

11.0 Engineering and Research

At Harding Energy we are constantly upgrading designs and test capabilities, researching the latest developments in cell design and capability, enhancing our manufacturing techniques and capabilities and developing new methods and resources.

Given the complexities of battery chemistry, electronics, manufacturing attributes, reading this handbook is not enough to make anyone an expert on building battery packs. It requires study, research experience and specialized testing equipment, application experience, and experts on assembly techniques.

To assist our customers in designing portable energy solutions that optimize the performance of your end product, Harding provides dedicated battery experts in the United States along with specialized equipment to research and provide for you needs.

Harding's experience allows us to:

- Test your product to determine the optimum performance characteristics.
- Test battery packs that we custom designed for your application
- Design Custom electronics
- Develop Circuit boards as required
- Develop specialized electronic testing, fixtures and tooling.

Utilizing our engineering team, assures you will get a portable energy solution that meets your application requirements.

11.1 Electrical Requirements

If you have an application you would like to discuss with us, listed below is the typical information you will need to provide to us.

11.1.1 Battery Pack

- What are the maximum and minimum voltages?
- What are the average current and the peak current?
- What is the duty cycle?
- What is the ambient temperature range during charge?
- What is the ambient temperature range during discharge?
- What are the maximum and minimum storage temperatures expected?
- What is the life expectancy desired in years and cycles?
- What is the charge rate, or charge time desired?

11.1.2 Charger

- Do you need a charger?
- Termination method preferred?
- How fast does it need to charge?
- Wall mount or desk mount?
- Connector configuration preferred?

¹ Contact Harding for listing of current items in stock

- Appearance?
- Minimum cord length desired?
- Thermistor?

11.1.3 Special requirements

- Do you need a gas gauge and how accurate does it need to be?
- How long will the pack sit on the shelf before and between uses?
- Do you have high moisture or humidity requirements?
- Does it need shock resistance? If so please define.
- What display requirements do you have?

11.1.4 Application

- What is the function of the end product?
- Are there any special environmental concerns?
- High EMI waves or other inference possible circuits?
- Exposure to any fumes or effluents that could be damaging?

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