



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Road vehicles - Mechanical coupling between towing vehicles
with coupling mounted forward and below and centre-axle
trailers - Interchangeability**

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1 Scope

This document specifies the requirements for the interchangeability of mechanical coupling between towing trucks with coupling mounted forward and below and center-axle trailers, vehicle combinations and vehicle interchangeability marks.

This document is applicable to vehicle trains that consist of towing trucks with coupling mounted forward and below AND center-axle trailers.

This document does not apply to special vehicle trains in which the coupling is mounted at the rear of the towing truck, and the closed coupling device is mounted and can be extended.

NOTE: The vehicle and train models that meet the requirements of this document (see Annex A)

are not interchangeable with those that meet the requirements of GB/T 41656.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 3730.1, Motor vehicles and trailers - Types - Terms and definitions

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 3730.1 as well as the followings apply.

3.1 towing truck

Trucks with special devices for drawbar trailers, center-axle trailers and rigid bar trailers.

4.1 Distance from the center of the pin shaft of the coupling to the rear end of the

towing truck The horizontal distance (A) between the center of the pin shaft of the coupling and the rear end of the towing truck (see Figure 1, Figure 2) shall meet the requirements of Table 1. Auxiliary operating device shall be used. The operating position of the auxiliary operating device shall not exceed 420mm from the outer edge of the vehicle.

4.2.1 The horizontal distance from the center of the center-axle trailer drawbar hanging

ring hole to the front end of the center-axle trailer body is the front turning radius (C) (see Figure 3). The minimum value Cmin is calculated according to formula (1) in the state of the vehicle train. When the front inclination angle (α) of the center-axle trailer relative to the towing truck is 4° and the hinge angle (β) is 40° , the slewing clearance (S) of the towing truck and the trailer shall not be less than 250mm.

Where, W - The width of the towing truck, in millimeters (mm);

A - The horizontal distance from the center of the pin shaft of the coupling to the rear end of the towing truck, in millimeters (mm);

S - The slewing clearance of the towing truck and the trailer, in millimeters (mm).

NOTE 1: The forward inclination angle (α) of the center-axle trailer relative to the towing truck is 6° . When the hinge angle (β) takes all possible values, S is 365mm.

NOTE 2: A smaller value of C is determined based on the articulation angle of the towing truck and the center-axle trailer AND the height of the towing truck and the center-axle trailer. Although it will not cause contact and component damage between the towing truck and the center-axle trailer, the corresponding interchangeable dimensions are a special combination and are not applicable to this document.

Annex C (normative) Test methods for strengths of towing truck coupling and drawbar hanging ring

of center-axle trailer C.1 General requirements C.1.1 The coupling and the drawbar hanging ring shall be installed on the stand in the same way as they are installed on the vehicle.

C.1.2 The coupling and the drawbar hanging ring may be tested individually or in combination.

C.1.3 The test load can be loaded using the structural device shown in Figure C.1 or a device that can achieve the same function.

Keys:

x - The length of center-axle trailer load area;

L1 - The theoretical length of the drawbar [the distance from the center of the drawbar hanging ring to the center of the axle (axle group)].

Figure C.1 -- Schematic diagram of trailer dimensions

C.2 Determination of Dc value and V value C.2.1 The Dc value is based on the theoretical reference value of the horizontal force generated between the towing truck and the center-axle trailer, in kilonewtons (kN), calculated by formula (C.1):

Where, T - The maximum design gross mass of the towing truck with a coupling, including the mass (S) applied to the vertical direction of the coupling device when the center-axle trailer reaches the maximum design total mass under static conditions, in tons (t);

M - The mass of the center-axle trailer axle (axle group) that reaches the maximum design total mass transferred to the ground, in tons (t);

g - Gravitational acceleration, $g=9.81\text{m/s}^2$.

C.2.2 The V value is a theoretical reference value based on the vertical force generated between the towing truck and the center-axle trailer, in kilonewtons (kN), calculated from formula (C.2). If the value of $X/L1$ in formula (C.2) is less than 1, then $X/L1$ shall be calculated by taking the value of 1.

Where, a - The equivalent vertical acceleration of the connection point, a constant factor determined by the suspension type of the rear axle (axle group) of the towing truck.

When the suspension system is air suspension (or has equivalent damping characteristics), $a=1.8\text{m/s}^2$; when the suspension system is other types, $a=2.4\text{m/s}^2$;

M - The mass of the center-axle trailer axle (axle group) that reaches the maximum design total mass transmitted to the ground, in tons (t);

x - The length of the center-axle trailer load area (see Figure C.1), in meters (m);

L1 - The theoretical length of the drawbar. It is the distance from the center of the drawbar hanging ring to the center of the axle (axle group) (see Figure C.1), in meters (m).

C.3 Dynamic test C.3.1 Dynamic test simulates the actual driving conditions of the vehicle. The test load specified in Table C.1 shall be applied to the connection point.

C.3.2 Apply dynamic test loads on the part to be tested. The dynamic test load is the resultant force of the horizontal load and vertical load specified in Table C.1.

Simultaneous loading shall be achieved on the stand shown in Figure C.2. The resultant force of horizontal load and vertical load shall be sinusoidal load (see Figure C.3) and shall be asynchronous. The frequency difference between the two shall be controlled within 1% ~ 3%.