Emergency HVAC Repair Pros

We solve the HVAC problems other contractors won't.

FIELD GUIDE · BIRMINGHAM, ALABAMA

Restaurant Cooling: BTU Calculator for Birmingham

A real BTU sizing framework for restaurant kitchens, dining rooms, and combined spaces — built for Birmingham's humidity and a working line.

Who this is for: Restaurant owners, GMs, and consultants planning new builds, replacements, or addressing kitchens that never cool down.

What's inside: Equipment heat-load chart (every common piece), occupancy load math, ventilation load for Birmingham humidity, makeup-air implications, the dining-room vs kitchen split, and the question to ask before you sign any RTU spec.

Service area: Commercial HVAC across the Birmingham, AL metro

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Why Restaurant Sizing Defeats Residential Logic

Residential load is dominated by walls, windows, and people. Restaurant load is dominated by EQUIPMENT — and equipment can throw 5-10x the heat per square foot of a typical office. Add the door cycling 200-400 times during service and the dining room HVAC is fighting both kitchen heat migration AND humidity from outside air. Standard Manual J residential sizing gets a restaurant about half-right.

Step 1 — Equipment Heat Gain

Sum the sensible and latent heat from each piece of cooking equipment. Use manufacturer specs when available; rule-of-thumb when not. Hooded equipment dumps about 50% of heat to the hood and 50% to the room; un-hooded dumps 100%.

- Gas range, 6-burner (hooded): ~12,000 BTU/hr to room
- Flat-top griddle, 36": ~15,000 BTU/hr
- Gas char-broiler, 36": ~22,000 BTU/hr
- Deep fryer, 50-lb capacity: ~12,000 BTU/hr
- Convection oven, gas: ~8,000 BTU/hr
- Steam table, full-size (4-pan): ~7,000 BTU/hr (heavy latent load)
- Pizza oven, gas conveyor: ~15,000-25,000 BTU/hr depending on duty cycle
- Espresso machine, 2-group: ~3,500 BTU/hr
- Reach-in refrigerator (heat rejected): ~4,000 BTU/hr per unit
- Walk-in compressor (if interior): ~12,000-20,000 BTU/hr

Step 2 — Occupancy Load

People doing different work give different load:

- Line cook on full service: 700-900 BTU/hr per person
- Server walking: 500 BTU/hr per person
- Customer at table (sedentary, eating): 400 BTU/hr per person
- Bartender: 600 BTU/hr
- Dishwasher (hot, wet area): 800 BTU/hr
- Add latent load from breath and perspiration: ~25-30% of sensible

Step 3 — Ventilation & Makeup Air

Birmingham's outdoor humidity is brutal on a kitchen that's pulling 1,500-3,000 CFM of makeup air for the hood. That outside air has to be cooled AND dehumidified.

- Sensible load per 1,000 CFM of outside air at 95°F outdoor vs 75°F indoor: ~22,000 BTU/hr
- Latent load per 1,000 CFM at 95°F/80% RH outdoor: ~30,000 BTU/hr
- A 2,000-CFM kitchen hood pulling unconditioned makeup air = ~104,000 BTU/hr of additional load on the RTU
- Tempered makeup air (heated/cooled before entering the kitchen) is the right answer for most Birmingham restaurants

Step 4 — Envelope Load

Standard residential-style calculations:

- Walls (R-13 framed): ~3 BTU/hr per sq ft of wall
- Roof (R-30 attic): ~3-4 BTU/hr per sq ft of roof
- Windows (single pane, sun-exposed): up to 250 BTU/hr per sq ft
- Slab/floor: usually neutral (subtract from load on slab-on-grade in summer)

Step 5 — Total and Apply Safety Factor

Sum all loads. Apply 5-10% safety factor (NOT the 20-30% residential contractors love — that's how you end up with short-cycling and humidity problems). For a typical 4,500-sq-ft Birmingham restaurant with full kitchen:

- Equipment: ~80,000-140,000 BTU/hr
- Occupancy (40 people total): ~22,000 BTU/hr sensible + ~6,000 latent
- Ventilation load: ~75,000-130,000 BTU/hr (with hood)
- Envelope: ~30,000-45,000 BTU/hr
- TOTAL: ~210,000-340,000 BTU/hr = 17.5-28 tons across the building

Split — Kitchen vs Dining Room

Almost always 2+ zones, often 2+ RTUs. The kitchen runs hotter set points (76-78°F) and higher airflow. The dining room runs cooler (72-74°F) with more emphasis on humidity control. Single-zone systems sized for the worst case will overcool the dining room and underperform in the kitchen.

The Question Before You Sign

Ask the contractor: "Show me your load calc spreadsheet — equipment by equipment, ventilation by CFM, occupancy by hour of service. I want to see how you got to this BTU number." If they can't produce it, the sizing is a guess. Guesses fail in August.

About Emergency HVAC Repair Pros

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>
> Commercial HVAC across the Birmingham, AL metro

This guide was written by working HVAC techs, not marketing teams. Direct, honest, practical. Real Alabama numbers, real local context, no guarantees we can't back up.

If something in here saved you a service call — or saved you from a bad one — share it with a neighbor. That's the whole point.

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