

PART 1, Max demand with and without diversity

Circuits	No diversity	With diversity
1. 6x3kW, Conv. heaters	$I = \frac{18000W}{230V} = 78.26A$	$I = \frac{14250W}{230V} = 61.96A$
2. 4x1kW, Oil filled rods	$I = \frac{4000W}{230V} = 17.39A$	$I = \frac{3250W}{230V} = 14.13A$
3. 2x3kW, Immersion heaters	$I = \frac{6000W}{230V} = 26.09A$	$I = \frac{6000W}{230V} = 26.09A$
4. 1x6kW, Cooker	$I = \frac{6000W}{230V} = 26.09A$	$I = \frac{6000W}{230V} = 26.09A$
5. 5x32A, Radial sockets	$I = 160A$	$I = 96A$
6. 2x1.5kW, Discharge lights	$I = \frac{5400W}{230V} = 23.48A$	$I = \frac{4860W}{230V} = 21.13A$
7. 1x2kW, SOD, ext Lights	$I = \frac{3600W}{230V} = 15.65A$	$I = \frac{3240W}{230V} = 14.09A$
8. 2x3.5kW, 3Ph machines	$I = 12.63A$	$I = \frac{3240W}{?} = 11.36A$
Total	359.59 A	268.34 A

Diversity calculations (as per OSG Table A2)

1. $3kW + (75\% \text{ of } 15kW) = 3 + 11.25 = 14.25 kW$
2. $1kW + (75\% \text{ of } 3kW) = 1 + 2.25 = 3.25 kW$
3. No diversity, $= 6 kW$
4. No diversity, $= 6 kW$
5. $32A + (50\% \text{ of } 128A) = 32 + 64 = 96A$
6. $90\% \text{ of } 3kW = 2.7kW \times 1.8 (\text{factor}) = 4.86 kW$
7. $90\% \text{ of } 2kW = 1.8kW \times 1.8 (\text{factor}) = 3.24 kW$
8. $1 \text{ machine} = \frac{3500W}{400V \times \sqrt{3} \times 0.8 (PF)} = 6.31 A$

$$3 \text{ machines} = 6.31A + (80\% \text{ of } 6.31A) = 6.31 + 5.05 = 11.36A$$