# KUSTOMPLO

## **PIPE SYSTEM** Installation Guidelines



### **KUSTOMFLO PIPE INSTALLATION GUIDELINES**

#### SCOPE

These specifications apply to all KustomFlo profile-wall high-density polyethylene (HDPE) pipes, in gravity-flow applications, of all diameters, and including all joints.

#### **PIPE REQUIREMENTS**

KustomFlo pipes must be installed in accordance with ASTM F894, AASHTO LRFD, and ASTM D2321, as well as the instructions identified in this document and those found at SolenoUSA.com.

#### PREPARATION

#### STEP 1

#### **BEFORE UNDERTAKING THE WORK**

It is recommended that you contact your Soleno Representative at least 48 hours before work begins, after receiving materials on site.

In the case of a discrepancy between the instructions contained in this document and those contained in the plans and specifications, please contact your Soleno representative.

Upon receipt of the materials, ensure that all items listed on the delivery slip are delivered and in good condition. Please notify your Soleno representative immediately in the case of damaged or missing items.

#### STEP 2

#### HANDLING

- Do not use steel wire ropes, chains, or hooks to unload or handle pipes.
- **Do not** drop pipes and fittings on the ground.
- Do not lift the pipe by inserting the forks into its ends.
- Handle pipes manually or use slings.

#### STEP 3

#### **ON-SITE STORAGE**

Provide an adequate storage space for pipes and fittings to prevent deformation or damage.

- Pipes of 24 inches diameter and smaller can be stored in stacks, for a maximum height of 6 feet.
- Pipes of 30 inches diameter and bigger must be laid individually on the ground.
- · Proper protection should be used to protect the socket from flattening when laid on the ground



#### **INSTALLATION**

#### STEP 4

#### **TRENCH PREPARATION**

Proceed with the excavation of the trench and the preparation of the bedding, in accordance with ASTM D2321, and the instructions and diagram below. The installation of the pipe must be done in a dry trench. The drying techniques used must comply with the local safety standards in force.

- The minimum trench width must allow for proper compaction of the haunch materials under the pipe.
- The minimum trench width shall be 1.25\*Pipe Outside Diameter + 12", per ASTM D2321.
- The foundation beneath the trench depth shall be well consolidated and stable material.
- Bedding material shall be a relatively loose material, roughly shaped to fit the bottom of the pipe, with a minimum depth of 4".





#### STEP 5

#### INSPECTION, CLEANING AND LUBRICATION

- Ensure that the socket section is not damaged.
- Clean the spigot and socket of the pipe.
- Lubricate the spigot and socket jointing surfaces including the gasket. Ensure that the lubricant stays clean and free of any dirt.

#### STEP 6

#### ASSEMBLY

- Begin installation on the downstream side. This section will have to be restrained mechanically or with backfilling. The standard installation direction intended is spigot end to socket end.
- Position the next section and push the spigot end into the socket using excavating equipment. Do not push
  directly on the socket. Use a wood blocking (sheet of plywood) so as not to damage the end of the pipe. It
  is essential to push evenly around the perimeter of the pipe socket (push in the center of the plywood).
- It is recommended to position the excavating equipment at the upstream end of the KustomFlo pipe and push with the bucket of the shovel in the axis of the culvert.
- Draw an insertion line on the spigot end, depending on the depth of the socket. For a proper connection, make sure that the spigot end is fully inserted up to the insertion line. Check inside that there is no free space between the sections and that the spigot end is not pushed beyond the end of the socket.
- Validate the longitudinal alignment of the sections as the installation progresses. A tolerance of plus or minus two degrees can be achieved with the pipe connections.

#### **CONNECTION TYPES**

- KustomFlo: SOCKET AND SPIGOT
  - All KustomFlo pipe is fabricated with an integrated socket and spigot on each pipe length. The spigot end can be inserted into the socket end of the previously laid pipe section. Spigots may have 0, 1, or 2 gaskets, depending on the project or application.



KustomFlo: ELECTROFUSION SEAL

Electrofusion socket and spigot is available on all KustomFlo pipe. Please contact your Soleno representative for additional documentation on Electrofusion.





#### A – METHOD WITH EXCAVATOR AND PANEL

- Place a rigid panel (plywood or beam broad enough to prevent damage to the socket/spigot) against the socket end of the pipe to be installed. The panel should completely cover the surface of the pipe socket or extend beyond the outside diameter of the socket.
- Firmly press the bucket of an excavator against the center of the panel and push until the insertion line is aligned with the end of the socket.



#### **B - METHOD WITH EXCAVATOR AND SLING**

- Wrap the sling around the pipe.
- Make sure there is no dirt or debris inside the socket.
- With the excavator, slowly move the pipe to align the spigot in the socket.
- With the first gasket ring in the socket, lower the pipe to improve the alignment with the other pipe.
- Slowly pull the sling until the insertion line is aligned with the edge of the socket.





#### STEP 7

#### BACKFILLING

- Proceed with the backfilling of the pipe, referring to ASTM D2321 Section 7, respecting the heights, the type of granular material and the degree of compaction.
- Refer also to the trench diagram above for definitions of the zones of backfill within the trench.
- Initial Backfill for pipe embedment material to meet ASTM D2321 Class I, II, III, or approved equal, compacted to a minimum of 90% standard proctor (Native material can be utilized that meets ASTM D2321 or approved equal.) All lifts shall be placed in a controlled manner. To prevent uneven loading, it is recommended that lifts not exceed 8" in uncompacted lift heights.
- The most sensitive portion during backfilling is located under the springline of the pipe, within the depth labelled "Haunch Zone" in the figure above. Insufficient compaction of the haunch material can lead to pipe ovality, misalignment, and/or failure. Haunch Zone material shall be hand-shoveled into place to allow for proper fill under the pipe and proper compaction. The use of a vibratory compacter is recommended for an effective compaction of the granular material in the haunch area.
- The backfill on one side of the pipe must never exceed by more than 12 inches the height of the backfill on the other side of the pipe.
- No compaction shall be done directly on the pipe until the backfill above reaches at least 12 inches.

For multiple rows of pipe, installed side-by-side (stormwater management facilities or other applications):

• Backfill shall be evenly spaced across the rows. Backfilling shall be performed equally on both sides of each pipe, along the entire length of the trench. See Appendix 2 for more information.

#### STEP 8

#### TESTING

- For installations with joint testing requirements, proceed with joint pressure testing after completion of the Assembly process as laid out in Step 6 above.
- For installations with inside diameter testing requirements, proceed with testing as set forth by the approving agency after completion of the Backfilling process as laid out in Step 7 above.

#### STEP 9

#### LOADING

- The minimum and maximum covers specified for the specified KustomFlo pipe profile will vary depending on the site conditions and loading requirements of the project. However, most specified cover conditions assume H-20 Highway loading. Backfill shall be placed and fully compacted to the minimum cover listed prior to loading the pipe to the design loads.
- Construction equipment and loading must be kept off the pipes during construction and installation.



#### **Appendix 1: Installation Troubleshooting**

Environmental conditions can lead to constraints during installation. Several potential circumstances and Soleno's recommended solutions are included below:

#### Excessive groundwater entering the trench/excavation:

If the trench/excavation has excessive groundwater, buoyancy may affect the installation of lightweight KustomFlo pipes. If buoyancy becomes an issue during installation, it is recommended to use sand bags during the installation to control the elevation of the pipe when connecting pipe segments. The sand bags can be added to the interior of the pipe segment being installed and attached to the previously installed pipe segments.



#### Ovalization of larger diameter pipes during installation:

Larger diameter pipes are subject to more ovular deformation than smaller diameter pipes, especially when lower pipe stiffness is specified due to shallow cover or limited loading. This deformation may result in difficulties joining two pipe sections. Pre-joining pipe sections within the laydown area can prevent any additional difficulties within the trench. If pre-joining sections is not possible, jacks or similar framing can be used within the pipe section to return the pipe to its circular shape. When jacks or framing are used to increase the stiffness during installation, these support structures shall remain in place until backfill is placed above the springline. The installer may need to take measures to ensure that the shape of the pipe remains circular during the installation and backfill process.





#### Appendix 2: Detention Systems and Side-by-side pipe installation:

KustomFlo pipes are useful tools for stormwater management. KustomFlo pipes can offer advantages for subsurface stormwater detention and infiltration. These installations often involve several large-diameter pipes installed side-by-side within a large excavation. The following are the Soleno recommendations for KustomFlo installation for side-by-side pipe systems.

- ASTM Class I Backfill compacted to 95% standard proctor is the recommended backfill for top
  performance. ASTM Class I, II, II or approved equal backfill, compacted at 90% or 95% can be used with
  confirmation from Soleno, to verify the performance of the specified KustomFlo profile.
- The recommended standard spacing between parallel pipe runs is half of the nominal pipe diameter, or three feet for nominal pipe diameters of 72 inches or larger.
- Backfill shall be evenly spaced across the rows. Backfilling and compaction shall be performed equally on both sides of each pipe, along the entire length of the trench.
- In the case where uneven backfilling is occurring, do not allow for the backfill to exceed a difference of two compacted lifts from one side of a pipe to the other side of the pipe.





For more details, visit <u>WWW.SOLENOUSA.COM</u> or contact our customer service department at 838-746-0122.





#### Soleno USA 66 Duplainville Rd Saratoga Springs, NY 12866 Info@SolenoUSA.com 838-746-0122