

Electrical Passive Fire Protection for Engineering Plants

Substations · Heavy Machining & Fabrication · Heat Treatment & Paint Shops · Assembly Bays · Safety-Critical Circuits

Section A | Electrical Zone-Wise Fire Risk Map

A1. Substations, MCC Rooms & Cable Galleries

Heavy engineering, fabrication and capital-equipment manufacturing plants — main substation, captive utilities, heavy machining bays, welding and fabrication shops, heat-treatment furnaces, paint shop, sand / shot blasting, assembly bays, EOT crane control, compressor house, solvent / paint store and finished-goods yard. Hydrocarbon exposure (paint solvents, oil quench) and conventional cellulosic fire (cardboard, electrical insulation) must both be designed for.

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
Main substation	Transformer + cable fire	Cable coatings, firestops, panel FP	3 hr / Critical
Boiler / utility electrical	Fuel + lagging fire exposure	Cable coatings, firestops, panel FP	2-3 hr / Critical
Heavy machining bay MCC	Cutting oil mist + chip fire	Cable coatings, panel FP	2 hr / Critical
Welding / fabrication shop MCC	Sparks + gas cylinders + cable	Cable coatings, panel FP	2 hr / Critical
Heat treatment furnace electrical	Gas furnace + oil quench bath fire	Cable coatings, panel FP, firestops	H60 + 2 hr / Critical
Paint shop / paint booth MCC	Solvent vapour ignition + pool fire	Panel FP (Zone 1 spec), cable coatings, firestops	H60 + 2 hr / Critical
Sand / shot blasting MCC	Combustible dust + spark	Panel FP, cable coatings	2 hr / High
Assembly bay MCC	Drive + cable fire	Cable coatings, panel FP	2 hr / High
EOT crane control / pendant rooms	Drive + cable fire (overhead)	Cable coatings, panel FP	2 hr / High
Solvent / paint storage electrical	Hydrocarbon vapour explosion + pool fire	Structural intumescent, cable wraps, panel FP	H120 + 2 hr / Critical
Compressor house MCC	Lube oil mist fire	Panel FP, cable coatings	2 hr / High
Finished goods / fabrication yard MCC	Class A high-hazard fire load	Cable coatings, fire-survival cabling, firestops	3 hr / Critical
Cable galleries (utility → shops)	Propagating cable fire	Cable coatings + transverse firestops every 30 m	3 hr / Critical
DG room	Diesel pool fire	Cable coatings, firestops, panel FP	2-3 hr / Critical
CCR / DCS	Panel + cable fire	Panel FP, firestops, FR doors	2 hr / Critical

A2. Safety-Critical Electrical Systems

These systems must remain operational throughout the fire event in order to control or extinguish it. Fire-survival cable integrity is mandatory under IEC 60331-21 and BS 6387 CWZ; failure to specify is a non-compliance under NBC Part 4 —

Fire and Life Safety and IS 1646 (industrial premises), and where solvent / paint and oil-quench zones are involved, OISD-STD-117 hydrocarbon-fire ratings apply.

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
Fire water pump house	Must survive the fire it fights	Fireproofed structure, FR cables	3 hr / Critical
Heat treatment quench fire suppression	Quench bath suppression release	Fire-survival cable	IEC 60331 / BS 6387 CWZ / Non-negotiable
Paint booth fire suppression release	CO ₂ / IG release on detection	Fire-survival cable, panel FP	IEC 60331 / BS 6387 CWZ / Non-negotiable
Solvent / paint store F&G detection	Vapour detection + ESD trip	Fire-survival cable, panel FP	IEC 60331 / BS 6387 CWZ / Non-negotiable
Welding shop gas cylinder isolation	Gas detector to manifold solenoid	Fire-survival cable	IEC 60331 / BS 6387 CWZ / Non-negotiable
Sprinkler / hydrant pump power	Switchgear to motor	Fire-survival cable	IEC 60331 / BS 6387 CWZ / Non-negotiable
EOT crane safe-park / homing	Crane control to safe parking position	Fire-survival cable	BS 6387 CWZ / Critical
Emergency DG start & transfer	Battery to engine panel	Fire-survival cable	BS 6387 CWZ / Critical
Emergency lighting + PA / GA	Plant-wide egress	Fire-survival cable	BS 6387 CWZ / Critical
UPS feeders to DCS / SCADA	UPS to marshalling	Fire-survival cable	BS 6387 CWZ / Critical

Section B | Product-to-Application Matrix

This section maps each of the four priority Stanvac product lines to the specific engineering plants locations and circuits where they must be specified. Use these tables to build the bill of quantities (BOQ) for any engineering 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
Heavy machining bay cable routes	Drive, coolant, lighting	Critical
Welding / fabrication shop cable routes	Welder, gas, lighting	Critical
Heat treatment hall cable routes	Furnace controls + quench bath	Critical

Zone	Specific Application	Priority
Paint shop / booth cable routes	All cables crossing classified zones	Critical
Sand / shot blasting cable routes	Dust collector, blast media drive	High
Assembly bay cable routes	Drive, lighting, hand tool drops	High
EOT crane festoon and pendant cable	Bridge, trolley, pendant	High
Solvent / paint storage cable entries	All cables crossing classified zones	Critical
Compressor house cable routes	HP air compressor + dryer	High
FG / fabrication yard cable routes	Lighting + sprinkler	Critical
Main substation cable gallery	Incoming and outgoing	Critical
DG room cable entries	Start, alternator, control	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
Fire water pump power (electric + diesel)	Switchgear to motor	Non-negotiable
Heat treatment quench suppression	Detector to suppression actuator	Non-negotiable
Paint booth fire suppression release	Detector to suppression actuator	Non-negotiable
Solvent / paint store F&G detection	Detector to F&G panel	Non-negotiable
Welding shop gas cylinder isolation	Detector to manifold solenoid	Non-negotiable
Sprinkler pump power	Switchgear to motor	Non-negotiable
EOT crane safe-park / homing	Crane control to safe parking position	Critical
Emergency lighting + PA / GA	Plant-wide egress	Critical
UPS feeders to DCS / SCADA	UPS to marshalling	Critical
Emergency DG start & transfer	Battery to engine panel	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.

Option	Stanvac Solution	Description & Typical Use
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
Heat treatment hall boundary	Cable, pipe, duct penetrations	Critical
Paint shop / booth boundary	Cable, duct, pipe penetrations	Critical
Solvent / paint storage compartment walls	All wall, floor, duct penetrations	Critical
Welding / fabrication shop boundary	Cable and gas pipe penetrations	Critical
Heavy machining bay boundary	Cable and pipe penetrations	High
FG / fabrication yard perimeter	Every wall, floor, duct penetration	Critical
Compressor house boundary	Cable and pipe penetrations	High
Main substation cable trench to building	Sand-seal + firestop pillows + mortar	Critical
Cable tunnel transverse barriers	Every 30–50 m	Critical
DG room boundary	Fuel and cable penetrations	Critical
Fire water pump house entries	Power and control cable penetrations	Non-negotiable
HVAC duct penetrations	Fire dampers + collar seals	High

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

For more information, please connect with us.