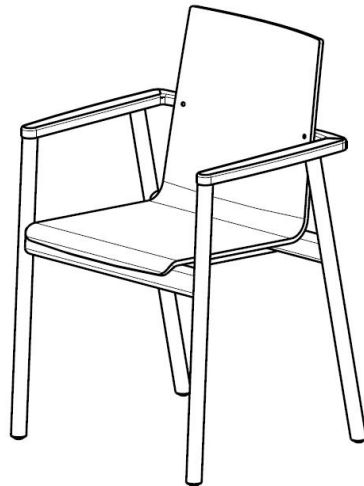


Plus+



## Environmental impact assessment

- 1 Description and assessment of the Materials used in the Product
- 2 Description and assessment of the Production process
- 3 Description and assessment of the Surface Treatment Methods
- 4 Description and assessment of the Packing practices
- 5 The products structure, Plus+ welfare furniture collection

## 1 Description and assessment of the Materials used in the Product

Materials are assessed according to energy consumption and burdening of the environment when the Product reaches the end of its life cycle, their physical characteristics and feasibility for recycling.

- **Steel**

*Energy contents: 23.4 MJ/kg*                      *recycled: 10 MJ/kg*

Steel is a commonly used and economical construction material. Due to good mechanical properties, it can be used in wide variety applications. Further it is suitable for many different processing and fabrication methods.

The waste generated by steel (→ rust) has hardly any impact on the environment. Moreover, the material is very suitable for recycling and the infrastructure for recycling steel is well established.

- **Plastic**

*Energy contents: 70 MJ/kg*                      *recycled: 10 MJ/kg*

Plastic takes little energy to produce. Most synthetics are suitable for recycling, although their mechanical characteristics deteriorate each time. Because of its relatively low price, the demand for recycled plastics is minnow, and further the infrastructure for recycling plastics is not well organized. Due to these factors, plastics are burned most of the time → energy production.

- **Particle board**

*Energy contents: 8.0 MJ/kg*

Particle board is one of most common construction material in Scandinavian furniture industry. Board is produced from small wood particles and glue under high pressure and heat. Used glue is usually urea-formaldehyde resin. The amount of glue is less than 10% percentages (by weight). Raw material is origin from renewable natural recourses. Particle board's basic properties are comparable to wood. It may be covered in a melamine or plastic foil, natural veneer (+ staining and lacquering) or painted. Regarding recycle ability, particle board is used for energy production.

- **Form pressed component**

*Energy contents: 19.44 MJ/kg*                      *recycled: - MJ/kg*

Form pressed veneer is used in seat/back design. Raw material is birch veneer, and it is origin from renewable natural resources. Top veneer is selected according to customer order as birch, beach or oak. All material comes from cultivated forests and are not endangered species. Since recycling possibilities for form pressed components are limited, the material is usually burned for energy production.

- **Massive wood**

*Energy contents: 14.89 MJ/kg*                      *recycled: 10.42 MJ/kg*

- **Upholstery / polyester fabric**

*Energy contents: 53.7 MJ/kg*

*Fabric:* for the upholstery of the Product the company standard collection is used. Fabrics aimed to be used in panel upholstery are mainly oil based synthetics: . We have two main sources for woollen fabrics, both manufacturers operating under strict environmental legislation:

- British manufacturer with ISO 14001 and BS standard

## 2 Description and assessment of the Production process

The production processes are assessed according to energy consumption, emissions during the process and residual waste.

- **Steel punching, forming and cutting**

Steel is punched, formed and cut by electrically driven hydraulic machines which form and cut the steel with knife-like tools. No substances that burden the environment are released in this process. Cutting waste is removed as scrap metal and delivered to recycling.

- **Machining techniques**

Metal axles and pipes are produced by means of machining techniques such as turning, milling and sawing. Cutting oil is used in the machining process. This is a mixture of water and a very small quantity of soluble oil. The chips are collected, while the oil residues are removed by means of centrifugation. The oil is processed as chemical waste. The chips are removed as scrap metal and recycled.

- **Fabrication of wood based materials**

Veneer and laminated components are made by gluing veneer/ laminate to base panel, usually MDF or particle board. Semi-fabricants are machined to final sizes in machining line. At the same phase the panel can be edge-banded and machined. Machining line can make holes and grooving to the components. Complicated shapes can be produced with CNC-routers.

## 3 Description and assessment of the Surface Treatment Methods

Surface treatment techniques are assessed for emissions and residual waste.

- **Painting/lacquering chip board based items**

Planar components are lacquered in roller coating line. Lacquer is spread with rollers and hardening is made by UV-lamps. Edges are threaded by spraying and hardening is made by dispersed the solvent. UV-hardened and solvent based lacquers are quite often water based liquids.

## 4 Description and assessment of the Packing practices

Packing operations are assessed for burdening of the environment and recycle ability.

There are two packing operations involved in production:

- packing of parts
- packing of finished product

### *Parts*

For the packing of large parts, pallets and wire-mesh trolleys are used, which are recycled.

For smaller parts, cardboard boxes and plastic bags (LDPE) are used, which are recycled several times.

#### *Finished product*

For the packing of finished product, cardboard boxes and plastic bags (LDPE) are used. Since Martela takes care of its own transport, we are able to take back our packing material and have it recycled or disposed of in a responsible manner.

#### *Cardboard*

In cardboard production main raw materials are recycled paper and virgin fibre. As a waste product, it can be used again as a raw material for cardboard. This makes cardboard the most environmentally friendly packing material. Only white (bleached) cardboard is an extra burden on the environment and is therefore not used as a packing material. On average the raw material mixture in our cardboard packages is: 40% recycled and 60% virgin fibre.

#### *Plastic bags (PE)*

A plastic bag is often needed for proper scratch-resistant and dust-proof packing. Natural PE is the most environmentally friendly plastic for this. Since the bags are very thin (=0.05mm), they require only very little material. Moreover, the plastic bags can be used several times. Hardly any hazardous substances are released when processed in a waste incinerator.

## **5 The product structure, Plus+, massive wooden chair and tables**

- **Environment-related issues**

#### *Dismantling*

The Product can be dismantled entirely, since all materials can be separated. No composite materials have been used in the product.

- **Materials and weights**

Veneer, wood and plastic are materials that are suitable for recycling.

#### **2731/KO/KO**

	<b>Kg</b>	<b>%</b>
Veneer	2.5	40.8
Wood	3.6	58.8
Felt	0.002	0.1
Plastic	0.02	0.3
<b>Total</b>	<b>6.12</b>	<b>100</b>

The total energy content is 103.6 MJ

MRK/ 1-12-2011

- **The structure of the product**

- **Plus+ chair, 2731/KO/KO**

*Weight: 6.12 kg      energy contents: 103.6 MJ*

- Seat (2.5 kg / 21.9 MJ);
  - a. veneer, lacquered, s = 11 mm
- Base (3.6 kg / 53.6 MJ);
  - a. wood, birch, lacquered
- Glide (0.004 kg / 0.28 MJ);
  - a. plastic, PA, injection – moulding, white
- Felt for glide (0.0004 kg / 0.0076 MJ);
  - a. felt, grey

- **Upholstery seat, 280CT/VV+PEI**

*Weight: 0.548 kg      energy contents: 16.49 MJ*

- Upholstery board (0.412 kg / 8.24 MJ);
  - a. veneer, size = 369x398x4.5 mm
- Foam (0.058 kg / 4.06 MJ);
  - a. material PU, size = 381x398x10 mm, SL1, HR50, cutted
- Fabric (0.078 kg / 4.19 MJ);
  - a. size = 0.5/2, Martela standard fabric

- **Back rest upholstery, 280CT/VV+PES**

*Weight: 0.559 kg      energy contents: 16.76 MJ*

- Upholstery board (0.422 kg / 8.44 MJ);
  - a. veneer, size = 393x383x5 mm
- Foam (0.059 kg / 4.13 MJ);
  - a. material PU, size = 398x386x10 mm, SL1, HR35, cutted
- Fabric (0.078 kg / 4.19 MJ);
  - a. size = 0.5/1, Martela standard fabric

MRK/ 1-12-2011

**8712/150x90/KO/KO**

	Kg	%
Mdf	22.50	69.0
Steel	6.34	19.4
Wood	3.77	11.6
Plastic	0.02	0.0
Felt	0.002	0.0

**Total 32.63 100**

The total energy content is 384.6 MJ

o **The structure of the Plus+ table, 8712/150x90/KO/KO**

*Weight: 32.63 kg energy contents: 384.6 MJ*

- Top (22.5 kg / 180.0 MJ);
  - a. mdf, lacquered, s = 22 mm
- Support tube (1.96 kg / 45.86 MJ);
  - a. square tube, 30x30x2, Fe, painted, black
- Flange (0.605 kg / 14.16 MJ);
  - a. Fe, painted, black
- Leg (0.943 kg / 14.04 MJ);
  - a. birch, Ø 50.8x737, lacquered
- Felt for glide (0.0004 kg / 0.0076 MJ);
  - a. felt, grey

**8712/150x90/TA/TA**

	Kg	%
Mdf	22.5	66.5
Steel	6.34	18.7
Wood	5.02	14.8
Plastic	0.02	0.0
Felt	0.002	0.0

**Total 33.88 100**

The total energy content is 402.6 MJ

o **The structure of the Plus+ table, 8712/150x90/TA/TA**

*Weight: 33.88 kg energy contents: 402.6 MJ*

- Top (22.5 kg / 180.0 MJ);

MRK/ 1-12-2011

- a. mdf, lacquered, s = 22 mm
- Support tube (1.96 kg / 45.86 MJ);
  - a. square tube, 30x30x2, Fe, painted, black
- Flange (0.605 kg / 14.04 MJ);
  - a. Fe, painted, black
- Leg (1.254 kg / 18.67 MJ);
  - a. oak, Ø 50.8x737, lacquered
- Felt for glide (0.0004 kg / 0.0076 MJ);
  - a. felt, grey

#### 8711/120x60/KO/KO

	<u>Kg</u>	<u>%</u>
Mdf	12.2	75.0
Steel	2.42	14.9
Wood	1.63	10.0
Plastic	0.02	0.1
Felt	0.002	0.0
<b>Total</b>	<b>16.27</b>	<b>100</b>

The total energy content is 186.5 MJ

o **Plus+ table, 8711/120x60/KO/KO**

*Weight: 16.27 kg      energy contents: 186.5 MJ*

- Top (12.2 kg / 97.6 MJ);
  - a. mdf, lacquered, s = 22 mm
- Flange (0.605 kg / 14.16 MJ);
  - a. Fe, painted, black
- Leg (0.408 kg / 8.06 MJ);
  - a. birch, Ø 44.5x503, lacquered
- Felt for glide (0.0004 kg / 0.0076 MJ);
  - a. felt, grey

MRK/ 1-12-2011

**8711/120x60/TA/TA**

	Kg	%
Mdf	12.2	72.6
Steel	2.42	14.4
Wood	2.16	12.9
Plastic	0.02	0.1
Felt	0.002	0.0

**Total 16.80 100**

The total energy content is 185.99 MJ

o **Plus+ table, 8711/120x60/TA/TA**

*Weight: 16.80 kg energy contents: 185.99 MJ*

- Top (12.2 kg / 97.6 MJ);
  - a. mdf, lacquered, s = 22 mm
- Flange (0.605 kg / 14.04 MJ);
  - a. Fe, painted, black
- Leg (0.541 kg / 8.05 MJ);
  - a. oak, Ø 44.5x503, lacquered
- Felt for glide (0.0004 kg / 0.0076 MJ);
  - a. felt, grey

**8711/60/KO/KO**

	Kg	%
Mdf	4.79	54.1
Steel	2.42	27.3
Wood	1.63	18.4
Plastic	0.02	0.2
Felt	0.002	0.0

**Total 8.86 100**

The total energy content is 127.2 MJ

o **Plus+ table, 8711/60/KO/KO**

*Weight: 8.86 kg energy contents: 127.2 MJ*

- Top (4.79 kg / 38.32 MJ);
  - a. mdf, lacquered, s = 22 mm



MRK/ 1-12-2011

- Flange (0.605 kg / 14.16 MJ);
  - a. Fe, painted, black
- Leg (0.408 kg / 6.08 MJ);
  - a. birch, Ø 44.5x503, lacquered
- Felt for glide (0.0004 kg / 0.0076 MJ);
  - a. felt, grey

### 8711/60/TA/TA

	<u>Kg</u>	<u>%</u>
Mdf	4.79	43.5
Steel	2.42	22.0
Wood	3.77	34.3
Plastic	0.02	0.2
Felt	0.002	0.0

---

**Total**                      **11.00**    **100**

The total energy content is 126.75 MJ

o **Plus+ table, 8711/60/TA/TA**

*Weight: 11.00 kg      energy contents: 126.75 MJ*

- Top (4.79 kg / 38.32 MJ);
  - a. mdf, lacquered, s = 22 mm
- Flange (0.605 kg / 14.04 MJ);
  - a. Fe, painted, black
- Leg (0.541 kg / 8.06 MJ);
  - a. oak, Ø 44.5x503, lacquered
- Felt for glide (0.0004 kg / 0.0076 MJ);
  - a. felt, grey