Electrical Passive Fire Protection for Thermal Power Plants

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

Section A | Electrical Zone-Wise Fire Risk Map

A1. Substations, MCC Rooms & Cable Galleries

Main electrical building, cable tunnels / galleries (kilometre-scale), blast-resistant CCR, battery and UPS rooms, switchyard and GIS hall. Every one of the four Stanvac product lines is heavily used.

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
Main electrical room / switchgear building	Cable + switchgear fire	Cable coatings, firestops, panel FP	**Critical**
Cable tunnels / galleries (unit-wide)	Browns Ferry propagation	Cable coatings + transverse firestops every 30 m	**3 hr / Critical**
Central control room (CCR / DCS)	External propagation + panel fire	Panel FP, firestops, FR doors	**2 hr / Critical**
Unit control room (UCR)	Cable + panel fire	Panel FP, firestops	**Critical**
Battery room (220 V DC system)	H_2 accumulation	Firestops, FR doors, panel FP	**Critical**
UPS room	Thermal runaway	Firestops, FR doors, panel FP	**Critical**
Generator transformer (GT) / ST / UAT yard	Transformer oil fire	Fire walls with firestopped penetrations, cable wraps	**3 hr / Critical**
Switchyard / GIS hall	SF_6 leak + cable fire	Cable coatings, firestops, panel FP	**Critical**
Coal mill MCC & control	Pulverized coal fire, lube oil fire	Panel FP, cable coatings, firestops	**Critical**

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
Turbine hall electrical cabinets	Lube oil fire exposure	Structural intumescent + cable coatings overhead	**Critical**

A2. Safety-Critical Electrical Systems

Fire water pumps, emergency DG, turbine & boiler trip circuits, and transformer deluge controls are non-negotiable 240-min survival circuits.

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	**Non-negotiable**
Emergency DG sets	Fuel + lube oil fire, must start on demand	Panel FP, firestops, fire-survival cable	**Non-negotiable**
Turbine ETS + boiler BMS/FSSS protection	Trip circuits must survive fire	Fire-survival cable coating, panel FP	**Non-negotiable**
GT / ST deluge / foam system	Actuation during transformer oil fire	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 thermal power plants locations and circuits where they must be specified. Use these tables to build the bill of quantities (BOQ) for any thermal power 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
Cable tunnels — SS to UCR, SS to BTG	Full-length coating + transverse firestops every 30 m	**Critical**

Zone	Specific Application	Priority
Main electrical room cable galleries	All HT and LT trays	**Critical**
Boiler house cable trays (multi-elevation)	All trays on boiler structure	**Critical**
Turbine hall overhead cable trays	Trays above lube oil system	**Critical**
Coal mill & PF building cable routes	All mill and feeder cables	**Critical**
CHP gallery & transfer tower cables	Conveyor motor and control cables	**Critical**
Switchyard / GIS cable gallery	All incoming and outgoing HV	**Critical**
FGD cable trays	All FGD process cables	**High**
Ash handling cable routes	All AHP cables	**High**
Cooling water pump house cables	Power and control cables	**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
Turbine emergency trip system (ETS)	Over-speed, lube oil low, vibration, thrust	**Non-negotiable**
Boiler emergency trip (furnace safety)	Flame scanner, drum level, fuel trip valves	**Non-negotiable**
Generator protection & neutral earthing	Class A / B relaying	**Non-negotiable**
Fire water pump power (electric + diesel)	Switchgear to motor; battery to diesel	**Non-negotiable**
Emergency DG start & transfer	Battery to engine control panel	**Non-negotiable**
Deluge / foam system controls (GT, lube oil)	Solenoid and MOV actuation	**Non-negotiable**
F&G detection (H_2 in generator room)	Detector to F&G panel to CCR	**Non-negotiable**

Circuit Type	Where Applied	Priority
Coal mill inerting (CO_2 / N_2 flood)	Inerting valve actuation	**Critical**
Emergency lighting + PA / GA	Egress routes & CCR	**Critical**
UPS feeders to DCS, SIS, F&G	UPS to marshalling	**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
Cable tunnel transverse barriers	Every 30–50 m + at each end	**Critical**
Wall between MCC and switchgear rooms	Cable + tray penetrations	**Critical**

Location	Specific Application	Priority
Floor slab penetrations in multi-floor main electrical room	All cable, tray, conduit, busduct openings	**Critical**
CCR external wall cable entries	All incoming marshalling cable bundles	**Critical**
CCR under-floor void boundary	Slab penetrations + void sealing	**Critical**
Battery / UPS room boundary	Cable and ventilation duct penetrations	**Critical**
Transformer bay fire wall penetrations	HT/LT + control cable openings	**Critical**
Fire water pump house entries	Power and control cable penetrations	**Non-negotiable**
Emergency DG room boundary	Fuel line, cable, and exhaust penetrations	**Non-negotiable**
Coal mill building to adjacent areas	Wall + door penetrations	**Critical**
HVAC duct penetrations in CCR / battery / UPS	Fire dampers + collar seals	**Critical**

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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