



Construction Guide



Table of Contents

<i>Introduction</i>	1
<i>Material & Equipment Checklist</i>	2
<i>Materials</i>	2
<i>Equipment</i>	2
<i>Handling</i>	3
<i>Receiving</i>	3
<i>Unloading</i>	3
<i>Moving</i>	3
<i>Subgrade and Foundation Preparation</i>	4
<i>Excavation</i>	4
<i>Placing Geotextile</i>	4
<i>Placing Foundation</i>	5
<i>Manifold Assembly</i>	6
<i>End Cap and Chamber Assembly</i>	7
<i>Connecting End Caps to Manifold</i>	7
<i>For prefabricated end cap/inlet:</i>	7
<i>For on-site end cap/inlet fabrication:</i>	7
<i>Adding Chambers</i>	7
<i>Pre-treatment/Sediment Row</i>	9
<i>Inspection Port Placement</i>	9
<i>Chamber Backfill Process</i>	10
<i>Embedment Stone</i>	10
<i>Initial Backfill</i>	11
<i>Final Backfill</i>	12
<i>Table 1 - Backfill Materials</i>	12
<i>Table 2 - Placement Methods</i>	13
<i>Table 3 - Construction Loading</i>	14
<i>Notes</i>	15

Introduction

To ensure a trouble-free installation, it is essential that the installer is familiar with the minimum requirements specified in this guide.

Adherence to this guide is necessary to maintain the structural integrity of the HydroStor Chamber system. In addition, the chamber supplier, chamber installer (site contractor) and the design engineer may meet for a pre-construction meeting to discuss any questions relating to the installation process, and the guidelines herein.

Material & Equipment Checklist

Materials

- HydroStor chambers and end caps
- Woven & non-woven geotextiles
- Manifold pipe, fittings & couplers
- Acceptable backfill material found in Table 2 on page 13
- Pre-treatment system
- Inlet diversion structure for sediment row (optional)
- PVC pipe & fittings for inspection port (optional)

Equipment

- Forklift equipment for pallet dimensions below:

Note: HS31 chamber pallets are 35" x 90" (89 cm x 229 cm), weighing approximately 1,630 lbs. (740 kg).

HS75 chamber pallets are 52" x 88" (132 cm x 223.5 cm), weighing approximately 2,500 lbs. (1,134 kg).

HS180 chamber pallets are 78" x 86" (198 cm x 218 cm), weighing approximately 2,600 lbs. (1,179 kg).

HS290 chamber pallets are 102" x 54" (259 cm x 137 cm), weighing approximately 1,350 lbs. (612 kg).

- Reciprocating saw or hole saw for coring holes in end caps/chambers
- Approved compaction equipment
- Excavator to dig trench and place stone and soil backfill
- Stone conveyor/lightweight tracked dozer not exceeding 4.5 psi (31 kPa) to grade backfill
- Wire cutters
- Transit/laser level

Handling

Receiving

- Visually inspect chambers and end caps for damage.
- Ensure accurate quantities.



Unloading

- Unload chamber pallets using forklift.

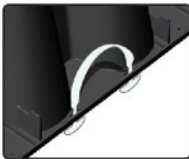


Use a forklift with a minimum of 72" (1.8 m) forks when unloading the HS290, HS180, and HS75 chamber pallets.



Moving

- Use handles on each side of larger chambers when moving.



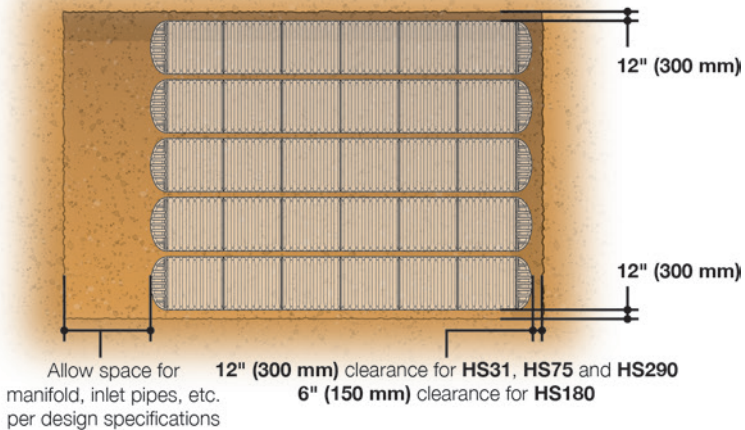
Subgrade and Foundation Preparation

Excavation

- Excavate area according to project plans.
- Maintain required clearance around chamber system (see illustration below for minimum clearance).

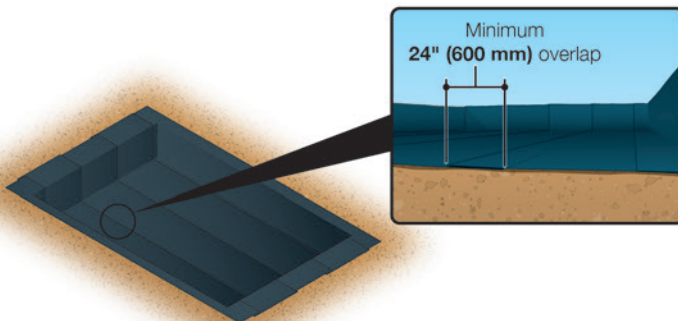


If subgrade is wet or unstable, take appropriate measures to correct. Consult design engineer if necessary.



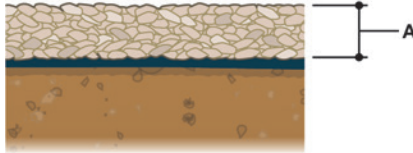
Placing Geotextile

- Place an AASHTO M288 Class 2 non-woven 4 oz. or 6 oz. (136 or 203 g/m²) geotextile on foundation bottom and sidewalls; overlap all seams 24 in. (600 mm).



Placing Foundation

- Place base of ¾ in. - 2 in. (19-50 mm) clean, crushed, angular stone over geotextile.
- Maintain depth as indicated on project plans (see chart below).



Chamber	Foundation Stone Depth (A)
HS31	6 in. (150 mm) minimum
HS75	6 in. (150 mm) minimum
HS180	9 in. (225 mm) minimum
HS290	9 in. (225 mm) minimum

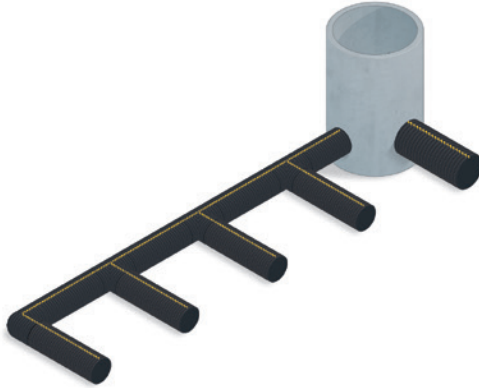
- Compact stone with a vibratory compactor.



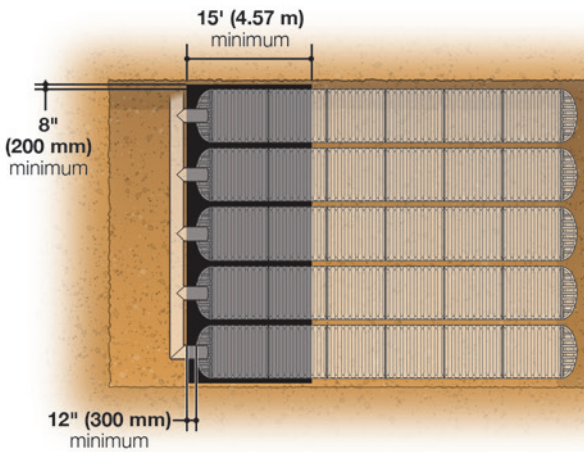
- Install perimeter underdrain if specified on project plans.

Manifold Assembly

- Assemble manifold system according to project plans.



- To alleviate scour at inlets, place a 15 ft. (4.57 m) wide strip of woven geotextile under manifold and inlets.



End Cap and Chamber Assembly

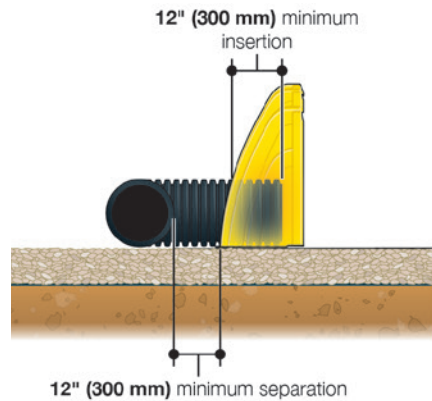
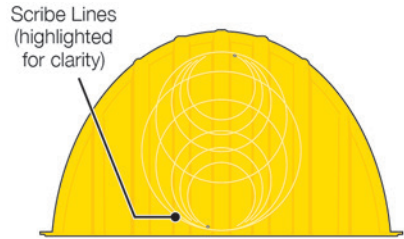
Connecting End Caps to Manifold

For prefabricated end cap/inlet:

- Connect to manifold using split coupler.

For on-site end cap/inlet fabrication:

- Core an opening in the end cap the same size as the inlet pipe, using the indicated scribe lines as a guide.
- Insert inlet pipe a minimum of 12 in. (300 mm) into end cap.
- Cover any voids greater than $\frac{3}{4}$ in. (19 mm) with non-woven geotextile.
- Connect to manifold using split coupler.



Adding Chambers

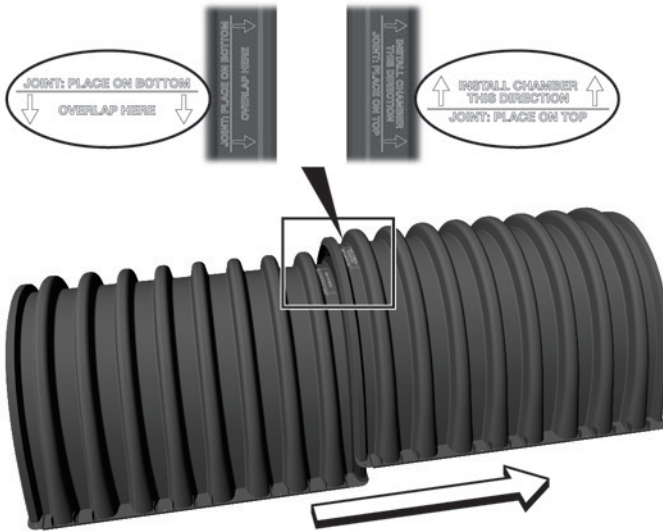


Note overlap and orientation instructions labeled on chamber ends (see illustration on next page).

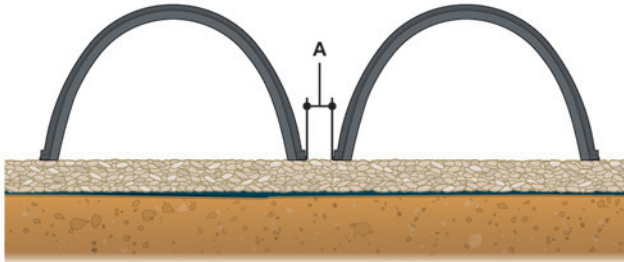
- Place first corrugation of chamber under end cap, following direction arrow on chamber end.
- Fasten end caps with three screws at indicated locations to ensure they do not shift during backfill.



- Assemble each row by placing following chamber on top of previous chamber.



- Maintain required minimum row spacing (see chart below).



Chamber	Distance Between Chambers (A)
HS31	6 in. (150 mm) minimum
HS75	6 in. (150 mm) minimum
HS180	8 in. (200 mm) minimum
HS290	8.5 in. (216 mm) minimum

- Row assembly should not exceed reach of backfill placement equipment.
- Terminate each row with end cap.

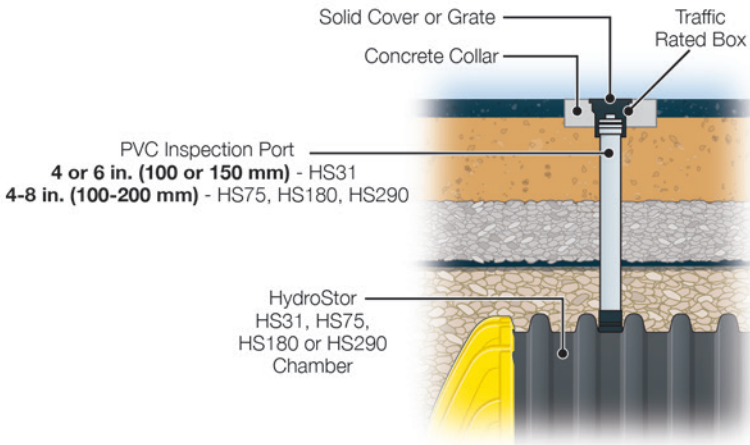


Pre-treatment/Sediment Row

Prinsco recommends pretreatment of stormwater runoff using a Prinsco Water Quality Unit and/or sediment row. Review design plan for installation.

Inspection Port Placement

- Identify chamber(s) to be fitted with inspection port(s).
- Cut a 4-8 in. (100-200 mm) diameter opening at the appropriate location(s) per the design plans.
- Build inspection port(s) using a tap tee connection to join Sch 40 or SDR 35 PVC pipe and fittings.



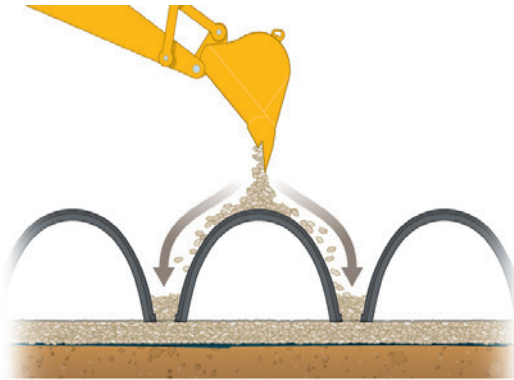
Chamber Backfill Process

Embedment Stone

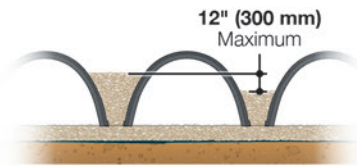


No construction equipment shall be situated atop of the chamber system.

- Use ¾ in.-2 in. (19-50 mm) particle size, washed, crushed, angular stone.
- Carefully deposit embedment stone along chamber centerline using excavator or stone shooter.

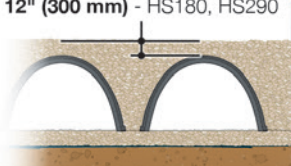


- Stone height between rows and sidewalls should not differ by more than 12 in. (300 mm).



- Embedment stone minimum cover height: 6 in. (150 mm) for HS31 and HS75, and 12 in. (300 mm) for HS180 and HS290.

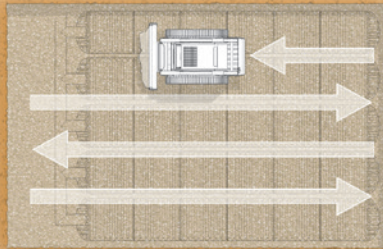
6" (150 mm) - HS31, HS75
12" (300 mm) - HS180, HS290





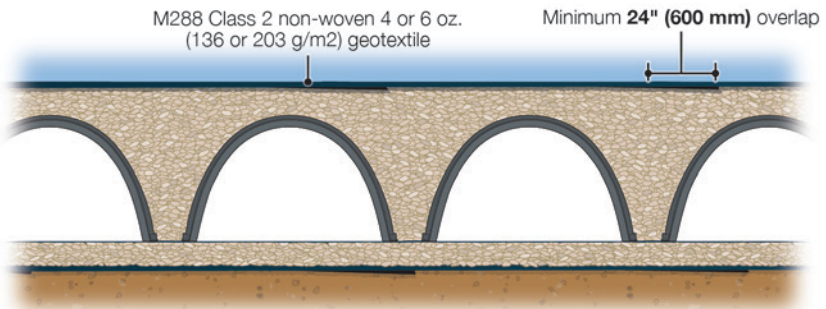
Wheel and Roller Loads Not Allowed. Minimum of 6" (150 mm) of cover for HS31 and HS75 chambers, and a minimum of 12" (300 mm) of cover for HS180 and HS290 chambers before a skid loader or small dozer is allowed over chambers.

- Finalize grading with tracked dozer with ground pressure less than 4.5 psi. (31 kPa), running dozer parallel to rows at all times.



- Cover with AASHTO M288 Class 2 non-woven 4 or 6 oz. (136 or 203 g/m²) geotextile; overlap all seams 24 in. (600 mm).

Initial Backfill



- Begin compaction to cover height of 18 in. (450 mm) for HS31 and HS75; 23.5 in (590 mm) for HS180, and 24 in. (600 mm) for HS290.
- Compaction equipment to travel parallel with chamber rows (refer to Table 3 on page 14 for loads).

Final Backfill

- Refer to design plans for final backfill specifications.

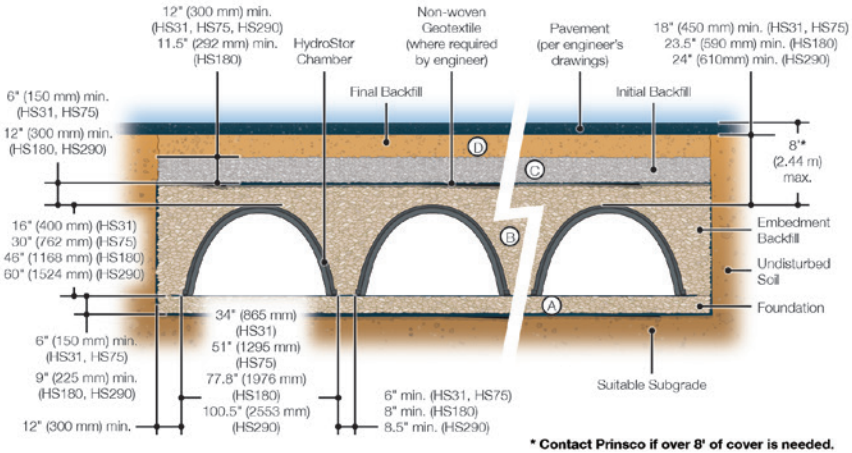


Table 1 - Backfill Materials

Fill Material Location	Material Description	AASHTO M43 Designation
[D] Final Backfill - Fill material for Layer D starts at the top of the C layer to the bottom of the pavement or to the finished grade of an unpaved surface. The pavement sub-base may be part of the final backfill.	Any backfill which provides adequate subgrade for the project per the engineer's plans. Plans shall indicate subgrade requirements.	N/A
[C] Initial Backfill - Material for layer C starts at the top of the embedment zone (layer B) and continues to 18" (450 mm) above the top of the chamber for the HS31 and HS75, 23.5" (590 mm) for the HS180, and 24" (600 mm) for the HS290. The pavement sub-base may be part of the initial backfill layer.	Well graded granular material, <35% fines.	AASHTO M45 A-1, A-2, A-3 or AASHTO M43 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10
[B] Embedment Stone - Embedment stone will surround the chambers and extends from the top of the foundation stone (layer A) to the bottom of the fabric layer.	3/4" to 2" (19 to 51 mm) washed, crushed, angular stone.	AASHTO M43 3, 357, 4, 467, 5, 56, 57
[A] Foundation Stone - Foundation Stone extends from the subgrade to the foot of the chambers.	3/4" to 2" (19 to 51 mm) washed, crushed, angular stone.	AASHTO M43 3, 357, 4, 467, 5, 56, 57

Table 2 - Placement Methods

Fill Material Location	Placement Methods / Restrictions	Compaction Requirements	
[D] Final Backfill	A variety of placement methods may be used. All construction loads must not exceed the limits in Table 3, page 14.	Subgrade will be placed and compacted to the requirements as shown on the site plans.	
[C] Initial Backfill	Use of an excavator positioned off bed is recommended. Small excavators and small dozers may be allowed based on the information in Table 3, page 14.	For HS31 and HS75: Compaction will not begin until a minimum of 12" (300 mm) of material is placed over the chambers. Additional layers shall be compacted in 6" (150 mm) lifts to a minimum of 95% standard proctor density for well graded material.	For HS180 and HS290: Compaction will not begin until a minimum of 24" (600 mm) of material is placed over the chambers. Additional layers shall be compacted in 12" (300 mm) lifts to a minimum of 95% standard proctor density for well graded material.
		Roller gross vehicles are not to exceed 12,000 lbs. (53.38 kN) and dynamic force not to exceed 20,000 lbs.(88.96 kN).	
[B] Embedment Stone	No equipment is allowed on bare chambers. Use excavator or stone conveyor positioned off bed to evenly place the backfill around and on top of all of the chambers.	No compaction required	
[A] Foundation Stone	Placement with a variety of equipment is acceptable to provide a stable, level base.	For HS31 and HS75: Placed in 6" (150 mm) lifts and compacted with a vibratory roller.	For HS180 and HS290: Placed in 9" (230 mm) lifts and compacted with a vibratory roller.

Table 3 - Construction Loading

Material Location	Fill Depth Above Chambers in. (mm)	Max Allowable Wheels Loads		Max Allowable Track Loads		Max Allowable Roller Loads
		Max Axle Load For Trucks lbs. (kN)	Max Wheel Load For Trucks lbs. (kN)	Track Width in. (mm)	Max Ground Pressure psf (kPa)	Max Drum Weight Dynamic Force lbs. (kN)
[D] Final Fill Material	36" (900) Compacted	32,000 (142)	16,000 (71)	12" (300) 18" (450) 24" (600) 30" (750) 36" (900)	3,420 (163.75) 2,350 (112.52) 1,850 (88.58) 1,510 (72.30) 1,310 (62.72)	38,000 (169)
[C] Initial Fill	24" (600) Compacted	32,000 (142)	16,000 (71)	12" (300) 18" (450) 24" (600) 30" (750) 36" (900)	2,480 (118.74) 1,770 (84.75) 1,430 (68.47) 1,210 (57.94) 1,070 (51.23)	20,000 (89)
	24" (600) Dumped	24,000 (107)	12,000 (53)	12" (300) 18" (450) 24" (600) 30" (750) 36" (900)	2,245 (107.49) 1,625 (77.81) 1,325 (63.44) 1,135 (54.34) 1,010 (48.36)	HS31/HS75: 20,000 (89) HS180/HS290: 16,000 (71) Gross weight of roller not to exceed 12,000lbs (5,443 kg)
	18" (450)	24,000 (107)	12,000 (53)	12" (300) 18" (450) 24" (600) 30" (750)	2,010 (96.24) 1,480 (70.86) 1,220 (58.41) 1,060 (50.75)	HS31/HS75: 20,000 (89) HS180/HS290: 5,000 (22) Gross weight of roller not to exceed 12,000lbs (5,443 kg)
[B] Embedment Zone	12" (300)	N/A	N/A	12" (300)	HS31/HS75: 1540 (73.74) HS180/HS290: 1,100 (52.67)	N/A
				18" (450)	HS31/HS75: 1,190 (56.98) HS180/HS290: 715 (34.23)	
				24" (600)	HS31/HS75: 1,010 (48.36) HS180/HS290: 660 (31.60)	
				30" (750)	HS31/HS75: 910 (43.57) HS180/HS290: 580 (27.77)	
	6" (150)	N/A	N/A	12" (300)	HS31/HS75: 1,070 (51.23) HS180/HS290: N/A	N/A
				18" (450)	HS31/HS75: 900 (43.09) HS180/HS290: N/A	
				24" (600)	HS31/HS75: 800 (38.30) HS180/HS290: N/A	
				30" (750)	HS31/HS75: 760 (36.39) HS180/HS290: N/A	

N/A = Not Allowed

Notes:

1. 36 in. (900 mm) of stabilized cover is required over chambers before full dump trucks may travel and dump on chamber system.
2. To calculate the ground pressures for small tracked dozers, determine the vehicle operating weight and divide by total ground contact area for both tracks. The ground pressures for tracked excavators will be greater due to the loaded bucket weight and boom extension.
3. Allowable track loads based on the vehicle travel only. Excavators shall not operate on chamber beds until a minimum of 3 feet (900 mm) of cover has been placed over the chambers.
4. Mini excavators (<8,000 lbs. [3,629 kg]) can be used with at least 12 in. (300 mm) of stone cover over the chambers and are limited based on the ground pressures shown in Table 3 on page 14.
5. During paving operations, loaded dump trucks at minimum cover heights may be necessary. Precautions must be taken to ensure that rutting of the sub base layer does not occur, that minimum cover heights are met and that adequate compaction of the sub base is maintained. Refer to Table 3 on page 14 or contact your local Prinsco Representative for more information about allowable axle loads.
6. Construction materials, excess equipment or spoil piles should not be positioned over a HydroStor chamber system. For equipment not listed in Table 3 on page 14, contact your Local Prinsco Representative for more information.
7. Compaction of the initial backfill layer should not begin until the minimum cover over the chambers has been reached (minimum 18 in. [450 mm] for HS31 and HS75, minimum 23.5 [590 mm] for HS180, and minimum 24" [600 mm] for HS290).



HS31	HS75		HS180	HS290
31ft ³ (.88m ³) per chamber	75 ft ³ (2.12m ³) per chamber	Installed Storage Capacity*	164ft ³ (4.64m ³) per chamber	180ft ³ (5.1m ³) per chamber
16" (406mm)	29.7" (754mm)	Height	59.5" (1511mm)	45.5" (1156mm)
34" (864mm)	51" (1295mm)	Width	100.5" (2554mm)	77.8" (1976mm)
87.8" (2253mm)	87.1" (2212mm)	Unit Length	51.8" (1317mm)	88.7" (2253mm)
85.4" (2166mm)	84.9" (2156mm)	Installed Length	85.4" (2166mm)	85.4" (2166mm)
32 lbs (14.5kg)	70 lbs (31.75kg)	Weight	125 lbs (58kg)	127 lbs (58kg)
45	33	Chambers/Pallet	10	19
PP	PP	Material	PP	PP
Injection Molding	Injection Molding	Mfg. Process	Injection Molding	Injection Molding
Lightweight Option	Lightweight Option	Special Features	Lightweight Option	Lightweight Option
Meets or Exceeds	Meets or Exceeds	ASTM Standards	Meets or Exceeds	Meets or Exceeds
6" (150mm) min.	6" (150mm) min.	Backfill Above Chamber	12" (300mm) min.	12" (300mm) min.
6" (150mm) min.	6" (150mm) min.	Bedding	6" (230mm) min.	9" (230mm) min.
6" (150mm)	6" (150mm)	Chamber Spacing	8.5" (216mm)	8" (200mm)
34" (864mm)	51" (1295mm)	Chamber Width	100.5" (2554mm)	77.8" (1976mm)
12" (300mm)	12" (300mm)	Backfill At Edge Of System	12" (300mm)	12" (300mm)
16" (406mm)	29.7" (754mm)	Chamber Height	59.5" (1511mm)	45.5" (1156mm)
18" (450mm)	18" (450mm)	Minimum Cover	24" (600mm)	23.5" (590mm)
8' (2.44m)	8' (2.44m)	Maximum Burial Depth	8' (2.44m)	8' (2.44m)

* Assuming 40% void volume of backfill with 6" (150mm) bedding and 6" (150mm) cover for HS31 and HS75, 9" (230mm) bedding and 12" (300mm) cover for HS180 and HS290.



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