



Let's bring space technology into everyday life

Thermal insulating ceramic

**GAINA**

Ceramic Insulation Technology



「JAXA COSMODE」 The first certified product (2005)

**JAXA** *Using JAXA technology for private purposes*

+

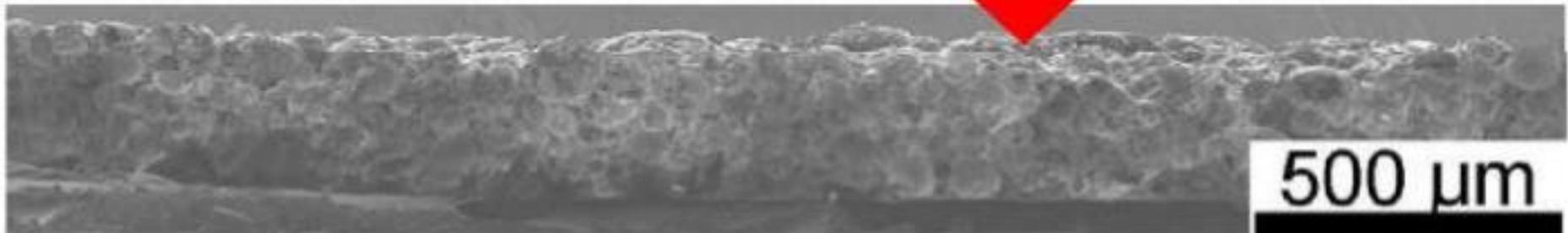
*Nisshin Sangyou Co., Ltd.*



# What the gaina thermal insulating ceramic is exactly



The technology of multi-layer application of inorganic (only due to the paint), special, hollow, ceramic



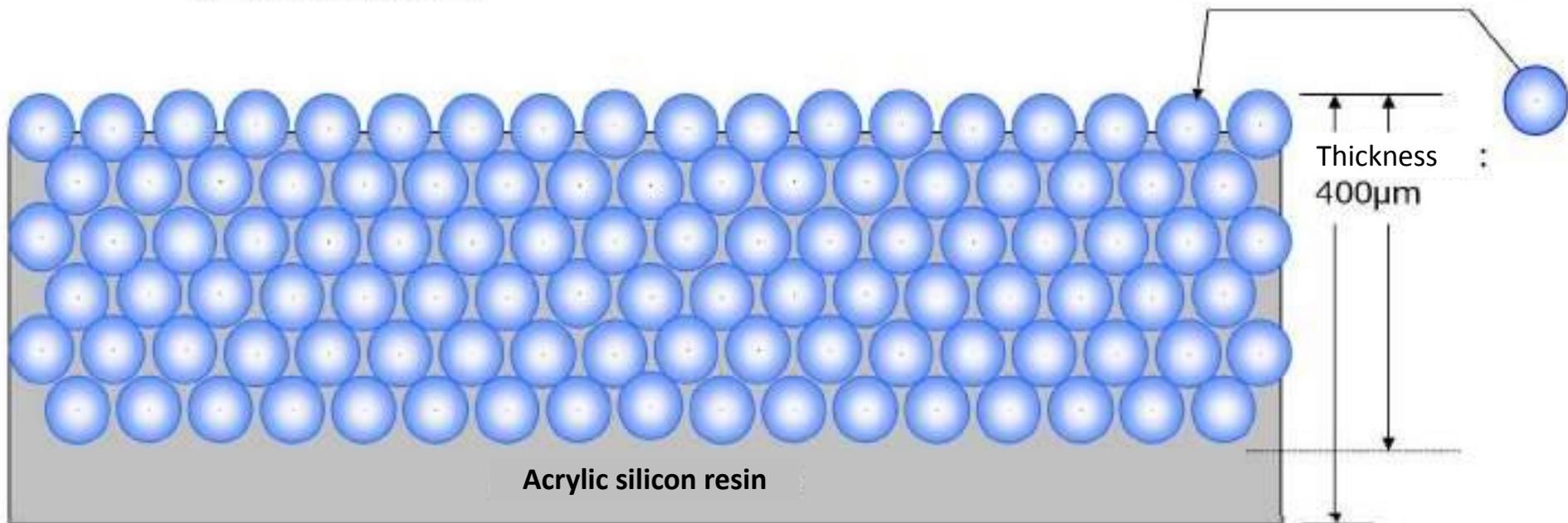
# The structure of gaina thermal insulating ceramic



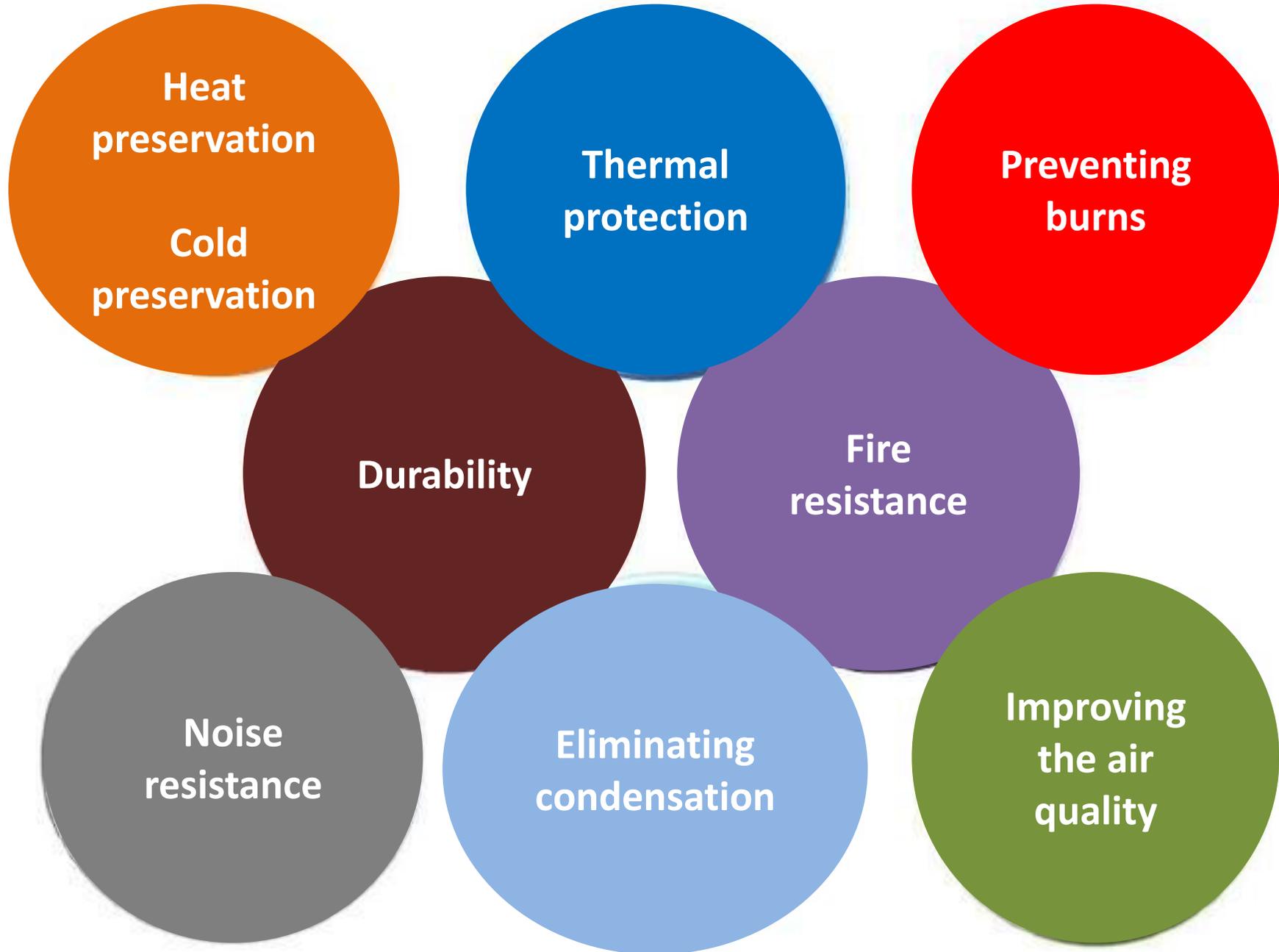
- The composition of the coating film layer when dry

Acrylic silicon resin – 20%

Special hollow ceramic-pearls – 80%



The illustration of the structure of the coating layer



Heat  
preservation

Cold  
preservation

Thermal  
protection

Preventing  
burns

Durability

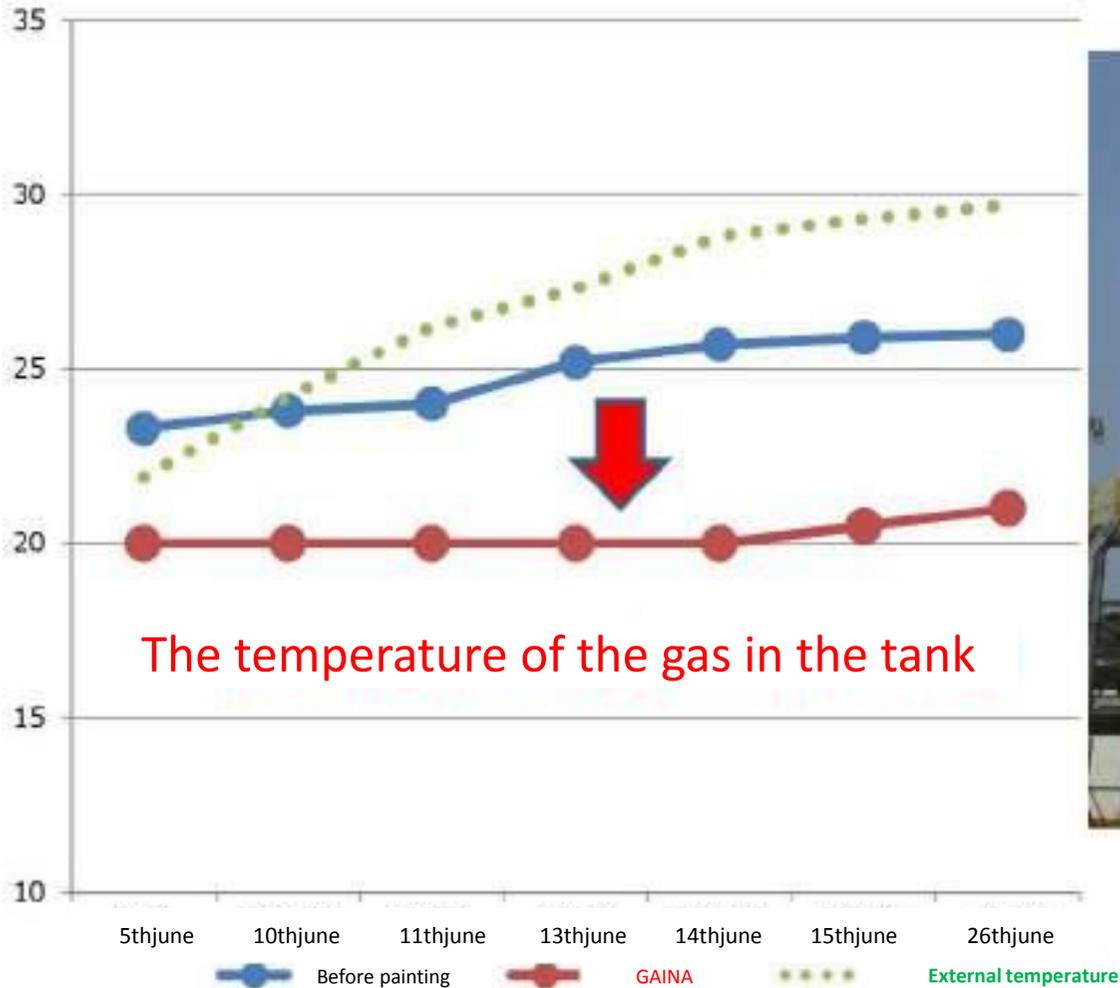
Fire  
resistance

Noise  
resistance

Eliminating  
condensation

Improving  
the air  
quality

# Gas tank (butane gas)



The temperature of the gas in the tank



The internal temperature of the tank



decrease in temperature of 5°C

# The tank containing chemicals



The upper surface of the tank



Cylindrical tank



◀ tank from the outside

▶ When the temperature inside the tank reached the permissible level, the **alarm** sounded and rang. **After it was painted with gaina, the alarm never sounded.**

# Fishing freezer storage (external painting)



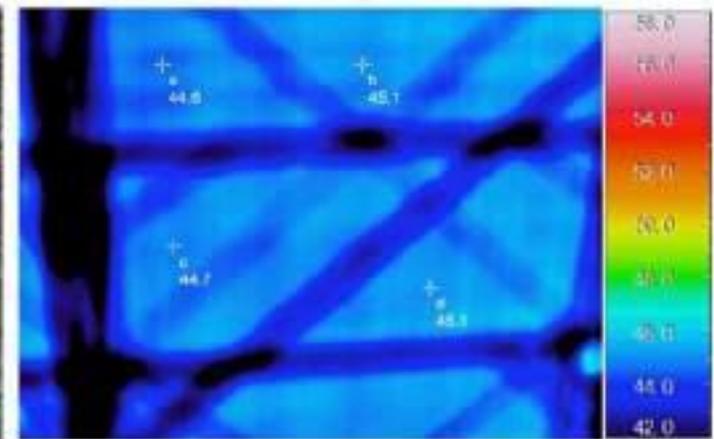
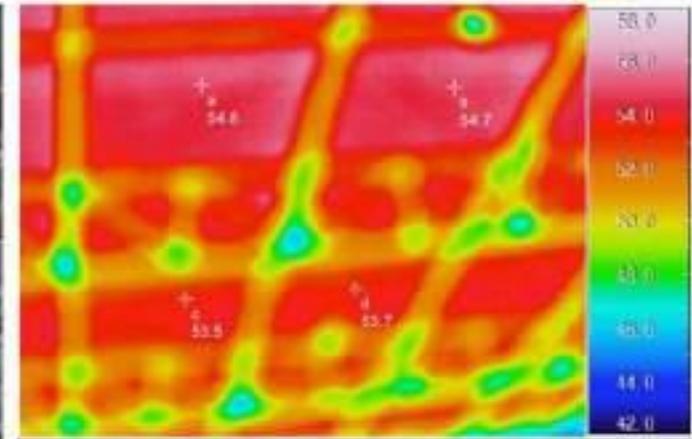
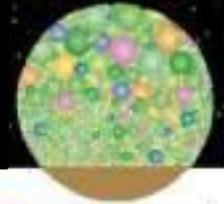
## ◆ Refrigerator

Storage was originally planned to freeze with 8 refrigerators



After being painted with gaina, 4 refrigerators were sufficient for reaching the planned levels

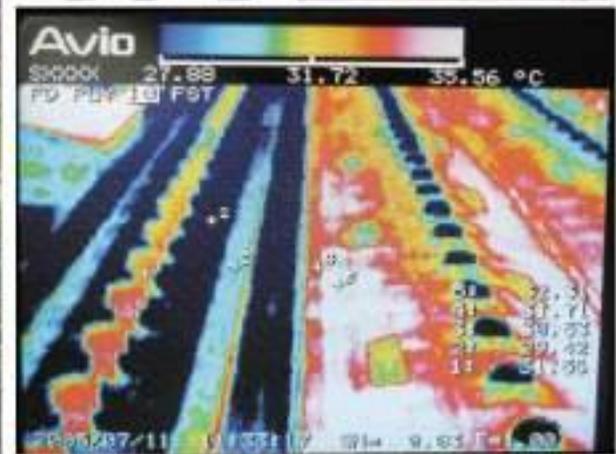
# Factory ceilings



Surface  
temperature  
of ceilings

**54.8°C** ► **44.6°C** -10.2°C

# JR super express railway terminal



- The temperature of the inner space

**-2.5°C**

- After painting, in the case of decreasing the inner temperature by 2°C using the air conditioner:
  - 8,12 million yen (1 season);
  - Co2 emissions decreased by 220 tons.

# RENFE company railway terminal in Spain

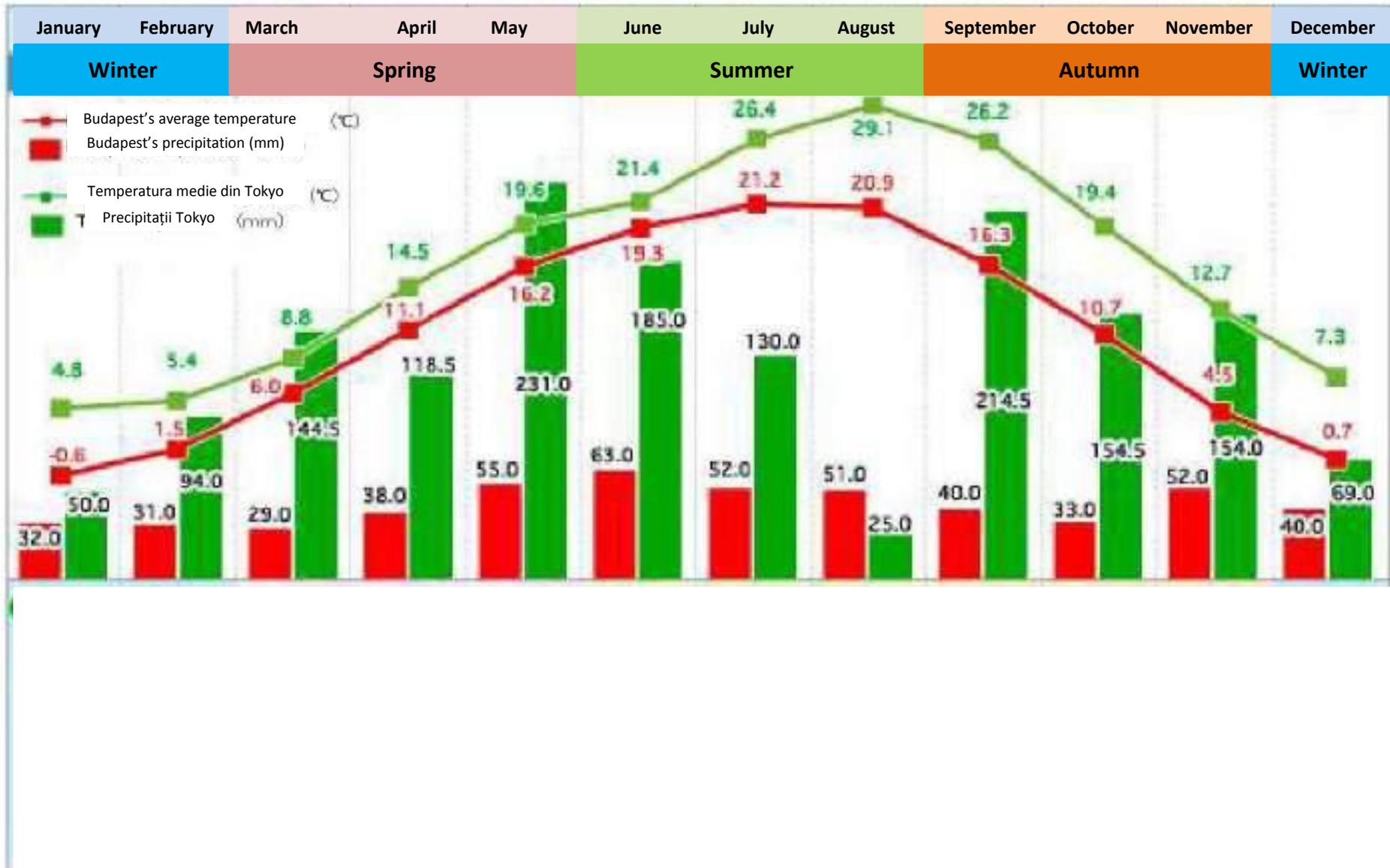


AVE high speed train

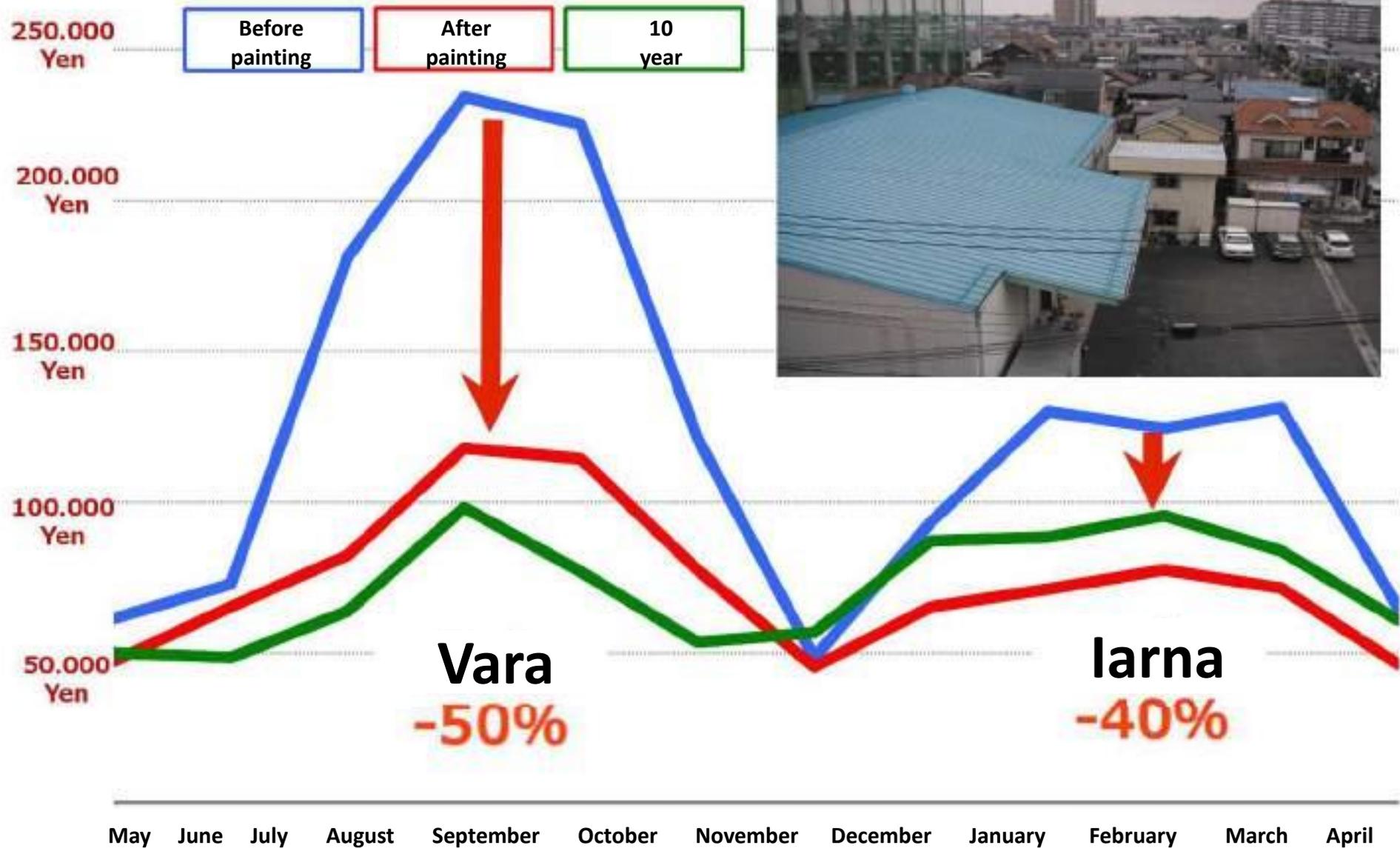


The inner temperature of the factory decreased by **more than 5°C**

# Budapest's climate



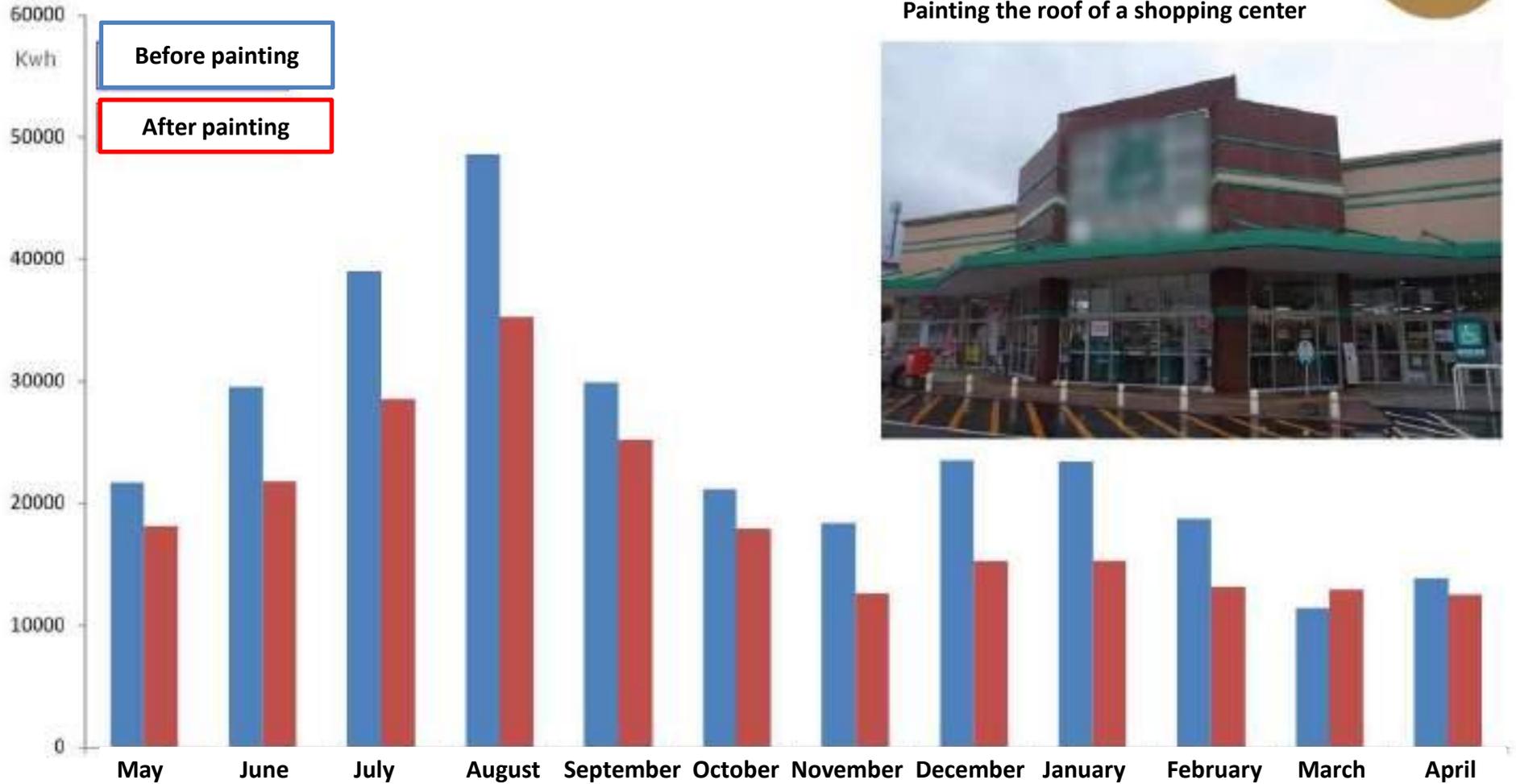
# The economic results of GAINA (1 year)



# The economic results of GAINA (1 year)



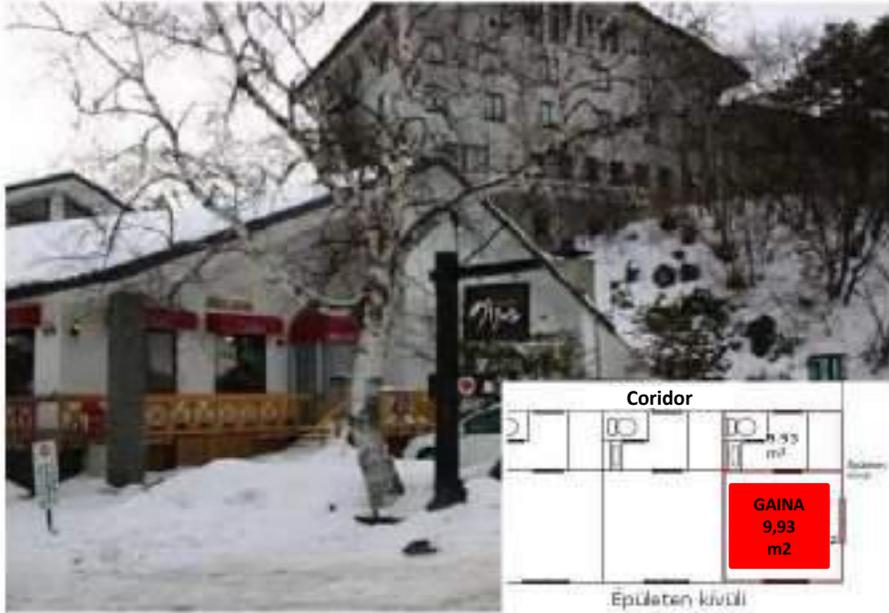
Painting the roof of a shopping center



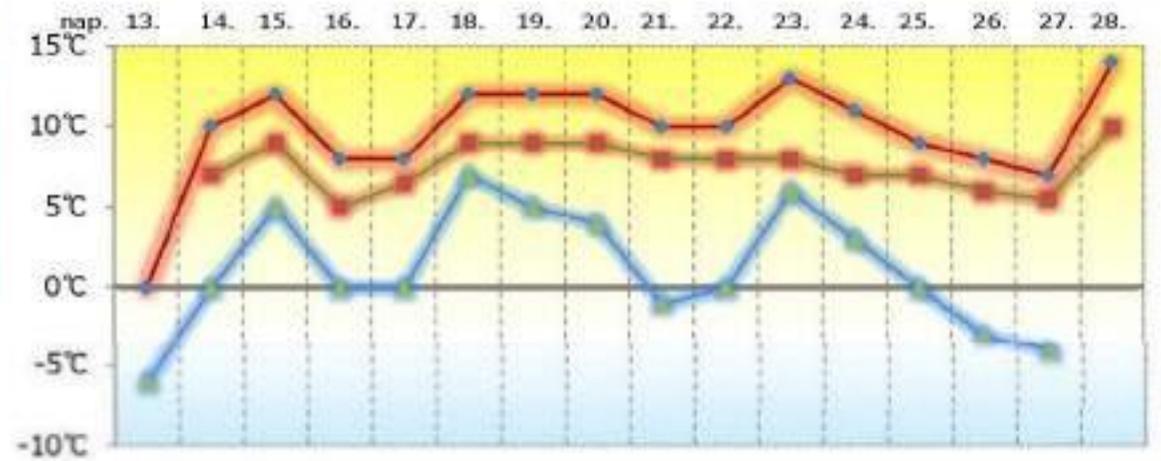
## Savings

Month	May	June	July	August	September	October	November	December	January	February	March	April
Savings (%)	16,6%	26,1%	26,9%	27,4%	15,9%	15,1%	31,3%	35,0%	34,7%	29,6%	13,4%	9,9%

# Example of the change of inner temperature in winter



The set temperature of the radiator is consistent	Before painting	After painting wall	After painting ceiling
The temperature inside the room	11,9°C	14,9°C	19,6°C
Temperature difference	—	+3,0°C	+7,7°C



- The temperature of room after painting
- The temperature of inner plaster after painting
- External temperature

# Car transport ship (Mitsui commercial boat)



The decks of all the new types of ships were painted with gaina (43 of them)

The temperature under the deck

65°C



38°C

## Evaluation after the painting:

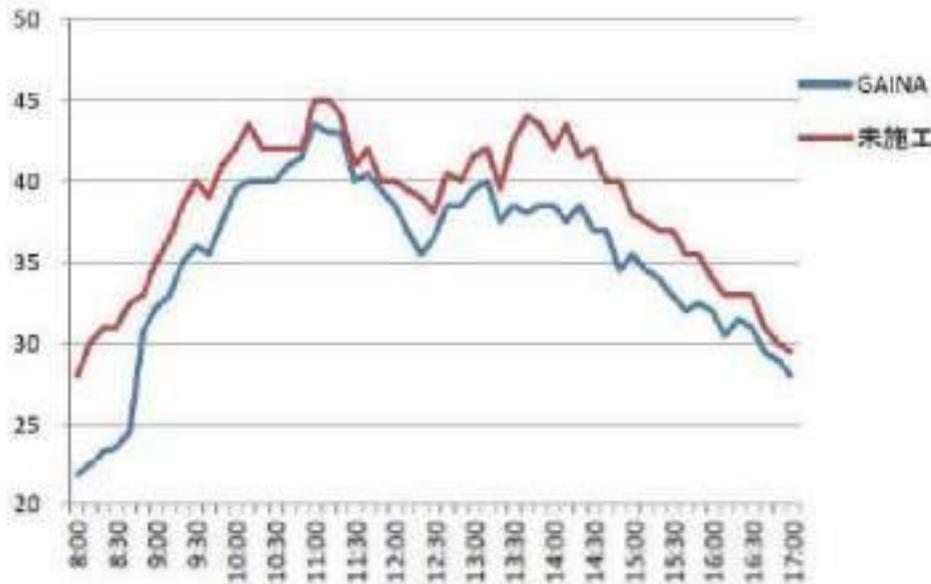
- The work efficiency improved significantly.
- Protecting the quality of the cars became easier.
- Repainting wasn't necessary for 9 years, even with extreme temperature conditions between a cold of -60 °C and the torrid +60 °C heat at the equator.
- This expressly shows the efficiency of gaina.

# Bus (its upper surface was painted)

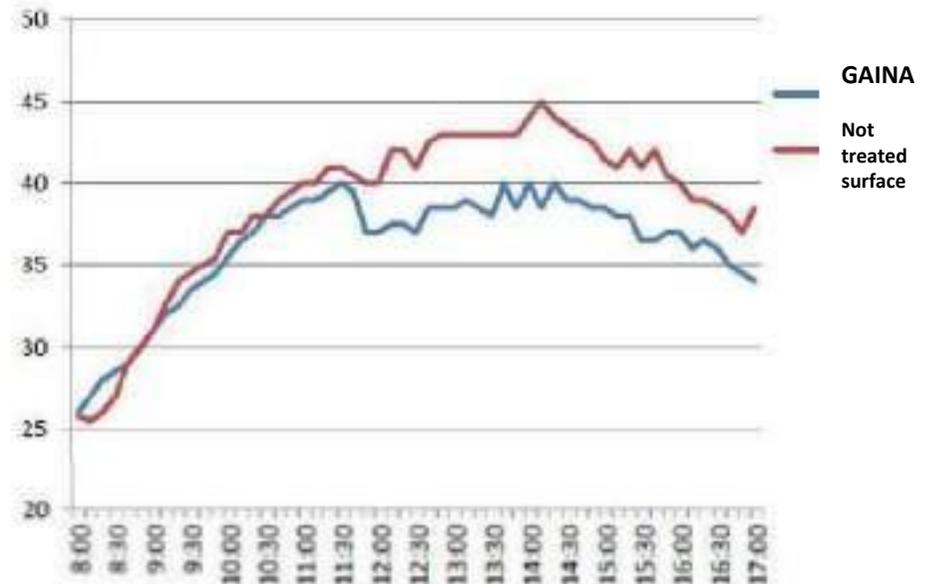


## Surface treated and not treated with gaina painting

	GAINA	Not treated surface	Difference
Ceiling temperature	38,5°C	45,0°C	-6,5°C
Temperature of the external upper surface	37,5°C	43,5°C	-6,0°C



Change in ceiling temperature

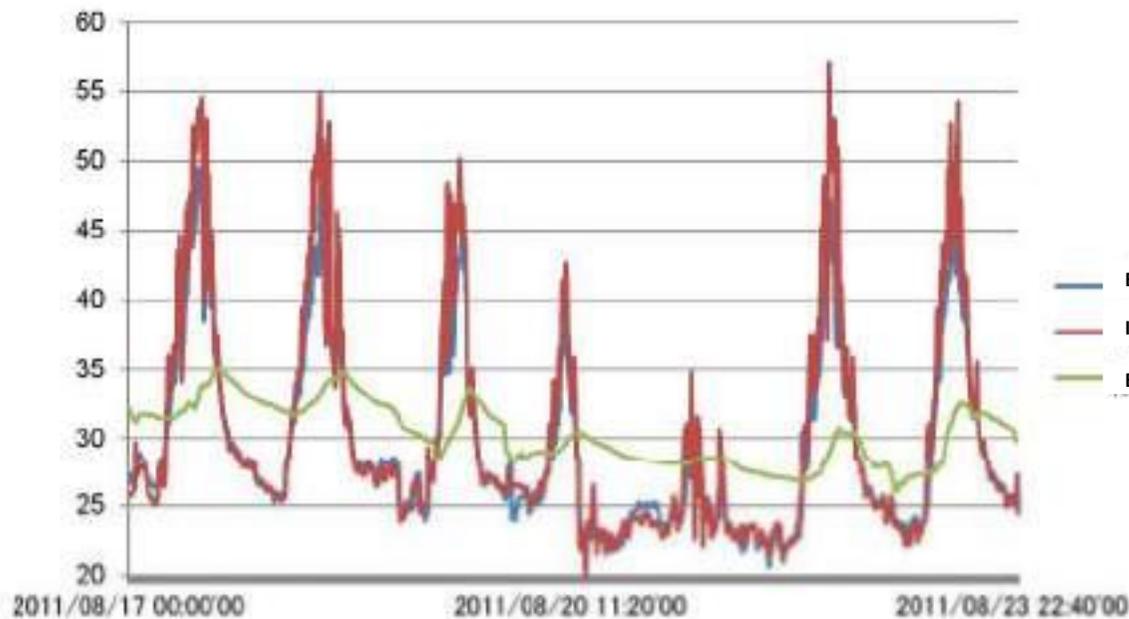


Change in temperature of external upper surface

# Spain (Valencia bus)



# Kansai airport Wing Transfer train



■ The inner ceiling temperature

**57.1°C**

**47.3°C**

Maximum circa 10 °C and average of circa 5°C temperature decrease

# Containers for railway communication equipment



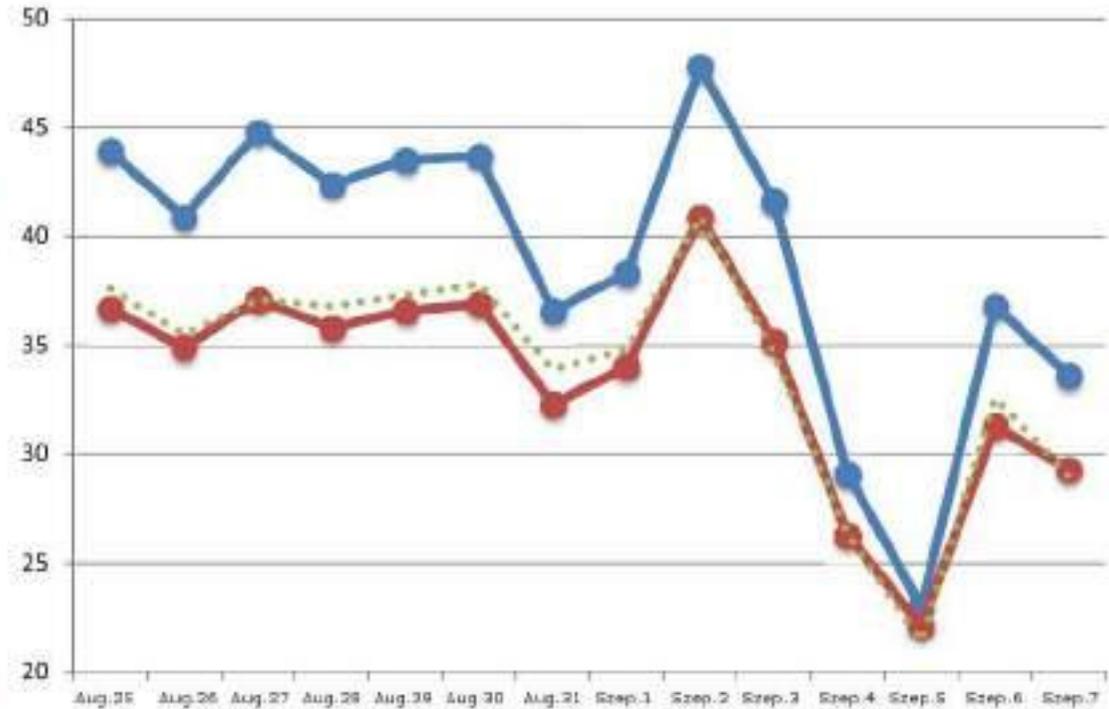
The equipment at rail crossings, because of the strong sunlight and heat, often malfunction. Therefore, they were treated with Gaina.



▲ Before painting



▲ After painting



● Not paint ● paint ●●●● External temperature

The inner temperature of an unpainted container. (average)

**39.0°C**

The inner temperature of a painted container. (average)

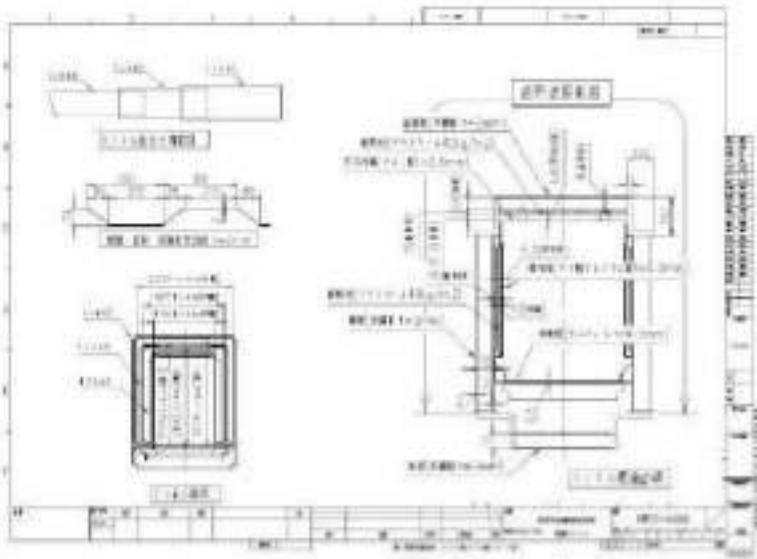
**33.5°C**

Average

**-5.47°C**



# Haneda Airport first building PBB (passenger bridge)



The external surface of the passenger bridge was painted with Gaina to ease the increase of inner heat, easing the effects of ultraviolet radiation.  
The lifespan of the passenger bridge was significantly increased.

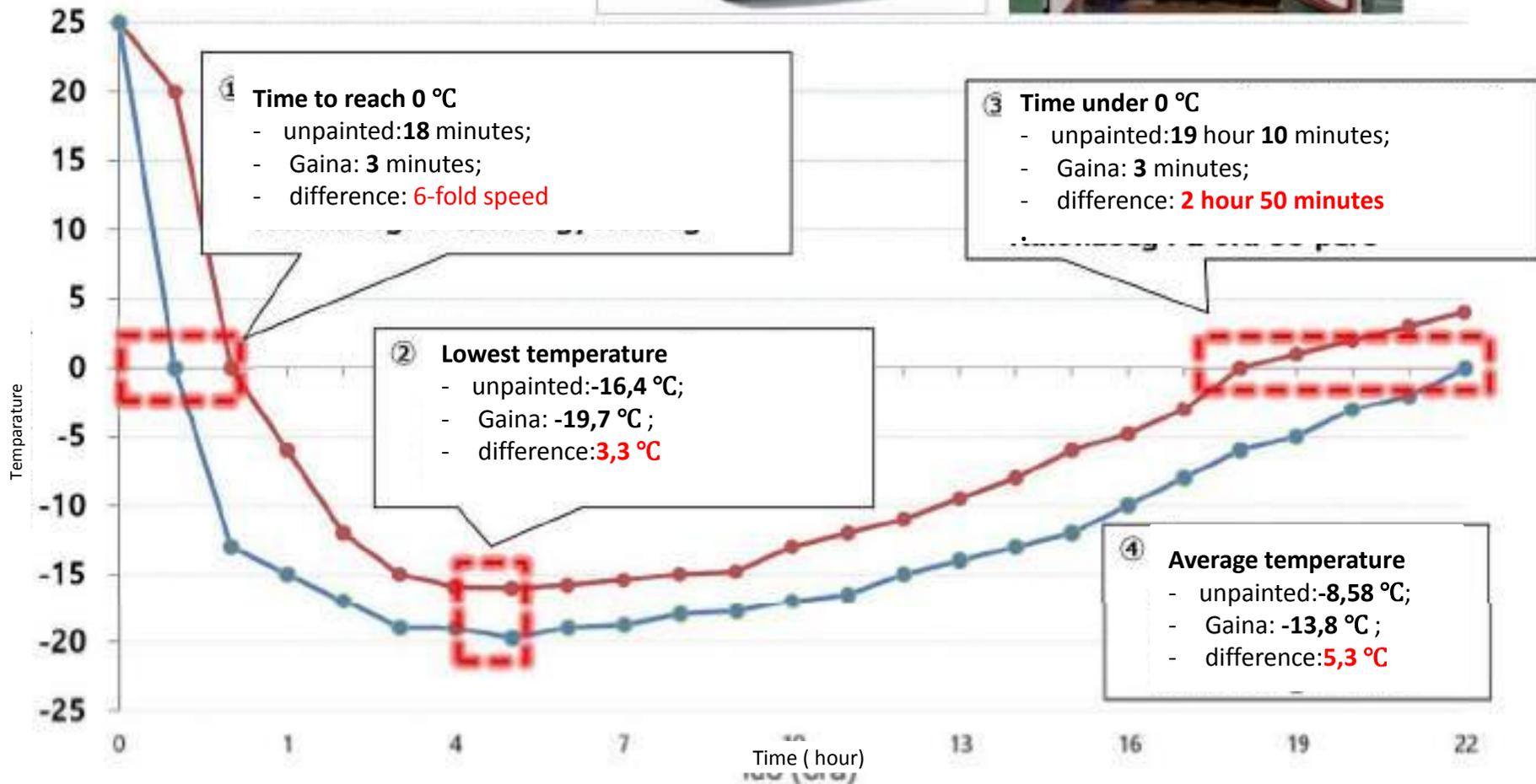
# Truck with refrigerated cargo hold (the inner part of the cargo hold was painted)

Thermal protection

## Comparison of the inner temperature of a freezer

The measurements after introduction of -29°C freezing equipment (PCM).

● Not paint ● Paint



# Freezing trailer (ceiling) without condensation

Eliminating condensation

## Measures taken against condensation up until now

### Layer preventing condensation



Layer peeling.  
It often happened that the packages  
ripped the isolation cover.

### The packaged was wrapped in foil



Working plan

The work efficiency decreases

# Freezing trailer (ceiling) without condensation

Eliminating condensation



▲ External appearance



▲ After painting the ceiling

2010.

As a trial,  
they painted  
10 trucks

2014.

They painted  
**50** more  
trucks



**The notes from the transport company:**

With the decrease of ceiling condensation, we can prevent the spoiling of the cargo during loading and unloading.

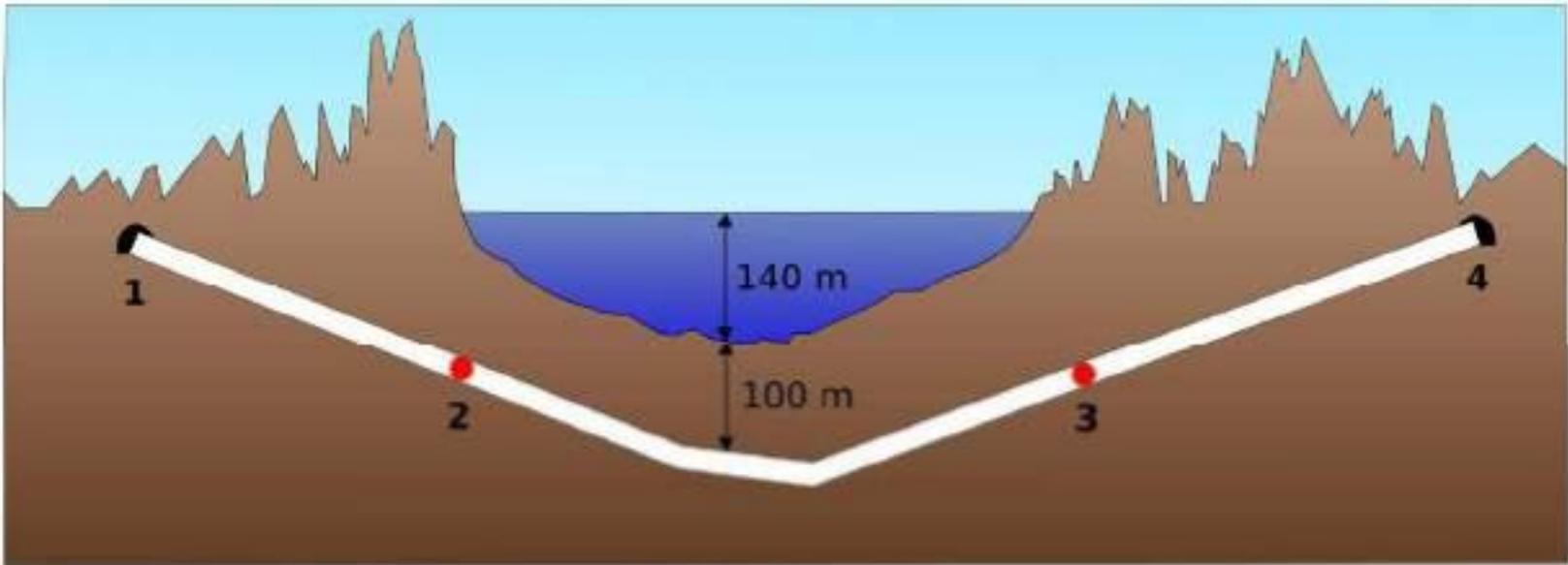
In this way, we bypass the time and material loss due to the foil wrapping and damage to the thermal isolating layer.

# The rail transfer in the Seikan tunnel (electronic control panel)

Eliminating  
condensation



青森-大館間 160.4km	大館-弘前間 14.2km	弘前-青森間 10.2km	青森-大館間 14.2km	大館-弘前間 14.2km	弘前-青森間 10.2km	計 87.8km
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# Map of Japan.

Around 100m from here, the whole length of the tunnel passage under the sea level is 53,85km. Of the tunnels used for transferring, this is **the longest in the world.**



# The rail transfer in the Seikan tunnel (electronic control panel)

Eliminating  
condensation



▲ Train number 485



▲ Due to condensation, the circuit breaker has failed



▲ In winter, water got into the electronic box



▲ Not paint



▲ Paint

The tunnel Seikan connects  
Aomori and Hokkaido. The  
whole length is 53,9km

In the tunnel: the **temperature is 20°C**  
the whole year, the **humidity 80-90%**

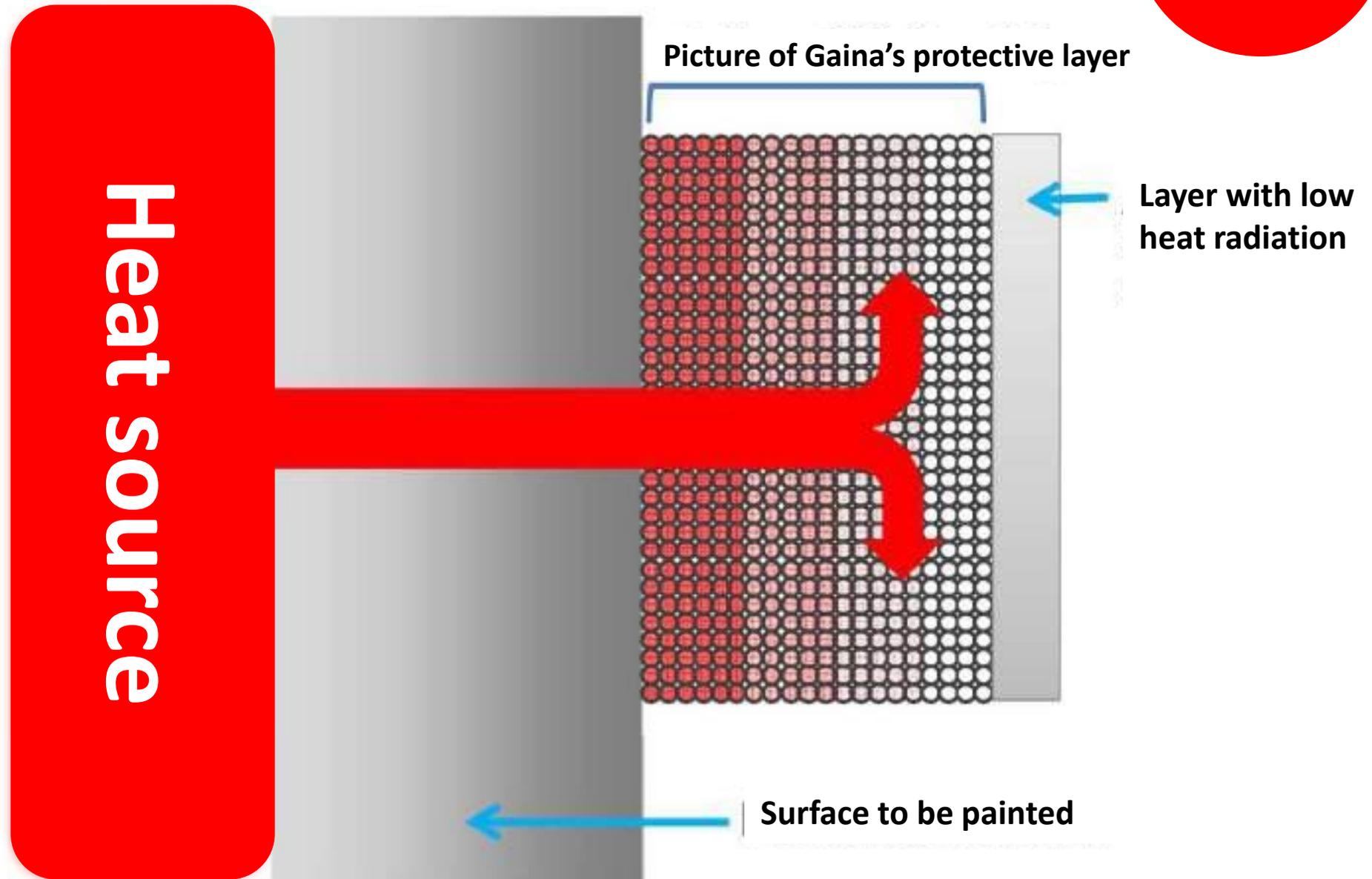
In the tunnel, moisture gets into the electronic box, and therefore the temperature increases. Emerging from the tunnel, because of the air in Hokkaido, the temperature suddenly decreases, which causes condensation in the box. This can cause failure or short circuits.



After being painted with Gaina, the thermal isolation improved, and the condensation became controllable.

# Heat preservation

Heat preservation



# Aluminum melting furnace

Heat  
preservation



(m <sup>3</sup> /day) Used quantity of gas	Before painting	After painting	Difference
2nd June	287.0	210.0	77.0
3rd June	224.0	109.0	115.0
4th June	195.0	174.0	21.0
5th June	244.0	111.0	133.0
6th June	230.0	162.0	68.0
7th June	252.0	162.0	90.0
Ave.	238.7	154.7	84.0

Energy savings : **35,2%**

# Canvas-drying machine

Heat  
preservation

Before painting



After painting



The work process of painting



# Cost effectiveness of the canvas-drying machine

Heat  
preservation

Compared to regular operation .....



**-The unit price of 365 liter x 365 days raw oil is 82 Yen =  
circa 10,1 million Yen/year decrease**

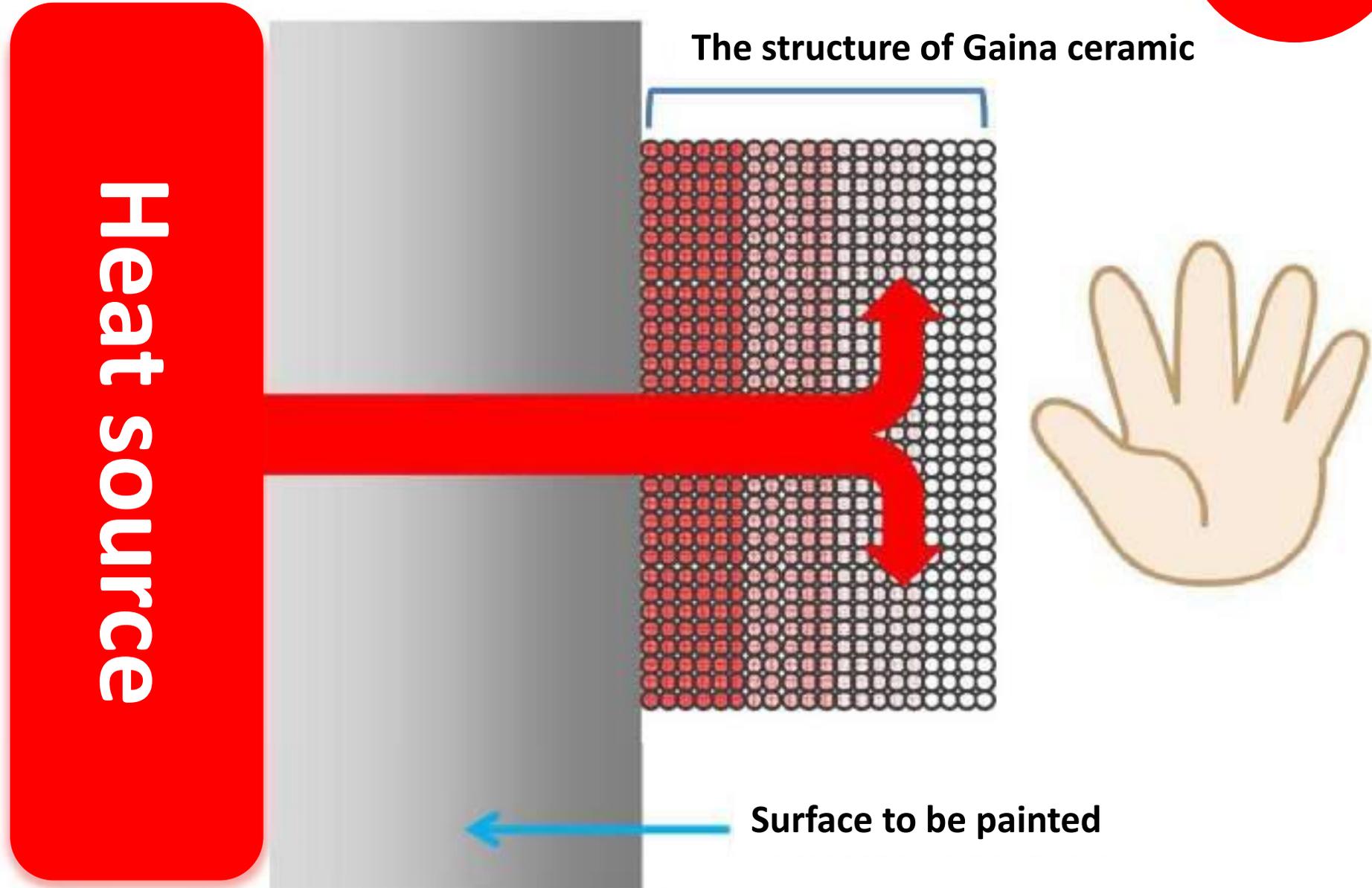
**- Compared to the planned 5,5 million Yen, it means a  
decrease of 200%**

## Notes:

Despite the fact that the quantity of material put into the drying machine increased, the drying time decreased, the effectiveness increased, and they can thereby save on the price of raw oil.

# Preventing burns

Preventing  
burns



# Prevention of high temperature burns

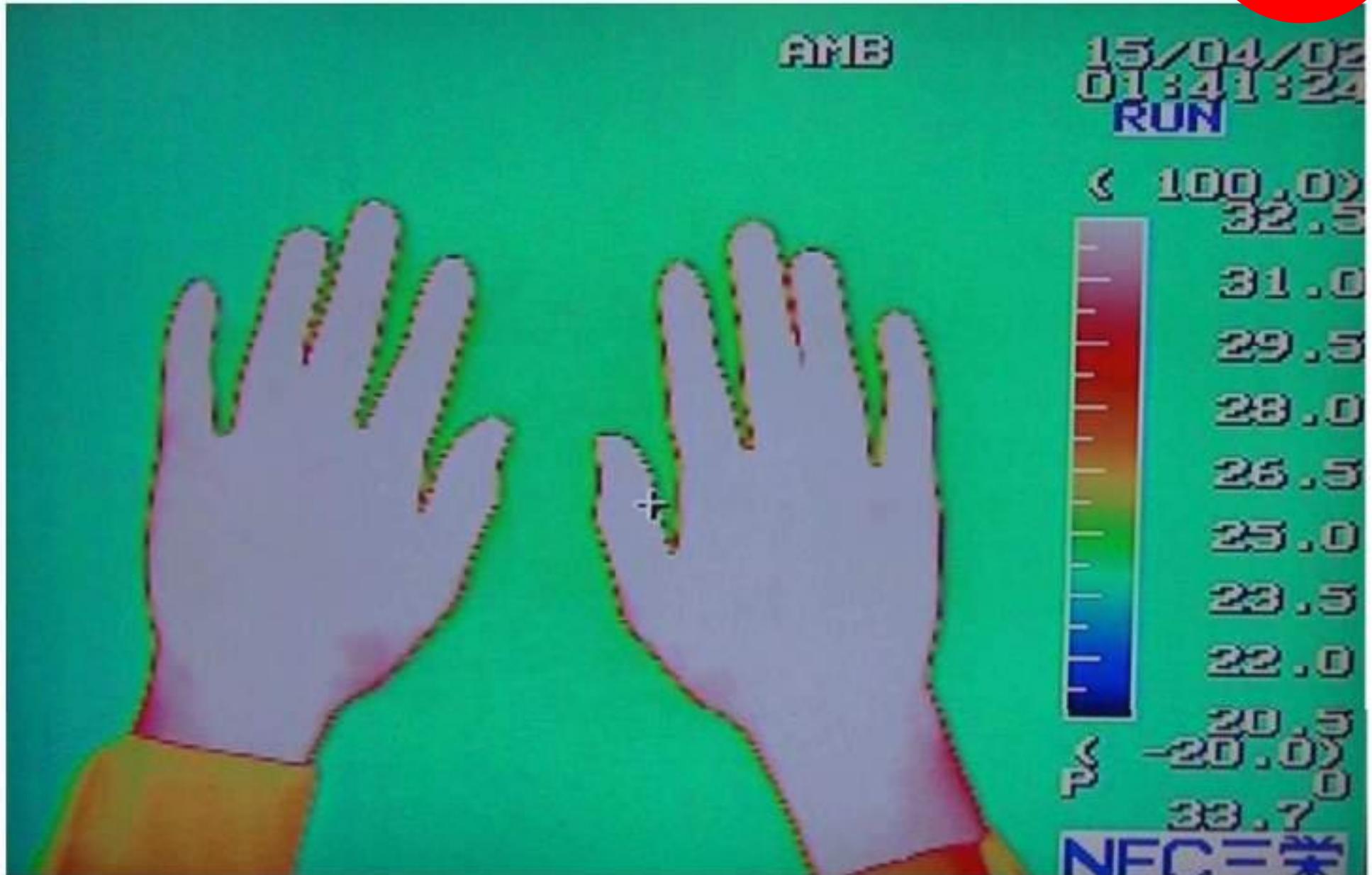
Preventing  
burns

**They put their hand on the heated metal sheet**



# Prevention of low temperature burns

Preventing  
burns



# Preventing burns

Preventing  
burns

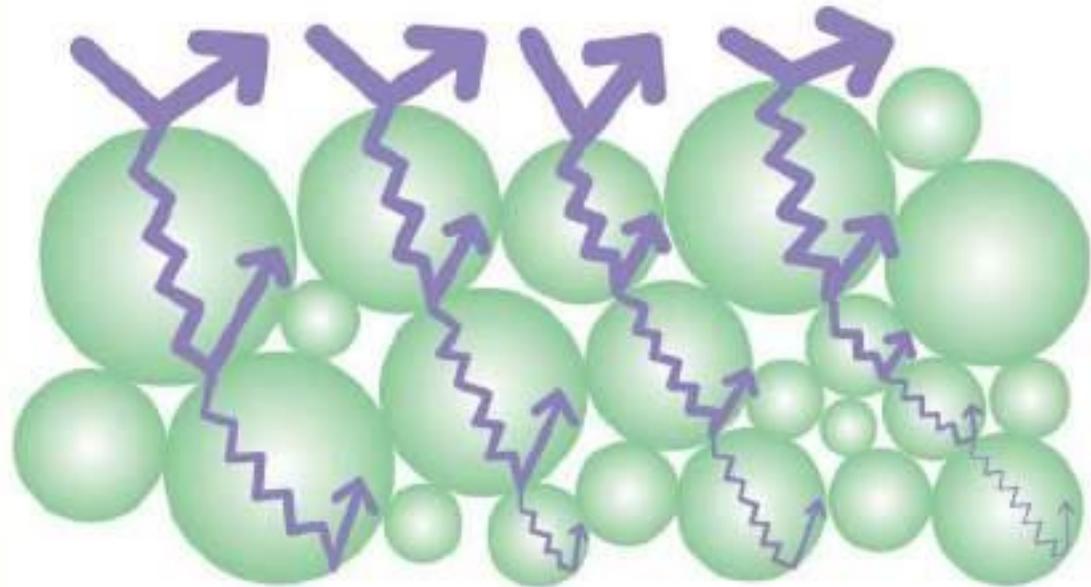


The temperature of the surface doesn't change, but because the huge decrease in temperature of the surface of ceramic paint, it's excellent for the prevention of burns.

# Noise isolation

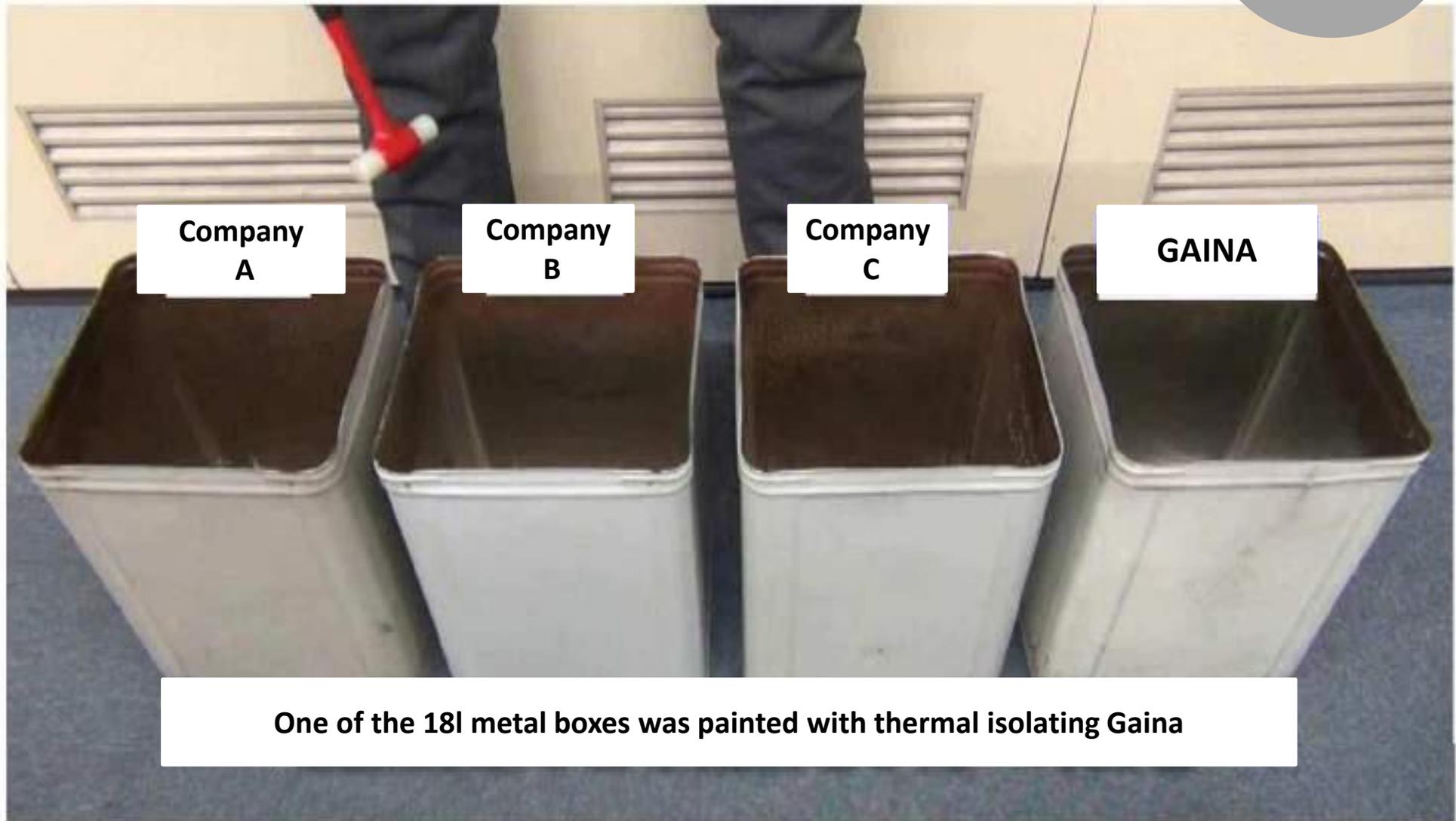
Noise  
resistance

- ▶ The Gaina special ceramic paint causes sound reflection which results in vibration dampening.



# Noise isolation

Noise  
resistance



One of the 18l metal boxes was painted with thermal isolating Gaina

# Inner painting of apartments

Noise  
resistance



Making noise on the upper floor, they measure with noise level measuring equipment the level of noise perceptible on the lower floor (decibel).



① Dropping a spoon



② Dropping a ball



③ Listening to music



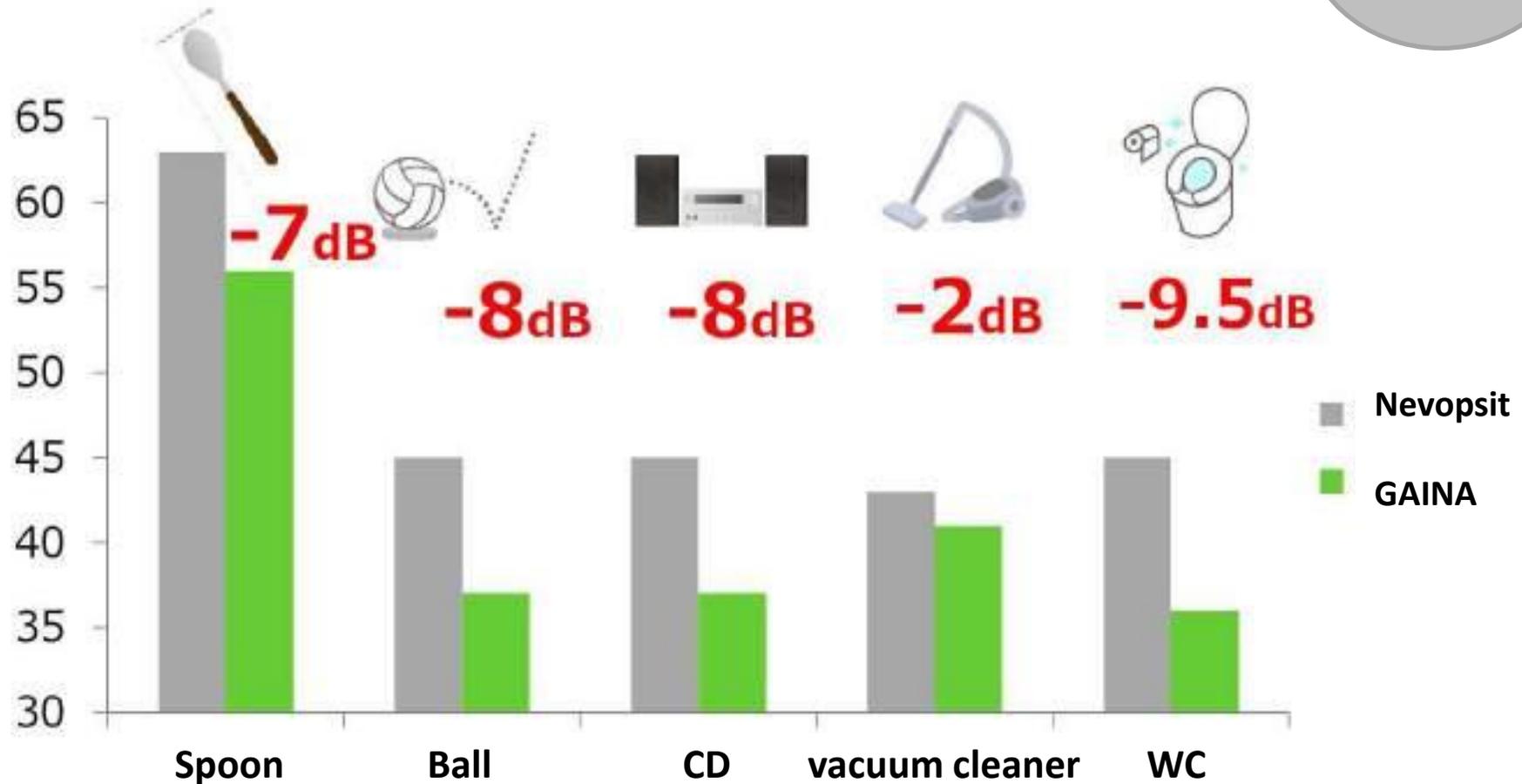
④ Vacuuming



⑤ Flushing the toilet

# Inner painting of apartments (measuring results)

Noise  
resistance



Notes from the painter:

“Even if the upper and lower floors weren’t painted, Gaina’s effect was still noticeable. I was really surprised.”

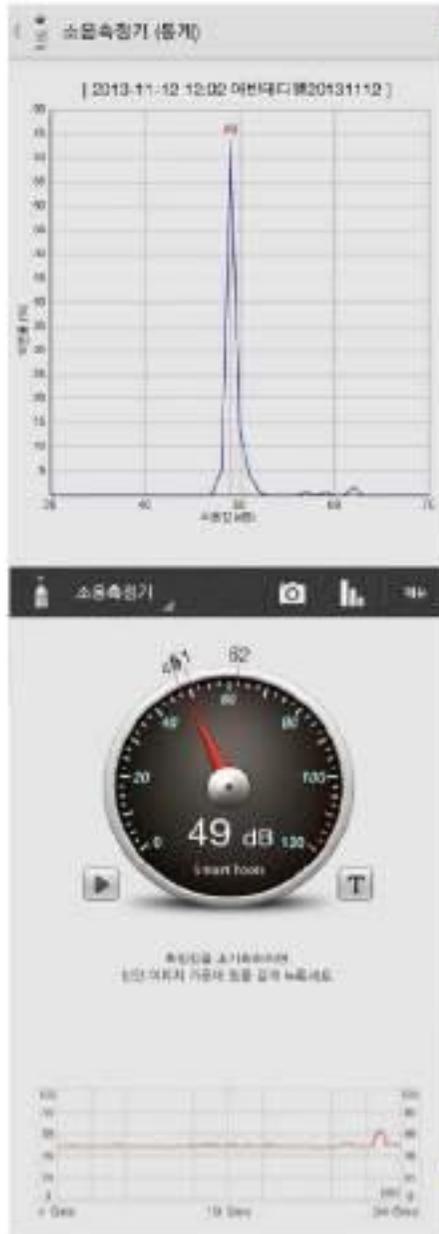
# Performance increase of sound isolation (special example)

Noise  
resistance



# Performance increase of sound isolation (the underside of the car, and the hood)

Noise  
resistance



49dB

Before  
painting



After  
painting

39dB



# Improvement of inner air quality (apartment)

Improving  
the air  
quality



# The Todaji Church and Museum (treasury) is protected by the state as a national treasure

Durability

Painting date :2011

Treated area: inner painting

**Insect repellent-Condensation-Extreme temperature**



# Izumotaisha

Durability



Izumotaisha: External appearance

Arts and Industrial Museum

# Saijo Industrial Sanctuary

Durability

External painting - 2012



during painting



# Onjo-ji church (Mii church)

Durability

Treated area: internal and external

Date: 2009-2014



# Important cultural goods-building sanctuaries and churches

Durability

Settlement	County	settlement	County
Houkongouin	Kyoto	Susa jinja	Hukuoka
Gumyouji	Kanagawa	Shoukouji	Shiga
Houonji	Kyoto	Kannonji	Aichi
Gokurakuji	Ehime	Onjouji	Shiga
Houonji	Kyoto	Anyouji	Okayama
Bodaiji	Yamanashi	Shouunji	Ehime
Anrakuji	Nagano	Joudoji	Hiroshima
Chouhukuji	Ooita	The Todaji Church and Museum	Nara
Nouhakusan jinja	Niigate		

**More than 70 buildings  
Until the end of 2015**

## Countries where Gaina is exported



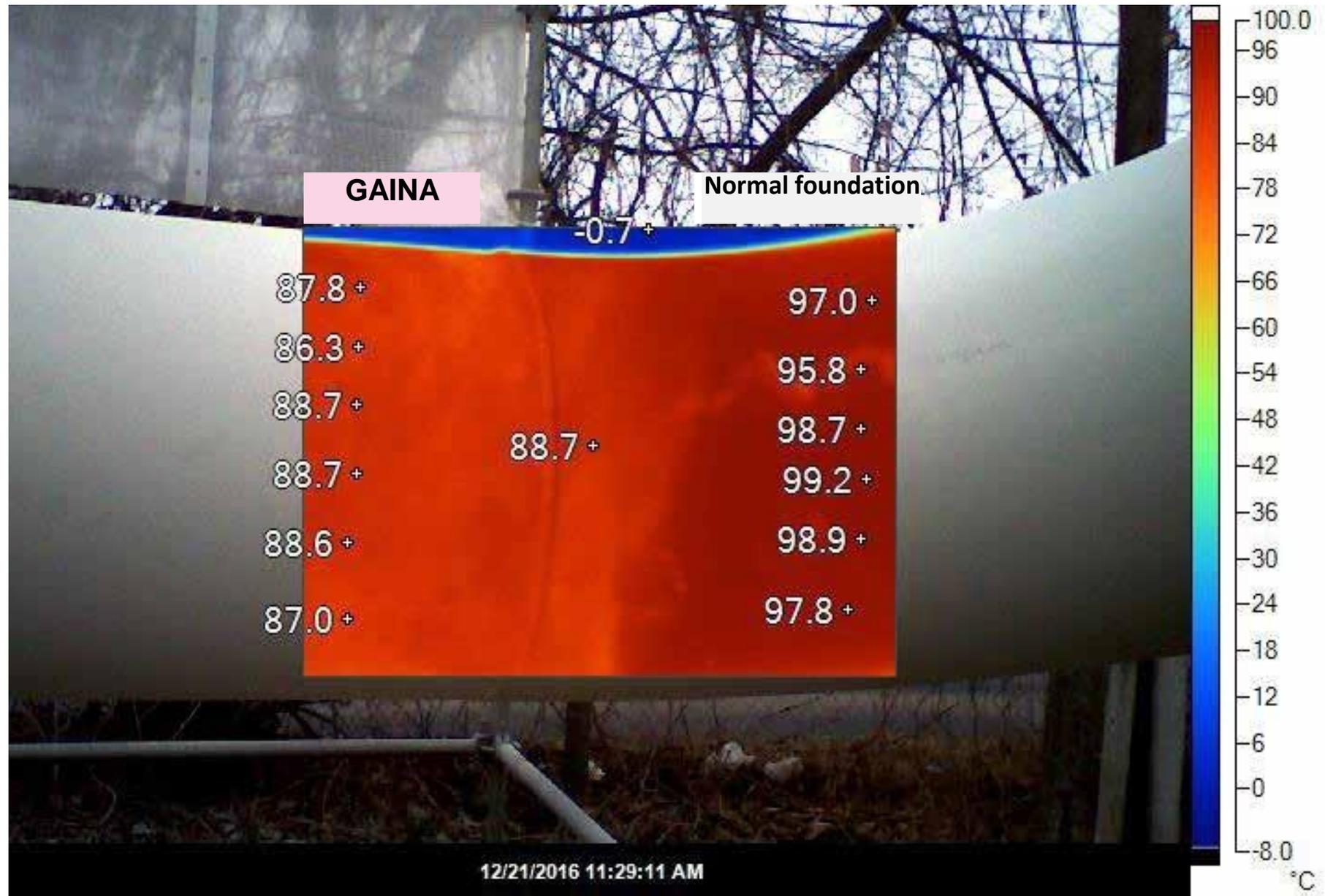
- China
- India
- Taiwan
- South Korea
- Thailand
- Malaysia
- Vietnam
- Philippines
- Cambodia
- Singapore
- Mongolia
- Sri Lanka
- Palau
- Australia
- New Zealand
- Brazilia

- Spain
- Norway
- Netherland
- Great Britain
- Egypt
- Dubai

- Germany
- Turkey
- Maroc
- S.U.A
- Mexic
- Chile
- Argentina
- Brazilia

- Hungary
- Poland
- Czech Republic
- Slovakia
- Croatia
- Austria
- Romania

# THERMAL ISOLATION OF DISTRICT HEATING GRID WITH



# THERMAL ISOLATION OF FIXED-TRACK VEHICLES WITH GAINA



RAIL CAR



TRAM

# THERMAL ISOLATION OF A FAMILY HOUSE WITH GAINA

You can decrease your heating and air conditioning bill by at least **27%**!



**The sole distributor of Gaina thermal  
isolating paint and group of products  
in Eastern Europe is**

**FIT-PLAN KFT.**

BP. 1075, KIRÁLY U. 19

dr. habil. Mező Ferenc  
**University Docent**  
Chief Executive Officer

**Thank you for your kind  
attention.**



JAXA COSMODE

The logo features the text "JAXA COSMODE" in white, uppercase letters, centered above a stylized horizon of the Earth. The horizon shows a gradient from blue to orange, set against a dark background.