Checklist Design for **Recycling**

Project

Project name	**Example "Yoghurt Pot"**
Project number	040 – 39 1002 – 0
Project manager	Schweig / Zimmermann
Date	01.02.2018

Initial situation: An existing K3-Pot (3 Component-Pot) with the following specifications is to be (eco-) re-designed. The strategic element "Design for Optimised Ressource Use" has already been applied and provides 5 input options for this strategic element -> see the following overview

Initial situation: K3-Pot (3 Component-Pot) with the following specifications

- Yoghurt Pot 500ml, K3-System
- Lid: Aluminiumfoil, 30µm printed, weight 0,8g
- Sealing lacquer: 2g/m²
- Pot: PS-thermoformed, 6,4g unprinted
- Paper sleeve: White lined chipboard ~240g/m². Weight 7,8g

RESULTS FROM CHECKLIST OPTIMISED RESOURCE USE

K3-Pot

1. Inner-Pot made of PP
2. Inner-Pot made of Chalk-Plastic: PP and CaCO3,

All-Plastic Pot

3. PS-All-Plastic Pot
4. PP-All-Plastic Pot
5. Chalk-Plastic Pot: PP and CaCO3

Question	Explanation	Instructions	Documentation of results
Step 1: Reviewing the underlying framework conditions			
Is there a functioning waste collection system in the supply region?	An (orderly) waste collection system is a prerequisite for subsequent recycling. One general indicator of functioning waste disposal can, for instance, be that more than 90 per cent of household waste (incl. packaging) can be disposed of in an orderly manner.	If **YES**: continue. If **NO**: reconsider the decision to deliver to the region. Set up a private collection system (for example, a private deposit system). If necessary, state reasons and continue.	***Yes*** *(Reference region is Germany)*
Are plastics in the total packaging waste material being sorted into separate fractions for recycling?	Answer with YES if most of the packaging is sorted into separate fractions for recycling. If no sorting takes place, proceed with step 3	If **YES**: continue. If **NO**: consider setting up your own sorting/collection system. Check whether there may be an incentive for establishing sorting and recycling processes in the supply region through the use of *recycling ready* packaging *(i.e. strict application of step 2)*. Depending on regional disposal structures, packaging should also be designed for energy production *(i.e. application of step 3)* or in the case of poorly developed forms of disposal with exceptionally low levels of pollutants *(i.e. application of step 4)*.	***Yes***
Is there an established recycling stream for the main plastic material (in the recovery region)?	An existing recycling stream is the prerequisite for recycling. Question can be answered with YES, if at least 50% of the material can be assigned to an existing recycling stream.	If **YES**: continue (*step 2)*. If **NO**: select another primary plastic material for which a recycling stream exists in the supply region. Then continue (*step 2)*.	***Yes*** *(see RecyClass/ PRE)*

Question	Explanation	Instructions	Documentation of results
Step 2: Reviewing Recyclability			
Have readability and comprehensibility of information on the packaging regarding proper disposal been improved?	Relevant information contributes to the correct disposal of the packaging.	If **YES**: document changes made and continue. If **NO**: state reasons.	***Yes**: Clear information text "tear open here for recycling and dispose separately" (separation of cardboard/plastic to ensure sortability)*
Is the surface of the packaging designed in such a way that the consumer/user can identify it as plastic?	Only if the consumer / end user is able to identify the packaging as plastic, a correct disposal (as plastic) possible.	If **YES**: document changes made and continue. If **NO**: state reasons.	***No**: Paper touch / will not be further adapted, as info text complements it (see previous step)*
Has (if necessary) the surface of the packaging been adapted to enable sorting into the plastics fraction?	Correct sorting is a requirement for recycling.	If **YES**: document changes made and continue. If **NO**: state reasons.	*Only if the consumer really separates. This should be ensured by clear information*
Can other polymers be used in order to increase recyclability?	Certain polymers are recycled rather than others, for example PE-HD, PE-LD, PP, PET	If **YES**: document changes made and continue. If **NO**: state reasons.	***Yes**, by using PP* *A) instead of PS* *B) instead of PP-CaCO3* *for both K3-pots as well as all-plastic pots*
Can the number of different polymers (taking the previous question into account) be reduced?	Reducing the number and ensuring the separability of different polymers increases recyclability?	If **YES**: document changes made and continue. If **NO**: state reasons.	*Not relevant.*
Have material combinations that are incompatible with recycling been avoided?	To increase recyclability, certain material combinations should be avoided (incompatible PET -types, certain polymer combinations, ...)	If **YES**: document changes made and continue. If **NO**: state reasons.	*Not relevant.*
Has the pigmentation or dyeing of the packaging been reduced?	Unpigmented polymers are more valuable than pigmented ones. Certain colorings (carbon black) can prevent sorting	If **YES**: document changes made and continue. If **NO**: state reasons.	*White must be retained as color (excluded regarding design leeway).*
Has the pollution of the recycling material stream with	To increase recyclability, this kind of pollution should be avoided.	If **YES**: document changes made and continue. If **NO**: state reasons.	***Yes**, by printing of the sleeve*

Question	Explanation	Instructions	Documentation of results
dyes, glues and foreign material residue been reduced?			
Has a compartmentalised design of the packaging been avoided?	Small pieces (<2cm) are typically sorted out and not recycled	If **YES**: document changes made and continue. If **NO**: state reasons.	*Yes*.
Has it been determined that the packaging was recycling ready?	After the adjustments of the design the recyclability has to be checked. For this purpose external tools (e.g. RecyClass, Cotrep, Recoup or others see toolbox) or external support (e.g. Cyclos-htp or others) can be used.	If **YES**: the packaging has a recycling-ready design. If **NO**: if necessary, modify the key requirements or review the design leeway and carry out recursion. Otherwise, the packaging is not recycling ready.	*K3-Pot with inner PP-Pot:* *Class C (RecyClass) (by separating the sleeve, otherwise F)* *PP-All-Plastic Pot* *Class C (RecyClass)* *(a better result is prevented by the white color)*

Question	Explanation	Instructions	Documentation of results
Step 3: Reviewing Energy Recovery Useability			
Is packaging waste sorted into a fraction intended for energy recovery in corresponding plants (waste-to-energy)?		If **YES**: continue. If **NO**: Eliminate pollution and check / implement other Eco design elements e.g. optimized resource usage	No.
Has the calorific value/CED ratio of the packaging been checked?	The ratio of the calorific value resulting from the energetic use to the cumulative energy expenditure which was required for the production of the packaging gives an appropriate orientation as to whether a relevant share of energy is recovered in the energetic use. If calorific value> 50% KEA, then Ok.	For a calorific value/CED **>50%:** the packaging is able to make a worthwhile contribution to energy recovery when used in appropriate plants. For calorific value / CED: **<50%:** continue.	Not relevant.
Can the share of materials with a low caloric value–CED ratio be reduced?	If caloric value >50% CED, then YES.	If **YES**: carry out the new design and check the calorific value–CED ratio again. If **NO**: the packaging is not making any real contribution to energy recovery.	Not relevant.

Result:

- **K3-Pot with inner PP-Pot**
- **PP-All-Plastic Pot**
- **Clear information text for proper (separate) disposal of pot and sleeve**