Innovative, Environment-Friendly
Inorganic , Non-combustible, Asbestos-free

Calcium silicate thermal insulation material
ASTM C 533 Type Ⅰ product

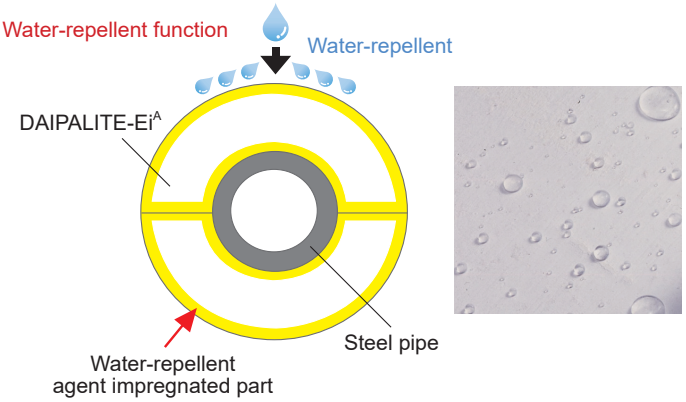
DAIPALITE-Ei^{A}

DAIPALITE-Ei^{A} is a calcium silicate thermal insulation material which has water-repellent and chemical corrosion inhibition performance, and is used in various industrial facilities such as oil refinery plant, power plants, petrochmical plants, and others.

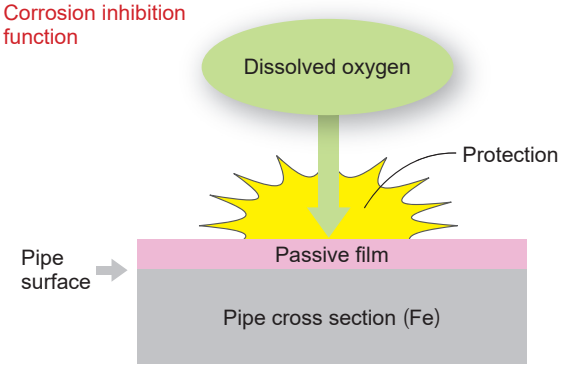
Special effects of DAIPALITE-Ei^{A}

DAIPALITE-Ei^{A} is surface-treated with a special corrosion inhibitor containing soluble components (Na^{+}, SiO_3^{2-}). When the components are dissolved in water, the pH of the solution is more than 10, and a passive film is formed on the pipe surface, preventing iron corrosion.

Water-repellent function



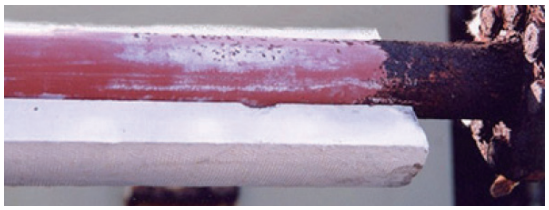
Corrosion inhibition function



Secular change of piping covered with thermal insulation material ＊

＊The covered material is our water-repellent product, calcium silicate thermal insulation material made in Japan. DAIPALITE-Ei^{A} has similar performance.

Crude oil piping at a thermal power plant (7 years) : The piping was covered with our water-repellent products. The small white circle on the pipe is due to the hole which was opened accidentally after the inspection. There is evidence that water has flowed for several years. The piping was not corroded.



Steam (12K) piping at a steel plant (14years) : The left side was almost uncorroded where it was covered with our water-repellent products. On the right side, the corrosion was considerably progressing in the area covered with mineral fiber thermal insulation material.

Standard physical properties of DAIPALITE-Ei^{A} (reference values)

Apparent Density	Flexural Strength	Compressive Strength	Heating Linear Shrinkage	Maximum Service Temperature	Recommended service temperature range	Thermal conductivity λ〔W/(m・K)〕, Temperature θ〔℃〕
170kg/m^3	≧ 344kPa (≧ 34.4N/cm^2)	≧ 688kPa (≧ 68.8N/cm^2)	2.0% max.	1000℃	Ordinary temperature to 1000℃	Pipe cover $\lambda = 0.0489+7.885\times10^{-5}\cdot\theta+2.032\times10^{-10}\cdot\theta^3$ Board $\lambda = 0.0516+7.240\times10^{-5}\cdot\theta+1.884\times10^{-10}\cdot\theta^3$

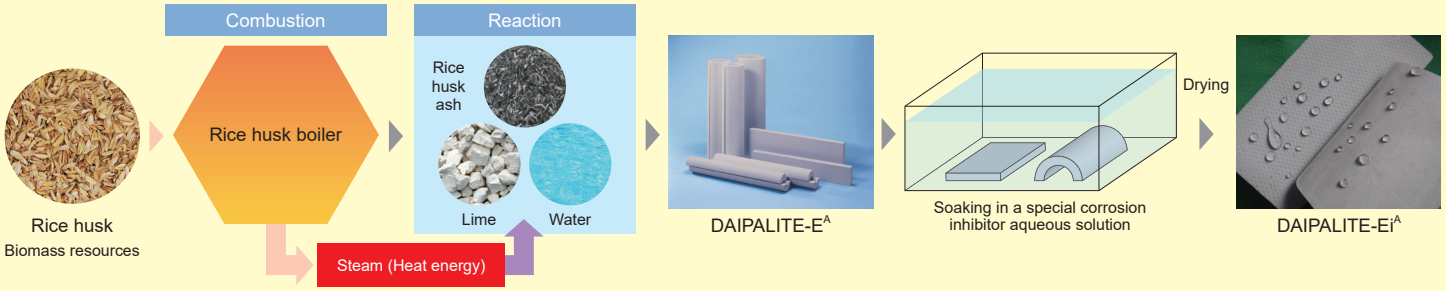
Environment-friendly production process (original manufacturing method in Vietnam plant)

JIC is the first and the only one that succeeded in inventing the production process using rice husk. Rice husk is used as energies for reaction of raw materials and drying formed products. The rice husk ash is used for as a raw material instead of Silica rock. This unique process is certificated as an environment-conscious business by Viet Nam Government.

UNIDO ITPO Tokyo's STePP Sustainable Technology Promotion Platform

DAIPALITE-E series (Thermal Insulation Material Using Biomass) is registered to Sustainable Technology Promotion Platform (STePP) of United Nations Industrial Development Organization (UNIDO) Investment and Technology Promotion Office, Tokyo (ITPO Tokyo)

Manufacturing process diagram



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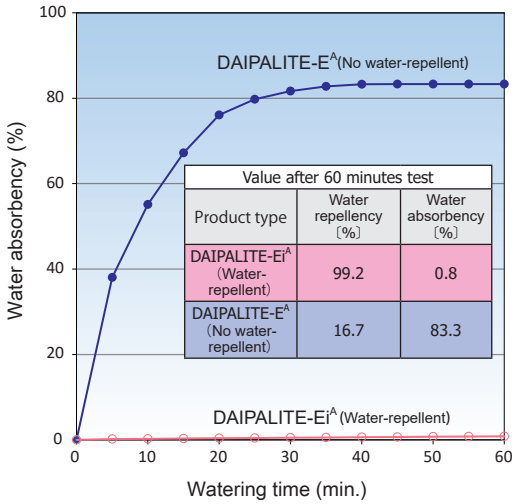
Water-repellent performance

In order to measure water-repellent and water absorption, the thermal insulation material was sprinkled for 60 minutes. The results are as follows. (by a test method similar to the JIS A 9510, measured in November 2020)



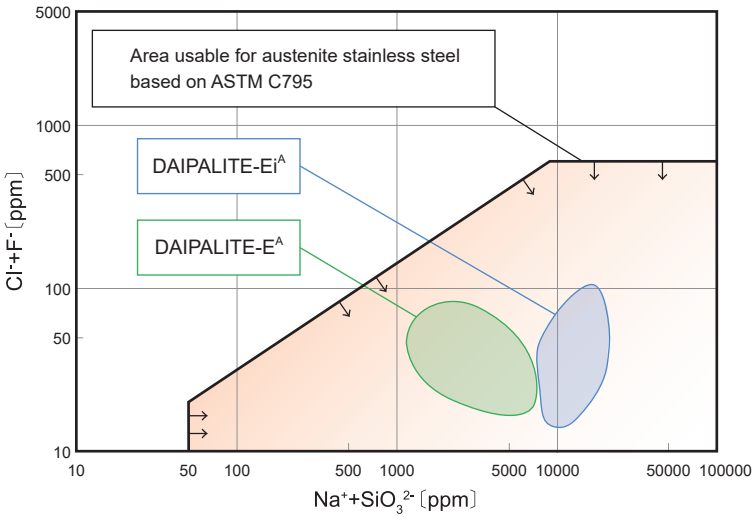
Value after 60 minutes test

Product type	Water repellency [%]	Water absorbency [%]
DAIPALITE-Ei^{A} (Water-repellent)	99.2	0.8
DAIPALITE-E^{A} (No water-repellent)	16.7	83.3

Water absorbency [%] = (M_1-M_0) ／ (V × ρ_W) × 100 [%]
M_0 : Mass of test piece before test [g]
M_1 : Mass of test piece after test [g]
V : Volume of specimen [cm^3]
ρ_W : Water density 1 [g/cm^3]

Stress corrosion cracking inhibition (ASTM C795)

These calcium silicate materials have performance to satisfy ASTM standards as a thermal insulation material in contact with austenitic stainless steel.



Standard dimensions [mm]

	Internal Diameter	Thickness	Width	Length
Pipe cover	22 ~ 610	25 30 40 50 65 75	—	914
Board	—		303 × 914 150 × 914	

List of ASTM C533 test results

Property	Test Methods	ASTM C533 Requirement							Test Results
Density (Dry) Average*	ASTM C302	≦ 240 kg/m^3							Pass
Flexural Strength*	ASTM C203	≧ 344 kPa (50 psi)							Pass
Compressive Strength*	ASTM C165	≧ 688 kPa (100 psi)							Pass
Abrasion Resistance Weight Loss by Tumbling*	ASTM C421	After the first 10 min <20%,After the second 10min <40%							Pass
Linear Shrinkage after Heat Soaking*	ASTM C356	Less than 2% after 24hr,Soaking period at 650℃							Pass
Hot Surface Performance of High Temperature*	ASTM C411	Warpage ≦ 6mm Cracking : no cracks completely through the insulation thickness. Surface cracks on hot face are acceptable							Pass
Surface Burning Characteristics*	ASTM E84	Flame spread - 0,Smoke Developed-0							Pass
Apparent Thermal Conductivity*	ASTM C177/GHP ASTM C518/HFM ASTM C335/Pipe cover ASTM C1045	Temp. [℃]	38	93	149	204	260	316	371	Pass
		λ W/(m･K)	≦ .059	≦ .065	≦ .072	≦ .079	≦ .087	≦ .095	≦ .102	Pass
Stress Corrosion Performance* (Austenitic Stainless Steel)	ASTM C795 ASTM C692 ASTM C871	① Na^+ + SiO_3^{2-} ions : ≧ 50ppm ② Acceptable range of Cl^-+ $F^-$and Na^++ SiO_3^{2-} ③ pH ≦ 12.5 (at 25℃) ④ The stress corrosion test (ASTM C692) must be passed.							Pass
Moisture Content*	ASTM C1616	≦ 20%							Pass
Combustibility*	ASTM E136	Non-Combustible							Pass
Corrosion**	ASTM C1617	Mass Loss Corrosion Rate (MLCR) ≦ DI (The MLCR of Type 1 materials, when tested with extracted solutions, shall be equal to or less than that determined when tested with DI Water)							Pass

* Tested product : DAIPALITE-E^{A}　　** Tested product : DAIPALITE-Ei^{A} (Water-repellent type)

DAIPALITE-Ei^{A} is a water-repellent material but not a waterproof material. Also, there is no guarantee that the metal to be covered will not corrode. With proper construction and maintenance, DAIPALITE-Ei^{A}'s water repellency and corrosion inhibition are effective.

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< Notes and caution >

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