# Will the gliders with a poor reputation dominate the club class?

The club class in gliding should be the most accessible way for pilots to compete and should provide the fair conditions when comparing pilots performance during the competitions on different gliders. Thanks to a system of handicaps that should create equal level of performance for all the gliders used.

How does it work in reality? Each type of glider is assigned a handicap based on expected performance, as described in the IGC procedures for handicapped classes. This document also explains how the basic handicaps are reduced or increased when the takeoff weight of the glider is lower or higher than the reference weight. Furthermore it describes which modifications of gliders are still allowed without changing its handicap or how adding winglets increases the gliders handicap.

To put it very simply, the actual performance of the glider with the pilot divided by its handicap should equalise the performance of individual gliders to the same level**.** If fair handicaps would be correctly assigned to each glider, then logically pilots would not prefer certain gliders in competitions, they would fly all permitted gliders and their representation in the result list would follow and copy more or less quantity of glider types produced worldwide. Same on the podiums, winning gliders would be diverse and their numbers would correspond again proportionally to the quantity of gliders produced of each type, as shown in the table below:

Table 1

| Glider | Handicap till 2024 | Handicap 2025 | Reference mass | Wing area | Wing loading | Production quantity | Production quantity in |
|---|---|---|---|---|---|---|---|
| | | | kg | m2 | kg/m2 | pcs | % |
| ASW 20B, C | 1.060 | 1.080 | 372 | 10.5 | 35.4 | 240 | 6,6 |
| ASW 20, F, L | 1.055 | 1.074 | 372 | 10.5 | 35.4 | 740 | 20,4 |
| ASW 24, B | 1.050 | 1.060 | 365 | 10.0 | 36.5 | 221 | 6 |
| Discus a,b,CS | 1.045 | 1.054 | 367 | 10.58 | 34.6 | 800 | 22 |
| LS 3 | 1.045 | 1.062 | 377 | 10.5 | 35.9 | 155 | 4,2 |
| LS 3a | 1.045 | 1.062 | 377 | 10.5 | 35.9 | 274 | 7,5 |
| LS 7 | 1.030 | 1.036 | 353 | 9.7 | 36.3 | 164 | 4,5 |
| LS 4, a, b | 1.025 | 1.030 | 356 | 10.5 | 33.9 | 1048 | 28,8 |
| Total | | | | | | 3642 | |

I only display the majority of club class gliders presented in main FAI comps above, not including all IGC club class gliders, like old stuff St. Cirrus, ASW 15 & 19 or seldomly used SZD 55, DG 300, Pegase, Mosquitos, H 301 etc. Purpose of that is just to make it more simple and transparent. If all of them would be included, then we come to more than 6000 club class gliders included in current IGC handicap list.

**The complete results of the World and European Championships since 2017, including the gliders and their handicaps, are on soaringspot.com and first ten are here:**

**19th FAI European Gliding Championship 2017 Czech republic**
**(old previous handicap list in use)**

| | Glider | Handicap |
|---|---|---|
| 1. Tim Kuipers | St. Cirrus | 0.996 |
| 2. Boris Zorz | St. Cirrus | 1.000 |
| 3. Fabian Peitz | St. Libelle WL | 0.981 |
| 4. Sergey Serov | St. Cirrus | 0.988 |
| 5. Tomas Suchanek | St. Cirrus | 0.992 |
| 6. Rasmus Orskov | LS 1f | 1.006 |
| 7. Valentin Leleu-Lambour | St. Cirrus | 1.000 |
| 8. Jozef Kozar | LS 1f | 1.010 |
| 9. Sandor Laurinyecz | LS 1f | 1.015 |
| 10. Dennis Behnke | St. Libelle WL | 0.985 |

Total of 31 competitors, only two ASW 24 as high performance gliders competing

**35th FAI World Gliding Championships 2018 Poland**
**(IGC handicap list 2018 – 2024)**

| | |
|---|---|
| 1. Rasmus Orskov | ASW 20 |
| 2. Tomasz Rubaj | SZD 55 |
| 3. Jaroslav Tomana | St. Cirrus |
| 4. Jakub Barszcz | SZD 55 |
| 5. Ivan Novak | St. Cirrus |
| 6. Tim Kuipers | H 304 CZ |
| 7. Andrej Lebedev | ASW 20 |
| 8. Erik Bernard | LS 4 |
| 9. Frederic Hoyeau | LS 4 |
| 10. Darius Liaugaugas | Pegase 101 |

Total of 48 competitors, 19 high performance gliders competing such as ASW 20, LS 3, LS 4, SZD 55, one Discus only

**20th FAI European Gliding Championship 2019 Slovakia**

| | | |
|---|---|---|
| 1. Tom Arscott | LS 7 | 1.031 |
| 2. Gerard G Dale | ASW 24 | 1.054 |
| 3. Uwe Wahlig | LS 3 WL | 1.057 |
| 4. Ivan Novak | LS 4 | 1.029 |
| 5. Ferenc Tamas | LS 3 | 1.049 |
| 6. Jozef Kozar | LS 1f | 1.005 |
| 7. Adrian Henry | St. Cirrus | 1.000 |
| 8. Jaroslav Tomana | Pegase 101 | 1.019 |
| 9. Per Carlin | LS 1f | 1.009 |
| 10. Arturas Pilvinis | SZD 55 | 1.030 |

Total of 31 competitors, 13 high performance gliders, no Discus presented

**36th FAI World Gliding Championships 2021 France**

| | | |
|---|---|---|
| 1. Uwe Wahlig | LS 3 WL | 1.057 |

| | | |
|---|---|---|
| 2. Thies Bruins | ASW 20 WL | 1.056 |
| 3. Stefan Langer | LS 3 WL | 1.049 |
| 4. Tom Arscott | LS 7 WL | 1.034 |
| 5. Ferenc Tamas | LS 3 | 1.053 |
| 6. Robin Smit | LS 4 | 1.033 |
| 7. Jake Brattle | LS 7 WL | 1.034 |
| 8. Hugo Corbille | LS 4 | 1.022 |
| 9. Mark Travner | DG 300 | 1.012 |
| 10. Darius Gudziunas | ASW 20 | 1.052 |

Total of 36 competitors, only 2 low performance gliders: St. Libelle, Jantar 3, one Discus only

**21th FAI European Gliding Championship 2022 Lituania**

| | | |
|---|---|---|
| 1. Tomas Suchanek | ASW 20 | 1.052 |
| 2. Thies Bruins | ASW 20 WL | 1.056 |
| 3. Tom Arscott | LS 7 | 1.024 |
| 4. Tapio Tourula | LS 7 WL | 1.028 |
| 5. Michael Mix | LS 3 a | 1.045 |
| 6. Lukas Blattmann | LS 4 b | 1.029 |
| 7. Jake Brattle | LS 7 | 1.024 |
| 8. Hugo Corbile | LS 4 | 1.022 |
| 9. Andrej Lebedev | ASW 20 | 1.055 |
| 10. Uwe Melzer | LS 4 WL | 1.029 |

Total of 28 competitors, only 2 low performance gliders: St. Libelle, Jantar 3, one Discus only

**37th FAI World Gliding Championships 2023 Australia**

| | | |
|---|---|---|
| 1. James Nugent | LS 3 | 1.049 |
| 2. Uwe Wahlig | LS 3 WL | 1.057 |
| 3. Stefan Langer | LS 3 WL | 1.053 |
| 4. Rasmus Orskov | ASW 20 CL | 1.057 |
| 5. Tomas Suchanek | ASW 20 | 1.052 |
| 6. Jacek Flis | LS 3 WL | 1.057 |
| 7. Tim Milner | LS 3 | 1.053 |
| 8. Roelof Corporaal | LS 7 neo WL | 1.034 |
| 9. Adrien Henry | ASW 20 | 1.059 |
| 10. Hugo Corbile | LS 7 neo WL | 1.038 |

Total of 30 competitors, only 1 one St. Cirrus, three Discus gliders

**22th FAI European Gliding Championship 2024 Czech republic**

| | | |
|---|---|---|
| 1. Jacek Flis | LS 3 WL | 1.057 |
| 2. Tomas Suchanek | ASW 20 | 1.049 |
| 3. Gvidas Sabeckis | ASW 20 | 1.049 |
| 4. Kim Toppari | LS 7 WL | 1.031 |
| 5. Tapio Tourula | LS 7 | 1.024 |
| 6. Mikolaj Zdun | LS 3 WL | 1.057 |
| 7. Jaroslav Tomana | ASW 20 | 1.052 |
| 8. Michal Lesingr | ASW 20 | 1.055 |
| 9. Ringaudas Kikalas | ASW 20 | 1.055 |
| 10. Hugo Corbile | LS 7 neo WL | 1.034 |

Total of 40 competitors, only 1 LS 1f and two Discus gliders

Why am I presenting the results of the major world competitions over two pages?
Because it clearly shows how the preferences of club class pilots regarding gliders have evolved after the introduction of the new handicaps in 2018. Due to the IGC handicap system 2018 – 2024, which favored higher performance gliders over older designs from the late 1960s and early 1970s, older, cheap and less performing gliders like the St. Cirrus, ASW 15 & 19 and LS 1 have been completely pushed out of competition world of club class. Nowadays mainly the gliders with originally bad reputation such as LS 3 and LS 7 dominate the club class despite the fact, that their relative production is only around 4 % of gliders produced, which are included in club class.

**Their domination will even strenghten with the new IGC handicaps 2025.**

Additionally, data from major competition clearly show that the types of gliders are not represented proportionally to their production numbers, either in the result lists or on the podium. This goes against the philosophy and purpose of the entire club class and indicates a problem in the handicap system that needs to be corrected.
The new handicap list for 2025 supposedly no longer contains this distortion favoring high-performance gliders. However, it still carries errors in the handicaps of some gliders, which were already apparent in the previous list 2018–2024, and unfortunately, impact of some of these errors will further increase in the IGC handicap list for 2025.

Allow me to comment on these errors from my perspective as a pilot who flies the ASW 20 in competitions such as the World and European Championships. I will deliberately not address all club class gliders but only a few with which I have flown closely and I had the opportunity to observe their real performance in the air.

I believe that some gliders with an originally poor reputation have been assigned IGC handicaps that are lower than what would reflect their actual performance.

**The first of them is LS 3** (drei), nicknamed LS blei (lead) in Germany due to its very heavy wings, where the single-piece flaperon (aileron + flap in one) is counterweighted with approximately 10 kg of lead in each flaperon to prevent flutter. Due to the lead in the flaperons and the Wortmanns FX-67-K-170 airfoil used, which is very sensitive to contamination by insects, this glider earned a bad reputation and low popularity among pilots in the late seventies. This is perhaps why it was assigned a lower handicap than, for example, the ASW 20, despite the fact that its actual performance is probably slightly higher than that of the ASW 20 when flying both gliders at their reference weights, based on what I’ve been able to compare during competition flying.

The real performance of the LS 3 was described in 1978 by Richard Johnson in his test of this glider. Upon first measurement, he found a strangely deformed polar curve and a maximum glide ratio of 37. After sealing the glider, however, he measured a maximum glide ratio of 41.8 at 58 knots (the ASW 20 measured a glide ratio of 41.7 at 57 knots with a very similar wing loading). He further stated that the sink rate of the LS 3 at 80 knots is about 8 percent better than that measured in the ASW 20 test, for both clean and with bugs contaminated glider.
Attached I include tests of both gliders, where you can compare the measured polar curves of the LS 3 (figure 6) and the ASW 20 (figure 5). Dick Johnson wrote in this test, I quote: "The LS 3's thermalling performance was consistently excellent, being able to outclimb all but 20m gliders. Despite its weight, the LS-3 is a real champion in a thermal with climb matching its handling qualities."

The advantage of the LS 3's coefficient for club class was discovered by Uwe Wahlig, who demonstrated his correct choice by winning the 2021 World Championship in France (+ Stefan Langer in 3rd). Since then, the LS 3 has won almost all club class competitions with consistent weather and a high number of completed tasks (reducing the factor of luck), such as the World Championship in Narromine, Australia 2023 (all three podium positions), or the European Championship 2024 in Tábor, Czech Republic 2024.

**Why does the LS 3 perform so well? Because:**
1/ The sensitivity of the FX 67-170 airfoil used to contamination is nowadays solved by bug wipers, which must be used to keep the wing profile clean during the flight. Then the efficiency and performance of the airfoil, wing and glider is high across the entire speed range.
2/ LS 3 has the highest reference weight of all the gliders and thus one of the highest surface wing loading in the handicap list.
3/ The flaperon is controlled from the fuselage with a rotating drive, so the LS 3 wings are aerodynamically clean and do not have any flap and aileron drives protruding from the wings like other flap gliders, where four pieces of these drives always create unnecessary extra drag. Additionally, the flaperon is undivided and has no gaps between the aileron and flap like other gliders, maintaining a constant angle of attack across the wing span, unlike the combination of ailerons and flaps of ASW 20 or other flapped gliders, where these angles usually differ. This likely contributes to the ability to both climb and glide excellently, as mentioned by Johnson. You can find Johnson's description of the LS 3's qualities on pages 3 and 4 of the attached LS 3 test.

I would also like to emphasize that I am talking here about the first variant of the LS 3 with flaperon, not LS 3a, a glider where the one-piece flaperon was replaced by two pieces, a flap near the fuselage and a conventional aileron on the outer part of the wing. This added two aileron drives protruding from the wing contour (drag), and both the rudder and elevator were enlarged (more drag) to LS 3a. You can also see in comp results, that winnings pilot choice is always LS 3 not the LS 3a version.

I also include a test of the LS 3a, in which Dick Johnson measured lower performance compared to the original LS 3 (for example, a maximum glide ratio of only 38.9) and where, in the conclusion of the LS 3a test (figure 6), he states that the LS 3a does not come close to the performance of its predecessor, the LS 3.

**Conclusion: The LS 3** is the best performing glider in the current club class and with regard to its qualities it should receive a handicap slightly higher than the ASW 20, otherwise it will have an unfair advantage and will dominate the competition field just like Diana 2 in the fifteen-metre class. However, this is the club class, which has a tool in the form of handicaps to equalize the handicapped performance to the same level, and thus has the potential to make the entire

competition fair. It would also be appropriate to separate LS 3 and LS 3a with different handicaps in the IGC handicap list, as it is currently done to the ASW 20 and ASW 20 B, C.
The excessively low handicap for this glider is demonstrated by both Johnson's measurements and his comparison LS 3 with the ASW 20 in tests, the preferences of pilots who choose this glider for the comps, and finally, its victories and dominance in nearly all top competitions over the past three years.

**The second glider with an originally poor reputation is the LS 7**. This aircraft failed to meet expectations at the end of the eighties to become a Discus beater. When water ballasted LS 7 simply had a worse ability to climb in thermals and was considered a rather unsuccessful type at the time. Its production was discontinued after 6 years with only 164 gliders produced. This reputation, combined with a lack of further measurements (Johnson did not test it), probably led to the decision to assign LS 7 a handicap in 2018 that was close to its predecessor, the LS 4, and significantly lower than, for example, the Discus from Schempp-Hirth. However, reality is different, and the LS 7 without water is just as excellent in the club class as its follower LS 8 is in the standard class. From the cockpit of my ASW 20, the glide performance of the LS 7 is almost identical at speeds up to 160 km/h, and it only climbs slightly worse in thermals compared to the flapped ASW 20. This is likely due to the smaller wing area (9.7 $m^2$) and higher wing loading at its reference weight. From the results of major competitions and pilot preferences for this glider, its competition qualities can easily be inferred now. I estimate that the new handicap system  2025 will make this already rare glider highly sought after and valued like gold. This is completely unnecessary and only because its handicap is too low.

**Discus – a glider with too good reputation**. It dominated the competition in the standard class with a water ballast for over a decade, winning five world championships and countless other comps. More than 800 of them were produced and they fly all over the world. Modern glider with automatic flight control connection, tail water tank, wing root fairings, easy folding, 168 liters of water ballast option, it is robust and foolproof. Ideal for competition flying in the club and free flying for fun with water ballast. However, why is it only a rare choice for pilots in the club class these days? Not only since 2018, but since Discus went into club class in early 2000, it has never reached the top ten in major club class competitions contrary to LS 7 as far as I remember.

Probably because, due to its reputation, it received too high handicap, the same as the dominating LS 3. The Discus maybe flew with 160 liters of water ballast (MTOW 525 kg) just as good as the LS 3 flew with 80 liters (MTOW 472 kg), but its performance without water in club class is a different story. Nevertheless, it had till October 2024 the same handicap with lower wing loading, and in the new IGC handicap list only 0.75% lower than the excellent LS 3 with flaps and higher wing loading. This is not a correctly set handicap and the lack of interest from top pilots to choose Discus for the club class clearly proves it.

If you study the Discus test from February 1986, you will find the following:
In the initial test flights, Johnson measured a maximum glide of 39 at 52 knots. After sealing and tuning the glider, he measured an LD of 42.5 at 53 knots, but this was at a takeoff weight of 317 kg. This is 50 kg below Discus IGC’s specified reference weight of 367 kg. Johnson conducted further polar curve measurements with the glider filled with 83 liters of water, i.e., at 400 kg TOW (33 kg above the IGC reference weight for the Discus), and obtained the polar curve shown in figure 6. The maximum LD of 42.5 at 58 knots, and the sink rate across speeds up to 90 knots was very similar to that of the LS 3 (figure 6), but the LS 3 was at 351 kg, which is 25 kg below its IGC reference weight. What does this imply shows? Clearly, the performance of the Discus without water is significantly lower than that of the LS 3 and lower than the ASW 20, all at IGC reference weights. Also, the performance of the Discus B (with a larger and taller fuselage, more exposed

surface area, less effective wing area and span, and greater overall drag) is logically lower than the Discus a. Therefore, Discus a and Discus b should be listed as separate types with different handicaps in the IGC handicap list.

My opinion is that the handicap of LS 7 should increase by about 1 % and Discus handicap should be reduced by 1 – 1.5 % in the IGC handicap sheet by 2025. The reason is the same or probably higher performance shown and higher wing loading of the LS 7 in the club than the Discus.

**ASW 20 & ASW 20 B,C**. As a direct participant in major competitions, I see no difference in the performance of the ASW 20 and ASW 20 B, C when they fly without water. The modified wing profile of B and C variants and the boundary layer control system with blow holes did not bring any visible performance improvement, This system can be actually a source of problem when the micro holes become clogged . There is no available performance measurement for the individual variants of the ASW 20 that would prove that the ASW 20 B, C flies better without water than the original ASW 20.
My opinion is that the handicaps for the B and C variants should be the same as for the ASW 20, which is currently 1.074.

**Other problems of the IGC Handicap Sheet 2025:**

At the European Championships in Tábor, the ASW 20 glider registration D 1110 "LAB" with an installed retractable tail wheel flew in the club class. This modification, now widely used on the 18 m class high performance gliders, means a reduction in overall drag of the glider, resulting in an increase in overall performance. I believe that this modification goes beyond the permitted modifications of gliders without changing the handicap defined in the official IGC document procedures for handicapped classes as follows:

1.9.2.1. Modifications that do not require adjustments to handicaps: • turbulator tape, vortex generators, taping, sealing and masking of gaps • end plates to ailerons and flaps • bug wipers
1.9.2.2 Modifications that require adjustments to handicaps • flying with winglets (see. 1.6.2)
• Other modifications that improve the performance will be evaluated by IGC Handicap Committee (sub-committe of Annex A) and may result in an adjustment to handicaps.

Since we can expect that similar modifications will appear more often in the club class, I think that an addition to the handicap should be created for them, similar to the one like for winglets.
I suppose the value of this coefficient should be around 0.006 according to my calculations.

**Winglets:** I believe, also with regard to my education as an aeronautical engineer, that the influence of modern winglets on the overall performance of club-class gliders is higher than the 0.004 addition defined in the document, and should be around 0.006–0.008. I attach prof. Mark D. Maughmers study regarding the modern winglets and its impact on overall gliders performance. My conclusion is also supportet by the calculated improvements of wingletted gliders in CZIL, handicap list used within czech gliding. The evaluation of winglets installed shows in average higher addition than IGC handicap list does.

I believe Richard Johnson's glider tests conducted in the 1970s and 1980s provide strong insight for evaluating the performance of current club class gliders, as all the tests were performed using the same methodology and procedures. Dick Johnson was also independent of the individual glider manufacturers, who often conducted their own tests and used their results as the marketing tool for further sales of their new models, and whose measured values sometimes significantly exceeded reality.

Determining IGC handicaps is not easy because to set gliders handicaps properly in the way, that they would equalize glider performance to an ideally same level in various weather conditions is a complex process. Sometimes the thermals in which we circle are narrow, other times wide, sometimes weak, and other times strong. A correctly set handicaps should take all of this into account.

A satisfactory result can likely be achieved by combining several different methods:
1/ Thorough analysis of available data, such as glider tests
2/ Thorough retrospective analysis of flights from IGC files to determine the real performance of gliders and compare it to existing handicaps
3/ Monitoring competition results and trends in preferences for certain gliders and the reasons behind them
4/ Direct observation of pilots and reporting on findings

These feedbacks should be a stimulus for the appropriate body, in this case the IGC Handicap Committee, to make corrections to the handicaps if any discrepancies or anomalies are found.

It’s not a simple process, and more importantly, it’s not a one-time process, but rather a long-term run with possible further handicap corrections in the future. However, it’s worth making this effort to ensure that the club class return to what it is intended to be:

The club class should be the most accessible, affordable, and thanks to the handicap system, it should equalize the performance of individual gliders to an ideally same level. This is a difficult task, unfortunately with the newly introduced IGC handicaps for 2025, this goal was not reached. Some of the above mentioned gliders have handicaps that are too low, and since only a small number of them were produced, they are not easily accessible and quite expensive. They are preferred by pilots and frequently occupy the competition podiums. Others have handicaps that are set too high, and despite the large quantities produced and their other qualities, they suffer from a complete lack of interest from pilots. This is wrong, and we have the power to change it and set handicaps so that the club class remains open, fair to all gliders, and financially accessible. I believe my contribution is aimed in this direction.

If you have your opinion on club class handicaps, you welcome to send it to email: cch@d.cz

Have a smooth landings!

Tomas Suchanek

**Materials:**
Richard Johnson's test LS 3
Richard Johnson's test ASW 20
Richard Johnson's test LS 3a
Richard Johnson's test Discus
Richard Johnson's test LS 4
Winglets by Mark. D. Maughmer
CZIL czech handicap list
IGC procedures for handicapped classes

You can download all tests & others on:

https://bit.ly/IGC_PROCEDURES-TS

or

https://www.dropbox.com/scl/fo/vr4qij8oq1kc3sypk03pd/ALEiu5EKmmvtUlF_1W16Z18?rlkey=lwypw557awxm4u4navlva644f&st=eshtavqu&dl=0