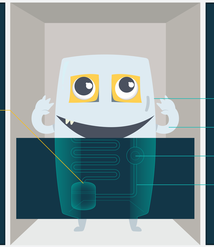
一號處理線
Processing Line 1

雪櫃小知識
Some facts about Refrigerators

氫氟碳化物 (製冷劑)
HFCs (Refrigerant)

在氟碳化物（HFCs）那一種雙這使用雪櫃的影響（如用「雪櫃」）。雖然氫氟碳化物在不屬於臭氧消耗物質，但成不是雖然的加剧氣候效應。它們是溫室排放物，以致干擾地球的氣候系統，並對人類構成嚴重威脅。

HFCs (Hydrofluorocarbons) are widely used as refrigerant in refrigerators. Although HFCs are not ozone-depleting substances, improper emission of HFCs can significantly contribute to climate change. HFCs are influential to climate change and thereby disrupt our planet's ecosystem, bringing serious threat to both the environment and human health.



① 前期準備 Pre-processing

我工會按電線、拔出的類型分類，再移除電源線、膠頭及其他物料（例如木材或玻璃部件）。

Refrigerators are sorted according to the types of refrigerants used. Cables, plugs and other materials (including wooden and glass components) are removed.

② 抽取製冷劑 Extraction of Refrigerant

雪櫃中的製冷劑會被收集，並抽取注入氣瓶內，以便送往特定設施以自手機保要求的方式處理。

Refrigerants are carefully extracted from the refrigerators, and stored temporarily in gas cylinders for transfer to dedicated facilities where they are treated in an environmentally-sound manner.

有害物質 Harmful Substances

- 氫氟碳化物
- 氯氟烴
- 揮發性有機化合物

以上有害物質會被抽取及運往特定的設施以自手機保要求的方式處理。

- HFCs (Hydrofluorocarbons)
- CFCs (Chlorofluorocarbons)
- VOCs (Volatile organic compounds)

These harmful substances are extracted for transfer to dedicated facilities where they are treated in an environmentally-sound manner.

③ 移除壓縮機及潤滑油 Removal of Compressor and Lubricating Oil

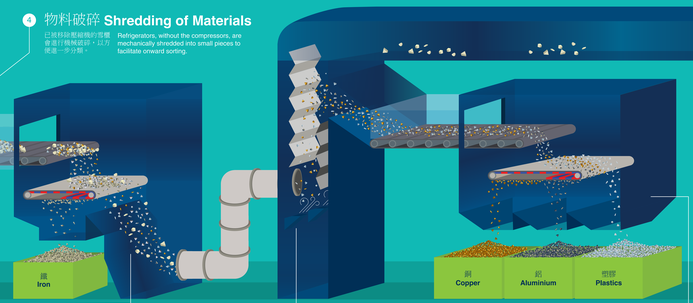
員工會用油壓剪/鑽開壓縮機從雪櫃機體拆出。之後壓縮機會被放置在金屬網上，以便將潤滑油排出收集箱內。收集箱會被送往特定設施回收或以其他合手機保要求的方式處理。

Staff removes compressors from refrigerators using hydraulic cutters, and drills holes into the compressors. The compressors are then placed onto metal grids to drain the lubricating oil into reception tanks. Afterwards, these tanks are transferred to dedicated facilities where the lubricating oil is recycled or otherwise treated in an environmentally-sound manner.

④ 物料破碎 Shredding of Materials

已被抽出壓縮機的雪櫃會進行機械破碎，以方便進一步分類。

Refrigerators, without the compressors, are mechanically shredded into small pieces to facilitate onward sorting.



⑤ 磁力分類 Sorting by Magnetic Field

經過傳送帶之後，黑色物料會被磁鐵吸收，其餘物料將繼續進行下一階段分類。

Using magnetic conveyor belt, ferrous metals are separated and collected. Remaining materials are moved along for further sorting.

⑥ 密度分類 Sorting by Density

經過之字形分離器時，較輕的聚胺酯（發泡膠）會被送收到分離器頂部收集，而較重的塑料/塑膠及非鐵金屬將會經由另一較低通道收集作進一步篩選。

Using zig-zag separator, lightweight polyurethane (PUR) foam is brought to the upper part by the air current, whereas the heavier plastics and non-ferrous metals are collected at the lower end for further sorting.

⑦ 渦電流分類 Sorting by Eddy Current

通電流分離器所產生的電磁場可以暫時磁化所有金屬，使其被吸附下，並藉此將其與不導電的塑膠物料分離。

Conductive materials such as copper and aluminium are temporarily magnetised by the electromagnetic field generated by the eddy current, thus separating them from non-conductive plastics.

⑧ 發泡膠脫氣 Foam Degassing

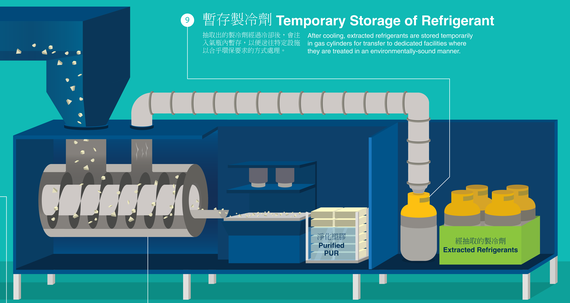
聚醚氨基甲酸乙酯(PUR)泡沫是絕緣材料，會在蒸氣處理後被清除。脫氣後，PUR 泡沫會被壓縮成塊狀，以便運輸。

The PUR foam used as insulation in refrigerators contain refrigerants that need to be extracted using steam. Degassed and purified PUR foam is then compressed into cubes for easier storage and transport.

⑨ 暫存製冷劑 Temporary Storage of Refrigerant

抽取出的製冷劑經過冷卻後，會在儲氣瓶內暫存，以便送往特定設施以合手機保要求的方式處理。

After cooling, extracted refrigerants are stored temporarily in gas cylinders for transfer to dedicated facilities where they are treated in an environmentally-sound manner.



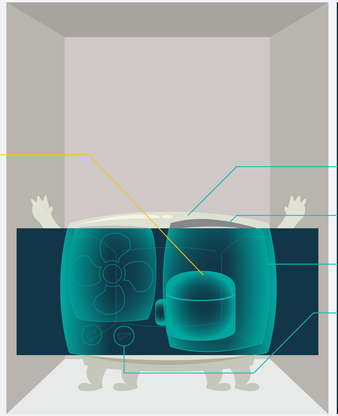
二號處理線
Processing Line 2

冷氣機小知識
Some facts about Air Conditioners

氟氯化碳 (製冷劑)
CFCs (Refrigerant)

氟氯化碳（CFCs）是一種廣泛使用於冷氣機的製冷劑。它會破壞臭氧層，從而減弱阻隔對地球生物有害的紫外線。過量接觸紫外線會增加患皮膚癌、白內障等疾病的風險。氟氯化碳亦是一種溫室氣體，會加劇氣候變化，以致干擾地球的生態系統，並對人類健康和環境構成嚴重威脅。

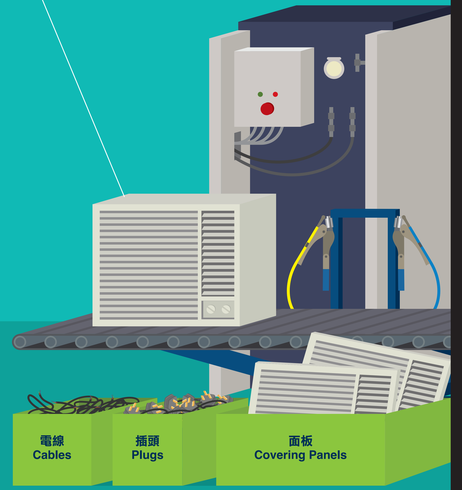
CFCs (Chlorofluorocarbons) are widely used as refrigerant in air conditioners. They are ozone depleting substances, reducing the ozone layer's capability to protect life forms on Earth from the exposure of harmful UV radiation. Excessive UV-radiation increases the risk of developing diseases such as skin cancer and cataracts. CFCs are also greenhouse gases and contribute to climate change, thereby disrupting our planet's ecosystem and bringing serious threat to both the environment and human health.



1 前期準備 Pre-processing

員工會按冷氣機所採用的製冷劑類型分類，並移除電源線、插頭以及面板等。

Air conditioners are sorted according to the types of refrigerants used. Cables, plugs, covering panels, etc. are removed.



2 抽取製冷劑 Extraction of Refrigerant

冷氣機中的製冷劑會被小心抽取並注入氣瓶內，以便送往特定設施以合乎環保要求的方式處理。

Refrigerants are carefully extracted from the air conditioners, and stored temporarily in gas cylinders for transfer to dedicated facilities where they are treated in an environmentally-sound manner.

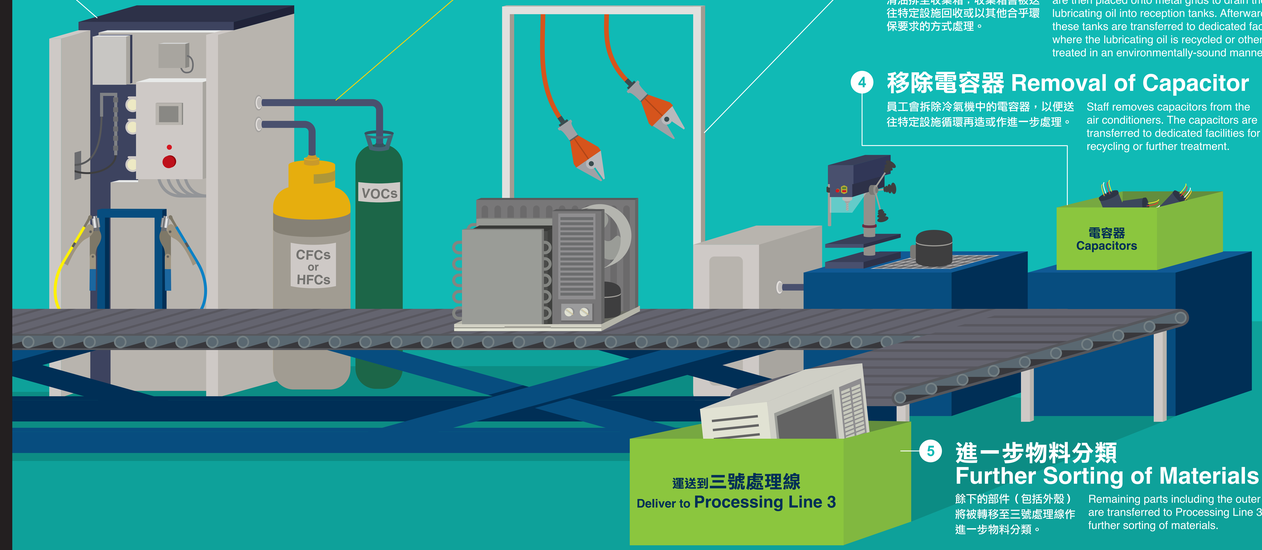
有害物質 Harmful Substances

- 氫氟碳化物
- 氟氯化碳
- 揮發性有機化合物

以上有害物質會被抽取及送往特定的設施以合乎環保要求的方式處理。

- HFCs (Hydrofluorocarbons)
- CFCs (Chlorofluorocarbons)
- VOCs (Volatile organic compounds)

These harmful substances are extracted for transfer to dedicated facilities where they are treated in an environmentally-sound manner.



3 移除壓縮機及潤滑油 Removal of Compressor and Lubricating Oil

員工會用油壓剪刀將壓縮機從冷氣機體移走，經鑽孔後，壓縮機會被放置在金屬網上，以便將潤滑油排至收集箱；收集箱會被送往特定設施回收或以其他合乎環保要求的方式處理。

Staff removes the compressors from the air conditioners using hydraulic cutters, and drill holes into the compressors. The compressors are then placed onto metal grids to drain the lubricating oil into reception tanks. Afterwards, these tanks are transferred to dedicated facilities where the lubricating oil is recycled or otherwise treated in an environmentally-sound manner.

4 移除電容器 Removal of Capacitor

員工會拆除冷氣機中的電容器，以便送往特定設施循環再造或作進一步處理。

Staff removes capacitors from the air conditioners. The capacitors are transferred to dedicated facilities for recycling or further treatment.

5 進一步物料分類 Further Sorting of Materials

餘下的部件（包括外殼）將被轉移至三號處理線作進一步物料分類。

Remaining parts including the outer shell are transferred to Processing Line 3 for further sorting of materials.

三號處理線
Processing Line 3

洗衣機小知識
Some facts about Washing Machines

製造洗衣機的主要原材料包括不銹鋼和塑料等金屬，並以表示的圖，顯示最常見最高的回收價值。鐵和銅是最有價值的金屬，而鋁和塑料則是次之。

Washing machines are mainly made of various types of plastics and metals, with stainless steel, copper and aluminum are the most valuable materials. Iron and copper are higher value, discounting those otherwise useful resources in our course (with space is certainly needed).

- 鐵 Iron
- 銅 Copper
- 鋁 Aluminium
- 塑膠 Plastics

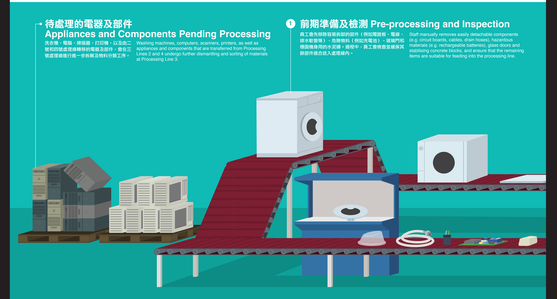
電腦小知識
Some facts about Computers

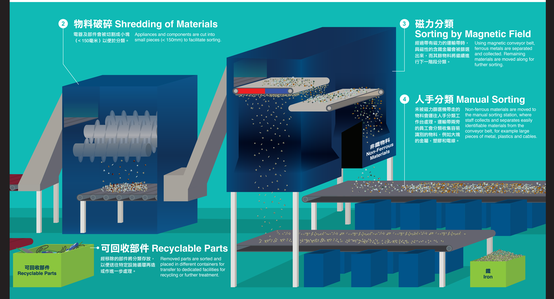
鎘 Cadmium

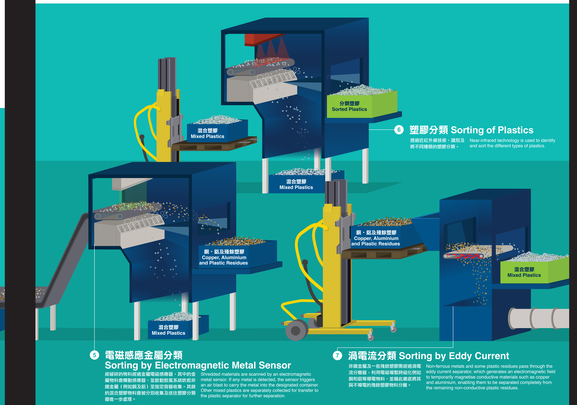
許多電腦、電視、打印機等機器含有鎘金屬的零件或組件，鎘是一種有毒的金屬，可以通過皮膚、肺部和消化系統進入體內。鎘會在體內積累，並在腎臟中積累，並且會對骨骼造成損傷。因此，在回收過程中，鎘會被釋放出來，對工人的健康構成潛在風險。因此，需要採取適當的安全措施，以保護工人免受鎘的影響。

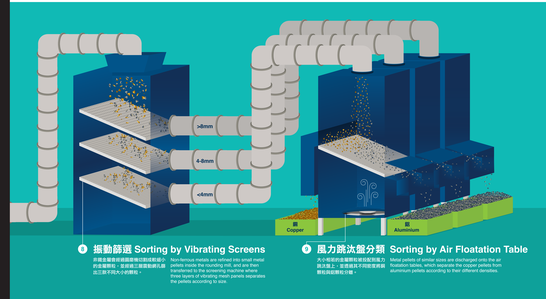
Screens, computers, printers and other devices contain components from metals and plastic components that contain cadmium. Cadmium is a toxic metal that can enter the body through the skin, lungs and digestive system. It accumulates in the kidneys and bones and causes damage to bones. Therefore, in the recycling process, cadmium may be released into the air, soil and water, posing a potential risk to the worker's health. Therefore, in the process of recycling, appropriate measures should be taken to deal with cadmium-ray damage such as lungs, central nervous system and kidneys damage.

- 鐵 Iron
- 銅 Copper
- 鋁 Aluminium
- 塑膠 Plastics



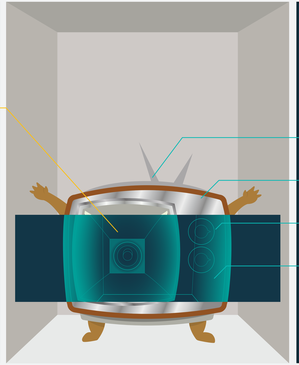






四號處理線（陰極射線管電視機及顯示器）
Processing Line 4 (CRT TVs and Monitors)

陰極射線管電視機及顯示器小知識
Some facts about CRT TVs and Monitors



鉛 Lead

陰極射線管中使用的玻璃加入了鉛以阻擋輻射。不當處理陰極射線管電視機和顯示器可能會引致泥土及水源受鉛污染，並在食物鏈中積累，對人類健康造成威脅。鉛攝取特別影響幼童的大腦及神經系統發展，亦會對成年人的腎臟、循環系統及生殖系統造成長遠損害。

Leaded glass is used in cathode ray tube (CRT) to block radiation. Improper disposal of CRT TVs and monitors could result in soil and water contamination and accumulation of lead in the food chain, posing threats to human health. Lead absorption particularly affects the development of the brain and nervous system of young children. Lead also causes long term harm in adults, including damages to the kidneys, circulatory system and reproductive system.

鐵 Iron

銅 Copper

鋁 Aluminium

塑膠 Plastics

1 前期準備 Pre-processing

員工會先拆除陰極射線管電視機和顯示器的外殼，移除電源線和插頭，以及機殘其他部件，例如電路板、電容器及喇叭等，以準備下一階段的除毒工序。

Staff prepares the CRT TVs and monitors for the detoxification process by removing the cases, cables and plugs, circuit boards, capacitors and speakers.

2 熱絲拆除錐管玻璃 Hotwire Removal of Funnel Glass

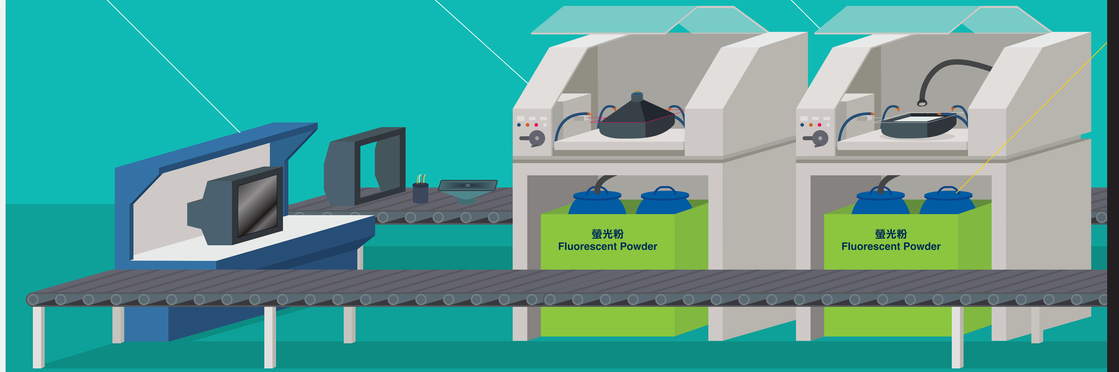
採用鎢絲加熱切割法，將玻璃屏幕和含鉛錐管玻璃分離，後者會被送往特定設施以合乎環保要求的方式處理。

Glass panels and lead-containing funnel glass are separated using hot wires. The funnel glass are transferred to dedicated facilities where they are treated in an environmentally-sound manner.

3 抽取螢光粉 Extraction of Fluorescent Powder

真空吸塵器會將玻璃屏幕內的螢光粉抽走至採集桶內。

A vacuum tube extracts fluorescent powder from the inner side of the glass panels and transfer the powder to collection barrels.



有害物質 Harmful Substances

- 螢光粉會隨空氣散播，而吸入螢光粉可導致腎功能受損及骨質疏鬆。

  Fluorescent powder may cause kidney damage and weakening of bones (osteoporosis) if inhaled.

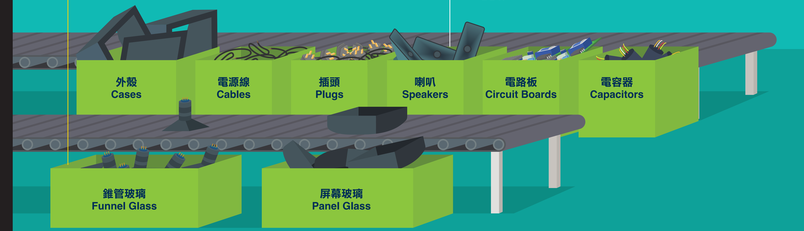
- 含鉛錐管玻璃。

  Lead-containing funnel glass.

4 可回收部件 Recyclable Parts

經移除的部件將分類存放，以便送往特定設施循環再造或作進一步處理：
- 外殼
- 電源線
- 插頭
- 喇叭
- 電路板
- 電容器

Removed parts are sorted and placed in different containers for transfer to dedicated facilities for recycling or further treatment:
- Cases
- Cables
- Plugs
- Speakers
- Circuit boards
- Capacitors



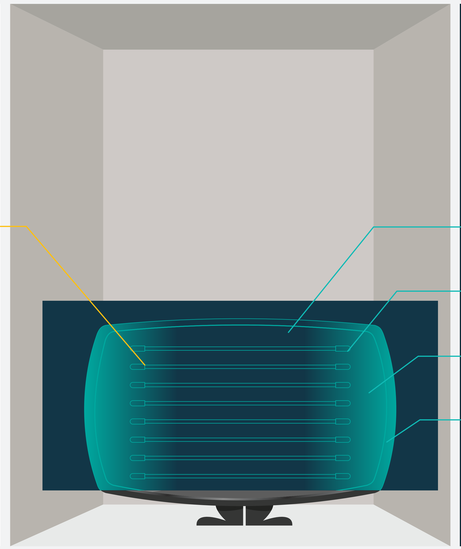
四號處理線（平面電視機及顯示器）
Processing Line 4 (Flat Screen TVs and Monitors)

平面電視機及顯示器小知識
Some facts about Flat Screen TVs and Monitors

汞 Mercury

液晶體電視機和顯示器含有汞（水銀）。當水銀落入河流、湖泊或海洋時，水銀可借助細菌變為甲基汞，隨後在魚和貝類中積累。食用含水銀的海產可能會破壞神經、呼吸及消化系統。

Mercury is present in fluorescent lamps in LCD screen televisions and monitors. When mercury enters rivers, lakes or seas, it can be transformed by bacteria into methylmercury, which then bioaccumulates in fish and shellfish. Consumption of seafood contaminated with methylmercury can cause damages to the nervous, respiratory and digestive systems.



鐵 Iron

銅 Copper

鋁 Aluminium

塑膠 Plastics

1 前期準備 Pre-processing

員工會按平面電視機及顯示器的屏幕尺寸及類別分類，再移除支架、電源線和插頭；剩餘的機身部份將透過輸送帶運往下一個工序作進一步處理。

Flat screen TVs and monitors are sorted and classified by size and type. Staff then removes the stands, cables and plugs, and transports the remaining parts along the conveyor belt for further processing.

2 機械臂自動切割屏幕 Automated Cutting of Screen by Robotic Arm

全自動機械臂會將顯示屏幕與機殼分離。機械臂裝有感應器，能自動按屏幕大小調整切割位置。此工序在負氣壓封閉式環境內進行，以防止水銀外泄。

Fully-automated robotic arm separates the display panel from the casing. The robotic arm is mounted with a sensor to automatically adjust the cutting position according to the size of the screen. This process is carried out in an enclosed environment under negative air pressure to prevent mercury leakage.

3 拆除含有水銀的螢光燈 Removal of Mercury-containing Fluorescent Lamp

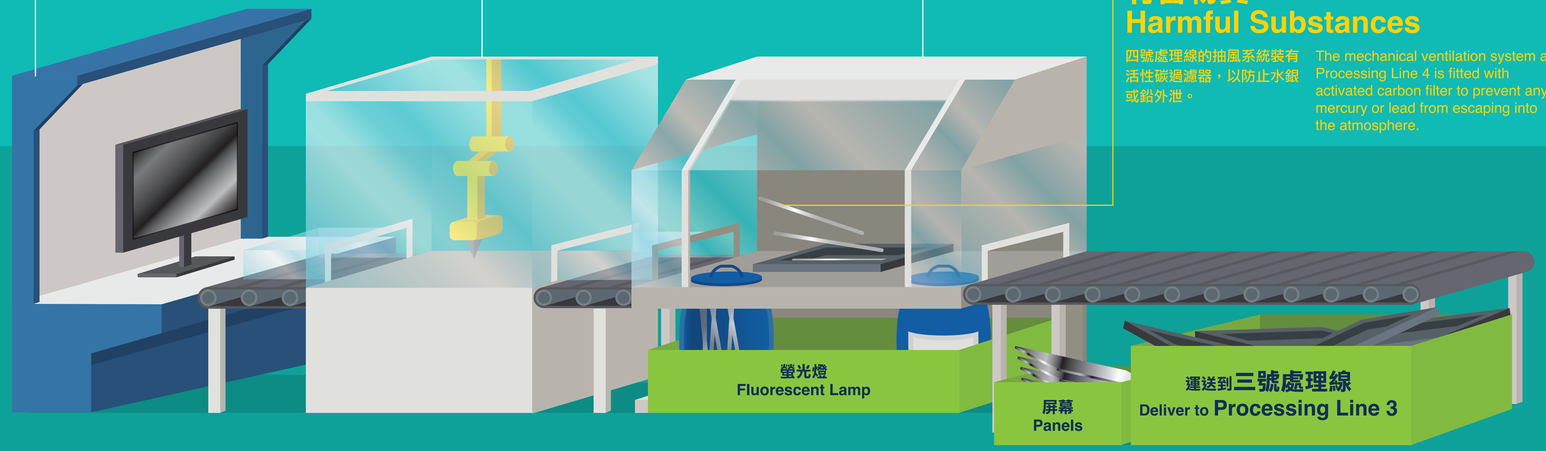
經切割後的電視機和顯示器會被輸送到負氣壓半封閉式工作台，讓員工在安全的環境下拆除顯示屏幕和含有水銀的螢光燈。後者會被送往特定設施以合乎環保要求的方式處理。

電視機和顯示器的剩餘部份將被轉移至三號處理線作進一步物料分類。

After the LCD panel is cut, the TV/monitor is transported to a semi-enclosed workstation under negative air pressure, so that staff can remove the display panel and the mercury-containing fluorescent lamps safely. The fluorescent lamps will be transferred to dedicated facilities where they are treated in an environmentally-sound manner.

Remaining parts of the TV/monitor are transferred to Processing Line 3 for further sorting of materials.

有害物質 Harmful Substances

四號處理線的抽風系統裝有活性碳過濾器，以防止水銀或鉛外泄。

The mechanical ventilation system at Processing Line 4 is fitted with activated carbon filter to prevent any mercury or lead from escaping into the atmosphere.