

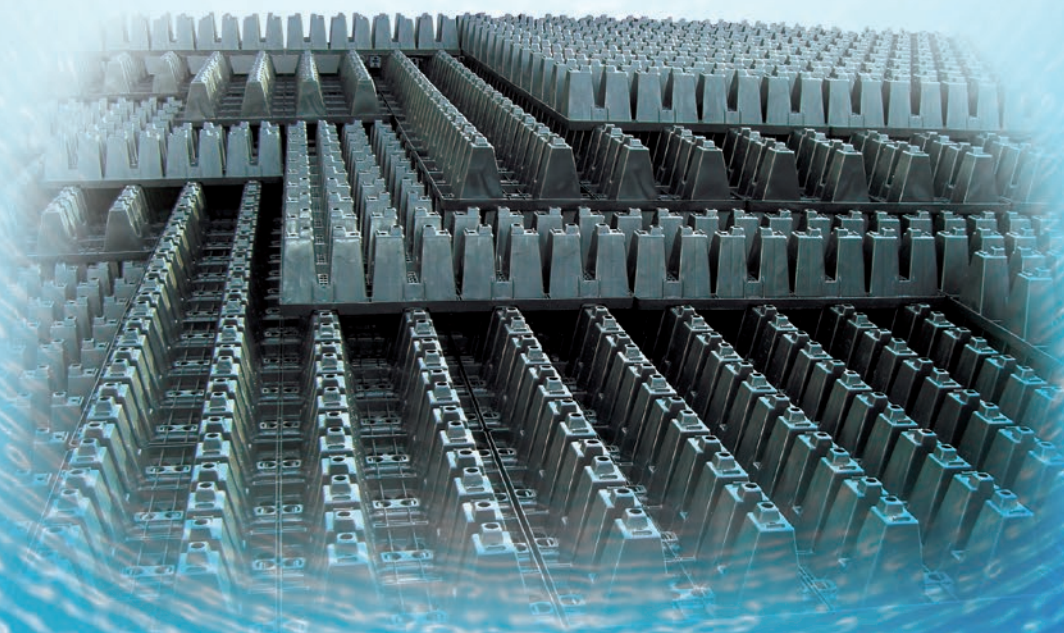
SEKISUI

September 2026
edition

調整池
物置
サッカーコート
雨水浸透処理施設
プール
L=8.00m
5.00m × 8.00m × 1.70m
Water space under the ground

Plastic material for water storage

CROSS-WAVE



SEKISUI CHEMICAL CO., LTD.

Cumulative total pondage in Japan
More than **3.9** million m³

Cumulative total installation in Japan
Over **17,000** cases

Reliable track record
More than **28** years from release

Plastic material for water storage required now

The CROSS-WAVE series is intended to construct rainwater storage and infiltration reservoirs by burying plastic blocks (made of recycled polypropylene resin) under the ground in order to reduce rainwater runoff and use rainwater. Piling up blocks so that they intersect at right angles achieves a high void ratio, securing necessary and sufficient pondage. The completed structure is significantly stable.

SEKISUI CHEMICAL CO., LTD. launched the CROSS-WAVE series in 1998. Since then, it has been adopted at both public and private facilities, and the cumulative total of installation and the cumulative total pondage have exceeded 17,000 cases and 3,900,000 m³, respectively. As a manufacturer of plastic storage materials, we have the best track record in Japan and continue to steadily increase the number of installation cases also in overseas countries.

Furthermore, we provide high-quality products by producing them at our own plants.



■ Use applications of CROSS-WAVE

Materials for rainwater storage provided by a leading plastic manufacturer, Sekisui, for control of flooding due to typhoons, torrential rain, etc.

Rainwater runoff reduction

Even in the event of heavy rain due to typhoons and torrential rain, rainwater can be stored under the ground efficiently and safely to reduce rainfall runoff, minimizing damage from flooding.



+

Rainwater use

Stored rainwater can be used as:

Household non-potable water

Industrial water

Agricultural water

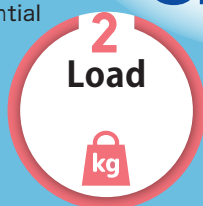


Five features of CROSS-WAVE



1 Void ratio

Achieving a 95 % void ratio allows storage of substantial volume of water



2 Load

Can load a T-25 truck (Except for general roads)



3 Resistance against earthquakes

Resistant to level-2 seismic movements
No collapse even in the event of the Great East Japan Earthquake



4 Easy installation

No fixing material required and can be installed manually



5 Environmental friendliness

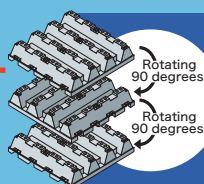
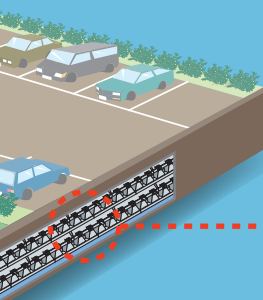
The use of recycled materials reduces environmental impact

Use of recycled plastic

CROSS-WAVE

Water space under the ground

Plastic material for water storage



By piling up corrugated plastic blocks so that they intersect at right angles with each other (requiring no jointing materials), a robust and rigid structure can be constructed while securing great voids between blocks.



Since CROSS-WAVE is fully buried under the ground to store rainwater, rainwater storage and infiltration measures can be taken without impairing the scenery around the facility and in the community.

SEKISUI CHEMICAL CO., LTD. aims to produce products for achieving SDGs* through CROSS-WAVE.



Six SDGs that CROSS-WAVE is aimed at achieving. Through initiatives to achieve these goals, Sekisui Techno Molding has declared to return more natural capital back to the planet than it uses to help to conserve the natural environment.

SUSTAINABLE DEVELOPMENT GOALS

* Internationally shared goals from 2016 to 2030 specified in the 2030 Agenda for Sustainable Development, adopted at the United Nations Summit held in September 2015

Broad product lineup according to the purpose Proposing the most suitable product for every environment

We offer four types of products with different earth covering and burial depth that respond to various installation conditions and burial environments of each customer's desired rainwater storage and infiltration facility. We will propose the optimum product for each customer. Please do not hesitate to contact us.

Product selection guide table

Maximum burial depth	Product	Vehicle load	Minimum Cover		Maximum Cover
			1.3 feet (0.4 m)~	1.6 feet (0.5 m)~	~5.9 feet (1.8 m)
Under 12.4 feet (3.8 m)	CW-Ne	HL-93	○	—	○
		HS-25	○	—	○
		CL800	○	—	○
		CL625	○	—	○
12.4 to 18.3 feet (3.8~5.6 m)	CW-NS	HL-93	○	—	○
		HS-25	○	—	○
		CL800	○	—	○
		CL625	○	—	○

Note 1) Calculations assume a soil unit weight of 121 psf (19 kN/m³).

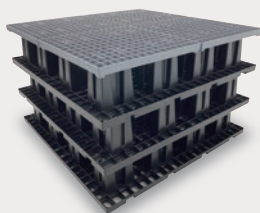
Note 2) () indicates measurements in meters.

Note 3) Burial depth is measured from the bottom of the module (excluding any base sheet) to the finished surface (top of pavement or soil).

When installed adjacent to a slope, the effective burial depth is taken to the point where a 45° line projected upward from the outer edge of the module bottom intersects the ground slope.

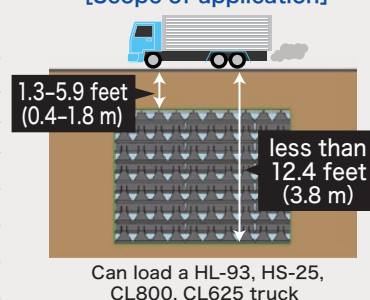
CW-Ne

CROSS-WAVE Ne



Product name		Full size	Half size	Spacer
Mass, lb (kg)		18.3 (8.3)	9.2 (4.2)	2.4 (1.1)
Dimensions (inches)		39.1×39.1×8.7	39.1×19.5×8.7	19.3×19.3×1.6
Dimensions (mm)		994×994×220	994×494×220	490×490×40
Vertical direction	Permissible stress	2,297 psf (110 kN/m²)		
	Permissible stress for sustained loading	751 psf (36 kN/m²)		
Horizontal direction	Permissible stress	1,253 psf (60 kN/m²)		
	Permissible stress for sustained loading	553 psf (26.5 kN/m²)		
Void ratio		95 % (3 layers or more)		

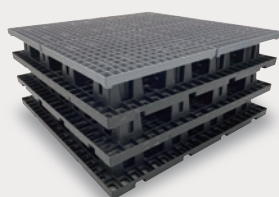
[Scope of application]



CW-NS

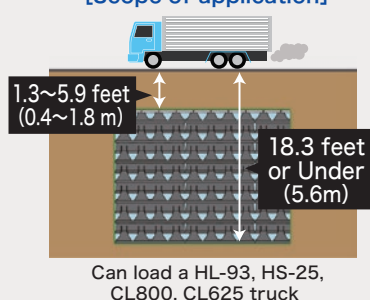
CROSS-WAVE NS

Maximum burial depth: 18.3 feet (for CW-Ne Hybrid)



Product name		Full size	Half size	Spacer
Mass, lb (kg)		15.9 (7.2)	7.9 (3.6)	2.4 (1.1)
Dimensions (inches)		39.1×39.1×6.3	39.1×19.5×6.3	19.3×19.3×1.6
Dimensions (mm)		994×994×160	994×494×160	490×490×40
Vertical direction	Permissible stress	2,088 psf (100 kN/m²)		
	Permissible stress for sustained loading	751 psf (36 kN/m²)		
Horizontal direction	Permissible stress	2,506 psf (120 kN/m²)		
	Permissible stress for sustained loading	1,127 psf (54 kN/m²)		

[Scope of application]



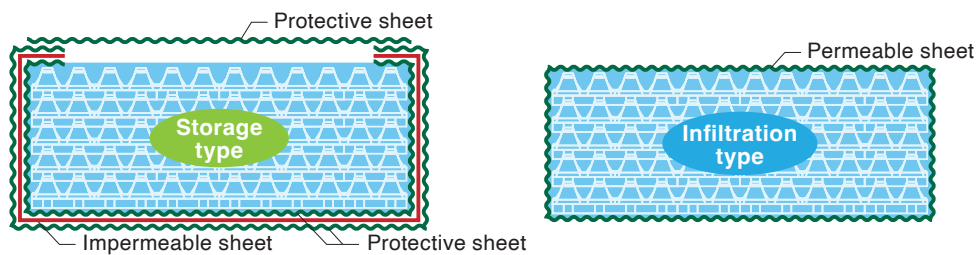
Note 1) () indicates measurements in meters.

**Two structural patterns offered according to the purpose:
storage type and infiltration type**
**Simple structure makes installation easy and helps to
shorten the work period.**

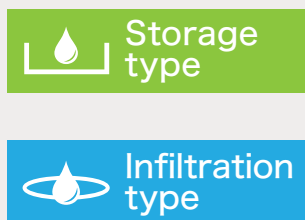
■ Bearing capacity of the ground

Item	Earth covering	Depth of foundation
Storage tank	1.3~5.9 feet (0.4~1.8 m)	Concrete: 0.3 feet (100 mm) + crushed stone: 0.5 feet (150 mm)
Infiltration tank		Sand: 0.15 feet (50 mm) + crushed stone: 0.5 feet (150 mm)

Note 1) If the allowable bearing capacity is less than 1,044 psf ($\approx 50 \text{ kN/m}^2$), verify design separately.
Note 2) () indicates measurements in meters.



■ Installation procedure



Unlike concrete type, CROSS-WAVE does not require large-scale and prolonged construction work for installation, curing, etc. After the foundational construction (spreading base gravel, base concrete placing, etc.), the work that needs to be done is only laying sheets, assembling CROSS-WAVE blocks and backfilling, minimizing work using heavy equipment, a special-purpose vehicle, etc. to reduce costs.

Thoughtful design for easy maintenance to operate safely for a long time with peace of mind

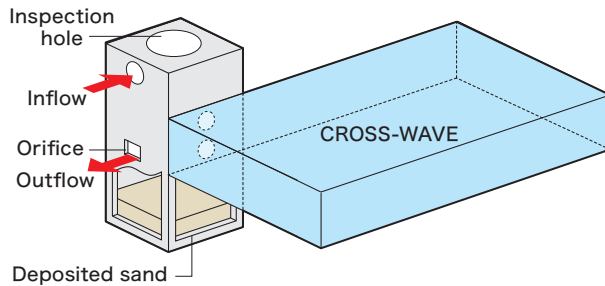
Regular maintenance is required. To prevent CROSS-WAVE's performance degradation from sediment (silt and sand) accumulated inside the storage reservoir due to rainwater inflow, a concrete management basin system for maintenance and an easy cleaning system are prepared. These make periodic inspection and cleaning of deposition easy and quick, allowing full preparation for disasters.

Concrete management basin system

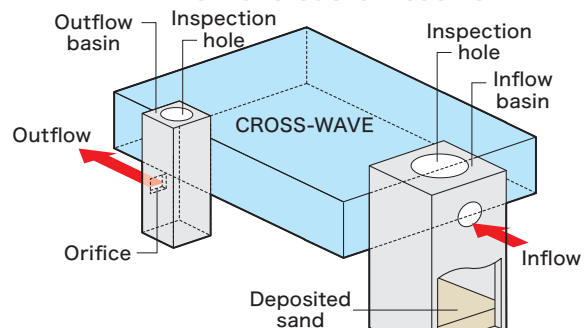
A maintenance-focused storage reservoir structure that can be adopted for small to large areas

Installing a sand basin, etc. at the inflow portion separates sand and earth flowing in, thereby letting only rainwater enter the CROSS-WAVE storage reservoir. Maintenance can be performed by removing deposited sediment in the sand basin with a vacuum truck, etc.

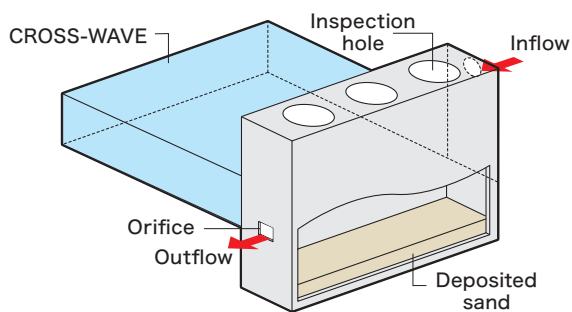
Example of integrated inflow and outflow basins



Example of separately locating inflow and outflow basins



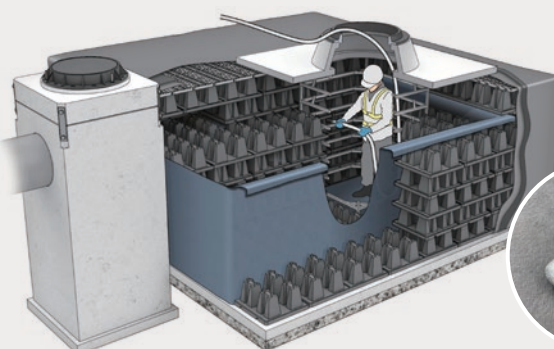
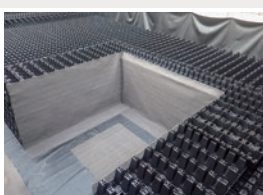
Example of integrated inflow and outflow basins (large-scale regulating pondage)



Easy cleaning system

Thoughtfully designed for workers to enter through the inspection hole and do the cleaning easily

Workers can enter the CROSS-WAVE storage reservoir through the inspection hole to check the status of deposition in it. The easy cleaning system allows concentration of sand and earth flowing in from the inflow pipe to deposit inside the basin, which can be checked by workers.



Installation cases show CROSS-WAVE's capabilities. Small- to large-scale facilities installed almost everywhere in Japan

In other words, CROSS-WAVE has penetrated into almost all areas of the country.

Below are installation cases by architecture type, such as plant, shopping center, warehouse, school, hospital and residential area, that respond to various site environments and installation conditions.



School



Hospital



Plant and
warehouse



Public
facility



Commercial
facility



Others



■ Installation cases



Rainwater regulating reservoir
in Ishikawa
9,200 m³



Farm in Shizuoka
16,500 m³



Cemetery in Tokyo
1,000 m³



Land development in Okinawa
400 m³



Hospital in Saitama
110 m³



□ Related products

Material for temporary roads “Plaroad”



NETIS registration
Registration No.
KT-100053-VR

In the case of electric transmission-related construction work at paddies and fields, temporary roads are traditionally constructed by using a combination of mountain sand, crushed stone, crossties, etc. and steel plates; however, this method makes the construction period longer and causes a problem with restoration to the original state and material waste disposal. The material for temporary roads named “Plaroad” enables effective construction and removal of temporary roads.

Material exclusive for roads “AQUAROAD”



▲Flooding-prone roads, underpasses
Measures against soft ground/buoyant force, lightweight mounding ▶

Construction Technology Review
and Certification No.1012
Public Works Research Center



“AQUAROAD” is effective for load alleviation and as a measure against flooding in the event of concentrated heavy rain and buoyant force when using earth pressure-relieving mounding and lightweight mounding. As a structural part of resin rainwater storage/infiltration reservoirs that can be constructed under roads, AQUAROAD has been certified by Construction Technology Review and Public Works Research Center.



Commercial complex in Saitama
500 m³



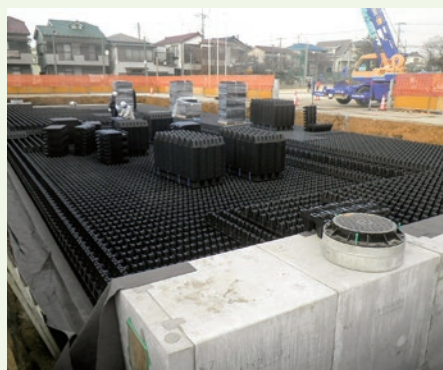
Elementary school in Fukuoka
800 m³



Commercial complex in Chiba
100 m³



Housing land development
in Saitama 5 m³



Elementary school
in Chiba 460 m³



Town development in Saitama
15 m³×140 subdivisions

■ Calculated load for the vertical direction and scope of application

CW-Ne, CW-NS						
Earth covering feet (m)	Vertical earth load psf (kN/m ²)	Total load (earth + live), psf (kN/m ²) Sum of vertical earth load and live load				Scope of application
		HL-93	HS-25	CL800	CL625	
1.3 (0.4)	159 (7.6)	1,409 (67.4)	1,693 (81.1)	2,089 (100.0)	1,667 (79.8)	Maximum earth covering 5.9 feet Permissible stress CW-Ne 2,300 psf (110 kN/m ²) CW-NS 2,090 psf (100 kN/m ²) • Permissible stress for sustained loading CW-Ne 751 psf (36 kN/m ²) CW-NS 751 psf (36 kN/m ²)
1.6 (0.5)	198 (9.5)	1,248 (59.8)	1,487 (71.2)	1,820 (87.2)	1,465 (70.2)	
2.0 (0.6)	238 (11.4)	1,143 (54.7)	1,349 (64.6)	1,636 (78.3)	1,330 (63.7)	
2.3 (0.7)	278 (13.3)	1,073 (51.4)	1,254 (60.0)	1,506 (72.1)	1,238 (59.3)	
2.6 (0.8)	317 (15.2)	1,027 (49.2)	1,188 (56.9)	1,413 (67.7)	1,174 (56.2)	
3.0 (0.9)	357 (17.1)	997 (47.8)	1,143 (54.7)	1,346 (64.4)	1,130 (54.1)	
3.3 (1.0)	397 (19.0)	980 (46.9)	1,113 (53.3)	1,298 (62.1)	1,101 (52.7)	
3.6 (1.1)	437 (20.9)	972 (46.5)	1,094 (52.4)	1,264 (60.5)	1,083 (51.9)	
3.9 (1.2)	476 (22.8)	971 (46.5)	1,084 (51.9)	1,241 (59.4)	1,074 (51.4)	
4.3 (1.3)	516 (24.7)	976 (46.7)	1,081 (51.8)	1,227 (58.8)	1,072 (51.3)	
4.6 (1.4)	556 (26.6)	986 (47.2)	1,084 (51.9)	1,220 (58.4)	1,075 (51.5)	
4.9 (1.5)	595 (28.5)	999 (47.8)	1,091 (52.2)	1,219 (58.4)	1,083 (51.8)	
5.2 (1.6)	635 (30.4)	1,015 (48.6)	1,102 (52.8)	1,223 (58.5)	1,094 (52.4)	
5.6 (1.7)	675 (32.3)	1,034 (49.5)	1,116 (53.4)	1,389 (66.5)	1,232 (59.0)	
5.9 (1.8)	714 (34.2)	1,055 (50.5)	1,133 (54.2)	1,391 (66.6)	1,243 (59.5)	
6.2 (1.9)	754 (36.1)	1,078 (51.6)	1,152 (55.1)	1,398 (66.9)	1,257 (60.2)	
6.6 (2.0)	794 (38.0)	1,102 (52.8)	1,173 (56.1)	1,407 (67.4)	1,273 (60.9)	

Note 1) Calculations assume a soil unit weight of 121 psf (19 kN/m³).

Note 2) The maximum earth covering is determined based on the long-term vertical load performance test.

Note 3) () indicates measurements in meters.

■ Height and void ratio chart

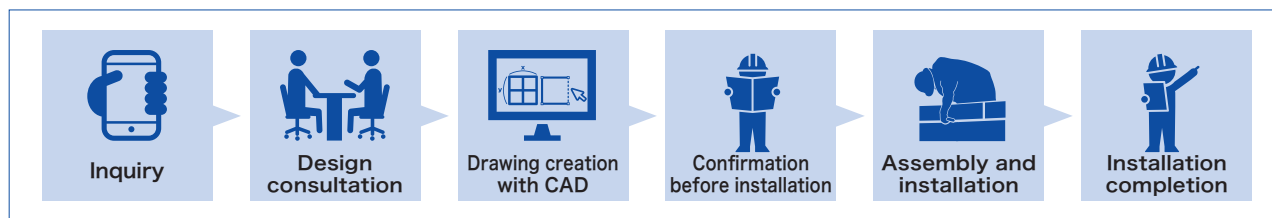
		CW-Ne+NS (in the case of hybrid)	
		Height (feet (m))	Void ratio (%)
Range with a burial depth under 12.4 (3.9 m) feet CW-Ne is used.	1	0.75 (0.23)	94
	2	1.41 (0.43)	
	3	2.07 (0.63)	95
	4	2.72 (0.83)	
	5	3.38 (1.03)	
	6	4.04 (1.23)	
	7	4.69 (1.43)	
	8	5.35 (1.63)	
	9	6.00 (1.83)	
	10	6.66 (2.03)	
	11	7.32 (2.23)	
	12	7.97 (2.43)	
	13	8.63 (2.63)	
	14	9.28 (2.83)	
	15	9.94 (3.03)	
	16	10.60 (3.23)	
Range with a burial depth from 13.12 to 18.3 feet (4.0 to 5.6 m) CW-NS is used.	1	0.46 (0.14)	94
	2	0.92 (0.28)	
	3	1.38 (0.42)	
	4	1.84 (0.56)	
	5	2.30 (0.70)	
	6	2.76 (0.84)	
	7	3.22 (0.98)	
	8	3.67 (1.12)	
	9	4.13 (1.26)	
	10	4.59 (1.40)	
	11	5.05 (1.54)	
	12	5.51 (1.68)	
	13	5.97 (1.82)	
	14	6.43 (1.96)	

■ Vertical loads from construction equipment and soil cover during backfilling (for reference)

Earth covering		Vertical earth pressure		Live load (psf)								Total (psf)							
				20 t bulldozer		20 t roller		10 t roller		4 t vibration roller		20 t bulldozer		20 t roller		10 t roller		4 t vibration roller	
feet	m	psf	kN/m²	psf	kN/m²	psf	kN/m²	psf	kN/m²	psf	kN/m²	psf	kN/m²	psf	kN/m²	psf	kN/m²	psf	kN/m²
1.0	0.3	113	5.4	703	34	1,980	95	1,080	52	625	30	816	39	2,093	100	1,193	57	738	35
1.3	0.4	150	7.2	566	27	1,358	65	731	35	453	22	716	34	1,508	72	881	42	603	29
1.6	0.5	188	9.0	467	22	1,022	49	528	25	344	16	655	31	1,210	58	716	34	532	25
2.0	0.6	226	10.8	393	19	823	39	424	20	272	13	618	30	1,048	50	650	31	497	24
2.3	0.7	263	12.6	335	16	679	33	349	17	220	11	599	29	942	45	613	29	483	23
2.6	0.8	301	14.4	299	14	571	27	293	14	182	9	599	29	871	42	594	28	483	23
3.0	0.9	338	16.2	272	13	487	23	250	12	153	7	611	29	826	40	588	28	492	24
3.3	1.0	376	18.0	250	12	421	20	216	10	131	6	626	30	797	38	592	28	507	24
3.6	1.1	414	19.8	229	11	368	18	189	9	113	5	643	31	782	37	602	29	527	25
3.9	1.2	451	21.6	212	10	325	16	166	8	99	5	663	32	776	37	617	30	550	26
4.3	1.3	489	23.4	196	9	289	14	148	7	87	4	685	33	778	37	636	30	576	28
4.6	1.4	526	25.2	182	9	259	12	132	6	77	4	708	34	785	38	658	32	604	29
4.9	1.5	564	27.0	169	8	233	11	119	6	69	3	733	35	797	38	683	33	633	30

Our partner companies across Japan provide support for design and installation throughout Japan.

Our partner company will provide support about the desired rainwater storage reservoir (rainwater storage and infiltration facility), from design consultation to after-sales service.



※ The support described above is provided upon request.

[To use CROSS-WAVE safely]

Below are important instructions regarding safety. Please be sure to follow them.



The following acts are prohibited as they may cause an accident or damage to a facility.

- **Use of broken products**
Never use broken products.
- **Fire safety**
The products are flammable. Keep away from open flames during storage and installation.
- **Modification of products**
Do not make modifications (boring, cutting, etc.) to the products. Doing so will reduce strength.
- **Violation of law**
Observe related laws, regulations, etc. for installation.
- **Use outside the applicable scope**
When using the products, observe the applicable loading condition by product. (If the products are used with an earth covering, burial depth, etc. outside the scope of application, the products may break.)
- **Crane operation**
Do not operate a crane or remove sheet piles on the storage reservoir.
- **Installation during stormy weather**
Do not lay sheets during the rain or snow.
- **Pouring of hot water**
Pouring hot water will cause deformation and reduce strength. Contact us before doing so.



To install products safely, caution should be exercised regarding the following matters.

- **Handling products**
Do not throw away the products. Doing so will cause breakage.
- **Storing products**
When the products are in storage for a long time, cover them with sheets to keep from direct sunlight.
- **Laying sheets**
Sheets shall be laid by professionals so as not to cause leakage of water, etc. due to imperfect bonding of sheets.
- **Installation**
When getting on the upper surfaces of the products or spacers during installation, watch your step.
- **Backfill**
After completing installation of the storage reservoir, backfill the hole as soon as possible. Backfill the area around the storage reservoir evenly so as not to cause uneven load.
- **Oil resistance**
If organic solvents, oil, etc. stick to the products, deformation and strength reduction are caused. Be sure to keep them away.

※ SEKISUI CHEMICAL CO., LTD. makes a proposal pursuant to the Technical Guidelines for Plastic Underground Storage and Infiltration Facilities (Draft).

SEKISUI CHEMICAL CO., LTD.

URBAN INFRASTRUCTURE & ENVIRONMENTAL
PRODUCTS COMPANY
Pipe Systems & Civil Engineering Materials Sales Department.
Cross-wave Group

Okura Prestige Tower, 2-10-4 Toranomon, Minato-ku,
Tokyo 105-8566

CROSS-WAVE Special Site

<https://sekisui-cw.co.jp>