



# U4E Model Regulation Guidelines on refrigerators

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# Model Regulation Guidelines on Refrigerators



## Objective

Guidance to help **inform regulatory authorities and policy makers**

Sets a **minimum efficiency floor** to prohibit future sales of inefficient products from the market.

Set **maximum allowed GWP and ODP levels** to support compliance with HFCs phased-down

Over **60 technical experts** from around the world contributed data, analysis, expert reviews

References **global technology and policy** trends

Available: English, Spanish, Chinese, French, Portuguese  
Upcoming: Arabic

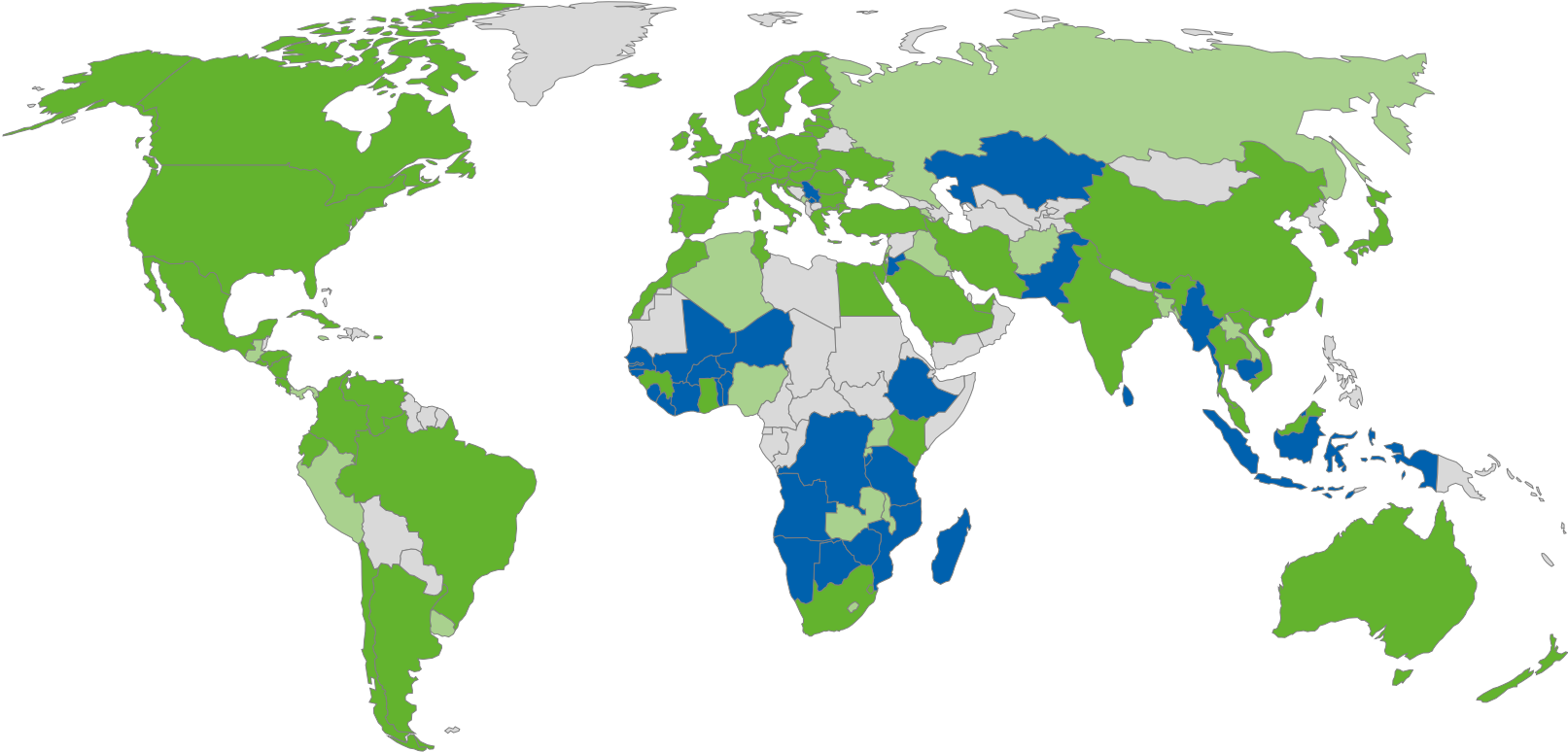
**Download here:** <https://united4efficiency.org/resources/model-regulation-guidelines/>



Commercial refrigeration guidelines published recently!



# Policy gaps exist on MEPS and labelling – Residential Refrigerators



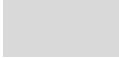
Mandatory



New Development



Voluntary



No Data Found

Yet many are:  
Out of date, unenforced, circumvented,  
Varying in stringency



# Scope of Products – Refrigerating appliances

## REFRIGERATORS

one or more chilled compartments, generally at various temperature zones between 0°C and 14°C, and which may include an ice-making section



## FREEZERS

one or more frozen compartments, usually between -18°C and -6°C



## FRIDGE-FREEZERS

combination of both chilled and frozen compartment(s) in the same appliance



## Type of Refrigeration System

Vapour Compression

## Rated volume

**10 Liters (L)** and at or below **1,500 L**,

## Electricity connection

powered by **electric mains** and offered for sale or installed in any application.

# Exempted Products – Refrigerating appliances

Wine storage appliances



Refrigerating appliances with a direct sales function



Mobile refrigerating appliances



## Other Considerations:

- appliances where the primary function is not the storage of foodstuffs through refrigeration,
- other products that do not meet the definition of a Refrigerator, Refrigerator-Freezer, or Freezer, and
- other refrigerating appliances different than vapor compression type.

## General Requirements

- IEC 62552-1:2015, Household refrigerating appliances - Characteristics and test methods - Part 1

## Performance requirements

- IEC 62552-2:2015, Household refrigerating appliances - Characteristics and test methods - Part 2

## Energy Consumption and Volume

- IEC 62552-3:2015, Household refrigerating appliances - Characteristics and test methods - Part 3
- Energy consumption is determined from measurements taken when tested as specified at 16°C and at 32°C.

# Summary Maximum Energy Use

$$E_{daily} = P \times 24 \text{ in Wh} \quad \text{or} \quad E_{daily} = P \times 24 + \frac{\Delta E_{df} \times 24}{\Delta t_{df}} \text{ in Wh}$$



$$E_{daily} = EC_{24} = 0.5 \times E_{daily,16} + 0.5 \times E_{daily,32} \text{ in Wh per day} \quad EC_T = a \times E_{16} + b \times E_{32} \text{ in Wh per day}$$



$$\text{Annual Energy Consumption (AEC)} = EC_T \times (365/1000) \text{ in kWh per year}$$



$$AEC_{MAX} = M \times AV + N$$

Reference Ambient Temperature	Product Category	AEC <sub>Max</sub> (kWh/year)
24°C	Refrigerators	0.163×AV+102
	Refrigerator-Freezers	0.222×AV+161
	Freezers	0.206×AV+190



$$R = \frac{AEC_{Max}}{AEC}$$



# Energy Performance Grade Requirements

Grade	Refrigerators	Refrigerator-Freezers	Freezers
High Efficiency	$R \geq 1.50$	$R \geq 1.50$	$R \geq 1.50$
Intermediate	$1.25 \leq R < 1.50$	$1.25 \leq R < 1.50$	$1.25 \leq R < 1.50$
Low Efficiency	$1.00 \leq R < 1.25$	$1.00 \leq R < 1.25$	$1.00 \leq R < 1.25$

$$R = \frac{AEC_{Max}}{AEC}$$

- **R=1:** Lowest efficiency but comparable with international best practices identified at the time of the Guidelines development.
- **R=1.25:** the intermediate performance tier between the low and high requirements in the Guidelines. For refrigerators and freezers, this level will be roughly comparable with the EU 2024 levels (p5 U4E Guidelines Supporting Information).
- **R=1.5:** high-efficiency tier in the Guidelines where highly efficient products are assessed to meet

# Energy Labelling - Energy Labelling Guidance for Lighting and Appliances

The purpose of energy labelling is to **help overcome an informational market barrier to energy efficiency**, wherein **consumers of energy-using equipment are unaware of the energy performance of the equipment** they purchase and thus are **unable to take this aspect into account in their procurement decisions**.

## TYPES OF ENERGY LABELS:

### 1. Comparative energy labels (More common)



- Show how efficient a product is compared to other products on the market and use a scale to indicate where the efficiency of a product is positioned within the spectrum.
- The scale enables consumers to see the spread in performance that may be observed in the market and where each product is positioned within this scale.
- More effective at transforming markets
- comparative labels are generally mandatory

### 2. Endorsement energy labels.



- Labels that indicate formal recognition (or endorsement) of a product.
- Endorsement labels are voluntary
- Endorsement labels therefore need to be heavily promoted
- Incentives are often included,



# Product Information

- All representations of energy performance shall indicate that the performance rating is based on the measurement according to [test standard name], an indicative value, and not representative of actual annual energy consumption in all situations.
- The original equipment manufacturer shall provide an energy label to the importer, product retailer, or installer before the product enters the market.

## Refrigerators

- 1) Model name / serial number
- 2) Type of unit [refrigerator, refrigerator-freezer, or freezer]
- 3) Country where the product was manufactured
- 4) Volume of the different compartments and an indication of whether they are frost-free
- 5) Rated performance grade
- 6) Yearly energy consumption in kWh at ambient temperature in °C or °F
- 7) Reference ambient temperature[s] used in performance rating
- 8) Refrigerant and foam-blowing designation in accordance with ISO 817 or ASHRAE 34, including ODP and GWP.

# Refrigerant & Foam Blowing Agent Requirements

- Requirements for ozone depletion potential (ODP) and global warming potential (GWP) over a 100-year time horizon.
- Refrigerant designation (ISO 817:2014, Refrigerants - Designation and safety classification),
- Safety requirements (IEC 60335-2-24:2020, Household and similar electrical appliances - Safety - Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice makers).

Product Class	GWP	ODP
All types	20	0

# Open discussion



# Contact

TRANSFORMING MARKETS TO ENERGY-EFFICIENT PRODUCTS



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