GUIDE BATTERY STORAGE · 7 MIN.

Battery storage for insurers and expert assessors: what makes a storage system insurable

What property insurers and expert assessors look for in large-scale battery storage systems, and the part the structural thermal barrier plays in limiting the maximum loss. With reference to VdS 3103, UL 9540A and EN 1366-3.

Situation

For the property insurer, a fire in the storage system is the decisive event. It is not the failure of a single unit that governs the calculation, but the question of how far an event can spread before it comes to a halt. That question determines the possible maximum loss and with it cover, deductible and the conditions written into the contract.

Large-scale battery storage systems are regarded as insurable where minimum technical standards are demonstrated. Systems with evidence to EN IEC 62619 and UL 9540A are considerably easier to underwrite than those without solid test data. Added to that are requirements for monitoring, emergency shutdown, maintenance schedules and staff training. The VdS 3103 guideline sets out what property insurers expect in the handling of lithium batteries.

In the assessment, active fire protection is usually described in detail: detection technology, gas warning, suppression system, emergency shutdown. The structural part is often confined to general wording. Yet it is the structural separation that works without actuation, without a power supply and without intervention, and that therefore still holds when the active systems can no longer control the event.

For the expert assessor this creates a problem of evaluation. A UL 9540A report describes the behaviour of a test assembly under defined conditions. Whether the components at the real site withstand that load is not thereby answered. Without a documented link between test data and the structure as built, the judgement remains an estimate rather than evidence. This gap regularly comes to light only during claims handling.

Our approach

Insist on the link between test data and component. The UL 9540A report yields the thermal load on adjacent surfaces, the propagation behaviour between units and the gas release. The separating structure installed has to match those values. Only once the exposed side, the fire resistance duration and the permissible temperature rise on the unexposed side are stated can the execution be assessed at all.

Examine the penetrations as strictly as the surface. A correctly executed separating wall loses its effect at the first unsealed cable entry. EN 1366-3 is the relevant test framework for penetration seals on cable and pipe

penetrations. A penetration register with a certificate of usability for each opening carries more weight in an appraisal than any general description of the concept.

Assess the separation as a loss-limiting measure, not as prevention. Thermal runaway in a cell cannot be ruled out by structural means. A structural thermal barrier ensures that the event stays confined to one unit or one section and that the fire service retains time and access. For the maximum loss that difference is decisive, because it fixes the size of the installation affected.

Look at the condition over the service life, not only at acceptance. Module replacement, retrofits and capacity expansions intervene in separating structures. An operator who records interventions, releases openings and documents seals delivers a solid risk picture. Where that history is missing, the acceptance documentation describes a condition whose continued existence nobody can evidence. Ask for the change history explicitly, therefore, not just for the acceptance file.

Word conditions so that they can be checked. "Adequate structural separation" can neither be implemented nor verified. What can be checked is the required fire resistance duration, evidence to EN 1366-3 for penetrations, a maintained penetration register and recurring visual inspections with a defined scope. Conditions of that kind can be worked through at the next inspection visit without discussion.

Sequence

1. Review of the documents

We check the fire protection concept, the system documentation and the as-built documentation for completeness and internal consistency. The focus is on whether the components described match the test data of the installed system. Contradictions between concept, design and evidence file are named before the site visit takes place.

2. Site walk-through of the structural separations

On site, separating walls, barriers and linings are recorded in their as-found condition. Connection joints, fixings, damage and all penetrations are captured. These are compared against the penetration register. Deviations are documented photographically and assigned to the respective component identifier.

3. Assessment of the propagation scenario

From the test data to UL 9540A and the layout as actually built we derive which part of the installation would realistically be affected in an event. The siting logic to NFPA 855 and the expectations to VdS 3103 serve as the benchmark. The result is a reasoned statement on the loss limitation achievable by structural means.

4. Measures and verifiable conditions

Defects identified are prioritised by their effect on the protection objective and translated into concrete measures. For the contract we word conditions with measurable criteria: fire resistance duration, route to evidence, documentation obligations and inspection intervals. At the next visit it is then unambiguous whether the condition has been met.

5. Evidence and follow-up review

After implementation you receive an ordered evidence file with certificates of usability, installation records and photographic documentation for each component. A follow-up review rhythm is agreed for the years ahead. That keeps the risk picture current without a full reassessment being required at every contract renewal.

Frequently asked questions

Is VdS 3103 binding for large-scale battery storage systems?

VdS 3103 is not a legal standard but a publication of the property insurers on the handling of lithium batteries. It becomes binding where it is agreed as a condition in the insurance contract. Independently of that, it serves in practice as the benchmark that risk engineers and expert assessors use in their evaluation.

What does a UL 9540A report say about the structural execution?

It describes the behaviour of a defined test assembly under forced thermal runaway, that is temperatures, propagation and gas release. About the structural execution at the site it says nothing. Its value lies in supplying the thermal load profile against which the separating structures can be designed and subsequently judged.

Does a suppression system replace structural separation?

No, the two work on different levels. Active systems have to detect and actuate, and they need power and functionality to do so. Structural separation works without actuation and remains in place even when an event exceeds the capacity of the suppression technology. In risk assessment they are two protection levels to be judged separately.