Design for Recycling (D4R)

Polyco D4R Guidelines

HDPE

High-density Polyethylene (HDPE) Packaging

Why Design Products for Recyclability?

As a packaging designer, you play a key role in creating packaging that is good for the product, good for people, and good for the planet.

These Design for Recycling (D4R) guidelines have been created to help you to make the best decisions when choosing how to design packaging that keeps the planet in mind. Designing packaging that can be easily recycled keeps that packaging out of landfill and out of the environment. Recyclable packaging re-enters the recycling value chain and can be used again and again, protecting and preserving the natural world.

These guidelines show you which materials are best to use, which materials should be avoided, and what quality criteria to factor in to ensure that your packaging can continue to be recycled in the highest grade possible.

Designing packaging for recyclability does not mean that you have to sacrifice quality or performance. By using these guidelines you will see that you can achieve high quality packaging and recyclability at the same time.

High-density Polyethylene (HDPE) Packaging

BASIC PRINCIPLES

Ideally:

- Natural or white.
- Caps and closures in HDPE.
- Labels that can be removed easily.
- Water-soluble adhesives.
- All PP components (caps, labels, handles and other) must be less than 5% of container weight.
- Easily identifiable with clear, legible material identification codes.

Avoid:

- Silicone gaskets.
- Metal closures or inserts.

Contents

1 Blow Moulded Bottles, Drums and Jars

BASIC PRINCIPLES

Implementing these basic design principles will ensure that your HDPE bottles, drums and jars are picked for recycling.

Ideally:

- Polymer should be natural or white.
- Labels that can be removed easily.
- Caps and closures should also be HDPE.
- Adhesives should be water-soluble.
- If PP components (caps, labels, other) are being used, this must be less than 5% of the container's mass.

Avoid:

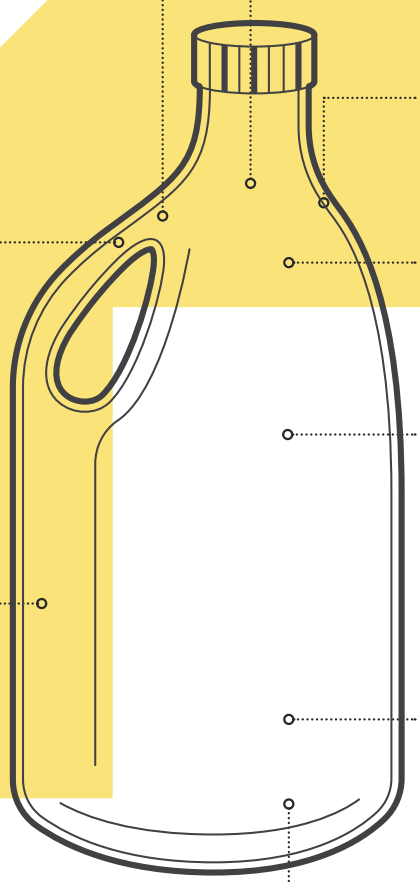
- Silicone gaskets.
- Metal closures or inserts.

QUALITY CRITERIA

Know what to factor in to ensure that your packaging can continue to be recycled in the highest grade possible.

- Natural, white- or cream-coloured products are desired above other colours.
- Once colour is added (in the material or printed on) it cannot be removed.
- Natural, white- or cream-coloured products give a light-coloured recyclate.
- Light-coloured recyclate can be used for light-coloured or pigmented products.
- Printing, shrink sleeves (of the same density) or IML's cancel the light colour and result in dark grey or black recyclate.
- Dark recyclate can only be used for black products.
- The colour and the strength of the polymer deteriorate with every recycling cycle.
- Only extrusion grade to be used.
- Ensure legible and correct material identification codes are moulded in on all components.

HDPE Bottles, Drums or Jars*



COLOUR
- Natural or White
- Any other colour

MATERIAL
- Natural or white recycled content
- Pure extrusion–grade HDPE recyclate; some LDPE and LLDPE content allowed
- Grey or darker coloured recycled content
- Recycled content with PP contamination

CAP / CLOSURE
- HDPE same colour
- PP, HDPE different colour
- Metal

CAP LINERS
- PE-E
- Paper, Board, PS-E, PP-E

TAMPER EVIDENT SEALS
- HDPE
- PP, PET, PVC

DISPENSERS
- HDPE mono-material (same colour)
- LDPE, PP and HDPE (different colour) components
- Containing metal inserts

LABEL
- Paper with water-soluble glue
- PP (IML or other)

SLEEVE
- PET, PVC
- LDPE, PP

PRINTING
- Direct printing on container

CONTENTS
- Non-water-soluble residue, e.g. silicon, enamel paints, etc

MULTI-LAYER CONSTRUCTION
- Same colour different HDPE layers
- Different colour HDPE layers
- Containing barrier layer, e.g. E/VAL

ADDITIVES
- Fillers, e.g. $CaCO_3$ (overall container density to remain less than 1 g/cc)
- Oxo-biodegrad-able additives

KEY:
- popular for recycling and will be widely collected and processed
- widely recycled; less popular
- not recycled

* Generic example and represents all bottles, drums and jars

2 Injection Moulded Crates, Bins, Trays and Buckets

BASIC PRINCIPLES

Implementing these basic design principles will ensure that your HDPE crates, bins, trays and buckets are picked for recycling.

Ideally:

- All components should be HDPE, including lids, handles and hinges.
- Adhesives for labels should be water soluble.

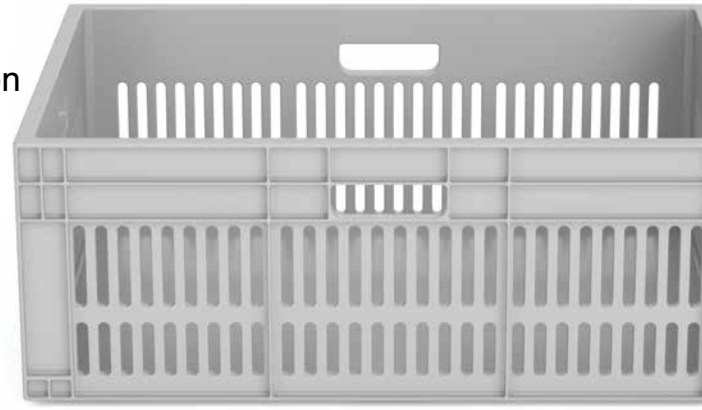
Avoid:

- Metal axels, inserts or brackets.
- Swopping moulds between PP and HDPE.
- Printed shrink labels that are of the same density.

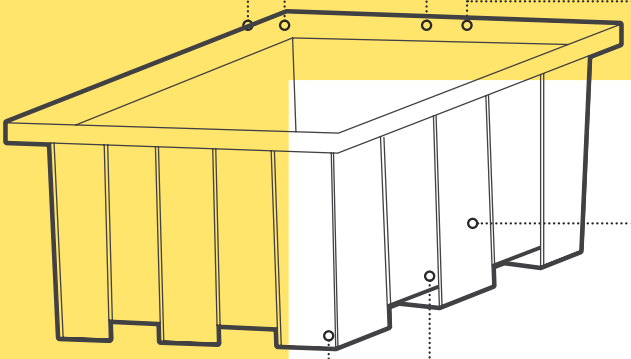
QUALITY CRITERIA

Know what to factor in to ensure that your packaging can continue to be recycled in the highest grade possible.

- White, cream or natural coloured products give a light-coloured recyclate.
- Light-coloured recyclate can be used for light-coloured or pigmented products.
- Printing, shrink sleeves (of the same density) or IML's cancel the light colour and result in dark grey or black recyclate.
- Dark recyclate can only be used for black products.
- The colour and the strength of the polymer deteriorate with every recycling cycle.
- Only injection grade to be used.
- Ensure legible and correct material identification codes are moulded on all components.



HDPE Crates, Bins, Trays or Buckets*



COLOUR
- Natural or White
- Any other colour

MATERIAL
- Natural or white recycled content
- Pure injection–grade HDPE recyclate; some LDPE and LLDPE content allowed
- Grey or darker coloured recycled content
- Recycled content with PP contamination

LID
- HDPE same colour
- PP, HDPE different colour

HINGE
- HDPE
- PP
- Metal

KNOB / HANDLE
- HDPE same colour
- PP, HDPE different colour, PET, PVC

WHEELS
- HDPE injection moulded
- HDPE hollow, blow moulded
- PVC, Nylon, PP, Metal

AXLE
- Metal

LABEL
- Paper with water-soluble glue
- PP (IML or other)
- RFID tracking code

PRINTING
- Direct printing on container

INSERTS or HANDLE
- HDPE, same colour
- PP, HDPE different colour
- Metal

ADDITIVES
- Fillers, e.g. $CaCO_3$ (overall container density to remain less than 1 g/cc)
- Oxo-biodegradable additives
- Non-HDPE contaminants in recycled content, e.g. PolyAl

KEY:
- popular for recycling and will be widely collected and processed
- widely recycled; less popular
- not recycled

* Generic example and represents all crates, bins, trays and buckets

3 Extruded Film and Bags

BASIC PRINCIPLES

Implementing these basic design principles will ensure that your HDPE film and bags are picked for recycling.

Ideally:

- No printing.
- Thicker than 24 microns.
- Encourage re-use.

Avoid:

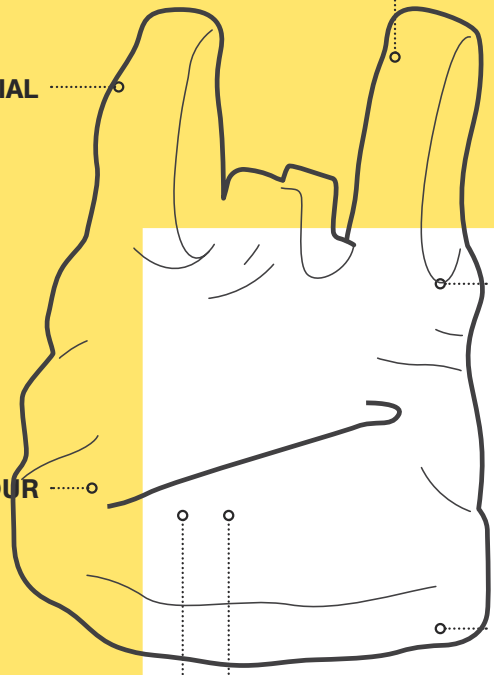
- Heavy print in dark colours.
- Handles or stitching in other materials.
- Potential confusion with compostable bags.

QUALITY CRITERIA

Know what to factor in to ensure that your packaging can continue to be recycled in the highest grade possible.

- Natural, white or cream coloured films give a light-coloured recyclate.
- Light-coloured recyclate can be used for light-coloured or pigmented films.
- Darker colour and black printing cancel the light colour and result in dark grey or black recyclate.
- Dark grey or black recyclate can only be used for black film and bags.
- The colour and the strength of the polymer deteriorate with every recycling cycle.
- Ensure legible and correct material identification codes are used.
- HDPE films are recycled with *mixed and coloured* LDPE films.
- LDPE film regrind, HDPE film regrind and HDPE bottle regrind is suitable for HDPE coloured film and bags.

HDPE Film and Bags*



MATERIAL
- Natural or white recycled content
- Pure extrusion–grade HDPE, LDPE and LLDPE
- Grey or darker coloured recycled content
- Recycled content with PP contamination

COLOUR
- Natural or White
- Any other colour

THICKNESS
- 24 micron and more
- Thinner than 24 micron

ATTACHMENTS
- Welded-on HDPE or LDPE handles
- Stitched on HDPE or PP handles
- Stitched on fibre, nylon or cloth handles

LABEL
- Paper with water-soluble glue
- Other labels

PRINTING
- No printing other than legal markings
- Minimal printing in lighter colours
- Printing in darker colours

ADDITIVES
- Fillers, e.g. $CaCO_3$ (overall container density to remain less than 1 g/cc)
- Oxo-biodegradable additives

KEY:
- popular for recycling and will be widely collected and processed
- widely recycled; less popular
- not recycled

* Generic example and represents all HDPE film and bags

4 Extruded Tapes, Bags and Sacks

BASIC PRINCIPLES

Implementing these basic design principles will ensure that your HDPE tape, bags and sacks are picked for recycling.

Ideally:

- Mono material construction.
- Polyethylene labels.

Avoid:

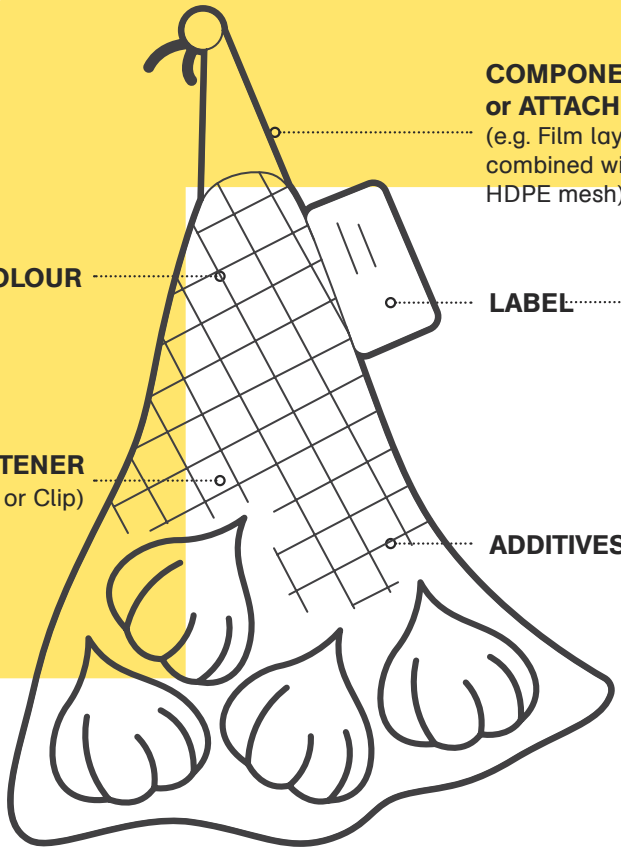
- Metal fasteners.
- Avoid PP draw strings or webbing.

QUALITY CRITERIA

Know what to factor in to ensure that your packaging can continue to be recycled in the highest grade possible.

- Coloured tapes and bags result in dark grey or black recyclate.
- HDPE tapes and bags are recycled with *mixed and coloured* LDPE films.
- The colour and the strength of the polymer deteriorate with every recycling cycle.
- Ensure legible and correct material identification codes are used.
- These are easily confused with PP tapes and bags.
- Limited recycled content in orientated tapes to remain strong.

HDPE Tapes, Bags and Sacks*



COMPONENTS or ATTACHMENTS (e.g. Film layer combined with HDPE mesh)
- Polyethylene film
- PP film

COLOUR
- Natural or White
- Any other colour

LABEL
- LDPE or HDPE
- PP

FASTENER (String or Clip)
- PE draw-string
- PP string or tape
- Metal

ADDITIVES
- Fillers, e.g. $CaCO_3$ (overall container density to remain less than 1 g/cc)
- Oxo-biodegrad-able additives

KEY:
- popular for recycling and will be widely collected and processed
- widely recycled; less popular
- not recycled

* Generic example and represents all HDPE tapes, bags and sacks

5 Extruded Tubes and Tottles

BASIC PRINCIPLES

Implementing these basic design principles will ensure that your HDPE tubes and tottles are picked for recycling.

Ideally:

- Mono material.
- Tottles follow same rules as bottles.

Avoid:

- Big, heavy PP closures.

Notes:

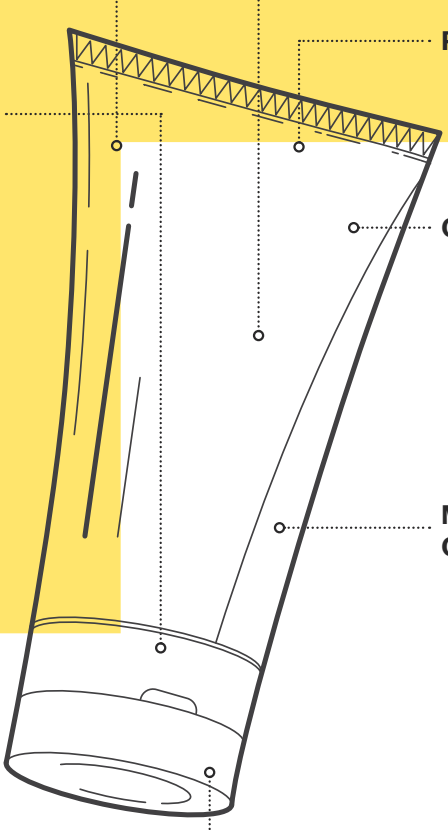
- Large quantities of residual content discourages collection and recycling.
- Easily confused with tubes made from other material.
- Very small packaging items will only be “picked” up by waste collectors if part of a separation at source initiative, they are not desirable.

QUALITY CRITERIA

Know what to factor in to ensure that your packaging can continue to be recycled in the highest grade possible.

- Natural, white or cream coloured products give a light-coloured recyclate.
- Light-coloured recyclate can be used for light-coloured or pigmented products.
- Printing and IML’s cancel the light colour and result in dark grey or black recyclate.
- Dark recyclate can only be used for black products.
- The colour and the strength of the polymer deteriorate with every recycling cycle.
- Only extrusion grade to be used.
- Ensure legible and correct material identification codes are used.

HDPE Tubes and Tottles*



COLOUR
- Natural or White
- Any other colour

CAP / CLOSURE
- HDPE same colour
- PP, HDPE different colour
- Metal

CAP LINERS
- PE-E
- Paper, Board, PS-E, PP-E

DISPENSERS
- HDPE mono-material (same colour
- LDPE, PP and HDPE (different colour) components
- Containing metal inserts

LABEL
- Paper with water-soluble glue
- PP (IML or other)

PRINTING
- Direct printing on container

CONTENTS
- Non-water-soluble residue, e.g. silicon, enamel paints, etc

MULTI-LAYER CONSTRUCTION
- Same colour different HDPE layers
- Different colour HDPE layers
- Containing barrier layer, e.g. E/VAL

ADDITIVES
- Fillers, e.g. $CaCO_3$ (overall container density to remain less than 1 g/cc)
- Oxo-biodegradable additives

KEY:
- popular for recycling and will be widely collected and processed
- widely recycled; less popular
- not recycled

* Generic example and represents all HDPE tubes and tottles

Polyco (the Polyolefin Responsibility Organisation NPC) is focused on making waste a valuable resource that works for our economy. We aim to grow the collection and recycling of polyolefin plastic packaging in South Africa and to promote the responsible use and reuse of this plastic packaging. Our mission is to reduce the amount of plastic packaging going to landfill and to end plastic waste in the environment. Polyco does this by collaborating with multiple stakeholders, by investing in recycling innovation and infrastructure in South Africa, and by educating both the industry and the consumer about recycling.

We hope you have found these Design for Recycling Guidelines helpful. If you have any comments or queries please contact us.

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