

**2009 HGMA AIRWORTHINESS STANDARDS**

**H.G.M.A. PART 1  
HGMA AIRWORTHINESS STANDARDS  
UTILITY ULTRALIGHT GLIDERS**

**SECTION ONE-** DOCUMENTS AND FORMS

- 1) Application Form and Release
- 2) Documentation Video Checklist
- 3) Documentation Report Checklist
- 4) Compliance Verification Specification Sheet

**SECTION TWO-** HGMA ADMINISTRATIVE POLICIES AND PROCEDURES

- 1) Purpose, scope, interpretation, units, amendments to standards, membership and other fees, advertising.
- 2) Applicability, glider categories, certificates of compliance, the certification committee, review and verification of records of compliance, review and revocation of certificates of compliance, call for incident report.

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Flight tests, vehicle tests, and documentation requirements.

**SECTION FOUR-** DOCUMENTATION REPORT

Requirements for the written documentation report.

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APPLICATION FOR CERTIFICATE OF COMPLIANCE

Date \_\_\_\_\_ Manufacturer \_\_\_\_\_

Principal Officer \_\_\_\_\_

Factory Address:

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Country \_\_\_\_\_ Phone \_\_\_\_\_

GLIDER FOR WHICH CERTIFICATE IS REQUESTED

Model \_\_\_\_\_

Size Description \_\_\_\_\_

General Description of Glider:

SUMMARY OF SELECTED FLIGHT CHARACTERISTICS

3.8 Will the glider spin?

3.100 Roll Rate (45 to 45)

3.110 Approved acrobatic maneuvers

3.130 L/D \_\_\_\_\_ at \_\_\_\_\_ mph

3.200 Longitudinal control

3.210 Maximum speed recommended (Vne) mph

3.300 Positive Ultimate Test Speed \_\_\_\_\_ mph

4.20 May glider be towed?

Recommended pilot weight range \_\_\_\_\_ lbs.

Weight of glider \_\_\_\_\_ lbs.

Recommended level of pilot skill

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**INFORMATION RELEASE**

The information contained herein is to the best of my knowledge complete, accurate, and in accordance with the requirements of the HGMA standards.

I hereby release this information to the Hang Glider Manufacturers Association, and acknowledge that the material may be used pursuant to the stated goals and purposes of the association.

Date                      PRINCIPAL OFFICER, TITLE

**HGMA COMPLIANCE VERIFICATION SPECIFICATION SHEET**

GLIDER MODEL

MANUFACTURED BY

All dimensions in inches; weights in pounds.

NOTE: These specifications are intended only as a guideline for determining whether a given glider is a certified model and whether it is in the certified configuration.

Be aware, however, that no set of specifications, however detailed, can guarantee the ability to determine whether a glider is the same model, or is in the same configuration as was certified, or has those performance, stability, and structural characteristics required by the certification standards. An owner's manual is required to be delivered with each HGMA certified glider, and it is required that it contain additional airworthiness information.

- 1) Weight of glider with all essential parts and without coverbags and non-essential parts:
- 2) Leading Edge Dimensions
  - a) Nose plate anchor hole to:
    - 1) Crossbar attachment hole
    - 2) Rear sail attachment point
  - b) Outside diameter at:
    - 1) Nose
    - 2) Crossbar
    - 3) Rear sail attachment point
- 3) Crossbar Dimensions
  - a) Overall pin to pin length from leading edge attachment point to hinge bolt at glider centerline
  - b) Largest outside diameter
- 4) Keel dimensions; least and greatest allowable distances, whether variable through tuning or through in-flight variable geometry, from the line joining the leading edge nose bolts to:
  - a) The xbar center load bearing pin
  - b) The pilot hang loop
- 5) Sail Dimensions
  - a) Chord lengths at:
    - 1) 3 ft outboard of centerline
    - 2) 3 ft inboard of tip
  - b) Span (extreme tip to tip)
- 6) Location of Information Placard  
Location of Test Fly Sticker
- 7) Recommended Pilot Weight Range
- 8) Recommended Pilot Proficiency

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### SECTION TWO

#### FORWARD

##### 1. PURPOSE

These Airworthiness requirements are published by the HGMA. They comprise the minimum requirements consistent with safe flying characteristics and structural soundness of Hang Gliders.

##### 2. SCOPE

These Airworthiness Standards were adopted at the December 15, 2008 meeting of the Board of Directors by majority vote.

These standards become effective upon adoption.

Use of a dictionary is recommended when interpreting the requirements of these standards.

##### 3. INTERPRETATION

These Airworthiness requirements should not be regarded as constituting a textbook of current aeronautical knowledge; interpretation of the requirements against a back-ground of such knowledge is essential.

Mandatory clauses are denoted by the use of "shall" or "must": "should" or "may" are used in the text to introduce permissive or recommended clauses.

The term "video" is used throughout to refer to motion picture documentation. Either video or video media is acceptable as long as the information so presented is of sufficient quality to fulfill the requirements.

##### 4. UNITS

Throughout this document the British units of measurements are used.

##### 5. AMENDMENTS

These requirements will be amended when deemed necessary, by the directors by their majority vote.

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### 6. FEES

An initial membership fee of \$100 shall entitle the member company to membership. Annual membership renewal will require a fee of \$50.

A \$100 filing fee shall be assessed for each submission (documentation package or addendum) that requires the issuance of a new certificate of compliance. A \$50 filing fee shall be assessed for each submission (addendum) that does not require the issuance of a new certificate of compliance.

An additional annual fee shall be assessed to each member with at least one certified glider in current production. The total of such fees shall be computed so as to equal the additional revenue required to meet the association's expenses, and each individual fee shall be a prorated portion of the total based on a percentage of the total certified gliders in production that are manufactured by each member.

### 7. ADVERTISING

Member manufacturers agree as a condition of their membership to restrict themselves in their mention of or reference to HGMA certification in advertising for their gliders according to the following:

- a) These restrictions shall apply to any and all advertising that is published in media which is circulated to the public.
- b) Mention of HGMA certification in any advertising shall be restricted to stating that a given model and size is HGMA certified. No such statement shall be made with respect to any glider, which has not been granted an HGMA certificate of compliance at the time the advertising copy is submitted for publication. Comparative or superlative references to HGMA certification such as "fully certified" or "strongest ever certified" or "fastest ever certified" or "certified to twice the required strength" are prohibited. Also prohibited are references such as "certification in progress", "certification pending", "tested to certification standards", or "meets all certification requirements".

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### 2.10 APPLICABILITY

The information, specifications, and procedures prescribed herein apply to Utility Category Ultralight Hang Gliders.

### 2.20 GLIDER CATEGORIES

**a)** Utility Category is defined to be the class of non-aerobatic, medium performance ultralight hang gliders designed for normal operation, and general use, sale and production.

**b)** The Utility Category is limited to gliders intended for "limited acrobatic operation". Gliders certificated in the utility category may be used in any of these normal operations:

- 1) Any maneuver incident to normal flying.
- 2) Stalls (except whip stalls)
- 3) Steep turns in which the angle of bank is not more than 60 degrees.
- 4) Spins (if approved).
- 5) Steep turns in which the angle of bank is more than 60 degrees, (but less than 90 degrees).

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### CERTIFICATES OF COMPLIANCE

#### 2.30 GENERAL

Unless otherwise specified, each requirement of this standard must be met at a gross loading within the recommended load range, for which certification is requested. This must be shown by documented tests upon a glider of the type for which certification is requested, or, where prescribed by calculations based on and equal in accuracy to the results of testing. Each size glider of a particular model must be so certified. There is no provision in these standards for satisfying the documentation requirements for any glider model or size by reference to the documentation package for any other model or size. A complete and separate documentation package is required for each size of each model for which certification is requested.

General required documentation, which is not specific to the glider, such as terrain slope and vehicle free stream flow, may be specified relative to a prior package.

#### AMENDMENTS AND ADDENDA

All design changes to a previously certified glider, which may alter the accuracy of the record of compliance, require the filing of an amendment or an addendum. Included in any amendment or addendum must be an identifying description not to exceed 100 characters which identifies adequately the changes for which the document has been submitted. The extent or complexity of a single addendum should not exceed what can adequately be identified with 100 characters.

- 1) Any design changes, which are of a solely structural nature, may be covered by an addendum to the certification package for the glider in question. Such addendum shall show that the glider in its modified form still complies with the requirements of the airworthiness standards to which it was originally certified.
- 2) Any design changes that affect any aerodynamic characteristics of the glider require that an addendum be filed showing that the modified glider complies with the HGMA Airworthiness Standards in effect at the time the addendum is filed.
- 3) Any name changes to a previously certified glider must be recorded by the filing of an amendment or the model so designated is not considered certified. A corresponding new certificate of compliance will be issued.



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### GLIDERS WITH IN-FLIGHT VARIABLE GEOMETRY OR IN-FLIGHT VARIABLE TUNING

Manufacturers wishing to certify gliders with in-flight variable geometry or in-flight variable tuning must show that the glider passes all requirements with the variable geometry or tuning mechanism at both extremes of its in-flight adjustment. If more than one adjustment method is available, documentation must be supplied for all combinations of all extremes of such adjustments.

In addition, the manufacturer must present an analysis in the written package that provides a reasonable assurance that compliance is implied at any intermediate setting or combination of settings of the in-flight adjustable devices.

During the documentation of the 45/45 roll reversal, the pilot may activate or de-activate the variable geometry control mechanism. If he does so, however, the video documentation must clearly show the process of activation or de-activation, and the timing for the maneuver will start when the pilot transitions from the normal flying position to begin the process of activating or de-activating the mechanism.

If any in-flight change in tuning is made during any required flight maneuver, it is mandatory that the glider be placarded by the manufacturer for a minimum pilot proficiency equivalent to a USHGA Hang IV Rating.

All documentation of flight maneuvers for packages and addenda for VG gliders must be entirely separated into one section documenting all maneuvers VG loose in checklist order, and a second section documenting all maneuvers VG tight in checklist order.

#### 2.40 APPLICATION FOR A CERTIFICATE OF COMPLIANCE

After all testing has been completed, the manufacturer will submit a Record of Compliance to the HGMA. The record shall be in two parts:

- 1) A video documenting all required flight and vehicle tests as outlined in section three of these standards.
- 2) A written report containing all information requested in section four of these standards.

In order to make application for a certificate of compliance, a member manufacturer must first call the HGMA president and ask for a time slot. The president will reserve a time slot at the next scheduled meeting of the review board, or, if no meeting is scheduled, will schedule a review board meeting.

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The Record of Compliance presented to the board for review must be in the form of a report. Such a report shall be bound in some manner and organized in an easily accessible fashion. The written report shall follow the order of the documentation report checklist contained in Section One of these standards. Photographs and/or other supportive materials must be wholly contained and attached to the report. Mailing envelopes containing loose sheets and pictures will not be considered. Three ring notebooks are the most common means for presenting a report. Additional copies of the written report may be submitted in electronic form for online review in pdf format.

### SEALING OF DOCUMENTATION PACKAGES

Following the review of a documentation package or addendum and prior to its being put on file with the HGMA, a review board member other than the member submitting the package shall seal the package in a suitable container, and shall, in writing on the package, identify the date and the contents. Packages thus sealed may not be opened except by a quorum of the board of directors of the HGMA not less than 7 days after notice has been given to the member company in question.

### 2.50 CERTIFICATION COMMITTEE

The Certification Committee shall be comprised of the Board of Director's of the Hang Gliders Manufacturer's Association. The number of directors shall be as determined by the board, as per the association bylaws.

A majority of the authorized number of Directors constitutes a quorum as per the association bylaws.

Acceptance of a Record of Compliance shall require a majority vote of the directors present.

No Certificates of Compliance will be granted based upon a contingent action. A Record of Compliance is either acceptable or unacceptable as it is submitted. A Certificate of Compliance cannot be issued if the Record of Compliance was voted unacceptable.

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### 2.60 REVIEW AND VERIFICATION OF RECORD OF COMPLIANCE

a) At a duly scheduled meeting of the Certification Committee, or by individual review by the committee members, the committee shall review any and all documentation packages submitted by any member manufacturer who is currently paid up with respect to membership dues, who has paid the appropriate filing fee, and who has duly scheduled in advance with the HGMA president a time slot for the review of the documentation package, or has arranged with the president and each certification committee member for submission and review of the documentation package by mail or by a combination of mail and review online. Submission of documentation for review by mail or online is permissible whenever all of the following conditions are met:

i) No meeting of the Certification Committee is scheduled within the next 30 days.

ii) The submitting member has contacted each certification committee member and the president and notified them of the intent to submit the package for review by mail.

The submitting member shall then supply either one copy of the package to be circulated to each committee member in turn, or multiple copies of the package for review by the committee members, or, in the case of a combination mail and on line review, will submit the video and checklists to the review committee members by mail, and submit one complete copy of the written package to one review board member who is not the submitting member, and submit one electronic copy in pdf format of the written package (excluding the batten diagram) to the president for posting to the HGMA web site for online review. The review committee member receiving the written copy of the package will review both the written copy and the on line copy to verify equivalence, and upon acceptance of the documentation will seal the written copy with the video to be placed on file. In either case, a set of checklists must be provided for each reviewing committee member. Each committee member shall review the package within 2 weeks of receipt, in a manner generally in accordance with the procedures in 2.60 (b) below, except that they will complete their individual checklists in such a manner as to reflect their vote for acceptance or rejection of each item on the checklists, and, they will record their overall individual vote to either accept the package, reject the package with complete re-submission required, or reject the package with re-submission of the marked rejected items required, in accordance with 2.60 (b) items 4 and 5 below. Each committee member will then forward their completed checklists representing the results of their review and their vote to the president. The president will tally the votes and determine the consensus in the following manner:

i) If a majority of votes cast is in favor of acceptance, the package is accepted.

ii) If a majority of votes cast is in favor of rejection requiring complete re-submission, the package is rejected and complete resubmission is required.

iii) If neither (i) or (ii) above applies, then the package is rejected according to the following:

"RE-SUBMISSION OF THOSE ITEMS INDICATED REJECTED ON THIS LIST IS PERMITTED, PROVIDING THAT THE ENTIRE PACKAGE SUBMITTED AT THIS MEETING IS PUT ON FILE AT THIS TIME."

where the rejected items will be considered to be all items marked rejected on any checklist submitted by any committee member.

In addition, when a package is being "reviewed by mail" under the provisions above, if any review board member feels that there is a need for discussion among the review board members of items in question in the package, he may, within 2 weeks of receipt of the package, notify the president by phone or email, at which point it will become necessary for all review board members reviewing the package to participate in a discussion of these items, either by teleconference, or by web based conferencing, or by email exchange, before casting their votes regarding acceptance of the package.

After all appropriate review procedures have been followed, the president will then communicate the results of the review to the submitting member.

The purpose of the review process will be to verify that the record is complete and in accordance with the requirements, recommendations and suggestions of the HGMA standards. The Record of Compliance must be in the form of a document, written and organized in accordance with the requirements of the HGMA Standards, and in such a manner so as to be easily read and verified.

**b) OPERATION PROCEDURE FOR THE REVIEW OF PACKAGES**

- 1) The board members mark each item on the checklist to accept or reject, as the package is being reviewed. If the item is marked reject, the board member notes the reason or reasons in the comments section to the right of the item.
- 2) The review board members ask any questions they have at the time they review each item, and are responsible for coming to a decision on each item before moving on to the next. A board member can change his decision on an item at a later time, if he finds additional or misplaced documentation. When reviewing the video/film documentation, the video is stopped after each section as indicated to allow the board members to mark each item, and to ask for a review of any section they need to see again.
- 3) At the end of the review of the written report, and again at the review of the video/film documentation, each board member marks his checklist to either accept or reject the overall organization, clarity and quality of documentation of that section.
- 4) After the review is complete, the presenting member leaves the room, and the remaining board members fill out a master review checklist, by establishing a consensus to accept or reject each item on the checklist. The board then votes to accept or reject the entire package, and so marks the master checklist, indicating the numerical result of the vote.
- 5) If the rejection of the package is based substantially on unacceptable overall organization, clarity, and quality of documentation, then the board will mark the statement, which reads, "COMPLETE RE-SUBMISSION OF PACKAGE IS REQUIRED".

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If the overall organization, clarity and quality of documentation is adequate, then the board may elect to mark the statement, "RE-SUBMISSION OF THOSE ITEMS INDICATED REJECTED ON THIS LIST IS PERMITTED, PROVIDING THAT THE ENTIRE PACKAGE SUBMITTED AT THIS MEETING IS PUT ON FILE AT THIS TIME."

6) In the event that a partial re-submission is allowed, and elected by the presenting member, the board will keep one copy of the master checklist, and give one to the presenting member, and the board will put on file the entire package presented at that meeting.

7) Resubmittal of rejected material shall take place in a timely fashion. Failure to do so within 90 days of first submittal will result in rejection and return of the retained material, requiring complete resubmittal of the package.

8) In the event that a certification package or addendum presented for review is rejected, no subsequent acceptance of said item nor any issuance of certificate may take place within 30 days of the date of original submission.

c) If so verified, a Certificate of Compliance will be issued. The certificate is to read:

"(Date), The (model and size), Manufactured by (manufacturer), has, by declaration of the manufacturer, been found to comply with H.G.M.A. Part 1: Airworthiness Standards, Utility Ultralight Gliders. A Record of Compliance has been received by the H.G.M.A. Certification Committee and found to be complete and in accordance with the recommendations specified in H.G.M.A. Part 1."

In addition, a copy of the compliance verification specification sheet, items 1 through 8, will be put on file at the time of the awarding of the certificate of compliance. These specifications will be preceded by the following statement:

"NOTE: These specifications are intended only as a guideline for determining whether a given glider is a certified model and whether it is in the certified configuration. Be aware however, that no set of specifications, however detailed, can guarantee the ability to determine whether a glider is the same model, or is in the same configuration as was certified, or has those performance, stability, and structural characteristics required by the certification standards. An owner's manual is required to be delivered with each HGMA certified glider, and it is required that it contain additional airworthiness information."

The certificate of compliance will be issued a number in the following format: "#####-##" The numbers are assigned chronologically with the digits for each category as follows:

#### year, ## month, ## day, dash, ## first through nth certificate awarded that day.

Example: Cert. # 20010216-02 would be the second certificate awarded on the 16th day of February 2001.

**2.70 REVIEW AND REVOCATION OF CERTIFICATES OF COMPLIANCE**

**a)** A Certificate of Compliance shall be reviewed by the Certification Committee if the glider for which the certificate is issued:

- 1) suffers an in-flight structural failure and/or aerodynamic abnormality which interferes with the safe operation of the aircraft, and
- 2) is considered by at least three members to be of questionable safety, or;
- 3) is considered, by a 2/3 majority of the membership, by their vote to have characteristics indicative of a condition that could result in serious injury or death.

**b)** If by a vote of three members following an in-flight incident, or by a vote of the membership at large as specified in (a) of this section, it is determined that there is a "question of compliance".:

- 1) The manufacturer will be notified by registered letter that there is a "question of compliance" and the matter is being reviewed by the Certification Committee.
- 2) Upon notification, the manufacturer must, within 30 days, provide the HGMA Certification Committee, for compliance verification, a glider of identical type and construction as that named in the "question of compliance" action. If it is found that the glider so supplied is not representative of the type named, the Certificate of Compliance will be revoked without further review.
- 3) The H.G.M.A. will issue a formal statement to be published in the hang gliding media that will read:  
"On (date), the H.G.M.A. Board determined that there is a question whether the (model), manufactured by (manufacturer), complies with the H.G.M.A. Airworthiness Standards."
- 4) The Record of Compliance provided by the manufacturer of the glider in question shall be reviewed and its accuracy verified by the Certification Committee within 30 days of the receipt of the glider by the committee. Upon completion of its review the Committee will issue a statement, to be published in the hang gliding media, regarding its findings.

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(i) If the Committee finds any part of the "Record of Compliance" to be deliberately falsified or obviously not representative of the glider in question, the Certificate of Compliance shall be formally revoked and by direction of the Committee, neither this Certificate or any new Certificate will be reconsidered for a period of up to one year, depending upon the extent and nature of the falsification. The following statement will be issued and published in the hang gliding media:

"The Certification Committee as a result of the compliance action dated (date), concerning the (model), manufactured by (manufacturer), has reviewed the Record of Compliance provided by the manufacturer and found the Record to be spuriously inaccurate. Accordingly, the Certificate of Compliance granted (date) for the (model) has been revoked. Furthermore, the Certification Committee has directed that no new applications from (manufacturer) be considered until (date)."

(ii) If the Certification Committee finds that there is reason to believe that marginal compliance in one or more cases could have resulted in accident or injury, it will declare "Compliance with Qualification." The manufacturer will be sent a statement discussing the section(s) in question. Upon receipt of this statement, the manufacturer shall be required to make such changes in the design as are necessary to increase the margin of compliance as recommended by the Committee. When tests verify compliance as recommended, the following statement will be issued and published in the hang gliding media:

"The Certification Committee, as a result of the Compliance action dated (date), concerning the (model), manufactured by (manufacturer), has reviewed all available information pertaining to the action including, but not limited to, the Record of Compliance and found "Compliance with Qualification". Upon notification the manufacturer promptly made such changes in the "(model)", so as to increase the margin(s) of compliance as recommended by the Committee."

(iii) If the Certification Committee verifies compliance, but in its review of the action finds that there is a condition or characteristic not adequately considered in the Airworthiness Standards, but in their judgement of a nature that could result in injury or accident, a formal recommendation will be made to the H.G.M.A. Board concerning the creation or modification of the Airworthiness Standard so as to preclude this condition in production gliders.

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5) If the Committee finds no evidence of non-compliance or other conditions or characteristics, which could result in injury or accident, it will be the determination of the Committee that an "error in the operation of the glider" was the most probable cause for an accident or apparent non-conformity. A statement will be issued in this regard and published in the hang gliding media. If the compliance action was the result of an accident the statement shall read:

"The Certification Committee as a result of a Compliance action dated (date), concerning the (model), manufactured by (manufacturer), has reviewed all information pertaining to the action including, but not limited to, the Record of Compliance and found no evidence of non-compliance. It is the determination of the Committee that an error in the operation of the glider was the most probable cause of the accident on (date) which resulted in the compliance action."

### 2.80 CALL FOR INCIDENT REPORT

If a glider for which a certificate has been issued is involved in an incident that, in the opinion of any member of the HGMA calls into question either the compliance of the glider with the standards, or the airworthiness of the glider, the member shall have the right to issue a "Call for Incident Report" (CFIR).

The procedure for issuing a CFIR shall be that the issuing member shall send a registered letter to the manufacturer of the glider in question, and a copy of the letter to the HGMA Board of Directors, in care of the president. The letter shall state such facts or assumptions regarding the incident, and, if available the name, address and phone number of the pilot and any witnesses. The letter shall also contain the statement, "It is the intent of this letter to invoke Section 2.80 of the HGMA Airworthiness Requirements, Part 1. This letter requires written response, within sixty days of receipt, according to the requirements stated in section 2.80."

The manufacturer of the glider in question shall be required, within sixty days of receipt of the CFIR letter, to make a reasonably thorough investigation of the incident and to send, by registered mail, a written response to the HGMA Board of Directors, in care of the president. Such written response shall be made available to any member for inspection at each of the next three HGMA Board of Directors' Meetings, and shall then be placed on file with the HGMA record of compliance for the glider in question.



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The written response to the CFIR shall include at least the following information:

- 1) A copy of the original CFIR letter.
- 2) A description of the incident, which is as detailed and as accurate as the manufacturer is able to provide, based on his investigation of the incident.
- 3) A statement of the apparent probable cause or causes of the incident in the opinion of the manufacturer.
- 4) A statement of any advisories issued, or modifications made to the model in question that are a result of the incident or that are, in the opinion of the manufacturer relevant to the incident.

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**SECTION THREE**

This section describes the required flight tests, vehicle tests, and the required methods for performing and documenting these tests.

Flight tests which require documentation by ground based video or suitably framed onboard video are described first, followed by flight tests which require documentation by onboard video, followed by vehicle tests.

The order of this section follows the order of THE DOCUMENTATION VIDEO CHECKLIST in Section 1.

The video documentation must be arranged in order in accordance with the documentation video checklist, and the video must contain appropriate titles, preceding each segment of documentation, which identify the requirements, which will be documented by that video segment. Video segments should not be of any longer duration than the minimum duration required for adequate documentation of the requirements in question. All video footage must be of sufficient quality to adequately document the requirements in question, and must serve some purpose in providing information to the review board about the airworthiness of the glider. The inclusion of extraneous documentation without such purpose, or of any documentation of insufficient quality to be useful in the review process, or of documentation, which is mislocated within the documentation video, shall be considered as sufficient grounds for rejection of the documentation package by the review board.

All flight maneuvers must be performed by a pilot within the recommended weight range for the glider in question. Required flight maneuvers, which demonstrate control authority in pitch and roll must be performed by a pilot whose weight is between 1 and 1.5 times the minimum recommended pilot weight.

Any required ground based footage for any flight maneuver in which a bank angle is specified must include a horizon reference, either real or artificial.

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### FLIGHT MANEUVERS REQUIRING GROUND BASED FOOTAGE

**3.10 TAKE OFF WITHOUT EXPERT SKILL IN LIGHT WIND ON A SHALLOW SLOPE IN ACCORDANCE WITH THE FOLLOWING:**

- a) Wind of 5 mph or less, on a slope not steeper than 5 to one, or,
- b) Wind of 6 mph or less, on a slope not steeper than 6 to one, or,
- c) Wind of 7 mph or less, on a slope not steeper than 7 to one.

Ground based video, or suitably framed onboard video must document the angle to the horizon of the slope, and the approximate speed of the wind, and then show a safe, controlled launch and departure which does not require the exercise of extraordinary skill. If this launch cannot be shown in accordance with the above specified wind and slope, then the glider must be skill rated and placarded for a USHGA Advanced Proficiency level, and the minimum slope steepness and windspeed required for safe launch must be documented in this section.

### **3.20 TAKE OFF SAFELY CONTROLLABLE**

Ground based video, or suitably framed onboard video must show a launch and departure out of ground effect.

**3.30 GLIDING FLIGHT, DIVING FLIGHT, TURNS, SLIPS, STALLS, SMOOTH TRANSITIONS, ONE MINUTE OF FLIGHT IN NON-UNIFORM AIR.**

**3.40 LONGITUDINAL, LATERAL AND DIRECTIONAL STABILITY OVER THE OPERATING SPEED RANGE.**

Ground based video, or suitably framed onboard video must show the pilot performing all maneuvers incident to normal operation, including gliding, diving, turns and turn reversals, stalls and slips, and at least one minute of thermalling flight or other flight in non-uniform air. The video must show that the glider can make smooth transitions from one flight mode to another without the exercise of exceptional skill, alertness or strength on the part of the pilot, and without danger of exceeding the limit load factor. The video must show that the glider is inherently stable about all three axes throughout the normal operating speed range.

NOTE: This video section need not, and should not be of more than three minutes duration.

### **3.50 SPIRAL STABILITY**

Ground based video, or suitably framed onboard video must show the pilot flying a minimum of 2 complete circles in a coordinated 15 to 20 degree banked turn, with the pilot centered or below center on the control bar. Pilot/glider image in frame must be of sufficient size and clarity to adequately document the requirement. Turns in both directions are required.

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### 3.60 STALLS IN TURNS

Ground based video or suitably framed onboard video must show pilot flying in a coordinated 30 degree banked turn, then reducing airspeed at approximately 1 mph per second until a stall occurs or until the pilot reaches the full nose up limit of pitch control. Recovery to normal flight must be shown, and must occur without excessive loss of altitude, uncontrollable rolling characteristics, or uncontrollable spinning tendencies.

### 3.70 STALL LESS THAN 15 DEGREES ROTATION IN ROLL OR YAW

Ground based video, or suitably framed onboard video showing a reliable reference (horizon is a good reference) must document the following maneuver:

Pilot begins maneuver by flying wings level, in a straight line at a constant speed 10% above that of stall. Pilot reduces airspeed at approximately 1 mph per second until a stall results as evidenced by an uncontrollable downward pitching rotation of the glider, or until the pilot reaches the full nose up limit of pitch control. It should be possible to prevent more than 15 degrees roll or yaw rotation by normal use of the controls throughout this maneuver and the recovery to normal flight, and there should be no uncontrollable tendency for the glider to spin.

### 3.80 SPINS

Ground based video or suitably framed onboard video must show the pilot making a serious attempt to spin the glider. Proper technique for spin initiation in a flex wing hang glider involves raising the angle of attack while in a moderately banked turn to that of the first onset of stall, and then simultaneously pushing out and to the high side of the control bar. Different gliders will require different initial bank angles, and different relative amounts of push out and high siding to obtain a spin. The pilot should try various combinations and make a sincere effort to spin the glider before concluding that the glider cannot be spun.

If the glider is to be designated as "characteristically incapable of spinning", this must be adequately proven by the documented spin attempts.

Otherwise, the glider must be shown to recover from a spin of  $x$  degrees of rotation in not more than half that additional rotation, but in no case in more than 360 degrees of additional rotation without exceeding either the limiting airspeed or the positive limit load factor.

The image of the pilot in the video frame must be large and clear enough to provide for adequate review of the required maneuvers.

## 2009 HGMA AIRWORTHINESS STANDARDS

### 3.90 LATERAL CONTROL AUTHORITY

#### 3.100 DIRECTIONAL AND LATERAL STABILITY

The time to reverse a coordinated circling turn at 45 degrees bank angle must be no more than that given by the following equation:

$$T_{req} = 4 \text{ sec.} * (\text{Min. Pilot Wt.} / \text{Test Pilot Wt.})$$

Compliance with this section must be documented using a pilot weight between 1 and 1.5 times the minimum recommended pilot weight. Ground based video, or suitably framed onboard video should show the following sequence:

If ground based video is used, glider flies away from camera such that angle of view from camera to glider is not more than 45 degrees above the horizon. Pilot performs one 360 coordinated circling turn at 45 degrees bank, reverses on heading, performs a second 360 degree turn at 45 degrees bank in the opposite direction and then reverses on heading a second time.

Reversals must be initiated within a sufficiently small deviation from the prescribed heading that the bank angle can be adequately judged. Size and resolution of the glider and pilot image must be such that the movement of the pilot's body, which initiates the reversal, can be clearly seen for timing purposes. The time for each reversal must fall within the limits prescribed above.

If it is impractical for the pilot to perform two successive reversals in opposite directions, the two reversals in opposite directions may be performed separately.

During these maneuvers, the glider should not show dangerous skid characteristics.

If the glider is equipped with in-flight variable tuning devices, such devices may be activated or de-activated during the 45/45 degree reversal. If the pilot does so, however, the video must clearly show the process of tuning adjustment, and the timing for the maneuver will start when the pilot first transitions from the normal flying position to begin the process of adjusting the tuning.

**2009 HGMA AIRWORTHINESS STANDARDS**

**3.110 AEROBATIC MANEUVERS**

If it is desired to certify the glider for aerobatic maneuvers (maneuvers in which the bank angle exceeds 60 degrees, or in which the pitch angle exceeds 30 degrees nose up or nose down), each such maneuver must be performed safely and documented on video.

Such documentation requires both ground based video from two different view points and on board video.

Pilot weight must be between 1 and 1.5 times the minimum required pilot weight. A calibrated airspeed indicator and accelerometer must be clear in the onboard video frame. Airspeed must be corrected to that of the free stream. If the airspeed attained in any such maneuver exceeds the previously determined Vne speed for the glider, then the highest airspeed attained in such a maneuver shall be used as the Vne speed, and the speeds used during structural testing shall be adjusted upwards accordingly.

**3.130 THE L/D OF THE GLIDER MUST BE AT LEAST 5:1**

No specific documentation of this performance is required; provided that the video footage, which documents the requirements, listed above is sufficiently indicative of the required performance level.

**3.140 LANDING WITHOUT EXPERT SKILL**

**3.150 LANDING SAFELY CONTROLLABLE**

Ground based video, or suitably framed onboard video must show a safe, controlled approach with turns and landing without the exercise of extraordinary skill. The image of the pilot should be sufficiently large and clear so that the pilot's control movements can be seen.

## 2009 HGMA AIRWORTHINESS STANDARDS

### FLIGHT MANEUVERS REQUIRING ON BOARD VIDEO

NOTE: All of the following flight maneuvers require an airspeed indicator to be in the video frame.

#### 3.200 LONGITUDINAL CONTROL

The pilot must accelerate from a speed of 1.1 times the stall speed to a speed of 1.5 times the stall speed or to 30 mph whichever is greater in no more than four seconds.

#### 3.210 MAXIMUM SPEED

a) The pilot must demonstrate the ability to attain and maintain a steady state top speed of at least:

$$35 \text{ mph} * (( \text{Test Pilot Wt.} / \text{Min. Pilot Wt.})^{.5})$$

The pilot must be between 1 and 1.5 times the minimum recommended pilot weight, and must perform the maneuver with his hands remaining on the control bar baretube (if the glider is so equipped.)

The speed achieved must be held within +/- 2 mph for at least three seconds.

b) Maximum steady state speed at maximum loading (  $V_{dmax}$  ), must be documented if the glider has a maximum steady state top speed, which is less than terminal velocity or less than 120% of  $V_{ne}$ .

The maximum steady state speed is computed from the observed steady state speed by:

$$V_{dmax} = V_{dobserved} * (( \text{Max. Pilot Wt.} / \text{Test Pilot Wt.})^{.5})$$

## 2009 HGMA AIRWORTHINESS STANDARDS

### 3.220 STATIC LONGITUDINAL STABILITY

Onboard video documentation must show that the glider exhibits positive pitch stability over the normal operating speed range: i.e. that it has one specific trim speed, that continuous pressure of the pilot pulling forward (or equivalent) is required to obtain and maintain speeds above trim, that continuous pressure of the pilot pushing back (or equivalent) is required to obtain and maintain speeds below trim, and that the glider returns to trim speed +/- 10% when control pressures are relaxed.

The following maneuvers must be videoed. The camera must show simultaneously the pilot's hands on the control bar and the airspeed indicator. Relative airspeeds must be easily read.

The pilot releases the control bar and allows the glider to establish trim speed. With his hands behind (NOT on top of) the basetube, with open palms so that the only force on the basetube is forward, the pilot pushes out until a speed below trim is achieved. The pilot holds this speed for three seconds, and then by relaxing pressure against the bar allows the glider to return to trim speed.

In a like manner, with his hands open palmed against the front of the basetube, the pilot attains, holds for three seconds, and allows return from at least three speeds above trim, including the maximum steady state top speed. A negative or neutral control force for any speed faster than trim will be considered unacceptable.

### 3.230 STALL SPEED AT MINIMUM LOADING

The stall speed at minimum loading must be documented. This may be done by one of the following methods:

1. Tufting the wing, or adding another suitable indicator of first onset of flow reversal, and providing auditory documentation of first onset of flow reversal. This can be done by the pilot observe the tufts and call out separation while the camera records the airspeed indicator. If the tufts are not observable, a stall warning horn can be used, or any other suitable indicator.

The stall speed at minimum loading is then computed from the observed stall speed by:

$$Vs_{min} = Vs_{observed} * (Min. Pilot Wt. / Test Pilot Wt.)^{.5}$$

2. Tufting the wing and documenting stall at minimum loading on a load measuring test vehicle.



## 2009 HGMA AIRWORTHINESS STANDARDS

### VEHICLE TESTS

#### 3.300 LOAD TESTS

Gliders shall be load tested according to the following requirements. All such testing must be documented by photographs or movie video of the glider for which certification is requested.

In all loads tests, the glider must be suspended or restrained from the pilot suspension point that provides the most adverse loading on that particular member. This paragraph does not apply in the case of analytically determined component loads based on actual dynamic flight test measured component loads.

During vehicle or tow testing, the airflow should be shown to be reasonably uniform and not decelerated in the region of the intended attachment point of the glider.

During vehicle or tow testing, the maximum airspeed must be documented or the airspeed attained be attested to by a principal of another HGMA member company who observed the speed measuring device.

Strength requirements are specified in terms of limit loads (the maximum loads to be expected in service) and ultimate loads (limit loads multiplied by a safety factor of 1.5).

The structure must be able to support limit loads without permanent deformation. Video documentation must show no permanent deformation after limit loads. At any load up to limit loads, the deformation may not interfere with safe operation. The structure must be able to support ultimate loads without failure for at least three seconds.

During vehicle or tow testing, angles of attack must be documented. Video must show airspeed and glider simultaneously, unless airspeed is observed as per the provision stated above. Airspeed indicators must be calibrated, and airspeeds corrected to that of the free stream, or shown to be conservative. If the airspeed indicator reading is fluctuating, an average reading will be used as the indicated airspeed.

Vehicle load tests must be conducted using a "three component" electronic test vehicle, which records two mutually perpendicular resultant components, one pitching moment component, airspeed, and angle of attack in each data cycle, with a minimum sample rate of 2 complete cycles per second.

**2009 HGMA AIRWORTHINESS STANDARDS**

**THE FOLLOWING VEHICLE LOAD TESTS SHALL BE CONDUCTED AND DOCUMENTED:**

POSITIVE LOAD TEST:

With the root section at +35 degrees angle of attack, or at the stall angle of attack as confirmed by documented tuft testing, or at the angle of maximum resultant force as confirmed by load versus angle of attack data, the minimum required ultimate test speed shall be the greater of:

- 1)  $V_a / .707$
- 2)  $V_{ne} / .816$

The minimum required limit load speed shall be:

Min. req. ultimate test speed \* .816

NEGATIVE 30 DEGREE LOAD TEST

With the root section at negative 30 degree angle of attack, the minimum ultimate test speed shall be the greater of:

- 1)  $V_a$
- 2)  $V_{ne} * .866$

The minimum required limit load test speed shall be:

Min. req. ultimate test speed \* .816

NEGATIVE 150 DEGREE LOAD TEST

With the root section at a negative 150 degree angle of attack, the minimum required ultimate test speed shall be:

50% of the required minimum ultimate positive test speed, but not less than 30 mph.

The minimum required limit load test speed shall be:

Min. req. ultimate test speed \* .816

**2009 HGMA AIRWORTHINESS STANDARDS**

**3.310 ADDITIONAL LONGITUDINAL, DIRECTIONAL AND LATERAL STABILITY TESTS**

**a) PITCH TESTS**

A test of the glider pitching moment about the pilot tether point, or other suitable reference must be made over the following speeds and angles:

- 1)  $V_{smin}$  from 30 degrees above to 25 degrees below zero lift.
- 2)  $(V_{smin} + V_{ne})/2$  from 25 degrees above to 15 degrees below zero lift.
- 3)  $V_{ne}$  from 10 degrees above to 5 degrees below zero lift.

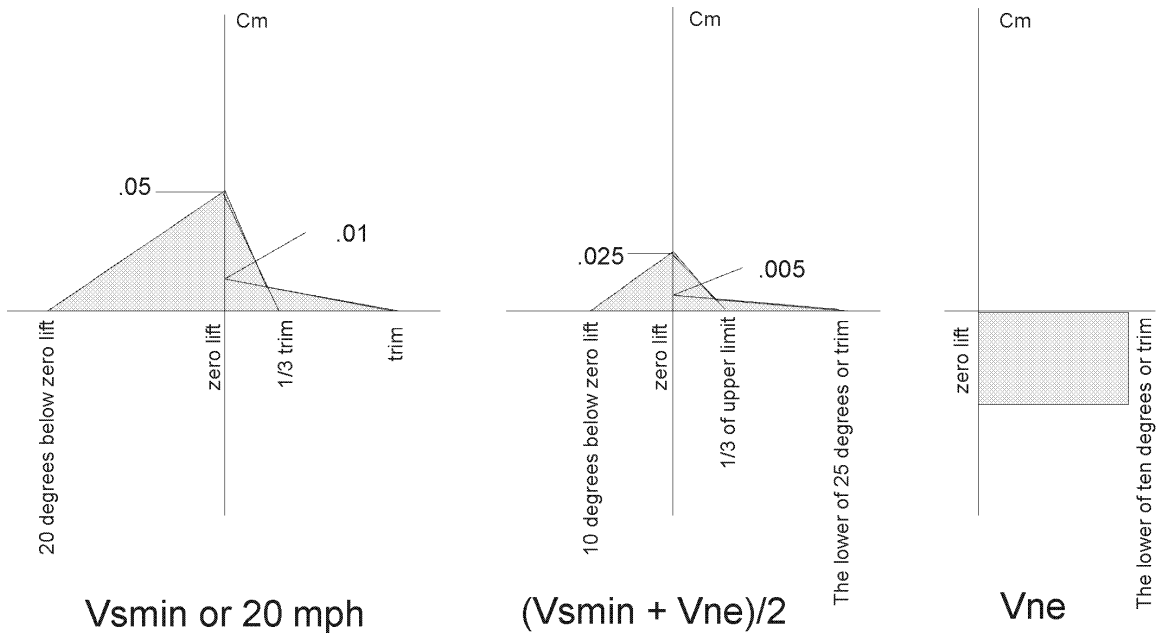
Note: In all pitch test requirements 20 mph may be substituted for  $V_{smin}$ .

Vehicle pitching moment tests must be conducted using a "three component" electronic test vehicle, which records two mutually perpendicular resultant components, one pitching moment component, airspeed, and angle of attack in each data cycle, with a minimum sample rate of 2 complete cycles per second. To be acceptable pitch test data must show a smooth angular change with a maximum difference of 2 degrees between consecutive readings.

A graph of the pitching moment coefficient versus the angle of attack shall be plotted for each of the three required speeds from measured forces.

At each of the three speeds, the pitching moment coefficient, when plotted on a graph against the angle of attack relative to zero lift must not enter the shaded regions as defined and shown on the graphs on the following page.

PITCH GRAPHS AND RESTRICTED ZONES:



$$C_m = M / q s c$$

$C_m$  = pitching moment coefficient (dimensionless)

$M$  = pitching moment about pilot tether point in ft.-lbs.

$q$  = dynamic pressure (in slugs/ft-sec<sup>2</sup>) = .5  $\rho v^2$

$s$  = projected planform area in feet<sup>2</sup>

$c$  = mean chord length in feet

$\rho$  = air density in slugs/ft<sup>3</sup> (Standard sea level density is .002377)

$v$  = calibrated airspeed in ft/sec

If the moment origin (point of rotation) is not the pilot tether point, the moment values should be transferred to the tether point using conventional aerodynamic techniques. The raw data, and the actual calculation of  $C_m$ , including all values used in the calculation, is required.

For purposes of data correlation, the in-flight trim angle of attack must be compared to the vehicle trim angle of attack. The calculations and methods used must be included in the report. This may be done by comparing in-flight pilot/control bar position at trim with the keel attitude, which produces this position on the ground and then correcting for the estimated L/D at trim. This does not necessarily require that the in-flight and vehicle trim angles be equal, however, a gross discrepancy between the two may be cause for the documentation to be called into question.

**b) ADDITIONAL TESTS**

If available, it is recommended that additional directional and lateral testing over an extended range of angles of attack be pursued.

**c) EXCEPTIONS**

Lesser values of  $C_{mo}$  and variations of  $C_m$ 's required in (a) may be used if compelling documentation of adequate stability is supplied.

#### SECTION FOUR

This section details the requirements for the written documentation report, which is part of the record of compliance.

All information requested herein must be supplied in a clear, organized and easily legible form. It is the responsibility of the manufacturer to adequately describe, specify, and otherwise identify the glider for which a certificate is requested. Incomplete applications will be rejected. If any requested information is not applicable to the glider in question, explain why in writing. Use supplementary sheets wherever necessary. The following information and materials must be supplied:

1. The completed application and signed release from section one.
2.
  - a) A clear, high quality, set of drawings of all structural airframe components including rigging, specifying all lengths, diameters, wall thicknesses, material specifications (alloy and temper, etc.), hole sizes, and other dimensions. Rough sketches will not be accepted.
  - b) A list of fasteners (nuts, bolts, pins, etc.), tangs, plates, and other hardware including dimensions (thicknesses), and material specifications.
3. Accurate, to scale, three view drawings or photographs of the glider.
4. With the airframe assembled, and the sail or wing covering removed, photographs or drawings of each junction of spar to spar, spar to hardware fitting, spar or fitting to cable, bolt or other fastener installation, etc., as well as at least two views showing general airframe configuration. If photographs are used, they must be of high quality. If drawings are used, they must be of sufficient quality that they convey at least as much information as would be conveyed by high quality photographs.
5. A copy of the glider flight manual.
6. A full scale tracing of any pre-shaped battens or ribs used to define or control the airfoil shape in a membrane wing or fabric covered wing.

## 2009 HGMA AIRWORTHINESS STANDARDS

7. A scale drawing of the sail planform (including keel pocket), with the weights and types of fabrics used indicated (including materials used as leading edge stiffeners, such as foam or Mylar), and general dimensions, including root chord, tip chord, mean chord, and span.

NOTE: Poor quality photostatic copies of photographs will not be accepted as satisfying the above documentation requirements. Applicants should not submit for review copies of the documentation package, which are different, or of different quality from that copy which will be placed on file. In particular, the practice of submitting original photographs for review and then placing photostatic copies on file will not be permitted.

8. The Video Outline, consisting of a copy of the video checklist with all required data filled in, must be included in the report. Also, both a copy of the video outline and the documentation report checklist contained in Section One, shall be provided for each review board member.

9. A copy of the glider placard.

10. A copy of the glider test fly sticker.

11. A description and proof of calibration of all instruments used for documentation will be required. This includes airspeed indicators, tensiometers and scales, and film movie cameras (must be calibrated for film and projection speed). Concerning the airspeed indicator: in some tests not only calibration is required but also correction for differences in the local dynamic pressure from that of the free airstream.

12. Pitch graphs (as described in section three) for  $V_s$  (or 20mph),  $(V_s+V_{ne})/2$ , and  $V_{ne}$ .

13. Pitch test raw data (See section three).

14. A comparison of the vehicle and in-flight trim angles of attack (See section three).

15. Two copies of the compliance verification specification sheet, items one through eight, using the form provided in section one. One copy shall be bound in the report, and one shall be loose for the HGMA files. If an allowable range of adjustment of the glider nose angle is stated in the specification of longitudinal crossbar center location in the compliance verification specifications, then the written report must state the adjustment in effect during each of the vehicle and flight tests as they are documented on video. The board may reject a package if it feels that the tests as so stated are not reasonably conservative with regard to the most adverse adjustment for a given test, or if the tests as documented do not adequately cover the range of adjustment stated.

## 2009 HGMA AIRWORTHINESS STANDARDS

The followings section details the requirements for the glider placards and glider flight manual:

### OPERATING LIMITATIONS AND INFORMATION

#### MARKINGS AND PLACARDS

##### 4.10 GENERAL

a) The glider must display:

- 1) The markings and placard specified in 4.20
- 2) Any additional information, markings, and placards required for safe operation if it has unusual design, operation, or handling characteristics.

b) Each marking and placard prescribed in paragraph (a) of this section:

- 1) Must be displayed in a conspicuous place, and
- 2) May not be easily erased, disfigured, or obscured.

##### 4.20 OPERATING LIMITATIONS AND INFORMATION PLACARD

a) A conspicuously placed placard must list the following information:

- 1) The stalling speed at the maximum recommended loading and the maximum speed at the minimum recommended loading.
- 2) The kind of operations (such as towing) to which the operation of the glider is limited, or from which it is prohibited, by the equipment installed (for example: towbar, floats, etc.).
- 3) A list of approved acrobatic maneuvers or the following statement:  
"Flight operation should be limited to non-acrobatic maneuvers, i.e., those in which the pitch angle will not exceed either 30 degrees nose up or nose down of the horizon and in which the bank angle will not exceed 60 degrees."
- 4) The recommended pilot weight range.
- 5) The recommended level of skill in terms of a USHGA "Hang Rating."
- 6) The recommended  $V_a$  - the maximum speed for flight in rough air, or for abrupt maneuvering.
- 7) The recommended  $V_{ne}$  - speed never to exceed.



## 2009 HGMA AIRWORTHINESS STANDARDS

Va must be equal to or greater than 46 mph. Vne must be equal to or greater than 53 mph. Exception: If Vdmax is less than 53 mph, then Vne may be set equal or greater than Vdmax, but not less than 45 mph, and Va may be set equal to or greater than  $.866 Vne$  (minimum Va = 39 mph).

Any glider which doesn't have a maximum steady state dive speed (Vdmax) which is less than terminal velocity, or any glider for which the maximum steady state dive speed is greater than 120% of Vne must be sold with a functioning airspeed indicator, and placarded speeds must be given as relative to indicated airspeeds for the airspeed indicator installed.

**b)** A sticker shall be affixed to a conspicuous location on the glider indicating that the glider has been test flown by a factory trained pilot prior to shipment of the glider from the factory. The sticker shall list the date of such test flight. This sticker shall attest to the fact that the glider was factory test flown according to the following standards:

A flight test of at least three minutes duration was performed during which the following maneuvers were performed:

- 1) Launch
- 2) Stall from level flight
- 3) Stall in a turn of 10 to 40 degrees bank
- 4) Turns with reversals in both directions
- 5) Dive, with control bar pressures correct

The sticker shall also represent affirmation by the manufacturer that the flight test confirmed that the glider's handling and flight characteristics were equivalent to those of the glider which was certified, and that the date and location of the test flight, and the name of the test pilot are on file at the manufacturer's place of business.

## 2009 HGMA AIRWORTHINESS STANDARDS

### GLIDER FLIGHT MANUAL

#### 4.30 GENERAL

- a) A glider flight manual must be included in the sale of any glider. All manual material must be clearly identified and not easily erased, disfigured, or misplaced.
- b) Any information not specified in these standards that is required for safe operation because of unusual design, operating or handling characteristics must be furnished.

#### 4.40 OPERATING LIMITATIONS

All information stated on the placard as required by Section 4.20 must be furnished in the flight manual. In addition, if the glider has been shown to be "characteristically incapable of spinning", a statement to that effect should be entered.

The flight manual shall contain a recommendation that the glider not be flown at speeds in excess of  $V_{ne}$ . If the  $V_{dmax}$  of the glider is between 100% and 120% of  $V_{ne}$ , adequate information must be contained which specifically directs the pilot on how to comply with the limiting airspeeds for the glider. Information on maximum forward limits of control in pitch will be deemed suitable for this purpose.

#### 4.50 OPERATING PROCEDURES

The following information must be furnished in the flight manual:

- 1) Recommended assembly procedure and preflight check.
- 2) Recommended maintenance schedule
- 3) Any additional information of a non-typical nature necessary for safe flight.

## 2009 HGMA AIRWORTHINESS STANDARDS

### 4.60 COMPLIANCE VERIFICATION SPECIFICATION SHEET

A list of specifications shall be included in the glider flight manual to help the pilot to determine whether or not the glider is in the configuration in which it was certified.

The specifications required are detailed on the form titled "Compliance Verification Specification Sheet" in section one. The advisory statement on that form is also required to precede these specifications in the manual.

In addition, as an attachment, the glider manual must obtain a full scale tracing of any pre-shaped battens or ribs used to define or control the airfoil of a membrane wing or fabric wing covering.

In addition, a complete description of any stability systems, such as washout tips and bridles, and precise methods and specifications for checking the settings or adjustments of such systems shall be included in the glider flight manual.

DOCUMENTATION VIDEO CHECKLIST

Accept Reject

L T L T GROUND BASED OR ONBOARD DOCUMENTATION

(L and T columns for loose and tight setting, VG gliders)

- 00 00 Take off w/o expert skill, 5:1 slope, wind < 5 mph \_\_\_\_\_
- 00 00 Take off and departure safe and controllable \_\_\_\_\_
- 00 00 Gliding, diving, turns, slips, stalls, smooth transitions, one minute thermalling flight in non-uniform air (not to exceed 3 min. duration) \_\_\_\_\_
- 00 00 Longitudinal, lateral and directional stability across speed range \_\_\_\_\_
- 00 00 Spiral stability in 15 to 20 degree bank (min of 2 complete circles both directions) \_\_\_\_\_
- 00 00 Stalls in turns \_\_\_\_\_
- 00 00 Stall less than 15 degrees roll or yaw \_\_\_\_\_
- 00 00 Spin attempts \_\_\_\_\_
- 00 00 45 / 45 roll reversal \_\_\_\_\_
- 4 seconds x (min pilot weight / test pilot weight) = (time reqd) \_\_\_\_\_
- 00 00 L/D at least 5:1 \_\_\_\_\_
- 00 00 Approach and landing safely controllable w/o expert skill \_\_\_\_\_

ON-BOARD DOCUMENTATION

- 00 00 Longitudinal Control 1.1 Vs to 30 mph \_\_\_\_\_
- 00 00 Max steady state speed greater than: 35 mph x (test pilot wt / min pilot wt)<sup>.5</sup> \_\_\_\_\_
- Vdmax = Vdobserved \*((max pilot wt / test pilot wt)<sup>.5</sup>) \_\_\_\_\_
- 00 00 Longitudinal stability and return to trim \_\_\_\_\_
- 00 00 Stall speed at min loading: Vsmin = Vsobserved \*((min pilot wt / test pilot wt)<sup>.5</sup>) \_\_\_\_\_

VEHICLE TESTS

- 00 00 Positive limit test (speed) \_\_\_\_\_ >=53 Req \_\_\_\_\_
- 00 00 Positive ultimate test (speed) \_\_\_\_\_ >=65 Req \_\_\_\_\_
- 00 00 Negative 30 limit test (speed) \_\_\_\_\_ >=37 Req \_\_\_\_\_
- 00 00 Negative 30 ultimate test (speed) \_\_\_\_\_ >=46 Req \_\_\_\_\_
- 00 00 Negative 150 limit test (speed) \_\_\_\_\_ >= 26 Req \_\_\_\_\_
- 00 00 Negative 150 ultimate test (speed) \_\_\_\_\_ >=32 Req \_\_\_\_\_

0 0 OVERALL ORGANIZATION, CLARITY AND QUALITY OF VIDEO / VIDEO DOCUMENTATION

FOLLOWING SECTION TO BE COMPLETED ON MASTER CHECKLIST ONLY

Package is:

- 0 Accepted by a vote of \_\_\_\_\_ to \_\_\_\_\_
- 0 Rejected by a vote of \_\_\_\_\_ to \_\_\_\_\_
- 0 Complete resubmission of package is required
- 0 Resubmission of those items indicated rejected on this list is permitted, providing the entire package submitted at this meeting is put on file at this time.

\_\_\_\_\_  
 Signature of officer representing the Board

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 2009 HGMA AIRWORTHINESS STANDARDS  
 DOCUMENTATION REPORT CHECKLIST

Board Member \_\_\_\_\_ Representing \_\_\_\_\_ Date: \_\_\_\_\_

Glider \_\_\_\_\_ Manufactured By \_\_\_\_\_

Accept Reject                      Comments/Reasons for Rejection

- 0    0    Application Page \_\_\_\_\_
- 0    0    Signed Release \_\_\_\_\_
- 0    0    Structural airframe drawings with dimensions \_\_\_\_\_
- 0    0    Rigging drawings with dimensions \_\_\_\_\_
- 0    0    List of fasteners, tangs, plates, with dimensions, thicknesses and material specs \_\_\_\_\_
- 0    0    Three view drawings or photographs \_\_\_\_\_
- 0    0    Airframe junction drawings or photos \_\_\_\_\_
- 0    0    Airframe two views \_\_\_\_\_

GLIDER FLIGHT MANUAL

- 0    0    Information for safe operation \_\_\_\_\_
- 0    0    Placard operating limitations \_\_\_\_\_
- 0    0    Information for compliance with Vne recommendation \_\_\_\_\_
- 0    0    Assembly and pre-flight information \_\_\_\_\_
- 0    0    Maintenance schedule \_\_\_\_\_
- 0    0    Compliance verification specification sheet \_\_\_\_\_
- 0    0    Description of stability systems \_\_\_\_\_
  
- 0    0    Batten diagram \_\_\_\_\_

SCALE DRAWING OF SAIL PLANFORM WITH:

- 0    0    Weights and types of materials used \_\_\_\_\_
- 0    0    Root chord \_\_\_\_\_
- 0    0    Tip chord \_\_\_\_\_
- 0    0    Mean chord \_\_\_\_\_
- 0    0    Span \_\_\_\_\_
  
- 0    0    Video Outline / Checklist with required data filled in \_\_\_\_\_

PLACARDS

- 0    0    Stall speed at max loading \_\_\_\_\_
- 0    0    Top speed at minimum loading \_\_\_\_\_
- 0    0    Prohibited operations \_\_\_\_\_
- 0    0    List of approved aerobatic maneuvers or "Flight operations should be limited" statement \_\_\_\_\_
- 0    0    Pilot weight range \_\_\_\_\_
- 0    0    Pilot skill level \_\_\_\_\_
- 0    0    Va recommendation \_\_\_\_\_
- 0    0    Vne recommendation \_\_\_\_\_
- 0    0    Test fly sticker \_\_\_\_\_

VEHICLE TESTS

- 0    0    Description and calibration of instruments and cameras used \_\_\_\_\_
- 0    0    Pitch graphs at Vsmin, (Vsmin+Vne)/2, and Vne \_\_\_\_\_
- 0    0    Pitch test raw data \_\_\_\_\_
- 0    0    Trim angle comparison \_\_\_\_\_
  
- 0    0    Two copies; compliance verification specification sheet \_\_\_\_\_
- 0    0    OVERALL ORGANIZATION, CLARITY AND QUALITY OF DOCUMENTATION REPORT \_\_\_\_\_