|  |  |
| --- | --- |
| 1.0 | **GENERAL notes for passive fire protection system** |
| 1.1 | **general** |
|  | .1 | firestop system shall be designed as per astm or en standard. the firestop system must be tested based on astm standard or european standard. must be provided ul or eta approval once the system testing is done by approved third party. suppliers to submit that information. Working life of the firestop system shall be 30 years. The firestop system shall be tested under: |
|  |  | **.1.1 penetrationS application**  |
|  |  | 1. TEST STANDARD- **UL 1479** FOR THROUGH PENETRATION OR- **EN 1366-3** FOR THROUGH PENETRATION
2. **INTUMESCENT** MATERIAL
 |
|  |  | **.1.2 JOINTS APPLICATION** |
|  |  | 1. TEST STANDARD- **UL 2079** FOR CONSTRUCTION JOINTOR- **EN 1366-4** FOR CONSTRUCTION JOINT
2. AGEING TEST
3. MOLD AND MILDEW PERFORMANCE
4. RAIN RESISTANCE
5. WATER TIGHTNESS
 |
| 1.2 | **QUALITY ASSURANCE** |
|  |  .1 |  Firestop system installation shall conform to requirements of qualified designs or manufacturer approved modifications, as supported by engineering reports. |
|  | .2 | Install firestop materials, and systems as required under by-laws UBBL 1984 and by these Contract Documents and accepted for use by Director General of Fire Services (D.G.F.S.) or Bomba. |
|  | .3 | Submit manufacturer’s product data, letter of certification, or certified laboratory test report that the material or combination of materials (firestop system) meets the requirements specified in accordance with the applicable referenced standards. |
| .4 | The firestop compound shall not contain any harmful solvents or inorganic fibers. The penetration seal material must be unaffected by moisture and must maintain the integrity of the floor or wall assembly for its rated time period when tested in accordance with D.G.F.S. requirement. |
| .5 | To prepare and demo the products and application on site for comments by the Architect and other project consultants. |
| 1.3 | **FIRESTOPPING** |
|  | .1 | Provide firestop compounds for caulk, pour, wrap, seal, trowel or pump application. Material must be capable of sealing openings around single or multiple pipes against fire, smoke and toxic gases, and maintaining the required fire rating with a thickness no greater than the structure. |
|  | .2 | Provide a firestop system consisting of a material, or combination of materials, to retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke or gases through penetrations in fire-rated barriers. It shall be used in specific locations as follow:- |
|  |  | i | Penetrations for the passage of pipings and ducts through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor slabs and floor / ceiling assemblies), and vertical service shafts. |
| ii | Locations where specified in other section of these specifications. |
| 1.3 | **SUBMITTALS** |
|  | .1 | Submit shop drawings, product data, and manufacturer’s installation instructions for all materials and prefabricated devices, providing descriptions sufficient for identification at the job site. |
|  | .2 | Submit shop drawings showing proposed material, reinforcement’s anchorage, fastenings, and method of installation. Construction details shall accurately reflect actual job conditions. |
|  | .3 | Submit Material Safety Data Sheets with product delivered to job site. |
|  | .4 | Submit complete details of each type of penetration to be used indicating the proper local authority or Uniform Laboratory (U.L.) approved firestop system. |
|  | .5 | To submit 5 years Jointly and Severally Warranty by the Main Contractor, product manufacturer and installer; and Forms C1, C 2 and C3 for Bomba. |
| 1.4 | **SUBMISSIONS** |
|  | .1 | Information Required in Tender ReturnIf The Tenderer is submitting other Proprietary Made For the Architect’s Consideration As Approved Equivalent:-The Tenderer shall provide the following information within the tender submission:- |
|   |  | i | Statement of compliance with the fire specification |
|  |  | ii | Data sheets of the proposed fire rated seal for the fire compartmentation. |
|  |  | iii | Acoustic, water tightness and fire rated test reports for the proposed fire rated sealant tests performed at an accredited an independent test laboratory. |
|  |  | iv | Current Jabatan Bomba dan Penyelamat Malaysia Fire Certificate. |
|  |  | v | Local Commercial Project Reference. |
|   |  .2 |  Information Required in Post TenderAfter award of the contract, the passive fire protection system contractor shall submit the following information for approval by the Architect: |
|  |   |  i | Detailed shop drawings |
| ii | A detailed construction and installation program |
| ii | Confirmation of compliance to the original specification prior to commencement on site. |
| iii | Construction method statement |
| iv | Commissioning test report showing compliance with the performance specification. |
| v | C1, C2 and C3 documentation for submission to Jabatan Bomba dan Penyelamat Malaysia |
| 1.5 | **elements of firestop inspections:** |
|  | .1.2.3.4.5.6.7.8.9 | firestop systems must not be concealed from view before being inspected and approvedconstruction documents detailling the firestop locations and systems must be kept on site to assist in the conduct of inspectionfirestop installation shall be performed by personnel trained to install the system per the manufacturer’s printed installation instructions (mpii), as included in the material packaging. the contractor shall arrange for a manufacturer’s representative to provide onsite installation training for firestop and the training record must be submitted for approval.mock-up installation need to be done before commencement of work.insure a reasonable degree of workmanship, which would indicate compliance with the specified design.walk through visual inspections should be made during rough and final inspections with appropriate tools such as flashlight etc. visual inspections shall be conducted only when requested by consultant or architect. this visual inspection should include architects, consultant installer and supplier representative.when necessary or required, destructive evaluation will be made with approval from related parties.official visual inspection should be generated for documentation purposes.contractor to perform the defect works after inspection based on suppliers’ rectification recommendation |

**Schedule of Firestop Application**

| **CATEGORIES** | **TYPES OF APPLICATIONS** | **ADDITIONAL PROPERTIES** | **OPENING SIZE** | **FIRE-RATED BASE MATERIAL1** | **FIRE RESISTANCE RATING** | **APPLICABLE PRODUCTS** |
| --- | --- | --- | --- | --- | --- | --- |
| Through-penetration fire-stopping | Non-combustible (metal) pipes penetration | Non-insulated | Outside Diameter (OD) ≤ 200mm | Wall/ Floor | 2 hours/ 4hours | Silicone Firestop Sealant (CP601S) |
| Outside Diameter (OD) ≤ 600mm[Outside Diameter (OD ≤ 200mm copper pipe] | 4 hours/ 4 hours [2 hours] | Flexible Acrylic Firestop Sealant (CP606) |
| Insulated | Outside Diameter (inclusive of insulation) ≤ 50mm | Wall/ Floor  | 4 hours/ 4 hours | Intumescent Firestop Sealant (FS-ONE MAX) |
| 50mm < Outside Diameter (inclusive of insulation) ≤ 160mm | Intumescent Firestop Wrap (CP 648E) |
| 160mm < Pipe outside diameter (inclusive of insulation) ≤ 250mm | Intumescent Firestop Collar (CP 644/CP 634N) |
| Combustible pipes penetration, e.g. uPVC, PVC, ABS, CPVC, PVDF, PP, FRPP, etc. | Non-insulated | Outside Diameter (OD) ≤ 50mm | Wall/ Floor  | 4 hours/ 4 hours | Intumescent Firestop Sealant (FS-ONE MAX) |
| 50mm < Outside Diameter (OD) ≤110mm | Intumescent Firestop Wrap (CP 648E) |
| 110mm < Outside Diameter (OD) ≤ 250mm | Intumescent Firestop Collar (CP 644/CP 634N) |
| Insulated | Outside Diameter (OD) ≤ 50mm | Wall/ Floor  | 4 hours/ 4 hours | Intumescent Firestop Sealant (FS-ONE MAX) |
| 50mm < Outside Diameter (OD) ≤ 160mm | Intumescent Firestop Wrap (CP 648E) |
| 160mm < Outside Diameter (OD) ≤ 250mm | Intumescent Firestop Collar (CP 644/CP 634N) |
| Air Conditioner Damper |  | Max opening of 800mm x 800mm | Wall/Floor | 4 hours | Cementitious Based Firestop Mortar (CP636) / Fire Safety Coating (CP 670) |
| Multiple penetrations, trunking, cable tray penetration and main shaft riser | Non-load bearing | Max opening of 1200mm x 2000mm  | Wall  | 2 hours | Fire Safety Coating (CP 670) / Stainless Steel Composite Sheet (CFS-COS) |
| Max opening of 1200mm x 5000mm | Floor | 2 hours | Cementitious Based Firestop Mortar (CP636) / Stainless Steel Composite Sheet (CFS-COS) |
| Max opening of 600mm x 1150 mm  | Wall/Floor | 4 hours/ 4hours | Cementitious Based Firestop Mortar (CP636) |
| Max opening of 450mm x 450mm | Wall/ Floor  | 2 hours/ 2 hours | Firestop Expansion Foam (CP660) |
| Cable and cable bundle penetrations | Fixed | Max opening of 160mm diameter | Wall/Floor | 4 hours/ 4 hours | Intumescent Firestop Sealant (FS-ONE MAX) |
| Adjustable | Max opening of 122mm diameter | Wall/Floor | 3 hours/ 3 hours | Firestop Speed Sleeve (CP 653 BA) |
| Multiple penetrations | Fixed & Adjustable | Large openings | Wall/ Floor  | 4 hours/ 4 hours | Intumescent Firestop Block (CFS-BL) |
| Clean room application |  |  | Wall/ Floor  | 4 hours/ 4 hours | Intumescent Firestop Block (CFS-BL), Firestop Expansion Foam (CP 660), Speed Sleeve (CP 653 BA) and S/S Composite Sheet (CFS-COS) |
| Fire rated construction joints | Top of wall joints, floor-to-floor joints, floor-to-wall joints, wall-to-wall joints | Movement capability of up to ±12.5% | Max gap width 100mm | Wall/ Floor | 4 hours | Elastomeric Silicone Firestop Sealant (CP601S) |
| Lift door/ door frame | Easily mouldable |  | Wall | 2 hours | Flexible Acrylic Firestop Sealant (CP606) |
| Perimeter barrier | Fire-rated curtainwall perimeter joints | Movement capability of up to ±25% | Max joint width 200mm | Curtain wall horizontal & vertical joint | 2 hours | Firestop Joint Spray (CFS-SP WB/CFS-SP SIL) |
|  |  | Max joint width 100mm |  | 4 hours | Elastomeric Silicone Firestop Sealant (CP601S) |

1 Fire-rated base material is typically concrete wall or floor unless otherwise stateD

**Table of Additional Attributes of Firestop Products**

|  |  |
| --- | --- |
| **Attributes** | **FIRESTOP PRODUCTS** |
| **Elastomeric Silicone Firestop Sealant** (CP601S) | **Flexible Acrylic Firestop Sealant** (CP606) | **Intumescent Firestop Sealant** (FS-ONE MAX) | **Cementitious Based Firestop Mortar** (CP636) | **Gypsum Based Structural Grade Firestop Mortar** (CP637) | **Intumescent Firestop Collar (**CP644 / CP634N) | **Intumescent Firestop Wrap** (CP648E) | **Firestop Expansion Foam** (CP660) | **Fire Safety Coating** (CP670) | **Intumescent Firestop Block**(CFS-BL) | **Firestop Speed Sleeve** (CP653 BA) | **Stainless Steel Composite Sheet** (CFS-COS) | **Firestop Acrylic Joint Spray** (CFS-SP WB) | **Firestop Silicone Joint Spray**(CFS-SP SIL) |
| Acoustic Insulation[[1]](#footnote-1) | ✓ | ✓ | ✓ | ✓ | ✓ |  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Gas Tightness | ✓ | ✓ |  | ✓ | ✓ |  |  |  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Movement Capability | ±25% | ±12.5% |  |  |  |  |  |  |  |  |  |  | ±25% | ±12.5% |
| Water Tightness | ✓ | ✓ | ✓ | ✓ | ✓ |  |  |  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Ageing Resistance[[2]](#footnote-2) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Rain Resistance | ✓ | ✓ |  |  |  |  |  |  | ✓ |  | ✓ | ✓ | ✓ | ✓ |
| Mold & Mildew Resistance[[3]](#footnote-3) | Rating 0 | Rating 0 | Rating 0 | Rating 1 | Rating 1 | Rating 0 | Rating 0 | Rating 0 | Rating 0 | Rating 0 | Rating 0 | Rating 0 | Rating 0 | Rating 0 |
| Electrical Resistance | ✓ | ✓ | ✓ | ✓ |  |  |  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Green Building Product | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

 Firestop systems are tested for airborne and structure borne sound insulation. For airborne sound insulation, it is tested based on ISO140 and they are rated between STC45-STC55.

2 Firestop systems are subjected to ageing resistance test that simulates a service life of approximately 30 years.

3 Mold and mildew resistance are tested based on ASTM G-21 whereby material is rated between 0 to 4, with 0 exhibits no attack by fungi.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **END OF SECTION**  |

1. [↑](#footnote-ref-1)
2. [↑](#footnote-ref-2)
3. [↑](#footnote-ref-3)