GUIDE BATTERY STORAGE · 7 MIN.

Battery storage for operators and asset managers: fire protection in ongoing operation

Passive fire protection does not end at acceptance. How operators and asset managers keep the condition of the thermal barrier demonstrable over the service life and stay in control of third-party interventions.

Situation

At acceptance, a battery storage system moves out of project mode and into an operation optimised for availability. Passive fire protection frequently ends up with nobody responsible for it. It triggers no alarm, appears in no monitoring system and reports no fault. That is precisely why a damaged or incompletely reinstated thermal barrier can go unnoticed for years in normal operation, even though it lost its protective effect long ago.

The operator carries responsibility for the safe condition of the installation. That includes the risk assessment under the Betriebssicherheitsverordnung (German ordinance on industrial safety and health), which has to cover all relevant operating states and be kept up to date. Separate sets of rules apply to the operation of electrical installations and to recurring inspections. Structural fire protection, however, is rarely carried along in those inspections, because it is not managed as electrical equipment.

Over the service life, many trades intervene in the installation. Module replacement, retrofitted sensors, additional cable routes, modifications to the cooling: every one of these interventions can breach a separating structure. If the opening is then not closed to EN 1366-3, a weak point arises exactly where the highest load will arrive in the event of an incident.

The installation itself also changes. Cell ageing shifts the thermal behaviour, capacity expansions tighten the layout, and repowering brings systems with different test data into a structural environment designed for the original configuration. The fire protection concept drawn up once then describes a state that no longer exists in the field. Anyone reaching for it in an incident is working from an outdated basis.

Our approach

Manage passive fire protection as an asset in its own right in your maintenance system. Every separating wall, every thermal barrier and every barrier between units is given an identifier, a certificate of usability and an inspection interval. Only then does an object exist that belongs to someone, that is inspected to a plan and whose condition can be documented over the service life. Without that step, fire protection remains an annex to

the acceptance documentation.

Make the penetration register a binding working document. Whoever opens a separating structure enters the opening and closes it again with the tested system build-up. A simple release step before closing, combined with photographic documentation, prevents the most common cause of ineffective thermal barriers in existing installations: the well-meant but undocumented seal made by an outside trade.

Define recurring visual inspections and describe what to look for. Cracks and spalling at connection joints, displaced or missing covers, cables introduced later without a penetration seal, corrosion on fixings, moisture damage to insulation layers. These points can be captured with a short checklist during walk-throughs that take place anyway, without an additional shutdown. The effort per unit is a matter of a few minutes.

With every change to the installation, check whether the structural design still holds. A change of system brings a new UL 9540A report with different temperatures and different propagation behaviour. A tighter layout shortens separation distances that replaced separations in the original concept. Both belong assessed before implementation, not afterwards. The assessment belongs in the same release step as the technical change itself.

Keep the evidence documentation in such a way that it is to hand within an hour when it matters. Insurers, expert assessors and authorities ask for the same documents: certificates of usability, installation records, photographic documentation, change history. An ordered file that is updated after every intervention is worth considerably more in a claim and at contract renewal than a reconstruction after the fact, which convinces neither expert assessors nor authorities and, in case of doubt, is read to the operator's disadvantage.

Sequence

1. On-site condition survey

We record all fire protection relevant components of the installation in their as-found condition: separating walls, barriers between units, linings and every penetration. These are compared against the fire protection concept and the as-built documents. The result is a list of deviations, separated into immediate action required and medium-term upgrading.

2. Assessment against the protection objective

Every deviation is assessed for whether it actually reduces the protective effect. The test data of the installed system, the siting logic to NFPA 855 and the property insurers' expectations to VdS 3103 are drawn on. This produces a prioritisation based on effect rather than on the number of findings.

3. Upgrading during ongoing operation

The measures are cut so that they can be implemented section by section and largely without shutting down the installation as a whole. Where isolation is unavoidable, it is coordinated with your marketing windows. Every completed penetration seal is documented photographically before closing and assigned to the component.

4. Inspection and maintenance plan

For the inspected components we draw up a plan with intervals, inspection scope and checklists that can be adopted into your existing maintenance system. In addition we define the release process for penetrations made by outside trades. That settles who may open a separating structure and how it is closed again.

5. Updating when changes occur

For module replacement, capacity expansion or repowering we check the structural design against the new system data. Changes to layout, separation distances or cell chemistry are assessed for their consequences for the thermal barrier. The evidence file is updated so that documentation and installation describe the same condition at all times.

Frequently asked questions

At what intervals should the structural thermal barrier be inspected?

There is no fixed statutory interval specifically for thermal barriers on battery storage systems. It makes sense to tie inspection to the walk-throughs and recurring plant inspections that take place anyway, supplemented by an inspection after every intervention that has touched a separating structure. What matters is less the frequency than the complete recording of interventions.

What happens to the fire protection concept in a capacity expansion?

It has to be updated. An expansion changes the layout, the separation distances and frequently the system in use with its test data as well. The separating structures were designed for the original configuration. Whether they still cover the new load is a question of assessment, to be settled before implementation, not at the next walk-through.

Who is liable if an outside trade damages a thermal barrier?

Responsibility for the safe condition of the installation stays with the operator, regardless of who caused the damage. That is why the release process for penetrations matters so much: it documents who opened and who properly closed, and it makes deviations visible before they disappear into the installation.