

MULTEC[®] Presentation

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1. MULTEC: Recycling of Lamps and Flat Screens



1. MULTEC: Recycling of Lamps and Flat Screens

One machine with 2 waste treatment processes:

1. Lamp treatment through the mixer in a batch process with a capacity of 1000 tons per year.
2. FPD treatment through the shredder process, a continues process with a capacity of 2000 tons per year.



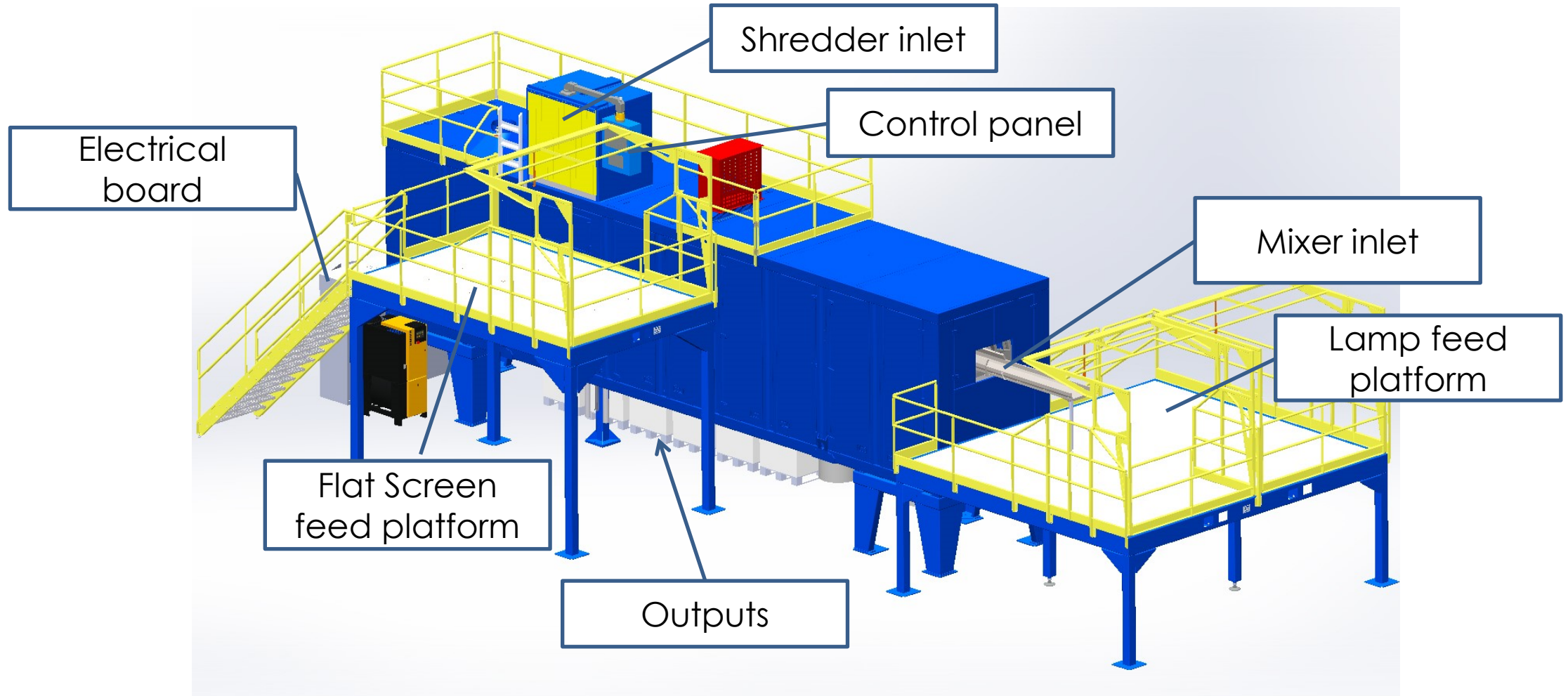
1. Example of a MULTEC Installation



The Sorting Machine

The MULTEC

1. Outside the MULTEC



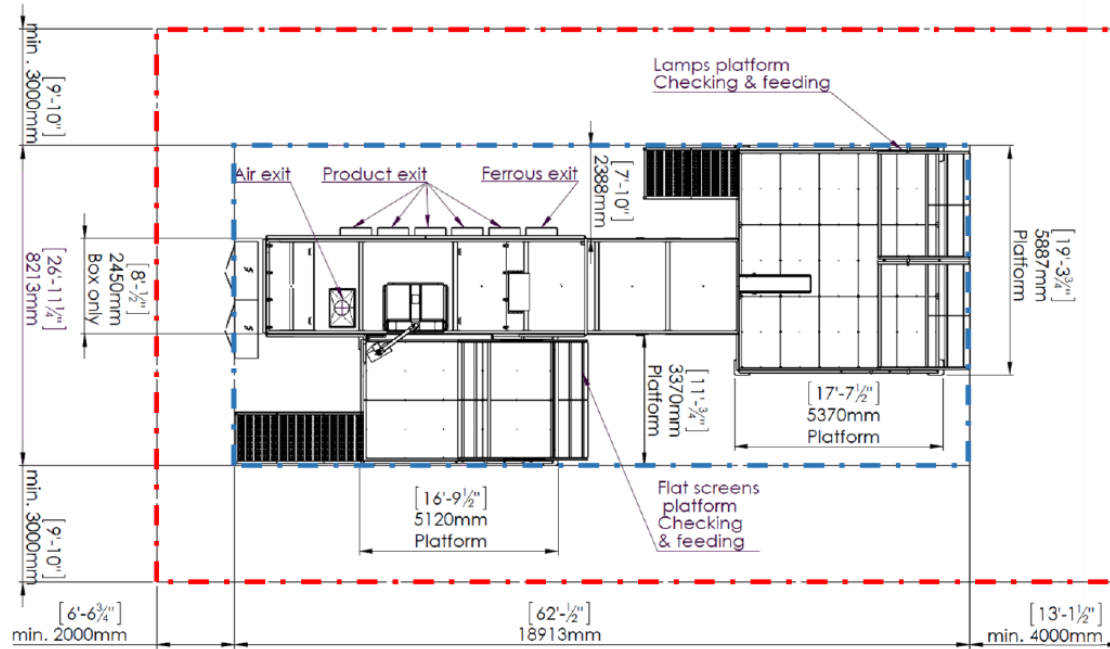
1. Space need for the Installation

Container (length x width x height): 12.20m x 2.50m x 3.00m
 Supports (height): 1.32m

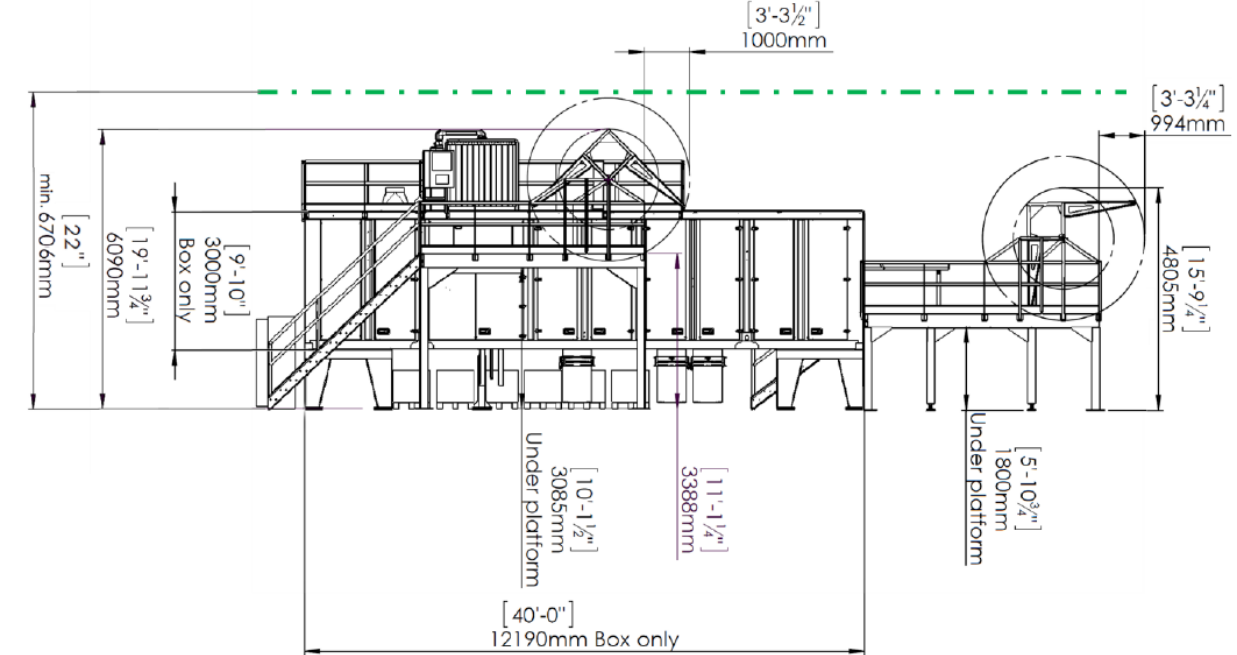
Required space (length x width x height): 25m x 14.2m x 6.7m

BLUE AREA: WHOLE BLUBOX

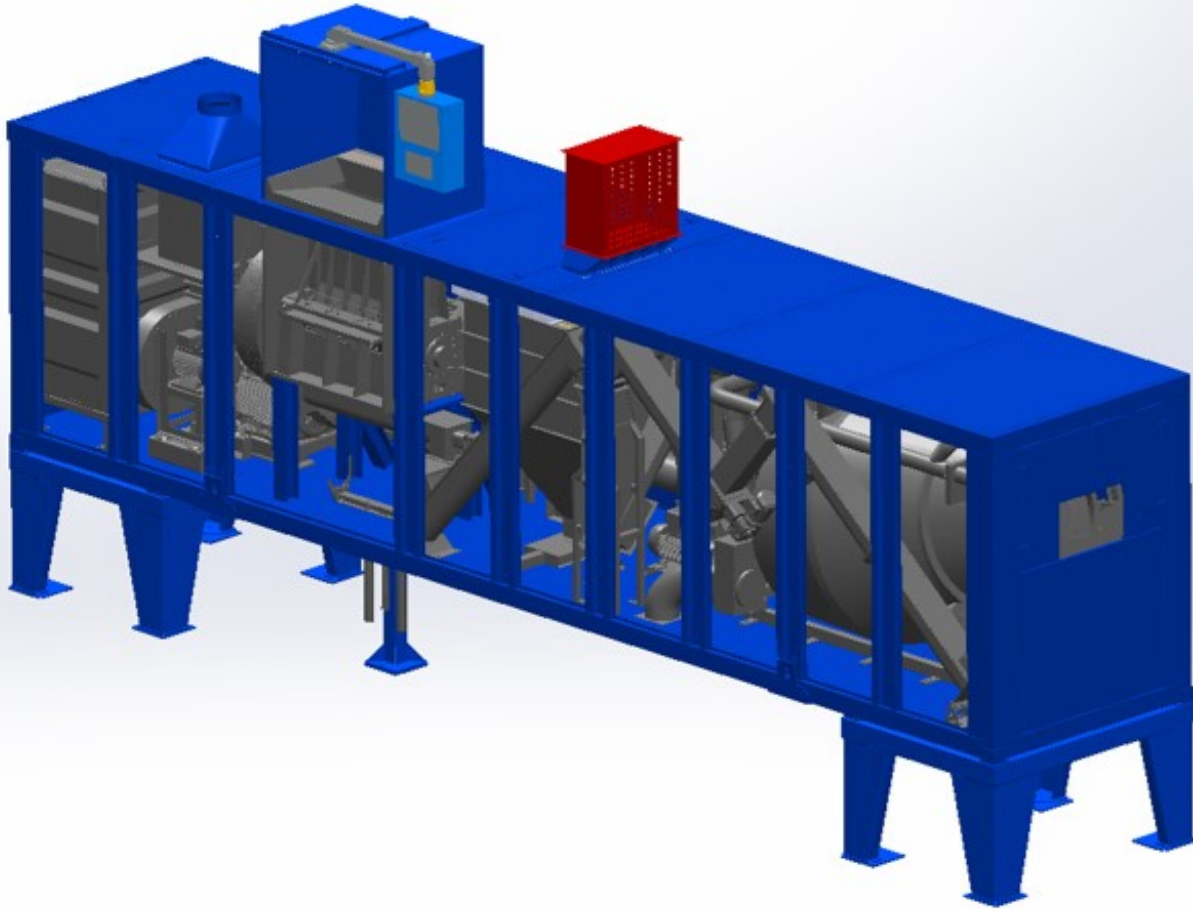
RED AREA: RECOMMENDED SPACE



GREEN LINE: MINIMAL REQUIRED HEIGHT



1. The Inside of the MULTEC



- The 40 feet container is packed with all the equipment.
 - 90 kVA Shredder
 - 4m3 Mixer
 - 5'000 m3/h air treatment system with Mercury and dust absorption.
 - A separation system with magnetic separation and drum screen.

1. MULTEC for the Recycling of Flat Screens and Lamps

“THE ALL-IN-ONE SOLUTION
IN A 40 FEET CONTAINER”



2. The Recycling Process

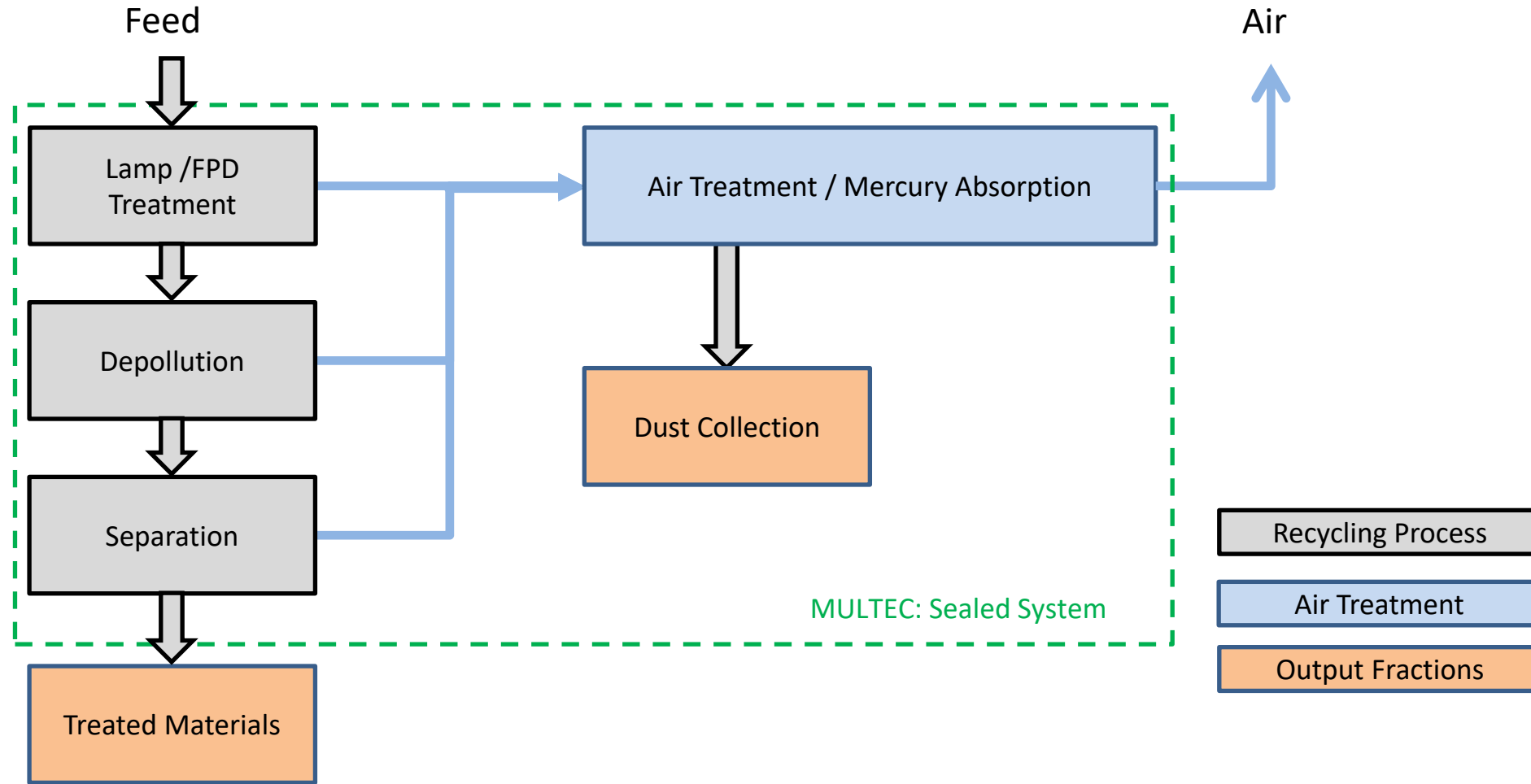


Shredder process to liberate the materials and make them available for cleaning and separation.

Separation process to separate the hazardous from the non-hazardous materials.

Sorting process to sort the materials in valuable fractions and down stream processing.

2. The Flow Chart



3. Flat Screen Recycling



The MULTEC can treat:

- All types of flat screens
- Throughput 1'000 kg/h or
 - 180 Monitors/h
 - 55 Televisions/h
- Flat screens up to 95 inch
- Plasma screens up to 55 inch

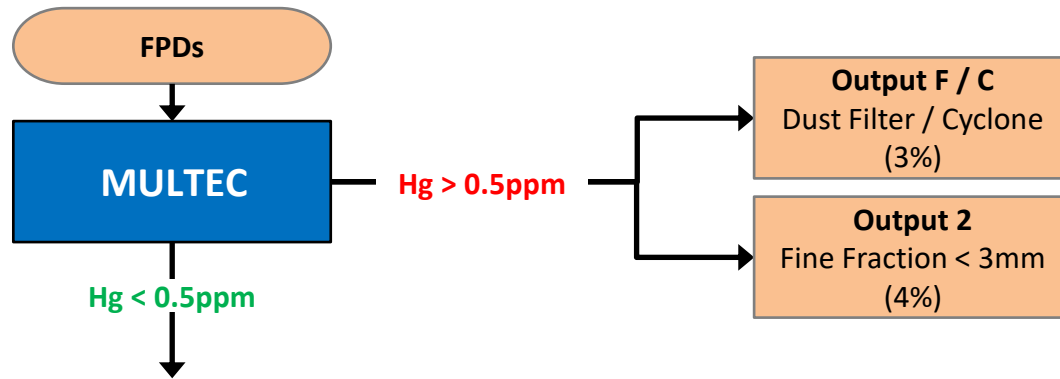
3. A Typical Mass Balance of Flat Screens



Description	Mass [%]
Ferrous metals	37.0
Aluminum, CrNi	8.0
Printed circuit boards (PCB) / Copper	7.0
Liquid crystal glass	5.0
PMMA	13.0
Mixed plastics	28.0
Backlights	1.0
Others	1.0
Total	100.0

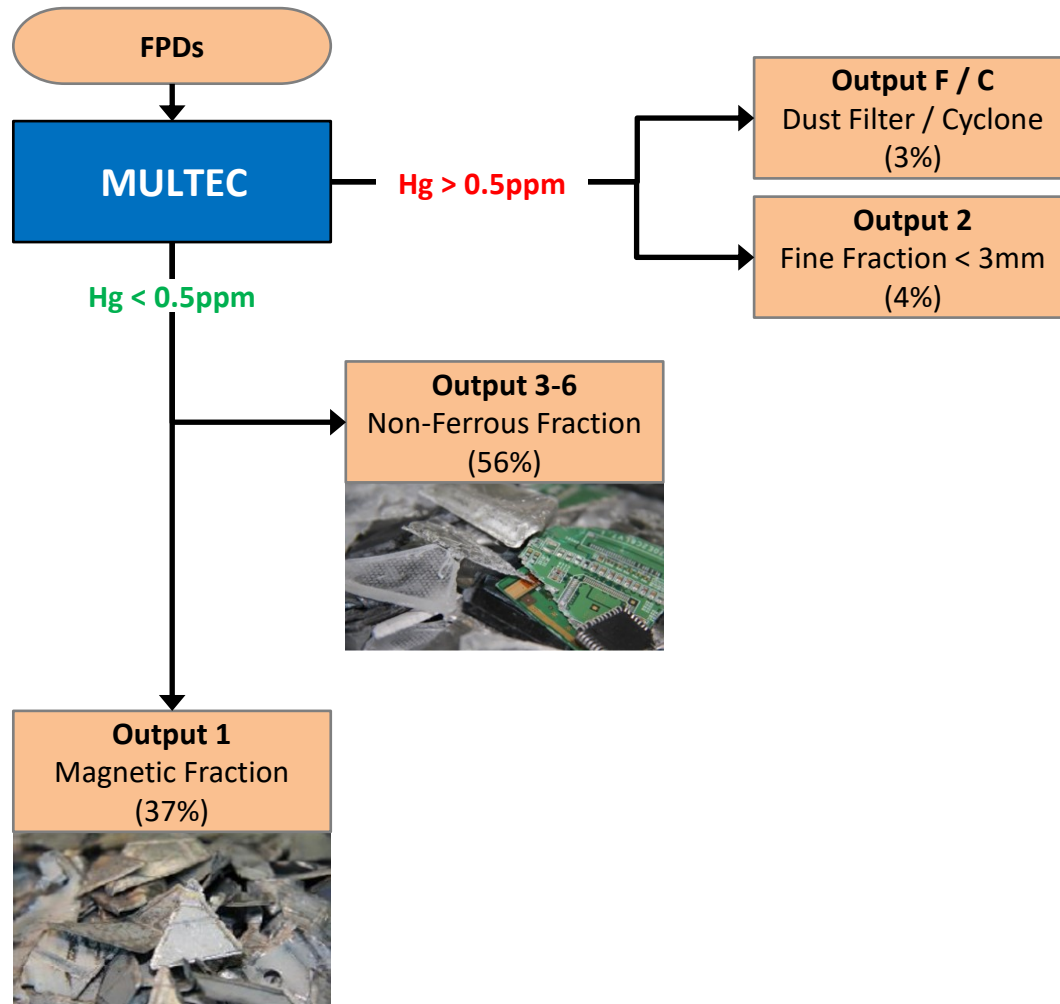
Source: MULBERRY WASTE LIMITED

3. Flat Screen Recycling



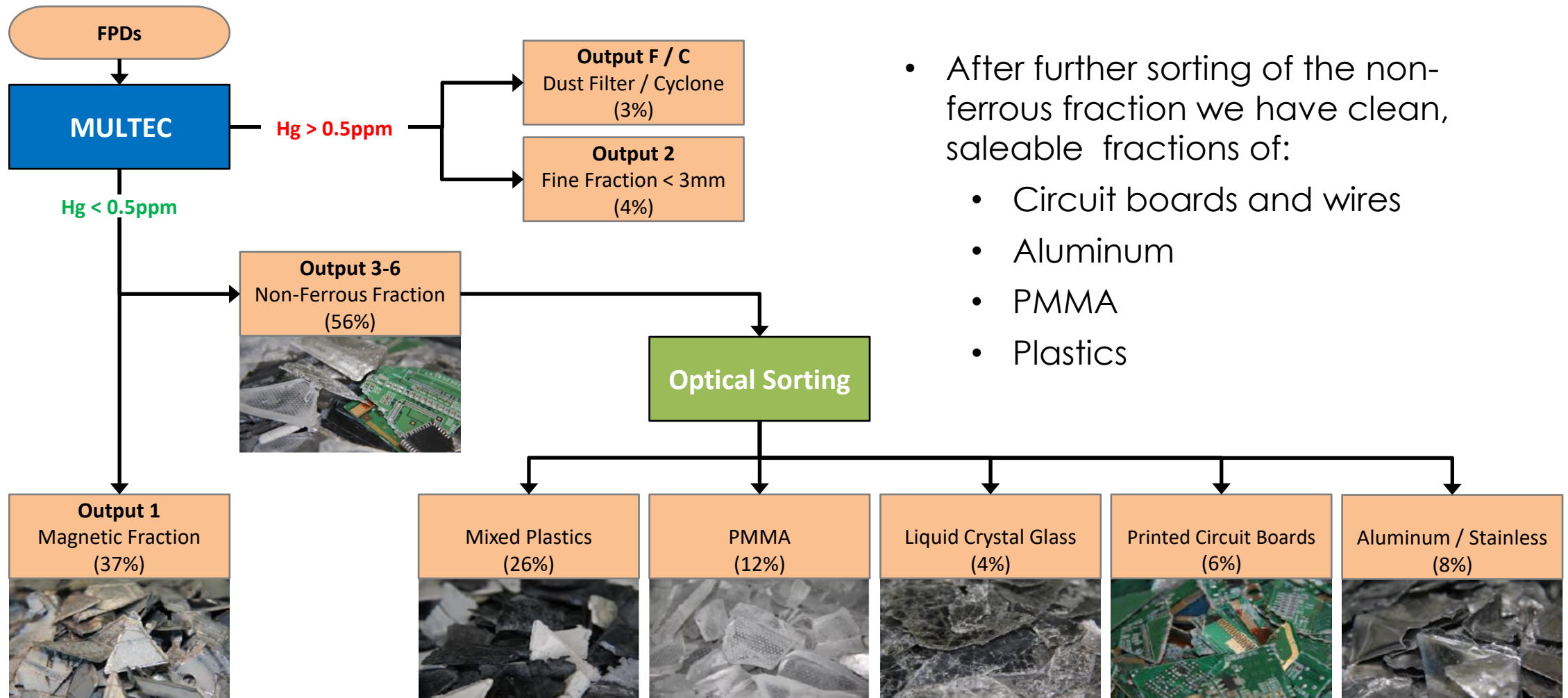
- The Flat Screens are shredded inside the MULTEC.
- Mercury vapor and dust are collected and absorbed by the air treatment system.
- Separation of the hazardous from the non-hazardous materials.

3. Flat Screen Recycling



- The shredded material is separated in a magnetic and a non-ferrous fraction.
- The magnetic fraction is an end product and can be sold without further treatment.
- The non-ferrous fractions needs further sorting to be valorized.

3. Flat Screen Recycling



4. Lamp Recycling



The MULTEC can treat:

- Straight fluorescent tubes
- Special forms and compact lamps
- Throughput 500 kg/h or
 - 2'500 tubes/h
- LED Lamps



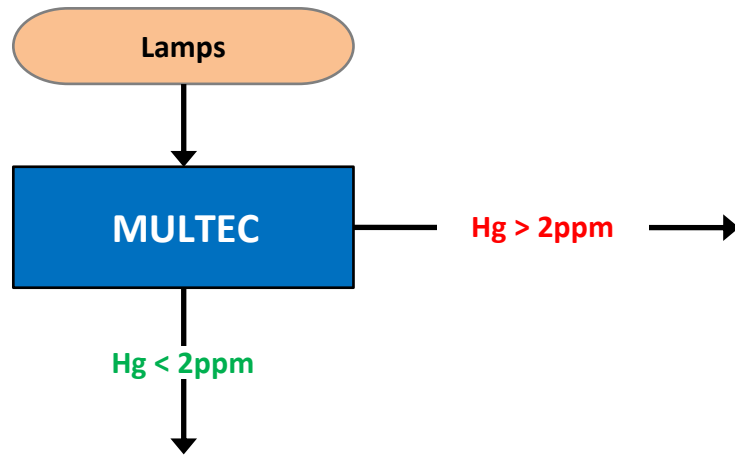
4. A Typical Mass Balance of Lamps



Description	Mass [%]
Magnetic fraction	2.2
Glass fine-grained fraction	5.4
Glass fraction	25.5
Glass fraction	51.5
Glass fraction	8.3
End Caps (Aluminum)	2.1
Fluorescent powder (Cyclone)	3.3
Fluorescent powder (Dust filter)	1.7
Total	100.0

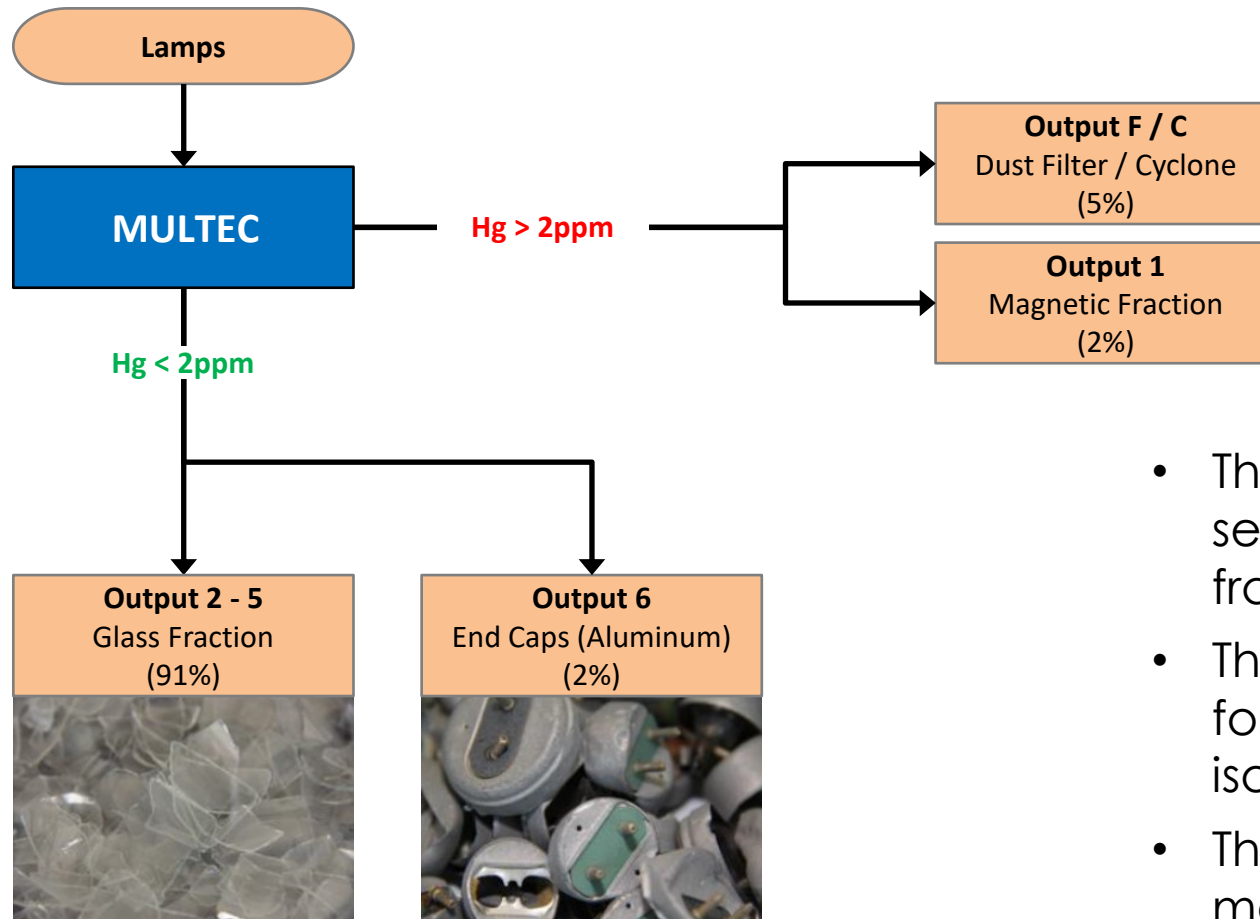
Source: MULBERRY WASTE LIMITED

4. Lamp Recycling



- The Lamps are crushed inside the MULTEC.
- Mercury vapor and dust are collected and absorbed by the air treatment system.
- Separation of the hazardous from the non-hazardous materials.

4. Lamp Recycling



- The cleaned material is separated in a glass and metal fraction.
- The glass fraction can be reused for the production new lamps or isolation material.
- The metal fractions goes to the metal recycling.

5. Other Materials to be Recycled

- Mobile Phones
- Laptops
- Desktop Computers
- Hard Drives and Storage Drives
- Small household appliance
- Etc.



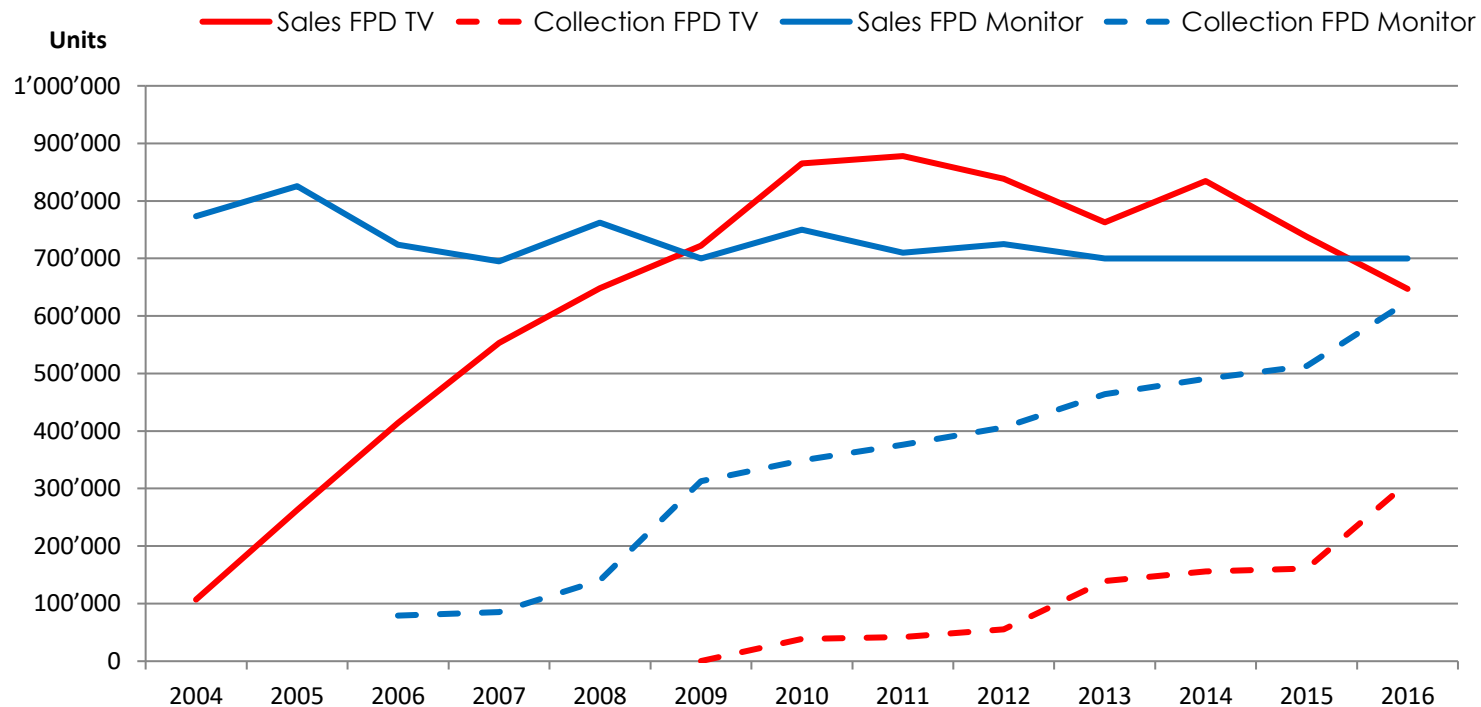
5. Data Destruction



- The MULTEC is equipped with a camera system to control the shredder room.
- This system can be used for the data destruction monitoring.
- The particle size of the output material can be adapted.
- The valorization of the shredded material can be increased through sorting.

6. Development of the Flat Screen Market

Sales and Collection of FPD's in UK



- Each year 2 people out of 10 buy a new flat screen.
- Flat screens are in use for 8 to 10 years.
- Today 50% are collected for recycled
- 75% are still with CCFL backlights
- Strongest market in numbers of units

6. Key Figures

- Treatment capacity of 3'000 tons per year
 - 2'000 tons of flat screens
 - 1'000 tons of lamps
 - No size limitation for flat screens
- Safe & Secure
 - Powerful aspiration and filter system
- Low operation and maintenance costs

