## HW 6

**Reading:**
Read Chapter J of the Spec and all other PDF readings on website

**Problem 1**

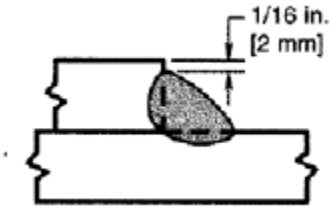
For a 3/4" thick plates, what is the min size fillet weld?

**TABLE J2.4**
**Minimum Size of Fillet Welds**

| Material Thickness of Thinner Part Joined, in. (mm) | Minimum Size of Fillet Weld, [a] in. (mm) |
|---|---|
| To 1/4 (6) inclusive | 1/8 (3) |
| Over 1/4 (6) to 1/2 (13) | 3/16 (5) |
| Over 1/2 (13) to 3/4 (19) | 1/4 (6) |
| Over 3/4 (19) | 5/16 (8) |

[a] Leg dimension of fillet welds. Single pass welds must be used.
Note: See Section J2.2b for maximum size of fillet welds.

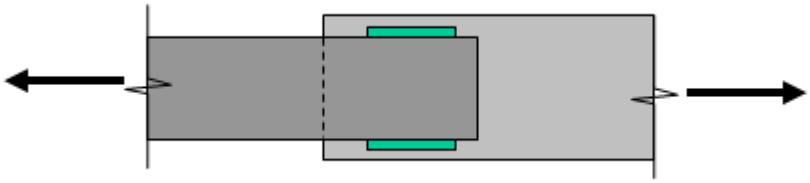
If a lap joint using SMAW, what is the max size fillet weld for the same plates?




Max Fillet Weld of 3/4" plate, assuming lap joint = 3/4 - 1/16 = 11/16

**Problem 2**

For 2 plates in a tension lap splice as shown below with welds in shear...



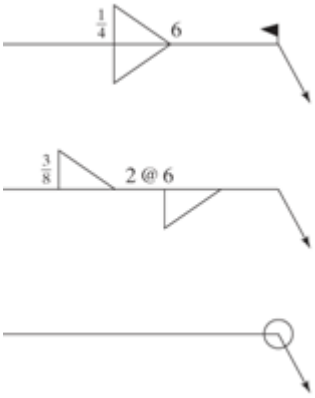
How long does the doubler sided fillet weld need to be if the weld is 270 kips ASD?

Assuming 5/16" fillet welds (there is no right answer)...
The strength of a 1" long of a 1/16" fillet is 0.928 = 0.6 (70ksi) 0.707/(2 x 16)
270 k < 4 x (0.928) x 2 sides x L solve for L

L = 270 / (5 x 0.928 x 2) = 29 inches

**Problem 3**

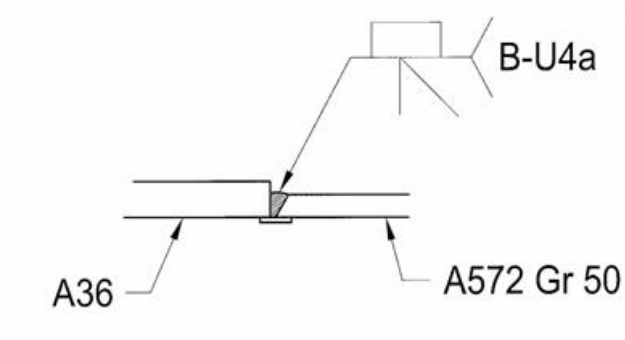
What do the flag and circle mean in a weld symbol?




Flag is "field weld"
Circle means weld "all around"

**Problem 4**

For the following connection tension splice between a 1x1 bar to a 2x2 bar (A36), what is the capacity of the CJP weld?

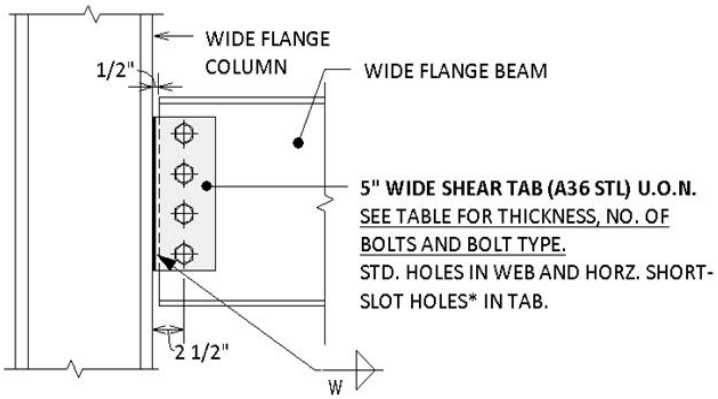



Remember this is just the capacity of the 1x1 bar

Assume LRFD - 0.9 x 36ksi x 1 x 1 = 32.4 kips

**Problem 5**

Assuming the weld is 1/4 fillet each side, and shear plate is 11.5" long, what is the LRFD shear capacity of the weld below....




**BEAM TO WF COL FLANGE SHEAR TAB**

LRFD Capacity of 1" long weld per 1/16 = 0.75 x 0.6 x 70ksi x 0.707/16 = 1.392

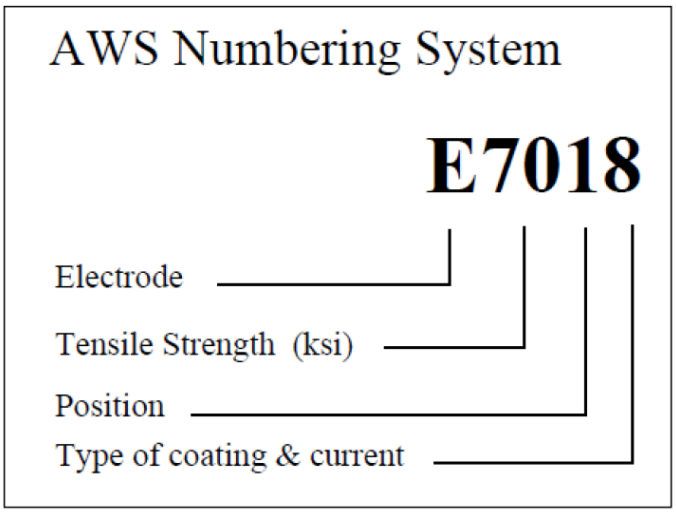
Shear Capacity of Weld = 2 x 11.5" x 1.392 x 4 = 128 kips

**OR**

Shear Capacity of Weld = $F_wA_w$ = (0.75 x 0.6 x 70ksi) x (0.707 x 1/4 x 2 x 11.5") = 128 kips

**Problem 6**

What do the numbers and letter E7018 mean? Why do we specify E70XX?




XX just means unknown or does not matter.

**Problem 7**

What does SMAW, GMAW, FCAW, and SAW mean? Which one is stick welding? Which is MIG welding?

Shielded Metal Arc Welding (SMAW) is also known as manual, stick, or hand welding

Gas Metal Arc Welding (GMAW) is also known as MIG welding

Flux Cored Arc Welding (FCAW) is similar to the GMAW process

Submerged Arc Welding (SAW) is only performed by automatic or semiautomatic methods

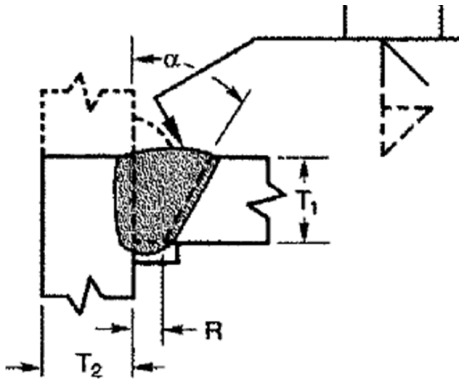
**Problem 8**

What are the 5 different types of tests to determine the quality of the weld?

- Visual
- Dye Penetrate Test
- Magnetic Particle Inspection
- Ultrasonic Inspection
- Radiographic Inspection

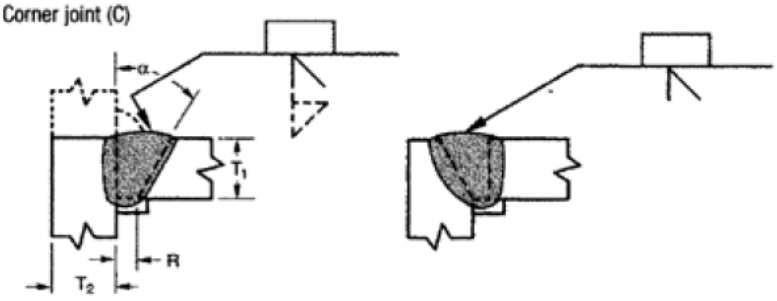
**Problem 9**

For a CJP weld using a single bevel type TC-U4a, what is the root dimension required for a 45 degree bevel?



# CJP Symbol TC-U4a

Single-bevel-groove weld (4)
T-joint (T)
Corner joint (C)




| Tolerances | |
|---|---|
| As Detailed (see 3.13.1) | As Fit-Up (see 3.13.1) |
| R = +1/16, −0 | +1/4, −1/16 |
| α = +10°, −0° | +10°, −5° |

| Welding Process | Joint Designation | Base Metal Thickness (U = unlimited) | | Groove Preparation | | Allowed Welding Positions | Gas Shielding for FCAW | Notes |
|---|---|---|---|---|---|---|---|---|
| | | $T_1$ | $T_2$ | Root Opening | Groove Angle | | | |
| SMAW | TC-U4a | U | U | R = 1/4 | α = 45° | All | — | 5, 7, 10, 11 |
| | | | | R = 3/8 | α = 30° | F, V, OH | — | 5, 7, 10, 11 |
| GMAW FCAW | TC-U4a-GF | U | U | R = 3/16 | α = 30° | All | Required | 1, 7, 10, 11 |
| | | | | R = 3/8 | α = 30° | F | Not req. | 1, 7, 10, 11 |
| | | | | R = 1/4 | α = 45° | All | Not req. | 1, 7, 10, 11 |
| SAW | TC-U4a-S | U | U | R = 3/8 | α = 30° | F | — | 7, 10, 11 |
| | | | | R = 1/4 | α = 45° | | | |

1/4"