

Electric Forklifts



Today's powerful and responsive electric forklifts are revolutionizing goods movement and manufacturing around the world. Technology advancements such as higher voltage and AC-drive systems, and high-frequency charging, have boosted electric forklift performance and utility, and therefore industry acceptance.

"We recently helped a customer convert to electric forklifts. Using the EPRI lift truck calculator, we estimated that the customer would save about \$54,000 per truck in fuel and maintenance costs over five years."

—*Marshall Cromer, President, Cromer Material Handling*

"We build these trucks in Sweden and test them in the snow, so we know they can go inside and outside."

—*Richard Umstead, Regional Manager, Kalmar*

Forklifts, also called lift trucks, are classified by size and fuel. Classes 1, 2, and 3 trucks are electric, powered primarily by lead-acid batteries, which can act as a counterweight. Class 4 and 5 lift trucks use internal combustion engines, fueled most often by propane, but also natural gas, gasoline, and diesel.

Today's AC drive electric forklifts can do the work of most Class 4 and many Class 5 IC forklifts, and are often used in similar applications. A Class 1 electric with solid tires can replace a Class 4 IC used indoors. A Class 1 electric with pneumatic tires can replace a Class 5 IC truck used outdoors.

Outdoor forklifts have pneumatic tires to improve handling on rough surfaces; enclosed motors and electronic systems to ensure safe operation in wet, dusty, windy conditions; and sometimes an enclosed cab for the driver.

Most Class 1 electric indoor or outdoor forklifts operate at 36 V, 48 V, or 80 V. Typical lift capacity is 3,000–12,000 lbs. Models with up to 20,000 lbs. capacity are available.

Class 2 indoor narrow-aisle trucks are designed for use in compact vertical spaces. They typically have 3,000–5,500 lbs. lift capacity, reach heights of up to 42 ft., and operate at 24 V, 36 V, or 48 V.

Class 3 electric hand- or rider-trucks typically operate at 12 V and 24 V, and have 3,500–8,000 lbs. lift capacity.

Today's new charger technologies can charge multiple batteries at once, in the forklift, eliminating the need for extra batteries and a battery room. They also are more energy-efficient and can save space. Even in the most demanding operations, a lift truck is typically in use only 50% of the time, so most modern electric lift trucks can operate for two 8-hour shifts on a single battery and charger, five days a week.

Typical Input Demand: 7.6–30 kW

Typical Annual Energy Usage: 12,960–25,932 kWh

Select Electric Forklift Manufacturers

Brand Name	Supplier	Contact Information
CAT	Mitsubishi Caterpillar Forklift	www.catlift.com
Clark	Clark Material Handling International	www.clarkmhc.com
Crown	Crown Equipment Corp.	www.crown.com/usa
Doosan	Doosan Industrial Vehicle	www.doosanlift.com
HC Hangcha	Hangcha Group Co.	www.hcforklift.com
Heli	Heli Americas	www.heliamericas.com
Hyster	Hyster-Yale Materials Handling	www.hyster.com
Hyundai	Hyundai Heavy Industries	http://forklifts.hyundai.eu/en
Jungheinrich	Mitsubishi Caterpillar Forklift	www.jungheinrich-lift.com
Kalmar	Cargotec USA	www.kalmarind-northamerica.com
Komatsu	Komatsu Ltd.	www.komatsuamerica.com
Linde	KION Group	www.lmh-na.com
Mitsubishi	Mitsubishi Caterpillar Forklift	www.mitlift.com
Raymond	Toyota Industries Corp.	www.raymondcorp.com
Toyota	Toyota Industries Corp.	www.toyotaforklift.com
UniCarriers /Nissan	UniCarriers Americas Corp.	www.nissanforklift.com
Yale	Hyster-Yale Materials Handling	www.yale.com

Additional EPRI Resources

Available for download at www.epri.com/ET.

EPRI Lift Truck Calculator (Mobile iOS), 2011, ID# 1023534

EPRI Lift Truck Calculator (Android), 2014, ID# 3002004340

These lift truck cost calculators enable users to compare life cycle costs of electric versus internal combustion and propane forklifts.

Commercial and Industrial Guide to Electric Transportation, 2015, ID# 3002004898

This 16-page color brochure introduces the electric vehicles and equipment that are currently in use or being demonstrated, and the opportunities for further electrification in commercial and industrial applications.

Contact Information

For more information contact Andra Rogers, Sr. Project Manager, Electric Transportation at 650.855.2101 (arogers@epri.com).

EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

Electric Power Research Institute

3420 Hillview Avenue, Palo Alto, California 94304-1338 • PO Box 10412, Palo Alto, California 94303-0813 USA
800.313.3774 • 650.855.2121 • askepri@epri.com • www.epri.com