Battery cooling plate thickness requirements

What is the maximum temperature of a battery cold plate?
The maximum temperature of the cold plate was around 27Cand the surface temperature variation Tmax was around 5.4C,both within the typical performance requirements of battery cold plates. The fluid temperature rise from inlet to outlet is around 3.1C.

How thick should a coolant plate be?
The optimal plate thickness depends on several factors,including the heat load,the type of coolant used,and the required cooling capacity. For most applications,a thickness ranging from 1.5 mm to 3.0 mmis common. However,specific requirements may necessitate thicker or thinner plates. a. Channel Design and Heat Transfer

What is a battery cooling plate?
A battery cooling plate is a flat component manufactured from thermally conductive materials like aluminum or copper. Its function efficiently removes excess heat generated during the battery's fast charging and discharging processes. Two simple schemes will show what is a cold plate and the main principles of thermal management.

What is a typical battery cold plate?
A typical battery cold plate was chosen for this study with the dimensions of 250 x 500 x 10mmand a uniform heat load of 500W on both sides. The coolant used was a mixture of ethylene glycol and water. A simulation model was created using the commercially available CFD tool FloTHERM.

Why is the thickness of a cooling plate important?
The thickness of the cooling plate is a critical factor that influences both thermal performance and structural integrity. A thicker plate generally provides better heat dissipationdue to the increased material volume,which can absorb more heat.

How to design and optimize cold plates for EV batteries?
Design and optimization of cold plates require tradeoffs between conflicting requirements including thermal resistance, pressure drop, and manufacturing constraints. In the case of EV batteries, it is also very important to consider the surface temperature uniformity of the cold plate.

As shown in Figure 1(a), fins which have 3 mm thickness are attached to the surface of the battery and transfer heat from the battery to the bottom cooling plate located under the battery and fin assembly. The heat transferred to the ...

By optimizing the aluminium plate thickness to 4 mm and the inlet velocity to 0. ... At the inside surfaces of the flow channels, a non-slip boundary condition is employed. At the interfaces between the cooling

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plate-battery, aluminium partition-battery, and coolant-cooling plate, a coupling boundary condition is employed: (14) ? 1-2 · ? T 1-2 = ? 2-1 · ? T 2-1. 2.2.5. ...

o Dedicated design for battery or electronics cooling o Design and manufacturing experience of large size plate. Technical Parameter. Medium : Refrigerant / Coolant: Ambient temperature-40 ? to 120 ? Product thickness: 4 mm to 9 mm: Max. width: 1.6 m: Max. length: 2.5 m: Flatness < 0.5 mm in 0.2 m2 area: External tightness: <= 8.8 * 10^-6 mbar × L/s: Product Type. ABOUT US ...

We also check the maximum temperature difference between the cold plate"s surface and the battery pack"s maximum temperature difference. These tests check if the design is feasible before mass production. liquid cooling plates runner design . Our design step-by-step process: 1. First form the liquid circuit concept then calculate the temperature and pressure drop. 2. Determine ...

The battery cooling plate is a key component in the EV thermal management system. This article will provide a detailed introduction to its structure, material selection, ...

The modeling approach employed to determine thermal states of prismatic automotive cells under US EPA drive cycles is a recent advance, and its application to a ...

Intercell cooling is similar to fin cooling because it employs a cooling plate. However, the cooling plates in intercell cooling are placed between the battery cells, result-ing in a higher heat transfer ability compared with fin cool-ing, which utilizes a bottom cooling plate that indirectly contacts the batteries. Feng et al. [18] carried ...

(1) Flexible design, high reliability with no visible weld points, and the ability to manufacture very thin water cooling plates; the entire water cooling plate can have a thickness of 5-7mm, meeting lightweight standards. (2) Enables rapid ...

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