

## Electrical Passive Fire Protection for Integrated Steel Plants

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

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

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

Central and unit-wise receiving substations, MCC rooms serving cast house, BOF, rolling mills, CPP auxiliaries, plus plant-wide cable tunnels and central / unit control rooms. External molten metal splash and hot gas exposure combine with large internal cable loads.

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
Main 220/132 kV receiving substation	Transformer + cable fire	Cable coatings, firestops, panel FP, fire-rated doors	<b>2-3 hr / Critical</b>
CPP unit substation & switchyard interface	Transformer + cable fire	Cable coatings, firestops, fire walls	<b>Critical</b>
Cast house MCC (BF, BOF)	Molten splash + arc flash, hydraulic oil fire	Intumescent panel gaskets, FR cable trays, firestop mortar	<b>Critical</b>
Rolling mill MCC (HSM, CRM)	Hydraulic oil fire, arc flash	Cable coatings, FR trays, firestops	<b>Critical</b>
Plant-wide cable tunnels & galleries	Propagating cable fire	Intumescent cable coating, transverse firestops every 30 m	<b>3 hr / Critical</b>
Overhead cable racks in cast house / mills	Molten splash, radiant heat	Intumescent cable coating, ablative wraps	<b>Critical</b>
CPP transformer yard	Transformer oil fire	Fire walls with firestopped penetrations, cable wraps	<b>3 hr / Critical</b>
Unit control rooms (BF, BOF, CCM, HSM) + CCR	External heat / explosion + internal panel fire	Blast & fire-rated panels, firestops, FR doors	<b>2 hr / Critical</b>

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
Battery / UPS rooms	H <sub>2</sub> accumulation, thermal runaway	FR doors, firestops, panel FP	2 hr / High

## A2. Safety-Critical Electrical Systems

Plant-wide fire water pumps, ESD / F&G loops at BF & gas holder farm, and CPP turbine trip 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	2-3 hr / Critical
ESD / F&G cable routing (gas holders, BF, BOF)	Circuit integrity during fire	Fire-survival cable coating, FR trays	IEC 60331 / BS 6387 CWZ / Non-negotiable
CPP turbine trip & protection	Trip valve + protection relay power	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 integrated steel plants locations and circuits where they must be specified. Use these tables to build the bill of quantities (BOQ) for any integrated steel 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
CPP cable tunnels	All HT and LT trays + transverse firestops every 30 m	Critical
Main receiving substation cable gallery	Incoming EHV and outgoing feeder trays	Critical
Cast house overhead cable trays	Exposed to molten metal splash + radiant heat	Critical
Rolling mill basement cable trays	Bottom-of-pit cable bunches in oil cellars	Critical

Zone	Specific Application	Priority
Gas plant cable routing (BFG, COG, LDG)	Trays through gas-exposure zones	Critical
Unit MCC cable trenches (BOF, CCM, HSM, CRM)	Bottom-entry cable bunches	High
Cold rolling & pickling cable routes	Acid + fire exposure	High
Sinter plant cable galleries	Conveyor and process cable bunches	High
Coal handling cable routes to CPP	Conveyor galleries and transfer towers	High
Oxygen plant (ASU) cable routing	All O <sub>2</sub> -exposure zones	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
ESD / emergency stop loops (plant-wide)	Field SDVs to logic solver to CCR	Non-negotiable
F&G detection circuits	HC / CO gas detectors to F&G panel	Non-negotiable
Fire water pump power (electric + diesel)	Switchgear to motor; battery to diesel	Non-negotiable
CPP turbine emergency trip circuits	Over-speed, lube-oil-low, vibration	Non-negotiable
Coke oven gas safety shut-off valves	SSV solenoid actuation	Critical
BF cooling water safety circuits	Cooling water low-pressure trip	Critical
Emergency DG start circuits	Battery to starter panel	Critical
Emergency lighting + PA / GA plant-wide	Egress routes and CCR	Critical
UPS feeders to DCS and SIS	UPS to marshalling panels	Critical
Rolling mill e-stop and interlock	Safety PLC I/O to field	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
<b>A</b>	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>B</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.
<b>C</b>	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
CPP control building cable entries	Sand-seal + firestop pillows + mortar	<b>Critical</b>
Wall between MCC and switchgear rooms (all plant MCCs)	Cable + tray penetrations	<b>Critical</b>
Floor slab penetrations in multi-floor substations	Cable, tray, conduit, busduct openings	<b>Critical</b>
Cable tunnel transverse barriers	Every 30–50 m + at both ends	<b>Critical</b>
CCR under-floor void boundaries	Slab penetrations + void sealing	<b>Critical</b>
Battery / UPS room perimeters	Cable + ventilation duct penetrations	<b>High</b>

Location	Specific Application	Priority
Transformer bay fire wall penetrations	HT/LT + control cable openings	<b>Critical</b>
Fire water pump house entries	Power + control cable penetrations	<b>Critical</b>
Coke oven gas main building penetrations	Gas-leak containment	<b>Critical</b>
Rolling mill basement to ground-floor slab	Trench and riser openings	<b>Critical</b>
HVAC duct penetrations in CCR / MCC	Fire dampers + collar seals	<b>High</b>

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

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

*Stanvac Chemicals India Ltd · Passive Fire Protection Division*