



Victorian
Health Building
Authority

Health service HVAC COVID-19 readiness assessment

Health Technical Advice HTA 2021-002

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Introduction

Heating, ventilation and air-conditioning (HVAC) systems can be effective in minimising airborne exposure to COVID-19 by reducing the number of infected droplets that gather indoors. Proper ventilation can help prevent aerosol transmission, when adopted alongside other risk-mitigating controls, by increasing the intake of outdoor air to optimise environmental conditions of facilities.

The purpose of this health technical advice (HTA) is to provide guidance to health agencies on the HVAC assessments required to understand the appropriateness of spaces and risk mitigation measures required to be deployed for the treatment and care of patients with COVID-19.

The Department of Health *Infection prevention control ventilation policy* (June 2021) ¹ and the Victorian Health Building Authority Health Technical Advice HTA-2020-001 *HVAC system strategies to airborne infectious outbreaks* ² are to be used as reference documents for this HVAC readiness assessment.

The table below defines the minimum expected values for room ventilation rates (ACH), outside air rate (ACH), airflow direction and filtration requirements for HVAC systems in an inpatient setting.

Table 1: Minimum expected values for room ventilation rates

Criteria	Below minimum recommendations	Minimum recommendations	Exceeds minimum recommendation
Room ventilation rate	<6 ACH	6-8 ACH	>8 ACH
Outside air rate	<2 ACH	2 ACH	>2 ACH or 100% outside air
Airflow direction	Net Positive environment between patient zones and common area	Balanced or slight Negative air flows between patient zones and common areas	Net Negative environment between patient zones and common areas (> -2.5Pa)
Filtration (for recirculating HVAC systems)	< MERV 13 (F7 or below)	MERV 13-16 (F8 or F9)	HEPA filters

HVAC systems are to be assessed with the HVAC system parameters set to operate for treatment of COVID-19 patients, that is, set to pandemic mode.

¹ Department of Health [Infection prevention control ventilation policy \(June 2021\)](https://www.dhhs.vic.gov.au/infection-prevention-control-resources-covid-19) <<https://www.dhhs.vic.gov.au/infection-prevention-control-resources-covid-19>>

² Victorian Health Building Authority Health Technical Advice HTA-2020-001 [HVAC system strategies to airborne infectious outbreaks](https://www.vhba.vic.gov.au/aerosol-study-within-healthcare-environments-health-technical-advice) <<https://www.vhba.vic.gov.au/aerosol-study-within-healthcare-environments-health-technical-advice>>

Health agency details

Health agency:			
Campus:			
Building		Floor	Ward

Room type	Number
No. of single patient bedrooms	
No. of double patient bedrooms	
No. of four patient bedrooms	
No. of Class N rooms	
No of Class S rooms	

Section 1 – Only to be completed for areas where AECOM HVAC assessments undertaken


This section is to be completed for spaces where an AECOM HVAC assessment was undertaken.


Area	Response
Is this space still proposed to be used for treating COVID-19 patients?	Yes / No
Have all the recommendations from the AECOM HVAC assessment report been implemented	Yes / No
List any Category 1 and/or Category 2 recommendations from the VHBA letter accompanying the AECOM HVAC assessment report that have <u>not</u> been implemented	List here
Provide details of any non-infrastructure controls implemented	Provide details here


Section 2 – To be completed for areas where AECOM HVAC assessments were not done/new capacity or wards


This section is to be completed for spaces that are being used, or are proposed to be used, for treating COVID-19 patients where an AECOM HVAC assessment was not undertaken.


Refer HVAC system checklist below. All areas being utilised for the treatment of COVID-19 patients should be considered within the assessment.


Outside air provision			
	Outside air rate	Calculated rate	#Value
		Meets min recommendation of two outside air changes per hour	Yes / No
	Capacity for 100% outside air	Able to meet recommendation all year round	Yes / No
		Able to meet recommendation during 'shoulder' seasons only	Yes / No

Air pathway		
	Dedicated return/spill air from ward area	Yes / No
	Fully ducted return/spill air system from ward area	Yes / No
	Fully ducted return/spill air system from patient rooms	Yes / No
	Dedicated HVAC system to ward area	Yes / No

Air change rates			
	Air change rate	Calculated rate air changes per hour	#Value
		Meets min recommendation of six air change per hour	Yes / No

Air balance			
	Air flow direction	Net positive environment between proposed hot zone and warm/cold zone	Yes / No
		Balanced to slight net negative air flows between hot zone and warm/cold zone	Yes / No
		Net negative environment between hot zone and warm/cold zone. Greater than -2.5Pa	Yes / No

Air filtration		
	Type of filters installed within AHU on supply air side	#Value
	Meets min recommendation of MERV 13-16 (F8 or F9)	Yes / No
	Type of filters installed within AHU on return/spill air side	#Value
	Type of Filters installed within exhaust systems	#Value

HVAC system criteria		
	Duty/standby system or essential power/generator back-up	Yes / No
	Dedicated exhaust to the ward	Yes / No
	HEPA filtered exhaust or minimum 10 m/s discharge velocity	Yes / No
	Dedicated spill system for the ward	Yes / No
	Fully ducted spill system from patient areas to the risers	Yes / No
	Fully enclosed rooms for one-bed and two-bed wards	Yes / No

Please provide details of any non-infrastructure controls implemented to address gaps or limitations in the HVAC systems:

Section 3 – All spaces to be used for treating COVID-19 patients

This is to be completed for all spaces that are being used or are proposed to be used for treating COVID-19 patients.

Area	
Date of last AHU/coil clean	#Date
Date of last AHU/duct inspection	#Date
Maintenance for scheduled services performed by	#Value
Overall ward tier rating (see next page)	#Value

Certification must be completed by an appropriately authorised person on behalf of the health service, endorsing the assessment and statements made within this assessment are true and correct, and understands the operation and limitations of the HVAC system, and has appropriate control measures in place to prevent COVID-19 transmission aligned to the hierarchy of controls.³

HVAC ward assessment completed by			
Name			
Position			
Signature		Date	

Health agency executive certification			
Name			
Position			
Signature		Date	

³ Department of Health [Infection prevention control resources – Covid-19](https://www.dhhs.vic.gov.au/infection-prevention-control-resources-covid-19) <<https://www.dhhs.vic.gov.au/infection-prevention-control-resources-covid-19>>

Table 2: Tier rating assessment

Parameter	Tier 1.1	Tier 1.2	Tier 2.1	Tier 2.2	Tier 3
Air change rates	8 ACH	8 ACH	6 ACH	6 ACH	< 6 ACH
Outside air supply	100%	100%	100%	Min. 2 ACH	< 2 ACH
Duty/standby system or essential power/generator back-up (single point of failure)	Yes	Yes	Yes	No	No
Dedicated exhaust to the ward	Yes	Yes	Yes	No	No
HEPA filtered exhaust or minimum 10 m/s discharge velocity	Yes	No	No	No	No
Dedicated spill system for the ward	Yes	No	No	No	No
Fully ducted spill system from patient areas to the risers	Yes	Yes	No	No	No
Fully enclosed rooms for one-bed and two-bed wards	Yes	Yes	No	No	No
Comments - works required to improve tier rating	Meets all criteria recommended for pandemic patient wards.	Meets outside air and air change requirements but requires: 1. minor upgrades to exhaust systems 2. minor upgrades to spill systems.	Meets outside air and air change requirements but requires: 1. upgrade works to exhaust systems 2. upgrade works to spill air systems 3. segregation building works.	Meets supply air change requirements but requires: 1. an increase to outside air system provisions 2. upgrades to exhaust systems 3. upgrades to spill air systems 4. segregation building works.	Requires major ventilation upgrade and segregation works for compliance with pandemic patient ward recommendations.

HVAC system checklist

HVAC system checklist to be used to assist and inform 'Section 2' of the assessment

Design criteria

Air handling unit		
AHU location:		
Capacity		m ³ /s
Pre-filter		grade
Main filter		grade
Return air		m ³ /s or %
Outside air		m ³ /s or %
Spill air		m ³ /s or %
Cooling coil capacity		kW
Heating coil capacity		kW
Fan static		Pa
VSD speed (if applicable)		Hz

Extract fan		
Capacity		m ³ /s
Fan static		Pa
VSD speed (if applicable)		Hz

Return air fan		
Capacity		m ³ /s
Fan static		Pa
VSD speed (if applicable)		Hz

Psychrometric check		
External condition limitations when operating in 100% o.a mode		
Mode	Dry bulb C	Wet bulb C
Heating		
Cooling		

Floor distribution		
Return air volume as a % of supply air		%
Dedicated extract to		

Fire mode	
Current HVAC fire alarm response in zone	
Current HVAC fire alarm response in adjacent zone	

General criteria

Air handling unit		
Humidifier	Yes <input type="checkbox"/>	No <input type="checkbox"/>
AS1668 separation from discharge louvres?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
BMS controlled	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Room in AHU to blank return air path	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Return air damper capable of tight shut off?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Economy cycle available	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Mixing Box	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Power	Essential <input type="checkbox"/>	Non-essential <input type="checkbox"/>

Extract fan		
Power	Essential <input type="checkbox"/>	Non-essential <input type="checkbox"/>
BMS controlled	Yes <input type="checkbox"/>	No <input type="checkbox"/>

Return air fan		
Power	Essential <input type="checkbox"/>	Non-essential <input type="checkbox"/>

Psychrometric check		
Supplemental cooling / heating required in zone	Yes <input type="checkbox"/>	No <input type="checkbox"/>

Fire mode		
Does response need to be adjusted for pandemic mode?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

Floor distribution		
Supply air diffusers to all areas	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Toilets (exhaust)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Showers (exhaust)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Dirty utility (exhaust)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Current air balance checked	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Can system be easily re-balanced to achieve new air flow patterns	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does proposed area match fire zones	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does proposed area match HVAC zones	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Return air path	Fully ducted from patient room <input type="checkbox"/>	Ceiling plenum or corridor return <input type="checkbox"/>

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