

ANSI/ITSDF B56.9-2019
(Revision of ANSI/ITSDF B56.9-2012)



SAFETY STANDARD FOR OPERATOR CONTROLLED INDUSTRIAL TOW TRACTORS

AN AMERICAN NATIONAL STANDARD

INDUSTRIAL TRUCK STANDARDS DEVELOPMENT FOUNDATION

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FOREWORD

(This foreword is not part of ANSI/ITSDF B56.9-2019)

On September 28, 1979, the B56.9 Subcommittee started work on this standard in the direction of the B56 Committee and sponsor, The American Society of Mechanical Engineers (ASME).

Following a number of work sessions and ballots within the Subcommittee and the B56 Committee, it was submitted for B56 Committee ballot, public review, and ASME approval. After obtaining such approval, the Standard was submitted to the American National Standards Institute, Inc. (ANSI). ANSI approval to issue the first edition of this standard as American National Standard B56.9 was granted on August 6, 1987.

Following approval by the B56 Committee and ASME, and after public review, ASME B56.9-1992 was approved by ANSI on January 2, 1992.

After transferring the management of the B56 Committee from ASME to ITSDF, ASME B56.9-1992 was reaffirmed and redesignated as ANSI/ITSDF B56.9-2005. After approval by the B56 Committee and after public review, a revision of ANSI/ITSDF B56.9 was approved by ANSI and designated an American National Standard on August 23, 2006.

Following approval by the B56 Committee and after public review, a revision of ANSI/ITSDF B56.9 was approved by ANSI and designated an American National Standard on August 24, 2007.

After approval by the B56 Committee and public review, a revision of ANSI/ITSDF B56.9 was approved by ANSI and designated an American National Standard on June 6, 2012.

After approval by the B56 Committee and public review, a revision of ANSI/ITSDF B56.9 was approved by ANSI and designated an American National Standard on March 19, 2019.

This Standard shall become effective 1 year after its respective Date of Issuance. Part III applies only to trucks manufactured after the effective date.

Safety codes and standards are intended to enhance public health and safety. Revisions result from committee consideration of factors such as technological advances, new data, and changing environmental and industry needs. Revisions do not imply that previous editions were inadequate.

ITSDF STANDARDS COMMITTEE ROSTER B56

Powered and Nonpowered Industrial Trucks

(The following is the roster of the Committee at the time of approval of this Standard.)

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J.E. Johnson, *Vice Chair*
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ANSI/ITSDF B56.9-2019

SUMMARY OF CHANGES

Following approval by the ITSDF B56 Committee and after public review, ANSI/ITSDF B56.9-2019 was approved as a revision of ANSI/ITSDF B56.9-2012 on March 19, 2019. Changes were made in this revision to 7.8.5 Test Methods. Changes are indicated by the margin note **(19)**.

POWERED AND NONPOWERED INDUSTRIAL TRUCKS

B56 SERIES INTRODUCTION

GENERAL

This Standard is one of a series that have been formulated with the Industrial Truck Standards Development Foundation as Sponsor in accordance with the Accredited Organization method, the procedures accredited by the American National Standards Institute, Inc., and the following scope:

Establishment of the safety requirements relating to the elements of design, operation, and maintenance; standardization relating to principal dimensions to facilitate interchangeability, test methods, and test procedures of powered and nonpowered industrial trucks (not including vehicles intended primarily for earth moving or over-the-road hauling); and maintenance of liaison with the International Organization for Standardization (ISO) in all matters pertaining to powered and nonpowered industrial trucks.

One purpose of the Standard is to serve as a guide to governmental authorities having jurisdiction over subjects within the scope of the Standard. It is expected, however, that the Standard will find a major application in industry, serving as a guide to manufacturers, purchasers, and users of the equipment.

For convenience, Standards of Powered and Nonpowered Industrial Trucks have been divided into separate volumes:

Safety Standards

- B56.1 Low Lift and High Lift Trucks
- B56.5 Guided Industrial Vehicles and Automated Functions of Manned Industrial Vehicles
- B56.6 Rough Terrain Forklift Trucks
- B56.8 Personnel and Burden Carriers
- B56.9 Operator Controlled Industrial Tow Tractors
- B56.10 Manually Propelled High Lift Industrial Trucks
- B56.14 Safety Standard for Vehicle Mounted Trucks

Standardization Standards

- B56.11.1 Double Race or Bi-Level Swivel and Rigid Industrial Casters
- B56.11.4 Hook-Type Forks and Fork Carriers for Powered Industrial Forklift Trucks
- B56.11.5 Measurement of Sound Emitted by Low Lift, High Lift, and Rough Terrain Powered Industrial Trucks
- B56.11.6 Evaluation of Visibility from Powered Industrial Trucks
- B56.11.7 Liquefied Petroleum Gas (LPG) Fuel Cylinders (Horizontal or Vertical) Mounting – Liquid Withdrawal – for Powered Industrial Trucks
- B56.11.8 Safety Standard for Seat Belt (Lap-Type) Anchorage Systems for Powered Industrial Trucks

Safety standards that were previously listed as B56 volumes but now have different identification due to a change in standards development assignments are as follows:

- NFPA 505 Fire Safety Standard for Powered Industrial Trucks – Type Designations, Areas of Use, Maintenance and Operation (formerly B56.2)
- UL 583 Standard for Safety for Electric-Battery-Powered Industrial Trucks (formerly B56.3)
- UL 558 Standard for Safety for Internal Combustion Engine-Powered Industrial Trucks (formerly B56.4)

If adopted for governmental use, the references to other national codes and standards in the specific volumes may be changed to refer to the corresponding governmental regulations.

The use of powered and nonpowered industrial trucks is subject to certain hazards that cannot be completely eliminated by mechanical means, but the risks can be minimized by the exercise of intelligence, care, and common sense. It is therefore essential to have competent and careful operators, physically and mentally fit, and thoroughly trained in the safe operation of the equipment and the handling of the loads. Serious hazards are overloading, instability of the load, obstruction to the free passage of the load, collision with objects or pedestrians, poor maintenance, and use of equipment for a purpose for which it was not intended or designed.

Suggestions for improvement of these Standards, especially those based on actual experience in their application, shall be submitted to the Secretary of the B56 Committee, ITSDf, 1750 K Street NW, Suite 460, Washington DC 20006.

Comments shall be written in accordance with the following format:

- (a) specify paragraph designation of the pertinent volume;
- (b) indicate suggested change (addition, deletion, revision, etc.);
- (c) briefly state reason and/or evidence for suggested change;
- (d) submit suggested changes to more than one paragraph in the order in which they appear in the volume.

The appropriate B56 Subcommittee will consider each suggested revision at its first meeting after receipt of the suggested revision(s).

SAFETY STANDARD FOR OPERATOR CONTROLLED INDUSTRIAL TOW TRACTORS

Part I – Introduction

1 SCOPE

This Standard defines the safety requirements relating to the elements of design, operation, and maintenance of operator controlled industrial tow tractors up to and including 66750 N (15,000 lb) maximum rated drawbar pull of a non-braked load.

2 PURPOSE

The purpose of this Standard is to promote safety in the design, construction, application, operation, and maintenance of operator controlled industrial tow tractors.

This Standard may be used as a guide by governmental authorities desiring to formulate safety rules and regulations. This Standard is also intended for voluntary use by others associated with the manufacture or use of operator controlled industrial tow tractors.

3 INTERPRETATION

3.1 Mandatory and Advisory Roles

To carry out the provisions of this Standard, all items in Parts II, III, and appendices are mandatory except those including the word *should*, which are recommendations.

3.2 Classification of Approved Tow Tractors

The word approved means the classification or listing of tow tractors as to fire, explosion, and electric shock hazard by a nationally recognized testing laboratory, i.e., a laboratory qualified and equipped to conduct examinations and tests such as those prescribed by Underwriters Laboratories, Inc., and Factory Mutual Research Corp.

3.3 Requests for Interpretation

The B56 Committee will render an interpretation of any requirement of this Standard. Interpretations will be rendered only in response to a written request sent to the Secretary of the B56 Committee, ITSDF. The request for interpretation shall be in the following format.

Subject: Cite the applicable paragraph number(s) and provide a concise description.
Edition: Cite the applicable edition of the pertinent standard for which the interpretation is being requested.
Question: Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for approval of a proprietary design or situation. The inquirer may also include any plans or drawings, which are necessary to explain the question; however, they should not contain proprietary names or information.

ITSDF procedures provide for reconsideration of any interpretation when or if additional information, which might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ITSDF Committee or Subcommittee. ITSDF does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

3.4 Metric Conversions

The values stated in metric units are to be regarded as the standard. U.S. customary units are maintained in the User's section (in parenthesis) as information for those not familiar with metric units. The conversion to U.S. customary is a direct (hard) conversion from the SI units.

Part II – For the User

4 GENERAL SAFETY PRACTICES

4.1 Introduction

4.1.1 Part II contains broad safety standards applicable to tow tractor operation. Only authorized operators trained to adhere strictly to the operating instructions stated in Section 5 shall be permitted to operate tow tractors.

4.1.2 Unusual operating conditions may require additional safety precautions and special operating instructions.

4.1.3 Supervision is an essential element in the safe operation of powered industrial trucks.

4.2 Modifications, Nameplates, Marking, and Capacity

4.2.1 Except as provided in paragraph 4.2.2, no modification or alterations to an operator controlled industrial tow tractor, which may affect the capacity, stability, or safe operation of the tow tractor, shall be made without the prior written approval of the original tow tractor manufacturer or its successor thereof. When the tow tractor manufacturer or its successor approve a modification or alteration, appropriate changes shall be made to capacity plates, decals, tags, and operation and maintenance manuals.

4.2.2 If the tow tractor manufacturer is no longer in business and there is no successor to the business, the user may arrange for a modification or alteration to a operator controlled industrial tow tractor, provided however the user

(a) arranges for a modification or alteration to be designed, tested and implemented by an engineer(s) expert in tow tractor and their safety;

(b) maintains a permanent record of the design, test(s), and implementation of the modification or alteration;

(c) makes appropriate changes to the capacity plate(s), decals, tags and operation and maintenance manual;

(d) affixes a permanent and readily visible label on the truck stating the manner in which the tow tractor has been modified or altered together with the date of the modification or alteration, and the name of the organization that accomplished the tasks.

4.2.3 The user shall see that all nameplates, caution, and instruction markings are in place and legible.

4.2.4 The user shall consider that changes in load(s), dimension(s), coupling(s), and position(s), may affect capacities.

4.3 Stopping Distance

4.3.1 General. The tow tractor rated brake drawbar drag is based on dry level floor operation with specified coupler height. The actual brake drawbar drag capability on a particular surface, as well as speed, load, and grades, affect stopping distance. The determination of stopping distance depends on many factors, such as other vehicle and pedestrian traffic, clearances for evasive action, and stability of loads on trailers. Changes in weather and surface conditions affect the amount of brake drag force available, and speeds and loads should be adjusted accordingly.

4.3.2 When descending a grade, stopping distance will be greater than on level operation. Methods shall be provided to allow for this condition. Some methods are: reducing speed, limiting loads, allowing adequate clear space at the bottom of the grade, etc. (See para. 5.3.8)

4.3.3 Approximate theoretical stopping distance for a dry clean asphalt, brushed concrete, or equivalent surface may be determined from the following formulas:

$$s = \frac{0.394v^2}{D-G}$$

or

$$s_1 = \frac{3.34v_1^2}{D-G}$$

where

- D = drawbar drag, as a percent, as determined from Fig. 1 (e.g. 25 for 25%)
- G = percent grade (e.g., 5 for 5%)
- s = distance to stop, m
- s_1 = distance to stop, ft
- v = velocity, km/h
- v_1 = velocity, mph

4.4 Fuel Handling and Storage

4.4.1 The storage and handling of liquid fuels (such as gasoline and diesel fuel) shall be in accordance with ANSI/NFPA 505 and ANSI/NFPA 30.

4.4.2 The storage and handling of liquefied petroleum gas fuel shall be in accordance with ANSI/NFPA 505 and ANSI/NFPA 58.

4.5 Changing and Charging Storage Batteries for Electric Tow Tractors

4.5.1 Battery changing and charging facilities and procedures shall be in accordance with ANSI/NFPA 505.

4.5.2 The charger connector shall not be plugged into the tow tractor connector under any circumstances.

4.5.3 To avoid damage to equipment or injury to personnel, follow manufacturer's procedures when replacing the contacts in any battery connector.

4.6 Hazardous Locations

4.6.1 It shall be the responsibility of the user to determine the hazard classification of any particular atmosphere or location according to ANSI/NFPA 505.

4.6.2 Tow tractors operated in and batteries used in hazardous areas shall be approved and of the type required by ANSI/NFPA 505. Dependent on the proposed type of truck and area, approved trucks shall be built in compliance with one of the following:

- (a) UL 558
- (b) UL 583

4.6.3 Tow tractors and area of use shall be marked in accordance with ANSI/NFPA 505.

4.7 Aisles and Obstructions

4.7.1 Permanent aisles, roadways or passageways, floors, and ramps shall be defined in some fashion or marked to conform with ANSI Z535.2.

4.7.2 Permanent or temporary protrusion of loads, equipment, material, and construction facilities into the usual operating area shall be guarded, clearly and distinctively marked, or clearly visible.

4.8 Lighting for Operating Areas

4.8.1 Controlled lighting of adequate intensity should be provided in operating areas in conformance with ANSI/IES RP7.

4.8.2 Where operating conditions indicate, the user shall be responsible for having the tow tractor equipped with lights.

4.9 Control of Noxious Gases and Fumes

4.9.1 Carbon monoxide is a colorless, odorless, tasteless, poisonous gas. This gas is the product of incomplete burning of any material containing carbon, such as gasoline, LP and natural gas, and diesel fuel. Internal combustion engines that use these fuels are the source of exposure in the workplace. Control of carbon monoxide levels in the workplace is dependent on ventilation and proper maintenance of carbon monoxide producers including internal combustion powered equipment.

Properly running internal combustion engines will still produce carbon monoxide emission and deplete the oxygen supply sufficiently, affecting the ambient air of the work environment if the ambient air exchange is not adequate. Always use ventilation as the primary means of control by providing necessary exchange capability.

4.9.2 Ventilation shall be provided in enclosed areas where internal combustion powered equipment is used to maintain an atmosphere that shall not exceed the contamination levels specified by the American Conference of Governmental Industrial Hygienists in "Threshold Limit Values of Airborne Contaminants." (See 29 CFR 1910.1000 Table Z-1) This includes the atmosphere within the tow tractor cab when a cab is provided.

4.9.3 Common symptoms of carbon monoxide exposure may include headaches, dizziness, and nausea. If employees exhibit these symptoms, move them into fresh air, seek medical attention as required, and determine the source of carbon monoxide by monitoring "threshold limit values" in areas of exposure.

4.9.4 Questions concerning degree of concentration and methods of sampling to ascertain the conditions should be referred to a qualified professional. Users must follow applicable local, state and federal regulations that apply to their workplace.

4.10 Sound

Tow tractors can contribute to the ambient sound in the work area. Consideration should be given to the sound exposure of personnel in the work area.

4.11 Warning Device

4.11.1 Every tow tractor shall be equipped with an operator controlled horn, whistle, gong, or other sound-producing device(s).

4.11.2 The user shall determine if operating conditions require the tow tractor to be equipped with additional sound-producing or visual (such as lights or blinkers) devices, and be responsible for providing and maintaining such devices.

4.12 Relocating Tow Tractors

4.12.1 When utilizing lifting equipment such as elevators, cranes, ship hoisting gear, etc., to relocate a tow tractor, the user shall ensure that the capacity of the hoisting equipment being used is not exceeded.

4.12.2 Before entering or leaving an elevator with a tow tractor, all personnel other than the operator should leave the elevator.

4.13 Steering

4.13.1 Where steering must be accomplished with one hand and a steering handwheel is used, a steering knob(s) or equivalent shall be used to promote safe and effective operation. The steering handwheel and knob configuration shall be a design that will minimize the hazard from a spinning handwheel due to a road reaction feedback, or the steering mechanism shall be of a type that prevents road reactions from causing the steering handwheel to spin. A steering knob(s) shall be within the periphery of the steering handwheel.

4.13.2 Where steering can be accomplished with either hand, and the steering mechanism is of a type that prevents road reactions from causing the handwheel to spin (power steering or equivalent), steering knobs may be used. When used, steering knobs shall be of a type that is engaged by the operator's hand from the top, and shall be within the periphery of the steering handwheel.

4.14 Operator Qualifications

Only trained and authorized personnel shall be permitted to operate a tow tractor. Operators of tow tractors shall be qualified as to visual, auditory, physical, and mental ability to operate the equipment safely according to para. 4.15, and all other applicable parts of Section 4.

4.15 Operator Training

4.15.1 Personnel who have not been trained to operate tow tractors may operate a tow tractor for the purposes of training only, and only under the direct supervision of the trainer. This training should be conducted in an area away from other trucks, obstacles, and pedestrians.

4.15.2 The operator training program should include the user's policies for the site where the trainee will operate the tow tractor, the operating conditions for that location, and the specific tow tractor the trainee will operate. The training program shall be presented to all new operators regardless of previous experience.

4.15.3 The training program shall inform the trainee that:

- (a) The primary responsibility of the operator is to use the tow tractor safely following the instructions given in the training program.
- (b) Unsafe or improper operation of a tow tractor can result in:
 - (1) death or serious injury to the operator or others;
 - (2) damage to the tow tractor or other property.

4.15.4 The training program shall emphasize safe and proper operation to avoid injury to the operator and others and prevent property damage, and shall cover the following areas:

- (a) Fundamentals of the tow tractor(s) the trainee will operate, including:
 - (1) characteristics of the tow tractors(s), including variations between trucks in the workplace;
 - (2) similarities to and differences from automobiles;
 - (3) significance of nameplate data, including rated capacity, warnings, and instructions affixed to the truck;
 - (4) operating instructions and warnings in the operating manual for the tow tractor, and instructions for inspection and maintenance to be performed by the operator;
 - (5) type of motive power and its characteristics;
 - (6) method of steering;
 - (7) braking method and characteristics, with and without load;
 - (8) load towing capacity;
 - (9) controls-location, function, method of operation, identification of symbols;
 - (10) hazards due to production of carbon monoxide by internal combustion engines and common initial symptoms of exposure;
 - (11) fueling and battery charging;
 - (12) guards and protective devices for the specific type of tow tractor;
 - (13) other characteristics of the specific industrial truck.

- (b) Operating environment and its effect on tow tractor operation, including:
- (1) floor or ground conditions including temporary conditions;
 - (2) ramps and inclines, with and without load;
 - (3) trailers, railcars, and dockboards (including the use of wheel chocks, jacks, and other securing devices);
 - (4) fueling and battery charging facilities;
 - (5) the use of "classified" trucks in areas classified as hazardous due to risk of fire or explosion, as defined in ANSI/NFPA 505;
 - (6) narrow aisles, doorways, and other areas of limited clearance;
 - (7) areas where the truck may be operated near other powered industrial trucks, other vehicles, or pedestrians;
 - (8) use and capacity of elevators;
 - (9) operation near edge of dock or edge of improved surface;
 - (10) other special operating conditions and hazards that may be encountered.
- (c) Operation of the tow tractor, including:
- (1) proper preshift inspection and approved method for removing from service a truck that is in need of repair;
 - (2) traveling, with and without loads; turning corners;
 - (3) parking and shutdown procedures;
 - (4) other special operating conditions for the specific application.
- (d) Operating safety rules and practices, including:
- (1) provisions of this Standard in paras. 5.1 to 5.3 address operating safety rules and practices;
 - (2) provisions of this Standard in para. 5.4 address care of the truck;
 - (3) other rules, regulations, or practices specified by the employer at the location where the tow tractor will be used.
- (e) Operational training practice, including
- (1) if feasible, practice in the operation of tow tractor shall be conducted in an area separate from other workplace activities and personnel;
 - (2) training practice shall be conducted under the supervision of the trainer;
 - (3) training practice shall include the actual operation or simulated performance of all operating tasks such as maneuvering, traveling, stopping, starting, and other activities under the conditions that will be encountered in the use of the tow tractor.

5 OPERATING SAFETY RULES AND PRACTICES

5.1 Operator Responsibility

5.1.1 Safe operation is the responsibility of the operator.

5.1.2 The operator shall develop safe working habits and also be aware of hazardous conditions in order to protect himself, other personnel, the tow tractor, and other material.

5.1.3 The operator shall be familiar with the operation and function of all controls and instruments before undertaking to operate the tow tractor.

5.1.4 Before operating any tow tractor, tow tractor operators shall have read and be familiar with operator's manual for the particular tow tractor being operated, and they shall also abide by the safety rules and practices in paras. 5.2, 5.3, and 5.4.

5.2 General

5.2.1 Before starting to operate the tow tractor:

- (a) be in normal operating position;
- (b) place directional controls in neutral;

- (c) disengage clutch on manual transmission-equipped tow tractors, or apply brake on power shift or automatic transmission-equipped tow tractors and electric tow tractors;
- (d) start engine or turn switch of electric tow tractors to the "on" position.

5.2.2 Do not start or operate the tow tractor from any place other than from the designated operator's position.

5.2.3 Keep hands and feet inside the operator's designated area or compartment on rider tow tractors. Do not put any part of the body outside the operator compartment of the tow tractor, except while engaging hitch.

5.2.4 Understand tow tractor limitations and operate the tow tractor in a safe manner so as not to cause injury to any personnel. Safeguard pedestrians at all times.

- (a) Do not drive a tow tractor up to anyone standing in front of an object.
- (b) Ensure that personnel stand clear of the rear swing area before conducting turning maneuvers.
- (c) Exercise particular care at cross aisles, doorways, and other locations where pedestrians may step into the path of travel of the truck.

5.2.5 Do not permit passengers to ride on tow tractor unless a safe place to ride has been provided by the manufacturer. Motorized hand tow tractors shall not be ridden unless they are of the hand/rider design.

5.2.6 A tow tractor is attended when the operator is less than 8m (25 ft) from the tow tractor, which remains in his view.

5.2.7 A tow tractor is unattended when the operator is more than 8m (25 ft) from the tow tractor, which remains in his view, or whenever the operator leaves the tow tractor and it is not in his view.

5.2.8

(a) Before leaving the operator's position:

- (1) bring tow tractor to a complete stop;
- (2) place directional controls in neutral;
- (3) apply the parking brake.

(b) When leaving the tow tractor unattended:

- (1) stop the engine or turn off the controls;
- (2) if the tow tractor must be left on an incline, block the wheels.

5.2.9 Maintain a safe distance from the edge of ramps, platforms, and other similar working surfaces.

5.2.10 In areas classified as hazardous, use only tow tractors approved for use in those areas.

5.2.11 Report all accidents involving personnel, building structures, and equipment to the supervisor or as directed.

5.2.12 Do not add to, or modify, the tow tractor.

5.2.13 Do not block access to fire aisles, stairways, and fire equipment.

5.2.14 The exhaust from all internal combustion engines contains carbon monoxide, a colorless, odorless, tasteless, poisonous gas. Exposure to carbon monoxide can cause serious injury or health problems, including death.

(a) Carbon monoxide can become concentrated in areas such as trailers, containers, freezers, and poorly ventilated rooms or buildings. Therefore, limit internal combustion engine usage in those areas.

(b) Common symptoms of carbon monoxide exposure may include headache, dizziness, and nausea. The smell of internal combustion engine exhaust means carbon monoxide could be present.

(c) If an operator experiences these symptoms, move him into fresh air, seek medical attention as required, and contact your employer so he can monitor "threshold limit values." (Consideration should be given to shutting off the operator's internal combustion engine.)

5.3 Traveling

5.3.1 Observe all traffic regulations, including authorized plant speed limits. Under normal traffic conditions, keep to the right. Maintain a safe distance, based on speed of travel, from the vehicle ahead, and keep the tow tractor under control at all times.

5.3.2 Yield the right of way to pedestrians and emergency vehicles such as ambulances and fire trucks.

5.3.3 Do not pass another vehicle traveling in the same direction at intersections, blind spots, or at other dangerous locations.

5.3.4 Slow down and sound the audible warning device(s) at cross aisles and other locations where vision is obstructed.

5.3.5 Cross railroad tracks at an angle wherever possible. Do not park closer than 2 m (6 ft) to the nearest rail of a railroad track.

5.3.6 Keep a clear view of the path of travel and observe for other traffic, personnel, and safe clearances.

5.3.7 Ascend or descend grades slowly, and with caution. Avoid turning, if possible, and use extreme caution on grades, ramps, or inclines; normally travel straight up and down.

5.3.8 Under all travel conditions, operate the tow tractor at a speed that will permit it to be brought to a stop in a safe manner.

5.3.9 Make starts, stops, turn, or direction reversals in a smooth manner so as not to shift load.

5.3.10 Do not indulge in stunt driving or horseplay.

5.3.11 Slow down for wet and slippery floors.

5.3.12 Before driving over a dockboard or bridge plate, be sure that it is properly secured. Drive carefully and slowly across the dockboard or bridge plate, and never exceed its rated capacity.

5.3.13 Do not drive tow tractors onto any elevator unless specifically authorized to do so. Approach elevators slowly, and then enter squarely after the elevator car is properly leveled. Once on the elevator, neutralize the controls, shut off power, and set brakes. It is advisable that all other personnel leave the elevator before a tow tractor is allowed to enter or leave.

5.3.14 Avoid running over loose objects on the roadway surface.

5.3.15 When negotiating turns, reduce speed to a safe level consistent with the operating environment, and turn the hand steering mechanism in a smooth, sweeping motion. Except when maneuvering at a very low speed, turn the hand steering mechanism at a moderate, even rate.

5.3.16 Motorized hand tow tractor operation requires special safety consideration as follows:

- (a) never operate with greasy hands;
- (b) foot protection is recommended;
- (c) do not ride on the tow tractor;
- (d) keep feet clear of tow tractor frame while operating;
- (e) always keep hands and fingers inside the protected area of the control handle;
- (f) never travel at a speed greater than normal walking speed [approximately 5.6 km/h (3.5 mph)].
- (g) always place both hands on the control handle when operating with the towing end leading;
- (h) always operate with one hand on controls, and when possible, walk ahead and to the side of the tongue when traveling forward (towing end trailing);

- (i) enter elevator or other confined areas with the towing end leading;
- (j) tow only stable or safely arranged loads. When towing off-center loads which cannot be centered, operate with extra caution;
- (k) tow only loads within the capacity of the tow tractor;
- (l) use caution when turning. The trailers tend to cut the corner;
- (m) check couplers for engagement.

5.4 Operator Care of the Tow Tractor

5.4.1 At the beginning of each shift and before operating the tow tractor, check its condition, giving special attention to the following:

- (a) condition of tires
- (b) if pneumatic tires, check inflation pressure
- (c) warning and safety devices
- (d) lights
- (e) battery
- (f) controls
- (g) brakes
- (h) steering mechanism
- (i) fuel system(s)
- (j) couplers
- (k) additional items or special equipment as specified by the user and / or manufacturer

If the tow tractor is found to be in need of repair or in any way unsafe, or contributes to an unsafe condition, the matter shall be reported immediately to the user's designated authority, and the tow tractor shall not be operated until it has been restored to safe operating condition.

5.4.2 If during operation the tow tractor becomes unsafe in any way, the matter shall be reported immediately to the user's designated authority, and the tow tractor shall not be operated until it has been restored to safe operating condition.

5.4.3 Do not make repairs or adjustments unless specifically authorized to do so.

5.4.4 The engine shall be stopped, and no one shall be on the tow tractor while refueling.

5.4.5 Spillage of oil or fuel shall be carefully and completely absorbed or evaporated, and the fuel tank cap replaced before restarting engine.

5.4.6 Do not use open flames when checking electrolyte level in storage batteries, liquid level in fuel tanks, or the condition of LPG fuel lines and connectors.

6 MAINTENANCE AND REBUILD PRACTICES

6.1 Operation

Operation of tow tractors may be hazardous if maintenance is neglected or repairs, rebuilds, or adjustments are not performed in accordance with the manufacturer's design criteria. Therefore, maintenance facilities (on or off premises), trained personnel, and detailed procedures shall be provided.

6.1.1 Parts manuals and maintenance manuals shall be obtained from the tow tractor manufacturer.

6.1.2 In unusual cases not covered by the manuals referred to in para. 6.1.1, consult the tow tractor manufacturer.

6.2 Maintenance and Inspection

Maintenance and inspection of all tow tractors shall be performed in conformance with the manufacturers' and users' recommendations, and the following practices.

(a) A scheduled planned maintenance, lubrication, and inspection system shall be followed.

(b) Only trained and authorized personnel shall be permitted to maintain, repair, adjust, and inspect tow tractors, in accordance with manufacturer's specifications.

6.2.1 Before starting inspection and repair of tow tractor:

(a) raise drive wheels free of floor, disconnect battery, or use chocks or other positive tow tractor-positioning devices;

(b) before disconnecting any part of the engine fuel system of gasoline-powered tow tractors with gravity feed fuel systems, take precaution to eliminate any possibility of unintentional fuel escape;

(c) before disconnecting any part of the engine fuel system of LP gas-powered tow tractors, close LP tank valve and run engine until fuel in system is depleted and engine stops. If the engine will not run, close LP tank valve and vent fuel slowly in a nonhazardous area;

(d) disconnect battery before working on the electrical system;

(e) the charger connector shall be plugged only into the battery connector and never into the tow tractor connector.

6.2.2 Operation of the tow tractor to check performance shall be conducted in an authorized area where safe clearance exists.

6.2.3 Operation of the tow tractor to check performance shall be conducted in an authorized area where safe clearance exists.

(a) Starting to operate the tow tractor:

(1) be in normal operating position;

(2) disengage clutch on manual transmission-equipped tow tractors, or apply brake on power shift or automatic transmission-equipped tow tractors and electric tow tractors.

(3) place directional controls in neutral;

(4) start engine or turn switch of electric tow tractors to "ON" position;

(5) check functioning of steering, warning devices, and brakes.

(b) Before leaving the tow tractor:

(1) stop tow tractor;

(2) place directional controls in neutral;

(3) apply the parking brake;

(4) stop the engine or turn off power;

(5) turn off the control or ignition circuit;

(6) if the tow tractor must be left on an incline, block the wheels.

6.2.4 Avoid fire hazards and have fire protection equipment present in the work area. Do not use an open flame to check for level, or leakage of fuel, electrolyte, or coolant. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.

6.2.5 Properly ventilate work area, vent exhaust fumes.

(a) The exhaust from all internal combustion power lift truck engines contains carbon monoxide, a colorless, odorless, tasteless, poisonous gas. Carbon Monoxide can become concentrated in poorly ventilated maintenance areas. Exposure to carbon monoxide can result in serious injuries or health hazards, including death.

(b) Common symptoms of carbon monoxide exposure may include headache, dizziness, and nausea. The smell of internal combustion engine exhaust means carbon monoxide could be present.

(c) If maintenance personnel experience these symptoms, move him into fresh air, seek medical attention as required, and contact your employer so he can monitor "threshold limit values." (Consideration should be given to shutting off the operator's internal combustion engine.)

(d) Maintenance levels affect carbon monoxide emissions. Follow manufactures' maintenance and adjustment procedures. (See para. 7.2.3)

6.2.6 Handle LP gas cylinders with care. Physical damage such as dents, scrapes, or gouges may dangerously weaken the tank and make it unsafe for use.

6.2.7 Brakes, steering mechanisms, control mechanisms, warning devices, lights, governors, guards and safety devices, suspension components, from members, and couplers shall be carefully and regularly inspected and maintained in safe operating condition.

6.2.8 Special tow tractors or devices designed and approved for hazardous area operation shall receive special attention to ensure that maintenance preserves the original, approved, safe operating features.

6.2.9 Fuel systems shall be checked for leaks and condition of parts. Special consideration shall be given in the case of a leak in the fuel system. Action shall be taken to prevent the use of the tow tractor until the leak has been corrected.

6.2.10 The tow tractor manufacturer's capacity, operation, and maintenance instruction plates, tags, or decals shall be maintained in legible condition.

6.2.11 Batteries, motors, controllers, limit switches, protective devices, electrical conductors, and connections shall be inspected and maintained in conformance with good practice. Special attention shall be paid to the condition of electrical connections.

6.2.12 To avoid injury to personnel or damage to the equipment, follow manufacturer's procedures in replacing contacts in any battery connector.

6.2.13 Tow tractors shall be kept in a clean condition to minimize fire hazards and facilitate detection of loose or defective parts.

6.2.14 Modifications and additions which affect capacity and safe tow tractor operation shall not be performed without manufacturer's prior written approval. Capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly.

6.2.15 Care shall be taken to assure that all replacement parts, including tires, are interchangeable with the original parts and of a quality at least equal to that provided in the original equipment.

6.2.16 When removing tires, follow industry safety practices. Most important, deflate pneumatic tires completely prior to removal. Following assembly of tires on multi-piece rims, use a safety cage or restraining device while inflating.

6.2.17 When changing batteries on electric tow tractors, replacement batteries shall be of the service weight that falls within the minimum/maximum range specified on the tow tractor nameplate by the tow tractor manufacturer.

Part III - For the Manufacturer

7 DESIGN AND CONSTRUCTION STANDARDS

7.1 Introduction

This Part sets forth safety standards for the design and construction of tow tractors at the time of manufacture.

7.2 Operating Instructions

7.2.1 The manufacturer shall provide instructions covering the operation of the specific type to tow tractor.

7.3 Capacity

7.3.1 Both electric and internal combustion tow tractors shall be rated at a maximum drawbar pull.

7.3.2 In addition, electric tow tractors shall be rated at a normal rated drawbar pull.

7.4 Drawbar Pull

7.4.1 Drawbar pull ratings are developed on a level dry clean asphalt, brushed concrete, or equivalent surface. These ratings shall be tested using a calibrated dynamometer or equivalent test device. If applicable, the battery weight and size used shall be within limits stated on the vehicle nameplate.

7.4.2 Maximum drawbar pull in pounds (newtons) shall be defined by the manufacturer at the specified coupler height under the conditions of para. 7.4.1 when traveling at a minimum of 0.22 m/sec and for a minimum of 30 sec.

7.4.3 Normal rated drawbar pull is the greatest continuous towing force in newtons which can be sustained under the rated load conditions of para. 7.4.1 and the test conditions of para. 7.4.4.

7.4.4 Drawbar pull rating tests shall be performed as follows.

(a) Test Conditions

- (1) course surface to be as defined in para. 7.4.1;
- (2) one trailer train loaded to require a measured drawbar pull equal to the normal rated drawbar pull;
- (3) one trailer train loaded to require a measured drawbar pull equal to 10% of the normal rated drawbar pull.

(b) Test Methods

- (1) sixty percent of total test time, the vehicle will be towing a test load;
- (2) the test cycle is made up of:
 - (a) one 61 m run with trailer load as per (a) (2) above;
 - (b) one 61 m run with trailer load as per (a) (3) above;
 - (c) vehicle shall accelerate to maximum controlled speed during each run and loads shall be cycled at least 6 times per hour;
 - (d) continuous test until a stable temperature range has been reached for a minimum of 1 hr on components.
 - (e) In addition to the above test, alternate rated drawbar pulls may be established to suit the user's operation.

7.5 Nameplates and Makings (See Para. 7.3)

7.5.1 The manufacturer shall stamp or otherwise permanently affix the serial number to the frame of the tow tractor.

7.5.2 On every tow tractor the manufacturer shall install a durable, corrosion resistant nameplate(s), legibly inscribed with the following information:

- (a) tow tractor model and tow tractor serial number;
- (b) approximate service weight of tow tractor [for electric tow tractor, see paras. 7.5.4(b) and (c)];
- (c) designation of compliance with the mandatory requirements of this Standard, applicable to the manufacturer;
- (d) type designation to show conformance with the requirements, such as those prescribed by Underwriters Laboratories, Inc., or Factory Mutual Research Corp.;
- (e) maximum drawbar pull and coupler height.

7.5.3 Markings authorized by the appropriate nationally recognized testing laboratory shall be installed on approved tow tractors.

7.5.4 On electric tow tractors the nameplate shall also show:

- (a) normal rated drawbar pull and coupler height;
- (b) tow tractor weight without battery;
- (c) minimum and maximum service weights of the battery to be used;
- (d) nominal voltage for which the tow tractor is arranged;
- (e) when required, maximum rated ampere hour capacity for which the tow tractor is equipped;
- (f) identification of battery. Identifying letters of batteries are E, EE, EO, and EX, defined as follows:
 - (1) E – a battery assembled as a unit with a cover, and in conformance with UL 583, for use in type E or ES tow tractors which do not have a covered battery compartment;
 - (2) EE – a battery assembled as a unit, and in conformance with UL 583, with a cover that can be locked for use in type EE tow tractors which do not have an enclosed battery compartment with locking means;
 - (3) EO – a battery assembled as a unit without a cover, and in conformance with UL 583, for use in type E tow tractors with a covered battery compartment, in type ES tow tractors with an enclosed battery compartment, or in type EE tow tractors with an enclosed battery compartment, or in type EE tow tractors with an enclosed battery compartment with locking means;
 - (4) EX – a battery assembled as a unit, and in conformance with UL 583, with a cover that can be locked for use in type EX tow tractors which do not have a locked battery compartment with locking means.

7.5.5 For tow tractors designated type EX, the class and group of hazardous locations in which they are intended to be used shall be shown on the tow tractor.

7.5.6 The nameplates for batteries installed in electric tow tractors shall show:

- (a) manufacturer's name
- (b) model
- (c) battery identification
- (d) voltage
- (e) ampere hour capacity

Batteries for use in electric tow tractors shall have the battery weight legibly stamped on the battery tray near the lifting means as follows: Service Weight____(kg).

7.5.7 On motorized hand tow tractors (not hand/rider tow tractors) the manufacturer shall label in letters at least 40 mm high, "NO RIDING," or an appropriate symbol may be used in lieu thereof.

7.6 Steering Arrangements

7.6.1 Tow tractors employing a horizontal or tiller-bar steering control with the operator facing the direction of forward travel shall be steered in such manner the clockwise movement of the handle shall steer the tow tractor to the operator's right.

7.6.2 Tow tractors employing a handwheel with the operator facing the direction of forward travel shall be steered in such manner that clockwise rotation of the handwheel shall steer the tow tractor to the operator's right.

7.6.3 Tow tractors employing a handwheel with the operator facing at a right angle to the line of travel shall be steered in such manner that clockwise rotation of the handwheel shall steer the tow tractor clockwise when the tow tractor is traveling in its forward direction.

7.6.4 Motorized hand and hand/rider tow tractors employing a steering tongue control which extends beyond the confines of the tow tractor shall be steered in such manner that clockwise movement of the steering tongue shall steer the tow tractor clockwise with the operator facing in the direction of forward travel.

7.6.5 Other steering controls shall execute a sense of movement in the same direction as the desired motion of the tow tractor when the operator is facing in the direction of forward travel.

7.7 Steering Requirements

7.7.1 All steering controls, except for motorized hand and hand/rider tow tractors employing a steering tongue, shall be confined within the plan view outline of the tow tractor or guarded against injury to the operator during movement of the controls when passing obstacles such as walls, columns, and racks.

7.7.2 Steering handles on motorized hand and motorized hand/rider tow tractors employing a steering tongue, shall be provided with means to provide protection for the operator's hands against injury from items such as doors, walls, columns, and racks.

7.7.3 Where steering must be accomplished with one hand and a steering handwheel, crank, or tiller is used, a steering knob(s) or equivalent shall be used to promote safe and effective operation. The steering handwheel and knob configuration shall be a design that will minimize the hazard from a spinning handwheel due to a road reaction feedback, or the steering mechanism shall be of a type that prevents road reactions from causing the steering handwheel, crank, or tiller to spin. A steering knob(s) shall be within the periphery of the steering handwheel.

7.7.4 Where steering can be accomplished with either hand, and the steering mechanism is of a type that prevents road reactions from causing the handwheel to spin (power steering or equivalent), steering knobs may be used. When used, steering knobs shall be of a type that is engaged by the operator's hand from the top, and shall be within the periphery of the steering handwheel.

7.8 Service Brake System Performance

7.8.1 A service brake system which meets the performance requirements of this section shall be provided.

7.8.2 The service brake system performance shall be measured by one of two tests, the Drawbar Drag Test [see para. 7.8.5(a)] or the Stopping Distance Test [see para. 7.8.5(b)].

7.8.3 Brake Control Force Limits

(a) For pedals having a downward movement to apply the brakes, the required brake performance shall be attained with a pedal force of not more than 670 N.

(b) For brake pedals having an upward movement to apply brakes, the required brake performance shall be attained with the pedal fully released; however, the brake linkage shall be such that the pedal will be fully depressed and the brakes released by a force of not more than 290 N.

(c) For handgrip (squeeze) operated brakes, the force shall be limited to a maximum of 225 N.

(d) Other types of brake actuation, including those applied by position of the steering tongue, may be used.

7.8.4 Test Conditions

(a) Test surface shall be level (0.5% maximum gradient) clean asphalt, brushed concrete, or equivalent, and of adequate length to permit safe conduct of the test. When using the stopping distance test procedure, it shall also be of sufficient length to permit stabilized travel speed of the tow tractor before application of the brakes.

(b) Power boost system, if supplied, shall be operating. Travel controls, including the transmission, shall be in neutral and all brake systems disengaged.

(c) Burnishing of brakes prior to test is optional. The following is a suggested procedure:

- (1) initial road speed – maximum or 24 km/h, whichever is less;
- (2) final road speed – zero (stop);
- (3) deceleration rate – maximum without sliding tires or lifting steer tires;
- (4) alternate – forward stop then reverse stop;

(5) rest – 30 min after each 50 stops. This is to be used as a guide; if smoke is evident, the rest time may be increased and the number of stops between rests decreased.

(d) The tractor shall be tested in both forward and reverse directions.

(19) 7.8.5 Test Methods

(a) Drawbar Drag Method

(1) Measure drawbar drag while pulling at no more than 1.6 km/h in both forward and reverse directions.

(2) The drawbar shall be horizontal and attached at the specified coupler height but not more than 900 mm above the road surface.

(3) Performance requirements shall be as outlined in Table 1 and Fig. 1.

(b) Stopping Distance Method. Determine that the brakes will stop the tow tractor within the required distance, measured from the point of brake application, calculated from the following formulas:

$$s_1 = \frac{0.394v_1^2}{D_1}$$

where

D_1 = drawbar drag as a percent of gross tractor weight (e.g., 25 for 25%)

s_1 = approximate theoretical stopping distance, m

v_1 = speed, km/h

Table 1 Performance Requirements – Service Brake System

Type	$V_1 \leq 13.4$ km/h	$V_1 > 13.4$ km/h
1 or 2 braked wheels	$D_1 = 2.6V_1$, 10% min	$D_1 = 35\%$ max
3 or 4 braked wheels	$D_1 = 3.72V_1$, 10% min	$D_1 = 50\%$ max wheels

GENERAL NOTE:

D = drawbar drag as a percent of unloaded tractor weight

V_1 = speed, km/h

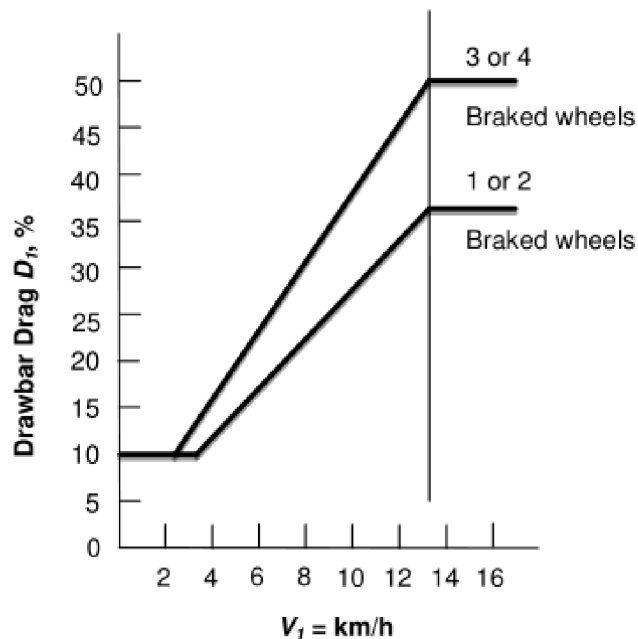


Fig. 1 Performance Requirements – Service Brake System

7.8.6 Strength

- (a) For tow tractors having a downward movement of the brake pedal to apply the service brake(s), the system shall be capable of withstanding a brake pedal force of 1335 N without failure of any component.
- (b) For tow tractors having an upward movement of the brake pedal to apply the service brake(s), a force of 200% of the maximum possible setting of the spring shall not cause failure of any component.
- (c) For tow tractors having hand grip (squeeze) operated brakes(s), the system be capable of with-standing a force of 715 N at the midpoint of the brake handle.

7.9 Parking Brake System Performance

7.9.1 A parking brake, which may be part of, or include the service brake(s), shall be provided which shall hold the tractor on a grade of 15% and shall hold the tractor and its maximum permitted towed load, on a grade of 5%.

7.9.2 The parking brake system shall be capable of maintaining the specified performance requirement despite any contraction of the brake parts, exhaustion of the source of energy, or leakage of any kind.

7.9.3 The parking brake system shall be operable from, or automatically applied by leaving, the normal operating position.

7.9.4 Brakes may be burnished prior to test.

7.10 Travel Direction Controls(s) Marking

Forward and reverse direction control(s) shall be clearly and durably identified on the control or in close proximity.

7.11 Travel Controls – Electric Tow Tractors, Sit Down Rider

7.11.1 Means shall be provided so that the travel circuit can be activated only by resetting the speed and directional control(s) when the operator assumes the normal operating position. A positive neutral position or control shall be provided.

7.11.2 Travel control shall be so arranged that the tow tractor will not move unless control(s) have been actuated for both direction and speed.

7.11.3 Means shall be provided to disconnect the travel circuit automatically when the operator leaves the normal operating position.

7.11.4 Means readily accessible to the operator in the normal operating position shall be provided to shut off all power to the tow tractor.

7.11.5 A manually operated switch (may be key type) to disconnect all control circuits shall be provided.

7.11.6 Directional controls

(a) Hand Operated

(1) Directional Control - Directional control selector shall be conveniently located. The selection pattern shall be durably and clearly identified.

(2) Travel Speed Selector – Travel speed selector shall be conveniently located. The speed selection pattern shall be durably and clearly identified.

(3) If hand operated direction control and an accelerator pedal are fitted, the accelerator pedal shall be located to the right of the brake pedal.

(b) Pedal control

(1) If a single accelerator pedal is fitted, pedal depression shall increase speed, but may also reduce speed when the truck is in motion and reverse traction is selected and the pedal shall be located for right-foot operation.

(2) If foot pedal operated direction control is fitted, direction of travel may be selected by actuating either a direction change pedal or one or two pedals which select the direction of travel and also perform the function of the accelerator pedal.

(3) If a service brake pedal is fitted, it shall be depressed to apply the brakes and be capable of being activated by the operator's right foot. The service brake may also consist of two adjacent pedals capable of allowing braking of the traction wheels independently or together. The brake pedal(s) shall be located totally or partly to the right of the seat longitudinal axis. Actuation of the service brake pedal(s) shall not be hindered by the simultaneous use of other controls.

7.12 Travel Controls – Electric Tow Tractors, Stand Up Rider

7.12.1 Means shall be provided so that the travel circuit can be activated only by resetting the speed and/or directional controls(s) when the operator assumes the normal operating position.

7.12.2 Means shall be provided to disconnect the travel circuit automatically when the operator leaves the normal operating position.

7.12.3 A manually operated switch (may be key type) to disconnect all control circuits shall be provided.

7.12.4 Service brakes may be actuated by either an upward or downward motion.

7.12.5 Means readily accessible to the operator in the normal operating position shall be provided to shut off all power to the tow tractor.

7.13 Travel Controls – Internal Combustion Powered Tow Tractors, Sit Down Rider

7.13.1 Travel controls shall be so arranged that power will be applied to the wheels only when the transmission or direction control has been actuated. A positive neutral position or control shall be provided.

7.13.2 Engine speed should be no greater than low idle unless the acceleration control has been intentionally actuated.

7.13.3 A manually operated engine shutoff device (may be key type) shall be provided.

7.13.4 Service brakes, if foot operated, shall be applied by downward motion of a pedal located for right foot operation.

7.13.5 Clutch pedal, if used, shall disengage the clutch by downward motion, and shall be located for left foot operation.

7.13.6 If a combination clutch and service brake pedal is used, the initial downward movement shall disengage the clutch and the final downward movement shall apply the service brakes.

7.13.7 Accelerator, if foot operated, shall increase speed by downward motion of a pedal located for right foot operation.

7.13.8 If a combination pedal controls both acceleration and service brakes, downward motion of the brake portion shall apply the service brakes. The combination pedal shall be located for right foot operation.

7.13.9 The normal engine starting system shall not be operable if the operation will produce rotation of the drive wheels.

7.14 Travel Controls – Internal Combustion Powered Tow Tractors, Stand Up Rider

7.14.1 Travel controls shall be so arranged that power will be applied to the wheels only when the transmission or direction control has been actuated.

7.14.2 Accelerator, if foot operated, shall increase speed by downward motion of a pedal located for right foot operation.

7.14.3 A manually operated engine shutoff device (may be key type) shall be provided.

7.14.4 Service brakes may be actuated by either an upward or downward motion.

7.14.5 The normal engine starting system shall not be operable if the operation will produce rotation of the drive wheels.

7.15 Travel Controls – Electric Motorized Hand and Hand/Rider Tow Tractors

7.15.1 The travel circuit shall automatically return to a neutral position when released by the operator, or the travel circuit shall be interrupted when released by the operator and can be reactivated only by resetting the speed and direction control(s) when the operator assumes the normal operating position.

7.15.2 Forward and reverse motion of the tow tractor shall be controlled or selected by means of a readily accessible control device, while grasping the handle grip on the tiller tongue or steering wheel. This control device shall operate directionally in one of the following manners:

- (a) the control shall have a forward motion for forward travel and a rearward motion for reverse travel;
- (b) the control shall consist of two buttons located at the top of the control handle when the steering tongue is approximately vertical, arranged so that the forward one is for forward travel and the rearward one is for reverse travel;
- (c) the control shall have rotary motion, the rotation being in the same direction as the drive wheel rotation.

7.15.3 The control system shall provide the capability for the tractor to travel at or less than walking speed [approximately 5.6 km/h (3.5 mph)].

7.15.4 Travel control for high-speed operation shall be designed to avoid inadvertent operation by the walking operator.

7.15.5 The brake shall be applied and current to the drive motor shall be cut off whenever the steering tongue is in approximately a vertical position, and the same conditions shall exist whenever the steering tongue is in approximately a horizontal position, or the brake shall be applied and current to the drive motor cut off by release of the device normally used to control travel motion of the tow tractor.

Exception: Tow tractors may be provided with a coasting system which cuts off the current to the drive motor but does not apply the brake when the travel control device is released. Means to apply the brake and activate the vehicle's warning device shall be readily operable while walking alongside of tractor. Speed with this system shall not exceed normal walking speed (approximately 5.6 km/h) whenever the coasting system is activated. Additionally, a label or symbol shall be affixed to the tractor indicating the tractor is equipped with a coasting system.

7.15.6 On tractors equipped with a steering tongue which can be moved up or down for brake application, means shall be provided to

- (a) reverse automatically the tractor's travel direction if the steering tongue is in the operating range and its control end contacts the walking operator, or
- (b) apply the brake in the steering tongue operating range when the control is released and allowed to return to the neutral position.

7.15.7 Means readily accessible to the operator shall be provided to shut off all power to the tow tractor.

7.16 Warning Device

7.16.1 Every tow tractor shall be equipped with an operator controlled horn, whistle, gong, or other sound-producing device(s).

7.16.2 In addition, other devices (visible or audible) suitable for the intended area of use may be installed when requested by the user.

7.17 Guards for Wheels

Guards or other means shall be provided to protect the operator, in the normal operating position, from particles thrown by the tires or wheels.

7.18 Guards for Moving Parts

The operator, in the normal operating position, shall be protected from moving parts that represent a hazard.

7.19 Pedal and Platform Surfaces

Control pedals and control platforms stood on, or engaged, by the operator's feet shall have slip resistant surfaces.

APPENDIX A REFERENCES

(This Appendix is an integral part of ANSI/ITSDF B56.9- 2019 and is placed after the main text for convenience.)

The following are safety standards and codes (unless otherwise noted) referenced within this Standard. It is the intent of this Standard to refer to the standards and codes listed below when they are referenced within the Standard.

ANSI Z94.0-2000	Industrial Engineering Terminology (not a safety standard)
ANSI/NFPA 30-2003	Flammable and Combustible Liquids Code
ANSI/NFPA 58-2004	Liquefied Petroleum Gases, storage and Handling of
ANSI/NFPA 505-2005	Powered Industrial Trucks, Type Designations, Areas of Use, Maintenance and Operation
UL 558-1996	Industrial Trucks, Internal Combustion Engine-Powered
UL 583-1996	Industrial Trucks, Electric-Battery-Powered
ANSI Z535.2-2002	Environmental and Facility Safety Signs
IESNA RP7-2004	Industrial Lighting, Practice for (not a safety standard)

The following are related documents:

ANSI/ITSDF B56.1a-2018	Safety Standard for Low lift and High Lift Trucks
ANSI/ITSDF B56.5-2012	Safety Standard for Guided Industrial Vehicles

Copies of the publications listed above are available from:

ANSI	American National Standards Institute, Inc. 25 West 43 rd Street, New York, NY 10036
ITSDF	Industrial Truck Standards Development Foundation, Inc. (ITSDF) 1750 K Street, NW, Suite 460, Washington, DC 20006 www.itsdf.org
NFPA	National Fire Protection Association Batterymarch Park, Quincy, MA 02269
UL	Underwriters Laboratories, Inc. 333 Pfingsten Road, Northbrook, IL 60062

APPENDIX B

GLOSSARY OF COMMONLY USED WORDS AND PHRASES

(This Appendix is not part of ANSI/ITSDF B56.9-2019, and is included for information purposes only.)

alternate rated drawbar pull – see drawbar pull, alternate rated

approved – the word approved means the classification or listing as to fire, explosion, and electric shock hazard by a nationally recognized testing laboratory, i.e., a laboratory qualified and equipped to conduct examinations and tests such as those prescribed by Underwriters Laboratories, Inc., and Factory Mutual Research Corp.

authorized personnel – persons designated by the user to operate or maintain the equipment

brake, parking – a device(s) to prevent inadvertent movement of the stationary vehicle

brake, service – the primary means of any type used for stopping and holding the tow tractor

bridge plate – a portable device for spanning the gap between two rail cars

coupler height – the vertical dimension from the working surface to the centerline of the coupler

dockboard – a portable or fixed device for spanning the gap or compensating for difference in level between loading platforms and carriers

drawbar drag – force in pounds (newtons) required at the coupler to retard or stop the tow tractor

drawbar pull, alternate rated – the sustained towing force in pounds (newtons) using special test conditions and test methods to suit the user's operation

drawbar pull, maximum – the maximum pull in pounds (newtons) a tow tractor or vehicle will develop on a level floor having the prescribed coefficient of friction, when moving a load at a uniform rate

industrial tow tractor – see tow tractor, industrial

operator – a trained and authorized person who controls any function(s) of an industrial tow tractor

service weight – weight of tow tractor plus battery or full fuel tank, less operator

tow tractor, electric – a tow tractor in which the principal energy is transmitted from power sources to motor(s) in the form of electricity

tow tractor, industrial – a powered industrial truck designed primarily to draw one or more nonpowered trucks, trailers, or other mobile loads

tow tractor, internal combustion engine – a tow tractor in which the power source is a gas or diesel engine

tow tractor, motorized hand – a tow tractor that is designed to be controlled by a walking operator

tow tractor, motorized hand/rider – a dual purpose tow tractor that is designed to be controlled by a walking or by a riding operator

tow tractor, motorized walkie – see tow tractor, motorized hand

user - the person(s) or organization(s) responsible for the operation and maintenance of a(n) industrial tow tractor. This typically would be the owner, lessee, or employer.