Table 10.4.: Stair Pressurization Requirements

ITEMS	REQUIREMENTS
5. PRESSURE DIFFERENTIAL	i. Exit stair pressurization systems shall be designed to operate within a pressure difference range. This range is between the minimum design pressure difference and the maximum design pressure difference. The maximum design pressure shall corresponds to the maximum allowable door-opening force depending on the door size. **See Table 10.3.b.** ii. Where the system designer has determined that a higher minimum pressure difference is necessary to achieve the smoke control system objectives, the higher minimum pressure difference shall be used. iii. The minimum pressure difference for exit stair pressurization systems shall be established at a level that is sufficient such that it will not be overcome by the forces of wind, stack effect, or buoyancy of hot smoke. iv. For exit stair pressurization systems, the orifice equation can be used to estimate the flow through building flow paths. The total leakage area of the protected space shall be calculated using input data from NFPA 92, EN 12101-6 standards or other relevant standards. $$Q = 0.839A\sqrt{\Delta p}$$ Where, Q = volumetric airflow rate, m^3/s A = flow area (leakage area), m^2 Δp = pressure difference across flow path, Pa
6. FORCE ON DOOR	i. The flow through open doors shall be calculated based on the pressure difference across the open doors. ii. The pressure difference across a barrier must not result in door-opening forces that exceed the maximum force of 133 N. iii. The force required to open a door in an exit stair pressurization system is as follows: $$F = F_{dc} + \frac{WA\Delta p}{2(W-d)}$$ Where, F = total door-opening force, N F_{dc} = force to overcome the door closer and other friction, N W = door width, m A = door area, m^2 ΔP = pressure difference across the door, Pa d = distance from the doorknob to the knob side of the door, m