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Standard Terminology Relating to Concrete Pipe and Related Products[1]

This standard is issued under the fixed designation C 822; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

ε[1] NOTE—Editorial changes were made throughout in April 1999.

1. Referenced Documents

1.1 *ASTM Standards:*

C 497 Test Methods for Concrete Pipe, Manhole Sections, or Tile[2]

2. Terminology

absorption—the increase in weight of concrete resulting from the penetration of water into the concrete.

absorption test—a test made to determine the absorption of concrete.

admixture—a material other than water, aggregates, cement and fibre reinforcing used as an ingredient of concrete and added to the batch immediately before or during its mixture.

annular space—the space between the inner surface of the female end and the outer surface of the male end of an assembled pipe joint.

bell—see **female end of pipe.**

blend—a combining of various cementitious materials.

box section—a concrete pipe with a rectangular cross section.

box section bottom slab—lower horizontal portion of a box section in the installed condition. **C 789, C 850**

box section top slab—upper horizontal portion of a box section in the installed condition. **C 789, C 850**

box section wall—vertical sides of a box section in the installed condition. **C 789, C 850**

cage—an assembled unit of steel reinforcement consisting of circumferential and longitudinal bars or wires.

circular reinforcement—a circular-shaped line of reinforcement.

circumferential reinforcement—reinforcement that is approximately perpendicular to the longitudinal axis of the concrete pipe.

combined sewer—a pipeline intended to convey sewage and storm water.

compression test—a test made on a concrete specimen to determine the compressive strength.

compressive strength—the maximum resistance of a concrete specimen to axial compressive loading; or the specified resistance used in design calculations.

concrete—a homogeneous mixture of portland cement, aggregates, and water which may contain admixtures.

core—a cylinder of concrete obtained from concrete by means of a core drill.

crown—the top or highest point of the internal surface of the transverse cross section of a pipe.

culvert—a pipeline intended to convey water under a highway, railroad, canal, or similar facility.

cylinder (test)—a cast cylindrical specimen of concrete.

design strength—the minimum acceptable 0.01-in. (0.3-mm) crack D-load.

designated size—the dimensional name for a particular size that may or may not be equal to or related to the dimensions used for design purposes or of the manufactured product.

distribution reinforcement—reinforcement, typically running 90° to the main or circumferential reinforcement, intended to disperse concentrated loads to larger areas of a structural member. **C 850**

D-load—the supporting strength of a pipe loaded under three-edge-bearing test conditions expressed in pounds per linear foot per foot of inside diameter or horizontal span, or expressed in newtons per linear metre per millimetre of inside diameter or horizontal span.

D-load, 0.01-in. (0.3-mm) crack—the maximum three-edge-bearing test load supported by a concrete pipe before a crack having a width of 0.01 in. (0.3 mm) occurs, measured at close intervals, throughout a continuous length of 1 ft (300 mm) or more measured parallel to the longitudinal axis of pipe barrel expressed as D-load.

D-load ultimate *(Du)*—the maximum three-edge-bearing test load supported by a pipe, expressed as D-load.

drain tile—pipe for collecting and conveying surface and subsurface water from an area.

elliptical reinforcement—a line of reinforcement in the approximate shape of an ellipse.

exfiltration—the volume of pipeline flow leaving a sewer and its connections into the soil from pipe, joints, connections, and appurtenances.

external load-crushing strength test—a test of the pipe in

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[2] *Annual Book of ASTM Standards*, Vol 04.05.

which external crushing forces are exerted in specified directions and locations on a specified length of pipe.

external sealing bands—flexible wrappings that are applied to the outside of a concrete pipe, box section, or manhole section joint intended to control the movement of fluids or solids through the joint. **C 877**

female end of pipe (bell, socket, groove, modified groove)—that portion of the end of the pipe, regardless of its shape or dimensions, which overlaps a portion of the end of the adjoining pipe.

flow line—a line formed by the inverts of pipe.

gradation—the distribution of particles of granular material among standard sizes usually expressed in terms of cumulative percentages larger or smaller than each of a series of sieve openings.

grade rings—precast concrete rings used for vertical adjustment at the top of a manhole to set manhole casting to proper grade.

groove—see **female end of pipe.**

handling reinforcement—reinforcement intended to reduce the risk of collapse of the pipe or section during handling or storage prior to and during final placement.

hydrostatic pressure—the pressure exerted by water at rest.

hydrostatic test—a test of the ability of a pipe or its joint to withstand internal hydrostatic pressure.

infiltration—the volume of groundwater entering a sewer and its connections from the soil through pipe, joints, connections, or appurtenances.

inflow—the volume of any kind of water entering a sewer and its connections from outside sources not including those sources described under "infiltration."

invert—the bottom or lowest point of the internal surface of the transverse cross section of a pipe.

irrigation pipe—pipe intended for the distribution of irrigation water by pumping or gravity.

joint—a connection between two pipe sections, made either with or without the use of additional parts.

joint acceptance test—test procedure, utilizing compressed air or pressurized water, intended to determine the acceptability of an individual installed pipeline joint. **C 1103**

joint reinforcement—reinforcement, in or near the joint, intended to enhance the structural characteristics of the joint area of a concrete pipe or box section.

joint test apparatus—sealing device used on the inside of the pipe to isolate a single pipe joint so that it can be tested for leakage without filling the entire pipe with compressed air or water. See joint acceptance test.

layer of reinforcement—circumferential reinforcement that is one bar or wire in thickness.

lift hole—a small hole cast or drilled in the wall of the pipe or section for inserting a bolt, loop of cable or other device used in handling the pipe or section.

line of reinforcement—circumferential reinforcement comprised of one or more layers.

longitudinal reinforcement—reinforcement, in a concrete pipe or box section, running parallel to the intended flow.

lot—an assemblage of concrete pipe, all being of like size, material, and strength designation, manufactured by the same process. The lot size may differ from the quantity designated in the contract or order.

low-pressure air test—testing procedure, utilizing compressed air, intended to determine the acceptability of a pipe section, joint, or pipeline. **C 924**

male end of pipe (spigot, tongue, modified tongue)—that portion of the end of the pipe, regardless of its shape or dimensions, which is overlapped by a portion of the end of the adjoining pipe.

manhole—a precast concrete structure for vertical access to a pipeline or other closed structure.

manhole base—a concrete slab foundation for the bottom manhole riser section or a bottom manhole riser section with an integrally cast concrete floor.

manhole reducer section—a concrete pipe section used as a transition between different-diameter manhole riser sections.

manhole riser section—a concrete pipe section used to construct a manhole exclusive of the base, reducers, and top section.

manhole top—the concrete slab top or conical top used to reduce the manhole riser diameter to that of the desired access hole.

manufacturer—the group, corporation, partnership, or individual that manufactures or supplies a product.

mat reinforcement— see **quadrant mat.**

material tests—the quality and property tests of component materials.

modified design—a concrete pipe design changed from a standard design.

modified groove—see **female end of pipe.**

modified tongue—see **male end of pipe.**

negative air pressure (vacuum) test—test procedure utilizing air at a pressure less than atmospheric pressure, intended to determine the acceptability of a pipe section or multiple pipe sections, or an installed pipeline or manhole before or after backfill. **C 1214, C 1244**

nonreinforced pipe—concrete pipe designed without reinforcement.

O-ring gasket—a solid gasket of circular cross section.

owner—the public agency or authority, group, corporation, partnership, or individual that specifies products or services for use on a project that it presently or eventually will own or administrate.

permeability—that property which permits movement of a liquid through the pores and interstices of the concrete.

permeability test—a test to determine the movement of a liquid through concrete under a hydraulic or pressure gradient.

pipe—a tube or hollow concrete structure.

pipe diameter—the inside diameter of a concrete pipe.

pipe section—a single pipe.

pipeline—pipe sections joined together.

plant tests—the quality assurance tests performed prior to delivery as a basis of acceptance.

preformed flexible joint sealant—pliable material, formed into a defined cross section, that is applied to the surface of a pipe, box section, or manhole section joint, intended to control the movement of fluids or solids through the joint.

quadrant mat—additional tension zone circumferential reinforcement secured to a layer of reinforcement in the concrete pipe wall.

reinforced concrete pipe—concrete pipe designed with reinforcement as a composite structure.

reinforcement—steel embedded in concrete in such a manner that the two materials act together to resist forces.

resilient connector—a flexible connection for joining pipe to structures capable of being deformed and deflected without rupture or leakage.

rubber gasket—rubber formed and used as a seal in concrete pipe joints.

sample—the number of specimens drawn from a lot.

sewage (wastewater)—the spent water of a community which is a combination of liquid and water-carried wastes.

sewer—a pipeline intended to convey sewage.

special design—a concrete pipe design for sizes, loads, or service conditions not covered by a standard design.

specimen—an individual unit on which a test can be made.

spigot—see **male end of pipe.**

splice (reinforcement)—junction of two sections of parallel reinforcement intended to provide continuity and to transfer forces between the two sections.

springline—the points on the internal surface of the transverse cross section of a pipe intersected by the line of maximum horizontal dimension; or in box sections, the mid-height of the internal vertical wall.

standard design—a published and proven concrete pipe design.

storm drain—a pipeline intended to convey storm water.

storm sewer—a pipeline intended to convey storm water.

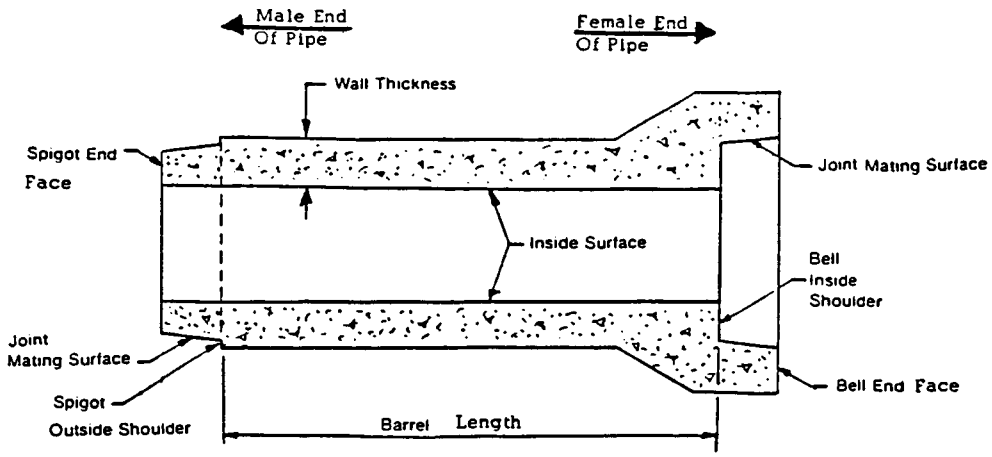
storm water—precipitation run-off.

three-edge-bearing method—a method for applying the load to a pipe in an external load-crushing strength test.

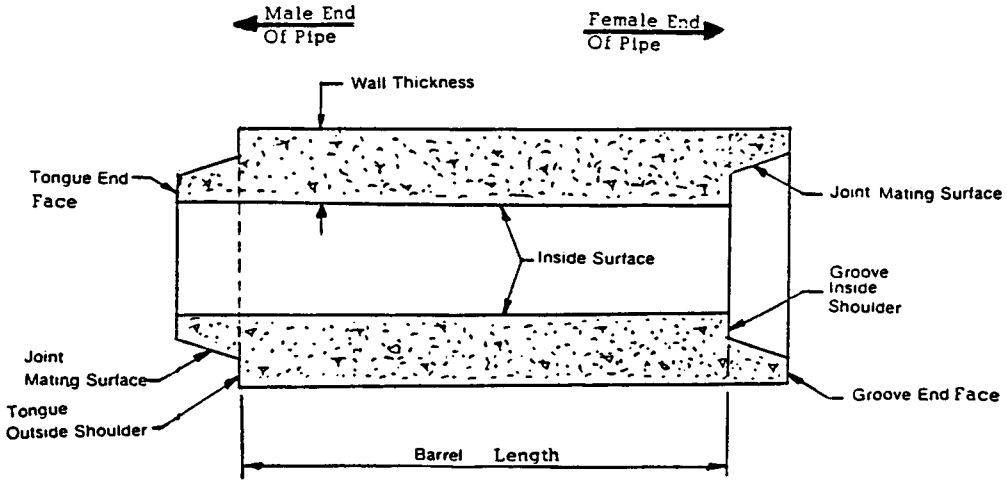
tongue—see **male end of pipe.**

ultimate strength—the maximum three edge bearing test load supported by a pipe.

wall (pipe)—the structural element composed of concrete or concrete and steel between the inside and outside surfaces of a concrete pipe.



Bell and Spigot Pipe



Tongue and Groove Pipe

NOTE 1—This is a schematic drawing which only defines nomenclature, and cannot be used for joint designs.
NOTE 2—Laying length is not shown and shall be as recommended by the pipe manufacturer when developing a pipe layout for field installations.
NOTE 3—The length of pipe used in the calculations for three-edge bearing strength test results is defined as laying length in the Calculations Section of Test Methods C 497[2] and may not equal field laying length.

FIG. 1 Pipe Nomenclature

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