

## Appendix 2 - Nordic Power Primary Category

### 1: Description

The category is based on IAC rules, but with some of the figures adjusted to provide a fair contest for aircraft without inverted fuel systems. The adjusted figures and judging criteria are described below. The sequence is designed to accommodate lower performance aircraft.

### 2: Adjusted figures

In the sequence diagram, the adjusted figures are preceded by a letter "P". The principal adjustments are as follows:

In Cuban 8s and  $\frac{3}{4}$  loop, the roll shall commence once the 45-degree attitude is reached. In rolls, the nose shall pitch up 15 degrees before the roll starts, and pitch down 15 degrees after the roll ends. In addition, a wingover (a figure used for IAC glider sequences) may be used to give the sequence good flow and energy management.

### 3: Judging criteria

Normal IAC judging criteria are used, but adjusted to represent the Primary figures:

#### Family 7.3 PRIMARY Three Quarter Loops:

Sometimes referred to as "Goldfish," it is not required that the lengths of the 45 degree lines bear any strict relation to the diameter of the three quarter loop. That is, the lengths of the two 45 degree lines may be different and the entry and exit altitudes need not correspond to the altitude limits of the loop

The half roll shall commence once the 45-degree attitude is reached. If a line is drawn or the roll starts before reaching the 45 degree attitude, the figure will be downgraded according **IAC Official Contest Rules 8.4.2.d:**

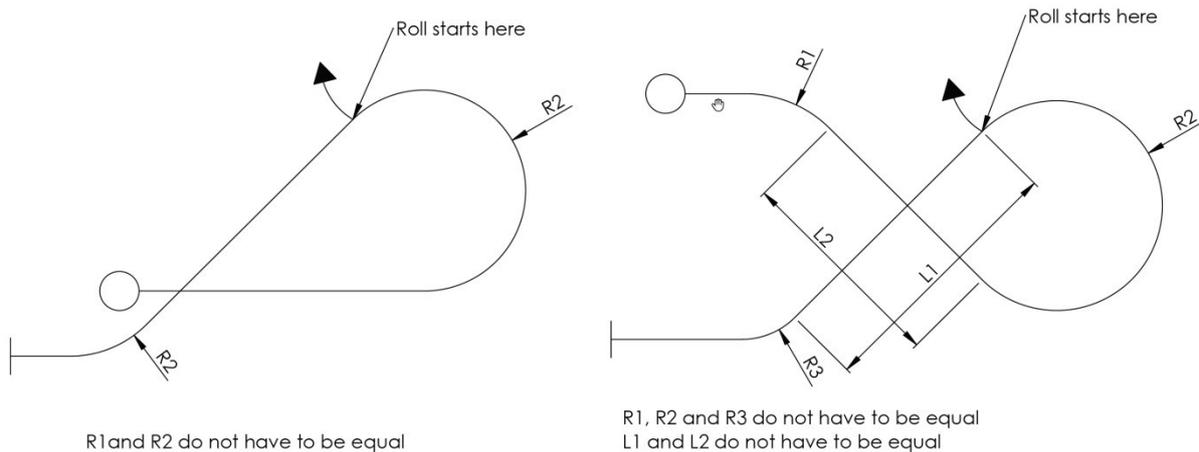
When the looping portion of a figure is immediately preceded or followed by one or more rolls (i.e., rolls not centered on a straight line), there must be no visible line between the roll and loop elements. Drawing a line requires a downgrade of at least one (1) point depending on the length of the line drawn. This criterion is not meant to imply that one element (roll or loop) must start before the preceding element is completely finished. A brief hesitation between elements (similar to opposite rolls) must not be downgraded.

#### Family 8.5.1 PRIMARY Half Cuban Eights:

The half roll shall commence once the 45-degree attitude is reached. If a line is drawn or the roll starts before reaching the 45 degree attitude, the figure will be downgraded according **IAC Official Contest Rules 8.4.2.d:**

When the looping portion of a figure is immediately preceded or followed by one or more rolls (i.e., rolls not centered on a straight line), there must be no visible line between the roll

and loop elements. Drawing a line requires a downgrade of at least one (1) point depending on the length of the line drawn. This criterion is not meant to imply that one element (roll or loop) must start before the preceding element is completely finished. A brief hesitation between elements (similar to opposite rolls) must not be downgraded.



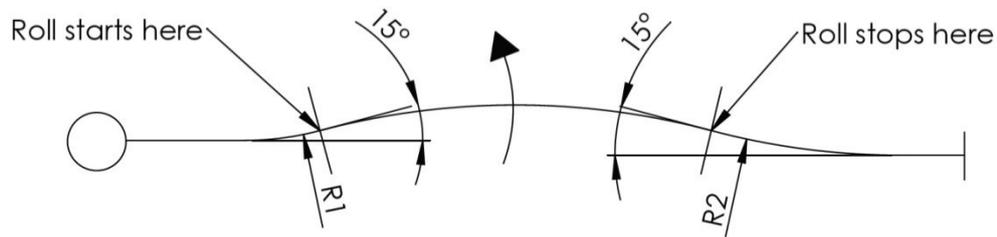
### Family 9.1. PRIMARY Rolls:

The nose will pull up to a 15-degree attitude before the roll starts. The roll will be flow on a constant radius arc and stop when the nose reaches a 15-degree nose down attitude. The Primary Roll must start and finish with a horizontal line (before pull-up and after pull-out), and will be downgraded with normal criteria in this respect. Pull-up and pull-out radius, as well as horizontal entry and exit altitude may differ without penalty. (In practical terms, only huge radius differences would make a perceptible altitude difference between entry and exit altitude)

The penalty for varying the rate of roll is one (1) point per variation. Any stoppage in the Primary roll that could result in it being considered a hesitation roll would result in a grade of HZ for the figure. The finish of the roll must be as crisp and precise as possible. Coming to a slow finish in fact represents a change in the rate of roll and must be penalized accordingly. The wings must stop precisely after the desired degree of rotation and not go past the stop point and then return. This is referred to as “bumping the point”. A deduction of 0.5 point to one (1) point is given depending on the severity of the “bump”. Deviation from the 15 degrees nose-up and nose-down attitudes are downgraded 1 point per 5 degrees deviation. Variation in the arc where the roll is performed is downgraded with 1 point, according to **IAC Official Contest Rules 8.4.2.b**. If a line is drawn before or after rolling, or the roll starts during pull-up or ends pull-out back to horizontal, the figure will be downgraded according **IAC Official Contest Rules 8.4.2.d**:

When the looping portion of a figure is immediately preceded or followed by one or more rolls (i.e., rolls not centered on a straight line), there must be no visible line between the roll and loop elements. Drawing a line requires a downgrade of at least one (1) point depending on the length of the line drawn. This criterion is not meant to imply that one element (roll or

loop) must start before the preceding element is completely finished. A brief hesitation between elements (similar to opposite rolls) must not be downgraded.



Arc in middle must have constant radius  
Altitude for level entry and level exit does not have to be equal  
R1 and R2 do not have to be equal

### Family 0.0 Wingover

The wingover is judged according to IAC glider criteria:

The Wingover begins with a climbing coordinated turn, with the turn begun immediately after the climb is initiated. Climb and turn will be timed so that at the top of the climb, heading is 90 degrees off the original heading, the wings are perpendicular to the horizon, and the longitudinal axis of the aircraft is horizontal. Deductions for errors in heading and attitude at this point must be made according to the "one point per five degree" rule. The second half of the wingover is a continuation of the turn, now on a descending flight path, returning to horizontal flight on the reciprocal of the entry heading (Fig 8.5.1). The 180-degree change of heading must be flown at a constant rate of turn and the bank angle must be constantly and smoothly changed throughout the turn, stopping only briefly as the roll direction is reversed at the 90-degree point of turn. Each change in the rate of roll or turn is a deduction of no more than one (1) point. Any complete stoppage of the rate of roll or turn is also a deduction of no more than one (1) point.

## Appendix 1: Explanatory notes and examples

The criteria may seem somewhat complex at first, but they are simply based upon existing IAC judging principles and should present no difficulty for judges and or pilots.

Primary half Cubans and  $\frac{3}{4}$  loops use the existing criteria found in the IAC Contest Rules, but since the roll immediately follows the looping portion, criteria used for half loops, more commonly referred to as an Immelmann, apply. That means there must be no visible line between the looping portion and the roll, and the roll must not start during the looping portion. In that sense, the figures are downgraded exactly like an Immelmann. This replaces the requirement for the roll to be placed in the middle of the line.

Example:

In a  $\frac{3}{4}$  loop (P 7.3.3.3 + 9.1.4.2, figure 2 in the 2019 Nordic Primary), a line is drawn before the roll. According to 8.4.2.d, 1 point is deducted.

In a half Cuban (P 8.5.6.1 + 9.1.4.2, figure 5 in the 2019 Nordic Primary), the roll is started 10 degrees before reaching the 45 degree attitude. 2 points are deducted according to the standard 1 point/5 degree rule.

In the Primary roll, the rotational element is judged according to existing criteria in the IAC rule book, i.e. constant roll rate and wings level start/stop. In the entry, we have a radius immediately followed by the roll, and in the exit, a radius immediately following the roll. Again, "think Immelmann", same criteria apply. The arc where the roll is placed must have constant radius, this is downgraded like radius variations in looping portions in other figures.

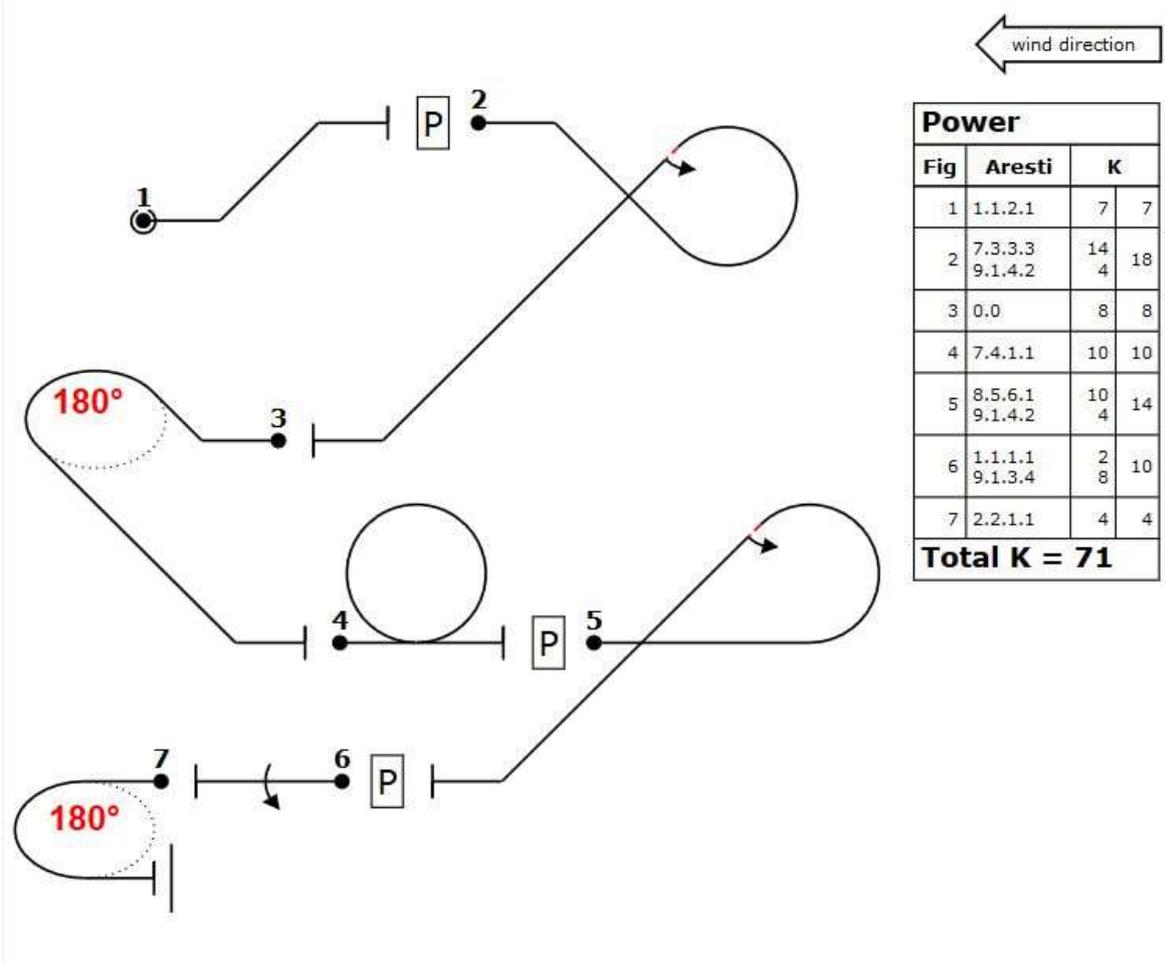
The figure must start and end with a horizontal line. There is no requirement for equal radius or equal altitude in entry and exit. This is to make the criteria practical, and conforms to other figures where there is no such requirement, like Cuban eights and hammerheads. Since the radius only describes a 15 degrees arc, a huge difference in radius would be required to make a visible difference in entry and exit altitude as long as the roll is started and finished at the 15 degree point. Thus, an equal radius requirement would be purely academic.

Example:

In the Primary roll (P 1.1.1.1 + 9.1.3.4, figure 6 in the 2019 Nordic Primary), a 25 degree line is drawn after the roll stops. 1 point is deducted for drawing a line, and 2 points are deducted for the attitude error. No points are deducted for the altitude difference in start and finish horizontal lines.

In the Primary roll (P 1.1.1.1 + 9.1.3.4, figure 6 in the 2019 Nordic Primary), the roll is started 10 degrees before reaching the 15 degrees attitude. The resulting arc is uneven. 2 points are deducted for initiating the roll 10 degrees too early, according to the standard 1 point/5 degree rule. 1 point is deducted for the uneven arc.

## Appendix 2: 2019 Nordic Primary Sequence



Power			
Fig	Aresti	K	
1	1.1.2.1	7	7
2	7.3.3.3 9.1.4.2	14 4	18
3	0.0	8	8
4	7.4.1.1	10	10
5	8.5.6.1 9.1.4.2	10 4	14
6	1.1.1.1 9.1.3.4	2 8	10
7	2.2.1.1	4	4
<b>Total K = 71</b>			