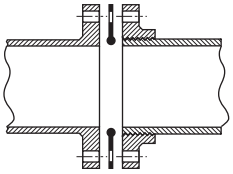
Long-Span and Piping Supports

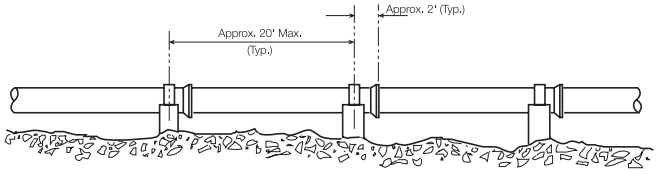
The beam strength of ductile iron pipe, along with the capability of certain AMERICAN joints, allows the installation of clear spans of up to 48′ or more in sizes 6″* - 64″. This was made possible due to the advent of AMERICAN's unique Toruseal® gaskets** in the 1970s.



Shown below are sketches of three cases of long-span or pipe-on-supports situations. Case #1 shows traditional pipe-on-supports installations where one support is provided for each length of pipe. Cases #2 and #3 show long-span pipe assemblies that use AMERICAN's Toruseal® gaskets. Other pipe assemblies using other AMERICAN joints may be possible depending upon circumstances. Notes under each case apply to that case. General notes are shown at the end.

*Contact AMERICAN on long–span requirements involving 4" pipe.
**See Sections 6 and 8 for details on Toruseal Gaskets.

Case #1



Case #1 uses 20′ or less lengths of Fastite, MJ, or other push-on restrained pipe. (See page 7-29 General Note 3.) This length is normally subject to normal manufacturing and trim (cut pipe) variations, with some pipe allowed up to two feet shorter than full length. Where exact length pipe is required, say to fit existing pier spacings, etc., contact AMERICAN.

Minimum pressure classes of all sizes of ductile iron pipe are more than adequate to support the weight of the pipe and the water it contains in Case #1 installations when analyzed and installed in accordance with the suggestions in the Ductile Iron Pipe Research Association's procedure for "Design for Ductile Iron Pipe on Supports." This procedure is available from AMERICAN.

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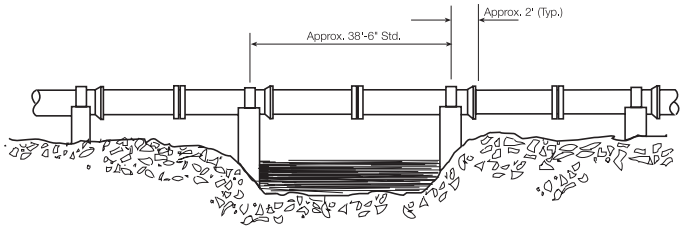
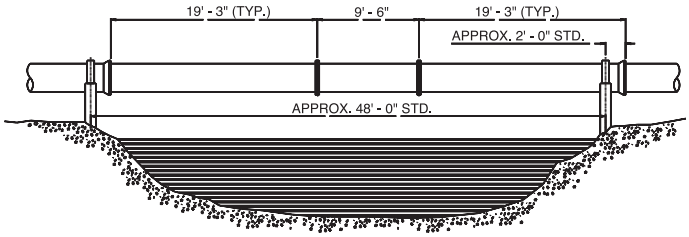
Case #2



Case #2 uses 19′-3″ lengths of flange plain end and flange bell (Fastite, MJ, or other push-on restrained) pipe. (MJ pipe is not available over 12″ in diameter.) Since Case #2 uses flanged pipe joints, minimum nominal thicknesses shown in AWWA C115 are required.

Case #3



Case #3 uses 19′-3″ lengths of flange bell and flange plain end pipe with a 9′- 6″ flange-flange pipe in the center. This can result in more mid-span deflection than Case #2 and, therefore, it is normally used only in 18″ and larger sizes.

The 48′ clear span distance for Case #3 has been increased in larger pipe size applications by lengthening the 9′-6″-long center pipe (maximum possible with three fulllength pipes is 58′-6″). Contact AMERICAN on requirements greater than 48′ or for longer desired spans in smaller pipe sizes than is illustrated in Case #2.

Since Case #3 uses flanged pipe joints, minimum nominal thicknesses for fabricated flanged pipe shown in AWWA C115 are required.

LONG SPAN AND PIPING SUPPORTS

GENERAL NOTES

1. Principles presented in the DIPRA publication "Design of Ductile Iron Pipe on Supports" can be used to calculate the maximum localized stress due to support reaction and to approximate the maximum beam-bending stress near mid-span of these systems. This publication can be obtained from AMERICAN.

2. Small-diameter pipe systems with very long unsupported pipe spans can exhibit visible mid-span deflection, or "sag." While this deflection results in no structural problems, the designer may consider means to reduce or eliminate midspan deflection if aesthetic or other concerns are anticipated in the application.

3. Push-on or push-on restrained joint pipe is normally a better choice than mechanical joint pipe due to more tolerance for thermal expansion and contraction, movement effects, and other aspects. Mechanical joints are not available from AMERICAN for ductile iron pipe over 12".

4. Where pipeline bends adjacent to crossings are externally restrained for restraint of axial pressure thrust, or where there are no bends adjacent to crossings to result in such thrusts, it is common to install push-on or mechanical pipe joints with a slight axial "gap" (1/8"-1/4") between the spigot and the back of the socket, and with the pipe sections firmly strapped to shaped pier supports located immediately behind the pipe bells as indicated. This is appropriate for normal anticipated thermal expansion and contraction of individual pipe sections and is easy to accomplish in the field by assembling the joints to metal contact condition and then "backing them out" slightly. Slight rebating deflection (or "wiggling") of the joint can produce the desired results, with field marking of the relative position of the spigot to the bell face to gauge results.

5. It is generally recommended that effective lateral restraint (means of assuring lateral stability of joints) be provided for the joints of all pipe-on-support installations, particularly in pressure pipelines and in other cases where lateral or columnar forces may exist to deflect joints or to dislodge the pipeline from the supports. Unstabilized, single rod or other hangers may not be desirable for pressure or other pipelines.

6. Contact AMERICAN where other design factors are a consideration. Systems where crossing pipe is subject to axial thrust forces or movements from bends, etc., long bridge crossings, large or concentrated thermal expansion-contraction effects, pipe-on-rollers, etc., are applications that may involve special design concerns.

7. The piping layouts as per Cases 2-3 consider the possibility of projects with sizable numbers of exact length repetitive pipe "spans." Where lesser numbers of spans are involved on candidate projects, it may be practical and more economical to provide slightly longer "standard spans," say by furnishing longer laying length intermediate flanged pipe (see Sec. 8) in lieu of the 19'-3" lengths depicted in thesecases, etc. Contact AMERICAN if this is necessary or desirable.