

Description of Items

Functional unit



- Single-use Coverall**
- Lifespan: 1 use
 - Materials: Virgin Polyester, Polypropylene, Rubber, PET



- SmartPPE**
- Lifespan: 100 uses
 - Materials: Virgin Polyester, Polypropylene, Rubber, PET

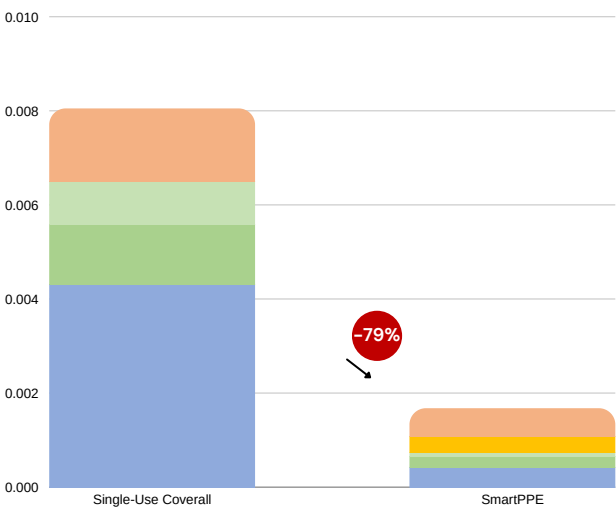
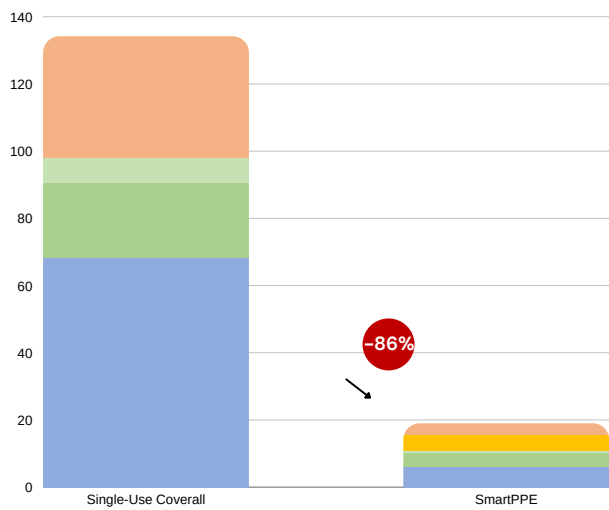
100 uses of a coverall (EBOLA)

Item	Use life	Reference Flows
Single-Use	1	100
SmartPPE	100	1

Assumptions

Both products are manufactured from locally sourced materials in China and transported to the field by ship. SmartPPE is assumed to be washed after every use with tap water, chlorine and soap. Open burning in considered as end of life.

Results of the computation



Stage	kgCO ₂ e	
	Single Use	SmartPPE
Raw Material	68.28	6.10
Production	22.44	4.08
Transportation	7.33	0.74
Use	0.00	4.61
End-of-Life	36.15	3.47

Stage	Human Health	
	Single Use	SmartPPE
Raw Material	4.30E-03	4.09E-04
Production	1.29E-03	2.34E-04
Transportation	9.01E-04	9.08E-05
Use	0.00E+00	3.52E-04
End-of-Life	1.56E-03	5.92E-04

Variations (% from baseline figures presented above)

To use recycled materials

Computation made by considering 100% recycled raw materials for products

kgCO ₂ e	
Single-Use	SmartPPE
-25%	-87%
Human Health	
Single-Use	SmartPPE
-26%	-80%

To use renewable energy for production

Computation made by considering 100% of renewable energy in factory mix

kgCO ₂ e	
Single-Use	SmartPPE
-14%	-88%
Human Health	
Single-Use	SmartPPE
-11%	-81%

To ship via air freight

Computation made by considering overseas shipping by air

kgCO ₂ e	
Single-Use	SmartPPE
+37%	-82%
Human Health	
Single-Use	SmartPPE
+23%	-76%

To dispose via recycling

Computation made by considering waste sent to recycling facilities

kgCO ₂ e	
Single-Use	SmartPPE
-15%	-86%
Human Health	
Single-Use	SmartPPE
-11%	-86%

Best Possible Scenario

Recycled + Renewable + Collected for Recycling

kgCO ₂ e	
Single-Use	SmartPPE
-39%	-90%
Human Health	
Single-Use	SmartPPE
-37%	-89%

Analyses

To reduce the environmental impact of single-use coveralls, significant improvements can be made by focusing on **raw materials** and the energy used during manufacturing. However, the greatest reductions are possible by switching from **single-use to reusable coveralls**. It is important to highlight that this study focuses on two main indicators: climate change and human health. Other impact categories, such as ecosystem quality and water usage, are not covered. For example, **the reusable coverall requires approximately 1,000 litres of water** for cleaning over its lifespan.

Emission factors

The values displayed here are not per functional unit but per item. These values can be used to compute a carbon footprint of an organisation and can be adapted to a specific case using the tool

Name	GHG Protocol Categories	kgCO ₂ e/unit	
		Single-Use	SmartPPE
Cradle-to-grave	N/A	1.34	19.0
Cradle-to-gate	3.1 Purchased Goods	0.92	10.3

References

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About this project

Designing methodologies and performing life cycle analyses of high-impact items to build a GHG emission factor and environmental impact database adapted to the humanitarian sector with the goal of identifying key strategies to reduce environmental impacts.

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