

The answer of insulation

GAINA

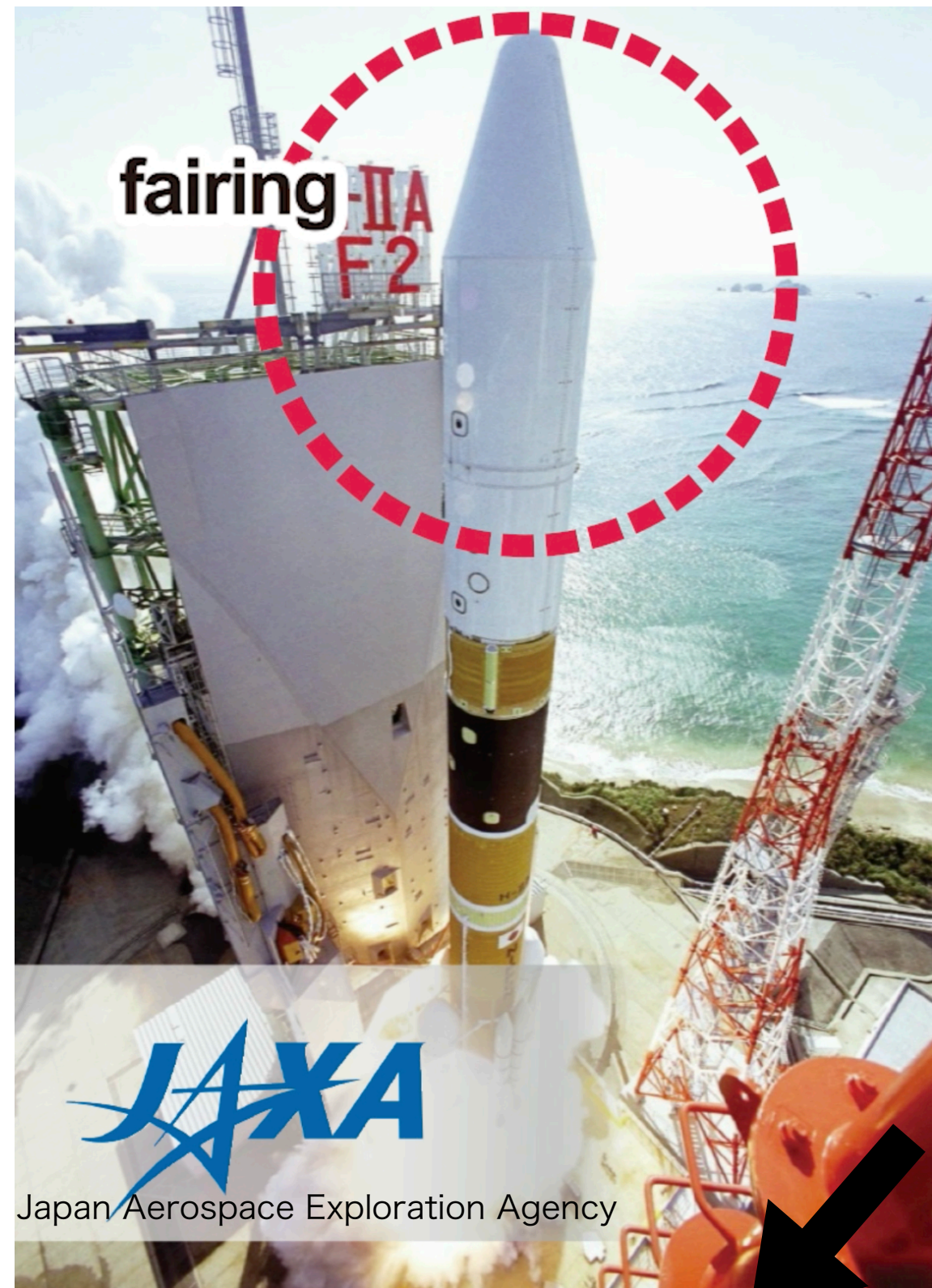
TITANEX GENERAL TRADING L.L.C





What's GAINA?

GAINA is a highly advanced ceramic coating material, uniquely utilizing Japanese rocket insulation technology from JAXA. Unlike conventional products, GAINA stands out as the only coating composed of over 75% ceramic, allowing it to effectively transform heat into far infrared radiation and dissipate it.



GAINA, a cutting-edge insulation material with a thickness of just 0.3 to 0.7 mm, is derived from Japan's advanced rocket technology.

The Japan Aerospace Exploration Agency (JAXA) originally developed insulation technology for the H-II rocket, designed to protect its body and satellite payload from the extreme heat during launch. Building on this technology, Nissin Sangyo Co., Ltd., a pioneer in thermal insulation coatings, created GAINA – a lightweight, heat-regulating ceramic coating that offers thermal insulation simply by being applied.

As a groundbreaking product that controls heat transfer through a thin layer, GAINA has gained global recognition across various industries. Through JAXA COSMODE, a brand founded to bring cutting-edge aerospace technology into daily life, products like GAINA showcase the practical impact of Japan's space research and development.



GAINA has reached 170,000 applications!

This remarkable milestone highlights its effectiveness and versatility across various locations worldwide.



GAINA's Core Abilities



Heat Shield

GAINA reflects up to **95% of infrared radiation**, acting as a powerful heat shield to prevent excessive heat buildup.



Durability

GAINA offers high **durability** with a lifespan of around **15 years**, making it a long-lasting solution for insulation and protection.



Dew Proofing

GAINA provides effective dew proofing by preventing moisture accumulation on surfaces, helping to maintain dry conditions and reduce the risk of mold formation.



Heat/Cold Retention

GAINA retains heat and cold effectively, reducing energy consumption by up to **30%** in temperature regulation for buildings and facilities.



Air Quality Improvement

GAINA improves air quality by reducing **VOC and formaldehyde** levels by up to **90%**, contributing to a healthier environment in enclosed spaces.



Sound Deadening

GAINA reduces sound transmission by **up to -9dB**, helping to create a quieter and less stressful environment.



Non-Flammable

GAINA is non-flammable and certified as non-combustible by UL, enhancing building safety by significantly reducing the risk of fire hazards.

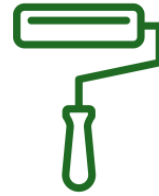


Safety

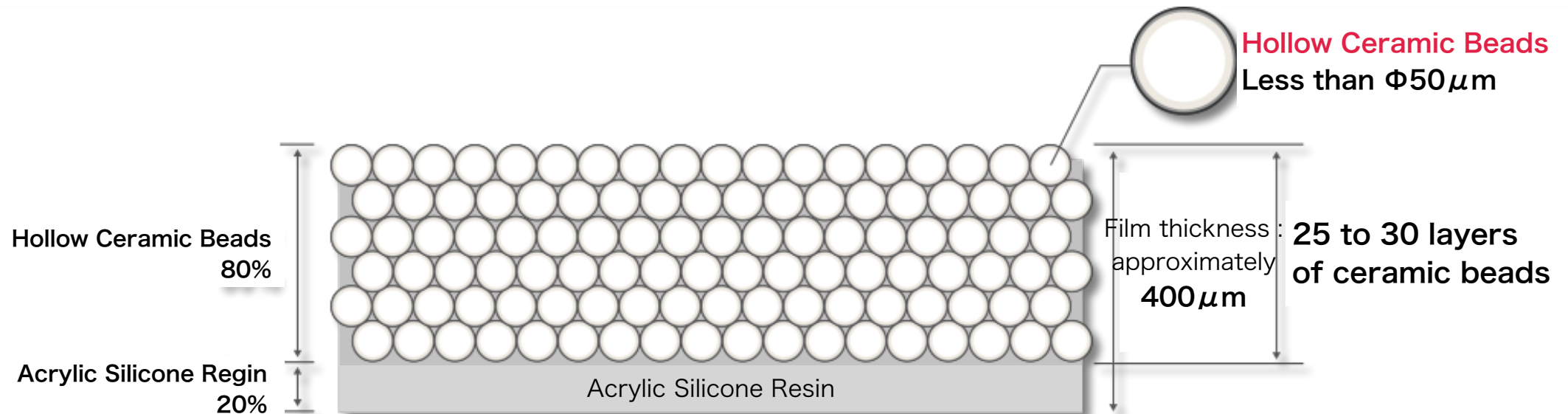
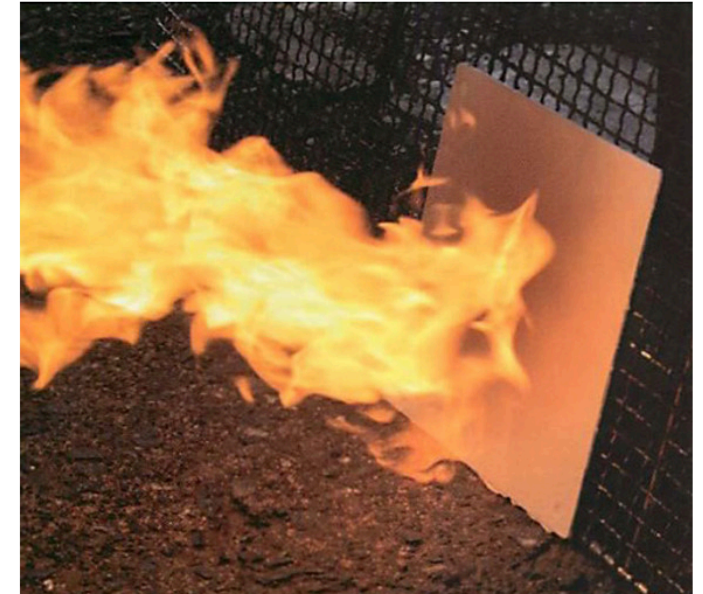
GAINA is non-toxic, environmentally friendly, and effective at reducing odors, ensuring safety for both users and the environment.

Just paint

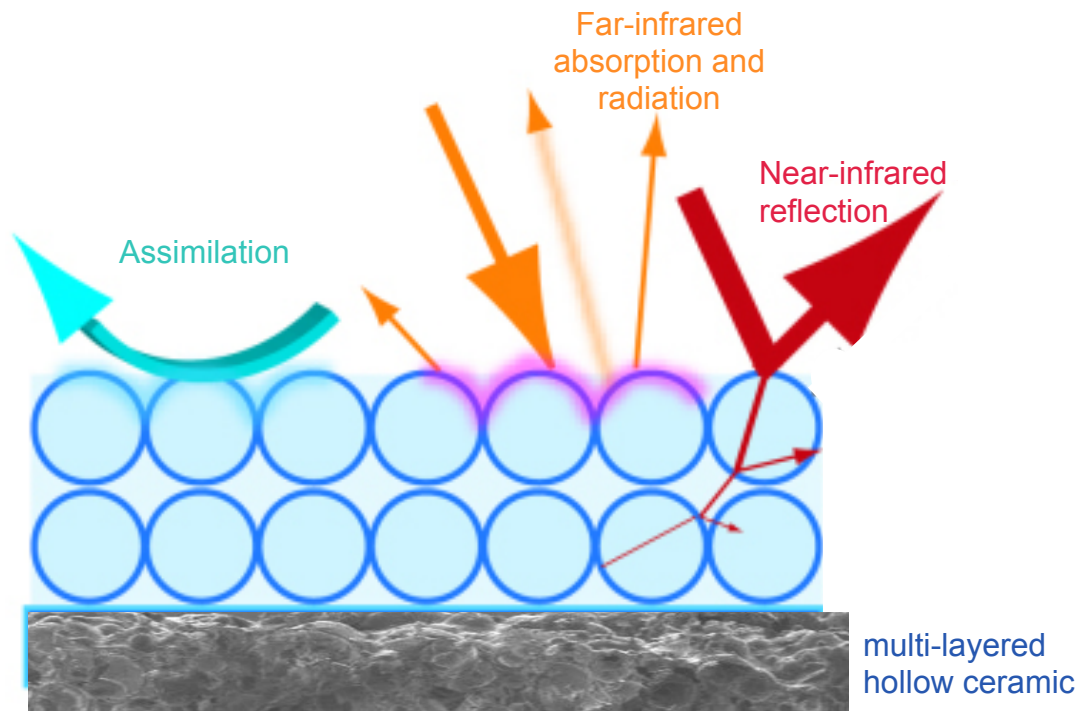
however it's NOT a PAINT



GAINA's exceptional qualities stem from its unique hollow ceramic beads, which make up to 80% of the coating once dried. These beads form an extremely robust film, providing a lifespan 2-3 times longer than standard paints, ensuring lasting effectiveness. Our patented technology has also advanced this ceramic to achieve the ease of application comparable to regular paints. Additionally, GAINA offers excellent fire resistance and is a water-based, non-toxic substance, free from harmful chemicals.



Four Key Functions



(1) High Reflectivity

- Reflects 90% of near-infrared rays from sunlight
- Reduces heat generation on the coating surface by reflecting thermal rays

(2) High Emissivity

- Radiates 95% of absorbed heat as far-infrared radiation
- Releases heat from the coating, lowering surface temperature

(3) Low Thermal Conductivity

- Low thermal conductivity reduces heat penetration, enhancing insulation

(4) Low Specific Heat Capacity

- Specific heat capacity similar to that of air
- Prevents heat retention, allowing air flow to naturally dissipate heat and lower temperature

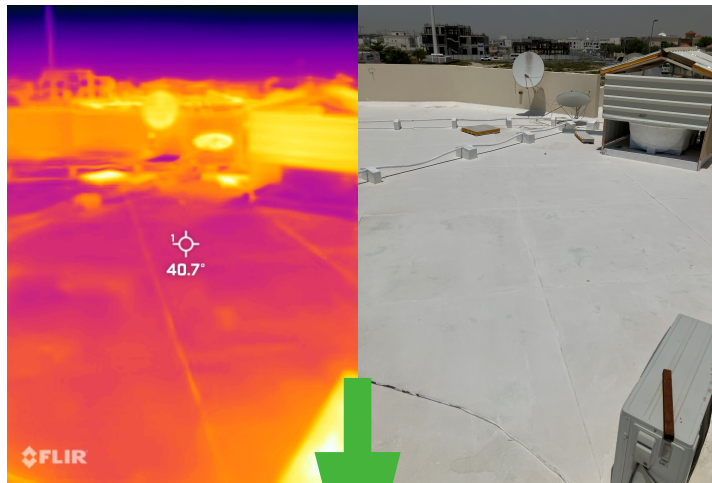
GAINA's surface reflects near-infrared rays to suppress heat reactions, while it absorbs and re-emits far-infrared rays, enabling precise thermal control.

Due to its very low heat capacity, the coating heats up and cools down rapidly. When not exposed to intense infrared radiation, the surface temperature of the coating instantly equalizes with the surrounding air temperature. This property applies not only to air but to any object that comes into contact with the coating; if an object with a larger heat capacity touches the coating, the contact temperature quickly equalizes. Heat transfer does not occur between surfaces or fluids that are at the same temperature.

Thus, GAINA minimizes heat transmission by maintaining thermal equilibrium, effectively reducing heat flow through assimilation and balance.

Case Study at Nad Al Sheba

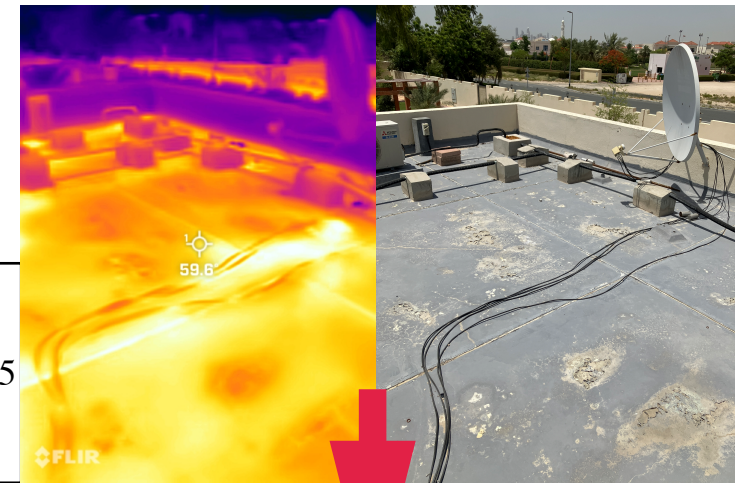
The thermal imaging comparison at Nad Al Sheba clearly shows the effectiveness of GAINA coating on rooftops. The coated rooftop recorded a temperature of **40.7°C**, significantly cooler than the **59.6°C** measured on the uncoated rooftop, resulting in a difference of **18.9°C**. This evidence highlights GAINA's ability to reflect heat, contributing to improved energy efficiency and thermal comfort in urban settings. By maintaining cooler surface temperatures, GAINA can help reduce air conditioning costs, enhance the longevity of roofing materials, and create a more comfortable living environment for occupants.



Rooftop with GAINA Coating.

Day: 18/05/24 Time: 12:47

Temperature: **40.7°C**



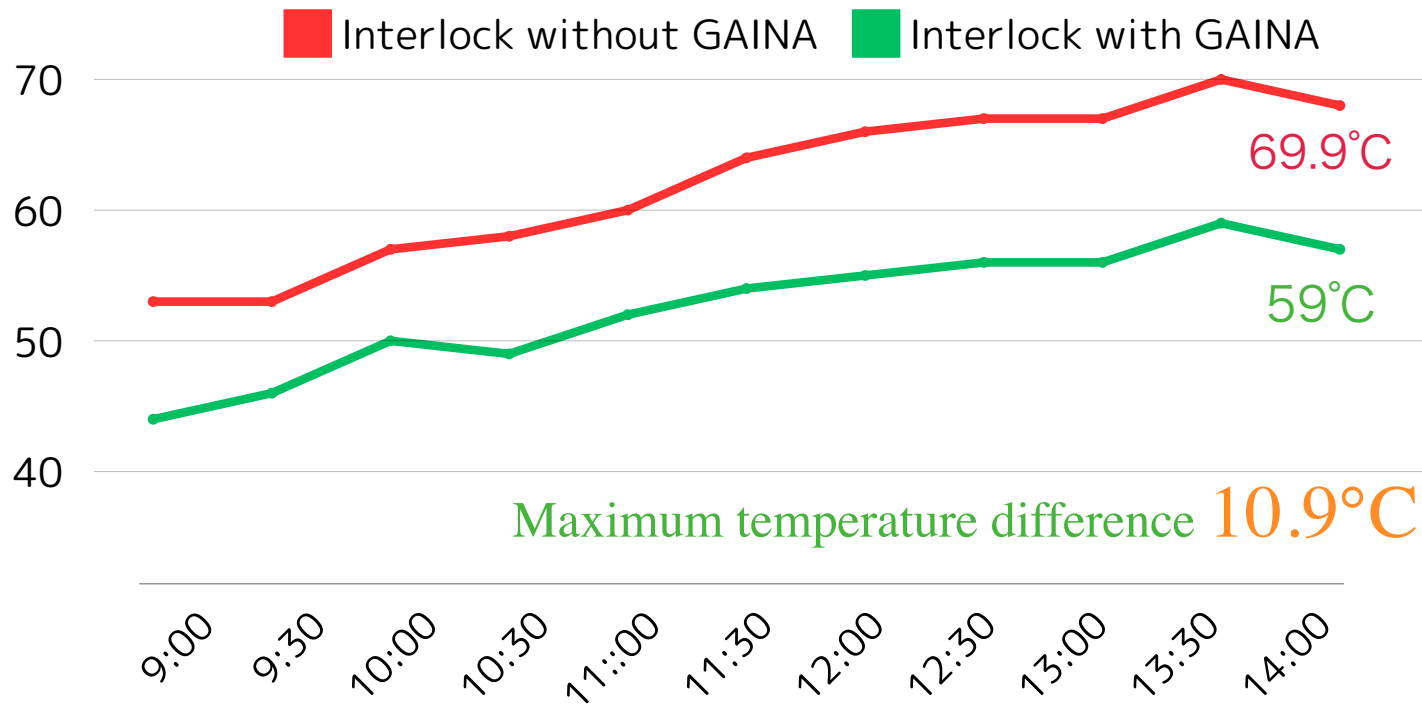
Rooftop without GAINA.

Day: 18/05/24 Time: 12:45

Temperature: **59.6°C**



Dubai Municipality Nursery



16/July/2024

The sampling at the Dubai Municipality Nursery highlighted the effectiveness of GAINA's formulation. It demonstrated a significant reduction in maximum surface temperatures, with the temperature dropping from **69.9°C** without GAINA to **59°C** with it—a difference of **10.9°C**. GAINA's ability to absorb **95%** of UV rays not only reduces health risks associated with skin and eye irritation but also protects underlying materials, extending surface durability to approximately **15 years**. This study confirms GAINA's role in effectively managing heat absorption and enhancing surface performance in Dubai's challenging climate.

Frozen refrigerated storage – Maskar

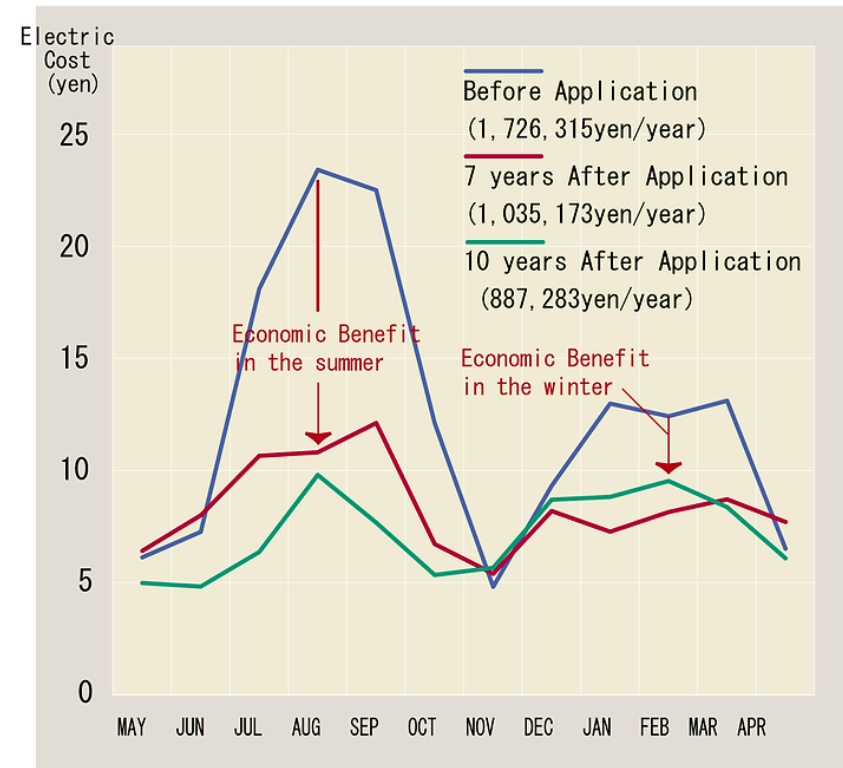
The implementation of GAINA has led to significant operational improvements in the freezer room. Firstly, the number of air conditioning units required has decreased from **8 units to 4 units**, indicating enhanced thermal efficiency. Secondly, the contracted power demand has been substantially reduced from **960 kWh to 380 kWh**, reflecting a more efficient use of energy. Lastly, these changes have resulted in a **50% reduction** in annual electricity costs, underscoring the economic benefits of adopting GAINA's advanced heat management solutions. Overall, these improvements contribute to a more sustainable and cost-effective operation.



Long Lasting Performance



Electricity Cost Transition



The implementation of GAINA has led to substantial long-term benefits over a 10-year period, with estimated electricity cost savings of **2.8 million yen**. Additionally, the temperature on the second floor has been reduced by **15 degrees Celsius**, allowing for a significant decrease in the number of air conditioning units required—from **4 units to just 1**. Furthermore, the need for spraying water on surfaces during the summer has been eliminated, simplifying maintenance. Importantly, the effectiveness of GAINA's heat management properties has been sustained even **10 years after installation**, demonstrating its lasting impact on energy efficiency and operational costs.

Achievements

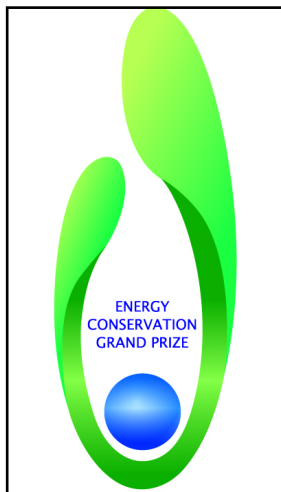


"GAINA" is registered to the environmental technology database of UNIDO Tokyo Office.

Registered Category

**Low carbon & energy conservation
(Goal 9: Industry / Buildings and household / Energy efficiency)**

**Prevention & destruction of pollution :
(Goal 11: Urban and living environment)**



ENERGY CONSERVATION GRAND PRIZE

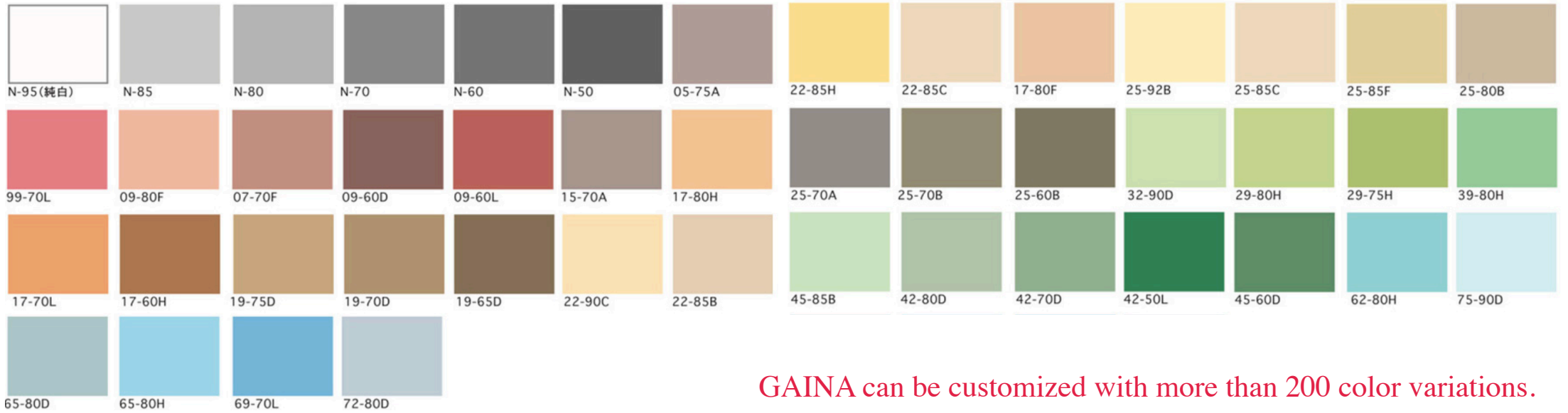
Feb.2018

**First time ever as
"construction coating material"**

GAINA has received "The energy Conservation Center Japan" by ECCJ, one of the Japanese government organization under Japanese Ministry of Economy, Trade and Industry.

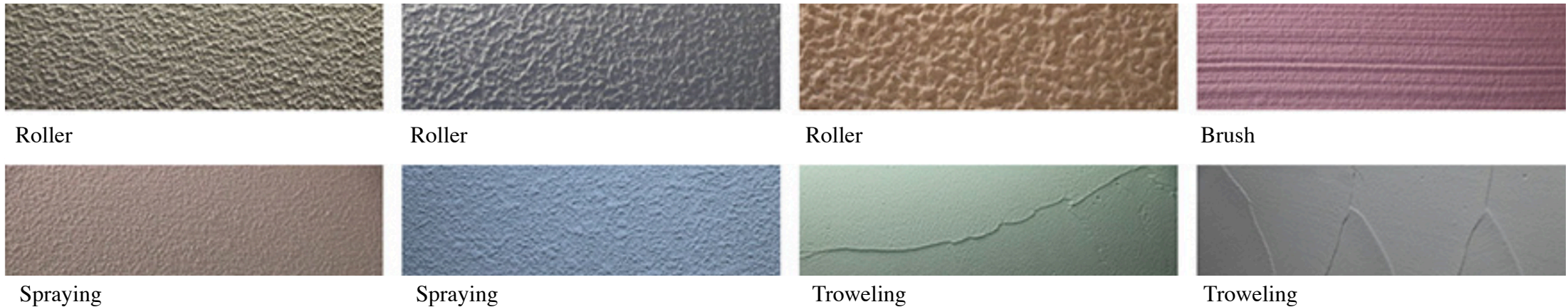
With respect to "Energy saving theme", This has been most prestigious and influential award in Japan.

Color Palette Sample [Basic 52 Colors]



GAINA can be customized with more than 200 color variations.

Finish Options



Multiple finish styles are possible, allowing for versatile applications.

FAQ

Features and Performance

Q. Does the thermal insulation effect deteriorate over time?

A. As the thermal insulation effect is brought by the unique ceramic, it does not deteriorate even with dirt on coating surface over time.

Q. Does the smell remain after application?

A. Please provide adequate ventilation after application. In general, the smell disappears in a few days. We have another low odor type which is specialized for interior.

Q. What kind of materials can GAINA be applied to?

A. It can be applied to most materials with appropriate under coat.

Q. Are there any materials that GAINA cannot be applied to?

A. Polypropylene (high density), fluorine processed product, Teflon processed product etc.

Q. What colors are available?

A. There are 52 basic colors. Please contact with your supplier for further details.

Q. Does coloring affect the thermal insulation effect?

A. Coloring does not affect the thermal insulation effect, even though in dark colors, the heat shield effect slightly decreases.

Q. When applying GAINA over an existing coating in dark color, is the underlying color seeable?

A. The underlying color is not seeable if applied with recommended application amount. But if it is uncertain, under coating in white color is recommended.

Q. Is there a transparent type GAINA?

A. There is no transparent type. It is available only with colors.

Q. What is the temperature range of thermal resistance of GAINA?

A. The temperature range of thermal resistance of GAINA is from -100 Degree Celsius to 150 Degree Celsius. But please apply it at normal temperature.

Q. Is the thermal insulation effective in below-freezing condition?

A. Even at below-freezing temperatures, thermal insulation is fully effective after drying is totally completed.

Q. Can it be used as waterproof material for rooftop etc.?

A. It is not made for waterproofing but it can be applied as a top coat for protection of waterproofing or to provide elasticity for the body of the building.

Q. What is the appropriate number of years for recoating?

A. Since the special ceramic, which is the main component of GAINA, is extremely strong against ultraviolet rays, 15-20 years is a standard for recoating under general environment.

Application and Tools

Q. How to treat the substrate to be applied?

A. To ensure maximum adhesion to the substrate, start by thoroughly cleaning it to remove dirt, algae, mold, and rust. For glossy metallic surfaces, sanding or roughening is recommended to enhance grip. After surface preparation, apply a primer or sealer that is specifically designed for the substrate type before proceeding with the coating.

Q. What kind of tools are required for application?

A. Ordinary paint tools like brush, roller, trowel, air compressor, airless coating machine, low-pressure hot air coating machine, and all kinds of spray gun (air spray gun, airless spray gun). Please use appropriate tools according to desired finish.

Q. How to stir GAINA and adjust its viscosity?

A. As the ceramic particles are floating on the upper part, it is required to stir properly and adjust the viscosity with water. * Be sure to stir sufficiently with an electric stirrer (about 3 to 5 minutes) immediately after opening a bucket.

Q. What is used for diluent and how about the dilution rate?

A. GAINA is water-based material. Please dilute with water to adjust the viscosity for easier application.
- For brush or roller: 0 to 2L per 14kg bucket.
- For spray: 0 to 3L per 14kg bucket.

Q. To carry out GAINA's effectiveness, what is the appropriate application amount?

A. For thermal insulation, heat shield and soundproofing: 30m² per 14kg bucket or 0.46kg per square meter. (in two or more coating)
For thermal insulation and heat shield: 35m² per 14kg bucket or 0.40kg per square meter. (in two or more coatings)
*Cracking may occur if applied too thickly at once.

Q. What is the finish like?

A. It is in matte finish, without gloss. A calm and unique finish of GAINA.

Q. How long does it take for drying?

A. The drying time varies depending on the weather, season, and environmental conditions. As a general guideline, the surface becomes 'touch dry' within 1-2 hours in summer and 3-4 hours in winter, allowing you to apply the second coat. However, it takes approximately two weeks for GAINA to fully cure and develop its complete ceramic layer.

Q. How about safety precautions on application?

A. Prevent contacts from skin when handling and wear appropriate protective glasses or masks if necessary. Moreover, it is required to provide adequate ventilation in application process and drying process.

Q. How to dispose used buckets?

A. Please remove the contents completely and dispose properly as industrial waste. The used buckets could also be reuse as containers for tools etc.



GAINA



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