1. To find **the major diameter** of the external thread

D_c: diameter of cylinder (known)
R_c: reading of micrometer over the cylinder (measured value)
D_{th}: diameter of the thread (unknown)
R_{th}: reading of micrometer over the thread (measured value)

$(R_{th} - D_{th} = R_c - D_c)$ or $(R_{th} - R_c = D_{th} - D_c)$

After rearrange the formula

$\therefore majorD_{th} = D_c + (R_{th} - R_c)$

2. To find the **Minor diameter** of an external thread

$\therefore minorD_{th} = D_c + (R_{th(prism)} - R_{c(prism)})$

3. To find the **effective diameter** E_d of the external thread (using the three wires method)

For the distance T

$T = D_c + (R_{th(wire)} - R_{c(wire)})$

$E_d = T + 2x$

Where $2x = \frac{P}{2}\cot\theta - d(cosec\,\theta - 1)$

$(d: diameter\ of\ the\ wire)$

The proof for $(E_d = T + 2x)$ is

From the Fig-14, $E_d = T + 2x$

In the ΔABC, $AB = BC\cot\theta$

But, $BC = \frac{1}{4}$ pitch $= \frac{1}{4}P$

Therefore, $AB = \frac{1}{4}P\cot\theta$

In the ΔADE, $AE = DE\cos ec\theta = \frac{d}{2}\cos ec\theta$

Now, $x = AB - AF$ and $AF = AE - EF = AE - d/2$

$$\therefore AF = \frac{d}{2}(\cos ec\,\theta - 1)$$

Therefore, $$x = \frac{P}{4}\cot\theta - \frac{d}{2}(\cos ec\,\theta - 1)$$

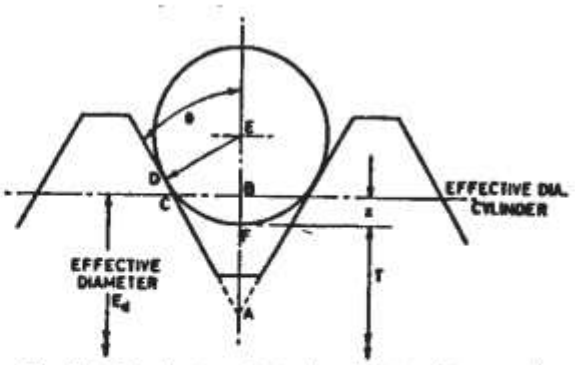

Fig-14 Calculation of simple effective diameter.[4]

where,

P= Nominal Pitch
D=Wire Diameter
θ= Nominal Flank Angle or semi angle of thread