Stichting FietsParKeur

Standardisation document for bicycle parking systems

Version 2.5
July 2021

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For suppliers submitting a bicycle parking system for review, the document may only be used to verify the system's conformity to the standard. Once the FietsParKeurmerk (quality mark) has been awarded, the suppliers may refer to this quality mark on their bicycle parking system.

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Version 2.5, July 2021

Contents

1 Introduction

1.1 Background

Stichting FietsParKeur is responsible for the testing and certification of bicycle parking systems. Based on the Standardisation Document for Bicycle Parking Systems, the systems are tested and certified exclusively by FietsParKeur two times per year.

The first Standardisation Document for Bicycle Parking Systems was drawn up in 1999. This first document was updated in 2004, followed by a new Standardisation Document in 2011 for multilevel bicycle parking.

Thanks to the rapid growth of bicycle traffic, especially in cities, bicycle parking facilities are in great demand. National and local governments and (private) organisations are giving increasing attention to (sufficient and high-quality) bicycle parking facilities both at train stations and in city centres. This means that demand for bicycle parking systems at different locations and for different target groups has increased. The diversity of types of bicycles and accessories, e.g. crates, child seats, etc., has also increased.

The above-mentioned developments translate into new requirements for bicycle parking systems. A more differentiated range of bicycle types and target groups has also led to more differentiated demand for different bicycle parking systems. Differentiation of bicycle parking systems is necessary to ensure that the systems meet the requirements of users and operators, as well as managers of bicycle parking facilities. To guarantee the quality and usability of these different systems, an amended Standardisation Document for Bicycle Parking Systems has become necessary. This is the text you are reading now. This amended Standardisation Document is in line with the Selection Guide on the site www.fietsparkeur.nl.

1.2 Definition

This Standardisation Document applies to bicycle parking systems approved according to version 2.5 dated July 2021.

Different types of bicycle parking systems can be defined. These different types are explained in more detail below.

- Single-level (single-level parking at ground level);
- Multilevel (multilevel/double-level parking);
- Vertical (vertical bicycle parking spaces available in the bicycle parking system).

Multilevel bicycle parking refers to bicycle parking in which the bicycles are parked on two or more horizontal levels, one above the other. The person parking the bicycle remains at the original ground level. This also includes all systems in which bicycles are placed opposite and/or half above and below each other inside a bicycle parking system. In vertical bicycle parking, the bicycle is placed in the bicycle parking system vertically.

The standard is not applicable to automatic bicycle parking systems. For these systems and other systems with automatic characteristics, the European Rules apply.

Within the categories described above, a subdivision can be made into:

- Single-sided (bicycle parking spaces only on one side of the bicycle parking system);
- Double-sided (bicycle parking spaces on both sides of the bicycle parking system).

The standardisation document also aims to test and assess bicycle parking systems other than the single-level and multilevel bicycle parking systems currently available on the market. However, it may be the case that these tests are not sufficiently compatible with these new systems, in particular if they work in a completely different way. In that case, it may prove necessary to supplement the standardisation document in line with the requirements that have now been included.

The Standardisation Document for Bicycle Parking Systems is intended to serve as the basis for an expert assessment by the Expert Committee. A test can only be considered to be performed against the Standardisation Document for Bicycle Parking Systems if this test is conducted by or on behalf of this Expert Committee. This requirement exists because the application and interpretation of the requirements demands an expert assessment, which is guaranteed by the Expert Committee that includes a broad representation of users, manufacturers and other stakeholders. This working method and composition of the Expert Committee guarantees that it is able to act objectively and independently. The Expert Committee of FietsParKeur (as the sole body) advises the Board on the granting of licences and the management of the Standardisation Documents.

1.3 A differentiated standard

A differentiated standard has been selected for this version of FietsParKeur. This makes it possible to assess the bicycle parking systems, and thus issue the FietsParKeur quality mark, for specific bicycle types, requirements and/or circumstances.

Each approved bicycle parking system must comply with:

1. the basic requirements (B) contained in Chapter 2 **and**
2. the lower threshold of the differentiated requirements (O) contained in Chapter 3.

In addition, you can select (K) to test a system for differentiated requirements contained in Chapter 3. Suitable bicycle parking systems can then be selected based on the desired criteria.

For example:

1. Each system must be tested for the basic requirement of entrapment hazard (B)
2. Each system must be tested for stability after installation with a standard bicycle (O)
3. Optionally, the system can also be tested for stability after installation with another bicycle, e.g. the BAFO (K) (see the below table and the definitions in Chapter 5)

Bicycles

An important part of the differentiated FietsParKeur system is making a distinction between the different bicycle types for which a certain system is suitable. In this Standardisation Document, we distinguish the following bicycle types.

Category	**Bicycle type**
Standard bicycle	City bicycle, large City bicycle, small
BAFO: Bicycle with limited parts deviation [**B**eperkt **A**fwijkende **F**iets op **O**nderdelen], based on a combination of:	Hybrid E-bike Speed pedelec
BAFA: Bicycle with limited accessories deviation [**B**eperkt **A**fwijkende **F**iets op **A**ccessoires]	Crate bicycle/front rack bicycle Child seat Bike bags (panniers)
Rear child seat	Yepp Maxi Easyfit
Front child seat	Yepp Mini
Crate	Fastrider 34.5 litres (or equivalent)
Specials*	Not pre-defined

* The dimensions of any standard bicycles to be used in the Specials category must be supplied by the supplier, just like the accompanying test bicycle.

2 Basic requirements

All bicycle parking systems must meet the basic requirements (B). This chapter explains these basic requirements in more detail. The basic requirements are summarised in the table below. Any bicycle parking system that fails to meet all of the basic requirements is not eligible for the FietsParKeur quality mark.

The numbering refers to the following paragraphs.

In addition to these basic requirements, the bicycle parking system must also meet the lower threshold (O) for the differentiated requirements contained in Chapter 3.

2.1	Centre-to-centre distance	B
2.2	*Safety*	
2.2.1	Moving parts	B
2.2.2	Surface roughness	B
2.2.3	Entrapment hazard	B
2.3	Prevention of damage	B
2.4	*Strength*	
2.4.1	Impact strength	B
2.4.2	Removability of protective parts	B
2.5	Water drainage	B
2.6	Weather resistance	B

Table 2.1: Basic requirements of a bicycle parking system

2.1 Centre-to-centre distance

The bicycle parking system must have suitable dimensions so that the distance between two bicycles installed in parallel on the same side of the system is nowhere less than 37.5 cm, measured from centre to centre between two installed bicycles.

Test method
The centre-to-centre distance between two bicycles must be measured (distance). When installed in parallel, no values less than 37.5 cm may be measured.

2.2 Safety

2.2.1 Moving parts

If the system contains moving parts, the movements of the system must always be well controlled and smooth. Grabbing, releasing or otherwise operating the system (correctly or incorrectly) must not cause the moving parts to move uncontrollably and thus endanger the user.

Test method
For all moving parts accessible to the user without a parked bicycle and with a parked standard bicycle (see Annex 1);
- release moving parts while the system is at rest;
- release moving parts while performing a movement;
- setting the resting system in motion in any way.

A controlled movement is said to occur if the tester can still grab and brake the system.

2.2.2 Surface roughness

The surfaces of the bicycle parking system must be sufficiently smooth that there is no risk of injury to the user and damage to the bicycle (e.g. due to burrs, weld spatter and/or zinc droplets).

Test method
Assessment with the naked eye and by touch (hand smoothness). Testing by the Expert Committee.

There must be no injuries to the users. There must be no burrs, weld spatter and/or zinc droplets on parts that can reach of the user.

2.2.3 Entrapment hazard

Holes in the bicycle parking system with an insertion depth of more than 8 millimetres must have a diameter of less than 8 millimetres or more than 25 millimetres in accessible places.

Test method
The inside of the holes must be measured (diameter).

No values may be found that fall between the indicated dimensions (between 8 mm and 25 mm).

2.3 Prevention of damage

When the bicycle parking system is used correctly, damage to the bicycle itself, the bicycles in the adjacent racks, the user and the bicycle parking system itself must be prevented. This means that no paint damage may occur on the bicycle or the bicycle parking system due to e.g. sharp protruding parts or friction between parts. Parts of the bicycle itself, the adjacent parked bicycles and the bicycle parking system must also be protected against being damaged or broken off. In addition, the user must not suffer any injuries/wounds when the system is used correctly.

Test method
The bicycle must be parked in the bicycle parking system. Then check for damage to adjacent bicycles, the user and the bicycle parking system itself. The test methods are an empirical process.

When using the bicycle parking system correctly, no damage must occur to the bicycle, adjacent bicycles, the user or third parties.

2.4 Strength

2.4.1 Impact strength

The bicycle parking system must be resistant to tampering.

To test the impact strength of the bicycle parking system, it must be tested for possible loads, e.g. jumping on it or kicking it. The starting point is a force of 800 N applied to the system in obvious ways.

Test method
Qualitative assessment by the Expert Committee.

2.4.2 Removability of protective parts

Parts fitted to the bicycle parking system that are intended to serve as a (protective) contact surface between the bicycle parking system and the bicycle and/or the user's hands must be able to withstand efforts to remove these parts.

Test method
Parts fitted to the bicycle parking system must be able to withstand efforts to remove these parts from the bicycle parking system for at least 30 seconds by:
- applying a pulling or pushing force of 150 N to the relevant part without the use of tools.

No parts may break off/tear off or be able to be removed in any other way and no breakages and/or visible cracks may occur in the bicycle parking system. The bicycle parking system must still function correctly.

2.5 Water drainage

No water that is a nuisance to users may remain in and on parts of the bicycle parking system. This applies both to rainwater and water from wet bicycles. Users must be prevented from getting wet from water originating from (parts of) the bicycle parking system.

Test method
Empty one bucket of water (approximately 10 litres) over the bicycle parking system so that all of its parts become wet.

No nuisance water may remain in the wheel rails and/or moving parts of the bicycle parking system. In short, the water must be drained away.

2.6 Weather resistance

Plastic parts
The plastics used must be sufficiently resistant to weather impacts (temperature, moisture, UV, ozone) that their mechanical properties after 15 years of use (in bad weather and wind) still correspond to at least 80% of the original value.

Glass transition plastic
If a glass transition occurs at low temperatures in the plastics used (the temperature change point at which brittleness occurs), that glass point may only occur at minus 25 °C or lower.

Paint adhesion
- the paint adhesion must be equal to or less than class 1;
- the paint adhesion is determined according to NEN-EN-ISO 2409.

If the paint layer is thicker than 250 µm, the paint adhesion may also be determined according to ASTM 3359, test method A (X-cut). The paint adhesion must then be equal to or less than class 4A (corresponds to class 1 according to NEN-EN-ISO 2409).

Temperature insulation
The contact surfaces of the bicycle parking system (e.g. latches, etc.) that must unavoidably be gripped by the user for correct use must not be made from metal (plastic covering or powder coating, etc., are permitted).

Corrosion
The complete bicycle parking system (including mounting materials) must show no rust after six months of outdoor exposure or the 'salt spray test' ISO 9227 (to be assessed with the naked eye) or if the bicycle parking system is only galvanised, the galvanisation must be in conformity with NEN-EN-1461.

Test method

Plastic parts: statement from the supplier of the plastic parts or research on mechanical properties of new and artificially aged material.

Plastic glass transition: statement from the supplier of the plastic parts or research on mechanical properties of new and artificially aged material.

Paint adhesion: The paint adhesion must be demonstrated by the supplier.

Temperature insulation: Visually assess the material properties of contact surfaces
College of Experts

Corrosion: conformity to ISO9227 or in the case of galvanisation only NEN-EN-1461, to be demonstrated by the supplier. The supplier must indicate for which corrosion class (C-value) the system is suitable.

3

Differentiated requirements

This chapter specifies the requirements that depend on the selection criteria for the bicycle parking system.

For most requirements, a lower threshold has also been included for the requirements (O) that the bicycle parking system must in any case meet to qualify for the FietsParKeur quality mark. The manufacturer can also test the system for the additional requirements associated with the selection criteria (K). The bicycle parking system then receives an additional approval for the selected criteria.

If a lower threshold (O) has not been included with a requirement, the requirement is not compulsory and the FietsParKeur
may also be granted if the differentiated requirement is not met.

3.1 Stability after installation

The bicycle parking system must provide sufficient stability to ensure that the bicycles in Annex I are clamped/held such that they remain in or against the system and are not damaged when the bicycle or adjacent bicycles are parked and removed. Bicycles may not fall over when a combination of a 10 kg bag is hung on the luggage carrier and a 7.5 kg bag is hung on the handlebars. In addition, the bicycles may not deviate more than 15º from the vertical axis. If the bicycle parking system is designed for two-sided use, the bicycles on both sides may not interfere with each other's stability.

Test method
Implementation of a practical test by the Expert Committee (assessment panel) for a selection of bicycle types (Annex 1) in which the bicycle is both unloaded and loaded (see also Annex 1). The practical test consists of the following:

- parking the bicycle;
- leaving the bicycle in the clamped position;
- after being placed in the BPS, the bicycle is loaded on one side as follows:
  - 10 kg in a side bag on the luggage carrier on the bicycle, centre of gravity of weight: above the rear axle, 20 ± 2 cm below the top edge of the luggage carrier and 5 ± 2 cm to the side of the luggage carrier. And
  - 7.5 kg hanging from the handlebar, approx. 5 cm from the end of the handlebar.
- The BPS should provide stability at both sides, without the use of any fastening or latching capability.
- The bicycle thus loaded must also not fall over when another bicycle is dropped against the BPS or the bicycle from a distance of 20 cm.
- By loading a bicycle parked on the BPS in the way described above, the bicycle must not tilt sideways by more than 15° relative to its resting position. The parked bicycle must also not tilt more than 15° when a bicycle is parked into or out of an adjacent spot in the BPS.
- removing the bicycle.

		Bicycle remains in the system	**Bicycles do not interfere with each other's stability (if used on both sides)**
6a	Standard bicycle: *city bicycle, large and small*	O	O
6b	BAFO	K	K
6c1	BAFA: city bicycle, large with crate	K	K
6c2	BAFA: city bicycle, large with rear child seat	K	K
6c3	BAFA: city bicycle, large with front child seat	K	K
6c4	BAFA: city bicycle, large with panniers	K	K
6d	Specials	K	K

3.2 Manoeuvrability when parking a bicycle

The bicycle parking system must have sufficient dimensions to allow the bicycles to be moved in and out while any vulnerable parts are not damaged. The vulnerable parts are the spokes, headlight and dynamo. Any cables must also not become trapped and/or snagged. When placing a bicycle with an accessory, the accessory must touch the bicycle parking system. However, the presence of the accessory must not prevent the bicycle from being moved in and out. When manoeuvring the bicycle past another bicycle with accessories, one hand may be used to move the bicycles sideways to make insertion and removal easier.

Test method
The Expert Committee (assessment panel) conducts a practical test for the bicycle types (Annex 1) in loaded and unloaded states.

While placing the bicycle, vulnerable parts of the bicycle, e.g. the spokes, headlight and dynamo must not be damaged by the bicycle parking system. Any cables must also not become trapped and/or snagged.

		Bicycle can be moved in or out (may touch accessory)	No vulnerable parts (spokes, headlight, dynamo) get damaged	Cables do not get squeezed or remain snagged
7a	Standard bicycle: *city bicycle, large and small*	O	O	O
7b	BAFO	K	K	K
7c1	BAFA: city bicycle, large with crate	K	K	K
7c2	BAFA: city bicycle, large with rear child seat	K	K	K
7c3	BAFA: city bicycle, large with front child seat	K	K	K
7c4	BAFA: city bicycle, large with panniers	K	K	K
7d	Specials	K	K	K

3.3 Stability when manoeuvring the system

The bicycle parking system must provide sufficient stability to ensure that, once the bicycle has been parked, both hands of the person parking the bicycle are free to operate the system.

Test method
The Expert Committee (assessment panel) conducts a practical test for the selected bicycle types (Annex 1).

After placing the bicycle, both hands of the person parking the bicycle must be free to operate the system.

		Hands of the person parking the bicycle are free to operate system
8a	Standard bicycle: *city bicycle, large and small*	O
8b	BAFO	K
8c1	BAFA: city bicycle, large with crate	K
8c2	BAFA: city bicycle, large with rear child seat	K
8c3	BAFA: city bicycle, large with front child seat	K
8c4	BAFA: city bicycle, large with panniers	K
8d	Specials	K

3.4 Height difference

The height difference between the wheels of two bicycles installed next to each other must be adjusted so that the bicycles do not touch each other.

Test method
The Expert Committee (assessment panel) conducts a practical test for the selected bicycle types (Annex 1), in which the combinations of the bicycle types are also tested:
- Basic requirement 1: large city bicycle next to another large city bicycle
- Basic requirement 2: large city bicycle next to small city bicycle in at least one configuration
- Optional choice: selected type next to large city bicycle
- More than one optional choice, for each of the selected types: -
  selected type next to large city bicycle
- selected type next to each of the other selected types

		Bicycle does not touch other bicycle
9a1	Standard bicycle: *large city bicycle and large city bicycle*	O
9a2	Standard bicycle: *large city bicycle and small city bicycle in at least one configuration**	O
9b	BAFO	K
9c1	BAFA: city bicycle, large with crate	K
9c2	BAFA: city bicycle, large with rear child seat	K
9c3	BAFA: city bicycle, large with front child seat	K
9c4	BAFA: city bicycle, large with panniers	K
9d	Specials	K

*), e.g. the large city bicycle above and the small city bicycle below

3.5 Lifting height

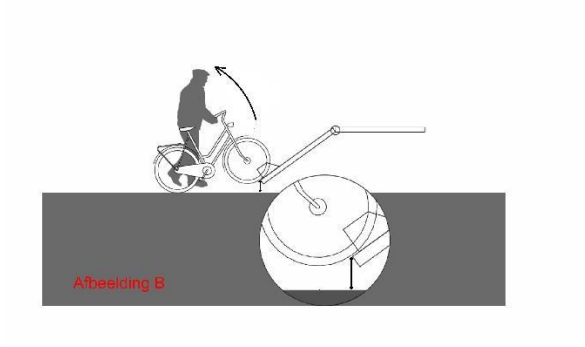


Figure 3.1: Lifting height

The different target groups have their own maximum lifting height and maximum push/pull force. To assist each target group inside the parking system/garage, the lifting height of the bicycle parking system and the push/pull force must not exceed the values stated in the table below, assuming a flat floor.

Target group	Lifting height (cm)	Push/pull force (N)	Requirement
Children	20	100*	K
Adults	38	200	O
Elderly	20	135	K
Lifting comfort Adults	35	135	K
Lifting comfort Elderly	15	135	K
Lifting comfort Children	15	100*	K

*) The small city bicycle is used by children

Test method
The Expert Committee (assessment panel) conducts a practical test for all selected bicycle types (Annex 1) in which, depending on the placement method, the lifting height (in cm) must be measured or the push/pull force is measured in N.

3.6 Protruding parts and sharp edges

It must be prevented that users of the bicycle parking system (including children) could injure themselves on protruding parts or sharp edges of the bicycle parking system itself. Bicycles must also be able to be stored without being damaged when it is used correctly.

Test method

- Protruding parts at a height of 0.8 m to 2 m must be blunt and have an end width of at least 3.6 cm (flat part of the end) with a projected area of at least 4 cm^2 (flat part section + radii of curvature);
- Protruding parts lower than 0.8 m and/or higher than 2 m must be blunt and have an (end) surface of at least 0.8 cm^2 (corresponding to Ø 10 mm).
- In the case of children as users of the bicycle parking system, projecting parts lower than 0.8 m must be blunt and have an end width of at least 3.6 (flat part of the end) with a projected surface of at least 4 cm^2 (flat section + radii of curvature);
- There must be no sharp edges and/or protruding parts on the bicycle parking system that could injure users, catch them behind and/or damage the bicycle to be parked:
  - sharp edges and corners must be rounded off
  - the other edges of the bicycle parking system must have a radius of curvature.

	Children	Adults
11a Projecting parts < 0.8m (adults)		O
Blunt end created		
Surface ≥ 4 cm^2		
11b Projecting parts < 0.8m (children)	K	
Blunt end created		
Width ≥ 3.6 cm		
Surface ≥ 4 cm^2		
11c Projecting parts 0.8 – 2.0 m		O
Blunt end created		
Surface > 0.8 cm^2		
11d Projecting parts > 2.0 m		O
Blunt end created		
Width ≥ 3.6 cm		
Surface ≥ 4 cm^2		
11d Corners and edges clipped or radius of curvature		O
11e Other edges radius of curvature		O

3.7 Ease of understanding

The intended manner of parking and/or fastening/locking must be clear and comprehensible to all target groups and/or clearly communicated by means of instructions.

Test method
Markings/instructions should preferably not be necessary. This is determined empirically by the Expert Committee (assessment panel). If markings or instructions must be provided, the following requirements apply:

- in the opinion of the Expert Committee, the information must be comprehensible to all selected target groups;
- all markings on the product that are relevant to the end user must be durable and applied so as to be clearly visible and easy to read when the product is in use;
- if figures and/or characters are used, they must have high contrast (e.g. use black and white or primary colours);
- the font size of the information on the bicycle parking system must be at least 8 mm.

In the opinion of the Expert Committee, the intended manner of parking and/or fastening/locking must be clear to all users of the bicycle parking system.

Target group	Is the information and the parking method clear?
12a Children	K
12b Adults	O
12c Elderly	K

3.8 User forces

Excessive force should not be required to place and/or remove the bicycle and/or to operate the system. A distinction is made between forces before starting a movement (peak loads) and forces during ongoing movements (forces exerted over a longer period of time). Both forces must be registered separately. The requirement for the starting forces is *150%* of the values set for the ongoing movement. The peak load is measured over the first 20 cm of the movement. The maximum peak load (for adults) is 210 N.

Test method
The performance of a practical test by the Expert Committee (assessment panel) with the large city bicycle (Annex 1), unless the user has indicated that the system is only suitable for another bicycle in Annex 1. The forces to be used for operating the filled and empty bicycle parking system must meet the following requirements:

- maximum operating force of an ongoing movement applied at a height lower than 135 cm above ground level is 140 N with a peak load of 210 N;
- maximum operating force of an ongoing movement applied at a height higher than 135 cm above ground level is 85 N with a peak load of 127.5 N;
- the maximum height of the point of application for forces is 170 cm above ground level.
- For the elderly and children, the forces are 50% lower.
- The point of application is also lower for children, 100 and 140 cm.

Lifting the bicycle completely is not permitted. In addition, the angle of inclination of the rail during insertion and removal is a maximum of 46º to the horizontal.

These values are based on NEN 1005. This standard specifies that, among the working population and young adults, 90% of women and 99% of men can carry a weight of 15 kg up to and including a point of application of 135 cm. In the new version of this standard, all forces have been reduced by 5%.

Excessive force should not be required to place and/or remove the bicycle and/or to operate the system. For test execution, see Annex 2.

	Point of application	Operating force	Peak load	Complies?
13a. Adults	< 135 cm (0.5 in.)	140 N	210 N	O
	135 - 170	85 N	127.5 N	O
13b. Elderly	< 135 cm (0.5 in.)	70 N	105 N	K
	135 – 170	42.5 N	63 N	K
13c. Children*	< 100 cm (0.5 in.)	70 N	105 N	K
	100 - 140	42.5 N	63 N	K

*) The small city bicycle is used by children

3.9 Parking time

The bicycle parking system must be sufficiently user-friendly to ensure that placing the bicycle in the rack is not time-consuming. The values (in seconds) must differ in terms of parking reason (short-term or long-term parking). Below is a brief description of what the two parking reasons involve.

Short-term parking
Short-term parking means leaving the bicycle in the system for less than 60 minutes. In practice, this applies to parking at a supermarket, snack bar, etc. The person parking the bicycle must then be able to act quickly and easily.

Long-term parking
Long-term parking means leaving the bicycle in the system for longer than 60 minutes. In practice, this applies to parking at train stations, companies, large events, etc.

Test method
The Expert Committee measures the time (in seconds) required to place the bicycle in the rack. The time starts when the bicycle is placed in a suitable position in front of or near to the rack on the stand (start parking, rack in home position) and ends when the bicycle is placed in the rack and the rack is returned to the home position. Fastening, locking or latching the bicycle or the system is not part of the parking time. The same requirement is applied for each target group.

The maximum parking time is:
- 5 seconds for short-term parking;
- 20 seconds for short-term parking.

	Short-term parking	Long-term parking
14a < 5 seconds	K	
14b < 20 seconds		O

If the parking time meets the requirement, then the bicycle parking system is suitable for short-term and/or long-term parking.

3.10 Options for fastening

There is no lower threshold included in the standard for the fastening options. We distinguish between three situations on which the system can be assessed:
1. Approved fastening device
2. No approved fastening device
3. Fastening made deliberately impossible

Approved fastening device
If this option is selected, the bicycle parking system must have a means of securing the bicycle to the bicycle parking system using an integrated or external 90 cm cable lock at the position specified by the supplier. When using the fastening option, the locks referred to in Annex I all remain at least 25 cm away from the ground. It is also not possible with simple actions to move the bicycle parked in the BPS in such a way that the lock is closer to the ground than 25 cm. If more than one fastening option is present, the above requirement applies to at least one of the options.
The fastening option must have an aperture at least 6 cm in diameter.

The starting point is that the attack resistance of the rack must be at least equal to that of approved locks. Therefore, the fastening option of the rack, including all parts of the rack necessary for fastening, must be at least made from solid round steel class S235 with a diameter of 14 mm, or at least equivalent in terms of attack resistance.

Test method
For solid round steel S235: thickness to be measured by the Expert Committee. **For a non-standard material, form or solution**: attack resistance at least equivalent, to be demonstrated by the supplier.

Fastening with a chain lock at the specified location: to be tested by the Expert Committee with a standard bicycle.

Aperture ≥ 6 cm: to be measured by the Expert Committee.

No approved fastening option
If this option is selected, the bicycle parking system has no fastening device or a fastening device that does not meet the requirements. The system can then still qualify for FietsParKeur.

	Requirement	Does the fastening option frame or front wheel + frame comply?	Does the rear wheel fastening option comply?	Fastening impossible?
16a	Can be tied down with chain of minimum 90 cm on frame or front wheel and frame	K		
16b	Can be tied down with chain of minimum 90 cm on rear wheel		K	
16c	Aperture for external lock ≥ 6 cm	K	K	
16d	Attack resistance	K	K	
16e	Fastening impossible?			K

Fastening impossible
If this option is selected, the bicycle parking system must **not** have a means of securing the bicycle to the bicycle parking system using an integrated or external 90 cm cable lock. The system must therefore not be suitable for securing the bicycle.

3.11 Robustness of moving parts

The parts of the bicycle parking system that must be moved for the correct functioning of the bicycle parking system (rails, etc.) must be able to withstand certain movements and forces.

Test method
The relevant parts must be able to withstand at least 15,000 movements. This is based on the following test method:

To test the fatigue strength, load the bicycle parking system cyclically according to practical situations. Draw up a plan for this describing at what point and what angle the cyclical load is applied. Offer the plan for inspection by the system client on request.

Preconditions for the plan:
■ use air cylinder or equivalent for cyclical loading; ■ configuration without bicycles.

Equipment to be used
Air cylinder (or equivalent) fitted to the bicycle parking system with an alternating pull/push force of 250N +- 5%. One pull and one push = 1 load cycle.

To be in conformity with this requirement, a self-declaration must be issued by the supplier.

If there are parts of the bicycle parking system that must be moved for the correct functioning of the bicycle parking system (bolts, etc.), these parts must be able to withstand the values according to the table below and, after testing according to the above method, the moving parts must still function correctly, the operating force must meet the requirement of para. 3.8 'user forces' and no excessive play can occur.

system robustness	movements	bicycle parking system
17a Basic requirement	15,000	O
17b Generous	25,000	K
17c Future-proof	30,000	K

3.12 Maintenance

The bicycle parking system must be maintained. The developer/owner decides to use a certain maintenance frequency. Three selection criteria are distinguished within this Standardisation Document for Bicycle Parking Systems, namely (1) intensive, (2) medium and (3) extensive. The three selection criteria are defined as follows:

- Intensive (intensive maintenance (cleaning, checking the bicycle parking system) more than 2x/year);
- Medium (maintenance (cleaning, checking the bicycle parking system) 1-2x per year);
- Extensive (extensive maintenance (cleaning, checking the bicycle parking system) less often than 1x/year.

Maintenance	maintenance frequency	bicycle parking system
18a Extensive	Less than 1x per year	O
18b Medium	1-2x per year	K
18c Intensive	More often than 2x per year	K

4 Information for users

4.1 Markings on the product

Markings should preferably not be necessary on the product. If markings are used, the following requirements apply:

- the information must be understandable for all selected target groups;
- all markings on the product that are relevant to the end user must be durable and applied so as to be clearly visible and easy to read when the product is in use;
- if figures and/or characters are used, they must have high contrast (e.g. use black and white or primary colours);
- the font size of the information on the bicycle parking system must be at least 8 mm.

4.2 Purchase information

The purchase information must contain the following information:

- name, address and other relevant data of the supplier (e.g. phone, fax, etc.);
- model name/type of bicycle parking system;
- user group(s) for which the bicycle parking system is intended (bicycle types);
- number of bicycles to be parked in the bicycle parking system;
- 'centre to centre' distance (C2C distance) of the (bicycle) spaces in the bicycle parking system;
- installation distance between two separate bicycle parking spaces;
- overall dimensions of the bicycle parking system (after installation);
- assembly/placement form(s);
- overall dimensions of the bicycle parking system installed and with bicycle(s) (bicycle length, but also (extra) space as a result of the handlebar width of the outermost bicycles);
- required passageway width between two adjacent systems;
- overall dimensions of the bicycle parking system with the space required for placing bicycles (manoeuvring space);
- assembly dimensions;
- total weight;
- if the bicycle parking system can be dismantled, weight of the heaviest part;
- materials used and surface treatment(s);
- maintenance;
- number of moving parts;
- frequency of cleaning;
- if a guarantee is mentioned, the conditions (which, when and period) must be stated;

- information regarding available colours;
- information regarding the purchasing procedure (delivery times, prices, etc.);
- the FietsParKeur certificate, including the specifications
- if the certificate has been (partly) granted for a bicycle type that falls under the 'specials' category: the dimensions of the test bicycle(s) used.

4.3 Instructions for use

The instructions for use must contain the following information:

- assembly/installation instructions;
- required materials and/or tools (for assembly or installation);
- maintenance and cleaning.

5

Terms and definitions

Fastening device
A fastening option present on the bicycle parking system, with which the bicycle can be connected to the bicycle parking system using an external lock.

Anti-theft device
A device on a bicycle parking system that makes it possible to secure a bicycle to the bicycle parking system, possibly using a lock.

BAFA
Bicycle with limited accessories deviation. A bicycle that does not fall within the dimensions of the standard bicycle due to the presence of accessories on the bicycle, e.g. a crate, rear or front child seat or panniers. The Azor Ameland model year 2019 has been selected as the standard bicycle.

BAFO
Bicycle with limited parts deviation. A bicycle that does not fall within the dimensions of the standard bicycle due to the deviating dimensions of one or more parts, e.g. saddle height or handlebar width. The Azor Terschelling model year 2019 has been selected as the standard bicycle.

Push/pull force
The force that the user must apply to place (a wheel of the) bicycle in the system by pushing the bicycle forward or pulling it backwards, without lifting the bicycle up.

Bicycle parking system
The construction intended for installing one or more bicycles in or against it in such a way that the bicycles are provided with sufficient stability.

Centre to centre (C2C)
The reciprocal distance between the centre of two bicycle spaces (measured perpendicular to the centre line of the bicycle space).

Installation distance
The reciprocal distance between the centre of two bicycle parking spaces.

Children
Users of the bicycle parking system aged 10 to 14 years.

Multilevel bicycle parking
Multilevel bicycle parking refers to bicycle parking in which the bicycles are parked on two or more horizontal levels, one above the other. The person parking the bicycle remains at the original ground level.

Non-rigid system
The bicycle parking system or a part thereof deforms elastically by 10 cm under a load of 250 N or less. (when the load is removed, the part returns to its original position.)

Elderly
Users of the bicycle parking system aged 65 and older.

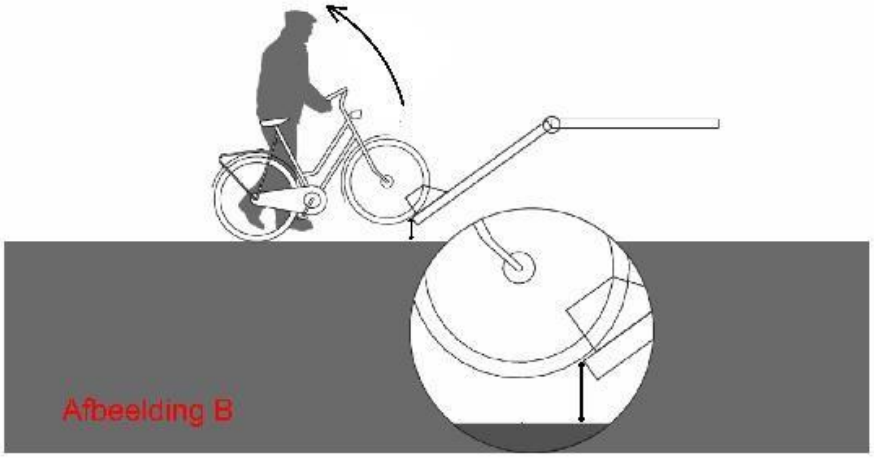
Peak load
The maximum force required to start a movement. This is differentiated from a force during ongoing movements (forces applied over a longer period of time). The peak load is the increased initial force required and is measured over the first 20 cm of the movement.

Rack/bicycle rack
A bicycle parking system intended for more than two bicycles.

Standard bicycle / large city bicycle
A bicycle with standard dimensions. The Azor Terschelling model year 2019 has been selected as the test bicycle.

Small city bicycle
The Azor PKW model year 2020 has been selected as the small city bicycle.

Lifting height
The height difference between the ground and the height that decreases the lifting force, because part of the bicycle receives (some) support from part of the bicycle parking system (see figure B).



Double-sided use
A bicycle parking system where bicycles can be installed on both sides of the system.

Adults
Users of the bicycle parking system aged 15 to 64 years.

Annex 1 Description of bicycles and locks

Standard bicycles

The below table contains an overview of the characteristics of standard bicycles.

Table of basic dimensions

		Azor Terschelling (2019)	Azor PKW (2020)	Azor Ameland (2019)	Height of top of saddle (cm)	Handlebar height outside with accessories (cm)	Steering axle height if necessary without accessories (cm)	Steering axle height if necessary with accessories (cm)	Height of bottom of handle (cm)	Height of bottom of hand brake (cm)	Bicycle length (cm)	Handlebar width (cm)	Tyre thickness (cm)	Wheelbase (cm)	Wheel diameter (inches)	Mass (kg)
Standard bicycle	City bicycle, large	X			105	125	118		115	109	192	67	4.8	119	28″	25
	City bicycle, small		X		88	111	105		102	97	182	62	4.0	113	26″	24
BAFO	Hybrid	X			105	123	118	125			183	67	4.5	112	28″	25
	E-bike	X			101	125	118	125			192	67	4.5	119	28″	28
	Speed pedelecs*	X			104	119	114				190	68	5.0	118	28″	28
BAFA	Crate bicycle/front rack bicycle			X	108	124	116		113	108	188	68	4.5	115	28″	28

* Sizes based on the most sold speed pedelec

Table Additional dimensions BAFA with crate and panniers

		Azor Ameland	Crate width (cm)	Crate height (cm)	Crate height from ground(cm)	Front wheel to top of crate (cm)	Front wheel to bottom of crate (cm)	Crate depth (cm)	Pannier width (cm)*
BAFA	Crate bicycle with pannier	X	43	27	112	30	25	35	47

* 2.5 kg on one side and 0.5 kg on the other side

Loading
A loaded bicycle, which is not a BAFA with panniers, is tested by fitting a small pannier with a weight of 5 kg on one side at 20 cm (+/- 2 cm) below the top edge of the luggage carrier and 5 cm (+/- 2 cm) to the side of the luggage carrier.

Table Additional dimensions BAFA with front and/or rear child seat

		Azor Ameland	Child seat height rear from the ground(cm)	Maximum width of child seat rear (com)	Width child seat at top edge (cm)	Back of seat to rear side of luggage carrier (cm)	Front seat windscreen width (cm)	Front seat windscreen height (cm)	Front seat windscreen side wheel upper edge screen (cm)
BAFA	Child seat rear	X	134	40		2			
BAFA	Front child seat	X					40	163	66

*Locks*The fastening of the bicycle is tested with a chain lock with a length of 90 cm.

Test bicycles

	Height upper side saddle	Handlebar height outer side with accessoires	Handlebar height axle with accessoires	Height of steering axle without accessoires	Bicycle length	Handlebar width	Tyre Thickness	Wheelbase	Wheel diameter (inches)	Mass (kg)
City bicycle, large	105	125		118	192	67	4.8	119	28″	25
City bicycle, small	88	111		105	182	62	4.0	113	26″	24
BAFO	105	125	125	118	192	67	4.5	119	28″	28

Measurements in cm unless otherwise stated

Test bicycle equipment

	Coaster brakes	Hand brakes	Dynamo	Dèrailleur	Rear light	Front light	Luggage carrier	Bell	Control panel stem	Front rack	Pannier	Child seat rear side	Child seat front side
Large city bicycle (Azor Terschelling)		X	X		X	X	X	X					
Small city bicycle (Azor PKW)		X	X		X	X	X	X					
BAFO (Azor Terschelling)		X	X		X	X	X	X	X				
BAFA (Azor Ameland)		X	X		X	X	X	X		X	X	X	X

Accessories test bicycle BAFA, to be mounted on large city bicycle (Azor Terschelling)

- Front rack width 50 cm with crate
- Rear child seat with sufficient height that the highest point is at 134 cm with a width of 40 cm
- Front child seat with sufficient height that the highest point is at 158 cm
- Pannier with a total width of 47 cm and a load of 2.5 kg on one side and 0.5 kg on the other side.

Drawing Adjustment of test bicycles

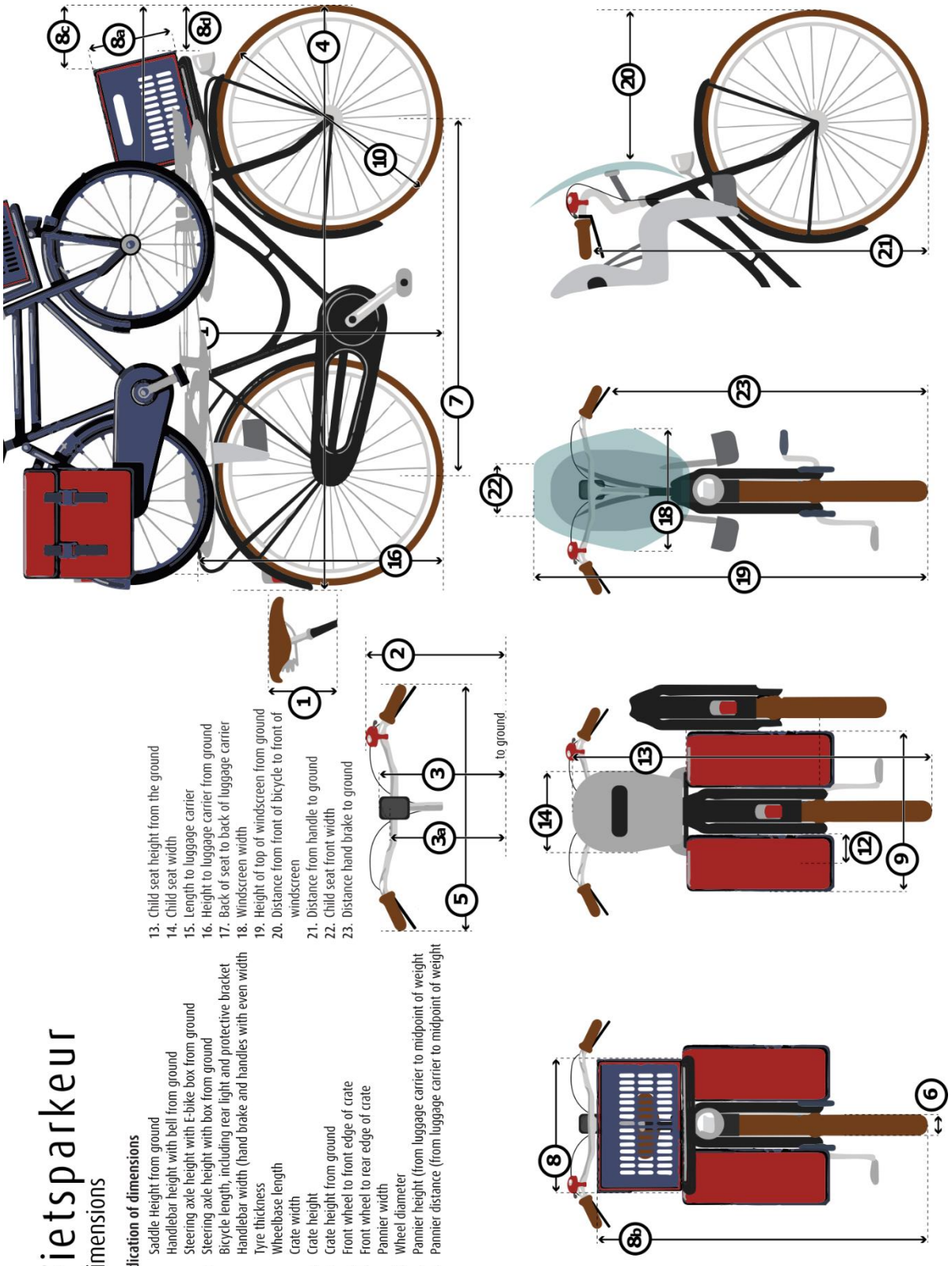


Table associated with drawing Adjustment of test bicycles (dimensions in cm unless otherwise indicated)

		Standard bicycle		BAFO			BAFA
		City bicycle, small	City bicycle, large	Hybrid	E-bike	Speed pedelec	crate bicycle/fror rack /child seat
1.	Saddle height from ground	88	105	105	101	104	108
2.	Handlebar height with bell from ground	111	125	123	125	119	124
3.	Steering shaft height with box E-bike from ground			125	126		
3a.	Handlebar height without box from ground	105	118	118	118	114	116
4.	Bicycle length, including rear light and protection bar	182	192	183	192	190	188
5.	Handlebar width (hand brakes and handles have the same width)	62	67	67	67	68	68
6.	Tyre thickness	4.0	4.8	4.5	4.5	5.0	4.5
7.	Wheelbase length	113	119	112	119	118	115
8.	Crate width						43
8a.	Crate height						27
8b.	Crate height from ground						112
8c.	Front wheel up to top of crate						112
8d.	Front wheel to bottom of crate						25
9.	Pannier width						47
10.	Wheel diameter (inches)	26″	28″	28″	28″	28″	28″
11.	Pannier height (from luggage carrier to centre of weight)						30.5
12.	Pannier distance (from luggage carrier to centre of weight)						7
13.	Rear child seat height from ground						134
14.	Child seat width						40
15.	Length up to luggage carrier	180	185				184
16.	Height to luggage rack from ground	75	81				79
17.	Back of seat to back of luggage carrier						2
18.	Windscreen width						40
19.	Height of top of windscreen from ground						163
20.	Distance front of bicycle to front of windscreen						66
21.	Distance handle to ground	102	115				113
22.	Top of child seat width						25

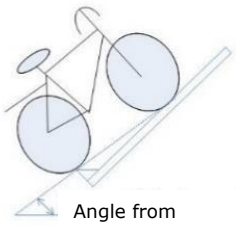
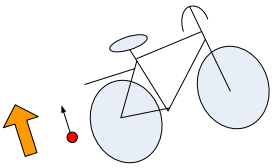
23.	Distance hand brake to ground	97	109				108

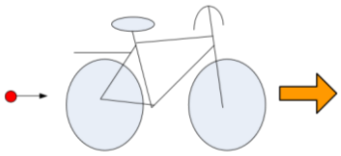
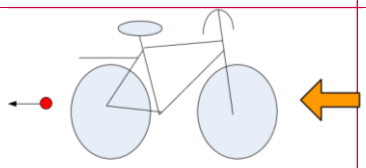
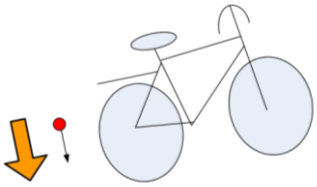
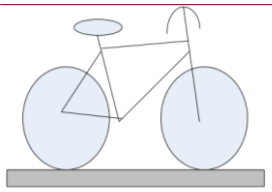
Annex 2

Application of operating forces

Legend
Direction of bicycle

Point of application
of force measurement

step	Description	Figure	force recorded without bicycle	force recorded with bicycle
1	Place the entire bicycle in the bicycle parking system so that it is stable (e.g. driven up a rail).	 Angle from horizontal	Not applicable.	- No force recorded. - Lifting height. - Maximum rail angle 46º to horizontal.
2	Moving the stabilised bicycle upwards.		- Point of force application on handle of bicycle parking system. - Force recording ongoing force and initial force: perpendicular to possible pivot point.	- Point of force application on handle of bicycle parking system. - Force recording ongoing force and initial force: perpendicular to possible pivot point. - Stabilisation of the bicycle other than by the bicycle parking system is not permitted.

3	Parking of the bicycle, horizontal movement.		- Force application point on handle of bicycle parking system. - Force recording of ongoing force and initial force: extended from movement direction.	- Force application point on handle of bicycle parking system. - Force recording of ongoing force and initial force: extended from movement direction. - Stabilisation of the bicycle other than through the bicycle parking system is not permitted.
4	Removal of the parked bicycle, horizontal movement.		- Force application point on handle of bicycle parking system. - Force recording of ongoing force and initial force: extended from movement direction.	- Force application point on handle of bicycle parking system. - Force recording of ongoing force and initial force: extended from movement direction. Measure peak load over first 20 cm of movement. Maximum peak load 210 N. - Stabilisation of the bicycle other than through the bicycle parking system is not permitted.
5	Downward movement of the bicycle.		- Force application point on handle of bicycle parking system. - Force recording of ongoing force and initial force: perpendicular to possible pivot point.	- Force application point on handle of bicycle parking system. - Force recording of ongoing force and initial force: perpendicular to possible pivot point. - Stabilisation of the bicycle other than through the bicycle parking system is not permitted.
6	Removal of the bicycle from the bicycle parking system and placing it on the ground.		Not applicable.	- If applicable to the system. - No force recording. - Lifting height.

Recording of forces

The recording of forces is divided into forces before starting the movement and forces during an ongoing movement.

The forces are recorded as follows:

1. Determine the optimal place to apply force to the bicycle or bicycle parking system, e.g. seat tube, luggage carrier or handle.

2. Attach the force transducer to this point so that no torque can be transmitted to the force transducer.
3. Apply a slowly increasing force to the bicycle or parking system via the force transducer so that the system starts to move. The direction of force should be as far as possible in line with the direction of movement.
4. If the measurement is performed using a force transducer with a logging function:
   a) read the force required to move the system;
   b) read the maximum force that arises after the system starts moving.
5. If the measurement is performed using a force transducer without a logging function:
   a) read the force required to move the system;
   b) in a separate measurement: read the maximum force that arises after the system starts moving;
6. Record the maximum height of the point of application of the forces.
7. Repeat this measurement nine times.
8. The minimum value of the recorded measurements is the test value, unless it is less than 80% of the median (middle value). In that case, the test value is 80% of the median.

The forces should be measured at a temperature between 10 and 20 °C.

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