

2025 Pathology Department HVAC Compliance Checklist

Hospital/Project Name: _____

Date/Version: _____

Prepared By: _____

Use this checklist during design review, commissioning, or audits. All items based on GB 51039-2014, WS 233-2017, and international biosafety standards. Mark ✓ for compliant, ✗ for action needed.

Section 1: Core System Requirements

- 100% fresh air system (no recirculation) in all contaminated/semi-contaminated zones
- Independent HVAC systems for clean, semi-contaminated, and contaminated areas
- Backup supply & exhaust fans in every contaminated zone (auto-switchover <10 sec)
- Variable-frequency drives (VFDs) on all major fans for energy efficiency
- No electrostatic/ionic purifiers used as primary fresh-air treatment

Section 2: Air Change Rates & Pressure Cascade (Reference Table)

Verify against room sizes; use larger value if equipment requires more.

Room Type	Fresh Air (ACH)	Exhaust Air (ACH)	Required Pressure	Compliant? (✓/✗)
Grossing/Specimen Reception	6	8	–15 Pa	
Dehydration & Staining	6	8	–15 Pa	
Immunohistochemistry (IHC)	6–12	8–12	–15 Pa	
PCR Amplification	15	18	–30 Pa	

Molecular Pathology/FISH	3–12	4–18	–15 to –30 Pa
Reagent Preparation	12	10	+5 Pa
Diagnosis/Archive Rooms	3	3	+3 to +5 Pa

- Directional airflow: Clean (+5 Pa) → Semi (+/- 5 Pa) → Contaminated (–15 to –30 Pa)
- Pressure verified by electronic gauges + third-party testing
- Supply diffusers NOT placed above fume hoods or workstations

Section 3: Local Exhaust Equipment (Minimum Specs)

Equipment	Min. Airflow (m³/h)	Face Velocity (m/s)	Installed & Tested?
Grossing Station	2,000	0.5	
Chemical Fume Hood (IHC/Staining)	2,400–2,500	0.5–0.6	
Specimen Storage Hood	450	N/A	
Class II B2 BSC (Molecular)	1,400–2,100	N/A	

- All hoods/BSCs interlocked with room exhaust (start exhaust first)
- Stainless steel ducts for chemical connections (no positive pressure through rooms)
- Exhaust stacks: ≥2m above roof, ≥12m from intakes, leeward side

Section 4: Sensors & Intelligent Controls

- Formaldehyde sensors in: Grossing, frozen section, specimen storage rooms
- Xylene sensors in: Embedding, dehydration, staining, slide drying rooms
- Dual (formaldehyde + xylene) sensors in: Dehydrator/waste-liquid areas
- Auto-boost exhaust + alarm if >0.3 mg/m³ (per GB/T 18883-2022)
- Full BMS integration + local override panels in each lab
- Air detection system with audible/visual alarms

Section 5: Waste Gas & Exposure Controls

- Indoor limits met: Formaldehyde <0.5 mg/m³ (8-hr avg), xylene <0.2 mg/m³
- Outdoor discharge per GB 16297-1996 (no backflow risk)
- Waste-gas treatment unit with backup + auto-switch
- No ozone generators/ionizers for air treatment

Section 6: Common Pitfalls & Verification

- No single-fan reliance (redundancy confirmed)
- Transitional season temp/humidity met (22–26°C, 40–65% RH)
- HEPA filters on PCR supply terminals
- Commissioning report attached (airflow, pressure, sensor calibration)

Notes/Actions Required:

Sign-Off:

Design Engineer: _____ Date: _____

Commissioning Engineer: _____ Date: _____

Hospital Rep: _____ Date: _____

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