

CLEVELAND-CLIFFS BATTERY ENCLOSURE

A STEEL SOLUTION SUPERIOR TO ALUMINUM

BATTERY ENCLOSURE FEATURES:

- > 70% reduction in GHG emissions during material production
- Increased thermal runaway protection
- Ease of manufacturing and cost efficiency
- Versatile design for scalability and performance



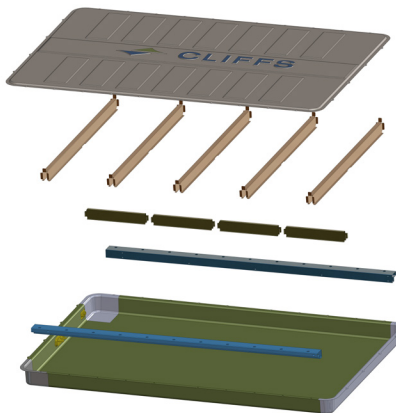
The Cleveland-Cliffs Battery Enclosure is a sustainable and robust all-steel battery enclosure concept that meets stringent performance requirements. It is designed to fit any unibody architecture connecting to the rockers through the unique L-shaped tubular side rails.

Our Battery Enclosure design utilizes an innovative one-piece bottom tray stamped with laser-welded blanks, which eliminates the need for additional reinforcements to protect the battery cells. It has novel L-shaped side rails, pushing the limit of design while providing robust protection for a side impact. This approach also improves the attachment of the unit to the body-in-white (BIW).

The all-steel design utilized here enables a CO₂ reduction of more than 70% as compared to a comparable all-aluminum design. It also has the advantage of thermal runaway mitigation.

The Cliffs' Battery Box design specifications are shown below:

- Overall size: 2100 x 1400 x 130 mm (L x W x H)
- 80 kWh battery capacity with 4680 cylindrical cells
- Structural weight of 103 kg
- Component steel details:

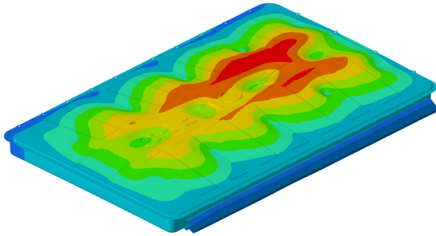


Cleveland-Cliffs Battery Enclosure design.

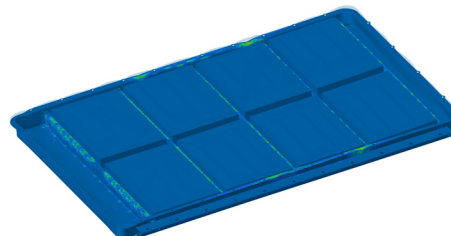
Part	Steel Grade	Description
Lateral Crossmembers	M1500	Martensite 1500
Longitudinal Crossmembers	MP980	Multi-Phase 980
L-shaped side rails	ULTRALUME® 1500	Aluminized Press-Hardened Steel
Top Cover	DDS	Mild Steel
Battery Tray	M1700 and EDDS	Martensite 1700 and Mild Steel

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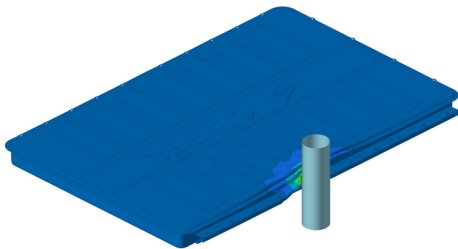
The Cleveland-Cliffs battery enclosure has been thoroughly evaluated for engineering performance, as described below:



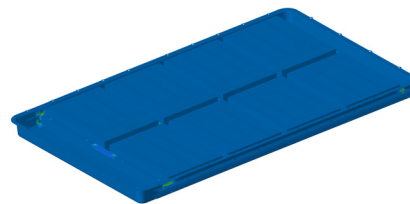
Modal Analysis: First Structural Mode 23.4 Hz



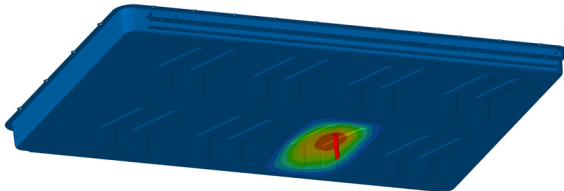
Drop Test: No Failures



Side Crush: No Contact with Modules before Reaching 100 kN



Shock Test: Stresses below Yield/Tensile Strength



Underfloor Intrusion: No Contact with Modules before reaching 35 kN

About Cleveland-Cliffs Inc.

Cleveland-Cliffs is the largest flat-rolled steel producer in North America. Founded in 1847 as a mine operator, Cliffs also is the largest manufacturer of iron ore pellets in North America. The Company is vertically integrated from mined raw materials, direct reduced iron, and ferrous scrap to primary steelmaking and downstream finishing, stamping, tooling, and tubing. The Company serves a diverse range of markets due to its comprehensive offering of flat-rolled steel products and is the largest supplier of steel to the automotive industry in North America. The Company is headquartered in Cleveland, Ohio with mining, steel and downstream manufacturing operations located across the United States and in Canada. For more information, visit www.clevelandcliffs.com.

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