















Hangcha's Full Line of Material Handling Equipment

HANGCHA

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ISO14001:2015

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Making Material Handling Easier
SINCE 1956

HANGCHA

INNOVATIVE SOLUTIONS
NEW POWER NOW

Lithium-ion technology (Lithium Iron Phosphate, $LiFePO_4$), was developed jointly by HANGCHA and CATL for use in material handling equipment applications. These innovative and reliable battery cells and modules are manufactured to the highest standard by CATL exclusively for Hangcha Group's full line of material handling equipment.









HANGCHA'S
MANUFACTURING FACILITIES







WHY PARTNER WITH US?

HANGCHA HAS OVER 67 YEARS EXPERIENCE IN THE MATERIAL HANDLING INDUSTRY

Hangcha Group is a global leading full line forklift developer, manufacturer, and supplier. For the last 15 consecutive years, Hangcha Group has remained the largest Chinese forklift exporter for the last 15 consecutive years. Since 1956, Hangcha Group continues to engineer and manufacture high quality forklifts and warehouse equipment.

HC Forklift America Corporation is Hangcha Group's U.S. Headquarters. Located in Charlotte, NC, our team of dedicated industry specialist are focused on providing support, products, and parts to our dealers and customers. In addition to our Charlotte, NC headquarters, we have two other dealer support centers stratigically placed in Houston, TX and Los Angeles, CA. These three locations offer equipment inventory, lithium-ion battery service centers, and comprehensive support for our dealers and end-users.

400,000
We produce more than 400,000 units annually.

180
We export to 180 Countries

22%
Our market share in China is over 22%

11%
Our global market share is 11%.

www.hcforkliftamerica.com



FULL LINE OF MATERIAL HANDLING EQUIPMENT

CLASS 1 - 7

With load capacities ranging from 3,000 to 70,000 lbs, HC Forklift America Corporation offers a full line of equipment to meet your material handling needs.

Electric Pneumatic & Cushion Forklifts
Page 5



Narrow Aisle Forklifts
Page 7



Electric Pallet Jacks/Stackers
Page 9



Internal Combustion Cushion Forklifts
Page 13



Internal Combustion Pneumatic Forklifts
Page 15



Tow Tractors/ Burden Carrier
Page 17



Rough Terrain Forklifts
Page 19



Hangcha's Lithium-ion Technology
Page 21



Class 1:
Electric Cushion & Pneumatic Forklifts

Hangcha offers a line of electric cushion and pneumatic forklifts with load capacities ranging from 3,000-36,000lbs. These forklifts are powered using our Lithium Iron Phosphate ($LiFePO_4$) battery packs. In addition, Hangcha now offers a 36,000lb high-voltage, lithium-ion powered pneumatic forklift. These lithium-ion forklifts feature longer running times, opportunity charging, maintenance-free batteries, and a lower total cost of ownership when compared to similar lead-acid powered forklifts.



XC Series 3-Wheel Electric Lithium-ion Forklift
3,200-4,000lb Load Capacity



A Series 3-W Electric Lithium-ion Stand-Up Counterbalanced Forklift
3,000-5,000lb Load Capacity



X Series Electric Lithium-ion Cushion Tire Forklift
4,000-6,500lb Load Capacity



XC Series Electric Lithium-ion Compact Pneumatic Tire Forklift
4,000-7,000lb Load Capacity



XE Series Electric Lithium-ion Pneumatic Tire Forklift
4,000-7,600lb Load Capacity



XC Series Electric Lithium-ion Cushion Tire Forklift
8,000-12,000lb Loading Capacity



XC Series Electric Lithium-ion Pneumatic Tire Forklift
8,000-11,000lb Loading Capacity



XH Series Electric Lithium-ion Pneumatic Tire Forklift
26,000-36,000lb Loading Capacity



Class 2:
Electric Stock Pickers & Narrow Aisle Forklifts

Narrow aisle operation demands efficiency, safety, and performance. Hangcha has designed our electric reach trucks, high level order pickers, and a stock picker to meet all three requirements with world class engineering and the dependability that Hangcha Group is known for. Powered using lithium-ion batteries, Hangcha's narrow aisle equipment is the perfect addition to your warehouse or distribution center.



A Series Electric Lithium-ion Mini Stock Picker
475lb Load Capacity



A Series Electric Lithium-ion Stock Picker
1,000lb Load Capacity



A Series Lithium-ion High Level Order Picker
3,000lb Load Capacity



Lithium-ion Swing Reach Turret Truck
3,500lb Load Capacity



X Series Lithium-ion Pantograph Single Reach Truck
3,000-4,500lb Load Capacity



X Series Lithium-ion Pantograph Double Reach Truck
3,000-3,500lb Load Capacity

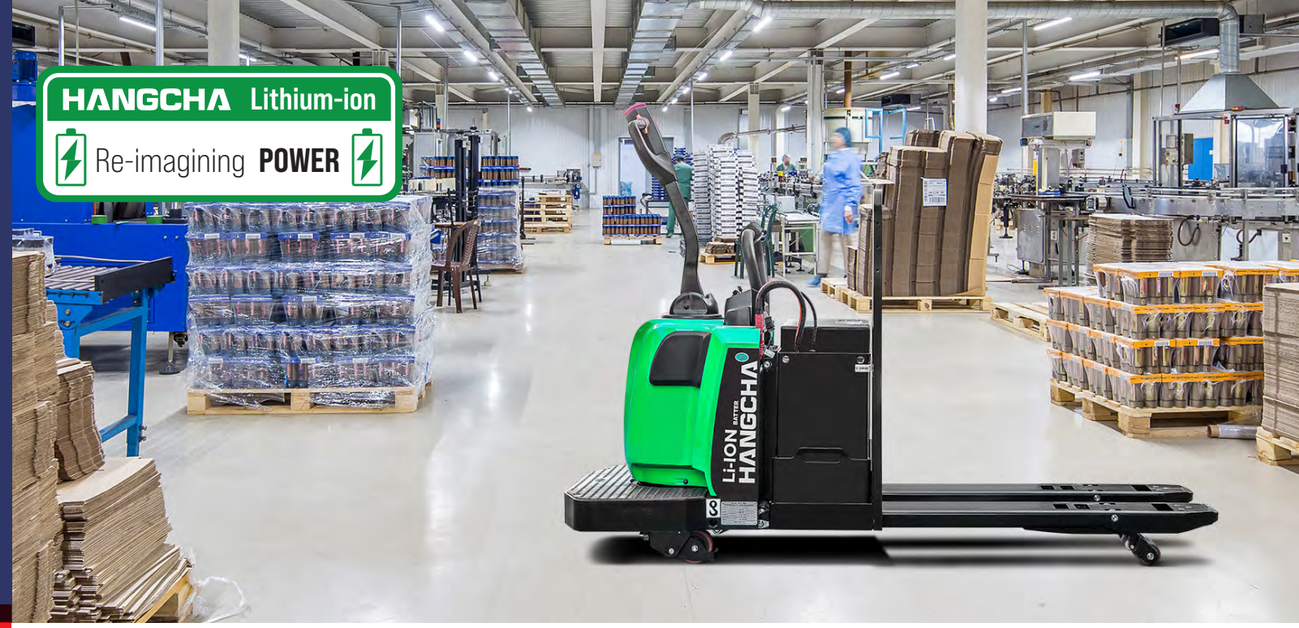


XC Series Lithium-ion Moving Mast Reach Truck
3,000-5,500lb Load Capacity



Class 3:
Electric Pallet Jacks

Hangcha's lithium-ion powered electric pallet jacks were designed with North American logistics applications in mind. These efficient pallet trucks combine safety, reliability, and ease of operation to increase productivity in the high intensity operational environments of North America warehouses and manufacturing facilities.



A Series Lithium-ion Walkie Pallet Jack
3,000lb Load Capacity



A Series Lithium-ion Walkie Pallet Jack
4,000lb Load Capacity



A Series Lithium-ion Walkie Pallet Jack
5,000lb Load Capacity



A Series Lithium-ion Walkie Pallet Jack
6,000lb Load Capacity



A Series Lithium-ion End Control Rider Pallet Jack
6,000-8,000lb Load Capacity



A Series Lithium-ion Center Control Rider Pallet Jack
6,000-8,000lb Load Capacity



A Series Lithium-ion Stand-Up Tow Tractor
10,000lb Load Capacity





Class 3:
Electric Walkie Stackers

Hangcha's lithium-ion powered electric walkie stackers were designed with North American logistics applications in mind. These efficient pallet trucks combine safety, reliability, and ease of operation to increase warehouse productivity in the high intensity operating environments of North America warehouses.

A Series Lithium-ion Walkie Straddle Stacker
2,500lb Load Capacity



A Series Lithium-ion Industrial Walkie Stacker
2,500-4,000lb Load Capacity



A Series Lithium-ion Industrial Walkie Reach Stacker
3,000lb Load Capacity



A Series Lithium-ion Industrial Walkie Counterbalanced Stacker
2,000-4,000lb Load Capacity





Class 4:
IC Cushion Forklifts

HANGCHA

Designed for the North American market, the XF Series LPG Cushion Tire Forklifts are built to work in the confined spaces of warehouses, distribution centers, and manufacturing facilities. These forklifts feature a load capacity ranging from 3,000-15,500lbs. These forklifts also include the latest advancements from Hangcha Group. They include LED efficient lighting, a load-sensing hydraulic system, a low-emission engine, noise & vibration control, and a new control system. The XF Series LPG Cushion Tire Forklifts provide safe and efficient solutions for confined spaces where higher load capacities are needed.

XF Series
LPG Cushion Tire Forklift
3,000-6,500lb Load Capacity



XF Series
Box Car Special Forklift
8,000-12,000lb Load Capacity



XF Series
Paper Roll Special Forklift
12,000lb Load Capacity



XF Series
LPG Cushion Tire Forklift
13,500-15,500lb Load Capacity





Class 5:
IC Pneumatic Forklifts

HANGCHA

Over 30 years of building forklifts have culminated in the XF series from Hangcha Group. This experience in forklift manufacturing, combined with the latest in forklift technology, results in a line of forklifts that are efficient, comfortable, reliable, and safe. The XF Series IC Pneumatic Tire Forklifts represent the true do it all forklift from Hangcha Group.

XF Series Compact Pneumatic Tire LPG Forklift

5,000lb Load Capacity



XF Series Pneumatic Tire LPG, Dual Fuel, or Diesel Forklift

LPG: 3,000-7,000lb Load Capacity
Dual Fuel: 4,000-7,000lb Load Capacity
Diesel: 4,000-7,000lb Load Capacity



XF Series Mid-Size Pneumatic Tire LPG/Diesel Forklift

8,000-11,000lb Load Capacity



XF Series Big Pneumatic Tire LPG/Diesel Forklift

11,000-15,500lb Load Capacity



XF Series Large Pneumatic Tire Diesel Forklift

17,500-26,000lb Load Capacity



High Capacity Pneumatic Tire Diesel Forklift

26,000-36,000lb Load Capacity





Class 6/Specialty: Tow Tractors/Burden Carrier

Hangcha's tow tractors and burden carrier offer load capacities ranging from 3,000-70,000lbs. The tow tractors and burden carrier are powered by Lithium Iron Phosphate ($LiFePO_4$) battery packs. This allows the equipment to have a maintenance-free battery and to be able to rapid/opportunity charge. Hangcha's Tow Tractors and Burden Carriers are perfect for the automotive, aviation, and manufacturing industries.

Lithium-ion Tow Tractor
4,500-13,500lb Towing Capacity



Lithium-ion Heavy Duty Tow Tractor
44,000-70,000lb Towing Capacity



Lithium-ion Burden Carrier
3,000-6,000lb Load Capacity





Class 7:
Rough Terrain Forklifts

Hangcha's rough terrain forklifts with 4WD were developed from the XF series forklifts that Hangcha Group manufactures. They use either the Deutz or Kubota diesel engine to give them the power needed to navigate through any type of terrain. These forklifts, with up to a 11,000lb load capacity, easily navigate through the rugged roads found in the stone industry, lumber industry, and at construction sites. The 4WD system works with the unique tire tread to provide traction in wet and slippery conditions. Because the road isn't always smooth, choose Hangcha's Rough Terrain Forklifts.

Four-Wheel Drive Rough Terrain Forklift

5,000-7,000lb Load Capacity



Four-Wheel Drive Rough Terrain Forklift

11,000lb Load Capacity

















LITHIUM POWERED

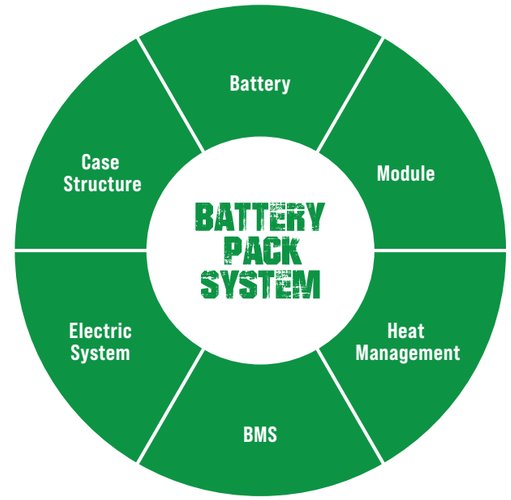
THE FUTURE IS NOW

SUPERIOR PERFORMANCE, INNOVATIVE TECHNOLOGY, & ECONOMICAL SOLUTION.

- / Long Service Life
- / Energy Saving
- / Safe and Reliable
- / Maintenance-Free
- / Fast Charging
- / High Energy Density
- / Compact Chassis

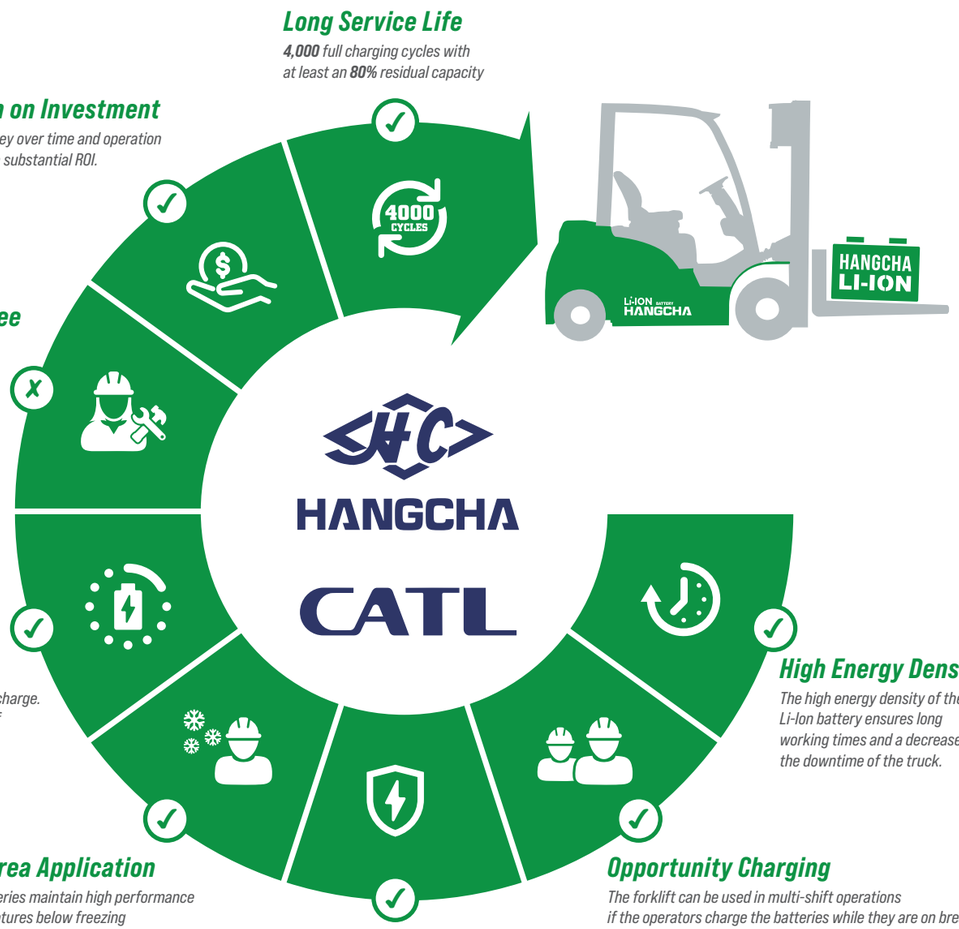
LITHIUM-ION BATTERY ADVANTAGES

- / **Battery Technology:** We use square lithium iron phosphate batteries. These are the same type of batteries used in new electric vehicles.
- / **Design:** The module uses a sturdy and lightweight aluminum alloy frame. It is also designed to provide excellent heat dissipation.
- / **Safe and Effective:** Charging efficiency as high as 98% and the thermal runaway temperature is at 600 ℃ and above.
- / **Adapted to Low Temperatures:** Comes standard with an electrical heating feature, ensuring normal operation in low temperatures.
- / **Quick Charging:** Fully charges in 2 hours.
- / **Efficient:** Can use opportunity charging to allow for continuous use in multi-shift operations.
- / **Long-Lasting:** 4000 charging cycles with a capacity retention greater than 80%.
- / **Maintenance-Free:** Lithium-ion batteries do not require manual maintenance such as watering.
- / **Green and clean:** The batteries are pollution-free, release zero emissions, and are recyclable.



DESIGN PHILOSOPHY

After seeing the benefits that lithium Iron Phosphate ($LiFePO_4$) battery technology has when compared to traditional lead-acid batteries, Hangcha Group realized the material handling industry would be the perfect beneficiary for this technology. Lithium-ion technology would give material handling equipment the ability to run longer, more reliably, and require less maintenance. Hangcha Group worked closely with CATL to develop lithium-ion technology specifically for this industry. Hangcha then redesigned our material handling equipment around this technology. The result is a line of fast charging, long lasting, maintenance-free forklifts with the ability to run efficiently in multi-shift operations.



Long Service Life
4,000 full charging cycles with at least an 80% residual capacity

Return on Investment
Saves money over time and operation providing a substantial ROI.

Maintenance Free
No topping up of water or checking acid levels

Fast Charging
Only takes 2 hours to fully charge. Provides an efficient use of operator breaks.

Cold Area Application
Li-Ion batteries maintain high performance at temperatures below freezing

Safety and Reliable
Intelligent battery management monitors every battery function to prevent malfunction. The battery does not release toxic gases for operational safety.

High Energy Density
The high energy density of the Li-Ion battery ensures long working times and a decrease in the downtime of the truck.

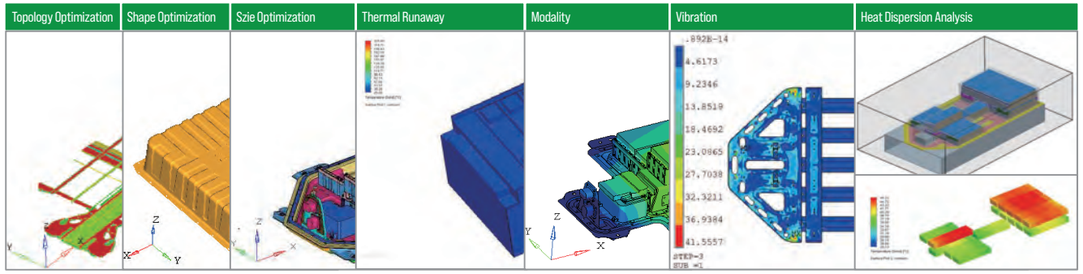
Opportunity Charging
The forklift can be used in multi-shift operations if the operators charge the batteries while they are on break.

Safety

While designing the lithium-ion technology for Hangcha's material handling equipment, safety was of our top concerns. We wanted a system that was not only efficient, but also safe for the operators and surrounding employees. In fact, CATL's batteries have caused ***0*** safety accidents. Between 2014 and 2017, the number of passenger cars using CATL batteries exceeded 95,000. Even with the amount of batteries being used, CATL products still caused ***0*** safety accidents. After designing the system, Hangcha and CATL performed over 48 safety tests to make sure that the battery packs could safely handle the harsh environments that our users operate their equipment in. The result is a line of lithium-ion battery systems that has passed all of our tests and are extremely safe for our users.

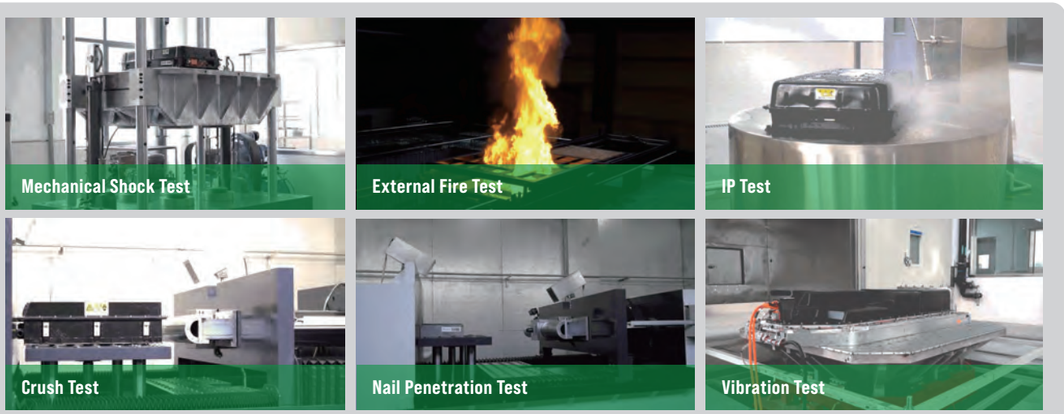
Safety Design





Comprehensive Test & Validation

Hangcha and CATL have a large testing lab devoted to our lithium-ion battery systems. This lab allows us to perform over 273 kinds of tests on the battery pack systems before releasing them to the market. These tests include 100 performance tests, 48 safety tests, and 125 reliability tests. By thoroughly testing the battery pack systems, we can offer up to a 10-year 20,000-hour warranty on our battery packs. The time spent designing and testing translates to a reliable, safe, and efficient battery system designed to increase productivity and eliminate downtime.



FEATURES & BENEFITS

Power
/ The Lithium-ion battery has a high energy density. When compared to an identical volume as a lead-acid battery, the Li-Ion battery contains twice as much energy.
/ Quick opportunity charging equals constant avalibility.
/ Stable voltage supply throughout the discharging process means that the truck will run longer on a single charge.
/ Li-Ion batteries maintain their performance level at temperatures below freezing making them ideal for use in cold areas.

Precision
/ The truck communicates with the battery controller to precisely control the use of the lithium-ion battery.

Compactness
/ Higher energy density means that the battery can hold the store about of energy in a smaller space.

Safety
/ Intelligent battery management monitors every important battery function.
/ Higher user safety, thanks to an acid-free battery.
/ User friendly thanks to not having to change the battery.
/ The battery does not emit toxic gasses.

Environmentally Friendly
/ These batteries have twice the serivce life making them evironmentally friendly.
/ The batteries also do not contain any acid making them environmentally friendly.
/ The Li-Ion batteries are substatially more efficient when charging and discharging which reduces energy costs and is environmentally friendly.

Ergonomics
/ Because battery changes are not needed, the operatore is not physically strained.
/ These batteries are maintenance-free meaning that the user doesn't need to top off the water or check the battery's acid levels.
/ The user doesn't have to preform a pre-work check on the battery.

Warranty

The Integrated Battery Management System (BMS) continually monitors energy management and ensures reliable operation. Because of this reliablity, Hangcha provides up to a ***10 year*** or ***20,000 hours*** warranty on our lithium-ion battery packs.

WORKING LIFE 20000 HOURS WARRANTY

10 YEAR WARRANTY



BMS Security Strategy

HANGCHA battery management system (BMS) monitors the li-ion cells at all time. As a result, our li-ion solution is the most reliable power option.

Battery Safety Management
Overcharge/over discharge protection
Overcurrent/over-temperature/low- temperature protection
Multi-level fault diagnosis protection
Double fault monitoring

SOC/SOH Detection
Residual capacity estimates
Battery health estimates
High precision capacity integration

High Pressure Safety Management
High voltage interlock(HVIL)
High voltage insulation monitoring
High voltage switch diagnostics

Battery Parameter Detection
Battery voltage detection and analysis
Battery current detection and analysis
Battery temperature detection and analysis

Equilibrium Management
Equalization based on voltage mode
Equalization based on time mode
Equalization based on battery cell SOC
Active/passive equalization optional

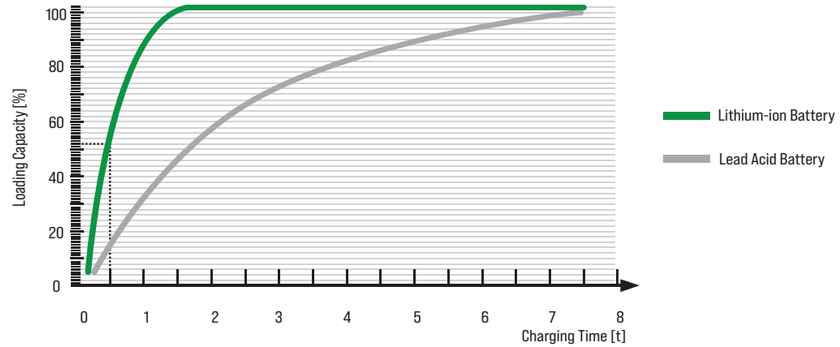
Other Features
Low cost,low power consumption
Historical data record
Flexible cascade expansion
CRC data validation

CHARGING

Rapid charging and opportunity charging ensure continuous availability of vehicles.

The chargers allow for fast full charging or boost charging **(100 % charge in 2 hours)**. The lithium-ion batteries are maintenance free and do not require a battery change when used in multi-shift operations. Instead, the batteries can be charged during user breaks and shift changes which allows the forklift to run contiuously during multi-shift operations.

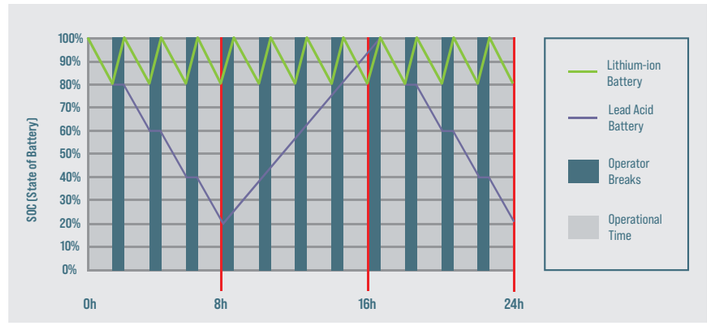
COMPARING BATTERY CHARGING TIMES



Lithium-ion Batteries VS **Lead Acid Batteries**

EFFICIENCY

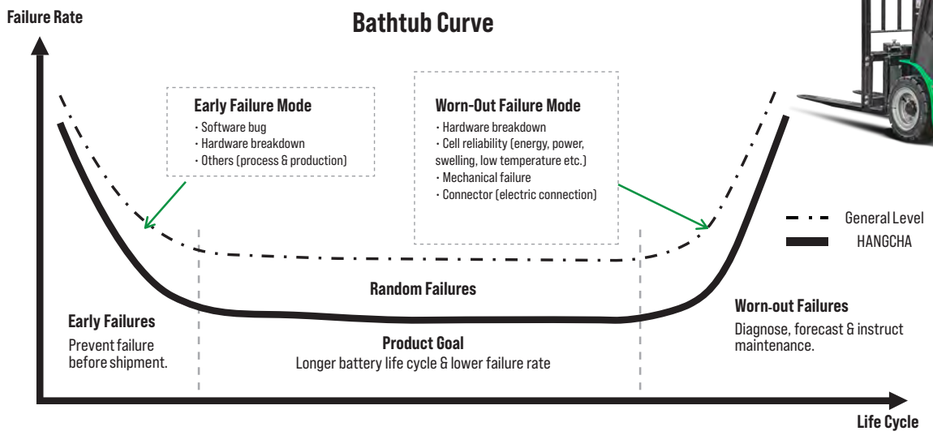
The high-performance lithium-ion technology shines in cases where lead acid batteries are in use and have to be changed in two/three-shift operations. Lithium-ion batteries do not need to be replaced. By quickly charging during downtime, such as during the user's lunch break, the battery can be efficiently used allow the forklift to remain operational throughout all three shifts. This is called **OPPORTUNITY CHARGING**. Intermittently charging also does not affect the battery service life. Lithium-ion technology supplies constant voltage throughout the entire operational time. This meas that the operator can can work under full power throughout several shifts without having to change a battery or do any kind of maintenance.



RELIABILITY

HIGHLY RELIABLE THROUGHOUT THE BATTERY'S ENTIRE LIFE



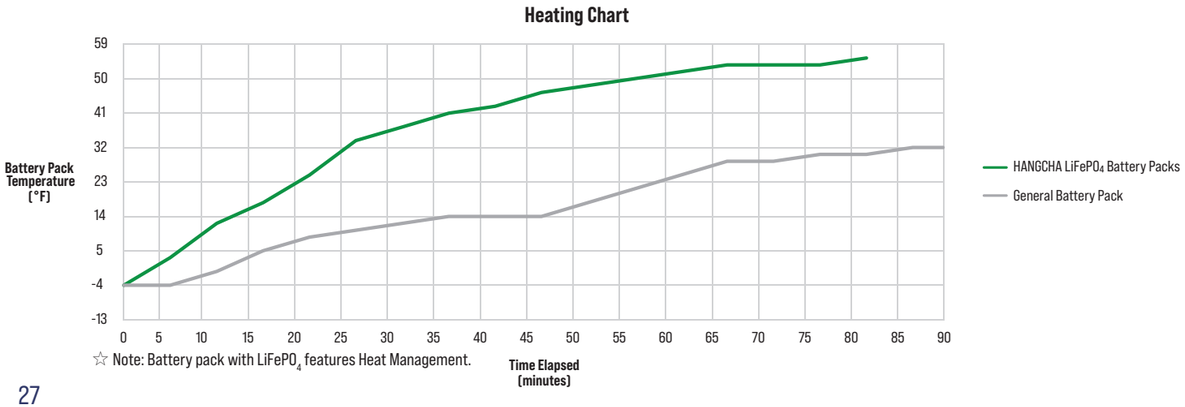


PERFECT PERFORMANCE IN COLD AREA



BATTERY PACK HEAT MANAGEMENT

During the discharge process, HANGCHA's battery pack temperature rises from - 4°F to 32°F and only takes ***25-30*** minutes thanks to its heat management. During the discharge process, a general battery pack's temperature rises from - 4°F to 32°F but will take 85-90 minutes. This means that Hangcha's Lithium-ion forklifts are perfect for cold operation applications.



☆ Note: Battery pack with $LiFePO_4$ features Heat Management.

LONG CYCLE LIFE

BATTERY PACK CYCLE LIFE TEST

Attenuation rate comparison

HANGCHA: First year 6.29%, Second year 4.66%, third year 3.18%

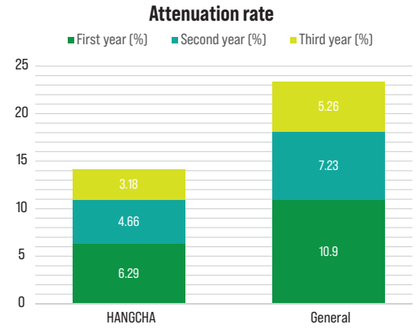
Total attenuation 14%

General: First year 10.9%, Second year 7.23%, Third year 5.26%

Total attenuation 23.4%

This means that Hangcha's lithium-ion batteries last longer and hold more energy over time compared to a general battery.

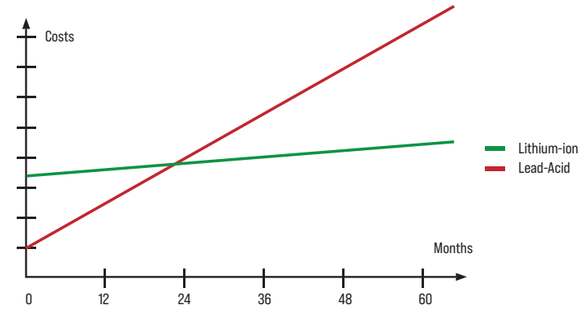
HANGCHA provides the Lithium-ion ($LiFePO_4$) battery with up to a 10 year or 20,000 hour warranty.



Total Cost of Ownership Comparison

After taking a look at the complete total cost of ownership (TCO), the initial investment of the equipment is more than compensated for by HANGCHA's longer service times and significantly lower operating expenses. This means that the lithium-ion trucks, including the initial cost, will cost the user less over time than lead acid forklifts.

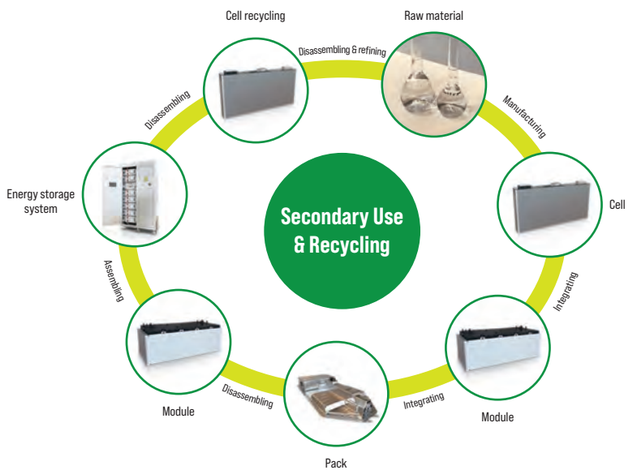
Item	Unit	Lithium Battery	Lead Acid Battery
Voltage	V	48	48
Capacity	Ah	400	500
Battery Energy	KW.h	19.2	24
Charge Efficiency	%	95%	70%
Times Charged Annually	Time	300	300
Electricity Price	USD/KW.h	0.14	0.14
Annual Cost of Electricity	USD	866	1469
Annual Maintenance Cost	USD	0	1429
Maintenance Cost over Ten Years	USD	8661	28980
Purchase Cost Over Ten Years	USD	15714 (1 unit)	25286 (3~4 unit)
Total Cost per Forklift	USD	24376	54266
Lithium-ion's Batteries Lead to a Cost Reduction of about 55%			



☆ The chart above uses actual data from an operational lithium-ion forklift.

Lithium-ion Battery Recycling Solution

In the future, battery components will not be sourced solely from mining. They will also have to come from recycling. HANGCHA and CATL are committed to improving the secondary use technology needed to properly recycle and refine the recycled batteries back into raw materials. In doing so, we are hoping to to protect the environment for future generations.



24/7 Service by Hangcha and CATL

Service Purpose: Leading the way with attentive service.

Service Concept: Results orientation and quick service.

24/7 CUSTOMER SERVICE



The New XH Series High Voltage Lithium-ion Forklifts

XH Series High Voltage Lithium-ion Pneumatic Forklifts are new series of high voltage lithium-ion forklifts independently developed by Hangcha Group. By applying the same technology found in automobile applications, Hangcha's high voltage forklifts are designed to outperform similar electric and internal combustion forklifts. Hangcha Group is redefining electric forklifts' efficiency, power, and reliability with the XH Series High Voltage Lithium-ion Forklifts.

High Voltage Technology

After the success from our full line of lithium-ion equipment, Hangcha decided to up the voltage by creating a new line of high voltage lithium-ion pneumatic forklifts and container equipment. This equipment is designed to cut charging times down to as little as one hour while increasing the run time of the forklifts to over 12 hours. By using high voltage technology, companies are able to save over 90% of the total cost of ownership when compared to similar I.C. powered forklifts.

VOLTAGE

309V - 650V

*Depending on model

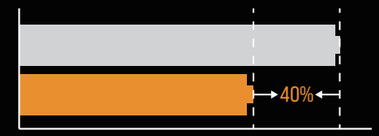
RUN TIME

12 Hours

FASTER & MORE EFFICIENT

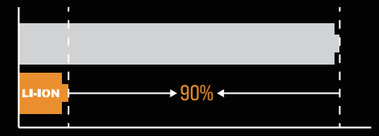
Compared to low-voltage lithium-ion forklifts, high-voltage lithium-ion technology can save operators about 40% throughout their ownership when comparing the total cost of ownership.

40%



Compared to I.C. powered forklifts, high-voltage lithium-ion technology can save operators about 90% throughout their ownership when comparing the total cost of ownership.

90%



THE *Plus* FOR YOUR BUSINESS

Rapid Charging

1h

The XH Series can rapid charge in one hour to 100% depending on the model. The XH Series can also opportunity charge as needed.

Longer Lasting

4000
CYCLES OF CHARGING

»

75% LI-ION

Under normal charging and discharging conditions, the lithium battery of Hangcha products has a capacity retention rate of more than 75% and a life span of up to 10 years after 4000 cycles of charging and discharging.