

9 Aircraft & Equipment Standards

The continued safe operations of aircraft are dependent on four principal factors:

- (a) design of the aircraft;
- (b) manufacture of the aircraft;
- (c) standard of maintenance applied to the aircraft; and
- (d) operations to which the aircraft is subject to.

9.1 Certification Specifications and Standards:

The HGFA recognises the following specification and certification standards:

- (a) Hang Glider Manufacturers Association of the USA (HGMA)
- (b) Gutesiegel of Germany (DHV / LTF)
- (c) Deutschen Ultraleichtflugverbandes (DULV)
- (d) Dirección General de Aeronáutica Civil (DGAC)
- (e) European Standards – EN (CEN)
- (f) German Paramotoring Association (DMSV)
- (g) European Academy of Parachute Rigging (EAPR)
- (h) Paraglider Manufacturers Association (PMA)
- (i) Light Sport Aircraft (LSA)

9.2 Aircraft Design / Construction (Solo)

9.2.1 Minimum Standards for Hang Gliders, Paragliders & PPG/PHG <70kg (CAO 95.8)

There are no specified certification requirements for pilot only aircraft.

Note: The HGFA and/or the HGFA's Competitions Committee may stipulate minimum design certification requirements in the interest of Pilot safety, especially for the experimental / high performance and difficult to recover paragliding wings.

9.2.2 Standards for Weightshift Microlights and PPG/PPC >70kg (CAOs 95.10, 95.32)

CASA may from time to time change the applicability criteria of CAO's 95.10 and 95.32.

Pilots of these aircraft shall maintain a working knowledge of the current CAO's.

Failure to comply with these Civil Aviation Orders and relevant legislation is unlawful and can attract significant penalties.

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9.3 Aircraft Design / Construction (Passenger Carrying)

9.3.1 Minimum Standards for Hang Gliders, Paragliders PPG/PHG <70kg (CAO 95.8)

Under CAO 95.8 there are no specified certification requirements for aircraft. However, for any HGFA aircraft to carry a passenger, either for enjoyment or instruction, the wing and attachment method must be certified to safely and reliably carry the total load of the aircraft, occupants and equipment.

Note: The HGFA and/or the HGFA's Competitions Committee may stipulate minimum design certification requirements in the interest of Pilot safety, especially for the experimental / high performance and difficult to recover paragliding wings.

9.3.2 Standards for Weightshift Microlights and PPG/PPC >70kg (CAOs 95.10, 95.32)

CASA may from time to time change the applicability criteria of CAO's 95.10 and 95.32.

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9.4 Ancillary Equipment

9.4.1.1 Standards for Altimeters (WM Aircraft)

Aircraft that are legally permitted to fly in Controlled Airspace (CTA) as detailed in provisions of CAO 95.10, 95.32, must have their instruments maintained in accordance with the provisions of CAO 100.5. The checks are only available through a LAME with specialised calibrated equipment and appropriate licence ratings.

Note: A specification issued by the competent authority in a contracting state (this means the relevant Civil Aviation Authority in other countries), or a manufacturer's proprietary specification may, upon application to the CASA be designated as an alternative design standard.

9.4.1.2 Standards for Altimeters (Operation outside CTA)

It is highly recommended that all altimeters, utilised by pilots of other HGFA aircraft, be checked biennially for accuracy. (e.g. a water manometer and scale, or GPS) and must not deviate by more than +/- 100 feet, up to the maximum normally expected operating altitude of the aircraft.

9.5 Emergency Equipment

9.5.1 Standards for Helmets

Helmets are strongly recommended for all HGFA flying operations; and are mandatory for all HGFA flying training operations. The helmets used shall conform to the following specifications.

The helmet shall:

- (a) preferably have a hard outer shell for penetration resistance;
- (b) be lined with foam (expanded polystyrene or similar) and a soft inner lining for comfort and impact resistance;
- (c) not restrict the movement or vision of the pilot and preferably leave the pilots ears exposed;
- (d) be as light as possible;
- (e) be free from holes or other items that can catch on obstructions during impact;
- (f) be able to be adjusted for the correct fit; and
- (g) For training operations, be manufactured in accordance with the Australia/New Zealand standard as detailed within AS/NZS 2063.

9.5.2 Standards for Emergency Parachutes

It is the owners and/or operators responsibility to ensure their emergency parachute, used for hang gliding, paragliding or weightshift microlights, shall be of a type specifically designed and constructed for use with the specific aircraft type.

It is the owners and/or operators responsibility to ensure their emergency parachute is load rated to cover the operation being embarked upon.

The HGFA recommends that emergency parachutes be certified to EN, LTF or an equivalent recognised standard, by a reputable rating body such as DHV, DULV, DGAC or similar.

Emergency parachutes shall be maintained in accordance with the recommendations of the parachute manufacturer.

Notwithstanding a manufacturer's recommendation, the HGFA recommends the period between repacking an emergency parachute not exceed six months.

9.5.3 Emergency Beacons

It is recommended all pilots carry a current personal satellite GPS messenger device or a current Emergency Position Indicating Radio Beacon (EPIRB) or a current Personal Location Beacon (PLB), especially for all tandem flights, cross country flights and for any operations around or over water.

Pilots operating under CAO 95.32 and travelling more than 50NM with a passenger, must comply with CAR 252A.

9.6 Assembly, Inspection and Maintenance Standards

All equipment must be assembled as detailed in the manufacturer's assembly instructions.

It is the pilot's responsibility to carry out a pre-flight inspection prior to every flight operation. This must be done as per the Manufacturer's Aircraft Operation Manual. If the Operation Manual was not received with the aircraft, every effort must be made to obtain a copy, either from the manufacturer or through the HGFA.

9.6.1 Pre-flight Inspection Standards

Inspection by the pilot in command prior to each flight and in accordance with the Manufacturer Operation Manual(s) is required, and must at least include:

Aircraft Equipment:

- (a) Equipment assembled correctly; and
- (b) Daily Inspection Completed, (See [9.6.2](#) or [9.6.3](#) or [9.6.4](#) or [9.6.5](#) as applicable)

Pilot's Equipment:

- (c) Pilot's certificates and endorsements valid.
- (d) Emergency parachute checked and repacked.
- (e) Suitable Footwear without lace hooks which may snag lines.
- (f) Radio and instrument batteries and calibration.
- (g) Altimeter adjusted.
- (h) Helmet on and adjusted correctly
- (i) Harness and all straps fastened and adjusted correctly and attached to glider (HANG CHECK!)

Conditions:

- (j) Observe the intended landing area and any emergency landing areas taking careful notice of any hazards.
- (k) Observe the weather for the landing and take-off areas and the intended flight course. Endeavour to forecast possible changes.
- (l) Observe the take-off area planning the intended take off run and possible abort area.
- (m) Wind acceptable. Ask for assistance if wind is strong. Ensure that any take-off assistants are correctly briefed.
- (n) Check for approaching air traffic.

9.6.2 Daily Inspection (HG/WM Wing)

Inspection of the following items, after complete rigging of the glider and prior to operations each day, is required:

- (a) Check for no unacceptable bends, dents, scratches, in all tubes.
- (b) Check wire ends for bolt and/or other fastener security.
- (c) Check wires for twisted or jammed thimbles.
- (d) Check wires are free of kinks, frays, abrasions, broken strands etc.
- (e) Nose plate connections fastened.

- (f) Sprogs secure.
- (g) Tips secure.
- (h) Battens and batten ties installed and fastened.
- (i) A-frame connections at the top and base both sides properly fastened.
- (j) Variable Geometry operation as expected (full and free movement) and set for launch.
- (k) Rear keel connections secure, and rigging cords safely stowed.
- (l) Cross-bar tension wire and safety stops secured for launch.
- (m) Cross-bar operation (free floating).
- (n) King post connections fastened.
- (o) Dive strings attached and tension correct.
- (p) Instruments set and operational.
- (q) Sail condition suitable.
- (r) Harness straps and webbing secure height adjustment correct.
- (s) Emergency parachute secure, correctly mounted and attached, operating handle accessible.

9.6.3 Daily Inspection (WM Base Unit)

Check security of the following:

- (a) Structural tubes and wires.
- (b) Seat attachment and belt(s).
- (c) Hang bolt and safety strap.
- (d) Landing gear:
 - (i) Tubes and attachment points.
 - (ii) Wheels and tyres.
- (e) Foot brake clear and working.
- (f) Engine:
 - (i) Pull starter.
 - (ii) Ignition off.
 - (iii) No loose bolts.
 - (iv) No loose electrical connections.
 - (v) No loose spark plug caps.
 - (vi) No loose or damaged parts.
 - (vii) Throttle and choke cables operate without restriction.
 - (viii) Top of carburettor tight.
 - (ix) Fuel leaks.
 - (x) Sediment in fuel filter.
 - (xi) Oil leaks.
 - (xii) Oil and coolant levels.
 - (xiii) Reduction gearbox secure -no oil leaks.
 - (xiv) Reduction (V-belt) drive check for wear, proper tracking and correct tension
 - (xv) Exhaust springs intact and secured.
 - (xvi) All safety wire secure.
- (g) Propeller:
 - (i) No cracks, chips or nicks.
 - (ii) Propeller, bolts tight
 - (iii) Safety wire secure..
- (h) Fuel:
 - (i) Fuel safety cut-off valve – on and operates freely.
 - (ii) Fuel line for damage, contamination and secure clamps.
 - (iii) Check security and integrity of tanks.
 - (iv) Check fuel level - should be sufficient for flight.
 - (v) Water check – before first flight of the day and after refuelling.
 - (vi) Fuel drain – no leaks.
- (i) Registration Current

- (j) Controls: Sitting in seat with harness secured, can the throttle, brake, pedals, base bar, fuel safety cut-off valve and ignition switches be comfortably reached and operated fully.
- (k) Tow Gear:
 - (i) Secure.
 - (ii) Release checks.

9.6.4 Daily Inspection (PG/PPG Wing)

Inspection of the following items prior to operations each day is required:

- (a) Canopy:
 - (i) Check for absence of tears on all surfaces including the ribs.
 - (ii) Check stitching, especially at the line connection points.
 - (iii) Check for no foreign objects in the canopy.
 - (iv) Check that the paraglider weight range and certification standards (sometimes printed onto the canopy) are appropriate.
- (b) Lines:
 - (i) Knots and stitching secure.
 - (ii) No fraying from within the braiding, or the internal core breaking which may be felt as a change in the diameter along its length.
 - (iii) All lines must be clear of tangles.
 - (iv) Ensure the suspension lines and the brake lines pass directly from the canopy to the appropriate riser to avoid any twists.
 - (v) Brake line knots on the steering controls should be secure and not able to jam in their keepers. The steering control handles must not be able to pass through their keepers.
- (c) Harness:
 - (i) Connector links firm but not over tightened.
 - (ii) Check risers for wear under the connector links and karabiners.
 - (iii) The risers or keepers must be low enough to ensure the steering controls are within reach after being let go during flight.
 - (iv) All buckles should be of a type where the security can be visibly checked after fastening.
 - (v) All hardware should show no signs of wear and should be replaced if corroding, cracking, bending, or thread stripping is evident.
 - (vi) All stitching should be secure, paying close attention to points where stress may be placed on individual stitches.
 - (vii) Reserve parachute attachment points correct for strength and correct reserve bridle routing.

9.6.5 Daily Inspection (PPG Motor / Wheeled Base Unit)

Check security of the following:

- (a) Structural tubes / frame.
- (b) Seat attachment and belt(s).
- (c) Landing gear (wheeled):
 - (i) Tubes and attachment points.
 - (ii) Wheels and tyres
- (d) Foot brake clear and working.
- (e) Engine:
 - (i) Pull starter.
 - (ii) Ignition off.
 - (iii) No loose bolts.
 - (iv) No loose electrical connections.
 - (v) No loose spark plug caps.
 - (vi) No loose or damaged parts.
 - (vii) Throttle and choke cables operate without restriction.
 - (viii) Top of carburettor tight.
 - (ix) Fuel leaks.
 - (x) Sediment in fuel filter.
 - (xi) Oil leaks.
 - (xii) Oil and coolant levels.
 - (xiii) Reduction gearbox secure -no oil leaks.
 - (xiv) Reduction (V-belt) drive check for wear, proper tracking and correct tension
 - (xv) Exhaust springs intact and secured.
 - (xvi) All safety wire secure.

- (f) Propeller:
 - (i) No cracks, chips or nicks.
 - (ii) Propeller, bolts tight
 - (iii) Safety wire cage secure..
- (g) Fuel:
 - (i) Fuel safety cut-off valve – on and operates freely.
 - (ii) Fuel line for damage, contamination and secure clamps.
 - (iii) Check security and integrity of tanks.
 - (iv) Check fuel level - should be sufficient for flight.
 - (v) Water check – before first flight of the day and after refuelling.
 - (vi) Fuel drain – no leaks.
- (h) Registration Current (if under CAOs 95.10 or 95.32)
- (i) Controls: Sitting in seat with harness or seat belts secured; can the throttle, brake, pedals, fuel safety cut-off valve and ignition switches be comfortably reached and operated fully.

9.7 Maintenance

9.7.1 Hang Glider Maintenance Standards

Where a manufacturer does not provide a maintenance regime, the following maintenance schedule must be followed.

Note: The following Maintenance Schedules are generalised for use with varying construction details and operating conditions and as such represent minimum maintenance standards.

Within the following schedules the meaning of the codes are as follows:

Hang Glider Maintenance Code Legend

Code	Maintenance Requirement	Carried out by:	
		Private Operations	Training or Tandem Flts
1	Clean, service and check as directed.	Owner or Operator	Instructor or Operator
2	Check for security, cracks, wear and faulty operation.	Owner or Operator	Chief Flight Instructor
3	Remove, inspect and replace if necessary.	Owner or Operator in conjunction with independent observer.	Manufacturer or his accredited service agent.
Keeping of certified Maintenance record		Recommended	Mandatory

9.7.1.1 Other Inspections

It is necessary to do a detailed inspection following any unusual stressing of the Hang Glider. This full inspection should include all details listed for six monthly maintenance.

The inspection should be noted in the log book, and any replacement of parts to be recorded.

Log Book

When maintenance is performed always check appropriate square and make an entry in your log book. It is highly recommended that a separate maintenance log book for the glider be maintained.

9.7.2 Hang Glider Maintenance Schedule - Private Operations

1. Clean, service and check as directed		3. Remove, inspect and replace if necessary						
2. Check for security, cracks, wear and faulty operation		4. Recommend replacement or overhaul						
MAINTENANCE REQUIREMENT	Maintenance – By Period or number of flying days (whichever is sooner)							
	Period>	Daily	Every month	Three months	Six monthl y	Every year	Every 2 years	Every 4 years
	Flying Days>	1	10	30	50	100	200	400
Wing Fabric deterioration and tears		1	2	2	2	2	3	4
Wing Fabric attachment points		1	2	2	2	2	3	4
Batten Elastics		1	2	2	2	2	2	3
Check Battens against template supplied			1	2	2	2	2	2
Wing wires and attachment fittings.		2	2	2	3	3	4	4
Check leading edges, keel & A Frame for straightness, dents and corrosion, check for fatigue cracks radiating from drilled holes.		2	2	2	2	3	3	3
Check reflex bridle luff lines for kinks.		2	2	2	2	2	2	4
Check Inspection Zips.		1	2	2	2	2	2	2
Check Variable Geometry and compensator ropes, pulleys and cleats.		2	2	2	2	3	3	4
All bolts, nuts, washers & safety pins. Washers under each nut & at least one thread showing outside each nut.		1	2	2	2	2	3	3
Check hang straps and karabiners for wear or damage.		2	2	2	2	3	3	4
Check saddles and fittings for cracks.			2	2	2	3	3	4
Check harness stitching, webbing, ropes, pulleys, frame and Velcro fasteners.		2	2	2	3	3	3	4
Emergency parachute (repack six monthly).		1	1	1	3	3	3	3
Instruments and radio equipment, check correct operation and structural integrity of case and any connecting cables.		1	1	2	2	2	2	2
Helmet check for cracks, wear and security of fasteners.		1	2	2	2	3	3	3

9.7.3 Hang Glider Maintenance Schedule – Aircraft used for Training or Tandem operations.

MAINTENANCE REQUIREMENT	Maintenance – By period or number of flying days (whichever is sooner)							
	Period>	Daily	Every month	Three Months	Six monthl y	Every Year	Every 2 Years	Every 4 Years
	Flying Days>	1	10	30	50	100	200	400
1. Clean, service and check as directed	3. Remove, inspect and replace if necessary							
2. Check for security, cracks, wear and faulty operation	4. Recommend replacement or overhaul as specified by the manufacturer.							
Wing Fabric deterioration and tears	2	2	2	2	2	3	4	
Wing Fabric attachment points	1	2	2	3	3	3	4	
Batten Elastics	1	2	2	2	3	3	3	
Check Battens against template supplied		2	2	2	2	3	3	
Side Wires	2	2	2	3	4	4	4	
All wing wires and attachment fittings.	2	2	2	2	3	3	4	
Check leading edges, keel & A Frame for straightness, dents and corrosion, check for fatigue cracks radiating from drilled holes.	2	2	2	2	3	3	4	
Check reflex bridle luff lines for kinks.	2	2	2	2	2	3	4	
Check Inspection Zips.	1	2	2	2	2	2	2	
Check Variable Geometry and compensator ropes, pulleys and cleats.	2	2	2	2	3	3	4	
All bolts, nuts, washers & safety pins. Washers under each nut & at least one thread showing outside each nut.	1	2	2	2	2	3	3	
Check hang straps and karabiners for wear or damage.	2	2	3	3	3	3	4	
Check saddles and fittings for cracks.	2	2	2	3	3	3	3	
Check harness stitching, webbing, ropes, pulleys, frame and Velcro fasteners.	2	3	3	3	3	3	3	
Emergency parachute (repack six monthly).	1	1	1	3	3	3	3	
Instruments and radio equipment, check correct operation and structural integrity of case and any connecting cables.	1	2	2	2	2	2	3	
Helmet check for cracks, wear and security of fasteners.	2	2	2	3	3	3	3	

* Usage figures refer to: Training Days for Training Gliders, and Flying Hours for Gliders.

Log Book

When maintenance is performed make an entry in the maintenance log book for the glider.

Notes on Periodic Inspections of Hang Gliders

(a) Airframe Tubing

- (i) Installation & Removal
- (ii) When removing tubing do not bend or force tubes. When installing do not distort tubing from its original shape.

(b) Inspection

Inspect tubing for cracks, damage from abrasion, elongated holes or distortion in tube surface. Never attempt to repair tubing, always replace with new part. Inspect tubing for corrosion in and out

(c) Replacement

- (i) Aluminium tube comes in many different sizes and grades. Only manufacturer approved tubing is be used.

(d) Bolts - Installation & Removal

- (i) After tightening, all bolts should have at least 2 threads showing.
- (ii) All self-locking nuts should not be installed more than 2 times.
- (iii) If grip length is too long, washers may be added. No more than 3 washers should be used.
- (iv) A washer should always be installed under the nut.
- (v) Be sure not to over-torque bolts when installing.
- (vi) Check assembly instructions for correct bolt placement.
- (vii) Inspection - Check bolts for worn shanks, bad threads or corrosion.

(e) Sails

- (i) Installation & Removal
- (ii) When installing or removing the sail make sure there are no sharp edges or burrs that will tear the sail. See the Flight Manual or Parts Manual for complete instructions. Do not attempt this yourself unless you are confident in what you are doing.**

(f) Inspection

- (i) Check for tears in the sail cloth or any loose or unravelled seams.
- (ii) Check all inspection zippers to see if they function smoothly and close completely.
- (iii) Inspect velcro strips on inboard panels for wear or frayed edges.
- (iv) Check undersurface support tabs.
- (v) Sail may be repaired with appropriate sail tape or a sewn on patch. Keep the sail clean of oil and dirt by washing the sail with soap and water. Keep the sail covered when not in use.

CONTINUED EXPOSURE TO SUN DRAMATICALLY SHORTENS THE LIFE OF SAILS - possibly to as little as six months.

9.7.4 Paraglider Maintenance Standards

Paragliders deteriorate with both use and time. The attention they receive affects their performance, safety, life span, and the re-sale value if you decide to sell it.

9.7.4.1 Periodic Inspections

Paragliders shall be maintained in accordance with the Manufacturers Manual. Where no manufacturer's Manual exists the aircraft shall be maintained to the Schedules contained in this Manual.

Regular porosity testing for UV degradation is advised, particularly when purchasing a 2nd hand glider.

To set a frequency for routine maintenance and checks depends on both the time since the last check, and/or the amount of use the paraglider has had.

More frequent checks should be carried out under the following conditions:

- (a) Prolonged exposure to sun light. Even when in the bag. If you are getting sun burnt so is the paraglider.
- (b) Flying in salty air. Especially if the paraglider is left laid out on the ground the moist salty air will settle on it allowing sharp salt crystals to enter the threads. And the metal fittings will corrode faster.
- (c) Towing operations.
- (d) Operations that increase wing and lines loads. For example; Acrobatic flight, SIV training etc.
- (e) Any unusual rough treatment which should be examined immediately, for example:
 - (i) Snags on takeoff or landing.
 - (ii) An accident or hard landing.
 - (iii) A water landing.
 - (iv) Standing on the lines, which can damage the internal core.
 - (v) Allowing the canopy to crash forwards onto the ground with force which pressurizes the cells possibly ripping the ribs.
 - (vi) Other incidents including solvent or chemical spills on the canopy, lines or risers.
- (f) Bad storage conditions.
 - (i) A glider stored while damp can cause mildew and / or mould to form on the sail and will accelerate corrosion of metal parts.
 - (ii) Leaving the glider in its bag in the boot of the car can also cause deterioration due to excess heat and humid conditions.

9.7.5 Paraglider Maintenance Standards - Private Operations

Where a manufacturer does not provide a maintenance regime, the following maintenance schedule must be followed.

Note: The following Maintenance Schedule is generalised for use with varying construction details and operating conditions and as such represent minimum maintenance standards.

The meaning of the codes within the following schedule are as follows:

Paraglider Maintenance Code Legend

Code	Maintenance Requirement	Carried out by
1	a. Thorough and detailed inspection for security and any signs of wear and faulty operation. b. Replace or repair as necessary.	Owner or Operator
2	a. Thorough and detailed inspection for security and any signs of wear and faulty operation. b. Replace or repair as necessary. c. Test flight to check characteristics and integrity of canopy.	Owner or Operator in conjunction with a PG Flight Instructor or SSO.

Paraglider Maintenance Schedule - Private Operations

<u>MAINTENANCE INSPECTION REQUIREMENT:</u>	Pre-Flight	Yearly
Wing Fabric strength, porosity, deterioration and tears	1	2
Wing Fabric stitching, line attachment points	1	2
Wing Fabric freedom from mould salt or dirt	1	2
Check integrity of ribs and crossports	1	2
Check all lines (including steering lines for correct routing, length and strength and freedom from salt or dirt)	1	2
Check line sheathing, diameter, knots joins and stitching and freedom from wear points.	1	2
Check riser stitching and freedom from wear points, steering line keepers, connector links.	1	2
Check harness stitching, webbing, ropes, pulleys, frame and Velcro fasteners.	1	2
Emergency parachute (repack six monthly).	1	2
Instruments and radio equipment, check correct operation and structural integrity of case and any connecting cables.	1	2
Helmet check for cracks, wear and security of fasteners.	1	2

9.7.6 Paraglider Maintenance Standards - Gliders used for Training or Tandem Operations.

Where a manufacturer does not provide a maintenance regime, the following maintenance schedule must be followed.

The meaning of the codes within the following schedule is as follows:

Training/ Paraglider Maintenance Code Legend

Code	Maintenance Requirement	Carried out by:	
		Sports Tandem Operations	Training or Instructional Tandem Operations
1	a. Thorough and detailed inspection for security and any signs of wear and faulty operation. b. Replace or repair as necessary.	Owner or Operator	Instructor or Operator
2	a. Thorough and detailed inspection for security and any signs of wear and faulty operation. b. Replace or repair as necessary. c. Test flight to check flight characteristics and integrity of canopy.	Owner or Operator in conjunction with a PG Flight Instructor or SSO.	Manufacturer or their accredited service agent

Paraglider Maintenance Schedule - Training or Tandem Operations

<u>MAINTENANCE INSPECTION REQUIREMENT:</u>	Pre-Flight	Yearly
Wing Fabric strength, porosity, deterioration and tears	1	2
Wing Fabric stitching, line attachment points	1	2
Wing Fabric freedom from mould salt or dirt	1	2
Check integrity of ribs and crossports	1	2
Check all lines (including steering lines for correct routing, length and strength and freedom from salt or dirt)	1	2
Check line sheathing, diameter, knots joins and stitching and freedom from wear points.	1	2
Check riser stitching and freedom from wear points, steering line keepers, connector links.	1	2
Check harness stitching, webbing, ropes, pulleys, frame and Velcro fasteners.	1	2
Emergency parachute (repack six monthly).	1	2
Instruments and radio equipment, check correct operation and structural integrity of case and any connecting cables.	1	2
Helmet check for cracks, wear and security of fasteners.	1	2

Log Book

When maintenance is performed always make an entry in the maintenance log book for the glider.

9.7.7 Weightshift Microlight Maintenance Standards

The registration of weightshift microlights is only valid as long as all necessary Maintenance, Modification and Service requirements are fulfilled. These requirements include:

- (a) Maintenance of aircraft as per either:
 - (i) the Manufacturer's Maintenance Schedule, or
 - (ii) the Maintenance Schedule included in this manual, adjusted as necessary, to suit the particular weightshift microlight. (This is only to be used in the non-existence of a Manufacturers Maintenance Schedule).
- (b) Modification as detailed in any relevant Airworthiness Directives.
- (c) Major Modification as approved by the manufacturer (or CASR 21M Engineer as appropriate).
- (d) Repairs necessary to replace minor damage, wear or ageing.
- (e) Servicing, replacement and overhaul, inspection and checking in compliance with the Maintenance Schedule.

Where a weightshift microlight is used for training operations, any maintenance requiring removal or replacement of any part which would affect the airworthiness of the aircraft must be conducted by the aircraft manufacturer or an approved delegate of the aircraft manufacturer or the holder of a WM Aircraft & Rotax Engine Maintenance Endorsement.

9.7.7.1 Airworthiness Inspections

All HGFA registered weightshift microlights must undergo an independent airworthiness inspection, after each two years of service. This independent Biennial Airworthiness Inspection (BAI) is to be conducted by a holder of a Aircraft Inspector (AI) rating or WM Aircraft & Engine Maintenance Endorsement and is a prerequisite for the renewal of WM registration.

The Biennial Airworthiness Inspection (BAI) is a safety check designed to provide periodical independent assessment of an aircraft's condition. It is however recognised that there are situations where this requirement maybe difficult to meet. Therefore an extension to the requirement can be made available, where there is justified reason to provide it. Extension of the requirement for a BAI will generally only be provided in situations where there are extenuating circumstances restricting an owner from access to an appropriate Aircraft Inspector or holder of a WM Airframe & Engine Maintenance Endorsement.

In most circumstances an application for the extension of time to arrange the BAI is all that is required and will be considered by the HGFA Operations Manager, so long as commitment to set a date for the BAI is demonstrated and that date is not outside a 6 month period, starting from the initial date due. Subsequent 6 months extensions cannot be applied.

Requests for an inspection to be carried out by a person with alternate qualifications will be assessed by the Operations Manager on a case by case basis. The alternate qualifications must be put forward in writing to the Operation Manager, for consideration.

Regular Bettsometer testing for sail strength and UV degradation is advised, particularly when purchasing a 2nd hand glider.

Final responsibility & liability for a microlight's airworthiness always remains with the owner, not the inspector.

Note: The following Maintenance Schedules are generalised for use with varying construction details.

WM Maintenance Legend for Table 2.

Code	Maintenance Requirement
1	Oil, lubrication, clean and service
2	Check as directed
3	Check for insecurity, cracks, wear and faulty operation
4	Remove, inspect and replace if necessary
5	Replacement or overhaul

For information regarding who can carry out maintenance on these aircraft see section [9.7.9.3](#)

HGFA Operations Manual

Aircraft & Equipment Standards - Maintenance

Weightshift Microlight Maintenance Standards



9.7.7.2 WM Log Book

When maintenance is performed the appropriate square on the Maintenance Schedule should be checked off and an entry made in the appropriate log book

Table 2: WM Log Book Requirements

	MAINTENANCE REQUIREMENT	AIRCRAFT or ITEM - HOURS OF OPERATION															
		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
PROPELLER	Examine for nicks and abrasions	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Check security of blades		2		2		2		2	2	2		2		2		2
	Check security and torque of mounting bolts, sandwich plates, nuts & cotter pins		2		2		2				2		2		2		2
	Check minimum 25mm clearance between tip & airframe				2								2				2
	Rotate propeller to check out of track conditions - 3mm maximum at tips				2								2				2
	Thrust line to be within 3 degrees of manufacturers recommendations				2				2				2				2
	Check hub section for cracks				4				4				4				4
	Check balance				4				4				4				4
Gearbox	All welds		3		3		3		3		3		3		3		3
	All bolts		3		3		3		3		3		3		3		3
	Oil leaks		2		2		2		2		2		2		2		2
	Drive V Belts	1	1	1	4	1	1	1	5	1	1	1	4	1	1	1	5
	Reduction Pulleys								4								5
	Drive Shaft Bearing		1		1				5		1		1		1		5
	Drive Shaft								4								5
	Propeller Shaft								4								5
	Radial Bearing		1		1		1		5		1		1		1		5

HGFA Operations Manual

Aircraft & Equipment Standards - Maintenance

Weightshift Microlight Maintenance Standards



	MAINTENANCE REQUIREMENT	AIRCRAFT or ITEM - HOURS OF OPERATION															
		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
	Thrust Bearing		1		1		1		4		1		1		1		5
ENGINE	Overhaul	For a Rotax 2-stroke, this should be 300hr/5yr and for current 4-stroke Rotax, 2000hr/15yr. Same applies to gearbox components above.															
	Oil leaks which could indicate cracks or blown gaskets or seals		2		2		2		2		2		2		2		2
	Cylinders, tins and bottles		3		3		3		3		3		3		3		3
	All welds		3		3		3		3		3		3		3		3
	Loose belts	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Engine Rubber Mounts		3		4		3		5		3		4		3		5
	Spark plugs (2 stroke)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Spark plugs (4 stroke)				5				5				5				5
	Spark Plugs and Ignition Harness Secure		2		2		2		2		2		2		2		2
	Crankcase and mounting lugs free from cracks		2		2		2		2		2		2		2		2
	Fuel Lines routed properly (free from abrasion, heat & sharp edges) – fittings tight	2	2	2	4	2	2	2	4	2	2	2	4	2	2	2	5
	Fuel Tank secure		3		3		3		3		3		3		3		3
	Fuel Filer		5		5		5		5		5		5		5		5
	Fuel Pump	Fuel pump overhaul at 300hr/5yr 2-stroke. Fuel pump replaced at 5yr 4-stroke.															
	Throttle Cable	1	3	1	4	1	3	1	4	1	3	1	4	1	3	1	5
	Air Cleaner	1	1	1	4	1	1	1	4	1	1	1	4	1	3	1	5
	Check exhaust Ports for Carbon Build up		2		2		2		2		2		2		2		2
	Muffler		4		4		4		5		4		4		4		5
	Muffler Springs				5				5				5				5

HGFA Operations Manual

Aircraft & Equipment Standards - Maintenance

Weightshift Microlight Maintenance Standards



MAINTENANCE REQUIREMENT		AIRCRAFT or ITEM - HOURS OF OPERATION															
		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
Ignition switch had ON/OFF identification			2		2		2		2		2		2				2
Engine earthing cable			2		2		2		2		2		2		2		2
Carburettor			3		3		3		3		3		3		3		3
Ground run as specified by manufacturer, note static rpm in log book. If rpm below that required consult manufacturers recommendations			2		2		2		2		2		2		2		2
Exhaust Gas Temperature operation checked			2		2		2		2		2		2		2		2
Cylinder Head Temperature operation checked			2		2		2		2		2		2		2		2
WING	Wing Fabric deterioration and tears		2		2		2		4		2		2		2		5
Wing Fabric Stitching			2		2		2		2		2		2		2		5
Wing Fabric attachment points			3		3		3		4		3		3		3		3
Batten Elastics			3		3		3		5		3		3		3		5
Check Battens against manufacturers profile		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Wing wires and attachment fittings			3		3		3		3		3		3		3		4
Check leading edges, keel & A Frame for straightness and dents			2		2		2		2		2		2		2		4
Check anti luff lines for kinks			2		2		2		2		2		2		2		4
TRIKE BASE	Check seats and attachments		2		2		2		2		2		2		2		4
Check seat safety harness & attachments for damage, deterioration & security, check latches for faulty operation			2		2		2		2		2		2		2		4

HGFA Operations Manual

Aircraft & Equipment Standards - Maintenance

Weightshift Microlight Maintenance Standards



MAINTENANCE REQUIREMENT		AIRCRAFT or ITEM - HOURS OF OPERATION															
		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
All aircraft bolts, nuts, washers & safety pins. Washers under each nut & at least two threads showing outside each nut			2		2		2		2		2		2		2		2
Check universal joint for wear or damage			2		2		2		2		2		2		2		2
Main Hang Bolt		2	5	2	5	2	5	2	5	2	5	2	5	2	5	2	5
Check all instruments secure and functioning			3		3		3		3		3		3		3		3
TRIKE BASE AND LANDING GEAR	All structural members & attachments		3		4		3		4		3		a		3		4
	Pivot Points	1	1	1	4	1	1	1	4	1	1	1	4	1	1	1	4
	Shock absorbing devices		3		4		3		4		3		4		3		4
	Main and nose wheels		3		4		3		4		3		4		3		4
	Wheel Bearings	1	1	1	4	1	1	1	4	1	1	1	4	1	1	1	4
	Brakes -linings	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4
	Brakes - Drums or discs				4				4				4				4
	Brakes - Hose and lines				3				3				3				3
	Brakes - Check for correct operation		2		2		2		2		2		2		2		2
	Tyres		2		2		2		2		2		2		2		2
SEAPLANES or AMPHIBIANS	External coverings and internal structure or hull and floats		3		3		3		3		3		3		3		4
	Check for signs of internal damage, winking or buckling, or evidence of leaks. Check drain plugs		2		2		2		2		2		2		2		2

HGFA Operations Manual

Aircraft & Equipment Standards - Maintenance

Weightshift Microlight Maintenance Standards



MAINTENANCE REQUIREMENT	AIRCRAFT or ITEM - HOURS OF OPERATION																
	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	
Boat struts, bracing and fittings		3		4		3		4		3		4		3		4	
Water rudder and attachments	1	3	1	4	1	3	1	4	1	3	1	4	1	3	1	4	
Check for corrosion in all aircraft components	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	

9.7.8 Aircraft Log Book

It is recommended that a log book be kept for Hang Gliding & Paragliding aircraft.

Where an aircraft is used for training operations or the aircraft is a weightshift microlight, separate log books **must be kept for the aircraft, engine and wing**, and the following information entered:

- (a) Date and hours flown;
- (b) Maintenance carried out;
- (c) Name of the person who conducted the maintenance, their signature and HGFA number, if applicable.
- (d) Modifications;
- (e) Components changed; and
- (f) Special inspections.
- (g) Maintenance conducted by:

If a weightshift microlight, engine or wing is sold the relevant log book must be handed to the new owner. No lien can be held against the log book.

The log book must be produced on the request of the HGFA Operations Manager or a person authorised in writing by the HGFA Operations Manager to carry out Log Book inspections.

WM Aircraft Log books may be downloaded from the HGFA website (www.hgfa.asn.au)

9.7.9 Defects, Repairs and Modifications (HG/PG/PPG/WM)

NOTE: For any LSA, all repairs and modifications including who can conduct those repairs and modifications, must be approved by the LSA manufacturer.

9.7.9.1 Defect Reports

Details of any defect which develops in service and which if kept uncorrected would compromise the continued safe operation of the hang glider, paraglider or weightshift microlight shall be reported as soon as practicable to HGFA Operations Manager.

The Operations Manager shall initially investigate the defect and report the facts of the matter to the Safety and Operations Committee who will be responsible for determining any corrective action that is required, including the notification of owners of similar aircraft.

Defect Report forms are available online on the HGFA Website

9.7.9.2 Airworthiness Directives

Airworthiness Directives requiring mandatory compliance may be issued by the aircraft manufacturer, Operations Manager as faults or defects become evident.

9.7.9.3 Repairs -Weightshift Microlights

ANY MAJOR REPAIR - AIRCRAFT must be carried out in accordance with the manufacturer's specifications and recommended procedures.

Where a weightshift microlight is used for training operations, any major repair must be conducted by the aircraft manufacturer or authorised agent.

ANY MAJOR REPAIR -ENGINES must be carried out in accordance with the manufacturer's specifications and recommended procedures. In the absence of the manufacturer's specifications then the major repair shall be carried out by, or under the supervision of, a specialist in that type of engine.

NOTE: For any LSA, all repairs and modifications including who can conduct those repairs and modifications, must be approved by the LSA manufacturer.

ALL OTHER REPAIRS may be carried out by the owner in accordance with the manufacturer's specifications.
Details of all repairs must be entered into the appropriate logbook.

9.7.9.4 Modifications

Details of all modifications must be entered into the appropriate logbook, and must be conspicuously available to all operators of the aircraft and include all:

- (a) MAJOR MODIFICATIONS must be approved in writing by the manufacturer or in some instances, by a CASR 21M engineer. The approval must subsequently be kept with the relevant logbook.
- (b) MINOR MODIFICATIONS may be made by the owner.

9.7.9.5 AIRCRAFT OWNED BY MORE THAN ONE PERSON

Where an aircraft is owned by more than one person, or by a company, then the person it is registered to (the Principal Registered Owner) will be responsible for ensuring that all maintenance, repairs and modifications are properly carried out and recorded into the appropriate logbook.

9.7.9.6 Inspection after an Unusual Occurrence

Hard landing, high load in-flight, roll-over, etc are considered unusual occurrences and the following applies:

- (a) As with hang gliders, it will be necessary to do a detailed inspection for any unusual stressing of the microlight.
- (b) A full inspection of bolts, wire bolt holes, sail and trike carried out before the microlight is flown.
- (c) The inspection shall be noted in the log book, and any replacement to be recorded.

9.7.10 PPG/PPC Wheel Base Maintenance Standards (Engine Included)

PPG Wheel Bases operated in accordance with this Manual shall be maintained in accordance with the Manufacturers Manual. Where no manufacturers Manual exists the aircraft shall be maintained to the Schedules contained in this Manual.

These requirements include:

- (a) Maintenance of aircraft as per either:
 - (i) the manufacturer's Maintenance Schedule, or
 - (ii) the Maintenance Schedule included in this manual, adjusted as necessary, to suit the particular wheel base.
(This is only to be used in the non-existence of a Manufacturers Maintenance Schedule).
- (b) Modification as detailed in any relevant Airworthiness Directives.
- (c) Major Modification to approved details, obtained from the manufacturer .
- (d) Repairs necessary to replace minor damage, wear or ageing.
- (e) Servicing, replacement and overhaul, inspection and checking in compliance with the Maintenance Schedule.

Where a wheel base is used for training or operations, any maintenance requiring removal or replacement of an integral part must be conducted by the aircraft manufacturer or approved agent of the manufacturer.

9.7.10.1 Periodic Inspections

After each two years of service, a wheelbase being used for Tandem Flights or training, must undergo an independent airworthiness inspection, conducted in accordance with HGFA inspection guidelines (Doc. REG-07 - See [1.3](#) - Operational Documents Register). or guidelines specified by the aircrafts manufacturer.

This is to be completed by the aircraft manufacturer or approved agent of the manufacturer or the holder of a HGFA Maintenance Endorsement. A report on maintenance carried out to rectify any problems, must be kept with the wheel base log book, which is to be made available for inspection during a Flight Training Facility audit.

Note: The following Maintenance Schedules are generalised for use with varying construction details.

Figure 9-1-2 – PPG/PPC Wheel Base & Engine Maintenance Legend for Table 3;

Code	Maintenance Requirement
1	Oil, lubrication, clean and service
2	Check as directed
3	Check for insecurity, cracks, wear and faulty operation
4	Remove, inspect and replace if necessary
5	Replacement or overhaul

For information regarding who can carry out maintenance on these aircraft see [9.7.10.2](#) and [9.7.10.3](#)

HGFA Operations Manual

Aircraft & Equipment Standards - Maintenance

PPG/PPC Wheel Base Maintenance Standards (Engine Included)



Table 3: PPG/PPC Wheel Base & Engine Checklist

Cross out checks that are not applicable to the Wheel Base & Engine being inspected.		WHEEL BASE & ENGINE - HOURS OF OPERATION															
		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
MAINTENANCE REQUIREMENT CONT.																	
Check balance					4				4				4				4
Gearbox	All welds		3		3		3		3		3		3		3		3
All bolts			3		3		3		3		3		3		3		3
Oil leaks			2		2		2		2		2		2		2		2
Drive V Belts		1	1	1	4	1	1	1	5	1	1	1	4	1	1	1	5
Reduction Pulleys									4								5
Reduction Bearings			1		1				5		1		1		1		5
Drive Shaft									4								5
Propeller Shaft									4								5
Radial Bearing			1		1		1		5		1		1		1		5
Thrust Bearing			1		1		1		4		1		1		1		5
ENGINE	Check & Overhaul																5
Leaks which could indicate cracks or blown gaskets or seals			2		2		2		2		2		2		2		2
Cylinders and Manifolds			3		3		3		3		3		3		3		3
All welds			3		3		3		3		3		3		3		3
Loose belts		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Engine Rubber Mounts			3		4		3		5		3		4		3		5
Spark plugs (CLEAN EVERY TEN HOURS)		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Spark Plugs and Ignition Harness Secure			2		2		2		2		2		2		2		2
Crankcase and mounting lugs free from cracks			2		2		2		2		2		2		2		2
Fuel Lines routed properly (free from abrasion, heat & sharp edges) – fittings tight		2	2	2	4	2	2	2	4	2	2	2	4	2	2	2	5
Fuel Tank secure			3		3		3		3		3		3		3		3
Fuel Filer			5		5		5		5		5		5		5		5

HGFA Operations Manual

Aircraft & Equipment Standards - Maintenance

PPG/PPC Wheel Base Maintenance Standards (Engine Included)



Cross out checks that are not applicable to the Wheel Base & Engine being inspected.		WHEEL BASE & ENGINE - HOURS OF OPERATION															
		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
MAINTENANCE REQUIREMENT CONT.																	
Fuel Pump																	5
Throttle Cable		1	3	1	4	1	3	1	4	1	3	1	4	1	3	1	5
Air Cleaner		1	1	1	4	1	1	1	4	1	1	1	4	1	3	1	5
Check exhaust Ports for Carbon Build up			2		2		2		2		2		2		2		2
Muffler			4		4		4		5		4		4		4		5
Muffler Springs					5				5				5				5
Ignition switch ON/OFF identification			2		2		2		2		2		2				2
Engine earthing cable			2		2		2		2		2		2		2		2
Carburettor			3		3		3		3		3		3		3		3
Ground run as specified by manufacturer, note static rpm in log book. If rpm below that required consult manufacturers recommendations			2		2		2		2		2		2		2		2
Exhaust Gas Temperature operation checked			2		2		2		2		2		2		2		2
Cylinder Head Temperature operation checked			2		2		2		2		2		2		2		2
WHEEL BASE	Check seats and attachments		2		2		2		2		2		2		2		4
Check seat safety harness & attachments for damage, deterioration & security, check latches for faulty operation			2		2		2		2		2		2		2		4
All aircraft bolts, nuts, washers & safety pins. Washers under each nut & at least two threads showing outside each nut			2		2		2		2		2		2		2		2
Shock absorbing devices			3		4		3		4		3		4		3		4
Main and nose wheels			3		4		3		4		3		4		3		4
Wheel Bearings		1	1	1	4	1	1	1	4	1	1	1	4	1	1	1	4
Brakes -linings		3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4

HGFA Operations Manual

Aircraft & Equipment Standards - Maintenance

PPG/PPC Wheel Base Maintenance Standards (Engine Included)



Cross out checks that are not applicable to the Wheel Base & Engine being inspected.		WHEEL BASE & ENGINE - HOURS OF OPERATION															
		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
MAINTENANCE REQUIREMENT CONT.																	
Brakes - Drums or discs					4				4				4				4
Brakes - Hose and lines					3				3				3				3
Brakes - Check for correct operation			2		2		2		2		2		2		2		2
Tyres			2		2		2		2		2		2		2		2
WING	As specified under Paraglider Maintenance Standards - Sections 4.1.4, 4.1.5 & 4.1.6																

9.7.10.2 Repair of Wheel Base Aircraft Utilised for Training Operations.

ANY MAJOR REPAIR:

- (a) must be carried out in accordance with the manufacturer's specifications and recommended procedures, and
- (b) must be conducted by the aircraft manufacturer or approved agent of the manufacturer.

ANY MAJOR REPAIR – ENGINES: Must be carried out in accordance with the manufacturer's specifications and recommended procedures.

ALL OTHER REPAIRS: May be carried out by the owner in accordance with the manufacturer's specifications.

Details of all repairs must be entered into the Wheel Base logbook.

9.7.10.3 Repair of Wheel Base Aircraft Utilised for Recreational Operations.

It is highly recommended that repairs be carried out by personell as stipulated in section 9.7.10.2 or persons who hold an appropriate HGFA Maintenance endorsement.

9.7.10.4 Modifications of Wheel Base Craft Utilised for Training Operations.

Details of all modifications must be entered into the wheelbase logbook, and must be conspicuously available to all operators of the aircraft.

MAJOR MODIFICATIONS - Must be approved in writing by the manufacturer and the approval must subsequently be kept with the wheel base logbook.

MINOR MODIFICATIONS - May be made by the owner.

9.7.10.5 Wheel Base Owned By More Than One Person.

Where a wheel Base is being used for training or operations and is owned by more than one person, or by a company, then the person it is registered to (the Principal Registered Owner) will be responsible for seeing that all maintenance, repairs and modifications are properly carried out and recorded into the wheelbase logbook.

9.7.10.6 Inspection after an Unusual Occurrence (Training Aircraft)

(e.g. Hard landing, high load in-flight, roll-over, etc.)

It will be necessary to do a detailed inspection for any unusual stressing of the wheel base.

A full inspection must be carried out before the wheel base is flown.

The inspection shall be noted in the log book, and any replacement to be recorded.

9.7.10.7 Wheel Base Log Book

Where a wheel base is used for Instructional Tandem or training operations, a log book must be kept for the aircraft with the following information entered :

- (a) Date and hours flown;
- (b) Maintenance carried out;
- (c) Name of the person who conducted the maintenance, their signature and HGFA number, if applicable.
- (d) Modifications and their approvals;

HGFA Operations Manual

Aircraft & Equipment Standards - Maintenance

PPG/PPC Wheel Base Maintenance Standards (Engine Included)



- (e) Components changed; and
- (f) Special inspections.
- (g) Date of completed Biennial Inspections, if required, and reports attached.

If a wheel base used for training or tandem flights is sold, the relevant log book must be handed to the new owner.

No lien can be held against the log book.

NOTE: In law, a **lien** is a form of security interest granted over an item of property to secure the payment of a debt or performance of some other obligation. Not to be confused with, "he was lien about the aircraft"!

The log book must be produced on the request of the HGFA Operations Manager or a person authorised in writing by the HGFA Operations Manager to carry out Log Book inspections.

A Wheelbase Log book template may be downloaded from the HGFA website.

[End of the HGFA Operations Manual]