

Industrial batteries. Features Summary.

Chapter 4 – Lithium Ion cells construction type

Note:

To read Chapter 1, please visit: <https://www.norwatt.es/noticia-industrial-batteries--features-summary---chapter-1---acronyms-es.html>

To read Chapter 2, please visit: <https://www.norwatt.es/noticia-industrial-batteries--features-summary--chapter-2---industrial-battery-types-es.html>

To read Chapter 3, please visit: <https://www.norwatt.es/noticia-industrial-batteries--chapter-3-part-1-2--lithium-ion-battery-types-es.html>

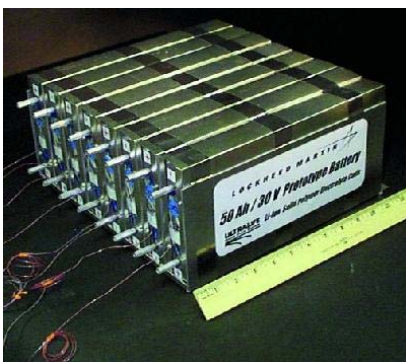
Lithium ion batteries are available in rigid cylindrical and prismatic constructions with stainless steel, or poly coated aluminium cell housing or pouch cells (sometimes called "lithium polymer")



4.1 Pouch cell

Pouch cells are prismatic cells with flexible polymer coated aluminium packaging instead of a metal can, generally with a gel electrolyte technology.

Rather than using a metallic cylinder and glass-to-metal electrical feed-through for insulation, conductive foil tabs welded to the electrode and sealed to the pouch carry the positive and negative terminals to the outside.



Main advantages:

- High load current
- Lightweight
- Highest packaging density

- Easily stackable
- Good cycling ability
- Economical to manufacture

Main disadvantages:

- The cell needs mechanical support
- Needs extra space because the cells grow 8–10 percent over 500 cycles.
- Internal pressure can crack the battery cover and the escaping gases can ignite.
- Exposure to high humidity and hot temperature can shorten service life.

Popular sizes:

No one, each manufacturer uses its own size.

4.2 Cylindrical cell

Cylindrical cells are the most common cell type in use today. This design allows for better automation processes and techniques that increase consistency and lower cost. The tubular cylinder can withstand high internal pressures without deforming.



Main advantages:

- High internal pressures without deforming.
- Good cycling ability
- Long calendar life
- Economical
- Pressure relief mechanism (membrane rupture under high internal pressure)

- Charge Interrupt Device that physically and irreversibly disconnect the cell when activated to an unsafe pressure builds up.
- Less expensive option

Main disadvantages:

- Low packaging density due to space cavities
- Heavy

Typical applications for the cylindrical cell are power tools, medical instruments, laptops and e-bikes.

Popular sizes:

- 18650: 18mm in diameter and 65mm the length
- 26650: 26 mm in diameter and 65mm the length
- 21700: Tesla, Panasonic & Samsung. While the 18650 has a volume of approximately 16cm³ (16ml) with a capacity of around 3000mAh, the 21700 cell has approximately 24cm³ (24ml) with a said capacity of up to 6000mAh, essentially doubling the capacity with a 50% increase in volume.

Available at Norwatt WebSite, please check:

<https://www.norwatt.es/productos/baterias-y-accesorios-pilas-saft-primary-lithium-batteries-es.html>

4.3 Prismatic cell

For greater stability, the prismatic cell is enclosed in aluminum or steel. Jelled or stacked, the cell saves space but can be more expensive to manufacture than the cylindrical cell. Modern prismatic cells are used in the electric powertrain and energy storage systems.

Prismatic cells have gained popularity because their large capacity and prismatic shape that make it easy to connect cells together and create a battery pack.



Main advantages:

- High packaging density
- Improves space utilization
- Flexible design
- Can be stacked

Main disadvantages:

- High cost than cylindrical cells
- Less efficient in thermal management
- Shorter cycle life than the cylindrical design

Available at Norwatt WebSite, please check:

<https://www.norwatt.es/productos/baterias-y-accesorios-baterias-ion-litio-saft-guia-para-la-seleccion-de-baterias-de-ion-litio---saft-es.html>

Coming soon... Chapter 5 – Battery management system
- BMS, BTMS