

## UN EQUAL LATERAL TEE HEADER HOLE FORMULA

4" Header OD = 114 mm =>  $\frac{1}{2}$  OD = 57 mm.

2 " Branch ID = 59 mm =>  $\frac{1}{2}$  ID = 29.5 mm.

CL = 16 Center line =>  $360^\circ \div 16 = 22.5^\circ$

**NOTE: No need to calculate Unequal lateral tee branch cutback for header hole marking but we have shown only for your information.**

*Un Equal Lateral Tee Branch Cutting Formula:*

$$(H\frac{1}{2} OD - \sqrt{(H\frac{1}{2} OD)^2 - (\sin(D) \times B\frac{1}{2} ID)^2}) \div \sin(Y) + B\frac{1}{2} ID(1 - \cos(D)) \div \tan(Y)$$

22.5°	=	$(57 - \sqrt{(57^2 - (\sin(22.5) \times 56.5)^2})) \div \sin(45) + 56.5(1 - \cos(22.5)) \div \tan(45)$	=	3.84 mm
45°	=	$(57 - \sqrt{(57^2 - (\sin(45) \times 56.5)^2})) \div \sin(45) + 56.5(1 - \cos(45)) \div \tan(45)$	=	14.23 mm
67.5°	=	$(57 - \sqrt{(57^2 - (\sin(67.5) \times 56.5)^2})) \div \sin(45) + 56.5(1 - \cos(67.5)) \div \tan(45)$	=	28.02 mm
90°	=	$(57 - \sqrt{(57^2 - (\sin(90.5) \times 56.5)^2})) \div \sin(45) + 56.5(1 - \cos(90)) \div \tan(45)$	=	41 mm
112.5°	=	$(57 - \sqrt{(57^2 - (\sin(112.5) \times 56.5)^2})) \div \sin(45) + 56.5(1 - \cos(112.5)) \div \tan(45)$	=	50.60 mm
135°	=	$(57 - \sqrt{(57^2 - (\sin(135) \times 56.5)^2})) \div \sin(45) + 56.5(1 - \cos(135)) \div \tan(45)$	=	55.95 mm
157.5°	=	$(57 - \sqrt{(57^2 - (\sin(135) \times 56.5)^2})) \div \sin(45) + 56.5(1 - \cos(135)) \div \tan(45)$	=	58.35 mm
180°	=	$(57 - \sqrt{(57^2 - (\sin(135) \times 56.5)^2})) \div \sin(45) + 56.5(1 - \cos(135)) \div \tan(45)$	=	59 mm

### **HORIZONTAL LINE DISTANCE FORMULA:**

$$(\sin^{-1} (B\frac{1}{2}ID \times \sin(\text{Degree}) \div H\frac{1}{2} OD)) \times H\frac{1}{2} OD \times \tan(1)$$

22.5°	=	$(\sin^{-1} (29.5 \times \sin(22.5) \div 57)) \times 57 \times \tan(1)$	=	11.36 mm
45°	=	$(\sin^{-1} (29.5 \times \sin(45) \div 57)) \times 57 \times \tan(1)$	=	21.35 mm
67.5°	=	$(\sin^{-1} (29.5 \times \sin(67.5) \div 57)) \times 57 \times \tan(1)$	=	28.41 mm
90°	=	$(\sin^{-1} (29.5 \times \sin(90) \div 57)) \times 57 \times \tan(1)$	=	31.00 mm
112.5°	=	$(\sin^{-1} (29.5 \times \sin(112.5) \div 57)) \times 57 \times \tan(1)$	=	28.41 mm
135°	=	$(\sin^{-1} (29.5 \times \sin(135) \div 57)) \times 57 \times \tan(1)$	=	21.35 mm
157.5°	=	$(\sin^{-1} (29.5 \times \sin(157.5) \div 57)) \times 57 \times \tan(1)$	=	11.36 mm
180°	=	$(\sin^{-1} (29.5 \times \sin(180) \div 57)) \times 57 \times \tan(1)$	=	00.00 mm

### **VERTICAL LINE DISTANCE FORMULA:**

$$(H\frac{1}{2} OD - \sqrt{(H\frac{1}{2} OD^2 - (\sin(D) \times B\frac{1}{2} ID)^2)}) \div \tan(Y) + B\frac{1}{2} ID(1 - \cos(D)) \div \sin(Y)$$

$$\begin{aligned} 22.5^\circ &= (57 - \sqrt{(57^2 - (\sin(22.5) \times 29.5)^2)}) \div \tan(45) + 29.5(1 - \cos(22.5)) \div \sin(45) = 04.30 \text{ mm} \\ 45^\circ &= (57 - \sqrt{(57^2 - (\sin(45) \times 29.5)^2)}) \div \sin(45) + 29.5(1 - \cos(45)) \div \sin(45) = 16.17 \text{ mm} \\ 67.5^\circ &= (57 - \sqrt{(57^2 - (\sin(67.5) \times 29.5)^2)}) \div \sin(45) + 29.5(1 - \cos(67.5)) \div \sin(45) = 32.69 \text{ mm} \\ 90^\circ &= (57 - \sqrt{(57^2 - (\sin(90.5) \times 29.5)^2)}) \div \sin(45) + 29.5(1 - \cos(90)) \div \sin(45) = 49.94 \text{ mm} \\ 112.5^\circ &= (57 - \sqrt{(57^2 - (\sin(112.5) \times 29.5)^2)}) \div \sin(45) + 29.5(1 - \cos(112.5)) \div \sin(45) = 64.62 \text{ mm} \\ 135^\circ &= (57 - \sqrt{(57^2 - (\sin(135) \times 29.5)^2)}) \div \sin(45) + 29.5(1 - \cos(135)) \div \sin(45) = 75.17 \text{ mm} \\ 157.5^\circ &= (57 - \sqrt{(57^2 - (\sin(22.5) \times 29.5)^2)}) \div \sin(45) + 29.5(1 - \cos(157.5)) \div \sin(45) = 81.39 \text{ mm} \\ 180^\circ &= (57 - \sqrt{(57^2 - (\sin(22.5) \times 29.5)^2)}) \div \sin(45) + 29.5(1 - \cos(180)) \div \sin(45) = 83.43 \text{ mm} \end{aligned}$$

[Watch Video for Marking Process](#)  

