



Invitation to:



WingGames is a yearly competition in indoor wingsuit piloting organized by FK Indoor Wingsuit club and Indoor Wingsuit Stockholm

When? Competition period: 11th June to 11th September 2022

Where? Indoor Wingsuit Stockholm, Sweden

What? Indoor Wingsuit Piloting Championships

Disciplines: Acrobatics, Artistic aerobatics, Glide-time Performance, Accurate Agility

Awards: Overall Indoor WS pilot champion and for each discipline

Party: On several occasions during competition period

Registration deadline: 11th September 2022

Register by emailing: competition@inclined.se

Preliminary results and scoring: to be updated online on competition webpage:

<https://indoorwingsuit.com/en/winggames-2022/>

Final results announcement: 30th September



Detailed info:

Registration: Register by emailing to competition@inclined.se : Name(s) and team name, competition disciplines. Deadline 11th September 2022

Registration fee of 500 SEK per individual (additional fee per competition discipline) is to be paid on-site at arrival.

Participation requires that pilot(s) have appropriate rating for flying in the tunnel. If uncertain, contact our Chief Instructor at patrick@inclined.se

Competition contributions/videos: submitted in email to competition@inclined.se

Description of competition disciplines:

Acrobatics:

A team of two pilots perform 4 rounds of compulsory acrobatic routines within a stated working time. Highest score (number of approved docks) wins.

Discipline fee (tunnel-time 4x2min): 960 SEK per team

Artistic aerobatics:

A team of two pilots performs 2 rounds of a freestyle routine, using a combination of existing graded moves and free moves performed as a synchronized program. Judges score program based on three criterions: artistic grade, grade of execution and technical skill level of moves.

Discipline fee: 480 SEK per team

Glide-time Performance:

Pilots fly solo and compete in aerodynamic performance skills.

The pilot flying with the lowest normalized vertical velocity wins. The competition consist of three 60sec runs with multiple trails on selected levels. Levels start from high vertical speeds and gradually the difficulty increases by reducing vertical speed until a winner has been appointed.

Discipline fee: 360 SEK per individual

Accurate Agility:

Pilots fly solo and compete in agility/precision.

The competition consist of two rounds of 60sec. A competition track with “stations” placed in different locations in the tunnel is to be flown in a preset order. At each station a push button must be accurately pressed switching a lamp to get a score. The pilot showing the highest total score wins.

Discipline fee: 360 SEK per individual

Rules for Acrobatics

General rules:

Working time is defined as when the first flyer leaves the floor. If this can not be seen in video, working time starts when video starts. At end of working time scoring stops.

Take-off with dock is allowed.

Any wingsuit can be used.

Glide Ratio can be selected freely between 1.6 and 2.4.

Scoring:

Each correct, stationary and presented/visible dock counts as one point. A hand-dock means a grip on hand-palm. A foot-dock means a grip on foot below ankle. A failed dock (bust) means score zero for that particular dock.

Between each dock a figure should be performed according to routine.

Incorrect figure means zero points. Omission of a figure means zero points.

Acro-advanced:

Program consist of four (4) compulsory routines.

Each compulsory routine consist of three (3) figures from dive-pool, as defined in the [FAI dive-pool](#). Figure E - fruity loops- is excluded in this competition.

Working time varies depending on GlideRatio(GR) according to below.

GlideRatio	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4
Working time (s)	60	62	65	68	70	73	76	79	82

Acro-intermediate:

Program consists of four (4) compulsory routines.

Each compulsory routine consist of two (2) figures from dive-pool, as defined in the [FAI dive-pool](#). The dive-pool for the Acro-intermediate category comprises a subset of the full divepool with belly-flying figures: A,C,G,L and additionally back-flying version of the same: A-backfly (Ab), C-backfly (Cb), G-backfly (Gb), L-backfly (Lb).

Working time is 60 seconds.

Dive-pool: [FAI dive-pool](#), [Animated divepool](#)

The routines:

The routines are defined on the day of the competition, 1h before start, by a draw-procedure. The draw procedure is set up so that all figures will be present.

Rules for Artistic Aerobatics

Athletes perform artistic aerobatic routines in team of two pilots. The team performing routines with the highest level of artistic, execution and technical skill wins. The routines are composed freely by each team and should be artistically pleasing. It may include a number of freely selected technical moves. The goal is to obtain the highest possible score from the judges in the criteria: Artistic Grade, Grade of Execution and Technical score.

General rules:

- Working time is fixed to 60 seconds.
- Working time is defined as when the first flyer leaves the floor.
- Glide Ratio can be selected freely between 1.6 and 2.4.
- Any suit can be used.
- The competition program consist of two routines scored individually. Final score is the sum.
- The content of the routines is chosen entirely by the Team and may or may not include grips.
- The Team may perform the same routine in both rounds.

Scoring:

Scoring is done with three different criteria, 1. Artistic Grade (AG), 2. Grade of Execution (GoE), 3. Technical Score (TS), according to below. Overall score is calculated as: $\text{Score} = \text{AG} + \text{GoE} \times \text{TS}$

Artistic Grade (AG) (0-30): Flow(0-6), Creativity(0-6), Variation (0-6), Team interaction (0-6), Use of time/space(0-6). Grade score=sum.

Grade of Execution (GoE) (0-100%): Control(0-100%), Synchronization (0-100%). $\text{Grade\%} = \text{C\%} \times \text{S\%}$

Technical Score (TS) (0-30): Each technical move performed score according to table only once per round. This means repeating a move does not add score. Score table of moves is seen below. New moves that are not part of table will be graded a Technical Score as decided by judges and added to list. Maximum score is set to 30.

Table of technical score(TS) moves:

Note of terms:

- semi-roll = transition from belly to back in on axis (called transition in Acrobatics dive pool)
- roll = full rotation on axis (called barrel-roll in Acrobatics dive pool)

Technical Score	Moves
1	Net-bouncing Floor-interactions BellyFly Up-and-over BellyFly Revolution BackFly Up-and-Over BackFly Revolution
2	Stack-static: vertical formation Dynamic Stack: Vertical formation w motion BellyFly Spiral: continous revolution w forward/backward motion BackFly Sprial Individual Transition/Semi-roll
3	Individual Roll Side Pancake-Transition with horizontal displacement Vertical Pancake -Transition with vertical displacement Inface layout-Revolution w two embedded semi-rolls, inface
4	Synchronized team roll Roll'n a half. 540 degree rotation Roll-under formation Roll-over formation
5	Outface carve-Revolution w two embedded semi-rolls, outface Multi-roll Formation Transition/semi-roll (docked)

(If all moves in table are used it would result in TS score of 59 points, but the maximum is 30 points.)

Rules for Glide-time Performance

Pilots fly solo and compete in aerodynamic performance skills in terms of flying at lowest vertical velocity. Below is a description of the aerodynamic lift and how it works, taken from NASA.

The Competition.

Pilots compete in demonstrating the lowest normalized vertical velocity (NVV), i.e. highest glide-time. The vertical velocity (VV) component is calculated from the glide-ratio and wind speed. By using wingloading (WL) normalization, the weight and suit size is compensated for and the pilot skill is the key factor for winning.

- For each attempt the Vertical velocity (VV) is recorded. It is calculated from wind speed and glideratio,
- Normalized vertical velocity (NVV)-scoring is calculated by: $NVV = VV / WL^{0.5}$
- Lowest NVV-value wins.
- Each pilot is given 3 rounds, each round is 60sec run at pilots predetermined glideratio and wind speed.

Procedure:

Pilots can select any suit but must use the same suit for entire competition. Prior to the competition each pilots weight and wing area is measured using weight scale and photometrics. These values are used to calculate Wing Loading (WL), in kg/m² according to: $WL = \text{weight} / \text{area}$.

The competition includes three rounds.

For each round:

- pilots select one glide-ratio and a list of wind speeds to attempt.
- pilot is given a 60 seconds run.
- the pilot starts flying at the highest predefined wind speed and at every 10 seconds the wind speed is reduced in predefined steps.
- the lowest vertical velocity is recorded where pilot demonstrated 10seconds of sustained flight in the competition zone of the tunnel.
- the result table is updated with lowest VV and NVV for each pilot,

After all three rounds, the best result in NVV-value for each pilot is taken as final score. Lowest NVV-value wins.



The Lift Equation

Glenn
Research
Center



$$L = C_l \times \frac{\rho}{2} \times V^2 \times A$$

Lift = coefficient x $\frac{\text{density} \times \text{velocity squared}}{\text{two}}$ x wing area

Coefficient C_l contains all the complex dependencies and is usually determined experimentally.



Rules for Accurate Agility

The competition is focused on accuracy and agility and is performed as a solo-flight. The competition consists of two rounds of 60sec. A competition track, with “stations” placed in different locations in the tunnel, is to be flown in a preset order. At each station, a push button must be accurately pressed switching a lamp to get a score. The pilot showing the highest total score wins.

Athletes compete in accuracy and agility, demonstrating agile flying, accuracy and control.

A track of stations is set up in the tunnel. In this competition a station means a recessed light-button switch that is to be pressed resulting in a lamp signal (seen from both flyer perspective and for judges/spectators).

Athlete flies the track of stations in a predefined pattern and presses the button at each station before proceeding.

Each correctly pressed light button gives a score.

Score is only given if athlete is fully in flight.

Working time is 60 seconds and starts when athlete takes off from behind starting line.

Competitions include two rounds of different tracks.

The score of a round is the total number of approved lamp indications during working time.

Highest total score wins.

Any suit is allowed.

GlideRatio can be selected by athlete to be between 1.6 and 2.4