



LEMUR-AG15
Solar Mitigation

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SOLAR MITIGATION

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ABOUT US

Haide Technologies is an Independent Research and Development entity supporting industry and the scientific and engineering communities with novel product development and technical solutions. Haide Technologies has a Strategic commercial focus on the development of future decarbonisation based technology and sustainability.

We are UK based company with in house Design, manufacture & R&D capabilities and heavily focused on green energy solution and the Pioneering of alternative/sustainable material utilisation and manufacturing techniques.

THE CLIMATE CHALLENGE

With a clear UK objective to achieve net zero by 2050, the power system will be required to both decarbonise itself and support the decarbonisation of other sectors. While ATL have been developing low carbon magnetics for over two decades that's not the only challenge we face, even if global efforts to mitigate CO₂ are successful, we will still face the impacts of climate change as a consequence of our past emissions. Hotter average and peak temperatures have been recorded and further forecasted. The power system has been traditionally designed to be reliable to expected abnormal conditions but coping with the catastrophic impacts of such extreme temperatures was never a design consideration and this is now clear within asset temperature related failure data. Different resilience strategies over decades have been developed to maintain high levels of continuity of supply to the current climate and credible, known events, however, extreme and potentially unknown events are forecasted to leave many critical systems without power and the current solutions give little to no benefit. Increased temperatures during summer months will disrupt the network across the UK as they have the last few years, dependent systems on the network will not be so quick to recover – train services, hospitals and airports will be disrupted for long periods of time while equipment is replaced. As extreme temperatures become frequent with climate change and electricity underpins more and more of the UK's energy services – how do we manage and achieve the transition towards solar resilient equipment in outdoor installations.

NETWORK RAIL CHALLENGE STATEMENT:

Adapting the Railway for Improved Resilience against Future Weather Conditions as a Result of Climate Change.

Adverse and extreme weather conditions have a significant impact on the reliability of assets and on the performance and safety of the railway. Weather impacts cost NWR £50-£100m per year in delays and cancellations alone. However, the overall cost is much higher when weather-specific maintenance and repair costs are included.

ENVIRONMENTAL BENEFITS

Air conditioning systems increase greenhouse gas emissions through increased energy use and leak hydrofluorocarbons (HFCs), which are thousands of times more potent than carbon dioxide. Testing has demonstrated an opportunity to completely remove or become less reliant on air conditioning systems by protecting structures with LEMUR-AG15.

LEMUR-AG15 is a Fully Passive solution requiring no electrical power. Safe to the environment and wildlife with no innocuous toxins or hazardous materials are used in the manufacture of LEMUR-AG15

No requirement for plant/ machinery & civils for installation.



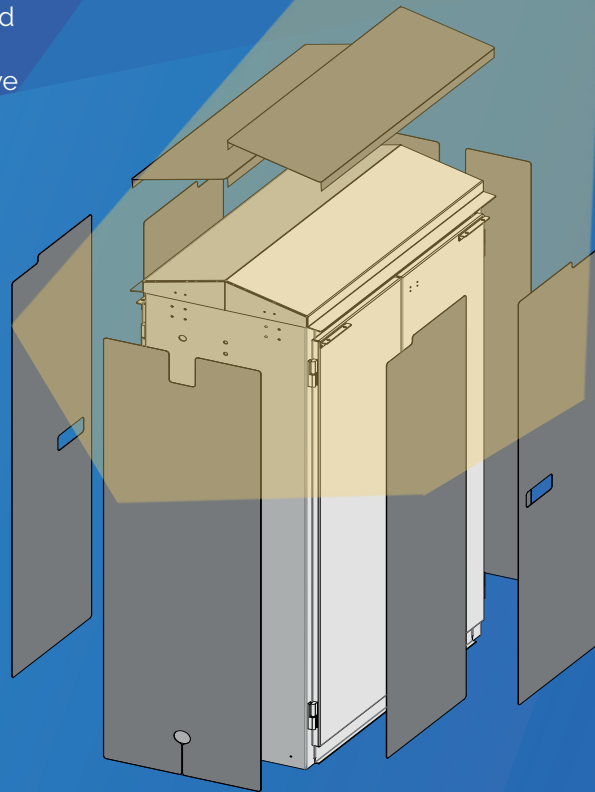
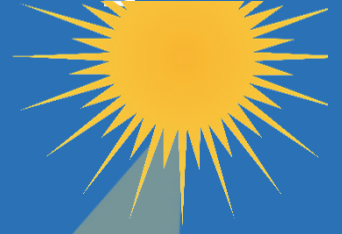
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WHAT IS LEMUR-AG15?

LEMUR-AG15, a novel technology originally developed to solve Network Rails challenges of over heating assets during summer periods. This fully passive system provides a highly efficient protective skin from the effects of electro magnetic waves of solar origin. Adaptable and scalable this technology protects equipment & apparatus housings, buildings & structures and is suited to all outdoor environments and sectors.

LEMUR-AG15 is a novel patented solar shielding compound textile. The glass and aluminium compound fabric has an aluminium outer laminate which diffuses and reflects transverse electromagnetic waves by means of a low emissivity heat sink surface while additionally offering high insulating properties by way of the glass e inner woven textiles which prevents thermal conduction. The weave pattern creates a dimpled surface when the aluminium is laminated creating a diffused surface by design. a highly efficient protective skin from the effects of electro magnetic waves of solar origin.

LEMUR-AG15 Solar Mitigation



APPLICATIONS



RAILWAYS

Equipment housing within the Railway Industry, this can be, but not limited to Location Cases, REB's, PSP's, Points, Point Machines & All other Equipment housings/buildings subject to heat related failures.



BUILDINGS

LEMUR-AG15 can be applied to building facia & construction materials from domestic to commercial applications.



HIGHWAYS

Equipment housing within the Highways Industry. This can include electrical feeder pillars, cabinets and enclosures.



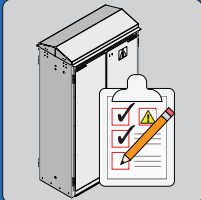
TELECOMMUNICATIONS

Equipment housing within the telecommunications industry, this can include cabinets, terminal housings, server rooms etc.

HOW IS LEMUR-AG15 INSTALLED?

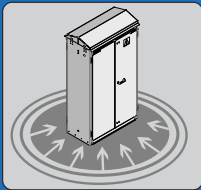
SIMPLE & QUICK INSTALLATION

The container/housing or building is measured up, this can be done digitally with drawings if necessary, if not an engineer will be on site to measure up any container/housings or buildings. With the measurements, each panel/wall has a pattern cut out to cover any possible direct sunlight. The patterns are then sent to the customer who can then install the cut patterns directly onto the source of application. The cut parts have an 'ease peel' which will be easy to find. The installer then has to assure the cut parts are lined up correctly before peeling and applying.



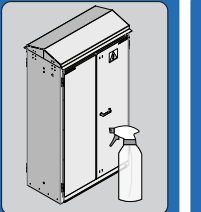
1. Existing Labels & Decals

Ensure that all Labelling to be covered during installation has been noted and details recorded for duplication and application of new labels post fitting LEMUR-AG15.



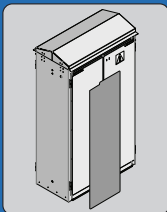
2. Repercussions

Ensure that the area to be worked is free from hazards, there is adequate space to unpack and fit LEMUR-AG15 panels in a safe and controlled manner.



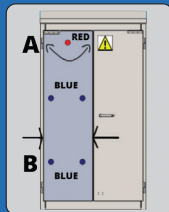
3. Surface Inspection

Use LEMUR-X15 cleaning spray (CAT #1236HT1) and ensure all surfaces are dry and free from debris.



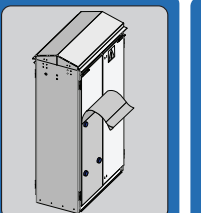
4. Product Alignment

Place the first LEMUR-AG15 Panel Against Corresponding LOC Panel



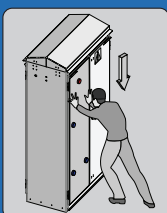
5. Magnets

A) Use the red magnet to hold the panel in place and align parallel to the loc
B) Use the blue magnets to secure the panel in place



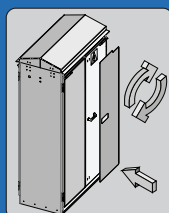
6. Initial Peeling

Remove the red magnet and peel off the first 15cm of backing tape.



7. Pressing

Press the 15cm of exposed tape against the loc then continue to peel small sections of backing tape then press against the loc until the full panel is secure.



8. Repeat

Once the first LEMUR-AG15 panel has been fixed into place repeat the same process with the remaining panels.



9. Even Out Surfaces

For final stage it is recommended that the product is properly evened out and bonded to the surface, there should be no corners or edges that are exposed to water ingress or air (should be air sealed tight). This can be achieved by using an Ink Roller, a plastic card (e.g. loyalty card) or a flexible piece of card. Do not use anything harsh or abrasive.

Peel and Stick !

LEMUR-AG15 does not require any modification to existing structures. The Material has a peel away film backing and structural adhesive.





LEMUR-AG15 COLLABORATORS



ASSET LIFE EXTENSION TO EXISTING EQUIPMENT



PROVING THE TECHNOLOGY

Thermal testing was carried out at Liverpool John Moore University over a period of 6 Months, in accordance with BSEN 50125-3:2003 and MIL-STD 810F. The simulated solar test procedure was created by LJMU under controlled laboratory conditions and who derived 1120 Watts/m² of Infrared EMW for the purpose of a simulated solar test. Funding for the research and laboratory testing was supported by the carbon trust & the green growth fund.

LEMUR-AG15 through the collaborative outputs of testing & product development evolved into a novel compound high performance material with unmatched solar reflectance, insulating properties, reduced glare, structural adhesion and weather resilience.

Thousands of assets protected across the UK national critical infrastructure since 2021 with 100% success in maintaining operational temperatures of apparatus housed equipment throughout the summer months.

KEY BENEFITS

- Reflects Transverse Electromagnetic waves from the sun >97%
- < 0.5Kg /m² - Ultra Light weight solution
- < 0.5mm thick, flexible and formable to any profile.
- Simple to cut with either scissors or Stanley knife.
- Long service life >20 years.
- 100% Recyclable.
- Typical installation time 15 minutes (Railway apparatus housing)
- Fully passive solution requiring no power source.
- Specially formulated Hi-Tac weatherproof structural tape backing.
- Non porous, resistant to water, chemicals, oils, mould & Algae.
- Resistant to graffiti and easily cleaned.
- Requires no specialist tools or training for installation.
- No requirements to drill the housing.
- No Requirements for plant & civils.
- No Requirement to de-energise the asset or open doors.
- Can be installed as part of scheduled maintenance tasks or within a factory environment prior to asset installation and commissioning.



COMING TO A RAILWAY NEAR YOU...



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