THE PISTON EFFECT IN LIFT SHAFTS

Mark Fishlock    Jul-11

Lift shafts are not pressure sealed environments
Most lifts have no SMOKE seals
Multiple lifts in same shaft can increase the effect
Motor Room
Containing Winding gear, motor and lift control system

Guide Rails

Lift Carriage (Lift Car)

Lift Cable (Steel)

Landing Doors
NOT SMOKE SEALED

Lift Car doors

Counterweight

Buffer

Floor 2

Floor 1

Ground Fl
THE PISTON EFFECT

Lift Car is STATIONARY

Pressure in neutral in lift car, in the lift shaft (above and below the Car)
Pressure is neutral in all the lobbies.
Pressure is neutral in the Motor room
THE PISTON EFFECT

Lift Car is MOVING DOWN

Pressure is neutral in lift car.
The air ABOVE the lift car is slightly NEGATIVE pressure
The air BELOW the lift car will be slightly POSITIVE pressure
There will be correctional air flow around the lift car and through
Gaps in the construction of the lift shaft (including the landing doors)

Air will be expelled into the lift lobbies BELOW the lift car
Air will be drawn from the lift lobbies above the car and from the
Motor room (Normally on the roof in High Rise buildings)

= Air flow directions
THE PISTON EFFECT

Lift Car is MOVING UP

Pressure is neutral in lift car.
The air BELOW the lift car is slightly NEGATIVE pressure
The air ABOVE the lift car will be slightly POSITIVE pressure
There will be correctional air flow around the lift car and through
Gaps in the construction of the lift shaft (including the landing doors)

Air will be drawn from the lift lobbies BELOW the lift car
Air will be expelled into the lift lobbies above the car and into the
Motor room (Normally on the roof in High Rise buildings)

= Air flow directions
THE PISTON EFFECT

Lift Car is MOVING DOWN
(Called by FRS)

Potentially products of combustion drawn into lift shaft

Air flow directions
THE PISTON EFFECT

Lift Car has moved UP
Crews deploying

Products of combustion that were drawn into lift shaft are mixed and expelled on other unaffected floors