

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST-TP CEN/TR 17112:2017](#)

<https://standards.iteh.ai/catalog/standards/sist/dcba5817-19d0-4230-8ab8-e4c5c1984187/sist-tp-cen-tr-17112-2017>

TECHNICAL REPORT

CEN/TR 17112

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

July 2017

ICS 43.150

English Version

Cycles - Composite material used in bicycles - Specific tests suitable for components manufactured from composite materials

Cycles - Matériaux composites utilisés dans les
bicyclettes - Essais spécifiques adaptés aux
composants fabriqués à partir de matériaux
composites

Fahrräder - Verbundwerkstoffe für Fahrräder -
Spezifische Prüfverfahren für aus Verbundwerkstoffe
hergestellte Komponenten

This Technical Report was approved by CEN on 26 June 2017. It has been drawn up by the Technical Committee CEN/TC 333.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

(standards.iteh.ai)

[SIST-TP CEN/TR 17112:2017](https://standards.iteh.ai/catalog/standards/sist/dcba5817-19d0-4230-8ab8-e4c5c1984187/sist-tp-cen-tr-17112-2017)

<https://standards.iteh.ai/catalog/standards/sist/dcba5817-19d0-4230-8ab8-e4c5c1984187/sist-tp-cen-tr-17112-2017>



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
European foreword.....	3
1 Scope	4
2 Normative references	4
3 Steerer tube fatigue test	4
3.1 General	4
3.2 Background	4
3.3 Requirements	5
3.4 Test methods - Addition	5
4 Heat resistance testing for composite wheels	6
4.1 Background	6
4.2 Requirements	6
4.3 Test methods	7
5 Composite saddle rail test	10
5.1 General	10
5.2 Background	10
5.3 Requirements	10
5.4 Test methods	11
6 Composite seat post fatigue testing	12
6.1 General	12
6.2 Background	12
6.3 Test methods	12

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST-TP CEN/TR 17112:2017

<https://standards.iteh.ai/catalog/standards/sist/dcba5817-19d0-4230-8ab8-e4c3e1984187/sist-tp-cen-tr-17112-2017>

European foreword

This document (CEN/TR 17112:2017) has been prepared by Technical Committee CEN/TC 333 “Cycles”, the secretariat of which is held by UNI.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST-TP CEN/TR 17112:2017](https://standards.iteh.ai/catalog/standards/sist/dcba5817-19d0-4230-8ab8-e4c5c1984187/sist-tp-cen-tr-17112-2017)

<https://standards.iteh.ai/catalog/standards/sist/dcba5817-19d0-4230-8ab8-e4c5c1984187/sist-tp-cen-tr-17112-2017>

CEN/TR 17112:2017 (E)**1 Scope**

The purpose of this Technical Report is to provide innovative requirements and test methods applicable to any category of bicycle (city/trekking, MTB, young adult and racing) containing components manufactured, in part or whole, from composite materials. Its aim is to provide technical solutions that reduce the risk of component failure and rider injury during the specified use of such bicycles.

This Technical Report includes requirements and test methods validated by the bicycle industry and test houses for composite assemblies including forks, frames, wheels, saddle rails and seat posts.

This Technical Report makes reference to current “state of the art” standards in the field of bicycles, agreed at CEN level through the publication of EN ISO 4210- series of standards. Therefore, the requirements and tests proposed in this Technical Report are intended to be read and applied in accordance with the appropriate EN ISO 4210 standard.

NOTE Please note that the tests described in this TR refer in places to paragraph numbers from the applicable EN ISO 4210- series.

2 Normative references

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

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 4210-4:2014, *Cycles - Safety requirements for bicycles - Part 4: Braking test methods (ISO 4210-4:2014)*

EN ISO 4210-5:2014, *Cycles - Safety requirements for bicycles - Part 5: Steering test methods (ISO 4210-5:2014, Corrected version 2015-02-01)*

EN ISO 4210-6:2015, *Cycles - Safety requirements for bicycles - Part 6: Frame and fork test methods (ISO 4210-6:2015)*

EN ISO 4210-7:2014, *Cycles - Safety requirements for bicycles - Part 7: Wheels and rims test methods (ISO 4210-7:2014)*

EN ISO 4210-9:2014, *Cycles - Safety requirements for bicycles - Part 9: Saddles and seat-post test methods (ISO 4210-9:2014)*

3 Steerer tube fatigue test**3.1 General**

To apply this test, EN ISO 4210-2:2015 and EN ISO 4210-6:2015 shall be used.

3.2 Background

The proposal for a fork steerer tube fatigue test was developed due to several professional and numerous consumer accidents that involved the fatigue failure of composite material steerer tubes. The cycle industry has developed a test to confirm stem and steerer tube compatibility as an assembly. Note

that the combination of specified handlebar stems and composite fork steerers can have an effect on the integrity of the product. This test has now been utilized for more than 8 years by some manufacturers as part of their internal validation testing.

3.3 Requirements

When tested by the method described in 5.8.2.1, there shall be no fractures or visible cracks in any part of the fork. This shall be confirmed by removing the steering assembly and inspecting the fork steerer. The running displacements (peak-to-peak value) at the points where the test forces are applied shall not increase by more than 20 % of the initial values for a composite fork.

3.4 Test methods - Addition

EN ISO 4210-6:2015, 5.8 Fork Steerer Tube and Stem Assembly - Fatigue Test

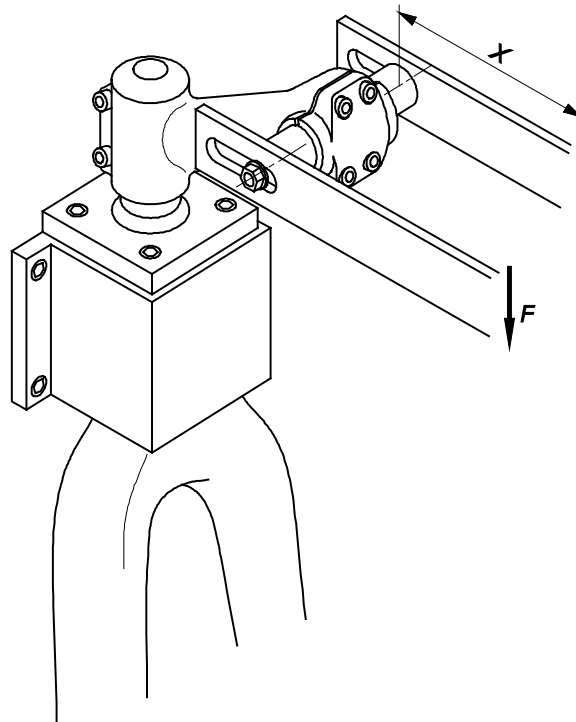
5.8.1 General

A bicycle fork shall be subjected to in-phase fatigue loading via a stem or a handlebar stem assembly attached at the steerer tube in the direction parallel to the fork steerer tube. The test shall be used to qualify the fork system, including the specified stem, expander nut, and headset assembly (top-cap, bearings, etc.). The headset spacers shall be removed and the stem shall contact the top cap of the headset. The stem fasteners shall be torqued to the manufacturers recommended maximum specification. If the intended stem type is known, the maximum specified length shall be used for this test.

5.8.2 Fork Steerer Tube Fatigue Test

5.8.2.1 Fork Steerer Tube Fatigue Test Method

The loading conditions are the same as EN ISO 4210-5:2014, 4.9.2.2 handlebar fatigue In-Phase procedure (phase 2). If a handlebar and stem assembly is used for testing, 400 N (F) shall be applied fully reversed to each end of the ball joint attachment. The maximum test frequency shall be maintained as specified in EN ISO 4210-3:2014, 4.5. In the case where the specified stem is known but not the handlebar, a dummy load arm shall be used and adjusted for length based on the manufacturer's specifications (minimum value of 110 mm - X). A load of 800 N (F) shall be applied fully reversed to the dummy clamp (see Figure 1). For composite fork steerer tubes, the running displacements (peak-to-peak value) at the points where the test forces are applied shall not increase by more than 20 % of the initial values. Stop the test after 20 000 cycles, remove the stem assembly and inspect the fork assembly for cracks or fractures.

**Key**

X length

F applied load

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Figure 1 — Dummy clamp

SIST-TP CEN/TR 17112:2017

<https://standards.iteh.ai/catalog/standards/sist/dcba5817-19d0-4230-8ab8-c4c5c9b4187/sist-tp-cen-tr-17112-2017>

4 Heat resistance testing for composite wheels**4.1 Background**

There has been some concern in the development of composite wheels (tubular or clincher rims) that excessive heat generated during extreme braking (long descents or turning during descents) can cause material damage that may lead to structural damage of the rim. The resin's TG (glass transition temperature) plays a large part in this, but also the braking force and brake pad compound factor in. Impact after heat damage can also cause structural damage to wheel components. We feel that a review and test requirement/proposal is a good direction forward to establishing a safety standard that can be incorporated into an EN and/or ISO standard.

4.2 Requirements

EN ISO 4210-2:2015, 4.6.9 Brakes – Heat resistance test:

4.6.9.1 General

This test applies to all disc and hub brakes, but it applies to rim brakes where the brake pads are known or suspected to be manufactured from or include thermoplastic materials. This test applies also to rim brakes where the rim brake sidewalls are known or suspected to be manufactured from or include composite materials.

Each brake on the bicycle shall be tested individually, but where the front and rear brakes are identical, only one brake needs to be tested. If rims are identical (spoke count, material, design), only one wheel needs to be tested.

4.6.9.2 Requirement for disc brakes, hub brakes and rim brakes and pads (alloy or steel rim, composite rims are excluded from this section)

Throughout the test described in EN ISO 4210-4:2014, 4.7, the brake lever shall not touch the handlebar grip, the operating force shall not exceed 180 N, and the braking force shall not deviate outside the range 60 N to 115 N.

Immediately after having been subjected to the test described in EN ISO 4210-4:2014, 4.7, the brakes shall achieve at least 60 % of the braking performance which was recorded at the highest operating force used during the performance tests EN ISO 4210-4:2014, 4.6.5.7 c) items 1) and 2).

4.6.9.3 Requirement for rim brakes and pads used with composite rims - Addition

A new wheel with new brake pads (recommended by the wheel/rim manufacturer) and a new tyre (tubular tyre, tyre w/inner tube or tubeless tyre) shall be subjected to two consecutive tests: EN ISO 4210-4:2014, 4.8 and EN ISO 4210-7:2014, Annex B.

After having been subjected to the first test described in EN ISO 4210-4:2014, 4.8 the rim with the inflated tyre mounted on shall have no visible cracking, fracture or permanent deformation (rim width shall not increase greater than 5 % of the initial maximal width value with EN ISO 4210-7:2014, 4.4 width measurement method).

After having been subjected to the second test described in EN ISO 4210-7:2014, Annex B the rim without tyre shall have no visible cracking or fracture. The lateral and radial run out shall not exceed 1,0 mm (EN ISO 4210-2:2015, 4.10.1).

4.3 Test methods **iTeh STANDARD PREVIEW**

EN ISO 4210-4:2014, 4.7 Brakes — Heat-resistance test for disc brakes, hub brakes and rim braking pads (alloy or steel rim, composite rims are excluded from this section)

Drive the wheel and tyre assembly with the brake applied on a machine such as those described in ISO 4210-4:2014, 4.6.5.5 at a velocity of 12,5 km/h \pm 5 % with a rearward, cooling air-velocity of 12,5 km/h \pm 10 %, so that a total braking energy of $E_{Wh} \pm 5 %$ specified in Table 1 is developed. The duration of the test shall be 15 min \pm 10 %.

Allow the brake to cool to ambient temperature and then repeat the test cycle.

A maximum of 10 interruptions per test cycle is permitted, each with a maximum duration of 10 s.

When the test has been carried out, subject the brakes to the applicable parts of the tests described in ISO 4210-4:2014, 4.6.5.7 item c) 1) and 2).

Calculate the braking energy from Formula (1):

$$E = F_{Br} \cdot V_{Br} \cdot t \quad (1)$$

where

F_{Br} is the braking force (N);

V_{Br} is the linear velocity of the periphery of the tyre (i.e. 12,5 km/h = 3,472 m/s) (m/s);

t is the duration of each test cycle (excluding interruptions) (i.e. 15 min = 0,25 h) (h).