Meal Distribution System

Electrolux
Meal Distribution System:

Electrolux offers a complete system able to produce and distribute large quantities of personalised meals: the Meal Distribution System. MDS meets the requests from:
- public and private hospitals
- catering professionals
- rest homes
for the service provider

Hygiene
- Tray completed during assembly phase. No need to rehandle food during distribution in the ward.

Flexibility
- Different and personalised meals stored in the same trolley.

A complete solution
- From Cooking to Washing, including the pre- and after-sales services.

A clever transport
- Temperature limits guaranteed on a single plate.

HACCP
- For the whole production process: from tray assembly to delivery.

Money saving
- Plate stock reduction due to the unique plate.
- Low power consumption transport trolley (only 1.55 kW on model for 16 trays).

Time saving
- Improved logistics thanks to unique plate management.
- Faster cleaning thanks to IPX5 water protection level on all the products.
The perfect solution:

The meal, the final result of this process, is ready to be served from the kitchen, without rehandling food during the distribution phase. The unique plate allows faster tray assembly operations, easier handling and lower stocks. The highest food quality and safety are guaranteed thanks to this new transport concept.
for the consumer

- Personalised meals
  - Customised meal for every person, chosen from a specialized menu

- Food quality
  - A gentle heating or cooling system preserves the original food tastes and properties, dish after dish, as if just cooked

- Not “too hot” not “too cold”
  - A clever temperature control for each dish, depending on the food quantity and type, guarantees the best solution for quality and taste

- The last as the first
  - The last patient is served with the same care as the first one. It does not matter if the trolley doors are open or not, dish temperatures are regulated independently on each tray

- Safe tray handling
  - No need for rehandling in the ward reduces labour costs and mistakes

- Non traditional menus
  - Possibility to offer non traditional meals thanks to the innovative transport trolley that guarantees food safety
The integrated solution...

Our specialists will follow the customer throughout the whole process to determine efficient and integrated solution... right up to the after-sales support.
Better logistics due to the possibility to stack up all the items (plates and lids). The same rectangular dish can be used for all types of meals, thus optimising logistic operations and reducing stock investments.

All the products feature IPX5 water protection level to speed up cleaning operations.

Low power trolleys increase (single phase, 230 V) and minimise costs.

The tray leaves the kitchen complete, thus eliminating further handling and guaranteeing the utmost hygiene.
Distribution in hot-cold link

- HOT-COLD LINK is the food distribution system based on preparation, cooking and immediate distribution of the meal.
- Temperature is adjusted and maintained during the entire transport.

• Transport is the most critical point in meal distribution. The innovative Electrolux system grants a continuous automatic adjustment of every plate temperature to the set parameters, thanks to the energy supplied by the on-board battery and to the innovative technology. Hot and cold plates are continuously heated or refrigerated during transport.
• With Electrolux MDS (see blue line in the above graph) even if the trolley is unplugged, the temperatures safely controlled during the transport phase. On the contrary, food in the traditional method of transport is heated just before the transport phase starts. Thus, resulting in a sudden and dramatic lowering of the temperatures, as shown in the above graph (yellow line). Instead, with the Electrolux trolley, the temperatures are maintained during the transport phase.

Each meal has been managed separately, so any combination of food (hot, cold and neutral) is possible. Each tray will be distributed with cutlery, condiments etc.
• Transport is the most critical point in meal distribution. The innovative Electrolux system grants a continuous automatic adjustment of every plate temperature to the set parameters, thanks to the energy supplied by the on-board battery and to the innovative technology. Food is generated in the ward while the trolley is connected to the electrical outlet (trays remain at room temperature).

• With Electrolux MDS (see blue line above), after the food has been regenerated, the battery will keep it at perfect temperature, assuring the utmost safety and quality.

In the traditional system (see yellow line above), during transport, the cold temperature has been guaranteed by the trolley insulation. But after the food is regenerated, the quality deteriorates rapidly because of a temperature reduction, due to the opening of the doors and the disconnection from the electrical network.

• Thermal separation between zones

The thermographic analysis of the heating/cooling elements shows the temperature separation between plates.
Food quality

- The intelligent power management applies the correct heating or cooling on each plate, independently from the food quantity or type.
- In order to reach the preset temperature, the power applied to the large portion will be higher than the one applied to the small.
- Every portion is managed independently, even when the doors are opened, so each person will receive his meal at the right temperature even if he is not present during the distribution operation.

- The dedicated power management precisely controls the temperature ± 1 °C, on each plate, avoiding overheating and, at the same time, reducing the power consumption. MDS adjusts and keeps food at the right temperature, thus guaranteeing the best food quality. Instead, if the temperature rises above 75°C, the proteins break down and the foods loose liquids and nutritional values.
Personalised menu

Any kind of food can safely be transported. The above examples show food portions on the rectangular plates.

* Weight of cooked food
Transport in hot-cold link

- **Transport.** Once the trolley is connected and the trays are inserted, each dish will be kept at the right temperature. Thanks to the Peltier cells which are battery operated for more than 40 minutes, (more than 60 with optional battery), even during transport.

- **Distribution.** Trays are kept at the right temperature until they are distributed. Food temperatures are not affected by the opening and closing of the doors. In this way, even if the person is not present during the distribution phase, he will receive high quality food.

- **Meal delivery verification.** Dish temperatures can be memorized. With this system it is possible to verify the dish temperatures, the time the tray is placed in the trolley and its delivery; this data can also be downloaded to a computer.

**Easy and fast cleaning**

The internal chamber, with rounded corners and smooth surfaces without joints or holes, is completely washable. After opening the doors the trolley can be easily and quickly washed (IPX5 water protection) by a water spray gun without removing the inside shelves.

**Ergonomics**

- The compact dimensions (only 148 cm high), light weight and optimised wheels position allow easy trolley handling.
- Retractable connection is available for queue transport.
- It features a large space on the top for any additional items.

- The internal chamber, with rounded corners and smooth surfaces without joints or holes, is completely washable.
The electronic devices continuously keep under control the dish temperatures and the trolley functions. The control panel can display the following information:

- Battery charge level
- Temperature level of single dish

When not working, an audio and visible alarm device advises the operator.

**Transport**

- Once the trolley is connected and the tray inserted, it will be kept cooled during its entire transport thanks to the Peltier cells which are battery operated lasting more than 30-40 minutes.

**Regeneration**

- At the scheduled time, regeneration starts automatically and only on the selected plates.

**Distribution**

- Regenerated food needs to be kept hot and cold and served quickly. The trolley will automatically enter “HOLDING” phase, which guarantees service at an even temperature from the first to the last tray, even with doors opened.

In the traditional system, regeneration is usually done in the ward, increasing noise and consuming energy. Instead, the MDS trolley incorporates two highly required characteristics:

1. Low consumption, avoiding high electrical power installations in each ward
2. Silence, avoiding the construction of acoustic barriers.

**Reliability**

- The trolley has a modular construction and total solid-state electric components for long-lasting and reliable use
- Bumpers are all round and plastic parts increase its reliability

**HACCP**

The electronic devices continuously keep under control the dish temperatures and the trolley functions. The control panel can display the following information:

- Battery charge level
- Temperature level of single dish

When not working, an audio and visible alarm device advises the operator.
How it works

Gentle temperature maintenance
During transport and distribution, even with the doors opened, the trolley provides a continuous energy supply, guaranteeing the right temperature to every single dish, inside the isothermal trays (patented system).

Automatic identification of single dish temperature
The clever trolley is able to identify the single dish temperature level (hot, cold, neutral) thanks to the sensors (3 or 4 according to the model) placed on the shelf where the tray is inserted. There are 4 holes in the tray, corresponding to the rectangular plates.

Hot-cold link
The battery package provides energy to the processor based on data from the probes. The probe, placed under each plate, perceives if the plate is hot or cold and the "Peltier" cell placed in the shelf provides the required energy.

HOW PELTIER CELLS WORK
The "Peltier" element is a solid double function component able to heat or cool.
- **Heating**: energy passes through the Peltier cell, absorbing the heat from the bottom and passes it to the top.
- **Cooling**: by inverting the polarity, the upper side of the plate absorbs heat from the plate, and releases it to the lower side.
The high quality of food is the result of a perfect balance between moisture and food temperature. Peltier cells allow the natural development of heat from the bottom to the top. Thanks to the precise thermostatic temperature ±1°C every plate receives the correct quantity of energy to be carried during transport and necessary to reach and maintain the ideal temperature, thus avoiding thermal stress to food. The correct temperature control and the thermal lids create an inner microclimate, preventing food from drying out.

Cold link
The identification of the plates to be regenerated is automatic
- white plate for foods to be regenerated
- blue plate for cool foods

The high technology of the MDS system guarantees low energy consumption: only the plate will be heated with no further dispersion of energy. In addition, avoiding food from overheating implies a reduction in energy consumption.
The food distributor trolley “smart” from Electrolux

Performance
- **How it works** by thermal contact. The temperature varies continuously in layers, working from the bottom up to the top, keeping all the organoleptic properties of the food intact, with no thermal shock, dosing the heat and cold gradually.
- **HACCP**
  The law contemplates maintaining the temperature. With the Electrolux “Smart” trolley the temperatures of the single meals can be controlled on the display and, with a special programme, the data referring to the last 5 cycles can be downloaded, highlighting each tray.
- **Operation**
  During transport the batteries power the Peltier cells maintaining the temperatures constant also in this delicate phase. Thanks to the batteries (also available in a more powerful version) the “Smart” trolley can work for more than 40 minutes from when it is disconnected from the electricity mains.
- **Consumption**
  Limited, at most approx. 2 kW - 220 v single-phase (for electrical household appliances)
- **Hygiene-cleaning**
  The trolley’s particular structural shape, both inside and out, complies fully with the requirements necessary to ensure thorough cleaning at the end of each service session. All corners are rounded. The materials are waterproof and resistant to the chemical components normally used as detergents. The trolley is classified IPX5.
- **Safety**
  The height of the trolley, 1465 cm for all models, is enough to let the person manoeuvring see the path in front of him as well as any obstacles that could be in the way.
- **Saving**
  This should be considered from certain important economical aspects
  - energy consumptions/day
  - storing crockery of just the one format
- **Simplicity**
  The person distributing the meals places the dish to be preheated and cooled in the appropriate service trolleys on one of the available plates, then the trolley will recognise the different temperatures and activate the holding process.
- **Accessories**
  Tray consisting of a base (0.5 cm h) and an insulated lid. The base has a central neutral area where the cutlery, water, bread, fruit or homogenized food can be placed.
  Crockery rectangular in shape with a capacity of 580cc to the rim, equivalent to 350cc of useful space with flat bottom for accumulating and distributing the heat and cold. With just one crockery format it is easier to handle stocks and the packing line.

The trolley will recognise the different temperatures and activate the holding process.
• Technical description

• Trolley for distributing meals to hospital patients
• 18/10 (AISI 304) stainless steel tubular and sheet bearing structure of a thickness designed to withstand the contemplated weights.
• Interior chamber with wide, rounded corners made in 18/10 (AISI 304) stainless steel and fixed to the structure with special shock absorbers
• Pressed ABS exterior cladding and top covering panel
• Control/command panel made with an LCD display system.
• Doors without seals, made in stainless steel externally and resined internally to withstand knocks and bumps, and for maintaining the temperature, recessed opening handles at the top
• Tubular 18/10 AISI 304 stainless steel handles ergonomically shaped so they are easy to grasp, secure whether pulling or pushing.
• Wheels with Teflon hubs, mounted on ball bearings coated in rubber for maximum smoothness – diam 200 mm.
• Maintenance plates in extruded aluminium with solid elements and electronic components embedded in resin for maximum operating safety under all working conditions.
• On-board electronics on a card and circuits protected against external elements.

Technical analysis Accessories

• Tray made in technopolymer suitable for use with food with large rounded inserts for easy cleaning.
• Glossy finish inside while externally it is finely embossed to ensure against less handling wear
• Comprising two elements: base for putting dishes and relative items in, lid with inserts to keep temperatures constant.
• Standard colour: light grey
• High resistance to working temperatures (0°C+ 100 °C)
• High resistance to knocks due to its mono block shape
• Dimensions: 532x325 mm base h 25 mm + lid h 65 mm = tot: 90 mm
• Weight: 1,700 kg
• Crockery in white ceramic, rectangular in shape with reinforced corners and edges

Technical data

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Dimension mm</th>
<th>Power kW</th>
<th>Energy E.E.</th>
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<tbody>
<tr>
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<td>16</td>
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<td>1,6</td>
<td>Sing-ph. 230 V</td>
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<td>Sing-ph. 230 V</td>
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</tbody>
</table>
Food safety and food quality are the results of the well-structured wide range of products – conveyors, hot and refrigerated portioning trolleys and accessories as well. Electrolux provides the complete solution.
Tray conveyors

The MDS range offers two models – with either cord or belt conveyors – available in different lengths (4, 6, 8 m). The conveyor, constructed in AISI 304 stainless steel, has IPX5 water protection and is equipped with:

- **Protection bar** on both sides to avoid bumping
- **2 emergency switches** at both ends
- **End belt sensor** to stop the machine if there is no operator present
- **Electronic control panel** with speed control function
- **Soft start/stop** of belt to avoid drops
- **STD CE plugs** for connecting the appropriate trolleys
- **Waste collection drawer**

The units can be equipped, on request, with a side table to be placed near the end, as an additional working surface.

- **HACCP option**

  The Electronic control panel is available with the HACCP option, consisting in **temperature probes** placed in each plug to keep the food temperature inside the portioning trolley under control. When the unit is out-of-order, an audio and visible alarm advises the operator.
Hot units

• The Bain-marie trolleys – 2 and 3 GN models – are available with 1 single well or 2/3 separated wells (depth = 210 mm)
The units are made in AISI 304 stainless steel with a heavy-duty 40 x 40 mm frame. They have IPX5 water protection and they are equipped with:
  • Comfortable and safe handles

  • Ergonomic knobs
  • High efficiency heating elements
  • Rounded corners and hand-finished well welding
  • 4 side bumpers
  • Drainage on each well with valve
Heated lowerators

The Heated lowerator trolleys are suitable for plates and 550 x 550 mm containers. The units are made in AISI 304 stainless steel, with double insulated side panels and IPX5 water protection. The lowerators are equipped with:

- Self-levelling removable platform, standing on a ball-bearing runner system
- Comfortable and safe handle
- Ergonomic knobs
- Ventilated heating system
- Integrated lid
- 4 side bumpers
Cold units

- Refrigerated well trolleys – 2 and 3 GN models – are available with static or ventilated well (+2 +8 °C – 210 mm depth). The units are made in AISI 304 stainless steel with IPX5 water protection level and equipped with:
  - Comfortable and safe handling
  - Ergonomic knob

- Digital temperature display controller
- Self-defrosting and automatic water evaporation
- 4 side bumpers
- Easy access for cleaning
- Drainage on well with open valve
Refrigerated lowerators

- Refrigerated lowerator trolleys are suitable for plates and containers. The units are made in AISI 304 stainless steel with IPX5 water protection level and equipped with:
  - Self-levelling removable platform standing on a ball-bearing runners system

- Comfortable and safe handles
- Ergonomic knobs
- Digital control temperature display
- Self-defrosting and automatic water evaporation
- Integrated lid
- 4 side bumpers
Neutral lowerators

Neutral lowerator trolleys – closed version – are suitable for trays and baskets. The units are made in AISI 304 stainless steel and equipped with:

• Self-leveling removable platform, standing on a ball-bearing runner system
• Comfortable and safe handle
• Integrated lid

• 4 side bumpers
• Drainage for easy cleaning
• One basket (also available as optional accessory)

A completely open version is available, made in AISI 304 stainless steel, suitable for 550 x 550 mm or Euronorm containers.
Complementary units

**The service trolley**

In 304 AISI stainless steel and completely welded. This is the service trolley for the start-up line position so that the operator can have all the meal items available in one place.

The upper structure can accommodate a cutlery container. The shelves, completely welded to the framework, are seamless, sound-absorbing, with double-folded edges and fitted with plastic bumpers.

**Open trolley for trays**

Structured in stainless steel with side protection bars, 4 shelves with rounded edges for 56 trays and 4 swivelling antitrack wheels, two with brakes.

4 integrated bumpers assure reliability and functionality to the user. This trolley is the storage unit for holding tray bases and lids during the assembly and drying operations.

**Diet Trolley**

The preportioned meal trolley, ideal for portioning, equipped with 4 heated drawers to hold 11 preportioned plates for each drawer. It is thermostatically controlled with temperature regulation from 30° to 90 °C. In the control panel there are 2 indicator lights: the green one to show that the appliance is on and the orange one to show the elements are heating up. The maintenance of the temperature guarantees the armoured heating elements.

Its structure, panels, top and handles are all made in stainless steel with side protection bars, 4 swivelling antitrack wheels and 4 integrated bumpers.
Optional accessories

For hot-cold trolley

- Plate
- Lid
- Insulated tray
- Watertight lid
- Set of 100 meal card holders
Optional accessories

For regeneration trolley

- Plate
- Insulated lid (in addition: lid for liquids)
- Plate to be used only with the regeneration trolley – to keep food cool
- Insulated lid (in addition: lid for liquids)
- Double-size plate
- Double-size insulated lid
- Tray

- Set of 100 meal card holders