



Drone Safety Lab – Impact Safety Testing

Drone impact safety test according to FAA (14 CFR Part 107) and ASTM F3389-21, Method-D

BACKGROUND: Operating commercial drones or small UAS (Unmanned Aircraft System) under FAA jurisdiction not only requires a pilot certificate but also compliance with the requirements outlined in Part 107 of the Code of Federal Regulation Title 14 (14 CFR Part 107). The regulation covers a wide range of conditions, including Operations Over People (OOP) as stipulated in Part 107 which was introduced to allow for expanded operation of small UAS without applying for a waiver (a lengthy and costly process with additional operating limitations). After consulting with industry and operators, the FAA set out requirements for sUAS Operations Over People and published these in the regulation which was discussed in our previous Part 2 “Controls and Regulations to Reduce Injuries (FAA)”. It was noted that there are separate impact requirements for each of the four categories of sUA corresponding to differences in weight, impact performance, operating limits, and airworthiness.

SAFETY COMPLIANCE: Subpart D of Part 107 is specifically intended to address impact safety of sUA Operations Over People (OOP), but only for Category 2 and Category 3 sUA. Compliance to Subpart D must be demonstrated by the operator of the sUA by submitting a Declaration of Compliance (DoC) to the FAA which contains, among other things, demonstration that the impact requirements of Category 2 or Category 3 were met. The impact testing must be performed by a third party using a test method (the FAA calls this a Means of Compliance, MoC) that has been approved by the FAA. Furthermore, the DoC must demonstrate that there are no safety defects and that product support and notification services are provided. Once accepted by the FAA, the sUA details are registered in a public database and operators must display their approval by affixing a label to their aircraft.

TEST METHOD: The MoC is a document that addresses the test setup, methodology, data collection and analysis, reporting, calibration and uncertainty involved in carrying out the tests. The test report provides an assessment as to whether the sUA complies with Category 2 or Category 3 and the results are included in the DoC package as justification. A MoC was developed by Biokinetics and is under review by the FAA who, upon acceptance, publishes a notice in the Federal Register that allows operators to use the lab in their DoC submission. Since the FAA does not provide a specific test method for the MoC, it recognizes industry based test methods, such as the ASTM F3389-21 “Standard Test Method for Assessing the Safety of Small Unmanned Aircraft Impacts”, which Biokinetics’ Drone Safety Lab (DSL) has implemented. An innovative horizontal, computer-controlled drone accelerator sled was developed to exceed these exacting requirements ensuring repeatable sUA impacts in any impact configuration with minimal damage from secondary impacts, see below photo. Biokinetics has also received industries’ first ISO 17025 accreditation which embeds quality management into the testing processes to help ensure confidence in the results within and across all test series.



SUMMARY: To allow sUA operations over people, operators are responsible for submitting a DoC to the FAA which includes safety impact test results obtained from an FAA approved laboratory and MoC, as provided by Biokinetics' Drone Safety Lab. By demonstrating compliance with Category 2 or Category 3 requirements of Part 107-Subpart D, manufacturers, aftermarket suppliers and operators can be qualified to operate their drones/sUA over people and moving vehicles without the need for waivers. Biokinetics has leveraged its decades of expertise in injury biomechanics and crash testing to develop a rigorous MoC with a focus on repeatability, traceability and confidence of the impact response measurements. Let Biokinetics' Drone Safety Lab assist you with your compliance, research and engineering evaluation needs to either industry standards or custom programs.

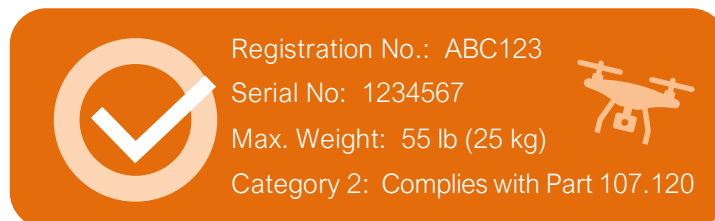


Figure 1: Sample certification label to be affixed to the drone.