



**SLOVENSKI STANDARD**  
**oSIST prEN 4855-01:2024**  
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**Aeronavtika - Ekoučinkovitost naprav za gostinstvo - 1. del: Splošni pogoji**

Aerospace series - ECO efficiency of catering equipment - Part 01: General conditions

Luft- und Raumfahrt - ECO Effizienz von Cateringgeräten - Teil 01: Allgemeine Bedingungen

Série aérospatiale - Éco efficacité du matériel de restauration - Partie 01: Conditions générales

**Ta slovenski standard je istoveten z: prEN 4855-01**

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**ICS:**

49.095

Oprema za potnike in  
oprema kabin

Passenger and cabin  
equipment

**oSIST prEN 4855-01:2024**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**DRAFT**  
**prEN 4855-01**

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## Aerospace series - ECO efficiency of catering equipment - Part 01: General conditions

Série aérospatiale - Éco efficacité du matériel de  
restauration - Partie 01: Conditions générales

Luft- und Raumfahrt - ECO Effizienz von  
Cateringgeräten - Teil 01: Allgemeine Bedingungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ASD-STAN.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (prEN 4855-01:2024) has been prepared by the Aerospace and Defence Industries Association of Europe — Standardization (ASD-STAN).

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 4855-01:2020.

The main changes compared to the previous edition are as follows:

- added description, function parameters, formulas and calculation sheets for trash compactors and espresso maker equipment throughout the document;
- expanded coverage of chilling equipment to chilling equipment not capable to freeze in the scope;
- clarified definition of weight measurement conditions;
- Corrected labelling of  $m_{K,F}$  and  $m_{K,B}$  to be “overall kerosene consumption”, was “kerosene consumption due to electrical energy”;
- added scaled kerosene consumption to all calculation sheets in 5.7;
- corrected labelling of several items on the calculation sheets.

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## **Introduction**

Efficient and economic aircraft operation is one of the main objectives in the aviation industry. The main goals for a competitive and environmental friendly operation are to reduce weight, fuel consumptions and thus to lower the costs leading to a more sustainable aircraft.

Today's aviation industry standards do not provide a classification of catering equipment according to their power demand and weight. Since it is state of the art for household appliances to be rated with ECO-label categories, the purpose of this document is to standardize the test procedures and calculations to determine the ECO efficiency for catering equipment installed in the aircraft.

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## 1 Scope

This document specifies the test procedures and calculations to determine the ECO efficiency of the following catering equipment installed in an aircraft:

- chilling equipment (with and without freeze function);
- ovens (steam and convection ovens);
- beverage makers (coffee maker, water heater);
- trash compactors (single and double bin);
- espresso makers (grain, powder, pad and capsule based).

Based on the results it will be possible to derive the energy consumption index and a performance index of the considered equipment type. The two index values represent the ECO efficiency.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 4855-02, *Aerospace series — ECO efficiency of catering equipment — Part 02: Oven equipment*

EN 4855-03, *Aerospace series — ECO efficiency of catering equipment — Part 03: Chilling equipment*

EN 4855-04, *Aerospace series — ECO efficiency of catering equipment — Part 04: Beverage makers*

EN 4855-05,<sup>1</sup> *Aerospace series — ECO efficiency of catering equipment — Part 05: Trash compactor*

EN 4855-06,<sup>1</sup> *Aerospace series — ECO efficiency of catering equipment — Part 06: Espresso maker*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### **catering equipment**

equipment installed in an aircraft to provide or support food or beverage service

Note 1 to entry: Includes ovens, beverage makers, water heaters, chilling equipment, trash compactors and espresso makers.

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<sup>1</sup> Published as ASD-STAN prEN, available at: <https://www.asd-stan.org/>.

**prEN 4855-01:2024 (E)****3.2****electrical energy consumption**

measured apparent power integrated over a period of time

**3.3****ECO efficiency**

aspect of sustainability of catering equipment regarding the energy consumption and performance during aircraft operation

Note 1 to entry: ECO efficiency in this context does not consider the whole life cycle assessment of catering equipment.

**3.4****energy consumption index****ECI**

index (dimensionless) describing the energy consumption related to a reference equipment during operation

**3.5****performance index****PI**

index (dimensionless) describing the performance related to a reference

Note 1 to entry: The definition of the performance index is specific for each equipment type, see in EN 4855-02, EN 4855-03, EN 4855-04, EN 4855-05 and EN 4855-06.

**4 Symbols and abbreviations**

ECI Energy consumption index

EUT Equipment under test

ICD Interface control document

N/A Not applicable

PN Part number

SFC Specific fuel consumption

**5 General test conditions****5.1 General**

Measurement conditions and calculation formulas are defined in the following sections.

To minimize rounding effects on the calculation results, all values related to measured or calculated weights shall have two decimals and all values related to measured and calculated power / power consumption shall have three decimals.

The EUT shall not be used for at least 2 h before start of each test and during which it shall be ensured that the environmental temperature according to 5.2 is maintained in the entire EUT (e.g. inner cavity or tank).

All test results shall be recorded in a test report.

Equipment tests to derive the ECO efficiency shall be performed according to the following procedures:

a) measurement for ovens according to EN 4855-02;



- b) measurement for chilling equipment according to EN 4855-03;
- c) measurement for beverage makers according to EN 4855-04;
- d) measurement for trash compactors according to EN 4855-05;
- e) measurement for espresso makers according to EN 4855-06.

## 5.2 Environmental conditions

All tests shall be performed in a room with a maximum air speed of 0,2 m/s.

The ambient temperature shall be  $(24 \pm 3)$  °C. The ambient temperature shall be held from two hours before the test until the end of the test and shall not be influenced by the EUT or other equipment.

The ambient temperature and air flow shall be measured at a distance between 0,5 m and 2 m from each equipment.

The ambient temperature measurement shall be started directly before test start. The sample time of the temperature measurement shall be set to at least 0,5 Hz.

The tests shall be performed at an ambient pressure level of  $(1\ 013,25 \pm 50)$  hPa.

## 5.3 Power supply and voltage

Each equipment under test (EUT) shall be connected as instructed by the respective manufacturers' ICD of the EUT PN. The rated voltage shall be  $(115 \pm 2)$  VAC on each of the three phases. The frequency during test shall be set to  $(400 \pm 5)$  Hz.

## 5.4 Measurement equipment

A device to measure the temperature shall be provided.

All measurement equipment shall be calibrated.

All temperature measurement equipment shall have a maximum measuring tolerance of  $\pm 0,5$  K. Table 1 shows the required equipment.

For convenience all terms of "power" related to electrical power measurements, in this document and in EN 4855-02, EN 4855-03 and EN 4855-04, the term of "apparent power" shall be applied.

**Table 1 — Equipment list**

Equipment	Tolerance
Temperature sensor	$\pm 0,5$ K
Thermo element and wiring	$\pm 0,5$ K
Power measurement per device	$\pm 1$ % for voltage and $\pm 1$ % for ampere
Datalogger	N/A
Weight scale	$\pm 0,01$ kg
Time measurement	$\pm 0,5$ s

## 5.5 General weight measurement conditions

The operational weight is defined as follows:

Any insert, which does not belong to the equipment PN, shall be removed (e.g. server, oven racks etc.).

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For beverage makers, water heaters, steam ovens and espresso makers, the equipment inner tanks and water lines shall be filled with water by connecting the EUT to a pressurized water source until filled.

Subsequently, the weight of the equipment shall be measured.

**5.6 Reference aircraft and reference mission****5.6.1 General**

The energy consumption index (ECI) is calculated based on parameters for a reference aircraft and mission. The energy consumption index is based on the calculation of the kerosene consumption for the EUT related to a reference.

**5.6.2 Assumptions**

a) Reference mission and description are:

The reference mission is a mid-range mission of 3 000 nm (5 556 km), which includes a ground, a climb, a cruise and a descent phase. The descent phase can be disregarded due to short duration and unused catering equipment.

The durations of the phases are:

- ground phase: 60 min;
- climb phase: 28 min;
- cruise phase: 6 h.

During the whole flight mission, two catering phases are performed. Moreover the use cases (catering profiles) of the different equipment types are defined as:

- ovens: During the climb phase, the oven runs in standby mode. During the cruise phase the oven is used four times as each of the two catering phases includes two times of heating. The standby duration [refer to 5.7.3 a)] during cruise phase is a set value based on the heating cycle duration of the reference equipment;
- chilling equipment: This equipment type is turned on during ground phase. After 60 min of ground phase duration, it can be assumed, that the freezer is in a steady-state during the climb and cruise phase;
- beverage makers: This equipment type is usually turned on initially during ground phase. Depending on the equipment design an initial preheating process may be performed after turning on. For the energy consumption during this phase, it is assumed 50 % of the ground phases follow another flight and the equipment is already preheated. During the whole flight mission, this equipment type is used three times. The standby duration [refer to 5.7.3 c)] during cruise phase is a set value based on the heating cycle duration of the reference equipment;
- trash compactors: This equipment type is in standby mode during climb. The trash compactor is used 7 times until the receptacle is full in one catering phase based on a typical 7:1 compaction rate. During the whole flight mission the unit is used 14 times assuming a second receptacle available. The standby duration (refer to 5.7.3 d) during cruise phase is a set value based on a 1 min duration for a compaction cycle;
- espresso makers: This equipment type is usually turned on initially during ground phase. The equipment may perform a first preheating process of water and/or thermal devices during this