Safety and quality: why certifying your electric bicycle

Customers are becoming more demanding and attentive to road safety issues, and look for bikes which are reliable and robust, in a nutshell: safe. The German certification agency TÜV Rheinland, with offices in Italy, boasts a highly skilled team at its laboratories in Pogliano Milanese (near Milan) and Ponte San Marco (near Brescia) that is able to support producers, importers and retailers wishing to make a voluntary certification, in order to ensure their customers safer bicycles, accessories and protective equipment.

The tests aim at meeting the requirements set by the regulations in force. Ernesto Collino (Technical Supervisor, Mechanical and Machinery Services at TÜV Rheinland Italia) explained us how tests on bicycles are performed.

Not all bikes are alike: assisted pedaling

Let’s start by saying that there are different types of bicycles, and each of them refers to a very specific regulation:

1. Trekking or City Bikes;
2. Boy Bikes;

Why making the TÜV certification?

TÜV Rheinland offers its customers greater visibility through its TUVdotCOM platform: the online search engine - www.tuvdotcom.com - contains all the certificates issued by the group; an ID number is assigned to the company: through the ID it is possible to know validity and veracity attestation of the issued certificate. The platform may become a great marketing tool for entrepreneurs who may benefit from it by spreading the issued certifications. Finally, through the TUV Akademie, TÜV Rheinland organizes courses and seminars for producers, importers and retailers. On the website www.tuv.com, it is possible to find the constantly updated schedule with the dates of the courses, the discussed topics and their costs.

The internationally recognized product tests by TÜV Rheinland allow to:

1. Actively contribute in the prevention of accidents
2. Give customers a valuable guide for their purchasing decisions, thanks to a recognized certification mark
3. Use the certification mark as an advertisement medium
4. Increase confidence in the product quality and safety
5. Testify compliance with law requirements thanks to certification
Electric Bikes (EPAC or pedal assisted cycles). TÜV Rheinland offers both the opportunity to run comprehensive tests in order to obtain the GS, TÜV Type Approved mark or a certificate of conformity, and the opportunity to run partial or complete tests on some bicycle components - such as saddle, frame and fork - in order to obtain the certification of conformity for the components themselves. We will discuss in particular the electric bicycles, subjected to both mechanical tests, like the other types of bicycles, and electrical tests. Electric pedal assisted cycles are treated or derive from trekking bicycle frames even though the market is also moving towards Mountain Bikes (MTB). EPACs are different from the other bicycles since a motor is installed, together with a battery and an electronic card. It is called “pedal assisted” since the electronic card manages current to be sent to the engine only while pedaling. The EN 15194 standard analyzes the security aspects of electric bicycles and identifies the electromagnetic compatibility requirements. In particular, the evaluation of the electric components examines the good quality of the components and assembly through specific tests for water resistance; the absence of electrical shocks during the use and/or charging of battery; the electromagnetic field that must not interfere with the surrounding environment. Moreover, the electromagnetic compatibility and radiated emissions are also assessed: the engine is run at full power in order to check the following parameters:

1. Radiated emissions (antenna effect)
2. Radiated immunity (shielding of the electrical part), not to be influenced by the surrounding environment
3. Test during battery charging
4. Conducted emissions (problems with the electric circuits which may interfere with the power supply)
5. Conducted immunity (the opposite of the above-mentioned)

Controlled braking

One aspect not to be neglected when riding a bike, of whatever type it is, is braking (see table). TÜV Rheinland performs tests in order to check its immediateness and reaction by reproducing different conditions: simulations are performed with the use of 70 kg weights mounted on the bike to check its dynamic resistance. Tests on braking performances are carried out under two operating conditions: dry and wet. In addition, tests are performed on the heat resistance of the braking system and linearity (i.e., if there is a correct balance during braking). Dynamic tests are performed to check the integrity of frame, fork and materials along with product quality during use. Tests consist of a series of loads cyclically applied to the component in order to assess the reaction of the materials, since the standard allows possibility of deformations which don’t compromise the safety of the bicycle; failures or fractures in its joints or components are not allowed. The tests performed by TÜV Rheinland last about two weeks.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Speed km/h</th>
<th>Brakes</th>
<th>Braking distance (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry</td>
<td>25</td>
<td>Both</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Only rear</td>
<td>15</td>
</tr>
<tr>
<td>Wet</td>
<td>16</td>
<td>Both</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Only rear</td>
<td>10</td>
</tr>
</tbody>
</table>