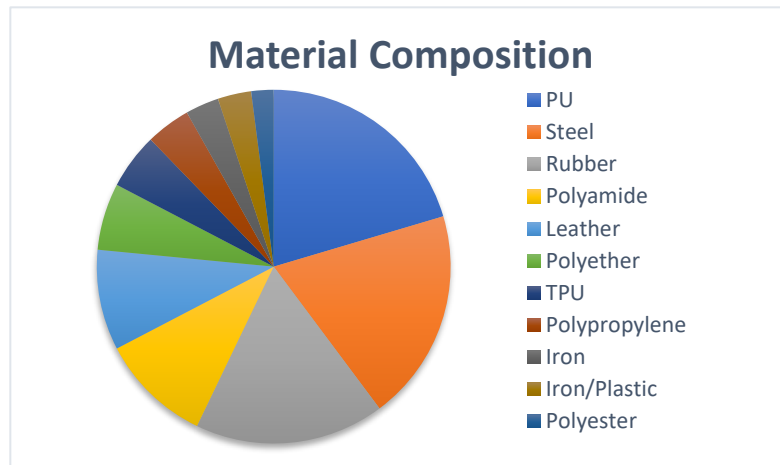

Dashboard CFA

This document provides detailed information on the environmental impact of recycling materials used in safety shoes.

General assumptions:

Weight of 1 pair safety shoes: 1,3 kg

Materials: PU (20%); Steel (19%); Rubber (17%); Polyamide (10%); Leather (9%); Polyether (6%); TPU (5%); Polypropylene (4%); Iron (3%); Iron / Plastic (3%); Polyester (2%); Glue - polychloroprene latex (50% water) (1%); PET 100% recycled (1%); Polyethylene



Reference: Digital Product Passport Grisport 803

Shoes Collected

Our recycling program aims to collect a wide variety of work and safety shoes from different brands and conditions. To facilitate the collection process, we provide two types of collection bags to our customers, each designed to accommodate a specific number of shoes.

Assumptions:

Types of Collection Bags:

1. Small Collection Bag:
 - Capacity: Up to 15 pairs of safety shoes
 - Dimensions: Approximately 60 cm x 40 cm x 40 cm
 - Weight when full: Approximately 19.5 kg (assuming an average weight of 1.3 kg per pair)
2. Large Collection Bag:
 - Capacity: Up to 150 pairs of safety shoes
 - Dimensions: Approximately 120 cm x 100 cm x 100 cm
 - Weight when full: Approximately 195 kg (assuming an average weight of 1.3 kg per pair)



Potential Energy Savings

CFA contributes to SDG 7- 'Affordable and clean energy' by reducing energy consumption through stimulating the use of recycled materials as alternative to generally more energy-intensive virgin materials.

To estimate the energy savings from using recycled materials in manufacturing safety shoes weighing 1.3 kg with the specified material breakdown, we use typical energy savings values for each material.



Methodology:

Material Breakdown by Weight: Calculate the weight of each material in the safety shoe.

Energy Savings Factors: Apply typical energy savings factors for recycling each type of material compared to using virgin materials.

Calculate Energy Savings: Multiply the weight of each recycled material by its respective energy savings factor.

Methodology Summary

The energy savings factors were applied to the weight of each material component in the safety shoe based on typical percentages of energy conserved by recycling versus using virgin materials. Conversion factors for each material type were used to estimate energy savings in kWh.

Assumptions

For these calculations we assume the ideal situation in which all materials are recycled into high quality materials that can be used for new applications. The energy saving outcome represents the potential energy savings. The energy regain from incinerating the materials is not included in the calculation.

Conversion Factors:

To convert from kg to kWh, we use approximate energy content values for each material. Here are some typical values:

- Steel/Iron: 5.3 kWh/kg
- Plastics (PU, Polyamide, Polyether, TPU, Polypropylene, Polyester): Approx. 2.5 kWh/kg
- Rubber: 2.8 kWh/kg
- Leather: 2.5 kWh/kg

Material Breakdown and Energy Savings:

Based on the material composition of the safety shoe and typical energy savings for recycling, here is the estimated energy savings in kWh for recycling 1.3 kg of safety shoes:

- **PU:** $0.195 \text{ kg} * 2.5 \text{ kWh/kg} = 0.488 \text{ kWh}$
- **Steel:** $0.185 \text{ kg} * 5.3 \text{ kWh/kg} = 0.982 \text{ kWh}$
- **Rubber:** $0.155 \text{ kg} * 2.8 \text{ kWh/kg} = 0.433 \text{ kWh}$
- **Polyamide:** $0.091 \text{ kg} * 2.5 \text{ kWh/kg} = 0.228 \text{ kWh}$
- **Leather:** $0.059 \text{ kg} * 2.5 \text{ kWh/kg} = 0.146 \text{ kWh}$
- **Polyether:** $0.055 \text{ kg} * 2.5 \text{ kWh/kg} = 0.137 \text{ kWh}$
- **TPU:** $0.046 \text{ kg} * 2.5 \text{ kWh/kg} = 0.114 \text{ kWh}$
- **Polypropylene:** $0.036 \text{ kg} * 2.5 \text{ kWh/kg} = 0.091 \text{ kWh}$
- **Iron:** $0.029 \text{ kg} * 5.3 \text{ kWh/kg} = 0.155 \text{ kWh}$
- **Iron/Plastic:** $0.028 \text{ kg} * 3.9 \text{ kWh/kg} = 0.110 \text{ kWh}$
- **Polyester:** $0.018 \text{ kg} * 2.5 \text{ kWh/kg} = 0.046 \text{ kWh}$

Total Estimated Energy Savings per pair of recycled safety shoes: 2.928 kWh

References

1. **U.S. Environmental Protection Agency (EPA)**

- General information on recycling and energy savings: [EPA Recycling Basics](#)
- Specific data on energy savings from recycling various materials: [WARM Model](#)
 - ❖ [Recycled Content \(ReCon\) Tool | US EPA](#)

2. **European Environment Agency (EEA)**

- Reports and data on waste recycling rates and environmental impacts: [EEA Waste and Recycling](#)
- Information on the benefits of recycling and resource efficiency: [EEA Circular Economy](#)

3. **European Commission**

- Circular Economy Action Plan: [Circular Economy Action Plan](#)

4. **Everyday Recycler**

- Insights on energy savings from recycling: Everyday Recycler

5. **American Geosciences Institute**

- Information on energy savings from recycling specific materials: American Geosciences Institute

6. **Recycling Partnership**

- Interactive tools and data on recycling impacts: [Recycling Partnership](#)

7. **U.S. Energy Information Administration (EIA)**

- General data on energy use and conservation: [EIA](#)

Potential Water Savings

CFA contributes to SDG 6- 'Clean water and sanitation' by reducing water consumption through stimulating the use of recycled materials as alternative to generally more water-intensive virgin materials.

To calculate the water savings from recycling the materials in a safety shoe weighing 1.3 kg with the specified material breakdown, we use typical water savings data for recycling each type of material.



Methodology for Calculating Water Savings

The water savings from recycling materials used in safety shoes are estimated based on typical water savings for recycling compared to producing the same materials from virgin resources. The following steps outline the methodology used to calculate the water savings:

Material Composition

The first step involves identifying the composition of the safety shoes. For this example, we use the following material breakdown for a safety shoe weighing 1.3 kg (See [Assumptions](#))

Water Savings Factors for Each Material

Here are the approximate water saving factors for each material type:

- **Plastics (PU, Polyamide, Polyether, TPU, Polypropylene, Polyester):** Approximately 1,800 liters/kg (we use the factor of the most widely used plastic for simplicity – PU).
- **Steel/Iron:** Approximately 1,200 liters/kg.
- **Rubber:** Approximately 4,000 liters/kg.
- **Leather:** Approximately 17,000 liters/kg (water savings due to the water-intensive tanning process)

Material	Water Savings Factor (liters/kg)	Weight (kg)	Water Savings (liters)
PU	1800	0,26	468
Steel	1200	0,247	296,4
Rubber	4000	0,221	884
Polyamide	1800	0,13	234
Leather	17000	0,117	1989
Polyether	1800	0,078	140,4
TPU	1800	0,065	117
Polypropylene	1800	0,052	93,6
Iron	1200	0,039	46,8
Iron/Plastic	1500	0,039	58,5
Polyester	1800	0,026	46,8

Total Estimated Water Savings per pair of recycled safety shoes: 4.374,5 liters.

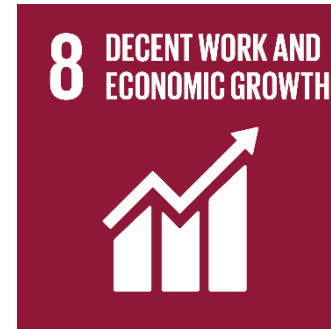
References

1. **U.S. Environmental Protection Agency (EPA)**
 - General information on water reuse and recycling: [EPA Water Reuse](#)
 - Data on water savings from recycling various materials: [WARM Model](#)
2. **European Environment Agency (EEA)**
 - Reports and data on water recycling rates and environmental impacts: [EEA Water Reuse](#)
 - Information on the benefits of recycling and resource efficiency: [EEA Circular Economy](#)
3. **European Commission**
 - Guidelines and regulations on water reuse and recycling: [European Commission Water Reuse](#)
 - Circular Economy Action Plan: [Circular Economy Action Plan](#)
4. **Everyday Recycler**
 - Insights on water savings from recycling: Everyday Recycler
5. **American Geosciences Institute**
 - Information on water savings from recycling specific materials: American Geosciences Institute
6. **BioEnergy Consult**
 - Data on water conservation through recycling: BioEnergy Consult
7. **Recycling Partnership**
 - Interactive tools and data on recycling impacts: [Recycling Partnership](#)
8. **U.S. Energy Information Administration (EIA)**
 - General data on energy and water use and conservation: [EIA](#)

Social Work Hours Generated

CFA contributes to SDG 8- 'Decent work and economic growth' by collaborating with Stepa, a company that offers sheltered workshop-places.

The following is a detailed calculation of the social work hours generated per pair of safety shoes through our collection and recycling process.



Methodology

To calculate the social work hours generated per pair of safety shoes, we:

1. Sum the total duration for processing one collection unit.
2. Convert the total duration from minutes to hours.
3. Divide the total hours by the number of pairs of safety shoes in a collection unit to find the work hours generated per pair of safety shoes.

Assumptions

In our small collection unit fits up to 15 pairs of safety shoes. In our large collection unit fits up to 150 pairs of safety shoes.

All tasks performed at our distribution center related to the collection process contribute to social work hours.

Tasks and Estimated Duration

The tasks involved in processing a collection unit and their estimated durations are as follows:

1. **Prepare order:** 15 minutes
2. **Packaging the collection unit:** 10 minutes
3. **Place pick-up order:** 10 minutes

Calculations

Total Duration for One Collection Unit:

- Prepare order: 15 minutes
- Packaging the collection unit: 10 minutes
- Place pick-up order: 10 minutes

Total duration: $15 + 10 + 10 = 35$ minutes

Convert Minutes to Hours:

Total duration in hours = 35 minutes = 0,58 hours

Work Hours Generated per pair Safety Shoes:

Work hours per pair = 0,58 hours / 150 pairs = 0,0038 hours per pair

Work hours generated per Collection Unit:

- Small Collection Unit: 15 pair * 0,0038 = 0,058 hours
- Large Collection Unit: 150 pair * 0,0038 = 0,58 hours

Summary

For every pair of safety shoes processed through our recycling program, approximately 0,0038 hours (or about 0,23 minutes) of social work hours are generated. This calculation highlights the additional social value created through our collecting and recycling efforts, providing meaningful employment opportunities to individuals who face challenges in the traditional job market.

References

Stepa Afwerking BV - [Certificate Social enterprise for Stepa Afwerking BV - Stepa](#)

CO2 reduction

CFA contributes to SDG 13- 'Climate Action' by reducing CO2 emission through stimulating the use of recycled materials as alternative to virgin materials.

To calculate the CO2 emissions from recycling the materials in a safety shoe weighing 1.3 kg with the specified material breakdown, we use typical CO2 reduction data for recycling each type of material.



Methodology

To calculate the potential CO2-reduction per pair of safety shoes:

- We used the Cirmar tool to calculate the environmental impact of a standard safety shoe, which is incinerated at the end-of-life.
- We used the Cirmar tool to calculate the environmental impact of a standard safety shoe, which is recycled at the end-of-life.
- We calculated the difference in environmental impact between the shoe, which is recycled and the shoe, which is incinerated.

Assumptions

1. We used the bill of materials of the reference safety shoe (mentioned under general assumptions) to calculate the CO2-impact.
2. We assume the optimal scenario in which the safety shoe will be 100% recycled into materials that can be 100% reused in a new shoe.
3. Scope: LCA+; the LCA+ scope is an LCA that includes the first step of the next life cycle. That is, if recycled materials that are retrieved from waste of the previous lifecycle are used to produce new shoes, less virgin materials are needed in the next lifecycle and the more positive the impact will be on the carbon footprint.

CO2 Savings Factors

We will use typical CO2 savings factors for recycling each material, expressed in kg CO2 eq saved per kg of material recycled.

Here are the approximate values:

- **Plastics:** 864,5 kg
- **Metals:** 305,5 kg
- **Biogenics:** 123,5 kg

Calculations

Material Weights:

- PU: 0.26 kg
- Steel: 0.247 kg
- Rubber: 0.221 kg
- Polyamide: 0.13 kg
- Leather: 0.117 kg
- Polyether: 0.078 kg
- TPU: 0.065 kg
- Polypropylene: 0.052 kg
- Iron: 0.039 kg
- Iron/Plastic: 0.039 kg
- Polyester: 0.026 kg

Total CO2 savings:

Impact Shoes Incinerated (Kg)	Impact Shoes Recycled (Kg)	Potential CO2 Savings (Kg)
11,46	6,1	5,56

Summary:

By recycling the materials in a single pair of safety shoes, approximately 5,56 kg of CO2 emissions can be saved. This significant reduction highlights the environmental benefits of recycling over using virgin materials.

References:

- Cirmar LCA+ calculator