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

Interior Solar and Safety Window Film up to 4 mil

Programme	The International EPD System, www.environdec.com
Programme operator	EPD International AB
Type of EPD	EPD of multiple products from a company
EPD registration number	EPD-IES-0024192:001
Version date	2025-09-16
Validity date	2030-09-15
	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
	Up to 4 mil EPD of multiple products, based on the average results of the product group (product names in table 3.1) From Avery Dennison®

AVERY DENNISON

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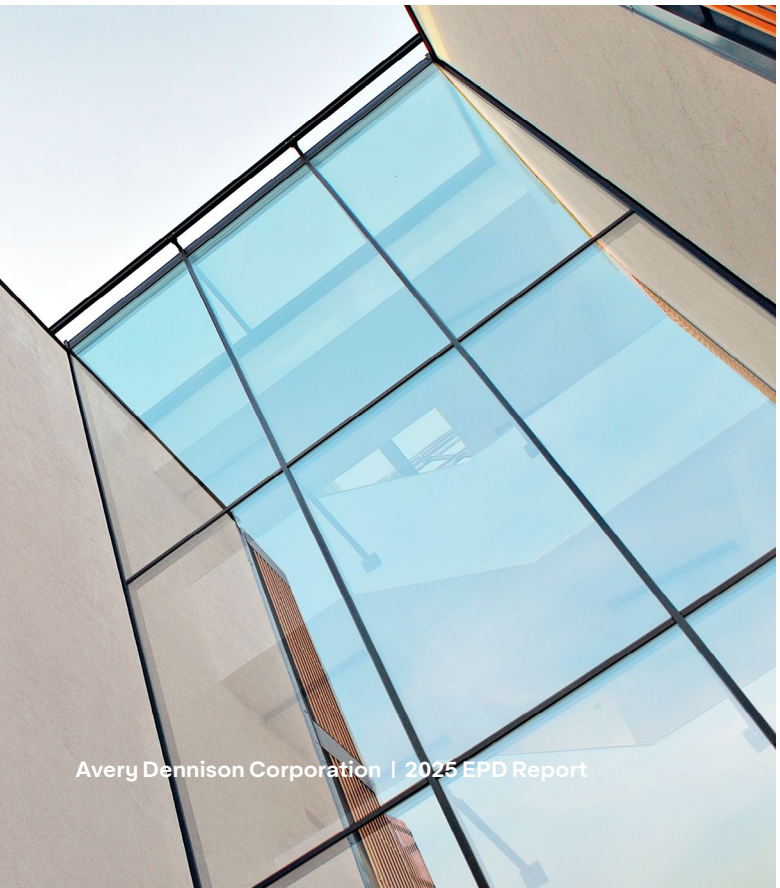


1. General Information

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.,
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.

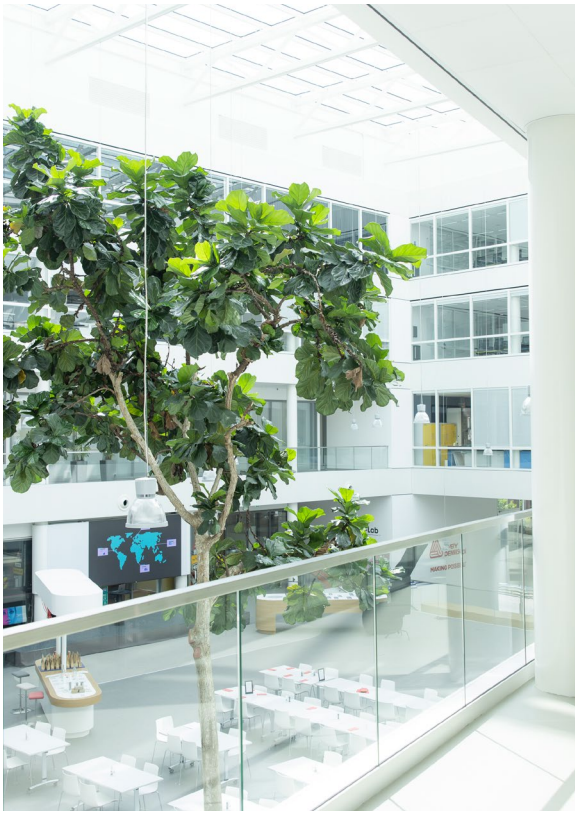
EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical 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	24 products, interior solar and safety window films, up to 4 mil
Declared Unit	1 m^2 of packaged window film, used over twenty years of use
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 9.3
Background database	Ecoinvent 3.9.1
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.

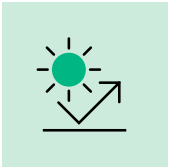
We are committed to operating clean, safe, and energy-efficient manufacturing facilities, and work to comply with or exceed community, state, and international standards. As stated in our global sustainability goals, we are also committed to reducing Scope 1 and 2 emissions.

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)

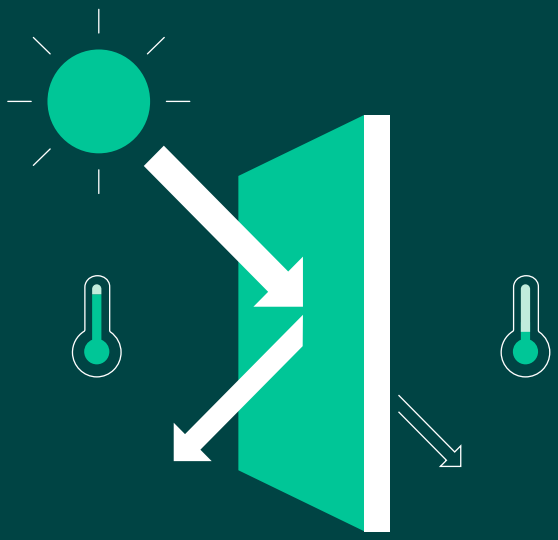
- Renewable energy

- 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

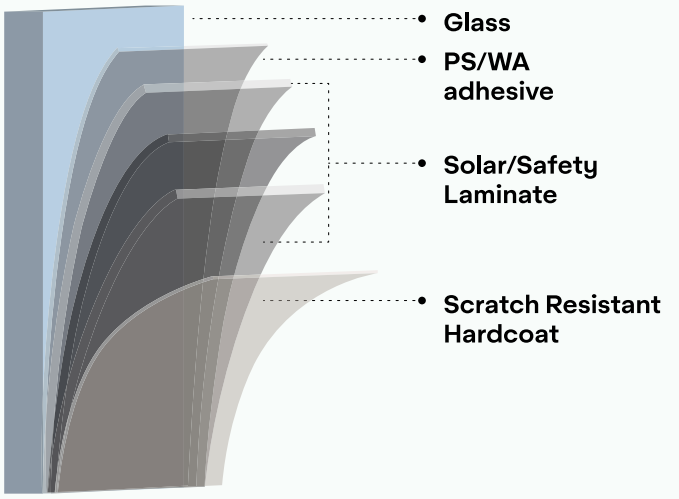
Our advanced solar control window films seamlessly manage solar radiation in your indoor spaces, filtering up to 85% of the sun's energy. This significantly reduces solar heat gain, providing tangible comfort and energy efficiency benefits by keeping rooms cooler and alleviating overheating. Our films 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

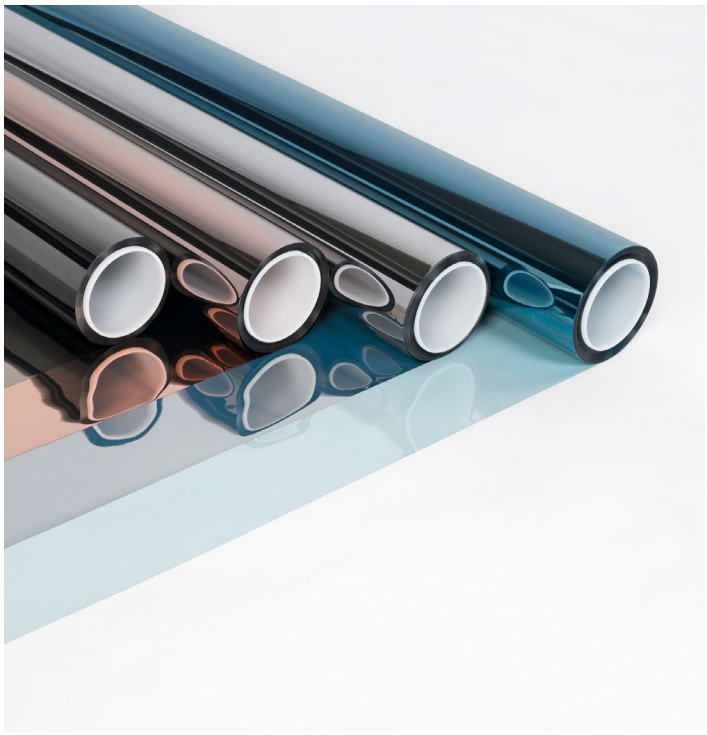
Avery Dennison internal Solar Control window films are optical filters constructed using multilayers of PET with a metalized layer. The specific solar performance and appearance of each product is determined by the type of metal and additional layers added, such as nanotechnology incorporated. Different mounting adhesives are used depending on the product's application target. Some products are available with both pressure-sensitive adhesive (PS) while others are designed with a water-activated adhesive (WA).

Avery Dennison Safety and Security window films offer exceptional clarity, low reflectance, and high levels of UV blockage, along with protection against various threats and hazards - field proven shard retention, forced entry protection and blast protection. Products are based on ultraclear PET film combined with advanced acrylic adhesive systems with enhanced UV protection characteristics.

This EPD covers 24 products in total, two (2) clear safety films and the rest solar control interior film - all up to 4mil thickness. The following products listed in table below have been analyzed while the report represents the average results. Specific information on any one of the products covered in this EPD can be shared by Avery Dennison.

Table 3.1
List of products in scope

Reflective (R)	Silver 20i (PS) Silver 20i (WA)
	Silver 35i Silver 35i (WA)
	Silver 50i
Dual Reflective (DR)	OptiTune 05i OptiTune 15i OptiTune 20i OptiTune 30i OptiTune 40i OptiShade 15i OptiShade 25i OptiShade 35i DR Grey 05i /Titan Duo 05i DR Grey 15i /Titan Duo 15i
Neutral (NT)	Perlite Ceramic 20i Perlite Ceramic 35i Perlite Ceramic 50i Perlite Ceramic 70i Natura 05i Natura 15i Natura 30i
Safety (SF)	Clear 4 mil i Clear 4 mil i Economic



These products are provided with a warranty period ranging from 12 to 15 years (pending product/zone), while the expected service life is longer considering an internal application usage, provided that the specified conditions for packaging, transport, storage, installation, use, maintenance and repair are followed. For information on warranty terms, exclusions and certain limitations that apply see window film warranty for details at www.graphics.averydennison.com/warranty.

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").

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 %	Solar Heat Gain Coefficient	Glare Reduction %
Silver 20 i	18	62	61	99	55	13	32	0.25	78	0.22	80
Silver 20 i WA	18	62	61	99	55	13	32	0.25	78	0.22	80
Silver 35i	33	41	42	99	39	25	36	0.40	65	0.35	63
Silver 35i WA	33	41	42	99	39	25	36	0.40	65	0.35	63
Silver 50i	51	23	24	97	24	39	37	0.58	50	0.50	44
OptiTune 05i	6	15	63	99	56	6	38	0.19	84	0.16	93
OptiTune 15i	13	25	56	99	51	12	37	0.26	78	0.22	85
Optitune 20i	21	15	32	99	31	18	51	0.38	67	0.33	77
OptiTune 30i	32	26	32	99	32	25	43	0.44	63	0.37	63
Optitune 40i	41	18	21	99	22	33	45	0.54	54	0.46	54
OptiShade 15il	16	17	44	99	42	13	45	0.31	73	0.27	82
OptiShade 25i	27	14	25	99	26	23	51	0.44	61	0.39	70
OptiShade 35i	35	10	13	99	14	34	53	0.58	50	0.50	61
DR Grey 05i /Titan Duo 05i	7	18	59	99	53	7	40	0.21	82	0.78	92
DR Grey 15i /Titan Duo 15i	12	25	56	99	51	9	40	0.23	80	0.7	87
Natura 05i	7	11	14	99	20	12	68	0.35	70	0.30	92
NT Natura 15i WA	17	15	13	99	14	15	71	0.43	63	0.37	81
NT Natura 30i	31	9	14	99	15	33	52	0.56	52	0.48	65
NT Perlite Ceramic 20i	22	24	25	99	29	14	57	0.36	70	0.30	76
NT Perlite Ceramic 35i	40	15	17	99	17	29	54	0.52	55	0.45	56
NT Perlite Ceramic 50i	51	16	18	99	20	40	40	0.60	48	0.52	43
NT Perlite Ceramic 70i	68	9	10	99	10	59	31	0.79	31	0.69	25
SF Clear 4 mil i	89	10	10	97	9	81	10	0.96	16	0.84	1

* 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]
Silver 20 i	0.095
Silver 20 i WA	0.102
Silver 35i	0.096
Silver 35i WA	0.102
Silver 50i	0.095
OptiTune 05i	0.109
OptiTune 15i	0.105
OptiTune 20i	0.105
OptiTune 30i	0.105
OptiTune 40i	0.105
OptiShade 15i	0.105
OptiShade 25i	0.105
OptiShade 35i	0.105
DR Grey 05i /Titan Duo 05i	0.098
DR Grey 15i /Titan Duo 15i	0.098
Natura 05i	0.105
Natura 15i	0.092
Natura 30i	0.105
Perlite Ceramic 20i	0.109
Perlite Ceramic 35i	0.109
Perlite Ceramic 50i	0.105
Perlite Ceramic 70i	0.105
SF Clear 4 mil i	0.197
SF Clear 4 mil i -Economic	0.196
Weighted Average	0.0105

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
PET sheet	92.84%	0%	0
Acrylic Adhesives	3.43%	0%	0
Evaporated Aluminium	0.02%	0%	0
Other adhesive	2.48%	0%	0
Nano Particles	1.27%	0%	0

Packaging Material	Weight,kg	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
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	0.11	kg
Pet sheet	0.10	kg
Acrylic adhesive	3.56	gram
Evaporated aluminium	0.02	gram
Other adhesives	2.87	gram
Nano Particles	1.32	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 24 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 over 20 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

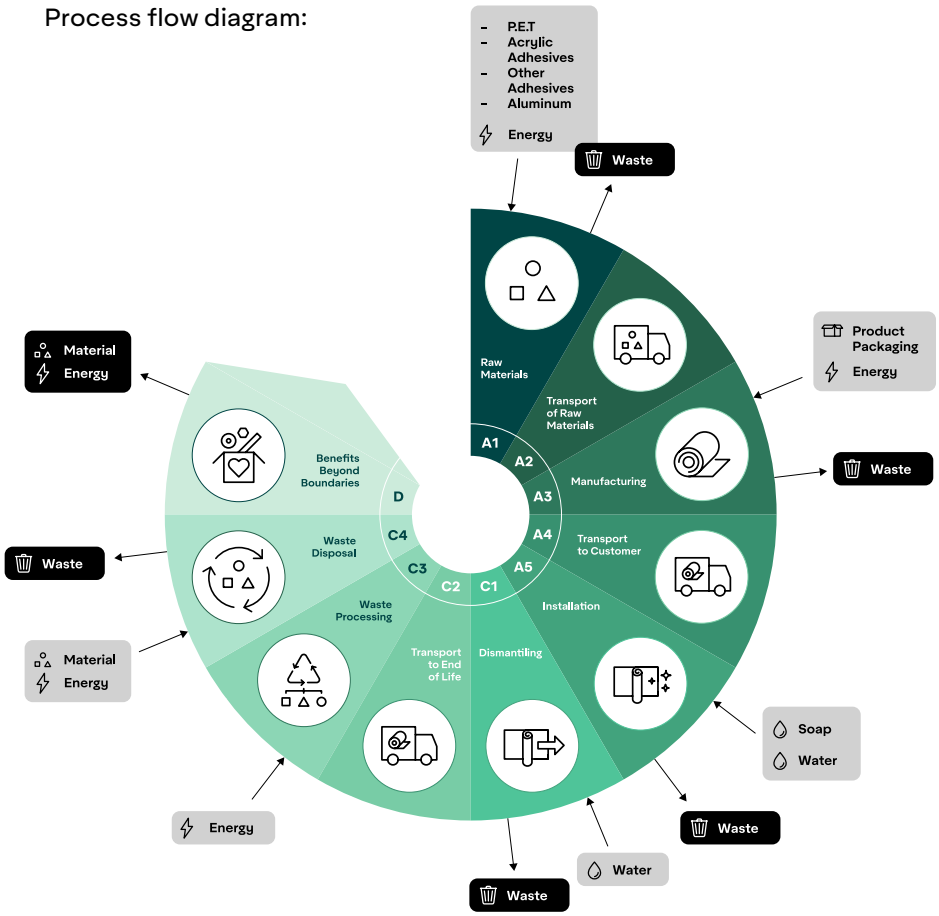
The Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804:2012+A2:2019/ AC:2021and based on EN 15804 + A2 (adapted) V1.00 / EF 3.1 Reference package. This study complies with ISO 14040 and 14044. This study has Compliance with PCR – Construction products 2019 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 3.9 database.

LCA Information

Declared unit: 1 m^2 of window film (for mass conversion factor please see table 3.3)
Reference service life: over 20 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 3.9.1, SimaPro 9.3.
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 20 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:

Sanitary water use (e.g., toilets and kitchen water in the facility) is excluded from the system boundary, as it is not directly related to the production processes and is expected to contribute negligibly to overall environmental impacts.
Auxiliary materials used for routine cleaning and maintenance of production equipment (e.g., lubricants, solvents, or cleaning agents) are excluded from the system boundary. These materials are used in small quantities and are not directly consumed in the product's life cycle. Their contribution to the overall environmental impact is expected to be negligible and falls below the cut-off criteria defined in ISO 14044.
During the installation phase, there may or may not be scraps created by pre cutting that the customer may do at home. We estimate this in the cases with pre-cutting, leading to creation of material scraps. We consider this to be in average of all customer uses to lead to very slim losses in the product, and can be viewed as around 1% making its exclusion, aligned with cut-off rules.
The use of soap during the window cleaning step prior to film installation is included in the downstream modeling. However, the treatment of resulting wastewater and residual soap was excluded due to the very small quantities involved and the assumption that most of the soap evaporates or is wiped off during application. The environmental impact of this omission is considered negligible and within the cut-off criteria.
As stated above, only minor flows were excluded from the LCA model. Aligned with 4.4 section of the PCR 4.4,. All available LCI data was used, and cut-offs were avoided wherever possible.

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. For all datasets, the cut-off allocation method is used. 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 20 years 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 weighted average results.The weighted average is calculated based on sale volumes. Below please see the sale percent varying between the models in the table below. The reason production volume was not used for the weighting average is the fact that not all products produced are later sold in the same year, as some products are sold a number of months after the production. In order to best represent the entire lifecycle, and 2024 weighted amounts the sales data was used. 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 3.9.1, 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 9.3.

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

Data Quality:
Primary data: Only used for **transport (A1–A3),** representing about **5% of GHG emissions** in those stages.

Table 4.1 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 3.9. While most inventory data is secondary and generic, primary data was used where available, particularly for 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 3.9 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 only in transport data, and accumulates to 5% 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. 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 4.2
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	5% (A1-A3)					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	+70%/-17%					-	-	-	-	-	-	-	-	-	-	-	-
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, Germany, USA, Korea, China 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.

Table 4.3
A1 raw material

Acrylic Hardcoat
Acrylic Adhesives
PET (Polyethylene terephthalate)
Nanoparticles Particles dispersed in adhesive
Metalized layers
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, metalization (for solar control films), finishing with slitting and packaging.

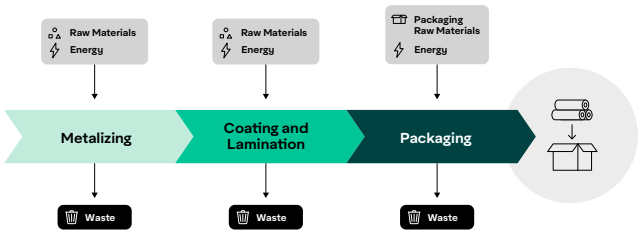


Table 4.4
A3 inputs and outputs

A3 inputs and Outputs per 1 Declared Unit		
Inputs		
Material	**Amount**	**Unit**
Solvents Fully evaporate in RTO	18-46	gram
Wood pallet	0.012	kg
Electricity	0.193-0.300	kWh
LPG	0.012-0.024	kg
Out Puts		
Material	**Amount**	**Unit**
Carbon dioxide, fossil Emission to Air	45-113	gram
Waste treatment- recycling of mixed plastics (Raw Material Packaging waste +Material loss in production)	0.0127-0.0182	kg

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

Table 4.5
Electricity data

Electricity Data Set Used	Year	Type	$kgCO_2e/kWh$ – GWP-GHG
Sher 2023 Electricity, medium voltage {IL}l electricity voltage transformation from high to medium voltage I Cut-off, U	2023	National Average Mix	0.684 $kgCO_2e$

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 2023. 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 4.6
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.

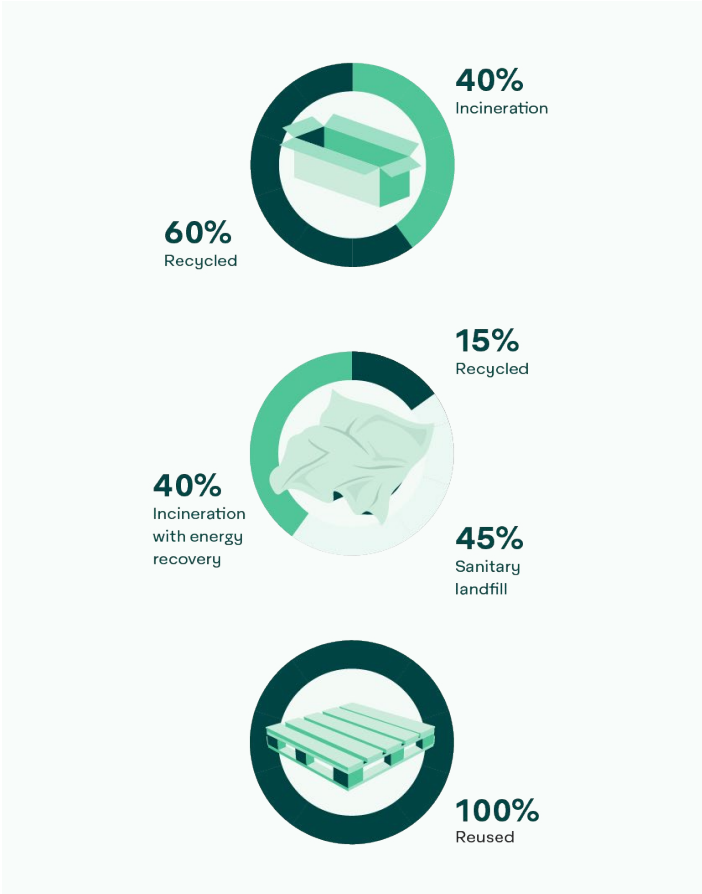


Table 4.7
A5 Installation

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
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 4.8 -C1,C2 inputs and Outputs

C1 and C2

Description	Amount
Tap water	1 kg
Transport to Waste treatment	100 km*109-112 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 4.9
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 4.10
C4 inputs and outputs

C4

Waste Treatment	Allocation
PET sanitary landfill	46%

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 4.11
Module D recovered outputs

Module D – Recovered Outputs

Recovered	Amount	Unit
Product		
Heat	-0.486	MJ
Electricity	-0.0539	kWh
Recycled Plastic	-0.0126	Kg
Packaging		
Recycled Plastic	-0.00432	kg
Cardboard	-0.0212	kg
Electricity	-0.0666	MJ
Heat	-0.167	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.	-1.78E-01	7.50E-06	1.78E-01	2.03E-06	7.07E-07	2.09E-05	4.75E-06	3.11E-02
Global Warming Potential -fossil	kg CO_2 eq.	1.40E+00	5.60E-02	6.41E-02	1.24E-03	2.01E-03	9.09E-02	5.19E-03	-8.14E-02
Global Warming Potential - luluc	kg CO_2 eq.	1.17E-03	3.42E-05	1.68E-02	1.64E-06	1.06E-06	6.79E-06	4.85E-07	1.49E-04
Global Warming Potential -total	kg CO_2 eq.	1.22E+00	5.61E-02	2.59E-01	1.24E-03	2.01E-03	9.09E-02	5.19E-03	-5.02E-02
Global Warming Potential - GHG	kg CO_2 eq.	1.41E+00	5.61E-02	8.20E-02	1.24E-03	2.01E-03	9.09E-02	5.19E-03	-7.57E-02
ODP - Ozone Depletion	kg CFC 11 eq.	1.77E-06	8.40E-10	5.61E-10	1.92E-11	3.16E-11	1.20E-10	1.45E-11	-2.55E-07
AP - Acidification potential	mol H+ eq.	7.09E-03	7.47E-04	1.38E-04	6.55E-06	4.97E-06	3.26E-05	4.48E-06	-4.00E-04
EP Eutrophication potential -freshwater	kg P eq.	3.33E-05	4.14E-07	1.78E-04	4.95E-08	1.91E-08	1.80E-07	1.00E-08	-2.87E-06
EP Eutrophication potential -marine	kg N eq.	1.52E-03	1.96E-04	1.38E-04	1.23E-06	1.18E-06	1.16E-05	7.78E-06	-4.97E-05
EP Eutrophication potential -terrestrial	mol N eq.	1.53E-02	2.15E-03	5.10E-04	1.36E-05	1.25E-05	1.20E-04	1.78E-05	-7.29E-04
POCP - Formation potential of tropospheric ozone	kg NMVOC eq.	5.54E-03	6.32E-04	1.00E-04	4.38E-06	6.64E-06	3.06E-05	6.92E-06	-2.63E-04
ADP-minerals&metals- Resource Depletion *	kg Sb eq.	4.35E-06	1.32E-07	1.12E-07	5.63E-09	6.54E-09	4.21E-09	1.34E-09	-3.41E-07
ADP-fossil - Resource Depletion *	MJ	2.38E+01	7.50E-01	1.58E-01	1.48E-02	2.83E-02	5.06E-02	1.29E-02	-1.56E+00
WDP - Water Deprivation Potential *	M3	4.50E-01	2.76E-03	6.31E-02	4.08E-02	1.26E-04	1.41E-03	5.38E-04	-2.81E-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	4.81E-02	3.84E-04	4.82E-01	1.42E-03	3.65E-04	0.00E+00	0.00E+00	-1.67E-01
	renewable primary energy sources used as raw materials	MJ	3.13E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.38E-01
	Total	MJ	7.94E-02	3.84E-04	4.82E-01	1.42E-03	3.65E-04	0.00E+00	0.00E+00	-5.05E-01
Use of Non Renewable Primary Energy	excluding Non-renewable primary energy sources, used as raw materials	MJ	1.46E+00	3.56E-02	1.71E-01	5.34E-07	2.83E-02	-1.40E+00	0.00E+00	-1.16E+00
	Non-renewable primary energy sources used as raw materials	MJ	2.76E-01	0.00E+00	4.48E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.88E-01
	Total	MJ	1.74E+00	3.56E-02	1.76E-01	5.34E-07	2.83E-02	5.06E-02	0.00E+00	-1.54E+00
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	4.50E-01	2.76E-03	6.31E-02	4.08E-02	1.26E-04	1.41E-03	5.38E-04	-2.81E-02

Table 5.3
Waste indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed of	Kg	6.36E-05	4.45E-06	8.97E-07	4.22E-08	1.83E-07	1.35E-07	6.30E-08	-2.88E-06
Non hazardous waste disposed of	Kg	8.46E-02	2.46E-02	2.53E-02	1.72E-04	1.40E-03	7.37E-04	4.89E-02	-2.13E-03
Radio Active Waste disposed of	Kg	9.80E-06	1.28E-07	1.78E-07	2.62E-08	5.79E-09	1.32E-07	5.08E-09	-2.04E-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	1.35E-02	0.00E+00	2.82E-02	0.00E+00	0.00E+00	1.58E-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	6.23E-04	0.00E+00	0.00E+00	9.71E-01	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	4.20E-02	0.00E+00	0.00E+00
information on biogenic content	Kg	1.78E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	1.78E-01	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	100% recycling
Acidification	mol H+ eq	0.00E+00	4.34E-05	8.65E-07	0.00E+00	9.31E-06	0.00E+00
Climate change	kg CO_2 eq	0.00E+00	2.25E-01	1.77E-04	0.00E+00	9.50E-03	0.00E+00
Ecotoxicity, freshwater	CTUe	0.00E+00	9.08E-02	8.19E-04	0.00E+00	3.43E-02	0.00E+00
Particulate matter	disease inc.	0.00E+00	2.41E-10	7.35E-12	0.00E+00	1.92E-10	0.00E+00
Eutrophication, marine	kg N eq	0.00E+00	2.26E-05	1.57E-07	0.00E+00	1.66E-05	0.00E+00
Eutrophication, freshwater	kg P eq	0.00E+00	4.78E-08	8.28E-09	0.00E+00	2.12E-08	0.00E+00
Eutrophication, terrestrial	mol N eq	0.00E+00	2.27E-04	1.72E-06	0.00E+00	3.66E-05	0.00E+00
Human toxicity, cancer	CTUh	0.00E+00	6.29E-12	4.13E-14	0.00E+00	7.43E-13	0.00E+00
Human toxicity, non-cancer	CTUh	0.00E+00	3.80E-10	1.42E-12	0.00E+00	2.23E-11	0.00E+00
Ionising radiation	kBq U-235 eq	0.00E+00	3.95E-05	8.96E-06	0.00E+00	1.72E-05	0.00E+00
Land use	Pt	0.00E+00	5.37E-03	3.56E-04	0.00E+00	6.10E-02	0.00E+00
Ozone depletion	kg CFC11 eq	0.00E+00	2.54E-10	1.90E-12	0.00E+00	2.94E-11	0.00E+00
Photochemical ozone formation	kg NMVOC eq	0.00E+00	5.46E-05	5.85E-07	0.00E+00	1.45E-05	0.00E+00
Resource use, fossils	MJ	0.00E+00	2.33E-02	2.93E-03	0.00E+00	2.75E-02	0.00E+00
Resource use, minerals and metals	kg Sb eq	0.00E+00	3.32E-09	1.56E-10	0.00E+00	2.86E-09	0.00E+00
Water use	m3 depriv.	0.00E+00	2.23E-03	2.84E-05	0.00E+00	1.14E-03	0.00E+00
Climate change - Biogenic	kg CO_2 eq	0.00E+00	1.10E-05	8.54E-07	0.00E+00	1.01E-05	0.00E+00
Climate change - Fossil	kg CO_2 eq	0.00E+00	2.25E-01	1.75E-04	0.00E+00	9.48E-03	0.00E+00
Climate change - Land use and LU change	kg CO_2 eq	0.00E+00	3.31E-07	3.43E-07	0.00E+00	1.04E-06	0.00E+00
GWP100	kg CO_2 -eq	0.00E+00	2.25E-01	1.76E-04	0.00E+00	9.49E-03	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.	5.13E-08	3.39E-09	2.09E-09	8.09E-11	1.49E-10	2.29E-10	9.02E-11	-3.74E-09
Ionising radiation	kBq U-235 eq	1.57E-02	2.28E-04	2.78E-04	4.32E-05	1.01E-05	1.90E-04	8.11E-06	-3.17E-03
Ecotoxicity, freshwater	CTUe	5.59E+00	4.02E-01	1.37E+00	5.43E-03	1.55E-02	4.34E-02	1.63E-02	-8.84E-02
Human toxicity, cancer	CTUh	6.41E-10	2.49E-11	3.03E-11	2.92E-12	9.12E-13	3.18E-12	3.67E-13	-9.21E-12
Human toxicity, non-cancer	CTUh	9.20E-09	4.28E-10	7.38E-10	4.13E-11	2.05E-11	1.75E-10	1.17E-11	-6.52E-10
Land use	Pt	8.18E+00	3.13E-01	1.01E+00	3.08E-03	1.71E-02	8.24E-03	2.84E-02	-1.73E+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	44%	8.03E-03	151%
Climate change Total	kg CO_2 eq	22%	1.61E+00	198%
Ecotoxicity, freshwater	CTUe	26%	7.47E+00	136%
Particulate matter	disease inc.	17%	5.73E-08	72%
Eutrophication, marine	kg N eq	43%	1.88E-03	126%
Eutrophication, freshwater	kg P eq	3%	2.12E-04	18%
Eutrophication, terrestrial	mol N eq	51%	1.82E-02	142%
Human toxicity, cancer	CTUh	23%	7.05E-10	108%
Human toxicity, non-cancer	CTUh	19%	1.06E-08	119%
Ionising radiation	kBq U-235 eq	28%	1.63E-02	75%
Land use	Pt	35%	9.50E+00	252%
Ozone depletion	kg CFC11 eq	18%	1.76E-06	80%
Photochemical ozone formation	kg NMVOC eq	43%	6.34E-03	184%
Resource use, fossils	MJ	21%	2.49E+01	195%
Resource use, minerals and metals	kg Sb eq	20%	4.62E-06	101%
Water use	m3 depriv.	10%	5.58E-01	44%
Climate change - Fossil	kg CO_2 eq	22%	1.62E+00	206%
Climate change - Land use and LU change	kg CO_2 eq	1%	1.80E-02	3%
GWP - GHG	kg CO_2 -eq	22%	1.65E+00	203%

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 Silver 20i film can reject up to 78% of the total solar energy when internally 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

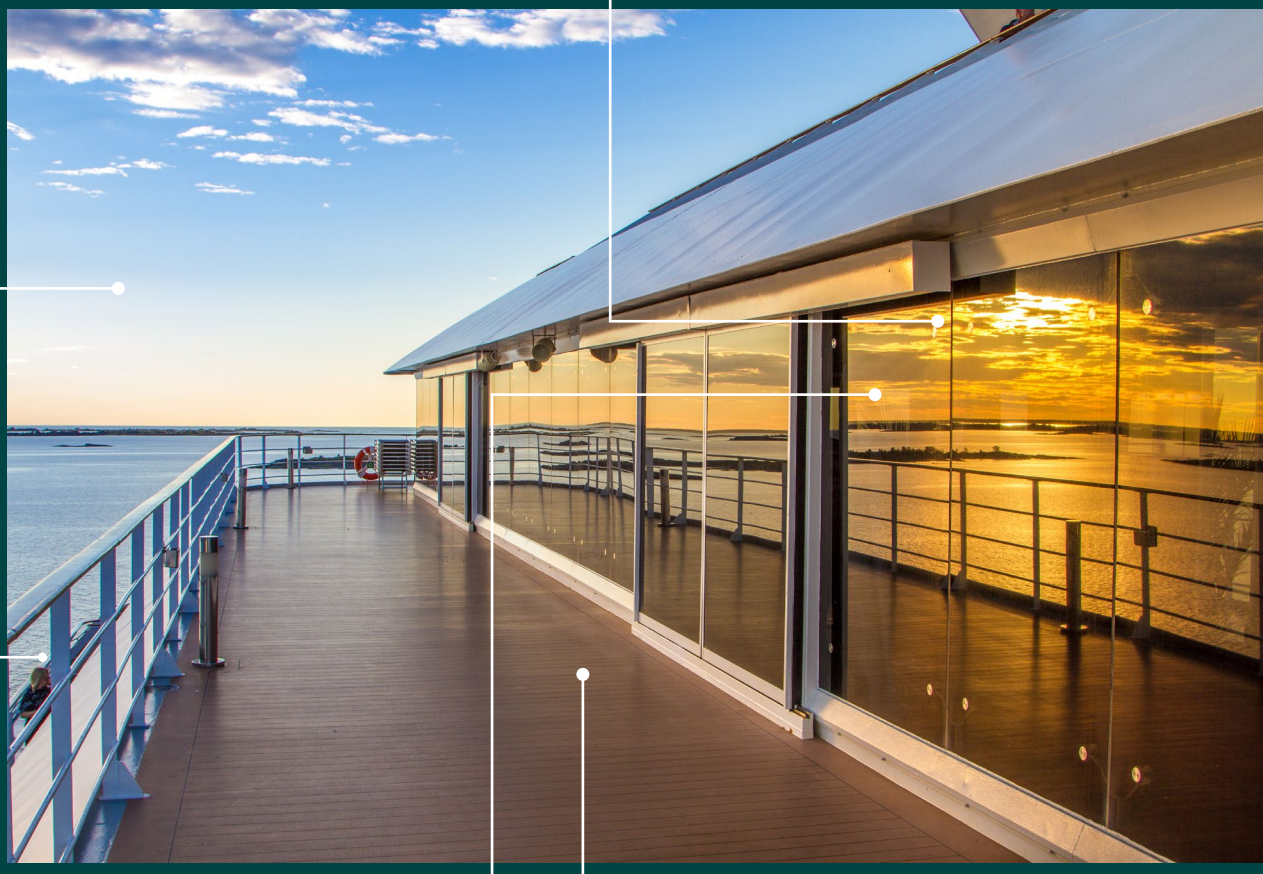
	Glazing without film applied			Glazing with Reflective interior film applied (R Silver 20i)		
	VLT %	SHGC (G-Value)	U-Value (Btu/h-ft2-F)	VLT %	SHGC (G-Value)	U-Value (Btu/h-ft2-F)
Clear Single Pane	88	0.80	1.03	17	0.23	0.96
Clear Double Pane (IGU)	77	0.68	0.47	16	0.32	0.46

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	22,400	17,120
	Spain	Madrid	38,700	29,160
	Italy	Rome	36,380	26,330
	Austria	Vienna	23,790	18,210
	Netherlands	Amsterdam	21,370	17,220
	Switzerland	Geneva	27,320	20,740
	Portugal	Porto	38,520	28,170
	United Kingdom	London	22,960	18,070
	France	Paris	24,520	18,450
	Poland	Warsaw	20,500	17,520
	Sweden	Stockholm	20,650	17,270
North America	Arizona	Phoenix	55,660	37,780
	Texas	Houston	40,300	28,230
	California	Los Angeles	44,470	30,760
	Georgia	Atlanta	39,030	28,700
	Illinois	Chicago	26,650	23,200
	Massachusetts	Boston	24,700	21,160
	Minnesota	Minneapolis	23,350	20,840
	Nevada	Las Vegas	52,950	38,620
	New York	New York City	29,100	22,540
	Pennsylvania	Philadelphia	29,820	22,330
	Indiana	Indianapolis	29,400	22,860
	Kansas	Wichita	36,870	27,970
	Missouri	Kansas City	31,880	24,180
	North Carolina	Charlotte	38,130	27,930
	Oklahoma	Oklahoma City	39,370	29,390
	Oregon	Portland	30,660	22,920
Asia	Australia	Victoria Melbourne	36,590	28,100
	New Zealand	Auckland	38,950	27,720
	India	Maharashtra, Mumbai	44,670	30,090

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

Associations and accreditations

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

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

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EPD
INTERNATIONAL EPD SYSTEM

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