

INGSTROM ESCAPE CHUTE (registered trade name)
Technical Specifications for Mobile/Portable Rescue Chute

Mobile/Portable Rescue Chute has become standard rescue equipment for fire aerial ladder trucks such as Bronto Skylift, Simon Snorkel, Cella, Iveco Magirus, Metz and Rosenbauer used by fire brigades worldwide for high rise rescue operations.

(A) Characteristic Features

The Mobile Unit provides a dual functions in 1 unit portable rescue facilities that is suitable for rescue of people trapped in tall buildings from Fire Brigade's aerial ladder:

1. The universal standard foldable platform is portable and adaptable for use with mobile rescue units, such as the fire brigades' aerial ladder trucks. The foldable platform can either in ready mounted on bucket or in a cassette, which is ready for used when required. With additional equipment, this platform can also be used from the window or balcony of a structure for rescue.
2. The chute main body is made up of several segments of 3 layers chute. The start piece of the first segment, usually of 6m or 8m long with fire snap hooks on one end. The other segment of chute with fire snap hooks on both ends usually corresponds to the height of a regular floor. The start piece and the other segments are easily connected with fire snap hooks for prolonging the chute to meet the desired chute length. Customer may indicate different or specific requirement of length for start piece or each segment to meet their rescue operation needs.
3. During deployment, the fiberglass container with the start piece chute is place firmly on the unfolded platform that is hooked on the rail to the bucket of the aerial ladder platform. Where height varies during rescue operations, the chute length can be easily extended from the start piece with additional segments. Except the start piece cannot be shorten or lengthen, the other segments are usually 3m per piece that corresponds to the height of a regular floor, and is easily connected with fire snap hooks to meet the desired chute length during rescue operations.
4. The quick deployment of mobile rescue unit provides people trapped in high rise building a safer means of rapid vertical escape from bucket to ground and also would reducing the risk exposure of the fireman climbing up the rescue. This approach eliminates the time involved in lowering and raising the aerial-ladder platform, hence reduces the speed of rescuing victims from tall building by almost ten times in comparison to using the conventional method.
5. Should the surrounding of the building site could not accommodate the fire aerial truck, the portability of the unit allows the rescue personnel to carry the unit to desired floor. With the additional equipment, it allows the rescue chute to be positioned at the parapet of balcony and window that do not have handrails. However, the rescuer must ensure that the wall of the balcony and window, ceiling and floor is structurally safe for the unit to be deploy on and the maximum safety load is 200 kg or do not use in exceed 50m in height.

(B) Material Specifications

1. Universal foldable platform – 100% aluminium (frame and cast), foldable, portable, attachable to buckets in most of fire trucks. Aluminium cast Alsi nr 6. Steel ring.
2. Red fiber glass container in 3 parts for storage of start piece.
3. Portable carrier bags for the storage of the prolong segment of chutes.
4. The chute main body material is white in colour, constructed of three layers chute. This 3-way protection protects the evacuees once inside the chute from flame, heat, and smoke during rescue operation. Each layer has its special function:

- 4.1. Outer Chute – The protection layer
Electro glass of low alkalic content at softening point of over 800 degree Celsius. Temperature limit for continuous use 550-600 degrees Celsius. This material provides a shield from flame, whose sole function is to protect the two underlying chutes from fire.
 - 4.2. Middle Chute – The braking layer
Modacryl and Elastomer (lycra) at softening point of 165 degree Celsius. This elastic material, covering inner chute that enables the user to control his/her speed of descent. The important properties of this material are its modulus of elasticity (260%) and its withstanding temperatures of 165 degrees Celsius.
 - 4.3. Inner Chute – The friction layer
Interlayer Para Aramid, warp and vet Vinyl Chloride fibres. Strength ISO 5081 (N) 3482 stripes 50mm and its tensile strength ISO (N) 10mm stripes support the chute. No softening point, decomposing temperature at about 500 degree Celsius. Evacuees slide down the chute through this inner layer, which bears the tensile stress, and have extremely low friction coefficient to minimize friction burns or chafing.
4. Each fire snap hook of galvanized steel lock as lengthening joints on each segment of chute to prolong and shorten the chute length can carry 260kg load. Each end of lengthening joints for one segment of chute consisting of 12 sets of fire snap hooks for easy connection to the next segment of chute.
 5. Additional Equipment – 1 set (2 pcs) of 100% aluminium extendable vertical legs, horizontal arms and hydraulic jacks. The complete set make it possible to combine use with the aluminium platform from the parapet of balconies and window for rescue..

(C) Descent and Safety

1. The system works on the principle of gravity, using the stress and friction on the body as it slides down. Usability for all people, regardless of body size, shape and weight, injured on stretcher and unconscious people can use the chute. Once inside the chute the evacuee will arrive at ground level quickly and relatively safely.
2. For conscious evacuees, the users allow themselves to slide down and can has good grip to control their speed by simply creating bulges by pushing out their elbows or knees. For a more rapid descent, the users keep their body as straight as possible. No other method of evacuation allows for such flexibility in control of descent speed: average speed for evacuee with right behaviour is about 2.5 m per second, which may vary from 0 – 5 m per second. It would take approximately 35 – 40 seconds to descend a chute of up to 50 metres and capable of conveying up to 30 persons per minute from any storey to safety.
3. For safety reasons, the SOP requires a helper at the ground to control a fast descend and guide the user out of the chute exit point quickly. By twisting and slowly untwisting the chute, slow down the speed of descending. This method also enables injured on stretcher, unconscious or disabled people and small children to be transported down safely.

(D) Storage of Chute:

1. The chutes are folded up inside its protective container and portable bag(s), provide year round weather protection, ready for immediate deployment.
2. After use, the chute can be re-stored back into its container and portable bag(s) ready for use in just a few minutes.
3. Whilst not in use, the chute is protected from dampness, salt in the air and chemical agents, by a thin 25/100 PVC layer which must be checked at least twice a year.

(E) Certification:

Materials used for chute construction are of EU standards. INGSTROM Escape Chute tested by The Josef Tuliszkowski Scientific and Research Centre for Fire Protection, Warsaw, Poland, and is approval for use as "escape chute".