

Digital Fire Safety Log Book – Product Spec & Compliance Map

Last updated: 1 November 2025

1) Purpose & Outcomes

Build a digital fire-safety log book platform that:

- Satisfies UK legal duties for record-keeping, maintenance evidence, and training under the Fire Safety Order and related regulations.
- Lets staff complete checks quickly (web/mobile, offline-first), attach evidence (photos, notes, GPS), and auto-sync when online.
- Gives managers a KPI dashboard, exception reporting, and exportable audit packs.
- Is multi-tenant and white-label ready for future resale to fire risk assessors.

Primary outcomes:

- **Compliance confidence** (auditable, immutable records)
 - **Operational visibility** (KPI dashboards, reminders)
 - **Scalability** (multi-site, multi-client, white-label)
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2) User Types & Roles (RBAC)

- **Responsible Person (RP) / Duty Holder:** Owns compliance per premises. Full access to their organisation.
- **Site Manager:** Manages one or more sites; schedules, reviews, signs off; views KPIs for their sites.
- **Technician / Fire Marshal / General Staff:** Completes assigned checks; can raise defects, attach evidence.

- **Competent Person / External Contractor:** Limited access to assigned assets and service visits.
- **Auditor / Enforcing Authority (optional read-only portal):** Read-only export/download of evidence and audit trail for a date range.
- **Super Admin (vendor):** Tenant management, branding, feature flags.

Permissions are scoped by **Organisation** → **Sites** → **Assets** with least-privilege defaults. All actions are logged (who/what/when/where).

3) Legal & Standards Compliance (What we must evidence)

Records to maintain (core):

- Fire detection & alarm: weekly tests; periodic servicing; false alarm log.
- Emergency escape lighting: monthly function tests; annual full-duration.
- Fire doors: routine condition checks; hold-open release tests.
- Firefighting equipment: extinguishers (monthly visual; annual service); hose reels (annual); sprinklers (weekly/periodic).
- Training & drills: induction, periodic training, drill records.
- Visits: Fire Safety Inspector/Auditor records; enforcement notices.
- Risk assessment references: linkage to latest FRA and significant findings.

Platform behaviours supporting compliance:

- **Immutable audit trail:** append-only event log; signed records; versioned edits with reasons.
- **Time, user, and location stamping:** server time; device time; optional geolocation for proofs.
- **Evidence capture:** photos, docs; hash on upload; EXIF preserved; GPS stored.

- **Scheduling:** pre-built frequency templates; site-level calendars; escalations for missed tasks.
 - **Defect lifecycle:** raise → classify risk → remedial action → retest → close.
 - **Retention:** configurable (e.g., 6+ years); legal hold for investigations.
 - **Exports:** read-only PDF “Compliance Pack” per period/site; CSV/JSON for raw data.
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4) Check Libraries (Templates)

Provide default check templates aligned to best practice. All templates are cloneable per site. Examples below.

4.1 Fire Detection & Alarm – Weekly Test

Fields: Date/time; call point ID; release devices (Y/N); detector zones impacted; result (Pass/Fail); faults; actions; tester; signature; location (auto); attachments.

4.2 False Alarm Log

Fields: Date/time; trigger (MCP/Detector/Panel); location; category (unwanted/equipment/accidental/malicious/good intent); cause; actions; responsible person; follow-up due date.

4.3 Emergency Lighting – Monthly

Fields: Date/time; test method (mains fail simulation); luminaires set/ID; pass/fail; fault details & mitigations; rectified date; tester; evidence.

4.4 Fire Doors – Routine Check

Fields: Door ID; location; condition (closer, seals, glazing, gaps); hold-open release test; defects; action priority; remediation owner; target date; photos/video.

4.5 Extinguishers – Monthly Visual / Annual Service

Fields: Extinguisher ID; type/size; pressure gauge; tamper seal; weight; mount/visibility; date in service; last service; pass/fail; remedial; certificates attachment.

4.6 Sprinklers – Weekly

Fields: Water/air pressures; tank levels; motor alarm; pump auto-start; diesel restart; trace heating; batteries check (if applicable); defects; actions.

4.7 Training & Drills

Fields: Date; attendees; duration; syllabus; assessor; outcomes; next due; attachments (sign-in sheets, certificates).

4.8 Inspector / Auditor Visits

Fields: Date; organisation; officer name; notes; actions; due dates; attachments; outcome.

5) KPI Dashboard (per Organisation / Site)

Leading indicators

- % scheduled checks completed on time (weekly, monthly, annual)
- Overdue checks count & trend
- Open defects by severity (critical/high/medium/low)
- Avg time to close defects
- False alarms per 100 detectors (trend)

Lagging indicators

- Enforcement notices (open/closed)
- Training coverage (% staff current)
- Fire door failure rate per month
- Missed drill frequency

Data quality

- Entries without evidence
- Entries failing GPS/geo-fence (optional)
- Edits after submission (flagged)

All KPIs filterable by site, building, floor, asset type, and date range. Drill-down to records.

6) Offline-First Operation

- **Clients:** PWA (iOS/Android/Desktop) + optional native wrapper later.
- **Local store:** IndexedDB/SQLite with encrypted at rest (WebCrypto); background sync via Service Workers.
- **Conflict strategy:** CRDT or last-write-wins with human-review queue; record versioning and diff viewer.
- **Deferred evidence uploads:** queue with retry; show per-item sync status; warn on partial sync.

7) Data Model (high-level)

- **Organisation** {id, name, branding, domain, settings}
- **User** {id, org_id, role, name, email, MFA, status}
- **Site** {id, org_id, name, address, what3words/postcode, geo-fence}
- **Building/Zone/Floor** {id, site_id, hierarchy}
- **Asset** {id, site_id, type (door, extinguisher, alarm, luminaire, sprinkler, hose reel), tag/code, location, attributes, service dates}
- **ChecklistTemplate** {id, scope, fields, frequency, guidance, references}
- **Schedule** {id, site_id, template_id, rule, assignees, SLAs}
- **Task** {id, schedule_id, due_at, status, assignee}
- **Entry** {id, task_id, created_by, created_at, location, device_id, hash, signature}
- **EntryItem** {entry_id, asset_id, field_id, value, pass_fail}
- **Defect** {id, source_entry_id, severity, description, owner, target_date, status}
- **Evidence** {id, entry_id, file_uri, hash, exif, gps, uploaded_by}
- **AuditEvent** {id, actor, action, entity, entity_id, before, after, timestamp, ip, device}

- **TrainingRecord / Drill / Visit** similarly structured

Multi-tenancy: every table keyed by org_id; row-level security in the DB.

8) Security, Privacy & Integrity

- **Auth:** OAuth/OIDC; SSO (Azure AD/Google) optional; enforced MFA; device registration.
 - **RBAC + RLS:** role & attribute-based; row-level policies in Postgres.
 - **Encryption:** TLS 1.2+ in transit; AES-256 at rest; client-side encryption for offline store.
 - **PII & images:** data minimisation; DPIA; configurable retention; redaction tools for exports.
 - **Immutability:** append-only audit events; cryptographic hash chain per entry; optional WORM storage for evidence.
 - **Backups & DR:** point-in-time recovery; cross-region; RPO ≤ 15 min; RTO ≤ 4 h.
 - **AppSec:** OWASP ASVS L2; secure SDLC; dependency scanning; pen tests; ISO 27001 readiness.
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9) Notifications & Reminders

- **Assignment notifications** (email/push) on new tasks
- **Pre-due reminders** (e.g., 24h/1h)
- **Escalations** on overdue to site manager, then RP
- **Digest emails** weekly/monthly with KPIs and exceptions
- **Trigger-based:** false alarm spike, repeated door failures, incomplete monthly emergency lighting
- Quiet hours & time-zone aware (Europe/London default)

10) Reporting & Exports

- **Compliance Pack (PDF):** period/site; includes executive summary, KPI tiles, register of checks, defects list, training & drills, inspector visits, and evidence index with hashes.
- **Asset registers** (CSV/Excel)
- **Full data export** (JSON/CSV) for client retention/migration
- **Branded** with white-label theme; optional QR code to verify authenticity

11) White-Labeling & Multi-Tenant Architecture

- **Theme engine:** colours, logos, typography; per-tenant subdomain (e.g., acme.firesafety.app)
- **Configurable templates:** tenants can publish custom check templates to their clients
- **Billing:** per-tenant usage (users, sites, storage)
- **Feature flags:** enable modules per tenant (e.g., HRB pack)

12) Accessibility & Usability

- WCAG 2.2 AA; large tap targets; offline banners; auto-save; barcode/QR scanning for assets; voice notes to text.
- Simple language mode for staff; embedded micro-guidance on each field.

13) MVP Scope (Phase 1 – 8–12 weeks)

Must-have

- Auth & RBAC (Org/Site/User)
- Sites, Assets, Templates (alarm weekly, emergency lighting monthly, extinguishers monthly, fire doors)
- Scheduling & tasks (RRULE)
- Offline capture + sync (PWA)
- Evidence capture (photos + GPS)
- KPI basics (completion, overdue, defects by severity)
- PDF Compliance Pack + CSV exports
- Email reminders & escalations

Should-have

- False alarm analytics
- Training & drills records
- Inspector visits

Could-have

- Read-only auditor portal
- QR codes for assets

14) Roadmap (Phases)

- **Phase 2:** Sprinklers module; hose reels; enhanced dashboard; push notifications; mobile app store wrappers.
- **Phase 3:** FRA linkage & actions, contractor portal, SSO, custom analytics, API for third-party CMMS.
- **Phase 4:** White-label marketplace (templates/themes), billing, multi-language, e-signatures.

15) Acceptance Criteria (samples)

- Creating an alarm weekly test offline generates a signed entry with timestamp, user, device ID, and location; on sync, the server verifies integrity and stores the evidence; the entry is immutable thereafter, with edits recorded as new versions.
- Overdue tasks trigger an escalation chain and appear in the KPI dashboard within 5 minutes of sync.
- Compliance Pack for any date range is reproducible (same data & hashes) and includes an audit events appendix.

16) Sample Screens (wireframe notes)

- **Home (Staff):** Today's tasks; start/continue; offline banner; last sync time.
- **Run Check:** Asset list with status; tap asset → quick form; attach photo; mark pass/fail; add comment; save.
- **Defect:** severity, owner, target date; raise from failed item; add photo.
- **Dashboard (Manager):** Completion %, overdue, defects, false alarms; filters.
- **Schedules:** calendar + list; rule editor; bulk assign.
- **Reports:** pick site, date range, report type; email/PDF/CSV.

17) Data Fields (starter set)

- **Common:** date/time (UTC + local), user, role, site, location (GPS), notes, evidence, digital signature, hash, version.
- **Alarm weekly:** MCP ID, release devices, affected zones, outcome, faults/actions.
- **Emergency lighting monthly:** luminaires subset/IDs, function OK, damage, rectification date.

- **Fire doors:** closer/seals/gaps, release OK, defects, priority.
 - **Extinguishers:** ID/type/size, gauge/weight/seal, location visibility, service due.
 - **Sprinklers weekly:** pressures, levels, alarms, pump start, diesel restart, trace heating.
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18) Tech Stack (suggested)

- **Frontend:** React + PWA (Service Workers, IndexedDB via Dexie); React Native wrapper later.
 - **Backend:** Node.js/TypeScript (NestJS) or Python (FastAPI); PostgreSQL + PostGIS; Redis (queues/rate-limits).
 - **Storage:** S3-compatible object storage with lifecycle rules; server-side encryption; optional Glacier for archive.
 - **Search/Analytics:** OpenSearch or ClickHouse for event/audit analytics.
 - **Infra:** Docker/K8s; IaC via Terraform; observability (Prometheus/Grafana), SIEM.
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19) Risk & Mitigation

- **Offline conflicts** → Merge UI + version history, human resolution queue.
 - **Photo PII** → DPIA; blur/redact tool; retention policy per tenant.
 - **Template drift** → Versioned templates; lock on scheduled tasks.
 - **White-label complexity** → Feature flags + theme tokens; start minimal.
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20) Future: HRB Pack (High-Rise Residential)

- Floor plans / building plan repository; secure share with FRS

- Monthly fire door checks to flat entrances; quarterly common doors
 - Wayfinding signage register; smoke control & evacuation alert tests
 - Premises information box contents checklist
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21) Starter Template Definitions (JSON-like pseudo)

```
{
  "name": "Fire Alarm – Weekly Test",
  "frequency": "RRULE:FREQ=WEEKLY",
  "fields": [
    {"id": "mcp_id", "label": "Call point ID", "type": "string", "required": true},
    {"id": "releases", "label": "Automatic door releases operated", "type": "boolean"},
    {"id": "detector_zones", "label": "Detector zones", "type": "multiselect"},
    {"id": "result", "label": "Result", "type": "enum", "options": ["Pass", "Fail"], "required": true},
    {"id": "faults", "label": "Faults found", "type": "text"},
    {"id": "actions", "label": "Actions taken", "type": "text"}
  ],
  "requiresEvidence": false,
  "geo": true,
  "signature": true
}
```

22) Implementation Checklist

- DPIA and privacy notice templates
 - Default legal retention (e.g., 6 years) + per-tenant override
 - Hashing & signature library integrated
 - PDF template for Compliance Pack + hash manifest
 - Seed assets & schedules importer (CSV)
 - QR code generator for assets
 - Monitoring/alerting on sync failures and overdue escalations
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23) Go-Live Readiness

- Pilot with 1–2 sites; parallel run with existing paper log for 4–6 weeks
- Data migration plan; user training; support runbook
- Evidence that KPIs and reminders functioned during pilot

End of Spec