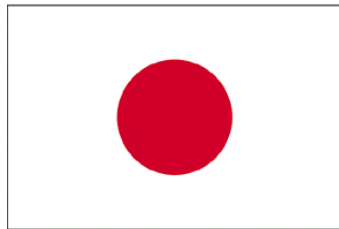


# Japan – Brazil

## Cooperation on Energy Efficiency and Conservation



**Main goals for the cooperation:  
Improvement in MEPS and Procel seal  
methodology**



MINISTÉRIO DE  
MINAS E ENERGIA



# Inmetro Table-

## Performance index for air conditioners

<http://www.inmetro.gov.br/consumidor/pbe/condicionadores-de-ar-indices-novos-idrs.pdf>



Ministério da Economia  
 INSTITUTO NACIONAL DE METROLOGIA, QUALIDADE E TECNOLOGIA  
 PROGRAMA BRASILEIRO DE ETIQUETAGEM - PRE  
 Tipo de Equipamento: Condicionadores de Ar

(Versão 17/06/2021)

(\*) Índice de Desempenho de Resfriamento Sazonal

(\*\*) Consumo de Energia calculado nos resultados do ciclo normalizado pelo INMETRO de 2.000 horas por ano

Para consultar os modelos comercializados pelo INMETRO, acesse o sistema eletrônico do PROCEL: [www.procel.com.br](http://www.procel.com.br)

FORNECEDOR	MARCA	TIPO	MODELO (separado para split)		MODELO (separado para portátil)	FUNÇÃO	TENSÃO	ROTACÃO	FLUIDO REFRIGERANTE	Nº de Registros	DADOS DECLARADOS (PET)										SISTEMA DE ENERGIA (**)	FAIXA DE CLASSIFICAÇÃO		
			UNIDADE INTERNA	UNIDADE EXTERNA							Carga Total (100%) 35°C [obrigatório]		Carga Parcial (50%) 35°C [obrigatório vel. variável]		Carga Parcial (50%) 29°C [opcional vel. variável]		Carga Total (100%) 29°C [opcional vel. fixa]		IDRS (*) (calculado com base nos dados)					
											Capacidade ØTOTAL(35)	Consumo P TOTAL(35)	Capacidade ØPARCIAL(35)	Consumo P PARCIAL(35)	Capacidade ØPARCIAL(29)	Consumo P PARCIAL(29)	Capacidade ØTOTAL(29)	Consumo P TOTAL(29)		Wh/Wh				
Dakin-Mitsubishi Air Conditioners Brasil Ltda.	Dakin	Split Inverter	FT10P0SL	RC09P0VL	-	Frio	220 V	Vertical	R410A	00006/2019	9.000	2.637	2.637	760,80	1397,60	336,40	1239,40	217,80	1239,40	-	-	6,20	391,0	A
Dakin-Mitsubishi Air Conditioners Brasil Ltda.	Dakin	Split Inverter	FT12P0SL	RC12P0VL	-	Frio	220 V	Vertical	R410A	00006/2019	12.000	3.516	3.516	974,60	1758,00	355,30	1758,00	275,30	1758,00	-	-	6,20	408,0	A
Dakin-Mitsubishi Air Conditioners Brasil Ltda.	Dakin	Split Inverter	FT18P0SL	RC18P0VL	-	Frio	220 V	Vertical	R410A	00006/2019	18.000	5.274	5.274	1409,60	2637,00	526,10	2637,00	412,90	2637,00	-	-	6,20	700,0	A
Dakin-Mitsubishi Air Conditioners Brasil Ltda.	Dakin	Split Inverter	FT24P0SL	RC24P0VL	-	Frio	220 V	Vertical	R410A	00006/2019	24.000	7.032	7.032	1844,60	3616,00	607,60	3616,00	530,00	3616,00	-	-	6,20	807,0	A

### DADOS DECLARADOS (PET)

Capacidade de Refrigeração		Carga Total (100%) 35°C [obrigatório]		Carga Parcial (50%) 35°C [obrigatório vel. variável]		Carga Parcial (50%) 29°C [opcional vel. variável]		Carga Total (100%) 29°C [opcional vel. fixa]		IDRS (*) (calculado com base nos dados)
Btu/h	W	Capacidade ØTOTAL(35)	Consumo P TOTAL(35)	Capacidade ØPARCIAL(35)	Consumo P PARCIAL(35)	Capacidade ØPARCIAL(29)	Consumo P PARCIAL(29)	Capacidade ØTOTAL(29)	Consumo P TOTAL(29)	
		W	W	W	W	W	W	W	W	
9.000	2.637	2.637	760,80	1397,60	336,40	1239,40	217,80	-	-	6,20
12.000	3.516	3.516	974,60	1758,00	355,30	1758,00	275,30	-	-	6,20
18.000	5.274	5.274	1409,60	2637,00	526,10	2637,00	412,90	-	-	6,20
24.000	7.032	7.032	1844,60	3616,00	607,60	3616,00	530,00	-	-	6,20

2 measuring point are compulsory and the third is optional

# Criteria for Procel Seal and Gold Seal

- Around 44 performance tests results, specified by the ISO 16358-1 standard, were analyzed;
- Technical information on air conditioner models with the Procel Seal was analyzed;
- Technical information on models sold in the domestic and international markets was analyzed;
- In order to obtain the Procel Seal, the air conditioner model should have greater efficiency than the level “A” of the PBE;
- It was defined that Procel Gold Seal level should be greater than Procel Seal’s;
- The Procel Gold Seal must have different criteria for refrigerants than Procel Seal;
- 3 measuring point are compulsory for Procel Seal and Procel Gold Seal.

# Using this measuring points for estimating the energy consumption

## COOLING SEASONAL PERFORMANCE FACTOR (CSPF) ⓘ

Método

Apenas IDRS

Requisitos

Apenas obrigatório

Arquivo climático (EPW) ⓘ

Browse

Horas de operação ⓘ

Consumo em 35°C ⓘ

Consumo Total 760.80

Consumo Parcial 336.40

Capacidade em 35°C ⓘ

Capacidade Total 2637


Capacidade Parcial 1397.60

Consumo em 29°C

Consumo parcial

Capacidade em 29°C

<http://pbeedifica.com.br/cspf/>

- 
- With this interface, based on ISO 16358 we can calculate the energy consumption for different times of use (day or night) and cities with the weather file used for EnergyPlus simulations.
  - How do you estimate the energy consumption for Splits in Japan? Average for all climates? 24 hours of use?

# Questions

- Is the next fluid for air conditioners an HC?
- Is the technology research that Japanese companies carry out only for products sold in Japan?
- After the inverter compressor technology, is Japan studying other types of more efficient technology?
- Can other types of materials for the condenser and evaporator improve the efficiency of the air conditioner?
- How does the Top Runner Program set the amount of time required to achieve a target? It is known that this time is necessary to accommodate product development periods, investments and future technical developments. What are the studies necessary to obtain information on technical development to set the target fiscal year? Does ECCJ sponsor periodic market surveys? Are economic studies being analyzed in this process? What is the role played by industry, universities and society in this process?

We would like to:

- To compare the Brazilian IDRS (CSPF) with the Japanese efficiency limit set for the Top Runner, in order to check if the IDRS set for PROCEL Gold Seal is in balance with the Japanese Top Runner. It would also be interesting to compare this with the technological limit (considering that Daikin and Gree received the first price in the Global Cooling Prize).
  - Calculations/simulations
- To understand how Japanese government estimates the technological advances that the market will achieve in order to define the efficiency target of the Top Runner Program. And also, how Japan estimates the technological limit of the equipment category.
  - Technical report
  - Webinar
  - Bilateral meeting
- To know if there is a change for a minimum standard when the equipment category under the Top Runner gets close to the technological limit
  - Technical report
  - Webinar
  - Bilateral meeting