

ENVIRONMENTAL PRODUCT DECLARATION

KOLEKSİYON® IKAROS

OFFICE FURNITURE

SEATING GROUP



KOLEKSİYON

Competitive in the global marketplace, Koleksiyon holds to global standards and has internalized the protection principles of natural resources, the environment and the provision of healthy and safe environments for all his employees, partners in all business processes.

The company continuously improves his processes with the integrated management system to ensure the fair balance between efficiency, productivity and safety.

In conjunction with environmentally sensitive understanding of production, Koleksiyon is a pioneer in waste treatment and facilitating a high level of recycling in all processes with a commitment to continuous improvement in this named area.

Using technology, environmentally friendly and recyclable materials when designing products and services, Koleksiyon always aims at protecting the environment as well as human safety. The brand is also willing to ensure that each employee truly knows the importance of his/her contribution towards the green and sustainable environment.



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ENVIRONMENTAL PRODUCT DECLARATION





Ikaros 240KNP
Seating Group

According to ISO 14025

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. **Exclusions:** EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. **Accuracy of Results:** EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. **Comparability:** EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.



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|---|--|--|
| PROGRAM OPERATOR | UL Environment | |
| DECLARATION HOLDER | KOLEKSIYON® Ikaros 240KNP | |
| DECLARATION NUMBER | 4787132300.101.1 | |
| DECLARED PRODUCT | KOLEKSIYON® Ikaros 240KNP | |
| REFERENCE PCR | NSF PCR for seating version 3 | |
| DATE OF ISSUE | November 10, 2016 | |
| PERIOD OF VALIDITY | 5 Years | |
| CONTENTS OF THE DECLARATION | Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications | |
| The PCR review was conducted by: | PCR Review Panel ncss@nsf.org | |
| This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL |  Wade Stout, UL Environment | |
| This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by: |  Thomas Gloria, Industrial Ecology Consultants | |

Product

This EPD document is for Ikaros fabric double sofa manufactured by KOLEKSİYON where the manufacturing plant located in Malkara Yolu 6. Km Doğandere Mevkii 59160-Tekirdağ.

Product Description

Ikaros, designed by Koray Malhan is a sofa as an alternative to a desk and to serve the needs of any work environment. The design can be placed in the middle of any work zone or at confluence areas to bring people together for chance or formal encounters, or to enhance cross fertilization of ideas and discussion in a work area.

The design combines work with pleasure and relaxation, with the sofa doubling as a writing tablet and a table at the same time. All horizontal surfaces may be used as service areas. The extension wing in the rear is at table height, where it can be used as a worktop whilst sitting on chair. This feature allows the seating unit to be used simultaneously from inside and outside, providing the users with a collaborative use for more casual work.



Figure 1. Ikaros 240KNP

Application Area

The design combines work with pleasure and relaxation, with the sofa doubling as a writing tablet and a table at the same time. All horizontal surfaces maybe used as service areas.

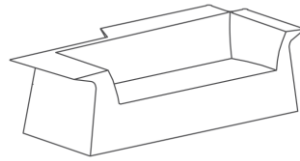
The design can be placed in the middle of any work zone or at breakout areas to bring people together for chance of formal encounters, or to enhance cross fertilization of ideas and discussions in a work area.

Ikaros 240KNP
Seating Group

According to ISO 14025

Technical Information

The relevant technical details for the Ikaros double sofa is shown in below image.



240 SOFA
L: 2400 mm / 94.5 inch
D: 1080 mm / 42.5 inch
H: 680 mm / 26.8 inch

Figure 2. Technical Details

Product Standards

International standards that KOLEKSIYON Ikaros double fabric sofa complies during manufacturing and also the product itself is listed below;

- EN ISO 9001:2008 Quality Management System
- ISO 14001:2004 Environmental Management Systems
- OHSAS 18001 Occupational Health and Safety Management
- EN 15373 Furniture – Strength, durability and safety – Requirements for non-domestic seating
- EN 1022 – Domestic furniture – Seating – Determination of stability

Base Materials

The materials as mass percentage and in kg per unit are shown in the tables below.

| Main Materials | Mass (kg) | Mass Percentage (%) |
|------------------------------------|---------------|---------------------|
| Plywood Board : | 68,704 | 70,26% |
| Wood Fibre Board : | 11,736 | 12,00% |
| Medium Density Fiberboard (MDF) : | 7,161 | 7,32% |
| Fabric : | 6,629 | 6,78% |
| Polyethylene Terephthalate Fiber : | 3,241 | 3,31% |
| Polyethylene Foam : | 0,264 | 0,27% |
| Acrylonitrile Butadiene Styrene : | 0,048 | 0,05% |
| TOTAL Weight : | 97,783 | 100% |

Table 1. Type, Weight and Mass Ratio of Raw Materials

| Ancillary Materials | Mass (kg) | Mass Percentage (%) |
|--------------------------|--------------|---------------------|
| Steel Part : | 1,624 | 61,59% |
| Natural Rubber : | 0,750 | 28,44% |
| Thermoplastic Adhesive : | 0,250 | 9,48% |
| Polyester Resin : | 0,009 | 0,34% |
| Alloy Components : | 0,004 | 0,15% |
| TOTAL Weight : | 2,637 | 100% |

Table 2. Type, Weight and Mass Ratio of Ancillary Materials

| Packaging Materials | Mass (kg) | Mass Percentage (%) |
|-----------------------|--------------|---------------------|
| Cardboard : | 8,566 | 96,69% |
| Plastic : | 0,193 | 2,18% |
| Metal : | 0,100 | 1,13% |
| TOTAL Weight : | 8,859 | 100% |

Table 3. Type, Weight and Mass Ratio of Packaging Materials

| Product Materials | Mass (kg) | Mass Percentage (%) |
|-----------------------|----------------|---------------------|
| Main Materials : | 97,783 | 89,48% |
| Ancillary Materials : | 2,637 | 2,41% |
| Packaging Materials : | 8,859 | 8,11% |
| TOTAL Weight : | 109,279 | 100% |

Table 4. Type, Weight and Mass Ratio of Product Materials

Manufacturing

Back and seat are manufactured as one piece and wood case is manufactured using plywood. In order to have smooth area on upholstery, case is coated with flexible plywood, fiber plate and MDF.

Elastic webbing is fixed onto the seat case in order to have necessary flexibility and covered with foam rubber. Foam rubber is used for internal rear and inside the armrests, whereas sponge is used for the front parts of the case and on the other external parts of case are used and for upper back and upper armrest sections. Inside the case fiber is also fixed by laminated cover.

Cases of sofas in Ikaros group are manufactured as a fixed system with fabric and leather choices. Single press sewing method is applied for fabric cover only on the joints and divisions. After the sewing process finished, plastic feet are connected to the case.



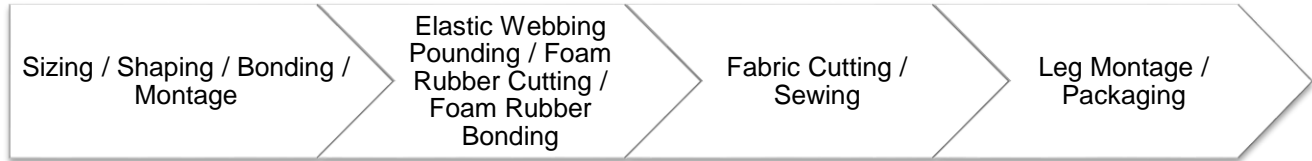


Figure 3. Flow Chart

Environment and Health Considerations

No measures over or beyond the statutory requirements are demanded for the manufacture of KOLEKSIYON Ikaros Fabric double sofa. The manufacturer attests that no threshold of significance has been exceeded for any material and there is no hazardous or toxic releases during production. All emissions are under applicable laws and regulations and residual materials are disposed of in accordance with the respective national guidelines.

For special working areas, e.g. protective clothes, earplugs, protective masks, helmets and safety shoes are used as designated by the authorities. All values established inside and outside the production facility are below the applicable requirements governing noise protection.

Packaging

Cardboard, staple and polypropylene are used for packaging the Ikaros double sofa. The packaging materials are easily separable and can be reused if necessary. Most of the packaging materials can be collected sorted by type and directed to regional recycling services.

Usage

Koleksiyon seating products are generally cleaned with a damp rag and do not typically require maintenance during their warranted lifetime. There is no requirement of energy or generated emissions during usage of the product.

Reference Service Life

Expected lifetime of all Koleksiyon seating products are 10 years according to the national regulation for product manufacturers. Also the "Regulation on After Sale Services" in Turkey is considered as an equivalent to the ANSI/BIFMA X 5.1 test methodology. Regarding this, maintenance service is provided during 10 years.

Disposal

The potential wastes generated during manufacturing of Ikaros Fabric double sofa are; wood chips, packaging materials of raw and ancillary materials used, scraps of upholsters, boiler ashes, fiber and foam rubber. The scraps of upholsters (fabric) and packaging wastes are sending to recycling facility by Koleksiyon under gate to gate processes. Wood chips are burning in the facility for general heating purposes and generated boiler ashes are sending to landfill.

End of life treatment of the product is assumed as landfill and incineration. Since KOLEKSIYON has no procedure for lifetime completed products, the product is modelled according to PCR requirements and based on USEPA Municipal Solid Waste (MSW) data.

Life Cycle Assessment

The LCA study analysis is conducted according to the Product Category Rule (PCR) created by NSF International in collaboration with Business and Institutional Furniture Manufacturers Association (*BIFMA PCR for Seating: UNCPC 3811*) in accordance with ISO 14044.

Declared Unit / Functional Unit

The declared unit is one unit of seating to seat one individual, maintained for a 10 year period.

System Boundary

The type of this EPD study is from cradle to grave. The system boundary is set to determine all environmental impacts from cradle to grave that encompasses the full product life-cycle including acquisition of all materials from the ground, processing and fabrication of component parts, production and assembly of final product, distribution of final product and end of life processes. For the purposes of creating EPDs according to relevant PCR, the following life cycle stages and information modules are considered;

- **Raw Material Extraction and Preprocessing**

The raw material stage covers the extraction and production of the raw materials needed to manufacture the product. It includes the extraction and processing of raw materials to the point where they turned into a recognizable part.

- **Transportation**

This stage includes the transportation of the finished raw materials to the production factory.

- **Production**

This stage includes the production processes of final product in the factory as gate to gate processes. The use of ancillary materials during production, energy consumption, transport of components between processes and/or facilities, materials used in packaging of the final product and waste generation is accounted in this stage.

- **Distribution, storage, and use**

This stage starts with the product leaving the gate of the production facility and ends with the used product entering the end-of-life stage. Transport of the final product to the final consumer, considering retail and warehousing is included. Disposal of packaging materials of the final product is also included in this stage. During use and maintenance of the product, there is no energy or emission generation and product do not require maintenance during warranted lifetime. Transportation to the end-of-life location is also included at this stage.

- **End of Life**

This stage covers the end of life treatment processes of the final product.

Period Under Consideration

The Data for this Life Cycle Assessment is based on the data declared by company for 12 consecutive months between 01.06.2014 and 31.05.2015.

Cut-off Criteria

All inputs and outputs to unit processes for which data available are included in the calculation. Data gaps are filled by conservative assumptions with average or generic data, as described above.

There is no neglected unit process more than 1% of total mass and energy flows. The total neglected input and output flows are also not exceeded 5% of energy usage or mass as indicated in the PCR.

This LCA study includes the provision of all materials, transportation, energy and emission flows, usage considerations and end of life processing of product. The entire life cycle is covered from cradle to grave, including all industrial processes from raw material acquisition and pre-processing, production, product distribution and storage, use and maintenance, and end-of-life management. No manufacturing process is omitted. The only neglected process is the amount of water to damp the rag for cleaning in the use stage. The production of capital goods, infrastructure, production of manufacturing equipment and personnel-related activities are not included in this LCA study as indicated in the PCR.

Background Data

The LCA model of KOLEKSIYON Ikaros Sofa was created using GaBi DB Version 6.115 software system for life cycle engineering by ERKE Sustainable Building Design and Consultancy Ltd.

For conservative assumptions in combination with plausibility considerations an expert judgment can be used to demonstrate compliance in practice. In this assessment, all modelling calculations are based on the amounts declared by manufacturer.

The primary data collection was accomplished in the form of spreadsheet and questionnaires and supplemented by conversations with manufacturer. All relevant background data necessary for the materials used in the model are included in the GaBi database. The data provided by company and calculations made by LCA practitioner can be found in Life Cycle Inventory section. Once the data had been collected, it was imported into GaBi where the modelling was carried out.

Data Quality

All primary required data for LCA Analysis were in the time period between 01.06.2014 and 31.05.2015 for 12 consecutive months. Datasets used in GaBi for calculation are attempted to select within the last 10 years.

The specific data quality coverages are also;

- Geographical coverage: the study applies to the actual manufacturing situation in Turkey. There is only one specific process that does not take place in Turkey (fabric and adhesive) but in Italy and England.
- Time period covered: goal of the study is to determine the actual environmental loads for 12 consecutive months, so data for the time period between 01.06.2014 and 31.05.2015 is used.
- Technology coverage: the objective of the study is to use data that apply to average technology which represents actual situation. Data available for those processes in GaBi are expected to show limited variability globally.

Allocation

Allocation is avoided for the main materials, ancillary materials and packaging materials used to manufacture the product. Each inputs were taken from manufacturer per one product. The total amount of annual energy consumed in atelier is allocated by using total number of seating unit produced in the atelier.

For some type of wastes that company has total general data only such as; plastic & paper cardboard packaging waste, boiler ash & clinker, the amount per one product is calculated by using the total production percentage of Ikaros in all manufacturing activities of the facility.

The detailed annual delivery distribution data for each country is averaged based on continentals where the product is sold. It is splitted into 3 regions like Turkey, Europe and US. Then the farthest distances are taken for each 3 different location to represent the worst condition.

The mass allocation for end of life stage is made as 80% landfill and 20% incineration.

Life Cycle Assessment Results

The Life Cycle Inventory Assessment results documented below are covered all product stages from cradle to grave. Results are based on characterization factors from the US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts called TRACI 2.1 Impact Categories.

Note: Results are shown for one unit of seating to seat one individual over a 10 year period.

| Impact Category | Global Warming Potential [GWP] | Acidification Potential [AP] | Eutrophication Potential [EP] | Photochemical Ozone Creation Potential (Smog) [POCP] | Ozone Depletion Potential [ODP] |
|----------------------|--------------------------------|------------------------------|-------------------------------|--|---------------------------------|
| Unit | kg CO ₂ Eq. | kg SO ₂ Eq. | kg N Eq. | kg O ₃ Eq. | kg CFC-11 Eq. |
| Raw Material | 119,0 | 0,940 | 0,170 | 11,50 | 3,25E-07 |
| Transportation | 18,3 | 0,064 | 0,004 | 1,84 | 6,04E-11 |
| Manufacturing | 24,2 | 0,091 | 0,017 | 1,23 | 9,80E-09 |
| Distribution & Usage | 144,0 | 0,490 | 0,028 | 14,20 | 4,36E-10 |
| End of Life | 73,0 | 0,054 | 0,023 | 0,75 | -1,98E-09 |
| TOTAL | 378,5 | 1,639 | 0,242 | 29,52 | 3,33E-07 |

Table 5. TRACI 2.1 Life Cycle Impact Assessment Results

| Parameter | Unit | Product |
|---|------|---------|
| Primary Energy from Nonrenewable Resources (net cal, value) | [MJ] | 4,28 |
| Primary Energy from Renewable Resources (net cal, value) | [MJ] | 2,95 |
| Primary Energy demand from Ren, and Non Ren, Resources (net cal, value) | [MJ] | 7,24 |
| Total Freshwater Use | [kg] | 323 |

Table 6. Results of LCA - Resource Use

Interpretation

The greatest contributor to the GWP (Global Warming Potential) and POCP (Photochemical Ozone Creation Potential) for the production of Ikaros double fabric sofa is the distribution and use stage which is mainly because of the cargo plane to distribute the product all around the world. The second greatest contributor to GWP and POCP is the raw material extraction processes dominated primarily by textile manufacturing. On the other hand, Acidification, Eutrophication and Ozone Depletion Potential environmental impacts were effected by raw material stage while distribution and use stage has relatively smaller contribution in ODP as compared to other stages.

The results of LCA study analysis also revealed that the product stages with significant impacts like raw material and distribution & usage mainly effected by textile manufacturing and cargo plane processes. Other processes of interest are waste treatment processes such as landfill and incineration, electricity grid mix, kraft paper, natural rubber tapped latex and kraft paper. For example; 53.82% of the total Global Warming Impact in raw material stage was primarily dominated by textile manufacturing while other processes such as plywood, cotton fiber, polypropylene, and wood fiber board have smaller effect respectively. The figures below illustrates the results of LCA study in detailed for each stages.



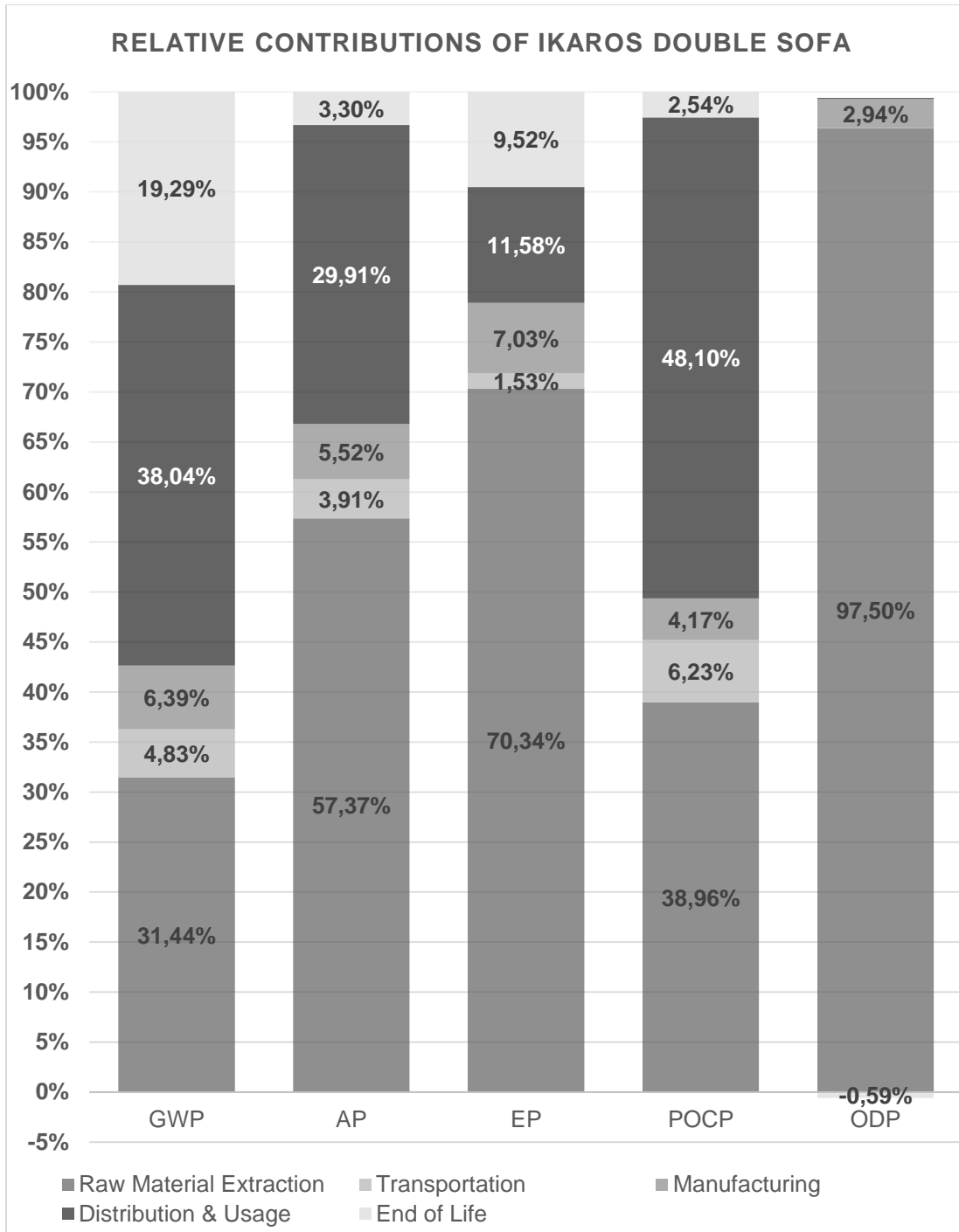


Figure 4. Impact Categories Relative Contributions

References

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GaBi DB Version 6.115. Software and database for life cycle engineering. LBP, University of Stuttgart and PE INTERNATIONAL AG, Leinfelden-Echterdingen.

TRACI 2.1. Tool for the Reduction and Assessment of Chemical and other Environmental Impact

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