b> Energy (internally used)		Unit		please specifiy e.g. medium voltage, provider, energy mix	Source
olvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (internally used) Ermissions to air Inputs	Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks	Sourc
olvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas Oxygen from air Octputs Energy (internally used) Emissions to air Inputs Laminate	Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks	Sourc
olvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (internally used) Ermissions to air Inputs	Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks	Sourc
olvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas Oxygen from air Octputs Energy (internally used) Emissions to air Inputs Laminate Electricity	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Sourc
olvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas air Oxygen from air Outputs Energy (Internally used) Emissions to air Inputs Electricity Outputs	Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks	Sourc
olvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs H2 laminate	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Sourc
olvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas air Oxygen from air Outputs Energy (Internally used) Emissions to air Inputs Electricity Outputs	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Sourc
olvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs H2 laminate	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Sourc
olvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs H2 laminate	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Sourc
volvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs H2 laminate	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix	Sourc
volvent oxidation with energy recovery  Process 4  iltring  ransport [1]	Waste Ethyl acetate Electricity Natural gas a Oxygen from air Outputs Energy (Internally used) Emissions to air Inputs Laminate Electricity Outputs N2Jaminate Solid losses	Quantity per m2 of packaging product Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix Remarks	Sourc
volvent oxidation with energy recovery  Process 4  iltring  ransport [1]	Waste Ethyl acetate Electricity Natural gas Oxygen from air Octyput Energy (internally used) Emissions to air Inputs Laminate Electricity Outputs N2 Jaminate Solid losses	Quantity per m2 of packaging product Quantity per m2 of packaging product Quantity per m2 of packaging product Transport mode	Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks Remarks	Sourc
volvent oxidation with energy recovery  Process 4  iltring  ransport [1]	Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (internally used) Ene	Quantity per m2 of packaging product Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks please specifiy e.g. medium voltage, provider, energy mix Remarks	Sourc
Folvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas Oxygen from air Octiputs Energy (Internally used) Emissions to air Inputs Laminate Electricity Outputs N2Jaminate Solid losses Inputs PE CR pellets PE virgin pellets	Quantity per m2 of packaging product Quantity per m2 of packaging product Quantity per m2 of packaging product Transport mode	Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks Remarks	Sourc
Folvent oxidation with energy recovery	Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (internally used) Ene	Quantity per m2 of packaging product Quantity per m2 of packaging product Quantity per m2 of packaging product Transport mode	Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks Remarks	Sourc
Process 4 Process 4 Silitting	Waste Ethyl acetate Electricity Natural gas Oxygen from air Octiputs Energy (Internally used) Emissions to air Inputs Laminate Electricity Outputs N2Jaminate Solid losses Inputs PE CR pellets PE virgin pellets	Quantity per m2 of packaging product Quantity per m2 of packaging product Quantity per m2 of packaging product Transport mode	Unit	Destination Origin Destination	please specifiy e.g. medium voltage, provider, energy mix Remarks Please specifiy e.g. medium voltage, provider, energy mix Remarks Remarks Remarks	Source Source Source Source
	Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs Energy (Internally used) Energy (Internally used) Energy (Internally used) Electricity Inputs Electricity Outputs It2 Iaminate Electricity Outputs It2 Iaminate Solid Iosses Inputs PE PCR pellets PE Vrigin pellets *optional EVOH virgin pellets *optional	Quantity per m2 of packaging product Quantity per m2 of packaging product Quantity per m2 of packaging product Transport mode Lorry	Unit Unit Unit Unit	Destination Origin Destination Truck technology EURO 6	please specifiy e.g. medium voltage, provider, energy mix         Remarks         Please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         Please specifiy truck payload e.g. 3, 51-7, 51; 7, 51-161, 161-321, >321	

#### Loop 1- Detergent Tabs (HP2)

Figure 33 Loop 1 Detergent Tabs Laminate production data collection sheet (data in green tbd)



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#### Loop 1- Cosmetics (PCP1)

Process 1						
Blown film coextrusion	Inputs	Quantity per m2 of packaging product	Unit	Origin	Remarks	Source
	PE PCR pellets					
	PE virgin pellets					
	at					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
				1		
	0.1	0	Unit	Destination	Demode	C
	Outputs	Quantity per m2 of packaging product	Unit	Destination	Remarks	Source
	LDPE50 film					
	Solid losses					
D						
Process 2					- ·	
Printing	Inputs	Quantity per m2 of packaging product	Unit	Origin	Remarks	Source
	MDOPE25 film					
	Ink				please specifiy	
	Natural gas				please specifiy	
	Electricity				along an efficiency and the second data and the se	
	Ethyl acetate				please specifiy e.g. medium voltage, provider, energy mix	
	Outmute	Quantity nor m2 of norkoning product	11	Destination	Bemarke	Course
	Outputs	Quantity per m2 of packaging product	Unit	Destination	Remarks	Source
	ink/MDOPE40					_
	Waste Ethyl acetate					
	Solid losses			1		-
				1		-
<b>D</b>						
Process 3	terror te	Quantify a second of a set of a set		Out-the	Demonto	<b>C</b> -1
Adhesive lamination 1	Inputs	Quantity per m2 of packaging product	Unit	Origin	Remarks	Source
	ink/MDOPE40					
	MDOPE25 film				alares as attacked as done to the track of the	
	Solvent-based adhesive				please specifiy, add product data sheet if possible	
	Natural gas				along an efficiency and the second data and the se	
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	_
	Ethyl acetate					
	Primer coating					
	SiOx					_
						-
	0.1	0	11	De esta esta en		
	Outputs	Quantity per m2 of packaging product	Unit	Destination	Remarks	Source
	ink/MDOPE40 SiOx/primer laminate	Quantity per m2 of packaging product	Unit	Destination		Source
	ink/MDOPE40 SiOx/primer laminate Waste Ethyl acetate	Quantity per m2 of packaging product	Unit	Destination	Remarks please specifiy composition of residue e.g. 10% PP, 20% PET	Source
	ink/MDOPE40 SiOx/primer laminate	Quantity per m2 of packaging product	Unit	Destination		Source
	ink/MDOPE40 SiOx/primer laminate Waste Ethyl acetate	Quantity per m2 of packaging product	Unit	Destination		Source
Process 4	ink/MDOPE40 SIOx/primer laminate Waste Ethyl acetate Solid losses				please specifiy composition of residue e.g. 10% PP, 20% PET	
Process 4 Adhesive lamination 2	ink/MDOPE40 SiOx/primer laminate Waste Ethyl acetate Solid losses Inputs	Quantity per m2 of packaging product		Destination		Source
	ink/MD0PE40SIOx/primer laminate Waste Ethyl acetate Solid losses Inputs ink/MD0PE40SiOx/primer laminate				please specifiy composition of residue e.g. 10% PP, 20% PET	
	Ink/MDOPE40SIOx/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MDOPE40SIOx/primer laminate LDPE50 film				please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible	
	ink/MDOPE40SIOx/primer laminate Waste Ethyl acetate Solid Osses Inputs Ink/MODPE40SIOX/primer laminate LDPE50 film Solvent-based adhesive				please specifiy composition of residue e.g. 10% PP, 20% PET	
	ink/MD0PE40SIOx/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE40SIOx/primer laminate LDPE50 film Solvent-based adhesive Natural gas				please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible	
	ink/MDOPE40SIOx/primer laminate Waste Ethyl acetate Solid losses Inputs ink/MDOPE40SIOx/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity				please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible	
	ink/MD0PE40SIOx/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE40SIOx/primer laminate LDPE50 film Solvent-based adhesive Natural gas				please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible	
	ink/MD0PE40SIOx/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE40SIOx/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate	Quantity per m2 of packaging product	Unit	Origin	please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix	Source
	ink/MODEF4050A/primer laminate Waste Ehrly acetate Solid losses inputs ink/MODEF405IOA/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Ethyl acetate Outputs			Origin	please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible	
	Ink/MD0PE40S0/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE40SIOx/primer laminate LDPE50film Solvent-based adhesive Natural gas Electricity Ethyl acetate Outputs Laminate	Quantity per m2 of packaging product	Unit	Origin	please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix Remarks	Source
	ink/MD0PE40SIOx/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE40SIOX/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Outputs Laminate Waste Ethyl acetate	Quantity per m2 of packaging product	Unit	Origin	please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix	Source
	Ink/MD0PE40S0/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE40SIOx/primer laminate LDPE50film Solvent-based adhesive Natural gas Electricity Ethyl acetate Outputs Laminate	Quantity per m2 of packaging product	Unit	Origin	please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix Remarks	Source
Adhesive lamination 2	ink/MD0PE40SIOx/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE40SIOX/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Outputs Laminate Waste Ethyl acetate	Quantity per m2 of packaging product	Unit	Origin	please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix Remarks	Source
Adhesive lamination 2	Ink/MODEF4050A/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MODEF4050A/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Outputs Laminate Waste Ethyl acetate Solid losses	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy composition of residue e.g. 10% PP, 20% PET	Source
Adhesive lamination 2	Ink/MD0PE40SOv/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE40SIOx/primer laminate LDPE50film DDPE50film Solvent-based adhesive Natural gas Electricity Ethyl acetate Solid losses Inputs Inputs	Quantity per m2 of packaging product	Unit	Origin	please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix Remarks	Source
Adhesive lamination 2	Ink/MODEF4050A/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MODEF4050A/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Outputs Laminate Waste Ethyl acetate Solid losses Inputs Waste Ethyl acetate	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy composition of residue e.g. 10% PP, 20% PET Remarks	Source
Adhesive lamination 2	ink/MD0PE40SOv/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE40SIOx/primer laminate LDPES0film Kolvent-based adhesive Natural gas Electricity Ethyl acetate Solid Laminate Waste Ethyl acetate Electricity Ethyl acetate Electricity Ethyl acetate Electricity Electric	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy composition of residue e.g. 10% PP, 20% PET	Source
Adhesive lamination 2	Ink/MODEF4050C/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MODEF4050S0X/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Cotputs Laminate Waste Ethyl acetate Solid losses Inputs Waste Ethyl acetate Electricity Waste Ethyl acetate Electricity Natural gas	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy composition of residue e.g. 10% PP, 20% PET Remarks	Source
Adhesive lamination 2	ink/MODEF4050x/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MODEF4050x/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Ethyl acetate Solid losses Inputs Waste Ethyl acetate Electricity RWaste Ethyl acetate Electricity Natural gas Oxygen from air	Quantity per m2 of packaging product	Unit	Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET  Remarks  please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy composition of residue e.g. 10% PP, 20% PET  Remarks  please specifiy e.g. medium voltage, provider, energy mix	Source Source
Adhesive lamination 2	Ink/MD0PE40SIOx/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE40SIOx/primer laminate LDPE50 film Solvent-based adhesive Natural gas Outputs Laminate Waste Ethyl acetate Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs	Quantity per m2 of packaging product Quantity per m2 of packaging product	Unit	Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET Remarks please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix Remarks please specifiy composition of residue e.g. 10% PP, 20% PET Remarks	Source
Adhesive lamination 2	ink/MODEF4050A/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MODEF4050A/primer laminate LDFE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Ethyl acetate Solid losses Inputs Imputs Inputs Input	Quantity per m2 of packaging product	Unit	Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET  Remarks  please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy composition of residue e.g. 10% PP, 20% PET  Remarks  please specifiy e.g. medium voltage, provider, energy mix	Source Source
	Ink/MD0PE40SIOx/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE40SIOx/primer laminate LDPE50 film Solvent-based adhesive Natural gas Outputs Laminate Waste Ethyl acetate Solid losses Inputs Waste Ethyl acetate Electricity Natural gas Oxygen from air Outputs	Quantity per m2 of packaging product	Unit	Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET  Remarks  please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy composition of residue e.g. 10% PP, 20% PET  Remarks  please specifiy e.g. medium voltage, provider, energy mix	Source Source
Adhesive lamination 2	ink/MODEF4050A/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MODEF4050A/primer laminate LDFE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Ethyl acetate Solid losses Inputs Imputs Inputs Input	Quantity per m2 of packaging product	Unit	Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET  Remarks  please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy composition of residue e.g. 10% PP, 20% PET  Remarks  please specifiy e.g. medium voltage, provider, energy mix	Source Source
Adhesive lamination 2	ink/MODEF4050A/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MODEF4050A/primer laminate LDFE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Ethyl acetate Solid losses Inputs Imputs Inputs Input	Quantity per m2 of packaging product	Unit	Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET  Remarks  please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy composition of residue e.g. 10% PP, 20% PET  Remarks  please specifiy e.g. medium voltage, provider, energy mix	Source Source
Adhesive lamination 2 Process 2:-4.1 Solvent oxidation with energy recovery Process 4	Ink/MDOBE40.50A/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MDOBE40.50A/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Outputs Laminate Waste Ethyl acetate Solid losses Inputs Inputs Instard gas Oxygen from air Oxygen from air Energy (Internally used) Emissions to air	Quantity per m2 of packaging product	Unit	Origin Destination Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks	Source Source Source
Adhesive lamination 2 Process 2-4.1 Solvent oxidation with energy recovery Process 4	ink/MD0F4030A/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0F4050A/primer laminate UDF50 film Solvent-based adhesive Natural gas Utyl acetate Utyl acetate Utyl acetate Utyl acetate Iaminate Waste Ethyl acetate Solid losses Inputs Input	Quantity per m2 of packaging product	Unit	Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET  Remarks  please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix  Remarks  please specifiy composition of residue e.g. 10% PP, 20% PET  Remarks  please specifiy e.g. medium voltage, provider, energy mix	Source Source
Adhesive lamination 2 Process 2:-4.1 Solvent oxidation with energy recovery Process 4	ink/MD0PE40S0/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE40SIOx/primer laminate LDPE50 film LDPE50 film Solvent-based adhesive Natural gas Inputs Inputs Ethyl acetate Electricity Energy (internally used) Emissions to air Inputs Input In	Quantity per m2 of packaging product	Unit	Origin Destination Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks	Source Source Source
Adhesive lamination 2 Process 2:-4.1 Solvent oxidation with energy recovery Process 4	ink/MD0F4030A/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0F4050A/primer laminate UDF50 film Solvent-based adhesive Natural gas Utyl acetate Utyl acetate Utyl acetate Utyl acetate Iaminate Waste Ethyl acetate Solid losses Inputs Input	Quantity per m2 of packaging product	Unit	Origin Destination Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks	Source Source Source
Adhesive lamination 2 Process 2:-4.1 Solvent oxidation with energy recovery Process 4	ink/MD0PE4050x/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE4050x/primer laminate LDPE50 film Solvent-based adhesive Natural gas Outputs Laminate Ethyl acetate Solid losses Inputs Inputs Inputs Inputs Iaminate Etectricity Ethyl acetate Etectricity Eteryl acetate Et	Quantity per m2 of packaging product	Unit Unit Unit Unit	Origin Destination Origin Origin Origin	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix	Source Source Source Source
Adhesive lamination 2 Process 2:-4.1 Solvent oxidation with energy recovery Process 4	ink/MODEF4050Cr/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MODEF4050Cr/primer laminate LDPE50film Solvent-based adhesive Natural gas Electricity Ethyl acetate Outputs Iaminate Waste Ethyl acetate Solid losses Inputs Electricity Electricity Electricity Emissions to air Inputs Iaminate Electricity Outputs Outputs Outputs	Quantity per m2 of packaging product	Unit	Origin Destination Origin Destination	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks	Source Source Source
Adhesive lamination 2 Process 24.1 Solvent oxidation with energy recovery Process 4	ink/MD0PE4030x/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE4030x/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Ethyl acetate Solid losses Inputs Iaminate Electricity Natural gas Oxygen from air Outputs Iaminate Electricity Electri	Quantity per m2 of packaging product	Unit Unit Unit Unit	Origin Destination Origin Origin Origin	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix	Source Source Source Source
Adhesive lamination 2 Process 2:-4.1 Solvent oxidation with energy recovery Process 4	ink/MODEF4050Cr/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MODEF4050Cr/primer laminate LDPE50film Solvent-based adhesive Natural gas Electricity Ethyl acetate Outputs Iaminate Waste Ethyl acetate Solid losses Inputs Electricity Electricity Electricity Emissions to air Inputs Iaminate Electricity Outputs Outputs Outputs	Quantity per m2 of packaging product	Unit Unit Unit Unit	Origin Destination Origin Origin Origin	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix	Source Source Source Source
Adhesive lamination 2 Process 2:-4.1 Solvent oxidation with energy recovery Process 4	ink/MD0PE4030x/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE4030x/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Ethyl acetate Solid losses Inputs Iaminate Electricity Natural gas Oxygen from air Outputs Iaminate Electricity Electri	Quantity per m2 of packaging product	Unit Unit Unit Unit	Origin Destination Origin Origin Origin	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix	Source Source Source Source
Adhesive lamination 2 Process 2-4.1 Solvent oxidation with energy recovery Process 4 Slitting	ink/MD0PE4030x/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MD0PE4030x/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Ethyl acetate Solid losses Inputs Iaminate Electricity Natural gas Oxygen from air Outputs Iaminate Electricity Electri	Quantity per m2 of packaging product	Unit Unit Unit Unit	Origin Destination Origin Origin Origin	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix	Source Source Source Source
Adhesive lamination 2 Process 2-4.1 Process 2-4.1 Process 4	ink/MODEF4050A/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MODEF4050A/primer laminate LDFE50 film Solvent-based adhesive Natural gas Uptyl acetate Ethyl acetate Uptyl acetate Solid losses Inputs Input Inp	Quantity per m2 of packaging product	Unit Unit Unit Unit Unit	Origin Destination Origin Origin Destination Origin	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix	Source Source Source Source Source Source Source
Adhesive lamination 2 Process 2-4.1 Solvent oxidation with energy recovery Process 4 Slitting	ink/MDOPE40S0x/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MDOPE40S0x/primer laminate LDPE50 film Solvent-based adhesive Natural gas Uationate Laminate Laminate Laminate Laminate Electricity Electricity Electricity Energy (internally used) Emissions to air Inputs Laminate Electricity Electricity Energy (internally used) Emissions to air Inputs Laminate Solid losses Laminate Laminate Solid losses Laminate Lam	Quantity per m2 of packaging product	Unit Unit Unit Unit Unit	Origin Destination Origin Origin Origin	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix	Source Source Source Source Source Source Source Source
Adhesive lamination 2 Process 2-4.1 Solvent oxidation with energy recovery Process 4 Slitting	ink/MODEF4050A/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MODEF4050A/primer laminate LDFE50 film Solvent-based adhesive Natural gas Uptyl acetate Ethyl acetate Uptyl acetate Solid losses Inputs Input Inp	Quantity per m2 of packaging product	Unit Unit Unit Unit Unit	Origin Destination Origin Origin Destination Origin Destination Truck technology	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix	Source Source Source Source Source Source Source
Adhesive lamination 2 Process 2-4.1 Solvent oxidation with energy recovery Process 4 Slitting	ink/MDOPE40S0x/primer laminate Waste Ethyl acetate Solid losses Inputs Ink/MDOPE40S0x/primer laminate LDPE50 film Solvent-based adhesive Natural gas Uationate Laminate Laminate Laminate Laminate Electricity Electricity Electricity Energy (internally used) Emissions to air Inputs Laminate Electricity Electricity Energy (internally used) Emissions to air Inputs Laminate Solid losses Laminate Laminate Solid losses Laminate Lam	Quantity per m2 of packaging product	Unit Unit Unit Unit Unit	Origin Destination Origin Origin Destination Origin Destination Truck technology	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix	Source Source Source Source Source Source Source Source
Adhesive lamination 2 Process 2-4.1 Solvent oxidation with energy recovery Process 4 Slitting	ink/MODEF4050X/primer laminate Waste Ethyl acetate Solid losses  inputs ink/MODEF4050X/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Outputs Laminate Waste Ethyl acetate Electricity Natural gas Outputs Laminate Cotputs Electricity Electricity Electricity Emissions to air  inputs Electricity Outputs Electricity Outputs Electricity Outputs Electricity Outputs Electricity	Quantity per m2 of packaging product	Unit Unit Unit Unit Unit Unit Unit Unit	Origin Destination Origin Destination Origin Destination Truck technology EURO 6	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >3	Source Source Source Source Source Source Source Source
Adhesive lamination 2 Process 2-4.1 Solvent oxidation with energy recovery Process 4 Slitting Transport (T) T1	ink/MODEF4050X/primer laminate Waste Ethyl acetate Solid losses  inputs ink/MODEF4050X/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Outputs Laminate Waste Ethyl acetate Electricity Natural gas Outputs Laminate Cotputs Electricity Electricity Electricity Emissions to air  inputs Electricity Outputs Electricity Outputs Electricity Outputs Electricity Outputs Electricity	Quantity per m2 of packaging product	Unit Unit Unit Unit Unit Unit Unit Unit	Origin Destination Origin Origin Destination Origin Destination Truck technology	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix	Source Source Source Source Source Source Source Source
Adhesive lamination 2	ink/MODEF4050Cr/primer laminate Waste Ethyl acetate Solid losses  inputs ink/MODEF4050Cr/primer laminate LDPE50 film Solvent-based adhesive Natural gas Electricity Ethyl acetate Cotputs Laminate Solid losses  inputs Energy (internally used) Emissions to air  inputs Electricity Cotputs Electricity Cotputs Electricity Electricity Cotputs Energy (internally used) Emissions to air  inputs Electricity Cotputs Electricity Cotputs Electricity Energy (internally used) Emissions to air  inputs Electricity Cotputs PC1 laminate Electricity Cotputs PC1 laminate Electricity Cotputs Energy (internally used) Emissions to air Electricity Cotputs PC1 laminate Electricity Cotputs PC1 laminate Electricity Cotputs PC1 laminate Electricity Cotputs PC1 laminate Electricity PC1 laminate PC1	Quantity per m2 of packaging product         Quantity per m2 of packaging product	Unit Unit Unit Unit Unit Unit Unit Unit	Origin Destination Origin Destination Origin Destination Truck technology EURO 6	please specifiy composition of residue e.g. 10% PP, 20% PET         Remarks         please specifiy, add product data sheet if possible         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy e.g. medium voltage, provider, energy mix         Remarks         please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >3	Source

Figure 34 Loop 1 Cosmetics Laminate production data collection sheet





#### Tracer production-POLY

#### <u>Loop 3</u>

Process 1						
Sinter process	Inputs	Quantity per	Unit	Origin	Remarks	Source
	Diyttriumtrioxide Y2O3					
	Diytterbiumtrioxide Yb2O3					
	Dierbiumtrioxide Er2O3					
	Diholmiumtrioxide Ho2O3					
	Sulphure S					
	Sodiumcarbonate Na2CO3					
	Tripotassiumphosphate K3PO4					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per	Unit	Destination	Remarks	Source
	Diyttriumdioxysulphide					
	Sodium sulphite					
	Sodium sulphate					
	Sodium phosphate					
	SO2 emissions					
Process 2	Innute	Quantity nor	Unit	Origin	Remarks	Source
Product washing	Inputs Diyttriumdioxysulphide	Quantity per	Unit	Origin	11011101153	Source
	Sodium sulphite				please specifiy e.g. medium voltage, provider, energy mix	
	Sodium sulphate				please specify e.g. medium vortage, provider, energy mix	
	Sodium phosphate					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per	Unit	Destination	Remarks	Source
	Diyttriumdioxysulphide					
	Wastewater				please specifiy composition of residue e.g. 10% PP, 20% PET	
Process 3						
Gas washing	Inputs	Quantity per	Unit	Origin	Remarks	Source
-	SO2 emissions			-		
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Water				p	
	Outputs	Quantity per	Unit	Destination	Remarks	Source
	Wastewater					
	SO2 emissions (below TA Luft 5.2.4.)					
Γransport (T) Γ1	Inputs	Transport mode	Unit	Truck technology	Remarks	Source
	Diyttriumtrioxide Y2O3		km	EURO 5		Jource
		Lorry	KII	EURU 5	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	
	Divtterbiumtrioxide Yb2O3					
	Dierbiumtrioxide Er2O3		-			
	Diholmiumtrioxide Ho2O3		-			
	Sulphure S					
	Sodiumcarbonate Na2CO3					
12	Sodiumcarbonate Na2CO3	Transport mode	Unit	Truck technology	Remarks	Source

Figure 35 Loop 3 Tracer production data collection sheet





#### Ink and Primer production-Siegwerk

#### Loop 1-3 Ink

Dispersion	Inputs	Quantity per kg	Unit	Origin	Remarks	Source
	Nitrocellulose					
	Polyurethan					
	Pigment C or M or Y or K					
	Additives					
	Ethanol					
	Ethylacetat					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Water					
			_			
	Outputs	Quantity per kg	Unit	Destination	Remarks	Source
			_			
Process 2						
Blending	Inputs	Quantity per kg	Unit	Origin	Remarks	Source
<u> </u>	Dispersion					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
					, , ,	
	Outputs	Quantity per kg	Unit	Destination	Remarks	Source
	Outputs Ink	Quantity per kg	Unit	Destination	Remarks	Source
		Quantity per kg	Unit	Destination	Remarks	Source
Transport (T)		Quantity per kg	Unit	Destination	Remarks	Source
		Quantity per kg	Unit	Destination Truck technology	Remarks Remarks	Source
	Ink					
Transport (T) T1	Ink	Transport mode	Unit	Truck technology	Remarks	
	Ink	Transport mode	Unit	Truck technology	Remarks	

Figure 36 Loop 1-3 Ink production data collection sheet

#### Loop 3 Primer

Process 1						
Blending	Inputs	Quantity per kg	Unit	Origin	Remarks	Source
	Acrylate resin					
	Water					
	Electricity				please specifiy e.g. medium voltage, provider, energy mix	
	Outputs	Quantity per kg	Unit	Destination	Remarks	Source
	Primer					
			_			
Transport (T)						
T1	Inputs	Transport mode	Unit	Truck technology	Remarks	Source
		Lorry	km	EURO 6	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	
T2	Inputs	Transport mode	Unit	Truck technology	Remarks	Source
		Lorry	km	EURO 6	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	

Figure 37 Loop 3 Primer production data collection sheet





# Food packaging production-Nestle Loop 2 and 3

	Inputs	Quantity per year	Quantity per ton	Unit	Origin	Remarks	Source
	inputs	Quantity per year	Quantity per ton	Unit	Ungin	Remarks	Source
						please specifiy e.g. medium voltage, provider, energy mix, provider, energy mix	
	Outputs	Quantity per year	Quantity per ton	Unit	Destination	Remarks	Source
Fransport (T)							
т1	Inputs	Transport mode	Distance	Unit	Truck technology	Remarks	Source
		Lorry		km	EURO 6	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	
T2	Inputs	Transport mode	Distance	Unit	Truck technology	Remarks	Source
		Lorry		km	EURO 6	please specifiy truck payload e.g. 3,5t-7,5t; 7,5t-16t, 16t-32t, >32t	

Figure 38 Loop 2-3 Food packaging production data collection sheet

