Transformer kVA Sizing from a Load List

Transformer kVA for a plant from the connected load, demand factor, growth margin, power factor and planned loading, with the secondary full-load current.

Method: Maximum demand with demand factor and margin

Input parameters

Unit system: SI

Parameter	Value	Unit
Total connected load	1,200.0	kW
Demand factor (maximum demand ÷ connected load, at most 1) Multiplies the connected load. A diversity factor (1 or more) divides instead: enter its reciprocal.	70.000	%
Margin for future load	20.000	%
Average power factor	85.000	%
Planned maximum transformer loading	80.000	%
Secondary line voltage	415.00	V

Calculated results

Parameter	Value	Unit
Transformer rating needed	1,482.4	kVA
Maximum demand	1,008.0	kW
Secondary full-load current at that rating	2,062.3	A

Notes for this case

- Choose the next standard rating above this; check the largest motor's starting dip with the motor starting calculator.

Formula and method

$$P_d = P_c \cdot DF(1+g) \qquad S = \frac{P_d}{\cos\varphi\,\lambda} \qquad I = \frac{S}{\sqrt{3}\,V}$$

Variables

P_c	connected load	W
DF	demand factor (maximum demand ÷ connected load)	–
g	growth margin	–
$\cos\varphi$	power factor	–
λ	planned loading	–
V	secondary line voltage	V
S	rating needed	VA
P_d	maximum demand	W
I	secondary full-load current	A

Method and standards

Maximum demand from connected load and demand factor with a growth margin; rating from power factor and planned loading.

Assumptions and limits

- DF is a demand factor (at most 1, multiplies the connected load). A diversity factor is its counterpart of 1 or more and divides; enter 1/diversity here.
- The method is the definition of maximum demand from a demand factor; the planned loading of 75–85 % and demand factors of 0.6–0.8 quoted in the FAQ are common practice ranges, not values from a standard. Use figures from your own load list.
- Balanced load; demand factor from the load list.

References

- Maximum demand with demand factor and margin

Report details

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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/electrical/transformers/transformer-sizing-load-list

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.