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GB 42590-2023

Safety requirements for civil unmanned aircraft system

民用无人驾驶航空器系统安全要求

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1 Scope

GB 42590-2023 is the Chinese national standard on safety requirements for civil unmanned

aircraft system, in the field of aircraft and space vehicle engineering. It carries no /T suffix, which in the Chinese system means compliance is mandatory: a product or a practice within its scope has to meet it to be lawfully made, sold or carried out in China. It was issued on 23 May 2023 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 June 2024. Classification: ICS 49.020, CCS V35. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document specifies the safety requirements for civil unmanned aircraft products (hereinafter referred to as "unmanned aircraft"); describes the corresponding test methods. This document applies to the development, production, delivery, operation of micro, light, small unmanned aircraft, excluding model aircraft.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies to this document; for undated references, the latest edition (including any amendments) applies to this document.

GB/T 3222.2-2022 Acoustics - Description, measurement and assessment of environmental noise - Part

3 Terms, definitions, abbreviations

3.1 Terms and definitions For the purposes of this document, the terms and definitions given in GB/T 35018-2018 and GB/T 38152-2019, as well as the following, apply.

3.1.1 Unmanned aircraft; UA An aircraft without an onboard pilot that possesses its own power system.

Note. Classified into micro, light, small, medium, large aircrafts.

3.1.2 Micro unmanned aircraft An unmanned aircraft, which has an empty weight of less than

0.25 kg, a maximum true flight altitude not exceeding 50 m, a maximum level flight speed not exceeding 40 km/h, whose radio transmission equipment complies with the technical requirements for micro-power, short-range devices, allowing for manual intervention and control at any time throughout the entire flight.

3.1.3 Light unmanned aircraft An unmanned aircraft, which has an empty weight not exceeding 4 kg, a maximum takeoff weight not exceeding 7 kg, a maximum level flight speed not exceeding 100 km/h; possesses airspace-keeping capabilities and reliable surveillance capabilities that comply with airspace management requirements, allowing for

manual intervention and control at any time throughout the entire flight.

Note. Excludes micro unmanned aircraft.

3.1.4 Small unmanned aircraft An unmanned aircraft, which has an empty weight not exceeding 15 kg and a maximum takeoff weight not exceeding 25 kg, possesses airspace-keeping capabilities and reliable surveillance capabilities that comply with airspace management requirements, allowing for manual intervention and control at any time throughout the entire flight.

Note. Excludes micro and light unmanned aircraft.

3.1.5 Electronic fence A function whereby an unmanned aircraft, based on its position information and geographic boundary data, detects when it is approaching, entering, or located within a specific geographic area, subsequently issues a notification or warning to the unmanned aircraft operator, or automatically executes a pre-programmed flight plan.

3.2 Abbreviations The following abbreviations apply to this document. EIRP. Effective Isotropic Radiated Power ID. Identity RMS. Root Mean Square UTC. Coordinated Universal Time

4 Safety requirements

4.1 Electronic fence Light and small unmanned aircraft shall, upon detecting a potential or actual conflict with a specific geographic area, provide a notification or warning to the unmanned aircraft operator, or automatically execute a pre-programmed flight plan. Such flight plans may consist of one or more selected actions, including preventing takeoff, restricting flight altitude, hovering, landing, or returning to base.

4.2 Remote identification When conducting flight operations, light and small unmanned aircraft shall actively transmit their identification information to an integrated regulatory service platform via a network connection. During flight, unmanned aircraft shall automatically broadcast their identification information via a Wireless Local Area Network (Wi-Fi) or Bluetooth. Remote identification for unmanned aircraft shall comply with the provisions set forth in Appendix A.

4.3 Emergency procedures When light and small unmanned aircrafts (UAS) encounter sudden contingencies during flight, such as data link interruption or loss, or insufficient battery/fuel levels, they shall possess one or more response capabilities, including hovering/loitering, returning to base, landing, or parachute deployment. In the event of navigation failure, the system shall provide a notification or warning to the UAS operator, via the control software or through other methods specified in the product manual.

4.4 Structural strength The structural strength of the unmanned aircraft shall meet the following requirements.

a) It shall possess sufficient strength and rigidity under various specified load conditions, ensuring that the aircraft structure does not undergo harmful deformation;

b) When subjected to a load equivalent to

1.33 times its maximum takeoff weight, the primary load-bearing structures of the aircraft shall not fail.

4.5 Airframe structure

4.5.1 Sharp edges The airframe and component structures of the unmanned aircraft shall not feature sharp edges, that could cause injury to users during normal operation or maintenance.

4.5.2 Propeller blades For micro and light unmanned aircraft that lacks propeller guard devices, the propeller blade design shall be optimized to minimize the risk of laceration to personnel. The propeller blades shall not be constructed from metal materials and shall satisfy any one of the following requirements.

a) Asymmetrical blades, where the leading-edge radius of the blade tip (R1) is greater than 1 mm, as shown in Figure 1a);

b) Rounded blade tips, where the tip radius (R2) is greater than 1 mm, as shown in Figure 1b);