# RB-010

P3 — Guidance • Version 1.0 • 2026-01-08

# RB-010: Gaps in Existing Standards, Codes, and Consumer Guidance

P3 — Guidance


## EXECUTIVE SUMMARY

This paper conducts a systematic gap analysis across the principal ventilation standards (ASHRAE 154, IMC Chapter 5, UL 710, NFPA 96), representative local building codes, and consumer-facing guidance materials (manufacturer literature, retailer guidance, online references). Building on the indoor-versus-outdoor assumption audit of RB-004 and the failure mode taxonomy of RB-007, this paper identifies thirteen specific gaps organized into four categories: standards gaps (no outdoor-specific exhaust rates, no outdoor capture test, no wind correction provisions, no outdoor hood classification); code gaps (no indoor/outdoor distinction in prescriptive tables, no outdoor-specific inspection criteria, inconsistent local amendments); test method gaps (no open-air capture efficiency protocol, no wind-exposure test, no outdoor cooking load standard); and consumer guidance gaps (no physics-based sizing information, misleading indoor-derived CFM claims, absent mounting height guidance, absent wind exposure assessment). For each gap, the paper documents the current state, the specific deficiency, the consequence for outdoor installations, and the proposed resolution path.


### THE CHALLENGE

The outdoor kitchen market has expanded substantially over the past two decades. Outdoor cooking appliances, countertops, cabinetry, and ventilation hoods are widely available consumer products. Yet the regulatory and standards framework that governs indoor kitchen ventilation has not been extended to address the fundamentally different physics of outdoor operation. The result is a gap between what the standards specify, what the codes enforce, what the manufacturers claim, and what the physics requires. This gap is the root cause of the systematic underperformance documented in RB-004 and the failure modes cataloged in RB-007.

**Outdoor Ventilation Standard**

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## Key Quantitative Findings

Wind deflects the plume laterally. Even a 3 mph breeze deflects the plume approximately 7 inches at 30-inch mounting height (RB-004 Section 3.8)

A hood rated at 85% capture efficiency per UL 710 may achieve only 50 to 65% under outdoor conditions

A hood that achieves 90% capture in still air may achieve only 60% at 5 mph — a common outdoor condition

The consumer guidance underspecifies overhang by 50 to 75%.

The 600 CFM rating sounds like it provides generous margin over the indoor requirement

In fact, the outdoor requirement for a medium gas grill at 30 inches is 609 to 747 CFM (RB-003 Tables 3.8a and 3.8b), making 600 CFM borderline to inadequate.

A blower rated at 900 CFM at 0 inches WG may deliver only 500 to 600 CFM against a typical residential duct run (0.5 to 1.5 inches WG)

A consumer installing a hood at 36 inches receives the same CFM and sizing recommendation as one installing at 24 inches, despite the physical requirement being 60 to 100% higher at 36 inches.

A charcoal grill rated at 30,000 BTU produces a plume equivalent to a gas grill of approximately 17,000 BTU in convective terms

A code-compliant outdoor kitchen installation that meets all prescriptive requirements of the IMC produces a system that captures only 50 to 70% of the cooking plume under standard outdoor conditions

### Why This Research Matters

This research provides the first physics-based, quantitative methodology for outdoor cooking ventilation design. These findings enable proper hood sizing, CFM specification, and mounting height selection — preventing the common failures that occur when indoor assumptions are applied outdoors.

### The Full Research Paper Includes:

✓ Complete derivations and governing equations
✓ Quantitative design tables and correction factors
✓ Engineering methodology with worked examples

✓ Interactive calculation tools and diagrams
✓ Full reference bibliography and validation data