



Report on the life cycle assessment comparison between a value retention system based on a removable polymer dispersion and a value retention system based on a 2-component permanent sealer (Extract)

Customer:

Dr. Schutz GmbH Holbeinstraße 17 53175 Bonn Germany

Kiwa GmbH Voltastraße 5 13355 Berlin Germany

Dr. Schutz[®]



Project manager:

Project management:

Publication date:

05/05/2023

Stella Unruh (de.nachhaltigkeit@kiwa.com)

Cut-off criteria

All flows which influence is higher than 1% on the total mass, energy or environmental impact are included in the LCA. It can be assumed that the neglected processes would have contributed less than 5% to the impact categories considered.

A4 consists of the delivery from the factory to the store/buyer, which was calculated according to the supplied data to an average value of 667 km (see explanation in 3.5). Furthermore, the transportation from the store/buyer to the construction side is part of A4. As this in comparison is small, and highly variable it was cut off as a variability is already covered under the average transportation distance to the store/buyer.

Concerning the installation process A5, a sand paper strip is needed, which consists of polyamide, synthetic resin and ceramic sand. No data was available on durability of one strip and detailed composition concerning masses. As the amount needed for 1m² floor is assumed to be negligibly small and the data situation as poor as described, the sand paper was cut off. Same accounts for the labels applied to the canisters, bottles and cardboards and the stretching foil used on the pallets in A3. No detailed data was available and amount can be assumed to be negligible small scaled down on the used amount. The IBC containers and the pallets are re-used and were therefore not considered in A3.

CO₂ footprint

Table 1 shows the difference between the CO₂ footprint of the different systems, and thus the amount of CO₂ that is saved when using Dr. Schutz® PU Sealer for $1m^2$ instead of either of the Dr. Schutz® Secura systems for $1m^2$.

Table 1: Differences and total savings between the CO_2 footprints of Dr. Schutz® PU Sealer (System 1 + 2) and both systems of Dr. Schutz® Secura, based on the GWP total (kg CO_2 Eq.)

System 1: New floor		
With PU Sealer	2,72	
With Secura	10,66	
Total savings	7,94	
In %	<u>292%</u>	
System 2: Old floor		
With PU Sealer	2,72	
With Secura	14,63	
Total savings	<u>11,91</u>	
In %	438%	

Table 1 shows the large differences in CO₂ footprint between Dr. Schutz® PU Sealer and both systems of Dr. Schutz® Secura. It shows the CO₂ footprint of using the Dr. Schutz® PU Sealer on $1m^2$, which is 2,72 kg CO₂ equivalent for both systems, the CO₂ footprint of using the Dr. Schutz® Secura on $1m^2$, which is 10,66 kg CO₂ equivalent for System 1 and 14,63 kg CO₂ equivalent for System 2, and it shows the total savings that are generated by using Dr. Schutz® PU Sealer on $1m^2$ both in kg CO₂ equivalent and in percentages.

As can be seen in the table, in both cases, using Dr. Schutz® PU Sealer produces significantly less CO₂ emissions when compared to Dr. Schutz® Secura. For System 1 (New floor) this difference is 292%, and for System 2 (Old floor) it is 438%. The only difference in the CO₂ footprint between the two Dr. Schutz® Secura systems can be found in module B4 (replacement). The Dr. Schutz® Secura System

2 (Old floor) has a significantly higher CO_2 footprint in the B4 module than System 1 of the same product, which leads to the large difference in total savings as portrayed in

Table 1.

Figure 1 presents the GWP-total as representative for the CO₂ footprint. This indicator allows a quick comparison of the global warming potential of Dr. Schutz® PU Sealer (both systems), Dr. Schutz® Secura (system 1: New floor) and Dr. Schutz® Secura (system 2: Old floor).



Figure 1: CO₂ -footprint of Dr. Schutz® PU Sealer (System 1 + System 2), Dr. Schutz® Secura (System 1) and Dr. Schutz® Secura (System 2)

Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)

Figure 2 presents an overview of changes between Dr. Schutz® PU Sealer (System 1+2), Dr. Schutz® Secura (System 1), and Dr. Schutz® Secura (System 2) in the total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT).



Figure 2: Differences in use of renewable primary energy excluding renewable primary energy resources used as raw materials between Dr. Schutz® PU Sealer, Dr. Schutz® Secura

Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials (PENRT)

Figure 5 presents an overview of changes between Dr. Schutz® PU Sealer (System 1+2), Dr. Schutz® Secura (System 1), and Dr. Schutz® Secura (System 2) in the total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT).



Figure 3: Use of non-renewable primary energy excluding renewable primary energy resources used as raw materials

As can be seen in both Figure 4 and Figure 5, the use of primary energy (both renewable and non-renewable) is lower for Dr. Schutz® PU Sealer (System 1 + 2) than for both systems of Dr. Schutz® Secura. The biggest differences between the two different products can be found in A5 (Installation into the building) and B4 (replacement). Next to that, the graph shows differences between the two products in modules A1, A3, and D. For modules A2, A4, C2, and C3 there are also differences, however, they are very little and therefore are not shown in the graph. Similarly, for these modules the primary energy use is lower for the Dr. Schutz® PU Sealer.

It is important to notice that for the use of non-renewable primary, the amounts of MJ are significantly higher than for the use of renewable primary energy, as shown by the vertical axis in both graphs.

Differences between PU Sealer and both Secura systems in primary energy consumption

Table 2: Differences in primary energy consumption (PERT and PENRT) between 1m² of PU Sealer and both Secura systems, in MJ and percentages

	System 1: New floor		
	PERT	PENRT	PERT + PENRT
With Dr. Schutz® PU Sealer	2,85	31,14	33,99
With Dr. Schutz® PU Secura	14,61	136,99	151,6
Total savings	11,76	105,85	<u>117,62</u>
In %	413%	340%	<u>346%</u>
		System 2: Old floor	
	PERT	System 2: Old floor PENRT	PERT + PENRT
With Dr. Schutz® PU Sealer	<i>PERT</i> 2,85	System 2: Old floor PENRT 31,04	<i>PERT + PENRT</i> 33,88
With Dr. Schutz® PU Sealer With Dr. Schutz® PU Secura	<i>PERT</i> 2,85 17,76	System 2: Old floor PENRT 31,04 195,63	<i>PERT + PENRT</i> 33,88 213,39
With Dr. Schutz® PU Sealer With Dr. Schutz® PU Secura Total savings	PERT 2,85 17,76 14,91	System 2: Old floor PENRT 31,04 195,63 164,49	PERT + PENRT 33,88 213,39 <u>179,40</u>

Table 2 shows the differences between the primary energy consumption of 1m² Dr. Schutz® PU Sealer and 1m² Dr. Schutz® Secura, in both systems. To determine the primary energy consumption, the categories "Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)" and "Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)" have been used. These categories have been combined to determine the primary energy consumption of the products, to arrive at a number that represents the consumption of both renewable and non-renewable energy.

As the table shows, in both systems, using Dr. Schutz® PU Sealer instead of Dr. Schutz® Secura saves a large amount of primary energy consumption. For System 1 (New floor) the total amount of primary energy saved is 117,62 MJ, or 346%, and for System 2 (Old floor) the total amount of primary energy saved is 179,40 MJ, or 528%.

Interpretation of the impacts by system

On the following pages, Dr. Schutz® PU Sealer and Dr. Schutz® Secura in the different systems will be analysed singularity. For that, each indicator will be shown, splitted by percentual impact of the life cycle modules according to EN15804+A2.

Interpretation - Dr. Schutz® PU Sealer (System1 and 2)

An application of Dr. Schutz® PU Sealer has a protective effect on the surface of the sealed floor. For calculation of the LCA, the protective aspect leads to the assumption that no new PVC is needed. Therefore system 1: new floor and system 2: old floor produces the same impacts.