Electrical Passive Fire Protection for Composite Cement Plants

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

Section A | Electrical Zone-Wise Fire Risk Map

A1. Substations, MCC Rooms & Cable Galleries

Main HT substation, mill-specific MCC rooms (with coal mill and PC silo as highest risk), plant-wide cable tunnels and the central control room (CCR).

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
Main 33/11 kV HT substation	Transformer + cable fire	Cable coatings, firestops, fire walls, fire-rated doors	**2-3 hr / Critical**
Coal mill MCC & control room	Pulverized coal fire / deflagration, lube oil fire	Panel FP, cable coatings, firestops at mill room	**Critical**
Pulverized coal silo cable routing	Hot-spot + CO build-up fire	Intumescent cable coating, firestops at silo penetrations	**Critical**
Unit MCC rooms (kiln, raw mill, finish mill)	Cable + panel fire, arc flash	Panel FP, cable coatings, firestops	**2 hr / Critical**
Preheater tower cable risers	Hot-spot cable fire on tower structure	Intumescent cable coating on risers	**High**
Cable tunnels / main cable galleries	Propagating cable fire	Cable coatings + transverse firestops every 30 m	**Critical**
WHR / CPP electrical building (where present)	Cable + transformer fire	Cable coatings, firestops, panel FP	**Critical**
Central control room (CCR / DCS)	Panel + external cable fire	Panel FP, firestops, FR doors	**2 hr / Critical**

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
Battery / UPS room	H_2 accumulation	Firestops, FR doors, panel FP	**2 hr / High**

A2. Safety-Critical Electrical Systems

Fire water pumps, kiln ESD, and coal-mill inerting / CO monitoring circuits must all survive the fire event.

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
Fire water pump house (electric + diesel)	Must survive the fire it fights	Fireproofed structure, FR cables, firestops	**Critical**
Kiln ESD & coal mill inerting circuits	Inerting valve actuation + trip logic	Fire-survival cable coating	**Non-negotiable**
PC silo hot-spot detection & discharge	CO / temperature monitoring to panel	Fire-survival cable, panel FP	**Non-negotiable**

Section B | Product-to-Application Matrix

This section maps each of the four priority Stanvac product lines to the specific composite cement plants locations and circuits where they must be specified. Use these tables to build the bill of quantities (BOQ) for any composite cement plants 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
Coal mill & PC silo cable galleries	All cable trays in coal mill building and PC silo structure	**Critical**
Preheater tower cable risers	Vertical cable trays on tower structure	**High**
Main substation cable gallery	Incoming and outgoing HT and LT trays	**Critical**

Zone	Specific Application	Priority
Cable tunnels (SS to CCR, SS to mills)	Full-length coating + transverse firestops every 30 m	**Critical**
Overhead cable trays in process area	Trays above kiln line, mills, packing	**High**
CCR under-floor cable void	All incoming cables	**High**
Packing plant & dispatch cable routes	Motor & control cables	**Medium**
Clinker cooler cable trays	Overhead trays exposed to hot-clinker radiant heat	**High**
Alternative fuel (RDF / tyre) cable routes	All AFR plant cables	**High**
WHR / CPP cable trays (if present)	Boiler and TG area	**Critical**

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
Coal mill inerting / CO_2 flood system	Inerting valve actuation + CO monitoring	**Non-negotiable**
Pulverized coal silo hot-spot detection	CO / temperature monitoring to panel	**Non-negotiable**
Kiln emergency shutdown (ESD)	Field SDVs to CCR logic	**Non-negotiable**
Fire water pump power	Switchgear to motor	**Non-negotiable**
Main DG start & transfer circuits	Battery to engine panel	**Critical**
Emergency lighting + PA / GA	Egress routes plant-wide	**Critical**
F&G detection (if AFR with gas exposure)	Detector to panel to CCR	**Critical**
Kiln critical instrumentation to DCS	Temperature, draught, O_2	**Critical**
UPS feeders to DCS, SIS	UPS to marshalling panels	**Critical**

Circuit Type	Where Applied	Priority
Compressed air safety valves to CCR	PSV feedback and solenoid power	**High**

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
Coal mill room to adjacent area	Wall penetrations and doorway transits	**Critical**
PC silo base and cable entries	Cable + instrumentation penetrations	**Critical**
Main substation cable trench to building	Sand-seal + firestop pillows + mortar	**Critical**
Wall between MCC and switchgear rooms	Cable and cable-tray penetrations	**Critical**
Cable tunnel transverse barriers	Every 30–50 m + at each end	**Critical**

Location	Specific Application	Priority
CCR external wall cable entries	Marshalling cable bundles	**Critical**
CCR under-floor void boundary	Slab penetrations + void sealing	**Critical**
Battery / UPS room boundary	Cable and ventilation duct penetrations	**High**
Fire water pump house entries	Power and control cable penetrations	**Critical**
DG room boundary	Fuel line, cable, and exhaust penetrations	**Critical**
AFR building compartment boundaries	Cable and conveyor penetrations	**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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