Three Phase Delta Connected Load

Power consumed by three phase load
The power consumed by the three phase load is given by sum of power consumed by each individual load in each phase.

$$P = \left|V_{RY}\right| \left|I_{RY}\right| COS\varnothing_{RY} + \left|V_{YB}\right| \left|I_{YB}\right| COS\varnothing_{YB} + \left|V_{BR}\right| \left|I_{BR}\right| COS\varnothing_{BR}$$

Where,
θ_{RY} = Phase difference between V_{RY} and I_{RY}
θ_{YB} = Phase difference between V_{YB} and I_{YB}
θ_{BR} = Phase difference between V_{BR} and I_{BR}
Since the system is balanced,
$|V_R| = |V_Y| = |V_B| = V$
$|I_R| = |I_Y| = |I_B| = I$
$\theta_{RY} = \theta_{YB} = \theta_{BR} = \theta$
P=VI cosθ + VI cosθ + VI cosθ
= 3 VI cosθ
In balanced delta system, $V = V_L$ and I= I_L / √3
P = $3V_L$ (I_L / √3) cosθ
P = √3 V_L I_L cosθ

The above equation represents the power consumed by a 3 phase delta connected load.

This expression is same as that of the power in balanced star connected load.