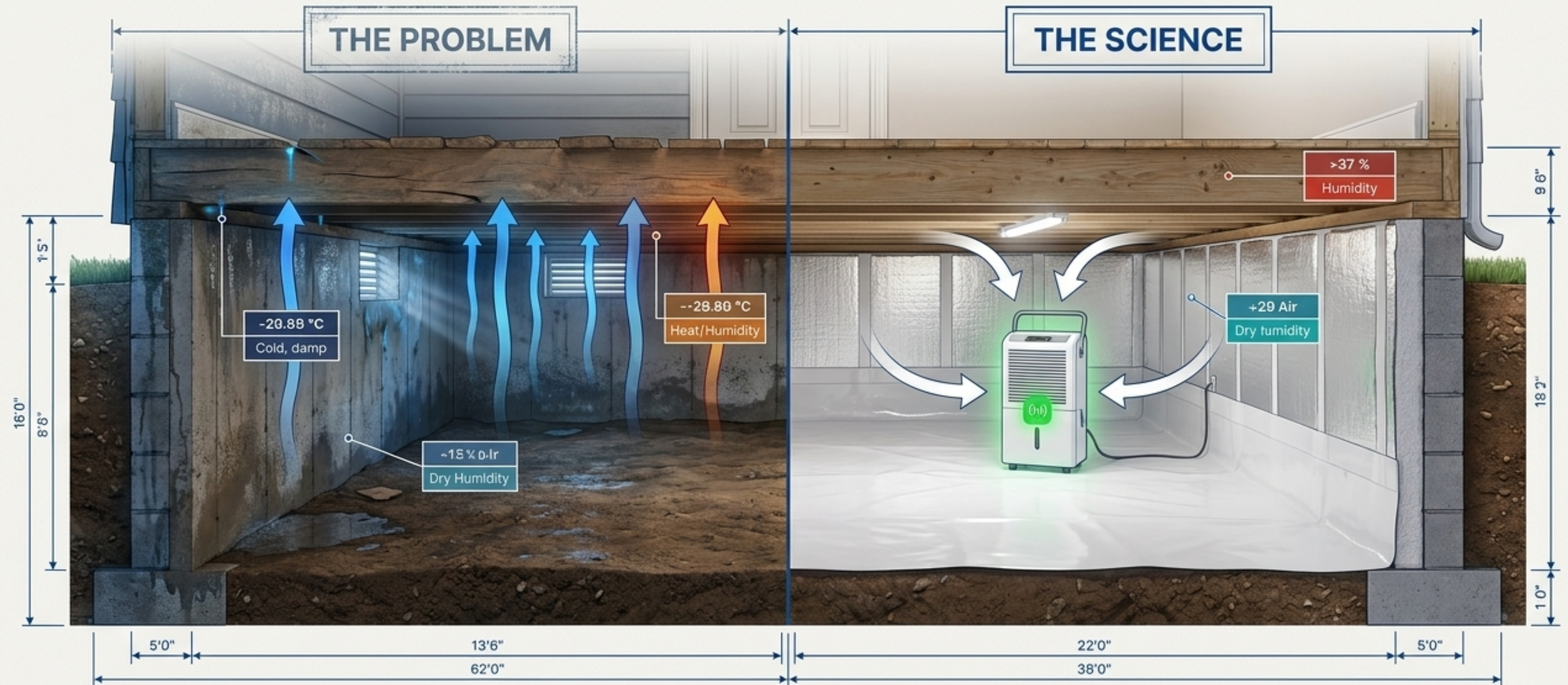


The Science of Crawl Space Encapsulation

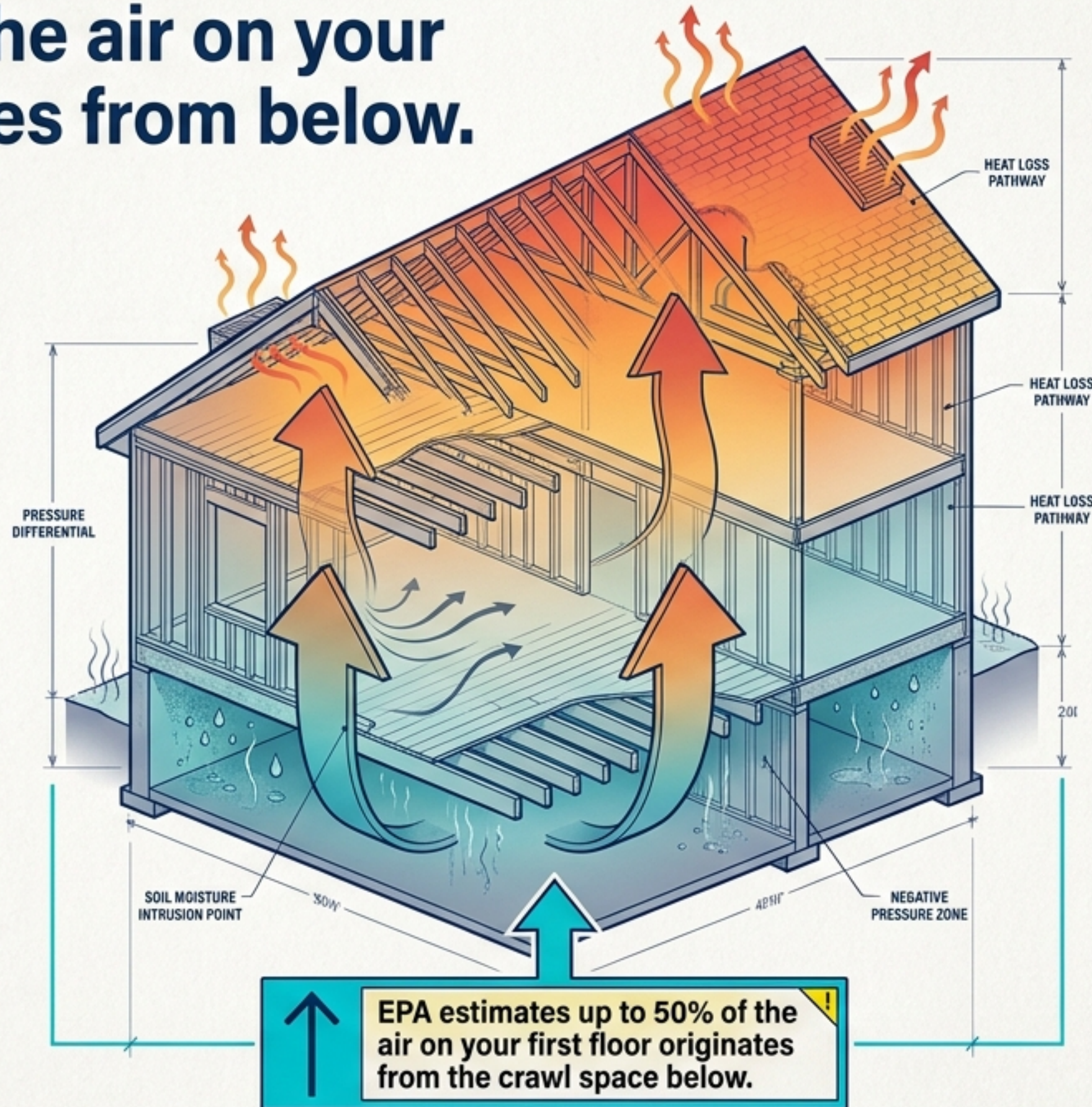
Sealing for Durability, Efficiency, and Health



Up to 50% of the air on your first floor comes from below.

The Vacuum

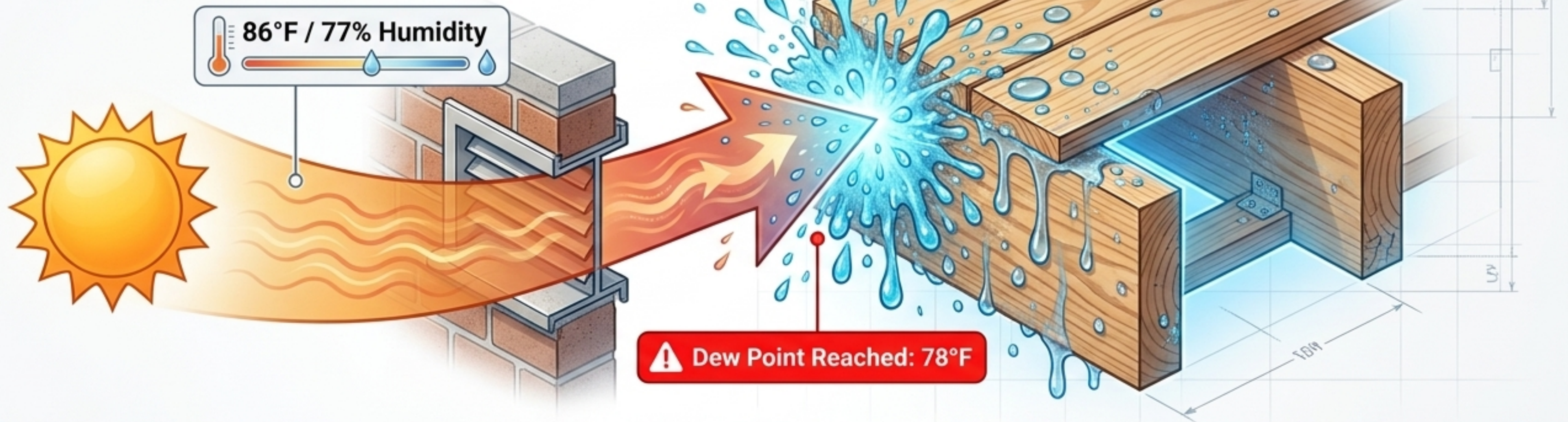
Warm air rises and escapes the upper levels of the home, creating a negative pressure zone that forcefully pulls crawl space air upward.



The Contaminants

Unsealed spaces off-gas soil moisture, mold spores, and pest allergens directly into the first floor.

The Myth of the Crawl Space Vent



The Old Logic:

Open vents in the summer to breathe and dry out the space.

The Physics Reality:

The Summer Condensation Paradox. Hot, moisture-laden summer air is pulled into the cool crawl space. It rapidly hits its dew point against cool subfloors, ductwork, and pipes, condensing directly onto the structural wood.

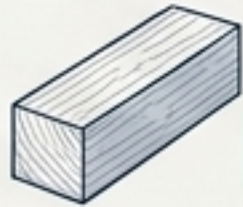
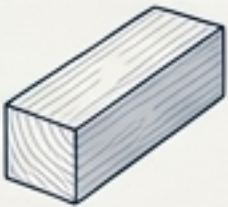


Inspector Tag

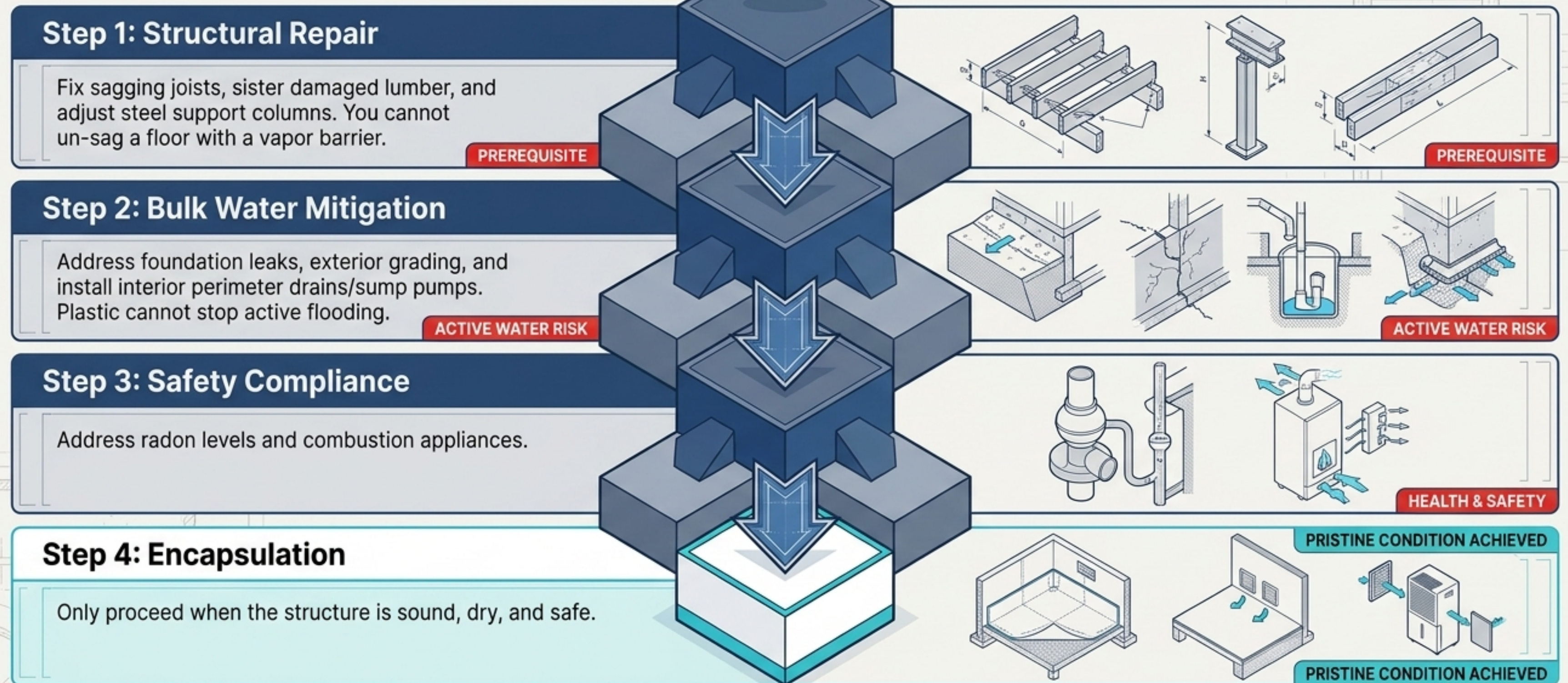
Minnesota crawl spaces experience ~86 freeze-thaw condensation cycles per winter, reducing R-19 insulation to R-10 performance.



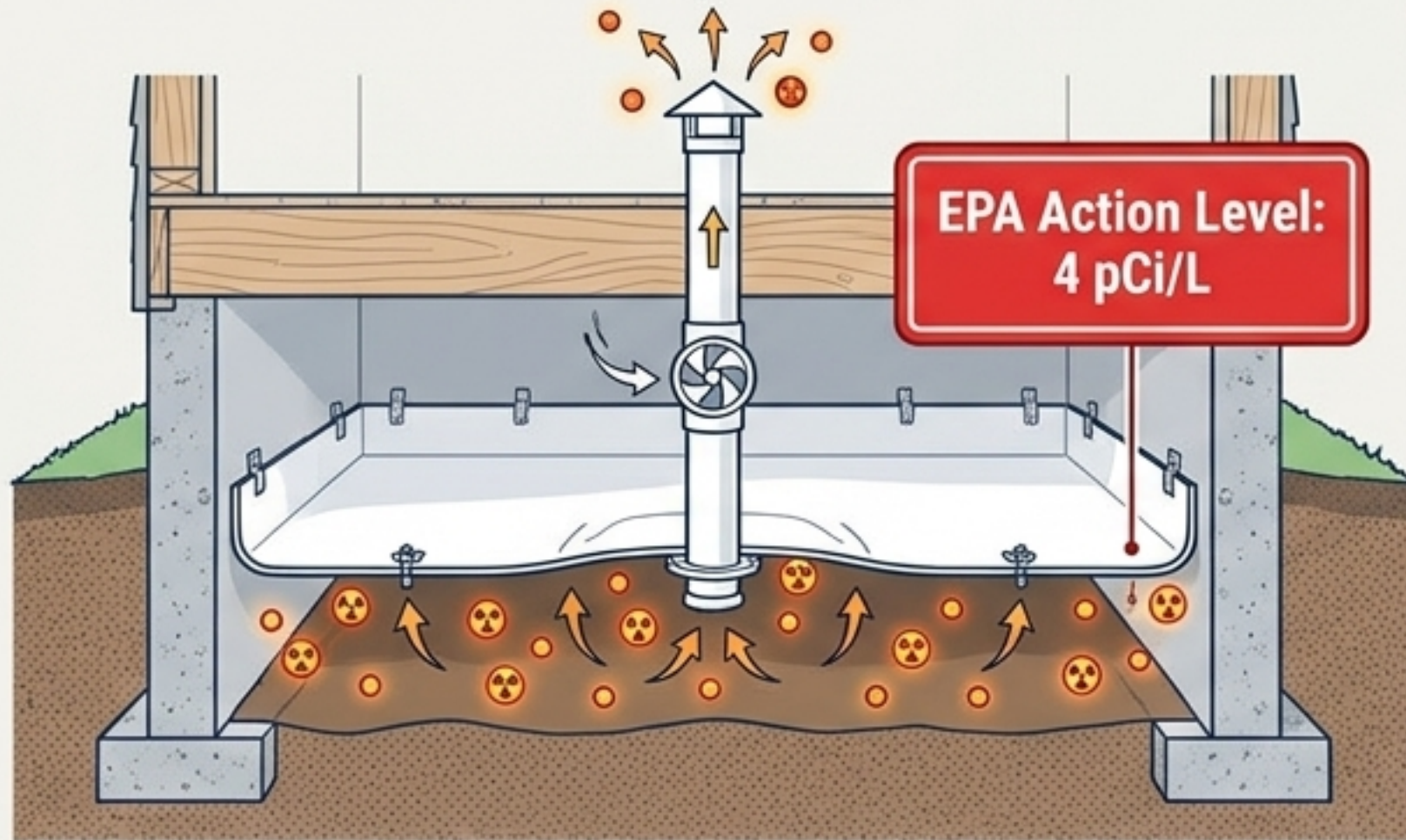
The Paradigm Shift in Building Science

		Vented Design (Old Standard)	Encapsulated Design (Modern Science)
	Moisture Source	Outdoor Air & Soil Evaporation	Fully Blocked & Conditioned
		 High (Summer Condensation) 	 Eliminated ($<60\%$ RH Maintained) 
		15-25% Energy Penalty	Up to 20% HVAC Savings (Building America)
		Open Access & Damp Organics	Blocked, Dry, & Uninhabitable
	Energy Impact		
	Pest Habitat		

Encapsulation is a Finishing Step, Not a Cover-Up



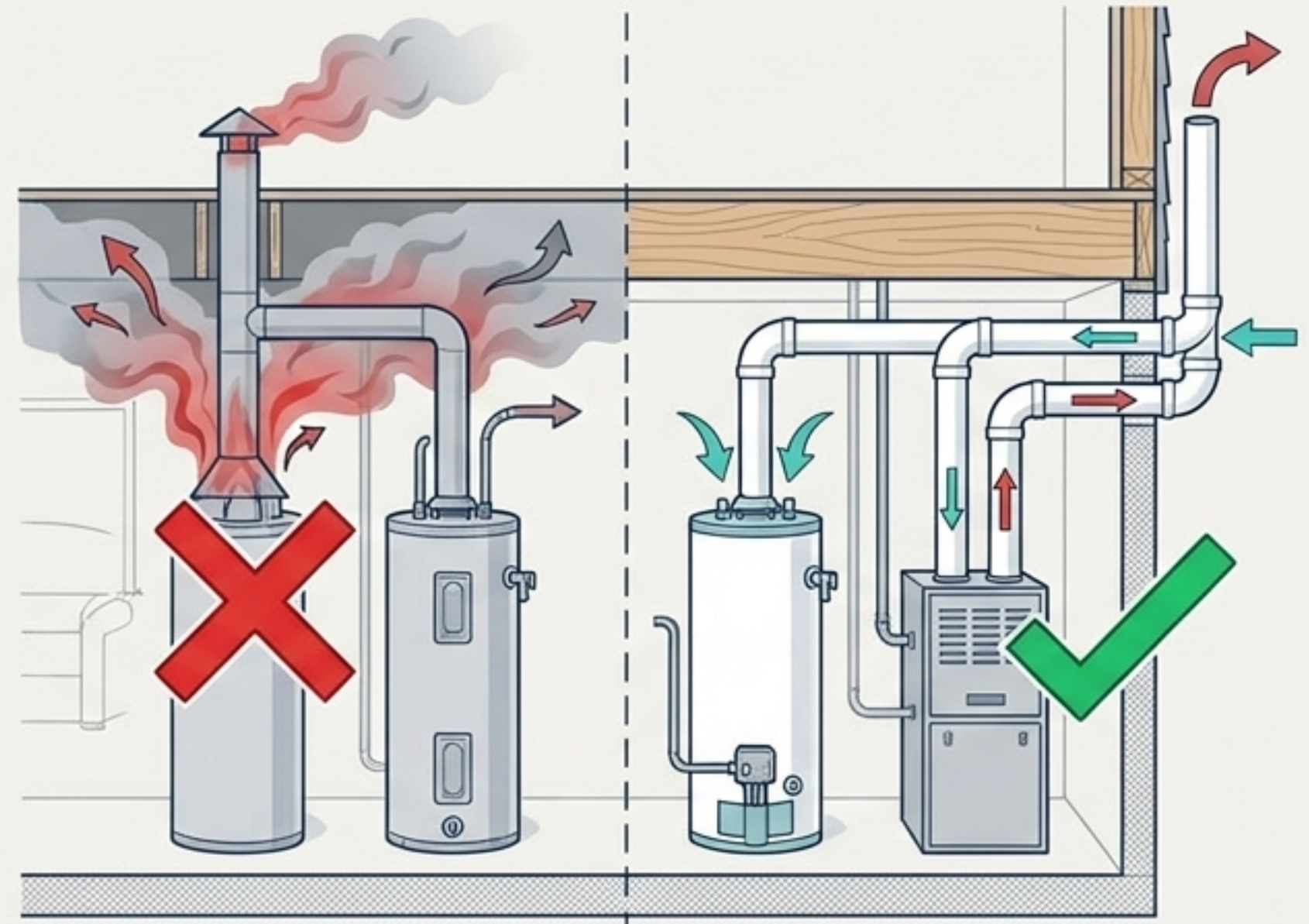
Do Not Seal a Hazard Inside Your Home



The Soil Gas Trap:

Sealing the foundation alters air dynamics. Radon gas can accumulate dangerously post-sealing.

Mandatory: Test before and 3-6 months after. Install sub-membrane mitigation if readings hit the EPA action level.



The Backdraft Risk:

Fuel-burning appliances in a sealed, depressurized space can pull deadly carbon monoxide exhaust into the home.

Mandatory: Convert furnaces and water heaters to direct-vent designs.

The Science of the Seal: Class I Vapor Retarder

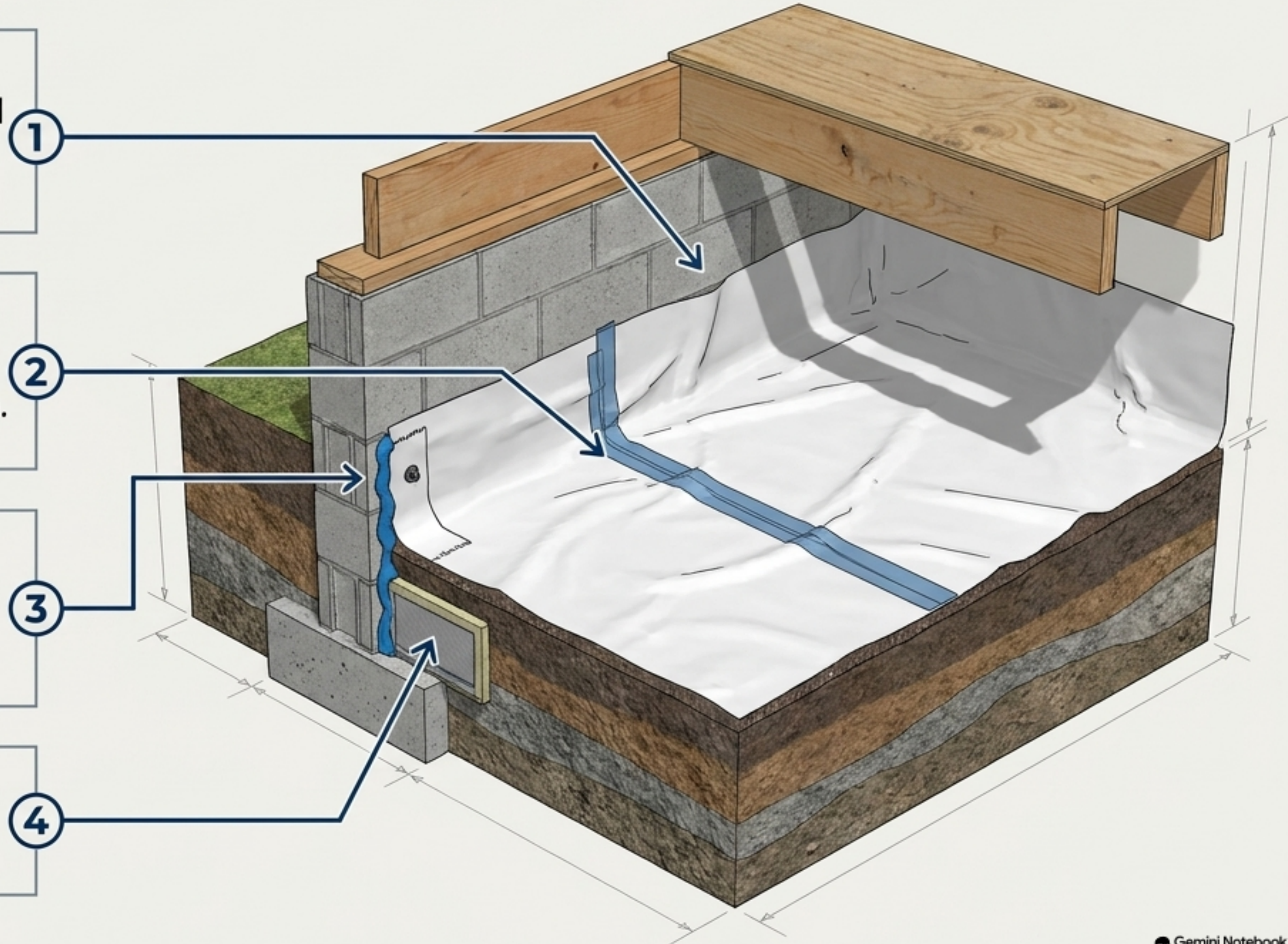
The Floor: Class I Vapor Retarder

Minimum **6-mil** polyethylene (10-20 mil reinforced preferred for high traffic). Laid across 100% of exposed soil.

The Seams: All joints overlapped by a minimum of **6 inches** and aggressively taped to block zero vapor transmission.

The Walls: Barrier runs at least **6 to 12 inches** up the foundation masonry, sealed securely with specialized polyurethane caulk/adhesive.

The Vents: Completely blocked, sealed, and insulated from outdoor air infiltration.

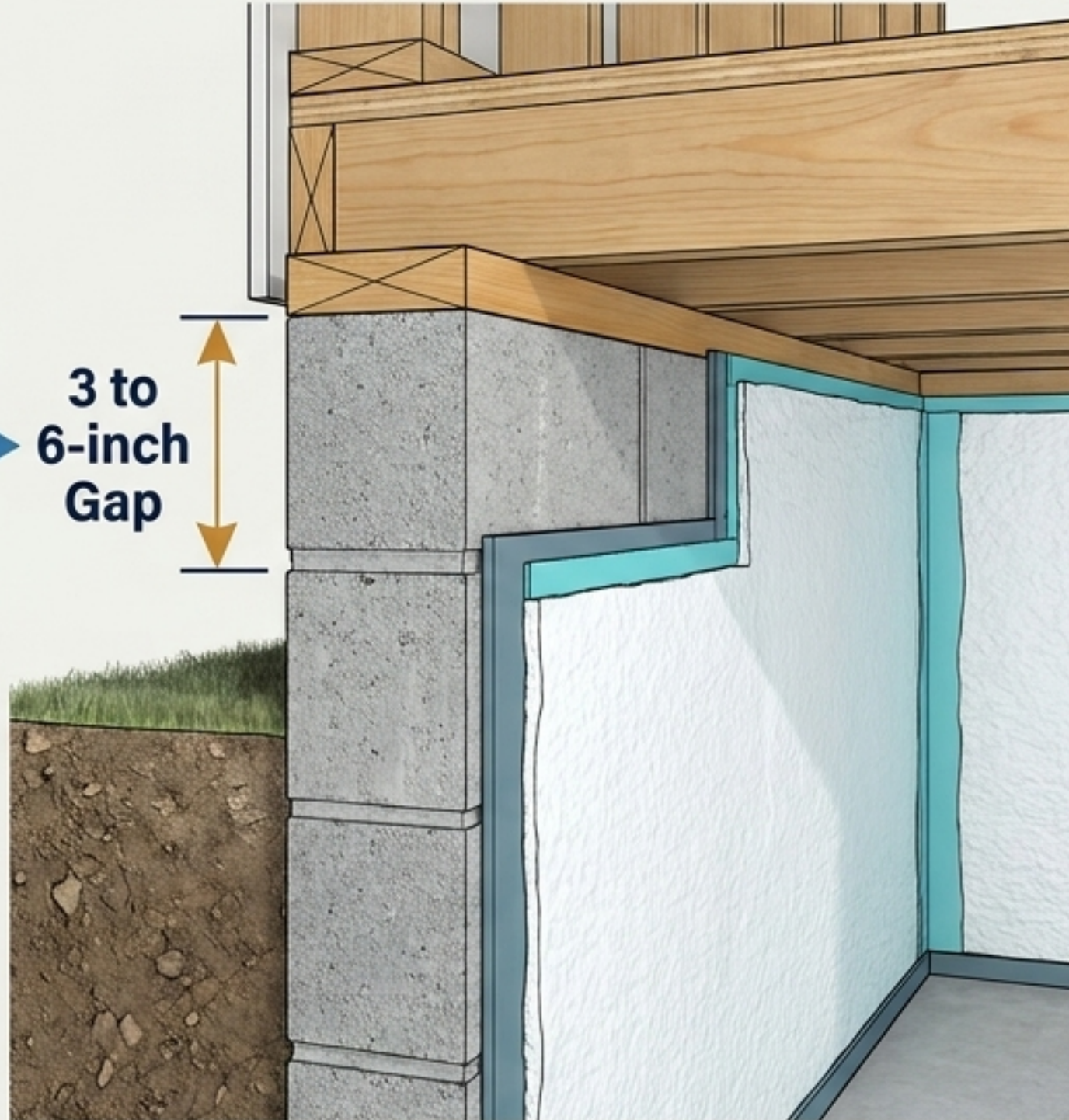


Designing for Inspection and Safety

The Inspection Gap:

Wall liners and spray foams must never run completely to the wooden sill plate. A mandatory 3-to-6-inch gap (up to 6 inches in SC) must be left at the top of the masonry to allow for visual termite inspections.

3 to
6-inch
Gap



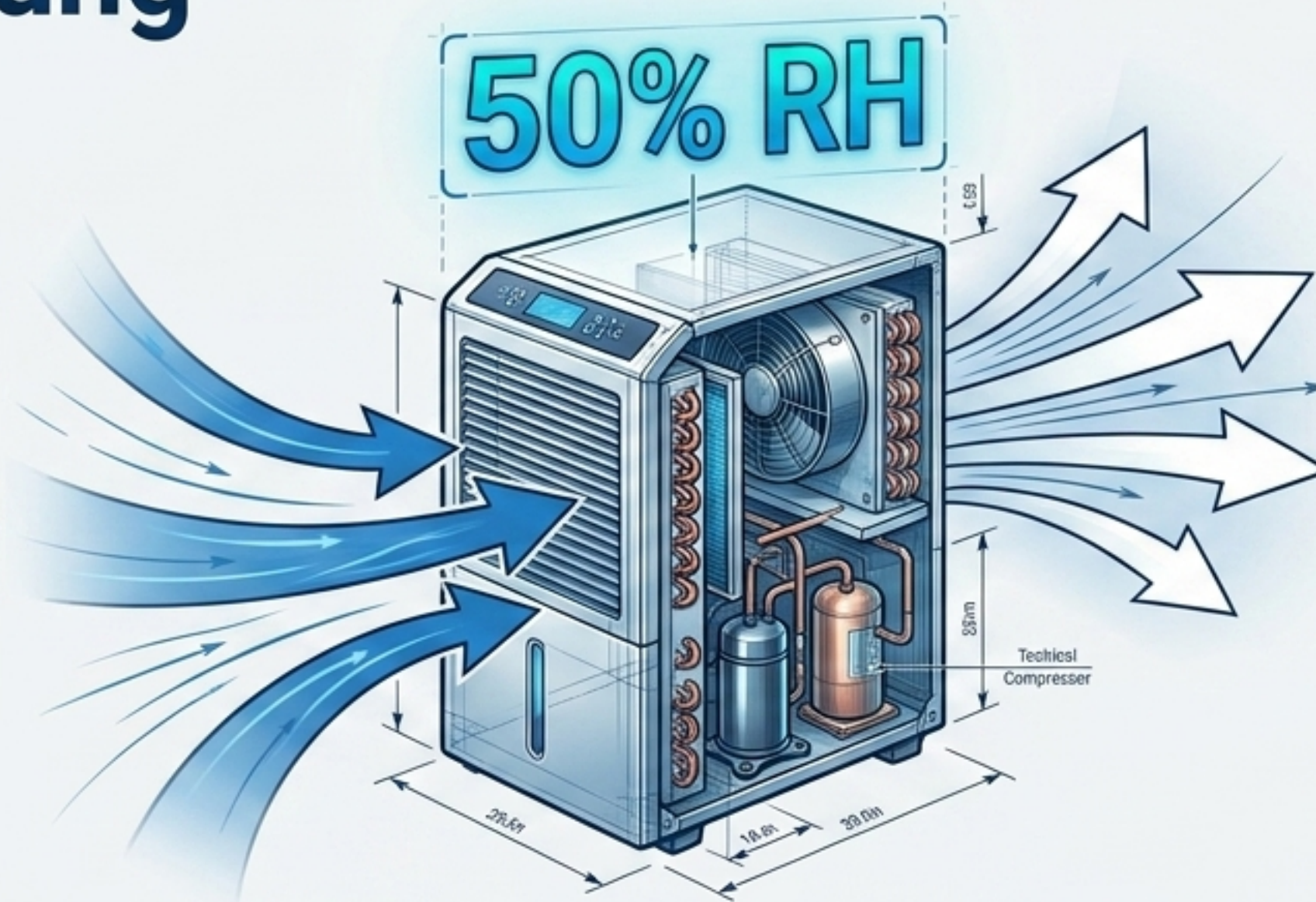
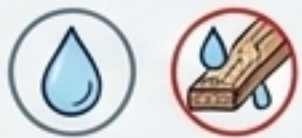
Electrical Safety:

Decades of humidity degrade existing wiring. Upgrading damp-location circuits to GFCI protection, and replacing degraded NM cable or aluminum splices (using AlumiConn/COPALUM), is standard code requirement during a professional seal.

A Sealed Space Requires an Active Lung

The Humidity Trap

Sealing a space without active conditioning creates a stagnant, closed moisture trap where condensation destroys hidden framing.



Inspector Callout Tag

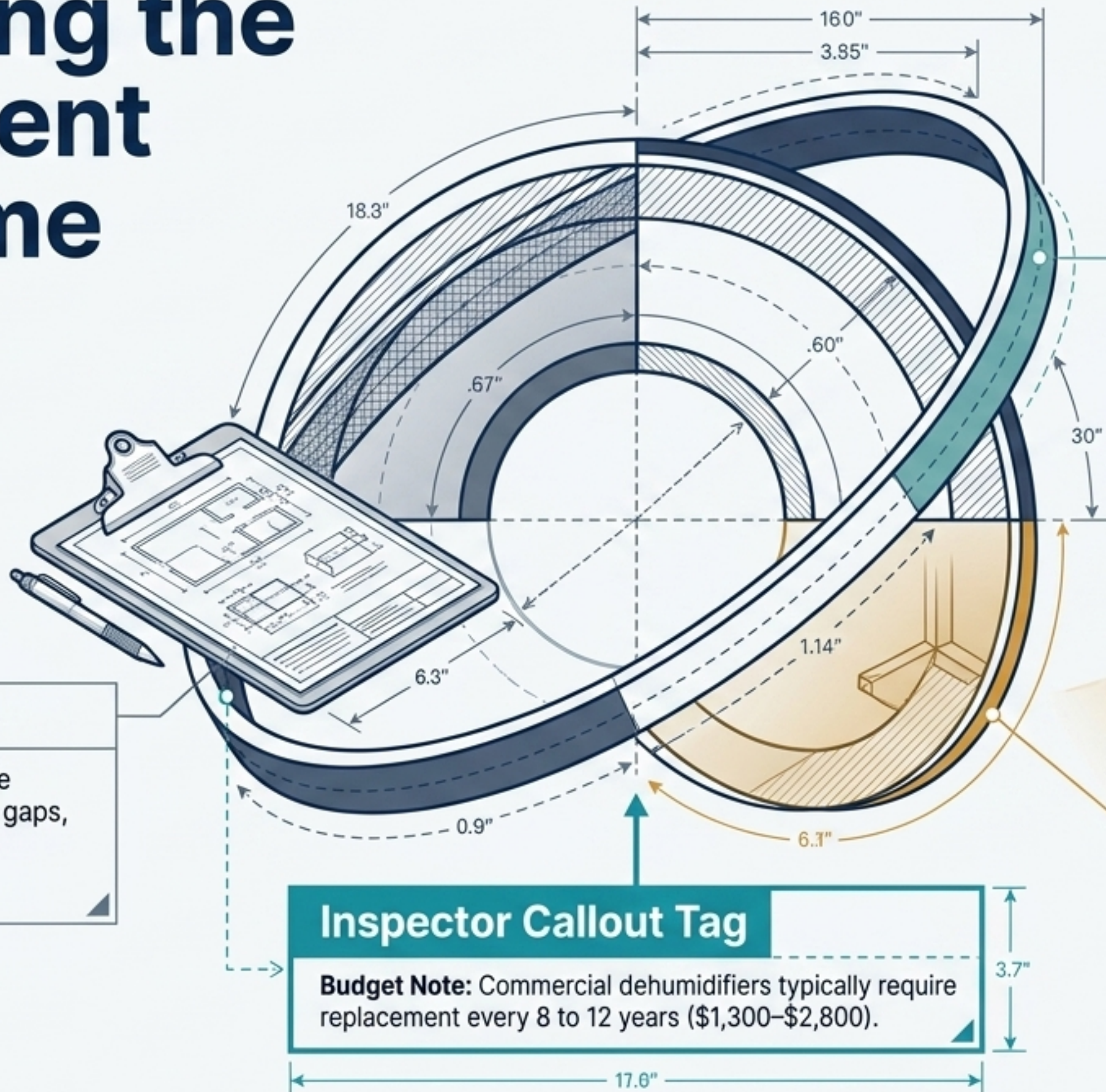
Target: Maintain constant Relative Humidity (RH) between 30% and 50% (Strictly <60%) to permanently eliminate mold growth conditions.

The Solution

A permanently installed, properly sized commercial dehumidifier (or dedicated HVAC supply) continuously pulls remaining moisture from the air, structural wood, and minor foundation leaks.



Protecting the Investment Over Time



Monthly (Homeowner Check)

Verify the dehumidifier display is under 60% RH. Ensure the condensate drain line is flowing freely and filter is clean.

Annually (Pro Check)

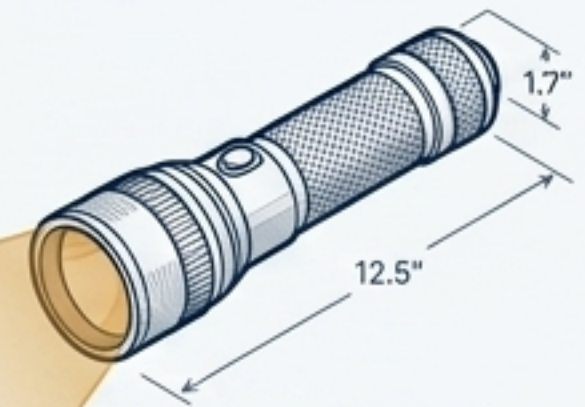
Professional inspection of tape seals, wall transitions, termite gaps, wood moisture content, and dehumidifier calibration.

Inspector Callout Tag

Budget Note: Commercial dehumidifiers typically require replacement every 8 to 12 years (\$1,300–\$2,800).

Quarterly (Visual Check)

Open the access door. Shine a high-lumen flashlight to check for liner tears, shifted wall tape, standing water on the plastic, or new pest mud tubes.



Do It Right. Do It Once.

Before You Call a Contractor

- ☐ - Buy a \$15 digital hygrometer to track current RH.
- ☐ - Check for standing water after a heavy rain.
- ☐ - Inventory your fuel-burning appliances (water heater, furnace).
- ☐ - Locate your most recent home radon test.

What to Demand in a Quote

- ☐ - A full structural and wood-rot assessment before a liner is priced.
- ☐ - Radon testing protocols built into the project timeline.
- ☐ - Direct-vent conversion plans for combustion appliances.
- ☐ - Active, sized dehumidification (never just a plastic sheet).