CBA APPENDIX

The *CBA*-procedure includes an algorithm that assesses players' performance based on the Probability P that players should return certain scores. This probability varies slightly from *handicap category* to *handicap category* and the number of players in each *handicap category* is used to determine normal conditions. Such normal conditions are defined by a specified range of players scoring in the *buffer zone* or better. The competition performance of the players is calculated from the *buffer zone* or better (BZ+) scores returned in the competition (N_{BZ}). This value is then compared with the calculated range of players scoring according to expectation (normal conditions). If the value is within the expected range, *CBA* is 0 (and buffer zones remain unchanged); if the value is outside the range, an adjustment (shift) in the buffer zones is computed. When the value is outside the range, the algorithm will select the *CBA* that would make the new competition p-value (taking into account the shifted buffer zones) fall inside the normal range.

Given the nature of scores in golf and their variability, it is impossible to develop a "perfect" *CBA*-tool. The *EGA*'s HRG have identified two main weak points for any daily adjustment feature: false positive *CBA*-values (*CBA* other than 0 when conditions were normal, also known as "Type I Errors") and a self-perpetuating cycle (once a false positive *CBA*-value is calculated, the likelihood for the next false positive increases). This algorithm is designed to minimize the likelihood of false positive values and consequently to avoid a self-perpetuating cycle. This way, the amended algorithm will produce a higher percentage of rounds where *CBA* is 0.

The *CBA*-calculation will be applied at the end of the competition, subject to the following provisions:

1 The effect of the *CBA*-calculation will be to shift the *buffer zones* of each *handicap category* with a specific value, from -2 to +1, according to the calculated *CBA*, for all *handicap categories* affected by *CBA*.

2 Where the abbreviation RO appears in conjunction with the value *CBA* (-2) the competition is designated "reduction only", meaning that *EGA Handicaps* will only be reduced and not increased.

3 Scores from players with "inactive" handicaps (if applicable) must not be included in the *CBA* calculation.

4 Where a *qualifying competition* has been cancelled for any reason, even if the score is allowed to stand for handicapping purposes, a *CBA* must not be calculated. In this situation, *EGA Handicaps* will be adjusted using *CBA* = 0 and the competition will be designated "Reduction Only" i.e. no *EGA Handicaps* will be increased as a result of a cancelled competition.

5 Where a qualifying competition field comprises only of players in *handicap category* 5 or less than 10 players from *handicap categories* 1 to 4 no *CBA* must be calculated and all *EGA Handicaps* will be adjusted against Stableford points scored with the *handicap categories buffer zones* unadjusted. NB: this is <u>not</u> a RO-scenario.

6 Committees in charge of competitions are reminded that, provided a competition meets the *CBA*-criteria, they do not have the discretion to determine whether a *qualifying competition* is designated "Reduction Only" or not.

7 The *CBA*-procedure may not be applied to *EDS* or 9-hole scores.

CBA ALGORITHM

NORMAL CONDITIONS-LIMITS

1.- The normal conditions upper p-value for each *handicap category* is defined in the following table:

CATEGORY	1	2	3	4
	$_{upper}P_1$	$_{upper}P_2$	$_{upper}P_3$	$_{upper}P_4$
upper p-value	53,50%	45,00%	43,50%	48,00%

2.- The normal conditions lower p-value for each *handicap category* is defined in the following table:

CATEGORY	1	2	3	4
	$_{lower}P_1$	$_{lower}P_2$	$_{lower}P_3$	$_{lower}P_4$
lower p-value	31,00%	27,50%	28,00%	34,00%

COMPETITION NORMAL CONDITIONS-LIMITS

1.- Count the number of players in *handicap categories* 1 thru 4 (n_i)and calculate the total number of players included in the *CBA*-calculation (N).

CATEGORY	1	2	3	4
number of players	n_1	n_2	n_3	n_4

$$N = n_1 + n_2 + n_3 + n_4$$

2.- Calculate the competition normal condition upper p-value using the formula:

$$nc.upP = \frac{\left(n_1 * {}_{upper}P_1 + n_2 * {}_{upper}P_2 + n_3 * {}_{upper}P_3 + n_4 * {}_{upper}P_4\right)}{N}$$

3.- Calculate the competition normal condition lower p-value using the formula:

$$nc.lwP = \frac{\left(n_1 * {}_{lower}P_1 + n_2 * {}_{lower}P_2 + n_3 * {}_{lower}P_3 + n_4 * {}_{lower}P_4\right)}{N}$$

4.- Calculate the competition normal condition-limits using the formulas:

$${}_{upper}ncLIMIT = {}_{nc.up}P * N + 2{,}821 * \sqrt[2]{N * {}_{nc.up}P * (1 - {}_{nc.up}P)}$$

$${}_{lower}ncLIMIT = {}_{nc.lw}P * N - 1{,}833 * \sqrt[2]{N * {}_{nc.lw}P * (1 - {}_{nc.lw}P)}$$

5.- Count the number of players returning a score in the *buffer zone* or better (N_{BZ}).

6.- Count the number of players returning a score in the *buffer zone* minus 1 or better (N_{BZ-1}).

7.- Count the number of players returning a score in the *buffer zone* minus 2 or better (N_{BZ-2}).

8.- To determine the *CBA*-value, apply the following rules:

-If the number of scores in *buffer zone* or better (N_{BZ}) is inside the normal conditions-limits $\left[{}_{upper}ncLIMIT\ ,\ {}_{lower}ncLIMIT\right]$, *CBA* is 0.

-If the number of scores in *buffer zone* or better (N_{BZ}) is higher than the normal conditions upper limit >$\left[{}_{upper}ncLIMIT\ \right]$, *CBA* is +1.

-If the number of scores in the *buffer zone* minus 1 or better (N_{BZ-1}) is higher than the normal conditions lower limit >$\left[{}_{lower}ncLIMIT\ \right]$, *CBA* is -1.

-If the number of scores in the *buffer zone* minus 2 or better (N_{BZ-2}) is higher than the normal conditions lower limit >$\left[{}_{lower}ncLIMIT\ \right]$, *CBA* is -2. If not, *CBA* is -2&RO.

In place in Portugal as from the 1st of January 2016, as complement to the EGA Handicap System 2016-2019.