Electrical Passive Fire Protection for Iron Ore Mining Operations

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

Section A | Electrical Zone-Wise Fire Risk Map

A1. Substations, MCC Rooms & Cable Galleries

Main substation, crusher / screen plant MCCs, conveyor gallery drive panels, workshop MCC, and the SCADA / dispatch control room.

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
Main 33/11 kV substation	Cable + transformer fire	Cable coatings, firestops, panel FP	**Critical**
Crusher / screen plant MCC	Belt fire + motor fire	Panel FP, cable coatings, firestops	**High**
Conveyor drive head-end panels	Belt fire exposure	Panel FP, cable coatings	**Critical**
Stacker / reclaimer control panels	Cable + motor fire	Panel FP, cable coatings	**High**
HEMM workshop MCC	Lube oil fire exposure	Panel FP, firestops	**High**
Fuel tank farm control panels	Pool fire + radiant heat	Panel FP, firestops	**High**
SCADA / dispatch control room	Panel + cable fire	Panel FP, firestops, FR doors	**High**
Weighbridge / communication panels	Cable fire	Panel FP	**Medium**
DG room	Fuel + lube oil fire	Panel FP, firestops	**High**

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

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	**Critical**
Conveyor emergency stop + belt-drift detection	Pull-cord + slip-sensor trip	Fire-survival cable	**Critical**
Fuel tank farm ESD	Tanker loading emergency trip	Fire-survival cable	**Critical**

Section B | Product-to-Application Matrix

This section maps each of the four priority Stanvac product lines to the specific iron ore mining operations locations and circuits where they must be specified. Use these tables to build the bill of quantities (BOQ) for any iron ore mining operations 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
Conveyor gallery cable trays (plant-wide)	All belt motor and control cables	**Critical**
Transfer tower cable bunches	At every transfer point	**Critical**
Main substation cable gallery	Incoming and outgoing	**Critical**
Crusher plant cable routes	Crusher motor and control	**High**
Cable tunnels (SS to CCR, SS to crushers)	Full-length coating + transverse firestops	**High**

Zone	Specific Application	Priority
Workshop cable routes	Welding, machining, lighting	**Medium**
HEMM parking area lighting cables	Floodlight and power	**Medium**
Fuel storage cable routes	Pump and level monitoring	**High**
Stacker / reclaimer cable routes	All travel and luff cables	**High**
DG room cable entries	Start, alternator, 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
Fire water pump power (electric + diesel)	Switchgear to motor	**Non-negotiable**
Emergency DG start & transfer	Battery to engine panel	**Critical**
Emergency lighting + PA / GA	Plant-wide egress	**Critical**
Conveyor emergency stop circuits	Pull-cord + belt-drift	**Critical**
F&G / methane detection (if coal-seam adjacent)	Detector to panel	**Critical**
Explosive magazine alarm circuits	Security + smoke detection	**Critical**
Crusher / screening safety interlocks	Over-load + tramp metal	**High**
Fuel tank farm ESD	Tanker loading trip	**Critical**
UPS feeders to SCADA	UPS to marshalling	**High**
Fire pump controller signalling	Auto-start circuit	**Critical**

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
Main substation cable trench to building	Sand-seal + firestop pillows + mortar	**Critical**
Conveyor transfer tower compartment walls	Cable, belt, duct penetrations	**Critical**
Workshop compartment walls	Cable and pipe penetrations	**High**
Fuel storage bund area penetrations	Pump and instrumentation	**High**
Cable tunnel transverse barriers	Every 30–50 m	**High**
CCR external wall cable entries	Marshalling bundles	**High**
Battery / UPS room boundary	Cable and ventilation duct penetrations	**Medium**
DG room boundary	Fuel and cable penetrations	**High**

Location	Specific Application	Priority
Fire water pump house entries	Power and control cable penetrations	**Critical**
HVAC duct penetrations	Fire dampers + collar seals	**Medium**

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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