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The office desks

OGI_Y, OGI_U, OGI_Q, OGI_A, OGI_M, VIK, OGI_N, ERGONOMIC MASTER, YAN_M, YAN_C, YAN_T, YAN_Z, OGI_DRIVE, COMPACT_DRIVE, FLOW, OGI_W, OGI_V, EKO

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ITB is the verified member of The European Platform for EPD program operators and LCA practitioner www.eco-platform.org

Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on ISO 14040 and EN 15804 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment. Their aspects were verified by the independent body according to ISO 14025. Basically, a comparison or evaluation of EPD data is possible only if all the compared data were created according to ISO 14040 and EN 15804 (see point 5.3 of the standard).

Life cycle analysis (LCA): A1-A4, C1-C4 and D modules in accordance with EN 15804
(Cradle to Gate with options)
The year of preparing the EPD: 2021
Service Life: minimum 10 years, depending on application type
PCR: ITB-PCR A (PCR based on EN 15804)
Declared unit: 1 piece of furniture (with the possibility of converting to 1 m^2)
Reasons for performing LCA: B2B
Representativeness: Polish production, year 2020

Products description

The MDD office furniture factory located in Sępólno Krajeńskie (Poland) was founded in 1993. Initially, the main stem of its production was the processing of wood. Since 1997, the production of office furniture is a base in the company's operations, which enables its dynamic development. Essential elements in production are made on site. MDD now distributes its products to more than twenty countries on three continents. Among the various MDD proposals are modern office desks covered by this EPD.

The products mainly consist of a top made of laminated particle board (28mm), and the frames and legs are made of various materials such as powder coated metal, wood or wood-based board (particle boards). Products may have also accessories made of polymers. The basic type of products covered by this declaration is a group called OGI. From a classic four-legged variant through a radial one with MFC legs to a desk adjusted to the user's size featuring a sit-sit frame the Ogi desks is a personalized workstation. The variety of options results from the combination of a universal top in multiple sizes and forms with diversified frame types, coming in both a single and double version, that allow to create an arrangement of any size. Combined with various cable management accessories or desk panels the Ogi desk provides a well-organized work station that enhance efficiency. Second typical group of desks is Yan. Yan is the solution for companies that have multiple project teams who need more room to work and interact. One of the most important elements in planning your ergonomic office space, is the functionality of office furniture. This is why one can use the panels interchangeably by dividing workplace into straight or intersecting sections. Yan has been designed to not only serve multi-station offices, but also to create professional spaces for managers. Combined with side tables, and partition walls a complete and cozy work environment can be created. Third group is Ergonomic master. A functional system of working desks allows arranging the office in versatile ways. What makes the system unique is a characteristic leg based on an aluminum foot. Inside the leg there is an easily accessible cable duct, which considerably shortens the time needed to prepare and install necessary electronic devices. The system offers a wide variety of shapes and work places elements, which can be matched in a number of different ways (see Table 1).

The office desks products have compliance with standards and regulations; EN 13849-1: 2007, Performance Level B; Rosh 2011/65/EU; LVD; EU Directive 2006/95/EC; EMC According to EU Directive 2004/108 / EC; PN-EN 55014-1:2017-06; PN-EN 55014-2: 2015-06; PN-EN 60204-1: 2010P; PN-EN 61000-1-2: 2016-11; PN-EN 61000-6-3: 2008/A1: 2012; PN-EN 60335-1: 2012; PN-EN- ISO-12100:2012.

Technical data of products covered by EPD is available at manufacturer web-site.

Life Cycle Assessment (LCA) – general rules applied

Declared Unit

The declared unit is 1 piece of the office desk. The environmental characteristics have been prepared for 4 groups of desks (represented by selected and specific products) made of different frame materials (Table 1).

Table 1. Groups of products covered by EPD, and selected representative products for each group

Products types	Representative product for each sub group	Weight	Surface
OGI_Y OGI_U OGI_Q OGI_A OGI_M VIK OGI_N ERGONOMIC MASTER YAN_M YAN_C YAN_T YAN_Z	**BOY04** Desk for desktop work with a top made of a chipboard 28 mm with a metal frame base. 	*40.1 kg*	*1.28 m²*
OGI DRIVE ERGOMASTER _DRIVE COMPACT DRIVE FLOW	**BOD56** Bench for desktop work with top made from a chipboard 28 mm with a metal frame built-up melamine plates bench with electric height adjustment. 	*51.3 kg*	*1.28 m²*
OGI_W	**BOW34** Desk for desktop work with a top made of a chipboard 28 mm with metal frame but with wooden legs with a 40x40 mm cross-section. 	*70.2 kg*	*2.56 m²*
OGI_V EKO	**BVG04** Desk for desktop work with a top made of a chipboard 28 mm. Basis also made of particle board. Sides 28 mm, a connection plate 18 mm. 	*70.2 kg*	*2.56 m²*

System boundary

The life cycle analysis of the declared product covers “Product Stage” A1-A4 modlues, “End of Life stage” C1, C2, C3, C4 modules and loads&gains beyond system in D module (Cradle to Gate with options) in accordance with ISO 14040, EN 15804 and ITB PCR A.

Allocation

The allocation rules used for this EPD are based on general ITB PCR A. Production of deks is the line process in factory located in Sępólno Krajeńskie (Poland). Allocation was done on product mass basis where the specific technology input and output data were hard to separate. The impacts from raw materials extraction and processing are allocated in A1 module of the EPD (including input materials, and energy carriers production, transportation, emissions and wastes resulting from the production of particle boards, cartoon, metals, wood and plastics). 100% of impacts from line production were inventoried and allocated to products Municipal waste and waste water of factory were allocated to module A3 (mass based). Energy supply was inventoried for whole production process. Emissions in the factory are calculated and were allocated to module A3 (allocation masss based). Energy supply was inventoried for whole factory and 100% was allocated to the product assessed mass based. Emissions in the factory are assessed using national KOBIZE emission factors for energy carriers were allocated to module A3. Allocation for steel production impacts is done in accordance with LCI data for Steel products Report compiled by Brian Hughes and William Hare (World Steel Association). Allocation (life cycyle) for particle boards and wood is done in accordance to Wood Solution organization recommendations. WoodSolutions is an industry initiative designed to provide independent, non-proprietary information about timber and wood products. For refinery products, allocation is done by mass and net calorific value.

System limits

The life cycle analysis of the declared products covers “Product Stage”, A1-A4, C1- C4 and D modules (Cradle to Gate with options) accordance with ISO 14040, EN 15804 and ITB PCR A. All materials and energy consumption inventoried in a factory were included in calculation. In the assessment, all significant parameters from gathered production data are considered, i.e. all material used per formulation, utilized thermal energy, internal fuel and electric power consumption, direct production waste, and all available emission measurements. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. Environmental impacts relating to personnel, infrastructure, and production equipment not directly consumed in the process are excluded from the system boundary

A1 and A2 Modules: Raw materials supply and transport

Particle boards 28mm, wood, plastics, steel elements, cartoon boards, ancillary materials and packaging materials are provided by a manufacturer and come from the recognised Polish and foreign suppliers.

Particleboard production uses wood residues as its main input, these include pulp logs, forest thinnings, log harvesting residues, co-products of sawmilling and post-consumer wood. The board production stage includes growth and harvesting of wood inputs, production of resin and wax, blending of wood particles with resin and wax, pressing of the mixture to create the particleboard substrate, cutting, sanding and – if applied – adding a melamine-impregnated paper layer to the top and bottom surfaces.

Data on transport of the different products to the manufacturing plants is declared by a producer. Means of transport include trucks. For calculation purposes Polish and European fuel averages are applied.

Density of the particle boards (28 mm) is in a range 610-630 kg/m^3.

A3: Production

In a factory, the first stage is mechanical processing of boards; cutting, bending, machine tools, frezing. Then the boargs go to the application of laminates. The next process is the assembly of components, component completion and packaging. The production process mainly uses electricity and, to a small extent, LPG and Diesel.

A4: Transport to construction site

Transport of final product to construction site is taken as the weight average values for transport to customers.

The following transport scenario to the place of use was assumed based on the manufacturer's declaration: large vehicle, 75% capacity over an average distance of 800 km. For calculation purposes European fuel averages are applied in module A4.

End of life scenarios (C and D modules)

The end-of-life scenario for all products has been generalized based on actual state of the art. It is assumed that in the end of life stage (C1), no electric energy or fuels is needed to remove products from building, the transport distance for waste to waste processing (C2) is 50 km on > 10t loaded lorry with 50% capacity utilization and fuel consumption of 20 l per 100 km. At the end of life the desks and tables are dismantled and the materials recycled or combusted according to the Polish treatment practice of industrial waste what is presented in Table 2. When a wood product reaches the end of its useful life, it may either be reused, recycled, landfilled or combusted to produce energy. The reuse, recovery and recycling stage is considered beyond the system boundaries (D). On average, 43% scrap steel is used in the A1 module for steel production. Net scrap is an amount of steel recycled at end-of-life minus scrap input from previous product life cycles. 50% of the wood and wood based boards are intended for energy recovery and 50% for recycling. In recycling, a similar release of CO_2 is assumed to the atmosphere as with energy recovery. Each scenario assumes that rate % of the material is sent to that scenario.

Table 2. End of life scenarios for the base materials

Parameter	Material recovery	Energy recovery	Disposal	Recycling
Particle Boards	100%	50%	0%	50%
Wood	100%	50%	0%	50%
Carton board	100%	30%	0%	70%
Polymers	60%	30%	70%	0%
Steel	100%	0%	0%	100%

The energy recovery scenario includes shredding (module C3) and combustion with recovered energy offset against average thermal energy from natural gas (module D) in line with EN 16485:2014.

Recycyling scenario- particleboard may be recycled in many different ways – including into new particleboard. This scenario considers shredding into wood chips. Wood waste is chipped (module C3) and assigned credits relative to the avoided production of woodchips from virgin softwood (module D). The sequestered CO_2 and the energy content of the wood are assumed to leave the system boundary at C3 so that future product systems can also claim these without double-counting (EN 16485: 2014).
Electricity at end-of-life (module C) has been modelled using an average polish electricity mix as the location where the product reaches end-of-life is unknown.

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2020 – 31.12.2020 (1 year). The life cycle assessments were done for Poland as reference area.

Data quality - production

The values determined to calculate A3 originate from verified Progress LCI inventory data. A1 values were prepared considering several specific and generic EPDs for steel elements, plastics and wood based products (particle boards). The background data for the secondary inputs come from the Ecoinvent v.3.7/8 data base.

Assumptions and estimates

The impacts in A3 module of the representative the desks and tables were aggregated using weighted average. Impacts were inventoried and calculated for all products of the desks and tables. Due to the significant number of product types, the environmental assessment results are presented on 4selected products representative for a group of desk products (or tables). Electricity for production (modules A1-A3) has been modelled as a state-specific split based upon the electricity consumption of the manufacturers who contributed data to this study. All breakdown of forest matter after harvest is modelled as aerobic and therefore carbon neutral as

carbon sequestered is released as carbon dioxide. It is assumed that all timber will be replanted (plantation forest) or will regrow.

Calculation rules

LCA was done in accordance with ITB PCR a document. Characterization factors are CML ver. 4.2 based. ITB-LCA algorithms were used for impact calculations. A1 was calculated based on data from the database and specific EPDs (mass important inputs), A3 and A2 are calculated based on the LCI questionnaire provided by the manufacturer. Emission of greenhouse gases was calculated using the IPCC 2013 GWP method with a 100 year horizon. Emission of acidifying substances, Emission of substances to water contributing to oxygen depletion, Emission of gases that contribute to the creation of ground-level ozone, Abiotic depletion, and ozone depletion emissions where all calculated with the CML-IA baseline method

Data bases

The background data for the processes come from the following databases: Ecoinvent v.3.7/8, specific EPD for a producers, energy KOBIZE/GUS (Polish electricity mix and combustion factors for fuels). Specific (LCI) data quality analysis was a part of the audit. The time related quality of the data used is valid (5 years).

Additional information

The electricity mix represents the average Polish specific electricity supply for final consumers, including electricity own consumption, transmission/distribution losses and electricity imports from neighbouring countries. Reference year is 2020 and carbon impact of electricity mix is 0.25 kg CO_2/MJ.

Particle boards have a certificate of origin FSC and PEFC.

To assure end users that the particleboard has the lowest possible formaldehyde emissions, a formaldehyde testing and labelling program is run by manufacturer.

Life Cycle Assessment (LCA) – Results

Declared unit

The declaration refers to the unit DU– 1 piece of specific product produced by .MDD. The following life cycle modules are included in the declaration (table 3).

Table 3. System boundaries (life stage modules included) in a product environmental assessment

Environmental assessment information (MA – Module assessed, MNA – Module not assessed, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse-recovery-recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
MA	MA	MA	MA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MA	MA	MA	MA	MA

Note: *In order to convert the results contained in the tables for piece of furniture to 1 m^2, the values given in the tables 4-7 should be divided by the surface of the furniture top given in the title of each table.*

Table 4. Environmental product characteristic – 1 completed product BOY04 (1.28 m2 and 40.1 kg)

Environmental impacts: (DU) 1 Product										
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
Global warming potential	kg CO_2	1.69E+01	3.55E+00	1.31E+01	3.54E+00	0.00E+00	2.21E-01	3.67E+01	2.70E-01	-2.68E+01

Depletion potential of the stratospheric ozone layer	kg CFC 11	3.05E-07	0.00E+00	1.25E-07	0.00E+00	0.00E+00	0.00E+00	2.75E-09	1.30E-09	-4.36E-08
Acidification potential of soil and water	kg SO_2	1.64E-01	2.73E-02	2.98E-02	2.72E-02	0.00E+00	1.70E-03	1.77E-03	4.02E-04	-2.43E-02
Formation potential of tropospheric ozone	kg Ethene	5.28E-02	1.83E-03	5.26E-02	1.83E-03	0.00E+00	1.14E-04	1.73E-04	5.81E-05	-4.52E-03
Eutrophication potential	kg $(PO_4)^{3-}$	2.57E-02	4.82E-03	1.28E-03	4.80E-03	0.00E+00	3.00E-04	5.31E-04	7.28E-05	-2.46E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb	1.95E-03	0.00E+00	8.32E-02	0.00E+00	0.00E+00	0.00E+00	3.96E-07	2.68E-07	-4.05E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	5.94E+02	4.85E+01	8.75E+01	4.83E+01	0.00E+00	3.02E+00	3.78E+00	1.69E+00	-4.49E+02
Environmental aspects: (DU) 1 Product										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	4.91E+02	2.67E+00	4.99E+00	2.66E+00	0.00E+00	1.66E-01	-3.33E+02	1.20E-01	-3.93E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	6.94E+02	5.09E+01	1.11E+02	5.07E+01	0.00E+00	3.17E+00	-5.24E+01	1.67E+00	-4.20E+02
Use of secondary material	kg	1.44E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.50E+00
Use of renewable secondary fuels	MJ	2.54E-01	2.54E+00	0.00E+00	2.53E+00	0.00E+00	1.58E-01	0.00E+00	0.00E+00	6.81E+00
Use of non-renewable secondary fuels	MJ	1.38E-03	0.00E+00	2.48E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.92E-01
Net use of fresh water	m^3	1.09E+00	5.19E-04	2.42E-01	5.17E-04	0.00E+00	3.23E-05	2.80E-04	1.52E-05	-5.03E-01
Other environmental information describing waste categories: (DU) 1 Product										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.52E-02	1.87E-06	6.49E-03	1.86E-06	0.00E+00	1.16E-07	7.82E-07	3.47E-07	-3.49E-02
Non-hazardous waste disposed	kg	2.73E+00	2.21E-03	6.47E-01	2.21E-03	0.00E+00	1.38E-04	3.66E-01	8.35E-01	9.69E-01
Radioactive waste disposed	kg	1.42E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E-05	1.05E-05	-1.97E-03
Components for re-use	kg	2.84E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E-01	0.00E+00	-8.65E-06
Materials for recycling	kg	2.73E-01	0.00E+00	1.22E+01	0.00E+00	0.00E+00	0.00E+00	1.67E+01	0.00E+00	-1.93E-01
Materials for energy recover	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.30E+01	0.00E+00	0.00E+00
Exported energy	MJ	1.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 5. Environmental product characteristic – 1 completed product BOD56 (1.28 m2 and 51.3 kg)

Environmental impacts: (DU) 1 Product										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2	3.14E+01	8.30E+00	1.68E+01	4.30E+00	0.00E+00	2.69E-01	3.67E+01	3.12E-01	-3.30E+01
Depletion potential of the stratospheric ozone layer	kg CFC 11	4.30E-07	0.00E+00	1.60E-07	0.00E+00	0.00E+00	0.00E+00	3.14E-09	1.30E-09	-6.99E-08
Acidification potential of soil and water	kg SO_2	2.04E-01	6.37E-02	3.81E-02	3.30E-02	0.00E+00	2.06E-03	1.86E-03	4.82E-04	-3.72E-02
Formation potential of tropospheric ozone	kg Ethene	6.02E-02	4.29E-03	6.73E-02	2.22E-03	0.00E+00	1.39E-04	1.81E-04	6.61E-05	-6.81E-03
Eutrophication potential	kg $(PO_4)^{3-}$	3.06E-02	1.13E-02	1.64E-03	5.84E-03	0.00E+00	3.65E-04	5.48E-04	8.30E-05	-4.14E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb	2.86E-03	0.00E+00	1.06E-01	0.00E+00	0.00E+00	0.00E+00	4.53E-07	2.74E-07	-6.18E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	7.48E+02	1.13E+02	1.12E+02	5.87E+01	0.00E+00	3.67E+00	4.04E+00	2.05E+00	-5.07E+02
Environmental aspects: (DU) 1 Product										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	5.03E+02	6.23E+00	6.39E+00	3.23E+01	0.00E+00	2.02E-01	-3.32E+02	1.43E-01	-4.44E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	8.73E+02	1.19E+02	1.42E+02	6.17E+01	0.00E+00	3.85E+00	-5.20E+01	2.04E+00	-4.63E+02
Use of secondary material	kg	2.21E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.94E+00
Use of renewable secondary fuels	MJ	3.87E-01	5.95E+00	0.00E+00	3.08E+00	0.00E+00	1.93E-01	0.00E+00	0.00E+00	8.63E+00
Use of non-renewable secondary fuels	MJ	1.38E-03	0.00E+00	3.17E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.19E-01
Net use of fresh water	m^3	1.15E+00	1.21E-03	3.10E-01	6.29E-04	0.00E+00	3.93E-05	4.10E-04	1.92E-05	-7.69E-01
Other environmental information describing waste categories: (DU) 1 Product										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.82E-02	4.36E-06	8.30E-03	2.26E-06	0.00E+00	1.41E-07	9.17E-07	3.48E-07	-4.31E-02
Non-hazardous waste disposed	kg	3.64E+00	5.18E-03	8.28E-01	2.68E-03	0.00E+00	1.68E-04	5.53E-01	1.04E+00	8.54E-01
Radioactive waste disposed	kg	2.05E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.22E-04	1.31E-05	-3.02E-03
Components for re-use	kg	4.33E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E-01	0.00E+00	-1.32E-05
Materials for recycling	kg	4.16E-01	0.00E+00	1.56E+01	0.00E+00	0.00E+00	0.00E+00	2.55E+01	0.00E+00	-2.95E-01
Materials for energy recover	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.32E+01	0.00E+00	0.00E+00
Exported energy	MJ	1.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 6. Environmental product characteristic – 1 completed product BOW34 (2.56 m2 and 70.2 kg)

Environmental impacts: (DU) 1 Product										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2	-3.35E+01	1.14E+01	2.30E+01	5.83E+00	0.00E+00	3.64E-01	4.16E+02	3.88E-01	-4.59E+01

Depletion potential of the stratospheric ozone layer	kg CFC 11	7.58E-08	0.00E+00	2.18E-07	0.00E+00	0.00E+00	0.00E+00	1.02E-07	1.30E-09	-5.17E-08
Acidification potential of soil and water	kg SO_2	2.59E-01	8.75E-02	5.21E-02	4.48E-02	0.00E+00	2.80E-03	2.33E-02	6.24E-04	-2.98E-02
Formation potential of tropospheric ozone	kg Ethene	1.19E-01	5.88E-03	9.21E-02	3.01E-03	0.00E+00	1.88E-04	2.36E-03	8.04E-05	-6.54E-03
Eutrophication potential	kg $(PO_4)^{3-}$	5.53E-02	1.55E-02	2.24E-03	7.92E-03	0.00E+00	4.95E-04	7.24E-03	1.01E-04	-2.77E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb	2.78E-04	0.00E+00	1.46E-01	0.00E+00	0.00E+00	0.00E+00	1.34E-05	2.83E-07	-4.93E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	9.50E+02	1.55E+02	1.53E+02	7.96E+01	0.00E+00	4.97E+00	5.67E+01	2.70E+00	-8.17E+02
Environmental aspects: (DU) 1 Product										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.54E+03	8.55E+01	8.74E+00	4.38E+00	0.00E+00	2.74E-01	-3.65E+03	1.84E-01	-7.17E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.09E+03	1.63E+02	1.95E+02	8.35E+01	0.00E+00	5.22E+00	-5.84E+02	2.70E+00	-7.82E+02
Use of secondary material	kg	4.41E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.35E+01
Use of renewable secondary fuels	MJ	7.88E-03	8.16E+00	0.00E+00	4.18E+00	0.00E+00	2.61E-01	0.00E+00	0.00E+00	1.19E+01
Use of non-renewable secondary fuels	MJ	1.38E-03	0.00E+00	4.34E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.66E-01
Net use of fresh water	m^3	1.26E+00	1.66E-03	4.24E-01	8.52E-04	0.00E+00	5.32E-05	2.27E-03	2.65E-05	-6.10E-01
Other environmental information describing waste categories: (DU) 1 Product										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	9.67E-03	5.99E-06	1.14E-02	3.06E-06	0.00E+00	1.91E-07	3.39E-05	3.50E-07	-3.83E-02
Non-hazardous waste disposed	kg	3.78E+00	7.10E-03	1.13E+00	3.64E-03	0.00E+00	2.27E-04	2.96E+00	1.42E+00	1.71E+00
Radioactive waste disposed	kg	5.90E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.73E-04	1.79E-05	-2.40E-03
Components for re-use	kg	8.66E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E+00	0.00E+00	-1.05E-05
Materials for recycling	kg	8.32E-03	0.00E+00	2.13E+01	0.00E+00	0.00E+00	0.00E+00	1.28E+02	0.00E+00	-2.35E-01
Materials for energy recover	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.62E+02	0.00E+00	0.00E+00
Exported energy	MJ	1.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 7. Environmental product characteristic – 1 completed product BVG04 (2.56 m2 and 70.2 kg)

Environmental impacts: (DU) 1 Product										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2	-2.35E+01	4.79E+00	1.75E+01	4.49E+00	0.00E+00	2.81E-01	8.20E+01	3.23E-01	-3.67E+01
Depletion potential of the stratospheric ozone layer	kg CFC 11	7.39E-08	0.00E+00	1.66E-07	0.00E+00	0.00E+00	0.00E+00	3.21E-09	1.30E-09	5.36E-09
Acidification potential of soil and water	kg SO_2	1.88E-01	3.68E-02	3.97E-02	3.45E-02	0.00E+00	2.15E-03	3.34E-03	5.02E-04	-1.12E-03

Formation potential of tropospheric ozone	kg Ethene	8.63E-02	2.47E-03	7.02E-02	2.32E-03	0.00E+00	1.45E-04	3.18E-04	6.81E-05	-2.27E-03
Eutrophication potential	kg $(PO_4)^{3-}$	3.63E-02	6.51E-03	1.71E-03	6.10E-03	0.00E+00	3.81E-04	9.40E-04	8.56E-05	8.30E-04
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb	2.69E-04	0.00E+00	1.11E-01	0.00E+00	0.00E+00	0.00E+00	4.48E-07	2.75E-07	-1.38E-04
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	6.74E+02	6.54E+01	1.17E+02	6.13E+01	0.00E+00	3.83E+00	7.20E+00	2.14E+00	-7.64E+02
Environmental aspects: (DU) 1 Product										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.05E+03	3.60E+01	6.66E+00	3.37E+01	0.00E+00	2.11E+00	-7.48E+02	1.49E-01	-6.71E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	7.98E+02	6.87E+01	1.48E+02	6.44E+01	0.00E+00	4.02E+00	-1.19E+02	2.13E+00	-7.64E+02
Use of secondary material	kg	4.41E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.89E+01
Use of renewable secondary fuels	MJ	7.88E-03	3.43E+00	0.00E+00	3.22E+00	0.00E+00	2.01E-01	0.00E+00	0.00E+00	9.10E+00
Use of non-renewable secondary fuels	MJ	1.38E-03	0.00E+00	3.31E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.76E-01
Net use of fresh water	m^3	1.09E+00	7.00E-04	3.23E-01	6.56E-04	0.00E+00	4.10E-05	7.98E-05	2.02E-05	-1.08E-02
Other environmental information describing waste categories: (DU) 1 Product										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	9.67E-03	2.52E-06	8.65E-03	2.36E-06	0.00E+00	1.47E-07	9.48E-07	3.49E-07	-1.98E-02
Non-hazardous waste disposed	kg	2.13E+00	2.99E-03	8.64E-01	2.80E-03	0.00E+00	1.75E-04	2.39E-02	1.10 E+00	1.86E+00
Radioactive waste disposed	kg	5.03E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.46E-06	1.38E-05	-5.75E-05
Components for re-use	kg	8.66E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.22E-03	0.00E+00	-2.65E-07
Materials for recycling	kg	8.32E-03	0.00E+00	1.63E+01	0.00E+00	0.00E+00	0.00E+00	5.12E-01	0.00E+00	-5.93E-03
Materials for energy recover	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.09E+01	0.00E+00	0.00E+00
Exported energy	MJ	1.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

VERIFICATION

The process of verification of this EPD was in accordance with ISO 14025 and ISO 21930. After verification. this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years. if the underlying data have not changed significantly.

The basis for LCA analysis was ISO 14040, EN 15804 and ITB PCR A
Independent verification corresponding to ISO 14025 (subclause 8.1.3.) [x] external [ ] internal
External verification of EPD: Ph.D. Eng. Halina Prejzner LCA. LCI audit and input data verification: Ph.D. Eng. Michał Piasecki. m.piasecki@itb.pl Verification of LCA: Ph.D. Eng. Justyna Tomaszewska. j.tomaszewska@itb.pl

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

Normative references

- EN 15804:2012+A1 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- TB PCR A General Product Category Rules for Construction Products
- NSF International. (2015). BIFMA PCR for Office Furniture Workspace Products: UNCPC 3814.
- https://www.woodsolutions.com.au/
- Intergovernmental Panel on Climate Change. (2013) IPCC Fifth Assessment Report.
- ISO 14040: Environmental management–Life cycle assessment–Principles and frameworks.ISO. (2011).
- ISO 14025: Environmental labels and declarations–Type III environmental declarations–Principles and procedures.NSF International. (2015). BIFMA PCR for Office Furniture Workspace Products: UNCPC 3814.
- LCI DATA FOR STEEL PRODUCTS at https://www.worldsteel.org/en/dam/jcr:04f8a180-1406-4f5c-93ca-70f1ba7de5d4/LCI%2520study_2018%2520data%2520release.pdf
- ISO 14025:2006. Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines

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CERTIFICATE № 266/2021
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Office desks

Manufacturer:

.mdd sp. z o.o.

ul. Koronowska 22, 89-400 Sępólno Krajeńskie, Poland

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

PN-EN ISO 14025

Environmental labels and declarations -
Type III environmental declarations -
Principles and procedures

This certificate, issued for the first time on 1st November 2021 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics and Environment Department
Agnieszka Winkler-Skalna, PhD

INSTYTUT TECHNIKI BUDOWLANEJ

Deputy Director for Research and Innovation
Krzysztof Kuczyński, PhD

Warsaw, November 2021