

Electrical Passive Fire Protection for Electronics Manufacturing

Substations · SMT & Cleanrooms · Battery & Solvent Areas · Server Halls · Safety-Critical Circuits

Section A | Electrical Zone-Wise Fire Risk Map

A1. Substations, MCC Rooms & Cable Galleries

Main substation, cleanroom AHU electrical, SMT and PCB assembly MCCs, reflow / wave-solder lines, solvent and chemical store, lithium-ion battery test and storage, data hall / server room, UPS room and central control. Solvent dispensing introduces hydrocarbon-fire exposure; lithium-ion handling introduces high-energy-density thermal-runaway scenarios.

Area	Fire Scenario	Stanvac PFP Product Application	Rating / Priority
Main substation	Transformer + cable fire	Cable coatings, firestops, panel FP	3 hr / Critical
Cleanroom AHU / utility MCC	AHU motor + filter media fire	Cable coatings, firestops, panel FP	2 hr / Critical
SMT line MCC	Drive + control panel fire	Panel FP, cable coatings	2 hr / High
Reflow oven electrical	Heater bank + polymer fume fire	Panel FP, cable coatings	2 hr / Critical
Wave-solder line MCC	Solder dross + flux residue fire	Panel FP, cable coatings	2 hr / High
Solvent / IPA dispensing room	Vapour ignition + pool fire	Panel FP (Zone 1), cable coatings, firestops	H60 + 2 hr / Critical
Li-ion battery test / aging chamber	Cell thermal-runaway + propagation	Cable coatings, panel FP, firestops	2-3 hr / Critical
Li-ion finished cell warehouse	Cascading thermal-runaway fire	Cable coatings, fire-survival cabling, firestops	3 hr / Critical
Chemical exhaust scrubber MCC	Corrosive fume + fan motor fire	Panel FP (corrosion-resistant), cable coatings	2 hr / High
Server room / data hall	Cable + PDU fire under raised floor	Cable coatings, firestops, panel FP	2 hr / Critical
UPS room (Li-ion or VRLA)	Battery thermal event	Cable coatings, firestops, panel FP, FR doors	2 hr / Critical
DG room	Diesel pool fire	Cable coatings, firestops, panel FP	2-3 hr / Critical
Cable galleries (substation → fab)	Propagating cable fire	Cable coatings + transverse firestops every 30 m	3 hr / Critical
CCR / SCADA	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 renders lithium-ion thermal-runaway response circuits inoperable.

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
Chemical exhaust scrubber power	Must run during fire to clear vapour	Fire-survival cable	IEC 60331 / BS 6387 CWZ / Non-negotiable
Battery test cell isolation	Cell-to-rack ESD trip	Fire-survival cable	IEC 60331 / BS 6387 CWZ / Non-negotiable
F&G detection (solvent + battery)	Detector to F&G panel	Fire-survival cable, panel FP	IEC 60331 / BS 6387 CWZ / Non-negotiable
VESDA + clean agent release (server)	Detection to suppression actuator	Fire-survival cable	BS 6387 CWZ / Critical
Cleanroom emergency shutdown	Grid + AHU isolation	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

Section B | Product-to-Application Matrix

This section maps each of the four priority Stanvac product lines to the specific electronics manufacturing locations and circuits where they must be specified. Use these tables to build the bill of quantities (BOQ) for any electronics manufacturing 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
Cleanroom utility cable trays	All HT/LT trays + transverse firestops every 30 m	Critical
SMT and assembly line cable routes	Drive and control	High
Reflow / wave-solder cable routes	Heater + control	High
Solvent dispensing room cable entries	All cables crossing classified zones	Critical
Battery test chamber cable routes	Charger, BMS, monitoring	Critical
Battery cell warehouse cable routes	Lighting + sprinkler + monitoring	Critical
Server room under-floor and overhead trays	Power and data	Critical
UPS to PDU cable runs	All battery feeder cables	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
Chemical exhaust scrubber power	Switchgear to fan motor	Non-negotiable
Battery test cell ESD circuit	ESD logic to isolation contactor	Non-negotiable
Solvent area F&G detection	Detector to F&G panel	Critical
VESDA + clean agent release (server room)	Detection to suppression panel	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
Cleanroom emergency stop & isolation	ESD logic to grid contactor	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
Cleanroom envelope	Cable, pipe, duct penetrations	Critical
Solvent / IPA storage compartment walls	All wall, floor, duct penetrations	Critical
Battery test cell boundary	Cable and exhaust penetrations	Critical

Location	Specific Application	Priority
Battery cell warehouse perimeter	Every wall, floor, duct penetration	Critical
Server room / data hall boundary	Cable and pipe penetrations	Critical
UPS room boundary	Cable and HVAC penetrations	Critical
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
Chemical exhaust duct penetrations	Fire dampers + collar seals (corrosion-resistant)	High

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

For more information, please connect with us.