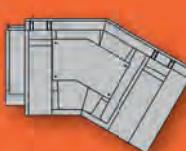
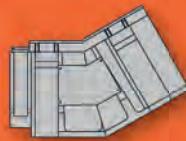




TECHNICAL SPECIFICATION



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TECHNICAL
SPECIFICATION
FOR
GREEN TROUGH

No. TS-101

Feb 2018 Version

1. Scope

This specification applies to Troughs made by re-cycled synthetic resin. It details the available parts and their respective dimensions. There are 9 section sizes in the range although not all parts are available for every size. The generic sizes are detailed in Appendix 1. At the end of the document there is a concrete comparator chart.

2. Structure

The structure and components of the Straight Trough unit are as shown in Figures 1 & 2 and Table 1. The colour tone is purposely designed to be similar to Concrete (grey color).

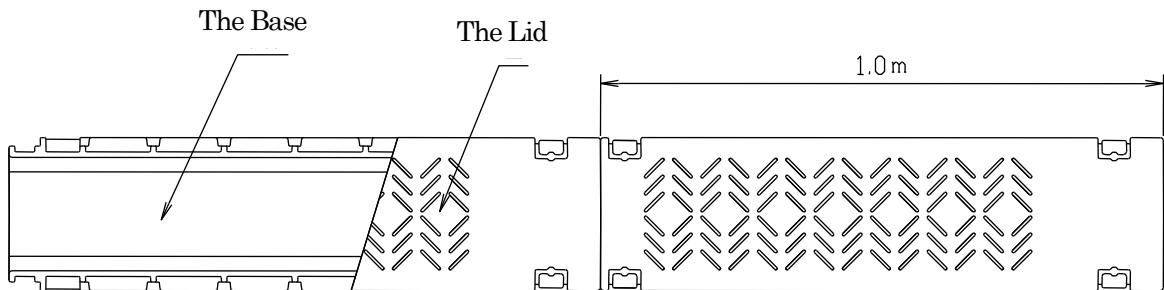


Figure 1. Structure (Assembly drawing of 090, 150, 200, 201, 300)

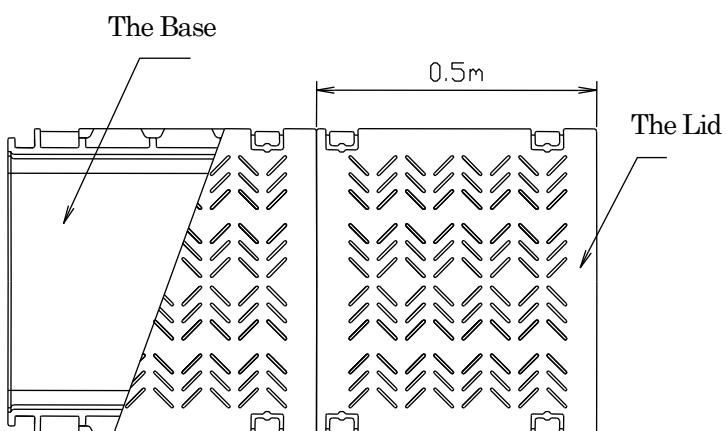


Figure 2. Structure (Assembly drawing of 250, 400, 430)

Table 1. Component

Item	Quantity	Material
The Lid	1 Piece	Basic material : Recycled Polyethylene (PE), Recycled Polypropylene (PP), Chemical agents (UV stabilisers, Anti-static), Inorganic filler, etc..
The Base	1 Piece	

Note : For the Lid fixing, the standard option uses the Screw (Appendix 7) .

3. Performance

The performance of the Trough is as shown in Table 2

Table 2 Performance

Item	Test method	Performance
Dimensions	4. 1	As shown in Appendix
Compressive strength	4. 2	In condition 4.9kN/0.5m, no crack or crevice shall appear in any part.
Flame retardance	4. 3	After having removed the source flame in the fire-retardant test of JESC E 7003 (2005), it extinguishes on the product within 60 seconds.
Chemical resistance	4. 4	A rate of weight change shall be 1% or less after soaking in water solution of 30%CaCl ₂ in a test method of JIS K 7114-IS0175

4. Test method

4.1 Dimensions

Each part (lid and base) of the trough will be measured with a steel tape measure at normal temperature (20 ± 10 degrees Centigrade)

4.2 Compressive strength

As shown in Figure 3., the trough with lid shall be added a linear load of more than 4.9kN/500 mm at a rate of 20 mm/min.

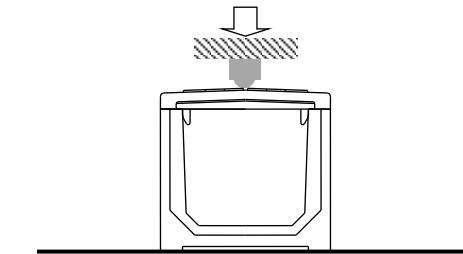


Figure 3. Illustration of compressive test

4.3 Flame retardance

Based on the test method of JESC E 7003 : 2005 ("flame retardance in combination with self-extinguishing properties", JESC : Japan Electro technical Standards and Codes Committee), prepare the specimen of about 300mm from the final product of the trough. And support this specimen horizontally and the central part of the specimen is burnt with a Bunsen burner which is about 130mm of the oxidizing flame. After having removed the flame, confirm that it disappears spontaneously within 60 seconds.

4.4 Chemical resistance

Follow to the test method of JIS K 7114 – ISO 175 (Chemical resistance test), prepare the specimen from the final product of the trough. And soak the specimen in 30% calcium chloride water solution for 24 hours and measure the mass of the specimen before and after the examination. Calculate a rate of weight change by the following the expression.

$$M = \frac{M_2 - M_1}{M_1} \times 100$$

M : A rate of weight change [%]
M₁ : A mass of the specimen before the test [mg]
M₂ : A mass of the specimen after the test [mg]

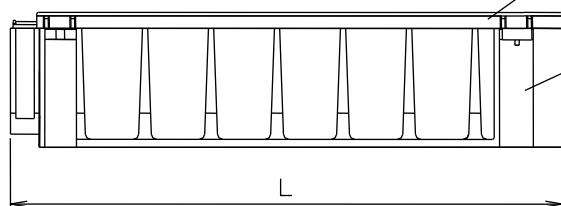
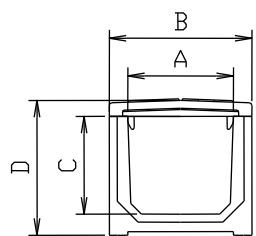
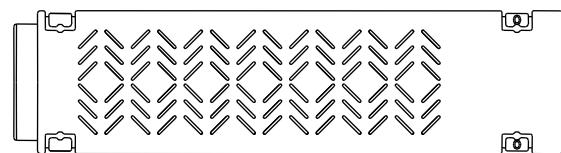
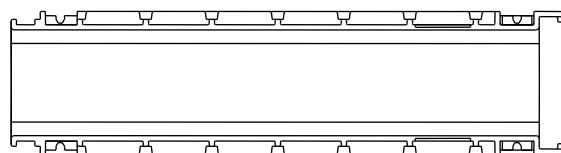
5. Locking mechanism

Two locking mechanisms are available for the Green Trough, screw type and clip type. Screw type Green Trough is the standard system sold, its characteristics are detailed in appendix 7. The clip type Green Trough system is only available upon request.

As a result, the part number used in this document denote for the screw type system. The part number for a clip type trough would start by “TC” instead of “TS”; e.g. TC200S denotes for a 200 series straight trough with a clip type locking mechanism, while TS200S denotes for a 200 series straight trough with a screw type locking mechanism.

The Appendices on the following pages detail the sizing and part numbers for the available units in the range.

Appendix1 Standard Straight Trough



The Lid

The Base

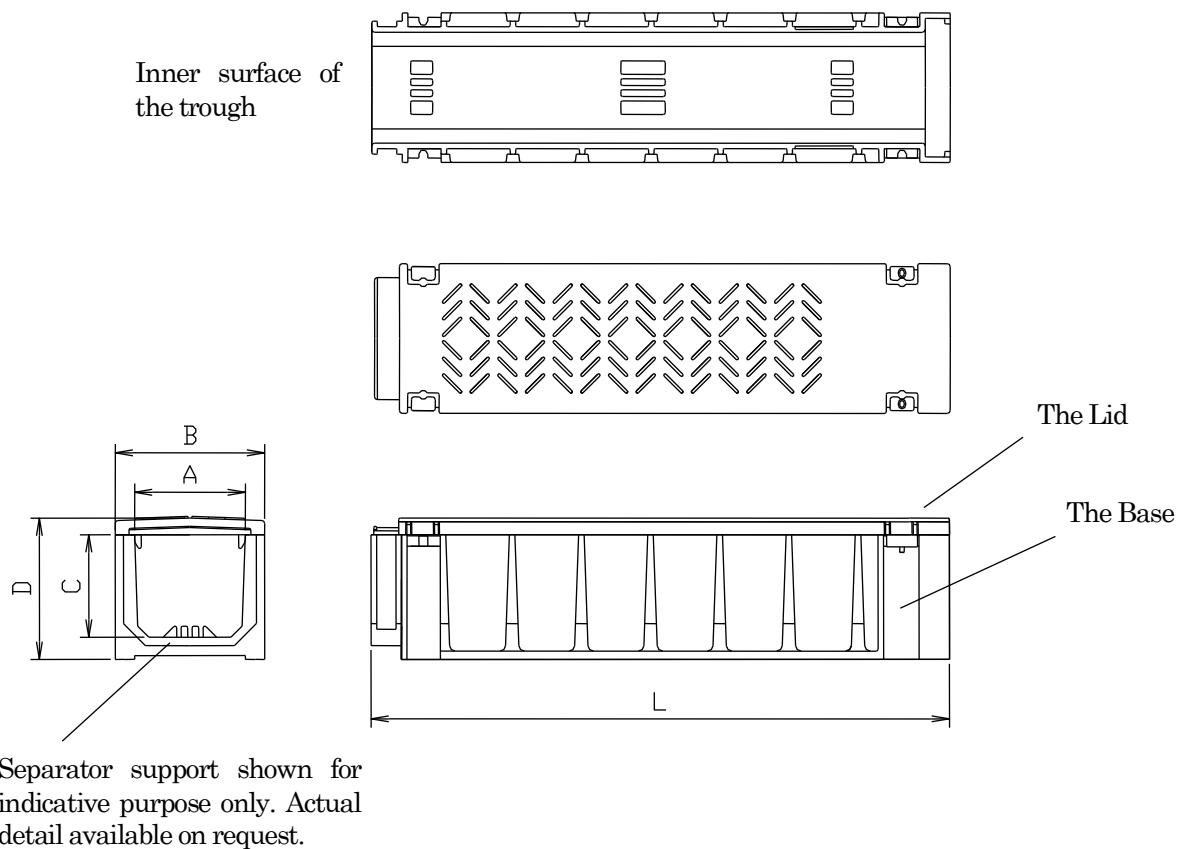
(Unit : mm)

Series	Part No.	Cat No.	A	B	C	D	L
090	TS090S	087/004634	90±8	120±8	100±8	136±10	1035 ⁺³⁰⁻¹⁰
150	TS150S	087/004701	160±8	210±8	135±8	190±10	1035 ⁺³⁰⁻¹⁰
200	TS200S	087/004702	200±8	270±8	185±8	255±10	1045 ⁺³⁰⁻¹⁰
250	TS250S	087/004704	250±8	330±8	175±8	265±10	545 ⁺³⁰⁻¹⁰
300	TS300S	087/004705	300±8	390±8	175±8	265±10	1045 ⁺³⁰⁻¹⁰
430	TS430S	087/004707	450±8	540±8	255±8	360±10	545 ⁺³⁰⁻¹⁰

*Denotes limited range of associated parts available in this size

Appendix 2 Straight Trough Multiple-Divider type

(supplied using standard straight trough and self supporting separator walls)



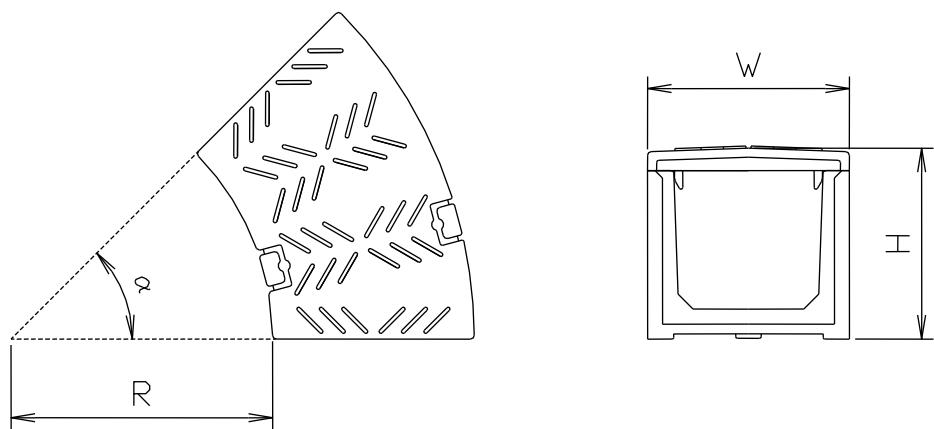
Series	Part No.	Cat No.	A	B	C	D	(Unit : mm)
150	TS152S	087/004636	160±8	210±8	135±8	190±10	1035^{+30}_{-10}
200	TS202S	087/004708	200±8	270±8	185±8	255±10	1045^{+30}_{-10}
250	TS252S	087/004709	250±8	330±8	175±8	265±10	545^{+30}_{-10}
250	TS253S	087/004710	250±8	330±8	175±8	265±10	545^{+30}_{-10}
300	TS302S	087/004711	300±8	390±8	175±8	265±10	1045^{+30}_{-10}
300	TS303S	087/004715	300±8	390±8	175±8	265±10	1045^{+30}_{-10}
430	TS432S	087/004716	450±8	540±8	255±8	360±10	545^{+30}_{-10}
430	TS433S	087/004717	450±8	540±8	255±8	360±10	545^{+30}_{-10}
430	TS434S	087/004718	450±8	540±8	255±8	360±10	545^{+30}_{-10}

Note: the fifth digit in the part number designates the voids created by separator plates in the trough

[Reference dimensions : Straight Trough Multiple-Divider type The location of separator wall]

	<p>Size 150</p> <p>210 160 55 25 25 55 135 190</p>
<p>Size 200</p> <p>270 200 80 20 20 80 185 255</p>	<p>Size 250</p> <p>330 250 67 58 58 67 175 265</p>
<p>Size 300</p> <p>390 300 100 50 50 100 175 265</p>	<p>Size 430</p> <p>540 450 150 75 75 150 255 360</p>

Appendix 3 45-degree angle trough

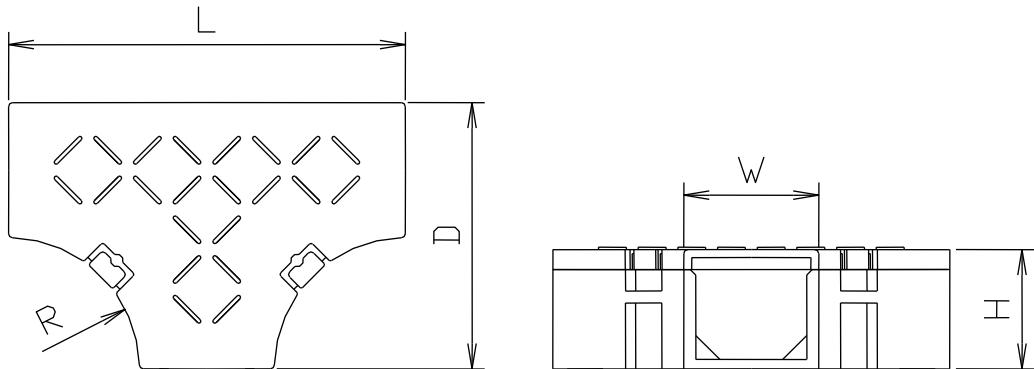


(Unit : mm)

Series	Part No.	Cat No.	W	H	α	R
090	TS090B	087/004641	90±8	100±8	45°	350
120	TS120B	087/004730	170±8	150±10		
150	TS150B	087/004731	210±8	190±10		
200	TS200B	087/004732	270±8	255±10		
250	TS250B	087/004733	330±8	265±10		
300	TS300B	087/004734	390±8	265±10		
430	TS430B	087/004735	540±8	360±10		

Accessory : Male-male adaptor : 1 set supplied

Appendix 4 T - Junction Trough

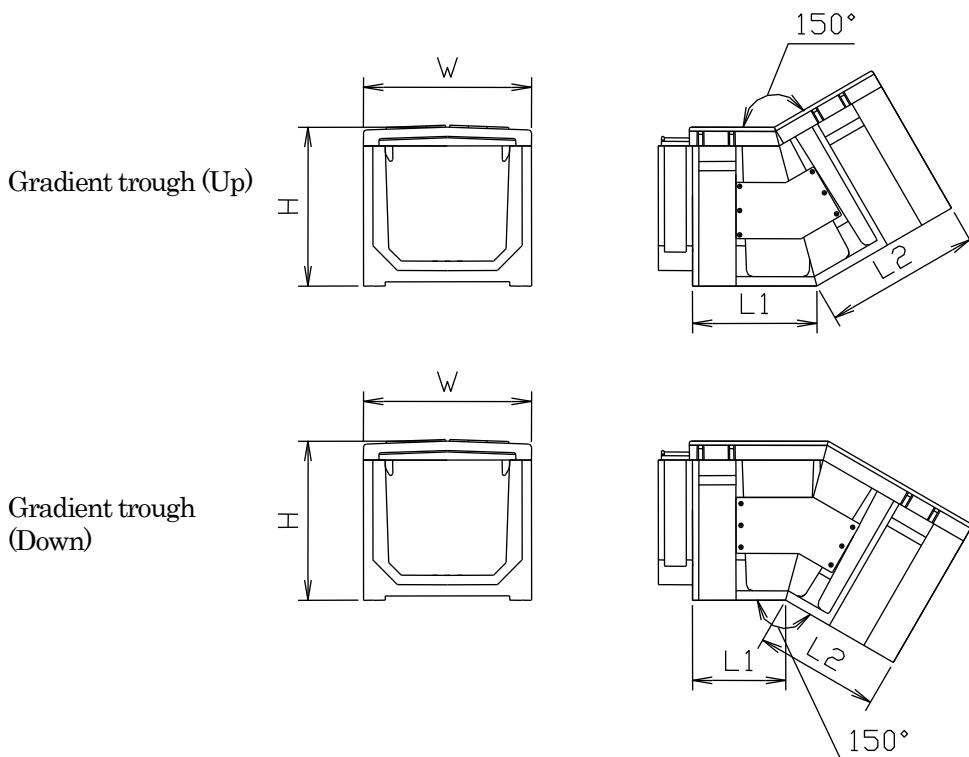


(Unit : mm)

Series	Part No.	Cat No.	L	D	W	H	R
090	TS090T	087/004642	500±8	310±8	90±8	100±10	190
120	TS120T	087/004736	500±8	335±8	170±8	150±10	165
150	TS150T	087/004737	500±8	355±8	210±8	190±10	145
200	TS200T	087/004738	500±8	385±8	270±8	255±10	115
250	TS250T	087/004739	560±8	445±8	330±8	265±10	115
300	TS300T	087/004740	600±8	495±8	390±8	265±10	105
430	TS430T	087/004643	730±8	635±8	540±8	360±10	*

Accessory : Male-male adaptor : 1 set

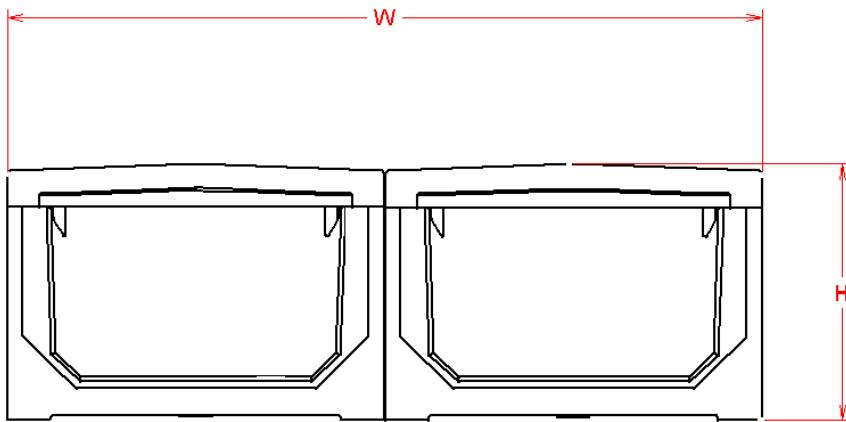
Appendix 5 Gradient trough



(Unit : mm)

Part name	Series	Part No.	Cat No.	W	H	L1	L2
Gradient trough(UP)	090	TS090U	087/004637	90±8	100±10	300±10	350±10
	120	TS120U	087/004719	170±8	150±10		
	150	TS150U	087/004720	210±8	190±10		
	200	TS200U	087/004721	270±8	255±10	200±10	250±10
	250	TS250U	087/004722	330±8	265±10		
	300	TS300U	087/004723	390±8	265±10		
	430	TS430U	087/004638	540±8	360±10	310±10	260±10
Gradient trough(Down)	090	TS090D	087/004639	90±8	100±10	250±10	300±10
	120	TS120D	087/004725	170±8	150±10		
	150	TS150D	087/004726	210±8	190±10		
	200	TS200D	087/004727	270±8	255±10	150±10	200±10
	250	TS250D	087/004728	330±8	265±10		
	300	TS300D	087/004729	390±8	265±10		
	430	TS430D	087/004640	540±8	360±10	225±10	175±10

Appendix 6 Walkway



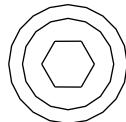
The walkway system comprises of two 300 series straight trough units assembled in parallel. They are connected together with the help of galvanised steel bars for stability. The top surface of the lids is coated with an anti slip layer to provide sure footing all year round. The lid surface has a slight camber to enable water run off and the anti slip material helps to completely prevent the potential for static charge build up. Lids can be lifted independently of each other and correct seating following replacement is ensured through design of the interface. There is zero chance of lid or base buckling in extreme temperatures due to innovative design features of interlocks and overlaps.

(Unit : mm)

Part Name	Part No.	L	W	H	Internal Capacity
Walkway	TS300W	1045±10	780±8	265±10	105,000mm ²

Appendix 7 Screw

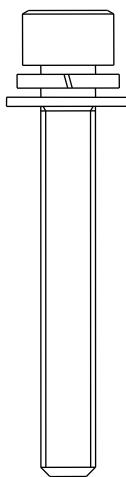
Hexagonal head fitting supplied as standard



Other head types available upon request

Examples:

- Snake eye
- Unique client specific head



Size	Part No.	Type of Screw	Security Level
All	RD-BS45	CAP SEMS P 3 M6L45	Standard
All	RD-SE45	CAP Snake Eye M6L45	High
All	RD-UH45	CAP Unique Head M6L45	Highest

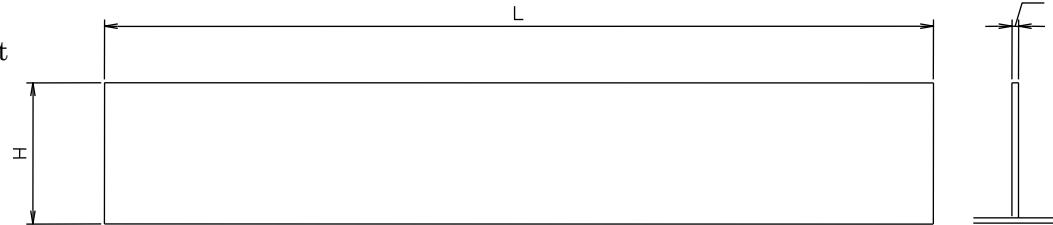
Use for Straight trough, 45-degree angle trough, T-junction trough, Gradient trough (UP & Down).
The number of the standard use:

- 2 parts / trough : Straight trough, 45-degree angle trough, T-junction trough
- 4 parts / trough : Gradient trough (UP & Down)

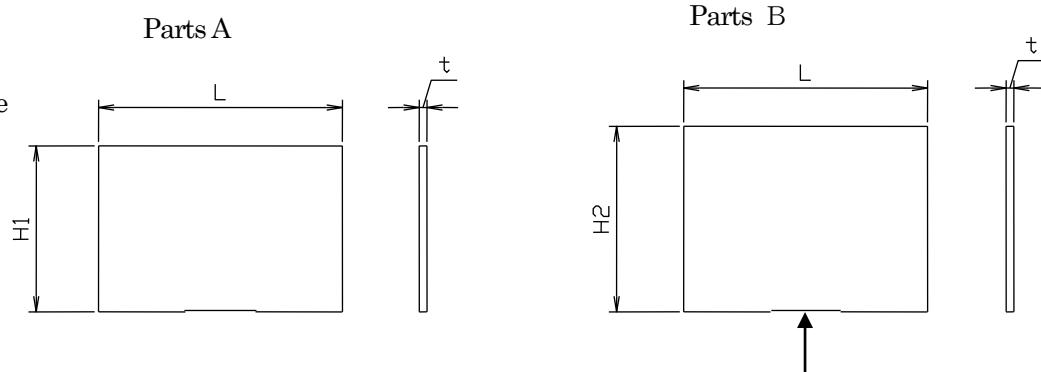
Material: Stainless steel.

Appendix 8 Separator wall for symmetrical chambers

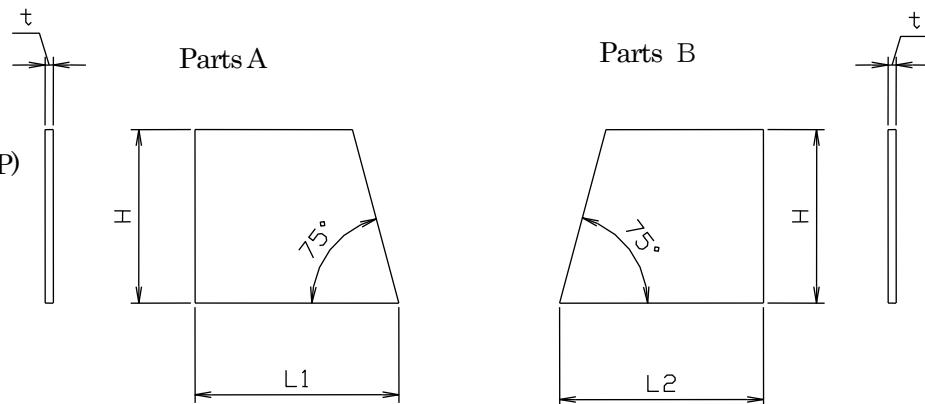
For Straight Trough



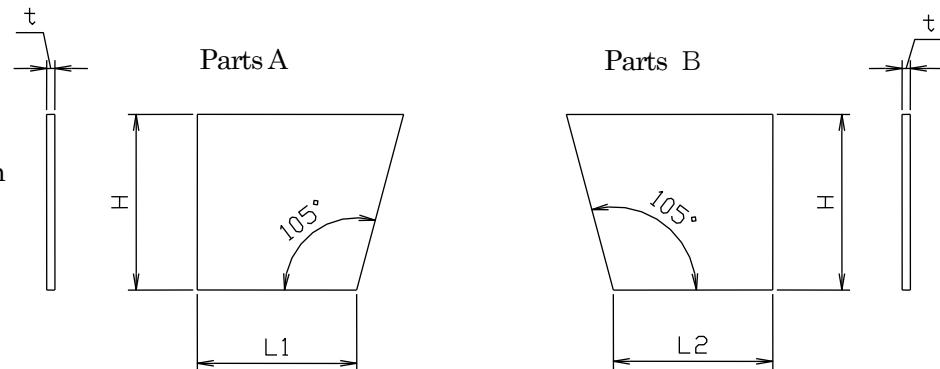
For 45-degree angle Trough



For Gradient trough (UP)



For Gradient trough (DOWN)



*The number of usage: • 2 parts (Parts A &B) / set : For 45-degree angle trough, For Gradient trough

(Unit : mm)

Part name		Part No.	Cat No.	L	H	t	
Separator (For Straight Trough)	For 150	GT-SP150B-L	087/004647	1000±5	120±3	8±1	
	For 200, 300	GT-SP200B-L	087/004648		170±3		
	For 250	GT-SP250B-L	087/004649	500±5			
	For 300	GT-SP300C-L	087/004650	1000±5	250±3		
	For 430	GT-SP430C-L	087/004651	500±5			

(Unit : mm)

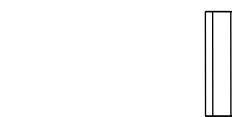
Part name		Part No.	L	H1	H2	t
Separator (For 45-degree angle Trough)			250±5			8±1
	For 150	GT-SP150B-C		120±3	133±3	
	For 200, 250	GT-SP200B-C		170±3	190±3	
	For 300	GT-SP300B-C		187±3	187±3	
	For 430	GT-SP430C-C		500±5	270±3	

Part name		Part No.	L1	L2	H	t
Separator For Gradient trough(UP)			338±8	308±8	8±1	8±1
	For 150	GT-SP150B-U			120±3	
	For 200, 300	GT-SP200B-U	244±8	194±8		
	For 250	GT-SP250B-U	232±8	198±8		
	For 430	GT-SP430C-U	230±8	190±8	250±3	
Separator For Gradient trough(Down)			301±8	271±8	8±1	8±1
	For 150	GT-SP150B-D			120±3	
	For 200, 300	GT-SP200B-D	215±8	165±8		
	For 250	GT-SP250B-D	207±8	172±8		
	For 430	GT-SP430C-D	160±8	118±8	250±3	

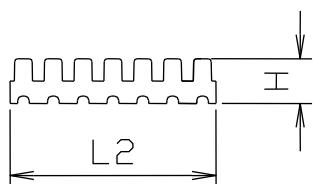
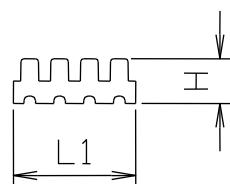
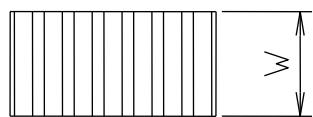
Material: Calcium silicate with fiber mixture cement

Appendix 9 Separator Stand For 45-degree angle Trough

Parts A



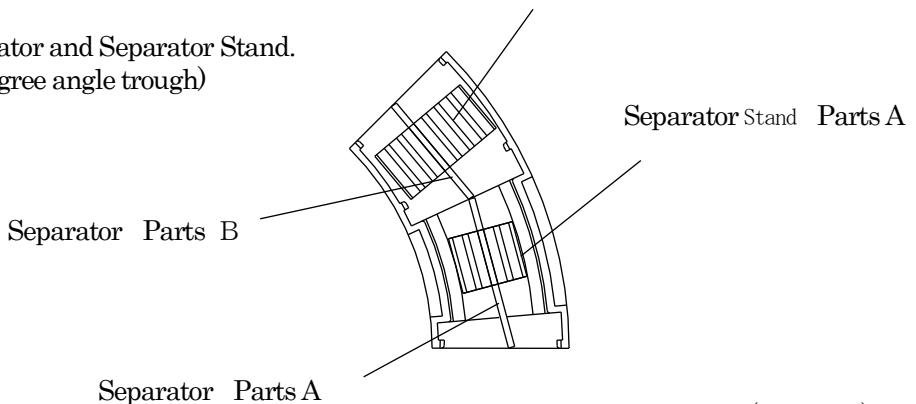
Parts B (for Straight trough and bends)



*The number of usage : 2 parts (Parts A &B) / set in bends

Separator Stand Parts B

Usage examples for Separator and Separator Stand.
(Inner surface of the 45-degree angle trough)



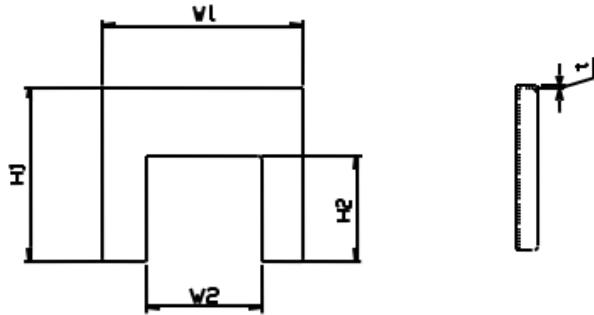
(Unit : mm)

Part name	Series	Part No.	L 1	L 2	H	W
Separator Stand For 45-degree angle trough	For 150	GT-ST150B-C	118±5	175±5	30±3	70±3
	For 200	GT-ST200B-C	155±5	219±5	30±3	
	For 250	GT-ST250B-C	184±5	277±5	30±3	
	For 300	GT-ST300B-C	272±5	272±5	30±3	
	For 430	GT-ST430C-C	405±5	405±5	30±3	

Main material: Recycled polymer

Colour: Black

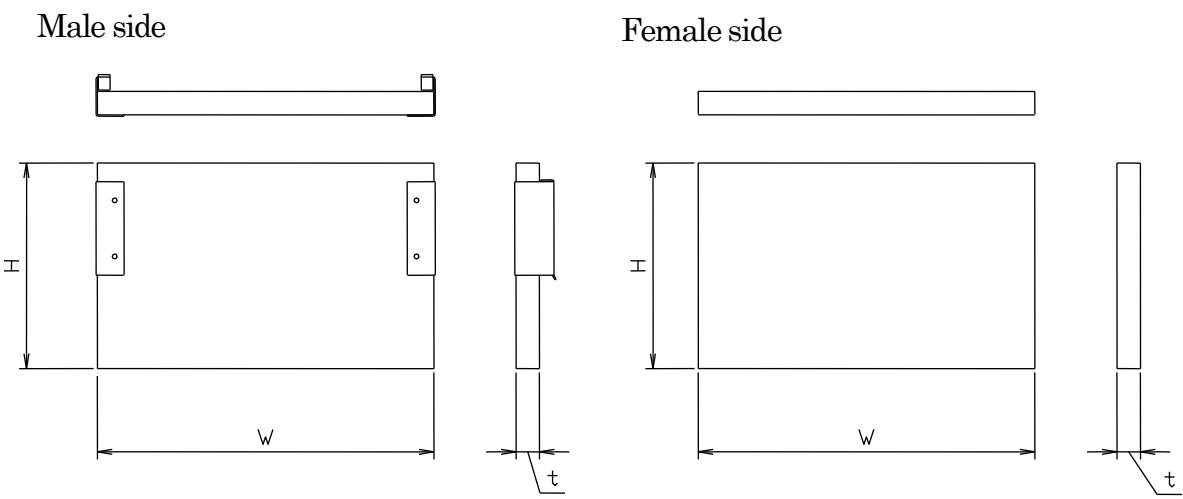
Appendix 10 Joint plate for different sizes



(Unit : mm)

Part No.	Cat No.	H 1	H 2	W 1	W 2	t (thickness)	
TT200/150	087/004761	213±5	165±5	245±5	178±5	t	
TT250/200	087/004762	220±5	215±5	299±5	229±5		
TT250/150		218±5	165±5	303±5	178±5		
TT300/250	087/004763	220±5	215±5	358±5	287±5		
TT300/200					229±5		
TT300/150		215±5	165±5		178±5		
TT430/300	087/004764	300±5	220±5		335±5		
TT430/250					287±5		
TT430/200					229±5		
TT430/150					178±5		

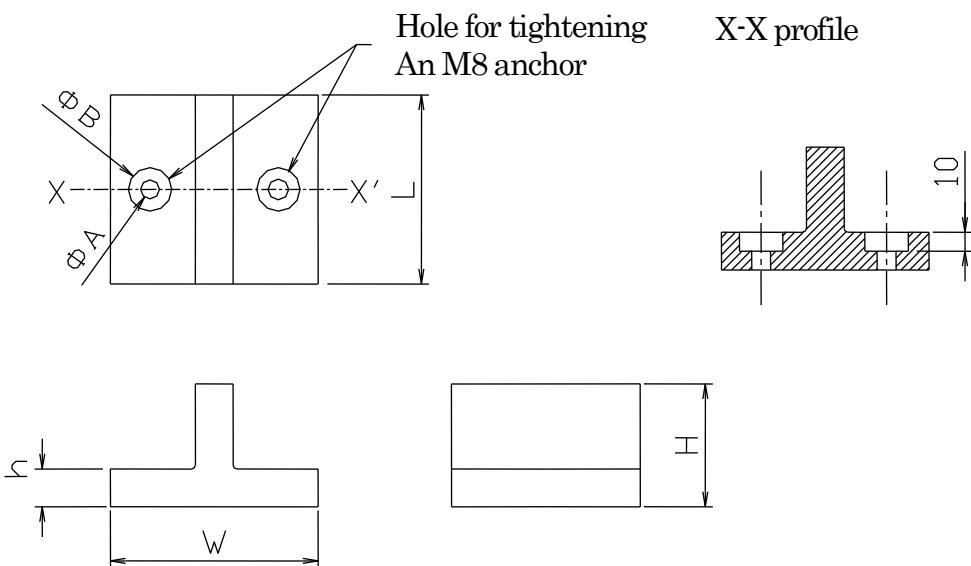
Appendix 11 End Plate



(Unit : mm)

Part name	Series	Part No.	Cat No.	H	W	t
End Plate For male side	For 090	TA090M	087/004644	105±5	105±5	15±3
	For 120	TA120M	087/004746	125±5	150±5	
	For 150	TA150M	087/004747	160±5	188±5	
	For 200	TA200M	087/004748	215±5	243±5	
	For 250	TA250M	087/004749	225±5	300±5	
	For 300	TA300M	087/004750	215±5	356±5	
	For 430	TA430M	087/004752	300±5	508±5	
End Plate For female side	For 090	TA090F	087/004645	105±5	105±5	15±3
	For 120	TA120F	087/004753	125±5	150±5	
	For 150	TA150F	087/004754	160±5	188±5	
	For 200	TA200F	087/004755	215±5	243±5	
	For 250	TA250F	087/004756	225±5	300±5	
	For 300	TA300F	087/004757	215±5	356±5	
	For 430	TA430F	087/004759	300±5	508±5	

Appendix12 Trough support



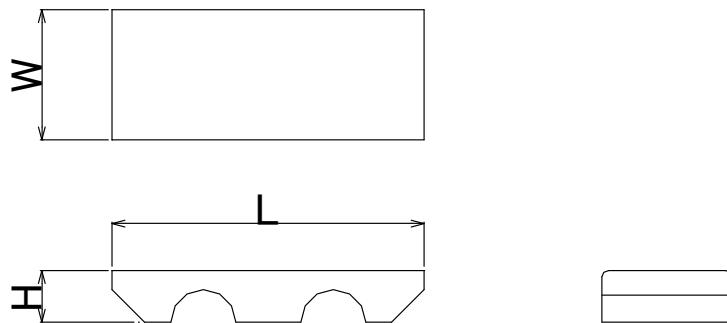
*The number of usage : 2 parts / set

(Unit : mm)

Part No.	L	W	H	h	ΦA	ΦB
GT-GETA	100±5	110±3	65±3	20±3	$\Phi 10$	$\Phi 23$

Main material: Recycled polymer

Appendix 13 Cable stabilizer



(Unit : mm)

Series	Part No.	L	W	H
For 090	GT-MK070B	60±5	100±5	25±5
For 150	GT-MK150B	140±5		
For 200	GT-MK200B	190±5		
For 250	GT-MK250B	240±5		
For 300	GT-MK300B	280±5		
For 430	GT-MK430C	410±5		

Main material: Recycled polymer

Colour: Black

The specifications described in this document are subject to change without notice for product improvement or other reasons.

Concrete comparator chart

Conventional concrete sizes, internal capacity and weights



Comparable

TTS sizes, internal capacity and weights



Concrete code	Ext Width mm	Ext Depth mm	Internal capacity CSA mm ²	Weight (inc lid) Kg	TTS code	Ext Width mm	Ext Depth mm	Internal capacity CSA mm ²	Weight (inc lid) Kg	TTS capacity v Concrete
C/1/6	190	170	7500	59	090	120	136	9000	7	+20%
C/1/7	220	210	14950	76	150	210	190	20250	13	+35%
C/1/8	250	280	27750	100	200	270	255	37000	21	+33%
C/1/9	280	210	21850	88	200	270	255	37000	21	+69%
C/1/10	340	210	28750	104	250	330	265	43750	14*	+52%
C/1/29	440	220	40250	137.2	300	390	265	52500	27	+30%
C/1/43	440	390	99750	180.8	430	540	360	114750	24*	+15%

* Denotes 0.5m length

Please note ; TTS Green Trough is available and certificated for use in an elevated application for three trough sizes from the range (090, 150 & 200 Series). The accessories for use in an elevated application includes standard brackets to mount the troughing support ladders on posts (either at one or two levels) or wall mounting brackets (for both perpendicular or angled walls). A separate Technical Specification for the elevated system is available to download from the website.

For further information contact us

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