

# Liebherr Appliances Corporate Responsibility





# Shaping tomorrow

---

As a family-run company, we think in generations, not just business cycles – committed to making long-term decisions that benefit people, the planet, and our business.

Our Corporate Responsibility documentation provides insights into how Liebherr Appliances embeds sustainability across its operations, from energy-efficient appliances and responsible sourcing to circular economy initiatives and employee development. While we have made significant progress, we recognise that there is always more to do. Our goal is to continuously innovate, reduce our environmental impact, and contribute to a more sustainable future.

[SEE FULL DOCUMENTATION 2024](#)





# Recycling





# This is not the end.

## The status of our recycling efforts

What happens when an appliance reaches the end of its lifecycle? It is the all-important question we continuously ask ourselves.

Recycling plays a crucial role in minimising an appliance's environmental impact. We comply with the WEEE Directive (Waste Electrical and Electronic Equipment Directive), which governs the recycling process in the EU, and collaborate with waste management partners to ensure valuable materials are recovered. At the same time, we are advancing the use of secondary raw materials, such as recycled steel, while addressing challenges like food safety regulations and the availability of high-quality recycled plastics.

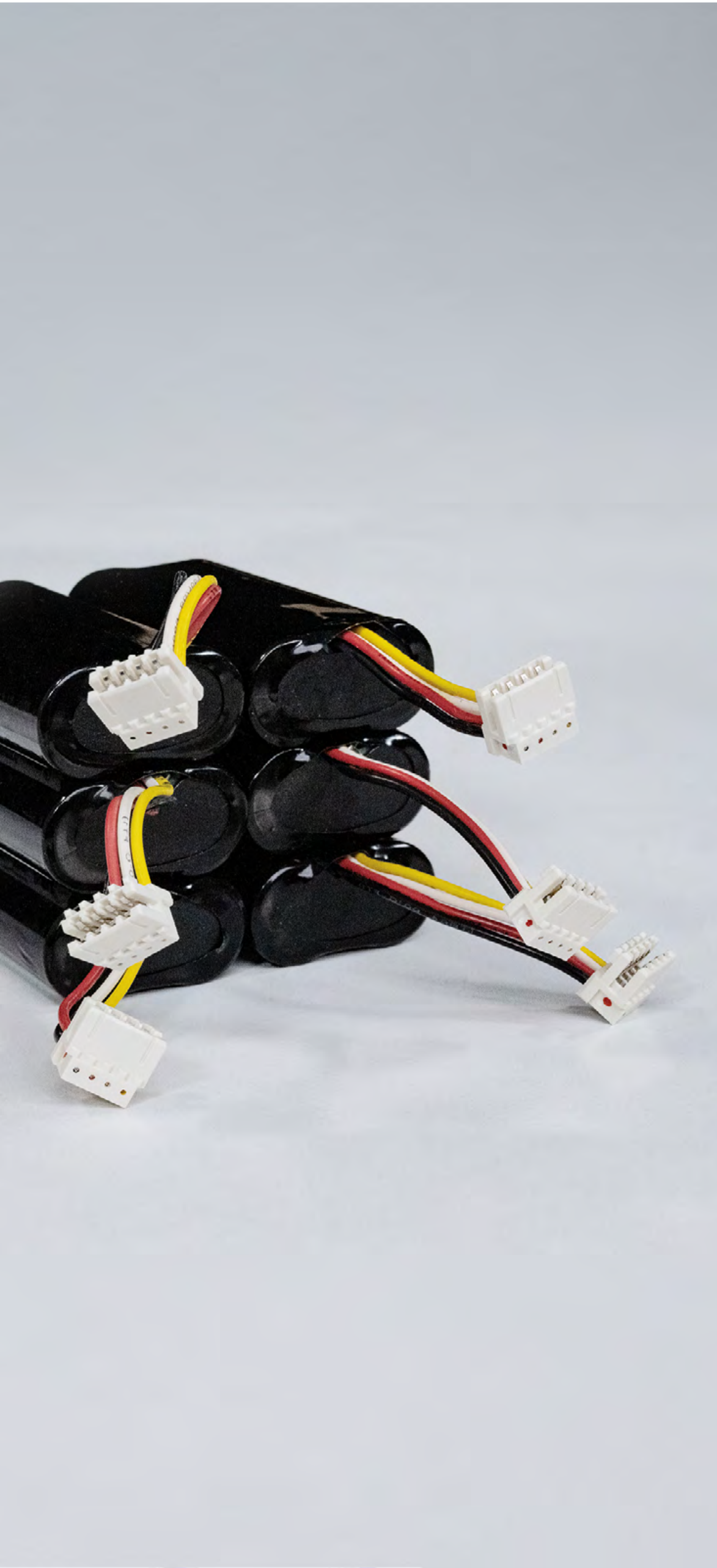
Through our **Circular by Design** research project, we identified and improved design aspects that hinder easy dismantling and material recovery. We aim to develop appliances that are easier to disassemble, recycle, and repurpose.

A major step in this direction is our patented **BluRoX technology** – a vacuum perlite insulation that enhances energy efficiency while supporting circularity. Set to launch in 2026, the freezer FNXa 522i will be built using BluRoX, with a design that allows essential components to be reused at the end of its lifecycle. This innovation has earned it the **Cradle to Cradle Certified® Bronze** status.

Beyond recycling, longevity remains a key focus. By manufacturing appliances designed to last at least 15 years, we help reduce waste and conserve resources. Every step towards longer-lasting, recyclable products contributes to lowering environmental impact across the entire lifecycle.

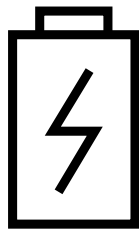






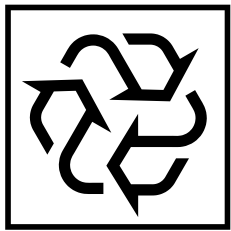
# What end users need to keep in mind

## Recycling batteries and light sources



### Important information about batteries

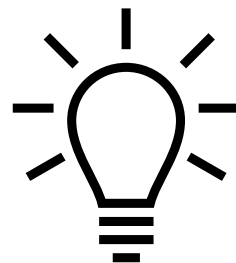
Some of our appliances include batteries that must be removed before disposal. Regulations require owners to separate batteries from discarded appliances and ensure proper recycling. Batteries can be returned free of charge at retail stores or designated recycling and waste collection points, helping to conserve valuable resources and reduce environmental impact.



### Lithium batteries

Appliances containing lithium batteries are marked with a specific symbol. When disposing of lithium batteries, ensure the terminals are taped over to prevent short circuits. For detailed guidelines on proper battery disposal, refer to the website of the German Environment Agency (UBA) or the respective authority in your region.

[WEBSITE GERMAN ENVIRONMENT AGENCY \(UBA\)](#)



### Light sources

If an appliance includes light sources that are designed to be replaced by the user, these must be removed before disposal and taken separately to a recycling or waste collection point. The appliance manual provides details on whether such light sources are included and how to remove them safely. LEDs do not need to be removed and can remain in the appliance.



## Responsible disposal of old appliances

### Municipal collection points and retail take-back programmes using Germany as an example

#### Municipal collection points

Old appliances can be disposed of free of charge at designated recycling and waste collection centres. In some municipalities, doorstep collection services for old electrical appliances are also available. Owners can check with their municipal authority for specific details on local regulations.

#### Disposal via retail stores

Both physical and online retailers are required to accept old appliances for proper disposal. Retailers with a sales area larger than 400 m<sup>2</sup> and grocery stores with at least 800 m<sup>2</sup> of sales space that sell electrical and electronic equipment must offer free take-back of old appliances of the same type. For small appliances (with no dimension exceeding 25 cm), they must accept up to three items free of charge, even without a new purchase – this is known as the 0:1 take-back scheme. For large household appliances, they are required to take back an old appliance when a new one is purchased, following the 1:1 take-back scheme.

#### Online and mail-order retailers

Online retailers are also required to take back large household appliances, including fridges and freezers when purchasing a new device (1:1 take-back). In the case of small appliances the 0:1 take-back rule is also applicable.

For fridges and freezers, the Liebherr online shop offers disposal services only when purchasing a new appliance. To use this option, customers must select **Disposal of Old Appliance** during check-out under optional service options. Customers will only pay for transportation, as Liebherr covers the disposal costs. This service must be chosen at the time of purchase.

Take-back of small appliances (no dimension larger than 25 cm) need to be at a reasonable distance from the consumer (0:1 take-back). To return small appliances to Liebherr in accordance with the Electrical and Electronic Equipment Act, please use the following link:

[RETURN SMALL ELECTRICAL APPLIANCES](#)

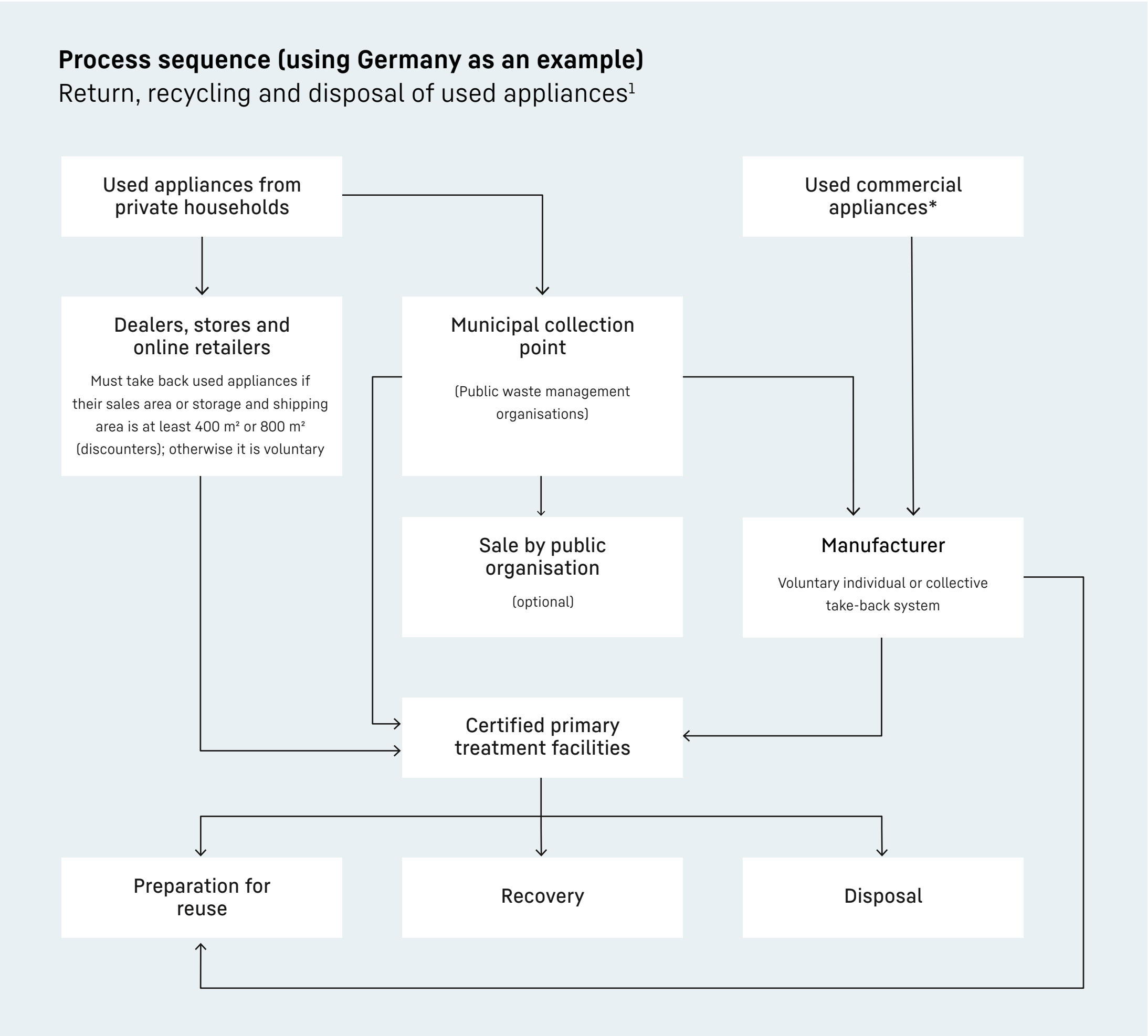


Giving old appliances a new purpose

Given the regional differences in Germany's disposal systems, we actively support campaigns such as **Drop it like E-Schrott**. This initiative of the **Stiftung Elektro-Altgeräte Register** (Foundation old electrical appliances register, EAR), financed by household appliance manufacturers and supported by the German Federal Environment Agency, promotes proper disposal of old electrical equipment nationwide. The correct disposal of old appliances helps recover valuable resources and contribute to a circular economy.

For more information, visit the campaign website. [E-SCHROTT ENTSORGEN](#) (only available in German)

Return process of used appliances



**Opportunities for households to return old appliances free of charge have been expanded in recent years. Retailers only have to do so in combination with the purchase of another comparable appliance (1:1 take-back).**

\* In contrast to this, manufacturers must provide professional customers with a return option and dispose of the appliances free of charge. Transport may be billed.

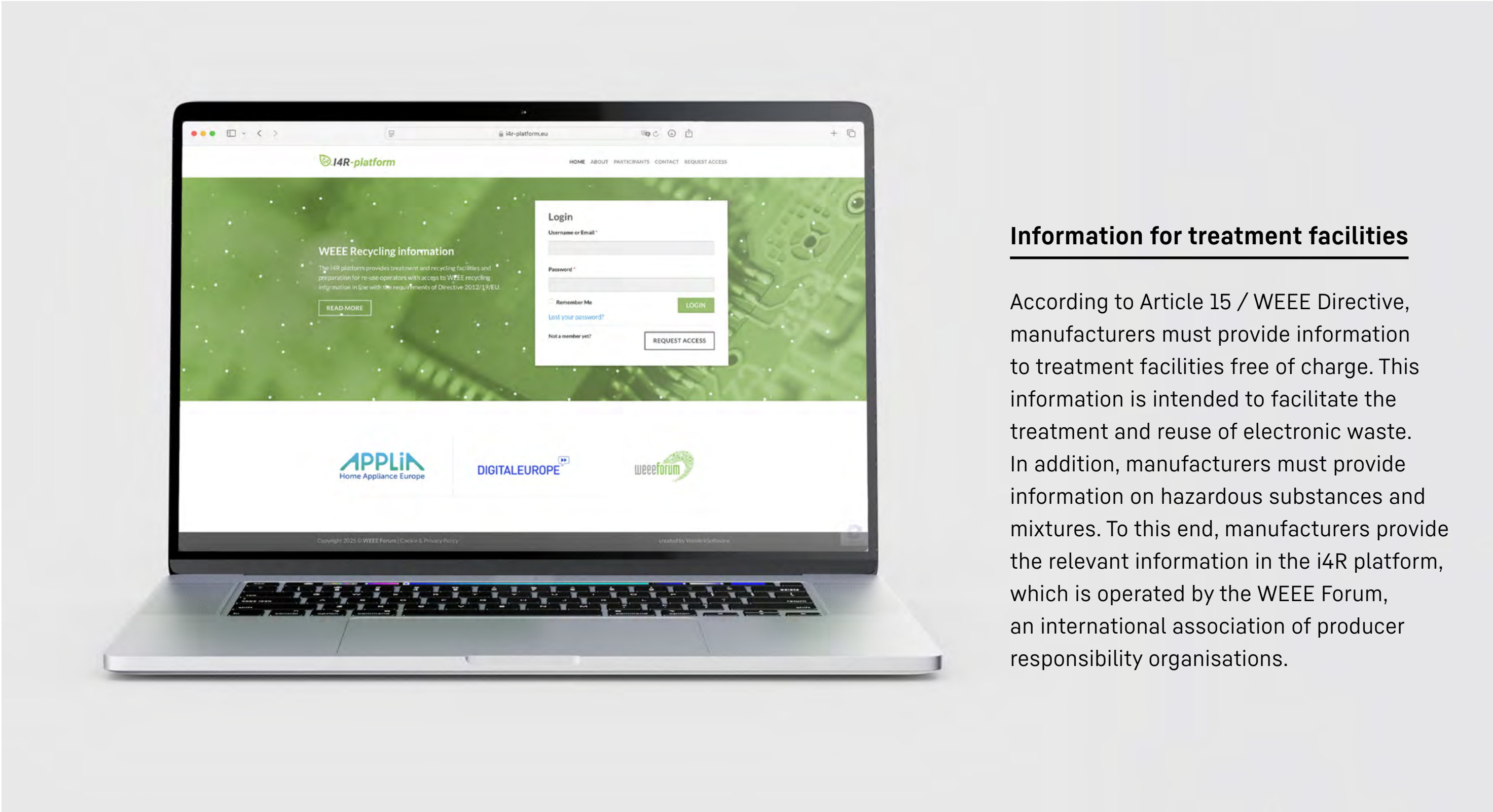
<sup>1</sup> (from households and professional appliances)  
in Germany as an example, legal framework:  
ElektroG (2015, last amended 2021)  
Processes in other countries may vary.



# From collection to compliance

## Our commitment to responsible recycling

Once consumers have correctly returned their old appliances, we, as the manufacturer, take responsibility for ensuring that these appliances are recycled in an environmentally sound manner. Through contractual agreements, we guarantee that the returned appliances are processed in compliance with environmental regulations, and that any residual materials are properly disposed of. We strictly adhere to both legal requirements and industry standards. To ensure compliance, we conduct regular audits of recycling facilities. If any facility is found to be non-compliant, we take corrective measures, which may include suspending deliveries to that facility. To address future recycling requirements, collaboration between manufacturers and recyclers must be strengthened and expanded. Our goal is to create a more cooperative approach that will help us effectively meet evolving regulations.



### Information for treatment facilities

According to Article 15 / WEEE Directive, manufacturers must provide information to treatment facilities free of charge. This information is intended to facilitate the treatment and reuse of electronic waste. In addition, manufacturers must provide information on hazardous substances and mixtures. To this end, manufacturers provide the relevant information in the i4R platform, which is operated by the WEEE Forum, an international association of producer responsibility organisations.

SOURCE: WEEEFORUM



Informative labelling

To ensure the effective recycling and reuse of old appliances, we maintain an active dialogue with the recycling industry. Since 2018, we have provided detailed recycling information through the Information for Recyclers (i4R) database, replacing earlier Liebherr-issued guidelines.

Our appliances feature stickers to aid recycling plants. A blue sticker identifies Vacuum Insulation Panels (VIPs), indicating their type and location, as VIPs are not visible externally. VIPs offer superior insulation compared to conventional foam. Investigations by APPLiA (European association representing home appliance manufacturers) and Liebherr Appliances have shown that most recycling plants are equipped to process VIP appliances. However, some require retrofitting of air filter systems.

Another sticker marks compressors with high-viscosity oils, ensuring occupational safety during recycling. We continue to collaborate in committees and research projects, which focus on providing recyclers with the information needed to meet legal standards and improve recycling quality for higher material reuse.

Quality assurance in recycling

Once we take back appliances, we ensure they are recycled in an environmentally friendly manner, complying with legal and normative requirements, including EN 50625-2-3 and CLC/TS 50625-3-4.

In Germany, for example, manufacturers, not public systems (PROs) oversee disposal, with waste companies inspected by the state and manufacturers. Since 2007, our quality assurance system has monitored the recycling process, conducting regular audits to ensure compliance. Non-compliance can result in penalties, including delivery cessation.

High-viscosity oil label



VIP label



- C = Cabinet
- D = Door
- DC = Door and cabinet
- P = Powder = fumed silica
- F = Fiberglass
- VIP = Vacuum insulation panel







Source: REMONDIS Electrorecycling GmbH

# Implementation of the WEEE Directive

The recycling process in the EU is governed by the **WEEE Directive** (Waste Electrical and Electronic Equipment Directive). Its goal is to recover as many valuable raw materials as possible, safely remove hazardous substances, and minimise environmental impact from improper disposal. As the WEEE is an european directive, it must be transposed into national law by the member states in order to become effective.

In Germany, the **Elektro- und Elektronikgerätegesetz (ElektroG)** regulates the responsible disposal of electrical and electronic appliances, including fridges and freezers.

Since 1 January 2019, all EU countries must achieve a minimum collection rate of 65 % for household electronic waste (based on the total weight of devices collected annually and the average weight of new devices placed on the market in the previous three years). At present, almost all EU countries fall short of this quota, which has various causes, including the unrealistic calculation of the collection rate.

For fridges and freezers, the required recovery rate is 85 %, with at least 80 % allocated to reuse and recycling. In contrast to the collection rate, the recovery rate is always exceeded.

The same applies to small appliances and IT equipment sold by Liebherr, where at least 75 % must be recovered, including a minimum of 55 % dedicated to reuse and recycling.

Germany only: For up-to-date information on collection and recycling quotas, visit the website of the Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMUV): [Collection and Recycling Quotas Information](#).

[WEBSITE BMUV](#)





## Extended Producer Responsibility

A key principle of the WEEE Directive is Extended Producer Responsibility (EPR). This means that manufacturers must ensure the proper disposal of consumer and professional appliances.

Manufacturers play a key role in ensuring the responsible disposal of old appliances by covering the costs of collection, recycling, and environmentally sound processing. Retailers are also responsible for ensuring proper disposal and are required to accept old appliances.

Beyond collection and recycling, product design plays a crucial role. Manufacturers must ensure that appliances are built for easy disassembly and material recovery, making recycling more efficient and reducing environmental impact.



# Differences between household and professional appliances

The WEEE Directive distinguishes in some points between domestic (household use) and professional (business use) appliances, with different responsibilities.

## Household appliances

Consumers are required to ensure the proper disposal of old appliances. They can return their old appliances free of charge at authorised collection points. Manufacturers must establish accessible collection systems that make appliance returns simple and convenient for consumers.

## Professional appliances

Ensuring the correct disposal of professional appliances is essential to preventing environmental harm, conserving natural resources through reuse and recycling, and maintaining accurate tracking and reporting of disposal volumes. Since 1 January 2022, manufacturers in Germany have been required to offer a reasonable return option for professional appliances and cover the costs of their disposal.

When purchasing a Liebherr professional cooling or freezing appliance, customers can return a comparable old appliance for free disposal – even if it is from a different brand. However, this does not apply to non-refrigeration appliances like dishwashers or washing machines. Exception: Professional appliances sold before 15 August 2018 ("historical appliances") are exempt from free manufacturer disposal.

Liebherr ensures proper treatment, preparation for reuse, and recycling by processing returned appliances in certified facilities that exceed legally required recycling quotas. This structured take-back process also allows reporting to authorities and inclusion in public environmental statistics.





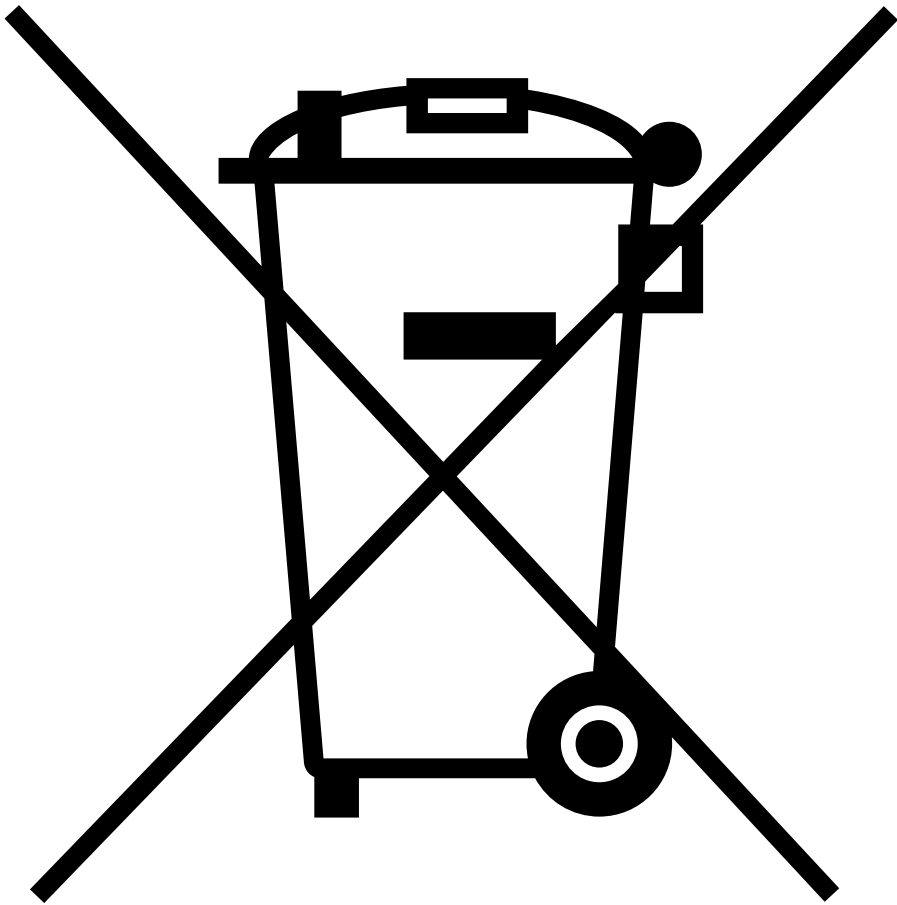
# Customer responsibilities

To ensure environmentally responsible disposal, old appliances must be processed according to their designated waste category (e.g., Group 1: Heat Exchangers). Cooling circuits must remain intact to prevent refrigerant leaks. Cooling and freezing appliances must not be discarded as household waste – this is indicated by the crossed-out bin symbol on the appliance.

Before disposal, empty appliances of stored goods or waste, but leave standard accessories like drawers and shelves inside. Some Liebherr

appliances have batteries for data storage or operations; these should be removed and recycled according to battery disposal guidelines. Battery locations are specified in newer models and detailed in the user manual.

Additionally, removable light sources, such as bulbs and fluorescent tubes, must be disposed of separately, while LEDs can remain in the appliance. For appliances with data storage, it is the customer’s responsibility to delete all stored information, particularly personal data, before disposal.



## Important

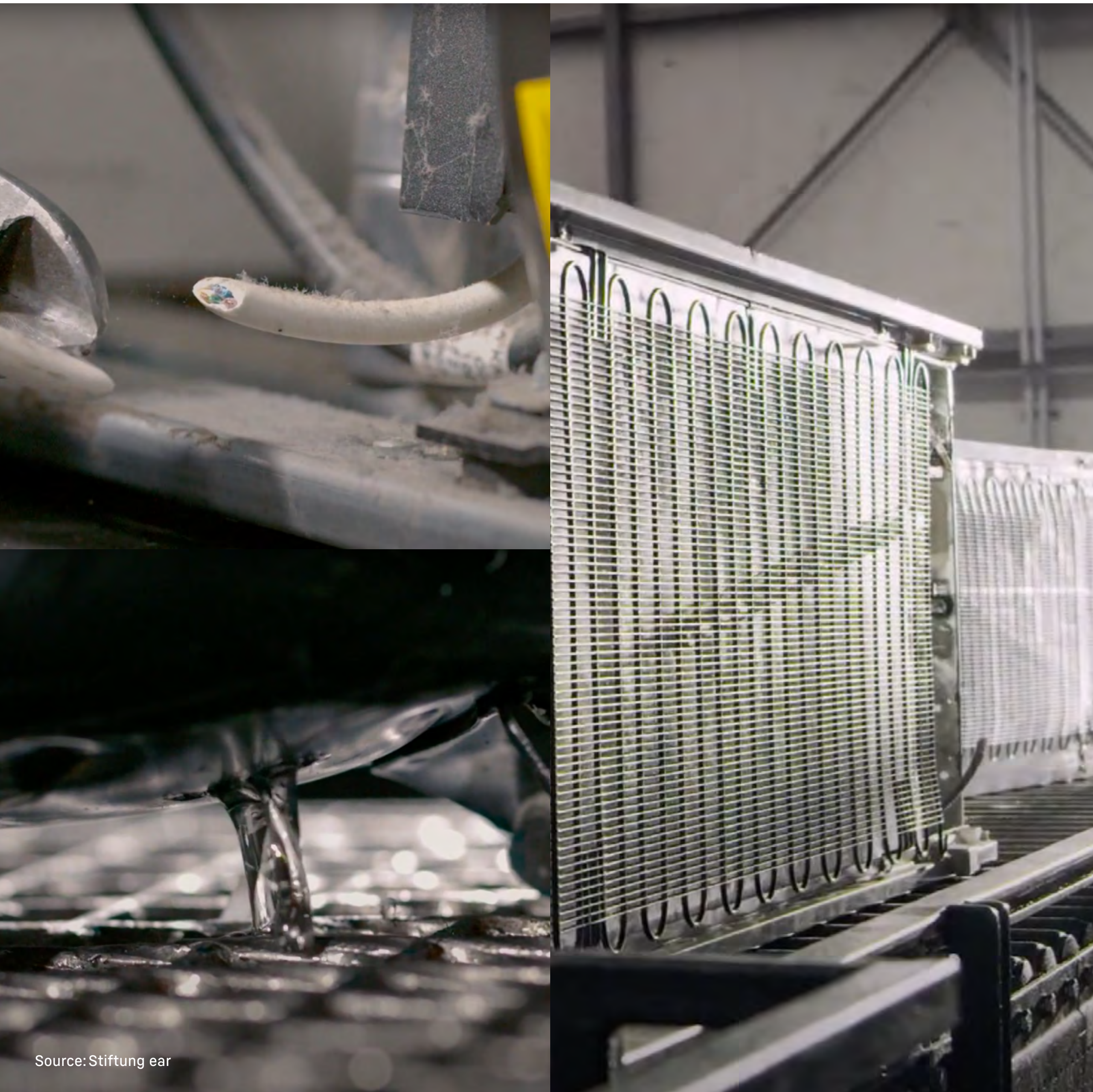
Professional customers **are not obligated** to return old appliances to the manufacturer. If they choose alternative disposal methods, they are responsible for ensuring compliance with waste regulations, including preparation for reuse, correct treatment, and meeting recycling quotas.

## How returns are arranged

Return requests **must be made at the time of purchase of a new appliance.**

For assistance, contact:  
**Professional Customers / Gastronomy and Laboratory**  
**vertrieb-gewerbe.lhv@liebherr.com**  
**Tel. +49 731 17 58 86-38**





Source: Stiftung ear

## First steps for the circular economy

### The recycling process for appliances

The processing of cooling and freezing appliances follows a structured process to recover valuable materials and safely dispose of harmful substances. The process consists of two stages, with step 1 focusing on dismantling and the removal of hazardous components and parts. These specialised steps ensure compliance with industry standards while maximising resource recovery.

### Delivery and preparation

Fridges arrive at the recycling facility and are manually unloaded for inspection, ensuring no visible damage or irregularities. Before processing, key preparations are made to ensure smooth and efficient recycling.

#### **Interior components**

Drawers and glass shelves are removed.

#### **Power cables**

Cables are cut to prevent entanglement in machinery.

#### **External condenser**

The external condenser is detached (external metal grille on the back).



## Step 1: Removal of hazardous material and valuable components

In the first stage, all hazardous and valuable components are carefully extracted.

- **Coolant extraction**  
Specialised equipment removes refrigerant and compressor oil to prevent environmental damage.
- **Compressor removal**  
The unit responsible for compressing the refrigerant is dismantled separately.
- **Condenser removal**  
Cooling elements and condensers are detached and sorted.
- **Electronics extraction**  
Circuit boards, sensors, and control units are removed for specialised electronic recycling.

### Difference to professional appliances

- **Manual processing**  
Each appliance is disassembled individually to meet its specific requirements.
- **Resale potential**  
Once properly processed, extracted materials or entire appliances may be eligible for resale.



Step 1





Step 2

## Step 2: Mechanical shredding and material separation

In this stage, appliances are mechanically shredded, allowing for precise separation of materials.

### **Blowing agent removal**

Harmful gases released during shredding, such as Chlorofluorocarbons (CFC) from insulation foam, are extracted and safely disposed of.

### **Material sorting**

Advanced systems efficiently separate key materials.

- Steel
- Aluminium
- Copper
- Plastics
- Foam

[WATCH A VIDEO ON THE RECYCLING PROCESS](#)

Source: REMONDIS Electrorecycling GmbH





# Recycling roadblocks

## The challenge of plastics and insulation foam

While valuable materials like steel, aluminium, and copper can be efficiently recovered, processing plastics and insulation foam remains a major challenge.

The wide variety of plastics with different properties currently is the biggest challenge for pure-grade sorting and high-quality recycling, meaning they cannot yet be reused at the same standard in new products.

Whenever processing technology permits, we use single-variety plastics. Plastic components weighing 50 g or more, as well as natural and synthetic rubber parts of 25 g or more, are marked according to international standards to facilitate subsequent recycling processes. Wherever possible, plastic waste generated during processing is collected, ground, and largely reintegrated into production. Non-recyclable plastic waste is sorted by type and sold accordingly.

Insulation foam cannot be recycled. Instead, it is used for thermal recovery, where its energy content is utilised, though the material itself is permanently lost.







The future  
is circular.

---

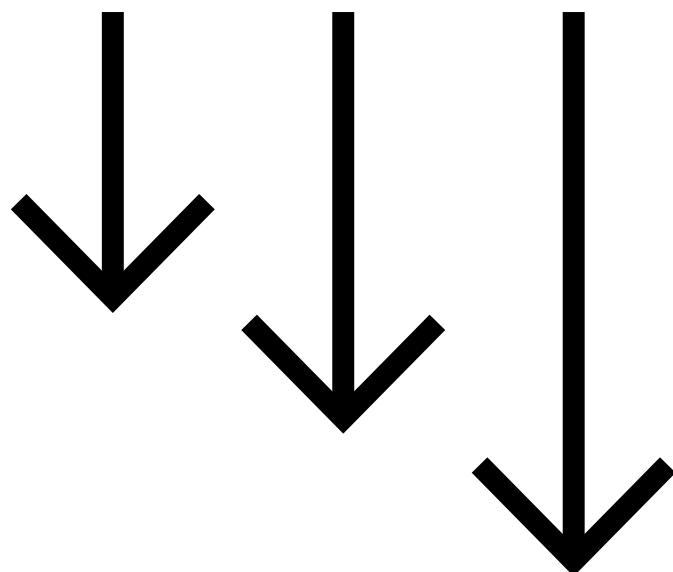


# Rethinking the way we make things

We are committed to integrating circular economy principles across our operations to minimise waste, enhance resource efficiency, and reduce our environmental footprint. For us, this means designing appliances that are durable, reusable, and recyclable – delivering both performance and sustainability.

Our long-term vision is clear: to build a future where our products contribute to a sustainable, circular economy. By constantly challenging ourselves to improve and innovate, we are taking meaningful steps towards closing the loop and making a lasting difference.

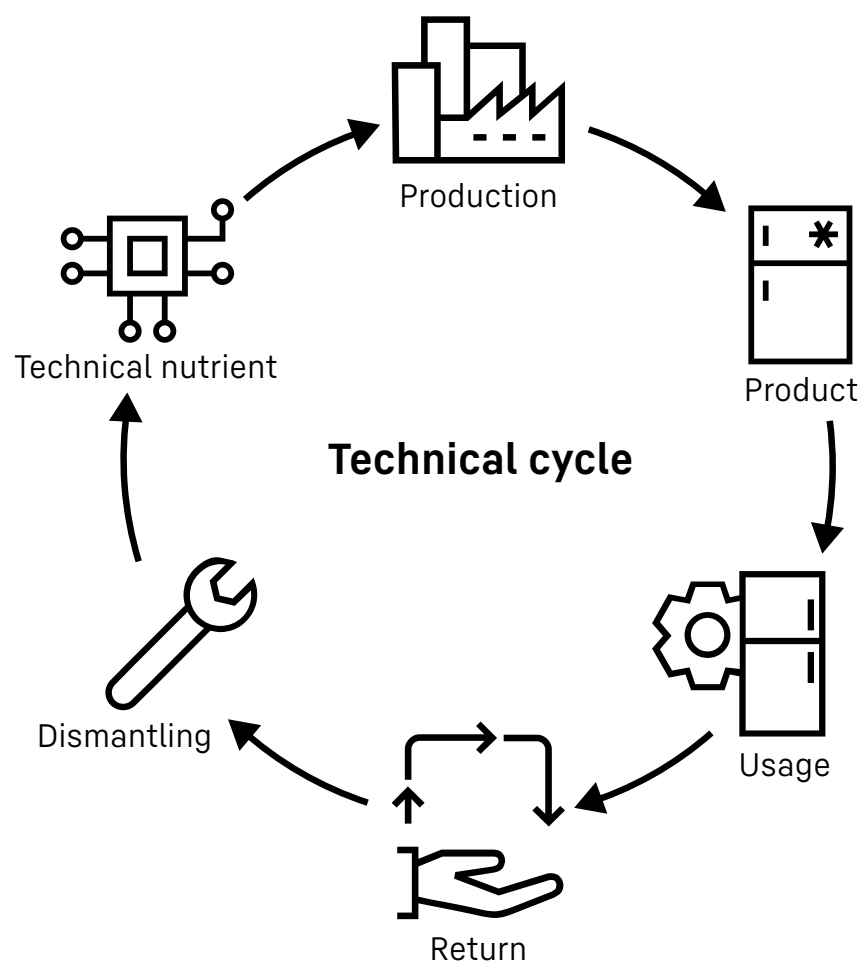
[MORE ON CRADLE TO CRADLE](#)







# Closing the loop: our vision for the circular economy



Our vision for the technical  
cycle in the circular economy

## Designing for circularity

We are working towards more "circular" appliances by increasingly considering end-of-life scenarios in our design process. A meaningful step in this direction is the FNXa 522i freezer with [BluRoX technology](#), which already integrates circular design concepts to support easier dismantling, reuse, and recycling.

## Advancing material selection

We are continuously exploring ways to integrate more renewable materials and recyclates while reducing material variety to simplify recycling. Through ongoing research into alternative materials, we aim to make our appliances even more innovative and sustainable.

## Improving recycling processes

We collaborate with recycling companies, providing detailed information through labels and databases to optimise the recovery of raw materials. Our participation in public awareness campaigns helps guide customers on the proper disposal of old appliances.

## Extending product lifespans

We design durable, high-quality appliances to reduce waste. By guaranteeing spare parts for at least 15 years, we help keep our products in use for longer, reducing environmental impact.

## Minimising waste at production sites

Reducing waste is a priority. We use reusable packaging, optimise material use, and analyse packaging waste from purchased parts to further minimise our impact.

## Collaborative partnerships

Collaboration is key. We work with suppliers, recyclers, and research institutions to innovate and improve every stage of our product lifecycle.





## BluRoX: A new standard in energy efficiency

### The next step in insulation technology

Instead of conventional polyurethane foam, BluRoX utilises a far more efficient vacuum-sealed volcanic rock (perlite) insulation. This material not only provides superior thermal insulation but also reinforces structural stability. Unlike conventional insulation, BluRoX components are not permanently bonded, allowing the outer shell and inner container to be easily separated and efficiently recycled. At the end of its lifecycle, the perlite can be removed without complex processing and directly reused – laying the foundation for a circular economy. The next steps now focus on implementing this innovation at scale.

Given our commitment to durability, BluRoX appliances are designed for a minimum lifespan of 15 years, meaning it will take time before significant volumes reach the end of life. However, we are already working closely with logistics specialists, research institutions, and recycling companies to ensure a fully closed material loop for the future.



# From waste to resource

## Our efforts for more efficient recycling

We are committed to continuously optimising recycling processes, even for our conventional appliances. Through intensive research and development, Liebherr Appliances is exploring innovative ways to enhance material recovery and minimise waste. Additionally, we are collaborating with recycling companies and industry partners to drive forward more efficient and sustainable recycling solutions.

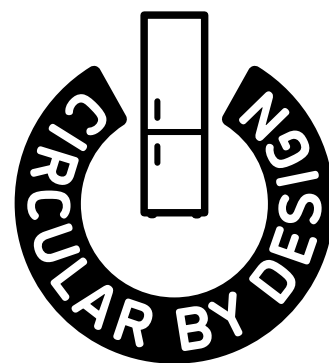






## Circular by Design initiative

Between 2019 and 2023, Liebherr Appliances contributed to the Circular by Design project, a research initiative dedicated to advancing a resource-efficient circular economy. The project focused on rethinking how fridges and freezers are designed to ensure easy repair, reuse, and recycling, reducing waste and conserving valuable materials.



Traditionally, product design has prioritised energy efficiency, but Circular by Design expands this focus to resource efficiency, ensuring a sustainable raw material supply. The project developed evaluation tools to assess recyclability, explored new business models like repair and leasing, and established digital material flow models to optimise resource management.

The project addressed critical obstacles to circularity, such as:

- **End-of-life considerations in design**  
Ensuring appliances are built for efficient disassembly and recycling
- **Component separation**  
Overcoming challenges in dismantling electronics and mixed materials
- **Recycled plastic limitations**  
Improving safety and quality for use in food contact areas
- **Material supply consistency**  
Addressing fluctuations in the availability and quality of recycled materials

### Liebherr's role and contribution

As an industry leader and specialist in refrigeration and freezing, we provide technical expertise and appliance models (e.g., CNPes 4758) for research and testing. Findings from the project are directly integrated into our product development, ensuring future fridges and freezers are designed for maximum recyclability. We also actively test our products' recyclability to enhance material recovery rates.

### Collaboration and research partners

The project is led by the Helmholtz Institute Freiberg for Resource Technology in collaboration with key research institutions, including the Wuppertal Institute, Folkwang University of the Arts, and industry partners like BEC Becker Elektrorecycling Chemnitz GmbH.

### Impact and future outlook

Through Circular by Design, Liebherr is driving the transition towards fully recyclable cooling and freezing appliances while exploring new economic models that reduce dependence on virgin resources. By merging resource efficiency with life cycle assessment, the project paves the way for an industry-wide shift towards true circularity.

With durability built into every Liebherr appliance – designed for a minimum 15-year lifespan – the company is already preparing for the future. By working closely with logistics experts, researchers, and recyclers, we continue to refine solutions for a fully closed material loop, reinforcing our commitment to sustainability and responsible resource management.