



Water space under the ground.

Plastic material for water storage
CROSS-WAVE

To use CROSS-WAVE safely

The clauses here are important please follow the instruction below.



PROHIBITED

The clauses below are prohibited because has possibility to become a cause of accident or damage to the facilities.

- **Do not throw away**
It has a possibility for breakage.
- **Do not bring down in packaged.**
Do not bring down when transport on the pallet.
*The works at winter time and cold weather area plastic product have a breakage easily.
- **Do not use with a breakage.**
Do not use when the product with breakage.
- **Caution flammable.**
Do not put near fire may fire or transformation.
- **Prohibit a post processing**
Do not cutting because it reduce the strength.
If you need please consult to us.
- **Prohibit inflow of hot water**
The inflow of hot water reduce the strength or transformation.
If you need please consult us.



CAUTION

Remark the clauses below because has possibility to become a cause of accident or damage to the facilities.

- **Load weight**
Please see the data in the manual and use under appropriate design and construction.
- **Things to strage**
When you strage other than water please consult us before.
- **Oil registance**
The organic solvent or oils become cause of transformation or reduce the strength.
- **Precautions at construction**
 - Do not throw away.
 - Arrange the setting plane, even and smooth as much as possible.
 - Mind your step when you got on the products during construction.
 - Be careful about a burn because products become hot during summer time under the sunshine.

CROSS-WAVE proposes effective use of rain water.

The underground water space created by CROSS-WAVE controls flood of river and drainage caused by heavy rain, at the same time it also provide the environment through which stored rain water can be utilized according to necessity.

A new relationship has come to existence between human & water.

The reserved water can be used for daily life usage or industrial usage and can also be used at the time of emergency.

It provides richness and calmness for our life.



Flood Control

Controlling overflow in a redevelopment area

If you make some underground reservoir at redevelopment area you could reduce rainwater runoff in the area.



Can be used

- 1) Under park at redevelopment area
- 2) Under parking lots at shopping center

Reference



Fire Fighting

Water storage for fire fighting and disaster

CROSS-WAVE can be applied from 40 ton to 10000m³ and can store for emergency water supply.



Can be used

- 1) Under park
- 2) Under schoolyard

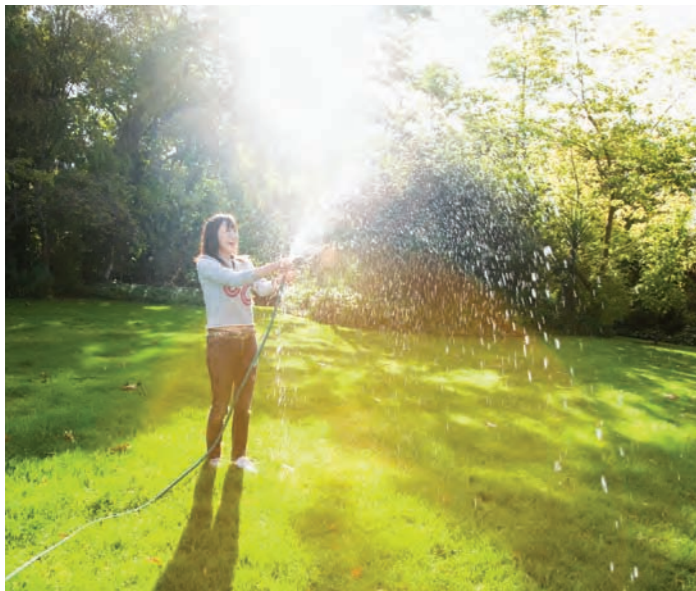
Reference



Rainwater Harvesting

Water for life, industry and irrigation

CROSS-WAVE has miscellaneous uses it can be used for various purposes such as water for car washing, irrigation ,industrial usage and for gardens.



Can be used

- 1) Under parking lots at personal house, hospital and office
- 2) Under parking lots at plant
- 3) Under farm road or green house

Reference



Daily use water

Water for fountain or small stream

Use rainwater for fountain on small stream then you can develop hydrologic cycle that enrich your life.



Can be used

- 1) Around park or amenity space
- 2) Under parking lots at housing complex

Reference



CROSS-WAVE only crossed and pile up one by one.

As CROSS-WAVE is light weight so transportation is also smooth.
 Heavy load capacity, strong enough for 25t truck with covering more than 60cm.
 Can be install simply by cross and piling up.
 Apart from that you can utilize for wide range of civil engineering materials such as lightweight fill materials or temporary construction material.

[Installation Process]

- 1 Digging 
- 2 Protection sheet 
- 3 Lining sheet 
- 4 Carry in 
- 5 Pile up 
- 6 Setting Spacer 
- 7 Lining sheet, Protection sheet finished 
- 8 Finished 

[How to pile up]

plan view

Half size Full size Half size

direction for convex →

direction for convex ↑

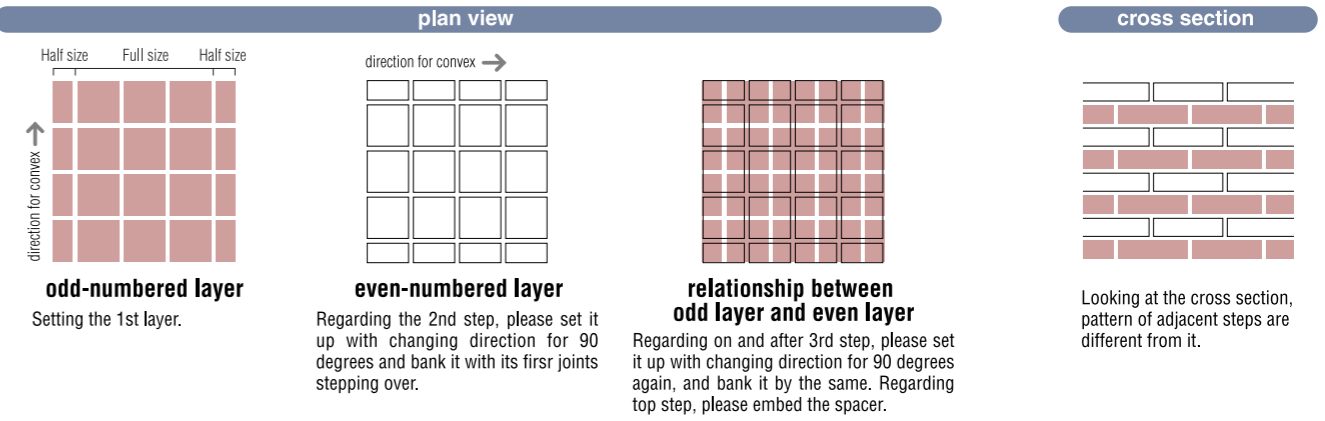
odd-numbered layer
Setting the 1st layer.

even-numbered layer
Regarding the 2nd step, please set it up with changing direction for 90 degrees and bank it with its first joints stepping over.

relationship between odd layer and even layer
Regarding on and after 3rd step, please set it up with changing direction for 90 degrees again, and bank it by the same. Regarding top step, please embed the spacer.

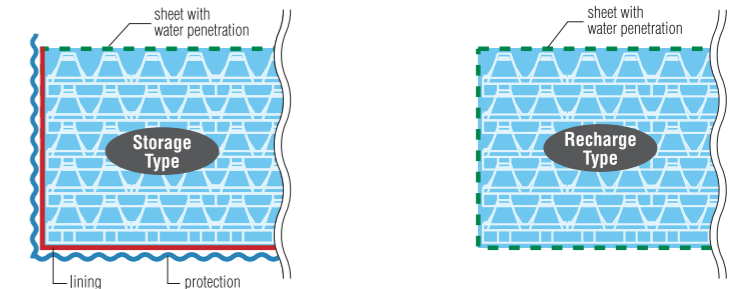
cross section

Looking at the cross section, pattern of adjacent steps are different from it.



[Structural pattern for a water storage]

There are following patterns according to the purpose.

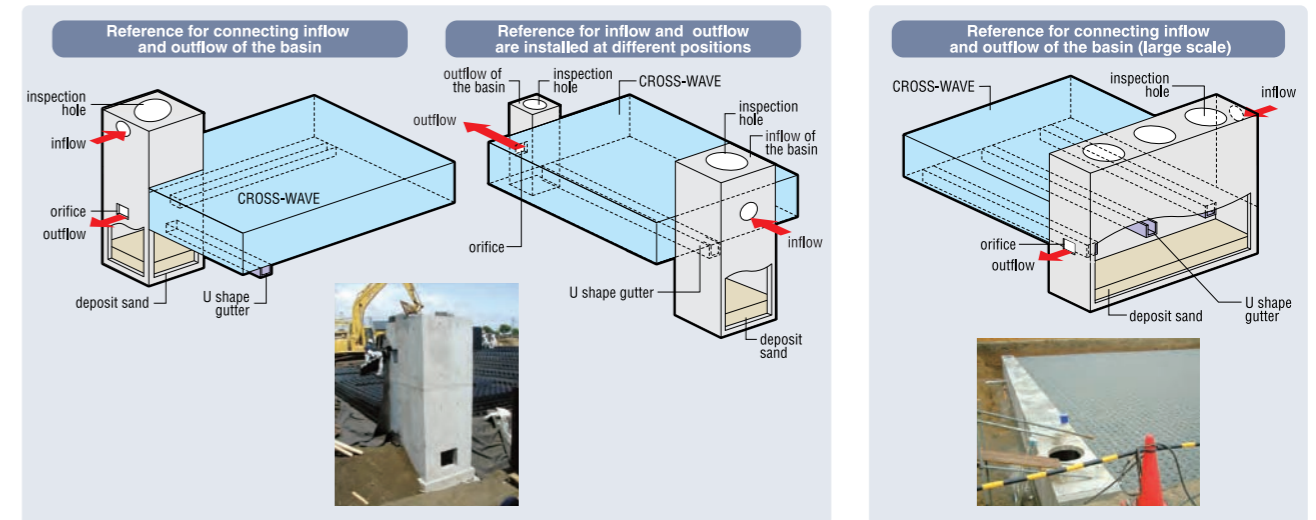


Maintenance for inside a water storage

1 Structure of a water storage

Our concept is that setting up sand basin etc. at the inflow, purifying rainwater, and flowing toward the 'CROSS-WAVE' water storage. In order to maintain CROSS-WAVE, please get rid of deposits in the sand basin. In some cases, you can use jet nozzle to clean up if you can set up the ditch under the CROSS-WAVE.

We will advise appropriate solutions for maintenance according to your setting of storage.



Reference for connecting inflow and outflow of the basin

Reference for inflow and outflow are installed at different positions

Reference for connecting inflow and outflow of the basin (large scale)

inspection hole, inflow, orifice, outflow, deposit sand, U shape gutter, CROSS-WAVE, outflow of the basin, inspection hole, inflow of the basin, U shape gutter, deposit sand

2 inspection hole

You can check condition inside the CROSS-WAVE if you will set up some inspection plates.
 Or you can use rake out deposits endways by using jet nebulizer with the nozzle toward backward direction.



inspection hole

inside of CROSS-WAVE

cleaning nozzle

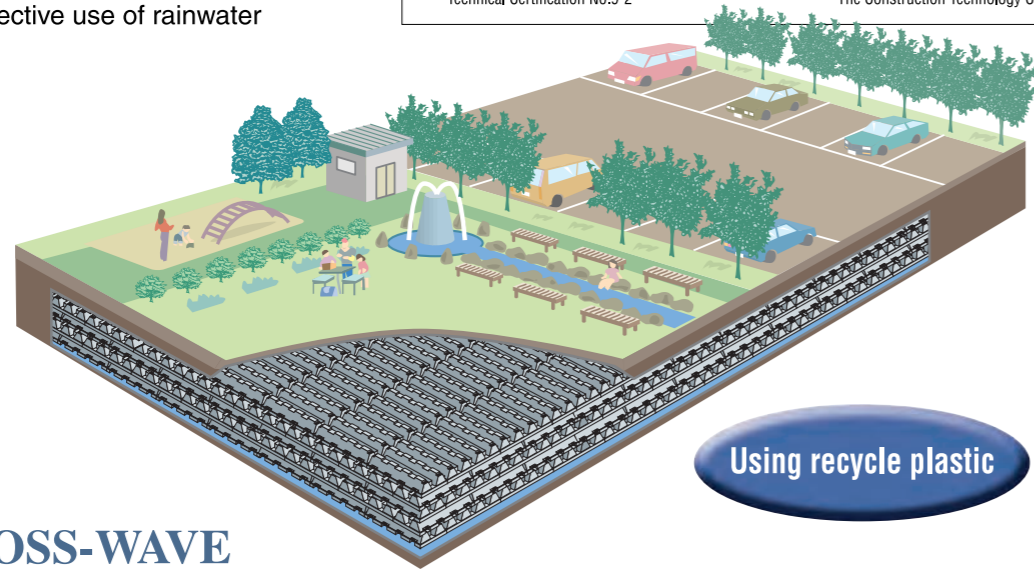
cleaning test

High void ratio to avoid urban flooding.

A rainfall is a blessing brought to us for coexistence with nature.

CROSS-WAVE is a material of underground rainwater storage for a Rain Water Harvesting.

Creating a space underground for water in high void ratio which contributes to the effective use of rainwater and control overflow.



Certification



"CROSS-WAVE Method"
ARSIT
Technical Certification No.9-2



Ministry of Land,
Infrastructure,
Transport and Tourism
NETIS registration
registration No.
KT-060086

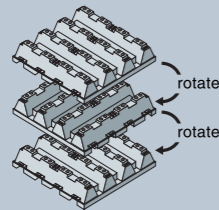


"Double Port by CROSS-WAVE"
JWET
The Construction Technology Certification

Features of CROSS-WAVE

1 High Void Ratio

- High space can be maintained by intersecting it at 90 degrees and piling it up.
- Reduce the amount of digging and can make a big volume storage in compact space.
- As digging is small so post processing is easy.



2 Time saving

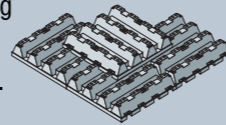
- Installation can be done only by hand.
- Compared to using concrete no need curing time.
- No need heavy equipment unlikely to use precasting concrete products.

3 Heavy load capacity design

- Can load 25 ton truck for vertical direction.

4 Easy Installation

- Due to slide layer design no fixing material is required.
- Installation speed is outstanding.

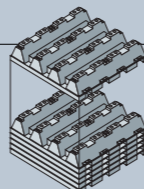


5 No pollution

- Polypropylene is used.
- Excellent chemical and water resistant, do not pollute the water.

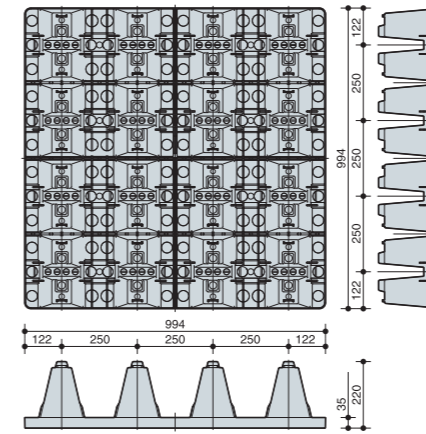
6 Compact Storage

- It can be easily stored if piled in the same direction and reduces storage space at the site.

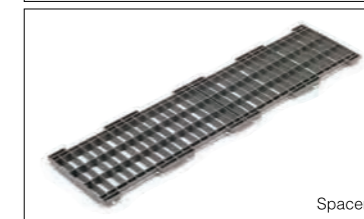


CW-H CROSS-WAVE HIGH

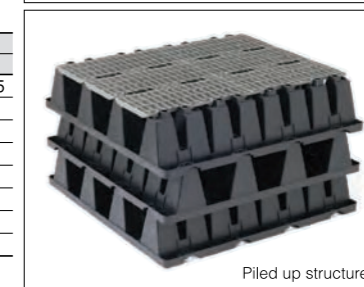
Maximum void ratio in the crosswave series.
Models can apply from small to large scale facilities.



CROSS-WAVE HIGH



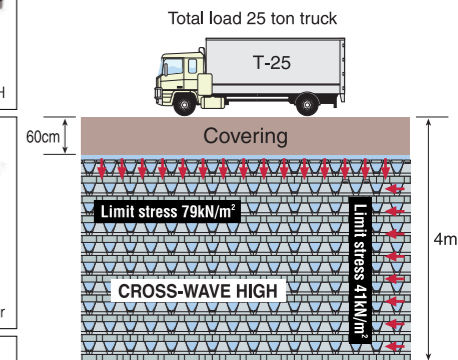
Spacer



Piled up structure

Grade	CROSS-WAVE HIGH (CW-H)			
	Full	Half	Quarter	Spacer
Size (mm)	994×994×220	994×494×220	494×494×220	988×240×25
Weight (kg)	7.3	3.6	1.8	0.8
Vertical direction	Deemed proposition	94kN/m ²		
	Permissional	79kN/m ²		
Horizontal direction	Deemed proposition	48kN/m ²		
	Permissional	41kN/m ²		
Manu.method	INJECTION			
Material	Polypropylene or Recycled Polypropylene			
Void rate	more than 95%			

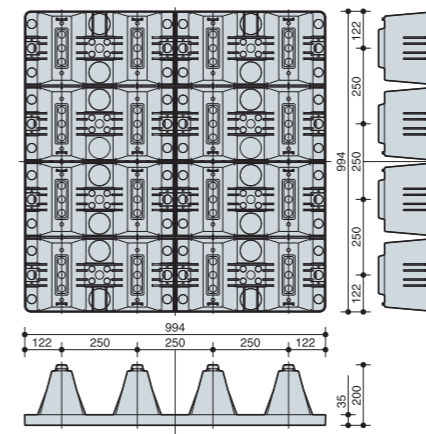
• Scope of application



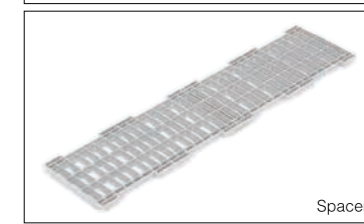
Covering limit 1.6m

CW-L CROSS-WAVE LARGE

High void ratio and strength.
Develop a new application field!



CROSS-WAVE LARGE



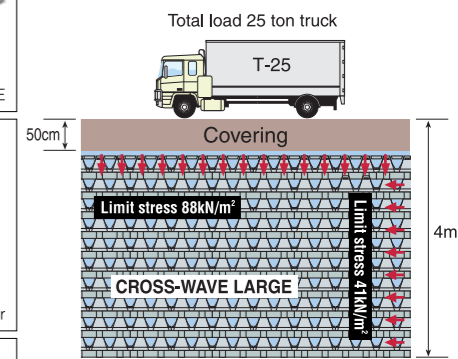
Spacer



Piled up structure

Grade	CROSS-WAVE LARGE (CW-L)			
	Full	Half	Quarter	Spacer
Size (mm)	994×994×200	994×494×200	494×494×200	988×240×25
Weight (kg)	7.7	3.8	1.9	0.8
Vertical direction	Deemed proposition	103kN/m ²		
	Permissional	88kN/m ²		
Horizontal direction	Deemed proposition	49kN/m ²		
	Permissional	41kN/m ²		
Manu.method	INJECTION			
Material	Polypropylene or Recycled Polypropylene			
Void rate	more than 94%			

• Scope of application

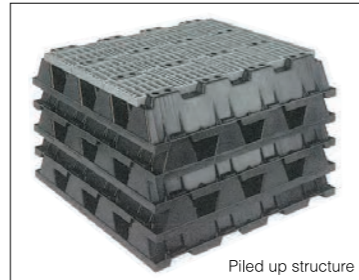
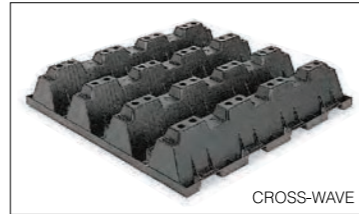
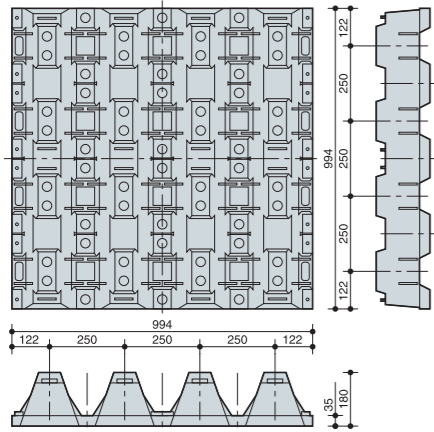


Covering limit 2.2m

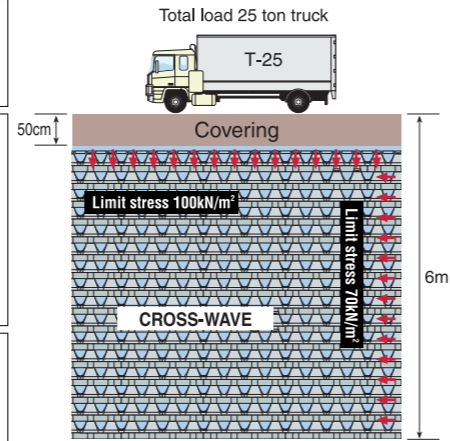
CW

CROSS-WAVE

Basic type of crosswave.
Can be used for deeper project.



• Scope of application

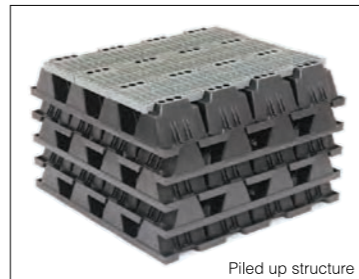
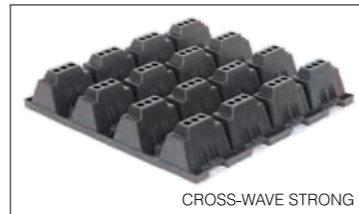
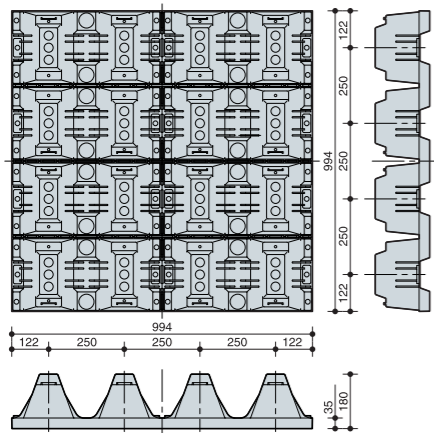


Grade	CROSS-WAVE (CW)		
	Full	Half	Spacer
Size (mm)	994×994×180	994×494×180	993×246×45
Weight (kg)	6.5	3.2	1.4
Vertical direction	Deemed proposition	122kN/m ²	
	Permissional	100kN/m ²	
Horizontal direction	Deemed proposition	90kN/m ²	
	Permissional	70kN/m ²	
Manu.method	INJECTION		
Material	Polypropylene or Recycled Polypropylene		
Void rate	more than 93%		

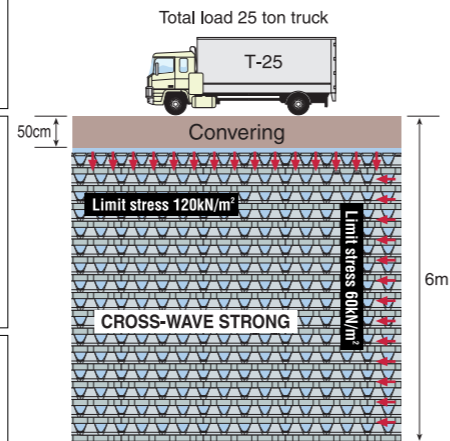
CW-S

CROSS-WAVE STRONG

Crosswave high intensity type.
Can bear with heavy vertical load.



• Scope of application



Grade	CROSS-WAVE STRONG (CW-S)			
	Full	Half	Quarter	Spacer
Size (mm)	994×994×180	994×494×180	494×494×180	993×246×45
Weight (kg)	7.3	3.6	1.8	1.4
Vertical direction	Deemed proposition	151kN/m ²		
	Permissional	120kN/m ²		
Horizontal direction	Deemed proposition	70kN/m ²		
	Permissional	60kN/m ²		
Manu.method	INJECTION			
Material	Polypropylene or Recycled Polypropylene			
Void rate	more than 92%			

Height and void rate at glance

Number of stacking	CW-H (CROSS-WAVE HIGH)		CW-L (CROSS-WAVE LARGE)		CW (CROSS-WAVE)		CW-S (CROSS-WAVE STRONG)	
	Height (m)	V.rate (%)	Height (m)	V.rate (%)	Height (m)	V.rate (%)	Height (m)	V.rate (%)
1	0.220	94.7	0.200	93.9	0.1800	92.6	0.1800	92.1
2	0.405	95.1	0.365	94.4	0.2925	93.0	0.2925	92.4
3	0.590	95.3	0.530	94.5	0.4050	93.2	0.4050	92.5
4	0.775	95.4	0.695	94.6	0.5175	93.3	0.5175	92.6
5	0.960	95.4	0.860	94.7	0.6300	93.4	0.6300	92.6
6	1.145	95.5	1.025	94.7	0.7425	93.4	0.7425	92.7
7	1.330	95.5	1.190	94.7	0.8550	93.5	0.8550	92.7
8	1.515	95.5	1.355	94.7	0.9675	93.5	0.9675	92.7
9	1.700	95.5	1.520	94.8	1.0800	93.5	1.0800	92.7
10	1.885	95.5	1.685	94.8	1.1925	93.5	1.1925	92.7
11	2.070	95.6	1.850	94.8	1.3050	93.5	1.3050	92.7
12	2.255	95.6	2.015	94.8	1.4175	93.5	1.4175	92.8
13	2.440	95.6	2.180	94.8	1.5300	93.5	1.5300	92.8
14	2.625	95.6	2.345	94.8	1.6425	93.6	1.6425	92.8
15	2.810	95.6	2.510	94.8	1.7550	93.6	1.7550	92.8
16	2.995	95.6	2.675	94.8	1.8675	93.6	1.8675	92.8
17	3.180	95.6	2.840	94.8	1.9800	93.6	1.9800	92.8
18	3.365	95.6	3.005	94.8	2.0925	93.6	2.0925	92.8
19	3.550	95.6	3.170	94.8	2.2050	93.6	2.2050	92.8
20	3.735	95.6	3.335	94.8	2.3175	93.6	2.3175	92.8
21	3.920	95.6	3.500	94.8	2.4300	93.6	2.4300	92.8
22			3.665	94.8	2.5425	93.6	2.5425	92.8
23			3.830	94.8	2.6550	93.6	2.6550	92.8
24			3.995	94.8	2.7675	93.6	2.7675	92.8
25					2.8800	93.6	2.8800	92.8
26					2.9925	93.6	2.9925	92.8
27					3.1050	93.6	3.1050	92.8
28					3.2175	93.6	3.2175	92.8
29					3.3300	93.6	3.3300	92.8
30					3.4425	93.6	3.4425	92.8
31					3.5550	93.6	3.5550	92.8
32					3.6675	93.6	3.6675	92.8
33					3.7800	93.6	3.7800	92.8
34					3.8925	93.6	3.8925	92.8
35					4.0050	93.6	4.0050	92.8
36					4.1175	93.6	4.1175	92.8
37					4.2300	93.6	4.2300	92.8
38					4.3425	93.6	4.3425	92.8
39					4.4550	93.6	4.4550	92.8
40					4.5675	93.6	4.5675	92.8
41					4.6800	93.6	4.6800	92.8
42					4.7925	93.6	4.7925	92.8
43					4.9050	93.6	4.9050	92.8
44					5.0175	93.6	5.0175	92.8
45					5.1300	93.6	5.1300	92.8
46					5.2425	93.6	5.2425	92.8
47					5.3550	93.6	5.3550	92.8
48					5.4675	93.6	5.4675	92.8
49					5.5800	93.6	5.5800	92.8
50					5.6925	93.6	5.6925	92.8

Reference construction



under construction

Rainwater regulating reservoir construction in Ishikawa prefecture (Storage capacity:9,200m³)



after completion



parking lots

Rainwater regulating reservoir construction in Nara prefecture, under the parking lot, at a funeral hall (Storage capacity:720m³)



parking lots

Rainwater regulating reservoir construction in Ehime prefecture, under the parking lot, at shopping centre (Storage capacity:6,600m³)



under park

Reservoir construction in Tokyo for rainwater utilization (Storage capacity:100m³)



under park

Rainwater regulating reservoir in Chiba prefecture at group housing society (storage capacity:420m³)



under construction

Rainwater regulating reservoir construction for government office in Miyagi prefecture (Storage capacity:1,700m³)



after completion



under schoolyard

Rainwater regulating reservoir construction in Fukuoka prefecture under playground at school (storage capacity:800m³)

