

Standard Terminology for Light Sport Aircraft¹

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1. Scope

1.1 This terminology standard covers definitions of terms and concepts related to light sport aircraft. It is intended to ensure the consistent use of terminology throughout all F37 documents.

2. Referenced Documents

2.1 ASTM Standards:²

F2241 Specification for Continued Airworthiness System for Powered Parachute Aircraft

F2242 Specification for Production Acceptance Testing System for Powered Parachute Aircraft

F2243 Specification for Required Product Information to be Provided with Powered Parachute Aircraft

F2244 Specification for Design and Performance Requirements for Powered Parachute Aircraft

F2245 Specification for Design and Performance of a Light Sport Airplane

F2279 Practice for Quality Assurance in the Manufacture of Fixed Wing Light Sport Aircraft

F2295 Practice for Continued Operational Safety Monitoring of a Light Sport Aircraft

F2316 Specification for Airframe Emergency Parachutes

F2317/F2317M Specification for Design of Weight-Shift-Control Aircraft

F2352 Specification for Design and Performance of Light Sport Gyroplane Aircraft

F2354 Specification for Continued Airworthiness System for Lighter-Than-Air Light Sport Aircraft

F2355 Specification for Design and Performance Requirements for Lighter-Than-Air Light Sport Aircraft

F2356 Specification for Production Acceptance Testing System for Lighter-Than-Air Light Sport Aircraft

F2415 Practice for Continued Airworthiness System for

F2425 Specification for Continued Airworthiness System for Weight-Shift-Control Aircraft

F2426 Guide on Wing Interface Documentation for Powered Parachute Aircraft

F2427 Specification for Required Product Information to be Provided with Lighter-Than-Air Light Sport Aircraft

F2449 Specification for Manufacturer Quality Assurance Program for Light Sport Gyroplane Aircraft

F2457 Specification for Required Product Information to be Provided withWeight-Shift-Control Aircraft

F2483 Practice for Maintenance and the Development of Maintenance Manuals for Light Sport Aircraft

F2506 Specification for Design and Testing of Fixed-Pitch or Ground Adjustable Light Sport Aircraft Propellers

F2507 Specification for Recreational Airpark Design

F2563 Practice for Kit Assembly Instructions of Aircraft Intended Primarily for Recreation

F2564 Specification for Design and Performance of a Light Sport Glider

3. Terminology

aircraft make—name assigned to the aircraft by the aircraft manufacturer when each aircraft was produced.

aircraft model—aircraft manufacturer's designation for an aircraft grouping with similar design or style of structure.

airport elevation—highest point on an airport's usable runway.
F2507

airship—engine-driven lighter-than-air aircraft that can be steered. F2354, F2356, F2427

airship—engine-driven lighter-than-air aircraft that can be steered, and that sustains flight through the use of either gas buoyancy or an airborne heater, or both.F2355

annual condition inspection—detailed inspection accomplished once a year on a LSA in accordance with instructions provided in the maintenance manual supplied with the aircraft. The purpose of the inspection is to look for any wear, corrosion, or damage that would cause an aircraft to not be in a condition for safe operation.

F2483

AOI—aircraft operating instructions F2279, F2317/F2317M, F2352, F2425, F2427, F2449, F2457, F2564

Light Sport Gyroplane Aircraft

¹ This terminology is under the jurisdiction of ASTM Committee F37 on Light Sport Aircraft and is the direct responsibility of Subcommittee F37.91 on Terminology.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

A&P—airframe and powerplant mechanic as defined by 14 design maximum aircraft weight, n— aircraft design maxi-CFR Part 65 in the U.S. or equivalent certification in other mum weight W_{MAX} shall be the sum of W_{WING} + W_{SUSP} . F2317/F2317M countries. F2483 **AR**—aspect ratio = b^2/S F2245, F2564 design maximum trike carriage weight, n—design maximum trike carriage weight, W_{susp} , shall be established so that it is: **armed or arming,** v—the next action activates the system. (1) highest trike carriage weight at which compliance with Discussion—Armed or arming is not simply removing a safety pin. each applicable structural loading condition and each appli-F2316 cable flight requirement is shown, and (2) not less than the empty trike carriage weight, W_{tkmt} , plus a weight of occu-**ASTM**—American Society for Testing and Materials **F2352** pant(s) of 86.0 kg (189.6 lb) for a single-seat aircraft or 150 F2245 **b**—wing span (ft) kg (330.8 lb) for a two-seat aircraft, plus the lesser of full usable fuel or fuel weight equal to 1-h burn at economical b-wing span (m) F2564 cruise at maximum gross weight. F2317/F2317M **balloon**—lighter-than-air aircraft that is not engine-driven, and that sustains flight through the use of either gas buoyancy or design useful load—load (other than structure, engine, an airborne heater, or both. F2354, F2355, F2356, F2427 enclosure, and systems) that a lighter-than-air aircraft can carry while achieving the design defining performance F2245 **BHP**—brake horse power requirements. F2355 **blade**, *n*—the aerodynamic portion of a propeller which is F-Fahrenheit F2317/F2317M rotated through and acts on the air. **FAA**—United States Federal Aviation Administration. **F2483 blade root**, *n*—the portion of the blade that interfaces with the hub and provides retention. F2506 factor of safety, n-multiplier of limit load to determine design ultimate load. c-chord (ft) F2245 **fire proof**, *adj*—capable of withstanding for a period of at least F2564 c-chord (m) 15 min the application of heat by the standard flame. **F2352 C**—Celsius F2317/F2317M **fire resistant,** adj—capable of withstanding for a period of at F2425, F2563 least 5 min of heat by standard flame. **CAA**—Civil Aviation Authority **CAGE**—commercial and government entity F2563 **fixed pitch propeller,** n—a propeller with no capacity for pitch setting adjustment. F2506 **CAS**—calibrated airspeed F2317/F2317M, F2352 flaps—any movable high lift device. F2245, F2564 **CAS**—calibrated airspeed (fps, kts, mph) F2245 **FPM**—feet per minute F2245 **CAS**—calibrated airspeed (m/s, kts) F2564 FTS—flight training supplement F2457 C_D—drag coefficient of the aircraft F2245, F2564 **g**—acceleration as a result of gravity = 32.2 ft/s^2 F2245 F2245, F2352, F2564 **CG**—center of gravity **g**—acceleration as a result of gravity = 9.81 m/s^2 F2564 civil aviation authority (CAA)—government which has regulatory oversight for aircraft operations/safety in the country gross weight, n—total aircraft system weight at takeoff. This which the airport is located; for example, United States \rightarrow weight includes anything and everything that is on or a part Federal Aviation Administration. F2507 of the powered parachute aircraft, including, but not limited to, the wing, risers, fuselage, seats, engine, instruments, C_L—lift coefficient of the aircraft F2245, F2564 wheels, fuel, oil, water, pilot, passenger, clothing, and so C_m —moment coefficient (C_m is with respect to c/4 point, forth. F2245, F2564 positive nose up) gross weight—total aircraft system weight(s) at takeoff. The F2317/F2317M weight limits must be established so that it is: (1) the **cm**—centimetre designed maximum weight at which compliance with each C_{MO} —zero lift moment coefficient F2245, F2564 applicable structural loading condition is demonstrated, or C_n—normal coefficient F2245, F2564 (2) the highest weight at which compliance at each applicable flight requirement is demonstrated. F2352 CN—normal force coefficient ground adjustable propeller, n—a propeller whose pitch consumer—any person who follows the instructions covered setting is adjustable only when the aircraft is on the ground by this practice to assemble the kit. F2563 and the propeller is not rotating. F2506 F2317/F2317M daN-deca Newton heavy maintenance—any maintenance, inspection, repair, or design and performance specification—used herein to refer alteration a manufacturer has designated that requires spe-

cialized training, equipment, or facilities.

F2483

F2279

to Specifications F2245 and F2564.

Hg—mercury F2317/F2317M **hub,** n—any device that retains the blades of a propeller assembly. **IAS**—indicated air speed F2317/F2317M, F2352 **IAS**—indicated air speed (fps, kts, mph) F2245 **IAS**—indicated air speed (m/s, kts) F2564 ICAO—International Aviation Organization F2245, F2352. F2564 in.—inch F2317/F2317M ISA—international standard atmosphere F2317/F2317M **KAI**—kit assembly instructions F2563 kg—kilogram F2317/F2317M kt(s)—nautical mile per hour (knot) (1 nautical mph = (1852/ 3600) m/s) F2317/F2317M

lighter-than-air aircraft—aircraft that can rise and remain suspended by using contained gas weighing less than the air that is displaced by the gas.

lb—pound (1 lb = 0.4539 kg)

Discussion—Airships may include dynamic lift that derive as much as 30 % lift from other than buoyancy. **F2354**, **F2355**, **F2356**, **F2427**

light sport gyroplane, *n*—powered rotorcraft designed in accordance with Specification F2352. F2415

limit load, *n*—maximum expected static load on a component.

line maintenance—any repair, maintenance, scheduled checks, servicing, inspections, or alterations not considered heavy maintenance that is approved by the manufacturer and is specified in the manufacturer's maintenance manual.

F2483

F2317/F2317M

LSA—light sport aircraft F2245, F2352, F2564

LSA (**light sport aircraft**)—used herein to refer to both LSA airplanes and LSA gliders. **F2295**

LSA (light sport aircraft)—used herein to refer to both LSA airplanes and LSA gliders, including kits. F2279

LSA (light sport aircraft)—aircraft designed in accordance with ASTM standards under the jurisdiction of Committee F37 Light Sport Aircraft, for example, Specification F2244 for powered parachutes, Specification F2245 for airplanes, and Specification F2352 for gyroplanes.

F2483

LSA airplane (light sport aircraft airplane)—powered aircraft designed in accordance with Specification F2245 that is manufactured and delivered ready to fly. F2279, F2295

LSA glider (light sport aircraft glider)— aircraft designed in accordance with Specification F2564 that is manufactured and delivered ready to fly.

F2279, F2295

LSA kit (light sport aircraft kit)—aircraft designed in accordance with Specifications F2245 or F2564 that is manufactured and delivered as a kit. F2279

LSA repairman inspection—U.S. FAA-certificated repairman (light sport aircraft) with an inspection rating as defined by 14 CFR Part 65, authorized to perform the annual condition inspection on experimental light sport aircraft, or an equivalent rating issued by other civil aviation authorities.

Discussion—Experimental LSA do not require the individual performing maintenance to hold any FAA airman certificate in the U.S.

F2483

LSA repairman maintenance—U.S. FAA-certificated repairman (light sport aircraft) with a maintenance rating as defined by 14 CFR Part 65, authorized to perform line maintenance on aircraft certificated as special LSA aircraft. Authorized to perform the annual condition/100-h inspection on an LSA, or an equivalent rating issued by other civil aviation authorities.

LSG (**light sport gyroplane**)—used in this specification to refer to both light sport gyroplanes and gyroplane kits.

F2449

LSGA (**light sport gyroplane aircraft**)— rotary-wing aircraft designed in accordance with Specification F2352 that is manufactured and delivered ready to fly. F2449

LSG kit (light sport gyroplane kit)—complete or gyroplane or gyroplane accessory designed in accordance with Specification F2352 that is manufactured and delivered as a kit.

F2449

m—metre **F2317/F2317M**

MAC—mean aerodynamic chord

F2245

maintenance manual(s)—manual provided by an LSA manufacturer or supplier that specifies all maintenance, repairs, and alterations authorized by the manufacturer. F2483

major repair, alteration, or maintenance— any repair, alteration, or maintenance for which instructions to complete the task excluded from the maintenance manual(s) supplied to the consumer are considered major.

F2483

manufacturer—any entity engaged in the production of a LSA. F2279, F2295

manufacturer—any entity engaged in the production of an LSA or component used on an LSA. F2483

manufacturer—any entity engaged in the production of a LSG. F2449

manufacturer—any entity engaged in the production of a light sport gyroplane aircraft or light sport gyroplane aircraft kit.

maximum empty weight, W_E (kg)—largest empty weight of the glider, including all operational equipment that is installed in the glider: weight of the airframe, powerplant, required equipment, optional and specific equipment, fixed ballast, full engine coolant and oil, hydraulic fluid, and the



unusable fuel. Hence, the maximum empty weight equals maximum takeoff weight minus minimum useful load: $W_E = W - W_U$.

maximum empty weight, W_E (lb)—largest empty weight of the airplane, including all operational equipment that is installed in the airplane: weight of the airframe, powerplant, required equipment, optional and specific equipment, fixed ballast, full engine coolant and oil, hydraulic fluid, and the unusable fuel. Hence, the maximum empty weight equals maximum takeoff weight minus minimum useful load: $W_E = W - W_U$.

maximum takeoff weight—gross weight limit as defined by the manufacturer, proven through compliance with this specification and placarded on the aircraft as the not-to-exceed gross weight.

F2244, F2355

mb—millibars F2317/F2317M

MGW—maximum gross weight F2352

minimum useful load, W_U (kg)—where $W_U = W - W_E$.

minimum useful load, W_U (lb)—where $W_U = W - W_E$.

minor repair, alteration, or maintenance— any repair, alteration, or maintenance for which instructions provided for in the maintenance manual(s) supplied to the consumer of the product are considered minor.

F2483

MIP—maintenance and inspection procedures F2457

MPRS—minimum power required airspeed F2352

MRB—Materials Review Board F2449

n—load factor F2245, F2564

N—Newton F2317/F2317M

n₁—airplane positive maneuvering limit load factor **F2245**

 $\mathbf{n_1}$ —glider positive maneuvering limit load factor at V_A **F2564**

n₂—airplane negative maneuvering limit load factor F2245

 n_2 —glider positive maneuvering limit load factor at V_D F2564

n₃—load factor on wheels F2245

 $\mathbf{n_3}$ —glider negative maneuvering limit load factor at V_A **F2564**

 $\mathbf{n_4}$ —glider negative maneuvering limit load factor at V_D **F2564**

NFPA—National Fire Protection Association. F2507

night—hours between the end of evening civil twilight and the beginning of morning civil twilight.

Discussion—Civil twilight ends in the evening when the center of the sun's disc is 6 degrees below the horizon, and begins in the morning when the center of the sun's disc is 6 degrees below the horizon.

F2245

operation—process or action that is part of a series in the assembly of a kit. It is identified by the kit producer as a means to partition the aircraft assembly task into subgroups

of tasks or processes that allow the consumer to track progress or completion of portions of the kit in an orderly manner.

overhaul—maintenance, inspection, repair, or alterations that are only to be accomplished by the original manufacturer or a facility approved by the original manufacturer of the product.

overhaul facility—facility specifically authorized by the aircraft or component manufacturer to overhaul the product originally produced by that manufacturer.

permanent record—where specified herein, applicable quality assurance records shall be kept for each LSA produced for as long as the relative airworthiness certificate remains in effect.

F2279

permanent record—where specified in this specification, applicable quality assurance records shall be kept for each LSGA produced for as long as the relative airworthiness certificate remains in effect.

F2449

pitch setting, *n*—the propeller blade setting as determined by the blade angle measured in a manner, and at a radius, specified by the instruction manual for the propeller. **F2506**

POH—Pilot Operating Handbook F2245

powered parachute, *n*—aircraft comprised of a flexible or semi-rigid wing connected to a fuselage in such a way that the wing is not in position for flight until the aircraft is in motion. That aircraft has a fuselage with seats, engine, and wheels (or floats), such that the wing and engine cannot be flown without the wheels (or floats) and seat(s). Unique to the powered parachute is the large displacement between the center of lift (high) and the center of gravity (low), which is pendulum effect. Pendulum effect limits angle of attack changes, provides stall resistance and maintains flight stability.

F2241, F2242, F2243, F2244, F2426

power off, n—for testing purposes, engine at idle. **F2352**

primary structure, *n*—those parts of the structure the failure of which would endanger the gyroplane. **F2352**

producer—any person or company who fabricates the kit and authors the instructions covered by this practice.F2563

propeller, n—a device for propelling an aircraft that has blades on an engine-driven shaft and that, when rotated, produces by its action on the air, a thrust approximately perpendicular to its plane of rotation.F2506

psi—pounds per square inch gage pressure F2317/F2317M

q—dynamic pressure = $0.004823 V^2 \text{ kg/m}^2$, when V is in km/h **F2564**

q—dynamic pressure = $(V/19.77)^2 = V^2/391 \text{ lb/ft}^2$, when *V* is in mph **F2245**

QAM—quality assurance manual; the documentation of the Quality Assurance Program F2279

QAM—quality assurance manual; the documentation of the quality assurance program that prescribes the methods of inspections and acceptance criteria

F2449



QAP—quality assurance program; the method of inspections used by the manufacturer of a LSA to verify and ensure the proper production thereof

F2279

QAP—quality assurance program; describes the planned actions used by the manufacturer of a LSGA to verify and ensure the proper production thereof

F2449

QAR—quality assurance record; the record of Quality Assurance associated with each LSA produced F2279

QAR—quality assurance record; the quality assurance record associated with each LSGA produced. F2449

repair facility—facility specifically authorized by the aircraft or component manufacturer to repair the product originally produced by that manufacturer.

F2483

reserved holding area— for rejected parts, materials, and assemblies, shall mean an area for the containment of rejected non-airworthy items awaiting proper disposition, where such rejected items shall not be distributed for use on a LSA.

F2279

reserved holding area—for rejected parts, materials, and assemblies, an area for the containment of rejected non-airworthy items awaiting proper disposition, where such rejected items shall not be distributed for use on a LSGA.

F2449

runway protection zone (RPZ)—area off the runway end to enhance the protection of people and property on the ground.

runway safety area (RSA)—defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot or excursion from the runway also know as a RPZ or runway protection zone.

s—seconds F2317/F2317M

S—wing area (ft^2) F2245

S—wing area (m^2) F2564

satellite manufacturing, assembly, and distribution facilities—refers to facilities being operated by commercial or private entities that, though authorized by the original manufacturer, are not directly associated with or controlled by the original manufacturer.

F2279, F2449

secure storage area— for accepted parts, materials, and assemblies, shall mean an area of storage where the preservation of the contents to required design specifications is reasonably assured until distributed for use on a LSA. F2279

secure storage area—for accepted parts, materials, and assemblies, an area of storage where the preservation of the contents to required design specifications is reasonably assured until distributed for use on a LSGA.

F2449

SI—international system of units F2317/F2317M

taxiway (TW)—defined path established for the taxiing of aircraft from one part of an airpark to another. F2507

taxiway safety area (TSA)—defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft unintentionally departing the taxiway.

Discussion—Depressions such as swales are allowable. F2507

thermal airship—craft with design features to prevent collapse due to forward motion for which buoyancy is created or enhanced by heating of the gas in an otherwise unpressurized envelope.

F2355

thermal airship—airship using heated air for a portion of its lift, incorporating design features to prevent nose collapse due to dynamic pressure and exempt from specific pressurized envelope requirements.

F2427

threshold (TH)—beginning of that portion of the runway available for landing.
F2507

trike carriage empty weight, W_{tkmt} , n—all parts, components, and assemblies that comprise the trike carriage assembly or that are attached to the suspended trike in flight, including any wing attachment bolts, shall be included in the trike carriage assembly empty weight, W_{tkmt} . These must include the required minimum equipment, unusable fuel, maximum oil, and where appropriate, engine coolant and hydraulic fluid. Trike carriage empty weight, W_{tkmt} , shall be recorded in the Aircraft Operating Instructions (AOI).

ultimate load, *n*—limit load multiplied by the factor of safety. **F2352**

F2245

V—airspeed (mph)

V—airspeed (m/s, kts) F2564

V_A—design maneuvering speed F2245, F2564

 V_A—maneuvering speed (the maximum speed at which full or abrupt control movements are permitted)
 F2317/F2317M

V_C—design cruising speed F2245, F2564

V_C—operating cruising speed F2317/F2317M

V_D—design diving speed F2245, F2564

V_{DF}—demonstrated flight diving speed F2317/F2317M

 V_{DF} —demonstrated flight diving speed ($V_{DF} \le V_D$) F2245,

vectored thrust balloon—craft that can move laterally, but is limited to lateral speed by its lack of design features to prevent collapse due to forward motion.

vectored thrust balloon—thermal balloon with thrust capability that does not have design features to prevent forward envelope collapse due to dynamic pressure and is therefore limited in its lateral speed capability.

F2427

V_F—design flap speed F2245, F2564

V_{FE}—maximum flap extended speed F2245, F2564

VFR—Visual Flight Rules F2352



V _H —maximum speed in level flight with maximum continu-	V _Y —speed for best rate of climb F2245, F2564
ous power (corrected for sea level standard conditions) F2245, F2564	V _Y —best rate of climb airspeed, IAS F2352
V _H —maximum sustainable speed in straight and level flight F2317/F2317M	w—average design surface load (N/m²) F2564
	w—average design surface load (PSF) F2245
V _H —straight and level airspeed at full power F2352	W—maximum takeoff or maximum design weight (kg) F2564
V _{LO} —maximum speed for landing gear extended F2564	W-maximum takeoff or maximum design weight (lb) F2245
V_{MIN} —minimum controllable level flight airspeed, IAS F2352	W _E —maximum empty aircraft weight (kg) F2564
V _{NE} —never exceed speed F2317/F2317M	W _E —maximum empty airplane weight (lb) F2245
V_{NE} —never exceed speed ($V_H \le V_{NE} \le 0.9 V_{DF}$) F2245, F2564	weight limitations—operational weight restrictions
V _{NE} —never exceed airspeed, IAS F2352	(maximum/minimum) as defined by the manufacturer and proven through compliance with this specification to dem-
V _R —ground gust speed F2245, F2564	onstrate controllability. F2355
V_S —stalling speed or minimum steady flight speed at which the aircraft is controllable (flaps retracted) F2245, F2564	weight-shift-control, <i>n</i> —powered aircraft with a framed pivoting wing and a fuselage, controllable only in pitch and roll by the pilot's ability to change the aircraft's center of gravity
 V_{S0}—stalling speed or minimum steady flight speed at which the aircraft is controllable in the landing configuration (flaps fully deployed) F2245, F2564 	with respect to the wing. Flight control of the aircraft depends on the wing's ability to flexibly deform rather than the use of control surfaces. F2457
V_{S0} —stalling speed, or the minimum steady flight speed in the landing configuration F2317/F2317M	wing weight, W _{wing} , n— all parts, components, and assemblies that comprise the wing assembly, or that are attached to the
V_{S1} —stalling speed or minimum steady flight speed with the flaps in a specific configuration F2245, F2564	wing in flight, shall be included in the wing weight, W_{wing} . The wing weight, W_{wing} , shall be entered in the AOI. F2317/F2317M
V _{S1} —stalling speed, or the minimum steady flight speed in a specific configuration F2317/F2317M	W _{MAX} —maximum design weight F2317/F2317M
V _{SP} —maximum spoiler/speed brake extended speed F2245	WSC—weight shift control (aircraft) F2317/F2317M
V _T —maximum glider towing speed F2317/F2317M	W _U —minimum useful load (kg) F2564
V _T —maximum aerotow speed F2564	W _U —minimum useful load (lb) F2245
V_W —maximum winch tow speed F2564	14 CFR —Code of Federal Regulations Title 14 Aeronautics and Space also know as the "FARs" or Federal Aviation
V _x —speed at which best angle of climb is achieved	Regulations. F2483
V_X —speed for best angle of climb F2317/F2317M	100-h inspection—same as an <i>annual condition inspection</i> , except the interval of inspection is 100 h of operation instead of 12 calendar months. This inspection is utilized when the
V_y —speed at which best rate of climb is achieved F2317/F2317M	LSA is being used for commercial operations such as flight instruction or rental, or both. F2483

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