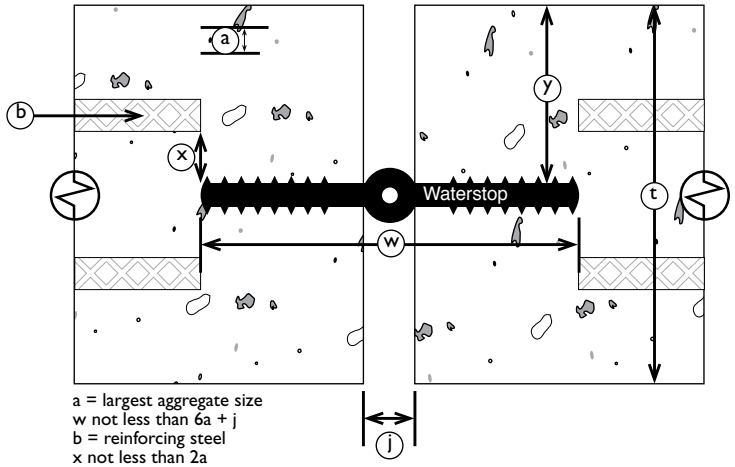
Waterstop Formulas

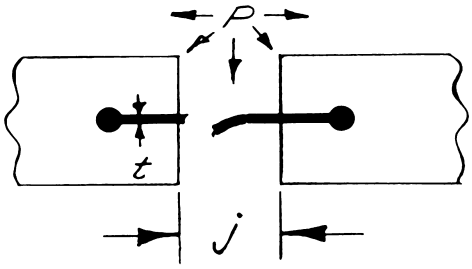
J P SPECIALTIES, INC.

Non-Metallic Embedded Waterstop Design



a = largest aggregate size
w not less than 6a + j
b = reinforcing steel
x not less than 2a
w not greater than t
y not less than 1/2(w - j)
ID = inside diameter of centerbulb
OD = outside diameter of centerbulb
j = OD - ID minimum

DESIGN WATERSTOP THICKNESS FOR SHEAR



P = Fluid pressure on joint (LB/IN^2).
j = Joint Gap (IN).
t = Thickness of waterstop (IN).
T = Tensile strength of waterstop compound (LB/IN^2).
S = Allowable shear strength of waterstop compound (LB/IN^2) = $\frac{T}{2}$.
S' = Actual shear stress for given set of conditions (LB/IN^2).
L = Length of joint (IN).
F = Force from fluid pressure on the joint (LB).
A = Shear area (IN^2).

$F = PjL = \frac{LB}{IN^2} \times IN \times IN = LB$

$A = 2Lt = IN \times IN = IN^2$

$S' = \frac{F}{A} = \frac{LB}{IN^2}$

$P = \frac{2tS'}{j} = \frac{LB}{IN^2}$

Feet of Water = 2.31 x P

Example:

Given:

t = .38 IN

T = 2000 LB/IN^2 (CRD-C-572 PVC specification grade compound)

$S = \frac{2000}{2} = 1000\ LB/IN^2$

j = .50 IN

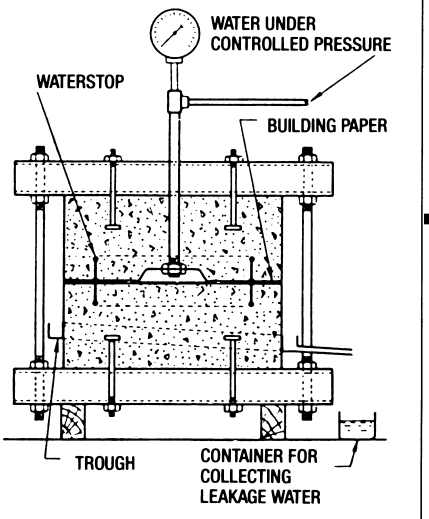
Find:

$P = \frac{2tS}{j} = \frac{2(.38)(1000)}{.5} = 1520\ \frac{LB}{IN^2}$

Feet of Water = 2.31 (1520) = 3511 Ft. of Water

If joint has to withstand 200 ft. of water then we have a safety-factor of $\frac{3511}{200} = 17.5$

This failure can be tested for with the following test apparatus:



LEAKAGE TEST SETUP