

TEST REPORT

Product name : Electric Bicycle

Trademark..... : EUY

Model No...... : K6F, K6T, K6S, K6

Applicant..... : FOSHAN ZHENGBU TECHNOLOGY CO.,LTD

Address of applicant : NO.9 ONE ROAD,XIQIAO INDUSTRIAL
ZONE,SHATOU,JIUJIANG TOWN,NANHAI DISTRICT,FOSHAN
CITY,CHINA

Date of test : 2023-11-10 to 2023-12-05

Data of issue..... : 2023-12-05

Test result:	Pass *
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* In the configuration tested, the EUT complied with the standards specified EN 15194:2017+A1:2023.

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TEST REPORT	
EN 15194	
Cycles - Electrically power assisted cycles - EPAC Bicycles	
Report Reference No.:	ATL202311281160S01
Tested by (name+signature).....:	Andy Huang 
Approved by (name+signature).....:	Xu Peng 
Date of issue.....:	Dec. 01, 2023
	
Testing Laboratory	Shenzhen ATL Testing Technology Co., Ltd.
Address.....:	Room 201, Building 1, Anxu Business Park, No. 35-1, Xiangyin Road, Nanlian Community, Longgang Street, Longgang District, Shenzhen
Applicant's name	FOSHAN ZHENGBU TECHNOLOGY CO.,LTD
Address.....:	NO.9 ONE ROAD,XIQIAO INDUSTRIAL ZONE,SHATOU,JIUJIANG TOWN,NANHAI DISTRICT,FOSHAN CITY,CHINA
Test specification:	
Standard	EN 15194:2017+A1:2023
Test procedure.....:	Test procedure
Non-standard test method.....:	N/A
Test Report Form No.:	IEC EN15194
Test Report Form(s) Originator	ATL
Master TRF	2021-06
Test item description.....:	Electric Bicycle
Brand Mark	EUY
Manufacturer.....:	FOSHAN ZHENGBU TECHNOLOGY CO.,LTD.
Address.....:	NO.9, ONE ROAD, XIQIAO INDUSTRIAL ZONE, SHATOU, JIUJIANG TOWN, NANHAI DISTRICT, FOSHAN CITY, CHINA
Model/Type reference.....:	K6F
Model difference.....:	Different appearance.
Ratings.....:	For charger: Input : AC 110-240V, 50Hz/60Hz, ≤130W Output: DC 54.6V, 2A

Test item particulars :
Possible test case verdicts : - test case does not apply to the test object..... : N/A - test object does meet the requirement..... : P (Pass) - test object does not meet the requirement : F (Fail)
Testing : Date of receipt of test item..... : Nov. 10, 2023 Date (s) of performance of tests : Nov. 10, 2023 to Dec. 01, 2023
General remarks: The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a comma (point) is used as the decimal separator.
Copy of marking plate: FOR LITHIUM BATTERY CHARGER: Electric Bicycle Model: K6F Input : AC 110-240V, 50Hz/60Hz, ≤130W Output: DC 54.6V, 2A   

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4	Safety requirements and/or protective measures		P
4.1	General		P
	EPAC shall be designed according to the principles of EN ISO 12100 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
4.2	Electrical requirements		P
4.2.1	Electric circuit 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 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 I and Annex J.	"On" "Off"	P
4.2.3	Batteries		P
4.2.3.1	Requirements a) The EPAC and batteries pack shall be designed in order to avoid risk of fire and mechanical deterioration resulting from abnormal use. Compliance is checked by the test described in 4.2.3.2. b) During the test the EPAC and the batteries shall not emit flames, molten metal or poisonous ignitable gas in hazardous amounts and any enclosure shall show no damage that could impair compliance with this European Standard. Safety and compatibility of the battery/charger combination shall be ensured, according to the manufacturer's specifications. c) The battery terminals shall be protected against creating an accidental short circuit d) An appropriate care shall be taken to ensure that the batteries are protected against overcharging. An appropriate overheating and short circuit protection device shall be fitted.	No emit flames, molten metal or poisonous ignitable gas	P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.2.3.2	Test method Compliance with 4.2.3.1 a) is verified by the following test: a) Battery terminals are short-circuited with the batteries in a fully charged condition. b) Motor terminals are short-circuited; all commands are in "ON" position, while the batteries are fully charged. c) The EPAC is operated with the electric motor or drive system blocked until the motor torque stops or the battery is fully discharged. d) The battery is charged for double the recommended charging period or for 24 h whichever is greater.		P
4.2.4	Battery charger Chargers for EPAC are considered to be operated in a residential (household) environment.		P
4.2.5	Electric cables and connections		P
4.2.5.1	General All connectors for cable and wire shall be selected to prevent corrosion of electrical contact conductance.	No corrosion	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
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.	No deterioration	P

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Clause	Requirement - Test	Result - Remark	Verdict
4.2.6	Wiring 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. 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. c) Wiring shall be effectively prevented from coming into contact with moving parts. Compliance with a), b), c) shall be checked by inspection. 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.	Smooth and free from sharp edges	P
4.2.7	Power cables and conduits 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
4.2.8	External and internal electrical connections Electrical connection shall comply with HD 60364-5-52:2011, 526.1 and 526.2.		P
4.2.9	Moisture resistance The electrical components of a fully assembled EFAC shall be tested and shall comply with IPX4 requirements according to EN 60529:1991.		N/A

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.2.10	Mechanical strength test 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: - Applying impacts to the battery pack mounted on the EPAC by means of the spring hammer as specified in EN 60068-2-75. 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 $(0,7 \pm 0,05) \text{ J}$ After the test the battery pack shall show no damage that could impair compliance with this European Standard; - Detachable batteries are submitted to free fall on a rigid surface as specified in EN 22248 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.	No damage	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. 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.	20km/h	P
4.2.11.2	Test method		P
4.2.11.2.1	Test conditions - 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. - The speed-measuring device used for the test shall have the following characteristics: 1) Accuracy: $\pm 2 \%$; 2) Resolution: 0,1 km/h. - The ambient temperature shall be between 5 °C and 35 °C. - Maximum wind speed: 3 m/s. - The battery shall be fully charged according to the manufacturer instructions.		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
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. The following example describes the cut-off speed test. a) Pre-condition the EPAC by running it for 5 min at 80 % of the maximum assistance speed as declared by the manufacturer. 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". c) While pedalling, ride steadily to reach a speed equal to 1, 25 times(if possible by design) the maximum assistance speed as declared by the manufacturer. 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. This mode shall be activated by the voluntary and maintained action of the user either when riding without pedalling or when the user is pushing the cycle.		P
4.2.12.2	Test method		P
4.2.12.2.1	Test conditions		P
	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. b) The speed-measuring device shall have the following characteristics: 1) accuracy: $\pm 2\%$; 2) resolution: 0,1 km/h. c) The ambient temperature shall be between 5 °C and 35 °C. d) Maximum wind speed: 3 m/s. e) The battery shall be fully charged according to the manufacturer's instructions.		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
	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. b) Activate the start-up assistance mode and verify that the speed increases up to 6 km/h maximum designed speed or lower value. 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. d) Activate the start-up assistance mode and maintain it for 1 min. e) Verify that speed is equal to or less than 6 km/h. 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; b) assistance shall be cut off when the cyclist stops pedalling forward and the cut-off distance shall not exceed 2 m; 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; d) the power output or assistance shall be progressively reduced (see Annex B) 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; e) the assistance shall be progressively and smoothly managed (e.g. no hunting); f) two independent applying actions shall be required to start the electrical assistance mode (e.g. power switch and forward pedalling activation); a traffic caused stop (e.g. traffic lights) is not subject to this requirement; 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 (pedalling is not considered as rider intervention).		P
4.2.13.2	Test method - Electric motor management		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
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; b) The test track shall be according to 4.2.13.2.2; c) The time-measuring device shall have an accuracy of $\pm 2\%$; d) The ambient temperature shall be between 5°C and 35°C; e) Maximum wind speed shall not exceed 3 m/s; f) The battery shall be fully charged according to the manufacturer's instructions; g) Speed measurement shall have an accuracy of $\pm 2\%$.		P
4.2.13.2.2	Test track		P
	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. 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. b) Check the cut off distance: 1) pedal so that the EPAC reach 90 % of the cut off speed; 2) stop pedalling without braking; 3) measure the cut off distance; 4) carry out the test three times; the result is the average of this measurement after rejection of invalid points. c) If braking device cut-off switches are fitted; actuate each brake device separately and verify the initiation of the cut off signal while pedalling.		P
4.2.14	Maximum power measurement — Measurement at the engine shaft The maximum continuous rated power shall be measured according to EN 60034-1 when the motor reaches its thermal equilibrium as specified by the manufacturer.		P
4.2.15	Electro Magnetic Compatibility		P
4.2.15.1	Emission The EPAC and ESA shall fulfil the requirements of Annex C.		P

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Clause	Requirement - Test	Result - Remark	Verdict
4.2.15.2	Immunity The EPAC and ESA shall fulfil the requirements of Annex C.		N/A
4.2.15.3	Battery charger 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.		N/A
4.2.16	Failure mode		P
4.2.16.1	Requirements It shall be possible to ride the EPAC by pedalling even if the assistance failed. This requirement shall be checked as described in 4.12.6.2		P
4.2.16.2.	Test method a) Remove or disconnect the battery pack, b) Ride the bicycle up to 10 km/h.	>10km/h	P
4.2.17	Anti-tampering measure		N/A
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.		N/A
4.2.17.2	Prevention of tampering of the motor The following anti-tampering requirements shall be taken into account: 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: 1) maximum speed with motor assistance (all systems), 2) parameters affecting the maximum vehicle speed limited by design, 3) maximum gear ratio (system with middle motors), 4) maximum motor power (all systems), 5) maximum speed of starting up assistance; 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; c) Closed set of components (i.e. operation only with released battery); d) Protection against opening of relevant components without traces (sealing).		N/A
4.3	Mechanical requirements		P
4.3.1	General		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
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 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 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
4.3.1.4	Accuracy tolerances of test conditions for brake tests and strength tests		P
4.3.1.5	Fatigue test The force for fatigue tests shall be applied and released progressively, not to exceed 10 Hz. The tightness of fasteners according to manufacturer [^] 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.	10 Hz, 1000 cycles	P
4.3.1.6	Fatigue test for composite components 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.	No composite components	N/A
4.3.1.7	Plastic material test ambient temperature 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.	25°C,2h	P
4.3.1.8	Crack detection methods 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 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.	No sharp edges	P
4.3.3	Security and strength of safety-related fasteners		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.3.1	Security of screws 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 seat- post 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 The minimum failure torque of bolted joints for the fastening of handle bars; handlebar-stems; bar- ends, 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 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.	Not Folding bicycles	N/A
4.3.4	Protrusions 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 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 used.	two independently actuated braking-systems	P
4.3.5.2	Hand-operated brakes		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.5.2.1	Brake-lever position 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	Brake-lever grip dimensions		P
4.3.5.2.2.1	Requirement 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
4.3.5.2.2.2	Test method for the brake-lever similar 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
4.3.5.3	Attachment of brake assembly and cable requirements Cable pinch-bolts shall not sever any of the cable strands when assembled to the manufacturer's instructions. In the event of a cable failing, no part of the brake mechanism shall inadvertently inhibit the rotation of the wheel.		P
4.3.5.4	Brake-levers - Position of applied force For the purposes of braking tests in this standard, for brake-levers similar to Type A: the test force shall be applied at a distance, b, which is equal to either dimension a as determined in 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 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

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.5.5.2	Test method Conduct the test on a fully-assembled bicycle with the brakes adjusted to a correct position with a rider or equivalent mass on the saddle. The combined mass of the bicycle and rider (or equivalent mass) shall be 120 kg.		P
4.3.5.6	Brake adjustment Each brake shall be equipped with an adjustment mechanism either manual or automatic. Each brake shall be capable of adjustment with or without the use of a tool to an efficient operating position until the friction material has worn to the point of requiring replacement as recommended in the manufacturer's instructions. Also, when correctly adjusted; the friction material shall not contact anything other than the intended braking surface.		P
4.3.5.7	Hand-operated braking-system - Strength test		P
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: a) a brake-lever into contact with the handlebar grip or the handlebar where the manufacturer does not fit a grip; b) brake extension-lever level with the surface of the handlebar or in contact with the handlebar; c) a secondary brake lever to the end of its travel.		P
4.3.5.8	Back-pedal braking system - Strength test	No Back-pedal braking system	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
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

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.5.8.3	Test method Conduct the test on a fully-assembled bicycle. After it has been ensured that the braking system is correctly adjusted, and with the pedal cranks in a horizontal position, as shown in Figure 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
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
4.3.5.9.3	Linearity requirements When tested by the methods described in 4.3.5.9.5.6 c) 1) and 2), the braking force $F_{Br\ average}$ shall be linearly proportional (within $\pm 20\%$) to the progressively increasing intended operating forces $F_{Op\ intend}$. The requirement applies to braking forces $F_{Br\ average}$ equal to and greater than 80 N (according to Annex F).		P
4.3.5.9.4	Ratio between wet and dry braking performance requirements 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
4.3.5.9.5	Test method		P
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
4.3.5.9.5.2	Symbols		P
4.3.5.9.5.3	Test machine		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
	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. 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. The specific requirements are as follows: a) the linear surface velocity of the tyre shall be 12,5 km/h and shall be controlled within $\pm 5\%$; b) a means of laterally restraining the wheel under test shall be provided which does not influence the measurement of braking force; 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 back-pedal 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 $\pm 2\%$; b) a device to record the braking force [see Figures 14 and 15, for example], accurate to within $\pm 5\%$ c) a device to record the operating force applied to the hand-lever or pedal, accurate to within $\pm 1\%$ 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; 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 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
4.3.5.9.5.6	Test method		P
4.3.5.10	Brakes - Heat-resistance test		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
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. 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
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
4.3.5.11	Back-pedal brake linearity test		N/A
	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
4.3.6	Steering		P
4.3.6.1	Handlebar – Dimensions 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

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
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 °C. Remove the handlebar from the freezer and allow the temperature of the handlebar to reach -5 °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 °C.		P
4.3.6.2.3	Hot water test method Immerse the handlebar, with handlebar grips fitted, in hot water of +60 CC ± 2 0C 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		P
4.3.6.5	Steering stability 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. 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

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
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 F₂ (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
4.3.6.6.2.1	General Conduct the test in two stages on the same assembly as follows.		P
4.3.6.6.2.2	Requirement for Stage 1 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
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 F₄ 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

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
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 The exact method of applying the torque will vary with the type of handlebar, and an example is shown in Figure 14.		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 T2 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		P
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.		P
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 Fs (Table 7) in accordance with the following: 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)); 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)); 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)).		P
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

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
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.		P
4.3.6.7.3	Test method for Stage 1		P
4.3.6.7.4	Test method for Stage 2		P
4.3.7	Frames		P
4.3.7.1	Suspension-frames - Special requirement 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.		P
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.S, there shall be no visible cracks or fractures of the frame. The permanent deformation measured between the axes of the wheel axles shall not exceed the following values: a) 30 mm where a fork is fitted; b) where a dummy fork is fitted in place of a fork, the values are given in Table 9.		P
4.3.7.2.2	General Manufacturers of frames are permitted to conduct the test with a dummy fork (see Annex E) fitted in place of a front fork. Where a frame is convertible for male and female riders by the removal of a bar, test it with the bar removed. 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.		P
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

EN 15194			
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. Where a frame is convertible for male and female riders by the removal of a bar, test it with the bar removed. 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: a) secure the fork at its extended length by an external locking method, or 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.		P
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 axes 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. 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 M_i 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 M_i, M_2, and M_3 (see Table 12) to the top of the steering head; the seat-post, and the bottom bracket respectively, as shown in Figure 20. 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 h_2 then allow the assembly to fall freely to impact on the anvil. Repeat the test and then measure the wheelbase again with the three masses in place and the roller resting on the anvil.		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
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. 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.		P
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.		P
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 F) of the same length and at least the same stiffness as the original fork.		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. 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 F) 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.		P
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.		P
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
4.3.7.6	Frame - Fatigue test with a vertical force		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.7.6.1	General Where a frame is convertible for male and female riders by the removal of a bar, remove the bar.		P
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.		P
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
4.3.8	Front fork		P
4.3.8.1	General 4.3.8.2, 4.3.8 A, 4.3.8.5 and 4.3.8.6 apply to all types of fork. In the strength tests; 4.3.8A, 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.		P
4.3.8.2	Means of location of the axle and wheel retention 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. 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		P
4.3.8.3.1	Tyre-clearance test		P
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.		P
4.3.8.3.1.2	Test method		P
	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): a) Inflate the tyre to its maximum pressure; b) Place the fork in uncompressed condition to have the highest displacement between suspension stanchion legs and suspension lower legs; c) If the suspension-fork can be locked, place the fork in the open position; d) If the fork has a spring adjust device, place it in the softest position; 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;	Not contact the crown of the fork	P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.8.3.2	Tensile test		P
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.		P
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.	No detachment or loosening	P
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
4.3.8.4.2	Test method Mount the fork according to Annex G 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.	Not exceed 10 mm.	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 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 wheel- axle or simulated axle in relation to the axis of the fork steerer; shall not exceed 45 mm.		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.8.5.1.2	Crown/steerer joint assembled by press-fitting, bonding, or damping 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
4.3.8.5.2	Forks which have composite parts 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.		P
4.3.8.5.3	Test method 1		P
4.3.8.5.4	Test method 2		P
4.3.8.5.5	Test method 3		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
4.3.8.6.2	Test method Mount the fork according to Annex G as shown in Figure 28.	Not exceed 45 mm	P
4.3.8.7	Forks intended for use with hub- or disc-brakes		P
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

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.8.7.2	Static brake-torque test 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.	no fractures or visible cracks	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 G 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 L2 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 L2 shall be equal to one half of the wheel diameter.		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
4.3.8.8	Tensile test for a non-welded fork		N/A
4.3.8.8.1	General		P
	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 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

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.9.2	Wheel/tyre assembly - Clearance 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_{j3} 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.	0.4	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. 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; 4.3.9A3 and 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.	No relative motion	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
4.3.9.5	Wheels - Quick-release devices - Operating features		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
	Any quick-release device shall have the following operating features: a) it shall be adjustable to allow setting for tightness; b) its form and marking shall clearly indicate whether the device is in the open or locked position; 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; d) the releasing force of the clamping device when closed shall not be less than 50 N; 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; f) the wheel retention with the quick-release device in the clamped position shall be in accordance with 4.3.9.4.2; 4.3.9A3; 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
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.		P
4.3.10.2	Tyre inflation pressure 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.	See marking	P
4.3.10.3	Tyre and rim compatibility Tyres that comply with the requirements of ISO 5775-1 and rims that comply with the requirements of ISO 5775-2 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 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).		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.10.5	Greenhouse effect test for composite wheels		P
4.3.10.5.1	General 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.		P
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: —no failure of any of the components of the wheel; —no tyre separation from the rim during the test; —no increase in rim width greater than 5 % of the initial maximal width value; —compliance of lateral and concentricity tolerance according to 4.3.9.1; —compliance of tyre and rim compatibility according to 4.3.10.3; —compliance of static strength according to 4.3.9.3.		P
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.		P
4.3.11	Front mudguard	No 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		N/A
4.3.11.2.1	Stage 1: Test method - Tangential obstruction		N/A
4.3.11.2.2	Stage 2: Test method – Radial force		N/A
4.3.11.3	Front mudguard without stays test methods		N/A
4.3.12	Pedals and pedal/crank drive system		P
4.3.12.1	Pedal tread		P
4.3.12.1.1	Tread surface The tread surface of a pedal shall be secured against movement within the pedal assembly.		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.12.1.2	Toe Clips Pedals intended to be used without toe-clips, or for optional use with toe-clips, shall have: a) tread surfaces on the top and bottom surfaces of the pedal; or b) a definite preferred position that automatically presents the tread surface to the rider's foot. Pedals designed to be used only with toe-clips or shoe-retention devices shall have toe-clips or shoe- retention devices securely attached and need not comply with the requirements of 4.3.12.1.2 a) and b).		P
4.3.12.2	Pedal clearance		P
4.3.12.2.1	Ground clearance 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 9° from the vertical before any part of the pedal touches the ground. The values are given in Table 26.		P
4.3.12.2.2	Toe clearance 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.	no fractures, visible cracks	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 FM 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	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.	no fractures	P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.12.4.2	Test method 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.	no fractures	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 M4 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
4.3.12.6	Drive-system - Static strength test		P
4.3.12.6.1	Requirement		P
	a) Drive-system with chain 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. b) Drive-system with belt 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.		P
4.3.12.6.2	Test method for drive-system with chain		P
4.3.12.6.2.1	General 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 With the left-hand crank in the forward position, apply a force, FJS, increasing gradually to 1 500 N vertically downwards to the centre of the left-hand pedal. Maintain this force for 1 min.		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.12.6.2.3	Multi-speed system a) Conduct the tests described in 4.3.12.6.2.2 with the transmission correctly adjusted in its highest gear; 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, F_1, adjusted to suit the particular gear ratio, thus: The maximum force, F_{15}, shall be a function of the lowest gear ratio, N_c/N_s, Where 1) F_{15} is the force applied to the pedal, expressed in newton (N), 2) N_c is the number of teeth on the smallest chain-wheel (front); 3) N_s is the number of teeth on the largest sprocket (rear). 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. a) If the drive-system is a single-speed system, conduct the tests as described in 4.3.12.6.2.2. b) If the drive-system is a multi-speed system, conduct the tests as described in 4.3.12.6.2.3.		P
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.	no fractures	P
4.3.12.7.2	Test method		P
4.3.13	Drive-chain and drive belt		P
4.3.13.1	Drive-chain 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
4.3.13.2	Drive belt	No Belt	N/A

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
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 b) a chain and drive belt protective device which conforms to 4.3.14.3; or 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.		P
4.3.14.2	Chain-wheel disc and drive pulley disc diameter 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).		P
4.3.14.3	Chain and drive belt protective device 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 chain- wheel 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)).		P
4.3.14.4	Combined front gear-change guide 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),		P
4.3.15	Saddles and seat-posts		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.15.1	Limiting dimensions 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 The seat-post shall be provided with one of the two following alternative means of ensuring a safe insertion-depth into the frame: 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); 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.		P
4.3.15.3.2	Saddles with adjustment-clamps 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 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.		P
4.3.15.3.4	Test method		P
4.3.15.4	Saddle - Static strength test		P

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
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.	no cracking or permanent distortion	P
4.3.15.4.2	Test method		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 seat-post or in the saddle, and no loosening of the clamp.	no fractures	P
4.3.15.5.3	Test method		P
4.3.15.6	Seat-post - Fatigue test		P
4.3.15.6.1	General 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
4.3.15.6.2	Requirement for stage 1		P
4.3.15.6.2.1	Seat-post without suspension system 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.		P
4.3.15.6.2.2	Seat-post with suspension system 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.		P
4.3.15.6.3	Test method for stage 1 (fatigue test) A seat post shall be inserted to the minimum insertion depth in a suitable fixture with a representative seat collar and damped to the manufacturers recommended torque. The seat post shall be fixed at an angle of 73° from horizontal, as shown in Figure 52.		P
4.3.15.6.4	Requirement for stage 2		P
4.3.15.6.4.1	Seat-post without suspension system 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

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.15.6.4.2	Seat-post with suspension system 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.		P
4.3.15.6.5	Test method for stage 2 (static strength test) 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
4.3.16	Spoke protector 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 If luggage carriers are fitted or provided they shall comply with EN ISO 11243.		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
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
4.3.19	Lighting systems and reflectors	No lighting	N/A
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.		N/A

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.19.2	Wiring harness 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.		N/A
4.3.19.3	Lighting systems 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.		N/A
4.3.19.4	Reflectors		N/A
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.		N/A
4.3.19.4.2	Rear reflectors Rear reflectors shall be red in colour.		N/A
4.3.19.4.3	Side reflectors The retro reflective device(s) shall be either 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 b) a continuous circle of reflective material applied to both sides of each wheel within 10 cm of the outer diameter of the tyre.		N/A
4.3.19.4.4	Front reflectors Front reflectors shall be white (clear) in colour.		N/A
4.3.19.4.5	Pedal reflectors 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.		N/A
4.3.20	Warning device 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.	No bell	N/A
4.3.21	Thermal hazards A warning shall be placed on the surface if the temperature of the hot accessible surface could be above 60 °C (see EN ISO 7010:2012, symbol W017). Brake systems are excluded from this requirement.	not exceeding 60 °C	N/A

EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
4.3.22	Performance levels (PLRs) for control system of EPACs The safety related parts of the control systems of the EPAC shall comply with the required performance level (PLr) given in Table 34 in accordance with EN ISO 13849-1. Should risk assessment indicate that additional or different PLr are required for a particular application, these should be determined in accordance with EN ISO 13849 (all parts). Such PLr will be outside the scope of this standard.		P
4.4	List of significant hazards The following significant hazards have been considered in this standard: a) Mechanical hazards: high deceleration, high acceleration, Protrusion, instability; kinetic energy; rotating elements and moving elements, rough, slippery surface, sharp edges; b) Electrical hazards: electromagnetic phenomena; electrostatic phenomena; overload; short-circuit; thermal radiation; c) Thermal hazards: explosion; flame; radiation from heat sources; d) Ergonomic hazards: effort; lighting; posture; e) Hazards associated with the environment in which the machine is used: water (rain and projection); f) Combination of hazards: braking under wet and dry condition, handgrips, motor management system, engine power management; installed braking power.	See user manual	P

5	Marking, labelling		P
5.1	Requirement		P
	In addition to the requirements of EN 14764, the EPAC shall be visibly and durably marked according to EN15194 as follows: -- EPAC According to EN 15194 -- XX km/h1) -- XX W2)		P

6	Instruction for use		P
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EN 15194			
Clause	Requirement - Test	Result - Remark	Verdict
	In addition to the instructions required by the bicycles standard EN 14764, each EPAC shall be provided with a set of instructions containing information on: 1) concept and description of electric assistance; 2) recommendation for washing; 3) control and tell tales; 4) specific EPAC recommendations for use; 5) specific EPAC warnings; 6) recommendations about battery charging and charger use as well as the importance of following the instruction contained on the label of the battery charger		

Appendix 1
Photo documentation



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8



Fig. 9



Fig.10



Fig. 11



Fig.12

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