# Electrical Passive Fire Protection for Paper Mills

*Substations · Cable Galleries · Control Rooms · Safety-Critical Circuits*

## Section A | Electrical Zone-Wise Fire Risk Map

### A1. Substations, MCC Rooms & Cable Galleries

Main substation, CPP electrical backbone, paper-machine MCCs, recovery boiler control room, bleach plant electrical (corrosion-resistant spec), and CCR.

| Area | Fire Scenario | Stanvac PFP Product Application | Rating / Priority |
|---|---|---|---|
| Main substation | Transformer + cable fire | Cable coatings, firestops, panel FP | **Critical** |
| CPP electrical room / turbine control | Full CPP fire exposure | Cable coatings, firestops, panel FP, structural intumescent | **Critical** |
| CPP transformer yard | Transformer oil fire | Fire walls with firestopped penetrations, cable wraps | **3 hr / Critical** |
| Recovery boiler control panels | Smelt-water explosion exposure | Panel FP, cable coatings | **Critical** |
| Paper machine basement / MCC | Lube oil fire exposure | Cable coatings, FR trays, firestops | **Critical** |
| Digester house MCC | $H_2S$ + oil fire | Panel FP, cable coatings | **High** |
| Bleach plant ($ClO_2$) panels | $ClO_2$ + corrosive exposure | Panel FP (corrosion-resistant), cable coatings | **High** |
| Cable tunnels / galleries | Propagating cable fire | Cable coatings + transverse firestops every 30 m | **Critical** |
| CCR / DCS | Panel + cable fire | Panel FP, firestops, FR doors | **Critical** |

| Area | Fire Scenario | Stanvac PFP Product Application | Rating / Priority |
|---|---|---|---|
| Battery / UPS room | $H_2$ accumulation | Firestops, FR doors, panel FP | **High** |

### A2. Safety-Critical Electrical Systems

| Area | Fire Scenario | Stanvac PFP Product Application | Rating / Priority |
|---|---|---|---|
| Fire water pump house | Must survive the fire it fights | Fireproofed structure, FR cables | **Non-negotiable** |
| Recovery boiler ESD (BLRBAC-mandated) | Trip circuit integrity | Fire-survival cable, panel FP | **Non-negotiable** |
| CPP turbine ETS protection | Trip circuit integrity | Fire-survival cable | **Non-negotiable** |

## Section B | Product-to-Application Matrix

This section maps each of the four priority Stanvac product lines to the specific paper mills locations and circuits where they must be specified. Use these tables to build the bill of quantities (BOQ) for any paper mills opportunity.

### B1. Cable Coatings — Fire Propagation Prevention

*Minimum 240 minutes protection, thickness ≤ 1.6 mm DFT.*

Purpose: prevent the spread of fire along cable trays, risers and bunches. The "Browns Ferry" scenario — one cable igniting an entire cable gallery — is the design basis.

**Applicable standards:** IEC 60332-3 (FM 3971 has limited use — it provides only short-duration protection against arcs and sparks)

| Zone | Specific Application | Priority |
|---|---|---|
| CPP cable tunnels | All HT and LT trays + transverse firestops every 30 m | **Critical** |
| Main substation cable gallery | Incoming and outgoing | **Critical** |
| Paper machine basement cable trays | Lube oil fire exposure | **Critical** |
| Recovery boiler cable trays | All boiler process cables | **Critical** |
| Digester house cable routes | All process cables | **Critical** |

| Zone | Specific Application | Priority |
|---|---|---|
| Warehouse perimeter cable routes | Lighting + sprinkler system | **High** |
| Bleach plant cable routes (corrosion-resistant) | All $ClO_2$ area cables | **High** |
| Broke handling cable routes | Motor and conveyor | **High** |
| DG room cable entries | Start, alternator, control | **Critical** |
| Lime kiln cable routes | Burner and control | **High** |

## B2. Cable Coatings — Fire Survivability

*240-minute circuit integrity, thickness ≤ 1.6 mm DFT.*

Purpose: keep the cable electrically functional while burning, so the safety circuit continues to operate through the fire event. Fire-survival coatings are specified where loss of the circuit would defeat the fire-fighting or shutdown system itself.

**Applicable standards:** IEC 60331-21 and IS 17505-1

| Circuit Type | Where Applied | Priority |
|---|---|---|
| Recovery boiler emergency shutdown (ESD) | BLRBAC-mandated safety trip | **Non-negotiable** |
| Black liquor high-solids trip | Liquor flow and concentration safety | **Non-negotiable** |
| Fire water pump power (electric + diesel) | Switchgear to motor | **Non-negotiable** |
| Paper machine e-stop & guard interlock | Machine safety circuits | **Critical** |
| Digester safety circuits | Blow valve, pressure relief | **Critical** |
| Emergency DG start & transfer | Battery to engine panel | **Critical** |
| Emergency lighting + PA / GA | Plant-wide egress | **Critical** |
| F&G detection ($H_2S$, $Cl_2$) | Detector to F&G panel | **Critical** |
| UPS feeders to DCS / SIS | UPS to marshalling | **Critical** |
| CPP turbine trip circuits | ETS system | **Non-negotiable** |

## B3. Electrical Panel Fireproofing

Purpose: protect field control panels, junction boxes, MCC panels and logic cabinets from external fire and internal electrical fire. Stanvac offers three complementary solutions under this product line.

| Option | Stanvac Solution | Description & Typical Use |
|---|---|---|
| **A** | Two-hour rated firestop sealant | For sealing cable gland openings, panel cut-outs, conduit entries and small penetrations at the panel boundary. Silicone / acrylic intumescent sealant certified to UL 1479 / IS 12458 at 2-hour rating. |
| **B** | Non-combustible intumescent paint | For external coating of panel enclosures, cable glands and junction boxes exposed to radiant heat or hydrocarbon fire. Non-combustible base with intumescent top-coat. |
| **C** | Two-hour rated intumescent translucent coating for small-dia. cables (aerosol spray) | Aerosol-delivered translucent intumescent coating for small-diameter instrumentation, control and signal cables entering panels. Clean application in congested panel interiors; 2-hour rated. |

## B4. Two-Hour Rated Firestop Barriers

*Hybrid combination of mineral wool and firestop mortar.*

Purpose: seal every penetration through a fire-rated wall, floor or cable tunnel so compartmentation is maintained. Stanvac's hybrid system combines high-density mineral wool (for bulk void filling and thermal insulation) with firestop mortar (for load-bearing, smoke-tight surface seal). This dual-material approach delivers superior 2-hour rating performance across a wider range of penetration sizes than single-material systems.

**Applicable standards:** UL 1479 · ASTM E814 · IS 12458

| Location | Specific Application | Priority |
|---|---|---|
| Recovery boiler building boundary | Cable, pipe, duct penetrations | **Critical** |
| Paper machine hood to adjacent area | Cable and pipe penetrations | **Critical** |
| Pulp & paper warehouse perimeter | Every wall, floor, duct penetration | **Critical** |
| Bleach plant compartment walls | Corrosion-resistant firestops | **Critical** |
| CPP boundary | Cable and pipe penetrations | **Critical** |
| Main substation cable trench to building | Sand-seal + firestop pillows + mortar | **Critical** |
| Cable tunnel transverse barriers | Every 30–50 m | **Critical** |
| Digester house boundary | Cable and pipe penetrations | **Critical** |

| Location | Specific Application | Priority |
|---|---|---|
| DG room boundary | Fuel and cable penetrations | **Critical** |
| Fire water pump house entries | Power and control cable penetrations | **Non-negotiable** |
| HVAC duct penetrations | Fire dampers + collar seals | **High** |

*Detailed product data sheets, certifications, specimen specifications and project BOQ support are available on request.*

**For more information, please connect with us.**

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