## YEAR TWO PROPOSAL TO IGC PLENARY 2012

Proposed by the IGC Bureau

## New List of IGC Reference Mass of the Club Class Gliders

**It is proposed that the Handicap List for the Club Class Gliders attached the Annex A to be replaced by the attached list (Table 4 IGC Club Class Handicap List 2012) including a new List of Reference Masses based on the Maximum Take Off Mass (MTOM) of the gliders without water.**

**Additionally the footnote below this list shall be replaced by the following shall be modified as follows (additions in italics):**
The handicap is based on the performance at *the MTOM of the glider without water. If a glider is flown at a mass not exceeding this reference mass it can be considered as operated within legal mass limits.* Where a glider is flown at a higher *mass* by necessity, *the pilot will have to provide documentation to prove that his glider is still operated within the legal mass limit and* the handicap will be increased by 0.005 for each 10 kg or part thereof that the glider exceeds the *reference mass. However the wing loading may in no case exceed 38 kg/m$^2$.*

**This Proposal affects:**
Sporting Code Section – None
Annex A - Appendix 3 IGC - Handicap Lists
Other - Nil

**Reasons supporting the Proposal:**
At the 2011 IGC Plenary meeting we decided to delete the IGC Reference Masses of the Club Class gliders from the Annex A. The arguments used to do this were the following:

« Initially introduced to stop competitors from increasing wing loading by adding fixed ballast in the wings, the specification of Reference Weights no longer serves any useful purpose. The scrutineering process will reveal any attempt to hide illegal ballast. In most cases the Reference Weight is equal to the Maximum Take Off Mass anyway, which means that fairness is in no way compromised by removing the specification of Reference Weights.
Missing Reference Weights in the IGC Club Class Handicap List and different Reference Weights for different models of the same glider WITH THE SAME HANDICAP are a continuous source of headache for Chief Stewards at World and Continental Championships. The determination of MTOM does not depend on the use of Reference Weights. MTOM for each glider is determined from the weight and balance sheet according to Annex A 4.2.1 d.»

These arguments are partly wrong. The reference mass has never been introduced to stop competitors from adding fixed ballasts in the wings. The reference mass is the take off mass which was taken into account when calculating the handicap for a given glider. This is confirmed by the footnote at the bottom of the handicap list which states that « the handicap is based on the performance at a stated glider reference weight, which is based on a typical empty weight plus 110 kg. Where a glider is flown at a higher weight

by necessity, the handicap will be increased by 0.005 for each 10 kg or part of thereof that the glider exceeds the base handicap weight».

Deleting the reference weight thus leaves our handicap list « in the air » since the maximum MTOM allowed before applying the penalty for overweight is no longer mentioned anywhere.

We have therefore worked out a more complete and more reliable list of reference masses based on the maximum take off mass (MTOM) without water of all club class gliders (including all their certified variants).

Since a legal MTOM without water is mentioned in the Type Certificate only for a few gliders, we have determined the average MTOM without water for each type/variant of glider by adding the maximum mass of the non lifting parts (which is always specified in the Type Certificate) to an estimate of the mass of the wings based on data provided by the manufacturers. More details on this procedure can be found in the attached paper entitled “Calculation of MTOM without water of club class gliders”.

In most cases the new reference masses differ by less than 10kg from the old ones, but in some cases (DG 200, Mosquito, LS3, Speed Astir, PIK 20 A, ASW19 and 19B, Jantar Standard 2b, ASW 15, LS1) the differences are much bigger. We leave it to the IGC Handicap Committee to decide if a correction of the handicap for these glider is necessary.

We also checked the resulting wing loadings. With the exception of the ASW 15, the wing loadings of all other gliders range between 32 and 38 kg/m2. This spread out appears reasonable especially considering that in principle the handicap takes into account the mass of the glider. We nevertheless believe that if a glider has to be flown at a higher mass by necessity, the wing loading should in no case exceed 38 kg/m2.

Finally the introduction of such a list of reference mass will simplify the scrutineering at club class competitions since a glider whose mass is not exceeding its reference mass can be considered as being operated within legal mass limits. Therefore the scrutineerers will have to check the weight sheet of the glider only in case the mass of the glider exceeds the reference mass.

# IGC Club Class Handicap List

| Index | Glider Type | Legal MTOM without water (kg) | Max Mass of non lifting parts (kg) | Average Mass of the wings (kg) (Estimate) | Average MTOM without water (kg) (Estimate) | New IGC Reference Mass (kg) | Old IGC Reference Mass (kg) |
|---|---|---|---|---|---|---|---|
| 1.09 | ASW 20 WL (15m) | | 235 | 137 | 372 | 372 | 385 |
| 1.09 | Discus a/b WL | | 240 | 127 | 367 | 367 | 360 |
| | Discus CS + WL | | 240 | 127 | 367 | 367 | |
| 1.08 | ASW 20 (15m) | | 235 | 137 | 372 | 372 | 385 |
| | ASW 20F | | 235 | 137 | 372 | 372 | |
| 1.08 | ASW 24 WL | | 230 | 126 | 356 | 356 | 365 |
| | ASW 24B WL | | 245 | 126 | 356 | 356 | |
| | Discus a/b | | 240 | 127 | 366 | 366 | 360 |
| 1.08 | Discus CS | | 240 | 127 | 366 | 366 | |
| 1.08 | LS7-WL | | 235-249 | 118 | 353-367 | 367 | 365 |
| 1.08 | SZD 55-1 | | 248 | 115 | 363 | 363 | |
| 1.07 | ASW 24 | | 230 | 126 | 356 | 356 | 360 |
| | ASW 24B | | 245 | 126 | 361 | 361 | |
| 1.07 | LS7 | | 235-249 | 118 | 353-367 | 367 | 365 |
| 1.07 | DG 200 (15m) | | 250 | 130 | 380 | 380 | 365 |
| 1.07 | Mosquito | | 240 | 128 | 368 | 368 | 380 |
| | Mosquito B | | 240 | 128 | 368 | 368 | |
| 1.07 | LS3 | | 240 | 137 | 377 | 377 | 410 |
| | LS3-a | | 230 | 137 | 367 | 367 | |
| 1.06 | Speed Astir II | 400 | 260 | 149 | 409 | 400* | 380 |
| | Speed Astir IIb | 400 | 260 | 149 | 409 | 400* | |
| 1.05 | DG 300 | | 246 | 123 | 369 | 369 | 375 |
| | DG 300 Elan | | 246 | 123 | 369 | 369 | |
| 1.05 | Glasflügel 304 | | 240 | 129 | 369 | 369 | 360 |
| | Glasflügel 304 CZ | | 240 | 129 | 369 | 369 | |
| 1.05 | LS4 / 4-a | | 230-264 | 126 | 356-390 | 390 | 385 |
| | LS4-b | | 230-264 | 126 | 356-390 | 390 | |
| 1.04 | Pégase 101 | 363 | 235 | 126 | 361 | 361 | 368 |
| | Pégase 101 A | 368 | 235 | 126 | 361 | 361 | |
| | Pégase 101 B/C | 370 | 230 | 126 | 356 | 356 | |
| | Pégase 101 D | | 225 | 126 | 351 | 351 | |
| | Pégase 101 P/AP | | 235 | 126 | 361 | 361 | |
| 1.03 | PIK 20 A | | 260 | 130 | 380 | 380 | 364 |
| | PIK 20 B | | 240 | 130 | 370 | 370 | |
| | PIK 20 D | | 225 | 130 | 355 | 355 | |
| 1.01 | ASW 19 | | 225 | 132 | 357 | 357 | 380 |
| | ASW19 B | | 230 | 132 | 362 | 362 | 380 |
| 1.01 | DG 100/100G | 385 | 265 | 132 | 397 | 385* | 385 |
| | DG 100 ELAN | 385 | 265 | 132 | 397 | 385* | |
| | DG 100 G ELAN | 385 | 265 | 132 | 397 | 385* | |
| 1.01 | Jantar Std. 2/2M | 385 | 245 | 128 | 373 | 373 | 385 |
| | Jantar Std. 3 | 390 | 248 | 128 | 376 | 376 | 385 |
| | Brawo | 360 | 242 | 128 | 360 | 360 | 365 |
| 1.01 | LS1-f | | 230 | 117 | 347 | 347 | 355 |
| | LS1-f/45 | | 230 | 117 | 347 | 347 | |
| 1.00 | Hornet | | 225 | 118 | 343 | 343 | 350 |
| | Hornet C | | 225 | 119 | 344 | 344 | |
| 1.00 | Jantar Standard | 366 | | 128 | 364 | 364 | 360 |

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|---|---|---|---|---|---|---|---|
| 1.00 | Std Cirrus | | 220 | 121 | 341 | 341 | 345 |
| | Std Cirrus B | | 220 | 121 | 341 | 341 | |
| | Std Cir. CS 11 75 | 345 | 220 | 121 | 341 | 341 | |
| | Std Cirrus G | | 220 | 121 | 341 | 341 | |
| 0.98 | ASW15 | 318 | 198 | 131 | 329 | 318* | 365 |
| | ASW15 B | | 220 | 131 | 351 | 351 | |
| 0.98 | LS1-0 | 312 | 212 | 116 | 328 | 312* | 345 |
| | LS1-a | 312 | 212 | 116 | 328 | 312* | |
| | LS1-b | 312 | 212 | 116 | 328 | 312* | |
| | LS1-c | 312 | 212 | 116 | 328 | 312* | |
| | LS1-d | | 212 | 116 | 328 | 328 | |
| 0.98 | Libelle | 300 | 200 | 118 | 318 | 300* | 325 |
| | H 201 Std Libelle | 290 | 200 | 118 | 318 | 290* | |
| | H 201B Std Libelle | | 210 | 118 | 328 | 328 | |

* The reference mass is equal to the legal MTOM without water because it is lower than the estimate of the MTOM without water

Retrofitting a glider with retractable landing gear increases the Handicap by 0.02.
Retrofitting a glider with winglets increases the Handicap by 0.01.

The handicap is based on the performance at a stated glider reference mass based the MTOM of the glider without water. If a glider is flown at a mass not exceeding this reference mass it can be considered as operated within legal mass limits. Where a glider is flown at a higher mass by necessity, the pilot will have to provide documentation to prove that his glider is still operated within legal mass limits and the handicap will be increased by 0.005 for each 10 kg or part thereof that the glider exceeds the reference mass. However the wing loading may in no case exceed 38 kg/m2.

Annex

# Calculation of the MTOM without Water of Club Class Gliders

## 1. Introduction

The Maximum Take Of Mass without water is generally not specified in the TCDS (Type Certificate Data Sheets) of the gliders, but the Maximum Mass of the Non Lifting Parts is. The MTOM of a particular glider can thus be calculated by adding the mass of the lifting parts (i. e. the mass of the wings) to this Maximum Mass of the non lifting part.

## 2. Data Collection

We have collected these data for all the variants of the certified club class gliders in Table 1.

In the first column we have listed the legal MTOM without water which are specified in the TCDS only for a few gliders (Speed Astirs, Pégase, DG 100, Jantar, Hornet, Std Cirrus CS 11/75, LS1.o to LS 1c). The references these legal MTOM come from are listed in column 2

In the third column we have listed the maximum mass of the non lifting parts. Column 4 shows that these data come nearly all from the TCDS, issued mainly by the EASA but some have been found in TCDS issued by the German LBA or by the French DGAC. Interestingly the LS7 and the LS4 have different masses of non lifting part depending on their center of gravity of the empty weight.

In the fifth column we have listed the masses of the wings provided by the manufacturers (or the TC holders when the manufacturer does no longer exist) or coming from the book of Thomas.

## 3. Normalisation of the Wing Masses

The data about the wing masses cannot be used as such because there are still data missing and there are generally large variations of the mass of the gliders produced (they may be as large as +/- 10kg.) Furthermore some manufacturers provided an average mass resulting from their statistics , some other gave an upper limit. We have therefore tried to normalize the masses of the wings so that the comparison between the masses of the wings produced by different manufacturers is fair.

A statistical evaluation of the data provided by the manufacturers shows that in average the wing mass of a standard class glider is approx. 12 kg/ m2 whereas the wing mass of a 15M class glider is approx 13 kg/m2

Table 2 shows that the normalized weight obtained by multiplying the area of the wings by these factors are quite close to the data provided by the manufacturers except for the LS3 and for the Libelle which are known to have very heavy and very light wings respectively.

## 4. Average MTOM Without Water and New IGC Reference Masses

Table 3 shows the average MTOM obtained by adding the normalized wing masses to the mass of the non lifting parts and the new IGC reference mass which can be derived from these data. For the IGC Reference masses we have taken the highest value of the

range for the LS 7 and LS 4. For the DG 100, ASW 15 and LS 1 we have taken the reference mass equal to the legal MTOM without water because the later is lower than the estimate of the MTOM without water

The last column in table 3 shows the old reference masses It can be seen that in most cases the new reference masses differ by less than 10kg from the old ones. However we leave it to the IGC Handicap Committee to decide if a correction of the handicap for the glider types for which the new reference mass differs by more than 10kg from the older one (DG 200, Mosquito, LS3, Speed Astir, PIK 20 A, ASW19 and 19B, Jantar Standard 2b, ASW 15, LS1).

**5. The Resulting Wing Loadings**

We also checked the resulting wing loadings. With the exception of the ASW 15, the wing loadings of all other gliders range between 32 and 38 kg/m2. This spread out appears reasonable especially considering that in principle the handicap takes into account the mass of the glider. We nevertheless believe that if a glider has to be flown at a higher mass by necessity, the wing loading should in no case exceed 38 kg/m2.

R.Stuck
October 2011

**Table 1**

| Index | Glider Type | Legal MTOM without water (kg) | Reference | Max Mass of non lifting parts (kg) | Reference | Typical mass of the wings (kg) | Reference |
|---|---|---|---|---|---|---|---|
| 1.09 | ASW 20 WL (15m) | | | 235 | LBA 314/SP | 134 | Ref.1 |
| 1.09 | Discus a/b WL | | | 240 | EASA A.049 | 130 | Ref.2 |
| | Discus CS + WL | | | 240 | EASA A.049 | 130 | Ref.2 |
| 1.08 | ASW 20 (15m) | | | 235 | LBA 314/SP | 134 | Ref.1 |
| | ASW 20F | | | 235 | DGAC IM160 | ? | |
| 1.08 | ASW 24 WL | | | 230 | LBA 366/SP | 122 | Ref.3 |
| | ASW 24B WL | | | 245 | LBA 366/SP | 122 | Ref.3 |
| 1.08 | Discus a/b | | | 240 | EASA A.049 | 130 | Ref.2 |
| | Discus CS | | | 240 | EASA A.049 | 130 | Ref.2 |
| 1.08 | LS7 WL | | | 249 | EASA A.049 | 127 | Ref.4 |
| 1.08 | SZD 55-1 | | | 248 | LBA 401/SP | | |
| 1.07 | ASW 24 | | | 230 | LBA 366/SP | 120 | Ref.3 |
| | ASW 24B | | | 245 | LBA 366/SP | 120 | Ref.3 |
| 1.07 | LS7 | | | 235-249 | EASA A.095 | 125 | Ref.4 |
| 1.07 | DG 200 (15m) | | | 250 | EASA A 239 | 130 | Ref.7 |
| 1.07 | Mosquito | | | 240 | EASA A.241 | 148 | Ref.8 |
| | Mosquito B | | | 240 | EASA A.241 | 134 | Ref.8 |
| 1.07 | LS3 | | | 240 | EASA A.095 | 162 | Ref.4 |
| | LS 3a | | | 230 | EASA A.095 | 139 | Ref.4 |
| 1.06 | Speed Astir II | 400 | EASA A.250 | 260 | EASA A.250 | 134 | Ref.1 |
| | Speed Astir IIb | 400 | EASA A.250 | 260 | EASA A.250 | ? | ? |
| 1.05 | DG 300 | | | 246 | EASA A. 239 | 138 | Ref.7 |
| | DG 300 Elan | | | 246 | EASA A .239 | 138 | Ref.7 |
| 1.05 | Glasflügel 304 | | | 240 | EASA A.241 | 130 | Ref.8 |
| | Glasflügel 304 CZ | | | 240 | EASA A.030 | ? | |
| 1.05 | LS 4 / 4 a | | | 230-264 | EASA A.095 | 128 | Ref.4 |
| | LS 4b | | | 230-264 | EASA A.095 | 132 | Ref.7 |
| 1.04 | Pégase 101 | 363 | DGAC IM171 | 235 | DGAC IM171 | | |
| | Pégase 101 A | 368 | DGAC IM171 | 235 | DGAC IM171 | | |
| | Pégase 101 B/C | 370 | DGAC IM171 | 230 | DGAC IM171 | | |
| | Pégase 101 D | | | 225 | DGAC IM171 | | |
| | Pégase 101 P/AP | | | 235 | DGAC IM171 | | |
| 1.03 | PIK 20 A | | | 260 | Ref.5 | 120 | Ref.5 |
| | PIK 20 B | | | 240 | Ref.5 | 120 | Ref.5 |
| | PIK 20 D | | | 225 | Ref.5 | 120 | Ref.5 |
| 1.01 | ASW 19 | | | 225 | LBA 308/SP | 140 | Ref.1 |
| | ASW19 B | | | 230 | LBA 308/SP | 140 | Ref.3 |
| 1.01 | DG 100/100G | 385 | EASA A.239 | 265 | EASA A.239 | 120 | Ref.1 |
| | DG 100 ELAN | 385 | EASA A.239 | 265 | EASA A.239 | 120 | Ref.1 |
| | DG 100 G ELAN | 385 | EASA A.239 | 265 | EASA A.239 | 120 | Ref.1 |
| 1.01 | Jantar Std. 2/2M | 385 | EASA A.446 | 245 | Ref.6 | | |
| | Jantar Std. 3 | 390 | EASA A.041 | 248 | Ref.6 | | |
| | Brawo | 360 | EASA A.446 | 242 | Ref.6 | | |
| 1.01 | LS 1f | | | 230 | EASA A.095 | 125 | Ref.4 |
| | LS1f/45 | | | 230 | EASA A.095 | 125 | Ref.4 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1.00** | **Hornet**<br>**Hornet C** | | | **225**<br>**225** | EASA A.241<br>EASA A 241 | **124**<br>**105** | Ref 8<br>Ref.8 |
| **1.00** | **Jantar Standard** | **366** | LBA331/SP | | | **136** | Ref.1 |
| **1.00** | **Std Cirrus**<br>**Std Cirrus B**<br>**Std Cir. CS 11 75**<br>**Std Cirrus G** | **345** | LBA 278/SP | **220**<br>**220**<br>**220**<br>**220** | LBA 278/SP<br>LBA 278/SP<br>LBA 278/SP<br>LBA 278/SP | **120**<br>**120**<br>**120**<br>**120** | Ref.2<br>Ref.2<br>Ref.2<br>Ref.2 |
| **0.98** | **ASW15** | **318** | LBA 272 SP | **198** | LBA 272 SP | **?** | Ref.3 |
| | **ASW15 B** | | | **220** | LBA 272 SP | **135** | Ref.1 |
| **0.98** | **LS 1.0**<br>**LS 1a**<br>**LS 1b**<br>**LS 1c**<br>**LS 1d** | **312**<br>**312**<br>**312**<br>**312** | EASA A.095<br>EASA A.095<br>EASA A.095<br>EASA A.095 | **212**<br>**212**<br>**212**<br>**212**<br>**212** | EASA A.095<br>EASA A.095<br>EASA A.095<br>EASA A.095<br>EASA A.095 | **116**<br>**116**<br>**116**<br>**116**<br>**120** | Ref.4<br>Ref.4<br>Ref.4<br>Ref.4<br>Ref.4 |
| **0,98** | **Libelle 301**<br>**Std Libelle**<br>**H 201B Std Libelle** | **300**<br>**290** | EASA A.241<br>EASA A.241 | **200**<br>**200**<br>**210** | EASA A.241<br>EASA A.241<br>EASA A.241 | **100**<br>**105**<br>**108** | Ref 8<br>Ref 8<br>Ref.8 |

## Sources of Type Certificate Design Specifications (TCDS)

TCDS issued by the EASA can be found here:
www.easa.europa.eu/certification/type-certificates/aircraft.php

TCDS issued by the German LBA can be found here:
https://www2.lba.de/data/bb/Blaues_Buch/04_segel.pdf

TCDS issued by the French DGAC can be found here:
www.pilotlist.org/manuels/planeurs/planeurs.htm

## References


1. Grundlagen für den Entwurf von Segelflugzeugen by Fred Thomas (Editor: Motor Buch Verlag)
2. Data provided by Christoph Wannenmacher from Schempp Hirth
3. Data provided by Michael Greiner from Schleicher Flugzeugbau
4. Data provided by Werner Scholz who worked for LS
5. Data provided by Markku Hiedanpää from the Finnish CAA who was involved in the design of the PIK 20 gliders
6. Data provided by SZD via Jacek Dankowski
7. Data provided by Wilhelm Dirks from DG Flugzeugbau
8. Data provided by Helmut Streifeneder TC holder for Glasflügel Sailplanes

## Table 2

| Index | Glider Type | Max Mass of non lifting parts (kg) | Typical mass of the wings (kg) | Wing Area (m2) | Normalized mass of the wings (kg) (estimate) |
|---|---|---|---|---|---|
| 1.09 | ASW 20 WL (15m) | 235 | 134 | 10.50 | 137 |
| 1.09 | Discus a/b WL | 240 | 130 | 10.58 | 127 |
| | Discus CS + WL | 240 | 130 | 10.58 | 127 |
| 1.08 | ASW 20 (15m) | 235 | 134 | 10.50 | 137 |
| | ASW 20F | 235 | 134 ? | 10.50 | 137 |
| 1.08 | ASW 24 WL | 230 | 122 | 10.50 | 126 |
| | ASW 24B WL | 245 | 122 | 10.50 | 126 |
| 1.08 | Discus a/b | 240 | 130 | 10.58 | 127 |
| | Discus CS | 240 | 130 | 10.58 | 127 |
| 1.08 | LS7 WL | 235-249 | 127 | 9.80 | 118 |
| 1.08 | SZD 55-1 | 248 | | 9.60 | 115 |
| 1.07 | ASW 24 | 230 | 120 | 10.50 | 126 |
| | ASW 24B | 245 | 120 | 10.50 | 126 |
| 1.07 | LS7 | 235-249 | 125 | 9.80 | 118 |
| 1.07 | DG 200 (15m) | 250 | 130 | 10.00 | 130 |
| 1.07 | Mosquito | 240 | 148 | 9.86 | 128 |
| | Mosquito B | 240 | 134 | 9.86 | 128 |
| 1.07 | LS3 | 240 | 162 | 10.50 | 137 |
| | LS 3a | 230 | 139 | 10.50 | 137 |
| 1.06 | Speed Astir II | 260 | 134 | 11.47 | 149 |
| | Speed Astir IIb | 260 | ? | 11.47 | 149 |
| 1.05 | DG 300 | 246 | 138 | 10.27 | 123 |
| | DG 300 Elan | 246 | 138 | 10.27 | 123 |
| 1.05 | Glasflügel 304 | 240 | 130 | 9.90 | 129 |
| | Glasflügel 304 CZ | 240 | ? | 9.90 | 129 |
| 1.05 | LS 4 / 4 a | 230-264 | 128 | 10.50 | 126 |
| | LS 4b | 230-264 | 132 | 10.50 | 126 |
| 1.04 | Pégase 101 | 235 | | 10.50 | 126 |
| | Pégase 101 A | 235 | | 10.50 | 126 |
| | Pégase 101 B/C | 230 | | 10.50 | 126 |
| | Pégase 101 D | 225 | | 10.50 | 126 |
| | Pégase 101 P/AP | 235 | | 10.50 | 126 |
| 1.03 | PIK 20 A | 250 | 120 | 10.0 | 130 |
| | PIK 20 B | 240 | 120 | 10.0 | 130 |
| | PIK 20 D | 225 | 120 | 10.0 | 130 |
| 1.01 | ASW 19 | 225 | 140 | 11.00 | 132 |
| | ASW19 B | 230 | 140 | 11.00 | 132 |
| 1.01 | DG 100/100G | 265 | 120 | 11.00 | 132 |
| | DG 100 ELAN | 265 | 120 | 11.00 | 132 |
| | DG 100 G ELAN | 265 | 120 | 11.00 | 132 |
| 1.01 | Jantar Std. 2/2M | 245 | | 10.66 | 128 |
| | Jantar Std. 3 | 248 | | 10.66 | 128 |
| | Brawo | 242 | | 10.66 | 128 |

| | | | | | |
|---|---|---|---|---|---|
| 1.01 | LS 1f | 230 | 125 | 9.75 | 117 |
| | LS1f/45 | 230 | 125 | 9.75 | 117 |
| 1.00 | Hornet | 225 | 124 | 9.80 | 118 |
| | Hornet C | 225 | 105 | 9.90 | 119 |
| 1.00 | Jantar Standard | | 136 | 10.66 | 128 |
| 1.00 | Std Cirrus | 220 | 120 | 10.04 | 121 |
| | Std Cirrus B | 220 | 120 | 10.04 | 121 |
| | Std Cir. CS 11 75 | 220 | 120 | 10.04 | 121 |
| | Std Cirrus G | 220 | 120 | 10.04 | 121 |
| 0.98 | ASW15 | 198 | ? | 11 | 131 |
| | ASW15 B | 220 | 135 | 11 | 131 |
| 0.98 | LS 1.0 | 212 | 116 | 9.74 | 116 |
| | LS 1a | 212 | 116 | 9.74 | 116 |
| | LS 1b | 212 | 116 | 9.74 | 116 |
| | LS 1c | 212 | 116 | 9.74 | 116 |
| | LS 1d | 212 | 120 | 9.74 | 116 |
| 0,98 | Libelle 301 | 200 | 100 | 9.80 | 118 |
| | Std Libelle | 200 | 105 | 9.80 | 118 |
| | H 201B StdLibelle | 210 | 108 | 9.80 | 118 |

## Table 3

| Index | Glider Type | Legal MTOM without water (kg) | Max Mass of non lifting parts (kg) | Normalized mass of the wings (kg) (estimate) | New IGC Reference Mass (kg) | Old IGC reference mass (kg) |
|---|---|---|---|---|---|---|
| 1.09 | ASW 20 WL (15m) | | 235 | 137 | 372 | 385 |
| 1.09 | Discus a/b WL | | 240 | 127 | 367 | 360 |
| | Discus CS + WL | | 240 | 127 | 367 | |
| 1.08 | ASW 20 (15m) | | 235 | 137 | 372 | 385 |
| | ASW 20F | | 235 | 137 | 372 | |
| 1.08 | ASW 24 WL | | 230 | 126 | 356 | 365 |
| | ASW 24B WL | | 245 | 126 | 356 | |
| 1.08 | Discus a/b | | 240 | 127 | 366 | 360 |
| | Discus CS | | 240 | 127 | 366 | |
| 1.08 | LS7 WL | | 235-249 | 118 | 353-367 | 365 |
| 1.08 | SZD 55-1 | | 248 | 115 | 363 | |
| 1.07 | ASW 24 | | 230 | 126 | 356 | 360 |
| | ASW 24B | | 245 | 126 | 361 | |
| 1.07 | LS7 | | 235-249 | 118 | 353-367 | 365 |
| 1.07 | DG 200 (15m) | | 250 | 130 | 380 | 365 |
| 1.07 | Mosquito | | 240 | 128 | 368 | 380 |
| | Mosquito B | | 240 | 128 | 368 | |
| 1.07 | LS3 | | 240 | 137 | 377 | 410 |
| | LS 3a | | 230 | 137 | 367 | |
| 1.06 | Speed Astir II | 400 | 260 | 149 | 400* | 380 |
| | Speed Astir IIb | 400 | 260 | 149 | 400* | |
| 1.05 | DG 300 | | 246 | 123 | 369 | 375 |
| | DG 300 Elan | | 246 | 123 | 369 | |
| 1.05 | Glasflügel 304 | | 240 | 129 | 369 | 360 |
| | Glasflügel 304 CZ | | 240 | 129 | 369 | |
| 1.05 | LS 4 / 4 a | | 230-264 | 126 | 356-390 | 385 |
| | LS 4b | | 230-264 | 126 | 356-390 | |
| 1.04 | Pégase 101 | 363 | 235 | 126 | 361 | 368 |
| | Pégase 101 A | 368 | 235 | 126 | 361 | |
| | Pégase 101 B/C | 370 | 230 | 126 | 356 | |
| | Pégase 101 D | | 225 | 126 | 351 | |
| | Pégase 101 P/AP | | 235 | 126 | 361 | |
| 1.03 | PIK 20 A | | 250 | 130 | 380 | 364 |
| | PIK 20 B | | 240 | 130 | 370 | |
| | PIK 20 D | | 225 | 130 | 355 | |
| 1.01 | ASW 19 | | 225 | 132 | 357 | 380 |
| | ASW19 B | | 230 | 132 | 362 | 380 |
| 1.01 | DG 100/100G | 385 | 265 | 132 | 385* | 385 |
| | DG 100 ELAN | 385 | 265 | 132 | 385* | |
| | DG 100 G ELAN | 385 | 265 | 132 | 385* | |
| 1.01 | Jantar Std. 2/2M | 385 | 245 | 128 | 373 | 385 |
| | Jantar Std. 3 | 390 | 248 | 128 | 376 | 385 |
| | Brawo | 360 | 242 | 128 | 360* | 365 |
| 1.01 | LS 1f | | 230 | 117 | 347 | 355 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | LS1f/45 | | 230 | 117 | 347 | |
| 1.00 | Hornet | | 225 | 118 | 343 | 350 |
| | Hornet C | | 225 | 119 | 344 | |
| 1.00 | Jantar Standard | 366 | | 128 | 364 | 360 |
| 1.00 | Std Cirrus | 345 | 220 | 121 | 341 | 345 |
| | Std Cirrus B | | 220 | 121 | 341 | |
| | Std Cir. CS 11 75 | | 220 | 121 | 341 | |
| | Std Cirrus G | | 220 | 121 | 341 | |
| 0.98 | ASW15 | 318 | 198 | 131 | 318* | |
| | ASW15 B | | 220 | 131 | 351 | 385 |
| 0.98 | LS 1.0 | 312 | 212 | 116 | 312* | 360 |
| | LS 1a | 312 | 212 | 116 | 312* | |
| | LS 1b | 312 | 212 | 116 | 312* | |
| | LS 1c | 312 | 212 | 116 | 312* | |
| | LS 1d | | 212 | 116 | 328 | |
| 0,98 | Libelle 301 | 300 | 200 | 118 | 300* | 385 |
| | Std Libelle | 290 | 200 | 118 | 290* | |
| | H 201B StdLibelle | | 210 | 118 | 328 | |

## Table 4

| Index | Glider Type | Wing Area (m2) | New IGC Reference Mass (kg) | Wing Loading (kg/m2) |
|---|---|---|---|---|
| 1.09 | ASW 20 WL (15m) | 10.50 | 372 | 35.4 |
| 1.09 | Discus a/b WL | 10.58 | 367 | 34.7 |
| | Discus CS + WL | 10.58 | 367 | 34.7 |
| 1.08 | ASW 20 (15m) | 10.50 | 372 | 35.4 |
| | ASW 20F | 10.50 | 372 | 35.4 |
| 1.08 | ASW 24 WL | 10.50 | 356 | 33.9 |
| | ASW 24B WL | 10.50 | 356 | 33.9 |
| 1.08 | Discus a/b | 10.58 | 366 | 34.6 |
| | Discus CS | 10.58 | 366 | 34.6 |
| 1.08 | LS7 WL | 9.80 | 353-367 | 37.4 |
| 1.08 | SZD 55-1 | 9.60 | 363 | 37.8 |
| 1.07 | ASW 24 | 10.50 | 356 | 33.9 |
| | ASW 24B | 10.50 | 361 | 34.4 |
| 1.07 | LS7 | 9.80 | 353-367 | 37.4 |
| 1.07 | DG 200 (15m) | 10.00 | 380 | 38.0 |
| 1.07 | Mosquito | 9.86 | 368 | 37.3 |
| | Mosquito B | 9.86 | 368 | 37.3 |
| 1.07 | LS3 | 10.50 | 377 | 35.9 |
| | LS 3a | 10.50 | 367 | 34.9 |
| 1.06 | Speed Astir II | 11.47 | 400* | 34.9 |
| | Speed Astir IIb | 11.47 | 400* | 34.9 |
| 1.05 | DG 300 | 10.27 | 369 | 35.9 |
| | DG 300 Elan | 10.27 | 369 | 35.9 |
| 1.05 | Glasflügel 304 | 9.90 | 369 | 37.3 |
| | Glasflügel 304 CZ | 9.90 | 369 | 37.3 |
| 1.05 | LS 4 / 4 a | 10.50 | 356-390 | 37.1 |
| | LS 4b | 10.50 | 356-390 | 37.1 |
| 1.04 | Pégase 101 | 10.50 | 361 | 34.4 |
| | Pégase 101 A | 10.50 | 361 | 34.4 |
| | Pégase 101 B/C | 10.50 | 356 | 33.9 |
| | Pégase 101 D | 10.50 | 351 | 33.4 |
| | Pégase 101 P/AP | 10.50 | 361 | 34.4 |
| 1.03 | PIK 20 A | 10.0 | 380 | 38.0 |
| | PIK 20 B | 10.0 | 370 | 37.0 |
| | PIK 20 D | 10.0 | 355 | 35.5 |
| 1.01 | ASW 19 | 11.00 | 357 | 32.5 |
| | ASW19 B | 11.00 | 362 | 32.9 |
| 1.01 | DG 100/100G | 11.00 | 385* | 35.0 |
| | DG 100 ELAN | 11.00 | 385* | 35.0 |
| | DG 100 G ELAN | 11.00 | 385* | 35.0 |
| 1.01 | Jantar Std. 2/2M | 10.66 | 373 | 35.0 |
| | Jantar Std. 3 | 10.66 | 376 | 35.0 |
| | Brawo | 10.66 | 360* | 33.8 |

| | | | | |
|---|---|---|---|---|
| 1.01 | LS 1f | 9.75 | 347 | 35.6 |
| | LS1f/45 | 9.75 | 347 | 35.6 |
| 1.00 | Hornet | 9.80 | 343 | 35.0 |
| | Hornet C | 9.90 | 344 | 35.0 |
| 1.00 | Jantar Standard | 10.66 | 364 | 34.1 |
| 1.00 | Std Cirrus | 10.04 | 341 | 34.0 |
| | Std Cirrus B | 10.04 | 341 | 34.0 |
| | Std Cir. CS 11 75 | 10.04 | 341 | 34.0 |
| | Std Cirrus G | 10.04 | 341 | 34.0 |
| 0.98 | ASW15 | 11 | 318* | 28.9 |
| | ASW15 B | 11 | 351 | 31.9 |
| 0.98 | LS 1.0 | 9.74 | 312* | 32.0 |
| | LS 1a | 9.74 | 312* | 32.0 |
| | LS 1b | 9.74 | 312* | 32.0 |
| | LS 1c | 9.74 | 312* | 32.0 |
| | LS 1d | 9.74 | 328 | 33.7 |
| 0,98 | Libelle 301 | 9.80 | 300* | 30.6 |
| | Std Libelle | 9.80 | 290* | 29.6 |
| | H 201B StdLibelle | 9.80 | 328 | 33.5 |

# IGC Club Class Handicap List 2012

| Index | Glider Type | Legal MTOM without water (kg) | Max Mass of non lifting parts (kg) | Average Mass of the wings (kg) | New IGC Reference Mass (kg) |
|---|---|---|---|---|---|
| 1.09 | ASW 20 WL (15m) | | 235 | 137 | 372 |
| 1.09 | Discus a/b WL | | 240 | 127 | 367 |
| | Discus CS + WL | | 240 | 127 | 367 |
| 1.08 | ASW 20 (15m) | | 235 | 137 | 372 |
| | ASW 20F | | 235 | 137 | 372 |
| 1.08 | ASW 24 WL | | 230 | 126 | 356 |
| | ASW 24B WL | | 245 | 126 | 356 |
| | Discus a/b | | 240 | 127 | 366 |
| 1.08 | Discus CS | | 240 | 127 | 366 |
| 1.08 | LS7-WL | | 235-249 | 118 | 367 |
| 1.08 | SZD 55-1 | | 248 | 115 | 363 |
| 1.07 | ASW 24 | | 230 | 126 | 356 |
| | ASW 24B | | 245 | 126 | 361 |
| 1.07 | LS7 | | 235-249 | 118 | 367 |
| 1.07 | DG 200 (15m) | | 250 | 130 | 380 |
| 1.07 | Mosquito | | 240 | 128 | 368 |
| | Mosquito B | | 240 | 128 | 368 |
| 1.07 | LS3 | | 240 | 137 | 377 |
| | LS3-a | | 230 | 137 | 367 |
| 1.06 | Speed Astir II | 400 | 260 | 149 | 400* |
| | Speed Astir IIb | 400 | 260 | 149 | 400* |
| 1.05 | DG 300 | | 246 | 123 | 369 |
| | DG 300 Elan | | 246 | 123 | 369 |
| 1.05 | Glasflügel 304 | | 240 | 129 | 369 |
| | Glasflügel 304 CZ | | 240 | 129 | 369 |
| 1.05 | LS4 / 4-a | | 230-264 | 126 | 390 |
| | LS4-b | | 230-264 | 126 | 390 |
| 1.04 | Pégase 101 | 363 | 235 | 126 | 361 |
| | Pégase 101 A | 368 | 235 | 126 | 361 |
| | Pégase 101 B/C | 370 | 230 | 126 | 356 |
| | Pégase 101 D | | 225 | 126 | 351 |
| | Pégase 101 P/AP | | 235 | 126 | 361 |
| 1.03 | PIK 20 A | | 260 | 130 | 380 |
| | PIK 20 B | | 240 | 130 | 370 |
| | PIK 20 D | | 225 | 130 | 355 |
| 1.01 | ASW 19 | | 225 | 132 | 357 |
| | ASW19 B | | 230 | 132 | 362 |
| 1.01 | DG 100/100G | 385 | 265 | 132 | 385* |
| | DG 100 ELAN | 385 | 265 | 132 | 385* |
| | DG 100 G ELAN | 385 | 265 | 132 | 385* |
| 1.01 | Jantar Std. 2/2M | 385 | 245 | 128 | 373 |
| | Jantar Std. 3 | 390 | 248 | 128 | 376 |
| | Brawo | 360 | 242 | 128 | 360 |
| 1.01 | LS1-f | | 230 | 117 | 347 |
| | LS1-f/45 | | 230 | 117 | 347 |
| 1.00 | Hornet | | 225 | 118 | 343 |
| | Hornet C | | 225 | 119 | 344 |

| | | | | | |
|---|---|---|---|---|---|
| 1.00 | Jantar Standard | 366 | | 128 | 364 |
| 1.00 | Std Cirrus | | 220 | 121 | 341 |
| | Std Cirrus B | | 220 | 121 | 341 |
| | Std Cir. CS 11 75 | 345 | 220 | 121 | 341 |
| | Std Cirrus G | | 220 | 121 | 341 |
| 0,98 | ASW15 | 318 | 198 | 131 | 318* |
| | ASW 15B | | 220 | 131 | 351 |
| 0,98 | LS1-0 | 312 | 212 | 116 | 312* |
| | LS1-a | 312 | 212 | 116 | 312* |
| | LS1-b | 312 | 212 | 116 | 312* |
| | LS1-c | 312 | 212 | 116 | 312* |
| | LS1-d | | 212 | 116 | 328 |
| 0.98 | Libelle | 300 | 200 | 118 | 300* |
| | H 201 Std Libelle | 290 | 200 | 118 | 290* |
| | H 201B Std Libelle | | 210 | 118 | 328 |

* The reference mass is equal to the legal MTOM without water because it is lower than the estimate of the MTOM without water

Retrofitting a glider with retractable landing gear increases the Handicap by 0.02.
Retrofitting a glider with winglets increases the Handicap by 0.01.

The handicap is based on the performance at the MTOM of the glider without water. If a glider is flown at a mass not exceeding this reference mass it can be considered as operated within legal mass limits. Where a glider is flown at a higher mass by necessity, the pilot will have to provide documentation to prove that his glider is still operated within the *l*egal mass limit *and* the handicap will be increased by 0.005 for each 10 kg or part thereof that the glider exceeds the.reference mass. However the wing loading may in no case exceed 38 kg/$m^2$.