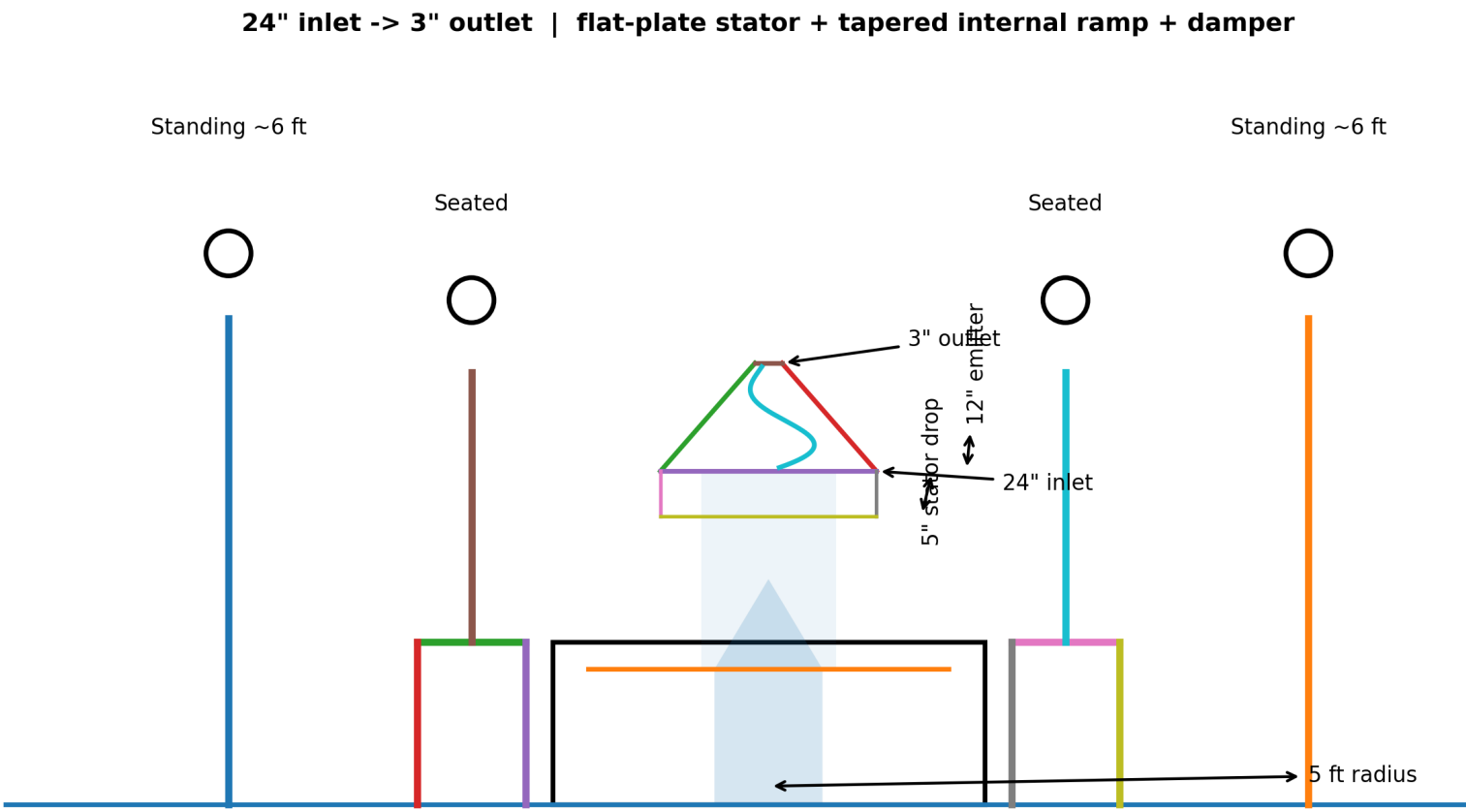
Emitter-Only Heating Concept (Updated)

50k BTU/h natural gas fire pit; two-stage swirl emitter (flat-plate stator + tapered internal ramp).
Goal: maximize wall heat pickup and IR emission without fans or ceiling reflector.

Scaled schematic with occupants at 5 ft radius



Note: geometry is dimensioned; plume and flame are illustrative (no wind).

Estimated Heat Felt by Users (No Fans)

Engineering approximations to validate feasibility. Actual results depend on wind, damper setting, coating emissivity, build quality, and burner plume characteristics.

Assumptions used in this estimate (all adjustable)

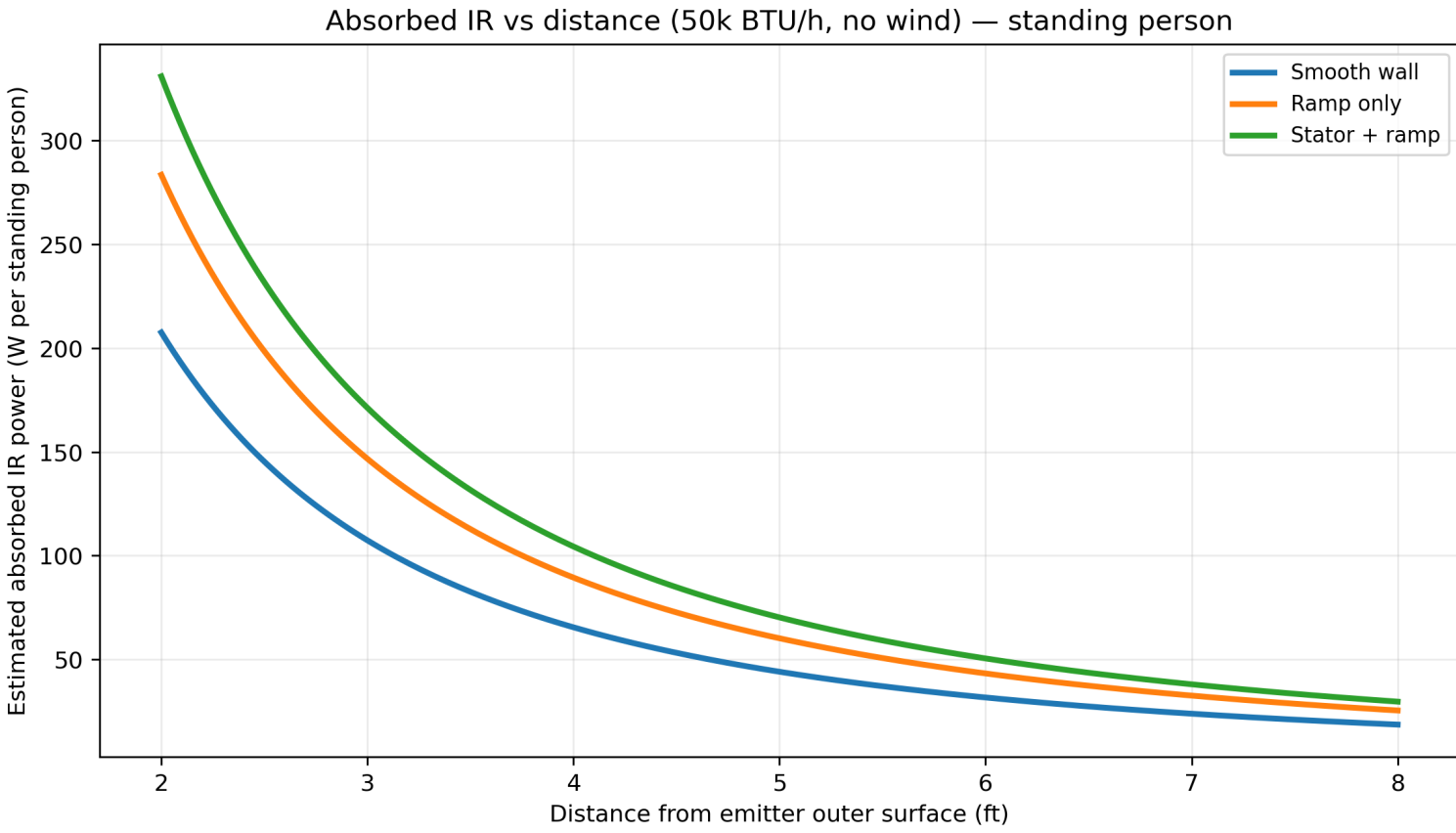
Burner power: 50,000 BTU/h = 14.65 kW; plume (convective) fraction assumed 70%.
Plume intercepted by 24" inlet at 12" above flame: 85%; bypass/leakage at tuned damper: 10%.
UA (internal heat transfer strength): smooth 12 W/K; ramp-only 20 W/K; stator+ramp 28 W/K.
Exterior radiant fraction: 55%; outward-delivery factor: 65%; human absorption: 80%.

Summary table

Summary (standing person). Seated values are ~0.71x these numbers (projected area scaling).

Case	UA (W/K)	Wall heat (kW)	IR out (kW)	Absorb @2ft (W)	Absorb @5ft (W)	Absorb @8ft (W)
Smooth wall	12	4.0	2.2	208	44	19
Ramp only	20	5.4	3.0	283	60	25
Stator + ramp	28	6.3	3.5	331	70	30

Absorbed IR vs distance from emitter surface



These values represent absorbed IR only. Warm-air convection from the hot emitter adds additional comfort, especially downwind.