

PRODUCTS OF CALCIUM SILICATE THERMAL INSULATION MATERIAL

JIC VIETNAM NEW PLANT

JIC VIETNAM ONE MEMBER COMPANY LIMITED., the subsidiary company of JIC built the new plant in Tan Trung Village, Phu Tan District of An Giang Province.

This is a plant based on production and the facilities of the plant in Japan, produce the inorganic thermal insulation materials which are equal to Japanese high quality products.

This business which produce the inorganic thermal insulation materials by using rice husk as a raw metal is certificated as environment friendly business from Socialist Republic of Vietnam.



JICV VIETNAM New Plant



DAIPALITE-E



DAIPALITE-Ei

JAPAN INSULATION CO., LTD.
JIC VIETNAM ONE MEMBER CO., LTD.

The Environment Friendly Plant using rice husk as a raw metal and The Inorganic Thermal Insulation Materials

Company Profile (Plant)

Company name	JIC VIETNAM ONE MEMBER CO., LTD.
Location	Tan Trung Industrial Cluster, Tan Trung Village, Phu Tan District, An Giang Province, Socialist Republic of Viet Nam
Founded	September, 2014
Capital	350 million yen
Stockholder	The company wholly owned by Japan Insulation Co., Ltd.
Plan of production start	Fall, 2016
Production quantity	1000 ton / year



This is the world's first and environment-friendly thermal insulation materials made from rice husk.



Thermal insulation materials
Pipe Cover & Board

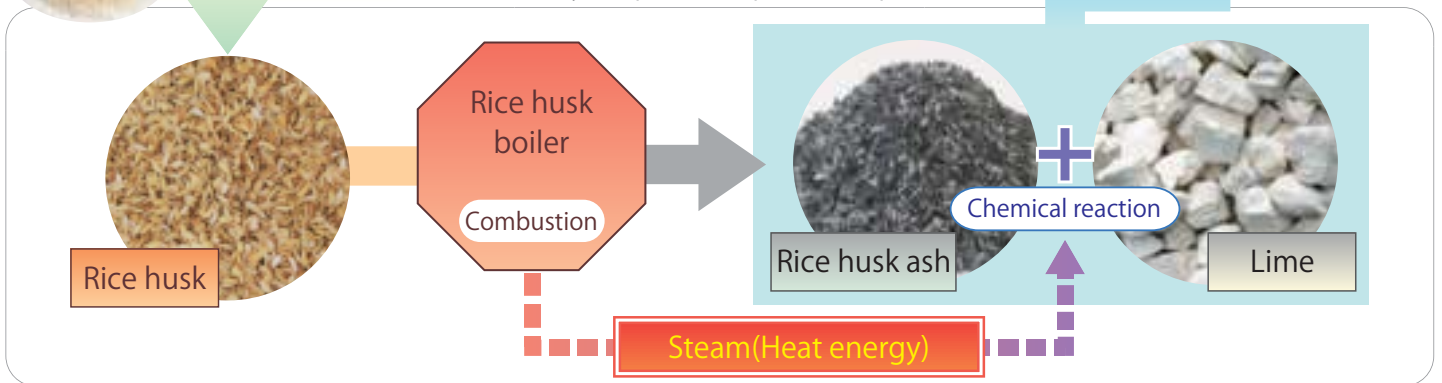
Products

DAIPALITE-E
DAIPALITE-E i

Polished rice

Rice

The summary of a part of the production process



Utilization of unused biomass energy

Steam is required to manufacture calcium silicate thermal insulation material. In the past, steam was generated by burning fossil fuel using a boiler. However, in this project, utilizing the energy generated when burning rice husk in the manufacture of thermal insulation material enables to reduce carbon dioxide emissions by approximately 4,200 ton-CO₂ a year.

Recycling waste

The rice husk ash as burnt residue can be utilized as an alternative to silica stone, which is a raw material for calcium silicate thermal insulation material, contributing to the reduction of waste. This project enables to reduce waste rice husk by 5,200 tons.

Reduction of environmental burdens using calcium silicate thermal insulation material

Since calcium silicate thermal insulation material inhibits diffusion of heat from pipes in the plant, using this product leads to the reduction of environmental burdens.

Use of rice husk technology developed through ODA

In the ODA research cooperation business between the Standards and Industrial Research Institute of Malaysia Berhad and JIC, etc. conducted in 1985, we conducted a practical research of the technology for making calcium silicate thermal insulation material from rice husks and succeeded in pilot production.



**Produce the high quality inorganic thermal insulation materials,
equivalent to Japanese products
Supply to Viet Nam, Southeast Asian countries and others**



JIC VIETNAM New Plant

To
markets



Plant building



Drying machine



Boiler



Rice husk storage warehouse

DAIPALITE-E

Innovative, Environment-Friendly
Calcium Silicate Thermal Insulation Material



DAIPALITE-E is a calcium silicate thermal insulation material and the crystal is Xonotlite. The material is pre-formed for pipe and block section and used for facilities. DAIPALITE-E is inorganic, asbestos free and noncombustible. The physical and thermal property meet or exceed the requirements of ASTM C533 Type I. DAIPALITE-E is supplied to various industrial fields, such as refinery plants, power plants, petrochemical plants and others.

Environment-friendly

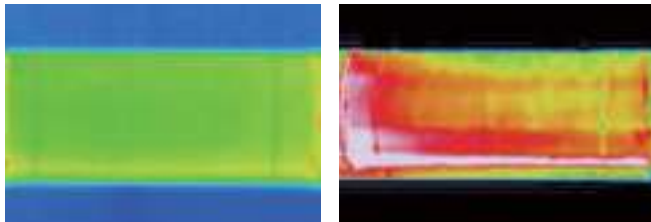
Using rice husk as a raw material and as a heat energy for the manufacturing process are quite unique points. The notable and original system contributes to the global environment.



Efficient & Economical

DAIPALITE-E features superior energy-saving performance. The material enhances thermal efficiency of the facilities. Long material life makes facilities in good condition for years. High heat performance can make thinner thickness of the thermal insulation materials and can also reduce subsidiary materials.

Surface temperature

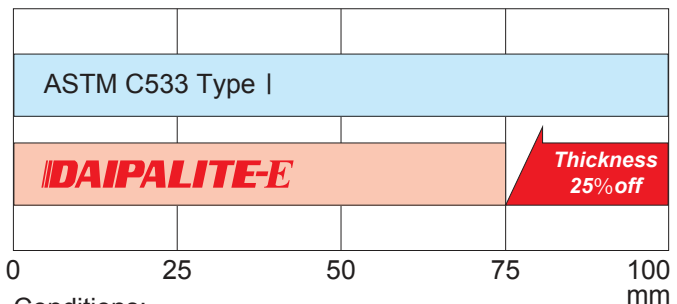


Surface Temp. 44.8°C
Heat loss: 160W/m

Surface Temp. 48.5°C
Heat loss: 190W/m

Conditions
Pipe inside temp.: 300°C Pipe outer diameter: 114mm
Thermal insulation thickness: 50mm

Thickness



Conditions:
Outside air temperature: 25°C
Heat loss: Same (less than 123W/m)
Pipe inside temp.: 300°C
Pipe outer diameter: 114mm

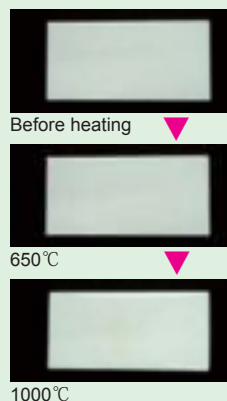
Entire surface heating test result

DAIPALITE(E,Ei) composed of Xonotlite crystal keeps its shape up to 1000°C though others are up to 650°C.

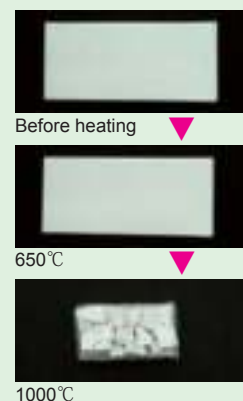
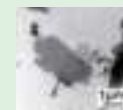
The reason is the difference of the crystal. Xonotlite crystal is strong against heat.

The heating linear shrinkage ratio after three hours of heating at 1000°C is max 2.0%.

Xonotlite crystal / DAIPALITE(E,Ei)

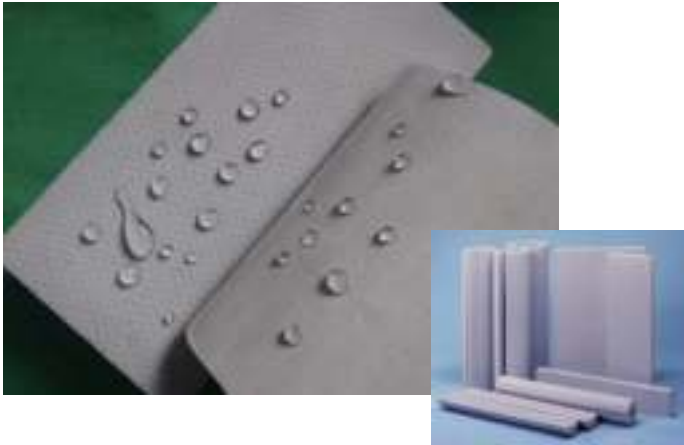


Tobermorite crystal / Other company's product



DAIPALITE-Ei

Water-Repellent, Anti-Corrosive
Calcium Silicate Thermal Insulation Material



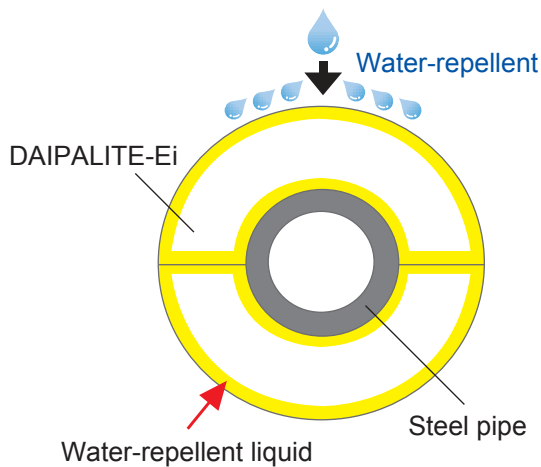
DAIPALITE-Ei is a calcium silicate thermal insulation material and the crystal is Xonotlite. The material is pre-formed for pipe and block section and used for facilities. DAIPALITE-Ei is inorganic, asbestos free and noncombustible. The physical and thermal property meet or exceed the requirements of ASTM C533 Type I . DAIPALITE-Ei provides not only **water-repellent function**, but also **corrosion inhibition effect** by attaching special liquid developed by Japan Insulation Company. DAIPALITE-Ei is supplied to various industrial fields, such as refinery plants, power plants, petrochemical plants and others.

Special Effects

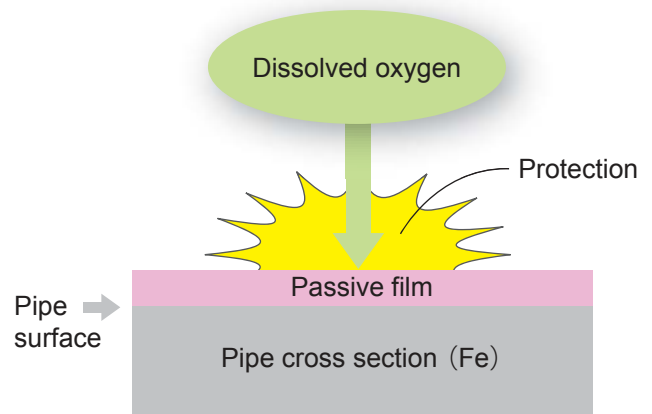
CUI (“Corrosion Under Insulation”) is a problem of all over the world. It may cause not only deterioration of efficiency, but also serious situations such as a leakage of contents, an explosion, a fire and others. DAIPALITE-Ei has two features against the CUI problems by adding a special water-repellent liquid on the surface. One of them is water-repellent function, and the other is corrosion inhibition effect. DAIPALITE-Ei contributes to solving the problems with outstanding features.



1. Water-repellent function



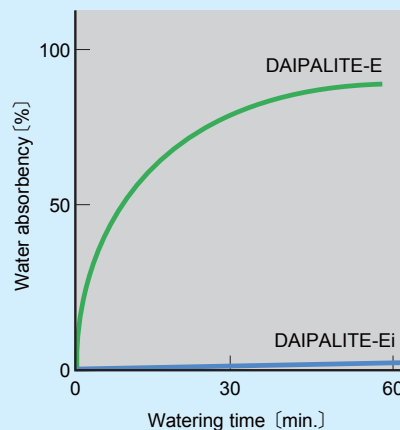
2. Corrosion inhibition mechanism



Water-repellent performance

Materials were watered for 60 minutes to measure water repellencies and absorbencies.

The result is showed as below.



$$\text{Water absorbency}(\%) = (M2-M1)/(V \times \rho) \times 100$$

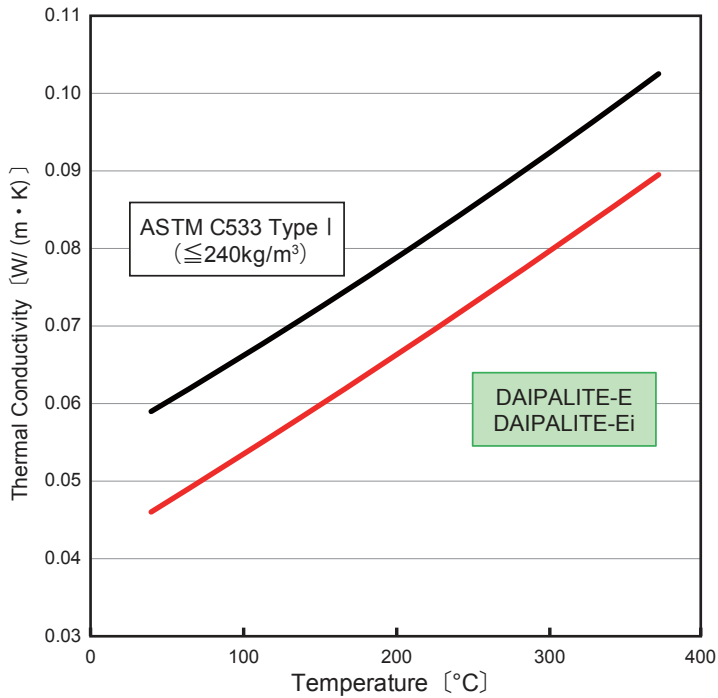
M1: Weight of test piece before watering

M2: Weight of test piece after watering

V: Volume of test piece

ρ : Specific gravity of water ($\rho=1$)

Thermal conductivity



Temperature [°C]		38	93	149	204	260	316	371
Thermal conductivity W/(m·K)	Requirement	.059	.065	.072	.079	.087	.095	.102
	DAIPALITE-E · Ei	.046	.053	.060	.067	.074	.081	.090

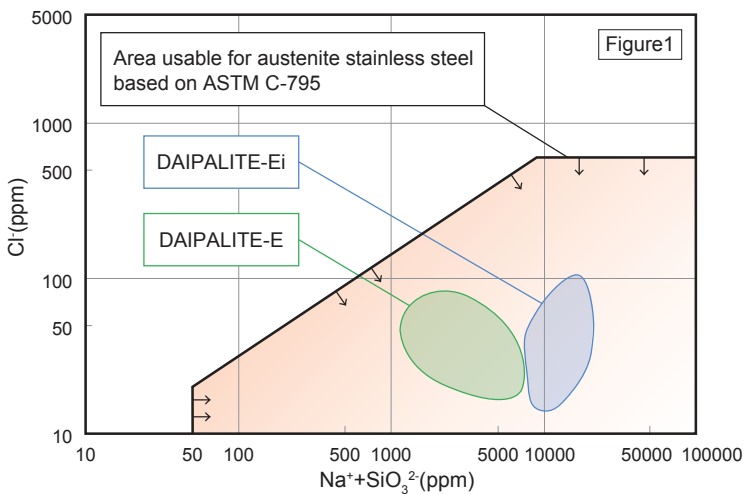
Standard dimensions [mm]

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

Standard physical properties (reference values)

Apparent Density	155kg/m ³ or less
Heating Linear Shrinkage	2.0% max.
Maximum Service Temperature	1000°C
Thermal Conductivity W/(m·K)	$[0 \leq \theta \leq 300]$ $\lambda = 0.0407 + 0.000128 \cdot \theta$ $[300 < \theta \leq 800]$ $\lambda = 0.0555 + 2.05 \times 10^{-5} \cdot \theta + 1.93 \times 10^{-7} \cdot \theta^2$

Stress corrosion cracking inhibition :Passed in test per ASTM C-795



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

※ Evaluation criteria based on ASTM C-795

- 1) $\text{Na}^+ + \text{SiO}_3^{2-}$ ions : ≥ 50 ppm
- 2) Acceptable range of Cl^- and $\text{Na}^+ + \text{SiO}_3^{2-}$ (Figure 1)
- 3) pH: ≤ 12.5 (at 25°C)
- 4) The stress corrosion test (C-692) must be passed.

ASTM test results

ASTM C302 Density (Dry) Average	Pass
ASTM C203 Flexural Strength	Pass
ASTM C165 Compressive Strength	Pass
ASTM C421 Mass loss by tumbling after first 10 minutes after second 10 minutes	Pass
ASTM C356 Type1 Linear Shrinkage (649°C) / (927°C)	Pass
ASTM C411 ($\leq 649^\circ\text{C}$) Hot-Surface Performance of High-Temperature	Pass
ASTM C1616-07 Moisture Content	Pass
ASTM E84 Surface Burning Characteristics	Pass
ASTM E136 Non Combustibility	Pass
ASTM C795/C692/C871 Stress Corrosion Performance	Pass
ASTM C1617 Corrosion* (DAIPALITE-Ei)	Pass

* Only Water-repellent material.

Pipe cover inside diameter* [mm]	All thickness of thermal insulation material [mm] **												
	80	90	100	115	125	130	140	150	165	175	180	190	200
	Combination of thermal insulation material's thickness [inside diameter x thickness of single, mm]												
22	22 x 50 127 x 30	22 x 40 102 x 50	22 x 50 127 x 50	/	/	22 x 50 127 x 30 194 x 50	/	/	22 x 40 102 x 50 219 x 75	22 x 50 127 x 50 244 x 75	22 x 30 89 x 75 244 x 75	22 x 40 102 x 75 273 x 75	/
27	27 x 30 89 x 50	27 x 40 114 x 50	27 x 50 127 x 50	27 x 40 114 x 75	27 x 75 194 x 50	27 x 30 89 x 50 194 x 50	27 x 40 114 x 50 219 x 50	/	27 x 40 114 x 50 219 x 75	27 x 50 127 x 50 244 x 75	27 x 30 89 x 75 244 x 75	27 x 40 114 x 75 273 x 75	/
34	34 x 40 114 x 40	34 x 40 114 x 50	34 x 25 89 x 75	34 x 40 114 x 75	34 x 50 141 x 75	34 x 40 114 x 50 219 x 40	34 x 40 114 x 50 219 x 50	34 x 25 89 x 75 244 x 75	34 x 40 114 x 50 219 x 75	34 x 25 89 x 75 244 x 75	34 x 40 114 x 75 273 x 65	34 x 65 168 x 75 324 x 50	/
43	43 x 30 102 x 50	43 x 40 127 x 50	43 x 75 194 x 25	43 x 75 194 x 40	43 x 75 194 x 50	43 x 75 194 x 25 244 x 30	43 x 75 194 x 25 244 x 30	43 x 75 194 x 75	43 x 75 194 x 25 244 x 65	/	43 x 75 194 x 65 324 x 30	43 x 75 194 x 65 324 x 40	43 x 75 194 x 65 324 x 50
49	49 x 30 114 x 50	49 x 25 102 x 65	49 x 25 102 x 75	/	/	49 x 30 114 x 50 219 x 50	/	/	/	/	49 x 30 114 x 75 273 x 75	/	/
61	61 x 40 141 x 40	61 x 65 194 x 25	61 x 50 168 x 50	61 x 65 194 x 50	61 x 50 168 x 75	61 x 65 194 x 65	61 x 65 194 x 75	61 x 75 219 x 75	61 x 65 194 x 25 244 x 75	61 x 50 168 x 50 273 x 75	61 x 40 141 x 65 273 x 75	61 x 65 194 x 75 345 x 50	61 x 50 168 x 75 324 x 75
73	73 x 30 141 x 50	73 x 65 219 x 25	/	73 x 40 168 x 75	73 x 30 141 x 65 273 x 30	73 x 30 141 x 25 194 x 75	73 x 65 219 x 75	/	73 x 65 219 x 50 324 x 50	/	73 x 40 168 x 75 324 x 65	73 x 40 168 x 75 324 x 75	/
89	89 x 50 194 x 30	89 x 50 194 x 40	89 x 50 194 x 50	89 x 65 219 x 50	89 x 50 194 x 75	89 x 65 219 x 65	89 x 65 219 x 75	89 x 75 244 x 75	89 x 65 219 x 50 324 x 50	89 x 75 244 x 50	89 x 65 219 x 50 324 x 65	89 x 75 244 x 65 375 x 50	/
102	102 x 30 168 x 50	102 x 65 244 x 25	/	102 x 65 244 x 50	/	102 x 30 168 x 50 273 x 50	102 x 65 244 x 75	/	102 x 40 194 x 75 345 x 50	/	102 x 30 168 x 75 324 x 75	/	/
114	114 x 50 219 x 30	114 x 50 219 x 40	114 x 50 219 x 50	114 x 50 219 x 65	114 x 50 219 x 75	114 x 65 244 x 65	114 x 65 244 x 75	114 x 75 273 x 75	114 x 50 219 x 50 324 x 65	114 x 50 219 x 50 324 x 75	114 x 65 244 x 40 324 x 75	114 x 50 219 x 75 378 x 65	114 x 50 219 x 75 378 x 75
127	127 x 30 194 x 50	127 x 40 219 x 50	/	/	/	127 x 30 194 x 25 244 x 75	127 x 40 219 x 50 324 x 50	/	127 x 40 219 x 50 324 x 75	/	127 x 30 194 x 75 345 x 75	127 x 40 219 x 75 378 x 75	/
141	141 x 50 244 x 30	141 x 50 244 x 40	141 x 50 244 x 50	141 x 50 244 x 65	141 x 50 244 x 75	141 x 50 244 x 40 324 x 40	141 x 50 244 x 40 324 x 50	141 x 50 244 x 50 345 x 50	141 x 50 244 x 40 324 x 75	141 x 50 244 x 50 345 x 75	141 x 65 273 x 65 406 x 50	141 x 50 244 x 65 375 x 75	141 x 50 244 x 75 406 x 75
168	168 x 50 273 x 30	168 x 50 273 x 40	168 x 50 273 x 50	168 x 50 273 x 65	168 x 50 273 x 75	168 x 50 273 x 40 356 x 40	168 x 50 273 x 40 356 x 50	168 x 50 273 x 50 378 x 50	168 x 50 273 x 40 356 x 75	168 x 50 273 x 50 378 x 75	168 x 50 273 x 65 406 x 65	168 x 50 273 x 65 406 x 75	168 x 50 273 x 75 427 x 75
194	194 x 40 273 x 40	194 x 25 244 x 65	194 x 25 244 x 75	194 x 65 324 x 50	194 x 75 345 x 50	194 x 65 324 x 65	194 x 65 324 x 75	194 x 75 345 x 75	194 x 25 244 x 65 378 x 75	194 x 75 345 x 50 457 x 50	194 x 65 324 x 65 457 x 50	194 x 65 324 x 50 427 x 75	194 x 75 345 x 50 457 x 75
219	219 x 50 324 x 30	219 x 50 324 x 40	219 x 50 324 x 50	219 x 50 324 x 65	219 x 50 324 x 75	219 x 50 324 x 40 406 x 40	219 x 50 324 x 40 406 x 50	219 x 50 324 x 50 427 x 50	219 x 50 324 x 40 406 x 75	219 x 50 324 x 50 427 x 75	219 x 50 324 x 65 457 x 65	219 x 50 324 x 65 457 x 75	219 x 50 324 x 75 478 x 75
244	244 x 40 324 x 40	244 x 40 324 x 50	244 x 50 345 x 50	244 x 40 324 x 75	244 x 50 345 x 75	244 x 65 378 x 65	244 x 65 378 x 75	244 x 75 406 x 75	244 x 75 406 x 50 508 x 40	244 x 75 406 x 50 508 x 50	244 x 40 324 x 65 457 x 75	244 x 40 324 x 75 478 x 75	244 x 50 345 x 75 508 x 75
273	273 x 50 378 x 30	273 x 50 378 x 40	273 x 50 378 x 50	273 x 50 378 x 65	273 x 50 378 x 75	273 x 65 406 x 65	273 x 65 406 x 75	273 x 75 427 x 75	273 x 65 406 x 50 508 x 50	273 x 50 378 x 50 478 x 75	273 x 40 356 x 75 508 x 65	273 x 40 356 x 75 508 x 75	/
324	324 x 40 406 x 40	324 x 40 406 x 50	324 x 25 378 x 75	324 x 65 457 x 50	324 x 50 427 x 75	324 x 65 457 x 65	324 x 65 457 x 75	324 x 75 478 x 75	324 x 65 457 x 50 559 x 50	324 x 25 378 x 75 559 x 75	324 x 65 457 x 75 610 x 40	324 x 40 406 x 75 559 x 75	/
356	356 x 50 457 x 30	356 x 50 457 x 40	356 x 50 457 x 50	356 x 50 457 x 65	356 x 50 457 x 75	356 x 50 457 x 50 559 x 30	356 x 75 508 x 65	356 x 75 508 x 75	356 x 50 457 x 50 559 x 65	356 x 50 457 x 50 559 x 75	356 x 50 457 x 65 610 x 65	356 x 50 457 x 75 610 x 65	356 x 50 457 x 75 610 x 75
406	406 x 50 508 x 30	406 x 50 508 x 40	406 x 50 508 x 50	406 x 50 508 x 65	406 x 50 508 x 75	406 x 50 508 x 50 610 x 30	406 x 75 559 x 65	406 x 75 559 x 75	406 x 50 508 x 50 610 x 65	406 x 50 508 x 50 610 x 75	/	/	/
457	457 x 50 559 x 30	457 x 50 559 x 40	457 x 50 559 x 50	457 x 50 559 x 65	457 x 50 559 x 75	/	457 x 75 610 x 65	457 x 75 610 x 75	/	/	/	/	/
508	508 x 50 610 x 30	508 x 50 610 x 40	508 x 50 610 x 50	508 x 50 610 x 65	508 x 50 610 x 75	/	/	/	/	/	/	/	/

* Inside diameter of thermal insulation material which is next to the plumbing [mm]

** After combined thickness of thermal insulation material [mm]

Number of pipe covers per case

Available sizes are shown with a quantity per case [Unit: pieces/case]

Pipe cover inside diameter [mm]	Thermal insulation material thickness [mm] and number of pieces per case					
	25t	30t	40t	50t	65t	75t
22	32	26	17	12	7	6
27	28	24	15	10	6-1/2	5
34	26	20	13-1/2	10	6	5
43	24	18	11	8-1/2		
49	20	15	10	7-1/2	5-1/2	4
61	16	12	8	7	4-1/2	3-1/2
73	12	10	7	6	4	3-1/2
89	11	9	6	5-1/2	3-1/2	2-1/2
102	9	7	6	4-1/2		
114	8	7	5	4	3	2-1/2
127		6		4		
141	6	5	4	3-1/2	2-1/2	2
168	6-1/3	5-1/3	3-1/2	3	2	1-1/2
194	5-1/3	4-2/3	3-1/3	2-1/3	2	1-2/3
219	5	4	3-1/3	2-1/3	1-2/3	1-2/3
244		4-1/4	2-2/3	2-1/3	1-2/3	1-1/3
273	5	4	3	2-2/4	1-2/4	1-1/4
324	4	3-1/4	2-1/4	1-3/4	1-2/4	1-1/4
345				1-3/6		1
356	4-1/6	3-2/6	2-3/6	1-4/6	1-1/4	1
378		3-2/6	2-3/6	1-5/6	1-2/6	1-1/6
406	3-5/6	3	2-2/6	1-5/6	1-1/6	1
427						1
457	3-2/6	3	2	1-4/6	1	1
478						1
508		2-3/6	1-5/6	1-2/6	1	1
559	2-7/8	2-3/8	1-6/8	1-2/6	1	5/6
610	2-6/8	2-2/8	1-5/8	1	4/6	4/6

External dimensions of case: 340×530×930 [mm]

Number of boards per case

Available sizes are shown with a quantity per case [Unit: pieces/case]

Width×Length [mm]	Thermal insulation material thickness [mm] and number of pieces per case					
	25t	30t	40t	50t	65t	75t
150×914	40	34	26	20	16	14
303×914	20	17	13	10	8	7

Domestic Distributor in Viet Nam



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