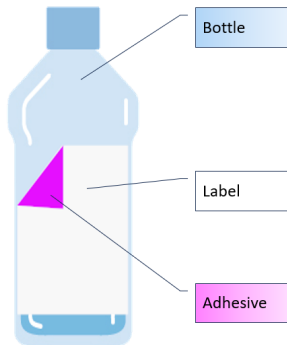# Kennisinstituut Duurzaam Verpakken

Assessment framework for the test-protocol for the releasability of plastic labels from rigid PP and PE packaging in the recycling process:

Introduction

Commissioned by the KIDV, the NTCP has drawn up a test protocol to test the removability of glued labels on PE and PP packaging in a common recycling process. Tests, at both industrial- and lab-scale, confirm that this protocol is representative of industrial recycling processes.

The following situations can occur when assessing whether a container/adhesive/label combination is properly recyclable according to this test protocol:

1. The container/adhesive/label combination has tested positive according to the protocol. This result is reliable.
2. The combination is identical to a previously tested combination and is recyclable in practice.
3. The combination is identical to a previously tested combination, but is not recyclable in practice due to unidentified variables.
4. The combination deviates from a previously tested combination and should be retested.

Situations 1 and 4 are self-explanatory.
Situations 2 and 3 are harder to estimate due to the limited description of released containers, specifically:

- A limited description of the material of the container with the only options being PE or PP;
- A limited description of the bonding with only type designation of the adhesive, with its global adhesive strength values not tested on PE or PP, but on reference materials such as glass or metal;
- A limited description of the material of the label; such as paper, (LD)PE, (O)PP.

There are variables that are not included in the test results but may still affect label removability significantly. This assessment framework helps determine which packaging can or cannot be released according to existing test results.

Purpose of the assessment framework:

The KIDV wants to avoid having to test all PE and PP packaging separately to demonstrate label removability, which would unnecessarily burden our testing capacity. We also want to avoid unjustified approval of packaging, which could disrupt the recycling process. This framework should minimise the risk of misjudgments and indicate which container/adhesive/label combinations should be tested separately. The framework should:

- Enable producers and material suppliers to determine whether testing is necessary,
- Help account managers find out during audits whether a packaging was rightly or wrongly not tested - increasing the level of knowledge on label removability,
- Be available for the 2024 declaration.

Problem statement:

Little is known about the variables and their impact on label removability. Research is needed, but it is unlikely that sufficient knowledge will be available before the 2024 annual declaration. The current specifications of the three components (container, adhesive and label) offer little insight into the variables, and there are no standardised descriptions for comparison.

In the past, releases have been based entirely on the limited information available, and recyclers report that this requires them to put extra effort into removing labels. And test results show that packaging that looks identical on paper produces different results in practice.

Launch of the Assessment Framework:

Short term (2024 declaration)

- The assessment framework is added directly to the disposal protocol and is available via the protocols page on the KIDV website
- New tests must complete the marked variables from Figure 2 and add them to the test results
- Adhesive manufacturers must have their adhesives tested according to the protocol.
- Packages within the indicated ranges of the marked variables are marked as removable, with a disclaimer that retesting is required if further investigation shows that one or more of the unmarked variables affect the result. - Available test results are displayed via the protocols page on the KIDV website.

	Base material*
Bottle	Packaging form*
	Material thickness label area*
	Production process*
	Surface roughness label area
	Coatings treatments and additives

| Label | Base material / bonding layer* |
| | Material thickness* |

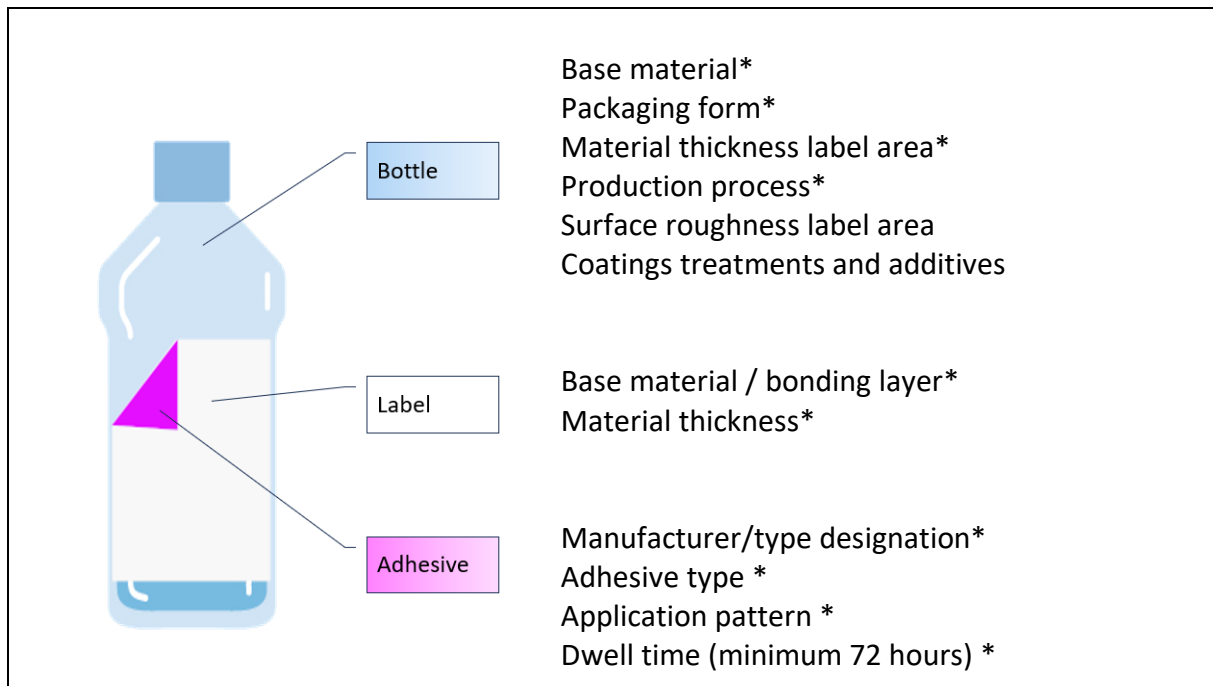| Adhesive | Manufacturer/type designation* |
	Adhesive type *
	Application pattern *
	Dwell time (minimum 72 hours) *

Figure 2: Overview of variables
Marked parameters are required to be displayed with the test results. Non-marked parameters are tested separately on behalf of the KIDV. Parameters affecting removability will be marked as mandatory in the next Recycle check update .

Longer term:
- In corporation with NTCP, conditions will be laid down that a test set-up must meet in order to have tests performed by multiple certified test labs
- Cooperation with Recyclass will be investigated
- An external Chain Knowledge Group (KKG) will be set up to broaden knowledge about recyclability and adhesives/labels. This group will periodically coordinate with the KIDV and NTCP.
- An interactive database will be developed in which released container/adhesive/label combinations will be documented. This database will be managed by the KIDV.

This assessment framework is essential for improving recycling processes and minimizing the burden on testing capacity.