

National Standards of the People's Republic of China

GB18447.1□200X
superseding GB18447.1□2001

Safety Requirements for Tractors

Part 1: Wheeled Tractors

(Pre-approval Draft)

(Revised according to the requirements by the National Standard Examination
Section)

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Preamble

All technical contents of the present standards are mandatory, and serve as the basis for safety inspection and testing.

GB 18447 “Safety Requirements for Tractors” contains four parts:

- Part 1: Wheeled Tractors;
- Part 2: Walking Tractors;
- Part 3: Crawler Tractors; and
- Part 4: Belt-driving Tractors.

This is Part 1 of GB 18447.

This part is the revision of GB 18447.1-2001 “Safety Requirements for Agricultural Wheeled and Crawler Tractors”; and compared with GB 18447.1-2001, the key changes are as follows:

1. Changes to the description of standard terms, to make them more in accordance with the drafting principles by GB/T 1.1 Standards;
2. reduction to the exhaust smoke value of tractors;
3. the addition of inflaming retarding requirements for the interior materials of a tractor’s driving cab;
4. the addition of braking performance requirements for tractors with a max speed exceeding 30km/h;
5. the addition of pressure resistance requirements for a hydraulic circuit;

6. the addition of requirements for a tractor's fuel tank;
7. the addition of requirements to criteria of a driver's body vibration 4.1.9, which requirements will be implemented after 12 months from the date of issuance of the present standards;
8. the addition of the requirements for protective devices for the safety of a tractor, which requirements will be implemented after 6 months from the date of issuance of the present standards;
9. the addition of the requirements to a driver's field of vision, which requirements will be implemented after 12 months from the date of issuance of the present standards;
10. the addition of requirements to lamination intensity and projecting position of a tractor's head lights, along with the addition of Appendix A;
11. the addition of particular contents of safety requirements and fuel usage requirements in a tractor's driver manual;
12. the removal of the requirements for belt-driving tractors and crawler tractors.

From the date of its implementation, this part will supersede the part of GB 18447.1-2001 "Safety Requirements for Agricultural Wheeled and Crawler Tractors" regarding the wheeled tractors.

Appendix A in this part is a regulatory supplement.

This part is proposed by China Machinery Industry Federation.

This part is under the administrative authority of National Tractors Standardization Technical Committee.

The entity in charge of this part's drafting is: Luoyang Tractor Research Institute.

The major entities participating in this part's drafting are: National Tractor Quality

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The previous version of standards superseded by this part is:

GB 18447.1-2001.

Safety Requirements for Tractors □ Part 1 □ Wheeled Tractors

0 Introduction

This part relates to the safety issues of agricultural wheeled tractors.

Hazards concerned in this part conform to that in GB/T 15706.1.

1 Scope

This part proposes the limitations regarding aspects of physical performances and expected uses of agricultural wheeled tractors, and the stipulated safety requirements are applicable to the hazards created in each stage of a machine's service life provided in 3.11 of GB/T 15706.1-1995.

The present part is applicable to wheeled tractors with directly coupled driving (referred to hereinbelow as "tractors") used in this country.

2 Regulatory Reference Documents

The clauses in the following documents are incorporated herewith by reference into the present part of GB 18447. For any reference document with an indicated date, all of its subsequent modification notices (not including any errata) or revised versions will not be applicable to the present part; however, all parties who have made an agreement based on the present part are encouraged to consider whether any such latest version of these documents can be used. As to any reference document without indicating a date, its latest version will be applicable to the present part.

GB/T 3871.6 Agricultural tractors - Testing procedures - Part 6: Determination of

braking performances of vehicles for agriculture and forestry use (ISO 5697:1982, IDT)

GB/T 3871.7 Agricultural tractors – Testing procedures - Part 7: Driver's field of vision
□ISO5721:1989, MOD□

GB/T 3871.8 Agricultural tractors - Testing procedures - Part 8: Noise measurement
(OECD R5:2002, MOD)

GB/T 3871.13 Agricultural tractors - Testing procedures - Part 13: Measurement of
exhaust smoke (ISO 789-4:1986, MOD)

GB/T 4269.1-2000 Tractors and machinery for agriculture and forestry, powered
machinery for lawn and horticulture □ Symbols for a driver's control mechanisms and
other display devices□Part 1: Common symbols (idt ISO 3767-1:1991)

GB/T 4269.2-2000 Tractors and machinery for agriculture and forestry, powered
machinery for lawn and horticulture□ Symbols for a driver's control mechanisms and other
display devices □ Part 2: Symbols for agricultural tractors and machinery (idt ISO 3767-
2:1991)

GB 6376 Noise limitation for tractors

GB/T 9480 Tractors and machinery for agriculture and forestry, powered machinery for
lawn and horticulture — Drafting Rules for a Drivers' manual (eqv ISO 3600:1996)

GB 9656 Safety glass for motor vehicles (ECE R43:2000, NEQ)

GB 10395.1-2001 Tractors and machinery for agriculture and forestry — Technical
requirements for safety — Part 1: General principles (eqv ISO 4254-1:1989)

GB 10396 Tractors and machinery for agriculture and forestry, powered machinery for
lawn and horticulture — Safety signs and hazard diagrams — General principles (ISO
11684:1995, MOD)

GB/T 10910 Agricultural wheeled tractors and field operation machinery —

Measurement of a driver's body vibration (ISO 5008:2001, NEQ)

GB/T 13876 Agricultural wheeled tractors — Evaluation criteria of a driver's body vibration

GB/T 15706.1 Safety of machinery — Basic concepts, general design principles — Part 1: Basic terminology, methodology (eqv ISO/TR 12100-1:1992)

GB/T 19498 Protective devices for agricultural and forestry tractors, method for static testing and technical conditions for approval (OECD R4:2000, MOD)

GB/T xxxx-xxxx Tractors and machinery for agriculture - Determination of flaming behaviour of interior materials in a driving cab (ISO 3795:1989, MOD)

GB/T xxxx-xxxx Tractors and machinery for agriculture and forestry — Technical requirements for rear view mirrors

GB/T xxxx-xxxx Wheeled tractors for agriculture and forestry – installation provisions for lighting and signal light devices

JB/T 6701 The head lights of tractors and agricultural transportation vehicles

JB/T 7325 The strength testing method and conditions for approval of wheeled tractors with narrow wheel span for agriculture and forestry

JB/T 8303 Agricultural tractors – Driver's seat belt (eqv ISO 3776:1989)

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ISO 500-1:2004 Agricultural tractors with rear-mounted power output axle types 1, 2 and 3 -- Part 1: General requirements, safety requirements, dimensions for protective shield and clearance

Table 1 shows the potential hazards during a tractor's running, operating, and maintaining processes.

Table 1 Hazard List

No.	Hazard type	No.	Hazard type
1	Crashing hazard	7	Burning injury due to contacting a heat source
2	Cutting hazard	8	Hazard caused by electrolyte leakage
3	Rotating parts without protective device	9	Insufficient lighting signal
4	Mechanical failure	10	Too much noise
5	Excessive exhaust smoke	11	Braking failure
6	Skidding on a bypass or other place	12	Hazards caused by maloperation

4. Safety requirements and/or measures and decisions

4.1 General requirements

4.1.1 In a tractor with a driving cab, a rider's seat can be provided, and the rider's seat should be secured firmly and its location should not hinder the driver's operation, also the seat should not increase the tractor's external dimensions. A tractor without a cab is not allowed to fit a rider's seat on the rear splash guards.

4.1.2 A tractor's wheel hubs and rims should have sufficient strength to protect them from being damaged during normal operation and maintenance.

4.1.3 A tractor's hydraulic system should have a safety protection device for preventing its overload; the bursting pressure of a hydraulic circuit used in a hydraulic steering system should be able to endure at least 4 times the system's normal working pressure, and the bursting pressure of other hydraulic circuits should be able to endure at least 2.5 times the system's normal working pressure. Also, the normal working pressure should be labelled on the circuits.

4.1.4 The arrangements of a tractor's hydraulic circuits and electric circuits should avoid any rubbing and contacting with a heat generating component.

4.1.5 A cab's front windscreen should use safety glass and meet the requirements of the GB 9656; and the front windscreen should be provided with a wiper, and the start and end positions of the wiper should not affect the driver's field of vision.

4.1.6 The installation of a tractor's fuel tank should ensure that there is no protrusion, sharp edge, or sharp end nearby. As to a tractor with a cab, the fuel pipeline and the refuelling port must be installed outside the cab. The fuel tank's structure should meet the following requirements:

- a) when a pressure of 2 times the fuel tank working pressure or compressed air not below 30 kPa is charged into the fuel tank, there should be no leakage within 10 min;
- b) when the fuel tank is charged with water of 85% of its rated capacity, closed by the fuel tank cap, and turned upside-down with refuelling port facing downwards, the leakage via the fuel tank cap and the air inlet/outlet device should not be more than 30 g/min.

4.1.7 A tractor's maximum light-opaque exhausted smoke value should be less than 2.5 m^{-1} , to be measured according to the provisions of GB/T 3871.13.

4.1.8 The noise limit value at a driver's operating position and in the tractor environment should meet the provisions of GB6376, to be tested according to the provisions of GB/T 3871.8.

4.1.9 The criteria of a driver's body vibration should meet the provisions of GB 13876, to be tested according to the provisions of GB/T 10910.

4.2 Safety Protection

4.2.1 When a driver is operating or doing maintenance, any exposed rotating part prone to create a risk should be fitted with protective devices, and such devices should be secured firmly and reliably, and should be compression-resistant, without any sharp tip or acute edge.

4.2.1.1 When in operation, a power output axle must have a protective cover; and when the power output axle is not in operation, a safety protective case should be installed; the requirements thereof should meet the provisions of Chapters 6 and 7 of ISO 500-1:2004.

4.2.1.2 Any pedal, foot pedal and step should be skid-proof, and there can be protruding edges or baffles if necessary. Their dimensions should meet the provisions of 10.1.3 of GB 10395.1-2001.

4.2.2 The position and direction of an exhaust pipe's exit should be arranged in such a way as to minimize a driver's or other drivers' exposure to hazardous gas and smog. A muffler and an exhaust pipe should be fitted with thermoinsulation devices, and the safety distance available through the safety devices should meet the provisions of 7.1.5 of GB 10395.1-2001.

4.2.3 A battery should be arranged to avoid any risk to the driver caused by the electrolyte solution and its acidic mist.

4.2.4 A tractor should be capable of being equipped with a safety cage (or a safety driving cab) and a safety belt, and their strength should meet the provisions of GB/T 19498, JB/T 7325 and JB/T 8303.

4.2.5 The flame retardant properties of the interior material in a tractor's driving cab should meet the provisions of GB/T xxxx-xxxx.

4.2.6 In a tractor with a driving cab, the driver's field of vision should meet the following requirements:

a) on a semicircle field of vision with a radius of 12m, the number of blocked shades

fallen into the sector of field of vision with a chord-length of 9.5m should not be more than 2, and the length of each blocked shade should not be more than 700 mm;

b) on the radius of field of vision beyond sector of field of vision, the number of blocked shades on each side should not be more than 2; moreover, the length of one of the blocked shades should not be more than 700 mm, and the length of the other one should not be more than 1500 mm, or else the lengths of both blocked shades should not be more than 1200 mm.

The measurement of the field of vision should meet the provisions of GB/T 3871.7.

4.3 Braking performances

4.3.1 On a 20% dry and hard slope way, a tractor should be able to stop reliably along both the directions of up and down the slope with the on-board braking device, to be tested according to the provisions of GB/T 3871.6.

4.3.2 The average braking deceleration in a test of a tractor in cold status should not be less than 2.5 m/s^2 . The test method should meet the provisions of GB/T 3871.6.

4.4 Lighting and signal devices

4.4.1 A tractor should comprise at least two head lights, one work light, one gauge light, and one ceiling light in the driving cab; the tractor should further include at least two braking lights, two turning signal lights in front and two at rear, a warning apparatus for hazard signals, and front and rear position lights. Tractors with less than 18 kW power may have no gauge light installed. The head light should meet the requirements of JB/T 6701, and the colours of the signal light devices should meet the provisions of GB/T xxxx-xxxx.

4.4.2 As to a tractor with a rated power of more than 18 kW, the luminous intensity of the far field light beam of each head light should not be less than 8 000 candela; and as to a

tractor with a rated power of less than 18 kW, the luminous intensity of the far field light beam of each head light should not be less than 6 000 candela.

4.4.3 When testing the projecting position of the near field light beam of the head light of a tractor and when the head light projects onto a screen 10m away, the height of the centre of the light beam from the ground should not be greater than 0.7 times the height of the installation centre of the head light to the ground. As to the requirements of the horizontal position, the offset to the right should not be more than 350 mm, and the offset to the left is not allowed. The test of the projection positions of the head light beam should be taken according to the provisions of Appendix A in the state that the tractor is fully filled with fuel and water but without added weight.

4.4.4 A tractor should be installed with rear reflectors of non-adhered type. The rear reflectors should be firmly attached to the tractor, and should be able to ensure that when a head light with the luminous intensity of 18 000 candela is used at night to project from 150m right behind, the reflective light can be recognized at the projecting position.

4.4.5 A rear view mirror should be fitted respectively on the left and right side of a tractor with a driving cab, and at least one rear view mirror should be fitted to a tractor without a driving cab. The requirements of a rear view mirror should meet the provisions of GB/T xxxx-xxxx.

4.5 Symbols for safe operation

When the operation directions of an operation device are not clear, they should be indicated by operational symbols on or close to the operation device, and the operational symbols should meet the provisions of GB/T 4269.1-2000 and GB/T 4269.2-2000.

5 Information on use

- 5.1 A permanent trademark or factory mark should be attached to an obvious part on the exterior surface of the front body of a tractor, and a sign for identifying the model should be attached on an obvious part of the exterior surface of the tractor body.
- 5.2 A tractor should be provided with a permanent product label, and the contents of the label should include at least the following:
- make and model of a tractor;
 - rated power of the engine (12-hour);
 - serial no. and date when leaving a factory;
 - name and address of a manufacturer;
 - number of the standards implemented to the product.
- 5.3 Safety marks should be provided at least on the following dangerous positions, and these safety marks should meet the provisions of GB 10396.
- a) A safety mark prohibiting riding on an area not designed for a passenger, e.g. prohibiting riding on rear splash guards of a tractor;
 - b) A safety mark prohibiting approaching when a towing device is working;
 - c) A safety mark indicating a power output axle is in use;
 - d) A safety mark at the cover of a water tank.
- 5.4 Every tractor should be shipped with a user manual, and the compiling of the manual should be easy to understand, the number of the lubricant used by a tractor should have a number corresponding to the relevant lubricant number in China. The requirements for its safe operation should meet the provisions of GB/T 9480 and should include at least the following:

- a) warnings on safe operation to avoid any risk;
- b) measures to be taken in case of emergency;
- c) prohibiting requirements;
- d) description of safety marks.

Appendix A

(Regulatory Appendix)

Method for testing projecting position of light beam of a head light

A.1 Screen Method: examination on a screen

The field for testing should be flat, and the screen should be perpendicular to the field surface. A test should be performed under the conditions that a tractor to be tested should have normal tire pressure and have a driver seated in it. The tractor is stopped in front of the screen and kept perpendicular to the screen, so that the base centre of the head light is kept 10 m away from the screen, then a horizontal base line having the same height as the distance H from the base centre of the head light to the ground surface is determined on the screen, and also the base centre positions of the right and left head lights are determined on the screen using the projection of the tractor's longitudinal central plane on the screen as a basis. The offset values of horizontal and vertical projecting direction of the far and near field light beams of the left and right headlights are measured respectively.

A.2 Testing with a headlight tester

A tractor to be tested is aligned with the headlight tester according to the specified distance (an aligning device should be used), and offset values of horizontal and vertical projecting direction of the far and near field light beams of the left and right headlights are measured respectively on the display screen of the headlight tester.