Innovative Energy Saving Proposal

Simple
Installation

Zero
Running Cost

No
Maintenance

Fluid Agitation Device

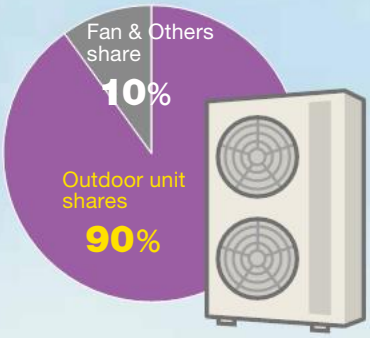
ESG TECHNOLOGIES

Patent Applications Filed for International & Japan Markets

Electric Power Saving with Agitation Device for Industrial Air-conditioning System

Unprecedented Innovative Technology Development

90% of air conditioning power is consumed by an outdoor compressor.
Accordingly, the only way for energy saving is to reduce compressor load.



As a result

Installation of α-ESG280 substantially reduces fluid flow resistance!!

- Effect 1 Reduction of Operating Time
- Effect 2 Low Electric Current Operation
- Effect 3 Substantial Increase in Efficiency on Heating/Cooling

Testimonials with many installation cases! Astounding Energy-saving Result with Innovative Technology

ESG TECHNOLOGIES's creative idea coupled with ingenious technology enabled achieving **15-35%** energy savings.

cooling heating

The key for electric power reduction of ventilation system for both cooling and heating is this device!

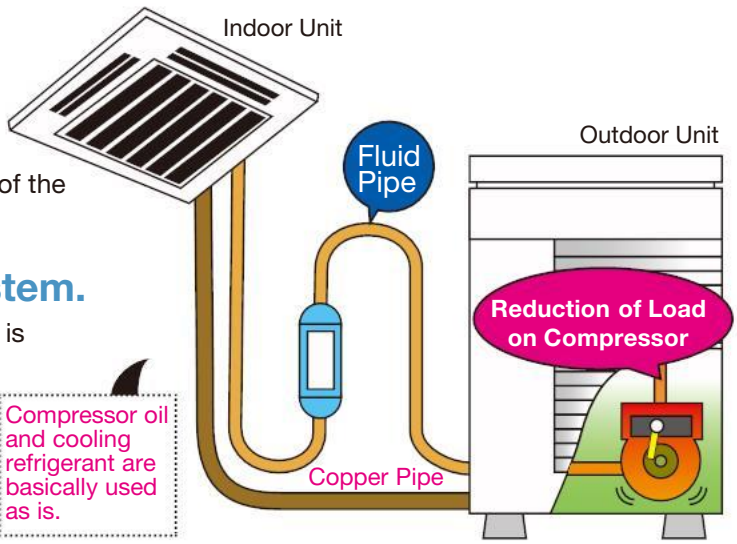
What is α-ESG?

Installing this device in the copper pipe (fluid pipe) of the ventilation system will reduce 15%-35% of power consumption.

α-ESG is a part of the piping system.

A ventilation system (both inside and outside units) is untouched.
α-ESG is regarded as a part of a piping system which is installed by an installer. Once the job is done, there is no need for maintenance.

Compressor oil and cooling refrigerant are basically used as is.

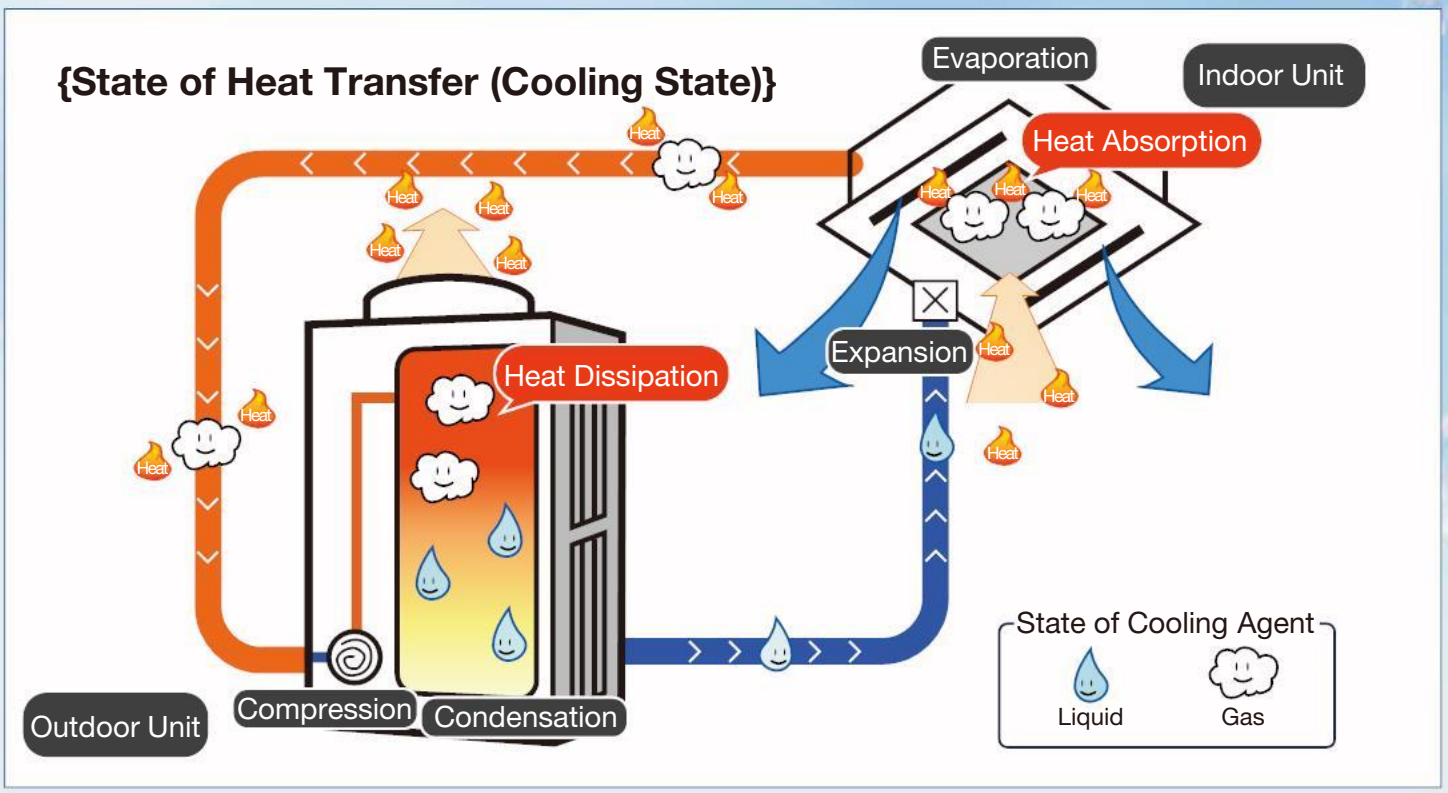


The function of cooling refrigerant which impacts efficiency

Cooling refrigerant plays an important role carrying thermal energy between the outdoor and indoor units. Through the phase change between liquid and gas, refrigerant carries thermal energy.

The system's efficiency largely depends upon how well the cooling refrigerant's liquefaction (condensation) and vaporization (evaporation) process is taking place in carrying heat energy.

Due to the environment, usage and the air conditioning system's operating conditions, there are many cases where cooling agent is not completely liquefied.



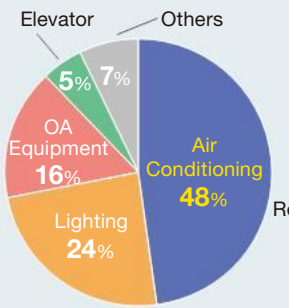
Incomplete liquefaction of cooling refrigerant causes insufficient heat transfer during evaporation. As a result, an inefficient operation takes place, causing higher electrical bill.

Incomplete liquefaction of cooling refrigerant ▶ **Deteriorated heat transfer efficiency** ▶ **Higher electric bill**

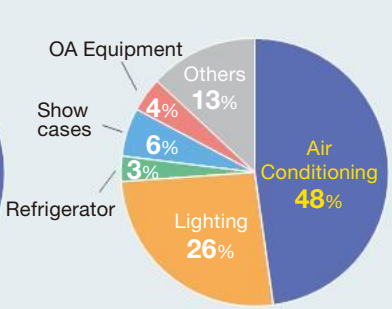
An air conditioning system occupies over 40% of the total electric power consumption.

Typical facilities such as office buildings and retail stores' air conditioning occupy 48% of the electric power consumption, medical institutions occupy 38%. Almost all facilities' air conditioning systems consume around 40% of electric power. Accordingly, it can be said that **"managing an air conditioning system can control energy efficiency"**. We should challenge to break this wall at first.

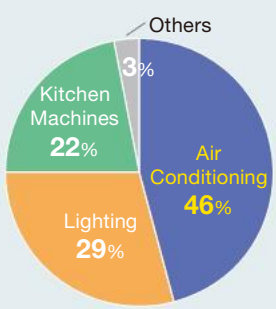
Office Building



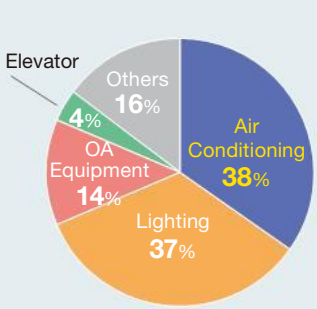
Retail Store



Restaurant



Medical Facilities

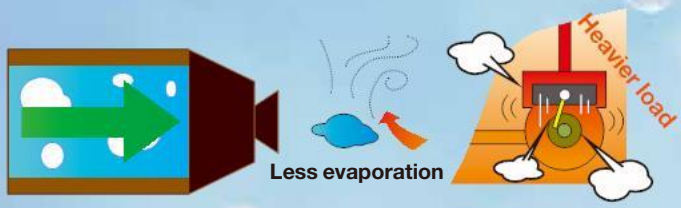


Source: Japan Resource Energy Agency (Power Consumption Plan)

Two energy saving benefits attributable to reduction of compressor load with use of α-ESG

Enhancement of cooling agent's liquefaction PLUS **Reduction of fluid-flow resistance**

If gas gets mixed in the cooling agent's liquefaction process



Heat transfer gets deteriorated, hence the compressor load increase in the system causing increase of electric power requirement.

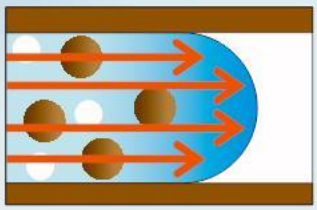
Incomplete liquefaction of refrigerant from the compressor generates pulsation, which in turn destabilizes the expansion valve. The α-ESG remedies this problem, hence allows more stable pressure.

- Miniaturization of freezer oil
- Macromolecular Liquefaction

Bringing liquid flow resistance in the pipe to nearly zero

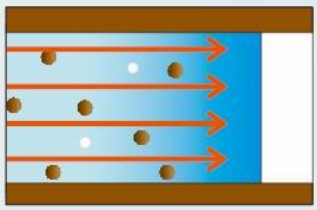
Significant reduction of compressor load

Normal flow of circulating refrigerant



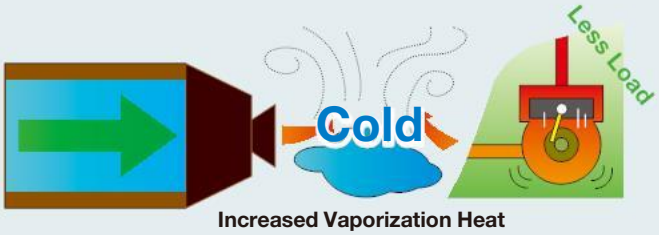
Viscosity of refrigerant becomes resistance which pushes up compressor's load =**Increased Power Consumption**

Flow of circulating refrigerant with α-ESG



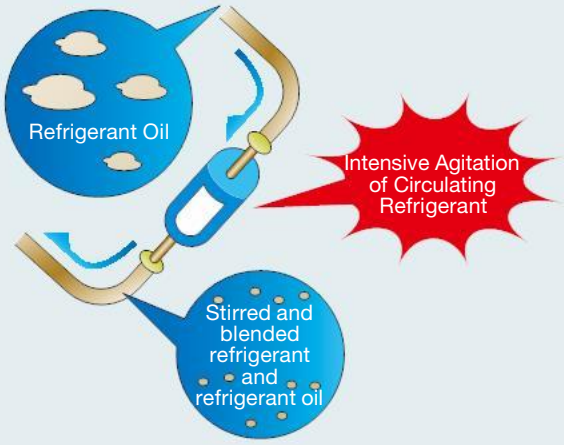
Viscosity of refrigerant becomes less resistant, which decreases compressor's load =**Reduction of Power Consumption**

When α-ESG is inserted in the system



Increased Vaporization Heat

Liquefaction is accelerated with **α-ESG's** agitation function, leading reduction of compressor load which in turn reduces electric power consumption.



Super Eco

The Selection Board of General Incorporated Association Japan Emission Amount Dealing Support Foundation recognized not only energy reduction, but also environmentally friendly and safety concerns of the device. These were used for their award assessment criteria.

【Appraisal Points】

- The temperature at output opening must be lower and must be confirmed for energy saving.
- A substantial reduction of peak-demand warnings

Actual Performance Result of α-ESG

Region	Type of Refrigerant	Reduction Rate of Power Consumption
Aichi Prefecture	R407	33.5%
Osaka Prefecture	R410	25.9%
Ehime Prefecture	R410	27.7%
Tochigi Prefecture	R410	29.1%
Kanagawa Prefecture	R410	31.5%
Osaka Prefecture	R410	32.4%

*It is not meant to guarantee the above energy saving rates. It varies depending upon the environment and temperature changes.

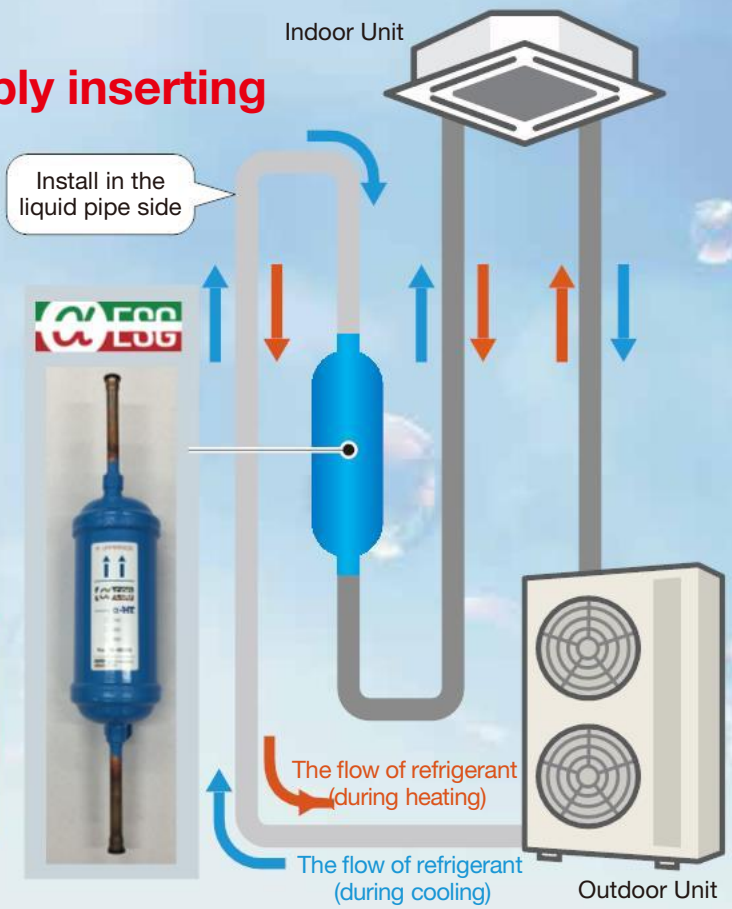
Characteristics of α-ESG

Installation of α-ESG is simply inserting into the existing pipelines.

α-ESG needs to be inserted in the liquid pipe between the condensation unit and expansion valve.

Position of a condensation unit and an expansion valve may vary depending upon the ventilation structure. In order to determine the installation point, it would be necessary to check the model number of the air conditioner in advance.

*Use the compressor oil and refrigerant as specified.



Absolutely no running cost.

No water nor electric power are required to run the device.

No maintenance required.

No consumables, no necessity for parts replacement

Easy installation

No need for special tools

Not only commercial-use air conditioning system, it also works for heat pump system with high temperature/pressure refrigerant.

***Works with new refrigerant R32**

Installation Method

Pump out the current refrigerant in the pipe.

Insert α-ESG between the cutoff pipes.

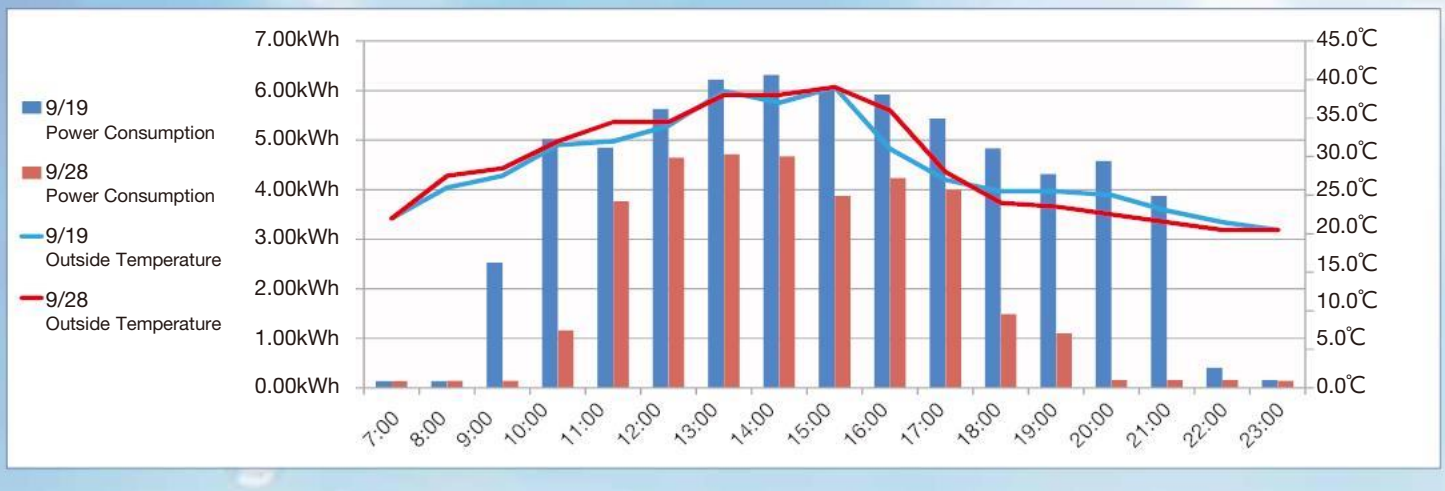
Apply silver welding in order to prevent any gas leakage.

After installation of the device, put thermo-insulator.

Completion of installation

S Hospital (Kanagawa Prefecture) Installation Outcome Report

Comparison of Power Consumption



Installation Photo

Total Power Usage

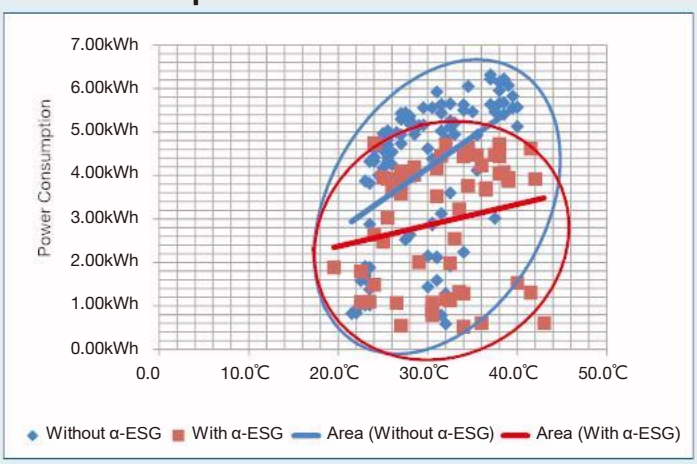
Date	9/19	9/28
Total Power Consumption	67.47kWh	35.68kWh
Operating Time Period	13 hours	10 hours
Total Power Consumption from 10:00 to 19:00	54.64kWh	33.66kWh
Average Power Consumption between 10:00 to 19:00	5.46kWh	3.37kWh
Amount of Power Saving	-20.98kWh	
Rate of Power Reduction	38.4%	

Power Consumption Comparison Data

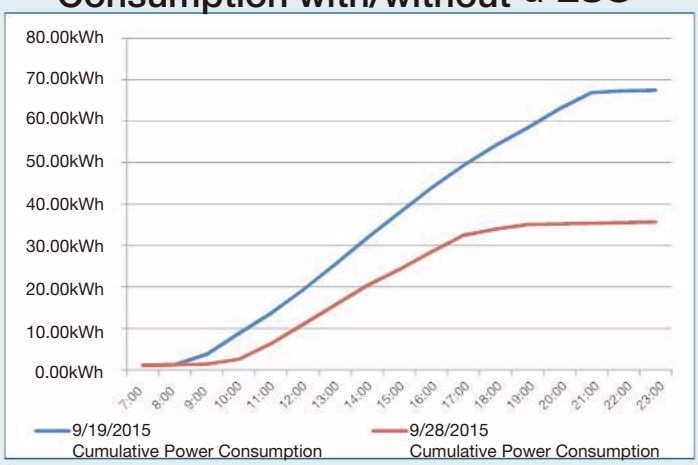
2015

Date	9/19	9/28	Saving Amount	9/19 Outside Temperature	9/28 Outside Temperature
0:00	0.14kWh	0.14kWh	0.00kWh	20.5℃	20.5℃
1:00	0.14kWh	0.14kWh	0.00kWh	20.0℃	20.5℃
2:00	0.14kWh	0.14kWh	0.00kWh	19.0℃	20.5℃
3:00	0.14kWh	0.14kWh	0.00kWh	19.0℃	20.0℃
4:00	0.14kWh	0.14kWh	0.00kWh	18.5℃	19.5℃
5:00	0.14kWh	0.14kWh	0.00kWh	18.5℃	20.0℃
6:00	0.14kWh	0.14kWh	0.00kWh	18.5℃	19.5℃
7:00	0.14kWh	0.14kWh	0.00kWh	22.0℃	22.0℃
8:00	0.14kWh	0.14kWh	0.00kWh	26.0℃	27.5℃
9:00	2.53kWh	0.14kWh	2.39kWh	27.5℃	28.5℃
10:00	5.03kWh	1.16kWh	**3.87kWh**	31.5℃	32.0℃
11:00	4.85kWh	3.77kWh	**1.09kWh**	32.0℃	34.5℃
12:00	5.63kWh	4.65kWh	**0.98kWh**	34.0℃	34.5℃
13:00	6.22kWh	4.72kWh	**1.50kWh**	38.5℃	38.0℃
14:00	6.32kWh	4.67kWh	**1.64kWh**	37.0℃	38.0℃
15:00	6.08kWh	3.88kWh	**2.20kWh**	39.0℃	39.0℃
16:00	5.92kWh	4.23kWh	**1.69kWh**	31.0℃	36.0℃
17:00	5.43kWh	4.00kWh	**1.44kWh**	27.0℃	28.0℃
18:00	4.83kWh	1.49kWh	**3.35kWh**	25.5℃	24.0℃
19:00	4.32kWh	1.10kWh	**3.22kWh**	25.5℃	23.5℃
20:00	4.59kWh	0.16kWh	4.43kWh	25.0℃	22.5℃
21:00	3.88kWh	0.16kWh	3.72kWh	23.0℃	21.5℃
22:00	0.41kWh	0.16kWh	0.25kWh	21.5℃	20.5℃
23:00	0.16kWh	0.14kWh	0.02kWh	20.5℃	20.5℃

Outdoor Temperature vs. Power Consumption Scatter Chart



Comparison of Cumulative Power Consumption with/without α-ESG



From Purchase to Installation Process

Inquiry

Please feel free to inquire by telephone call or email.
*May ask a simple question regarding your system condition.

Personal Visit to Explain

Will bring a pamphlet with detailed explanation.

Generating a Simulation

Upon submission of a check sheet, we will make an annual cost saving simulation at free of charge.

Investigation of the Location and Site

Inquire about your requirements, then check the condition of the existing system.

Proposal

We will make a proposal based upon the simulation and quotation.

Purchase Order

We would like to discuss the best installation date and time.

Installation Work

A warranty document is issued upon confirmation of the serial number.

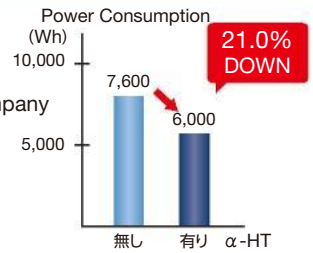
Actual Installation Cases

Drug Store

Location: Yamagata Prefecture

Equipment Manufacturer: Mitsubishi Electric Company

Power Consumption before Installation	**7,600Wh**	*Measured over 2 hour operation
Power Consumption after Installation	**6,000Wh**	*Measured over 2 hour operation
Power Saving Rate	**21.0%**	

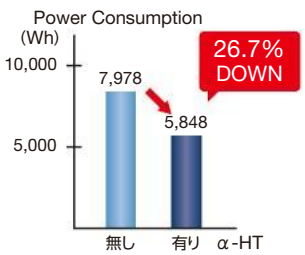


Chemical Company

Location: Hiroshima Prefecture

Equipment Maker: Hitachi Electric

Power Consumption before Installation	**7,978Wh**	*Measured over 3 hour operation
Power Consumption after Installation	**5,848Wh**	*Measured over 3 hour operation
Power Saving Rate	**26.7%**	



Specification of [α-ESG 280]

Item	Description
Category	JIS Refrigerant Coupling B8707 3 Class
External Dimensions	Main Body W89 x L280mm
Coating	Blue: Japan Refrigeration/Air Conditioning Industry Standard Spec IRA 9002 1991
Copper Pipe Diameter	Φ12.7mm/Φ15.88mm(Option)
Tolerable Pressure	More than 11Mpa
Management	Complete management by Traceability Enforcement (Protection against imitation)

α-ESG 280

α-ESG 560

Safety & Related Regulations

- Refrigeration/Air Conditioning
- Safety Regulation
- Pressure Container Structural
- Design Implementation

Consigned Manufacture
- Certified Factories for High Pressure

Gas Manufacturing Facilities

Caution

- It cannot be used for a homesmallRoom Airsystem
- One α-ESG 280 can handle up to 10power system.
- Two α-ESG 280 should be used in parallel for 20power system.
- Absorption and Tarbo type refrigerators are not useable.
- Please contact our sales companies for any other questions and inquiries.

[Development & Manufacturing]

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