

ADS[®] Storm Pipe Installation Guide

Important Notes: (Be advised this document does not supercede project specifications.)

- A. This installation guide provides the minimum requirements for proper installation of pipe. Non-adherence to this guide may result in damage to pipe. Replacement of damaged pipes during or after backfilling is costly and very time consuming. It is recommended that all installers are familiar with this guide, and that the contractor inspects the pipe for distortion, damage and joint integrity as work progresses.
- B. Care should be taken in the handling of pipe. To avoid damage to pipe and fittings please follow OSHA safety requirements, do **NOT** drop pipe and avoid any impact to the bell or spigot.



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Installation Page

Job Site Handling



4"-18" (100-450 mm) diameter pipe can be moved by hand.



24"-30" (600-750 mm) diameter pipe requires a backhoe with one nylon sling.



Lift 36"-60" (900-1500 mm) diameter pipe with a sling at two points, spaced 10' (3 m) apart.

Job Site Storage



Stack pipe in a flat, clear area no higher than 6' (1.8 m). Use securing blocks to ensure pile does not collapse.



While supporting lengths of pipe evenly, alternate bells for each row of pipe.



To prevent damage to the pipe, do not use forklift inside the pipe and avoid direct impacts. Do not drag or strike pipe ends against anything to avoid spigot or bell damage.

Trench Construction

Minimum Trench Widths

Diameter in (mm)	Trench Width in (mm)
4-8 (100-200)	*
10 (250)	28 (711)
12 (300)	30 (762)
15 (375)	34 (863)
18 (450)	39 (990)
24 (600)	48 (1219)
30 (750)	56 (1422)
36 (900)	64 (1625)
42 (1050)	72 (1828)
48 (1200)	80 (2032)
60 (1500)	96 (2438)

* Usually dependent on smallest bucket size available.

Backfill



Backfill Material Selection

- Provided ADS minimum recommendations are met, engineered plan set should take precedence.
- Locally available material may be acceptable for backfill use, but must meet one of the acceptable soil classifications in the Classes of Embedment and Backfill Materials table.
- Class I materials can be dumped around pipe. Voids must be eliminated by knifing under and around pipe.
- Non-cohesive sand, sand/gravel mixes and other Class II and III materials must be compacted to a minimum of 85% and 90% standard Proctor density, respectively.
- Inorganic silts, and gravelly, sandy or silty clays, and other Class IV materials are permitted for HP Storm only.
- Flowable fill is an acceptable backfill. Misalignment or flotation may occur unless the pipe is anchored or the flowable fill is poured in lifts.
- **For more information on backfill material, refer to ADS Technical Note 5.02**

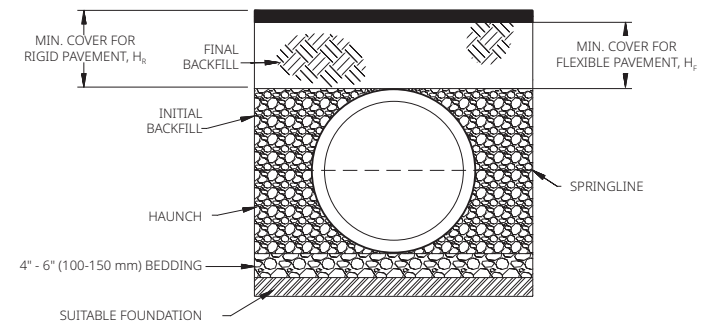


Dewatering

When groundwater or surface runoff is present, dewatering of the trench shall be performed to maintain the water level below the bedding. A dry trench allows for proper placement and compaction of backfill and minimizes the risk of flotation or alterations in line and grade of the pipe. Typical dewatering methods include sump pumps, well points, deep wells, underdrains or a diversion ditch. Consult the project engineer for appropriate dewatering methods given project conditions. **For more information on flotation, refer to ADS Technical Note 5.05.**

Backfill Envelope Construction

- If native soil cannot carry load, import, compact and level adequate bedding material as in the accompanying figure.
- The accompanying figure represents typical trench construction applicable to all products. **See applicable standard details** for trench installation details for N-12®, HP Storm and SaniTite® HP.
- Place and compact backfill in layers to meet compaction requirements and project requirements. Note that the large diameter pipes may require layer heights less than those indicated in the table to achieve proper compaction.
- Avoid impacting the pipe directly with compaction equipment. Hand tamper, rammer, small vibrating compactors and walk-behind static rollers may be used for compacting backfill. Heavy-duty compaction or vibratory equipment should have adequate separation from the pipe, typically 3'-4' (0.9-1.2 m).



 FILL AS SPECIFIED BY DESIGN ENGINEER
 STRUCTURAL BACKFILL (COMPACTED CLASS I, II, OR III MATERIAL)

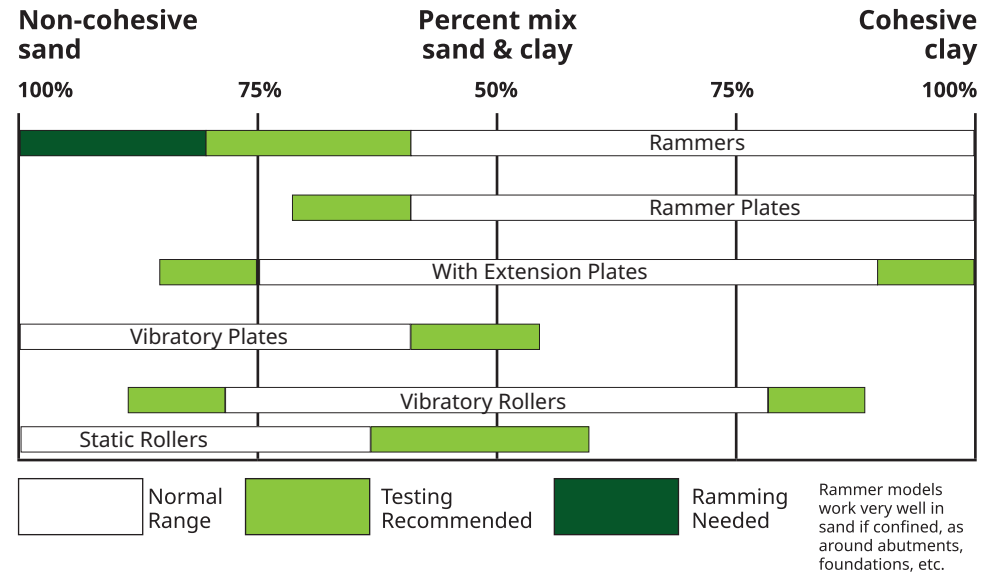
$H_r, H_f = 12"$ (300 mm) FOR PIPE DIAMETERS UP TO 48" (1200 mm)
 $= 24"$ (600 mm) FOR PIPE DIAMETERS 54" AND 60" (1350 and 1500 mm)

COMPACTION

Crushed stone or similar materials are usually not compacted, but do require care during installation to eliminate large voids in the backfill envelope. Using a shovel to 'slice' or 'knife' the material under and around the pipe is sufficient.

For other materials, compaction methods will depend primarily on the amount of compaction, or modulus of soil reaction, required and the moisture level of the material. At optimum moisture levels, some Class II and III soils can be compacted to minimum recommended levels simply by walking on each backfill lift. While this technique may not be acceptable for all installations, the point is that compaction need not always require a great deal of extra effort or mechanical equipment.

If, however, mechanical compaction equipment is needed in the backfill envelope or elsewhere on the site, the subsequent paragraphs provide guidance on compaction equipment and the soils for which they are most appropriate.



MECHANICAL COMPACTION EQUIPMENT

Hand Tampers: Haunch layer compaction may require a small (6" x 6" [150 x 150 mm]) tamping mechanism to obtain specified compaction in a confined area. Tampers shall not weigh more than 20 pounds (9 kg).

Rammers or rammer plates: Impact action is used to force out air and water from between soil particles to consolidate the fill.

This equipment works well on cohesive or high-clay content soils. For heavy-duty compaction equipment, a minimum of 4' (1.2 m) of backfill shall separate the pipe and equipment. Care should be taken to not use rammer directly on pipe.



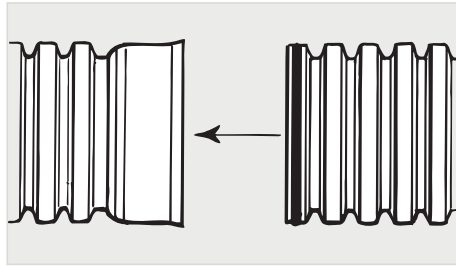
Static compactors: Consolidation with static compactors occurs as a result of the rolling weight of the equipment. Sheeps-foot rollers employ projecting feet to concentrate the weight of the machine. Static compactors are most valuable when used on non-cohesive backfill away from the pipe. Other methods of compaction should be used near the pipe.



Vibrating compactors: The motion of vibrating rollers or plates "shake" the soil particles into a more dense arrangement and works best with non-cohesive fills. Depending on the size and weight of the machine, vibrating compactors may be used close to the pipe. As always, care should be taken not to impact the pipe directly with a great deal of force.



Bell and Spigot Joint Assembly



It is recommended to lay pipe starting at the down stream end. Push spigots into bells with bells facing upstream. **Always** push spigot ends into bell.

- Lower pipe into trench
- Inspect bell and spigot; remove foreign matter
- Lubricate bell of pipe
- Remove protective wrap from gasket and lubricate gasket
- Do **NOT** allow lubricated section to touch dirt or backfill. Place spigot into bell and align.

- Small diameter pipe may be joined by hand.
- Ensure bell and spigot are "homed" for tight joining seal. If homing mark isn't present, measure bell depth and mark "homing" mark on appropriate corrugation of the spigot end. Do **NOT** over home the pipe.

Assemble joint using one of the following methods.

Backhoe & Sling Method

- Wrap nylon sling around pipe with pipe level and hook sling to backhoe bucket
- Pipe 36" (900 mm) or larger should be picked up at 2 points 10' (3 m) apart
- Push strap toward bell of pipe until spigot is inserted into bell

NOTE: Distance from bedding to bottom of pipe not to exceed 6" (150 mm) for a 20' (6 m) pipe.

Bar & Block Method

- Place stub into pipe's bell end
- Place wooden block horizontally across end of stub and use a bar to push against wooden block until pipe is inserted into bell

NOTE: This method requires use of installation stub. DO NOT push directly against pipe.

Installation Stub Fabrication

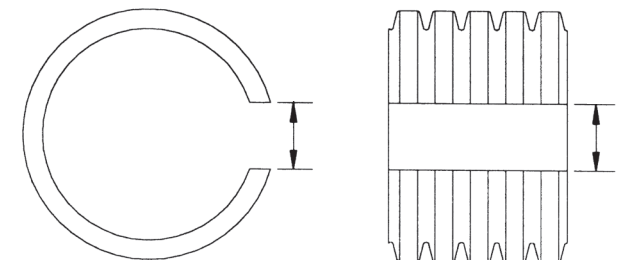
To push "home" joints, an installation stub can be used to prevent bell damage. Stubs are not required if the bell is not pushed on directly. Installation stubs can be fabricated on site:

- Cut a pipe 5 corrugations long
- Using a saw, remove a strip of pipe wall. Note: Strip width shown in table.
- To use stub, push on pipe walls to change outside diameter of stub to inside diameter of bell to be installed.

Strip Width for Installation Stub

Pipe Diameter in (mm)	Strip Width in (mm)
4-6 (100-150)	2 (51)
8 (200)	2.5 (64)
10-12 (250-300)	4 (102)
15 (375)	5 (127)
18 (450)	6 (152)
24 (600)	7.5 (191)
30-42 (750-1050)	10 (254)
48-60 (1200-1500)	12 (305)

Installation Stub



Minimum Cover, Temporary Construction and Paving Traffic

- 4"-48" (100-1200 mm) single pipe runs receiving H-25 traffic requires final backfill 12" (300 mm) above initial backfill to provide at least 12" (300 mm) of total cover as measured from the top of pipe to bottom of flexible pavement or to top of rigid pavement.
- 60" (1500 mm) single pipe runs receiving H-25 traffic require final backfill 24" (600 mm) above initial backfill to provide at least 24" (600 mm) of total cover as measured from top of the pipe to the bottom of flexible pavement or to top of rigid pavement. Some construction vehicles, such as many types of paving equipment, are not as heavy as the design load.
- The corresponding table presents surface applied loads and the corresponding minimum cover that can be temporarily permitted. Areas with heavy construction equipment traffic from 30-60 tons (27,215-54,431) kg and heavy duty compaction equipment require at least 3' (0.9 m) of cover. Higher loads require cover greater than 3' (0.9 m).
- If cover is not provided, mound and compact material over pipe to provide minimum cover needed for load during construction.

See details 111A through 111F for temporary minimum cover for additional construction vehicles.

Cover Requirements for Temporary Light Construction Traffic*

Vehicle Type	Single or Tandem Axle Load lbs (kg)	Pipe Diameter in (mm)	Temporary Min. Cover in (mm)	
			Class I Compacted	Class II @ 95% SPD
Drum Roller	29,626 (13,438)	12-48 (300-1200)	9 (229)	9 (229)
		60 (1500)	9 (229)	12 (305)
Dump truck	65,000 (29,484)	12-60 (300-1500)	15 (381)	18 (457)
Concrete Mixer	65,000 (29,484)	12-60 (300-1500)	15 (381)	18 (457)

** These criteria should only be employed during construction. Vehicles exceeding these criteria must not be permitted to drive over the installation.*

Fittings

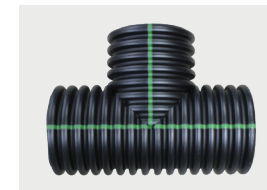
ADS offers a complete selection of fittings for gravity-flow pipe. These fittings are for plain end or field-cut pipe and are not to be used with bell and spigot connections. Fittings are available for pipe from 4"-60" (100-1500 mm) diameters and include couplers, bends, tees, wyes and reducers.



Split coupler being installed on N-12 plain end pipe.



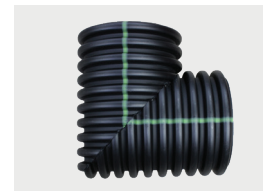
Split coupler



Tee



Wye



90° Bend



45° Bend



Reducer

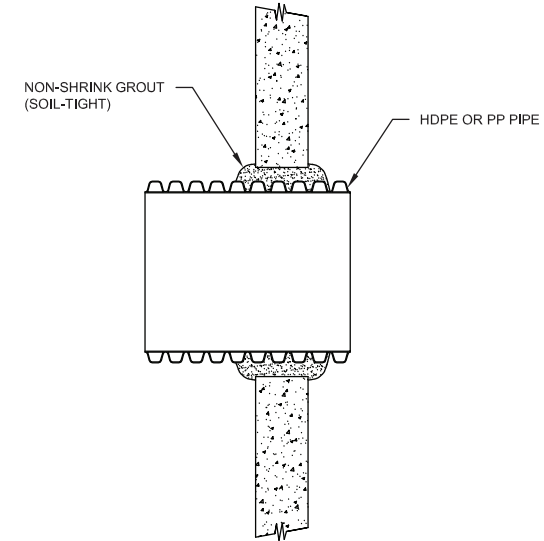
Installing Gaskets for Fittings

When standard lengths of pipe must be cut to fit in a field application, the following instructions will ensure proper performing joints:

- For reduced spigot pipe ONLY, reducing spigot must be removed.
- Using a saw, cut in the center of the valley of the first full corrugation.
- Trim remaining plastic burrs from saw cut. Note: Failure to smoothly trim burrs may compromise joint integrity.
- Wipe clean first valley from end of pipe. This is where gasket will be placed.
- Hold gasket with both hands so printing is facing you.
- With printing on gasket face-up and toward spigot end of pipe, slide gasket into first corrugation valley, starting at bottom. Note: It is easier to pull gasket up to conform to valley.
- Slide gasket into first corrugation valley by hand.
- Ensure printing on gasket is face-up and toward spigot end of pipe.
- Vent tubes shall be appropriately scaled at joint where applicable, see Technical Note 5.10: Integral Bell Transition for HDPE.
- Using clean rag or brush, lubricate exposed gasket with pipe lubricant.
- Do not let lubricated section touch dirt or backfill, as foreign material could adhere to surface and compromise joint integrity.

Manhole Connections

The most common method for connecting ADS pipe to a manhole is grouting into the structure. If grouting is allowed per project specifications, place and work non-shrink grout into the corrugations sealing both the inner and outer connection points around the entire circumference of the pipe at the manhole. When resilient connectors are required, refer to Technical Note 1.07.



Flotation

For projects where a high groundwater table or water surrounding the pipe is expected, precautions should be taken to prevent flotation of thermoplastic pipe. Minimum required cover to prevent flotation is based on the assumption that the pipe is empty with the groundwater at the ground surface and a saturated soil density of 130 pcf. **For more information on flotation, refer to ADS Technical Note 5.05.**

