

Electrical Passive Fire Protection for Coal Mining Operations

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

Section A | Electrical Zone-Wise Fire Risk Map

A1. Substations, MCC Rooms & Cable Galleries

UG flameproof substations and face-equipment panels, OC conveyor drive panels, surface main substation, and the CHP / dispatch control room.

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
UG substation chambers	Transformer + cable fire	Cable coatings (flameproof certified), firestops, flameproof panel FP	Critical
UG face equipment panels (LHD, SDL, CM, shearer)	Cable fire at longwall / shearer	Flameproof cable coatings, flameproof panel FP	Critical
UG main airway / return airway cables	Propagating cable fire (catastrophic in UG)	Flameproof cable coatings	Non-negotiable
UG pump chamber (dewatering)	Motor + cable fire	Flameproof panel FP, cable coatings	Critical
Surface main 33/11 kV substation	Cable + transformer fire	Cable coatings, firestops, panel FP	Critical
OC conveyor drive head-end panels	Belt fire exposure	Panel FP, cable coatings	Critical
CHP control panels	Belt + cable fire	Panel FP, cable coatings, firestops	Critical
Main fan / ventilation control panels	Must operate during fire	Panel FP	Non-negotiable

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
HEMM workshop MCC	Lube oil fire	Panel FP	High
SCADA / dispatch control room	Panel + cable fire	Panel FP, firestops, FR doors	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	Critical
Mine emergency withdrawal / escape circuits	UG escape lighting + PA	Fire-survival cable	Non-negotiable
Methane detection + auto-trip	Detector to panel to UG power trip	Fire-survival cable	Non-negotiable
Main fan + auxiliary ventilation	Fan continuity during fire	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 coal mining operations locations and circuits where they must be specified. Use these tables to build the bill of quantities (BOQ) for any coal 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
UG main airway + face cable (flameproof coating)	All UG cables — flameproof certified coating	Non-negotiable
UG substation chamber cables	All chamber cable bunches	Critical
Belt conveyor galleries (UG + OC)	All belt motor and control cables	Critical

Zone	Specific Application	Priority
OC transfer tower cable bunches	At every transfer point	Critical
Main substation cable gallery	Incoming and outgoing	Critical
CHP cable routes	All CHP cables	Critical
Cable tunnels (OC, SS to CHP)	Full-length coating + transverse firestops	Critical
HEMM workshop cable routes	Welding, machining	Medium
Fuel storage cable routes	Pump and level monitoring	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
Mine emergency withdrawal / escape circuits	UG escape lighting + PA	Non-negotiable
Methane detection + auto-trip	Detector to panel to UG power trip	Non-negotiable
Fire water pump power (electric + diesel)	Switchgear to motor	Non-negotiable
Emergency DG start & transfer	Battery to engine panel	Critical
Conveyor emergency stop + slip / drift	Pull-cord, belt-drift sensor	Critical
Main fan + auxiliary ventilation	Fan continuity during fire	Non-negotiable
Emergency lighting + PA / GA	Plant-wide + UG	Non-negotiable
Mine pump power (dewatering)	Flooding risk during fire	Critical
UPS feeders to SCADA	UPS to marshalling	High

Circuit Type	Where Applied	Priority
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
UG substation chamber boundaries	Flameproof cable + pipe penetrations	Non-negotiable
Main substation cable trench to building	Sand-seal + firestop pillows + mortar	Critical
Conveyor transfer tower compartment walls	Cable, belt, duct penetrations	Critical
CHP boundary	Cable and pipe penetrations	Critical
Cable tunnel transverse barriers	Every 30–50 m	Critical

Location	Specific Application	Priority
Workshop compartment walls	Cable and pipe penetrations	High
Fuel storage bund	Pump and instrumentation penetrations	High
Dispatch / control room boundary	Cable + HVAC penetrations	High
DG room boundary	Fuel and cable penetrations	High
Fire water pump house entries	Power and control cable penetrations	Critical
Main fan housing boundary	Duct and cable penetrations	Critical

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