iPhone 12

iPhone 12 Pro

Apple Recycler Guide

April 2022

Contents

About This Guide

Apple Recycler Guides provide guidance for electronics recyclers on how to disassemble products to maximize recovery of resources. The guides provide step-by-step disassembly instructions and information on the material composition to help recyclers direct fractions to the appropriate material recycler.

To conserve important resources, we work to reduce the materials we use and aim to one day source only recycled or renewable materials in our products. A key path to reaching that goal is resource recovery from end-of-life electronics.

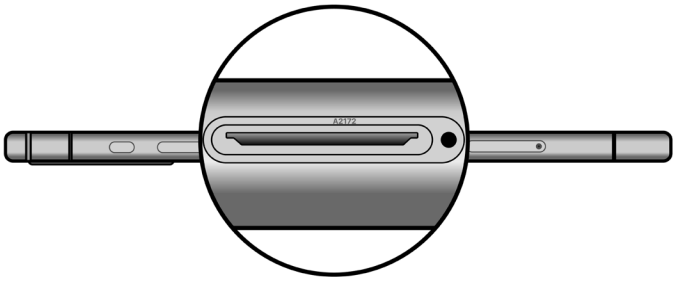
Disassembly procedures are intended to be performed only by trained electronics recycling professionals. The recycler is responsible for independently evaluating and ensuring compliance with all applicable environmental, health, and safety laws related to the work. These include but are not limited to laws relating to the management, handling, shipping, and disposal of the outputs of this work as waste and laws in place to ensure the health and safety of all employees who support this work.

For questions or feedback about this guide, email contactesci@apple.com.

Note: This guide may show images from other similar models, but the procedures are the same.

Identification

You can find the model number of the iPhone inside the SIM tray slot.



Model numbers:

A2172, A2341, A2402, A2403, A2404, A2406, A2407, A2408

Directive 2012/19/EU Annex VII Components

Directive 2012/19/EU Annex VII requirements apply to the following substances and components.

Substance/Component	Location	Removal Instructions
Printed circuit board if the surface is greater than 10 square centimeters	Main logic board	Follow steps 1–12
External electric cables	Power adapter	Follow step 1
Battery	iPhone enclosure	Follow steps 1–5
Cover glass and organic light-emitting diode (OLED) display if the surface is greater than 100 square centimeters	OLED display	Follow steps 1–4
No further substances or components as listed in Annex VII		

Safety Considerations

The recycler is responsible for independently evaluating all activities undertaken by its employees to perform or support the work and ensuring compliance with all applicable health and safety laws related to the work. These include but are not limited to laws relating to the health and safety of all employees who perform or support this work. The recycler is also responsible for evaluating the workspace and ensuring that the area in which the work is to be undertaken is designed using ergonomic best practices and meets all ergonomic requirements to ensure the protection of its employees.

Personal Protective Equipment

Personal protective equipment should be worn during the entire recycling process.


Wear hand protection


Wear a mask


Wear eye protection


Wear foot protection


Wear protective clothing

Battery Safety

This product uses a lithium-ion polymer battery. Follow these steps for safe removal and disposal of the battery:

- Discharge the battery to less than 25 percent before beginning any disassembly. Thermal runaway is less likely to occur in a discharged battery.
- Remove anything from your person that could conduct energy, such as jewelry and watches, to avoid electric shock to yourself or the logic board.
- To avoid the potential for thermal runaway and the release of potentially noxious fumes, don’t puncture, strike, or crush lithium-ion polymer batteries or devices powered by them.
- Don’t throw, drop, or bend the battery.
- Don’t expose the battery to excessive heat or sunlight.
- Use only tools that are not sharp and do not conduct electricity.
- Keep your workspace clear of foreign objects and sharp materials.
- Dispose of batteries according to local environmental laws and guidelines.

Workspace safety guidelines

- Use heat-resistant gloves and safety glasses.
- Keep a sand dispenser within arm's reach (2 feet or 0.6 m) on either side of the workstation, not above the workstation. The dispenser should be a wide-mouthed, quick-pour metal container with a flip-top lid or tray that contains 8–10 cups (1.9–2.4 L) of clean, dry, untreated sand.
- Keep the battery at least 2 feet (0.6 m) from paper and other combustible materials.
- Work in an area with adequate ventilation.

Handling a thermal runaway

If you notice any of the following signs, a thermal runaway is likely underway, and you should act immediately:

- The lithium-ion polymer battery or a device containing one begins to smoke or emit sparks or soot.
- The battery pouch suddenly and quickly puffs out.
- You hear hissing or popping sounds.

Don't use water or an ABC/CO_2 fire extinguisher on a thermal runaway battery or a device containing one. Water and ABC/CO_2 fire extinguishers will not stop the reaction.

Do smother the battery or device immediately with plenty of clean, dry sand, dumped all at once. Timing is critical; the faster you pour all the sand, the faster the thermal runaway will stop.

Do leave the room for 30 minutes if the thermal runaway causes any irritation.

Do wait 30 minutes before touching the battery. Wear heat-resistant gloves and safety glasses to remove the battery from the sand, or use a touchless thermometer to measure the battery temperature. Only touch the battery when the event has finished.

Do dispose of the damaged battery or device (including any debris removed from the sand) according to local environmental laws and guidelines.

OLED Safety

Broken OLEDs must be handled properly to ensure the safety of your employees and mitigate any hazards. Package broken OLEDs in an appropriate container to properly manage the hazards associated with the materials and store only with compatible materials. All waste must be properly classified, packaged, and labeled in accordance with all relevant laws and regulations.

Hazard Warnings

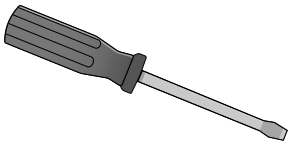

Broken glass hazard


Rechargeable battery hazard

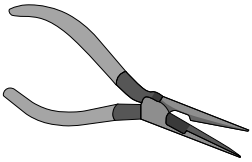

Chemical inhalation hazard

Recommended Tools

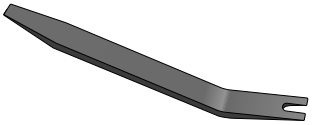
Flat-blade screwdriver



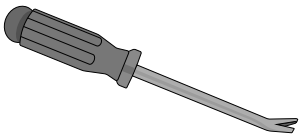
Long-nose pliers



Miniature plastic pry bar



Nail-pulling screwdriver



Disassembly Instructions

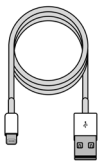
1. Remove the power adapter and charge cable.

» *Turn off the iPhone.*

» *Unplug the power adapter. Disconnect both ends of the charge cable.*

Fraction

Power adapter



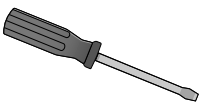
Charge cable

Cu

Copper

2. Remove the display.

Tools Used

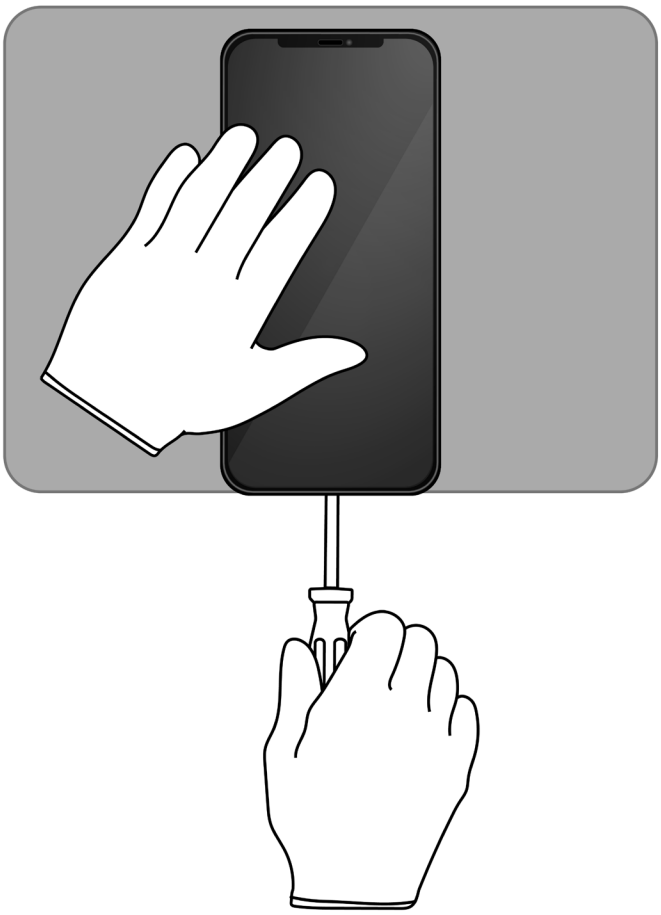


Broken glass hazard

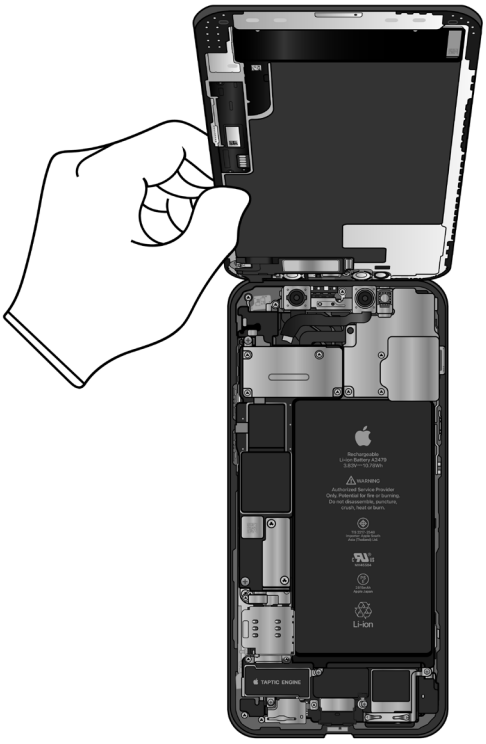
Chemical inhalation hazard

» *Hold the iPhone at the edge of a counter with the display face up and the Lightning connector toward the counter edge.*

» *Insert the tool tip into the Lightning connector. Push the handle down to pry the display from the enclosure.*

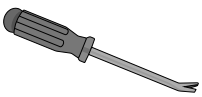


» *Remove the display by hand and set the enclosure aside.*

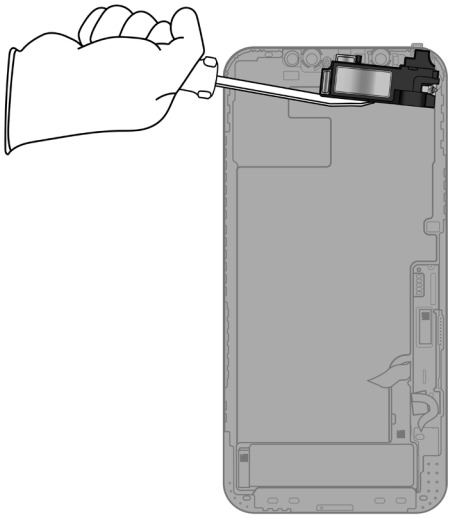


3. Remove the receiver.

Tools Used



» *With the display facing down, pry off the receiver.*



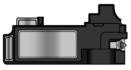
» *Pull the ribbon cable off the receiver.*

Fraction

Ribbon cable

Cu
Copper

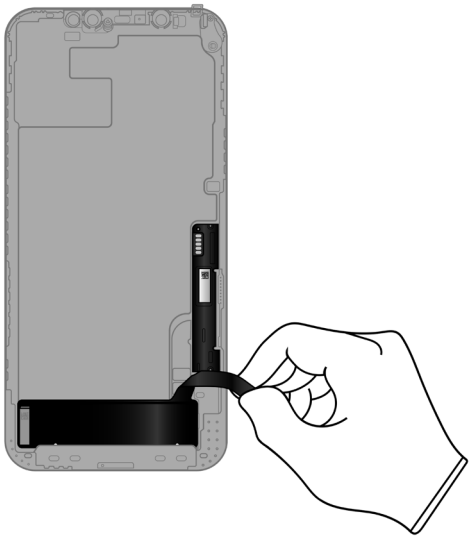
Fraction



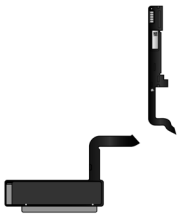
Receiver

REE
Rare Earth Elements

4. Pull the ribbon cables off the OLED display by hand.



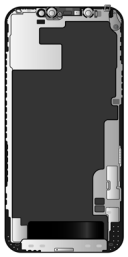
Fraction



Ribbon cables

Cu
Copper

Fraction

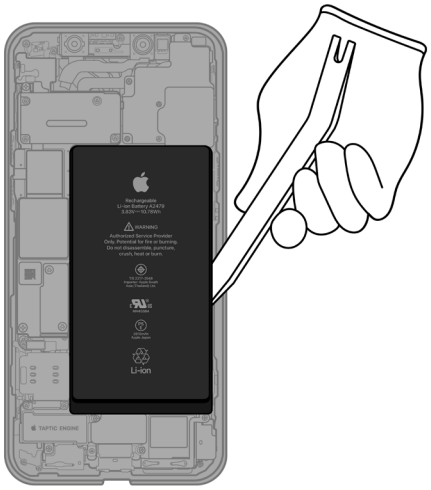


OLED display

GL
Glass

5. Inside the enclosure, carefully remove the lithium-ion polymer battery.

Rechargeable battery hazard



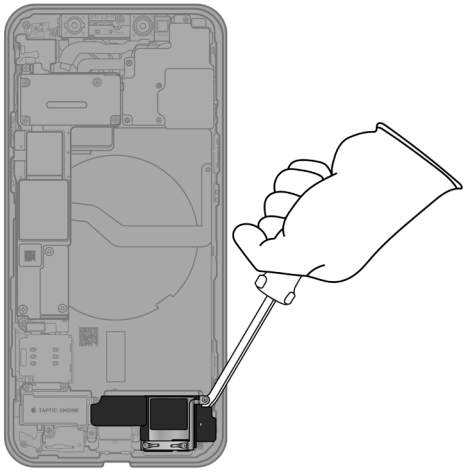
Tools Used

Fraction

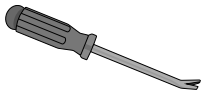
Lithium-ion polymer battery

BT
Battery

6. Pry off the speaker.



Tools Used

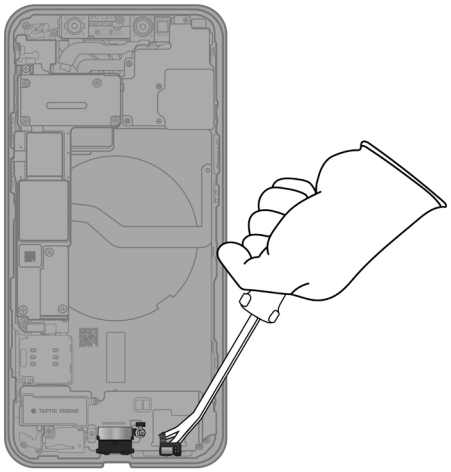


Fraction

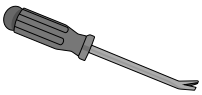
Speaker

REE
Rare Earth Elements

7. Pry off the right microphone and Lightning connector.

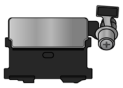


Tools Used



Fraction

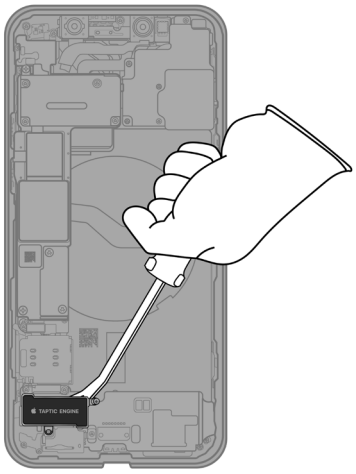
Right microphone



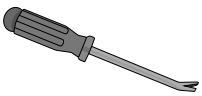
Lightning connector

Cu
Copper

8. Pry off the Taptic Engine.



Tools Used

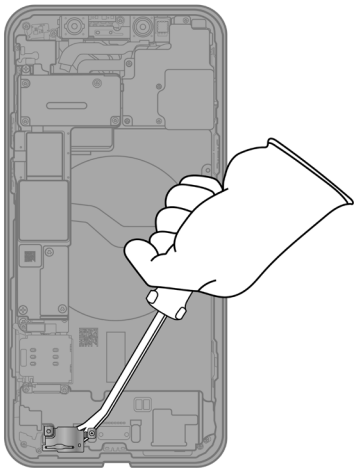


Fraction

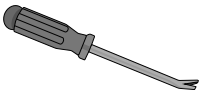
Taptic Engine

REE
Rare Earth Elements

9. Pry off the left microphone.



Tools Used

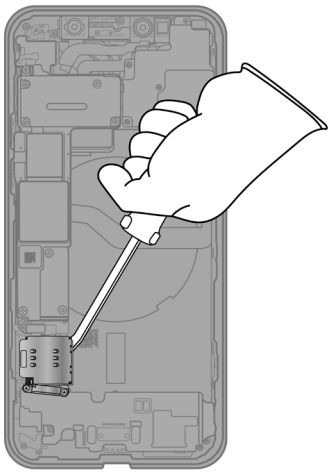


Fraction

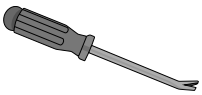
Left microphone

Cu
Copper

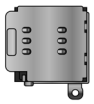
10. Pry off the SIM reader.



Tools Used



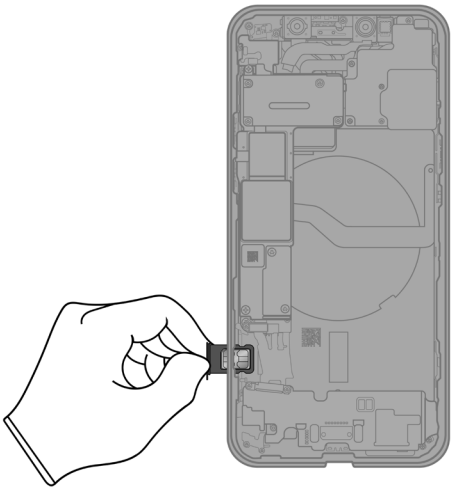
Fraction

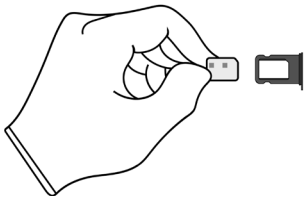


SIM reader

Cu
Copper

11. Remove the SIM card and SIM tray by hand. Separate the SIM card from the SIM tray.





Fraction

SIM card

PMs

Precious Metals

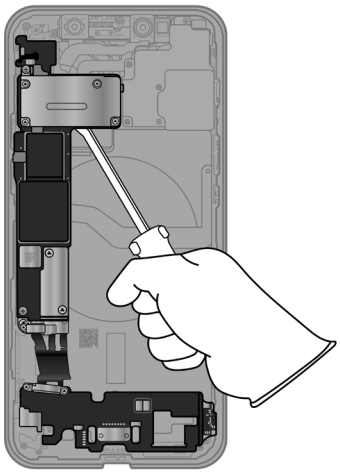
Fraction

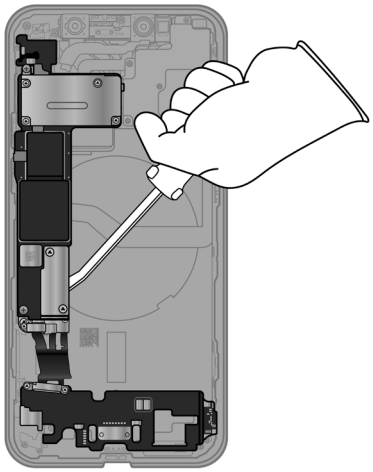
SIM tray

Al

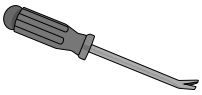
Aluminum

12. Pry off the main logic board.

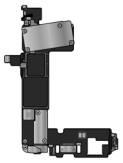




Tools Used



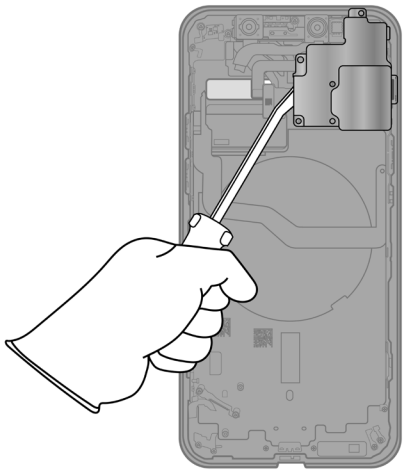
Fraction



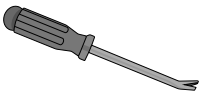
Main logic board

PMs
Precious Metals

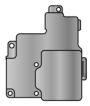
13. Pry off the rear camera shield.



Tools Used



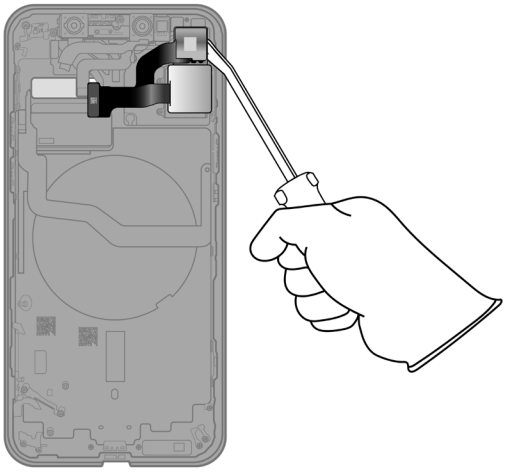
Fraction



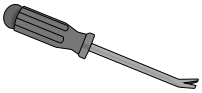
Rear camera shield

Fe
Ferrous

14. Pry off the rear camera.



Tools Used

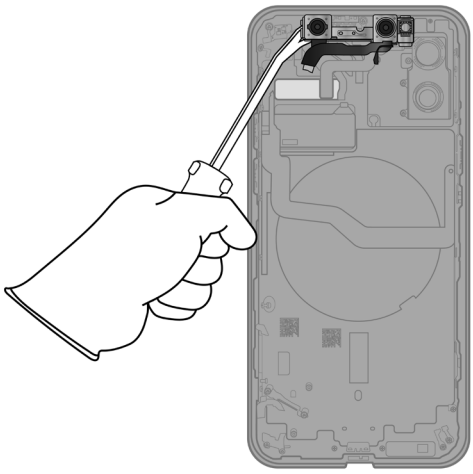


Fraction

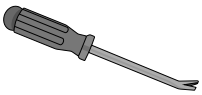
Rear camera

PMs
Precious Metals

15. Pry off the front camera.



Tools Used

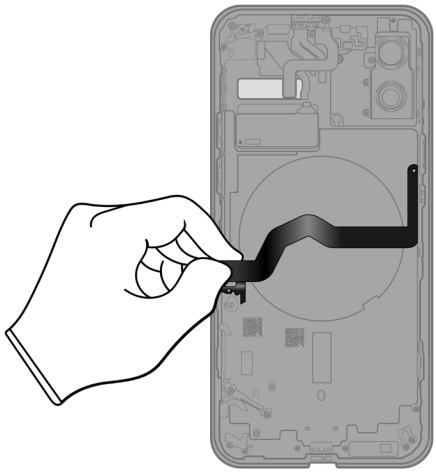


Fraction

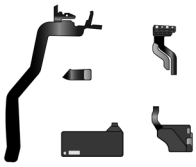
Front camera

PMs
Precious Metals

16. Pull the remaining ribbon cables off the enclosure.



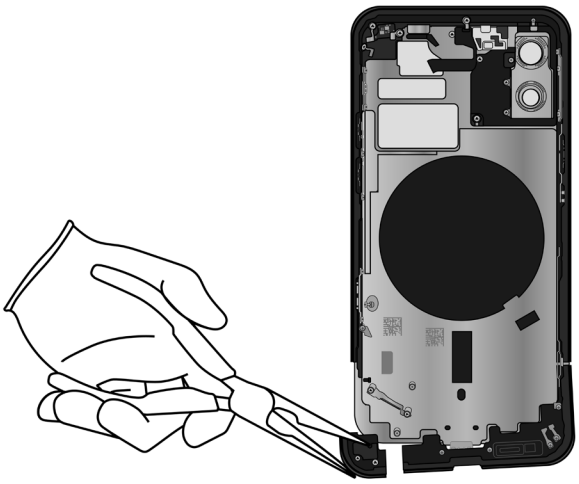
Fraction



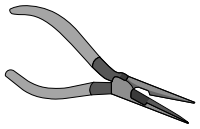
Ribbon cables

Cu
Copper

17. Pull the enclosure band off the support plate.



Tools Used



Fraction

Enclosure band

Al Aluminum

Fe Ferrous

Note: *The iPhone 12 and iPhone 12 Pro enclosure bands are made of different materials. The primary target material for the iPhone 12 enclosure band consists of aluminum. The target material for the iPhone 12 Pro enclosure band is ferrous.*

Fraction

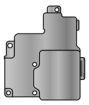
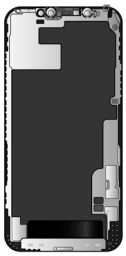
Support plate

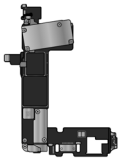
Cu Copper

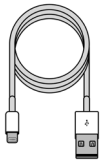
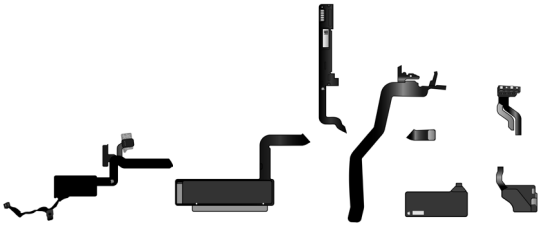
Material Categorization of Output Fractions

All outputs from this process must be managed, handled, and disposed of in accordance with applicable waste laws and regulations, including but not limited to the Waste Framework Directive and its national enactments in Europe.

Fraction	Downstream Processing
Aluminum	**Primary Target Material**
 *SIM tray*	
 *Enclosure band (iPhone 12)*	
Batteries	**Primary Target Material**
 *Lithium-ion polymer battery*	

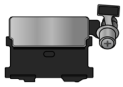
Fraction	Downstream Processing
Ferrous	**Primary Target Material**
 *Rear camera shield*	Fe Ferrous
 *Enclosure band (iPhone 12 Pro)*	
Glass	**Primary Target Material**
 *OLED display*	GL Glass
	Potential Additional Materials
	Cu Copper Au Gold ITO Indium Tin Oxide PL Plastics SS Stainless Steel

Fraction	Downstream Processing
Logic Boards	**Primary Target Material**
 *SIM card*	PMs Precious Metals
 *Main logic board*	**Potential Additional Materials**
 *Rear camera*	Al Aluminum Cu Copper Fe Ferrous
 *Front camera*	GL Glass PL Plastics

Fraction	Downstream Processing
Mixed Electronics  *Power adapter*  *Charge cable*  *Ribbon cables*  *Right microphone*	**Primary Target Material** Cu Copper **Potential Additional Materials** Fe Ferrous GL Glass PL Plastics PMs Precious Metals

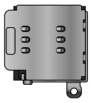
Fraction	Downstream Processing

Mixed Electronics (cont.)



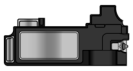
Lightning connector

Left microphone



SIM reader

Support plate

Fraction	Downstream Processing
Rare Earth Magnets  *Receiver*  *Speaker*  *Taptic Engine*	**Primary Target Material** REE Rare Earth Elements **Potential Additional Materials** Cu Copper Fe Ferrous PL Plastics W Tungsten