

# Technical Information for Multi-Entry mode of INGSTROM Escape Chute system

## **Installation Characteristics**

### New Building

The multi-entry escape chute mode is normally built-in at the design stage before the building is constructed and strategically located where occupants can easily and safely gain access to during emergencies:

- at the smoke free area at the central core building,
- at any strategic area(s) inside or outside the building.

### Old or Existing Building

The possible installation sites that can be converted into a precinct (small cubicle room), from the highest floor to the ground floor to safe exit on the same vertical line with no hindrance of piping, wiring, air-con ducts, etc at each level of ceiling floor:

- Reserved passage or corridors,
- Spare lifts structure,
- Cubicle toilet,
- Pantry or store room,
- Space at the central core of fire staircase,
- Extension of a rectangular structure out of the building similar to a lift shaft.

## **Precinct (Small cubicle room)**

It requires a precinct (small cubicle room) with approximate area of 2-sq. m. at each floor of a building. The provision of the precinct from the top storey through the ground level on same vertical line has similarity to a rectangular vertical lift shaft constructed inside/outside the building to serve every floor. The construction of the precinct has also got the similarity to that construction of fire staircase but without stairs in accordance to country's fire and building code.

The precinct is constructed with the shortest side of the wall that is of at least 1000mm and the longest side of the wall is of at least 2000mm. The rectangular precinct can have some part of its perimeter curved. The wall of the precinct must be constructed with fire resistance materials of at least RF120 (120 minutes resistant to the fire). Materials will be of MO category. A wall having a ceramic brick of 9cm thickness protected with chalk both sides are considered as acceptable. Walls need not be painted.

## **Round Hole**

Inside every precinct, a round hole of 68 +/- 1cm diameter is bored through each floor. These holes are in a vertical line going through every floor (from top floor to the first floor). There is no hole on the floor at ground level.

The positioning of the hole is situated at a minimum of at least 10cm from the 3 sides of the wall ('n' shape) and at least 85 cm from the 4<sup>th</sup> wall that is the side that with fire resistance door. This positioning of hole is to allow the opening of the fire door (80cm width) inward without passing over the hole for ease of evacuation. The hole is meant for the mounting of the ring with chute fabrics and also served as an entry point to the chute.

## **Escape Chutes**

The escape chutes of multi-entry mode are divided into segments or sections in accordance to the number of storeys of the building, minus the top storey. The highest storey does not have a chute segment.

Each chute segment is held on to the round hole at the floor inside the precinct by an aluminum ring. The lower

end of each chute segment penetrates 30/40 cm into the next segment of chute of the following floor.

The chute segment of the ground floor finishes 80/90 cm from the ground level in order to allow the person descending to free himself from the chute, with/without the help of an assistant.

## **Example of chute calculation:**

Assuming a building having 10 storeys inclusive of ground floor (first storey), each storey is of 3 meters high, would need the following length of chute:

- 10 storey minus highest storey = 9 segments (seg)
- 9 segs = 8standard (segs) + 1GF (seg)
- Each standard segment = 3 + 0.35m = 3.35m
- Therefore 8 std segments = 8 x 3.35m = 26.80m
- The ground floor segment = 3 - 0.85m = 2.15m
- Total length for 9 segments = **28.95m**

It would also need 9 holes, from the floor of the highest storey to the floor of the second storey.

## **Chute Fabrics**

The multi-entry escape chute installation consist 2 layers of chute fabrics:

- external layer is make up of Spuncell elastic, for breaking the speed of descent,

a person can control the speed of descent by stretching hands and bending knees against this layer of chute fabric.

- internal layer is make up of Kevlar fabric for resistant.

It does not need a third layer of fiberglass to protect the chute from the fire flame because the chute is enclosed within the fire-protected area in the precincts.

## **Fire Resistance Door**

The entrance at each precinct is protected by fire resistance door of at least RF30 (RF 60 is usually installed). The minimum width of the door is 80cm and the height is 2m. The door is always closed under normal condition. The doors for the upper floors are open inward and must never pass above the metal ring of the chute frame. The door for the ground floor is open outward to ease final escape. Anti-panic bars can be installed on the doors for ease evacuation.

## **Other essential elements:**

- Emergency Exit Lights – each floor
- Emergency Lighting – each floor
- Emergency light - each floor
- Service Lights – each floor
- A set of Rings (iron ring frame, aluminum ring, adjusting rubber profiles) – each floor
- Overpressure air supply system – one unit
- Inter-com system – each floor
- Escape hood – each floor

## **Integrated System**

When the building is equipped with the emergency power supply (EPS) system, the various supplementary devices such as over pressurized fan, the inter-com system at each level and emergency lights could also be integrated into the multi-entry escape chute system to facilitate the better control during evacuation process.

The building automation system will auto-start up the various devices for ease of the evacuation process.