EPD
INTERNATIONAL EPD SYSTEM

ECO PLATFORM
EPD
VERIFIED

In accordance with ISO 14025:2006 and
EN 15804:2012+A2:2019/AC:2021 for:

Environmental Product Declaration

XTRM Pro Window Films

Programme	The International EPD System, www.environdec.com
Programme operator	EPD International AB
Type of EPD	EPD of multiple products, based on the average results of the product group (product names in table 3.1) from Avery Dennison®
EPD registration number	EPD-IES-0031283:001
Version date	2026-07-28
Validity date	2031-07-27
	An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

AVERY DENNISON

Table of Contents

1. General Information 3

2. Company Information 5
- Corporate History 6
- Our Sustainability Progress 7
- Global Sustainability Goals 7
- Reducing Waste 8

3. Product Information 10
- Solar Control for Enhanced Comfort and Efficiency 10
- Safety Window Films: Enhancing Security and Comfort 11
- Design Films: Transforming Spaces, Inside and Out 11
- Product General Description 11
- Content Information 14

4. Life Cycle Assessment 16
- LCA Information 18
- Product stage, A1–A5 19
- End-of-life stage, C1–C4 19
- Beyond the system boundary, D 19
- Flows Excluded from the Analysis 20
- Allocation 20
- Calculation Methodology 21
- Data Sources 21

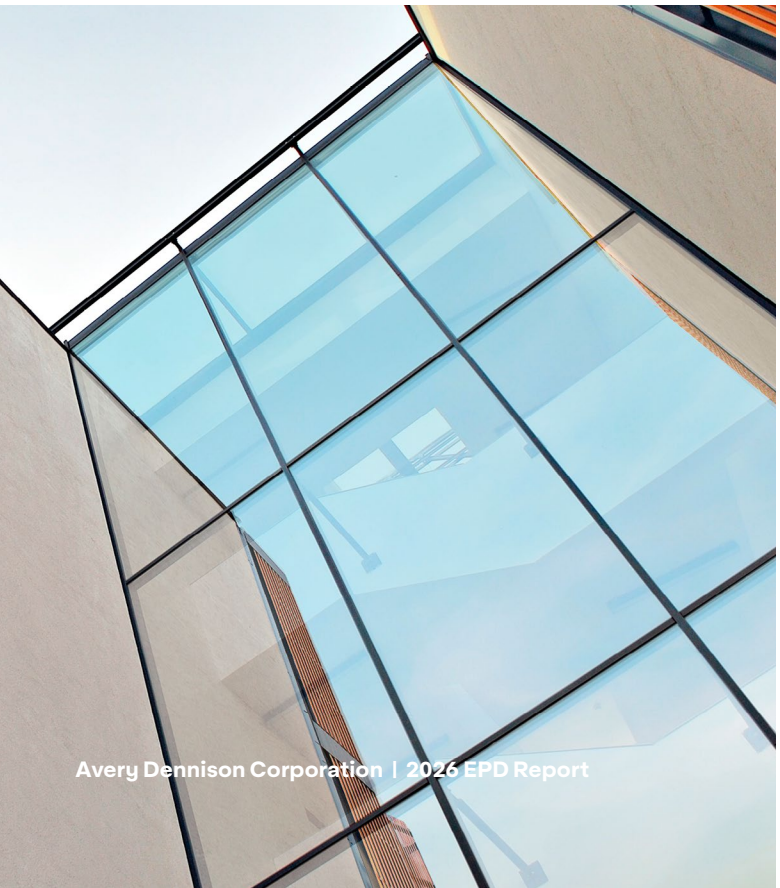
5. Environmental Performance 29
- LCA results of the products - main environmental performance results 29

6. Additional Enivornmental Information 33
- Energy consumption avoidance in a building 33
- Avery Dennison solar control window films offer a range of key benefits 36
- Associations and accreditations 38

Abbreviations 39

References 39

Version History 39



1. General Information

Program Information

Program	The International EPD® System
Address	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website	www.environdec.com
E-mail	support@environdec.com

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product Category Rules (PCR):
PCR – Construction products 2019 2.0.1

PCR review was conducted by:

PCR review was conducted by: The Technical Committee of the International EPD System. Chair of the PCR review: Rob Rouwette (chair), Noa Meron (co-chair).

The review panel may be contacted via support@environdec.com.

Third-party Verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

☒ **Individual EPD verification without a pre-verified LCA/EPD tool**
Third-party verifier:SGS ICS Italia S.r.l.,
via Caldera, 21, 20153 – Milan, Italy
accredited by: ACCREDIA with code 02242

Procedure for follow-up of data during EPD validity involves third party verifier:

☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Parameter	
Practitioner	Sher consulting & training
Commissioner	Avery Dennison
Products and variants investigated	13 products,Xtrm Pro collection
Declared unit	1 m^2 of packaged window film
Reference service life	15 years
Scope	Cradle to gate with options, module C1- C4, module D and optional modules (A4,A5)
Multiple product EPD	EPD of multiple products, based on average results
Location	Production in Hanita, Israel factory, sales worldwide
Standard applied	ISO 14040/44 (International Organization for Standardization (ISO) 2006a, b)
Product category rules	PCR – Construction products 2019 2.0.1
LCA software	SimaPro 10.2
Background database	Ecoinvent 3.11
Foreground data	Avery Dennison Corporation. This data includes production of product, distribution, transport, customer use, and end of life technology.
Life cycle impact assessment	EN 158O4+A2.
Target audience	B2B, B2C

2. Company Information

Owner of the EPD: Avery Dennison, Hanita
Address: Hanita, Kibbutz
Hanita, 2288500, Israel
Contact: Merav Yehuda, WF
Technical Manager
merav.yehuda@eu.averydennison.com

Address and contact information of the LCA practitioner commissioned by the EPD owner:
Hadar Oryan, hadar.oryan@mxns.com

About Avery Dennison®
Avery Dennison Corporation (NYSE: AVY) is a global materials science and digital identification solutions company. We are Making Possible™ products and solutions that help advance the industries we serve, providing branding and information solutions that optimize labor and supply chain efficiency, reduce waste, advance sustainability, circularity and transparency, and better connect brands and consumers. We design and develop labeling and functional materials, radio-frequency identification (RFID) inlays and tags, software applications that connect the physical and digital, and offerings that enhance branded packaging and carry or display information that improves the customer experience. Serving industries worldwide — including home and personal care, apparel, general retail, e-commerce, logistics, food and grocery, pharmaceuticals and automotive — we employ approximately 35,000 employees in more than 50 countries.

About the Avery Dennison window film business unit:
Avery Dennison Hanita, established in 1983 by Kibbutz Hanita as Hanita Coatings, specializes in developing and manufacturing high-performance engineered films. Acquired by Avery Dennison in 2017, it now operates as a distinct business unit in Materials Group.
Our innovative film technologies enhance customer products' performance, durability, and appearance across various markets. Solutions include improving building energy efficiency, securing glazing, and delivering exceptional printability and ultra-high barriers, providing significant value-added benefits and cost advantages.

Corporate History

Ray Stanton (“Stan”) Avery invented the world’s first self-adhesive label as a way to merchandise objects. In 1935, he founded Avery Adhesives in Los Angeles and, in 1990, the company merged with Dennison Manufacturing to form Avery Dennison. In 2017 the company acquired Hanita Coatings, which had been specializing in window film manufacturing and engineering since 1983. Today the company is a global force with locations in 50+ countries, operations in 100+ and 35,000+ dedicated employees.

Locations in
50+
Countries

Operations
100+

Employees
35,000+

Our Sustainability Progress

As a global corporation, Avery Dennison specializes in the design and manufacture of a wide variety of self-adhesive, graphics, labeling, and functional materials. For 90 years we have created the blueprint for trailblazing innovation and regenerative industry practices that are defining the future of manufacturing for this generation and the next. This is the leadership and commitment to sustainability we bring to the Window Film industry.

Today, as we look ahead, our goal is to make a material difference, by sourcing responsibly, reducing our operational footprint, and incorporating transparency and an EcoDesign methodology into our product developments.

Global Sustainability Goals

Our sustainability goals were developed based on careful analysis of what is most important for our business and stakeholders, covering the areas where we can, and should, make the greatest difference.

1. **Deliver innovations that advance the circular economy**
   Drive innovation to enable recyclability, reduce waste, increase recycled content, and integrate opportunities for circular processes across our industries.

2. **Reduce environmental impact in operations and supply chain**
   Reduce environmental footprint by reducing scope 1 and 2 GHG emissions and work with our suppliers to reduce Scope 3 GHG emissions. Our ambition is to become net zero by 2050. In addition, we will increase our water efficiency and protect the forests from which our paper-based products are derived.

3. **Make a positive social impact by enhancing the livelihood of our people and communities**
   Champion transparency, collaboration, equality, diversity, and inclusion. We serve as a force for good in our operations & our communities by investing in programs that advance women's empowerment, sustainability, and education.

For information on our Global Avery Dennison Sustainability Goals:
https://esg.averydennison.com/en/home/2030-sustainability-goals.html

At Avery Dennison, we ensure the raw materials to manufacture our products deliver both performance and a reduced environmental impact, including fewer associated greenhouse gas emissions. We also procure materials that meet our standards for safety and for human and labor rights and ensure we partner with suppliers that align with our ethical and environmental standards.

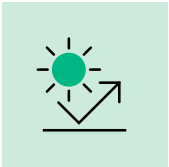
We are committed to operating clean, safe, and energy-efficient manufacturing facilities, and work to comply with or exceed community, state, and international standards. As stated in our global sustainability goals, we are also committed to reducing Scope 1 and 2 emissions.

Reducing Waste

Next to innovating new products to increase the efficient use of materials, we also continually identify ways to reduce waste in our global operations. Our waste management initiatives help keep materials out of landfills and reduce the consumption of natural resources.

Multiple initiatives are being implemented to contribute to this target, including:

- Reducing energy consumption in all operations - e.g. all production areas are converted to 100% LED lighting.



- Transitioning to renewable energy in our graphics production plant - e.g. the installation of solar panels or photovoltaic cells.

- Improving energy efficiency in manufacturing processes - e.g. more efficient pumps.

Window film focus – Avery Dennison is committed to the environment not only within its portfolio management , with the solar control solutions offering energy efficiency performance, but also within the manufacturing site with its sustainability advantage.

Manufacturing site:

- ISO 14001 certified (Environmental management system)
- ISO 50001 certified (Energy management system)

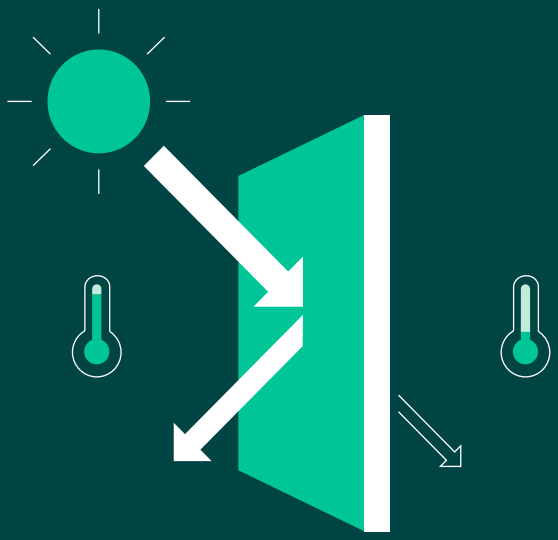
- Renewable energy

- Waste Management

- Lean Product design

3. Product Information

Avery Dennison provides various solutions for architectural window film applications, including solar control, safety, and design options.



Solar Control for Enhanced Comfort and Efficiency

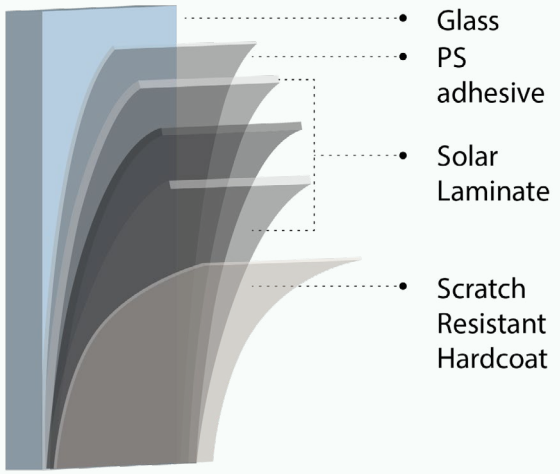
Our advanced solar control window films seamlessly manage solar radiation in your indoor spaces, filtering up to 85% of the sun's energy. This significantly reduces solar heat gain, providing tangible comfort and energy efficiency benefits by keeping rooms cooler and alleviating overheating. Our films also reduce glare, enhance comfort, minimize screen reflections, and optimize room space utilization. The most significant impact is the potential to dramatically cut energy consumption. Minimizing heat entry reduces strain on AC systems, translating on energy bills, a strong ROI, and a more sustainable footprint. Solar Control window films offer comprehensive protection by filtering the solar spectrum and blocking over 99% of harmful UV light. Many of our solar control window films have The Skin Cancer Foundation's Seal of Recommendation because they block 99% or more of UVA and UVB radiation, safeguarding people and property from the sun. They eliminate "hotspots" and the need for constant blind adjustments, effectively filtering sunlight while allowing ample natural light, ensuring naturally illuminated and inviting spaces without uncomfortable heat and glare.

Safety Window Films:
Enhancing Security and Comfort

Safety window films provide a crucial layer of protection, mitigating risks from shattered glass and enhancing property security. Our robust safety and security laminates feature thick, durable adhesive, holding shattered glass upon impact to reduce injuries from flying shards during accidents, natural disasters, or break-ins. Our innovative safety window films come in two versions: almost imperceptible clear laminates for unobtrusive protection, and solar control versions for heat management, energy efficiency, and a return on investment through reduced AC costs and glare. Whether for injury prevention, privacy, energy efficiency, or a combination, our versatile safety window films offer a comprehensive solution, strengthening security and contributing to a more comfortable, energy-efficient, and aesthetically pleasing environment.

Design Films:
Transforming Spaces, Inside and Out

Our premium aesthetic films revolutionize properties, offering design professionals versatile options for complete exterior transformations or sophisticated internal enhancements. These design films dramatically alter a building's external appearance, providing a cost-effective alternative to traditional renovations. Engineered for durability and weather resistance, they deliver stunning visual impact while preserving structural integrity. Our commitment to cutting-edge technology ensures high performance, durability, and aesthetic excellence, empowering creative professionals to realize ambitious visions and transform ordinary spaces into extraordinary environments.



Product General Description

Avery Dennison external solar control window films are optical filters constructed using multilayers of PET with a metalized layer. The specific solar performance and appearance of each product is determined by the type of metal and additional layers added, such as nanotechnology incorporated.

XTRM Pro is our new generation of durable exterior solar control solutions. XTRM Pro products feature a UV-enhanced polymer coating designed to protect and extend product longevity in harsh outdoor conditions. While most products in this line include a durable, scratch-resistant hard coat, the SkyLite series uses a protective sheet layer to ensure a scratch-free installation.
Optical and solar properties vary by product and depend on the specific components used, such as metal alloys or nanoparticles.
All XTRM Pro products are designed with a UV-durable surface coating, which extends the product's longevity, particularly in harsh outdoor conditions.

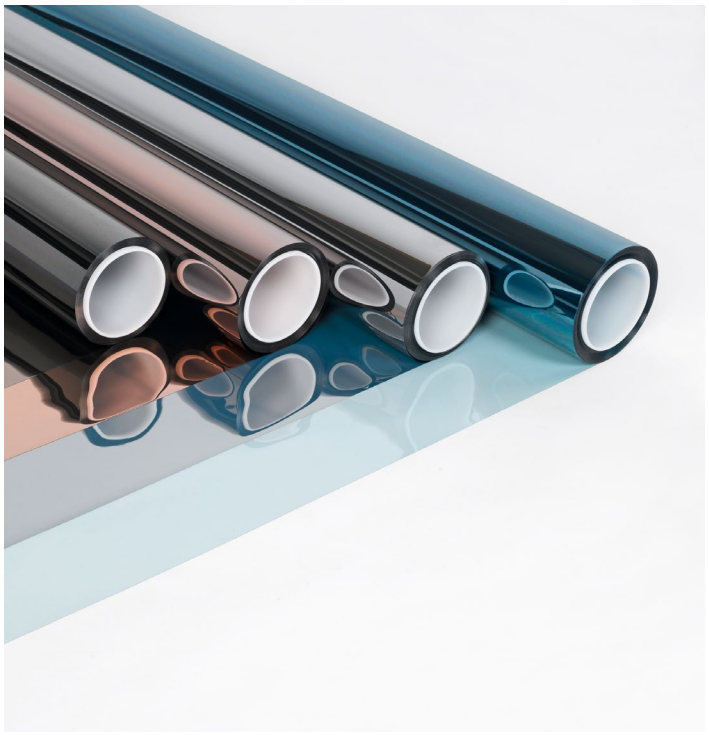
Table 3.1
List of products in scope
Specific information on any one of the products covered in this EPD can be shared by Avery Dennison.

Reflective XTRM Pro	R Silver 20 XTRM Pro R Silver 35 XTRM pro
Dual Reflective (DR) XTRM Pro	DR Grey 10 XTRM Pro DR Grey 20 XTRM Pro DR Grey 35 XTRM Pro DS Blue 35 XTRM Pro
SkyLite XTRM Pro	SkyLite 20 XTRM Pro SkyLite 20 XTRM Pro Poly Reflective SkyLite 20 XTRM Pro
XTRM Pro Neutral	XTRM Pro Neutral 05 XTRM Pro Neutral 20 XTRM Pro Neutral 40 XTRM Pro Neutral 50

These products are provided with a warranty period ranging from 10 to 15 years (pending product/zone), while the expected service life is longer considering an external application usage, provided that the specified conditions for packaging, transport, storage, installation, use, maintenance and repair are followed.

Products are usually supplied in 31lm (100') rolls in typical dimensions where width ranges from 0.914m (36") ; 1.22m (48"), 1.524m (60") and 1.829m (72").

This EPD covers 13 products in total. The following products listed in table below have been analyzed while the report represents the average results.



For information on warranty terms, exclusions and certain limitations that apply see window film warranty for details at www.graphics.averydennison.com/warranty.

Table 3.2
Product Optical and Solar Performance

Solar Performance*	Visible Light Transmitted %	Visible Light Reflected (Int) %	Visible Light Reflected (Ext) %	U V Block %	Total Solar Energy Reflected %	Total Solar Energy Transmitted %	Total Solar Energy Absorbed %	Shading Coefficient	Total Solar Energy Rejected %
R Silver 20 XTRM Pro	15	63	63	99.9	64	11	25	0.20	83
R Silver 35 XTRM Pro	30	46	49	99.9	53	22	25	0.34	71
DR Grey 10 XTRM Pro	7	20	66	99.9	66	7	27	0.17	85
DR Grey 20 XTRM Pro	20	17	40	99.9	44	17	39	0.33	71
DR Grey 35 XTRM Pro	36	14	22	99.9	25	31	44	0.50	57
DS Blue 35 XTRM Pro	33	21	15	99.9	24	31	45	0.51	55
SkyLite 20 XTRM Pro	22	32	28	99.9	29	18	53	0.40	65
SkyLite 20 XTRM Pro Poly	22	32	28	99.9	29	18	53	0.40	65
Reflective SkyLite 20 XTRM Pro	15	65	67	99.9	68	11	21	0.17	83
XTRM Pro Neutral 05	5	52	44	99.9	47	5	48	0.22	81
XTRM Pro Neutral 20	19	38	32	99.9	33	17	50	0.37	68
XTRM Pro Neutral 40	39	21	17	99.9	17	35	48	0.57	50
XTRM Pro Neutral 50	47	16	13	99.9	13	41	46	0.55	45

* Performance results are calculated and applied on 3mm (1/8'') single pane clear glass, using LBNL Optics/WINDOWS software following ISO 15099 standard, and are subject to variation in process conditions within industry standards.

Content Information

Content Declaration
The mass (weight) of one unit of a product, as purchased or per declared unit: 1 m^2 of window film

Table 3.3
Product Weight per sqm.

Product	Mass per sqm [kg]
R Silver 20 XTRM Pro	0.208
R Silver 35 XTRM Pro	0.208
DR Grey 10 XTRM Pro	0.208
DR Grey 20 XTRM Pro	0.208
DR Grey 35 XTRM Pro	0.208
DS Blue 35 XTRM Pro	0.212
SkyLite 20 XTRM Pro	0.165
SkyLite 20 XTRM Pro Poly	0.163
Reflective SkyLite 20 XTRM Pro	0.203
Neutral XTRM Pro 5	0.137
Neutral XTRM Pro 20	0.137
Neutral XTRM Pro 40	0.136
Neutral XTRM Pro 50	0.136
Weight Average	0.179

Table 3.4- content information

All raw materials composed of the product and the packaging components are listed in the following

Product components	Avg % in Product	Biogenic Material, weight % of product	Biogenic material, kg C/product
Acrylic Adhesive	7.75%	0%	0
Acrylic Durable coating	6.34%	0%	0
PET Sheet	85.18%	0%	0
Other adhesives	0.41%	0%	0
Aluminium	0.00%	0%	0
Nano Particles	0.31%	0%	0
Packaging Material		**Weight % vs the product**	**Biogenic Material, kg/c**
High Impact Polystyrene Core plastic rod	0.032	31.29%	0
Two end plastic end plates PolyPropylene	0.003	2.92%	0
LDPE nylon	0.001	1.06%	0
Recycled Cardboard box	0.038	37.55%	0.017
Wood pallet	0.012	10.91%	0.007

There are no SVHCs used in product or packaging, and thus they do not exceed the permitted limit of 0.1% by weight of the product.

Weighted Average Bill of Materials		
Final product weight	0.179	kg
Acrylic Adhesive	0.014	gra,
Acrylic Durable coating	0.011	gram
PET Sheet	0.152	kg
Other adhesives	0.001	gram
Aluminium	0.000	gram
Nano Particles	0.001	gram

4. Life Cycle Assessment

A Life Cycle Assessment examines the environmental impact of a product or service. Life Cycle Assessments identify and quantify the inputs and outputs over the different life stages of the product, while analyzing their impact on the environment. This research was conducted by examining all stages of the product life, using specific information originating from Avery Dennison, as well as LCA databases. The study is carried out using a leading product life cycle analysis software, SimaPro, which enables calculating the environmental impact of a product empirically.

Part of the Label and Graphic Materials family of business of Avery Dennison, Avery Dennison Hanita specializes in the development and conversion of coated, laminated and metallized films for a range of industrial and commercial applications.

As part of its commitment to sustainability, and mitigating product environmental impact, following the publication of one EPD, Avery Dennison Hanita have decided to conduct analysis and learn the environmental impact of 14 window film models – from the safety and solar series, up to 4 mil produced in the Hanita factory.

Declared Unit: Packaged 1 m^2 of window film for 15 years of use. This means 1.05 m^2 of product up until installation phase, where 5% scraps are calculated .
UN CPC code: 391990 Self-adhesive plates, sheets, film, foil, tape, strip and other flat shapes, of plastics, not elsewhere specified
Product description: Window films designed to improve energy efficiency, comfort, privacy, and safety. Engineered with advanced multilayer polyester and metalized or ceramic coatings, these films provide solar heat rejection, glare reduction, UV protection, and shatter resistance- while enhancing building aesthetics and occupant well-being.
Name and location of production site(s): Hanita manufacturing facility in Kibbutz Hanita.

References to any relevant websites for more information or explanatory materials, if applicable.
https://hanita.averydennison.com/na/en/home.html

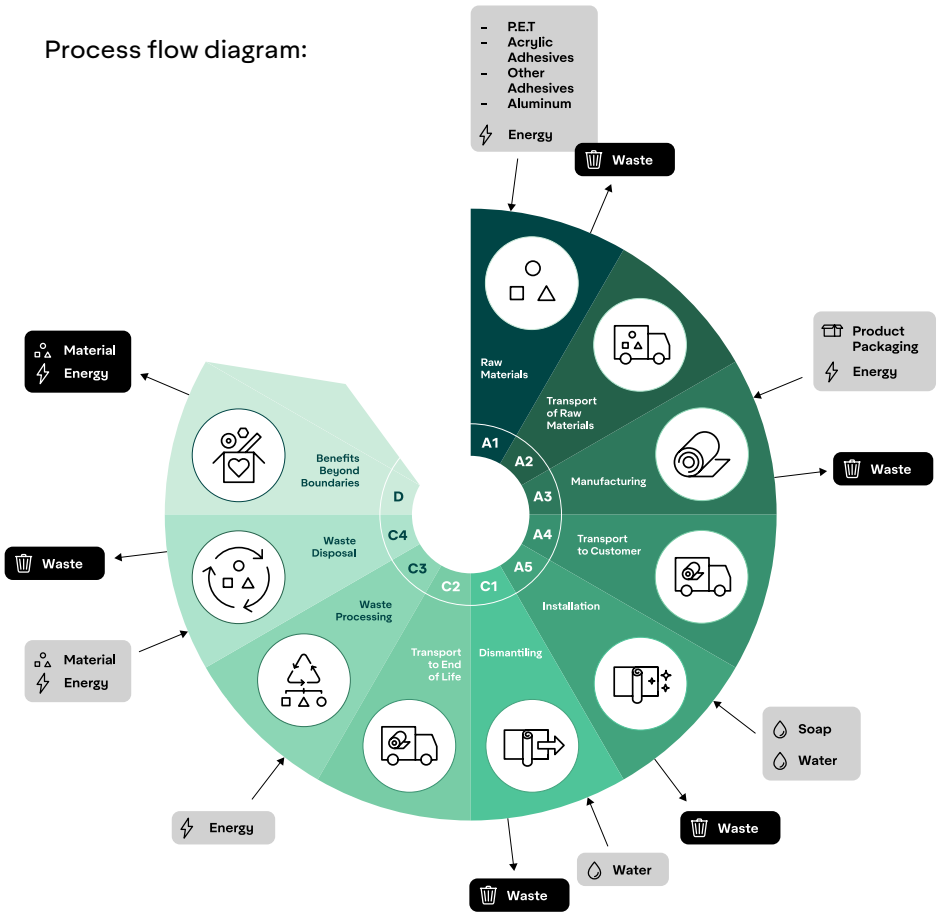
The Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804:2012+A2:2019/AC:2021and based on EN 15804 + A2 (adapted) V1.00 / EF 3.1 Reference package.
This study complies with ISO 14040 and 14044. This study has Compliance with PCR – Construction products 2019 2.0.1 and other requirements in General Programme Instructions V5 in the International EPD® System and complementary requirements at www.environdec.com.
The LCA uses the Ecoinvent 3.11 database.

LCA Information

Declared unit: Packaged 1 m^2 of window film for 15 years of use. This means 1.05 m^2 of product up until installation phase, where 5% scraps are calculated . (for mass conversion factor please see table 3.3)
Reference service life: 15 years of use.
Time representativeness: 2024
Geographical scope:
The production of the product takes place in one factory, in Hanita, Israel.
For raw material production and packaging materials, the largest suppliers were calculated, located in countries such as; USA, Europe and Asia. Regarding customer use, the study depicts the specific sales geography for each model, split between Europe, the Middle East and Africa, Latin America, North Asia Pacific ,South Asia Pacific, and US.
Database(s) and LCA software used:
Ecoinvent 3.11, SimaPro 10.2.
Description of system boundaries:
cradle-to-gate with options, modules C1-C4, module D and optional modules

The system boundaries for this study are cradle-to-gate with options, module C1- C4, module D and optional modules (A4,A5), over the lifecycle of 7 years. The following stages are included in this study: production and transport of raw materials, processing of raw materials into final product, distribution to customers, Installation at customer, deconstruction at end of life and transport and end of life treatment in landfill.

Process flow diagram:



Product stage, A1-A5

A1, Raw material supply
Covers the extraction and processing of raw materials, as well as the production of secondary materials and energy carriers required upstream of the manufacturing process.
A2, Transport to manufacturer
Includes the transport of raw materials and intermediate products to the manufacturing site.
A3, Manufacturing
Represents the manufacturing of the product and associated packaging. This includes energy use, auxiliary materials, emissions, and waste management within the production facility.
A4, Transport to the Customer
Accounts for the distribution of the finished product to the installation or use location. Transport scenarios are based on typical distances and modes of transport.
A5, Installation
Includes processes associated with installation, such as the use of ancillary materials, installation energy, and the generation and treatment of packaging and installation waste.

End-of-life stage, C1-C4

C1, Dismantling
Represents the activities required to remove the product from service at the end of its life, including manual demolition processes.

C2, Transport
Covers the transport of the dismantled product to waste processing or disposal facilities, based on representative distances and modes.
C3, Waste processing
Includes sorting, recycling, and incineration necessary prior to final disposal or material recovery.
C4, Waste Disposal
Represents the final disposal of product components that are not recovered

Beyond the system boundary, D

Module D
Reports the potential environmental benefits and burdens from material recycling, energy recovery, and reuse of product components that substitute primary materials or conventional energy sources in other product systems.

Flows Excluded from the Analysis:

Only minor flows were excluded from the LCA model in accordance with the cut-off criteria of ISO 14044 and Section 4.4 of the applicable PCR, after assessment of their potential contribution to Global Warming Potential (GWP). Sanitary water use at the manufacturing facility (e.g. toilets and kitchen water) was excluded, as it is not directly related to production processes; the site operates with approximately 150 employees on the day shift and 30 employees on the night shift, and even under conservative assumptions for sanitary water consumption per employee, allocation of the resulting wastewater treatment to the declared unit would lead to a contribution to GWP that is well below the 1% relevance threshold. The use of soap during window cleaning prior to installation is included in the downstream modeling; however, treatment of the resulting wastewater and residual soap was excluded due to the small quantities involved. A conservative screening check shows that treating the full 1 kg of installation water per declared unit as wastewater would correspond to approximately 0.002 kg CO_2e, or about 0.14% of total GWP, demonstrating that this exclusion is well below the 1% cut-off criterion. Auxiliary materials used for routine cleaning and maintenance of production equipment were also excluded, as they are used infrequently and in very small quantities; a conservative screening assessment indicates that more than approximately 1.5 g of auxiliary material per declared unit would be required to reach 1% of total GWP, which is significantly higher than actual usage. These exclusions are therefore considered justified and do not affect the robustness of the results or the conclusions of the study. No energy flows were excluded from this study.

Allocation

In accordance with ISO 14044:2006, section 4.3.4, allocation was applied following the recommended hierarchical approach. First, wherever possible, allocation was avoided by subdividing processes or expanding the system boundaries. If allocation could not be avoided, efforts were made to apply a physical relationship to reflect the underlying physical causality between inputs and outputs. When a physical relationship was not applicable, an allocation based on other relevant relationships, such as economic value, was considered. The allocation approach used in this study follows this prescribed order, ensuring methodological consistency with ISO 14044.
The study applies a mass allocation method, meaning that inputs and outputs are allocated based on the proportion of the product's mass relative to total production. In this approach, no environmental burdens or credits from recycled materials are assigned to the product system; only the burdens up to the point of recycling (including transportation to recycling facilities) are considered. This method is consistent with the Polluter Pays Principle, in accordance with section 4.5.2 of the Product Category Rules (PCR). The environmental burdens and credits associated with recycling are instead assigned to the subsequent product using the recycled material. The declared unit for this study is 1 m^2 of window film over 15 of use, as defined by the PCR. No co-products are generated during the production of the window film.

Calculation Methodology

The results in this study are presented as arithmetical average results.
As most of the products (11 out of 13) have only been created as prototypes and not yet fully produced and sold in 2024.
Description of allocation procedures in line with requirements of PCR in section 4.5.3, if recycled material is a main input to, or output from, the product system.
If the recycled material inputs contribute more than 10% to the GWP-GHG results of modules A1-A3, the GWP-GHG intensity of that recycled material (in kg CO_2 eq./tonne) shall be declared in the EPD.

Data Sources

For foreground data the study source is Avery Dennison company. This data includes production of product, distribution, transport, Installation and dismantling and end of life, true to 2024 data.
For background data the sources include Ecoinvent 3.11, and a system model of cut off is chosen.
Specifically, for A5 - Installation and C1 -Dismantling, a reference of quantities for auxiliary materials was extracted from a number of EPDs of similar product[1].
The calculation software used is SimaPro 10.2.

Data Quality:
Primary data: Was used for electricity, heat and transport (A1–A3), representing 20.58% of GHG emissions in those stages.

Table 4.1 - GWP - % of Primary Data

Process	Source Type	Source	Reference Year	Data Category	Share of primary data, of GWP-GHG results for A1-A3
Electricity and heat	Database	Ecoinvent 3.11	2024	Primary data	18.56%
Transportation	Database	Ecoinvent 3.11	2024	Primary data	2.02%
Other processes	Database	Ecoinvent 3.11	2024	Secondary data	0.00%
Total share of primary data, of GWP-GHG results for A1-A3					20.58%

[1] EPD number S-P-06660 V2, 2023-04-12, EPD number.: S-P-00994, Version 3.0, 2020-12-17

Table 4.2 Data quality Assessment Summary

Indicator	Score
Time Coverage	1.06
Geographical Coverage	2.50
Technological Coverage	2.00
Precision / Completeness	2.03
Representativeness	2.18
Overall Quality Score	1.95

Inventory data quality was assessed based on the following criteria: Time Coverage, Geographical Coverage, Technological Coverage, Precision / Completeness, and Representativeness. To ensure robust and credible results, primary data was collected directly from Hanita-Avery Dennison's internal sources for the year 2024, representing actual production conditions. This foreground data was supplemented with background data from Ecoinvent 3.11. While most inventory data is secondary and generic, primary data was used where available, particularly for electricity, heat and transport in A1–A3. Proxy data was used to select raw materials in A1 where specific datasets were unavailable. Overall, the inventory reflects moderate to good data quality in line with the criteria and is appropriate for use in an Environmental Product Declaration

Data source for all of foreground data is collected directly from Hanita-Avery Dennison for the year of 2024, and the relevant site. For background data ecoinvent 3.11 is used. As seen in the data quality assessment, most of the data is secondary and generic data. Primary data is located in A1-A3 and accumulates to 23% of the GWP-GHG of stages A1-A3.

Proxy data was used mostly in A1 – with 4 raw materials: nano particles, acrylic adhesives, metal, acrylic scratch resistant hard coat. Magnetron sputtering data is considered secondary and was created with technical professionals. Specific data could only be used for transport data, and reflects transport in A2, and A4. A5-D transport mentioned relays on an

assumption of average distance to waste facility.

Table 4.3
Modules declared, geographical scope, share of primary data

(in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			**Distribution/ installation stage**		**Use stage**							**End-of-life stage**				**Beyond product life cycle**
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	ISR	GLO	GLO	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Share of primary data	20.58% (a1-a3)					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-13%/+11%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%					-	-	-	-	-	-	-	-	-	-	-	-

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories

A1 - Raw Material Production

This section describes the raw material production, located in countries such as; Netherlands,UK, Germany, USA, Korea, China, Thailand and Israel.. It describes the raw material used for product production, packaging materials, detailing the amount of plastic used which is later on noted as part of waste flow in A3. In the table below listed main materials in A1. Unique to this collection are PET sheets that have undergone magnetron sputtering.

Table 4.4
A1 raw material

Acrylic Adhesives
PET (Polyethylene terephthalate) Sheets
Nanoparticles Particles dispersed in adhesive
Metalized layers - Evaporated alluminium
Polyurethane adhesives

A2 - Raw Material Transport

This section describes the shipping and transportation of these materials to the facility closest port (Haifa) and lorry transport from port to production site.

A3 - Manufacturing

This section includes the production of the Window films. A3 also includes transport to disposal of material loss and raw material packaging.

The manufacturing of a multilayer window films involves various coatings on PET films including adhesives, hardcoats, metal sputtering (Purchased),, finishing with slitting and packaging.

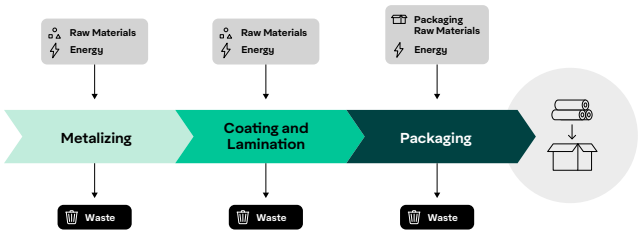


Table 4.5
A3 inputs and outputs

A3 inputs and Outputs per 1 Declared Unit

Inputs

Material	Amount	Unit
Solvents Fully evaporate in RTO	68- 106	gram
Wood pallet	0.012	Kg
PET sheet	0.04	Kg
Electricity	0.296-0.819	kWh
LPG	0.012 - 0.0306	kg

Material	Amount	Unit
Carbon dioxide, fossil Emission to Air	169-261	gram
Waste treatment- recycling of mixed plastics (Raw Material Packaging waste	0.0098 - 0.056	kg

+Material loss in production)

The wooden pallet mentioned is the same pallet as shown in the packaging table 3.4.

Table 4.6
Electricity data

Electricity Data Set Used	Year	Type	$kgCO_2e/kWh$ – GWP-GHG
Sher 2024 - Electricity, medium voltage {IL}| Cut-off, U	2024	National Average Mix	0.72 $kgCO_2e$

The data set used to represent the electricity in this research is specific for Israel country mix, and represents the country grid mix for the year of 2024. This is the most recent available data set for this matter.

A4 - Transport to customers

shipping documented per each product is accordance to sales allocations worldwide. Additionally, a distance of road via lorry was modeled - pertaining to distance of factory to port, from destined port to retail, and retail to customer home.

Please see distances in the table below:

Table 4.7
A4-distances to customers

	Port to port	Nautic Mile	AVG Truck Distance in destination country (km)	Hanita to Haifa (km)	Total land (km)
Europe, the Middle East and Africa	Haifa>Rotterdam	3361	600	57	657
Latin America (Brazil)	Haifa>Santos	6377	1000	57	1057
North Asia Pacific	Haifa>Shanghai	7420	1500	57	1557
SAPSSA	Haifa>Melbourn	8006	600	57	657
US	Haifa>New York	5206	1000	57	1057
Israel		0	183*		183

*Hanita To Ashdod Distance

A5 - Installation

The installation includes surface preparation, film application along with installation materials and their processing waste. It involves water and soap as detailed in table 4.7.

The card board packaging is modeled to represent 40% gone to Incineration, and 60% to recycling. The plastic part of the packaging is modeled to represent 15% of plastic treated with recycling, 45% of plastic gone to sanitary landfill, and 40% gone to incineration with energy recovery. The amounts mentioned correlate specifically for 1 m^2 of product, meaning the declared unit. The wood pallet that is part of the product packaging is transported to reuse.

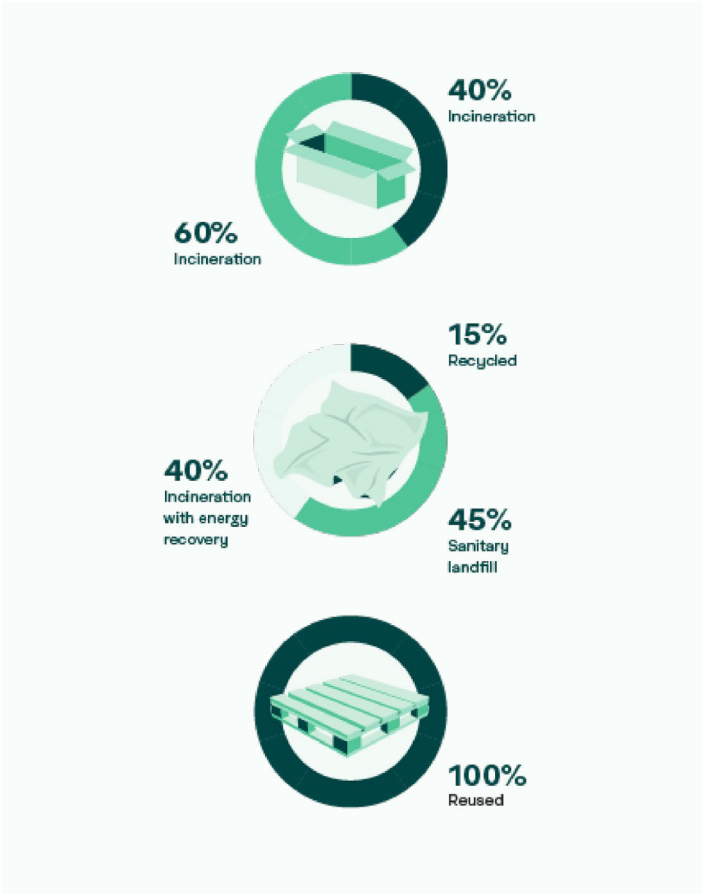


Table 4.8
A5 Installation

A5 - installation

Inputs

Material	Amount	Unit
Soap	0.005	kg
Tap water	1	kg
Transport to waste treatment (packaging material sent to waste treatment, and wood pallet (0.012 kg) to reuse)	0.0086	tkm

Outputs

Material	Amount	Unit
Mixed plastic, recycling	0.0359*15%= 0.00539	kg
Waste plastic, incinerated with fly ash extraction	0.0359*40%=0.0144	kg
Waste plastic, Sanitary landfill	0.0359*46%=0.0165	kg
Cardboard - Incineration	0.038*40%=0.0152	kg
Cardboard Recycling	0.038*60%=0.0228	kg
5% scraps to incineration	0.006 - 0.0106	kg
Wood Pallet – to be reused	0.012	kg

Regarding stages B1,B2, B3, B4, B5 – the window film physical priorities such as hardness, resistance to scratching and stains make repair, replacement or rehabilitation of the window film unnecessary. Due to this B3,4,5 are not included in studied modules. Regarding energy and water use in the operational use (B6, B7) there are no energy inputs as energy is not required for product use, therefore B6 is excluded from consideration for this study.

C1 - Dismantling

This part represents the activities required to remove the product from the window at the end of its life. This procedure includes 1 kg of water for window cleaning.

C2 - Transport to Waste Treatment Facility

This part models the transportation to landfill facilities, with an average 100 km distance.

Table 4.9 -C1,C2 inputs and Outputs

C1 and C2

Description	Amount
Tap water	1 kg
Transport to Waste treatment 16-32 tonne lorry (EURO 5)	100 km*0.006 - 0.0106 gram

C3 - Waste Processing

This part represents waste processing occurs in 15% of products that are recycled. Aligned with the PCR, the modeled inputs include two energy types stages: Loading and unloading to the sorting facility, and then mechanical sorting. Additionally 40% of the product will be treated in incineration with energy recovery. As the energy recovery is estimated to be 70% efficiency it is represented in module C3.

Table 4.10
C3 waste processing

C3

Description	Amount
Mixed Plastic recycling	15% of product
Diesel Fuel Loading and unloading to sorting facility –	1.8 kWh/tonne
Electricity – Mechanical sorting	2.2 kWh/tonne
Waste Treatment	Allocation
Waste PET Incineration with fly ash extraction	40%

C4 - Waste Disposal

This part models the treatment of the waste and disposal of polyethylene terephthalate In three ways. 15% of plastic treated with recycling, 46% of plastic gone to sanitary landfill, and 40% gone to incineration with energy recovery.

Table 4.11
C4 inputs and outputs

C4

Waste Treatment	Allocation
PET sanitary landfill	45%

D - Benefits Beyond Boundaries

Module D represents benefits from the end of life waste treatment occurring beyond study boundaries. This includes benefits that occurred in A5 waste treatment, and in C4 waste treatment. Model D includes benefits from recycling and incineration with energy recovery. Recycling is modeled as 15% of the allocated waste treatment. 1.249 kg of waste PET is needed to create 1 kg of recycled PET (based on Polyethylene terephthalate, granulate, amorphous {RoW}) data set in Ecoinvent. Regarding incineration with energy recovery, this waste treatment is allocated to 40% of the end of life of the product. The heating value of the plastic in incineration is 23.13 MJ/ Kg c. We assume 70% of recovery occurs, with 20% gone to electricity and 50% gone to heat.

Table 4.12
Module D recovered outputs

Module D – Recovered Outputs

Recovered	Amount	Unit
Product		
Heat	-0.828	MJ
Electricity	-0.0275	kWh
Recycled Plastic	-0.0215	Kg
Packaging		
Recycled Plastic	-0.0007	kg
Recycled Cardboard	-0.0038	kg
Electricity	-0.0119	MJ
Heat	-0.029	MJ

A-D does not include calculation of capital good

5. Environmental Performance

LCA results of the products - main environmental performance results

Table 5.1
Mandatory impact category indicators according to EN 15804

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential -biogenic	kg CO_2 eq.	-1.28E-02	1.07E-05	2.96E-02	3.03E-06	1.17E-06	3.41E-06	1.03E-05	2.88E-02
Global Warming Potential -fossil	kg CO_2 eq.	2.40E+00	6.48E-02	6.99E-02	1.20E-03	3.54E-03	1.48E-01	6.75E-03	-1.42E-01
Global Warming Potential - luluc	kg CO_2 eq.	1.38E-03	3.09E-05	1.41E-02	1.56E-06	1.62E-06	5.61E-07	5.52E-07	-8.06E-05
Global Warming Potential -total	kg CO_2 eq.	2.38E+00	6.48E-02	1.14E-01	1.20E-03	3.55E-03	1.48E-01	6.76E-03	-1.13E-01
Global Warming Potential - GHG	kg CO_2 eq.	2.40E+00	6.48E-02	8.41E-02	1.20E-03	3.55E-03	1.48E-01	6.76E-03	-1.34E-01
ODP - Ozone Depletion	kg CFC 11 eq.	3.20E-06	8.52E-10	4.37E-10	2.31E-10	4.80E-11	2.82E-11	2.28E-11	-3.90E-07
AP - Acidification potential	mol H+ eq.	9.64E-03	7.68E-04	1.20E-04	6.41E-06	8.51E-06	2.88E-05	6.36E-06	-6.64E-04
EP Eutrophication potential -freshwater	kg P eq.	5.64E-05	6.25E-07	1.63E-06	4.96E-08	4.38E-08	2.47E-08	1.04E-08	-4.57E-06
EP Eutrophication potential -marine	kg N eq.	1.85E-03	2.00E-04	1.27E-04	1.21E-06	1.88E-06	1.51E-05	5.43E-06	-9.08E-05
EP Eutrophication potential -terrestrial	mol N eq.	1.93E-02	2.22E-03	4.61E-04	1.35E-05	2.11E-05	1.52E-04	2.67E-05	-1.18E-03
POCP - Formation potential of tropospheric ozone	kg NMVOC eq.	8.99E-03	6.66E-04	8.52E-05	4.11E-06	1.15E-05	3.75E-05	1.07E-05	-5.24E-04
ADP-minerals&metals- Resource Depletion *	kg Sb eq.	1.01E-05	1.64E-07	8.34E-08	5.46E-09	1.18E-08	3.67E-09	1.67E-09	-7.38E-07
ADP-fossil - Resource Depletion *	MJ	4.08E+01	8.62E-01	1.21E-01	1.49E-02	4.91E-02	2.13E-02	2.01E-02	-2.60E+00
WDP - Water Deprivation Potential *	M3	5.60E-01	3.40E-03	6.70E-02	4.27E-02	2.30E-04	8.76E-04	-1.31E-02	-1.89E-02
Acronyms	**GWP-fossil** = Global Warming Potential fossil fuels; **GWP-biogenic** = Global Warming Potential biogenic; **GWP-luluc** = Global Warming Potential land use and land use change; **ODP** = Depletion potential of the stratospheric ozone layer; **AP** = Acidification potential, Accumulated Exceedance; **EP-freshwater** = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-marine** = Eutrophication potential, fraction of nutrients reaching marine end compartment; **EP-terrestrial** = Eutrophication potential, Accumulated Exceedance; **POCP** = Formation potential of tropospheric ozone; **ADP**-minerals&metals = Abiotic depletion potential for non-fossil resources; **ADP**-fossil = Abiotic depletion for fossil resources potential; **WDP** = Water (user) deprivation potential, deprivation-weighted water consumption								

”The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.”

“The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).”

Table 5.2
Resource use indicators
Energy sources were calculated using option B method of the PCR

Indicator	Sub Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Use of Renewable Primary Energy	excluding renewable primary energy sources, used as raw materials	MJ	1.36E+00	9.96E-03	3.69E-01	1.52E-03	6.65E-04	4.67E-04	2.66E-04	-0.16161569
	renewable primary energy sources used as raw materials	MJ	1.62E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.38E-01
	Total	MJ	1.52E+00	9.96E-03	3.69E-01	1.52E-03	6.65E-04	4.67E-04	2.66E-04	-0.49911969
Use of Non Renewable Primary Energy	excluding Non-renewable primary energy sources, used as raw materials	MJ	5.01E+01	8.62E-01	4.55E-02	1.49E-02	4.91E-02	2.13E-02	2.01E-02	-6.80E+00
	Non-renewable primary energy sources used as raw materials	MJ	5.54E+00	0.00E+00	8.97E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-4.21E+00
	Total	MJ	4.08E+01	8.62E-01	1.35E-01	1.49E-02	4.91E-02	2.13E-02	2.01E-02	-2.59525584
Use of Secondary Material		kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of Renewable Secondary Fuels		MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of Non Renewables as Secondary Fuels		MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net Use of Freshwater		M3	5.60E-01	3.40E-03	6.70E-02	4.27E-02	2.30E-04	8.76E-04	-1.31E-02	-1.89E-02

Table 5.3
Waste indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed of	Kg	2.95E-04	5.41E-06	1.30E-06	7.39E-08	3.33E-07	2.34E-07	1.42E-07	-1.94E-05
Non hazardous waste disposed of	Kg	1.00E-01	2.82E-02	2.06E-02	9.95E-05	2.32E-03	1.00E-03	8.25E-02	-3.81E-03
Radio Active Waste disposed of	Kg	1.75E-05	1.47E-07	9.22E-08	2.49E-08	9.80E-09	5.95E-09	4.15E-09	-2.97E-06

Table 5.4
Output flow indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components of reuse	Kg	0.00E+00	0.00E+00	1.20E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	Kg	2.19E-02	0.00E+00	2.78E-02	0.00E+00	0.00E+00	2.51E-02	0.00E+00	0.00E+00
Exported energy Electricity - MJ	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy thermal - MJ	MJ	0.00E+00	0.00E+00	3.33E-01	0.00E+00	0.00E+00	1.65E+00	0.00E+00	0.00E+00
Materials for Energy Recovery	Kg	0.00E+00	0.00E+00	1.44E-02	0.00E+00	0.00E+00	7.16E-02	0.00E+00	0.00E+00

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
biogenic carbon content	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
biogenic carbon content in accompanying packaging	Kg	5.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 5.5 - 100% end of life scenario
Additionally, as required by the PCR a table with 100% waste scenarios is found below, portraying 100% landfill, 100% recycling and 100% incineration with energy recovery.

Damage category	Unit	C3 - 100% landfill	C3 - 100% incineration with energy recovery	C3- 100% Recycling	C4- Incineration with energy recovery	C4-100% landfill	C4-100% recycling
Acidification	mol H+ eq	0.00E+00	7.15E-05	1.33E-03	1.38E-05	0.00E+00	0.00E+00
Climate change	kg CO_2 eq	0.00E+00	3.70E-01	2.69E-01	1.47E-02	0.00E+00	0.00E+00
Ecotoxicity, freshwater	CTUe	0.00E+00	1.95E-01	5.87E-01	3.25E-02	0.00E+00	0.00E+00
Particulate matter	disease inc.	0.00E+00	4.19E-10	1.21E-08	3.13E-10	0.00E+00	0.00E+00
Eutrophication, marine	kg N eq	0.00E+00	3.75E-05	2.43E-04	1.18E-05	0.00E+00	0.00E+00
Eutrophication, freshwater	kg P eq	0.00E+00	5.67E-08	1.41E-05	2.25E-08	0.00E+00	0.00E+00
Eutrophication, terrestrial	mol N eq	0.00E+00	3.78E-04	2.70E-03	5.79E-05	0.00E+00	0.00E+00
Human toxicity, cancer	CTUh	0.00E+00	1.30E-11	2.78E-11	4.71E-13	0.00E+00	0.00E+00
Human toxicity, non-cancer	CTUh	0.00E+00	1.09E-09	1.49E-09	4.00E-11	0.00E+00	0.00E+00
Ionising radiation	kBq U-235 eq	0.00E+00	1.77E-05	1.42E-02	1.41E-05	0.00E+00	0.00E+00
Land use	Pt	0.00E+00	1.09E-02	5.03E-01	1.03E-01	0.00E+00	0.00E+00
Ozone depletion	kg CFC11 eq	0.00E+00	6.94E-11	1.72E-09	4.96E-11	0.00E+00	0.00E+00
Photochemical ozone formation	kg NMVOC eq	0.00E+00	9.34E-05	7.98E-04	2.33E-05	0.00E+00	0.00E+00
Resource use, fossils	MJ	0.00E+00	5.14E-02	3.58E+00	4.37E-02	0.00E+00	0.00E+00
Resource use, minerals and metals	kg Sb eq	0.00E+00	9.07E-09	2.60E-07	3.62E-09	0.00E+00	0.00E+00
Water use	m3 depriv.	0.00E+00	2.18E-03	3.65E-02	-2.85E-02	0.00E+00	0.00E+00
Climate change - Biogenic	kg CO_2 eq	0.00E+00	7.93E-06	1.64E-03	8.60E-06	0.00E+00	0.00E+00
Climate change - Fossil	kg CO_2 eq	0.00E+00	3.70E-01	2.67E-01	1.47E-02	0.00E+00	0.00E+00
Climate change - Land use and LU change	kg CO_2 eq	0.00E+00	1.20E-06	5.64E-04	1.20E-06	0.00E+00	0.00E+00
GWP100	kg CO_2 -eq	0.00E+00	3.70E-01	2.68E-01	1.47E-02	0.00E+00	0.00E+00

Table 5.6 - Additional voluntary impact category indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Particulate matter	disease inc.	8.02E-08	3.99E-09	1.85E-09	8.35E-11	2.57E-10	1.69E-10	1.44E-10	-5.52E-09
Ionising radiation	kBq U-235 eq	2.79E-02	2.34E-04	1.42E-04	4.06E-05	1.56E-05	9.08E-06	6.50E-06	-4.65E-03
Ecotoxicity, freshwater	CTUe	9.24E+00	1.30E-01	5.64E-01	4.20E-03	9.04E-03	7.80E-02	1.50E-02	-3.00E-01
Human toxicity, cancer	CTUh	5.69E-10	1.18E-11	2.48E-11	9.66E-13	5.83E-13	5.22E-12	2.17E-13	-2.34E-12
Human toxicity, non-cancer	CTUh	1.42E-08	4.36E-10	5.78E-10	3.64E-11	3.06E-11	4.36E-10	1.84E-11	-9.51E-10
Land use	Pt	6.61E+00	3.74E-01	9.40E-01	3.02E-03	2.93E-02	4.45E-03	4.75E-02	-2.02E+00

Table 5.7 - Additional LCA results (other environmental performance results) of the product(s)

Damage category	Unit	Min(-)	weighted avg	Max (+)
Acidification	mol H+ eq	14%	1.06E-02	9%
Climate change Total	kg CO_2 eq	13%	2.71E+00	11%
Ecotoxicity, freshwater	CTUe	29%	1.00E+01	27%
Particulate matter	disease inc.	17%	8.67E-08	18%
Eutrophication, marine	kg N eq	13%	2.20E-03	9%
Eutrophication, freshwater	kg P eq	16%	5.88E-05	20%
Eutrophication, terrestrial	mol N eq	13%	2.22E-02	9%
Human toxicity, cancer	CTUh	26%	6.12E-10	21%
Human toxicity, non-cancer	CTUh	20%	1.58E-08	16%
Ionising radiation	kBq U-235 eq	23%	2.83E-02	21%
Land use	Pt	10%	8.01E+00	10%
Ozone depletion	kg CFC11 eq	25%	3.20E-06	22%
Photochemical ozone formation	kg NMVOC eq	13%	9.80E-03	10%
Resource use, fossils	MJ	14%	4.18E+01	11%
Resource use, minerals and metals	kg Sb eq	20%	1.04E-05	17%
Water use	m3 depriv.	11%	6.61E-01	26%
GWP - GHG	kg CO_2 eq	13%	2.71E+00	11%

6. Additional Enivornmental Information

Energy consumption avoidance in a building

Avery Dennison solar control window films are designed to significantly reduce heat gain and optimize energy savings. For example, our R Silver 20 XTRM Pro film can reject up to 83% of the total solar energy when externally applied on a clear single-pane glass.

To quantify the potential energy savings, we simulated these products using eQUEST software, based on DOE-2, which was collaboratively developed by James J. Hirsch & Associates (JJH) and Lawrence Berkeley National Laboratory (LBNL), with LBNL's contributions largely funded by the United States Department of Energy (USDOE). eQUEST is specifically designed to facilitate detailed comparative analysis of building's designs and technologies through advanced building energy use simulation techniques. This software uses defined parameters to calculate overall energy consumption in a building , taking into consideration all detailed conditions such as building type, dimensions, glazing systems, location (connecting to weather climate station files), type of cooling/heating systems used, defined energy use etc.

The results presented in table below for both clear single-pane glass and clear double-pane (IGU). These simulations were conducted for 30 main locations across Europe, North America and Asia.

For these simulations, we used a commercial office building as the model, with specific details outlined below:

Table 6.1 – Reference Building

Energy Model Information	
Type	Office Building
Conditioned floor space	27,000 sqft / 2500 sqm
Dimensions	95ft x 95ft / 29m x 29m
Number of levels	3
WWR % (Flr-Ciel)	20
Cooling Equip	Chilled Water Coils
Heating Equip	Hot Water Coils
HVAC System Type	Standard VAV with HW Reheat
HVAC System Size & Efficiency	
Cooling :	COP : 2.7 . 1 chiller of 67.7 RT
Heating	1 Boiler , 812 kBtu , 80% Efficiency
Heating source	Natural Gas
Typical Window Size	3ft x 5ft / 0.91m x 1.52m
Glass area of typical window -(Sqm/sqft)	15 sqft / 1.38 sqm
Number of window Per floor	68
Total Windows	204
Total glazing surface sqm/ sqft	3060 sqft / 281.5 sqm

Table 6.2: Optical and Solar Performance

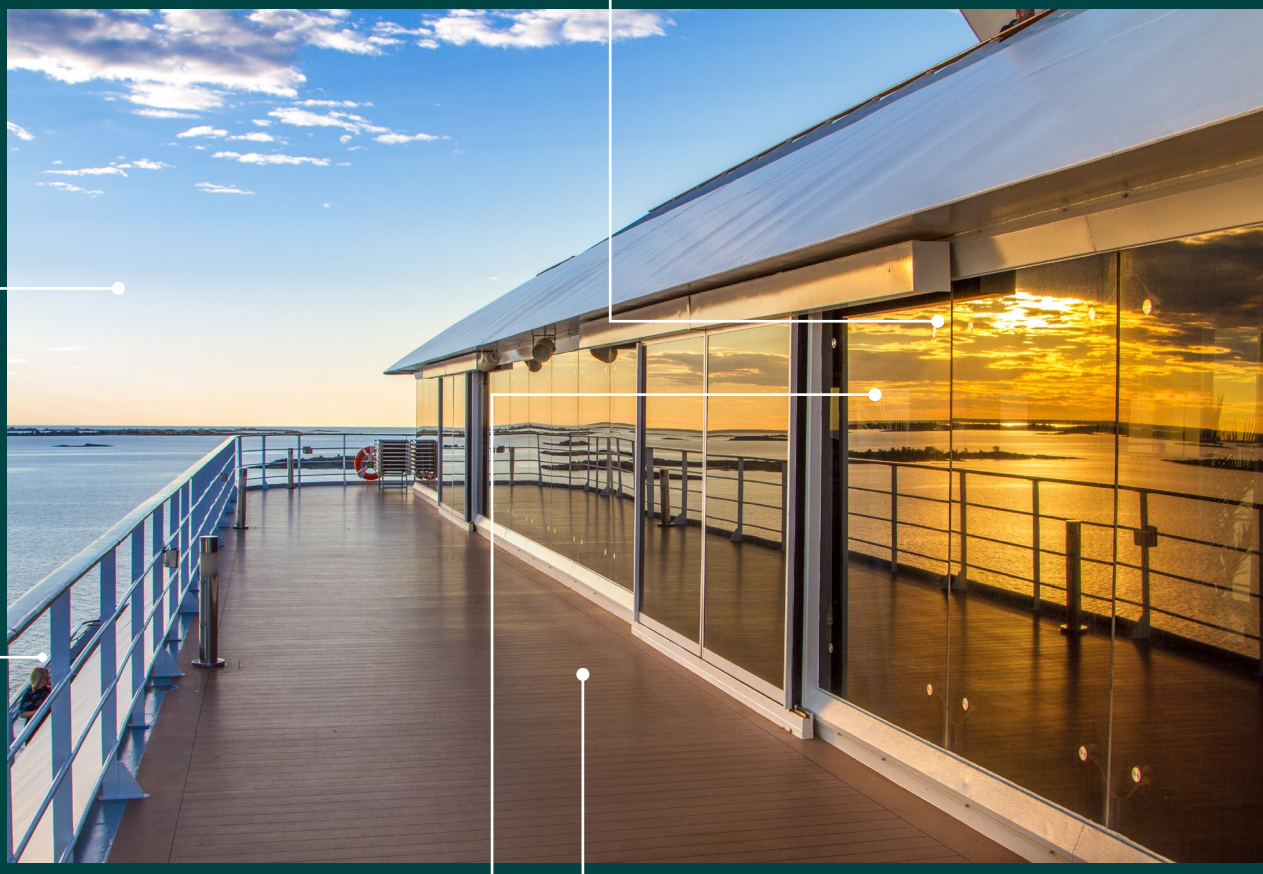
	Glazing without film applied			Glazing with spectrally selective exterior film applied (Silver 20 XTRM Pro)		
	VLT %	SHGC (G-Value)	U-Value (Btu/h-ft2-F)	VLT %	SHGC (G-Value)	U-Value (Btu/h-ft2-F)
Clear Single Pane	88	0.80	1.03	16	0.18	1.03
Clear Double Pane (IGU)	77	0.68	0.47	15	0.14	0.47

Table 6.3 Annual estimated energy

	Country	State / City	Single Clear Pane Electricity (kWh) Savings Per Year	Double Clear Pane Electricity (kWh) Savings Per Year
Europe	Germany	Berlin	24,100	25,800
	Spain	Madrid	42,190	43,900
	Italy	Rome	39,760	40,100
	Austria	Vienna	25,560	27,590
	Netherlands	Amsterdam	23,110	25,560
	Switzerland	Geneva	29,690	31,250
	Portugal	Porto	42,610	42,810
	United Kingdom	London	24,880	27,430
	France	Paris	26,720	27,990
	Poland	Warsaw	21,860	25,040
	Sweden	Stockholm	21,880	25,710
North America	Arizona	Phoenix	60,260	58,700
	Texas	Houston	44,010	43,180
	California	Los Angeles	49,520	47,410
	Georgia	Atlanta	42,280	43,080
	Illinois	Chicago	27,980	34,120
	Massachusetts	Boston	25,020	30,590
	Minnesota	Minneapolis	24,330	30,300
	Nevada	Las Vegas	57,270	58,260
	New York	New York City	31,020	32,800
	Pennsylvania	Philadelphia	31,770	33,750
	Indiana	Indianapolis	31,170	34,290
	Kansas	Wichita	39,630	41,550
	Missouri	Kansas City	33,960	36,550
	North Carolina	Charlotte	41,450	42,080
	Oklahoma	Oklahoma City	42,220	44,410
	Oregon	Portland	33,480	33,980
Asia	Australia	Victoria Melbourne	40,100	42,670
	New Zealand	Auckland	43,440	42,720
	India	Maharashtra, Mumbai	48,330	45,560

Avery Dennison solar control window films offer a range of key benefits:

- **Enhance Comfort and Productivity** by reducing glare and improving overall comfort.
- **UV Protection** our window film blocks 99% of harmful UV radiation, providing skin protection and reducing fading of interiors.



- **Our Safety and Security films** offer comprehensive protection and deterrence. They provide robust surface protection, significantly enhance personal safety, and improve overall safety in the event of different threats of glass breakage -spontaneous glass breakage, impact, blast, natural disaster . Additionally, these films serve as an effective deterrent against burglary.
- **Aesthetics Solutions** we offer aesthetic solutions that can upgrade building's appearance and provide daylight privacy.
- **Heat Reduction** our products significantly reduce heat gain through the glazing system, effectively minimizing heat buildup and maintaining a cooler interior.

Associations and accreditations

Our products have been tested, certified and are registered in various associations and accreditations:

NFRC Directory Search	search.nfrc.org
Skin Cancer Foundation	skincancer.org
EWFA / IWFA	iwfa.com
UL Standard	ul.com

To further learn about our solution and the sustainability impact, visit our website: https://avydn.co/net-positive.

Abbreviations

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
CEN	European Committee for Standardization
CLC	Co-location centre
CPC	Central product classification
GHS	Globally harmonized system of classification and labelling of chemicals
GRI	Global Reporting Initiative
SVHC	Substances of Very High Concern
ND	Not Declared

Version History

original version of the EPD - 2026-07-28

References

General Programme Instructions of the International EPD® System. Version 5.0.

PCR – Construction products 2019 2.0.1

EN 15804:2012+A2:2019, Sustainability of construction works - Environmental

Product Declarations – Core rules for the product category of construction products

EN ISO 14040:2006. Environmental management. Life cycle analysis. Principles and frame of reference.

EN ISO 14025:2010. Labels and environmental declarations Type III environmental declarations. Principles and procedures.

ISO 14044:2006. Environmental management – Life cycle assessment – Requirements and guidelines. International Organization for Standardization, Geneva, Switzerland.

Merlo, A., & Léonard, G. (2021). Magnetron sputtering vs. electrodeposition for hard chrome coatings: A comparison of environmental and economic performances. Materials, 14(14), 3823.

OECD. (2022, February 22). Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options. OECD Publishing. https://doi.org/10.1787/de747aef-en

Scheutz, C., & Astrup, T. (2009). Efficiency of energy recovery from municipal solid waste and the resultant effect on the greenhouse gas balance. Waste Management & Research, 27(9), 789–799. https://doi.org/10.1177/0734242X09345876

EPD number S-P-06660 V2, 2023-04-12, EPD number.: S-P-00994, Version 3.0, 2020-12-17

EPD
INTERNATIONAL EPD SYSTEM

AVERY DENNISON