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

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**Road vehicles - Trailers up to 3.5 t - Calculation of the
mechanical strength of steel drawbars**

道路车辆 3.5t以下挂车 钢制牵引杆机械强度计算

(English Translation)

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Foreword

This Document was drafted as per the rules specified in GB/T 1.1-2020 Directives for Standardization - Part 1: Rules for the Structure and Drafting of Standardizing Documents.

This Document modified and adopted ISO 7641:2012 Road Vehicles - Trailers up to 3.5t - Calculation of the Mechanical Strength of Steel Drawbars.

Compared with ISO 7641:2012, this Document made the following structural adjustments:

- Clause 3 corresponds to 3.1 of ISO 7641:2012;
- Clause 4 corresponds to 3.2 of ISO 7641:2012;
- Clause 5 corresponds to Clause 4 of ISO 7641:2012;
- Adjust the order of Figures 2 and 3 according to the order of citation.

The technical differences and causes between this Document and ISO 7641:2012 are as follows:

- Delete the normative references in ISO7641:2012. This Document is a document of the United Nations Economic Commission for Europe. The relevant technical content is the same as GB/T 15089, so GB/T 15089 is used as a reference;
- Change the 3.2 coefficient (k) in ISO 7641:2012, and add the value of k when $l \leq 2.5\text{m}$ (see Table 1), so that the data forms a closed loop;
- Add the cases of $e/l=0.15$, $e_x/l_x=0.15$ (see 5.3.2), so that the data form a closed loop;

--- Change the MfR in 4.3.3 in ISO 7641:2012 to MfP. Because MfR is not used in the ISO standard, it was determined after analysis that the symbol MfR shall be MfP.

This Document made the following editorial modifications:

--- Delete NOTE of 3.1.5 in ISO 7641:2012.

Please note some contents of this Document may involve patents. The issuing agency of this

Document shall not assume the responsibility to identify these patents.

This Document was jointly proposed by Ministry of Industry and Information Technology of the People's Republic of China, and Ministry of Transport of the People's Republic of China.

This Document shall be under the jurisdiction of National Technical Committee of Auto Standardization (SAC/TC 114).

Drafting organizations of this Document: Research Institute of Highway Ministry of Transport;

Shandong University of Technology; AL-KO (Yantai) Machinery Co., Ltd.; Wuhan University
Road Vehicles - Trailers up to 3.5t - Calculation of the
Mechanical Strength of Steel Drawbars

1 Scope

This Document specifies a simplified calculation process for the bending mechanical strength

of steel drawbars for trailers up to 3.5t.

This Document applies to steel drawbars equipped on center-axle trailers of categories O1 and

O2.

2 Normative References

There are no normative references in this Document.

3 Terms and Definitions

For the purposes of this Document, the following terms and definitions apply.

3.1 Mechanical coupling device; Mechanical coupling component

The mechanism that is fixed on the chassis, frame or body load-bearing part of the tractor vehicle or trailer for connecting the vehicle, referred to as "coupling device".

NOTE 1: It includes mechanisms used to connect coupling devices or components to vehicles or to operate coupling devices.

NOTE 2: The coupling device can transmit horizontal loads along the vehicle traveling direction or transversely; and transmit vertical loads vertically.

3.2 Drawbar

A special device that is installed on the trailer frame and can be connected to the tractor vehicle

or vehicle chassis after adapting to the drawbar hanging ring, connecting ball joint or similar structure.

NOTE 1: It is firmly fixed in the vertical direction and can withstand vertical force (rigid drawbar); the rigid drawbar can be completely fixed or fixed through suspension; the drawbar is composed of multiple

components, can be adjusted in the height direction, and can be equipped with optional inertia brake

control components.

NOTE 2: See Appendix A for configuration examples.

3.3 Chassis part

It is the part of the trailer frame and body, which is the component that is used to connect the

body and transfer the load to the axle.

3.4 Simple drawbar

A drawbar with any of the following characteristics:

--- Having a constant or reduced cross-section, two straight arms forming an open or closed shape;

--- A single shape consisting of a closed constant or reduced cross-section, which can be

composed of multiple parts and is height-adjustable.

NOTE 1: It can be installed with inertial control device or connector/drawbar hanging ring.

NOTE 2: If the simple drawbar has a simple structure, the tensile force endured by the drawbar can be

theoretically calculated with a certain safety factor, without dynamic tensile test of the entire structure.

3.5 Centre-axle trailer

The towing device cannot move vertically (relative to the trailer), only a vertical static load not

exceeding 10% of the maximum mass of the trailer or 1000kg (whichever is smaller) acts on

the tractor vehicle, under which the trailer that axle is located close to the center of gravity of

the trailer (when trailer is evenly loaded).

[SOURCE: GB/T 3730.1-2022, 7.2]

4 Symbols

The symbols and their meanings in this Document can refer to Table 1 and Figure 1.

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