



**GENERAL DIRECTORATE OF CIVIL DEFENCE
MINISTRY OF INTERIOR
STATE of QATAR**



CHECKLIST FOR MECHANICAL VENTILATION SMOKE CONTROL PLAN SUBMISSIONS

Proposed Development:		Application No.:
Location / PIN No.:		
Owner / Client:		BP Approval No.:
Consultant / Engineer:		

This document provides the minimum information required in the submission of applications for ACMV plan approvals. Accomplish this form correctly by checking the applicable provision/s for each item. This document shall form part of the attachments of the plan/drawings to be submitted for QCDD review/approval.

Note: Non-inclusion of this form could mean rejection of plan submission.

Series No.	Sub No.	Description	Provisions		
			Y	N	NA
1		GENERAL			
	1.1	Drawings to be submitted through MOI Online Permit System Portal must be in ACAD file format that is purged, all x-refs' bonded and audited for errors. Drawing files to be submitted with appropriate scale in model space and/or paper space layouts for review.			
	1.2	All drawings, calculations and related design reports shall be signed and endorsed by a qualified and registered Consultant Engineer, attested by the Engineering Company to where he/she is employed.			
	1.3	The Consultant Engineer shall certify on every drawing layout that the fire safety - ACMV submission is designed with the provisions of NFPA 88,92, 92A, 92B, 101 and 5000 and other applicable NFPA standard and/or Qatar Civil Defence requirement			
	1.4	Associated documents such as design, calculation and analysis reports are attached in the submission.			
2		PLANS AND DOCUMENTS TO BE SUBMITTED			
	2.1	Detailed Design Report – a narrative report which provides the following:			
	2.1.1	Description of the building, uses and occupancies of each spaces, passive and active fire protection system that will work together with the smoke control system.			
	2.1.2	Design criteria and objectives.			
	2.1.3	Smoke control system rational analysis.			
	2.1.4	Type/s of smoke control system provided in the building:			
	2.1.5	Passive smoke control system (fire or smoke barrier construction).			
	2.1.6	Active smoke control systems.			
	2.1.7	Smoke containment system; e.g. pressurization system			
	2.1.8	Smoke management system; e.g. smoke-heat exhaust ventilation system.			
	2.1.9	Method of operation of each zone (how the system will be initiated in each zone and associated system responses.			
	2.1.10	Event matrix relating to the methods of operation of the systems in the building.			
	2.1.11	CFD analysis and other calculations associated with smoke control system.			
	2.1.12	Fire modeling and other performance based analysis where utilized in the design of smoke control system.			
	2.1.13	Design Fire: • Anticipated fuel load, type of fuel/s, fuel characteristics, fire behavior. • Design of heat release assumption. • Analysis on sprinkler effectiveness, its effect to the fire and smoke.			
	2.2	Floor Plans, Elevation, Sectional Drawings and Details.			
	2.3	Drawings/layout showing the compartmentation procedures employed in the building; clear identification of the smoke zone boundaries and respective fire ratings.			
	2.4	Policy Plan (Indicating Location, PIN No. & QARS - areas, street, plot number)			
	2.5	Urban Planning & Development Authority (UPDA) latest and updated registration of the consultant and the Engineering Consultin Company.			



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	2.6	This Document, the Guidelines for Plan Submission to serve as a review checklist.			
	2.7	Fire Safety Provision shall be in accordance with the minimum requirement as prescribed by NFPA Codes and Standards and GACD General Requirements. Provisions in excess of the minimum requirement shall be confirmed by the design consultant with letter from the owner / client.			
3		DETAILS TO BE SHOWN ON PLANS			
	3.1	TITLE BLOCKS			
	3.1.1	Proper endorsement, drawing title & GACD space for stamps shall be provided.			
	3.1.2	List applicable codes used in the design of the project shall be indicated with complete editions & date.			
	3.1.3	Logo & stamp of the consultant/contractor firm complete with address and contact information shall be properly placed.			
	3.1.4	Owner's name & other details such as address and contact nos. shall be indicated.			
	3.1.5	The complete name/title of the project			
	3.1.6	Complete address of the project, Pin, area, plot & street nos. must be clearly provided.			
	3.1.7	Indicate correct plan scale in each drawing page.			
	3.1.8	Complete name of designer / engineer, checkers, draftsmen, etc. shall be clearly shown.			
	3.1.9	History of revisions must be provided.			
	3.1.10	Sheet number and content title must be consistent with the drawing index.			
	3.2	COVER / FRONT PAGE			
		Declaring, enumerating or tabulation of all the fire safety provisions required for the project. (see attach pdf sample for reference)			
	3.2.1	Drawing index with corresponding paper size and scale must be provided clearly and consistent with each page of the drawings.			
	3.2.2	Project description, scope of works, classification, construction type, occupancy, type of commodities and fire safety feature including the fire protection system provided as per the declarations in the approved Building Plans are clearly indicated.			
	3.2.3	Design parameters with complete description of the system are indicated and supported with engineering calculations. (e.g. Smoke management, pressurization & exhaust system)			
	3.2.4	Equipment Schedule; fans, motors, controllers & panels schedule are completely provided. (this may be provided on a separate sheet).			
	3.2.5	General notes applicable for the project.			
	3.2.6	Applicable legends & symbols.			
	3.2.7	Brief material specification for Fans and its enclosure, ducts, dampers, gauges, etc. shall be provided.			
	3.2.8	Emergency ventilation fans are connected to Emergency Power Supply System (EPSS) with a minimum 2-hour fire resistant cable - (must be specified on the plans and specification).			
	3.2.9	Ducts that pass through a fire barrier wall shall be protected by sealing the opening around the duct with a listed or approved material.			
	3.2.10	All ducts & pipes penetrating thru walls and slabs shall be sealed with fire retardant material with rating of not less than the fire rating of the wall or slab being penetrated. - (must be specified in the plans and specifications).			
	3.3	SITE PLAN			
	3.3.1	Site Plan scaled to fit an A0 or A1 drawing sheet and shall indicate the following:			
	3.3.2	Means of access to the site and to the perimeter of each building for fire fighting vehicle and equipment.			
	3.3.1	Grid Line References (x, y) and shall be same with other floor plan drawings.			
	3.3.2	Outline location of the fire pump room, generator room and fire command center (if applicable and where provided).			



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4		FLOOR PLANS (BASEMENT/S & CAR PARK BUILDINGS – as applicable)			
	4.1	The proposed, existing use of every part or modified portions of the plan clearly identified and provided with a narrative description of the scope of work/activity.			
	4.2	Smoke compartmentation / zone shall be clearly shown in the plans.			
	4.3	Supply air shall be drawn directly from the external with intake point not less than 5m from any exhaust discharge openings.			
	4.4	All ducts used for ventilation in the basements shall be fire rated with minimum thickness of 1.2mm.			
	4.5	Fans enclosure shall be able to withstand 250°C of fire rating, please specify.			
	4.6	Demonstrate on the plan that the enclosed parking structures shall be ventilated by a mechanical system capable of providing a minimum of 300 L/min per m ² of floor area (1 ft ³ /min per ft ² of floor area) or 6ACH during hours of normal operation.			
	4.8	For Fire Mode on any level/zone of enclosed parking structures demonstrate that the ventilation system shall operate with at least 10 ACH ventilation rate and the other level/zones of the Car Park shall be on normal condition to be ventilated by a mechanical system capable of providing a minimum of 300 L/min per m ² of floor area (1 ft ³ /min per ft ² of floor area) or at least 6 ACH.			
5		STAIR & LOBBY PRESSURIZATION (IF PROVIDED)			
	5.1	Multiple injection must be provided for more than five storey building or more than 18 meters of habitable height.			
	5.2	Criteria used in the design of stair & lobby pressurization such as pressure differential, ACH and other information are indicated in the front page.			
	5.3	Ensure that the pressure gradient/pressure at the exit staircase shall always be higher.			
	5.4	Demonstrate the fire fighting lobby pressurization system in accordance with QCD FSS 2.2.13 & 6.6.13 Fire Safety Standards Minimum Requirements. Clearly indicate on every floor plan layout the fire fighting lobby/fireman's lift. Indicate on the riser diagram to match on every floor plan layout the fire fighting lobby pressurization system. Indicate the Staircase No. on fire fighting lobby pressurization system riser diagram to clearly check & verify the lobbies adjacent to that Staircase.			
	5.5	Demonstrate the ventilation system in Fire Lift Machine Room.			
	5.6	Staircase shaft elevation and section-details with dimensions to show the configuration of staircase pressurization system has been provided.			
	5.7	Ensure that even air distribution of pressurizing air throughout the staircase shaft can be achieved. The pressurization system shall have injection points distributed throughout the shaft such that they are not more than 11m apart and not less than one injection points for every 3 level.			
	5.8	The pressurization system must be capable of maintaining an average air flow of not less than 1m/s across 3 doors open simultaneously plus maintaining a minimum of pressure differentials 0.05 in. water column (12.5 Pa.) in sprinklered buildings, or 0.10 in. water column (25 Pa.) in non sprinklered buildings (partial) for the remaining closed doors.			
	5.9	Pressure relief damper in each staircase to relieve excess pressures is provided with calculations and settings.			
6		ATRIUMS, COMMUNICATING SPACES & VERTICAL OPENINGS (WHERE APPLICABLE)			
	6.1	Demonstrate the compliance of Vertical Opening in accordance to NFPA Standards.			
7		PUMP ROOM AND GENERATOR ROOM VENTILATION SYSTEM (AS REQUIRED)			
	7.1	For the pump room ventilation, a 10 ACH is considered during operation of the pump/s.			
	7.2	Emergency ventilation system are provided in fire pump room, generator room, fire lifts and other areas deemed necessary for fire & safety functions and shall be connected to Emergency Power Supply.			
8		REFUGE FLOOR FOR HIGH RISE BLDG. (WHERE APPLICABLE)			
	8.1	Demonstrate the compliance of Refuge Floor ventilation system to QCD FSS 1.5 Fire Safety Standards Minimum Requirements.			



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9		SCHEMATIC AND CONTROL DIAGRAM			
	9.1	Schematic diagrams of the overall system showing clearly the key features and their functions, relative locations in the building, sizes, capacities and other essential information including the air distribution design arrangement in mechanical ventilation systems are provided.			
	9.2	Riser diagram showing the emergency ventilation fans are connected by 2 hours fire resistant cables to the Fire Fighter's Fan Control Panel is provided. Smoke control fan is provided with a rotary selector switch and indicating light for each fan/zone that indicates the following Manual-Yellow, Off-red, Automatic-green.			
	9.3	Fire rated vertical air duct, fire rated horizontal air duct, smoke damper, fire damper, FSD and MFSD location are clearly shown in the schematic.			
	9.4	Diagrammatic control wiring of the smoke control system is provided with sequence of operation.			
10		TYPICAL FLOOR PLANS			
	10.1	Mode of ventilation for all rooms/space have been indicated.			
	10.2	All floor plan matches with the approved building plans. Fire ratings of walls, doors, barriers and windows are clearly indicated.			
	10.3	Emergency supply air openings are drawn directly from the external with intake point not less than 5m from any exhaust discharge openings.			
	10.4	Services openings (A/C ducts, piping conduits, cables, etc.) between fire rated walls & slab are sealed with approved fire rated sealant or equally approved material. The fire rated sealant are at least equal to the elements of structure or wall.			
	10.5	Fire resistance rating of the emergency air duct are at least 2 hours fire rated air duct is clearly indicated on the plans and specified on the notes.			
	10.6	Fire resistance rating of the smoke emergency fans, emergency air ducts, cables, equipment and any other related component which operate during smoke and fire mode are at least 482°F (250°C) for a period not less than 2 hours or where design calculation shows that higher temperatures is required, those higher temperatures shall be used for equipment selection.			
	10.7	Emergency ventilation fans and their motors, motorized fire and smoke dampers, fire dampers, fire rated cables, emergency air ducts, control devices and all related equipment are listed for such purposes and approved by Qatar Civil Defence Department.			
	10.8	Location and details of Fire Fighter's Fan Control Panel is clearly shown on the plans. Smoke Control System Fan Controls as well as visual indication of the operation status are adjacent to the Main Fire Alarm Panel located on the Fire Command Center Room.			
	10.9	Smoke zone boundaries and the floor area are clearly shown and identified on the plans.			
11		Additional Information to Clarify the Design intent on the Drawings			
	11.1	Location of different zones, controlling damper and sequence of operation in relation to compartmentation procedures and isolation of fire zone from adjacent zones are clearly indicated on the plans.			
	11.2	Volumetric rate of flow of air at each point of inlet and outlet of each system including those serving protected staircases, exit passageways, lobbies, areas of refuge, fire command centre, fire pump rooms, generator rooms, rooms used for the storage of flammable liquids or gas or other areas of special risk are indicated on all floor plan layout.			
	11.3	Strategy and procedures for emergency ventilation systems such as staircase pressurization system and smoke control system are provided on the plans and schematic diagrams.			
	11.4	Sequence of operation of the following are provided: - smoke management system for basements and corridors, - stair & lobby pressurization, interfacing with fire alarm system shall be declared and shown in the layout.			
	11.5	Initiating device for the automatic activation of the smoke control system are clearly describe in the front page and control schematics.			



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	11.6	Schedule of Equipment - Fan capacities as per the calculation report - Fan components temperature and fire Ratings - Duct materials and joint thickness, temperature and fire ratings. - Type of Dampers (fire. Smoke/fire dampers), temperature and fire ratings.			
12		MISCELLANEOUS DETAILS			
	12.1	Detail on the protection of ducting penetrating walls.			
	12.2	Details of fans, grills, duct and smoke damper.			
	12.3	Details of duct supports.			
	12.4	Details of the equipment supports such as vibration isolators for fans and other equipment (such as AHUs, FCUs, etc.)			
13		CALCULATIONS			
	13.1	Calculation for smoke exhaust system, smoke-stop lobby, staircase and fire lift shaft pressurization system (if applicable). Ensure that the pressure at the exit stair case shall be higher than the lobby considering a minimum 3 open door in the computation with the pressure across the barriers of .05 in water columns (12.5 Pa) in sprinklered buildings.			
	13.2	Computation analysis and attach a copy of tables and references used in designing each stair. Please consider in the computation report (but not limited to) the following: i. openings and leakage areas ii. effect of outdoor temperature and wind on the performance iii. pressure differential iv. maximum allowable pressure differential v. minimum allowable pressure differential vi. all doors closed and 3 doors open vii. friction losses in shafts The calculation must be checked and signed by a registered engineer. - Include the size of relief vents on the calculation of pressurised staircases to avoid over-pressure.			
	13.3	CFD analysis for jet fans used in capr park ventilation and smoke clearance requirement is submitted.			
	13.4	CFD analysis where required by the authority having jurisdiction to check and verify the effectiveness of the smoke management system provided for the project.			
14		TECHNICAL REQUIREMENTS			
	14.1	Smoke Containment System (Smokeproof enclosure, zoned smoke control, etc.) - Method/s employed: i. Mechanical means ii. Natural means			
	14.2	Calculations: leakages, number of open doors, door opening forces, pressure differentials, air velocities, ACH, etc.			
	14.3	Over-pressurization control provision.			
	14.4	Stand-by fans (where required).			
	14.5	Primary & secondary power supplies.			
	14.6	Wiring systems (separate from any other circuits, approved and listed for specific use, protected against exposure to fire, etc.)			
	14.7	Means of actuating the system (fire alarm and/or smoke control initiating devices).			
	14.8	Manual System override.			
	14.9	Smoke-heat exhaust ventilation system			
	14.10	Types of construction i. Ducted ii. Jet fans			
	14.11	Fans & ducts, its components temperature and ratings			
	14.12	Means of actuating the system			



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			Y	N	NA
	14.13	Primary & secondary power supply			
	14.14	Wiring systems (separate from any other circuits, approved and listed for specific use, protected against exposure to fire, etc.)			
	14.15	Calculations / CFD analysis			
	14.16	Manual System override.			
	14.17	Natural i. Location and sizes of fixed ventilation openings. ii. Smoke control analysis and associated calculations confirming the efficiency of the system.			
		NOTES:			
***		<p>1) Herein listed minimum required information is only those deemed necessary to proceed with the plan review/evaluation. QCDD may require additional information during the course of its review/evaluation of the plans and documents submitted. Similarly, the Consultant may opt to provide additional information he believed would be beneficial in the review/evaluation and approval of the plans.</p> <p>2) For Strict Compliance : Each item is checked for completeness and compliance to NFPA Standards and General Directorate of Civil Defence, General Requirements Check the applicable/required item/s and attached this document to each plan submission/re-submissions made.</p>	Abbreviation: Y= Yes N= No NA = Not Applicable		

Name, Signature and Stamp of Consulting Engineer

Date