▶ How is cosphi calculated?

To calculate the cos phi of the plant, it is necessary to have data on the consumption of Active Energy (kWh) and Reactive Energy (kVArh), or Active Power (kW) and Apparent Power (kVA). These values can be found in the electricity bill or through a network analysis.

If in possession of kWh and kVArh

$$\cos phi = \frac{Ea}{\sqrt{Ea^2 + Er^2}}$$

Where Ea is the value of Active Energy in kWh and Er is the value of Reactive Energy in kVARh, both for the range (F1 or F2) taken into account.

If you are in possession of the values of Active Power (kW) P and Reactive Power (kVAR) Q, you can obtain the value of the tangent of the phase shift angle φ between the voltage and the current as follows:

$$tg\varphi = \frac{Q}{P}$$

The phase angle is obtained from the inverse goniometric function $\varphi = Arctg\left(\frac{Q}{P}\right)$
And therefore, finally the cos phi:

$$Cos\varphi = Cos\left(arctg\frac{Q}{P}\right)$$

If you are in possession of the values of Active Power (kW) P and Apparent Power (kVA) A, the value of Cos phi is obtained from the following expression:

$$Cos\varphi = \frac{P}{A}$$