MASTERBUILD CONSULTING - FREE COMPANION EDITION

IMC 2024 Chapter 4
Ventilation & Occupied-Space Air Quality Guide

A practical design, submittal, and field-verification control system for Sections 401-407

Turn occupied-space ventilation requirements into calculated outdoor air, verified intake protection, working controls, and documented breathing-zone delivery before permit submittal, TAB, and occupancy.

MasterBuild Consulting | Chapter 4 Field Guide

Free companion edition 1.1 | Daily Code Talk field resource | Model-code basis: 2024 IMC Chapter 4

Use boundary: Educational decision support only. Not sealed engineering, legal advice, a project-specific code determination, or AHJ/product approval. Verify the adopted code, amendments, project facts, and responsible-professional/AHJ decisions applicable to your project.

Read This First

What This Guide Does

Chapter 4 is the occupied-space ventilation layer beneath the rest of the IMC. It tests whether every occupied and occupiable space has a qualifying ventilation method, a calculated outdoor-air rate, protected intake, and controls that actually maintain outdoor air during occupancy - not just on paper at permit submittal.

Best use. Run the guide during mechanical design and load calculations, again at permit submittal, and again at TAB/commissioning and controls sequence verification.

Required outcome. Every occupied, occupiable, or uninhabited space subject to Chapter 4 has an identified ventilation method, calculation basis, intake condition, control sequence, and closeout evidence.

Project Basis Gate

Stop rule: Do not use a model-code summary as the project requirement. Verify the adopted edition, amendments, related codes, listing, manufacturer instructions, and written AHJ direction before deciding compliance.

Reviewed 2026-08-20: Florida Building Commission milestone materials identify December 31, 2026 as the scheduled effective date for the 9th Edition (2026) Florida Building Code. This guide uses the 2024 IMC as model-code education. Before applying its section numbering or criteria to a Florida project, verify the enforced edition, effective date, supplements, local requirements, permit date, and AHJ procedure.

Florida Project Note

Florida transition note: the 9th Edition (2026) effective date is scheduled for December 31, 2026. Until the applicable edition and AHJ implementation are verified for the specific permit, do not treat this 2024-IMC educational guide as a Florida project requirement.

Professional Boundary

This is educational decision support and a QA workflow. It is not sealed engineering, legal advice, an AHJ approval, a product approval, or a substitute for the adopted code, official commentary, manufacturer instructions, project specifications, calculations, or professional judgment.

Chapter 4 Operating Map

Risk Ladder

Level	Decision Rule	Action
RED	Occupied space has no identified ventilation method or calculation basis; intake is unprotected or contaminant-exposed; healthcare pressure/filtration requirements are unaddressed.	Hold submittal/issue/TAB sign-off until resolved.
AMBER	Natural ventilation feasibility, recirculation/transfer-air path, or DCV/VAV control sequence is asserted but not yet demonstrated on coordinated documents.	Assign owner, due date, and required evidence before proceeding.
GREEN	Method, calculation, intake condition, and control sequence trace to coordinated documents and a field/TAB verification method.	Proceed; retain evidence for closeout.

Definitions That Control This Scope

Confirm the adopted meanings of ventilation air, outdoor air, breathing zone, natural ventilation, occupied space, occupiable space, uninhabited space, transfer air, recirculated air, and local exhaust before using this guide. If the project condition fits a different definition, the downstream Chapter 4 path can change.

Required output: One Chapter 4 control register that links each space or system to its ventilation method, calculation basis, intake condition, controls, owner, status, and closeout evidence.

IMC 401 | General Ventilation Requirement & Intake Protection

Identify Every Space and Its Method

Name every occupied, occupiable, and uninhabited space and confirm whether ventilation is required, and by what method - natural or mechanical. Do not assume a space is exempt because it is small, transient, or storage-labeled; verify against the adopted definitions.

Escalation trigger. Odors, fumes, vapors, smoke, gases, particulates, heat, or other contaminant sources at a space route to a local- or special-exhaust path (Chapter 5), not general dilution ventilation alone.

Intake Location and Protection

Confirm outdoor-air intake separation from exhaust outlets, contaminant sources, loading areas, parking, streets, and other noxious sources. Confirm flood and hurricane exposure, and louver/screen protection appropriate to the site.

Control	Verify	Typical Failure
Separation	Distance from exhaust, contaminant, and loading sources per adopted code	Intake and exhaust shown close together on the same wall/roof
Flood/Hurricane	Elevation, opening protection, missile/debris exposure	Low intake with no protection in an exposed zone
Screen/Louver	Free area, weather resistance, listed assembly where required	Generic louver note with no free-area or listing basis

IMC 402 | Natural Ventilation Feasibility

Verify the Opening Actually Qualifies

Natural ventilation is not satisfied by the presence of a window. Verify operable opening area against the space it serves, a real outdoor-air pathway, adjoining-space ratios where ventilation is borrowed through another room, below-grade clearance conditions, and that occupants can actually control the opening.

Red item. A space relying on natural ventilation through an adjoining room without a demonstrated opening ratio and pathway is not a completed natural-ventilation path.

Question	Where to Prove It	Escalate When
Is the operable area ratio met?	Room schedule, window schedule, area calculation	Ratio is borderline or based on assumed sash area
Is there a real outdoor-air pathway?	Plan showing adjoining-space connection	Pathway crosses a corridor, door, or unrelated space
Can occupants control the opening?	Hardware type, accessibility	Opening is fixed or automatically controlled with no override

IMC 403 | Mechanical Ventilation, Outdoor Air & Breathing-Zone Delivery

Outdoor Air Calculation Basis

Confirm occupancy classification, occupant density, and area for every space, then confirm the outdoor-air calculation method (people-based and area-based components, or the applicable equivalent) and whether the rate is calculated at the zone or system level.

Field decision. Identify the occupancy classification, occupant density source, calculation method, and whether ventilation efficiency/distribution effectiveness has been applied before accepting a schedule value.

Breathing-Zone Delivery, Recirculation & Transfer Air

Outdoor air introduced at the air handler is not proof that it reaches the occupied breathing zone. Verify zone versus system-level calculations, VAV minimum outdoor-air settings, distribution effectiveness, and that recirculation and transfer air are not used from a prohibited or dissimilar space.

Stop rule. Do not accept a single system-level outdoor-air number as proof of compliance for zones served by VAV boxes without a documented zone minimum and control sequence.

Residential Ventilation (Group R-2/R-3/R-4)

Confirm dwelling-unit outdoor-air systems and required local exhaust rates, controls, fan listing, and operating schedule separately from the building's general ventilation system.

Section	Control Question	Primary Proof
403 calc	Is occupancy classification and occupant density documented?	Room/occupancy schedule, load calc basis
403 zone	Does the zone receive its minimum OA under VAV turndown?	Zone calculation, VAV minimum, controls sequence
403 recirc	Is recirculated/transfer air excluded from prohibited sources?	Airflow diagram, pressure relationships
403 R-occ	Are unit OA and local exhaust shown separately?	Unit schedule, fan listing, controls

IMC 404 | Enclosed Parking Garage Ventilation

Continuous or Detector-Based Control

Confirm whether the garage uses continuous mechanical ventilation or a detector-based (CO/NO2) automatic system, the fan control sequence, and pressure/ventilation for accessory occupied spaces adjacent to the garage.

Escalation trigger. Missing detector listing/location, an undefined fan sequence, or unresolved accessory-space pressure relationships escalate to the responsible design professional before permit submittal.

Control	Verify	Typical Failure
Detection basis	CO/NO2 detector listing, location, and setpoints	Detector shown as a generic note with no listing or location
Fan sequence	Continuous vs. automatic mode, staging, sequence of operation	Fan schedule with no defined control sequence
Accessory pressure	Positive pressure/ventilation for adjacent occupied spaces	Accessory space assumed protected with no basis

IMC 405 | Ventilation System Controls

Controls That Actually Operate During Occupancy

A compliant design on paper can fail in operation. Confirm the control sequence maintains outdoor air during occupancy, the occupancy-mode logic, demand-control ventilation (DCV) low limits, VAV outdoor-air control method, and that TAB/commissioning verifies the as-installed sequence.

Red item. A controls narrative that says 'maintain minimum outdoor air' without a DCV low limit, VAV OA control method, and TAB verification step is not a completed control sequence.

Question	Where to Prove It	Escalate When
Does the sequence maintain OA in setback mode?	Controls narrative, sequence of operation	Sequence is silent on unoccupied/setback OA handling
Is a DCV low limit defined?	DCV setpoint, CO2 sensor location	DCV referenced with no low limit or sensor location
Is the as-installed sequence TAB-verified?	TAB report, commissioning record	No TAB/commissioning evidence for the sequence

IMC 406-407 | Uninhabited Spaces & Healthcare Escalation Gate

Uninhabited Spaces

Identify uninhabited spaces that still require ventilation (moisture, odor, or heat-driven conditions) and document the method and rate rather than assuming 'unoccupied' means 'unventilated.'

Escalate Healthcare Ventilation

Group I-2 and ambulatory care ventilation requires this chapter plus ASHRAE/ASHE 170 and NFPA 99: pressure relationships, air-change rates, filtration, and exhaust/medical-gas coordination exceed ordinary IMC office/commercial ventilation.

Stop rule. Do not use general Chapter 4 ventilation logic to approve healthcare pressure relationships, air-change rates, or filtration; route to a specialty-qualified reviewer.

Ventilation & Outdoor Air Compliance Matrix | Working Tool

Complete one row for each space or zone whose ventilation method, calculation basis, intake condition, or controls can change design scope. Attach source evidence rather than expanding cells into narratives. Row 1 below is a worked illustrative example - delete or overwrite it with your project's first real entry before use.

Minimum Completion Standard

Space/zone + occupancy identifies the exact room, occupancy classification, and area. Ventilation method + OA basis names natural or mechanical method, calculation basis, and verification date. Intake/exposure identifies separation, flood/hurricane exposure, and protection. Controls/delivery evidence points to the control sequence, DCV/VAV setting, and TAB record. Owner/status/evidence identifies the responsible person, red/amber/green status, due date, and record location.

#	Space/Zone + Occupancy	Ventilation Method + OA Basis	Intake/Exposure	Controls/Delivery Evidence	Owner/Status/Evidence
1	Illustrative zone; replace before use.	Record actual occupancy, method, calculation basis, and verification date.	Record actual source separation, exposure, and protection basis.	Record actual control sequence, breathing-zone delivery, and TAB evidence.	Assigned reviewer; example GREEN; retain project evidence.

Gate: Do not approve procurement or release affected documents while a red matrix item remains unresolved.

Outdoor Air & Controls Verification Record

Pre-TAB / Pre-Occupancy Field Check

Calculated outdoor air matches installed diffuser/VAV box airflow. Intake protection is installed per detail. Controls sequence matches the submitted narrative. DCV sensors are calibrated. Parking garage detectors are tested. Healthcare pressure relationships are verified where applicable.

Client-risk control. Record scope and fee/schedule impact before providing redesign or additional-services direction that exceeds the contracted coordination basis.

40-Minute Ventilation & IAQ Readiness Audit

0-5 minutes. Confirm the project basis: jurisdiction, adopted editions, amendments, permit date, current set, and open AHJ/owner decisions.

5-12 minutes. Confirm every occupied, occupiable, and uninhabited space has an identified ventilation method and route contaminant sources to the Chapter 5 exhaust path where applicable.

12-18 minutes. Where natural ventilation is claimed, verify the operable-area ratio, outdoor pathway, adjoining-space ratio, and occupant control access.

18-27 minutes. Verify outdoor-air calculation basis, breathing-zone delivery, VAV minimums, recirculation/transfer-air restrictions, and residential unit ventilation where applicable.

27-32 minutes. Verify parking garage detection basis, fan control sequence, and accessory-space pressure relationships where applicable.

32-37 minutes. Verify the control sequence maintains outdoor air during occupancy, DCV low limits, and TAB/commissioning evidence.

37-40 minutes. Screen for healthcare escalation triggers; assign red/amber items, stop affected releases, set due dates, and identify required closeout evidence.

Red-Item Stop List

Ventilation method or calculation basis is missing or unverified for an occupied space.

Natural ventilation is claimed without a demonstrated operable-area ratio and pathway.

Outdoor air is not shown reaching the breathing zone under VAV turndown.

Recirculation or transfer air is used from a prohibited or contaminated source.

Parking garage detection or fan sequence is undefined.

Controls do not maintain outdoor air during occupancy or lack TAB verification.

Healthcare ventilation requirements are unaddressed by specialty review.

Pass standard: No red items; amber items have a named owner, written assumption, due date, affected-work hold point, and required evidence. Green items trace to coordinated documents and a field/TAB acceptance method.

Field Change Stop / Proceed Workflow

Decision Rule

Stop and describe the as-found condition before proposing a fix. Capture photographs, dimensions, space use, occupancy change, and affected approved documents.

Identify which Chapter 4 control changed: ventilation method, outdoor-air calculation basis, intake condition, recirculation/transfer path, parking garage controls, or occupancy/tenant change affecting ventilation demand.

Trace the change to related codes, calculations, controls, TAB records, and downstream trades. Classify risk and hold affected releases where needed. Route to the responsible design professional, owner, and AHJ where required; obtain written authorization. Revise controlling documents, retest/rebalance, and close the record with evidence.

Commercial control. Do not allow an unpriced tenant, occupancy, or ventilation-method change to become assumed design responsibility. Record authorization, scope, fee, schedule, and closeout obligations before additional professional services proceed.

Standalone Guide Application

Use the guide as a closed-loop ventilation-readiness control. It is complete on its own; no other chapter guide, article, membership, or unpublished resource is required.

Chapter 4 Summary

Confirm the project basis before applying any Chapter 4 workflow.

Identify every space's ventilation method and calculation basis.

Verify intake protection, breathing-zone delivery, and recirculation/transfer-air restrictions.

Confirm parking garage and healthcare escalation triggers where applicable.

Verify controls maintain outdoor air during occupancy and are TAB/commissioning-verified.

Stop affected work when a material condition lacks authority, owner, or closeout path.

Completion standard: The workflow is complete only when the project basis, ventilation method, calculation basis, intake condition, controls verification, and final record location are documented.

Go Deeper: Fast Plan Review & Special Exhaust

This guide covers the Chapter 4 compliance and design-verification workflow — the code side of occupied-space ventilation. It does not cover fast plan-review triage or special/hazardous exhaust classification, which is a different review problem and a different part of the code.

The MasterBuild Ventilation & Special Exhaust Field Guide ($149) is built for that: a 15-Minute Triage sequence for picking the highest-risk rooms first, a Room Story Matrix connecting occupancy to outdoor air to exhaust path, a Special Exhaust Classification Matrix (grease, dryer, garage, hazardous, process, and smoke-control exhaust — outside this guide's Chapter 4 scope), a Sheet Map for fast review, and a Field-Ready Closeout Gate.

Use this free guide during design and permit-readiness. Use the paid guide when you are reviewing someone else's submittal against the clock, or when special or hazardous exhaust is present.

Get the Ventilation & Special Exhaust Field Guide — $149:
https://buy.stripe.com/aFaeVd0s0a6d9KPf9Z2Nq01

Want the next chapter guide and field-QA notes as they publish? Join the free Code Desk email list:
https://buttondown.com/masterbuild

Official References and Verification Record

2024 International Mechanical Code, Chapter 4: https://codes.iccsafe.org/content/IMC2024P1/chapter-4-ventilation

Florida Building Code, Mechanical - 8th Edition (2023): https://www.floridabuilding.org/c/Default.aspx

Florida Building Commission milestones (reviewed 2026-08-20):
https://www.floridabuilding.org/fbc/commission/FBC_0626/Commission/FBC-Updated-Commission-Milestones_14-April-2026.pdf

ASHRAE/ASHE 170 and NFPA 99 (healthcare ventilation coordination): Open source

MasterBuild Chapter 4 kickoff and field-risk research: Internal source, verified against official ICC Digital Codes

Verification Record

Item	Reader Use Control
Model-code basis	2024 IMC Chapter 4; section structure verified against the official ICC source on 2026-08-04.
Florida note	Official Florida Building Commission milestone materials reviewed 2026-08-20 identify December 31, 2026 as the scheduled 9th Edition (2026) effective date. Verify the enforced edition and AHJ implementation for the specific permit.
Review status	Public client edition - free download. Use as educational decision support; verify the adopted code, project facts, responsible professional, and AHJ requirements before project use.
Source basis	Built from MasterBuild's own Chapter 4 field-risk research (sections 401-407), cross-checked against the official ICC Digital Codes source above.

Professional Boundary

Educational decision support only. This guide is not sealed engineering, legal advice, a code determination, product/AHJ approval, or a substitute for the adopted code, official commentary, project specifications, listings, manufacturer instructions, referenced standards, calculations, testing requirements, or professional judgment. Verify project-specific requirements with the responsible licensed professional and AHJ.

Edition boundary: Free companion edition 1.1 - public client edition. Free to download and use as educational decision support. Do not distribute it as a paid product or represent it as project-specific engineering.