BATTERY (LITHIUM or SODIUM) CALCULATIONS

How to Calculate Watt Hours

Packing Instructions: 965, 966, 967, 977,978

To conform to Section II requirements:
- MAX Lithium/Sodium per cell 20Wh
- MAX Lithium/Sodium per battery 100Wh

Batteries and cells above these limits must conform to Section I requirements, ship as Class 9.

The calculation used to determine watt hours is:

Volts x ampere hour (Ah) = watt hours

Example, if the battery you wish to ship is rated at 11.1 volts and 4,400 mAh per cell:

- 4,400 mAh is 4,400 milliampere hours. Since most batteries have a low ampere hour ratings, they are rated in milliamperes per hour (mAh), one thousandth of an ampere hour (Ah).

- Since a milliampere hour is one thousandth of an ampere hour, divide 4,400 mAh by 1000 to get ampere hours (Ah).
  4,400 mAh ÷ 1000 = 4.4 Ampere hours

To determine the watt hours in this battery, multiply 11.1 volts by 4.4 ampere hours:

11.1 V x 4.4 Ah = 48.8 Wh

How to Calculate Lithium/Sodium Content

Packing Instructions: 968, 969, 970, 977, 978

If you do not have enough information to determine the lithium/sodium content of a battery, the following formulas will assist you:

To conform to Section II requirements:
- Max 1g per cell
- 2g max per battery

Batteries and cells above these limits must conform to Section I requirements, ship as Class 9.

The calculation used to determine lithium/sodium content is:

Ah per cell x 0.3 gm x number of cells

- Many batteries are not rated in *Ampere hours* (Ah), they are rated in *milliampere hours* (mAh). Milliampere hours are one thousandth of an ampere hour. To determine the Ah, divide the mAh by 1,000.

- It requires about 0.3 grams of lithium metal to produce 1 Ampere hour of power.

Example, if the battery you wish to ship is rated at 2,500 mAh per cell and contains 6 cells:

- Divide 2,500 mAh by 1,000 to get the rating in Ampere hours:
  2,500 mAh ÷ 1,000 = 2.5 Ah

- Multiply the Ah by 0.3 gm to determine the amount of Lithium in each cell:
  2.5 x 0.3 gm = 0.75 grams of lithium in each cell

- Multiply the amount of lithium in each cell by the number of cells in each battery:
  0.75 grams/cell x 6 = 4.5 grams of lithium in the battery

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