Electrical Passive Fire Protection for Petrochemical Plants

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

Section A | Electrical Zone-Wise Fire Risk Map

A1. Substations, MCC Rooms & Cable Galleries

Main substation, jet-fire / blast-rated satellite PIB substations, cable spreading rooms, blast-resistant CCR, and safety-class logic rooms. Apply the refinery electrical playbook verbatim.

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
Main substation & satellite PIBs	Cable + transformer fire, external blast + jet fire	Blast + jet-fire rated wall coatings, cable coatings, firestops	**H120 + 2 hr / Critical**
Cable spreading rooms (CCR, RIE)	Browns Ferry propagation scenario	Cable coatings + transverse firestops	**3 hr / Critical**
Cable tunnels & overhead racks	Cable propagation + radiant heat from process	Cable coatings + firestops	**Critical**
Blast-resistant control building	External blast + cable fire	Panel FP, firestops, FR doors	**H120 + 2 hr / Critical**
MCC rooms in polymer / cracker units	Arc flash, cable fire	FR cable trays, panel FP, firestops	**Critical**
Transformer yard	Transformer oil fire	Fire walls with firestopped penetrations, cable wraps	**3 hr / Critical**
Battery / UPS rooms	H_2 accumulation, thermal runaway	Firestops, FR doors, panel FP	**Critical**
Switchyard / GIS hall	SF_6 leak, cable fire	Cable coatings, firestops, panel FP	**Critical**

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	**Non-negotiable**
F&G / ESD / SIS cable routing	Circuit integrity during fire	Fire-survival cable coating, ablative wrap	**Non-negotiable**
Reactor emergency isolation (BDV, depressuring)	BDV solenoids and feedback	Fire-survival cable, panel FP	**Non-negotiable**
Emergency DG	Fuel + lube oil fire, must start on demand	Panel FP, firestops, fire-survival cable	**Critical**

Section B | Product-to-Application Matrix

This section maps each of the four priority Stanvac product lines to the specific petrochemical plants locations and circuits where they must be specified. Use these tables to build the bill of quantities (BOQ) for any petrochemical 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 spreading rooms (CCR, RIE)	All cable trays, risers, bunches	**Critical**
Main substation cable galleries	Incoming/outgoing HT and LT trays	**Critical**
Satellite PIB cable galleries	All in-unit cable bunches	**Critical**
Cable tunnels (substation to CCR, to plant)	Full-length coating + transverse firestops every 30 m	**Critical**
Overhead cable racks above cracker	Trays above furnace and reactor area	**Critical**
Polymer unit cable routes	Reactor and extruder cables	**Critical**

Zone	Specific Application	Priority
Tank farm cable routing	Trays to MOVs, level tx, detectors	**Critical**
Loading gantry cable runs	Earthing, interlock, MOV cables	**Critical**
CHP cable trays	Boiler, TG hall, transformer	**Critical**
Fire water pump house cables	Incomer + motor	**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
ESD (Emergency Shutdown) loops	Field SDVs to logic solver to CCR	**Non-negotiable**
F&G detection (HC, H_2S, Cl_2, VCM, EO)	Detector to F&G panel to CCR	**Non-negotiable**
Fire water pump power (electric + diesel)	Switchgear to motor	**Non-negotiable**
Deluge / foam / water-curtain controls	Solenoid and MOV actuation	**Non-negotiable**
SIS / safety instrumented systems	Sensor to marshalling to logic	**Non-negotiable**
Reactor emergency isolation (BDV, depressuring)	BDV solenoids and feedback	**Non-negotiable**
Cracker furnace trip circuits	Fuel gas trip, flame scanner	**Non-negotiable**
Compressor emergency trip	Surge, vibration, seal protection	**Critical**
Emergency lighting + PA / GA	Plant-wide egress	**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
Substation cable trench to building entry	Sand-seal + firestop pillows + mortar	**Critical**
Wall between MCC and switchgear rooms	Cable + tray penetrations	**Critical**
Cable tunnel transverse barriers	Every 30–50 m	**Critical**
CCR under-floor void boundary	Slab penetrations + void sealing	**Critical**
CCR external wall cable entries	Marshalling cable bundles	**Critical**
PIB satellite substation entries	Blast + fire rated cable transits	**Critical**
Cable spreading room entries	Perimeter seal + penetration firestop	**Critical**
Transformer bay fire wall penetrations	HT/LT + control cable openings	**Critical**

Location	Specific Application	Priority
Fire water pump house entries	Power and control cable penetrations	**Non-negotiable**
HVAC duct penetrations in substation / CCR	Fire dampers + collar seals	**Critical**
DG room boundary	Fuel 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