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f) In addition to fire protection requirements as per Table 7, appropriate fire detection and suppressions systems shall be provided for the protection of hydraulic oil tank and pumps located below ground level for operation of car lifts.

g) Means of egress shall meet the requirements specified in **4**.

H-3 OPEN PARKING STRUCTURES (INCLUDING MULTI-LEVEL PARKING AND STILT PARKING)

a) The term open parking structure specifies the degree to which the structure's exterior walls must have openings. Parking structures that meet the definition of the term open parking structure provide sufficient area in exterior walls to vent the products of combustion to a greater degree than an enclosed parking structure.

b) A parking structure having each parking level wall openings open to the atmosphere, for an area of not less than 0.4 m^2 for each linear metre of its exterior perimeter shall be construed as open parking structure. Such openings shall be distributed over 40 percent of the building perimeter or uniformly over two opposing sides. Interior wall lines shall be at least 20 percent open, with openings distributed to provide ventilation, else, the structure shall be deemed as enclosed parking structures.

NOTE — A car park located at the stilt level of a building (not open to sky) can be considered an open or an unenclosed car park if any part of the car park is within 30 m of a permanent natural ventilation opening and any one of the following is complied with towards the permanent natural ventilation requirement:

i) 50 percent of the car park perimeter shall be open to permanent natural ventilation.

ii) At least 75 percent of the car park perimeter is having the 50 percent natural ventilation opening.

c) All stilt parking are required to be provided with sprinkler system where such buildings are required to be sprinklered.

d) Open parking structures are not required to be provided with compartmentation.

e) Open car parking (open to sky) within building complex having fire hydrant system shall also need to be protected with yard hydrant installation system in accordance with good practice [4(29)].

H-4 ENCLOSED PARKING STRUCTURES

a) Those car parking structures which are enclosed on all sides and on top, not falling within the definition of open car parking [*see* **H-3**(b)] and also those situated in the basements shall be known as enclosed car parking structures.

b) All sprinklers in car parking shall be standard response type with minimum K-Factor of 80, area coverage of 9 m^2 and designed as per good practice [4(20)].

c) For basement car parking, compartmentation can be achieved, with fire barrier or with water curtain nozzle (K-23) or with combination thereof. Automatic deluge system comprising deluge valve, piping, nozzles, etc shall be used to zone the compartment in case of water curtain system. In case of water curtain, existing water storage shall be supplemented by water demand for water curtain nozzles for 60 min considering the largest compartment's perimeter out of all compartments of car parking in any of the basements.

d) The water supply for the water curtain nozzles shall be through independent electric pump of adequate capacity (flow and head) with piping/riser for the water supply to the nozzles.

e) The water curtain shall be operated by the actuation of flow switch actuating sprinkler system.

f) For smoke ventilation requirement of car parking, *see* **4.6.2**.

g) All fire exit doors from the car parking to exits shall be painted green and shall display exit signage.

H-5 AUTOMATED CAR PARKING UTILIZING MECHANICAL OR COMPUTERIZED/ ROBOTIC MEANS

a) Automated car parking structure can be of open parking type or enclosed types.

b) Automated car parking facilities pose more hazard compared to manual parking due to following reasons:

1) High density of cars due to close stacking-one over another.
2) Lack of provision on fire separation/ compartmentation-horizontal or vertical leading to rapid fire spread.
3) Non-availability of any person to notice/ control the fire in initial stages.
4) Limited access to firefighting personnel.
5) Extensive height and depth involved with highly combustible load.

c) Fire escape staircases, at least 1 250 mm wide shall be provided at appropriate locations so

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