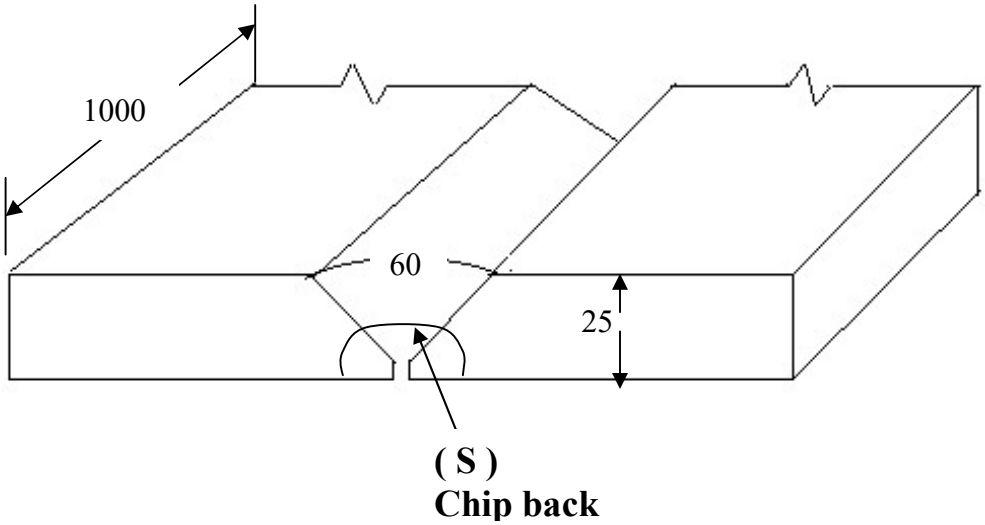
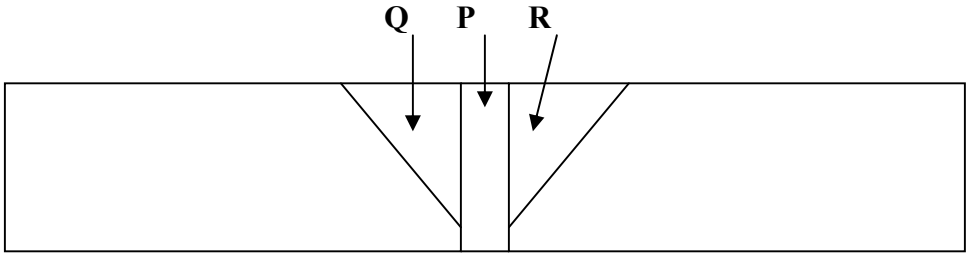
WELD METAL CALCULATION

a) PLATE LENGTH : - 1OOOmm

b) MATERIAL DENSITY : - 8 gm / cm³

1. SINGLE ‘ V’ (WITH CHIP BACK)

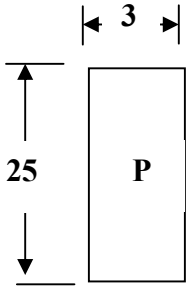




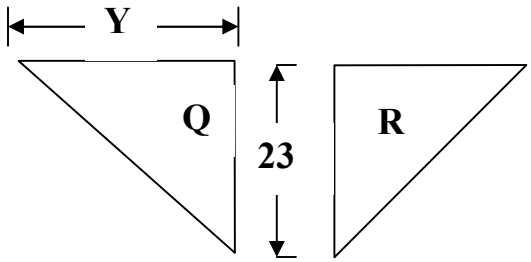
- **Area of P = b X h**

  = 3 X 25 mm²

  = 75 mm²



- **Area of Q + R**



Tan 30° = Y / 23

Y = Tan 30° X 23

Y = 1/2 X 23

Y = 13.27 mm

Area (Q + R) = 2 X (1/2 X b X h)

= 2 X [1/2 X 13.27 X 23)

= 305 mm^2

- **Now, total area (Q + R + P) = 305 + 75**

= 380 mm^2

- **Total volume = Total Area X Length Of Plate**

= 380 X 1000

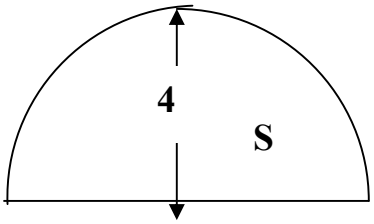
= 380000 mm^3

- **Weight of weld metal = Volume X Density**

$$= 380000 \times \frac{8}{1000} \quad \frac{gm}{cm^3}$$

= 3040 gm
= 3.04 Kg.

- **After chip back**



➢ **Area of S = (π / 2 X r^2)**

$$= \left[\frac{3.14}{2} \times (4)^2 \right]$$

$$= 25.12 \text{ mm}^2$$

Volume = Length X Area

= 1000 X 25.12

$$= 25120 \text{ mm}^3$$

➢ **Weight of weld metal = Volume X Density**

$$= 25120 \times \frac{8}{1000} \quad \frac{\text{gm}}{\text{cm}^3}$$

= 200.96 gm
= 0.2 Kg

➢ **Now, total weight = Before C / B (chip back) + After C / B**

= 3.04 + 0.2
= 3.24 Kg.

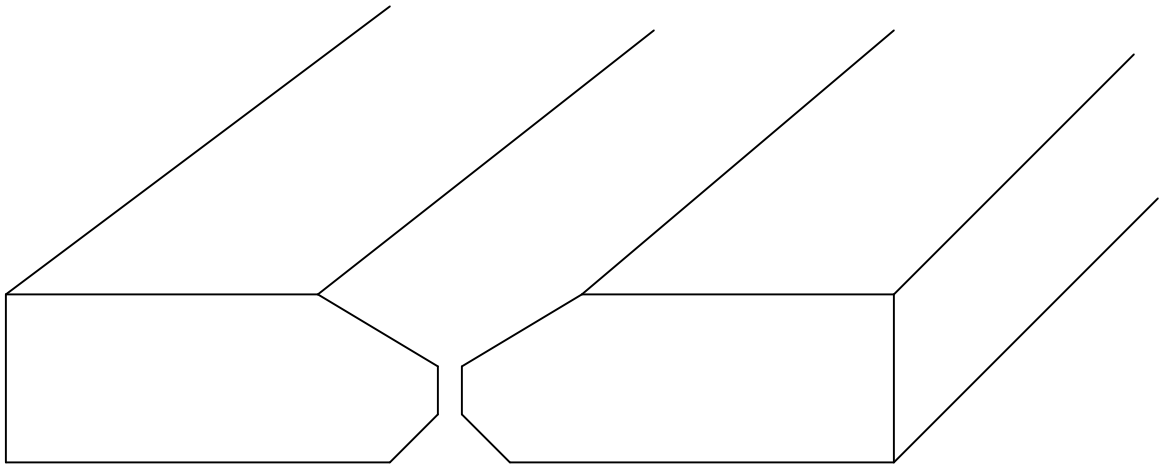
For SMAW (Considering Q factor) = 2 * 3.24
= 6.48 Kg required

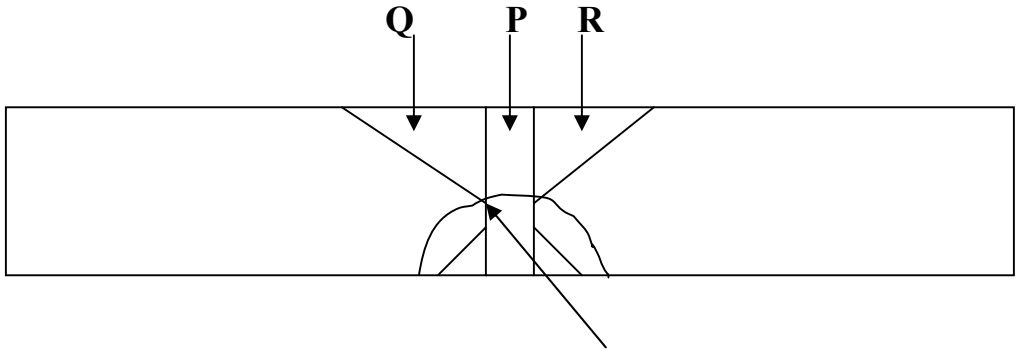
Face side welding (With upper Reinforcement) = 1.2 Kg
(Aprx 50 *3)
Lower reinforcement = 0.72 Kg

3.24 + 1.2 + 0.72= 5.16
Considering Q factor for Consumables = 2 * 5.15

=10.30 Kg

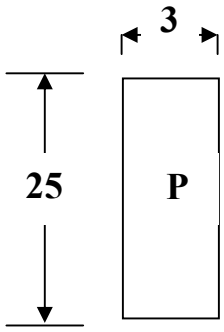
2. DOUBLE ‘ V ‘ (WITH CHIP BACK)





S

- **BEFORE CHIP BACK**

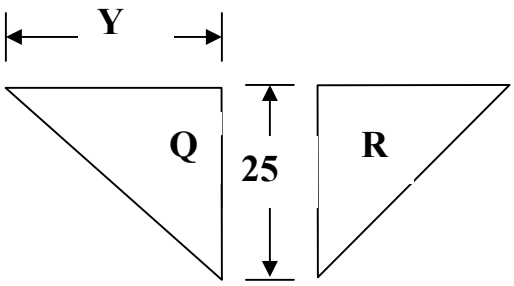


Area of P = b X h

= 3 X 25

= 75 mm^2

- **AREA OF Q & R**



Tan θ = Y / 20

Y = Tan 30° X 25

Y = 1/2 X 25

Y = 12.5 mm

- **Area (Q + R) = 2 X (1/2 X b X h)**

  = 2 X (1/2 X 12.5 X 25)

  = 312.5 mm^2

- **Now, total area (Q + R + P) = 312.5 + 75**

  = 387.5 mm^2

- **Total volume = Total Area X Length Of Plate**

  = 387.5 X 1000

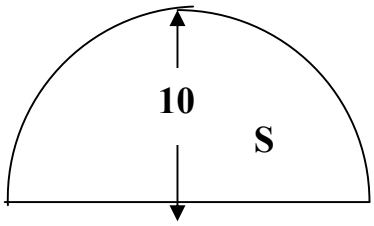
  = 387500 mm^3

- **Weight of weld metal = Volume X Density**

$$= 387500 \text{ X } \frac{8}{1000} \quad \frac{gm}{cm^3}$$

$$= 3100 \text{ gm}$$

- **<u>After chip back</u>**



- **Area of S = (π / 2 X r^2)**

$$= \left[\frac{3.14}{2} \text{ X } (10)^2 \right]$$

$$= 157 \text{ mm}^2$$

Volume = Length X Area

= 1000 X 157

= 157000 mm^3

- **Weight = Volume X Density**

$$= 157000 \text{ X } \frac{8}{1000} \quad \frac{gm}{cm^3}$$

= 1256 gm

- **Now, total weight = Before C / B (chip back) + After C / B**

= 3100 + 1256

= 4356 gm

= 4.5 kg Aprx.

For SMAW (Considering Q factor) = 2 * 4.56
= 8 Kg required Aprx.