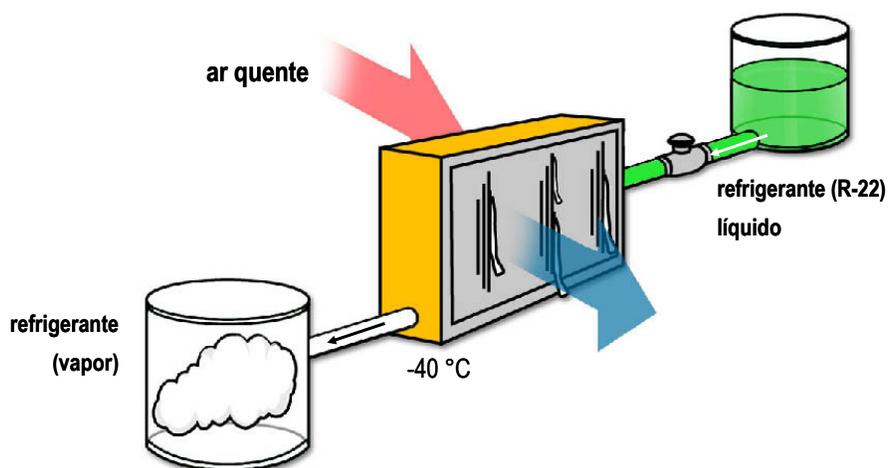


# Equipamentos de Ciclos Frigoríficos

Jurandir Itizo Yanagihara

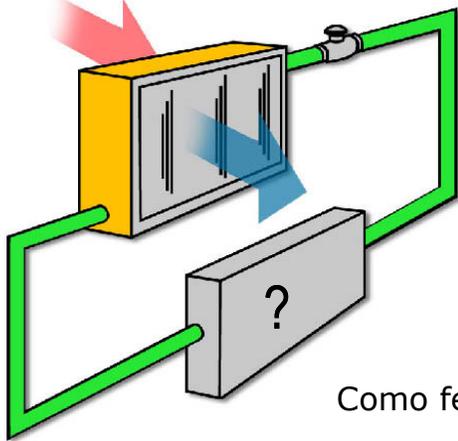


## Ciclo de Refrigeração



**PO  
LIO  
USP**

### Ciclo de Refrigeração



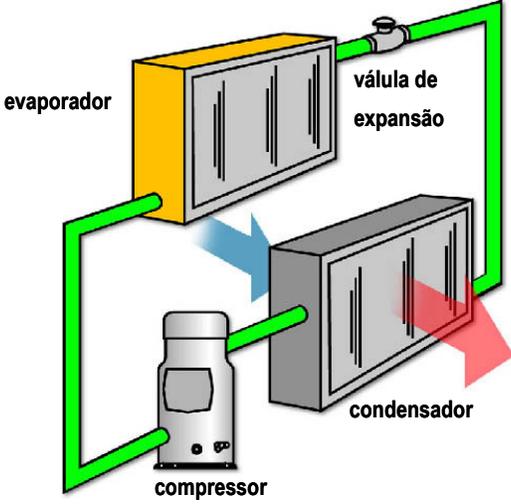
Como fechar o ciclo?

Ciclo Frigorífico Jurandir Itizo Yanagihara

The diagram shows a closed loop of green pipes. On the left, a yellow rectangular box (evaporator) has a red arrow pointing into it from the top and a blue arrow pointing out to the right. The pipe continues to the right, then down, then left, then up, and finally right into a grey rectangular box with a question mark inside. The pipe then continues to the left, then down, then left, and finally up back into the yellow box.

**PO  
LIO  
USP**

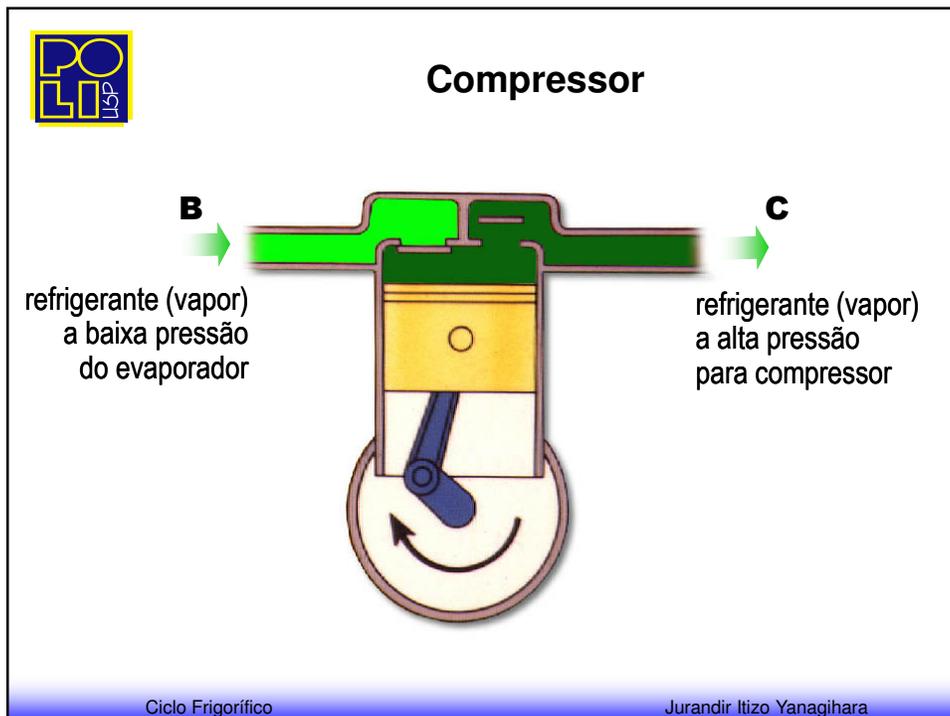
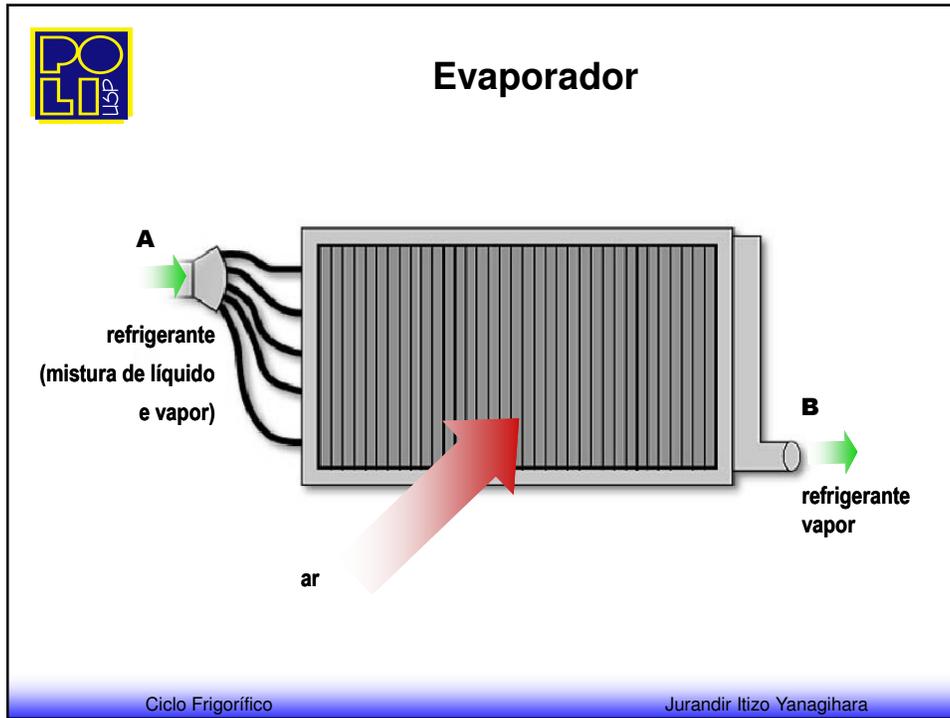
### Ciclo de Refrigeração

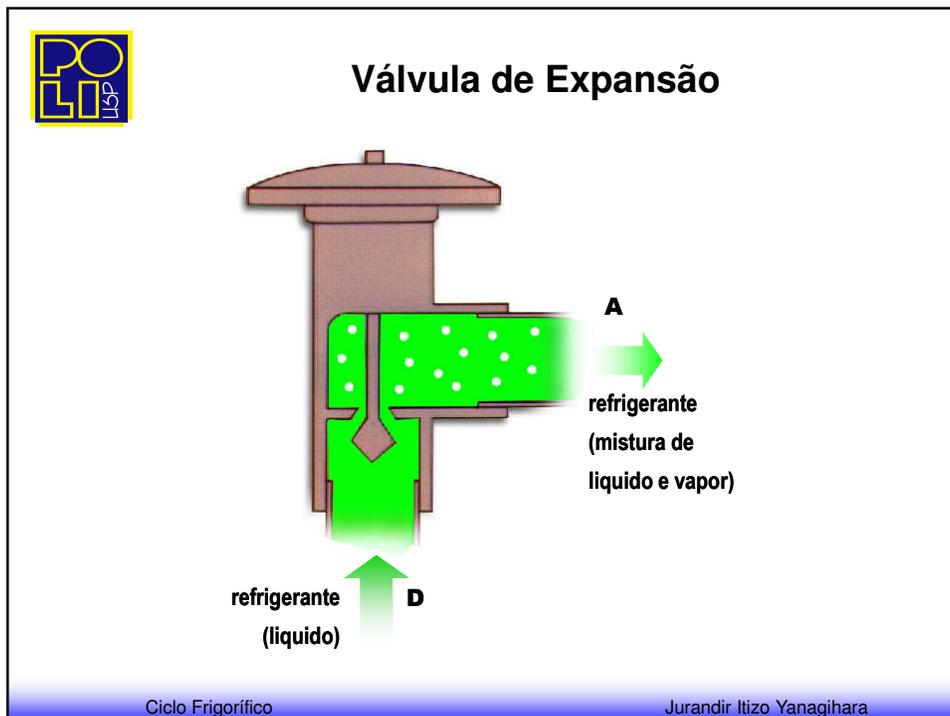
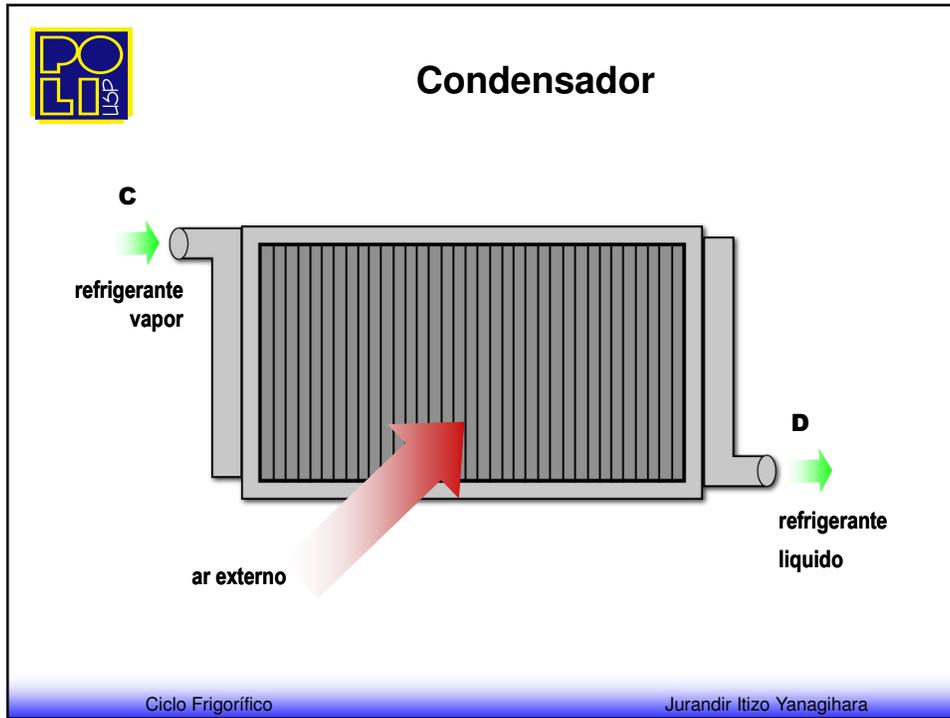


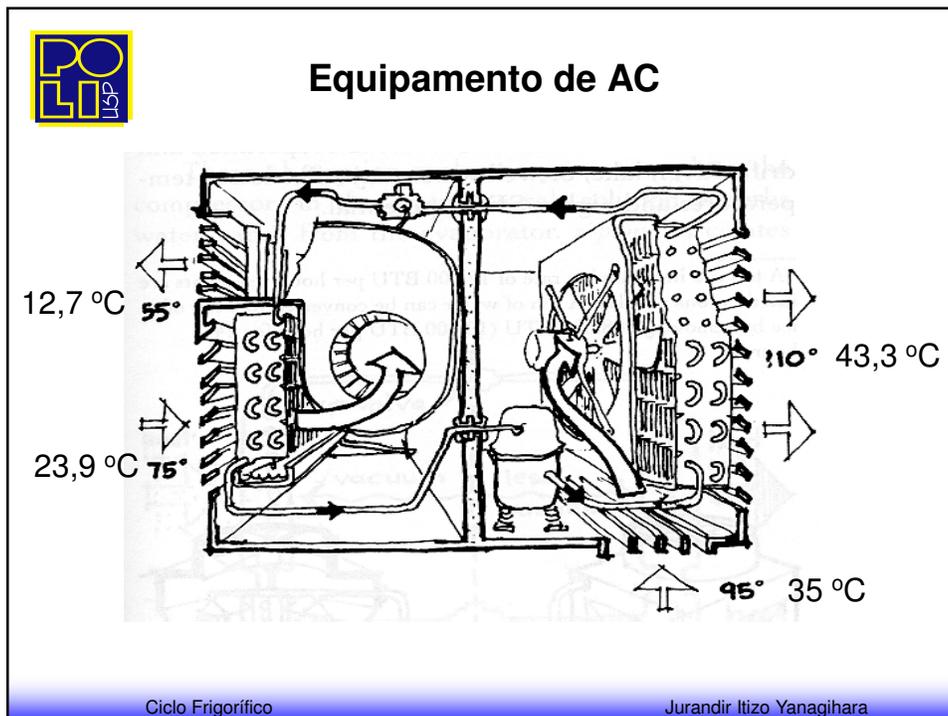
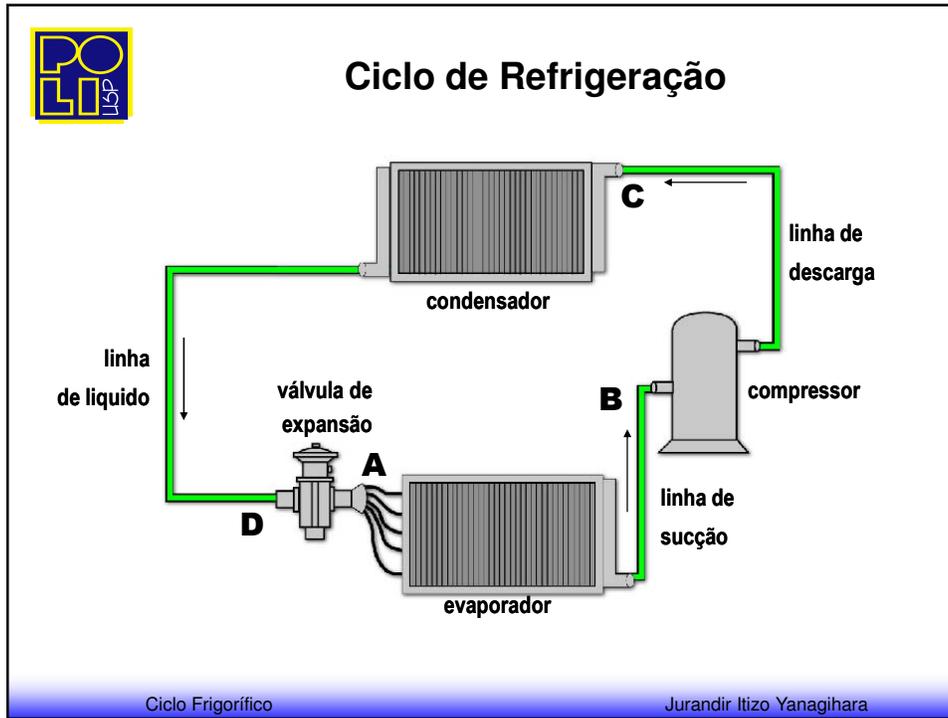
evaporador válvula de expansão condensador compressor

Ciclo Frigorífico Jurandir Itizo Yanagihara

The diagram shows a complete closed loop of green pipes. At the top left is a yellow rectangular box labeled 'evaporador' with a red arrow pointing into it from the top and a blue arrow pointing out to the right. The pipe continues to the right, then down, then left, then up, and finally right into a grey rectangular box labeled 'válvula de expansão'. From there, the pipe goes down, then left, then up, then right into a grey rectangular box labeled 'condensador' with a red arrow pointing out to the right. The pipe then goes down, then left, then up, then right into a grey cylindrical box labeled 'compressor'. From the compressor, the pipe goes up, then right, then up, then right into the 'evaporador'.

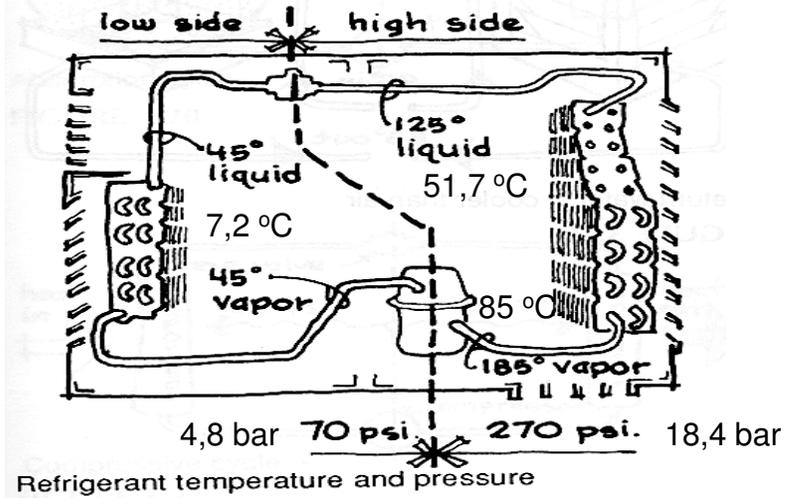








### Equipamento de AC

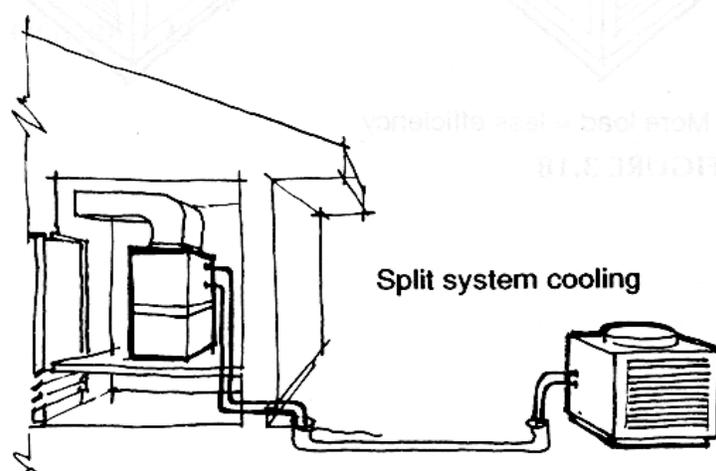


Ciclo Frigorífico

Jurandir Itizo Yanagihara



### Sistema de AC Tipo Split

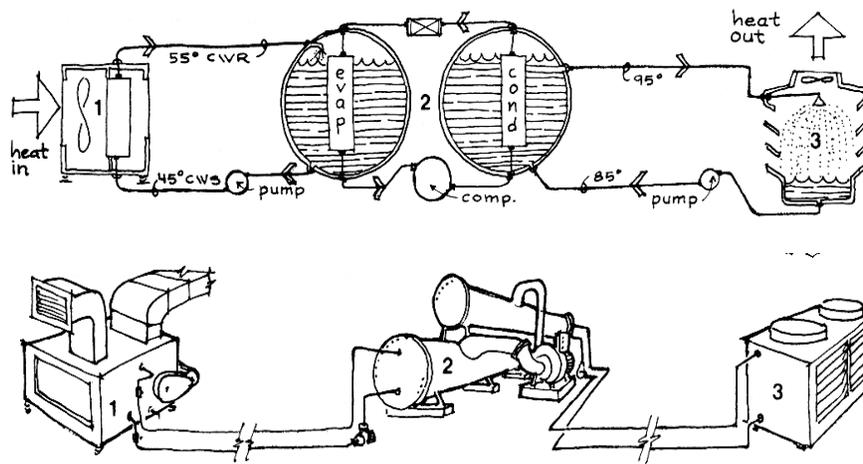


Ciclo Frigorífico

Jurandir Itizo Yanagihara



### Sistemas Centrais de AC

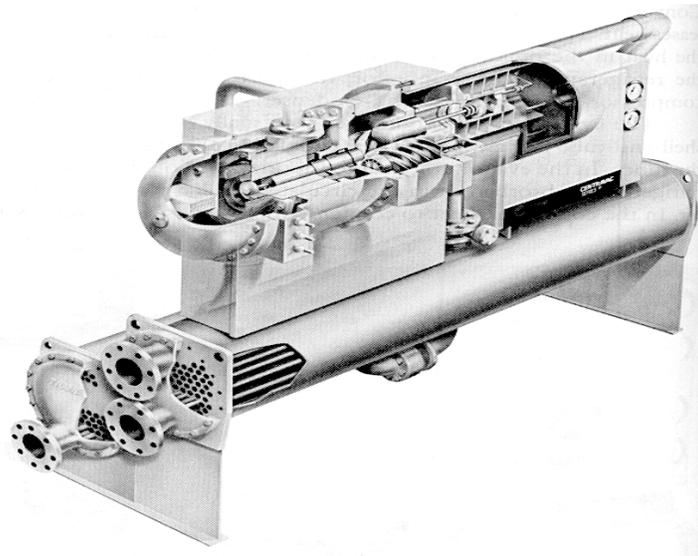


Ciclo Frigorífico

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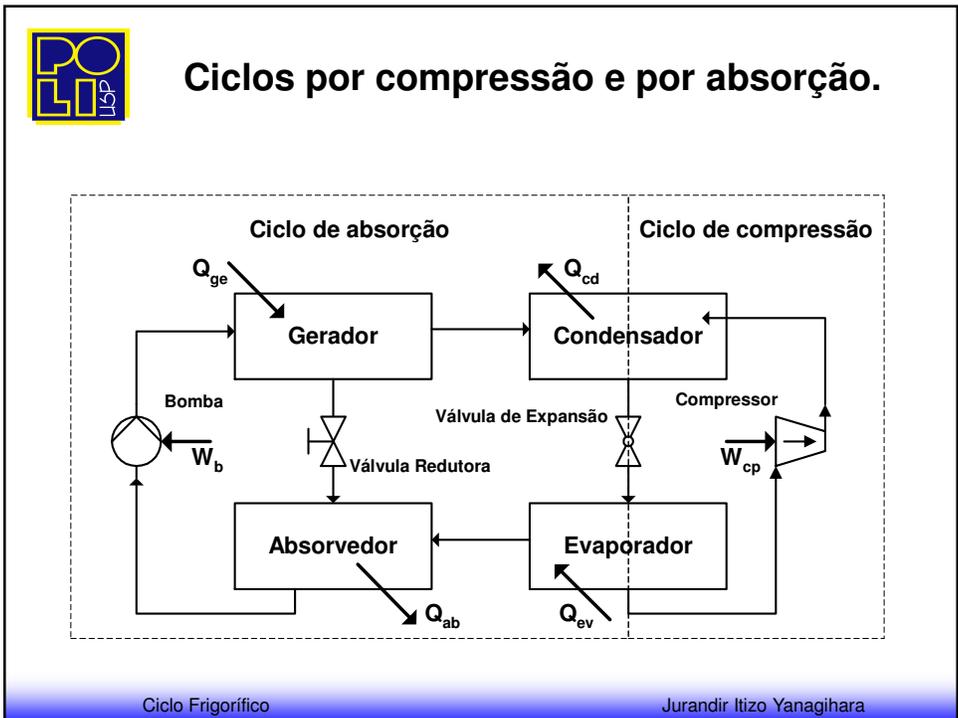
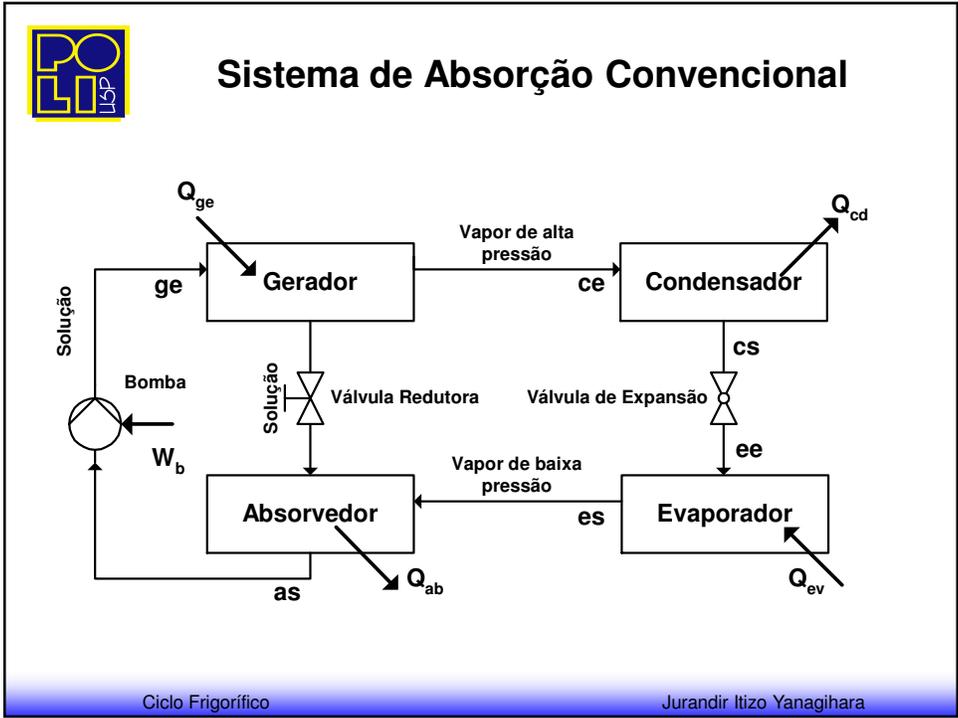


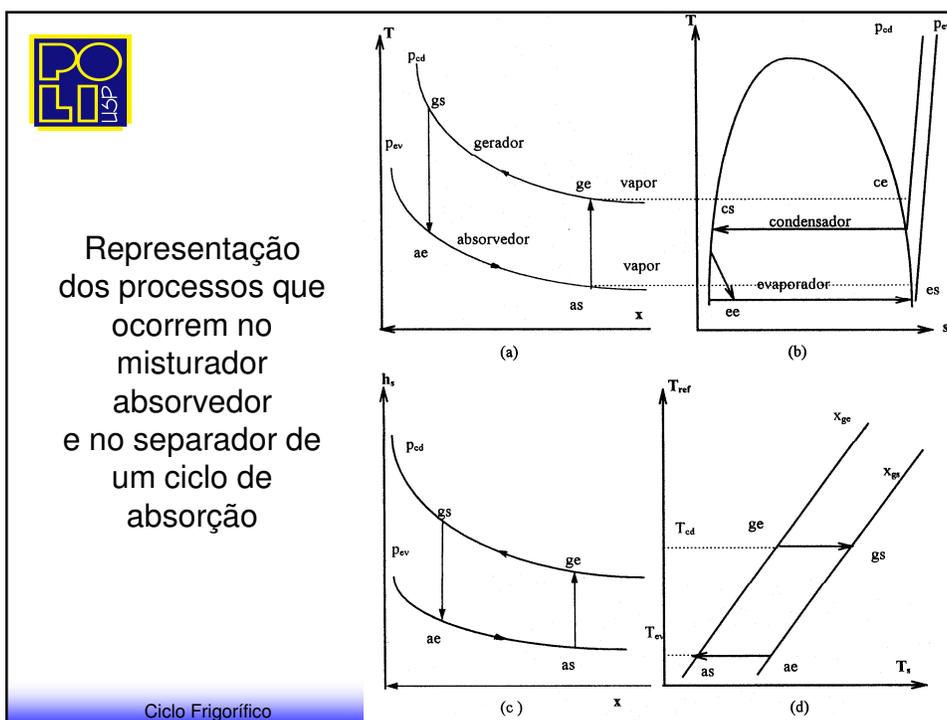
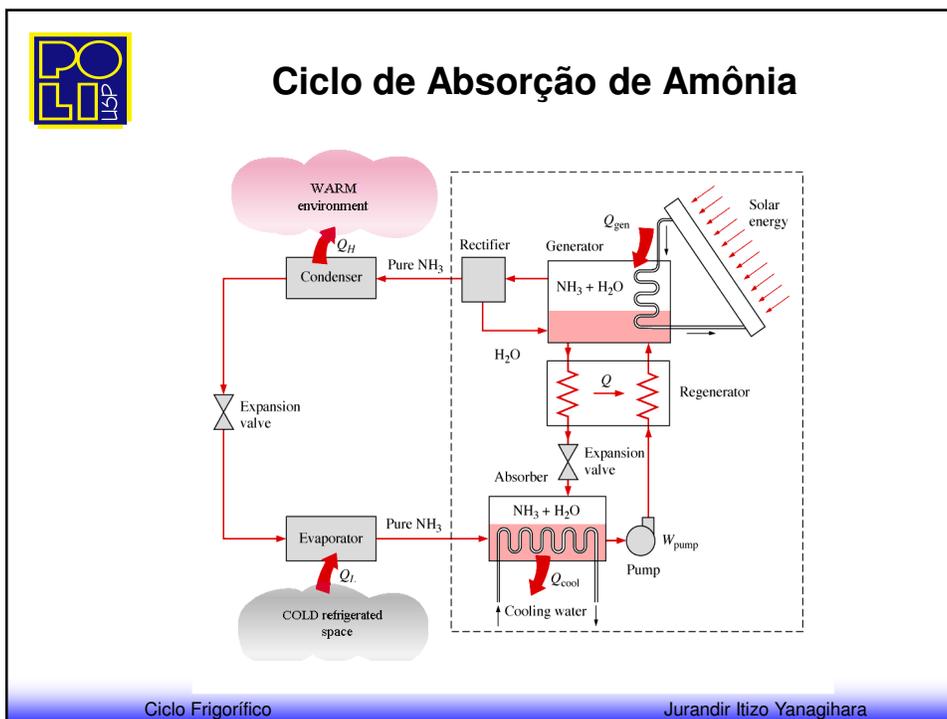
### Chiller – Compressor Centrífugo

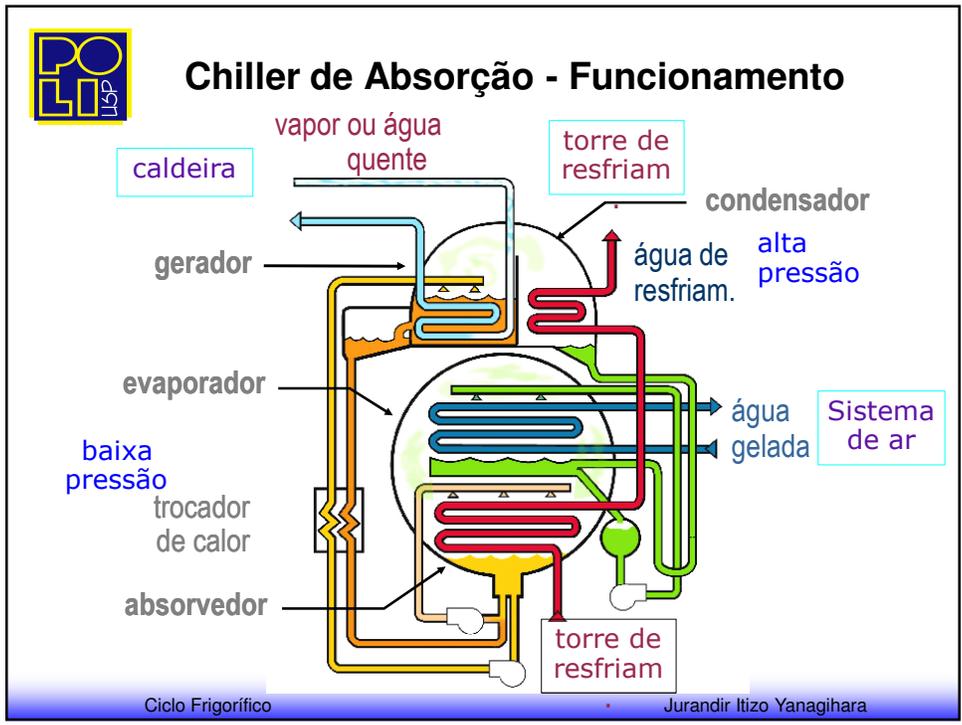
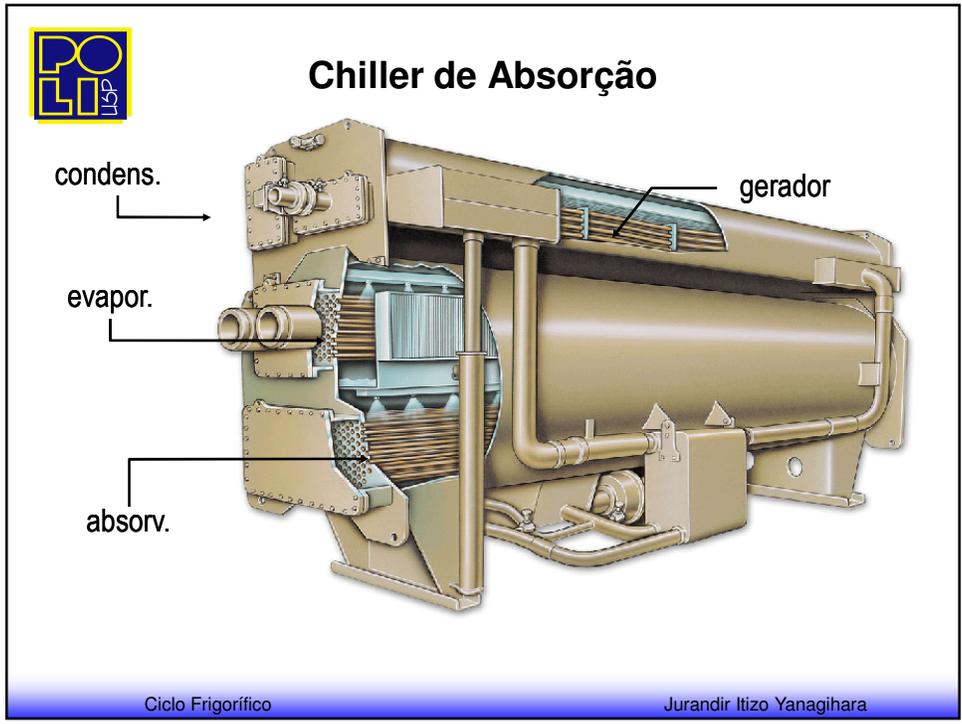


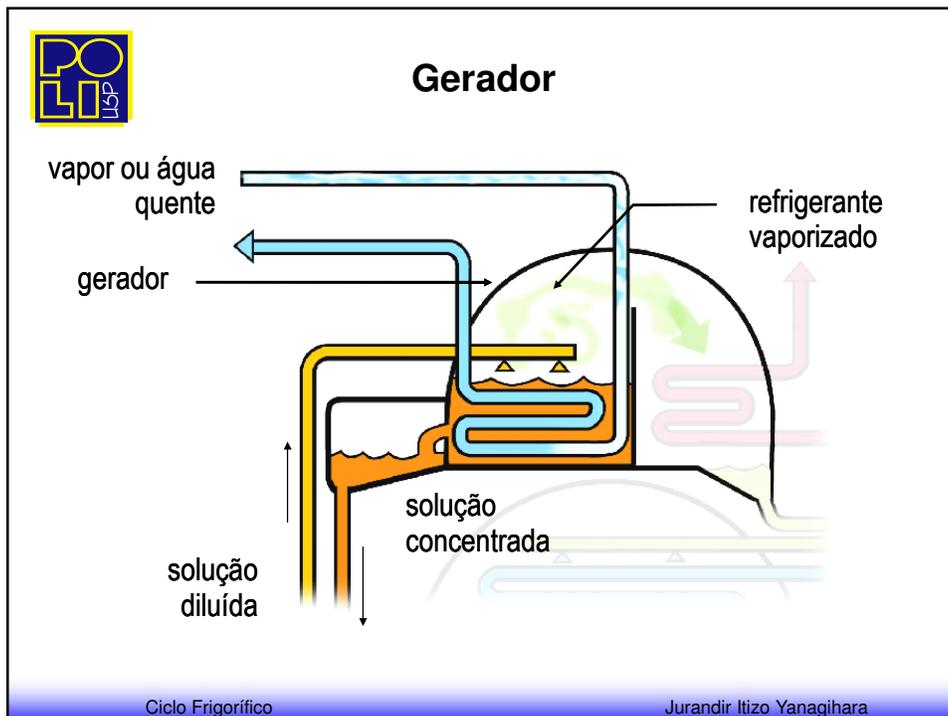
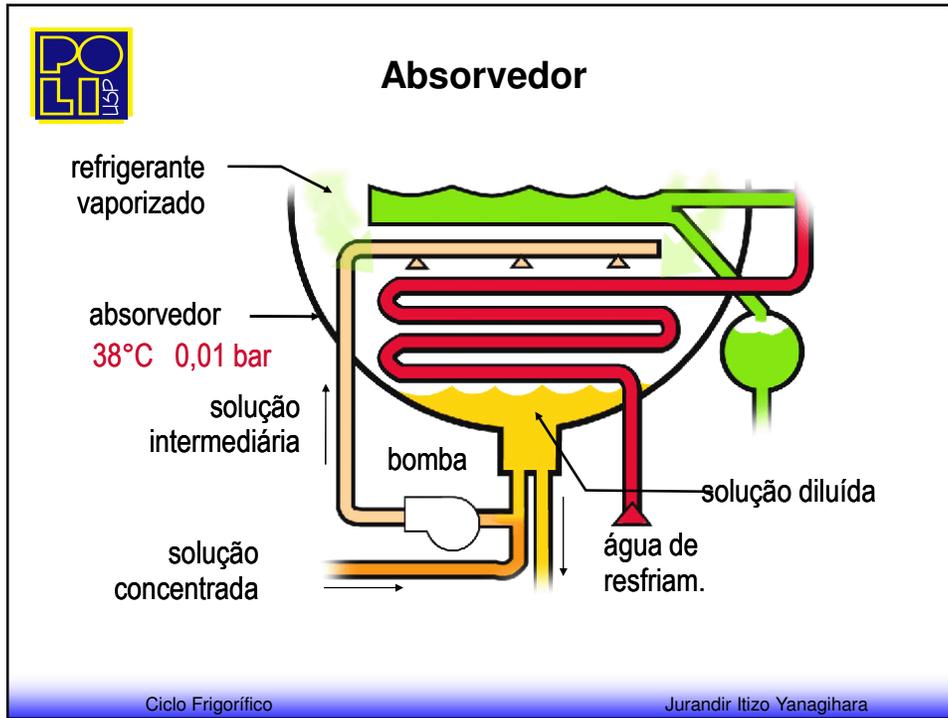
Ciclo Frigorífico

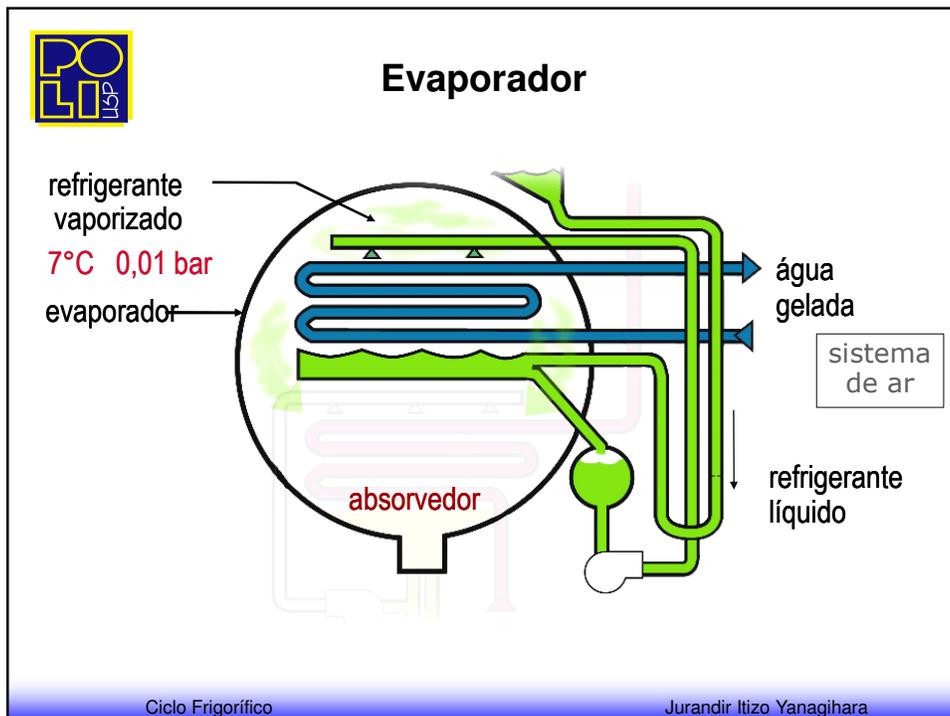
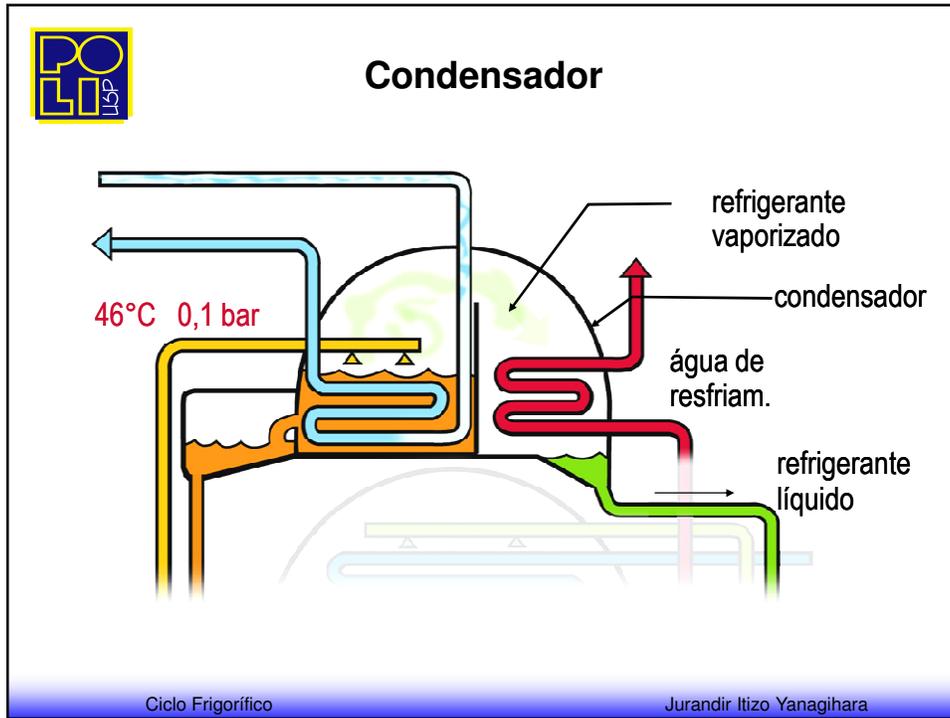
Jurandir Itizo Yanagihara

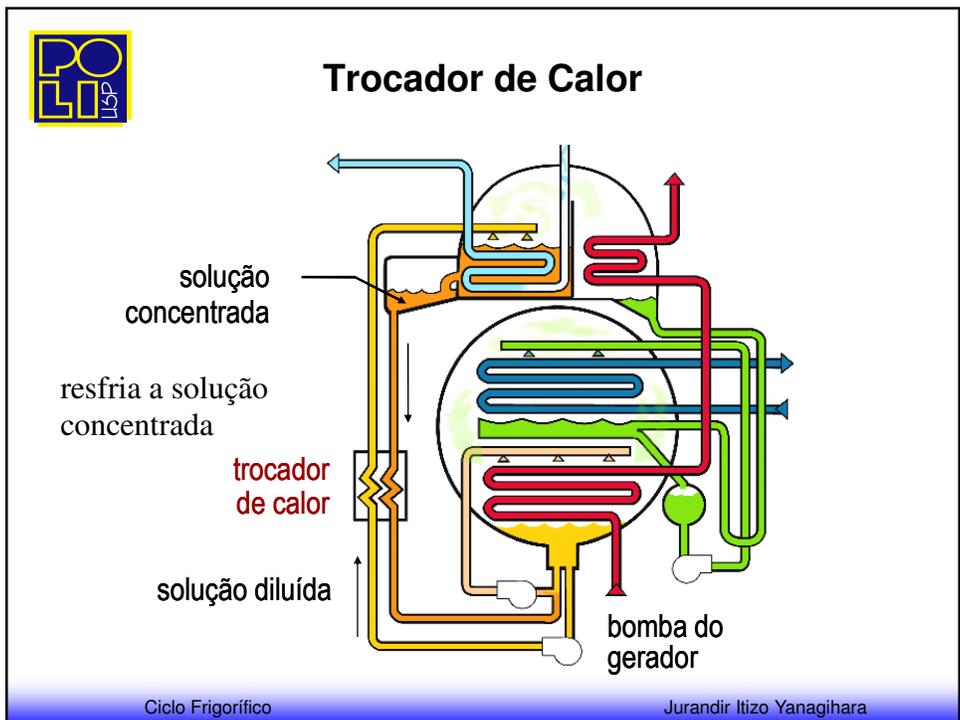
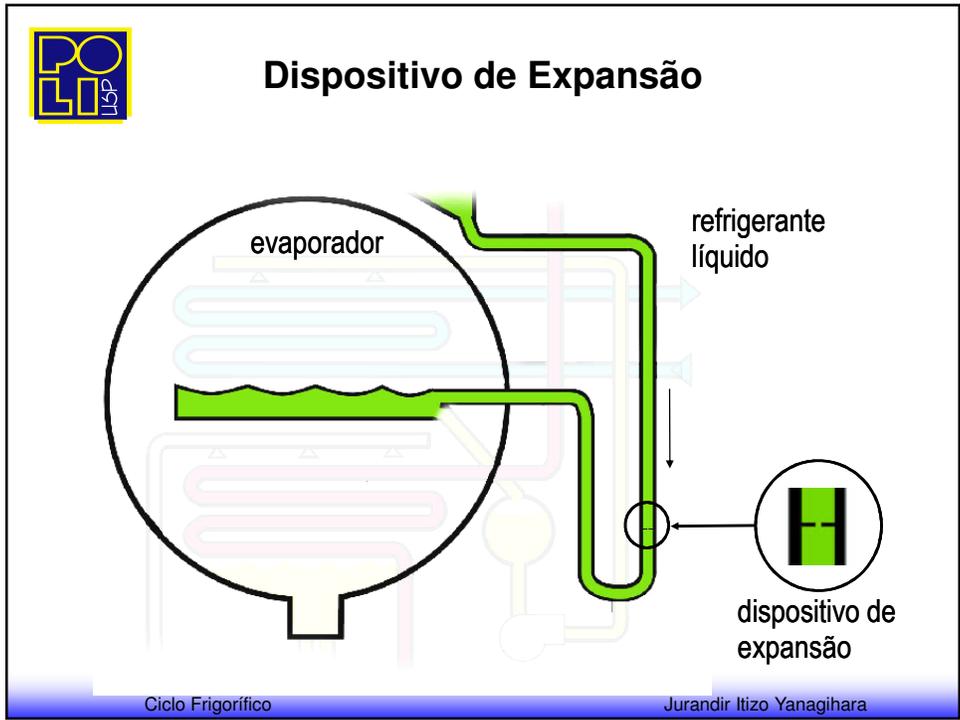














CARACTERÍSTICA	VALORES TÍPICOS
Pressão de entrada de vapor (bar)	1,6 - 1,8
Consumo de vapor (kg/h/TR)	8,3 - 8,5
Temperatura do fluido de aquecimento	115°C a 132°C, e 90°C para sistemas de pequena capacidade
Potência térmica fornecida (kW/TR)	5,3 a 5,4, podendo chegar a 5,0 para sistemas de pequena capacidade
Temperatura de entrada da água de resfriamento (°C)	29,0
Vazão de água de resfriamento (l/min/TR)	13,6 até 24,2 para sistemas de pequena capacidade
Temperatura de saída da água gelada (°C)	6,0
Vazão de água gelada (l/min/TR)	0,15 (podendo chegar a 0,164 para sistemas de pequena capacidade)
Potência elétrica consumida (kW/TR)	0,01 a 0,04 (com um mínimo de 0,04 para sistemas de pequena capacidade)
Capacidade nominal (TR)	50 a 1660 (de 5 a 10 para sistemas de pequena capacidade)
Comprimento (m)	3 a 10 (1,0 para sistemas de pequena capacidade)
Largura (m)	1,5 a 3,0 (1,0 para sistemas de pequena capacidade)
Altura (m)	3 a 10 (2,0 para sistemas de pequena capacidade)
Peso em operação (kgf)	5000 a 52000 (300 para sistemas de pequena capacidade)

Ciclo Frigorífico Jurandir Itizo Yanagihara



### Coeficiente de Eficácia

Ciclo frigorífico por compressão

$$COP = \frac{\dot{Q}_{ref}}{\dot{W}_{comp}}$$

Ciclo frigorífico por absorção

$$COP = \frac{\dot{Q}_{ev}}{\dot{Q}_{ge}}$$

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