

TEST REPORT EN 15194:2017+A1:2023 Cycles - Electrically power assisted cycles - EPAC Bicycles EN ISO12100:2010 Safety of machinery - General principles for design - Risk assessment and risk reduction	
Report Number.....:	PRMS2504015MR
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Applicant's name.....:	Douma Technology (Huizhou) Co., LTD
Address.....:	Dongsheng Industrial Zone ,Pu Raft Community,Changning town ,Boluo County,Huizhou City China
Test specification:	
Standard.....:	EN 15194:2017+A1:2023, EN ISO12100:2010
Test item description.....:	Electric Bike
Trade Mark.....:	Aairsk
Manufacturer.....:	Douma Technology (Huizhou) Co., LTD
Model/Type reference.....:	GT300
Ratings.....:	Please See marking plate

List of Attachments (including a total number of pages in each attachment):

-Appendix 1: Photos

☒ **The product fulfils the requirements of**
- EN 15194:2017+A1:2023

marking plate:

Electric Bike
Model: GT300
Input: DC42V
Max Speed: 25 km/h
Use Only Charger of HZ-36
WARNING – To reduce the risk of injury, user must read instruction manual Store Indoors
When Not in Use
Manufacture: Douma Technology (Huizhou) Co., LTD
Address: Dongsheng Industrial Zone ,Pu Raft Community,Changning town ,Boluo
County,Huizhou City China

Made in China



Test item particulars : EPAC Bicycles	
Possible test case verdicts: - test case does not apply to the test object..... : N/A - test case does not test : NT - test object does meet the requirement..... : P (Pass) - test object does not meet the requirement..... : F (Fail)	
Testing : Date of receipt of test item : 2025-03-19 Date (s) of performance of tests : 2025-03-19 to 2025-03-28	
General product information: 1.All tests were carried out the model GT300 2.The sample's mentioned in this report is/are submitted/supplied/manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.	
Product	Electric Bike
Cut off speed	25Km/h
Max. continuous rated power	0.25KW
Brake system	Disc brake on front and rear
Front lamp	White light on front
Rear lamp	Red light on rear
Wheel	Two wheels and motor in the rear wheel.
Audible warning Device	Bell

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Clause	Requirement + Test	Result - Remark	Verdict
4	Safety requirements and/or protective measures		P
4.1	EPAC shall be designed according to the principles of EN ISO 12100:2010 for relevant but not significant hazards, which are not dealt with by this document. It includes evaluation of such risks for all relevant components.		P
	Means shall be provided to the user to prevent an unauthorized use of the EPAC e.g. key, locks, Electronic control device.		P
4.2	Electrical requirements		P
4.2.1	Electric circuit		P
	The electrical control system shall be designed so that, should it malfunction in a hazardous manner, it shall switch off power to the electric motor without causing a hazardous situation and it requires user interaction to switch on again.		P
4.2.2	Controls and symbols		P
	If symbols are used, their meaning shall be described in the instructions for use. "On" "Off" symbols, lightings symbols, start-up assistance symbols, audible warning device symbols design shall be in accordance with those described in Annex H and Annex I.		P
	A master control device shall be fitted to switch on and shut off the assistance, which shall be apparent, easy to reach and unmistakable.		P
4.2.3	Batteries		P
	The battery shall comply with EN 50604-1:2016 and EN 50604-1:2016/A1:2021. At the moment of the publication of this standard, EN 50604-1 is only applicable for secondary lithium batteries, and only risks related to these batteries were taken into account.		P
4.2.4	Battery charger		P
	Chargers for EPAC are considered to be operated in a residential (household) environment. NOTE 1 For integrated battery charger with a 230V a.c. input the charger and the EPAC and for external battery charger supplied with an EPAC the requirements of the Low Voltage Directive are applicable. NOTE 2 For external chargers with d.c. output less than 42,4 Volt, e.g. EN 60335-2-29:2021/A1:2021 is applicable.		P
4.2.5	Electric cables and connections		P

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Clause	Requirement + Test	Result - Remark	Verdict
4.2.5.1	General		--
	All connectors for cable and wire shall be selected to prevent corrosion of electrical contact conductance.		P
4.2.5.2	Requirements		--
	Cable and plug temperature shall be lower than that specified by the manufacturer of the cables and plugs. Damage to cable and plug insulation shall be prevented.		P
	The cable cross sections shall be selected in accordance to EN 60335-1:2012, Table 11. If these requirements are not met, a temperature rise test shall be performed, in accordance to 4.2.5.3.		P
4.2.5.3	Test method		--
	At an ambient room temperature (20 ± 5) °C, discharge the fully charged EPAC battery to the discharging limit specified by the EPAC or ESA manufacturer at the maximum current allowable by the system and record it. Measure the cable and plug temperatures and ensure, by examination, that there is no deterioration of the insulation on either assembly.		P
	The increase of outer surface temperature of parts that can be touched shall be ≤ 60 K while in use on performance test rig.		P
4.2.6	Wiring		P
	Requirements on wiring shall be checked according to the following sequence at an ambient room temperature (20 ± 5) °C.		
	a) Wire ways shall be smooth and free from sharp edges.		P
	b) Wires shall be protected so that they do not come into contact with burrs, cooling fins or similar sharp edges that may cause damage to their insulation. Holes in metal through which insulated wires pass shall have smooth well-rounded surfaces or be provided with bushings		P
	c) Wiring shall be effectively prevented from coming into contact with moving parts.		P
	d) Separate parts of the EPAC that can move in normal use or during user maintenance relative to each other, shall not cause undue stress to electrical connections and internal conductors, including those providing ground continuity.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	If an open coil spring is used to protect wire, it shall be correctly installed and insulated. Flexible metallic tubes shall not cause damage to the insulation of the conductors contained within them.		P
	Compliance with d) shall be checked by inspection and by the following test method.		P
	If flexing occurs in normal use, the appliance is placed in its normal operational position and is supplied at rated voltage under normal operation.		P
	The movable part is moved backwards and forwards through the largest angle permitted by its construction, so that the conductor is flexed.		P
	For conductors that are flexed in normal use, flex movable part for 10 000 cycles at a test frequency of 0,5 Hz.		P
	For conductors that are flexed during user maintenance, flex the movable part for 100 cycles at the same frequency.		P
4.2.7	Power cables and conduits		P
	Conduit entries, cable entries and knockouts shall be constructed or located so that the introduction of the conduit or cable does not reduce the protection measures adopted by the manufacturer.		P
	Guidance for power cables size selection is given in HD 60364-5-52:2011, 5.22.1.2, 523.1523.3 and Table A.		P
	The insulation of internal wiring shall withstand the electrical stress likely to occur in normal use.		P
	The wiring and its connections shall withstand the electrical strength test. The test voltage expressed in V shall be equal to $(500 + 2 \times U_r)$ for 2 min and applied between live parts and other metal parts only.		P
4.2.8	External and internal electrical connections		P
	Electrical connection shall comply with HD 60364-5-52:2011, 526.1 and 526.2.		P
4.2.9	Moisture resistance		P
	The electrical components of a fully assembled EPAC shall be tested and shall comply with IPX4 requirements according to EN 60529:1991.		P
4.2.10	Mechanical strength test		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The electrical components including the battery shall have adequate mechanical strength and be constructed to withstand such rough handling that may be expected in normal use. Compliance is checked by:		P
	— Applying impacts to the battery pack mounted on the EPAC by means of the spring hammer as specified in EN 60068-2-75:2014. The battery pack is rigidly supported and three impacts are applied to every point of the enclosure that is likely to be weak with an impact energy of $(0,7 \pm 0,05)$ J. After the test the battery pack shall show no damage that could impair compliance with this European Standard;		P
	— Detachable batteries are submitted to free fall on a rigid surface as specified in EN 22248:1992 at a height of 0,90 m in three different positions. The positions shall be one surface, one edge and one corner of the enclosure that is likely to be weak.		P
	After the test the battery pack shall show no damage that could lead to emission of dangerous substances (gas or liquid) ignition, fire or overheating.		P
4.2.11	Maximum speed for which the electric motor gives assistance		P
4.2.11.1	Requirements		--
	The electrical motor assistance shall stop when the EPAC reaches a speed of 25 km/h or lower speed if limited by design.		P
	The maximum speed of the EPAC for which the electric motor gives assistance shall not differ by more than +10 % from the maximum assistance speed indicated in the marking required by Clause 5 when determined according to the test method described in 4.2.11.2.		P
4.2.11.2	Test method		--
4.2.11.2.1	Test conditions		--
	a) The test shall be performed either on a test track, a test bench or on a stand that keeps the motor driven wheel free of the ground.		P
	b) The speed-measuring device used for the test shall have the following characteristics:		P
	c) The ambient temperature shall be between 5 °C and 35 °C.		P
	d) Maximum wind speed: 3 m/s.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	e) The battery shall be fully charged according to the manufacturer instructions.		P
4.2.11.2.2	Test procedure		--
	The cut-off speed can be measured by measuring either the motor torque output or the motor current. Other appropriate method the pertinence of which has been demonstrated can be used.		P
	The following example describes the cut-off speed test.		P
	a) Pre-condition the EPAC by running it for 5 min at 80 % of the maximum assistance speed as declared by the manufacturer.		P
	b) Record continuously the current and note the speed at which the current drops to a value equal to or less than "no load current point".		P
	c) While pedaling, ride steadily to reach a speed equal to 1, 25 times (if possible by design) the maximum assistance speed as declared by the manufacturer.		P
	d) Verify that the noted value in b) is the no load current point.		P
4.2.12	Start-up assistance mode		P
4.2.12.1	Requirements		--
	An EPAC can be equipped with a start-up assistance mode that operates up to a maximum speed of 6 km/h.		P
	This mode shall be activated by the voluntary and maintained action of the user either when riding without pedaling or when the user is pushing the cycle.		P
4.2.12.2	Test method		--
4.2.12.2.1	Test conditions		--
	a) The test may be performed either on a test track, a test bench or on a stand that keeps the motor driven wheel free of the ground.		P
	b) The speed-measuring device shall have the following characteristics:		P
	1) accuracy: $\pm 2 \%$;		P
	2) resolution: 0,1 km/h.		P
	c) The ambient temperature shall be between 5 °C and 35 °C.		P
	d) Maximum wind speed: 3 m/s.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	e) The battery shall be fully charged according to the manufacturer's instructions.		P
4.2.12.2.2	Test procedure		--
	a) Pre-condition the EPAC by running it for 5 min at 80% of the maximum assistance speed as declared by the manufacturer, then stop.		P
	b) Activate the start-up assistance mode and verify that the speed increases up to 6 km/h maximum designed speed or lower value.		P
	c) Verify that the speed reduces progressively to 0 km/h when the start-up assistance mode is deactivated and that the current drops to a value equal to or less than the no load current point when the motor driven wheel freewheels.		P
	d) Activate the start-up assistance mode and maintain it for 1 min.		P
	e) Verify that speed is equal to or less than 6 km/h.		P
	f) Verify that the start-up assistance mode is activated only when the actuation of the device to initiate it is maintained.		P
4.2.13	Power management		P
4.2.13.1	Requirements		--
	a) When tested by the method described in 4.2.13.2 the recordings shall show that assistance shall be provided only when the cyclist pedals forward. This requirement shall be checked according to the test methods described in 4.2.13.2.3;		P
	b) assistance shall be cut off when the cyclist stops pedaling forward and the cut-off distance shall not exceed 2 m;		P
	c) If all braking devices (e.g. levers, back pedal) are equipped with cut-off switches, the cut off distance shall not exceed 5 m;		N/A
	d) The power output or assistance shall be progressively reduced (see Annex A) and finally cut off as the EPAC reaches the maximum assistance speed as designed. This requirement shall be checked according to the test methods described in 4.2.13.2;		P
	e) the assistance shall be progressively and smoothly managed (e.g. no hunting);		P

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Clause	Requirement + Test	Result - Remark	Verdict
	f) two independent applying actions shall be required to start the electrical assistance mode (e.g. power switch and forward pedaling activation); a traffic caused stop (e.g. traffic lights) is not subject to this requirement;		P
	g) After a deactivation of the electrical assistance mode due to any hazardous electric drive malfunction, the electric drive shall not start automatically without rider intervention (pedaling is not considered as rider intervention).		P
4.2.13.2	Test method – Electric motor management		--
4.2.13.2.1	Test conditions		--
	a) The test may be performed either on a test track, a test bench or on a stand which keeps the motor driven wheel free of the ground;		P
	b) The test track shall be according to 4.2.13.2.2;		P
	c) The time-measuring device shall have an accuracy of $\pm 2\%$;		P
	d) The ambient temperature shall be between $5\text{ }^{\circ}\text{C}$ and $35\text{ }^{\circ}\text{C}$;		P
	e) Maximum wind speed shall not exceed 3 m/s;		P
	f) The battery shall be fully charged according to the manufacturer's instructions;		P
	g) Speed measurement shall have an accuracy of $\pm 2\%$.		P
	The test to ensure the compliance to this clause shall be adapted to the technology used; for example:		P
	— pedal backwards and check the no load current point (see 3.48);or		P
	— pedal backwards and check that no torque is delivered on the driving wheel.		P
	For the test, the worst case conditions of gear ratio and speed shall be applied. The worst condition for speed is defined as 90 % of cut off speed (see 3.23).		P
4.2.13.2.2	Test track		--
	The gradient of the track shall not exceed 0,5 %. If the gradient is less than 0,2 % carry out all runs in the same direction. If the gradient lies between 0,2 % and 0,5 % carry out alternate runs in opposite directions.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The surface shall be hard, of concrete or fine asphalt free from loose dirt or gravel. The minimum coefficient of friction between the dry surface and the bicycle tyre shall be 0,75.		P
4.2.13.2.3	Test procedure		--
	a) Pedal backwards and check that no electric motor assistance is provided. The test to ensure the compliance to this clause shall be adapted to the technology used.		P
	b) Check the cut off distance:		P
	1) pedal so that the EPAC reach 90 % of the cut off speed;		P
	2) stop pedaling without braking;		P
	3) measure the cut off distance;		P
	4) Carry out the test three times; the result is the average of this measurement after rejection of invalid points.		P
	c) If braking device cut-off switches are fitted, actuate each brake device separately and verify the initiation of the cut off signal while pedaling.		P
4.2.14	Maximum power measurement — Measurement at the engine shaft		P
	The maximum continuous rated power shall be measured according to EN 60034-1:2010 when the motor reaches its thermal equilibrium as specified by the manufacturer.		P
	In circumstance where the power is measured directly at the shaft of the electronic motor, the result of the measurement shall be divided by 1,10 to consider the measurement uncertainty and then divided by 1,05 to include for example the transmission losses, unless the real values of these losses are determined.		P
4.2.15	Electro Magnetic Compatibility		P
4.2.15.1	Emission		P
	The EPAC and ESA shall fulfil the requirements of Annex B.		P
4.2.15.2	Immunity		P
	The EPAC and ESA shall fulfil the requirements of Annex B.		P
4.2.15.3	Battery charger		P

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Clause	Requirement + Test	Result - Remark	Verdict
	As an EPAC is not intended to be used while charging on the electric network, for integrated charger the whole EPAC plus integrated charger shall be tested for EMC according to the applicable standards based on the European EMC directive. NOTE The following European Standards are applicable for battery chargers to be used in residential environment: EN 55014-1:2017, EN 55014-2:2015, EN IEC 61000-3-2:2019, EN 61000-3-3:2013.		P
4.2.16	Failure mode		P
4.2.16.1	Requirements		P
	It shall be possible to ride the EPAC by pedalling even if the assistance failed.		P
	This requirement shall be checked as described in 4.2.16.2.		P
4.2.16.2	Test method		--
	a) Remove or disconnect the battery pack.		P
	b) Ride the bicycle up to 10 km/h.		P
4.2.17	Anti-tampering measure		P
4.2.17.1	General		--
	Anti-tampering measures apply to tampering or modifications that general consumers carry out concerning the control unit, drive unit or other parts of power assisting system by using commercially available tools, equipment or parts.		P
4.2.17.2	Prevention of tampering of the motor		P
	The following anti-tampering requirements shall be taken into account:		P
	a) Anti-tampering relevant parameters indicated below shall only be accessible to the manufacturer or authorized persons and changes of software configuration parameters require programming tools that are not commercially available or security protected:		P
	1) maximum speed with motor assistance (all systems),		P
	2) parameters affecting the maximum vehicle speed limited by design,		P
	3) maximum gear ratio (system with middle motors),		P
	4) maximum motor power (all systems),		P

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Clause	Requirement + Test	Result - Remark	Verdict
	5) maximum speed of starting up assistance;		P
	b) Assumable manipulations on the approval relevant configuration shall be prevented or compensated by effective counter measures, i.e. plausibility logics to detect manipulations on sensors;		P
	c) Closed set of components (i.e. operation only with released battery);		P
	d) Protection against opening of relevant components without traces (sealing).		P
4.3	Mechanical requirements		P
4.3.1	General		--
4.3.1.1	Definition of brake tests		--
	Brake tests to which accuracy requirements apply, as in 4.3.1.4, are those specified in 4.3.5.3 to 4.3.5.6 inclusive.		P
4.3.1.2	Definition of strength tests		P
	Strength tests to which accuracy requirements apply, as in 4.3.1.4, are those involving static, impact or fatigue loading as specified in 4.3.5.6 to 4.3.12, 4.3.13 inclusive and 4.3.19.2.		P
4.3.1.3	Numbers and condition of specimens for the strength tests		P
	In general, for static, impact and fatigue tests, each test shall be conducted on a new test sample, but if only one sample is available, it is permissible to conduct all of these tests on the same sample with the sequence of testing being fatigue, static and impact.		P
	When more than one test is conducted on the same sample, the test sequence shall be clearly recorded in the test report or record of testing.		P
	In all strength tests, specimens shall be in the fully-finished condition.		
4.3.1.4	Accuracy tolerances of test conditions for brake tests and strength tests		--
	Unless stated otherwise, accuracy tolerances based on the nominal values shall be as follows:		P
	Forces and torques 0/+5 %		P
	Masses and weights ± 1 %		P
	Dimensions ± 1 mm		P
	Angles $\pm 1^\circ$		P
	Time duration ± 5 s		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Temperatures ± 2 °C		P
	Pressures ± 5 %		P
4.3.1.5	Fatigue test		P
	The force for fatigue tests shall be applied and released progressively, not to exceed 10 Hz. The tightness of fasteners according to manufacturer's recommended torque can be re-checked not later than 1 000 test cycles to allow for the initial settling of the component assembly. (This is considered applicable to all components, where fasteners are present for clamping.) The test bench shall be qualified to meet dynamic requirements of 4.3.1.4.		P
4.3.1.6	Fatigue test for composite components		P
	For fatigue test for composite components, the initial value of displacement (peak-to-peak value) is taken after 1 000 cycles and before 2 000 cycles.		P
4.3.1.7	Plastic material test ambient temperature		P
	All strength tests involving any plastic materials shall be pre-conditioned for two hours and tested at an ambient temperature of 23 °C ± 5 °C.		P
4.3.1.8	Crack detection methods		P
	Standardized methods should be used to emphasize the presence of cracks where visible cracks are specified as criteria of failure in tests specified in this standard.		P
4.3.2	Sharp edges		P
	Exposed edges that could come into contact with the rider's hands, legs, etc., during normal riding or normal handling and normal maintenance shall not be sharp, e.g. deburred, broken, rolled or processed with comparable techniques.		P
4.3.3	Security and strength of safety-related fasteners		P
4.3.3.1	Security of screws		P
	Any screws used in the assembly of suspension systems or screws used to attach bracket attached electric generators, brake-mechanisms and mud-guards to the frame or fork, and the saddle to the seatpost shall be provided with suitable locking devices, e.g. lock-washers, lock-nuts, thread locking compound or stiff nuts.		P
4.3.3.2	Minimum failure torque		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The minimum failure torque of bolted joints for the fastening of handle bars, handlebar-stems, barends, saddle and seat-posts shall be at least 50 % greater than the manufacturer's recommended tightening torque.		P
4.3.3.3	Folding bicycles mechanism		N/A
	If provided, folding bicycle mechanism shall be designed so that EPAC can be locked for use in a simple, stable, safe way and when folded no damage shall occur to any cables. No locking mechanism shall contact the wheels or tyres during riding, and it shall be impossible to unintentionally loosen or unlock the folding mechanisms during riding.		N/A
4.3.4	Protrusions		P
	These requirements are intended to address the hazards associated with the users of EPACs falling on projections or rigid components (e.g. Handlebars, levers) on EPAC possibly causing internal injury or skin puncture. Tubes and rigid components in the form of projections which constitute a puncture hazard to the rider should be protected. The size and shape of the end protection has not been stipulated, but an adequate shape shall be given to avoid puncturing of the body. Screw threads which constitute a puncture hazard shall be limited to a protrusion length of one major diameter of the screw beyond the internally threaded mating part.		P
4.3.5	Brakes		P
4.3.5.1	Braking-systems		P
	EPAC shall be equipped with at least two independently actuated braking-systems. At least one shall operate on the front wheel and one on the rear wheel. The braking-systems shall operate without binding and shall be capable of meeting the braking-performance requirements of 4.3.5.9. No hand shall need to be taken from the handlebar to operate the brake levers. If additional braking-systems are implemented, they shall meet the brake requirements of 4.3.5. Brake-blocks containing asbestos shall not be permitted.		P
4.3.5.2	Hand-operated brakes		P
4.3.5.2.1	Brake-lever position		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The brake levers for front and rear brakes shall be positioned according to the legislation or custom and practice of the country in which EPAC is to be sold, and EPAC manufacturer shall state in the manufacturer's instructions which levers operate the front and rear brakes (see also Clause 6 i)).		P
4.3.5.2.2	Requirement		P
	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 1 not exceed 90 mm.		P
	Conformance shall be established by the method detailed in 4.3.5.2.2.2.		P
	The range of adjustment on the brake-lever ought to permit these dimensions to be obtained.		P
4.3.5.2.2	Test method for the brake-lever similar		P
	Fit the gauge illustrated in Figure 2 — over the handlebar-grip or the handlebar (when the manufacturer does not fit a grip) and the brake-lever as shown in Figure 3 — 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.		P
	The measurement ought to be conducted only on a fully-assembled bicycle.		P
4.3.5.3	Attachment of brake assembly and cable requirements		P
	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.		P
	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.		P
4.3.5.4	Brake-levers – Position of applied force		P

EN 15194:2017+A1:2023			
Clause	Requirement + Test	Result - Remark	Verdict
	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 4.3.5.2.2.2 or 25 mm from the free end of the brake-lever, whichever is the greater (see Figure 4).		P
4.3.5.5	Brake-block and brake-pad assemblies – Safety test		P
4.3.5.5.1	Requirement		P
	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 4.3.5.5.2.		P
4.3.5.5.2	Test method		P
	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 combined mass of the bicycle and rider (or equivalent mass) shall be 120 kg.		P
	Actuate each brake-lever with a force of 180 N applied at the point as specified in Figure 4 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.		P
	Then conduct the test described in 4.3.5.7 or 4.3.5.8 as appropriate depending on the style of brake, and then the test described in 4.3.5.9.		P
4.3.5.6	Brake adjustment		P
	Each brake shall be equipped with an adjustment mechanism either manual or automatic.		P
	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.		P
	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.		P
4.3.5.7	Hand-operated braking-system – Strength test		P

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.5.7.1	Requirement		--
	When tested by the method described in 4.3.5.7.2, there shall be no failure of the braking-system or of any component thereof.		P
4.3.5.7.2	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 4. This force shall be 450 N, or such lesser force as is required to bring:		P
	a) a brake-lever into contact with the handlebar grip or the handlebar where the manufacturer does not fit a grip;		P
	b) brake extension-lever level with the surface of the handlebar or in contact with the handlebar;		P
	c) a secondary brake lever to the end of its travel.		P
	Repeat the test for a total of 10 times on each brake-lever, secondary brake lever or extension lever.		P
4.3.5.8	Back-pedal braking system – Strength test		N/A
4.3.5.8.1	General		--
	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°.		N/A
	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.		N/A
4.3.5.8.2	Requirement		--
	When tested in accordance with 4.3.5.8.3, there shall be no failure of the brake system or any component thereof.		N/A
4.3.5.8.3	Test method		--

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Clause	Requirement + Test	Result - Remark	Verdict
	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 5, 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.		N/A
4.3.5.9	Braking performance		P
4.3.5.9.1	General		--
	The progressive characteristics of the brake are determined by linearity measurements. A final, simple track test checks for smooth, safe, stopping characteristics.		P
	Conduct the braking-performance test on a fully-assembled bicycle after the brakes have been subjected to the strength test detailed in 4.3.5.7, 4.3.5.8. Before testing the bicycle, inflate the tyres and adjust the brakes all according to the manufacturer's instructions, but in the case of rim-brakes to the maximum clearance specified by the manufacturer.		P
4.3.5.9.2	Requirements		--
	Where EPAC is fitted with secondary brake-levers attached to brake-levers, bar-ends or aerodynamic extensions, separate tests shall be conducted for the operation of the secondary brake-levers in addition to tests with the normal levers.		P
	When tested in accordance with 4.3.5.9.5, the bicycle shall fulfil the requirements shown in Table 1.		P
4.3.5.9.3	Linearity requirements		P
	When tested by the methods described in 4.3.5.9.5.6 c) 1) and 2), the braking force <i>FBr average</i> shall be linearly proportional (within $\pm 20\%$) to the progressively increasing intended operating forces <i>FOp intend</i> . The requirement applies to braking forces <i>FBr average</i> equal to and greater than 80 N (according to Annex E).		P
4.3.5.9.4	Ratio between wet and dry braking performance requirements		P
	In order to ensure safety for both wet and dry braking, the ratio of braking performance wet: dry shall be greater than 4:10.		P
	The methods for calculating this ratio are given in 4.3.5.9.5.6 g).		P

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.5.9.5	Test method		--
4.3.5.9.5.1	General		--
	The test machine enables the braking distances for both brakes or the rear brake alone to be calculated from measurements of the individual braking forces of the front and rear brakes on a drum or belt.		P
4.3.5.9.5.3	Test machine		--
	The test machine shall incorporate a system that drives the wheel under test by tyre contact and a means of measuring the braking-force, and typical examples of two types of machine are illustrated in Figure 6 and Figure 7.		P
	Figure 6 shows a machine in which a roller drives the individual wheels, and Figure 7 shows a machine in which a driven belt contacts both wheels. Other types of machine are permitted, provided they meet the specific requirements listed below and those specified in 4.3.5.9.5.4 and 4.3.5.9.5.5.		P
	The specific requirements are as follows:		P
	a) the linear surface velocity of the tyre shall be 12,5 km/h and shall be controlled within $\pm 5\%$;		P
	b) a means of laterally restraining the wheel under test shall be provided which does not influence the measurement of braking force;		P
	c) a means of laterally applying forces to the brake-levers at the point specified in Figure 4 shall be provided, with the width of the contact on the lever not greater than 5 mm. In the case of backpedal brake, a means of applying forces to a pedal is also required.		P
4.3.5.9.5.4	Instrumentation		--
	The test machine shall be instrumented to include the following:		P
	a) a device to record the surface velocity of the tyre, accurate to within $\pm 2\%$;		P
	b) a device to record the braking force (see Figures 14 and 15, for example), accurate to within $\pm 5\%$;		P
	c) a device to record the operating force applied to the hand-lever or pedal, accurate to within $\pm 1\%$;		P

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Clause	Requirement + Test	Result - Remark	Verdict
	d) a water spray system, to provide wetting of the brakes of the bicycle, consisting of a water reservoir connected by tubing to a pair of nozzles arranged as shown in Figure 8. Each nozzle shall provide a flow of water at ambient temperature of not less than 4 ml/s. The wheel shall be suitably enclosed to ensure that, in addition to the rim, any hub- or disc-brake is thoroughly wetted before a test begins;		P
	e) a system for loading the wheels of the bicycle against the driving mechanism (see 4.3.5.9.5.5).		P
4.3.5.9.5.5	Vertical force on the tested wheel		P
	The wheel to be tested shall be forced vertically downwards so that no skidding of the wheel occurs when tested according to 4.3.5.9.5.6 c) 1) and 2).		P
	It is permitted that the necessary force be applied anywhere on the bicycle (wheel-axle, bottom bracket, seat-post, etc.) provided that it is exerted vertically downwards.		P
4.3.5.9.5.6	Test method		--
	a) General:		--
	Test the front and rear wheels individually.		P
	b) Running-in the braking surfaces:		P
	Conduct a running-in process on every brake before the performance test is performed.		P
	In order to determine the operating force to be used during the running-in process, mount and load the bicycle on the test machine with the belt or drum running at the specified speed and apply an operating force to the brake-lever or the pedal that is high enough to achieve a braking force of 200 N $\pm$ 10 %. Maintain this operating force for at least 2,5 s, and note the value of the applied operating force.		P
	Repeat the procedure (applying the operating force determined as above accurate to within $\pm$ 5 %) 10 times, or, with more repetitions if necessary, until the mean braking force from anyone of the three latest tests does not deviate by more than $\pm$ 10 % from the mean braking force from these same three tests.		P
	c) The performance tests:		--
	1) Testing under dry conditions:		P

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Clause	Requirement + Test	Result - Remark	Verdict
	For hand operated brakes, with a vertical force applied to the bicycle sufficient to prevent skidding of the tyre on the wheel under test, accelerate the driving mechanism to the specified velocity, then apply the operating-force in a series of 20 N increments from 40 N to either 180 N or to the force necessary to achieve a braking force of at least 700 N, whichever is the lesser. However, if the wheel locks, if any possible brake-overload device is actuated, or if the hand-lever comes into contact with the handlebar, do not increase the force further. For each increment of applied operating force, perform three tests within 1 min. Before applying the next level of operating force, allow the brake to cool for 1 min.		P
	For back-pedal brakes, with a vertical force applied to the bicycle sufficient to prevent skidding of the tyre on the wheel under test, accelerate the driving mechanism to the specified velocity, then apply the operating-force in a series of 50 N increments from 100 N to either 350 N or to the force necessary to achieve a braking force of at least 400 N, whichever is the lesser. However, if the wheel locks, if any possible brake-overload device is actuated, do not increase the force further. For each increment of applied operating force, perform three tests within 1 min. Before applying the next level of operating force, allow the brake to cool for 1 min.		N/A
	The applied operating forces shall lie within $\pm 10\%$ of the intended operating forces, shall be applied as specified in Figures 5 and 6 and 4.3.5.9.5.3 c), shall be recorded with an accuracy of $\pm 1\%$, and shall be fully applied within 1,0 s of the commencement of braking.		P
	For each increment of operating force, record the braking force value, FBr rec, for a period of between 2,0 s and 2,5 s, with measurement starting 0,5 s to 1,0 s after the commencement of braking. Record FBr rec as the average braking force during this measurement period.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The time at which the measurement of the braking force is started shall be related to the speed at which the operating force is applied. If the operating force is fully applied in less than 0,5 s after the commencement of braking, start the measurement after 0,5 s. However, if the operating force is fully applied between 0,5 s and 1,0 s after the commencement of braking, start the measurement when the operating force is fully applied.		P
	2) Testing under wet conditions:		P
	The method shall be as given in 4.3.5.9.5.6 c) 1) with the addition that wetting of the brake system shall commence not less than 5,0 s before the commencement of braking and shall continue until the measurement period has ended.		P
	Water nozzles shall be arranged according to Figure 8.		P
	d) Correction of braking force:		P
	Each recorded braking force, <i>FBr rec</i> , shall be corrected for any difference between the recorded operating force and the intended operating force. The corrected braking force shall be calculated by multiplying the recorded braking force, <i>FBr rec</i> , with a correction factor which is the ratio between the intended operating force, <i>FOp intend</i> , and the recorded operating force, <i>FBr rec</i> .		P
	f) Linearity		P
	Plot the calculated <i>FBr average</i> values (the arithmetic mean of the three corrected braking forces at each level of operating force) against the equivalent operating force values, <i>FOp intend</i> , in order to assess the linearity against the requirement in 4.3.5.9.3. Plot the results on a graph, showing the line of best fit and the $\pm 20\%$ limit lines obtained by the method of least squares outlined in Annex E.		P
	g) Ratio between wet and dry braking For each <i>FOp</i> where <i>FDBr average</i> is > 200 N, determine (using the following formula) whether or not the requirements of have been met:		P
	h) Simple track test (see 4.3.18).		P
	After completion of the machine test, conduct a brief, simple track test with progressively increasing operating forces to determine whether or not the brakes bring the bicycle to a smooth, safe stop.		P

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.5.10	Brakes – Heat-resistance test		P
4.3.5.10.1	General		--
	This test applies to all disc- and hub-brakes but to rim-brakes only where they are known or suspected to be manufactured from or include thermoplastic materials.		P
	Each brake on the bicycle shall be tested individually, but where the front and rear brakes are identical only one brake need be tested.		P
4.3.5.10.2	Requirement		--
	Throughout the test described in 4.3.5.10.3, 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.		P
	Immediately after having been subjected to the test described in 4.3.5.10.3, the brakes shall achieve at least 60 % of the braking performance which was recorded at the highest operating force used during the performance tests 4.3.5.9.5.6 c) 1) and 2).		P
4.3.5.10.3	Test method		--
	Drive the wheel and tyre assembly with the brake applied on a machine such as those described in 4.3.5.9.5.3 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 2 is developed. The duration of the test shall be 15 min $\pm$ 2 min.		P
	Allow the brake to cool to ambient temperature and then repeat the test cycle.		P
	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 4.3.5.9.5.6 c) 1) and 2).		P
	When the test has been carried out, the brakes shall be subjected to the applicable parts of the test described in 4.3.5.9.5, in order to check that the requirement 4.3.5.10.2 is fulfilled.		P
4.3.5.11	Back-pedal brake linearity test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	This test shall be conducted on a fully assembled EPAC. The output force for a back-pedal brake shall be measured tangentially to the circumference of the rear tyre, when the wheel is rotated in the direction of forward movement, while a force of between 90 N and 300 N is being applied to the pedal at right angles to the crank and in the direction of braking.		N/A
	The braking force reading shall be taken during a steady pull and after one revolution of the wheel. A minimum of five results, each at a different pedal force level, shall be taken. Each result shall be the average of three individual readings at the same load level.		N/A
	The results shall be plotted on a graph, showing the line of best fit and the $\pm 20\%$ limit lines obtained by the method of least squares outlined in Annex E.		N/A
4.3.6	Steering		P
4.3.6.1	Handlebar – Dimensions		P
	Adjust the handlebar height to its highest normal riding position and the saddle to its lowest normal riding position as specified by the manufacturer (see Clause 6 i)). Measure the vertical distance from the centre and top of the handlebar grips to a point where the saddle surface is intersected by the seat post axis (see Figure 9). This dimension shall not exceed 400 mm.		P
4.3.6.2	Handlebar grips and plugs		P
4.3.6.2.1	Requirements		--
	The ends of the handlebar shall be fitted with handgrips or end plugs. When tested by the method described in 4.3.6.2.2 and 4.3.6.2.3, the handgrips or plugs shall withstand the specified removal forces.		P
4.3.6.2.2	Freezing test method		--
	Immerse the handlebar, with handlebar grips or plugs fitted, in water at room temperature for one hour and then place the handlebar in a freezer until the handlebar is at a temperature lower than $-5\text{ }^{\circ}\text{C}$. Remove the handlebar from the freezer and allow the temperature of the handlebar to reach $-5\text{ }^{\circ}\text{C}$, and then apply a force of 70 N to the grip or plug in the loosening direction as shown in Figure 10. Maintain the force until the temperature of the handlebar has reached $+5\text{ }^{\circ}\text{C}$.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	hole does not affect the seat of the plug in the handlebar and the fixture does not contact the handlebar during the test.		P
4.3.6.2.3	Hot water test method		--
	Immerse the handlebar, with handlebar grips fitted, in hot water of $+60\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for one hour. Remove the handlebar from the hot water, allow the handlebar to stabilize at ambient temperature for 30 min, apply a force of 100 N to the grip in the loosening direction as shown in Figure 10. Maintain this force for 1 min.		P
4.3.6.3	Handlebar stem – Insertion-depth mark or positive stop		N/A
	The handlebar-stem shall be provided with one of the two following alternative means of ensuring a safe insertion depth into the fork steerer:		N/A
	a) it shall contain a permanent, transverse mark, of length not less than the external diameter of the stem, that clearly indicates the minimum insertion depth of the handlebar-stem into the fork steerer. The insertion mark shall be located at a position not less than 2,5 times the external diameter of the handlebar-stem from the bottom of the stem, and there shall be at least one stem diameter's length of contiguous, circumferential stem material below the mark;		N/A
	b) it shall incorporate a permanent stop to prevent it from being drawn out of the fork steerer such as to leave the insertion less than the amount specified in a) above.		N/A
4.3.6.4	Handlebar stem to fork steerer – Clamping requirements		P
	The distance g , see Figure 11, between the top of the handlebar stem and the top of the fork steerer to which the handlebar stem is clamped shall not be greater than 5 mm.		P
	The upper part of the fork steerer to which the handlebar stem is clamped shall not be threaded.		P
	The dimension g shall also ensure that the proper adjustment of the steering system can be achieved.		P
	For aluminium and composite fork steerer any internal device that could damage the internal surface of the fork steerer shall be avoided.		P
4.3.6.5	Steering stability		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The steering shall be free to turn through at least 60° either side of the straight-ahead position and shall exhibit no tight spots, stiffness or slackness in the bearings when correctly adjusted.		P
	A minimum of 25 % of the total mass of EPAC and rider shall act on the front wheel when the rider is holding the handlebar grips and sitting on the saddle, with the saddle and rider in their most rearward positions.		P
4.3.6.6	Steering assembly – Static strength and safety tests		P
4.3.6.6.1	Handlebar and stem assembly – Lateral bending test		P
4.3.6.6.1.1	General		--
	This test is for manufacturers who produce handlebars and stems or for cycle manufacturers.		P
4.3.6.6.1.2	Requirement		--
	When tested by the method described in 4.3.6.6.1.3, there shall be no cracking or fracture of the handlebar, stem or clamp-bolt and the permanent deformation measured at the point of application of the test force shall not exceed 15 mm.		P
4.3.6.6.1.3	Test method		--
	Assemble the handlebar and stem in accordance with the manufacturer's instructions and, unless the handlebar and stem are permanently connected, e.g. by welding or brazing, align the grips portion of the handlebar in a plane perpendicular to the stem axis (see Figure 12). For stems which have a quill for insertion into a fork steerer, clamp the quill securely in a fixture to the minimum insertion depth, or, for stem extensions which clamp directly onto an extended fork steerer attach the extension to a fork steerer according to the manufacturer's instructions and clamp this fork steerer securely in a fixture to the appropriate height. Apply a force of F ₂ (Table 3) at a distance of 50 mm from the free end of the handlebar and parallel to the axis of the fork steerer as shown in Figure 12. Maintain this force for 1 min.		P
4.3.6.6.2	Handlebar-stem – Forward bending test		P
4.3.6.6.2.1	General		--
	Conduct the test in two stages on the same assembly as follows.		P
4.3.6.6.2.2	Requirement for Stage 1		--

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Clause	Requirement + Test	Result - Remark	Verdict
	When tested by the method described in 4.3.6.6.2.3, there shall be no visible cracks or fractures and the permanent deformation measured at the point of application of the test force and in the direction of the test force shall not exceed 10 mm.		P
4.3.6.6.2.3	Test method for Stage 1		--
	For stems which have a quill for insertion in to a fork steerer, clamp the quill securely in a fixture to the minimum insertion depth or, for stem extensions which clamp directly on to an extended fork steerer, clamp the handlebar-stem extension securely on to a suitable, solid-steel bar and clamp the bar in securely in a fixture, the projecting length of the bar not being critical.		P
	Apply a force F_3 of 1 600 N through the handlebar attachment point in a forward and downward direction and at 45° to the axis of the quill or steel bar as shown in Figure 13 and maintain this force for 1 min. Release the test force and measure any permanent deformation.		P
	If the handlebar-stem meets the requirement of 4.3.6.6.2.2, conduct Stage 2 of the test.		P
4.3.6.6.2.4	Requirement for Stage 2		--
	When tested by the method described in 4.3.6.6.2.5, there shall be no visible cracks or fractures.		P
4.3.6.6.2.5	Test method for Stage 2		--
	With the handlebar-stem mounted as in Stage 1, apply a progressively increasing force in the same position and direction as in stage 1 until either the force reaches a maximum of F_4 or until the handlebar-stem deflects 50 mm measured at the point of application of the test force and in the direction of the test force. If the stem does not yield or continue to yield, maintain the force for 1 min. The forces are given in Table 4.		P
4.3.6.6.3	Handlebar to handlebar-stem – Torsional safety test		P
4.3.6.6.3.1	Requirement		--
	When tested by the method described in 4.3.6.6.3.2, there shall be no movement of the handlebar relative to the handlebar-stem.		P
4.3.6.6.3.2	Test method		--

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Clause	Requirement + Test	Result - Remark	Verdict
	The exact method of applying the torque will vary with the type of handlebar, and an example is shown in Figure 14.		P
	If bar-ends are fitted by the manufacturer, the test forces shall be applied to them in the test, as shown later in Figure 18 a). If according to the manufacturer's instructions bar-ends may be used, simulated bar-ends (as shown in Figure 18 b)) shall be used for the test.		P
4.3.6.6.4	Handlebar-stem to fork steerer – Torsional safety test		P
4.3.6.6.4.1	Requirement		--
	When tested by the method described in 4.3.6.6.4.2, there shall be no movement of the handlebar-stem relative to the fork steerer.		P
4.3.6.6.4.2	Test method		--
	Assemble the fork steerer correctly in the frame and attach the handlebar-stem to the fork steerer with the locking system tightened in accordance with the manufacturer's instructions, and apply a torque of T_2 once in each direction of possible rotation by applying a force on test-bar in a plane perpendicular to the axis of the fork-steerer/handlebar-stem. Maintain each torque for 1 min. The torque is given in Table 6.		P
4.3.6.6.5	Bar-end to handlebar – Torsional safety test		N/A
4.3.6.6.5.1	Requirement		--
	When tested by the method described in 4.3.6.6.5.2, there shall be no movement of the bar-end in relation to the handlebar.		N/A
4.3.6.6.5.2	Test method		--
	Secure the handlebar in a suitable fixture and assemble the bar-end on the handlebar tightening the fixings in accordance with the bar-end manufacturer's instructions. Apply a force of F_5 (Table 7) in accordance with the following:		N/A
	a) the bar-end's length is more than 100 mm, at a distance of 50 mm from the free end of the bar-end (see Figure 16 a));		N/A
	b) the bar-end's length is from 50 mm to 100 mm, at a distance of 50 mm from the axis of the handlebar (see Figure 16 b));		N/A
	c) the bar-end's length is less than 50 mm, apply a load to the mid-point of the bar end (see Figure 16 c)).		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.6.7	Handlebar and stem assembly – Fatigue test		P
4.3.6.7.1	General		--
	Handlebar-stems can influence test failures of handlebars and for this reason, a handlebar shall always be tested mounted in a stem, but it is permitted to test a stem with a solid bar in place of the handlebar and bar-ends with dimensions corresponding to handlebars/bar-ends suitable for that stem.		P
	When the fatigue test is for the stem only, the manufacturer of the stem shall specify the types and sizes of handlebar for which the stem is intended and the test shall be based on the most severe combination.		P
	Conduct the test in two stages on the same assembly.		P
4.3.6.7.2	Requirement for Stage 1 and Stage 2		--
	When tested by the method described in 4.3.6.7.3 or 4.3.6.7.4, there shall be no visible cracks or fractures in any part of the handlebar and stem assembly or any bolt failure.	Test frequency: 2 Hz	P
	For composite handlebars or stems, 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.		N/A
4.3.6.7.3	Test method for Stage 1		--
	Unless the handlebar and stem are permanently connected, e.g. by welding or brazing, align the grips of portion of the handlebar in a plane perpendicular to the stem axis (see Figure 12a)) and secure the handlebar to the stem according to the manufacturer's instructions.		P
	Clamp the handlebar stem securely in a fixture to the minimum insertion depth, or in the case of a stem extension which is intended to be clamped to an extended fork steerer secure the extension using the manufacturer's recommended tightening procedure to an extended fork steerer which is secured in fixture to the appropriate length		P

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Clause	Requirement + Test	Result - Remark	Verdict
	For handlebars where the manufacturer states that they are not intended for use with bar-ends, apply fully-reversed forces of F_6 (see Table 8) at a position 50 mm from the free end each side of the handlebar for 100 000 cycles, with the forces at each end of the handlebar being out of phase with each other and parallel to the axis of the handlebar stem as shown in Figure 17 a). The forces are given in Table 8. The maximum test frequency shall be maintained as specified in 4.3.1.5.		P
	Where EPAC manufacturer fits bar-ends, fit the bar-ends to the handlebar according to the manufacturer's tightening instructions but with the bar-ends located in a plane perpendicular to the handlebar stem axis and apply the out-of-phase forces to the bar-ends, as shown in Figure 18 a).		N/A
	Where a handlebar manufacturer specifies that his handlebars are suitable for use with bar-ends conduct the test with the out-of-phase forces applied to simulated bar-ends as shown in Figure 18 b).		N/A
	If the handlebar meets the requirement of 4.3.6.7.2, remove any bar-ends and conduct Stage 2 of the test with the assembly in the same mountings.		N/A
4.3.6.7.4	Test method for Stage 2		--
	Apply fully-reversed forces of F_7 (see Table 8) at a position 50 mm from the free end each side of the handlebar for 100 000 cycles, with the forces at each end of the handlebar being in phase with each other and parallel to the axis of the handlebar stem as shown in Figure 17 b). The maximum test frequency shall be maintained as specified in 4.3.1.5.	Test frequency: 2 Hz	P
4.3.7	Frames		P
4.3.7.1	Suspension-frames – Special requirement		N/A
	The design shall be such that if the spring or damper fails, neither the tyre shall contact any part of the frame nor the assembly carrying the rear wheel become detached from the rest of the frame.		N/A
4.3.7.2	Frame – Impact test (falling mass)		P
4.3.7.2.1	Requirements		--
	When tested by the method described in 4.3.7.2.3, there shall be no visible cracks or fractures of the frame.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The permanent deformation measured between the axes of the wheel axles shall not exceed the following values:		P
	a) 30 mm where a fork is fitted;		P
	b) where a dummy fork is fitted in place of a fork, the values are given in Table 9.		N/A
4.3.7.2.2	General		--
	Manufacturers of frames are permitted to conduct the test with a dummy fork (see Annex D) fitted in place of a front fork.		P
	Where a frame is convertible for male and female riders by the removal of a bar, test it with the bar removed.		N/A
	Where a suspension fork is fitted, test the assembly with the fork extended to its unloaded free length. Where a rear suspension system is incorporated in the frame, secure the suspension in a position equivalent to that which would occur with a 90 kg rider seated on the bicycle. If the type of suspension system does not permit it to be locked, then replace the spring/damper unit by a solid link of the appropriate size and with end fittings similar to those of the spring/damper unit.		N/A
4.3.7.2.3	Test method		--
	Assemble a roller of mass less than or equal to 1 kg and with dimensions conforming to those shown in Figure 19 in the fork. The hardness of roller shall be not less than 60 HRC at impact surface. If a dummy fork is used in place of a fork the bar shall have a rounded end equivalent in shape to the roller. Hold the frame-fork or frame-bar assembly vertically by clamping to a rigid fixture by the rear-axle attachment points as shown in Figure 19.		P
	Rest a striker of mass 22,5 kg on the roller in the fork drop-outs or on the rounded end of the dummy fork and measure the wheelbase. Raise the striker to a height of $h1$ above the low-mass roller and release it to strike the roller or the steel bar at a point in line with the wheel centres and against the direction of the fork rake or rake of the bar. The drop heights are given in Table 10. The striker will bounce and this is normal. When the striker has come to rest on the roller or dummy fork, measure the wheelbase again.		P
	If the fork fails, the frame shall be tested with a dummy-fork.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.7.3	Frame and front fork assembly – Impact test (falling frame)		P
4.3.7.3.1	General		--
	Manufacturers of complete EPACs shall conduct the test with the frame fitted with the appropriate front fork.		P
	Where a frame is convertible for male and female riders by the removal of a bar, test it with the bar removed.		N/A
	Where a suspension fork is fitted, it shall be at its unloaded length prior to the impact. If the spring damper unit can be locked, it shall be locked in its unloaded length position. If the spring/damper cannot be locked, use one of the two following alternative procedures:		N/A
	a) secure the fork at its extended length by an external locking method, or		P
	b) replace the fork by a rigid fork which is known to meet the requirements of the impact test described in 4.3.8.5 and of a length which is consistent with an 90 kg rider seated in a normal riding position on the bicycle when it is equipped with the suspension fork.		N/A
	Where a rear suspension system is incorporated in the frame, secure the spring/damper unit in a position equivalent to that which would occur with an 90 kg rider seated on the bicycle; if the type of suspension system does not permit it to be locked, then replace the spring/damper unit by a solid link of the appropriate size and with end fittings similar to those of the spring/damper unit.		N/A
4.3.7.3.2	Requirement		--
	When tested by the method described in 4.3.7.3.3, there shall be no visible cracks or fractures in the assembly and after the second impact there shall be no separation of any parts of any suspension system. The permanent deformation measured between the axes of the wheel axles shall not exceed the values specified in Table 11.		P
4.3.7.3.3	Test method		--
	Conduct the test on the assembly used for the test in 4.3.7.2.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	As shown in Figure 20, mount the frame-fork assembly at its rear axle attachment points so that it is free to rotate about the rear axle in a vertical plane. Support the front fork on a flat steel anvil so that the frame is in its normal position of use. Securely fix mass $M1$ to the seat-post as shown in Figure 2 with the centre of gravity at distance D ($= 75$ mm) along the seat-post axis from the insertion point, and fix masses of $M1$, $M2$, and $M3$ (see Table 12) to the top of the steering head, the seat-post, and the bottom bracket respectively, as shown in Figure 20.		P
	Measure the wheelbase with the three masses in place. Rotate the assembly about the rear axle until the distance between the low-mass roller and the anvil is $h2$ then allow the assembly to fall freely to impact on the anvil.		P
	Repeat the test and then measure the wheelbase again with the three masses in place and the roller resting on the anvil.		P
4.3.7.4	Frame – Fatigue test with pedalling forces		P
4.3.7.4.1	General		--
	All types of frame shall be subjected to this test.		P
	In tests on suspension-frames with pivoted joints, adjust the spring, air-pressure, or damper to provide maximum resistance, or, for a pneumatic damper in which the air-pressure cannot be adjusted, replace the suspension-unit with a rigid link, ensuring that its end fixings and lateral rigidity accurately simulate those of the original unit. For suspension-frames in which the chain-stays do not have pivots but rely on flexing, ensure that any dampers are set to provide the minimum resistance in order to ensure adequate testing of the frame.		N/A
	Where a suspension-frame has adjustable brackets or linkages to vary the resistance of the bicycle against the ground-contact forces or to vary the attitude of the bicycle, arrange the positions of these adjustable components to ensure maximum forces in the frame.		N/A
4.3.7.4.2	Requirement		--
	When tested by the method described in 4.3.7.4.3, there shall be no visible cracks or fractures in any part of the frame, and there shall be no separation of any parts of the suspension system.	Test frequency: 2 Hz	P

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Clause	Requirement + Test	Result - Remark	Verdict
	For composite frames, the running displacements (peak-to-peak values) at the points where the test forces are applied shall not increase by more than 20 % of the initial values (see 4.3.1.6).		N/A
4.3.7.4.3	Test method		--
	Use a new frame/fork assembly fitted with standard head-tube bearings for the test. The front fork may be replaced by a dummy fork (see Annex D) of the same length and at least the same stiffness as the original fork.		P
	If a genuine fork is used, failures of the fork are possible, therefore, it is recommended that for convenience, a dummy fork stiffer and stronger than the genuine fork is used.		P
	Where a frame is convertible for male and female riders by the removal of a bar, test it with the bar removed.		P
	Mount the frame assembly on a base as shown in Figure 3 with the fork or dummy fork secured by its axle to a rigid mount of height R_w (the radius of the wheel/tyre assembly ± 30 mm) and with the hub free to swivel on the axle. Secure the rear drop-outs by means of the axle to a stiff, vertical link of the same height as that of the front, rigid mount, the upper connection of the link being free to swivel about the axis of the axle but providing rigidity in a lateral plane, and the lower end of the link being fitted with a ball-joint.		P
	Fit a crank, chain-wheel and chain assembly or, preferably, a strong, stiff, replacement assembly to the bottom bracket as shown in Figure 3 and described in a) or b) below.		P
	a) If a crank/chain-wheel assembly is used, incline both cranks forwards and downwards at an angle of 45° (accurate $\pm 2,0^\circ$) to the horizontal and secure the front end of the chain to the middle chainwheel of three, the smaller chain-wheel of two, or the only chain-wheel. Attach the rear end of the chain to the rear axle and perpendicular to the axis of the axle.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	b) If an adaptor assembly is used (as shown in Figure 3), ensure that the assembly is free to swivel about the axis of the bottom-bracket and that both replacement arms are 175 mm long (L) and that they are both inclined forwards and downwards at an angle of 45° (accurate $\pm 2,0^\circ$) to the horizontal. Secure the position of the crank replacement arms by a vertical arm (which replaces the chain-wheel) and a tie-rod which has ball-joints at both ends and which is attached to the rear axle perpendicular to the axis of the rear axle. The length of the vertical arm (R_c) shall be 75 mm and the axis of the tie-rod shall be parallel to and 50 mm from the vertical plane through the centre-line of the frame.		P
	Subject each pedal-spindle (or equivalent adaptor component) to a repeated downward force of F_7 at a position 150 mm from the centre-line of the frame in a vertical, transverse plane and inclined at $7,5^\circ$ (accurate to within $\pm 0,5^\circ$) to the fore/aft plane of the frame as shown in Table 13 and Figure 21. During application of these test forces, ensure that the force on a "pedal-spindle" falls to 5 % or less of the peak force before commencing application of the test force to the other "pedal-spindle".		P
	Apply the test forces for 100 000 test cycles where one test cycle consists of the application and removal of the two test forces. The maximum test frequency shall be maintained as specified in 4.3.1.5.		P
4.3.7.5	Frame – Fatigue test with horizontal forces		P
4.3.7.5.1	General		--
	Where a frame is convertible for male and female riders by the removal of a bar, remove the bar.		N/A
	It is not necessary for a genuine fork to be fitted, provided that any substitute fork is of the same length as the intended fork (see Annex D) and it is correctly installed in the steering-head bearings. For a suspension fork, lock it at a length equivalent to that with an 90 kg rider seated on the bicycle either by adjusting the spring/damper or by external means.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	In tests on suspension frames with pivoted joints, lock the moving part of the frame into a position as would occur with a 90 kg rider seated on the bicycle. This may be achieved by locking the suspension unit in an appropriate position or, if the type of suspension system does not permit it to be locked, then the suspension system may be replaced by a solid link of the appropriate compressed size. Ensure that the axes of the front and rear axles are horizontally in line, as shown in Figure 22. For suspensionframes in which the chain-stays do not have pivots but rely on flexing, ensure that any dampers are set to provide the minimum resistance in order to ensure adequate testing of the frame.		N/A
	Where a suspension frame has adjustable brackets or linkages to vary the resistance of the bicycle against the ground-contact forces or to vary the attitude of the bicycle, arrange the positions of theseadjustable components to ensure maximum forces in the frame.		N/A
4.3.7.5.2	Requirement		--
	When tested by the method described in 4.3.7.5.3, there shall be no visible cracks or fractures in the frame and there shall be no separation of any parts of any suspension system.	Test frequency: 2 Hz	P
	For composite frames, the running displacement (peak-to-peak value) at the point where the test forces are applied shall not increase by more than 20 % of the initial values (see 4.3.1.6).		N/A
4.3.7.5.3	Test method		--
	Mount the frame in its normal attitude and secured at the rear drop-outs so that it is not restrained in a rotary sense (i.e. preferably by the rear axle) as shown in Figure 22. Ensure that the axes of the front and rear axles are horizontally in line.		P
	Apply cycles of dynamic, horizontal forces of F_8 in a forward direction and F_9 in a rearward direction to the front fork drop-outs for C_1 cycles as shown in Table 14 and Figure 22, with the front fork constrained in vertical direction but free to move in a fore/aft direction under the applied forces. The maximum test frequency shall be maintained as specified in 4.3.1.5.		P
4.3.7.6	Frame – Fatigue test with a vertical force		P
4.3.7.6.1	General		--

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Clause	Requirement + Test	Result - Remark	Verdict
	Where a frame is convertible for male and female riders by the removal of a bar, remove the bar.		N/A
	Where a suspension frame has adjustable brackets or linkages to vary the resistance of the bicycle against the ground-contact forces or to vary the attitude of the bicycle, arrange the positions of these adjustable components to ensure maximum forces in the frame. Secure the rear suspension as described in 4.3.7.4.1.		N/A
	If a suspension fork is fitted lock it at a length equivalent to that with an 90 kg rider seated on the bicycle either by adjusting the spring/damper or by external means.		N/A
4.3.7.6.2	Requirement		--
	When tested by the method described in 4.3.7.6.3, there shall be no visible cracks or fractures in the frame and there shall be no separation of any parts of the suspension system.	Test frequency: 2 Hz	P
	For composite frames, the running displacement (peak-to-peak value) at the point where the test forces are applied shall not increase by more than 20 % of the initial value (see 4.3.1.6).		N/A
4.3.7.6.3	Test method		--
	Mount the frame in its normal attitude and secured at the rear drop-outs so that is not restrained in a rotary sense (i.e. preferably by the rear axle) as shown in Figure 23. Fit a suitable roller to the front axle in order to permit the frame to flex in a fore/aft sense under the test forces.		P
	Insert intended seat post at minimum insertion depth or equivalent to a seat-stem to a depth of 75 mm in the top of the seat-tube and secure this to the manufacturer's instructions by the normal clamp. Securely attach a horizontal, rearward extension (E in Figure 23) to the top of this bar such that its length (dimension <i>h3</i> in Figure 23) places point H in a position equivalent to that of the centre of the saddle-clamp with the bicycle at its maximum saddle height recommended for the particular frame, or if the maximum saddle height information is not available dimension <i>h3</i> shall be 250 mm.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Apply cycles of dynamic, vertically-downward forces of F_{10} at a point 70 mm behind the intersection of the axes of the solid steel bar and the extension piece, E, as shown in Figure 23 for 50 000 test cycles. The forces are given in Table 15. The maximum test frequency shall be maintained as specified in 4.3.1.5.		P
4.3.8	Front fork		P
4.3.8.1	General		--
	4.3.8.2, 4.3.8.4, 4.3.8.5 and 4.3.8.6 apply to all types of fork.		P
	In the strength tests, 4.3.8.4, 4.3.8.5, 4.3.8.6 and 4.3.8.7, a suspension-fork shall be tested in its free, uncompressed length condition.		N/A
4.3.8.2	Means of location of the axle and wheel retention		P
	The slots or other means of location for the wheel-axle within the front fork shall be such that when the axle or cones are firmly abutting the top face of the slots, the front wheel remains central within the fork.		P
	The front fork and wheel shall also fulfil the requirements of 4.3.9.4 and 4.3.9.5.		P
4.3.8.3	Suspension-forks – Special requirements		N/A
4.3.8.3.1	Tyre-clearance test		N/A
4.3.8.3.1.1	Requirement		--
	When tested by the method described in 4.3.8.3.1.2, the tyre shall not contact the crown of the fork nor shall the components separate		N/A
4.3.8.3.1.2	Test method		--
	For the tyre-clearance test, a suspension-fork shall first be checked and adjusted if necessary according to the items listed in following a) to f):		N/A
	a) Inflate the tyre to its maximum pressure;		N/A
	b) Place the fork in uncompressed condition to have the highest displacement between suspension stanchion legs and suspension lower legs;		N/A
	c) If the suspension-fork can be locked, place the fork in the open position;		N/A
	d) If the fork has a spring adjust device, place it in the softest position;		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	e) If the fork has a pneumatic device, blow up the one or the two chambers at their minimum pressures according the manufacturer's instruction;		N/A
	f) If the fork has a rebound device, place it on the slowest position.		N/A
	With a wheel and tyre assembly fitted to the fork, apply a force of 2 800 N to the wheel in a direction towards the fork-crown and parallel to the axis of the fork steerer. Maintain this force for 1 min.		N/A
4.3.8.3.2	Tensile test		N/A
4.3.8.3.2.1	Requirement		--
	When tested by the method described in 4.3.8.3.2.2, there shall be no detachment or loosening of any parts of the assembly and the tubular, telescopic components of any fork-leg shall not separate under the test force.		N/A
4.3.8.3.2.2	Test method		--
	Mount the fork steerer securely in a suitable rigid mount, keeping any clamping forces away from the fork-crown, and apply a tensile force of 2 300 N distributed equally between the two drop-outs in a direction parallel to the axis of the fork steerer and in the direction away from the fork-crown. Maintain this force for 1 min.		N/A
4.3.8.4	Front fork – Static bending test		P
4.3.8.4.1	Requirement		--
	When tested by the method described in 4.3.8.4.2, there shall be no fractures or visible cracks in any part of the fork, and the permanent deformation, measured as the displacement of the axis of the wheel axle or simulated axle in relation to the axis of the fork steerer, shall not exceed 10 mm.		P

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.8.4.2	Test method		--
	Mount the fork according to Annex F and fit a loading-attachment and swivel on an axle located in the axle slots of the blades (see Figure 24). Locate a deflection measuring device over the loading attachment in order to measure deflection and permanent deformation of the fork perpendicular to the steerer axis and in the plane of the wheel.		P
	Apply a static, pre-loading force of 100 N to the roller perpendicular to the steerer axis, against the direction of travel, and in the plane of the wheel. Remove and repeat this loading until a consistent deflection reading is obtained. Adjust the deflection measuring device to zero.		P
	Increase the static force to F_{11} and maintain this force for 1 min, then reduce the force to 100 N and record any permanent deformation. The forces are given in Table 16.		P
4.3.8.5	Front fork – Rearward impact test		P
4.3.8.5.1	Forks made entirely of metal		P
4.3.8.5.1.1	Crown/steerer joint assembled by welding or brazing		N/A
	When tested by the method described in 4.3.8.5.3, there shall be no fractures or visible cracks in any part of the fork, and the permanent deformation, measured as the displacement of the axis of the wheelaxle or simulated axle in relation to the axis of the fork steerer, shall not exceed 45 mm.		N/A
	If the fork is used in the frame impact test (falling-mass), 4.3.7.2, there is no need to perform this test.		N/A
4.3.8.5.1.2	Crown/steerer joint assembled by press-fitting, bonding, or clamping		P
	When tested by the method described 4.3.8.5.4 a), if there are any fractures or visible cracks in any part of the fork, and the permanent deformation, measured as the displacement of the axis of the wheel-axle or simulated axle in relation to the axis of the fork steerer, exceeds 45 mm, the fork shall be considered to have failed. If the fork meets these criteria then it shall be subjected to a second test as described in 4.3.8.5.4 b), after which, it shall exhibit no fractures, then it shall be subjected to a third test as described in 4.3.8.5.4 c), irrespective of the amount of permanent deformation, there shall be no relative movement between the steerer and the crown.		P

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.8.5.2	Forks which have composite parts		N/A
	When tested by the method described in 4.3.8.5.3, there shall be no fractures in any part of a fork and the permanent deformation, measured as the displacement of the axis of the wheel-axle or simulated axle in relation to the axis of the fork steerer, shall not exceed 45 mm. After which, it shall exhibit no fractures, then it shall be subjected to a second test as described in 4.3.8.5.4 c) Torque on fork, irrespective of the amount of permanent deformation, there shall be no relative movement between the steerer and the crown.		N/A
4.3.8.5.3	Test method 1		--
	Mount the fork according to Annex F as shown in Figure 25. Assemble a roller of mass less than or equal to 1 kg and with dimensions conforming to those shown in Figure 26 in the fork. The hardness of the roller shall be not less than 60 HRC at impact surface.		P
	Rest a striker of mass $22,5 \text{ kg} \pm 0,1 \text{ kg}$ on the roller in the fork drop-outs such that it is exerting a force against the direction of travel and in the plane of the wheel. Position a deflection measuring device under the roller and record the position of the roller in a direction perpendicular to the axis of the fork steerer and in the plane of the wheel and note the vertical position of the fork.		P
	Remove the deflection measuring device, raise the striker through a height of $h/4$ and release it to strike the roller against the rake of the fork. The drop heights are given in Table 17. The striker will bounce and this is normal. When the striker has come to rest on the roller, measure the permanent deformation under the roller.		P
4.3.8.5.4	Test method 2		--
	a) This test is described in 4.3.8.5.3.		P
	b) This test is similar to that described in 4.3.8.5.3 except that the dropping height shall be increased to 600 mm instead that given in Table 17. The section applies to forks in 4.3.8.5.1.2.		P
	c) Apply a torque of T_3 to the assembly and maintain for 1 min in each direction of possible rotation about the steerer axis. The torque is given in Table 18, and a typical example of test equipment is illustrated in Figure 27.		P
4.3.8.5.5	Test method 3		--

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Clause	Requirement + Test	Result - Remark	Verdict
	Apply a torque of T to the assembly and maintain for 1 min in each direction of possible rotation about the steerer axis. The torque is given in Table 18, and a typical example of test equipment is illustrated in Figure 27.		P
4.3.8.6	Front fork – Bending fatigue test plus rearward impact test		P
4.3.8.6.1	Requirement		--
	When tested by the method described in 4.3.8.6.2, there shall be no fractures in any part of the fork, and the permanent deformation, measured as the displacement of the axis of the wheel-axle or simulated axle in relation to the axis of the fork steerer, shall not exceed 45 mm.		P
	For composite forks, the running displacement (peak-to-peak value) at the points where the test forces are applied shall not increase by more than 20 % of the initial values (see 4.3.1.6).		N/A
4.3.8.6.2	Test method		--
	Mount the fork according to Annex F as shown in Figure 28.		P
	Apply cycles of fully-reversed, dynamic forces of F_{12} in the plane of the wheel and perpendicular to the fork steerer tube to a loading attachment and swivel on an axle located in the axle-slots of the blades for 100 000 test cycles. The forces are given in Table 19. The maximum test frequency shall be maintained as specified in 4.3.1.5.		P
	When the fork has failed conclude the test if the running displacement (peak-to-peak value) at the point where the test forces are applied increases by more than 20 % for rigid forks or more than 40 % for suspension forks from the initial values.		P
	Stop the test after 100 000 cycles and inspect the sample carefully for fractures. If fractures are found, conclude the test.		P
	If the sample completes 100 000 cycles without exceeding the displacement limits noted above, and if no fractures or can be observed, perform the impact resistance test described in 4.3.8.5 (The drop heights are given in Table 17). When the striker has come to rest on the roller, measure the permanent deformation under the roller and inspect the sample carefully for fractures.		P
4.3.8.7	Forks intended for use with hub- or disc-brakes		P

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.8.7.1	General		--
	When a fork is intended for use with a hub- or disc-brake and whether supplied as original equipment or as an accessory, the fork manufacturer shall provide an attachment point on the fork-blade for the torque-arm or calliper.		P
	In tests conducted by the methods described in 4.3.8.7.3 and 4.3.8.7.5 and where more than one mounting-point is provided for a hub- or disc-brake, the following shall apply:		P
	a) Where a complete EPAC is supplied, the test adaptor shall be secured to the mounting-point used on EPAC. If bracket is supplied, it shall be used to perform the test;		P
	b) Where a fork is supplied as an accessory with more than one mounting-point, separate tests shall be conducted on each of the mounting-points on separate forks.		P
4.3.8.7.2	Static brake-torque test		P
	When tested by the method described in 4.3.8.7.3, there shall be no fractures or visible cracks in any part of the fork.		P
4.3.8.7.3	Fork for hub/disc-brake – Static brake-torque test		P
	Mount the fork in a fixture representative of the head-tube according to Annex F and gripped in the normal head-bearings, fit an axle to the fork, and mount on the axle a pivoted, straight adaptor as shown in Figure 29 to provide a torque-arm of L_2 in length (see Table 20) and a suitable attachment for the brake mounting-point. If the wheel size is not listed in Table 20, the length L_2 shall be equal to one half of the wheel diameter.		P
	Apply a rearward force of 1 000 N to the torque arm perpendicular to the fork steerer axis and in the plane of the wheel. Maintain this force for 1 min, then reduce the force to 100 N and record any permanent deformation.		P
4.3.8.7.4	Fork for hub/disc-brake – Brake mount fatigue test		P
	When tested by the method described in 4.3.8.7.5, there shall be no fractures or visible cracks in any part of the fork and, in the case of suspension-forks, there shall be no separation of any parts.		P
4.3.8.7.5	Fork for hub/disc-brake – Brake mount fatigue test		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Mount the fork in a fixture representative of the head-tube according to Annex F and gripped in the normal head-bearings, fit an axle to the fork, and mount on the axle a pivoted, straight adaptor as shown in Figure 30 to provide a torque-arm of L2 in length (see Table 21) and a suitable attachment for the brake mounting-point.		P
	Apply repeated, horizontal, dynamic forces of 600 N rearward to the end of the torque-arm parallel to the plane of the wheel (as shown in Figure 30) for C2 cycles (see Table 21). The maximum test frequency shall be maintained as specified in 4.3.1.6.		P
4.3.8.8	Tensile test for a non-welded fork		P
4.3.8.8.1	General		--
	This test is for forks where the blades and/or the fork steerer are secured in the fork-crown by press fitting, clamping, adhesives, or any method other than brazing or welding.		P
4.3.8.8.2	Requirement		--
	When tested by the method described in 4.3.8.8.3, there shall be no detachment or loosening of any parts of the assembly		P
4.3.8.8.3	Test method		--
	Mount the fork steerer securely in a suitable rigid mount, keeping any clamping forces away from the fork-crown, and apply a tensile force of 5 000 N distributed equally to both drop-outs for 1 min in a direction parallel to the axis of the fork steerer.		P
4.3.9	Wheels and wheel/tyre assembly		P
4.3.9.1	Wheels/tyre assembly – Concentricity tolerance and lateral tolerance		P
4.3.9.1.1	Requirements		P
	When measured by the method described in 4.3.9.1.2, the run-out shall not exceed the values which are given in Table 22.		P
4.3.9.1.2	Test method		--
	The run-out tolerances represent the maximum variation of position of the rim when measured perpendicular to the axle at a suitable point along the rim (see Figure 31) (i.e. full indicator reading) of a fully assembled and adjusted wheel during one complete revolution about the axle without axial movement. Both sides of the rim shall be measured and the maximum value shall be taken as result.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The measurement of both axial run-out (lateral) and radial run-out (concentricity) shall be done with a tyre fitted and inflated to the maximum inflation pressure, but for rims where concentricity cannot be measured with the tyre fitted, it is permissible to make measurements with the tyre removed.		P
4.3.9.2	Wheel/tyre assembly – Clearance		P
	Alignment of the wheel assembly in EPAC shall allow not less than the clearance values given in Table 23 between the tyre and any frame or fork element or a front mudguard and its attachment bolts.		P
4.3.9.3	Wheel/tyre assembly – Static strength test		P
4.3.9.3.1	Requirement		--
	When a fully assembled wheel fitted with a tyre inflated to the maximum inflation pressure is tested by the method described in 4.3.9.3.2, there shall be no failure of any of the components of the wheel, and the permanent deformation, measured at the point of application of the force on the rim, shall not exceed the values which are given in Table 24.		P
4.3.9.3.2	Test method		--
	Clamp and support the wheel suitably as shown in Figure 32. Apply a pre-load of 5 N on the rim at one spoke perpendicular to the plane of the wheel as shown in Figure 32. Record the zero position of the rim at the point of load application as shown. Then apply a static force of F_{13} given in Table 25 for a duration of 1 min. Reduce the load to 5 N and allow a 1 min settling time. After this settling time and with the 5 N load still applied, re-measure the position of the rim.		P
	The wheel shall be fitted with the appropriate size tyre and inflated to the maximum pressure, determined by the lowest value between maximum inflation pressures recommended on the rim or the tyre.		P
	In the case of a rear wheel, apply the force from the sprocket side of the wheel as shown in Figure 32.		P
	Repeat the above measurement once between two spokes.		P
4.3.9.4	Wheels – Wheel retention		P
4.3.9.4.1	General		--
	Wheel retention safety is related to the combination of wheel, retention device, and drop-out design.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Wheels shall be secured to EPAC frame and fork such that when adjusted to the manufacturer's instructions they comply with 4.3.9.4.2, 4.3.9.4.3 and 4.3.9.5.		P
	Wheel nuts shall have a minimum removal torque of 70 % of the manufacturer's recommended tightening torque		P
	Where quick-release axle devices are used they shall comply with 4.3.9.5.		P
4.3.9.4.2	Wheel retention – Retention devices secured		P
4.3.9.4.2.1	Requirement		--
	When tested by the method described in 4.3.9.4.2.2, there shall be no relative motion between the axle and the front fork/frame.		P
4.3.9.4.2.2	Test method		--
	Apply a force of 2 300 N distributed symmetrically to both ends of the axle for a period of 1 min in the direction of the removal of the front and rear wheel independently.		P
4.3.9.4.3	Front wheel retention – Retention devices unsecured		--
	EPAC shall be equipped with secondary retention system that retains the front wheel in the dropouts when the primary retention system is in the open (unlocked) position and wheel off the ground.		P
	Where threaded axles and nuts are fitted, and the nuts are unscrewed by at least 360° from the finger tight condition and the brake system disconnected or released, the wheel shall not detach from the front fork when a force of 100 N is applied radially outwards, in line with the drop-out slots, and maintained for 1 min.		P
	Where quick-release is fitted, and the quick-release lever is fully open and the brake system is disconnected or released, the wheel shall not detach from the front fork when a force of 100 N is applied to the wheel radially outwards, in line with the drop-out slots, and maintained for 1 min.		P
4.3.9.5	Wheels – Quick-release devices – Operating features		P
	Any quick-release device shall have the following operating features:		P
	a) it shall be adjustable to allow setting for tightness;		P

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Clause	Requirement + Test	Result - Remark	Verdict
	b) its form and marking shall clearly indicate whether the device is in the open or locked position;		P
	c) if adjustable by a lever, the force required to close a properly set lever shall not exceed 200 N and, at this closing force there shall be no permanent deformation of the quick-release device;		P
	d) the releasing force of the clamping device when closed shall not be less than 50 N;		P
	e) if operated by a lever, the quick-release device shall withstand without fracture or permanent deformation a closing force of not less than 250 N applied with the adjustment set to prevent closure at this force;		P
	f) the wheel retention with the quick-release device in the clamped position shall be in accordance with 4.3.9.4.2, 4.3.9.4.3;		P
	g) the front wheel retention with the quick-release device in the open position shall be in accordance with 4.3.9.4.3.		P
	If applied to a lever, the forces specified in c), d), and e) shall be applied 5 mm from the tip end of the lever.		P
4.3.10	Rims, tyres and tubes		P
4.3.10.1	General		--
	Non-pneumatic tyres are excluded from the requirements of 4.3.10.2 and 4.3.10.3.		N/A
4.3.10.2	Tyre inflation pressure		P
	The maximum inflation pressure recommended by the manufacturer shall be permanently marked on the side wall of the tyre so as to be readily visible when the latter is assembled on the wheel. If the rim manufacturer recommends a maximum tyre inflation pressure, it shall be clearly and permanently marked on the rim and also specified in the manufacturer's instructions.		P
	It is recommended that the minimum inflation pressure specified by the tyre manufacturer also be permanently marked on the side wall of the tyre.		P
4.3.10.3	Tyre and rim compatibility		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Tyres that comply with the requirements of ISO 5775-1:2014 and rims that comply with the requirements of ISO 5775-2:2021 are compatible. The tyre, tube and tape shall be compatible with the rim design. When inflated to 110 % of the maximum inflation pressure, determined by the lower value between maximum inflation pressures recommended on the rim or the tyre, for a period of not less than 5 min, the tyre shall remain intact on the rim.		P
4.3.10.4	Rim-wear		N/A
	In the case where the rim forms part of a braking system and there is a danger of failure due to wear, the manufacturer shall make the rider aware of this danger by durable and legible marking on the rim, in an area not obscured by the tyre, (see also Clause 6 z) and 5.1).		N/A
	Where the rim is made of composite materials, the manufacturer shall include in the manufacturer's instructions warnings of the danger of rim failure caused by wear of the braking surfaces.		N/A
4.3.10.5	Greenhouse effect test for composite wheels		N/A
4.3.10.5.1	General		N/A
	This requirement is to ensure wheels made from composite materials that are subjected to high temperature conditions (i.e. such as car storage in direct sunlight) do not suffer concealed damage that could subsequently affect the safety performance of the wheel during normal use.		N/A
4.3.10.5.2	Requirement		--
	When a fully assembled wheel made of composite material, fitted with the appropriate size tyre and inflated according to the lowest value between maximum inflation pressure recommended on the rim or the tyre, is tested by the method described as 4.3.10.5.3, there shall be:		N/A
	— no failure of any of the components of the wheel;		N/A
	— no tyre separation from the rim during the test;		N/A
	— no increase in rim width greater than 5 % of the initial maximal width value;		N/A
	— compliance of lateral and concentricity tolerance according to 4.3.9.1;		N/A
	— compliance of tyre and rim compatibility according to 4.3.10.3;		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	— compliance of static strength according to 4.3.9.3.		N/A
4.3.10.5.3	Test method		--
	A fully assembled wheel, fitted with the appropriate size tyre and inflated according to the lowest value between minimum and maximum inflation pressure recommended on the rim or the tyre, shall be used for the test. Lateral run-out shall be in accordance with 4.3.9.1 and maximum width of the rim shall be recorded.		N/A
	A specific bench as shown in Figure 34 could be used to measure the maximum width all around the rim with tyre and pressure (continuous measuring).		N/A
	The wheel is laid down on the ground of a climate chamber pre heated at 80 °C, leant on axle and tyre support points, sprocket side of the wheel as shown in Figure 33, during 4 h. At the end of the 4 h, the wheel should be taken out of the climate chamber and let cool down at room temperature during 4 h to re-measuring the rim width and its conformance to 4.3.10.5.1 and 4.3.10.5.2.		N/A
4.3.11	Front mudguard		P
4.3.11.1	Requirements		--
	If front mudguard is fitted, when tested by the method described in the two-stage tests in 4.3.11.2 (for mudguard with stays) or 4.3.11.3 (for mudguard without stays), the front mudguard shall not prevent rotation of the wheel or obstruct steering.		P
4.3.11.2	Front mudguard with stays test methods		P
4.3.11.2.1	Stage 1: Test method – Tangential obstruction		P
	Insert a 12 mm diameter steel rod between the spokes, in contact with the rim and below the front mudguard stays as shown in Figure 35, and rotate the wheel to apply a tangentially-upward force of 160 N, against the front mudguard stays and maintain this force for 1 min.		P
	Remove the rod and determine whether or not the wheel is free to rotate and whether or not any damage to the front mudguard adversely affects wheel rotation (blocking of the wheel) and the steering.		P
4.3.11.2.2	Stage 2: Test method – Radial force		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Press the front mudguard at a distance of 20 mm from its free end (not taking the flap into consideration) with a 20 mm diameter, flat-ended tool radially towards the tyre with a force of 80 N as shown in Figure 36.		P
	While the force is maintained, rotate the wheel manually in the direction of forward movement of the bicycle and determine whether or not the wheel is free to rotate, and whether or not any damage to the front mudguard adversely affects wheel rotation (blocking of the wheel) and the steering.		P
4.3.11.3	Front mudguard without stays test methods		P
	Press the front mudguard at a distance of 20 mm from its free end with a 20 mm diameter, flat-ended tool radially towards the tyre with a force of 80 N as shown in Figure 36.		P
	While the force is maintained, rotate the wheel manually in the direction of forward movement of the bicycle and determine whether or not the front mudguard is rolled up the wheel, and whether or not any damage to the front mudguard adversely affects wheel rotation (blocking of the wheel) or obstructs the steering. Contact between tyre and mudguard is allowed.		P
4.3.12	Pedals and pedal/crank drive system		P
4.3.12.1	Pedal tread		P
4.3.12.1.1	Tread surface		P
	The tread surface of a pedal shall be secured against movement within the pedal assembly.		P
4.3.12.1.2	Toe Clips		N/A
	Pedals intended to be used without toe-clips, or for optional use with toe-clips, shall have:		N/A
	a) tread surfaces on the top and bottom surfaces of the pedal; or		N/A
	b) a definite preferred position that automatically presents the tread surface to the rider's foot.		N/A
	Pedals designed to be used only with toe-clips or shoe-retention devices shall have toe-clips or shoeretention devices securely attached and need not comply with the requirements of 4.3.12.1.2 a) and b).		N/A
4.3.12.2	Pedal clearance		P
4.3.12.2.1	Ground clearance		P

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Clause	Requirement + Test	Result - Remark	Verdict
	With EPAC un-laden, the pedal at its lowest point and the tread surface of the pedal parallel to the ground and uppermost where it has only one tread surface, EPAC shall be capable of being leaned over at an angle of θ from the vertical before any part of the pedal touches the ground. The values are given in Table 26.		P
	When EPAC is equipped with a suspension system, this measurement shall be taken with the suspension adjusted to the softest condition and with EPAC depressed into a position such as would be caused by a rider weighing 90 kg		P
4.3.12.2.2	Toe clearance		P
	EPACs 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 EPAC from the centre of either pedal-axle to the arc swept by the tyre or mudguard, whichever results in the least clearance (see Figure 37). The values are given in Table 27.		P
4.3.12.3	Pedal – Static strength test		P
4.3.12.3.1	Requirement		--
	When tested by the method described in 4.3.12.3.2, there shall be no fractures, visible cracks, or distortion of the pedal or spindle that could affect the operation of the pedal and pedal-spindle.		P
4.3.12.3.2	Test method		--
	Screw the pedal-spindle securely into a suitable rigid fixture with its axis horizontal, as shown in Figure 38, and apply a vertically-downward force F_{14} according to Table 28 for 1 min to the centre of the pedal as shown in Figure 38. Release the force and examine the pedal assembly and the spindle.		P
4.3.12.4	Pedal – Impact test		P
4.3.12.4.1	Requirement		--
	When tested by the method described in 4.3.12.4.2, there shall be no fractures of any part of the pedal body, the pedal-spindle or any failure of the bearing system.		P
4.3.12.4.2	Test method		--

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Clause	Requirement + Test	Result - Remark	Verdict
	Screw the pedal-spindle securely into a suitable rigid fixture with its axis horizontal as shown in Figure 40 and release a striker of the design shown in Figure 39 and mass 15 kg from a height of 400 mm to strike the pedal at the centre of the pedal. The width of the striker shall be wider than the width of the tread surface.		P
4.3.12.5	Pedal – Dynamic durability test		P
4.3.12.5.1	Requirement		--
	When tested by the method described in 4.3.12.5.2, there shall be no fractures or visible cracking of any part of the pedal, the pedal-spindle nor any failure of the bearing system.		P
4.3.12.5.2	Test method		--
	Screw each pedal securely into a threaded hole in a rotatable test-shaft as shown in Figure 41 and suspend a mass of <i>M</i> 4 at the centre of the pedal width by means of a tension-spring to each pedal, the object of the springs being to minimize oscillations of the load. The masses are given in Table 29.		P
	Drive the shaft at a speed not exceeding 100 min ⁻¹ for a total of 100 000 revolutions. If the pedals are provided with two tread surfaces, they shall be turned through 180° after 50 000 revolutions.		P
4.3.12.6	Drive-system – Static strength test		P
4.3.12.6.1	Requirement		--
	a) Drive-system with chain		P
	When tested by the method described in 4.3.12.6.2, there shall be no fracture of any component of the drive system, and drive capability shall not be lost.		P
	b) Drive-system with belt		N/A
	When tested by the method described in 4.3.12.6.3, there shall be no fracture of any component of the drive system, and the belt shall not slip/skip, fracture or cause any loss in drive capability.		N/A
	Smooth sliding between pulleys and belt is allowed at a rate not exceeding 1 °/s at the drive axis.		N/A
4.3.12.6.2	Test method for drive-system with chain		P
4.3.12.6.2.1	General		--

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Clause	Requirement + Test	Result - Remark	Verdict
	Conduct the drive system static load test on an assembly comprising the frame, pedals, transmission system, rear wheel assembly, and, if appropriate, the gear-change mechanism. Support the frame with the central plane vertical and with the rear wheel held at the rim to prevent the wheel rotating.		P
4.3.12.6.2.2	Single-speed system		N/A
	With the left-hand crank in the forward position, apply a force, <i>F15</i> , increasing gradually to 1 500 N vertically downwards to the centre of the left-hand pedal. Maintain this force for 1 min.		N/A
	Should the system slip or the drive-sprockets tighten such that the crank rotates while under load to a position more than 30° below the horizontal, remove the test force, return the crank to the horizontal position or some appropriate position above the horizontal to take account of yield or movement and repeat the test.		N/A
	On completion of the test on the left-hand crank repeat the test with the right-hand crank in the forward position and with the force applied to the right-hand pedal.		N/A
4.3.12.6.2.3	Multi-speed system		P
	a) Conduct the tests described in 4.3.12.6.2.2 with the transmission correctly adjusted in its highest gear;		P
	b) Conduct the tests generally as described in 4.3.12.6.2.2 with the transmission correctly adjusted in its lowest gear but, where appropriate, with the maximum force, <i>F1</i> , adjusted to suit the particular gear ratio, thus:		P
	The maximum force, <i>F15</i> , shall be a function of the lowest gear ratio, <i>Nc/Ns</i> ,		P
	Where		--
	1) <i>F15</i> is the force applied to the pedal, expressed in newton (N),		P
	2) <i>Nc</i> is the number of teeth on the smallest chain-wheel (front),		P
	3) <i>Ns</i> is the number of teeth on the largest sprocket (rear).		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Where the ratio N_c/N_s has a value equal to or greater than one, the force, F_{15} , shall be 1 500 N, but where the ratio N_c/N_s has a value less than one, the force, F_{15} , shall be reduced in proportion to the lowest gear ratio thus: F_{15} is $1\,500 \times N_c/N_s$		P
4.3.12.6.3	Test method for drive-system with belt		--
	The sample in its fully finished condition (with teeth if any) shall be submitted to a water spray conditioning equivalent to IPX4 specified in EN 60529:1991, 14.2.4, during 10 min. Application of the loading shall be done within 20 min after conditioning.		N/A
	a) If the drive-system is a single-speed system, conduct the tests as described in 4.3.12.6.2.2.		N/A
	b) If the drive-system is a multi-speed system, conduct the tests as described in 4.3.12.6.2.3.		N/A
4.3.12.7	Crank assembly – Fatigue test		P
4.3.12.7.1	Requirement		--
	When tested by the method described in 4.3.12.7.2, there shall be no fractures or visible cracks in the cranks, the bottom-bracket spindle or any of the attachment features, or loosening or detachment of the chain-wheel from the crank.	Test frequency: 2 Hz	P
	For composite cranks, the running displacements (peak-to-peak values) of either crank at the point where the test forces are applied shall not increase by more than 20 % of the initial value (see 4.3.1.6).		N/A
4.3.12.7.2	Test method		--
	Mount the assembly of the two pedal-spindle adaptors, the two cranks, the chain-wheel set (or other drive component), and the bottom-bracket spindle located on its normal-production bearings in a fixture with bearing housings representative of the bottom-bracket (as shown in Figure 42). Incline the cranks at 45° to the horizontal.		P
	Prevent rotation by locating a suitable length of drive chain around the largest or only chain-wheel and securing it firmly to a suitable support, or, for any other type of transmission (e.g. belt- or shaft-drive) by securing the first stage of the transmission.		P
	It is permissible to have the left crank in either of the two positions shown in Figure 42, provided the test force is applied in the appropriate direction as specified in the next paragraph.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Apply repeated, vertical, dynamic forces of F_{16} alternately to the pedal-spindle adaptors of the left- and right-hand cranks at a distance of 65 mm from the outboard face of each crank (as shown in Table 30 and Figure 42) for C test cycles (where one test cycle consists of the application of the two forces). The direction of the force on the right-hand crank shall be downwards and that on the left-hand crank shall be upwards for a rearward-pointing crank or downwards for a forward-pointing crank. During application of these test forces, ensure that the force on a pedal-spindle adaptor falls to 5 % or less of the peak force before commencing application of the test force to the other pedal-spindle adaptor. The maximum test frequency shall be maintained as specified in 4.3.1.5.		P
4.3.13	Drive-chain and drive belt		P
4.3.13.1	Drive-chain		P
	Where a chain-drive is used as a means of transmitting the motive force, the chain shall operate over the front and rear sprockets without binding.		P
	The chain shall conform to the tensile strength and push-out force requirements of ISO 9633:2001.		P
4.3.13.2	Drive belt		N/A
4.3.13.2.1	Requirement		--
	Where a belt-drive is used as a means of transmitting the motive force, the drive belt shall operate over the front and rear pulleys without binding. And when tested by the methods described in 4.3.13.2.2, there shall be no evidence of cracking, fracture or delamination of the belt drive.		N/A
4.3.13.2.2	Test method		--
	Set up a fixture with two drive pulleys that are similar or identical as shown in Figure 43. At least one pulley should be free to rotate. Increase the tensile load gradually until the tension load of the belt reaches 4 000 N.		N/A
4.3.14	Chain-wheel and belt-drive protective device		P
4.3.14.1	Requirement		--
	EPAC shall be equipped with one of the following;		--
	a) a chain wheel disc or drive pulley disk which conforms to 4.3.14.2; or		P

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Clause	Requirement + Test	Result - Remark	Verdict
	b) a chain and drive belt protective device which conforms to 4.3.14.3; or		N/A
	c) where fitted with positive foot-retention devices on the pedals, a combined front gear-change guide which conforms to 4.3.14.4 shall be used.		N/A
4.3.14.2	Chain-wheel disc and drive pulley disc diameter		P
	A chain-wheel disc shall exceed the diameter of the outer chain-wheel, when measured across the tips of the teeth by not less than 10 mm (see Figure 44).	Dimension: 14.56 mm	P
	A drive pulley disc shall exceed the diameter of the front pulley, when measured across the tips of the teeth by not less than 10 mm (see Figure 45). Where the design is such that the pedal-crank and chainwheel are too close together to accommodate a full disc, a partial disc may be fitted which closely abuts the pedal-crank.		N/A
4.3.14.3	Chain and drive belt protective device		N/A
	A chain protective device shall, as a minimum, shield the side-plates and top surface of the chain and the chain-wheel for a distance of at least 25 mm rearwards along the chain from the point where the chainwheel teeth first pass between the side-plates of the chain and forwards round the outer chain-wheel to a horizontal line passing through the bottom-bracket axle centre (see Figure 46 a)).		N/A
	A drive belt protective device shall, as a minimum, shield the side and top surface of the drive belt and the front pulley for a distance of at least 25 mm rearwards along the drive belt from the point where the tip circle of the pulley is intersected by the tip line of the belt (line C in Figure 46 b)) and forwards round the front pulley to a horizontal line passing through the bottom-bracket axle centre (see Figure 46 b)).		N/A
4.3.14.4	Combined front gear-change guide		N/A
	When the chain is located in the outer gear position, some portion of the combined front gear change guide shall be above the chain in the region 25 mm from the point where the chain wheel first passes between the side plates of the chain, parallel to the chain side plates in the direction towards the rear wheel of the bicycle (see Figure 47).		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	In addition some portion of the combined front gear change guide shall be present below the chain in the region beyond 25 mm from the point where the chain wheel first passes between the side plates of the chain, parallel to the chain side plates in the direction towards the rear wheel of the bicycle (see Figure 47).		N/A
	It is recommended that the gap between front-gear and front gear-change guide specified by the manufacturer is properly set.		N/A
4.3.15	Saddles and seat-posts		P
4.3.15.1	Limiting dimensions		P
	No part of the saddle, saddle supports, or accessories to the saddle shall be more than 125 mm above the top saddle surface at the point where the saddle surface is intersected by the seat-post axis.		P
4.3.15.2	Seat-post – Insertion-depth mark or positive stop		P
	The seat-post shall be provided with one of the two following alternative means of ensuring a safe insertion-depth into the frame:		P
	a) it shall contain a permanent, transverse mark of length not less than the external diameter or the major dimension of the cross-section of the seat-post that clearly indicates the minimum insertion-depth of the seat-post into the frame. For a circular cross-section, the mark shall be located not less than two diameters of the seat-post from the bottom of the seat-post (i.e. where the diameter is the external diameter). For a non-circular cross-section, the insertion-depth mark shall be located not less than 65 mm from the bottom of the seat-post (i.e. where seat-post has its full cross-section);		N/A
	b) it shall incorporate a permanent stop to prevent it from being drawn out of the frame such as to leave the insertion less than the amount specified in a) above.		P
4.3.15.3	Saddle/seat-post – Safety test		P
4.3.15.3.1	General		--
	If a suspension seat-post is involved, the test may be conducted with the suspension-system either free to operate or locked. If it is locked, the pillar shall be at its maximum length.		N/A
4.3.15.3.2	Saddles with adjustment-clamps		P

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Clause	Requirement + Test	Result - Remark	Verdict
	When tested by the method described in 4.3.15.3.4, there shall be no movement of the saddle adjustment clamp in any direction with respect to the seat-post, or of the seat-post with respect to the frame, nor any failure of saddle, adjustment clamp or seat-post. If the saddle design is such that it cannot accurately test the saddle/seat-post clamp, it shall be possible to use a fixture which is representative of the saddle dimensions.		P
4.3.15.3.3	Saddles without adjustment-clamps		N/A
	Saddles that are not clamped, but are designed to pivot in a vertical plane with respect to the seat-post, shall be allowed to move within the parameters of the design and shall withstand the tests described in 4.3.15.3.4 without failure of any components.		
4.3.15.3.4	Test method		--
	With the seat-post correctly assembled to EPAC frame at minimum insertion depth of the seat-post, and the clamps tightened to the torque recommended by the bicycle manufacturer, apply a force of $F18$ vertically downwards at a point 25 mm from either the front or rear of the saddle, whichever produces the greater torque on the saddle-clamp. The saddle shall be positioned in the seat post clamp assembly as defined by the saddle manufacturer's rail markings or instructions. Maintain this force for 1 min. Remove this force and apply a lateral force of $F19$ horizontally at a point 25 mm from either the front or rear of the saddle, whichever produces the greater torque on the clamp, and maintain this force for 1 min (see Figure 48). The forces are given in Table 31.		P
	The fixture shall be such that it does not damage the surface of the saddle.		P
4.3.15.4	Saddle – Static strength test		P
4.3.15.4.1	Requirement		--
	When tested by the method described in 4.3.15.4.2, the saddle cover and/or plastic moulding shall not disengage from the chassis of the saddle, and there shall be no cracking or permanent distortion of the saddle assembly.		P
4.3.15.4.2	Test method		--

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Clause	Requirement + Test	Result - Remark	Verdict
	With the saddle positioned in a suitable fixture representative of a seat-post clamp assembly and in a maximum rearward direction as defined by the saddle manufacturer's rail markings or instructions, and the clamps tightened to the torque recommended by the bicycle manufacturer, apply forces F_{20} of 400 N in turn under the rear and nose of the saddle cover, as shown in Figure 49, ensuring that the force is not applied to any part of the chassis of the saddle. The load application point is on the longitudinal plane of the saddle at 25 mm from the back (/front) of the saddle. If the saddle design is such that it cannot accept a centreline load application, the load shall be symmetrically applied at two points of the saddle.		P
4.3.15.5	Saddle and seat-post clamp – Fatigue test		P
4.3.15.5.1	General		--
	Seat-posts can influence test failures of saddles: for this reason, a saddle shall be tested in combination with a seat-post as recommended by the saddle manufacturer.		P
4.3.15.5.2	Requirement		--
	When tested by method described in 4.3.15.5.3, there shall be no fractures or visible cracks in the seatpost or in the saddle, and no loosening of the clamp.	Test frequency: 2 Hz	P
4.3.15.5.3	Test method		--
	Insert the seat-post to its minimum insertion depth in a rigid mount representative of that on the bicycle and with its axis at 73° to the horizontal. The saddle shall be positioned in the seat post clamp assembly in a maximum rearward direction as defined by the saddle manufacturer's rail markings or instructions. Adjust the saddle to have its upper surface in a horizontal plane and tighten the clamp to the torque recommended by the bicycle manufacturer. Apply a repeated, vertically-downward force of 1 000 N for 200 000 cycles, in the position shown in Figure 51 by means of a pad 300 mm long x 80 mm diameter to prevent localized damage of the saddle cover. The maximum test frequency shall be maintained as specified in 4.3.1.5.		P
4.3.15.6	Seat-post – Fatigue test		P
4.3.15.6.1	General		--

EN 15194:2017+A1:2023			
Clause	Requirement + Test	Result - Remark	Verdict
	In the following test, if a suspension seat-post is involved, the test shall be conducted with the suspension system adjusted to give maximum resistance.		P
	Conduct the test in two stages on the same assembly as per 4.3.15.6.2 and 4.3.15.6.4.		P
4.3.15.6.2	Requirement for stage 1		P
4.3.15.6.2.1	Seat-post without suspension system		P
	When tested by the method described in 4.3.15.6.3, there shall be no visible cracks or fractures in the seat-post, nor any bolt failure.	Test frequency: 2 Hz	P
	For composite seat-post, the peak deflection of seat-post during the test shall not increase by more than 20 % of the initial value.		N/A
4.3.15.6.2.2	Seat-post with suspension system		N/A
	When tested by the method described in 4.3.15.6.3, there shall be no visible cracks or fractures in the seat-post, nor any bolt failure. The design shall be such that in the event of failure of the suspension system, the two main parts do not separate nor does the upper part (i.e. the part to which the saddle would be attached) become free to swivel in the lower part.		N/A
4.3.15.6.3	Test method for stage 1 (fatigue test)		P
	A seat post shall be inserted to the minimum insertion depth in a suitable fixture with a representative seat collar and clamped to the manufacturers recommended torque. The seat post shall be fixed at an angle of 73° from horizontal, as shown in Figure 52.		P
	Secure an extension-bar to the saddle attachment point by the appropriate attachment fitting such that the bar extends rearwards and downwards at an angle of 10° below the horizontal to permit the application of a vertical test force at a distance of 70 mm from the centre of the saddle-clamp where the centre-line of the clamp intersects the axis of the bar, as shown in Figure 52.		P
	Apply a repeated, vertically downward, dynamic force of F_{21} to the point described above and shown in Figure 52 for 100 000 cycles. The forces are given in Table 32. The maximum test frequency shall be maintained as specified in 4.3.1.5.		P
4.3.15.6.4	Requirement for stage 2		P
4.3.15.6.4.1	Seat-post without suspension system		P

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Clause	Requirement + Test	Result - Remark	Verdict
	When tested by the method described in 4.3.15.6.5, there shall be no fractures, and the displacement shall not exceed 10 mm during testing.		P
4.3.15.6.4.2	Seat-post with suspension system		N/A
	When tested by the method described in 4.3.15.6.5, there shall be no fractures. The design shall be such that in the event of failure of the suspension system, the two main parts do not separate nor does the upper part (i.e. the part to which the saddle would be attached) become free to swivel in the lower part.		N/A
4.3.15.6.5	Test method for stage 2 (static strength test)		P
	A seat post shall be inserted to the minimum insertion depth in a suitable fixture with a representative seat collar and clamped to the manufacturers recommended torque. The seat post shall be fixed at an angle of 73° from horizontal, as shown in Figure 53.		P
	A force of F_{22} shall be exerted vertically on the saddle clamp for duration of 1 min. The displacement at the loading point shall be constantly monitored during testing. The forces are given in Table 33.		P
4.3.16	Spoke protector		P
	EPAC bicycles with multiple free-wheel/cassette sprockets shall be fitted with a spoke-protector guard to prevent the chain interfering with or stopping rotation of the wheel through improper adjustment or damage.		P
4.3.17	Luggage carriers		P
	If luggage carriers are fitted or provided they shall comply with EN ISO 11243:2016.		P
4.3.18	Road-test of a fully-assembled EPAC		P
4.3.18.1	Requirements		--
	When tested by the method described in 4.3.18.2, there shall be no system or component failure and no loosening or misalignment of the saddle, handlebar, controls or reflectors.		P
	The EPAC shall with or without assistance exhibit stable handling in braking, turning and steering, and it shall be possible to ride with one hand removed from the handlebar (as when giving hand signals), without difficulty of operation or hazard to the rider.		P

EN 15194:2017+A1:2023			
Clause	Requirement + Test	Result - Remark	Verdict
4.3.18.2	Test method		--
	First, check and adjust, if necessary, each EPAC selected for the road test to ensure that the steering and wheels rotate freely without slackness, that brakes are correctly adjusted and do not impede wheel rotation. Check and adjust wheel alignment and, if necessary, inflate tyres to the recommended pressure as marked on the side-wall of the tyre. Check and correct, if necessary, transmission-chain adjustment, and check any gear-control fitted for correct and free operation.		P
	Carefully adjust the saddle and handlebar positions to suit the rider.		P
	The test shall be carried out with the permissible total weight specified by the manufacturer in 6 n). Ensure that the EPAC is ridden for at least 1km.		P
4.3.19	Lighting systems and reflectors		P
4.3.19.1	General		--
	EPAC shall be equipped with reflectors at the front, rear and side. EPAC shall be equipped with lighting systems and reflectors in conformity with the national regulations in the country in which EPAC is marketed, because national regulations for lighting systems and reflectors differ from country to country.		P
4.3.19.2	Wiring harness		P
	When a wiring harness is fitted, it shall be positioned to avoid any damage by contact with moving parts or sharp edges. All connections shall withstand a tensile force in any direction of 10 N.		P
4.3.19.3	Lighting systems		P
	The lighting system consists of a front and a rear light. These devices shall comply with the provisions in force in the country in which the product is marketed. If there are no forced provisions of these devices, the lighting system shall comply with the requirements of ISO 6742-1:2015.		P
4.3.19.4	Reflectors		P
4.3.19.4.1	General		--
	These devices shall comply with the provisions in force in the country in which the product is marketed. If there are no forced provisions of these devices, the retro-reflective devices shall comply with the requirements of ISO 6742-2:2015.		P

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.19.4.2	Rear reflectors		P
	Rear reflectors shall be red in colour.		P
4.3.19.4.3	Side reflectors		P
	The retro reflective device(s) shall be either		P
	a) a reflectors fitted on the front half and on the rear half of EPAC. At least one of these shall be mounted on the spokes of the wheel. Where EPAC incorporates features at the rear wheel other than the frame and mudguard stays, the moving reflector shall be mounted on the front wheel; or		P
	b) a continuous circle of reflective material applied to both sides of each wheel within 10 cm of the outer diameter of the tyre.		P
	All side reflectors shall be of the same colour, either white (clear) or yellow.		P
4.3.19.4.4	Front reflectors		P
	Front reflectors shall be white (clear) in colour.		P
4.3.19.4.5	Pedal reflectors		P
	Each pedal shall have reflectors, located on the front and rear surfaces of the pedal. The reflector elements shall be either integral with the construction of the pedal or mechanically attached, but shall be recessed from the edge of the pedal, or of the reflector housing, to prevent contact of the reflector element with a flat edge placed in contact with the edge of the pedal.		P
4.3.20	Warning device		P
	Where a bell or other suitable device is fitted, it shall comply with the provisions in force in the country in which the product is marketed.		P
4.3.21	Thermal hazards		N/A
	A warning shall be placed on the surface if the temperature of the hot accessible surface could be above 60 °C (see EN ISO 7010:2020, symbol W017). Brake systems are excluded from this requirement.		N/A
4.3.22	Performance levels (PLrs) for control system of EPACs		P
4.4	List of significant hazards		P
	The following significant hazards have been considered in this standard:		P

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Clause	Requirement + Test	Result - Remark	Verdict
	a) Mechanical hazards: high deceleration, high acceleration, Protrusion, instability; kinetic energy; rotating elements and moving elements, rough, slippery surface, sharp edges;		P
	b) Electrical hazards: electromagnetic phenomena; electrostatic phenomena; overload; short-circuit; thermal radiation;		P
	c) Thermal hazards: explosion; flame; radiation from heat sources;		P
	d) Ergonomic hazards: effort; lighting; posture;		P
	e) Hazards associated with the environment in which the machine is used: water (rain and projection);		P
	f) Combination of hazards: braking under wet and dry condition, handgrips, motor management system, engine power management, installed braking power.		P
5	Marking, labelling		P
5.1	Requirement		--
	The EPAC shall be marked visibly, legibly and indelibly with the following minimum particulars:		P
	— contact and address of the manufacturer or authorized representative;		P
	— EPAC according to EN 15194;		P
	— appropriate marking required by legislation (CE);		P
	— year of construction, that is the year in which the manufacturing was completed (it is not possible to use a code);		P
	— cut off speed XX km/h;		P
	— maximum continuous rated power XX kW;		P
	— maximum permissible total weight (e.g. marked near the seat post or handlebar);		P
	— designation of series or type;		P
	— individual serial number if any;		P
	— mass if EPAC mass is more than 25 kg;		P
	— mass of the EPAC in the most usual configuration.		P
	The frame shall be:		--

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Clause	Requirement + Test	Result - Remark	Verdict
	a) visibly and permanently marked with a successive frame number at a readily visible location such as near the pedal-crank, the seat-post, or the handlebar;		P
	b) visibly and durably marked, with the name of the manufacturer of complete EPAC or the manufacturer's representative and the number of this document, i.e. EN 15194.; the method of testing for durability is specified in 5.2.		P
	Where appropriate, if EPAC is equipped with a coupling device for a trailer the following values shall be given:		N/A
	c) total weight of the trailer;		N/A
	d) Vertical load on the coupling system.		N/A
	For components, currently there are no specific requirements, but it is recommended that the following safety critical components be clearly and permanently marked with traceable identification, such as a manufacturer's name and a part number:		--
	e) front fork;		N/A
	f) handlebar and handlebar-stem;		N/A
	g) seat-post;		N/A
	h) brake-levers, brake blocks and/or brake-block holders;		N/A
	i) outer brake-cable casing;		N/A
	j) hydraulic-brake tubing;		N/A
	k) disc-brake callipers, brake-discs, and brake pads;		N/A
	l) chain;		N/A
	m) pedals and cranks;		N/A
	n) bottom-bracket spindle;		N/A
	o) wheel-rims.		N/A
5.2	Durability test		P
5.2.1	Requirement		--
	When tested by the method described in 5.2.2, the marking shall remain easily legible. It shall not be easily possible to remove any label nor shall any label show any sign of curling.		P
5.2.2	Test method		--

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Clause	Requirement + Test	Result - Remark	Verdict
	Rub the marking by hand for 15 s with a piece of cloth soaked in water and again for 15 s with a piece of cloth soaked in petroleum spirit.		P
6	Instruction for use		P
	Each EPAC shall be provided with a set of instructions in the language of the country to which EPAC will be supplied. Different countries may have local requirements regarding this type of information (see EN 82079-1:2012). Instructions for use shall be delivered obligatory in paper form. For more detailed information and enabling an access for vulnerable people instructions for use should be available additionally in electronic form on demand. Instructions for use shall contain the following information on:		P
	a) Concept and description of electric assistance including varying levels of motor assistance;		P
	b) Recommendation for cleaning and the use of high pressure cleaners;		P
	c) Control and tell tales;		P
	d) Specific EPAC recommendation for use (e.g. removal of the battery, temperature range for the use of the bicycle including battery, use of start-up assistance mode);		P
	e) Specific EPAC warnings (e.g. always remove the battery during maintenance, inappropriate use including manipulation of the electric management system);		P
	f) Recommendations about battery charging and charger use (e.g. temperature range for the battery storage, indoor or outdoor charging) as well as the importance of following the instruction contained on the label of the battery charger;		P
	g) The meaning of symbol and tell tales used shall be explained in the instruction for use. Warning about contact with hot surfaces as for example disc brakes after heavy use;		P
	h) The type of use for which EPAC has been designed (i.e. the type of terrain for which it is suitable) with a warning about the hazards of incorrect use;		P

EN 15194:2017+A1:2023			
Clause	Requirement + Test	Result - Remark	Verdict
	i) Preparation for riding - how to measure and adjust the saddle height to suit the rider with an explanation of the insertion-depth warning marks on the seat-post and handlebar-stem. Clear information on which lever operates the front brake, which lever operates the rear brake, the presence of any brake-power modulators with an explanation of their function and adjustment, and the correct method of using a back-pedal brake if fitted;		P
	j) Indication of minimum saddle height and the way to measure it;		P
	k) The recommended method for adjusting any adjustable suspension system fitted;		N/A
	l) Recommendations for safe riding, the use of a bicycle helmet, regular checks on brakes, tyre pressure, steering, rims and caution concerning possible increased braking distances in wet weather;		P
	m) The safe use and adjustment of foot-securing devices if fitted (i.e. quick-release pedals and toeclips);		N/A
	n) The permissible total payload (rider plus luggage) and the empty weight of the EPAC;		P
	o) Recommendation about usage for bicycle trailer or trailer bicycle if allowed by EPAC manufacturer;		N/A
	p) An advisory note to draw attention to the rider concerning possible national legal requirements when EPAC is to be ridden on public roads (e.g. lighting and reflectors);		P
	q) Recommended tightening of fasteners related to the handlebar, handlebar-stem, saddle, seat-post, wheels, and aerodynamic extension if fitted with torque values for threaded fasteners;		P
	r) The method for determining the correct adjustment of quick-release devices, such as "the mechanism should emboss the fork-ends when closed to the locked position";		N/A
	s) The correct method of assembling any parts supplied unassembled;		N/A
	t) Lubrication - where and how often to lubricate, and the recommended lubricants;		P
	u) The correct chain tension and how to adjust it (if appropriate);		P
	v) Adjustments of gears and their operation (if appropriate);		N/A

EN 15194:2017+A1:2023			
Clause	Requirement + Test	Result - Remark	Verdict
	w) Adjustment of brakes and recommendations for the replacement of the friction components;		P
	x) Recommendations on general maintenance;		P
	y) The importance of using only genuine replacement parts for safety-critical components;		P
	z) Care of the wheel-rims and a clear explanation of any danger of rim-wear (see also 4.3.10.4 and 5.1):		N/A
	aa) The correct gluing technique for wheels equipped with tubular tyres if fitted;		N/A
	bb) Appropriate spares, i.e. tyres, tubes, and brake friction-components;		P
	cc) Accessories - where these are offered as fitted, details should be included such as operation, maintenance required (if any) and any relevant spares (e.g. light bulbs);		P
	dd) An advisory note to draw attention of the rider to possible damage due to intensive use and to recommend periodic inspections of the frame, fork, suspensions joints (if any), and composite components (if any). The wording of the advice may be as follows;		P
	ee) For composite components, an advisory note to draw attention to the influence of high temperature (heat radiations) in confined environment on composite materials (if appropriate);		N/A
	ff) importance of possible suitably covering any coil springs under the saddle if a child-seat is fitted to prevent trapping of fingers;		N/A
	gg) The handlebar, the rider's response to steering and braking can be adversely affected;		P
	hh) The maximum inflation pressure for a conventional or tubular tyre, according to the lowest value between maximum inflation pressure recommended on the rim or the tyre (see also 4.3.10.2);		N/A
	ii) Recommendation on the installation of bicycle carriers as well as child seats (max. load, mounting, etc.): It is permitted to include any other relevant information at the discretion of the manufacturer.		N/A
	jj) Definition of tampering in user manual (i.e. exclude exchange of sprocket with non-original parts);		P

EN 15194:2017+A1:2023			
Clause	Requirement + Test	Result - Remark	Verdict
	kk) Recommendations and users responsibility in case of tampering;		P
	ll) The following statement: The A-weighted emission sound pressure level at the driver ears is les than 70 dB(A).		P



4.1		EN ISO 12100 safety requirements and evaluation			P
No	Type or group	Origin	Potential consequences	Subclause of this International	Evaluation
1	Mechanical hazards	- acceleration, deceleration; - angular parts; - approach of a moving element to a fixed part; - cutting parts; - elastic elements; - falling objects; - gravity; - height from the ground; - high pressure; - instability; - kinetic energy; - machinery mobility; - moving elements; - rotating elements; - rough, slippery surface; - sharp edges;	- being run over; - being thrown; - crushing; - cutting or severing; - drawing-in or trapping; - entanglement; - friction or abrasion; - impact; - injection; - shearing; - slipping, tripping and falling; - stabbing or puncture; - suffocation.	6.2.2.1 6.2.2.2 6.2.3 a) 6.2.3 b) 6.2.6 6.2.10 6.3.1 6.3.2 6.3.3 6.3.5.2 6.3.5.4 6.3.5.5 6.3.5.6 6.4.1 6.4.3 6.4.4 6.4.5	No such hazards
2	Electrical hazards	- arc; - electromagnetic phenomena; - electrostatic phenomena; - live parts; - not enough distance to live parts under high voltage; - overload; - parts which have become live under fault conditions; - short-circuit;	- burn; - chemical effects; - effects on medical implants; - electrocution; - falling, being thrown; - fire; - projection of molten particles; - shock.	6.2.9 6.3.2 6.3.3.2 6.3.5.4 6.4.4 6.4.5	N/A
3	Thermal hazards	- explosion; - flame; - objects or materials with a high or low temperature; - radiation from heat sources.	- burn; - dehydration; - discomfort; - frostbite; - injuries by the radiation of heat sources;	6.2.4 b) 6.2.8 c) 6.3.2.7 6.3.3.2.1 6.3.4.5	N/A

4	Noise hazards	- cavitation phenomena; - exhausting system; - gas leaking at high speed; - manufacturing process stamping, cutting, etc.; - moving parts; - scraping surfaces; - unbalanced rotating parts; - whistling pneumatics; - worn parts.	- discomfort; - loss of awareness; - loss of balance; - permanent hearing loss; - stress; - tinnitus; - tiredness; - any other ħfor example, mechanical, electricalħ as a consequence of an interference with speech communication or with acoustic signals.	6.2.2.2 6.2.3 c) 6.2.4 c) 6.2.8 c) 6.3.1 6.3.2.1 b) 6.3.2.5.1 6.3.3.2.1 6.3.4.2 6.4.3 6.4.5.1 b) and c)	N/A
5	Vibration hazards	- cavitation phenomena; - misalignment of moving parts; - mobile equipment; - scraping surfaces; - unbalanced rotating parts; - vibrating equipment; - worn parts.	- discomfort; - low-back morbidity; - neurological disorder; - osteo-articular disorder; - trauma of the spine; - vascular disorder.	6.2.2.2 6.2.3 c) 6.2.8 c) 6.3.3.2.1 6.3.4.3 6.4.5.1 c)	N/A
6	Radiation hazards	- ionizing radiation source; - low frequency electromagnetic radiation; - optical radiation ħinfrared, visible and ultravioletħ, including laser; - radio frequency electromagnetic radiation.	- burn; - damage to eyes and skin; - effects on reproductive capability; - mutation; - headache, insomnia, etc.	6.2.2.2 6.2.3 c) 6.3.3.2.1 6.3.4.5 6.4.5.1 c)	N/A
7	Material/substance hazards	- aerosol; - biological and microbiological viral or bacterial agent; - combustible; - dust; - explosive; - fibre; - flammable; - fluid; - fume; - gas; - mist; - oxidizer.	- breathing difficulties, suffocation; - cancer; - corrosion; - effects on reproductive capability; - explosion; - fire; - infection; - mutation; - poisoning; - sensitization.	6.2.2.2 6.2.3 b) 6.2.3 c) 6.2.4 a) 6.2.4 b) 6.3.1 6.3.3.2.1 6.3.4.4 6.4.5.1 c) 6.4.5.1 g)	No such hazards

8	Ergonomic hazards	- access; - design or location of indicators and visual displays units; - design, location or identification of control devices; - effort; - flicker, dazzling, shadow, stroboscopic effect; - local lighting; - mental overload/underload; - posture; - repetitive activity; - visibility.	- discomfort; - fatigue; - musculoskeletal disorder; - stress; - any other for example, mechanical, electrical as a consequence of a human error.	6.2.2.1 6.2.7 6.2.8 6.2.11.8 6.3.2.1 6.3.3.2.1	N/A
9	Hazards Associated with the environment in which the machine is used	- dust and fog; - electromagnetic disturbance; - lightning; - moisture; - pollution; - snow; - temperature; - water; - wind; - lack of oxygen.	- burn; - slight disease; - slipping, falling; - suffocation; - any other as a consequence of the effect caused by the sources of the hazards on the machine or parts of the machine.	6.2.6 6.2.11.11 6.3.2.1 6.4.5.1 b)	N/A
10	Combination of hazards	- for example, repetitive activity + effort + high environmental temperature	- for example, dehydration, loss of awareness, heat stroke	—	N/A

TABLE: Components

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity
Internal Wire	CHENG XING ELECTRONIC CO.,TLD	1015/1007	24AWG-16AWG	UL758	UL E249743
Battery charger	Shenzhen YongLeTong Electronic Technology Co Ltd	HZ-36	Input:110-240V~, 50/60Hz, 2.0A Output:DC42V, 2.0A	EN 60335-1 EN 60335-2-29	CE
Brushless Motor Controller	ShenZhen LENZOD Electronics Co.,Ltd	LENZOD	DC36V	ISO 13849	Test with applicant
Li-ion Battery	Huizhou Yitongshun Electronic Technology Co.,Ltd.	3613	36V 13Ah	IEC/EN 62133	Test Report: PTC250401 06911B- IE01
Motor	ChangZhou HangHong Electronics Co.,Ltd	HH	36V/250W	ISO 13849	Test with applicant
Enclosure	FORMOSA CHEM ICALS	PC+ABS	V-1, 130 °C	UL 94	UL E162823
1) An asterisk indicates a mark which assures the agreed level of surveillance					

-Appendix 1 Photos:

Photo 1



Photo 2



Photo 3



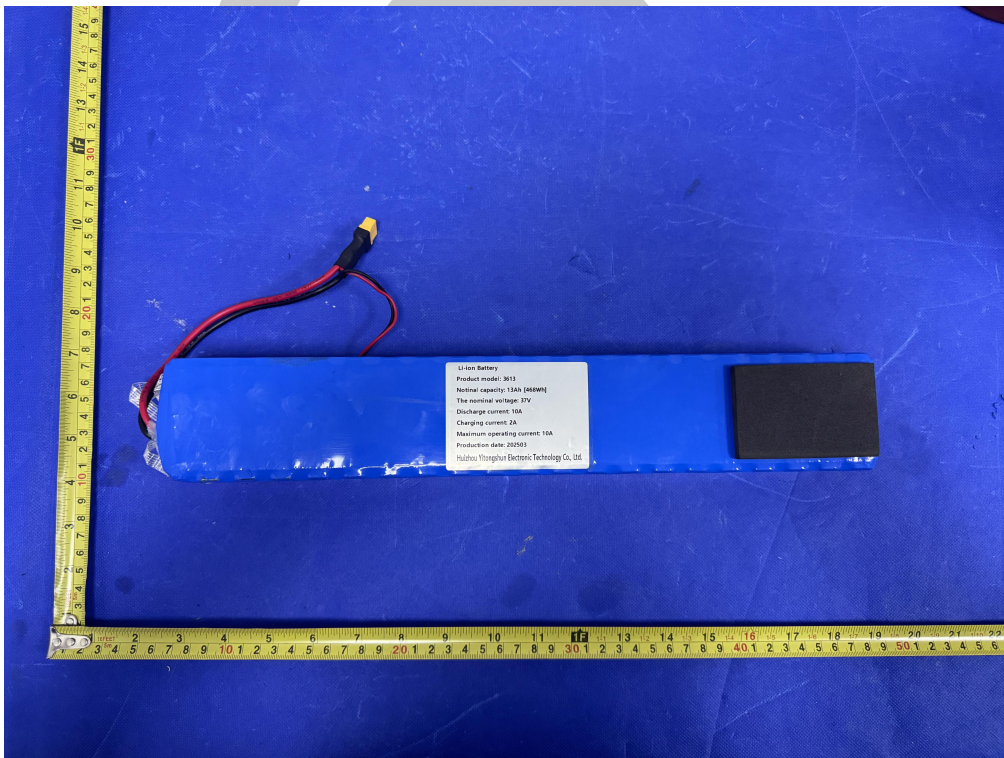
Photo 4



Photo 5



Photo 6



***** END OF REPORT *****