Table 10.12.: Jet Fan Smoke Clearance System

ITEMS	REQUIREMENTS
4. MAKE-UP AIR (REPLACEMENT AIR)	i. Makeup air shall be provided by either fans, openings to the outside leakage paths, or the combination thereof. ii. Where there is natural supply of air for areas, openings not less than 2.5 % of the floor area of such story, shall be considered as a satisfactory make-up air for the jet fan smoke clearance system. iii. However, such 2.5 % of floor area openings shall be evenly distributed over the entire area. iv. Where natural make-up air in accordance with **Table 10.12.4.i and ii** is not available, mechanical makeup air shall be provided at a minimum rate of 85% of the extract air via openings directly to the exterior of the building. v. Make-up air shall not exceed an inlet velocity of 2 m/s. vi. Makeup air intake shall not be less than 5 m from any exhaust discharge openings. vii. Outlets for the supply air shall be adequately distributed over the area. viii. Where mechanical make-up air is supplied, the supply points for the makeup air shall be located beneath the smoke layer interface. ix. Sharing of the fresh air fan and exhaust air fans shall be permitted provided that the fans, wiring and control panel are protected with at least 1-hour fire resistance rating.
5. JET FAN ZONING	i. The space shall be divided into virtual smoke control zones with each zone not larger than 2000m^2 (excluding plant rooms and circulation spaces) for the purpose of smoke containment and faster location of fire. ii. It shall be demonstrated through CFD or modeling that smoke can be contained within the zone boundaries and channeled by jet fans to the extract fans. iii. Each smoke control zone shall have its own jet fans system (fresh air fans, exhaust air fans and jet fans) to purge smoke from the affected zone. iv. Each group of exhaust or extract fans for each smoke control zone shall be interlocked with its corresponding groups of jet fans for that zone. v. If the group of exhaust or extract fans stops/fails in any smoke control zone, its corresponding jet fans in that zone shall stop. But if any of the exhaust or extract fan is still in operation in a particular smoke control zone, all the jet fans shall continue to operate in that zone. vi. The exhaust fan shall continue to run even if any corresponding group of jet fans fails. vii. The other groups of jet fans shall continue to run even if any one group of jet fans fails.
6. LONGITUDINAL ZONING	i. Where jet fan systems objective is to ventilate the space (to limit the concentrations of contaminants or CO levels to acceptable levels) a longitudinal Jet Fan ventilation system achieves its objectives through the longitudinal flow of air within the parking, roadway or tunnel. ii. A longitudinal Jet Fan ventilation system introduces air into, or removes air from, the parking or tunnel roadway at a limited number of points, such as a portal or a shaft, thus creating a longitudinal flow of air within the roadway, with discharge at the exiting portal. iii. Jet fan-based longitudinal ventilation employs a series of axial fans that are mounted at the ceiling level of the tunnel roadway. Such fans, due to the effects of the high-velocity discharge, induce a longitudinal airflow through the length of the tunnel. In all longitudinal ventilation systems, the exhaust gas stream (pollutants or smoke) discharges from the exit portal.