







# The circular design checklist for long lasting repairable products

- 1 Check if and why the life cycle phases fit your circular strategy
- 2 Check your product's the fitness for Circular Economy (CE)
- 3 Check for disassembly and serviceability

1 Review the fit with one or more of the circular strategies

<b>1</b>		Product requiring less resources, substitute scarce, harmful or resources with high environmental impact <input type="checkbox"/> Yes <input type="checkbox"/> No	Why?
		Less material required to fulfill the multiple users' requested functionality <input type="checkbox"/> Yes <input type="checkbox"/> No	Why?
		Repairing and maintaining products to safeguard optimal functionality <input type="checkbox"/> Yes <input type="checkbox"/> No	Why?
		Sequential product use for multiple users <input type="checkbox"/> Yes <input type="checkbox"/> No	Why?
		Upgrading and remanufacturing the product to initial or better specifications <input type="checkbox"/> Yes <input type="checkbox"/> No	Why?
		Valorisation of end of life waste as high quality materials <input type="checkbox"/> Yes <input type="checkbox"/> No	Why?

2 Review your current product design

**2**

**BASIC CHECKLIST FOR CURRENT PRODUCT DESIGN "FITNESS FOR CE"**

- USE AS LITTLE MATERIAL AS POSSIBLE
  - Light weight
  - Miniaturisation
  - Dematerialisation
  - Topology optimisation
- MODULAR DESIGN AS ENABLER FOR
  - Repairability
  - Serviceability
  - Upgradeability
  - Remanufacturability
  - Recyclability (separation)
- USE NO TOXIC OR HAZARDOUS MATERIALS
- REDUCE THE NUMBER OF DIFFERENT MATERIALS USED IN YOUR PRODUCT
  - Maximize monomaterial solutions
  - Use recycling compatible solutions
- AVOID PERMANENT, NON-REMOVABLE CONNECTIONS (PREVENT GLUE, POTTING, ...)
- USE CONNECTION METHODS ALLOWING EASY SEPARATION OF THE MATERIAL FRACTIONS
  - For servicing purpose
  - For upgrading
  - For remanufacturing and refurbishing purpose
  - For recycling purposes
- SELECT RECYCLABLE MATERIALS AND CHECK THE BELOW CONDITIONS:
  - A collection of end of life products/components is in place
  - Sorting is possible and performed
  - Recycling processes exist and recycling is performed
  - There is a market for the recycled materials
- IN CASE OF PLASTICS: SELECT STANDARD MATERIALS WITHOUT ADDITIVES, LAYERS, ...
- TRACE MATERIAL CONTENT (EG. WITH A QR CODE) SO THAT THEY CAN BE IDENTIFIED AT END OF LIFE
- SELECT MATERIALS WITH RECYCLED CONTENT OR FORM (BIO BASED) SIDE STREAMS
  - Assure the quality and traceability of the recycled content

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3 Design for disassembly

**3**

- Minimise the number of parts (integrate parts)
- Minimise the number of connection types (screws, reversible click connections)
- Group connections types in the same orientation
- Make connections are visible and easily reachable
- Only use standard tools (screwdriver, Allen key, torx, etc.) available on:
  - the remanufacturing site
  - the repair sites
  - the maintenance sites
  - the service site
- Make wearing parts easy changeable
- Make key functional modules upgradeable
- Assure that product status monitoring is possible
- ...