

To calculate the commercial kitchen extract volume, the standard thermal convection calculation based on the BESA DW/172 specification for kitchen ventilation systems was used.

The calculation below uses the equipment dimensions as per the attached datasheets plus the mandatory 300mm canopy overhang on all exposed sides.

Total Canopy Dimensions

To calculate the hood area, a 300mm overhang was added to the front and sides of the cooking line since the equipment sits against a wall:

- Equipment Width: 6-burner (900mm), griddle (900mm), and fryer (600mm) equals 2.4m total. Adding 0.3m overhang to the left and right sides yields a Canopy Length of 3.0m.
- Canopy Depth: Deepest equipment is the fryer at 812mm deep. Adding 0.3m overhang to the front yields a Canopy Depth 1.1m.
- Total Hood Area: 3.0m x 1.1m = 3.3m²

DW/172 uses specific thermal coefficients for each type of appliance. Electric fryers and gas ranges fall under medium-heavy classifications.

Appliance	Quantity	DW/172 Flow Rate (Ve)	Total Factor
6-Ring Gas Burner Range	1	0.45m ³ /s per m ²	0.45
Gas / Electric Griddle	1	0.40m ³ /s per m ²	0.40
Twin Pan Electric Fryer	1	0.45m ³ /s per m ²	0.45

The highest duty coefficient present in the cooking line is selected to ensure adequate capture. For a line containing a 6-burner and fryers, the overall extract coefficient is 0.45m³/s per m².

Total Volume Flow Rate

Using the area and the dominant thermal coefficient:

Extract Volume (Q)= Area x Coefficient

$$Q = 3.3\text{m}^2 \times 0.45 \text{ m}^3/\text{s} = 1.485\text{m}^3/\text{s}$$

Replacement (Make-Up) Air

To ensure proper room pressurization, the mechanical supply air system must introduce 85% of the air that is extracted.

$$\text{Supply Air Volume} = 1.485\text{m}^3/\text{s} \times 0.85 = 1.262\text{m}^3/\text{s}$$