

Procurement guidelines for general appliances

Refrigerators and freezers

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Introduction

About the Procurement Guidelines

These guidelines supply technical criteria that can be directly inserted into procurers' tenders and are calibrated to the most **energy-efficient** products in Argentina's local markets. They are meant only for electric and gas appliances with an **Energy Efficiency Label**.

Following these guidelines ensure the acquisition of products that consume less energy and emit **fewer greenhouse gases** throughout their lifetime.

About Topten Argentina

Toptenargentina.org is an online consultation tool that presents the most energy-efficient appliances available in Argentina's market. It offers the consumer the necessary information in order to incorporate the variable of energy consumption when buying new equipment. It is also an instrument that serves to make manufacturers and politicians aware of the importance of energy efficiency.

The website was launched in 2015 by [Fundación Vida Silvestre Argentina](#), an environmental NGO from the WWF network. It is the local version of the international [Topten initiative](#) (launched in Switzerland in 2000), and is part of the [Topten Latin-America group](#).

All refrigerator and freezer sets displayed on Topten Argentina **meet the criteria** contained in these guidelines. Procurers can therefore use the website to check the availability and assortment of products currently on the market, which meet the [Topten selection criteria](#).

Why use this guide?

How much can you save in energy?

Considering refrigerator and freezer sets listed on toptenargentina.org and the assumptions listed below, it is possible to achieve the savings indicated in Table 1.

Assumptions:

- Frequency of use: 24 hours / day, throughout the 365 days of the year
- Lifetime expectation: 15 years
- Electricity cost¹: 6,00 \$ / kWh

Table 1: Comparison in energy consumption between a Topten refrigerator and an inefficient model

	Topten model	Inefficient model	Topten model	Inefficient model
Refrigerator capacity (lts)	233	215	-	-
Freezer capacity (lts)	60	60	297	309
Energy class	A++	B	A+	B
Climatic class ²	N-T	T	SN-T	T
Energy consumption (kWh/year)	218	420	270	496
Use cost (electricity in 15 years)	\$ 16.620	\$ 37.800	\$ 24.300	\$ 44.640
Savings	48% energy / unit 18.180 \$ / unit		46% energy / unit 20.340 \$ / unit	

Differences in **electricity consumption** between inefficient and Topten models rise alongside the equipment's **capacity**, leading to higher energy savings. The size of the **freezer** takes particular importance in this aspect. As it keeps a lower temperature than the refrigerator, an increase in the freezer's volume raises the equipment consumption at a **higher rate** than an increase in the refrigerator volume, which leads to greater money savings when switching to Topten model. In Table 1, although all models have a similar total capacity (around 300 litres), the ones without refrigerators consume energy the most.

¹ The price per kWh is obtained by making an average between the rates of electricity companies from different provinces. Calculations are made for Urban Users with Small Demands (monthly consumption between 450 and 500 kWh/month). In addition, an average tax of 35% is considered, which includes IVA at 21%, IIBB of 5%, and a Municipal tax that can range from 1% to 10% according to each case.

² Climate class indicates the recommended ambient temperature range for the equipment operation. For more information, go to Notes on implementation.

It is important to note that energy consumption is measured behind closed doors and at 25°C ambient temperature, according to the IRAM³ standard for energy efficiency labelling (IRAM 2404-3:2015). However, daily conditions of use imply opening and closing the doors, as well as loading the refrigerator with food at room temperature to cool it down. Therefore, the **perceived consumption** of the equipment is **often higher** than the one reported in the Energy Label, elevating the total savings even more.

Procurement criteria

The following criteria can be inserted directly into tendering documents. The Topten selection criteria and the product lists are **updated regularly**. The newest versions are always available at <https://toptenargentina.org/>.

Energy efficiency class

Refrigerators and freezers must have at least the following energy efficiency class, declared in agreement with the Energy Label:

Table 2: Procurement criteria for the acquisition of energy-efficient models – Energy efficiency class

Type	Energy efficiency class
Refrigerators with no freezer	A+
Refrigerators with freezer	A+
Freezers only	A

Energy consumption

As mentioned, energy consumption rises alongside the equipment capacity, and especially alongside the freezer’s size. In order to limit said consumption, as well as the CO2 emissions derived from the use of electricity, the procured models must abide by an **energy usage cap**.

With the energy-consumption / total capacity⁴ ratio (kWh/year per litre) as indicator for freezers, and the energy consumption (kWh/year) for refrigerators, these appliances must comply with the following conditions:

³ Argentine Institute of Standardization and Certification.

⁴ Total capacity is obtained as the direct sum of the freezer and refrigerator capacities.

Table 3: Procurement criteria for the acquisition of energy-efficient models – Energy cap - Refrigerators

Type	Total capacity (lts)	Energy consumption (kWh / year)
Refrigerators with freezer	≤ 400	≤ 260
	> 400	≤ 280

Table 4: Procurement criteria for the acquisition of energy-efficient models – Energy cap - Freezers

Type	Total capacity (lts)	Energy consumption / total capacity (kWh / lts x year)
Upright freezers	≤ 100	≤ 2,20
	100 - 200	≤ 1,40
	≥ 200	≤ 1,20
Chest freezers	≤ 200	≤ 1,20
	200 - 250	≤ 1,10
	≥ 250	≤ 1,07

* Because chest freezers tend to consume less energy than upright freezers, a different category is needed. For more information, refer to Notes on implementation.

Verification

Bidders must supply the **Energy Label** and technical data, as it is stipulated in the resolution N° 319/1999 from the former Ministry of Industry, Commerce and Mining⁵. Information about the equipment's capacity, energy efficiency class, and energy consumption, can be found in the mentioned Energy Label.

Notes on implementation

Inverter models

Refrigerators with **inverter technology** consume **less energy**, compared to traditional ones. As their compressor can regulate its voltage, current, and frequency, the temperature inside the appliance is maintained evenly and for a longer time, meaning an improved energy efficiency and durability.

⁵ Link to the disposition: <http://servicios.infoleg.gob.ar/infolegInternet/verNorma.do?id=57667>.

The invert models are preferred over traditional ones. Usually, refrigerators and freezers that comply with these procurement criteria have inverter technology.

Upright and chest freezers

Because cold air is denser than room-temperature air, opening a freezer with a frontal door (which is to say, an upright freezer) causes the air contained inside to **flow out**. However, this is not the case with chest freezers, as their walls are able to retain most of the cold air. With this in mind, chest freezers require to spend energy in cooling **less frequently** than upright freezers, leading to reduced energy consumption and greater energy efficiency.

In terms of efficiency, **chest freezers are recommended over upright ones**.

Climate class

Climate class indicates the recommended **ambient temperature range** for the equipment operation, as shown in the table below:

Table 5: Climate classes for refrigerators and freezers

Class	Symbol	Ambient temperature range for which the devices are designed to operate (°C)
Extended tempered	SN	+10 to +32
Tempered	N	+16 to +32
Subtropical	ST	+18 to +38
Tropical	T	+18 to +43

Refrigerators suitable for higher temperatures (e.g.: Tropical climate class) will consume more energy than the ones suited for lower temperature (e.g.: Tempered climate class). However, if a class that was designed for a certain range of temperatures is chosen, and the refrigerator is exposed to higher temperatures, there is a risk of underperformance.

For good performance, the chosen class must be **appropriate** for the climate in which the user resides.

Energy efficiency class

According to the IRAM 2404-3 standard, the **energy efficiency class** of refrigerators and freezers is established based on an **Energy Efficiency Index (IEE)** as follows:

Table 6: Energy efficiency class for refrigerators and freezers

Energy Efficiency Index	Energy efficiency class
IEE < 22	A+++
22 ≤ IEE < 33	A++
33 ≤ IEE < 42	A+
42 ≤ IEE < 55	A
55 ≤ IEE < 75	B
75 ≤ IEE < 90	C
90 ≤ IEE	D

The IEE can be calculated as the quotient between the average energy consumption of the device and its normalized energy consumption, both measured during a laboratory test following the methods defined in the IRAM 2404-3 standard. This index is not listed on the Energy Label; therefore, it is only represented by the letter indicating its class.

During November 2013, resolution N° 682/2013 from the former Secretary of Energy⁶ established **class B** as **minimum standard of energy efficiency** for the commercialization of refrigerators and freezers. Since then, lower efficiency classes had been prohibited from entering the market.

Energy Label

The **Energy Efficiency Label** for refrigerators and freezers provides information on their energy consumption, based on the use of the efficiency classes.

Up to date, **two different labels** can still be found on the market: an old model (scale: A to G) and a recent one (scale: A+++ to D). The latter is placed on newer products and will gradually replace the previous label.

⁶ Link to the disposition: <http://servicios.infoleg.gob.ar/infolegInternet/verNorma.do;jsessionid=9033CD1AFF7365148F299F5FB289F9E0?id=220745>.

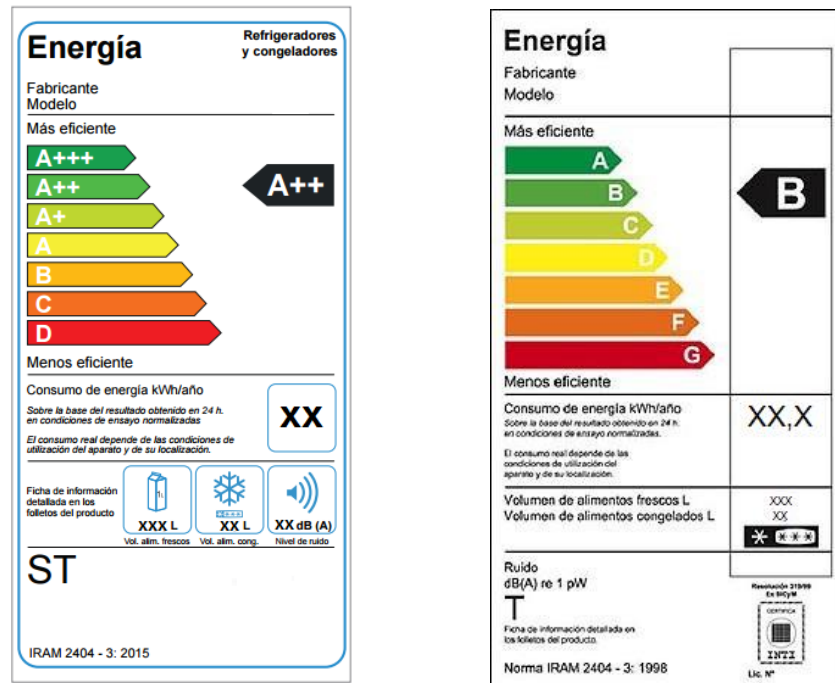


Figure 1: Energy efficiency label for refrigerators and freezers. Left: Newer model (2017). Right: Older model.

Life cycle costs

To increase savings and reduce environmental impact, procurers should evaluate **life cycle costs** when tendering for refrigerators and freezers. Thus, it is advisable to include in the tender a costing exercise - even if simple - for the product life cycle costs.

Table 7: Example of a breakdown costs table, to be filled in by bidders

	Information details	Different unit costs (\$)	Total cost (\$)
Delivery			
Installation			
Use*			
Maintenance			
Recycling and disposal			

*In order to estimate the **cost of use**, procurers must take into account their appliance **frequency** of use, its **lifetime** expectation or replacement rate, its energy **consumption** (as it is specified in the energy label), and the local **electricity costs**, among other possible factors. A step-to-step explanation can be found in toptenargentina.org.

It's important to note that **prices** for electricity are **highly variable**. They not only depend on the distribution company and the amount of energy consumed by the user, but they can also change significantly over time. Therefore, it is recommended that procurers make their **own estimates** of the energy consumption of an appliance, using the **tariff table** corresponding to their situation.

Advice and support

For further assistance in using the information presented in this guideline, please contact Argentina's Topten team (<https://toptenargentina.org/site/contact>).

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