

**Annexure-7: Fire proof sealing system (FPS)**

- 1.1 Fire proof sealing system shall consist of
- (i) Fire-stops/fire-seals for sealing of cable/cable tray and conduit/pipe penetrations, both horizontal and vertical, through brick or RCC walls/floors, to prevent the spread of fire from one area, which is separated from others by fire-resistant barriers.
  - (ii) 'Fire-breaks' provided on long runs of cable racks/trays to prevent the propagation of fire along the cable rack, within a single fire-area or fire- zone.
- 1.2 The FPS system shall also include all the necessary accessories and equipment required for supporting, holding in position, fixing and installation of the fire-stop/fire-break.
- 1.3 The FPS system shall comply in all respects with the requirements of the codes and standards listed below

IEEE-634  
ASTM-E-814  
ANSI-IEEE-383  
IEC-331  
IEC-332

1.4 Fire Stop/Seal

The FPS system adopted for cables or cable trays penetrating through walls and floor openings, or cables passing through embedded conduits/pipes/ pipe-sleeves, constitutes a 'fire stop/seal', which is meant to prevent spreading of fire between areas separated by fire-resistant barriers.

1.5 Fire Break

The fire proofing system, other than fire-stops, adopted to retard flame propagation along long runs of horizontal or vertical cable trays in the same fire zone or area, in an event of a fire, shall constitute a 'fire-break' and shall be provided by applying a suitable fire-resistant coating on cables and cable trays for the required length, with or without a fire resistant panel, at the point of the fire break to obtain the fire-rating specified.

- Firebreaks shall be provided on both cable rack and trenches at all cable tray intersections and tee-offs.

- On linear runs of cable trays between fire stops or fire breaks, fire breaks shall be provided at intervals of 15 metres on horizontal cable runs and 5 m on vertical cable runs.
- Fire breaks in linear runs of cable trenches between intersections and tee-offs shall be provided at intervals of 30 metres.

1.8 Contractor shall furnish the test certificates for the fire stops and fire breaks after award of contract for Owner / Owner's Representative review. If the certificates are not satisfactory all the tests shall be conducted free of cost. The offered system i.e. fire stops and fire breaks shall be identical (or better) with the system which is successfully type tested for the specified rating i.e. the composition density of the material, thickness of coating in case of fire breaks and any other properties of the material / system offered shall be identical or better than the tested system and shall be subject to Owner / Owner's Representative approval.

1.9 **Performance Tests: Tests on Fire Stops**

(a) The fire stops shall be subjected to the following type tests:

- (i) Fire Rating Test
- (ii) Hose Stream Test

(b) Type tests shall be conducted on different fire stop test specimens described above as per IEEE-634. The sizes of the fire stop test specimens, shall be similar to the largest of the sizes being used in the plant.

(c) Preconditioning of fire stop test specimens

Before conducting the fire rating and hose stream tests, each test specimen shall be preconditioned for thermal ageing, water immersion and vibration.

(d) Test on Fire Stops

During the fire rating test, the transmission of heat through the cable penetration fire stop shall not raise the temperature on its unexposed surface above the self ignition temperature of the outer cable covering, the cable penetration fire stop material, or material in contact with the cable penetration fire stop, with a maximum temperature limit on the unexposed surface of 200°C.

(e) Tests on fire breaks

Firebreaks shall undergo the following tests as per ANSI-IEEE-383:

- (i) Ampacity test
- (ii) Flame test



#### **28.5.10. Name plates and external indicators**

For an easy identification, each detector and manual pull station shall be equipped with a nameplate showing at least line number, detector identification number and fire zone number.

#### **28.5.11. Fire barriers, assemblies and interior finish**

All fire barriers shall have fire resistant classification for minimum 4-hour exposure rating or as specified in applicable codes. Openings in such barriers should be provided with fire door assemblies, fire dampers, penetration seals (fire stops), or other approved means having a fire protection rating consistent with the designated fire resistance rating of the barrier. Penetration seals provided for any electrical and piping openings should meet the requirements of suitable rating in accordance with applicable ASTM or other International Standards. Cellular or foam plastic materials shall not be used as interior finishing material for subsurface structures and in areas critical to fire. Material shall be suitably tested as per International Standards prior to their usage for interior finish.

#### **28.6. Drawings, Documents and Design Calculations**

##### **28.6.1. Design memorandum**

The Contractor shall submit to Owner a design memorandum prepared in accordance to clause 1.6 "Record and Documentation" of "Section 1- General Technical Requirements."

##### **28.6.2. Drawings and documents**

The Contractor shall submit all the drawings and documents in accordance with requirements stipulated in "Section 2 - Technical Documents" of "General Technical Specification (GTS)".

These drawings and documents shall include at least the following:

- ◆ Fire risk evaluation report, based on the plant's specific considerations with respect to design, layout and anticipated operating requirements, containing a detailed list of recommendations, based on acceptable means and standards, for separation, control of hazards, control or elimination of ignition sources and suppression of fire,
- ◆ Applicable codes, standards and other design criteria to which the system is required to comply,
- ◆ Fire risk evaluation in tabulated form with details of type of fire suppression system, annunciator locations and type of fire alarm system with types of initiating devices, notification appliances etc. to be provided clearly demarcating the fire area boundaries,