

**SPECIFICATION  
FOR  
TRUCKS, FORKLIFT  
(GAS, LP GAS, DIESEL AND BIODIESEL)**

**SCOPE**

This specification covers the requirements for gasoline, LP gas, diesel and biodiesel powered, industrial type forklift trucks from 3,000 to 15,500 pounds rated lift capacity at 24" load center. The trucks covered may be used in a variety of applications, including round-the-clock operations, indoors and outdoors, and down steep grades, across railroad tracks, and over earth, wood, asphalt, and concrete surfaces.

**I. CLASSIFICATION**

Forklift trucks covered by this specification are of the following types:

- Type 1 - Gasoline engine
- Type 2 - LP gas engine
- Type 3 – Diesel engine
- Type 4 – Biodiesel engine (B20)

Twenty classes of forklift are specified with six additional classes as variations. Within each class, several user-specified options are allowed. These options are identified herein, under section VIII, ORDERING DATA. The requirements given below are minimum requirements, except as noted, and in accordance with applicable standards.

Class	Type	Engine	Lift Capacity At 24" Load Center (lbs)	Right Angle Stack (in) <sup>1</sup>	Weight (lbs)
1	1	2.0 L, 4 cylinder	3,000	97	5,400
2	1	2.0 L, 4 cylinder	5,000	107	7,800
3	1	4.2 L, 6 cylinder	8,000	131	12,200
4	1	4.2 L, 6 cylinder	12,000	146	15,800
5	1	4.2 L, 6 cylinder	15,500	158	20,000
6	2	2.0 L, 4 cylinder	3,000	97	5,400
7	2	2.0 L, 4 cylinder	5,000	107	7,800
8	2	4.2 L, 6 cylinder	8,000	131	12,200
8A*	2	4.2 L, 6 cylinder	8,000	131	12,200
9	2	4.2 L, 6 cylinder	12,000	146	15,800
10	2	4.2 L, 6 cylinder	15,500	158	20,000
10A*	2	4.2 L, 6 cylinder	15,500	158	20,000
11	3	2.6L, 4 cylinder	3,000	97	5,400
12	3	2.6L, 4 cylinder	5,000	107	7,900
13	3	4.6 L, 6 cylinder	8,000	131	12,200
13A*	3	4.6 L, 6 cylinder	8,000	131	12,200
14	3	4.6 L, 6 cylinder	12,000	146	15,800
15	3	4.6 L, 6 cylinder	15,500	158	20,000
15A*	3	4.6 L, 6 cylinder	15,500	158	20,000
16	4	2.6L, 4 cylinder	3,000	97	5,400
17	4	2.6L, 4 cylinder	5,000	107	7,900
18	4	4.6 L, 6 cylinder	8,000	131	12,200
18A*	4	4.6 L, 6 cylinder	8,000	131	12,200
19	4	4.6 L, 6 cylinder	12,000	146	15,800

Class	Type	Engine	Lift Capacity At 24" Load Center (lbs)	Right Angle Stack (in) <sup>1</sup>	Weight (lbs)
20	4	4.6 L, 6 cylinder	15,500	158	20,000
20A*	4	4.6 L, 6 cylinder	15,500	158	20,000

<sup>1</sup> The value indicates the maximum allowable minimum right angle stack measured without a load and with zero tolerance on the aisle width.

\* Classes 8A, 10A, 13A, 15A, 18A, and 20A have stricter tilt requirements due to a DOT specific specification as seen in Section III, REQUIREMENTS, G. CHASSIS AND FRAME, 2. Mast and Carriage Assembly with DOT Requirement.

## II. APPLICABLE STANDARDS

The following documents shall form a part of this specification to the extent described herein under "Requirements." The issue or revision for the respective document which is in effect on date of bid opening shall apply, except where specifically otherwise called for.

ANSI/ITSDF B56.1 - Safety Standard for Low and High Lift Trucks

Federal Occupational Safety and Health Act Standards

NFPA 505 - Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations

State Occupational Safety and Health Act Standards

UL 558 - Standard for Safety, Industrial Trucks, Internal Combustion Engine Powered

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ANSI/ITSDF standards may be obtained from:  
Industrial Truck Standards Development Foundation  
1750 K Street NW, Suite 460  
Washington, DC 20009

Federal OSHA standards may be obtained from:  
U.S. Department of Labor  
200 Constitutional Avenue, NW  
Washington, DC 20210

NFPA standards may be obtained from:  
National Fire Protection Association  
1 Batterymarch Park  
Quincy, MA 02169-7471

State OSHA standards may be obtained from:  
N.C. Department of Labor  
4 West Edenton Street  
Raleigh, NC 27611

UL standards may be obtained from:  
Underwriters' Laboratories, Inc. (UL)  
Publications Stock  
333 Pfingsten Road  
Northbrook, IL 60062

### III. REQUIREMENTS

#### A. GENERAL

The lift truck shall be of conventional design and heavy duty construction. It shall be complete with forks and all necessary operating accessories customarily furnished by the manufacturer.

1. Standard Product

The lift truck shall be essentially the standard product of the manufacturer, differing only in respects necessary to meet special requirements of this specification and the Invitation For Bids. The component parts of the unit need not be products of the same manufacturer. The lift truck offered shall be a new, current production model.

2. Use Conditions

Design and construction shall be such that the lift truck will withstand continuous service. This includes lifting and transporting capacity loads with forks and other special material handling attachments. Components, particularly of the electrical, fuel, and exhaust systems shall resist the harmful effects of dust and water. Pneumatic tire fork trucks shall withstand operation in the open air under all weather conditions for extended periods of time.

3. Ease of Maintenance

The design of the lift truck shall permit ready accessibility for servicing, replacement, and adjustment of component parts and accessories, with minimum disturbance of other elements.

#### B. SAFETY

1. Occupational Safety and Health Act

The truck shall be furnished with all applicable equipment and accessories as required by the Occupational Safety and Health Act. The lift truck shall be designed not to exceed current OSHA requirements for noise at ear level of the seated operator for 8-hour exposure.

2. National Fire Protection Agency

The truck shall conform to the applicable requirements of NFPA 505.

3. Industrial Truck Standards Development Foundation

The truck shall conform to the applicable requirements of ASNI/ITSDF B56.1.

4. Underwriters' Laboratories

The truck shall conform to the applicable requirements of UL-558.

5. Protective Features

Provide skid resistant floor plates and steps for operator safety. Diesel engine models should be provided with heat guard on exhaust.

#### C. ENGINE

As called for in the Invitation For Bids, the truck shall be furnished with either a gasoline, LP gas, diesel or biodiesel fueled engine with sufficient power and torque to meet the performance and operational requirements of this specification.

1. Gasoline and LP Gas Engines

The gasoline and LP gas engines shall be of the four-stroke cycle, liquid cooled, and completely furnished with carburetor, full flow lube oil filter, fuel filter, PCV valve and filter, anti-restart ignition switch, battery, alternator, ignition system, voltage regulator, governor, and dry type air cleaner, complete with visual gauge and safety element.

2. Diesel Engine

The diesel engine shall be of the compression ignition type, four-stroke cycle, liquid or air cooled engine equipped with an adequate and efficient fuel injection mechanism, fuel filter, full flow type lube oil filter, dry type air filter, anti-restart ignition switch, battery, alternator, and voltage regulator.

3. Biodiesel Engine

The biodiesel engine shall be of the compression ignition type, four-stroke cycle, liquid or air cooled, and capable of operating on B20 biodiesel fuel. The engine shall be equipped with an adequate and efficient fuel injection mechanism, fuel filter, full flow type lube oil filter, dry type air filter, anti-restart ignition switch, battery, alternator, and voltage regulator.

4. Electrical System

Unless specified otherwise in the Invitation For Bids, the truck shall be provided with either a 12 or 24-volt starting, lighting, and electrical equipment system with negative ground and protected by a circuit breaker. The battery shall be installed so as to absorb the shocks incurred during use of the truck. In addition, unless specified otherwise in the Invitation For Bids, the truck shall be provided with manufacturer's standard alternator with solid state regulator, positive engagement starter and standard size battery(s).

5. Cooling System

If liquid cooled, the truck shall have a heavy duty radiator, blade type fan, circulating pump, thermostat, and shall be protected to a minimum of -20°F. The air cooled engine shall have an efficient cooling fan to assure proper engine operating temperatures.

6. Fuel Tank

The capacity of the fuel tank shall be sufficient for approximately 8-hour continuous operation. The tank for gasoline and biodiesel fuel shall be equipped with a safety filler cap, removable strainer, and a provision for padlocking, when specified in the Invitation For Bids. Tanks for liquid petroleum (LP) shall be approved by a nationally recognized testing laboratory (NRTL), and a DOT #4ET240 cylinder with an overfilling protection device (OPD) shall be used.

**D. TRANSMISSIONS**

The truck shall be equipped with either a power shift or manual transmission, as stated in the Invitation For Bids. A hydrostatic drive may be substituted for the power shift.

1. Power Shift

The power shift transmission shall be of the continuous drive type and equipped with and hydraulically actuated clutch pack coupled to a heavy duty torque converter. An oil filter is required for the transmission oil. The truck shall be equipped with an inching pedal for positive inching control in the forward and reverse directions. The inching control shall permit tilting and full lifting speeds with rated load, independently of and simultaneously with truck motion, while in inching travel. Trucks shall be provided with either an interlock in the starting system

or some other means to make sure that the starter may only be energized when the transmission is in neutral position.

2. Hydrostatic Drive

Trucks with hydrostatic drive shall have infinite speed control and dynamic braking.

3. Manual Shift

The manual shift transmission shall have a hand operated lever for gear shifting between speed ranges, and a foot operated oil cooled clutch to disengage the transmission. It shall have at least two forward and reverse speed ranges, with constant mesh, synchronized high/low gears.

**E. HYDRAULIC SYSTEM**

Power for the hydraulic system shall be furnished by hydraulic pump(s), gear driven by the engine or transmission. The lift and tilt cylinders shall be hydraulically operated. The system shall be equipped with relief and bypass valves to provide protection from excessive overloading pressures. A replaceable oil filter to filter all of the hydraulic oil shall be included. The lift system shall incorporate a means of gradually lowering the load in case of failure of, or damage to, the hydraulic hose attached to the lift cylinder(s).

**F. HYDRAULIC CONTROL VALVES**

A three-function hydraulic control valve shall be furnished as a minimum to permit the easy addition of attachments later.

When hydraulically operated accessories are to be furnished with the truck (side shift attachment, bale clamps, etc.), the required control valve(s), hydraulic hoses, hose reel, connectors and all other necessary items to operate the attachment shall be furnished also.

**G. CHASSIS AND FRAME**

The frame and related structure shall be of integral, one piece, heavy steel plate welded construction with sections designed to resist distortion or permanent deformation caused by the stresses of handling capacity loads.

The frame shall be designed to withstand maximum stresses under normal operating conditions, and in addition, provide adequate support for attaching any device approved by the manufacturer for use in combination with the lift truck.

1. Mast and Carriage Assembly (Classes 1-8,9,10,11-13,14,15,16-18,19, and 20)

The mast shall be of the roller telescopic type and designed to withstand, without deformation, the stresses inducted by capacity loads. Adequate means shall be provided in the mast to compensate, by adjustment or replacement, for wear between sliding surfaces or lateral rolling contacts. The mast and carriage shall each have a suitable method of resisting thrust introduced by off-center loading. The mast shall have a minimum tilt angle of five (5) degrees forward and six (6) degrees backward.

2. Mast and Carriage Assembly with DOT Requirement (Classes 8A,10A,13A,15A,18A and 20A)

The mast shall be of the roller telescopic type and designed to withstand, without deformation, the stresses inducted by capacity loads. Adequate means shall be provided in the mast to compensate, by adjustment or replacement, for wear between sliding surfaces or lateral rolling contacts. The mast and carriage shall each have a suitable method of resisting thrust introduced by off-center loading. The mast shall have a minimum tilt angle of twenty-five (25) degrees forward and ten (ten) degrees backward.

3. Forks for 8,000 lbs. or under rated load (Classes 1-3,6-8,8A,11-13,13A,16-18 and 18A)

Fork length shall be 42 inches unless otherwise stated in the Invitations For Bids. The forks shall be capable of withstanding, without permanent deformation, 300 percent of the rated load. They shall be Industrial Truck Association (ITA) hook mounted to the lift carriage, with lateral adjustment of the forks provided.

4. Forks for 12, 000 lbs. or over rated load (Classes 4,5,9,10,10A,14,15,15A,19,20 and 20A)

Fork length shall be 54 inches unless otherwise stated in the Invitations For Bids. The forks shall be capable of withstanding, without permanent deformation, 300 percent of the rated load. The forklift shall have an operator controlled automated positioning control for full lateral adjustment of the forks including adjusting the relative width between the forks.

5. Load Backrest

A metal backrest, removable without disturbing any other component, shall be furnished. The backrest shall be manufacturer's standard height, width, and capacity, and of sufficient strength to prevent a rated load, 48" or less in height, from forcing the backrest against the uprights when the mast is at maximum rear tilt. The backrest shall be firmly attached to the lift carriage.

## **H. WHEELS AND TIRES**

1. Wheels

The truck tires shall be mounted on steel, malleable or cast iron wheels, with tapered roller bearings. Wheels, when equipped with new tires, shall clear any part of the truck and mast structure by at least 1/4" under all conditions of operations.

2. Tires

Tires shall be of the industrial type, either cushion, solid pneumatic or pneumatic, as specified in the Invitation For Bids. Where flat base rim wheels are involved, the tire shall be fitted to the rim in accordance with tire manufacturer's recommendations. On spilt wheels, the tires shall be secured to eliminate lateral or circumferential slippage. Tires shall be provided with "non-skid" treads.

## **I. STEERING**

An automotive type steering wheel, mounted on a steering column, shall turn the steer wheels. Clockwise rotation of the steering wheel shall provide right hand turning of the truck when in forward motion. Manufacturer's current production power steering system shall be provided. Provision shall be made for lubrication of all friction points by easily accessible grease fittings. Steering shall be self-centering with no handwheel kickback.

## **J. BRAKES**

1. Service Brakes

Service brakes shall be of the hydraulic, self-adjusting, self-energizing type. They shall be in compliance with ANSI/ITSDF B56.1. The hydraulic master cylinder shall be easily accessible for servicing. The service brakes are to be operable with the engine off.

2. Parking Brake

The truck shall be equipped with a mechanical parking brake, which shall also be in compliance with ANSI/ITSDF B56.1.

**K. INSTRUMENT PANEL**

The truck shall have an instrument panel convenient to and easily visible to the operator, and equipped with manufacturer's standard gauges and/or warning lights.

**L. OPERATOR'S SEAT**

An operator's cushion seat with cushion backrest and adjustable forward and reverse (minimum of 4") shall be located within easy reach of all controls. Seat shall come equipped with a retractable seat belt. Forklift shall have a "dead man switch" which will shut off forklift if the operator leaves the seat.

Operator shall be able to enter and exit forklift from both the right and left side of the forklift.

**M. CONTROLS**

All switch and lever type controls shall be provided with position markings either at the switch or lever, or in the case of directional speed controls, on a diagram visible to the operator. Lift and tilt controls shall be self-centering lever(s) conveniently located for right hand operation.

**N. HORN**

The truck shall be equipped with a horn with a push button mounted on the center of the steering wheel.

**O. LIGHTS**

The truck shall be equipped with an industrial strobe light, headlights and turn signals.

**P. BACKUP ALARM**

The truck shall be equipped with a visual and audible reverse warning signal.

**Q. PERFORMANCE**

1. Lifting and Lowering Speeds

Speed of lift with rated capacity load on the forks shall not be less than 75' per minute (FPM) over the entire distance from ground level to maximum fork height. Speed of lowering forks with rated capacity load should not exceed 120 FPM.

2. Gradeability

Truck shall be capable of ascending a 14% grade on a dry concrete surface, with and without rated load. Trucks shall be able to accelerate from a dead stop when carrying rated load.

3. Miscellaneous

Truck performance shall comply with the specifications given in the Invitation For Bids in areas such as right angle turn, outside turn radius, travel speed, upright tilt, fork length, etc.

## **R. ACCESSORIES**

### 1. Overhead Guard

A driver's overhead guard, fabricated from steel bars or tubing, shall be installed on the truck. A minimum of 39" from top of operator's seat to underside of guard shall be provided at all tilt positions of the mast. Guard design shall not interfere with operation of the truck, nor with normal movements of the operator when entering, leaving, or operating the truck.

### 2. Side Shift Attachment

If specified in the Invitation For Bids, the truck shall be equipped with a side shift attachment. The side shift shall be hydraulically operated to move forks at least 4" either side of center with capacity load. Controls for the side shift operation shall be located for convenient right hand operation.

## **S. PAINT**

The truck shall be painted manufacturer's standard color(s) over a proper rust prohibitive primer.

## **T. ENGLISH REQUIREMENT**

All written documentation including safety placards, manuals, labels, and other such written communication on or about this equipment shall be supplied in at least English.

## **IV. WARRANTY**

The contractor warrants to the owner that the truck furnished under this specification will be new and of good material and workmanship and agrees to replace promptly any part or parts which by reason of defective material or workmanship shall fail under normal use, free of negligence or accident, for a minimum period of twelve months or 2,000 hours (whichever occurs first) from date of acceptance. Such replacement shall include all parts, labor, and travel to user's facility and be free of any charge to the owner or his representative.

## **V. SERVICE, PARTS, AND MANUALS**

The prompt availability of qualified service representatives and authorized replacement parts from a reliable and dependable source shall be considered in the overall acceptance of the truck. Each bidder will be required, as a part of the Invitation For Bids or otherwise, to establish this capability to the satisfaction of the Division of Purchase and Contract.

Unless otherwise stated in the Invitation For Bids, at least one (1) operator's manual, one (1) service manual, and one (1) parts book shall be furnished with each lift truck.

The successful bidder shall provide at user's site complete instruction covering all aspects of safe and proper operation of the delivered lift truck and its complete routine maintenance. This instruction is to be provided to all the user's forklift truck operators, and is to be presented upon delivery of the truck unless otherwise scheduled by the user. Instruction period is to be for a minimum of two (2) hours, and all costs therefore are to be included in the bid price.

## **VI. ACCEPTANCE EVALUATION AND QUALITY ASSURANCE**

The inspection procedure and acceptance criteria shall be as specified in the Invitation For Bids.

**VII. DELIVERY AND PAYMENT**

Delivery of and payment for trucks under this specification shall be in accordance with the terms and conditions of the Invitation For Bids. The contractor shall be responsible for any packing, packaging, or protection required to insure delivery in an undamaged condition.

**VIII. ORDERING DATA**

Purchasers should exercise any desired option offered herein and should state the following in the Requisition and Invitation For Bids:

1. Title, number, and date of this specification
2. Type 1 (Gasoline), Type 2 (LP Gas), Type 3 (Diesel) or Type 4 (Biodiesel)
3. Class
4. Either 12V or 24V battery(s) for electrical equipment, unless otherwise specified
5. Power shift or manual shift
6. Forklift height (min.)
7. Collapsed mast height (max.), if critical for intended use
8. Overall forklift height with forks lowered and width (max.) for entryway access (must be documented)
9. Free lift height (min.), if required
10. Underclearance beneath mast assembly loaded (min.), if critical for intended use
11. Cushion, solid pneumatic, or pneumatic tires
12. Overall truck length (less forks) (max.)
13. Overall truck width (max.)
14. Fork length
15. Side shift attachment, if desired. (See Item F, page 5)
16. Special attachments: bale clamps, paper roll clamps, squeeze clamps, etc. (See Item F, page 5)
17. If other than manufacturer's standard alternator and battery is required
18. If other than manufacturer's standard gauges and warning lights are required
19. If other than manufacturer's standard fuel tank is required
20. If other than manufacturer's standard backrest is required
21. Inspection requirements
22. Additional lights or alarms, if required
23. Padlocked fuel caps, if required
24. Fire extinguisher, if required

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