

## Affordable Avial Commuter e-Bike with a non-welding frame



Today, along with the growing popularity of environmentally friendly and easy-to-use electric vehicles, there is a growing interest among consumers in the multi-purpose Commuter e-Bikes class. This type of bicycle can be used both on city streets and on country trips, and over fairly long distances. As a result, the design of such e-bikes must have sufficient strength without increasing weight, provide ride comfort and be equipped with a large-capacity battery.

Along with the 6061-aluminum alloy, which has already become classic for bicycle frames manufacture, there are much stronger aviation alloys 2024 and 7075, which are used in the manufacture of aircraft fuselages and wings. These alloys have the best Fatigue Strength figures, which allows aircraft components to withstand significant dynamic and vibration loads. But these alloys have one characteristic – it is difficult to bend and weld them. The affordable

Avial Commuter e-Bike frame, developed by the Avial Bikes start-up team, is made from these aviation alloys and the Hybrid glue-rivet technology is used to connect the components, just like in the aviation industry.

Hybrid glue-rivet technology is a sustainable technology that protects both the environment and workers. Compared to welding, there are no high requirements for the preparation of the surfaces of the workpiece, there is no light radiation, vapors and sparks, no thermal stresses arise at the junction point, there is no need to re-heat the frame after welding to restore the strength properties of the aluminum alloy to the T6 state, and workers in production do not need any special skills. At the same time, the joint obtained with the help of Hybrid glue-rivet technology is not less strong than the welded one, and during long-term operation, it is always possible to visually control its quality.

The latest version of the affordable Avial Commuter e-Bike frame weighs up to 3 kg and is designed for cyclists up to 120 kg (260 lbs.). An important difference of the patent-pending frame developed by the Avial Bikes team is that when using modern aircraft alloys 6061 and 7075, and the Hybrid glue-rivet technology, the spatial structure of the frame is not only light and strong, but also quite elastic, commensurate with analogs made of steel. As a result, such a frame effectively dampens small vibrations that occur when driving on dirt roads and provides greater ride comfort.

The basic configuration of the new version affordable Avial Commuter e-Bike is equipped with a 250W Rear Hub Motor with a built-in controller and a 14Ah (504Wh) battery based on 18650 cells with a 3500mAh capacity. The use of such cells allows you to make the battery as light and compact as possible, and to equip the bike frame with a universal mount, which makes it possible to equip the bike with batteries with a capacity of 14, 17.5, 21 and even 24.5Ah (1176Wh). This will allow each owner to select the battery model that provides the required range. And for those who would like to get more dynamics and driving speed, you can choose the 350, 500, 750 or 1000W drive when placing an order. As a result, the average travel distance on a single charge will be 60–120 km (35–75 miles), depending on the selected battery capacity and rear-wheel drive power.

Currently, our previous Avial Mid Drive e-Bike working prototype, which patent-pending frame is also manufactured using Hybrid glue-rivet technology, has successfully passed more than half of the 5000 km planned road tests. The new version affordable Commuter e-Bike still exists only in the form of a 3D model, which has passed CAD simulation in the engineering center with which we cooperate. After the removal of the COVID-19 restrictions, we plan to make a working model for testing in various road conditions and, then, after all the modifications, we will create a pre-production sample to obtain ISO and EN certification and start production.

*Best regards from Avial Bikes Team,  
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