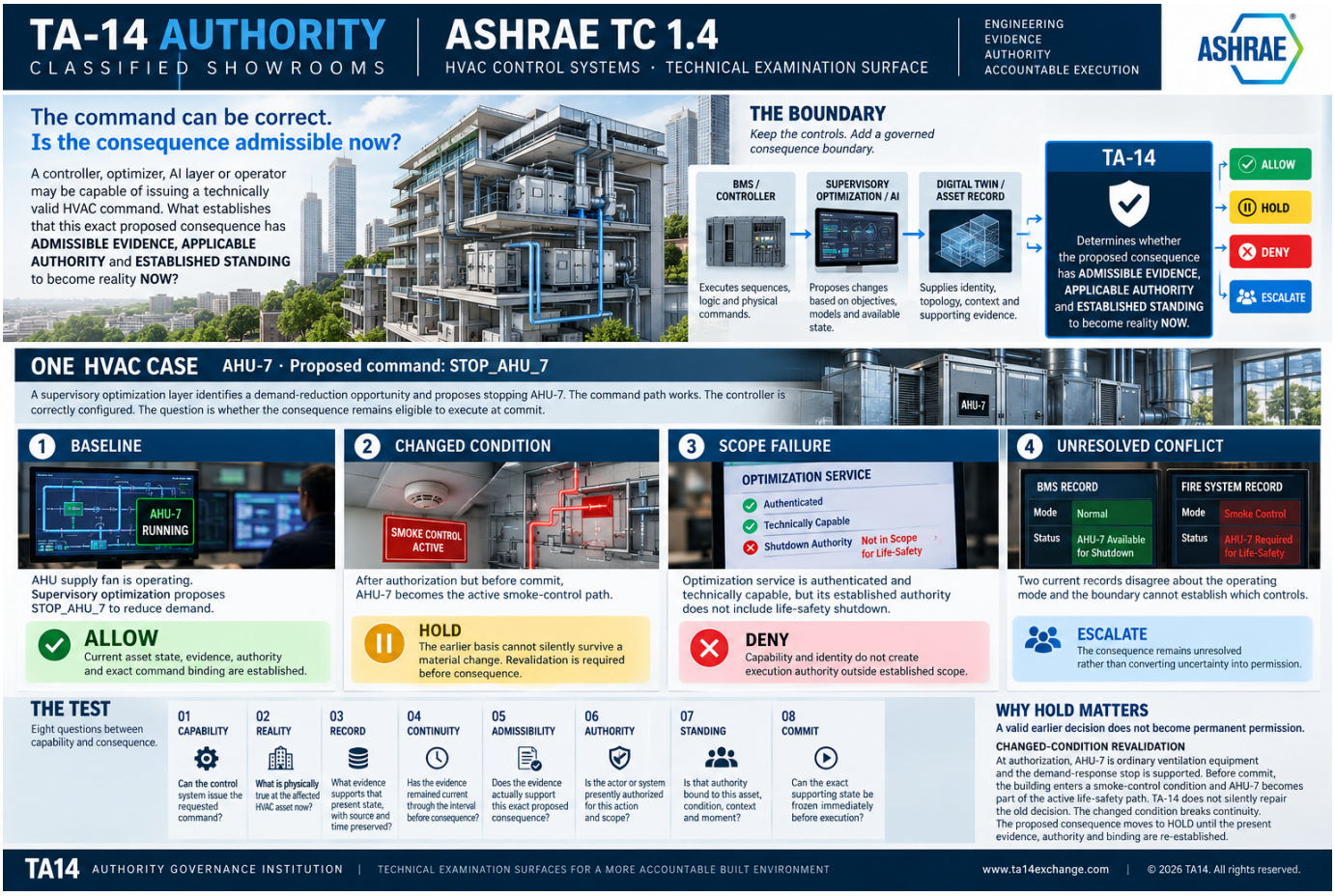
# TA14 | HVAC Execution Boundary

ASHRAE TC 1.4 context | Independent technical teaching reference | October 2026




## The command can be correct. Is the consequence admissible NOW?

A technically valid HVAC command is not automatically a sufficiently supported physical consequence. This guide examines the boundary between building-control capability and present admissibility, authority and standing. It complements rather than replaces established control sequences, smoke-control logic, BACnet priority handling, or life-safety interlocks.

# 01 | Capability is not authority

A supervisory optimizer proposes STOP_AHU_7 for demand reduction. The command path works. The first question is whether the command can be issued; the separate governance question is whether it may proceed under current conditions.

## Learn: command validity and execution eligibility are different propositions.

Suggested narration: Explain the specific evidence and control-system boundary shown in this lesson. Do not claim an approved field deployment or a verified performance result.

Next: Proceed to the next examination gate.

# 02 | Reality at the asset

Establish AHU-7 operating mode, current fire/smoke-control participation and the authoritative asset binding. A digital twin or stale dashboard alone cannot establish present physical reality.

## Learn: the decision concerns the actual equipment state, not only its representation.

Suggested narration: Explain the specific evidence and control-system boundary shown in this lesson. Do not claim an approved field deployment or a verified performance result.

Next: Proceed to the next examination gate.

# 03 | Record and provenance

Preserve observation source, observed_at, asset identity, uncertainty, and the source of any competing state assertion. BACnet may already provide command priority, value source and command-time information where supported; credit those native mechanisms.

## Learn: provenance supports review, but source identity alone does not prove evidentiary sufficiency.

Suggested narration: Explain the specific evidence and control-system boundary shown in this lesson. Do not claim an approved field deployment or a verified performance result.

Next: Proceed to the next examination gate.

# 04 | Continuity and changed conditions

At T0, ordinary ventilation conditions may support the demand-response stop. At T1, AHU-7 becomes part of an active smoke-control path. The earlier authorization cannot silently persist to T2 commit. An observable material change forces revalidation.

## Learn: an earlier ALLOW is not permanent permission.

Suggested narration: Explain the specific evidence and control-system boundary shown in this lesson. Do not claim an approved field deployment or a verified performance result.

Next: Proceed to the next examination gate.

# 05 | Admissibility for the exact consequence

Define the minimum required evidence set and the proposition each record supports. Check evidence freshness, bounded clock uncertainty, authoritative-source agreement and whether the record supports STOP_AHU_7 specifically. Missing or stale evidence leads to HOLD; unresolved authoritative conflicts lead to ESCALATE.

## Learn: data volume does not substitute for a consequence-specific sufficiency test.

Suggested narration: Explain the specific evidence and control-system boundary shown in this lesson. Do not claim an approved field deployment or a verified performance result.

Next: Proceed to the next examination gate.

# 06 | Applicable authority and established standing

Identify the actor, capacity, standing basis and authority relationship. Authentication and BACnet command priority are not necessarily institutional authorization to disable equipment in a life-safety context. Distinguish authority scope from its binding to this asset, condition and moment.

## Learn: an authenticated optimizer can still lack standing for this action.

Suggested narration: Explain the specific evidence and control-system boundary shown in this lesson. Do not claim an approved field deployment or a verified performance result.

Next: Proceed to the next examination gate.

# 07 | Commit and the residual race

At final validation T2a, recheck the evidence, authority, standing and exact action. Freeze the commit window for the specific equipment profile. A change observed before T2a must force revalidation. A change after T2a but before actuation may be invisible to the governance layer: native interlocks and safety logic must govern that residual interval.

## Learn: TA14 cannot claim zero-race safety or replace native physical safeguards.

Suggested narration: Explain the specific evidence and control-system boundary shown in this lesson. Do not claim an approved field deployment or a verified performance result.

Next: Proceed to the next examination gate.

# 08 | Execution, outcome and next chain

Preserve ALLOW/HOLD/DENY/ESCALATE, the evidence identifiers, timestamps, command or refusal, dispatch acknowledgment and observed resulting state. An unresolved physical outcome must remain unresolved. Execution consumes the determination; a later consequence starts a new Reality-to-Outcome chain.

## Learn: a decision is bounded to one consequence and one moment.

Suggested narration: Explain the specific evidence and control-system boundary shown in this lesson. Do not claim an approved field deployment or a verified performance result.

Next: Return to the complete consequence chain and its preserved outcome.

# Engineering examination | What remains unproven

Native BMS interlocks, smoke-control sequences, BACnet priority/source/time mechanisms, and functional testing already address important parts of the problem. TA14 does not claim to invent these functions.

R1-R5 narrowed the claimed distinction. Existing zero-trust and pre-execution authorization architectures have substantial conceptual overlap. Universal uniqueness, necessity and superiority have not been established.

R6-R8 identify a bounded architectural difference in explicit physical-evidence continuity through commit, but not a proof of uniqueness. A residual observation-to-actuation race remains.

R9-S is a deterministic simulation using illustrative timings, not measured hardware evidence. The next required examination is R9-H: measured I/O latency, frozen freshness limits, observed state transitions, native interlock behavior and reconstructable records.

Safety boundary: a HOLD must not block a required life-safety action. Site-specific sequences, applicable codes, competent authority and native safeguards remain controlling.

## Reality → Record → Continuity → Admissibility → Binding → Commit → Execution → Outcome

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