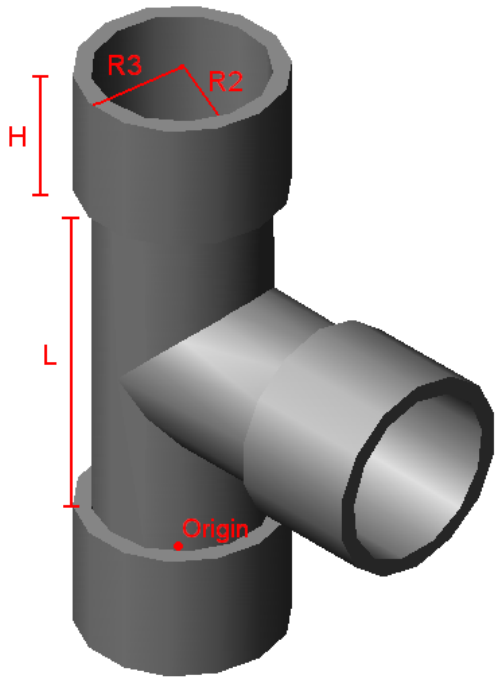
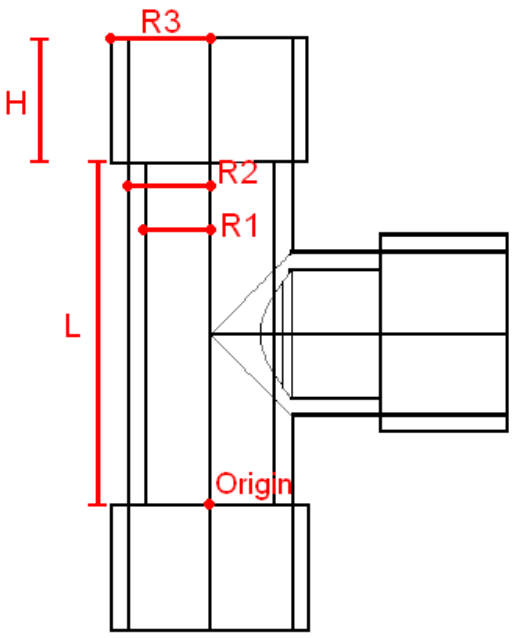
AutoCAD Tee Program

General Program Information

Unknown macro: {float}



Southeast Isometric View



Front View

Input Definitions

Inputs Needed to Call the Tee Function

origin - A 3*1 matrix with x,y,z positions corresponding to the point where the tee will be drawn.
ND - The nominal diameter of the tee. This value along with the pipe schedule is used to determine other actual dimensions of the tee.
EN- The enumerated pipe schedule type. Each schedule of pipe is represented by a specific number within our code.

Inputs Defined within Pipe Database

R1 - The inner radius of the main pipe, defined by outerradius(ND)
R2 - The outer radius of the main pipe, defined by innerD(ND,ED)/2
R3 - The outer radius of the sockets of the tee, defined by ConRadius(ND)
L - The length of the main pipe of the tee, defined by ShortTeeLength(ND)*2
H - The depth of the sockets of the tee, defined by SocketDepth(ND)

Inputs Defined within the Tee Function

p1 =

- x : $origin_0$
- y : $origin_1$
- z : $origin_2$

p2 =

- x : $origin_0$
- y : $origin_1$
- z : $origin_2$ + L/2

p3 =

- x : $origin_0$ + R2
- y : $origin_1$
- z : $origin_2$ + L/2

p4 =

- x : $origin_0$ - R1
- y : $origin_1$
- z : $origin_2$

p5 =

- x : $origin_0$ + L/2
- y : $origin_1$ + R1
- z : $origin_2$ + L/2

p7 =

- x : $origin_0$ - R3
- y : $origin_1$
- z : $origin_2$

p8 =

- x : $origin_0$ - R1
- y : $origin_1$
- z : $origin_2$

p9 =

- x : $origin_0$
- y : $origin_1$ - H
- z : -$origin_1$ - R3

p10 =

- x : $origin_0$
- y : $origin_2$ + L/2

p11 =

- x : $origin_0$ + zc
- y : $origin_2$ + L/2 - zc

p12 =

- x : $origin_0$ + zc
- y : $origin_2$ + L/2

ND - The nominal diameter of the pipe. This value along with the pipe schedule is used to determine other actual dimensions of the tee.
R1 - The inner radius of the main pipe.
R2 - The outer radius of the main pipe.
R3 - The outer radius of the sockets of the tee.
L - The length of the main pipe of the tee.
H - The depth of the sockets of the tee.

win1 =

- x : $origin_0$ - (L/2 + H)
- y : $origin_1$ - R3
- z : $origin_2$

win2 =

- x : $origin_0$ + (L/2 + H)
- y : $origin_1$ + R3
- z : $origin_2$

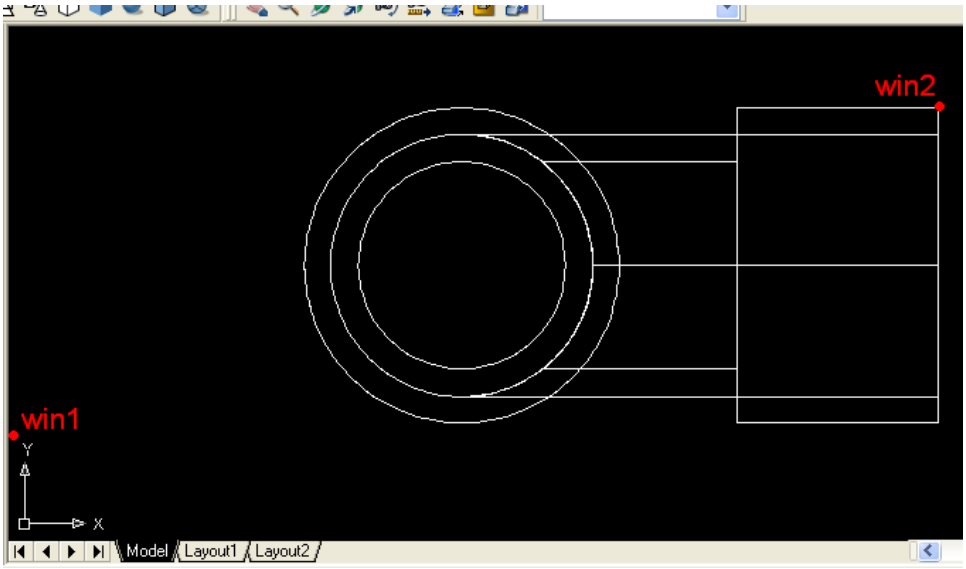
EN-The enumerated pipe schedule type. Each schedule of pipe is represented by a specific number within our code.

Note: zc corresponds to the zoom constant used within AutoCAD, defined by the basics file.

Technical Program Outline

Note: All coordinates are referenced in top view in the program unless otherwise specified

Unknown macro: {float}



$zoom_{win}$- zooms on a window space directly around where the tee is to be drawn. The points win1 and win2 are used to select this window size, based on including the space of the tee and a zoom constant (zc) to ensure the entire drawing will be within the frame.

$zoom_{win}$ <-- $zoom_{wina}$(win1,win2)

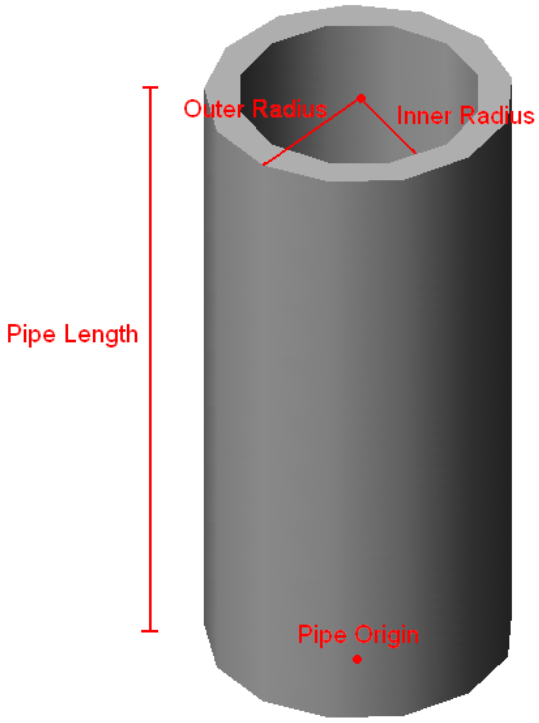
win1 =

- x : $origin_0$ - (L/2 + H)
- y : $origin_1$ - R3
- z : $origin_2$

win2 =

- x : $origin_0$ + (L/2 + H)
- y : $origin_1$ + R3
- z : $origin_2$

Unknown macro: {float}



Southeast Isometric View

Pipe- Draws a pipe of length L, with origin at p1, which will be the longer section of the tee.

pipe1 <-- Pipe(p1,ND,L,EN)

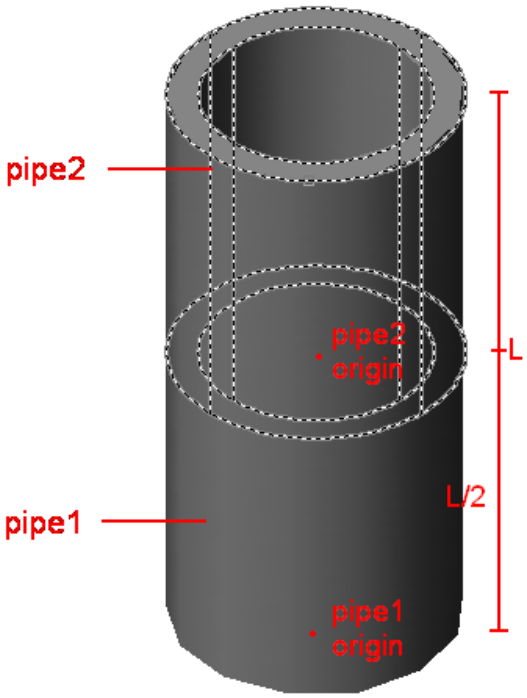
p1 = origin

ND = The nominal diameter

L = The length of the main pipe of the tee.

EN = The pipe schedule

Unknown macro: {float}



Southeast Isometric View

pipe2 - Draws a pipe of half the length of pipe1, which will be rotated to become the cross part of the tee. The origin starts at L/2, the middle of pipe1. All other dimensions are the same as pipe1.

pipe2 <-- Pipe(p2,ND,L/2,EN)

p2 =

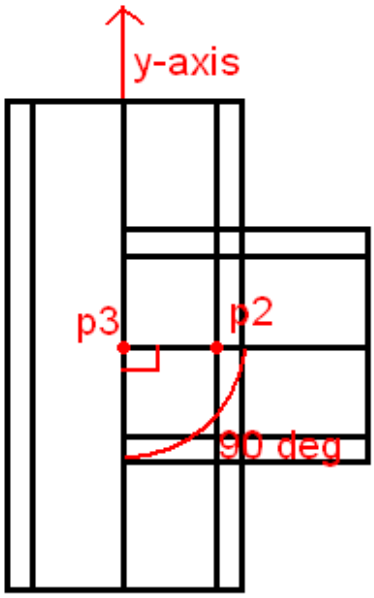
- x : $origin_0$
- y : $origin_1$
- z : $origin_2$ + L/2

ND = The nominal diameter

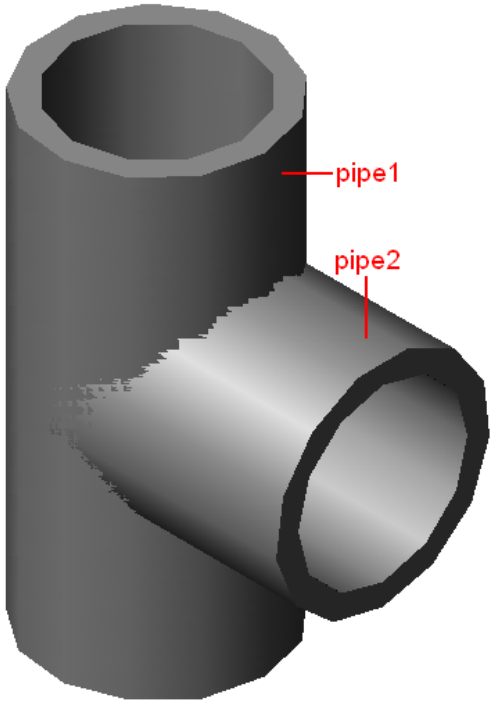
L/2 = half the length of the main pipe

EN = The enumerated pipe schedule

Unknown macro: {float}



Front View



Southeast Isometric View

rotate1- rotates pipe2 90 degrees using p2 to select pipe2, then using p3 to specify where on the y-axis to rotate.

rotate1 <-- $rotate_{3d}$(p3,p2,"y",90)

p3 =

- x : $origin_0$ + R2
- y : $origin_1$
- z : $origin_2$ + L/2

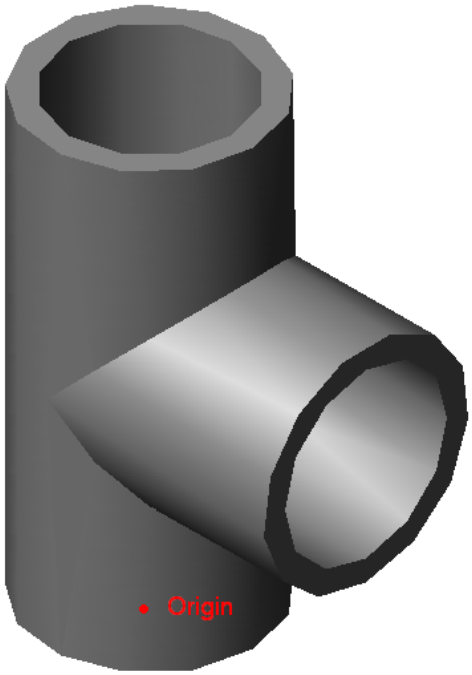
p2 =

- x : $origin_0$
- y : $origin_1$
- z : $origin_2$ + L/2

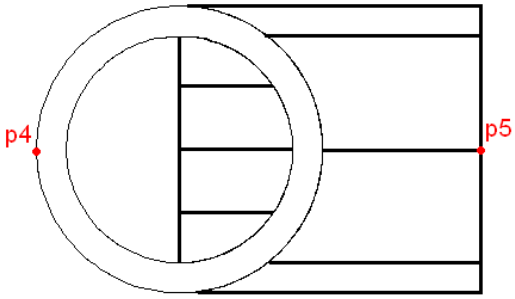
"y" - specifies which dimension to rotate in

90 - specifies how many degrees to rotate

Unknown macro: {float}



Southeast Isometric View



Top View

union1 - unites pipe1 and pipe2 to act as one solid unit, instead of 2 separate pieces, using p4 to select pipe1 and p5 to select pipe2.
union1 <-- unionA(p4,p5)

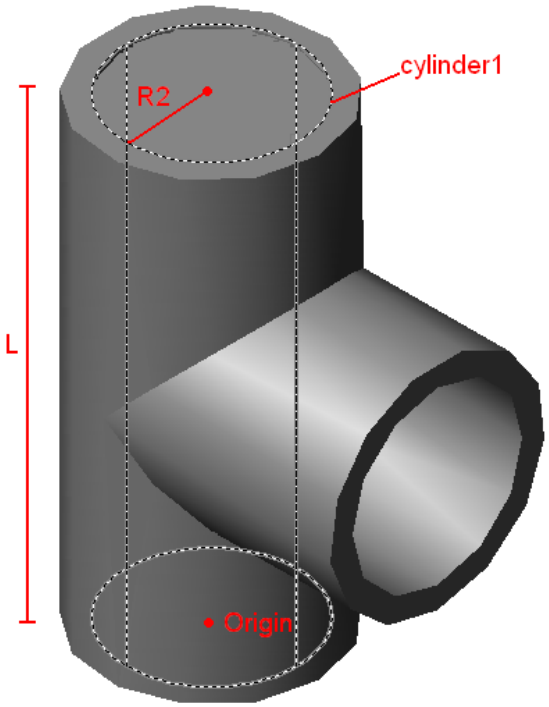
p4 =

- x : $origin_0$ - R1
- y : $origin_1$
- z : $origin_2$

p5 =

- x : $origin_0$ + L/2
- y : $origin_1$ + R1
- z : $origin_2$ + L/2

Unknown macro: {float}



Southeast Isometric View

cylinder1 - Draws a cylinder of length L and a radius of R2 at the origin

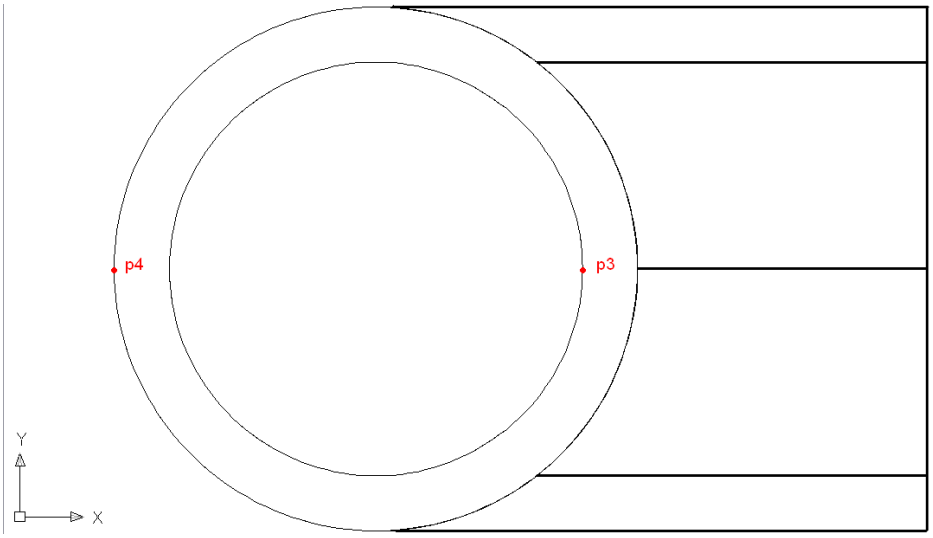
cylinder1 <-- cylinderA(p1,R2,L)

p1 = origin

R2 = The outer radius of the main pipe.

L = The length of the main pipe of the tee.

Unknown macro: {float}



subtract1- subtracts cylinder1 from the tee using p4 to select the tee as the object to be subtracted from, and using p3 to select the inner cylinder as the object to be subtracted.

subtract1 <-- subtractA(p4,p3)

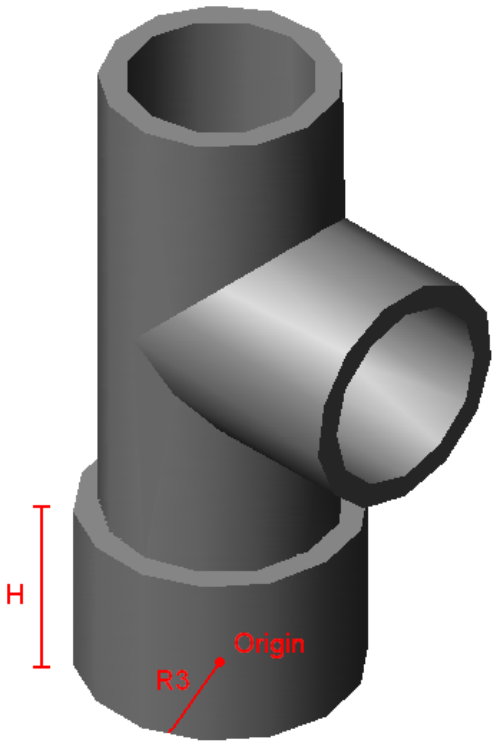
p4 =

- x : $origin_0$ - R1
- y : $origin_1$
- z : $origin_2$

p3 =

- x : $origin_0$ + R2
- y : $origin_1$
- z : $origin_2$ + L/2

Unknown macro: {float}



Southeast Isometric View

cylinder5- creates a cylinder of depth H, to draw it down from the origin, and radius R3 positioned at the origin, forming the outer surface for the socket of the tee.

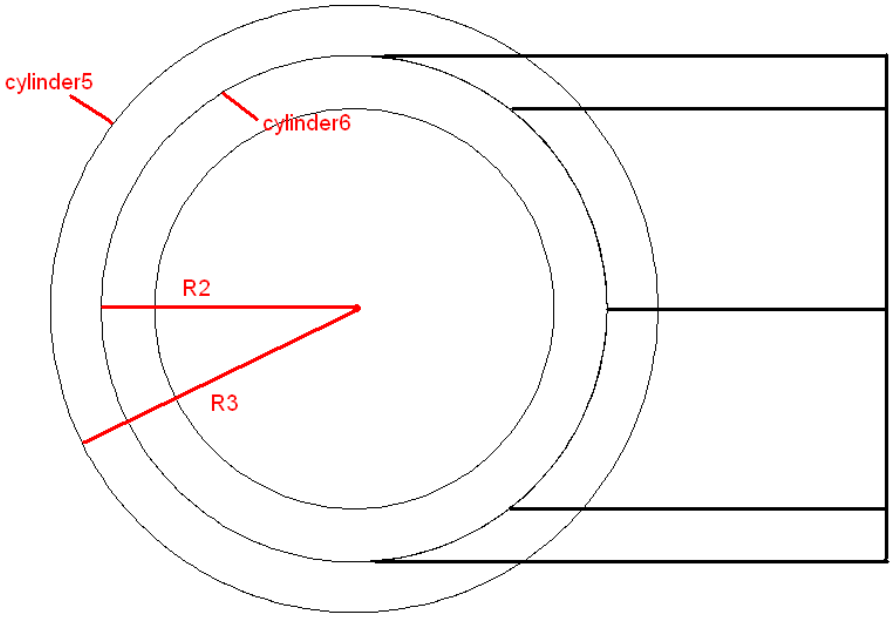
cylinder5 <-- cylinderC(p1,R3,-H)

p1 = origin

R3 = The outer radius of the sockets of the tee.

H = The depth of the sockets of the tee.

Unknown macro: {float}



cylinder6- creates a cylinder of depth H and radius R3 positioned at the origin, forming the inner surface for the socket of the tee.

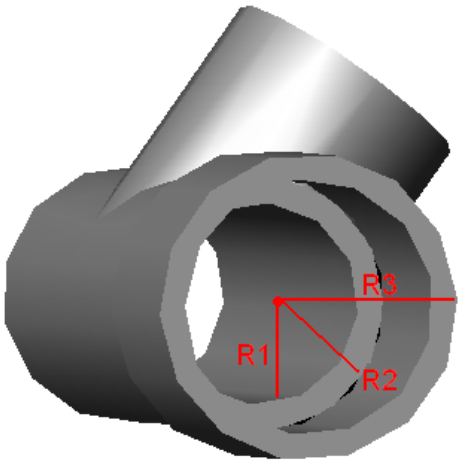
cylinder6 <-- cylinderA(p1,R1,-H)

p1 = origin

R1 = The inner radius of the main pipe

H = The depth of the sockets of the tee

Unknown macro: {float}



Free Rotation used to show the socket is now hollow

subtract3- subtracts cylinder6 from cylinder5 by using p7 to select cylinder6 as the object to be subtracted from, and using p8 to select cylinder5 as the object to be subtracted.

subtract3 <-- subtractA(p7,p8)

p7 =

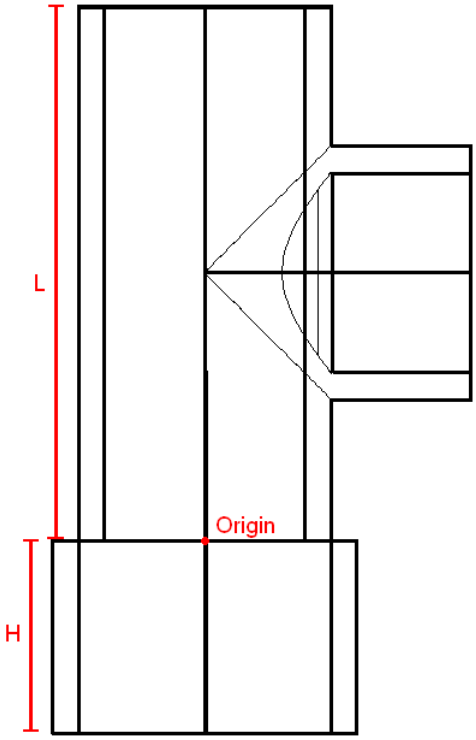
- x : $origin_0$ - R3

- y : $origin_1$
- z : $origin_2$

p8 =

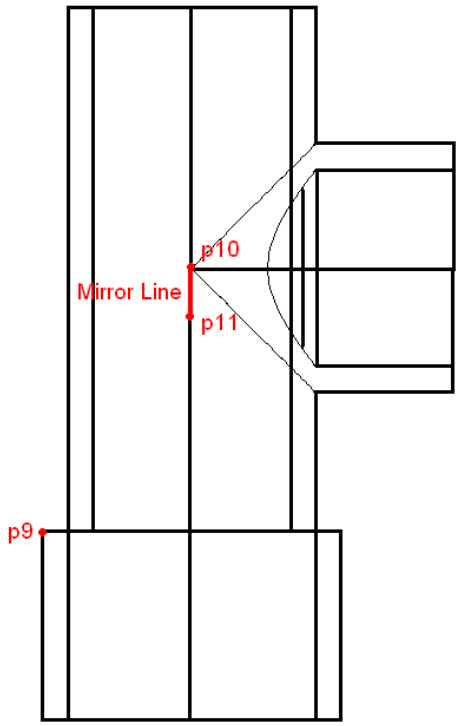
- x : $origin_0$ - R1
- y : $origin_1$
- z : $origin_2$

Unknown macro: {float}



viewfront- sets the workspace so that the user is viewing the object from the front
viewfront <-- viewfront

Unknown macro: {float}



mirror1 - replicates the original socket drawn onto the orthogonal end of the tee by selecting the hollow cylinder using p9, then reflecting it over a mirror line created using p10 and p11 to give the slope and direction of the mirror line.

mirror1 <-- mirrorA(p9,p10,p11)

p9 =

- x : $origin_0$
- y : $origin_1$ - H
- z : -$origin_1$ - R3

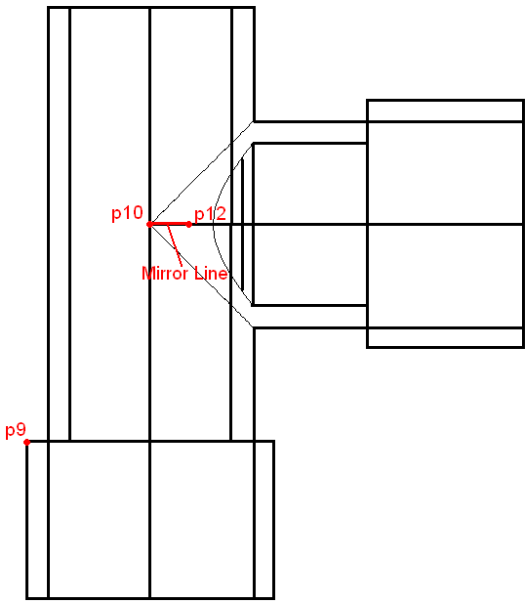
p10 =

- x : $origin_0$
- y : $origin_2$ + L/2

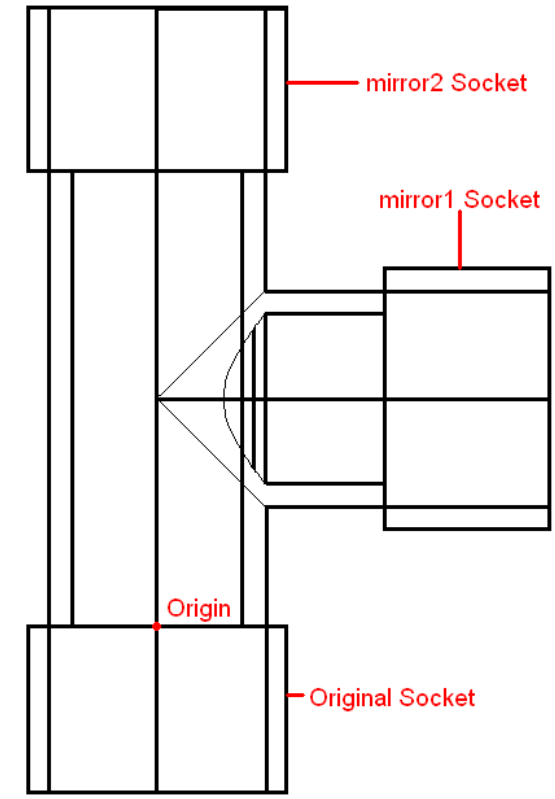
p11 =

- x : $origin_0$ + zc
- y : $origin_2$ + L/2 - zc

Unknown macro: {float}



Before mirror2



After mirror2

mirror2 - replicates the original socket drawn onto the opposite end of the tee by selecting the hollow cylinder using p9, then reflecting it over a mirror line created using p10 and p12 to give the slope and direction of the mirror line.

mirror2 <-- mirrorA(p9,p10,p12)

p9 =

- x : $origin_0$
- y : $origin_1$ - H
- z : -$origin_1$ - R3

p10 =

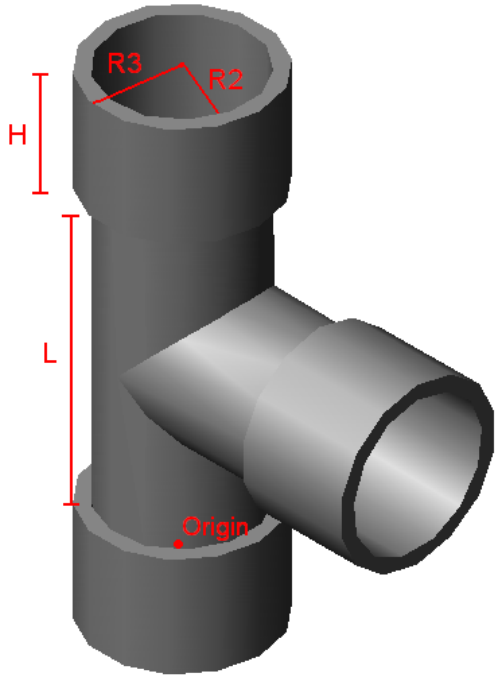
- x : $origin_0$

- y : $origin_2$ + L/2

p12 =

- x : $origin_0$ + zc
- y : $origin_2$ + L/2

Unknown macro: {float}



Southeast Isometric View

bigunion1- Unites all components of the tee to act as a single unit

bigunion1 <-- $union_{allA}$