APIS GUIDE 12 · BUILDINGS

Specifying fire detection *and suppression.*

You will be quoted a system designed to a standard. What you need is a system designed to your risk — and almost nobody asks which one they are buying.

APIS · FIRE PROTECTION & DETECTION

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ABOUT THIS GUIDE

Compliant is not the same *as suitable.*

READ THIS FIRST — WHAT THIS GUIDE WILL NOT DO

This guide states no detector spacing, no coverage area, no sound level, no evacuation time, no suppression concentration, no water density, no zone size and no test interval. Not because they do not matter — because they are precisely the things that must come from a competent fire engineer working on your building, against the regulations in force where it stands.

A buyer who takes a number from a guide and puts it in a specification has substituted a general document for a specific assessment. In this subject that is the error that matters most, and no other guide in this series carries the consequences this one does.

What this guide does is help you ask for the right thing, judge what you are offered, and know what a good answer looks like. It is written for the person signing the contract, not the person designing the system.

Fire systems are bought under a peculiar disadvantage. The buyer usually cannot assess the offer, the consequences of getting it wrong appear years later and rarely, and the supplier is frequently the only party in the room who understands what is being proposed.

The result is a market where offers are compared on price for equipment the buyer cannot evaluate, where the cheapest compliant system wins, and where the difference between a system that works on the night and a system that merely passed its commissioning test is invisible at the point of purchase.

This guide covers what you are actually buying, why the risk assessment must come before the system and not after it, how detectors are chosen by environment rather than by price, the cause-and-effect matrix that is the single most important document in the whole package, the interfaces where these systems actually fail, how to specify and tender, and what happens across the decades the system will be in service. It ends with a forty-point checklist.

Who this is written for

- Building owners, developers and asset managers procuring a fire system
- Facilities and technical managers who will operate and be responsible for one
- Public bodies and institutions procuring on their own estate
- Industrial and warehouse operators, where the risk is process-driven and the standard answer rarely fits
- Boards and duty holders who carry the responsibility and have never been shown what it rests on

What this guide is not

It is not a design document, a fire strategy, a risk assessment or a substitute for any of them. It does not interpret regulations, and it takes no position on what applies in any jurisdiction. It does not cover structural fire resistance, means of escape design, or fire strategy development — those belong to a fire engineer, and this guide's central argument is that you should have one.

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SECTION 01

What you are *actually buying.*

Four things, sold as one, with very different lifespans and very different failure modes.

A fire system quotation looks like a single purchase. It is not. It bundles four things that behave differently, are replaced on different cycles, and fail for different reasons — and the one that decides whether the system works is the one that appears nowhere in the price.

THE FOUR COMPONENTS OF THE PURCHASE

What	What it is	How it fails
The equipment	Detectors, sounders, beacons, manual call points, the panel, cabling, suppression plant	Rarely. Modern equipment to a recognised standard is reliable. This is the part buyers scrutinise and the part least likely to be the problem
The design	What is detected where, by what type of device, in what zones, at what category of coverage	**Frequently, and invisibly.** A system correctly installed to a wrong design passes every test and is unsuitable for the building
The logic	What happens when a device operates — which alarms sound, what shuts down, what opens, what closes, who is notified. The cause-and-effect matrix	**Most often of all.** Section 06. The fire system usually works; the thing it was supposed to trigger does not
The regime	Testing, servicing, records, competence, and who holds the duty over the decades the system is in service	Silently, over years. A system unmaintained for five years is not a system. Section 08

THE QUESTION THAT SEPARATES A GOOD PURCHASE FROM A COMPLIANT ONE

“Is this system designed to a standard, or designed to my risk?”

Both answers can be legitimate. A standard-based design applies a recognised set of rules to a building type and produces a defensible, compliant result — and for a straightforward building that is often exactly right.

A risk-based design starts from what is actually in the building, what it is worth, who is in it, how quickly they can leave, what would happen to the business, and what the insurer requires. It may produce more protection in one area and less in another.

The failure is not choosing one. It is not knowing which one you were sold — and discovering, after a fire or an insurance claim, that a standard solution was applied to a building whose risk was never assessed.

Five reasons a system gets bought, and they are not the same

1. **Life safety.** Detecting early enough that people can leave. The primary purpose, the one regulation is built around, and the only one that is not negotiable.

2. **Property protection.** Limiting damage to the building and its contents. A different objective that may require detection in places life safety would not cover — plant rooms, voids, unoccupied storage.
3. **Business continuity.** Limiting the interruption. A server room, a cold store, a production line — where the loss is not the fire damage but the months of downtime.
4. **Insurance requirement.** Frequently stricter than regulation, contractually binding, and routinely discovered after the design is complete.
5. **Statutory obligation.** What the law and the permitting authority require, which is the floor rather than the answer.

> ASK THE INSURER BEFORE THE DESIGN, NOT AFTER
>
> Insurers hold their own requirements for fire protection, they vary between insurers, they are contractually binding once accepted, and they are frequently stricter than the regulatory minimum — particularly for warehousing, manufacturing, cold storage and anything involving significant stored value.
>
> The pattern is consistent and expensive: a compliant system is designed, tendered and installed, and the insurer then requires something the design does not include. **Obtain the insurer's requirements in writing at the feasibility stage** and issue them with the tender. It costs an email and it is one of the most common causes of variation on these projects.

SECTION 02

The risk comes first, *and it decides everything.*

Every technical decision in this guide follows from an assessment that most projects commission after the system has already been specified.

The sequence that produces a suitable system is not complicated and is very frequently reversed. It should run: **fire strategy, then risk assessment, then system design, then procurement.** What commonly happens is that a supplier proposes a system, it is installed, and a risk assessment is produced afterwards to document what exists.

An assessment written after the system describes the building. An assessment written before it determines the building. Only the second is worth commissioning.

> WHAT THE FIRE STRATEGY IS, AND WHY YOU NEED IT BEFORE ANYTHING ELSE
>
> The fire strategy is the document that explains how the building achieves fire safety as a whole: how people are warned, how they leave, how the fire is contained, how the fire service intervenes, and what each system is there to do.
>
> **Every specification decision in this guide should be traceable to it.** Without one, the detection design, the alarm strategy, the suppression choice and the interfaces are each decided in isolation by whoever is supplying that part — and nobody is accountable for whether they work together.
>
> For an existing building, the questions are whether a strategy exists, whether the building as it stands still matches it, and whether the changes made since have been assessed against it. **Buildings drift away from their strategy silently**, through partitioning, changes of use, added plant and increased occupancy, and the drift is normally discovered during an incident or a transaction.

What the assessment must establish before a system can be specified

Question	Why it changes the system
Who is in the building	Numbers, whether they are awake, whether they are familiar with it, whether they can evacuate unaided. A hotel, a hospital, a school and a warehouse produce entirely different answers from the same floor area
How they leave, and how long it takes	Determines how early detection must occur and what the alarm must do. Where evacuation is slow or staged, detection has to be correspondingly earlier
What is stored or processed	Fire load, growth rate and the nature of any hazard. This is where industrial and warehouse buildings depart from standard solutions entirely
Where fire could start and how it would spread	Determines where detection is needed, which is not the same as where people are
What the environment does to detectors	Dust, steam, fumes, temperature, humidity, air movement. Section 03 — this is the false alarm question and it starts here
What the fire service needs	Access, information, water, and what they will be told on arrival. Establish it with them rather than assuming
What the business cannot lose	Separates life safety from continuity, and justifies protection that regulation would not require
What the insurer requires	Section 01. Obtain it in writing before design

WHERE STANDARD SOLUTIONS STOP WORKING

Standard, code-based solutions are built around common building types and normal fire behaviour. They become unreliable where the building is not normal:

- **High-bay warehousing and racking**, where fire behaves very differently from an open floor and where storage arrangement is itself a design input
- **Industrial processes** with specific hazards — flammable liquids, dusts, batteries, chemical storage
- **Very large or complex volumes** — atria, transport buildings, halls
- **Buildings where evacuation cannot be immediate** — hospitals, care settings, custodial buildings
- **Anything with a novel or changing occupancy**, including buildings converted from a use they were designed for

In each of these, **a fire engineer is not a nicety, and a standard solution applied without one is a decision to accept an unassessed risk.** The guide can go no further than saying so.

What to commission, and in what order

1. **Fire strategy** — for a new building, or a review of the existing one for an older building, including whether the building still matches it
2. **Fire risk assessment** — current, by a competent person, with its action register open and tracked
3. **Insurer's requirements** in writing
4. **System design** derived from all three, and traceable to them
5. **Procurement** against that design — Section 07

Steps one to three cost a fraction of the installation and are the only things that determine whether the installation is the right one. They are also the steps most often skipped when a programme is compressed.

SECTION 03

Detection — chosen by environment, *not by price.*

And the failure mode nobody prices: a system that cries wolf gets switched off, and a switched-off system is worse than none at all.

Detector selection looks like a technical detail and is in fact the decision that most often determines whether a system survives its first two years in service. Detectors are chosen for the environment they sit in and the fire they are expected to see. Chosen on unit price, they generate false alarms — and false alarms are the mechanism by which working systems are disabled.

> THE FALSE ALARM PROBLEM, STATED PLAINLY
>
> A system that produces repeated unwanted alarms creates a predictable sequence. Occupants stop evacuating. Staff begin silencing the panel before investigating. Detectors in the problem area are isolated “temporarily”. The fire service’s response may be reduced. And eventually the system is treated as a nuisance to be managed rather than a warning to be heeded.
>
> **At the end of that sequence the building has a compliant, tested, certified system and no functioning fire warning.** This is not a rare pathology; it is the normal life cycle of a badly selected system.
>
> It is prevented almost entirely at design stage by choosing detection appropriate to the environment — and it is very expensive to fix afterwards, because the fix is replacing devices throughout an occupied building.

The principal detection types, and what each is for

This is a description of what exists, not a selection guide. **Which type belongs where is a design decision for a competent designer**, taken against the risk assessment and the applicable standards.

Type	Responds to	Typically considered where
Optical / photoelectric smoke	Visible smoke particles from smouldering fires	General occupied areas. Susceptible to steam, dust and some aerosols
Ionisation smoke	Smaller particles from flaming fires	Less used than formerly; involves a radioactive source with disposal implications
Multi-sensor / multi-criteria	Combinations — smoke with heat, or with carbon monoxide	Environments where a single criterion generates false alarms. Frequently the answer to a nuisance problem
Heat — fixed temperature or rate of rise	Temperature, not smoke	Kitchens, plant rooms, dusty or steamy areas where smoke detection cannot be used. Slower to respond — a trade accepted deliberately
Aspirating smoke detection	Air continuously sampled and analysed, capable of very early detection	Where very early warning matters or where access is difficult — server rooms, high spaces, cold stores, heritage interiors
Beam detection	Smoke crossing an optical path across a large volume	Warehouses, atria, halls — large open volumes where point detection is impractical
Flame detection	Radiation from flame, not smoke or heat	Where fires develop fast with little smoke — flammable liquids, some industrial processes
Linear heat detection	Heat anywhere along a sensing cable	Cable tunnels, conveyors, racking, car parks — where the risk runs along a line
Carbon monoxide fire detection	Combustion gas	Specific applications, and distinct from CO detection for occupant safety
Manual call points	A person	Everywhere. The most reliable detector in the building, and easily forgotten in the design conversation

THE ENVIRONMENTS THAT CAUSE MOST NUISANCE ALARMS

Raise each of these specifically with the designer and ask what has been selected and why. If the answer is the same detector as the rest of the building, ask again.

- **Kitchens and cooking areas —** steam, aerosols, cooking fumes
- **Bathrooms, showers and drying rooms —** steam and humidity
- **Loading bays and entrances —** vehicle exhaust, dust, cold air, insects
- **Plant rooms and workshops —** dust, fumes, temperature swings
- **Car parks —** exhaust and, increasingly, a separate question about electric vehicles
- **Warehousing with forklift traffic —** dust disturbed continuously
- **Areas near ventilation supply —** air movement dilutes smoke and delays or prevents detection
- **Buildings under construction or fit-out —** where dust generates alarms and where detectors are frequently covered and then never uncovered

What to require in the specification

- **Detector type stated per area, with the reason**, in a schedule issued with the tender. Not left to the tenderer
- **The environments above addressed explicitly**, each with a named selection
- **Devices to a recognised standard** — the EN 54 series is the European family for fire detection and alarm system components — with certification for the specific models supplied, not a similar model or the range
- **Addressable devices** in anything but the simplest building, so the panel reports which device operated rather than which zone
- **Accessibility for testing and cleaning** considered at design stage. A detector that requires scaffolding to reach will not be tested at the stated interval, whatever the contract says
- **A stated position on detector isolation** — who may isolate a device, how it is recorded, and how isolations are reviewed. This is how systems quietly degrade

SECTION 04

Alarm, warning and what *the building is told to do.*

Detection is only useful if what follows it is correct — and what follows it is a decision, not a default.

When a detector operates, something must happen. What happens is not a property of the equipment; it is a strategy decision that belongs in the fire strategy and is implemented in the panel configuration. Left undecided, it becomes whatever the installing engineer's standard template does.

The evacuation strategy decides the alarm strategy

Buildings evacuate in different ways, and the alarm has to match. The choice belongs to the fire strategy and to the authority having jurisdiction — not to the system supplier.

Strategy	What happens	What the system must therefore do
Simultaneous evacuation	Everyone leaves at once on a single signal	The simplest arrangement. One alarm signal throughout
Phased evacuation	Some areas evacuate immediately, others are alerted and evacuate after	Different signals to different areas, in a defined order, with the ability to extend. Requires zoning that matches the strategy
Progressive horizontal evacuation	Occupants move to an adjacent protected area rather than out of the building	Signals and compartmentation that support movement sideways. Common in healthcare, and it makes the interfaces in Section 06 critical
Staff alarm before general alarm	Staff are alerted first and investigate within a defined period before the general alarm sounds	A two-stage arrangement with a defined and enforced investigation period. Used to manage false alarms and only appropriate where the strategy allows it
Defend in place	Occupants remain unless directly affected	Depends entirely on compartmentation being intact. Section 06 — this strategy fails when the compartmentation has been breached by services

THE EVACUATION STRATEGY MUST BE A DECISION, AND IT MUST BE WRITTEN DOWN

Ask directly: **which evacuation strategy does this building use, who decided it, and is it recorded in the fire strategy?**

Where the answer is unclear, the system will be configured to a default that may not match how the building is actually managed — and the mismatch will only be discovered during an evacuation or a drill. Where the answer is anything other than simultaneous evacuation, the zoning, the signalling and the interfaces all become materially more complex and must be specified rather than assumed.

Warning the occupants

- **Audibility throughout**, including in areas of high background noise, behind closed doors, and in sleeping accommodation where the requirement differs. The levels are a design matter and this guide states none

- **Visual alarm devices** where audible warning alone is not sufficient — high noise areas, and areas used by people who may not hear an alarm. This is an accessibility requirement as much as a technical one
- **Voice alarm systems** where the building is large, complex, unfamiliar to its occupants, or where phased evacuation is used. Voice systems demonstrably improve response — people act on instructions faster than on a tone — and they carry their own standards, their own commissioning requirements and their own message design decisions, which are frequently left to the supplier and should not be
- **Provision for occupants with impairments**, decided at design stage and not resolved with a procedure written afterwards

Who else is told, and how

- **Alarm transmission to the fire service or a monitoring centre** — whether it exists, whether it is required, whether it is verified before transmission, and what the response is. Establish what the local arrangement actually is rather than assuming
- **On-site responsible persons** — who is notified, how, and whether the notification survives out of hours
- **What the fire service sees on arrival** — the repeat panel or indicator, its location, and whether the information on it is intelligible to somebody who has never been in the building. A panel reporting a device number with no location text is a panel that costs the fire service minutes
- **Zone plans and building information** at the panel, current, and matching the building as it now is rather than as it was built

> THE INFORMATION AT THE PANEL IS A DESIGN ITEM, NOT A FORMALITY
>
> Whoever arrives first — a security guard at night, a duty manager, the fire service — reads the panel and decides what to do. The quality of what is displayed determines how quickly the right thing happens.
>
> Require: **device location text in plain language matching the building's own room naming**, not a panel address; a zone plan at the panel that reflects current layout; and a confirmed arrangement for updating both when the building changes. Buildings are repartitioned far more often than panel text is updated, and a panel that names rooms that no longer exist is actively misleading.

SECTION 05

Suppression — *where it earns its place.*

The most expensive element, the one most often sold on capability rather than need, and the one where the wrong choice is hardest to reverse.

Suppression is not a general requirement. It is required in some buildings by regulation, in others by an insurer, and in others chosen because the consequence of a fire — to the business rather than to life safety — justifies it. Establishing which of those applies is the first question, and it determines everything after.

THREE QUESTIONS BEFORE ANY SUPPRESSION SYSTEM IS CONSIDERED

One. Is it required, and by whom? Regulation, insurer, or your own decision. Each produces different requirements and different room to negotiate.

Two. What is it protecting, and against what outcome? Life safety, the building, the contents, or the continuity of an operation. A system that protects the building may destroy the contents; a system that protects the contents may cost several times as much.

Three. What does the system itself do to the space? Water damage, agent discharge, pressure, and the recovery time afterwards. **In some rooms the suppression system causes more loss than a small fire would**, and that trade-off must be made deliberately rather than discovered.

The principal types, and what governs each

A description of what exists. **Which is appropriate is a design decision**, and each type carries its own standards, its own hazard classification and its own design rules that this guide does not reproduce.

Type	Principle	Considerations that decide it
Automatic sprinklers	Heat-activated heads discharge water locally over the fire. Only heads in the fire area operate	The most established form of property protection, with a long evidence base. Requires a reliable water supply and its own hazard classification. EN 12845 is the European standard for fixed firefighting sprinkler systems. Water damage is real and must be weighed
Water mist	Fine droplets, cooling and displacing oxygen locally, using less water than sprinklers	Considered where water volume or damage is a constraint, or space is limited. System design is highly manufacturer-specific and performance is established by testing for the application — **which makes like-for-like comparison between offers genuinely difficult**
Gaseous extinguishing	An inert or chemical agent released into a sealed enclosure, suppressing combustion without residue	Server rooms, control rooms, archives — where water cannot be used. **Depends entirely on enclosure integrity**, which must be tested and maintained. Carries life safety requirements for anyone inside on discharge, and environmental questions about the agent. The EN 15004 series addresses gas extinguishing systems
Foam	A blanket suppressing vapour and excluding oxygen	Flammable liquid risks. Foam composition is subject to significant environmental regulation and change, and containment of discharged foam is a design requirement in its own right
Kitchen suppression	A wet chemical agent over cooking appliances and within the extract	Commercial kitchens. Must be interlocked with fuel and power isolation — Section 06 — and matched to the appliances actually installed, which change more often than the system does
Hose reels and hydrants	Manual firefighting provision	Fixed provision for occupants or the fire service. EN 671 addresses fixed hose systems. Requires a water supply and a maintenance regime like any other system
Portable extinguishers	First-aid firefighting	Type matched to the risk in each area, positioned, signed, serviced, and — the part that fails — with somebody trained to use them. EN 3 covers portable extinguishers

GASEOUS SYSTEMS FAIL ON ENCLOSURE INTEGRITY, NOT ON THE GAS

A gaseous system works by achieving and holding an agent concentration in a sealed room. If the room does not hold it, the system discharges an expensive agent that leaks away before the fire is out.

Enclosure integrity is compromised by exactly the things that happen to a server room over its life: cables added through walls, floor voids left open, dampers that do not close, doors propped, ceiling tiles removed. **Require an enclosure integrity test at commissioning, and require it to be repeated at a defined interval and after any building work in that room.** Without it, a gaseous system is an assumption rather than a protection.

What suppression brings with it

- **A water supply that must be proved —** flow and pressure, and whether it is available at the moment of need rather than at the moment of testing. Where a tank and pump are required, they are a system of their own with their own maintenance and their own failure modes
- **Drainage and containment** for whatever discharges, including any environmental obligation attaching to contaminated water or foam
- **Structural and space implications —** tanks, pump rooms, cylinder banks, and the loading and access they require
- **Interfaces —** ventilation shutdown, damper closure, power isolation, and alarm signalling. Section 06
- **A maintenance regime** that is more demanding than detection, and a decades-long obligation that must be budgeted at purchase rather than discovered later

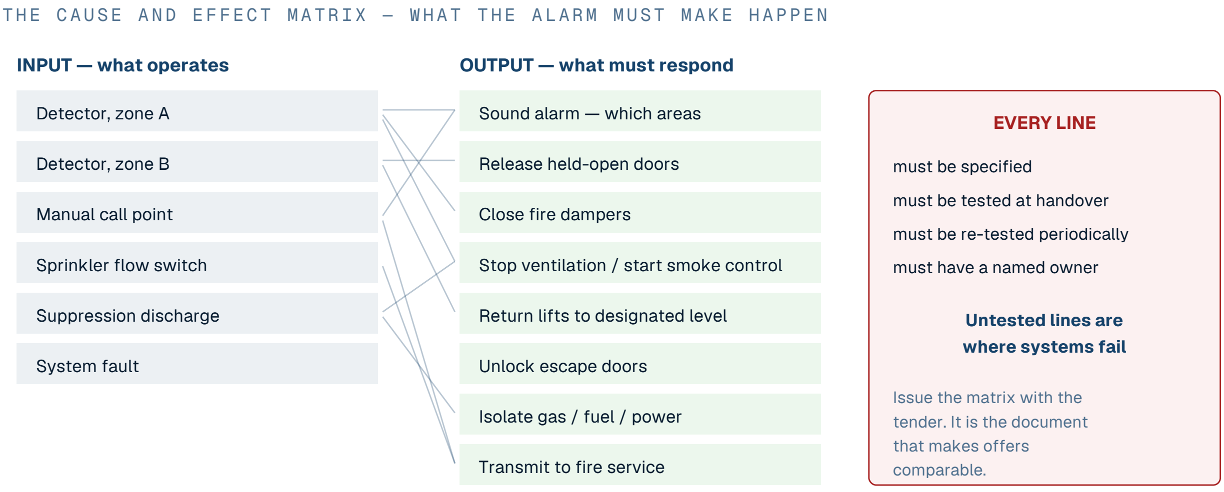
SECTION 06

The interfaces, where these systems *actually fail.*

The fire system usually works. The thing it was supposed to trigger is what does not — and the document that governs it is the one almost never issued with the tender.

A fire alarm system on its own makes noise. What protects the building is what the alarm causes to happen: doors releasing, dampers closing, ventilation stopping, smoke control starting, lifts returning, gas isolating, escape doors unlocking, suppression discharging.

Each of those is a different system, usually installed by a different contractor, commissioned at a different time, and maintained under a different contract. **The fire system is the only one tested regularly; the interfaces are frequently tested once, at handover, and never again.**



Illustrative of the structure only. The inputs, outputs and connections for any building are a design matter.

Figure 6.1 — The structure of a cause-and-effect matrix. The inputs, outputs and the connections between them for any particular building are a design matter and are not shown here.

ISSUE THE CAUSE-AND-EFFECT MATRIX WITH THE TENDER

The matrix states, line by line, what each input does and what each output must do in response. It is the specification of the system's behaviour, and it is **the single most important document in a fire system package.**

Where it is not issued with the tender, each bidder assumes a standard configuration, the offers are not comparable, and the actual behaviour is decided during commissioning by whoever is configuring the panel — usually under time pressure, at the end of a project, with the interfacing contractors already off site.

Where it is issued, every bidder prices the same behaviour, the interfacing contractors know what is required of them, and commissioning has a document to test against. **Producing it takes a day of a competent designer's time and it is the item most often missing.**

The interfaces to name explicitly

Interface	What goes wrong
Held-open door releases	Doors wedged, releases disconnected because they were a nuisance, or fitted to doors that are no longer fire doors after refurbishment
Fire and smoke dampers	**The most common untested interface.** Dampers are concealed, numerous, and frequently seized. A damper that does not close makes the compartmentation notional
Ventilation shutdown	Ventilation that continues running distributes smoke through the building. The interlock is simple and is often assumed rather than specified
Smoke control and pressurisation	Must start, not merely stop. Depends on the fire location being correctly identified, which depends on zoning being correct
Lifts	Return to a designated level and park with doors open. Frequently not tested after a lift modernisation
Access control and escape doors	**The interface with the most serious consequences.** Doors that must unlock on alarm, and must fail safe on power loss. Access control is often installed later, by a different contractor, without reference to the fire strategy
Gas, fuel and process isolation	Kitchens, laboratories, plant. Must be interlocked with suppression where fitted
Electrical isolation	What is isolated, what stays live, and confirmation that life safety systems are on the circuits that stay
Suppression release and abort	Including the warning to occupants before discharge and the means to abort
Alarm transmission	To the fire service or monitoring centre. Test the whole path, not the output contact
Emergency lighting	Not usually triggered by the fire system, but part of the same escape provision and the same maintenance regime. EN 1838 and EN 50172 apply

COMPARTMENTATION IS THE INTERFACE WITH NO CABLE

Every other interface on this list is a signal from the panel. Compartmentation is different: it is the building's own fire separation, and it is breached silently by services penetrating walls and floors — every cable, pipe and duct added since construction.

A building that has been modified several times may have hundreds of unsealed penetrations, each individually trivial and collectively enough to make the compartmentation ineffective. **Where the strategy relies on compartmentation — and phased evacuation and defend-in-place rely on it entirely — a survey of penetrations belongs in the scope**, and any new works should be required to make good what they penetrate. Guide 04 in this series covers this from the buyer's side.

SECTION 07

Specifying *and tendering it.*

The documents that make offers comparable — and without which the cheapest bid wins by having quoted for less.

A fire system tender issued as a performance description invites each bidder to propose a different system. The offers then differ in device count, detection category, coverage, interfaces and configuration, and the price differences reflect scope differences that the buyer cannot see.

The remedy is to issue the design, not to ask for one.

THE FOUR DOCUMENTS THAT MUST BE ISSUED WITH THE TENDER

Document	Why it decides the outcome
The fire strategy, or the relevant extract	So the bidder understands what the system is for. Section 02
The device schedule and layout	Every device, its type, its location, and the reason for the type in the sensitive areas. Section 03. **This is what makes offers comparable**
The cause-and-effect matrix	Line by line. Section 06. The behaviour of the system, and the instruction to every interfacing contractor
The interface schedule	Every interfacing system, who supplies it, who wires it, and who witnesses the test. The gap between contractors is where interfaces are lost

What else the specification must state

- **The applicable standards and the category of system**, as determined by the designer against the risk assessment — not selected by the bidder
- **Equipment certification for the specific models offered**, checked on delivery against what was certified. Guide 08 in this series makes the same point about a different product; the discipline is identical
- **Addressability and the panel’s reporting capability**, including device location text in plain language matching the building’s own room names
- **Cabling standard and fire survival requirements**, which circuits require them, and the segregation and support arrangements — cable supports that fail early in a fire defeat a fire-resisting cable
- **Power supply, standby duration and battery arrangements**, with the duration stated by the designer
- **Networking and graphics**, where multiple panels or a head-end are involved
- **Spares, tools and software** — below
- **Commissioning and witnessing requirements** — Section 08
- **The maintenance regime**, priced as part of the offer rather than agreed afterwards
- **Installer and maintainer competence**, stated as a requirement. EN 16763 addresses services for fire safety and security systems and is the reference to name

WHO CAN CONFIGURE THIS PANEL IN TEN YEARS?

Fire panels are configured with manufacturer software, and access to that software is frequently restricted to the installing company or to its authorised partners. A building whose panel can only be reconfigured by one company has one supplier for the life of the system — for every future modification, every extension, every change of room name.

Ask, before contract: who can configure this panel; is the software available to other competent companies or only to you; what happens if you cease trading or we change maintainer; do we receive the configuration file and the as-commissioned cause-and-effect matrix; and can another company take over maintenance without replacing the panel.

This is the same lock-in question that Guide 09 raises for building controls, and it applies here with more force, because the system is statutory and cannot simply be left alone.

Evaluating the offers

- **Compare device counts against the issued schedule.** A materially lower count is not efficiency; it is a different system
- **Compare against the cause-and-effect matrix.** Bidders who have priced the interfaces will say so; those who have not will be silent about them
- **Ask what has been excluded**, explicitly, and require exclusions listed rather than implied
- **Price the whole life, not the installation** — maintenance, spares, battery replacement, and the eventual panel replacement. Guide 07 in this series sets out how to build and write that comparison
- **Check the competence claimed** is held by the company doing the work rather than by a parent or a partner
- **Ask who commissions**, and whether it is the same people who install

EXISTING BUILDINGS — ESTABLISH WHAT YOU HAVE FIRST

Before extending or replacing, establish: the age, make and model of the panel; whether it is still supported and whether spares and compatible devices are still available; whether the existing devices can be extended or must be replaced; whether the as-installed drawings and the current cause-and-effect matrix exist; and what the current fire risk assessment says about the system.

An unsupported panel is a replacement decision, not a repair decision, and it should be identified before a partial upgrade is designed around it. It is also one of the few situations where the honest answer from a supplier costs them a smaller job — which is worth noticing when you receive it.

SECTION 08

Commissioning, handover *and the next thirty years.*

The installation takes weeks. The obligation lasts as long as the building, and it transfers to whoever owns it next.

Commissioning — what must actually be proved

Commissioning a fire system is not energising it and demonstrating that it makes noise. Each of the following must be demonstrated and recorded:

1. **Every device tested individually**, by the method appropriate to its type, and confirmed to report correctly at the panel — right device, right location text, right zone
2. **Every line of the cause-and-effect matrix tested**, with the interfacing system observed doing what it should. Not the output contact — **the damper closing, the lift returning, the door unlocking**. Section 06
3. **Audibility verified** throughout, including behind closed doors and in the areas the design identified as difficult
4. **Alarm transmission tested end to end**, to the receiving party, with their confirmation recorded
5. **Standby power proved** for the specified duration under load
6. **Suppression systems tested** to their own requirements, including enclosure integrity for gaseous systems. Section 05
7. **Faults and isolations demonstrated** — that the panel reports a fault correctly and that isolation is visible rather than silent

> WITNESS THE INTERFACE TESTS YOURSELF, AND SCHEDULE THEM
>
> Interface testing requires several contractors present at the same time, which is why it is the element most often compressed, deferred or signed off on the basis of an assurance.
>
> **Schedule the interface test as a named event in the programme, require all relevant contractors to attend, and have somebody on your side present.** It is the only opportunity in the project when all of them are on site together, and every line not tested then is a line that will be tested for the first time during a fire.

The handover pack

- As-installed drawings showing every device, with zones
- **The as-commissioned cause-and-effect matrix** — the version that reflects what was actually configured, not the tender version
- The commissioning certificate and full test records, including every interface line
- Certification for the equipment actually supplied
- Zone plans for the panel, matching the building as handed over
- Operating instructions written for the person who will use the panel at three in the morning
- The maintenance schedule, with intervals and who is competent to perform each activity
- Spares list, battery type and replacement date, and consumables
- **Configuration file, passwords and any software or tools** agreed under Section 07
- The fire risk assessment updated to reflect the system as installed

Tie a retention to delivery and verification of this pack, and verify by using it — open the drawings, read the matrix, check the passwords work — rather than by receiving a folder.

The regime that follows

The intervals, the scope of each activity and the competence required are set by the applicable standards and regulations, and this guide states none of them. What it does state is that **the obligation is continuous, it falls on a named responsible person, and it is the part of the system most likely to lapse.**

Activity	What matters about it
Routine user testing	Frequent, done by the building's own staff, and recorded. The most common failure is that it is done and not recorded, which is indistinguishable afterwards from not being done
Periodic servicing by a competent company	To the applicable standard, with every device attended over the cycle. Ask which devices were reached — the inaccessible ones are the ones that get skipped
Periodic re-testing of interfaces	**The item most often omitted from a maintenance contract.** Check whether yours includes it; most do not, and dampers in particular are rarely re-tested after handover
Battery and standby power	Batteries have a defined life and fail predictably. Replacement date recorded at handover, and diarised
Suppression servicing	Including agent quantity, cylinder inspection and, for gaseous systems, repeat enclosure integrity testing after any building work in the room
Isolation and fault log	Reviewed, not just kept. A device isolated for six months is a hole in the system that somebody accepted once and nobody has revisited
False alarm log and analysis	Reviewed for pattern rather than counted. A recurring alarm from one area is a design problem to solve, not an event to log. Section 03
Re-assessment after change	**Any partitioning, change of use, added plant or increased occupancy invalidates part of the original design.** The risk assessment and the cause-and-effect matrix should be revisited, and almost never are

THE DOCUMENT THAT GOES OUT OF DATE FIRST

The cause-and-effect matrix is written once, tested at handover, and then the building changes. Rooms are subdivided. A new access control system is installed. Ventilation is modified. A lift is replaced. Each change is managed by whoever did that work, and none of them updates the matrix.

After a few years the matrix describes a building that no longer exists — and it is the document the fire system is tested against. **Make updating it a required deliverable of any works that touch the building**, and review it annually against what is actually installed. It costs very little and it is the difference between a maintained system and a maintained illusion.

SECTION 09

The forty-point *checklist.*

Attach it to the tender. Every item is something to establish, require or verify — none is a technical value, because those come from your designer.

A · BEFORE ANYTHING IS SPECIFIED

- [ ] Fire strategy obtained, or commissioned, and the building checked against it
- [ ] Current fire risk assessment in place, by a competent person, with its actions tracked
- [ ] Purpose stated — life safety, property, continuity, insurance, statutory, or a combination
- [ ] Insurer's requirements obtained in writing before design
- [ ] Authority having jurisdiction consulted and its position recorded
- [ ] Whether the design is standard-based or risk-based, stated and understood
- [ ] A fire engineer engaged where the building is not a straightforward standard case
- [ ] Evacuation strategy decided, recorded, and matching how the building is actually managed
- [ ] Fire service access, water and information requirements established with them
- [ ] For an existing building: panel make, model, support status and spares availability established

B · DETECTION AND ALARM

- [ ] Device schedule issued with the tender, not proposed by the bidder
- [ ] Detector type stated per area with the reason given
- [ ] Every nuisance-prone environment addressed explicitly with a named selection
- [ ] Areas near ventilation supply identified and the effect on detection considered
- [ ] Addressable system with plain-language location text matching the building's room names
- [ ] Equipment certification required for the specific models offered, checked on delivery
- [ ] Audibility requirement stated by the designer and verified at commissioning
- [ ] Visual alarm devices provided where required for noise or accessibility
- [ ] Voice alarm considered where the building is large, complex, unfamiliar or phased
- [ ] Detector accessibility for testing and cleaning considered at design stage
- [ ] Isolation policy defined — who may isolate, how recorded, how reviewed

C · SUPPRESSION

- [ ] Whether suppression is required, and by whom, established before type is considered
- [ ] What it protects and against what outcome, stated
- [ ] Damage caused by the system itself weighed against the fire it prevents
- [ ] Water supply proved for flow and pressure, not assumed
- [ ] Drainage, containment and any environmental obligation addressed
- [ ] For gaseous systems: enclosure integrity tested at commissioning and re-tested periodically
- [ ] Kitchen suppression matched to the appliances actually installed, and interlocked with fuel isolation
- [ ] Structural, space and access implications of tanks, pumps and cylinders resolved

D · INTERFACES AND TENDERING

- [ ] **Cause-and-effect matrix produced and issued with the tender**
- [ ] Interface schedule issued — every system, who supplies, who wires, who witnesses
- [ ] Access control and escape door unlocking specified and fail-safe on power loss
- [ ] Damper closure included in both the matrix and the maintenance scope
- [ ] Compartmentation and service penetrations surveyed where the strategy relies on them
- [ ] Panel configuration software, access and configuration file secured in the contract
- [ ] Installer and maintainer competence required and verified as held by the company doing the work
- [ ] Offers compared against the issued schedule and matrix, with exclusions listed

E · COMMISSIONING AND THE LIFE AHEAD

- [ ] Interface test scheduled as a named event with all contractors present and witnessed by you
- [ ] Handover pack tied to a retention, and verified by use rather than receipt
- [ ] Maintenance contract confirmed to include periodic interface re-testing, and the matrix required to be updated after any building change

Fire systems sign-off

Complete and retain with the fire safety file.

FIRE DETECTION AND SUPPRESSION SIGN-OFF

Item	Name and role	Date and signature
Building and purpose of the system		
Fire strategy by		
Fire risk assessment by		
System design by		
Insurer’s requirements confirmed		
Cause-and-effect matrix issued with tender		
Checklist points 1–40 confirmed		
Responsible person for the ongoing regime		

> IF YOU CAN ONLY DO THREE THINGS
>
> **One.** Get the fire strategy and the risk assessment done before the system is specified, not after. Everything else in this guide follows from them.
> **Two.** Produce the cause-and-effect matrix and issue it with the tender. It is a day of work and it is the most commonly missing document in the package.
> **Three.** Witness the interface tests, and make sure the maintenance contract includes re-testing them. The fire system usually works; what it was supposed to trigger is what does not.

REFERENCE

Standards referred to *in this guide.*

Listed by number and subject so that you can obtain and read them. Confirm the current edition and the national adoption before citing any of them.

STANDARDS REGISTER

Reference	Subject
EN 54 series	Fire detection and fire alarm systems — the European family covering control and indicating equipment, detectors of each type, sounders, visual alarm devices, manual call points, power supplies and cabling
ISO 7240 series	Fire detection and alarm systems — the international series addressing the same subject matter
EN 12845	Fixed firefighting systems — automatic sprinkler systems, design, installation and maintenance
EN 15004 series	Fixed firefighting systems — gas extinguishing systems
EN 671 series	Fixed firefighting systems — hose systems, including hose reels and hydrant systems
EN 3 series	Portable fire extinguishers
EN 12101 series	Smoke and heat control systems — including natural and powered ventilators, smoke barriers, and pressure differential systems
EN 1838	Lighting applications — emergency lighting
EN 50172	Emergency escape lighting systems
EN 13501 series	Fire classification of construction products and building elements
EN 1366 series	Fire resistance tests for service installations — including penetration seals, dampers and ventilation ducts. Relevant to the compartmentation question in Section 06
EN 16763	Services for fire safety systems and security systems — the reference to name when specifying installer and maintainer competence
IEC 62305 series	Protection against lightning — relevant to the protection of the system itself

HOW TO USE THIS REGISTER — AND WHAT GOVERNS ABOVE IT

Standards are revised, withdrawn and superseded, and the fire safety family is revised frequently. Verify the current edition and the national adoption with the standards body applicable to your project, and confirm that the clause you intend to rely on still says what you think it says. **Nothing in this guide is a statement of the content of any standard.**

Four things govern above all of the above. The national fire safety legislation applicable where the building stands; the requirements of the authority having jurisdiction; the fire strategy for that specific building, prepared by a competent fire engineer; and the requirements of your insurer. Where any of these differ from anything in this guide, they prevail — and where this guide is silent on a numeric value, that silence is deliberate and those are the sources that supply it.

About APIS

APIS is an integrated engineering group founded in Kosovo, operating across the Western Balkans and into the European Union. The Group delivers mechanical, electrical, energy and infrastructure works through twenty-one delivery divisions across two strategic business units — Building Systems & Technologies, and Energy, Industry & Infrastructure — supported by four engineering excellence centres. APIS operates management systems certified to ISO 9001, ISO 14001, ISO 45001 and ISO 50001.

The **Fire Protection & Detection Division** designs, installs, commissions and maintains fire detection, alarm and suppression systems, and provides the interface coordination that Section 06 describes — because the party that installs the fire panel is rarely the party that installs the dampers, and somebody has to be accountable for the line between them. Work is delivered under the Group's DBOM lifecycle model — design, build, operate and maintain — which means the party that specifies the system is also the party that has to keep it working.

Prepared by the APIS Fire Protection & Detection Division · **Document** APS-GD-12 issue v1.0 of 20 August 2026 · **Contact** apisgroup.net/contact

Do you know what your fire system *is actually configured to do?*

Most buildings do not, because the cause-and-effect matrix was never issued and the interfaces were tested once. Our engineers will establish what your system is configured to do, test every line of it against what it should do, and give you the document that should have come with the building.

SPEAK TO THE FIRE PROTECTION & DETECTION DIVISION

System survey and panel support assessment · detection design and device schedules · cause-and-effect matrix production and testing · interface coordination and witnessing · suppression design and enclosure integrity testing · commissioning · maintenance and the statutory regime

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