



Environment, Safety and Health

ES&H Guideline

ESH-US-G-048

Powered Industrial Trucks

Please Note

1. This Guideline is specifically meant for use by companies and operations in the United States.
2. The Guideline (including the external references) is regularly updated by ES&H International. Please check that this is the current, up-to-date version before using any of the information below. **Highlighted text** indicates changes incorporated in the latest update.
3. Please refer to our [disclaimer](#) before using this Guideline.

Contents

1. Scope.....	2
2. Objectives	2
3. Definitions.....	2
4. Issues to be Addressed.....	2
4.1. Purchasing and Hire	2
4.2. Powered Industrial Truck Operators	2
4.3. Daily and Pre-operation Inspections	3
4.4. Powered Industrial Trucks Operation	3
4.5. Maintenance	4
4.6. Refuelling and Battery Charging	4
5. Responsibilities	4
6. Related ES&H Guidelines.....	5
7. External References	5
7.1. Acts and Regulations	5
7.2. Compliance Directives and Rules	6
7.3. Management System Standards	7
7.4. ANSI Standards	7
7.5. International Standards	8
7.6. Publications	9

1. Scope

This Guideline covers the requirements associated with the purchasing and hire, work areas, operation, refueling, inspection and maintenance of powered industrial trucks. It also includes requirements related to the types of powered industrial trucks to be used in specific circumstances (e.g. indoors, in hazardous areas, etc).

2. Objectives

To ensure that all powered industrial trucks are of the correct type for the work to be done, that they are all maintained in good working order and that all legislative requirements are met.

3. Definitions

None.

4. Issues to be Addressed

The major issues addressed in this guideline are as follows:

4.1. Purchasing and Hire

Purchasing and hire specifications for powered industrial trucks (refer ES&H Guideline [ESH-US-G-021](#)) shall take into account at least the following:

- The work which needs to be carried out, including potential loads;
- The selection of suitable powered industrial trucks and attachments;
- The available controls and whether they are suitable for the intended tasks;
- The maintenance requirements;
- The area where a powered industrial truck needs to operate (e.g. hazardous areas, etc.).

Purchasing and specifications shall include the safety features required for the powered industrial truck. This shall include, as applicable:

- Warning devices such as forward and reversing beepers, lights, rotary flashing lights, air horns, etc);
- FOPS (Falling Objects Protective Structure);
- Seat Belt;
- Load chart for safe handling of loads.

4.2. Powered Industrial Truck Operators

The following requirements shall apply to personnel assigned to operate powered industrial trucks:

- Powered industrial truck operators shall be properly trained to operate the specific powered industrial trucks they are required to operate (refer ES&H Guideline [ESH-US-G-003](#));
- Such personnel shall also hold the appropriate certificate of competency or license;
- Powered industrial truck operators shall undergo a health assessment (refer ES&H Guideline [ESH-US-G-081](#)).

4.3. Daily and Pre-operation Inspections

Work instructions shall be prepared and issued for the daily and pre-operation inspection of powered industrial trucks. This shall include at least:

- Inspection of carriage and fork and lifting assembly, hydraulic system for possible leaks, engine for fuel or oil leaks, tires, overhead guard and powered industrial truck body overall.
- Testing of brakes, forward and reverse movement, steering, lifting and tilting controls, and warning devices (horn, flashing lights, brake lights, turning lights, reversing beepers)
- Checking of capacity rating, radiator water, battery water, fuel level, brake fluid, hydraulic fluid level and instrumentation.
- Inspection of the work area.

Work shall not commence unless the powered industrial truck is in proper working order and the work area is clear of obstacles. Any deficiencies or problems shall be recorded, reported and addressed (refer ES&H Guidelines [ESH-US-G-009](#) and [ESH-US-G-028](#)).

4.4. Powered Industrial Trucks Operation

Areas where powered industrial trucks operate shall be:

- Clearly marked and sign posted (refer ES&H Guideline [ESH-US-G-032](#));
- Kept free of obstructions;
- Provided with separate areas for pedestrians and zebra crossings or walkways;
- Posted with speed limits and other traffic signs.

Where possible, pedestrian access to areas where powered industrial trucks operate shall be restricted by means of barriers.

Company personnel shall be instructed to, whenever possible, stay away from powered industrial truck operational areas.

Personnel, who need to be present at night in areas where powered industrial trucks operate frequently, shall be issued and shall wear high visibility safety garments.

Powered industrial truck operators shall:

- Use the powered industrial truck only for the purpose for which it is intended.
- Powered industrial trucks must not be used to lift persons, unless it is a powered industrial truck specifically designed and equipped for this purpose.

- Where applicable, use the appropriate Personal Protective Equipment (refer ES&H Guideline [ESH-US-G-052](#))
- Operate the powered industrial trucks safely and in accordance with their training and observe all operation instructions (e.g. speed limits)

Powered industrial trucks which emit fumes (e.g. diesel) must not be used indoors (e.g. warehouse, cold room, etc).

Empty drums shall not be used for lifting heavy materials.

Only flame-proof powered industrial trucks shall be used in hazardous areas (refer ES&H Guideline [ESH-US-G-058](#)).

4.5. Maintenance

All powered industrial trucks shall be maintained on a regular basis. This shall include:

- Maintenance work to be done by qualified personnel
- A controlled maintenance schedule
- Specific work instructions for maintenance work.

4.6. Refuelling and Battery Charging

Specific Work Instructions shall be prepared and issued for the refueling of different types of powered industrial trucks. These work instructions shall preferably be a sign mounted at the refueling point.

LP Gas and diesel refueling areas shall be designated as hazardous areas, in accordance with ES&H Guideline [ESH-US-G-058](#).

Appropriate safety precautions shall be exercised when charging powered industrial truck batteries. These shall at least include precautions related to:

- Spillage of electrolyte (refer ES&H Guideline [ESH-US-G-024](#))
- Fire-prevention (refer ES&H Guideline [ESH-US-G-045](#))
- Proper ventilation (refer ES&H Guideline [ESH-US-G-090](#))
- Electrical safety (refer ES&H Guideline [ESH-US-G-062](#))

5. Responsibilities

The following personnel should typically assume the primary responsibility for the activities covered by this guideline:

- Maintenance Manager
- Warehouse Manager (or other managers responsible for the operation of powered industrial trucks)
- Powered industrial truck Operators
- Maintenance personnel

6. Related ES&H Guidelines

ESH-US-G-003	ES&H Training
ESH-US-G-009	Hazard Notification and ES&H Improvement
ESH-US-G-021	Procurement
ESH-US-G-024	Toxic and Hazardous Substances
ESH-US-G-028	Hazard and Risk Management
ESH-US-G-032	Safety Identification and Signage
ESH-US-G-045	Fire Prevention and Control
ESH-US-G-052	Personal Protective Equipment
ESH-US-G-058	Areas with Flammable Gases and Dusts
ESH-US-G-062	Electrical Safety
ESH-US-G-081	Health Assessments and Surveillance
ESH-US-G-090	Air Quality and Ventilation

7. External References

This section includes references to external (i.e. not controlled by the company or the organization) references specifically related to the issues covered by this Guideline. These include acts, regulations, directives, management system standards, ANSI standards, international standards and publications.

Please Note

Click on any of the links below to access the relevant web site and gain access to the required documentation, as referenced below.

7.1. Acts and Regulations

OSHA (Occupational Safety and Health Administration)

<http://www.osha.gov>

Occupational Safety and Health Act of 1970 - Section 6 (as amended September 1998)

OSHA Regulations (Standards - 29 CFR) 1910 - Occupational Safety and Health Standards

Subpart H - Hazardous Materials

1910.110 - Storage and handling of Liquefied Petroleum Gases.

Subpart N - Materials Handling and Storage

1910.176 - Handling materials - General

1910.177 - Servicing Multi-Piece and Single Piece Rim Wheels

1910.178 - Powered Industrial Trucks (amended by Final Rule 68:32637-32638, June 2003)

1910.178 Appendix A - Stability of Powered Industrial Trucks

Subpart R - Special Industries

1910.265 - Sawmills

OSHA Regulations (Standards - 29 CFR) 1915 - Occupational Safety and Health Standards for Shipyard Employment

Subpart G - Gear and Equipment for Rigging and Materials Handling

1915.120, Powered Industrial Truck Operator Training

OSHA Regulations (Standards - 29 CFR) 1917 - Marine Terminals
Subpart B - Marine Terminal Operations
1917.17 - Railroad Facilities
1917.27 - Personnel
Subpart C - Cargo Handling Gear and Equipment
1917.43 - Powered Industrial Trucks

OSHA Regulations (Standards - 29 CFR) 1918 - Safety and Health Regulations for Longshoring
Subpart G - Cargo Handling Gear and Equipment Other Than Ship's Gear
1918.65 - Mechanically-powered Vehicles Used aboard Vessels
Subpart I - General Working Conditions
1918.98 - Qualifications of Machinery Operators and Supervisory Training

OSHA Regulations (Standards - 29 CFR) 1926 - Safety and Health Regulations for Construction
Subpart O - Motor Vehicles, Mechanized Equipment, and Marine Operations;
1926.602 - Material Handling Equipment

MSHA (Mine Safety and Health Administration)

<http://www.msha.gov>

Federal Mine Safety & Health Act of 1977 - Titles II and III (as amended by the Federal Mine Safety and Health Amendments Act of 1977) (as amended by the Mine Improvement and New Emergency Response Act of 2006, June 2006)

MSHA Regulations (Standards - 30 CFR)
Part 57 - Safety and Health Standards - Underground Metal and Nonmetal Mines
Subpart O - Materials Storage and Handling
57.16016 - Lift Trucks

7.2. Compliance Directives and Rules

OSHA (Occupational Safety and Health Administration)

<http://www.osha.gov>

- CPL 2-1.19, Logging Operations, Inspection Procedures and Interpretive Guidance (1995, March 17)
- CPL 2-1.28A - Compliance Assistance for the Powered Industrial Truck Operator Training Standards [11/30/2000]
- CPL 2-1.30 - Chocking of Tractor Trailer under the Powered Industrial Truck Standard [10/19/1999]
- Final Rule 63:66237-66274 - Powered Industrial Truck Operator Training
- STD 1-11.3, 1910.178(m)(b) Powered Industrial Trucks; Truck Operations (1978, October 30)
- STD 1-11.4, 1910.178(g)(2), Battery Charging Stations for Fork Lifts and Other Industrial Trucks (1978, October 30)
- STD 1-11.7, 1910.178(k)(1); 1910.178(m)(7), Mechanical Means to Secure Trucks or Trailers to a Loading Dock (1981, August 5)
- STD 1-16.7, Electrical Safety-Related Work Practices - Inspection Procedures and Interpretation Guidelines (1991, July 1)

- STD 1-7.3, 1910.147, the Control of Hazardous (Lockout/Tagout) - Inspection Procedures and Interpretive Guidance (1990, September 11)
- STD 1-8.2, 1910.151(c), Medical Services and First Aid; 1926.50 and .51, Medical Service and First Aid, and ... (1982, March 8)
- Compliance Directive CPL 2-1.28 Compliance Assistance for the Powered Industrial Truck Operator Training Standards (August 2000)
- Final Rule 68:32637-32638 - Powered Industrial Trucks (June 2003)

MSHA (Mine Safety and Health Administration)

<http://www.msha.gov>

- 03-1305 - Alternate Locking Devices for Plug and Receptacle-Type Connectors on Mobile Battery-Powered Machines; Direct Final Rule - 01/22/2003

EPA (Environment Protection Agency)

<http://www.epa.gov/>

- Final Rule RIN 2060-AK27 - Control of Emissions of Air Pollution From Nonroad Diesel Engines and Fuel, June 2004 (relates to regulations 40 CFR Parts 9, 69, et al)

7.3. Management System Standards

<http://www.iso.ch/iso/en/ISOOnline.frontpage>

ISO 9001-2008 Quality Management Systems - Requirements (Sections 6.3, 7.1, 7.5 and 7.6)

<http://www.ilo.org/public/english/protection/safework/index.htm>

ILO-OHS-2000 Guidelines on Occupational Health and Safety Management Systems (Section 3.10)

<http://bsonline.techindex.co.uk>

OHSAS 18001-1999 Occupational Health and Safety Management Systems - Specification (Sections 4.3.1 and 4.4.6)

7.4. ANSI Standards

Please Note

This section includes ANSI Standards and other standards available from ANSI, as applicable. However, not all standards are available online from the ANSI web site.

<http://web.ansi.org>

ANSI B56.1-69	Safety Standard for Powered Industrial Trucks (Incorporated by Reference - 29 CFR, 1910.6)
ANSI/SAE S276.6-JAN05	Slow Moving Vehicle Emblem (SMV Emblem) (revision and redesignation of): 1/21/2005
ANSI/ASME B56.1b-2003	Low Lift and High Lift Trucks (supplement to ANSI/ASME B56.1-2000): 2/28/2003
ANSI/ASME/ISO 3287-2001	Powered Industrial Trucks - Symbols for Operator Controls and Other Displays (withdrawal of ANSI/ASME/ISO 3287-2001): 5/25/2004
ANSI/ISEA 107-2004	High-Visibility Safety Apparel and Headwear (revision of ANSI/ISEA 107-1999): 9/15/2004
ANSI/ITSDF B56.10-2005	Safety Standard for Manually Propelled High Lift Industrial Trucks (reaffirmation and redesignation of ANSI/ASME B56.10-1992 (R2000)): 9/19/2005

ANSI/ITSDF B56.11.5-2005	Measurement of Sound Emitted by Low Lift, High Lift, and Rough Terrain Powered Industrial Trucks (reaffirmation and redesignation of ANSI/ASME B56.11.5-1992 (R2000)): 9/19/2005
ANSI/ITSDF B56.11.6-2005	Evaluation of Visibility from Powered Industrial Trucks (reaffirmation and redesignation of ANSI/ASME B56.11.6-1996 (R2000)): 9/19/2005
ANSI/ITSDF B56.1-2005	Safety Standard for Low Lift and High Lift Trucks (reaffirmation and redesignation of ANSI/ASME B56.1-2004): 9/16/2005
ANSI/ITSDF B56.5-2005	Safety Standard for Guided Industrial Vehicles and Automated Functions of Manned Industrial Vehicles (reaffirmation and redesignation of ANSI/ASME B56.5-2004): 9/16/2005
ANSI/ITSDF B56.6-2005	Safety Standard for Rough Terrain Forklift Trucks (reaffirmation and redesignation of ANSI/ASME B56.6-2002): 9/16/2005
ANSI/ITSDF B56.8-2005	Safety Standard for Personnel and Burden Carriers (reaffirmation and redesignation of ANSI/ASME B56.8-1993 (R2000)): 9/19/2005
ANSI/NFPA505-1996	Powered Industrial Trucks, Including Type Designations, Areas of Use, Maintenance, and Operation
ANSI/UL 1839-2005	Standard for Safety for Automotive Battery Booster Cables (new standard): 12/5/2005
ANSI/UL 558-2008	Standard for Industrial Trucks Internal Combustion Engine-Powered (revision of ANSI/UL 558-1 998): 2/26/2008
ANSI/UL 583-2007	Standard for Electric-Battery-Powered Industrial Trucks (Proposals dated 3-16-07) (revision of ANSI/UL 583-2006): 8/31/2007
JIS D 6011:1999	Fork lift trucks - Stability and stability tests
JIS D 6021:1999	Fork lift trucks - Overhead guards
JIS D 6023:1999	Fork lift trucks - Brake performance and brake tests
JIS D 6202:1995	Fork lift trucks - Standard form of specifications
SS-EN 1175-1	Safety of industrial machinery trucks - Electrical requirements - Part 1: General requirements for battery powered trucks
UL 558-1998	Internal-Combustion-Engine-Powered Industrial Trucks
UL 583-1998	Electric-Battery-Powered Industrial Trucks
VDI 2518	Recommendations for the supply of handling equipment for loading/unloading containers, railroad cars and exchange containers by fork-lift-trucks
VDI 3578	Attachment for forklift trucks (load lifting appliance)
VDI 4461	Duty classes for fork-lift trucks

7.5. International Standards

<http://www.iso.ch/iso/en/ISOOnline.frontpage>

ISO 10658:1996	Industrial Trucks Operating In Special Conditions of Stacking With Load Laterally Displaced By Powered Devices - Additional Stability Test
ISO 1074:1991	Counterbalanced Fork-Lift Trucks - Stability Tests

ISO 20898:2008	Industrial trucks - Electrical requirements
ISO 21281:2005	Construction and layout of pedals of self-propelled sit-down rider-controlled industrial trucks - Rules for the construction and layout of pedals
ISO 22877:2004	Castors and wheels - Vocabulary, symbols and multilingual terminology
ISO 22881:2004	Castors and wheels - Requirements for use on manually propelled equipment for institutional applications
ISO 22915-2:2008	Industrial trucks - Verification of stability - Part 2: Counterbalanced trucks with mast, \$49.00
ISO 22915-3:2008	Industrial trucks - Verification of stability - Part 3: Reach and straddle trucks
ISO 2328:2007	Fork-lift trucks - Hook-on type fork arms and fork arm carriages - Mounting dimensions
ISO 24134:2006	Industrial trucks - Additional requirements for automated functions on trucks
ISO 24135-1:2006	Industrial trucks - Specifications and test methods for operator restraint systems - Part 1: Lap-type seat belts (issued October 2006)
ISO 3691:1980	Powered industrial trucks - Safety Code
ISO 5053:1987	Powered Industrial Trucks - Terminology
ISO 6055:2004	Industrial trucks - Overhead guards - Specification and testing
ISO 6292:1996	Powered Industrial Trucks and Tractors - Brake Performance and Component Strength

7.6. Publications

OSHA (Occupational Safety and Health Administration)

<http://www.osha.gov>

- A sample powered industrial truck operator training program outline.
- Developing a Training Program for Powered Industrial Truck Operators
- Forklift Operation and Safety - an online Operator Training Course
- Forklift Operations by Young Workers, February 2004
- Frequently Asked Questions (FAQs) About Powered Industrial Truck Operator Training.
- Hazard and Abatement Summary - Forklift Truck Operations
- Hazard and Abatement Summary - Improper Loading Procedure
- Hazard and Abatement Summary - Servicing and Maintenance Operations
- **Materials Handling and Storage**
- **Powered Industrial Truck Operator Training Information Card for Construction**
- **Powered Industrial Truck Operator Training Information Cards for General Industry**
- Powered Industrial Truck Operator Training Standard
- **Powered Industrial Trucks**
- **Preventing Forklift Fatalities in Teens**
- Protecting Young Workers: Prohibition Against Young Workers Operating Forklifts, October 2003
- **QuickCard® - Lead in Construction**

- Safety and Health Information Bulletin: Protecting Young Workers: Prohibition Against Young Workers Operating Forklifts

- Safety and Health Topics – Lead

- Sample Daily Checklists for Powered Industrial Trucks

- Sample Daily Checklists for Powered Industrial Trucks
- Servicing Single-Piece and Multi-Piece Rim Wheels

NIOSH (National Institute for Occupational Safety and Health)

<http://www.cdc.gov/niosh>

- Work near Forklifts. NIOSH Pub. No. 2001-109 (2001, June)
- 78-199 - Outline For Training Of Industrial Truck Operators

Illinois On-Site Consultation Program

<http://www.illinoisbiz.biz/osha/resource.htm>

- Forklift Safety Guide – English
- Forklift Safety Guide – Spanish

Department of Energy

<http://tis.eh.doe.gov/portal/home.htm>

- Department of Energy (DOE) OSH Technical Reference (OTR), Chapter 6 - Powered Industrial Trucks

MSHA (Mine Safety and Health Administration)

<http://www.msha.gov>

- Seat Belts - A Law You Can LIVE With!
- Seat Belts Save Lives...

CDC Workplace Safety and Health

<http://www.cdc.gov/Workplace/>

- Alert: Preventing Injuries and Deaths of Workers Who Operate or Work Near Forklifts

NFPA (National Fire Protection Association)

<http://www.nfpa.org/Home/index.asp>

- NFPA 505-1969 Standard for Type Designations, Areas of Use, Maintenance, and Operation of Powered Industrial Trucks (Incorporated by Reference - 29 CFR, 1910.6)

NASD (National Agricultural Safety Database)

<http://www.cdc.gov/nasd/index.html>

- Chock and Block

ASAE (American Society of Agricultural Engineers)

<http://www.asae.org/>

- ASAE Emblem for Identifying Slow Moving Vehicles, ASAE S276.2 (1968) (Incorporated by Reference - 29 CFR, 1910.6)

National Institute for Environmental Health and Safety

<http://www.niehs.nih.gov/odhsb/manual/home.htm>

- Powered Industrial Trucks, Mowers, Tractors, etc.

ASME (American Society of Mechanical Engineers)

<http://www.asme.org/catalog/>

- ASME B56.1, 1959, Safety Code for powered Industrial Trucks (Incorporated by Reference - 29 CFR, 1910.6)
- ASME B56.6-1992 (with addenda), Safety Standard for Rough Terrain Forklift Trucks (Incorporated by Reference - 29 CFR, 1910.6)
- Double Race Or Bi-Level Swivel And Rigid Industrial Casters, 2000)

- Evaluation Of Visibility Form Powered Industrial Trucks, 2000)
- Hook-Type Forks And Fork Carriers For Powered Industrial Forklift Trucks, 2000)
- Liquefied Petroleum Gas(LPG) Fuel Cylinders (Horizontal Or Vertical -Powered Industrial Trucks, 1998
- Measurement Of Sound Emitted By Low Lift, High Lift And Rough Terrain Powered Industrial Trucks, 2000)
- Powered Industrial Trucks: Symbols for Operator Controls & Other Displays (Identical to ISO 3287-1999), 2001
- Safety Standard For High Lift And Low Lift Trucks, 2000
- Safety Standard For Manually Propelled High Lift Industrial Trucks, 2000)
- Safety Standard For Operator Controlled Industrial Tow Tractors, 2000)
- Safety Standard for Personnel and Burden Carriers, 2000)
- Safety Standard for Rough Terrain Forklift Trucks, 2002
- Safety Standard Guided Industrial Vehicles Automated Functions Of Manned Industrial Vehicles, 2000)

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