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oSIST prEN 17860-3:2022

01-september-2022

Tovorna kolesa - 3. Del: Lahka večsledna tovorna kolesa - Mehanski vidiki

Carrier Cycles - Part 3: Lightweight multi track carrier cycles - Mechanical aspects

Lastenfahrräder - Teil 3: Leichte mehrspurige Lastenfahrräder - Mechanische Aspekte

Cycles utilitaires - Partie 3 : Cycles utilitaires légers à 3 roues et plus - Aspects mécaniques

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Ta slovenski standard je istoveten z: **prEN 17860-3**

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ICS:

43.150	Kolesa	Cycles

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 17860-3

June 2022

ICS 43.150

English Version

Carrier Cycles - Part 3: Lightweight multi track carrier cycles - Mechanical aspects

Cycles utilitaires - Partie 3 : Cycles utilitaires légers à 3 roues et plus - Aspects mécaniques

Lastenfahrräder - Teil 3: Leichte mehrspurige Lastenfahrräder - Mechanische Aspekte

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European foreword

This document (prEN 17860-3:2022) has been prepared by Technical Committee CEN/TC 333 “Cycles”, the secretariat of which is held by UNI.

This document is currently submitted to the CEN Enquiry.

This document is part of standard series consisting of the following parts:

Parts under drafting:

prEN 17860-1: Cycles -Carrier Cycles - Part 1: Terms and definitions

prEN 17860-2: Cycles -Carrier Cycles - Part 2: Lightweight single track carrier cycles – mechanical and functional aspects

prEN 17860-3: Cycles -Carrier Cycles - Part 3: Lightweight multi track carrier cycles – mechanical and functional aspects

Preliminary parts:

Part 4: Cycles -Carrier Cycles - Heavyweight multi track carrier cycles – mechanical and functional aspects

Part 5: Cycles -Carrier Cycles - Electrical aspects

Part 6: Cycles -Carrier Cycles - Passenger transport

Part 7: Cycles -Carrier Cycles - Trailers

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Introduction

This document gives requirements and test methods for mechanical and functional aspects for multi-track carrier cycles.

This document has been developed in response to demand throughout Europe. Its aim is to provide a standard for the assessment of mechanical aspects for single-track carrier cycles of a type which are excluded from type approval by Regulation (EU) No. 168/2013.

Because of the diversity of geometries and solutions of carrier cycles not all requirements and test methods in this document may apply to every carrier cycle.

Following the completion of a risk analysis, the focus is on mechanical aspects for single-track carrier cycles. This document is a type C standard as specified in EN ISO 12100:2010. The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are indicated in the scope of this document.

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1 Scope

This document applies to multi track carrier cycles with a maximum gross vehicle weight of 300 kg, with or without electric assistance.

NOTE Electric assistance will be covered in a separate part of this standard series.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

prEN 17860-1, *Cycles -Carrier Cycles - Part 1: Terms and definitions*

prEN 17860-2, *Cycles -Carrier Cycles - Part 2: Lightweight single track carrier cycles – Mechanical and functional aspects*

prEN ISO 4210-2:2021, *Cycles - Safety requirements for bicycles - Part 2: Requirements for city and trekking, young adult, mountain and racing bicycles (ISO/DIS 4210-2:2021)*

prEN ISO 4210-3:2021, *Cycles - Safety requirements for bicycles - Part 3: Common test methods (ISO/DIS 4210-3:2021)*

prEN ISO 4210-4:2021, *Cycles - Safety requirements for bicycles - Part 4: Braking test methods (ISO/DIS 4210-4:2021)*

prEN ISO 4210-6:2021, *Cycles - Safety requirements for bicycles - Part 6: Frame and fork test methods (ISO/DIS 4210-6:2021)*

prEN ISO 4210-8:2021, *Cycles - Safety requirements for bicycles - Part 8: Pedal and drive system test methods (ISO/DIS 4210-8:2021)*

EN ISO 4210-2:2015, *Cycles - Safety requirements for bicycles - Part 2: Requirements for city and trekking, young adult, mountain and racing bicycles (ISO 4210-2:2015)*

EN ISO 4210-3-:2014, *Cycles - Safety requirements for bicycles - Part 3: Common test methods (ISO 4210-3:2014)*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

EN 1078:2012+A1:2012. *Helmets for pedal cyclists and for users of skateboards and roller skates*

EN ISO 898-1:2013, *Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs with specified property classes - Coarse thread and fine pitch thread*

ISO 14878:2015, *Cycles - Audible warning devices - Technical specification and test methods*

ISO 5775-1:2014, *Bicycle tyres and rims - Part 1: Tyre designations and dimensions*

ISO 5775-2:2021, *Bicycle tyres and rims - Part 2: Rims*

EN IEC/IEEE 82079-1:2020, *Preparation of information for use (instructions for use) of products - Part 1: Principles and general requirements*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 17860-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

4 Use cases: private and commercial/professional use

The requirements in this standard refer to carrier cycles for private use. In case the manufacturer defines the carrier cycles to be intended for commercial/professional use higher test values for dynamic tests apply. Annex A gives the higher test values for the relevant tests.

5 Design of the surface

prEN 17860-2:2022, 5.1 applies.

6 Securing and strength of safety-relevant fasteners

prEN 17860-2:2022, 5.2 applies.

7 Position of the payload

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The position of the transported load or the seats shall be selected such that the carrier cycle can be ridden and braked safely in each loading and operating situation, the rider is not hindered and vision is not limited. A rear-view mirror shall be installed if vision to the rear is limited due to normal positioning of the payload or the vehicles construction.

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Uniform wheel load distribution and the lowest possible overall centre of gravity shall be strived for.

8 Pedal clearance

8.1 Ground clearance

If the bike is capable of tilting during use, the pedal at its lowest point/position and the tread surface of the pedal parallel to the ground and uppermost where it has only one tread surface, carrier cycle shall be capable of being leaned over at an angle of 25 ° from the vertical before any part of the pedal touches the ground.

When the carrier cycle is equipped with a suspension system, this measurement shall be taken with the suspension adjusted to the softest condition and with the carrier cycle depressed into a position such as would be caused by a rider weighing 100 ±5 kg.

8.2 Toe clearance

Carrier cycles shall have at least C clearance between the pedal and front tyre or mudguard (when turned to any position). The clearance shall be measured forward and parallel to the longitudinal axis of the carrier cycle from the centre of either pedal-axle to the arc swept by the tyre or mudguard, whichever results in the least clearance (see Figure 1). The values are given in Table 1.

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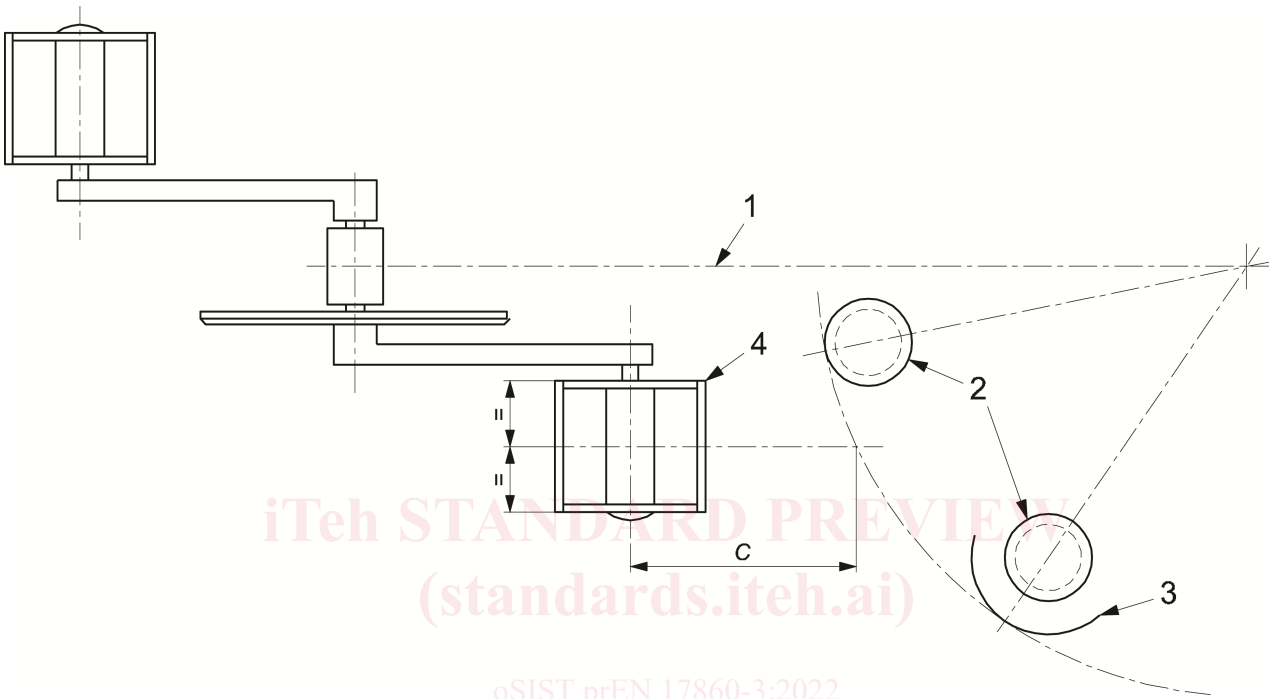
Table 1 — The values of toe clearance

Toe clearance *C*	without foot retention	100 mm
	with foot retention	89 mm
NOTE Foot retention system, e.g. quick-release pedal or toe-clip.		



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Key

C clearance
1 longitudinal axis
2 front tyre
3 mudguard
4 pedal

Figure 1 — Pedal to wheel/mudguard: toe clearance

9 Brakes

9.1 General

A carrier cycle shall be equipped with at least two independent brake systems that are actuated independently of one another. The brake systems shall function without jamming.

Two test methods are specified for determining the braking effect, and experience shows that both methods are suitable and that both can be applied. In the test method on a test track, the minimum braking deceleration is measured directly, where the ascending characteristic curve is clearly visible. In the alternative test method, the braking force is measured on a test device and these measurements are used to calculate the value for the braking effect. The ascending characteristic curve of the brake is determined through linearity measurements. A final, simple test drive is conducted to check that the cycle stops uniformly and safely on a test track.

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The heat stability test shall always be conducted. This test on the test bench can be conducted with thermally insulated brake components with reference to the acting axle load.

Requirements on the parking function are described in clause 10 (Parking).

The requirements in accordance with Table 2, and Table 3 shall be met irrespective of the test method.

NOTE See prEN ISO 4210-4:2021, 4.6.5.7, Point h), Test method — Simple check on the test track.

9.1.1 Brake-lever grip dimension

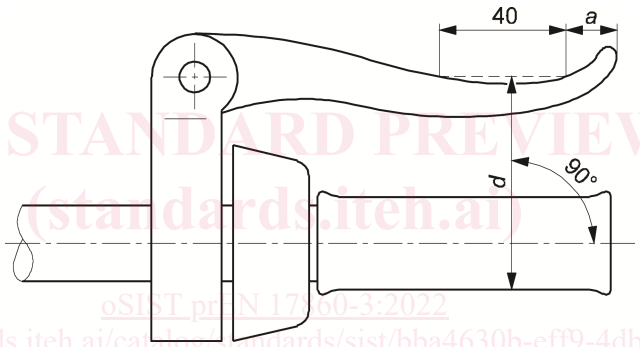
9.1.1.1 Requirements

The dimension, d, measured between the outer surfaces of the brake-lever in the region intended for contact with the rider's fingers and the handlebar or any other covering present shall over a distance of not less than 40 mm as shown in Figure 2 not exceed 90 mm.

Conformance shall be established by the method detailed in 9.1.1.2.

The range of adjustment on the brake-lever ought to permit these dimensions to be obtained.

Dimensions in mm



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Key

a distance between the last part of the lever intended for contact with the rider’s fingers and the end of the lever

b Brake-lever grip dimensions

Figure 2 — Brake-lever grip dimensions

9.1.1.2 Test method for the brake-lever similar

Fit the gauge illustrated in Figure 3— over the handlebar-grip or the handlebar (when the manufacturer does not fit a grip) and the brake-lever as shown in Figure 4— so that the face A is in contact with the handlebar or grip and the side of the brake-lever. Ensure that the face B spans an area of that part of the brake-lever which is intended for contact with the rider's fingers without the gauge causing any movement of the brake-lever towards the handlebar or grip. Measure the distance a, the distance between the last part of the lever intended for contact with the rider's fingers and the end of the lever.

The measurement ought to be conducted only on a fully-assembled bicycle.

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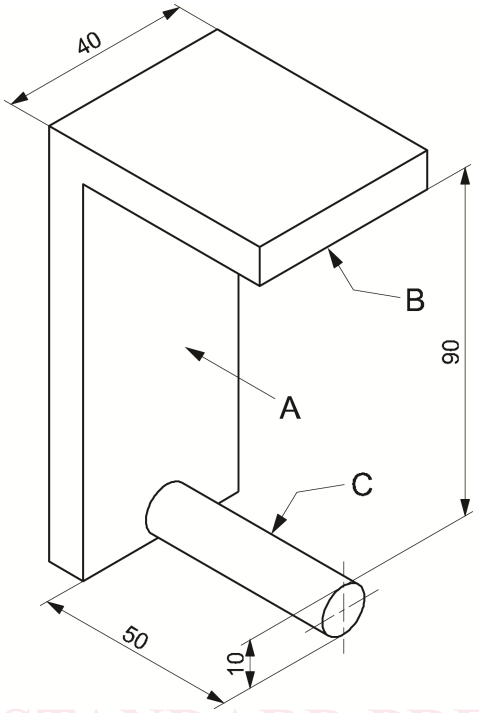
Dimensions in mm



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Key

A face A
B face B
C rod

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Figure 3 — Brake-lever grip dimensions gauge

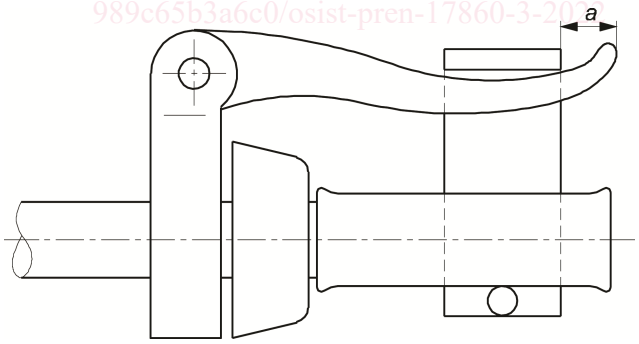

Figure 4 — Method of fitting the gauge to the brake-lever and handlebar (Minimum grip length is shown)

9.1.2 Attachment of brake assembly and cable requirements

Cable pinch-bolts shall not sever any of the cable strands when assembled to the manufacturer's instructions. In the event of a cable failing, no part of the brake mechanism shall inadvertently inhibit the rotation of the wheel.

The cable end shall either be protected with a cap that shall withstand a removal force of not less than 20 N or be otherwise treated to prevent unravelling.

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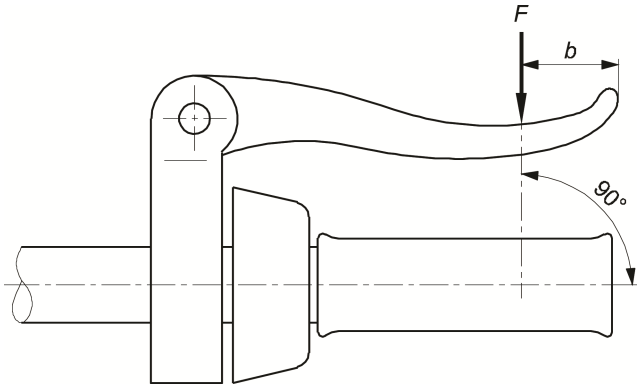
9.1.3 Brake-lever – Position of applied force

For the purposes of braking tests in this standard, for brake-levers similar to Type A, the test force shall be applied at a distance, b, which is equal to either dimension a as determined in 9.1.1.2 or 25 mm from the free end of the brake-lever, whichever is the greater (see Figure 5).



Key

F applied force

B = 25 mm or dimensions a, whichever is greater

Figure 5 — Position of applied force on the brake-lever type A

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9.1.4 Brake-block and brake-pad assemblies – Safety test

9.1.4.1 Requirements

The friction material shall be securely attached to the holder, backing-plate, or shoe and there shall be no failure of the braking system or any component thereof when tested by the method specified in 9.1.4.2.

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9.1.4.2 Test method

Conduct the test on a fully-assembled bicycle with the brakes adjusted to a correct position with a rider or equivalent mass on the saddle. The test shall be performed with the carrier cycle loaded to the gross vehicle weight as specified by the manufacturer.

Actuate each brake-lever with a force of 180 N applied at the point as specified in Figure 5 or a force sufficient to bring the brake-lever into contact with the handlebar grip, whichever is the lesser. Maintain this force while subjecting the bicycle to five forward and five rearward movements, each of which is not less than 75 mm distance.

Then conduct the test described in 9.1.6 or 9.1.7 as appropriate depending on the style of brake.

9.1.5 Brake adjustment

Each brake shall be equipped with an adjustment mechanism either manual or automatic.

Each brake shall be capable of adjustment with or without the use of a tool to an efficient operating position until the friction material has worn to the point of requiring replacement as recommended in the manufacturer's instructions. Also, when correctly adjusted, the friction material shall not contact anything other than the intended braking surface.

The brake blocks of a bicycle with rod brakes shall not come into contact with the rim of the wheels when the steering angle of the handlebars is set at 60°, nor shall the rods be bent, or be twisted after the handlebars are reset to the central position.

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9.1.6 Hand-operated braking-system – Strength test

9.1.6.1 Requirement

When tested by the method described in 9.1.6.2, there shall be no failure of the braking-system or of any component thereof.

9.1.6.2 Test method

Conduct the test on a fully-assembled bicycle. After it has been ensured that the braking system is adjusted according to the recommendations in the manufacturer's instructions, apply a force to the brake-lever at the point as specified in Figure 5. This force shall be 450 N, or such lesser force as is required to bring:

a) a brake-lever into contact with the handlebar grip or the handlebar where the manufacturer does not fit a grip;

b) brake extension-lever level with the surface of the handlebar or in contact with the handlebar;

c) a secondary brake lever to the end of its travel. Repeat the test for a total of 10 times on each brake-lever, secondary brake lever or extension lever.

9.1.7 Back-pedal braking system – Strength test

9.1.7.1 General

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If a back-pedal braking system is fitted, the brake shall be actuated by the operator's foot applying force to the pedal in a direction opposite to that of the drive force. The brake mechanism shall function regardless of any drive-gear positions or adjustments. The differential between the drive and brake positions of the crank shall not exceed 60°.

The measurement shall be taken with the crank held against each position with a pedal force of at least 250 N. The force shall be maintained for 1 min in each position.

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9.1.7.2 Requirement

When tested in accordance with 9.1.7.3, there shall be no failure of the brake system or any component thereof.

9.1.7.3 Test method

Conduct the test on a fully-assembled bicycle. After it has been ensured that the braking system is correctly adjusted, and with the pedal cranks in a horizontal position, as shown in Figure 6, apply a vertically-downward force to the centre of the left-hand pedal spindle. Increase the force progressively to 1 500 N and maintain fully for 1 min.

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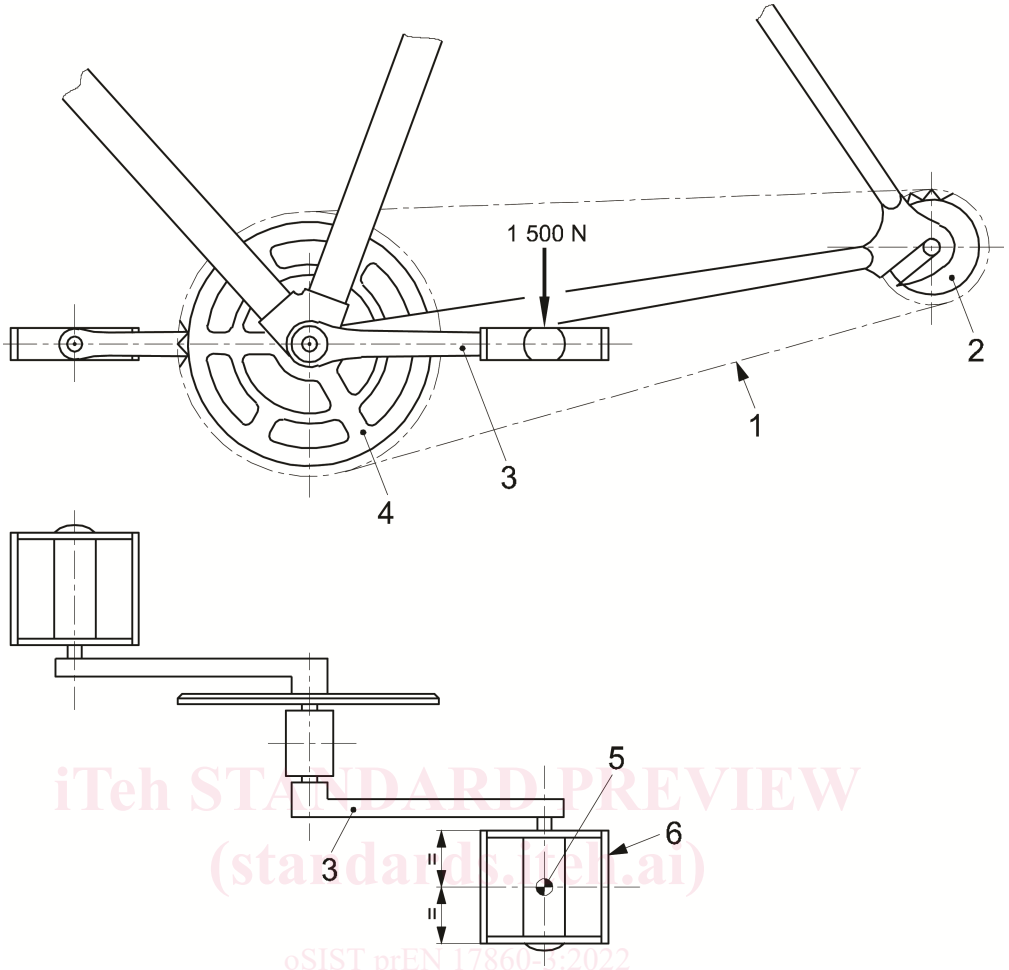

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Key

1 chain
2 hub sprocket
3 left crank
4 cycle chain-wheel and pedal crank
5 point of force application
6 pedal

Figure 6 — Back-pedal brake test

9.2 Requirements of the test method on a test track

The general requirements in accordance with 9.1 apply.

The requirements in accordance with a), b) and c) shall be met.

a) When testing on a test track, the carrier cycle shall meet the requirements listed in Table 2 in both fully laden condition as specified by the manufacturer and in unladen condition. As the maximum braking decelerations do not necessarily have to be achieved with the front wheel brake due to the axle load distribution of carrier cycles, which is dependent on the design and the loading condition, the respectively higher minimum braking decelerations shall apply to the axle that results in the better braking effect.