



AS/NZS 1668.1:2015

The use of ventilation and air conditioning in buildings

Fire and smoke control in buildings

Presented by:

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Presentation Content

- PURPOSE OF REVISION
- BRIEF SCOPE OF EACH SECTION
- IMPORTANT CHANGES IN EACH SECTION



PURPOSE OF REVISION

- Clarification for known misinterpretations
- Black holes between NCC & 1998 edition
- New technology
- Better supporting information
- Improved diagrams
- 17 year old Standard



SECTION 1

GENERAL

- Scope:
 - **Minimum** requirements for the design, construction, installation and commissioning of mechanical smoke control systems in **Class 2 to Class 9 buildings**.
 - Now includes **multi-compartment & large, single-compartment** buildings
 - Requirements for the **maintenance** of smoke control systems are **not included**.



SECTION 2

AIR-HANDLING SYSTEMS

- Scope:
 - General requirements for **air-handling** systems and **pressurization** systems
 - Properties & installation requirements for components



SECTION 2

AIR-HANDLING SYSTEMS

- Changes:
 - Interaction between smoke control systems
 - Damper definitions
 - Concessions for combustibility & temp of fusion
 - Electrical reference to AS/NZS 3000
 - Reminder about seismic conditions



SECTION 3

FIRE PROTECTION OF OPENINGS

- Scope:
 - To maintain the fire **integrity** of building elements compromised by mechanical ventilation
 - Protection of ducts, openings & equipment



SECTION 3

FIRE PROTECTION OF OPENINGS

- Changes:
 - Clarification around **FRL components**
 - Openings in Walls & Floors now “**Method of Protection**”
 - **Exemptions & Exclusions**
 - Fire-resistant **enclosing construction**
 - “**Smoke-spill**” is now “**Smoke exhaust**”
 - **Subduct** clarifications



SECTION 4

SMOKE CONTROL SYSTEMS

- Scope:
 - general requirements for air-handling systems used for smoke control
 - Location of inlets, outlets & direction of airflow
 - Noise & door force limits
 - Fan construction
 - Electrical requirements
 - Control & Indication
 - T&C requirements and Records



SECTION 4

SMOKE CONTROL SYSTEMS

- Changes:
 - Transfer of content to AS1670.1 Smoke Control
 - Wiring exceptions:
 - within fire rated plantroom (previous clash with authorities)
 - no adverse affect on operation
 - VSD Labelling
 - Can't use BMS
 - Table 4.1

TABLE 4.1 (continued)

Item	Power wiring	Automatic control*	Override control*	Indication*	Labelling
3 Smoke exhaust fans [see Figure 4.3(e), Section 8, Figures 8.1, 8.2, 8.3, 8.4 and 8.5].	<p>Where loss of voltage cannot adversely affect the operation of the smoke-control system, fan power wiring systems shall comply with the following:</p> <p>(a) Fan power wiring systems shall originate at a motor control centre that is supplied from the essential electrical power supply, and which is fire-isolated from all spaces apart from the stair served with construction having an FRL not less than -/120/120.</p> <p>(b) Fan power wiring systems shall meet the fire rating and mechanical protection requirements of AS/NZS 3013 and Appendix D.</p> <p>(c) Isolation switches at each fan shall be lockable.</p> <p>(d) Variable speed drives associated with smoke exhaust fans shall—</p> <p>(i) where the fan is installed to comply with the requirements of Sections 8 or 11, be fire-isolated from other equipment and the occupied space with construction having an FRL of not less than -/120/120, or shall be designed or arranged to ensure continuous operation of the fan throughout the duration required in Clause 4.8; or</p>	<p>Automatic control shall be initiated in accordance with Clause 4.9.</p> <p>Operation shall be in accordance with—</p> <p>(a) Clause 8.7 for zone smoke control systems;</p> <p>(b) Clause 9.11 for hot layer smoke control systems; or</p> <p>(c) Clause 11.8 for air purge systems.</p>	<p>A switch shall be provided for each fan or group of fans controlled at FFCP.</p> <p>Switches shall provide the following functionality: ON' 'AUTO' 'OFF'. 'AUTO' shall be located between 'ON' and 'OFF'.</p> <p>Where fans are grouped they shall serve the same SCZ.</p>	<p>One red (fan running) indicator shall be provided for each fan.</p> <p>One green (fan stopped) indicator shall be provided for each fan.</p> <p>One amber (fault) indicator shall be provided.</p> <p>Where multiple fans operate in unison and a single fault indicator is provided, the system designer shall assess the number of fans whose incorrect operation constitutes a fault condition.</p> <p>Where separate indicators are not provided for 'run' and 'stopped' conditions, a dual coloured indicator shall be provided</p> <p>There shall be a logical grouping of indicators adjacent to each control switch.</p> <p>Sensing device(s) shall be integrated with the smoke control system logic for the monitoring of each fan by—</p> <p>(a) a pressure differential switch arranged to sense airflow; or</p>	<p>Clear, appropriate, durable and indelible identification of the function and operation of each fan switch and indicator shall be secured permanently and firmly below each switch on the FFCP.</p> <p>Switches shall be labelled to complement the required functionally ON' 'AUTO' 'OFF'. 'AUTO' shall be located between 'ON' and 'OFF'.</p> <p>A red label with white lettering that states 'WARNING: THIS ISOLATING SWITCH SHALL BE LOCKED IN THE 'ON' POSITION AS THE FAN IS REQUIRED TO OPERATE DURING A FIRE' shall be located adjacent to each fan isolation switch.</p>

(continued)



SECTION 4

SMOKE CONTROL SYSTEMS

- More changes:
 - Baseline data, test results & documentation shall be **readily available at the site**
 - Improved documentation requirements:
 - Design documentation
 - O&M instructions & equipment schedules
 - Concise essential instructions
 - Schematic diagram
 - Improved testing requirements



SECTION 5

MISCELLANEOUS SYSTEMS

- Scope:
 - requirements for miscellaneous air-handling **systems that do not form part of a smoke control system.**



SECTION 5

MISCELLANEOUS SYSTEMS

- Changes:
 - “**Small systems**” now “**Single enclosures**”. $\pm 1000\text{L/s}$
 - Improved **minor system** ($<0.1\text{m}^2$) requirements
 - **Carparks:**
 - NOT A SMOKE EXHAUST SYSTEM
 - Dedicated (non-essential) main switch required
 - Jet fans shut down (and are not in series)
 - Ventilation (incl. supply) operate at FVR
 - Fire dampers often OK
 - Stair pressurisation relief = Smoke exhaust system



SECTION 6

KITCHEN EXHAUST HOOD SYSTEMS

- Scope:
 - requirements for exhaust **systems** serving kitchen hoods and kitchen appliances with proprietary exhaust provisions installed as required by AS 1668.2



SECTION 6

KITCHEN EXHAUST HOOD SYSTEMS

- Changes:
 - “it shall not shut down” (with switch labelling)
 - Other ventilation systems may share the shaft
 - Flame and spark arrestance required



SECTION 7

SHUTDOWN SYSTEMS

- Scope:
 - requirements for the shutdown of air-handling **systems that do not form part of a smoke control system.**
- Changes:
 - Improved requirements for **smoke dampers**



SECTION 8

ZONE PRESSURIZATION SYSTEMS

- Scope:
 - requirements for systems that are required to provide **zone smoke control** utilizing a pressurization system
 - **central plant** and **individual** plant air-handling systems



SECTION 8

ZONE PRESSURIZATION SYSTEMS

- Changes:
 - Now 20 to 80 Pa below other compartments
 - Clearer diagrams



SECTION 9

HOT LAYER SMOKE CONTROL SYSTEMS

- Scope:
 - Exhaust smoke from the hot smoke layer to maintain the smoke layer above egress paths.
 - Based on a single axisymmetric plume, which is confined to one reservoir.
 - Smoke plumes spilling across multiple reservoirs are not considered.



SECTION 9

HOT LAYER SMOKE CONTROL SYSTEMS

- Changes:
 - Entirely new section
 - Transfer of content from AS1668.3
 - Omission of “Fire Engineering-ness”
 - Exhaust air capacity (as per BCA)
 - Describes intakes, reservoirs, plenums, curtains, make-up & operation
 - Single fan permitted for multiple compartments



SECTION 10

PROTECTION OF FIRE-ISOLATED EXITS

- Scope:
 - Protection of fire-isolated exits by **pressurization**
 - Pressurization creates **airflow** across open doors
 - Relief, relief, relief



SECTION 10

PROTECTION OF FIRE-ISOLATED EXITS

- Changes:
 - More reminders about relief
 - Dedicated vs Zone pressurisation (leakage)
 - VSD's: encourages location within the exit
 - Vertical & horizontal combined
 - Reworked performance criteria
 - ...and don't forget about relief



SECTION 11

AIR PURGE SYSTEMS

- Scope:
 - Legacy item
 - Operation of HVAC smoke control to “purge” smoke from building
 - Smoke out. Outdoor air in.
 - Only applies to central plant systems serving multiple compartments
- Changes:
 - Not much.



SECTION 12

LIFT SHAFT PRESSURIZATION SYSTEM

- Scope:
 - lift shaft pressurization system when required to aid in smoke control
- Changes:
 - Not much.



APPENDICES

- **A:** Health & Aged Care (Informative)
- **B:** Subduct Principles (NEW) (Informative)
- **C:** Reliability (Informative)
- **D:** Wiring Systems Fire Resistance (**Normative**)
- **E:** Commissioning Tests (Informative)
- **F:** Hot Layer Application (NEW) (Informative)
- **G:** Building Geometry (NEW) (Informative)
- **H:** Hot Layer Inlet Requirements (NEW) (**Normative**)
- **I:** General Design Information (NEW) (Informative)
- **J:** Open Access Ramps & Balconies (NEW) (Informative)
- **K:** Exit Pressurization Tips (NEW) (Informative)



Thank you