



## Environmental Product Declaration

# 10500 Series™ 5-Shelf Bookcase

### Product Description

This sturdy five-shelf bookcase helps you get organized. It comes factory-assembled and amazingly strong, ready to handle your books and reference materials. Offering premium quality on a moderate budget, it's a value storage solution.

### Functional Unit

The primary function of HON® 10500 Series 5-Shelf Bookcase is to store office-based materials and supplies in an office setting. As a static storage unit, the functional unit is 0.15m<sup>3</sup> of storage capacity, serving the function of storage for a 10-year period. The 5-Shelf Bookcase provides a total storage capacity of 0.47m<sup>3</sup>. The reference flow for the modeling system is one complete storage unit and the results are normalized to 0.15m<sup>3</sup> of storage capacity.

### About HON

**We're inspired by the way you work — and the ways that's changing.**

The technology you use. The chair you sit in. And the spaces you choose to get it all done. Because the way you work inspires our work. We're dedicated to design and devoted to budget. We believe that well designed office furniture not only looks great, but makes you and your workers feel great, too. That's why everything we build is designed with purpose and motivated by change. Our products are simple, affordable and do exactly what they're meant to — day in and day out — to help you work smarter, work better and work your way.

The HON Company  
200 Oak Street  
Muscatine, IA 52761  
[www.hon.com](http://www.hon.com)

### EPD Program Operator

SCS Global Services  
2000 Powell Street, Ste 600  
Emeryville, CA 94608  
[www.scsglobalservices.com](http://www.scsglobalservices.com)

### Product Category Rule

BIFMA PCR for Storage: UNCPC 3812  
June 30, 2021

### EPD Number and Period of Validity

SCS-EPD-06355  
September 4, 2020 through  
September 3, 2025

# HON®

<b>Declaration Owner:</b>	The HON Company
<b>Address:</b>	200 Oak Street, Muscatine, IA 52761
<b>Declaration Number:</b>	SCS-EPD-06355
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<b>LCA Practitioner:</b>	Lila Taheraly and Aditi Suresh
<b>LCA Software:</b>	OpenLCA v1.9
<b>Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071</b>	<input type="checkbox"/> Internal <input checked="" type="checkbox"/> External
<b>LCA Reviewer:</b>	 <hr/> Tom Gloria, PhD, Industrial Ecology Consultants
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<b>PCR Review conducted by:</b>	Thomas P. Gloria, Ph.D. (Chair), Industrial Ecology Consultants
<b>Independent verification of the declaration and data, according to ISO 14025 and the PCR</b>	<input type="checkbox"/> Internal <input checked="" type="checkbox"/> External
<b>EPD Verifier:</b>	 <hr/> Tom Gloria, PhD, Industrial Ecology Consultants
<b>Declaration Contents:</b>	Product and Company Information.....1 Product Specifications.....3 Material Composition.....3 Life Cycle Assessment Stages.....4 Life Cycle Inventory.....4 Life Cycle Impact Assessment.....5 Additional Environmental Information.....6 References.....7
<p><i>Disclaimers: This EPD conforms to ISO 14025, 14040, and 14044.</i></p> <p><i>Scope of Results Reported: The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.</i></p> <p><i>Accuracy of Results: Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.</i></p> <p><i>Comparability: The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.</i></p>	

## Product Specifications

HON's 10500 Series™ 5-Shelf Bookcase provides a coordinated look for all the storage components in the office. Robust construction using metal-to-metal fasteners and wood dowels for a solid feel and lasting performance. Scratch-, spill- and stain-resistant laminate stands up to heavy use and is specially treated to withstand boiling liquids. Durable inner-frame construction stands up to the stress of frequent moving and relocation. Woodgrain, solid and patterned surface materials in over 90 combinations let you customize your office environment.

The HON® 10500 Series 5-Shelf Bookcase, assembled at the Oak Laminate facility in Muscatine, Iowa, is primarily constructed using particleboard, steel, zinc, and adhesives. The HON® 10500 Series 5-Shelf Bookcase passes the ANSI/ BIFMA X5.9 test, demonstrating a minimum expected lifetime of 10 years under specified conditions. This unit contains 0.2% post-consumer and 85% pre-consumer recycled content.

Table 1. The HON 10500 Series™ 5-Shelf Bookcase product information.

Product Dimensions (W x D x H)	Storage Volume (m <sup>3</sup> )	Number of Storage Units to Fulfill the Functional Unit
36" x 13.1" x 71"	0.47	0.32

## Materials Composition

Table 2. Material composition of the 10500 Series™ 5-Shelf Bookcase. Results are shown on a mass basis and as a percent of total.

Material Classification	(kg/unit)	(kg/ Functional Unit <sup>1</sup> )	Percent of Total
Particleboard	92	30	98%
Adhesive	0.70	0.23	0.7%
Steel	0.55	0.18	0.6%
Zinc	0.59	0.19	0.6%
Plastic	0.22	0.07	0.2%
Wood	0.20	0.07	0.2%
Thermally Fused Laminate (TFL)	0.006	0.002	0.01%
<b>Total</b>	<b>95</b>	<b>31</b>	<b>100%</b>

<sup>1</sup>The Functional Unit is defined as 0.15m<sup>3</sup> of storage capacity for a ten-year period.

Table 3. Packaging material composition of 10500 Series™ 5-Shelf Bookcase. Results are shown on a mass basis, and as a percent of total.

Packaging Material	(kg/unit)	(kg/ Functional Unit <sup>1</sup> )	Percent of Total
Paper/Corrugated Paperboard	8.2	2.6	94%
Sticker Paper	0.01	0.003	0.1%
Adhesive	0.49	0.16	6%
<b>Total Packaging</b>	<b>8.7</b>	<b>2.8</b>	<b>100%</b>

<sup>1</sup>The Functional Unit is defined as 0.15m<sup>3</sup> of storage capacity for a ten-year period.

## Life Cycle Assessment Stages

Figure 1 below is a representation of the life cycle of the 10500 Series™ 5-Shelf Bookcase. The system boundary is cradle-to-grave and includes resource extraction and processing, product manufacture and assembly, distribution/transport, use and maintenance, and end-of-life.

Figure 1. Life cycle diagram for HON 10500 Series™ 5-Shelf Bookcase.



## Life Cycle Inventory

The life cycle inventory (LCI) flows by life cycle stage of the 10500 Series™ 5-Shelf Bookcase are shown in Tables 4-8.

Table 4. Average air emissions by life cycle stage for the the 10500 Series™ 5-Shelf Bookcase. Results are shown in kg per functional unit.

Parameter	Unit	Total	Material Acquisition	Production	Delivery, Installation & Use	Disposal
Sulfur Dioxide (SO <sub>2</sub> )	kg	<b>8.0 x 10<sup>-2</sup></b>	3.8 x 10 <sup>-2</sup>	3.8 x 10 <sup>-2</sup>	2.9 x 10 <sup>-3</sup>	6.5 x 10 <sup>-4</sup>
Nitrogen Oxides (NO <sub>x</sub> )	kg	<b>9.4 x 10<sup>-2</sup></b>	5.7 x 10 <sup>-2</sup>	2.7 x 10 <sup>-2</sup>	8.8 x 10 <sup>-3</sup>	2.4 x 10 <sup>-3</sup>
Carbon Dioxide, fossil (CO <sub>2</sub> )	kg	<b>37</b>	19	16	1.9	0.31
Carbon Dioxide, biogenic (CO <sub>2</sub> )	kg	<b>14</b>	4.8	2.6	9.6 x 10 <sup>-3</sup>	6.3
Methane (CH <sub>4</sub> )	kg	<b>0.14</b>	5.1 x 10 <sup>-2</sup>	4.6 x 10 <sup>-2</sup>	1.4 x 10 <sup>-3</sup>	4.6 x 10 <sup>-2</sup>
Nitrous Oxide (N <sub>2</sub> O)	kg	<b>1.2 x 10<sup>-3</sup></b>	4.6 x 10 <sup>-4</sup>	6.1 x 10 <sup>-4</sup>	4.2 x 10 <sup>-5</sup>	7.1 x 10 <sup>-5</sup>
Carbon Monoxide (CO)	kg	<b>7.1 x 10<sup>-2</sup></b>	5.3 x 10 <sup>-2</sup>	1.3 x 10 <sup>-2</sup>	4.0 x 10 <sup>-3</sup>	1.5 x 10 <sup>-3</sup>

Table 5. Water emissions by life cycle stage for the 10500 Series™ 5-Shelf Bookcase. Results are shown in kg per functional unit.

Parameter	Unit	Total	Material Acquisition	Production	Delivery, Installation & Use	Disposal
Phosphates	kg	<b>8.7 x 10<sup>-2</sup></b>	2.5 x 10 <sup>-2</sup>	6.2 x 10 <sup>-2</sup>	4.8 x 10 <sup>-4</sup>	2.4 x 10 <sup>-4</sup>
Nitrates	kg	<b>3.7 x 10<sup>-2</sup></b>	7.1 x 10 <sup>-3</sup>	2.7 x 10 <sup>-2</sup>	1.8 x 10 <sup>-4</sup>	2.6 x 10 <sup>-3</sup>
Dioxin	kg	-	-	-	-	-
Arsenic	kg	<b>1.9 x 10<sup>-4</sup></b>	9.4 x 10 <sup>-5</sup>	8.7 x 10 <sup>-5</sup>	1.7 x 10 <sup>-6</sup>	9.3 x 10 <sup>-6</sup>
Lead	kg	<b>4.6 x 10<sup>-3</sup></b>	1.2 x 10 <sup>-3</sup>	2.7 x 10 <sup>-3</sup>	1.5 x 10 <sup>-5</sup>	5.5 x 10 <sup>-4</sup>
Mercury	kg	<b>1.4 x 10<sup>-5</sup></b>	1.7 x 10 <sup>-6</sup>	6.9 x 10 <sup>-6</sup>	3.7 x 10 <sup>-8</sup>	5.3 x 10 <sup>-6</sup>
Cadmium	kg	<b>4.1 x 10<sup>-7</sup></b>	1.8 x 10 <sup>-7</sup>	1.9 x 10 <sup>-7</sup>	2.0 x 10 <sup>-8</sup>	8.7 x 10 <sup>-9</sup>
Chromium	kg	<b>7.7 x 10<sup>-4</sup></b>	2.9 x 10 <sup>-4</sup>	4.6 x 10 <sup>-4</sup>	7.4 x 10 <sup>-6</sup>	3.1 x 10 <sup>-6</sup>

## Life Cycle Inventory (continued)

Table 6. Average water usage by life cycle stage for the 10500 Series™ 5-Shelf Bookcase. Results are shown in kg per functional unit.

Parameter	Unit	Total	Material Acquisition	Production	Delivery, Installation & Use	Disposal
Water Consumption	kg	<b>1,100</b>	380	690	6.0	1.7

Table 7. Average energy usage by life cycle stage for the 10500 Series™ 5-Shelf Bookcase. Results are shown in MJ per functional unit.

Parameter	Unit	Total	Material Acquisition	Production	Delivery, Installation & Use	Disposal
Primary Energy Demand	MJ	<b>860</b>	580	240	31	5.7
Fossil Fuels	MJ	<b>400</b>	200	170	30	5.5
Nuclear	MJ	<b>150</b>	110	38	0.46	0.16
Renewable Energy	MJ	<b>310</b>	270	36	0.33	0.10
Miscellaneous Fuels	MJ	<b>0.1</b>	0.04	0.03	4.2 x 10 <sup>-3</sup>	4.8 x 10 <sup>-5</sup>

Table 8. Average waste type by life cycle stage for the 10500 Series™ 5-Shelf Bookcase. Results are shown in kg per functional unit.

Parameter	Unit	Total	Material Acquisition	Production	Delivery, Installation & Use	Disposal
Incineration w/ Energy Recovery	kg	<b>5.1</b>	INA	0.8	INA	4.3
Incineration w/o Energy Recovery	kg	<b>0</b>	INA	0	INA	0
Recycling	kg	<b>9.1</b>	INA	2.9	INA	6.2
Hazardous	kg	<b>1.5 x 10<sup>-3</sup></b>	9.4 x 10 <sup>-4</sup>	5.1 x 10 <sup>-4</sup>	1.9 x 10 <sup>-5</sup>	5.6 x 10 <sup>-6</sup>
Non-Hazardous (Landfill)	kg	<b>30</b>	6.5	4.9	2.7	16

Table 9. Translation of LCA results to familiar activities for select aggregated inventory results for 10500 Series™ 5-Shelf Bookcase.

Category Indicator	Life Cycle Impact Assessment for 0.15 m <sup>3</sup> of storage volume, maintained for 10-years	Life Cycle Impact Assessment for 1 storage unit, maintained for 10-years	Basis of Calculation	0.15 m <sup>3</sup> of storage volume, maintained for 10-years	1 storage unit, maintained for 10-years
Net Water Consumption	1.1 m <sup>3</sup>	3.4 m <sup>3</sup>	Number of cycles run in a dishwasher <sup>1</sup>	24	75
Primary Energy Demand	860 MJ	2,700 MJ	Number of days operating a refrigerator <sup>2</sup>	45	141
Energy Resource Depletion (SCS-002)	250 MJ eq	780 MJ eq	Number of days operating a refrigerator <sup>2</sup>	13	41

<sup>1</sup>The net water use estimate is based on Energy Star-rated dishwashers and also considers the upstream water required to generate electricity to run the dishwasher. [https://www.energystar.gov/index.cfm?c=dishwash.pr\\_crit\\_dishwashers](https://www.energystar.gov/index.cfm?c=dishwash.pr_crit_dishwashers)

<sup>2</sup>The primary energy demand estimate is based on the energy consumption for Energy Star refrigerators, using a US average electricity supply mix, and also considers the upstream energy demand for electricity generation in US. <https://www.energystar.gov/index.cfm?fu-section=refrigerator.calculator>

## Life Cycle Impact Assessment

Impact category indicators are calculated using the TRACI 2.0 characterization methods, including acidification potential, eutrophication potential, photochemical ozone creation potential, ozone depletion potential, and global warming potential 100-year time horizon based on IPCC 2013.

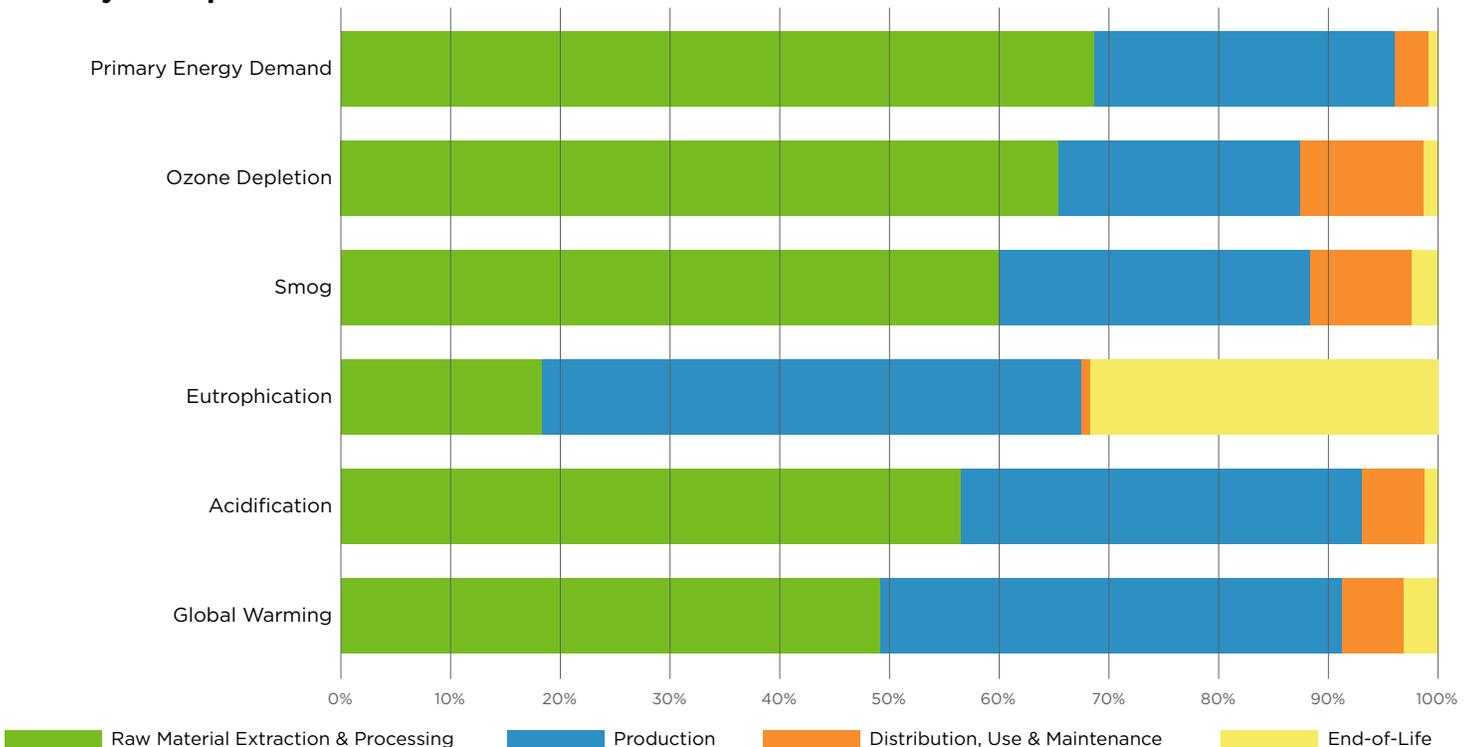
Table 10. Average life cycle impact assessment results for 10500 Series™ 5-Shelf Bookcase. Results are shown per functional unit (0.15 m<sup>3</sup> storage capacity). Results for 1 storage unit are shown in parenthesis.

Impact Category	Unit	Total	Material Acquisition	Production	Distribution, Installation & Use	Disposal
 IPCC Global Warming Potential - 100 year	kg CO <sub>2</sub> eq	<b>42</b> (130)	21 (64)	17 (54)	2.0 (6.2)	1.6 (5.0)
 Acidification Potential	mol H <sup>+</sup> eq	<b>8.8</b> (27)	4.8 (15)	3.3 (10)	0.50 (1.6)	0.13 (0.41)
 Eutrophication Potential	kg N eq	<b>0.37</b> (1.1)	0.07 (0.21)	0.18 (0.56)	2.3 x 10 <sup>-3</sup> (7.0 x 10 <sup>-3</sup> )	0.12 (0.37)
 Photochemical Ozone Creation Potential	kg O <sub>3</sub> eq	<b>2.4</b> (7.5)	1.5 (4.6)	0.67 (2.1)	0.22 (0.67)	5.9 x 10 <sup>-2</sup> (0.18)
 Ozone Depletion Potential	kg CFC-11 eq	<b>4.4 x 10<sup>-6</sup></b> (1.4 x 10 <sup>-5</sup> )	2.9 x 10 <sup>-6</sup> (8.9 x 10 <sup>-6</sup> )	9.7 x 10 <sup>-7</sup> (3.0 x 10 <sup>-6</sup> )	5.1 x 10 <sup>-7</sup> (1.6 x 10 <sup>-6</sup> )	8.9 x 10 <sup>-8</sup> (2.8 x 10 <sup>-7</sup> )

On assessing the percentage contribution by life cycle phase, it is evident that the raw material extraction and processing phase is the most dominant phase with significant environmental impacts across categories indicators. The manufacturing phase also contributes measurably to all environmental impact indicators – especially for the global warming, acidification and eutrophication potential indicators.

Figure 2. Contribution analysis graph representing % contribution to each impact category indicator by life cycle phase.

### Life Cycle Impacts of 10500 Series™ 5-Shelf Bookcase



## Life Cycle Impact Assessment (continued)

Additional life cycle impact results are reported in Table 11 below as optional parameters of concern. These impacts are calculated using the SCS-002 framework, which complements the ISO 14044 standard for LCA with additional guidance on conducting a more comprehensive impact assessment.

Table 11. Life cycle impact assessment results for the 10500 Series™ 5-Shelf Bookcase, according to SCS-002 standard.

Impact Category (SCS-002 Parameters)	Unit	Life Cycle Impact Results for 0.15m <sup>3</sup> of Storage Capacity	Life Cycle Impact Results for 1 Storage Unit
Global Climate Change	kg CO <sub>2</sub> eq	61	189
Ocean Acidification	kg H <sub>2</sub> CO <sub>3</sub> eq	18	56
Energy Resource Depletion	MJ eq	250	780

Select impact category indicators are equated on the basis of the number of miles driven in a typical passenger vehicle, or number of days of refrigerator operation, to help consumers make more informed choices regarding purchase of commercial furniture.

Table 12. Translation of LCA results to familiar activities for select aggregated inventory results for the 10500 Series™ 5-Shelf Bookcase.

Category Indicator	Life Cycle Impact Assessment results for 0.15 m <sup>3</sup> of storage volume, maintained for 10-years	Life Cycle Impact Assessment results for 1 unit of storage, maintained for 10-years	Basis of Calculation	0.15 m <sup>3</sup> of storage, maintained for 10-years	1 storage unit, maintained for 10-years
Global Warming Potential (IPCC, 100 year time horizon)	42 kg CO <sub>2</sub> eq	130 kg CO <sub>2</sub> eq	Number of miles driven in a typical passenger vehicle <sup>3</sup>	101	312
Global Climate Change (SCS-002)	61 kg CO <sub>2</sub> eq	189 kg CO <sub>2</sub> eq	Number of miles driven in a typical passenger vehicle <sup>3</sup>	136	423

<sup>3</sup>Average vehicle miles traveled are estimated using average US fuel economies for passenger vehicles and light trucks and the amount of carbon dioxide emitted per gallon of motor gasoline burned. <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references>

## Additional Environmental Information

HON makes it a priority to design product and implement processes that reduce our collective impact on the environment. HON is proud to support sustainable initiatives in the building industry as a member of the U.S. Green Building Council (USGBC).

HON 10500 Series Storage is LEVEL® 3 certified to the ANSI/BIFMA e3 Furniture Sustainability Standard and SCS Indoor Advantage™ Gold certified for indoor air quality. HON 10500 Series has the ability to contribute to several credits in the LEED® green building program and the WELL Building Standard®.

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# HON.

The HON Company  
200 Oak Street, Muscatine, IA 52761  
800.833.3964 | Check out [hon.com](http://hon.com)

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