Sport 46 Pylon Racing

The Sport 46 class of pylon racing is intended as an introductory beginners class. Essentially these rules define a pylon racing model that may be flown at most flying sites within the UK. All of the hardware such as engines and propellers will be readily available in models shops, with no need to source items from specialist suppliers.
The rules allow for all F3D pylon racing airframes designed or constructed since 1985 to be used, when equipped with engines as described below. In addition own design or newly released airframes conforming to these technical specifications may be used.

1.0.0 Definition of Radio Control Pylon Racing Model Aircraft (Sport 46 Type)
Model aircraft in which the propulsion energy is provided by a piston type engine and in which the lift is obtained by aerodynamic forces acting on the supporting surfaces, which, except for the control areas, must remain fixed in flight.

1.1.1 Technical Specifications of Pylon Racing Model Aircraft
(a) The model aircraft must be of conventional design with forward wing and an aft empennage with the general lines of a full size aircraft.
(b) A model aircraft including engine and exhaust system may not be used by more than one race team.
(c) Each competitor may process and use a maximum of three models during a contest.

1.1.2 Weight
Weight, less fuel but including all equipment necessary for flight, shall be at least 2250 g and not more than 3000g. If ballast is used it must be permanently and safely affixed.

1.1.3Fuselage
1.1.3.1 Cross-section
The fuselage shall have a minimum height of 175 mm and a minimum width of 85 mm, the measurements to be of the fuselage body and are to exclude any fins, attachments or spacers. Both minimum dimensions must occur at the same cross-section location. The fuselage at this point will have a minimum cross sectional area of 100 cm2 excluding fillets and competitors shall provide templates to prove this. Fillets are not considered part of the fuselage or lifting surfaces.

1.1.3.2 Cowls
The engine or engine(s) must be enclosed, with the exception of the silencer, cylinder head and controls that must be manipulated during operation of the engine. The cylinder head for this purpose is defined as the top (or outer) 1 cm of the engine, excluding ignition plug or compression screw.

1.1.3.3 Cockpit
A cockpit or canopy profile must be evident and capable of enclosing a dummy pilot's head 50 mm from the chin to the top of the head. The canopy need not be transparent and a dummy pilot’s head need not be fitted.

1.1.4 Lifting Surfaces
1.1.4.1. Area of Surfaces
Total projected area of the lifting surfaces (wing and horizontal tail combined) shall be a minimum of 34dm^2. With a biplane, the smaller of the two wings shall have at least 2/3 of the area of the larger wing. No delta or flying wing type aircraft are permitted.

1.1.4.2 Wing Span

Minimum wing span shall be 1150 mm for a monoplane and 750 mm for the largest wing of a biplane. Maximum wing span shall be 1800 mm.

1.1.4.3 Wing Thickness
Wing thickness of the root shall be at least 22 mm for a monoplane, and 18 mm for a biplane. On a biplane with different size wings, the smaller wing must be at least 13 mm thick at the root. Wing thickness may decrease in a straight line taper from root to tip as viewed from the leading or trailing edge.
Note: *Root shall be defined as the innermost wing section, not counting fillets that may be measured without removing wing from fuselage.*
On a completely exposed wing, such as on a parasol monoplane or the top wing of most biplanes, the root is that section of the wing that is intersected by a projection of the outline of the fuselage as seen in the top view, ie the root section would be 50 mm from the centreline of an exposed wing on a model aircraft with a 100 mm wide fuselage.

1.1.5 Engine(s)
Any Sports 46 size (7.54 cc) engines with a front intake and side exhaust, which is supplied with the standard manufacturers carburettor and silencer, having a retail price of no more than £80.00 inc VAT at 20% (2012 season). No modifications to the engines are allowed, all replacement parts must be from the same manufacturer as the engine. No mixing and matching of parts will be allowed. If in doubt ask the committee or CD.

1.1.5.1 Carburettor
You must be able to demonstrate a reliable idle picking up to full throttle and returning to idle.

1.1.6 Propellers and spinners
1.1.6.1 The only propellers allowed are 10”x6” size from the following manufacturers Graupner 'G-sonic' part no. 1318.25.15, Radio Active Manufacturing part no. RAM2515 and APC part no. LP10060.
A rounded nose spinner with a diameter of at least 25 mm and a nose radius of not less than 5 mm must be fitted. Propellers shall have a diameter, pitch, blade width, and blade aerofoil identical to that of the approved part numbers at every measurable station. The following modifications may be made without penalty.

1.1.6.2
One blade maybe sanded on the top (front) side only for balancing.

1.1.6.3
One side of the hub may be sanded for balancing.

1.1.6.4
The shaft hole may be enlarged, but only as much as necessary to fit the engine crankshaft. The enlarged hole shall be concentric with the original hole.

1.1.6.5
Edges and tips may be sanded, but only as much as necessary to remove sharp moulding flash.

1.1.7 Shut-off
The pilot must be able to shut off his engine, on the ground or in the air, by radio control within five seconds of command, irrespective of aircraft altitude.
The radio system used to control the aircraft shall be equipped with a fail safe. This fail safe shall be set to shut off the engine if radio signal is lost.

1.1.8 Undercarriage

The undercarriage may have a two or three wheel design with the main wheels having a minimum track of 150 mm. The minimum diameter of the main wheels shall be 57 mm. The competitor must give the organiser the opportunity to check that measurement. A tail skid may be used in lieu of a tail wheel. A positive means of steering on the ground shall be provided; rudder control is acceptable. Retracting undercarriage is prohibited.

1.1.9 Technical checks and safety requirements

(a) At registration of the model aircraft before the competition, the Technical Officer may carry out technical checks either at his own discretion or at the request of another competitor to check if the models comply with the technical specifications. However, under all circumstances during the competition, it is the competitor's responsibility to ensure that entire model aircraft complies with the technical specifications in 1.1.1–1.1.8.

(b) During the competition all measuring equipment will be at the disposal of competitors to check their model aircraft if they wish to.

(c) After a race, the Technical Officer may take any model aircraft for inspection. The Technical Officer may ask the competitor to empty the tank for weight checking and for analysis of the fuel. Where a fuel analysis is made, a sample of the contest fuel shall also be taken for comparison. If, after analysis of the fuel from the tank, this fuel appears to be different from the contest fuel, the competitor will be disqualified from the competition. If the fuel analysis result is not available during the competition then the disqualification may be applied retrospectively.

(d) If the model aircraft is not according to the technical specifications in 1.1.1–1.1.8, the competitor shall be disqualified from the competition.

(e) The Contest Director has the right to request any competitor to make a flight to demonstrate the airworthiness of his model aircraft.

(f) Safety inspections of all aircraft before or during registration and at random as a pre-flight check during the competition shall be conducted by the contestant under the supervision of the Technical Officer.

The list of safety checks should include the following:

i) Push/pull rods or cables, control horns, and servo leads shall be installed in such a way that they will not become disconnected in flight. Clevises shall be physically held closed by short pieces of fuel tubing or similar material. Metal clevises shall be protected from deterioration of the threads due to vibration by means of a lock nut, thread treatment such as Loctite ® or Vibra-tite ®, or a similar method. Ball links shall be tight.

ii) All screws holding the engine to the mount and the mount to the firewall shall be in place and secure.

iii) The radio receiver and battery pack shall be surrounded by soft foam rubber or other vibration dampening material and adequately protected against contamination by engine exhaust, raw fuel, or fuel residue.

iv) Batteries shall be of adequate capacity for the size and number of servos used. Minimum battery capacity shall be: 500 milliamp-hours (mAh).

v) Servos controlling the pitch and roll functions shall be of adequate strength for the weight and speed of the aircraft. Whenever a single servo is used to control one of these functions, it shall be designed and built to accommodate at least four mounting screws. When two or more servos are used together to control the same function, as in the case of dual aileron servos or the movable tail surfaces on a "v" tailed aircraft, each of said servos may be of the two-screw variety.

vi) Control surfaces shall be firm on the hinge line without excessive play. Safety officers shall be alert to the danger of excessive play whenever electronic servo throw reduction is used in combination with a mechanically inefficient linkage.

vii) All screws holding the servos to the servo rails or trays and holding any trays to the airframe shall be in place and secure. Rubber grommets shall be used on all servos

designed to accept them. If the heads of the servo mounting screws are small enough to pull through the grommets, washers shall be used to prevent this.
viii) Pushrods shall have only one threaded end that is free to turn. The other end shall consist of a "Z" bend, an "l" bend with keeper or collar, a metal clevis that is soldered on, or a threaded ball-link that is glued or otherwise secured so that it cannot turn.
ix) Wings, if removable, shall be securely attached to the fuselage with bolts or machine screws.
x) Wheels shall be securely attached and shall turn freely.
xi) The aircraft shall be free of stress cracks and any other indications of structural damage.
xii) Proper functioning of the engine shut-off by fail safe.
If a model aircraft does not comply with the safety items during a pre-flight check, the Technical Officer will not allow it to fly in the race.

1.1.10 Competitors
(a) A race team shall consist of a pilot and a caller. All pilots must be accompanied by a caller for reasons of safety.

(b) In each race, the caller must release the model aircraft at the start and give the pilot verbal information regarding the flying course of his model aircraft and any official signals.

(c) Electronic communication with the pilot shall be prohibited.

(d) There will be no pilots' helpers at any of the pylons.

(e) The Contest Director has the right to request any competitor to make a flight to demonstrate his bility to fly the aircraft around the course.

1.1.11 Helmets
(a) All officials, competitors and callers on the racecourse must wear a crash helmet with a properly fastened chin strap. Helmets must be worn duringpractice and during the competition.

(b) During the competition, any pilot or caller not wearing an appropriate helmet will disqualify that team from the heat.

1.1.12 Fuel
(a) Fuel will be a composition that contains no more than 5% Nitromethane.

1.1.13 Race Course, Distance and Number of Rounds
(a) The race course is a triangle with sides of 40 metres, 180 meters and 180 metres, marked by 3 pylons. In this triangle a circle with a diameter of 20 metres is specified, wherein, for reasons of safety, all pilots, callers and the Starter have to stay during a race**.**

(b) For the race course lay-out, see Figure 1. The race course specification may
be modified in the interest of safety or to suit existing field conditions if as long as safety is not compromised and subject always to strict compliance with rule 1.1.15(a).

(c) Figure 2 gives guidelines for the lay-out and organisation of the flying site in order to achieve maximum safety for competitors, judges and spectators.

(d) The pylons should have a minimum height of 4 m and should not exceed 5 m in height.

(e) The race is over 10 laps with an individual nominal length of 400 m and total nominal flying distance of 4000 m.

(f) The race starts at the start-finish line. The race is terminated at the start -finish line 10 full laps later.

(g) The number of rounds will be announced by the organiser before the start of the competition with a minimum of 3 and a maximum of 15. Because of weather conditions or other important reasons, the number of rounds may be reduced during the competition.