



Ratings Bureau

How South African ratings are calculated

Following are the Rules and Regulations for the calculation and updating of South African ratings which came into force on 01 October 2013. In this document, the terms "he" and "his" also refer to "she" and "her".

Age groups and Sections

Tournament age groups and sections will be defined as follow:

- 1 **u8:** A player who has not yet reached the age of 8 years on 31 December of the previous year.
- 2 **u10:** A player who has not yet reached the age of 10 years on 31 December of the previous year.
- 3 **Beginner:** For beginners:
 - Regardless of age, and
 - Where at least 66% (rounded upward) of the players do not have ratings, and
 - Is the lowest section/group of a tournament
- 4 **Other:** All other sections not covered by points 1, 2 & 3 (above).
- 5 U8 and u10 groups may be combined.

Time control and type of Ratings

- 1 There are 3 types of ratings. The minimum time control for each is:
 - 1.1 **Normal:** At least 60/60 (60 minutes per player).
 - 1.2 **Rapid:** At least 10/10 but less than 60/60.
 - 1.3 **Blitz:** Anything less than 10/10.
- 2 For u8, u10 and Beginners, the minimum time control for updating Normal ratings will be 30/30.
- 3 The original (base) time and excluding any increments per move, is used to determine the type of ratings to be updated.

Example 1: The time control for a tournament is 60/60 with an increment of 30 seconds added per move. Only the 60/60 part is taken into account, discarding the 30 seconds per move. Thus, Normal ratings will be updated.

Example 2: The time control for a tournament is 45/45 with an increment of 30 seconds added per move. Only the 45/45 part is taken into account, discarding the 30 seconds per move. Thus, Rapid ratings will be updated.

- 4 Where a tournament has multiple time controls, the fastest of these will be used to determine the type of ratings to be updated.

Example 1: The time control for the first 2 rounds of a tournament is 60/60. The time control for the other rounds is 90/90. 60/60 is the lesser value, so Normal ratings will be updated.

Example 2: The time control for the first 2 rounds of a tournament is 45/45. The time control for all other rounds is 60/60. 45/45 is the lesser value, so Rapid ratings will be updated.

K-Factor (K)

- 1 K is a "stabiliser" and determines the degree by which a player's rating changes. The higher the K-factor, the greater the rating change, and vice versa.
- 2 An unrated player does not have a K-factor. His K-factor is determined once he receives his first official rating.
- 3 Normal Ratings are classed into 5 groups. Each group has a different K-factor value. A player's K-factor may decrease but never increase. That is, once a player's rating goes into a higher rating group, his K-factor will decrease and remain this even though his rating drops into a lower rating group.
- 4 Normal ratings
 - K=10: Rating 2300+
 - K=15: Rating 2000-2299
 - K=20: Rating 1800-1999
 - K=30: Rating 1400-1799
 - K=35: Rating below 1400 (1399 or less)

Example 1: A player's rating is 1990 and his current K-factor is 20. His new published rating is 2010. His new K-factor is 15.

Example 2: A player's rating is 1810 and his current K-factor is 20. His new published rating is 1780. His K-factor remains 20 even though his rating dropped into the 1400-1799 group.

- 5 Rapid ratings: K=30 regardless of rating.
- 6 Blitz ratings: K=40 regardless of rating.

60% Rule

- 1 Only tournaments with a minimum of 5 rounds will be rated **unless special dispensation for fewer rounds has been granted by the CHESSA Ratings Committee** (organisers MUST first apply for this BEFORE the tournament is held, not after the fact). For braille tournaments the minimum is 4 rounds.
- 2 A player may only gain rating points if he has played at least 60% (rounded upwards) of the total number of scheduled tournament rounds.
Meaning: if a player's rating is supposed to go up (has a positive rating gain) then he will only receive these points if he has played at least 60% of the total number of rounds, otherwise not. The player will still drop rating points if his rating change is negative even though he has played at least 60% of the number of rounds.
- 3 A player WILL drop rating points (if his adjustment is negative) if he has played less than 60% of the number of tournament rounds.
- 4 Rounds where a player received a Bye or won on default will be considered as a "played game" but will not be taken into account for rating purposes.

Example 1: In a 5-round tournament a player played 3 "actual" games, received a Bye and won a game on default. He is considered to have played 5 games (100%) but only the 3 "actual games" will be used to update his rating.

Example 2: In a 5-round tournament a player played 2 "actual" games, won a game on default, received a Bye and lost a game on default. He is considered to have played 4 games (80%) but only the 2 "actual" games will be used to update his rating.

- 5 The 60% rule is not applicable to team tournaments.

Activity

For the purpose of calculating CHESSA Grand Prix Points.

- 1 All games vs. unrated opponents will count towards activity.
- 2 All games where a player won a game on default (opponent did not arrive) or where the player received a Bye (1 or ½ points) will count towards activity.
- 3 Games where a player did not play (gave notice of such) and/or where a player lost a game on default (did not arrive for the game) and/or where the player requested a ½-point-Bye will NOT count towards activity.

Rating of unrated and new players

- 1 An unrated player will only receive an official rating once he has played at least 20 rated games (per rating type).
- 2 All games (regardless if the opponent is rated or not) will count towards the calculation of his first rating.

Games vs. unrated opponents

- 1 **Rated player vs. unrated opponent:** For u8, u10 and Beginner groups, games vs. unrated opponents will be rated. The unrated opponent will be assigned a temporary rating before proceeding. However, for all other groups/sections, games vs. unrated opponents will not be taken into account for updating ratings.
- 2 **Unrated player vs. unrated opponent:** All games will be rated, regardless of the age group, section, etc.

How unrated players will be treated when rating tournaments

Before any tournament is rated, unrated players will be assigned a temporary rating and is equal to the unrated player's tournament performance. This is NOT an official rating and is only used to update the ratings of the opponents (taking all the above regulations into account).

The procedure is as follows:

- 1 Calculate the average rating of the rated players and floor the answer to the nearest factor of 100. E.g. if the average is 1234 then the floor is 1200. E.g. if the average is 987 then the floor is 900.
- 2 If all players are unrated then the floor will be assigned manually and is: (a) 500 for u8, and (b) 600 for u10 and Beginner.
- 3 Assign the floor (temporarily) to all unrated players (treat them as if they were rated) and recalculate the average rating of all the players. Floor this answer and assign the new value to all unrated players.
- 4 Repeat this process until the floor converges (does not change anymore).
- 5 Calculate the performance rating of each unrated player (see below) using the actual ratings of his rated opponents and the floor for his unrated opponents.
- 6 The tournament is then rated using these "temporary" ratings.

Example:

There are 10 players in a tournament.

Player	Rating
A	1142
B	1083
C	1011
D	987
E	845
F	0
G	0
H	0
I	0
J	0

The average rating of the rated players is:

$$Average = \frac{1142 + 1083 + 1011 + 987 + 845}{5} = 1013.6$$

The floor is 1000.

The table now becomes:

Player	Rating
A	1142
B	1083
C	1011
D	987
E	845
F	1000
G	1000
H	1000
I	1000
J	1000

The new average is:

$$Average = \frac{1142 + 1083 + 1011 + 987 + 845 + 1000 + 1000 + 1000 + 1000 + 1000}{10} = 1006.8$$

The floor is 1000.

We now stop the process as the last 2 floors have the same value. So, we assign 1000 to each unrated player and will use these to calculate their performance ratings.

Formulae

1 Performance rating (P) for rated players

$$P = A + 400 \left(\frac{W - L}{N} \right)$$

P = Performance rating

A = Average opponent rating

W = Number of won games (excluding byes and defaults)

L = Number of lost games (excluding defaults)

N = Number of games played (excluding byes and defaults)

2 Performance rating for unrated players (Pu)

A player's percentage score is first calculated (excluding all byes and defaults) and is rounded off to the nearest integer.

- If the player scores > 50%: $P_u = A + 30 \left(S - \frac{N}{2} \right)$
- If the player scores = 50%: $P_u = A$
- If the player scores < 50%: $P_u = A + D_p$

Pu = Performance rating

A = Average opponent rating

S = Score (excluding byes and defaults)

N = Number of games played (excluding byes and defaults)

Dp = Difference (see Table 1 below)

3 Weighed performance rating (Pw) (all players)

$$P_w = \frac{\sum_{i=1}^n P_i N_i}{\sum_{i=1}^n N_i} \quad \text{or} \quad P_w = \frac{P_1 N_1 + P_2 N_2 + \dots + P_n N_n}{N_1 + N_2 + \dots + N_n}$$

Pw = Weighed performance rating

P = Tournament performance

N = Number of games played (excluding byes and defaults)

In simpler terms:

- Step 1: For each tournament, multiply the player's performance rating with the number of games he has played. Then add all these answers together.
- Step 2: Calculate the players total number of tournament games played.
- Step 3: Divide the answer in step 1 by the answer in step 2.

NB! In all cases, the performance may not drop below 100. If it does, adjust it to 100.

Using Weighed Performance (Pw) to adjust/award ratings

- 1 **Unrated players:** For each type of rating, an unrated player will receive his first published rating once he has played 20 rated games. This rating is determined by calculating the Pw of his tournaments that make up the 20+ games. NB! Normal, Rapid and Blitz games are not mixed but counted separately for each type of rating.

Example: An unrated player has the following results.

Tournament 1: Pw=1234, N=5
Tournament 2: Pw=1482, N=7
Tournament 3: Pw=1050, N=6
Tournament 4: Pw=1506, N=9

$$\begin{aligned} P_w &= \frac{P_1 N_1 + P_2 N_2 + \dots + P_n N_n}{N_1 + N_2 + \dots + N_n} \\ &= \frac{(1234 \times 5) + (1482 \times 7) + (1050 \times 6) + (1506 \times 9)}{5 + 7 + 6 + 9} \\ &= \frac{36398}{27} \\ &= 1348 \end{aligned}$$

So his first published rating will be 1348.

- 2 **Rated players:** After each 5 tournaments a player's Pw is calculated. If Pw is greater than the player's latest published rating, his rating is adjusted upwards equal to the value which is the difference between Pw and his current rating but to a maximum of 150 points.

Example 1: A player's new rating is 1600. His Pw is calculated as 1700. The difference is 100. His rating is adjusted to 1700 (1600+100).

Example 2: A player's new rating is 1600. His Pw is calculated as 1900. The difference is 300. His rating is adjusted to 1750 (1600+150).

Example 3: A player's new rating is 1600. His Pw is calculated as 1500. No adjustment is made because Pw is less than his rating.

- 3 **For both rated and unrated players:** Pw is only calculated at the end of the month and after the new set of ratings were calculated.

Difference in rating (D)

- 1 D is calculated by subtracting the opponent's rating from the player's own rating.
Thus, $D = \text{Player rating} - \text{Opponent rating}$
- 2 For the higher rated player, D may not be more than +400. If it is, treat D as +400 (as if the opponent was only rated 400 rating points less).
- 3 For the lower rated player, D may not be less than -736. If it is, treat D as -736 (as if the opponents was rated 736 rating points higher).

Example

Player A is rated 2000.

Player B is rated 1200.

For player A: $D = 2000 - 1200 = 800$. Because $D > 400$ we treat Player B as if he is rated 1600 (2000-400).

For player B: $D = 1200 - 2000 = -800$. Because $D < -736$ we treat Player A as if he is rated 1936 (1200+736).

NB! The above is only used for updating ratings. When calculating performance ratings, the actual opponent ratings are used.

Number of rounds per tournaments

Only tournaments with a minimum of 5 rounds will be rated **unless special dispensation for fewer rounds has been granted by the CHESSA Ratings Committee** (organisers MUST first apply for this BEFORE the tournament is held, not after the fact). For braille tournaments the minimum is 4 rounds.

When ratings are updated

New ratings are calculated on the last day of each month (based on tournaments received in that month) and published on the first day of the next month.

A player's current rating will be used to calculate his overall rating change for that month, regardless of the number of tournaments he participated in. E.g. a player's rating is 1500. For each and every tournament he played in that month, his rating change will be calculated based on his current 1500 rating. The total rating change for that month will then be added to his current rating to determine his new rating.

Table 1

For calculating the Dp value of unrated players (see "Performance rating for unrated players").

%	Dp	%	Dp	%	Dp	%	Dp	%	Dp
49	-7	39	-80	29	-158	19	-251	9	-383
48	-14	38	-87	28	-166	18	-262	8	-401
47	-21	37	-95	27	-175	17	-273	7	-422
46	-29	36	-102	26	-184	16	-284	6	-444
45	-36	35	-110	25	-193	15	-296	5	-470
44	-43	34	-117	24	-202	14	-309	4	-501
43	-50	33	-125	23	-211	13	-322	3	-538
42	-57	32	-133	22	-220	12	-336	2	-589
41	-65	31	-141	21	-230	11	-351	1	-677
40	-72	30	-149	20	-240	10	-366	0	-800

To use the table, calculate the player's percentage score, find the value in the table and read the number to the immediate right.

E.g. A player's percentage score is 26. His Dp is -184.

Table 2

For rated players only. Used to calculate a player's expected score (We).

D	H	L	D	H	L	D	H	L	D	H	L
0-3	0.50	0.50	92-98	0.63	0.37	198-206	0.76	0.24	345-357	0.89	0.11
4-10	0.51	0.49	99-106	0.64	0.36	207-215	0.77	0.23	358-374	0.90	0.10
11-17	0.52	0.48	107-113	0.65	0.35	216-225	0.78	0.22	375-391	0.91	0.09
18-25	0.53	0.47	114-121	0.66	0.34	226-235	0.79	0.21	392-411	0.92	0.08
26-32	0.54	0.46	122-129	0.67	0.33	236-245	0.80	0.20	412-432	0.93	0.07
33-39	0.55	0.45	130-137	0.68	0.32	246-256	0.81	0.19	433-456	0.94	0.06
40-46	0.56	0.44	138-145	0.69	0.31	257-267	0.82	0.18	457-484	0.95	0.05
47-53	0.57	0.43	146-153	0.70	0.30	268-278	0.83	0.17	485-517	0.96	0.04
54-61	0.58	0.42	154-162	0.71	0.29	279-290	0.84	0.16	518-559	0.97	0.03
62-68	0.59	0.41	163-170	0.72	0.28	291-302	0.85	0.15	560-619	0.98	0.02
69-76	0.60	0.40	171-179	0.73	0.27	303-315	0.86	0.14	620-735	0.99	0.01
77-83	0.61	0.39	180-188	0.74	0.26	316-328	0.87	0.13	736+	1.00	0.00
84-91	0.62	0.38	189-197	0.75	0.25	329-344	0.88	0.12			

How to use the table:

- 1 Calculate D for each player and find the difference in the column marked "D".
- 2 For the higher rated player, read the value to the immediate right which is in the "H" column.
- 3 For the lower rated player, read the value to the immediate right which is in the "L" column.

Example 1

Player A is rate 1345. Player B is rated 1234.

For Player A: $D=1345-1234=111$. His We is 0.65.

For Player B: $D=1234-1345=-111$. His We is 0.35.

This means, because of the rating difference (D), Player A is expected to score 0.65 and Player B 0.35 points from their game.

Example 2

Player A is rated 2000.

Player B is rated 1000.

For Player A: $D=2000-1000=1000$. Because $D>400$ we use $D=400$. This gives $We=0.92$.

For Player B: $D=1000-2000=-1000$. Because $D<-736$ we use $D=-736$. This gives $We=0.00$.

Summary: How to calculate the tournament performance rating of an unrated player.

- 1 Calculate the average rating of all the rated players and floor the answer.
- 2 Assign this floor to each of the unrated players and recalculate the average rating of ALL players (taking this floor into account for each of the unrated players). Floor the answer and assign the new value to each of the unrated players.
- 3 Repeat step 2 until the last two floor values are the same. Assign this final answer to each of the unrated players.
- 4 Calculate the temporary performance rating of each of the unrated players by using the actual ratings of the rated opponents and the final floor value (obtained in step 3). Use the formulae as discussed in "Performance rating for unrated players".
- 5 Calculate an unrated player's tournament performance rating by using the actual rating of the rated opponents and the temporary performance rating (obtained in step 4) of the unrated opponents. **NB! - Use the performance rating for rated players.**

Summary: How to calculate the rating change of a rated player.

- 1 Calculate the difference in rating (D) for each game the player has played.
- 2 Calculate his expected score (We) for each of these games.
- 3 Calculate the difference (SWe) between his actual score (S) and We for each of these games. $SWe = S - We$.
- 4 Add all the SWe values together.
- 5 Multiply the final answer in step 4 with the player's K-factor. This will produce his rating change for that tournament.

Example 1: Calculate the tournament performance ratings of unrated players (regardless of the age group, section, etc.)

The following example has been constructed to illustrate the method used.

No.	Player	Rating	1	2	3	4	5	6	Scr
1	A	923		1	0	1	1	1	4
2	B	0	0		1	1	0.5	0.5	3
3	C	847	1	0		0	0	1	2
4	D	0	0	0	1		0.5	1	2.5
5	E	0	0	0.5	1	0.5		0	2
6	F	1011	0	0.5	0	0	1		1.5

STEP 1: Calculate the average rating of the rated players (A_r) and floor the answer (F).

$$A_r = \frac{923 + 847 + 1011}{3} = 927$$

$$F = 900$$

STEP 2: Assign this floor to all the unrated players and recalculate the average of all the players. Then floor the answer.

$$A_r = \frac{923 + 847 + 1011 + 900 + 900 + 900}{6} = 913.5$$

$$F = 900$$

Because the last two floors have the same value, we terminate the process and award 900 to each unrated player.

No.	Player	Rating	Scr
1	A	923	4
2	B	900	3
3	C	847	2
4	D	900	2.5
5	E	900	2
6	F	1011	1.5

STEP 3: Calculate the temporary performance rating for each of the unrated players, using the actual ratings of the rated opponents and the floor for each of the unrated opponents.

Calculate the percentage score for each of the unrated players.

No.	Player	Rating	Scr	%
1	A	923	4	
2	B	900	3	60
3	C	847	2	
4	D	900	2.5	50
5	E	900	2	40
6	F	1011	1.5	

Player B has a %>50. So we use the formula $P_u = A + 30\left(S - \frac{N}{2}\right)$

$$\text{Thus, } P_u = \frac{923+847+900+900+1011}{5} + 30\left(3 - \frac{5}{2}\right) = 916.2 + 30(0.5) = 916.2 + 15 = 931$$

Player D has a %=50. So we use the formula $P_u = A$

$$P_u = \frac{923 + 900 + 847 + 900 + 1011}{5} = 916$$

Player E has a %<50. So we use the formula $P_u = A + D_p$

$$P_u = \frac{923 + 900 + 847 + 900 + 1011}{5} + (-72) = 916.2 - 72 = 844$$

We now substitute these performances back into the original tournament table and use them to update the ratings of the rated players.

No.	Player	Rating	1	2	3	4	5	6	Scr
1	A	923		1	0	1	1	1	4
2	B	931	0		1	1	0.5	0.5	3
3	C	847	1	0		0	0	1	2
4	D	916	0	0	1		0.5	1	2.5
5	E	844	0	0.5	1	0.5		0	2
6	F	1011	0	0.5	0	0	1		1.5

STEP 4: Calculate an unrated player's tournament performance rating by using the actual rating of the rated opponents and the temporary performance ratings (obtained in step 3) of the unrated opponents. **NB! - Use the performance rating formula for rated players.**

Player B	Player D	Player E
$A = \frac{923 + 847 + 916 + 844 + 1011}{5}$ $= 908.2$	$A = \frac{923 + 931 + 847 + 844 + 1011}{5}$ $= 911.2$	$A = \frac{923 + 931 + 847 + 916 + 1011}{5}$ $= 925.6$
W = 2 L = 1	W = 2 L = 2	W = 1 L = 2
$P = 908.2 + 400\left(\frac{2-1}{5}\right) = 988$	$P = 911.2 + 400\left(\frac{2-2}{5}\right) = 911$	$P = 925.6 + 400\left(\frac{1-2}{5}\right) = 846$

These are then the performance ratings that will be used to calculate the unrated players' weighed performances in order to determine their eventual first official ratings.

Example 2: Calculate the rating change of a rated player in a tournament where unrated players participate (only applicable to u8, u10, u8 & u10, Beginner sections) where games vs. unrated opponents are rated

Use the example and data obtained in Example 1. **NB! We do NOT use the final tournament performances of unrated players.** The K-factor for each rated player is 35.

No.	Player	Rating	K	1	2	3	4	5	6	Scr
1	A	923	35		1	0	1	1	1	4
2	B	931	-	0		1	1	0.5	0.5	3
3	C	847	35	1	0		0	0	1	2
4	D	916	-	0	0	1		0.5	1	2.5
5	E	844	-	0	0.5	1	0.5		0	2
6	F	1011	35	0	0.5	0	0	1		1.5

STEP 1: Calculate the difference in rating (D) for each game the player has played.

Player A (923)			Player C (847)			Player F (1011)		
Opp	Rat	D	Opp	Rat	D	Opp	Rat	D
B	931	-8	A	923	-76	A	923	+88
C	847	+76	B	931	-84	B	931	+80
D	916	+7	D	916	-69	C	847	+164
E	844	+79	E	844	+3	D	916	+95
F	1011	-88	F	1011	-164	E	844	+167

STEP 2: Calculate his expected score (We) for each of these games.

Player A (923)				Player C (847)				Player F (1011)			
Opp	Rat	D	We	Opp	Rat	D	We	Opp	Rat	D	We
B	931	-8	0.49	A	923	-76	0.40	A	923	+88	0.62
C	847	+76	0.60	B	931	-84	0.38	B	931	+80	0.61
D	916	+7	0.51	D	916	-69	0.40	C	847	+164	0.72
E	844	+79	0.61	E	844	+3	0.50	D	916	+95	0.63
F	1011	-88	0.38	F	1011	-164	0.28	E	844	+167	0.72

STEP 3: Calculate the difference (SWe) between his actual score (S) and We for each of these games. $SWe = S - We$. Then add the SWe scores together.

Player A (923)						Player C (847)						Player F (1011)					
Opp	Rat	D	We	S	SWe	Opp	Rat	D	We	S	SWe	Opp	Rat	D	We	S	SWe
B	931	-8	0.49	1	0.51	A	923	-76	0.40	1	0.60	A	923	+88	0.62	0	-0.62
C	847	+76	0.60	0	-0.60	B	931	-84	0.38	0	-0.38	B	931	+80	0.61	0.5	-0.11
D	916	+7	0.51	1	0.49	D	916	-69	0.40	0	-0.40	C	847	+164	0.72	0	-0.72
E	844	+79	0.61	1	0.39	E	844	+3	0.50	0	-0.50	D	916	+95	0.63	0	-0.63
F	1011	-88	0.38	1	0.62	F	1011	-164	0.28	1	0.72	E	844	+167	0.72	1	0.28
					1.41						0.04						-1.80

STEP 4: For each player, multiply his total SWe with his K-factor to obtain his rating change for that tournament.

Player A: Rating change = $1.41 \times 35 = 49.35$

Player C: Rating change = $0.04 \times 35 = 1.4$

Player F: Rating change = $-1.80 \times 35 = -63.0$

Example 3: Calculate the rating change of a rated player in a tournament where unrated players participate (excluding u8, u10, u8 & u10, Beginner sections) where games vs. unrated opponents are NOT rated

Use the example and data obtained in Example 2 but IGNORE all games vs. unrated opponents.

No.	Player	Rating	K	1	2	3	4	5	6	Scr
1	A	923	35		1	0	1	1	1	4
2	B	931	-	0		1	1	0.5	0.5	3
3	C	847	35	1	0		0	0	1	2
4	D	916	-	0	0	1		0.5	1	2.5
5	E	844	-	0	0.5	1	0.5		0	2
6	F	1011	35	0	0.5	0	0	1		1.5

STEP 1: Calculate the difference in rating (D) for each game the player has played.

Player A (923)			Player C (847)			Player F (1011)		
Opp	Rat	D	Opp	Rat	D	Opp	Rat	D
C	847	+76	A	923	-76	A	923	+88
F	1011	-88	F	1011	-164	C	847	+164

STEP 2: Calculate his expected score (We) for each of these games.

Player A (923)				Player C (847)				Player F (1011)			
Opp	Rat	D	We	Opp	Rat	D	We	Opp	Rat	D	We
C	847	+76	0.60	A	923	-76	0.40	A	923	+88	0.62
F	1011	-88	0.38	F	1011	-164	0.28	C	847	+164	0.72

STEP 3: Calculate the difference (SWe) between his actual score (S) and We for each of these games. $SWe = S - We$. Then add the SWe scores together.

Player A (923)						Player C (847)						Player F (1011)					
Opp	Rat	D	We	S	SWe	Opp	Rat	D	We	S	SWe	Opp	Rat	D	We	S	SWe
C	847	+76	0.60	0	-0.60	A	923	-76	0.40	1	0.60	A	923	+88	0.62	0	-0.62
F	1011	-88	0.38	1	0.62	F	1011	-164	0.28	1	0.72	C	847	+164	0.72	0	-0.72
					0.02						1.32						-1.34

STEP 4: For each player, multiply his total SWe with his K-factor to obtain his rating change for that tournament.

Player A: Rating change = $0.02 \times 35 = 0.7$

Player C: Rating change = $1.32 \times 35 = 46.2$

Player F: Rating change = $-1.34 \times 35 = -46.9$

REAL EXAMPLE 1 (all players rated)

The following example is based on the actual results of the 2013 Western Province Closed Championships (B-Section). These results are used solely for the purpose of explain the rating system where all players are rated. We also assume that all games were played (no defaults).

No.	Place	K	Name	Rating	1	2	3	4	5	6	7	8
1	=1	20	SALIMU, REUBEN	1845	1	0	1	1	1	1	1	1
2	=1	20	DAVIES, JASON S	1938	0	1	1	1	1	1	1	1
3	3	20	JAMES, MICHAEL	1961	1	0	0	1	1	1	1	1
4	4	20	NTHO, LEFU	1833	0	0	1	0	1	1	1	1
5	5	30	FREDERICKS, MALCOLM MP	1775	0	0	0	1	0	1	1	0
6	6	20	WILLENBERG, GLEN I	1797	0	0	0	0	0	1	1	1
7	=7	30	BROWN, SHAUN C	1739	0	0	0	0	0	0	1	1
8	=7	35	BEHM, JOHANN	1278	0	0	0	0	1	0	0	1

STEP 1: For each player, calculate the rating difference (D), expected score (We) and score difference (SWe) for each game played.

Salimu, R=1845, K=20						Davies, R=1928, K=20						James, R=1961, K=20					
No.	Opp	S	D	We	SWe	No.	Opp	S	D	We	SWe	No.	Opp	S	D	We	SWe
1	1938	1	-93	0.37	0.63	1	1845	0	83	0.61	-0.61	1	1845	1	116	0.66	0.34
2	1961	0	-116	0.34	-0.34	2	1961	1	-33	0.45	0.55	2	1938	0	23	0.53	-0.53
3	1833	1	12	0.52	0.48	3	1833	1	95	0.63	0.37	3	1833	0	128	0.67	-0.67
4	1775	1	70	0.60	0.40	4	1775	1	153	0.70	0.30	4	1775	1	186	0.74	0.26
5	1797	1	48	0.57	0.43	5	1797	1	131	0.68	0.32	5	1797	1	164	0.72	0.28
6	1739	1	106	0.64	0.36	6	1739	1	189	0.75	0.25	6	1739	1	222	0.78	0.22
7	1278	1	400	0.92	0.08	7	1278	1	400	0.92	0.08	7	1278	1	400	0.92	0.08
					2.04						1.26						-0.02
Ntho, R=1833, K=20						Fredericks, R=1775, K=30						Willenberg, R=1797, K=20					
No.	Opp	S	D	We	SWe	No.	Opp	S	D	We	SWe	No.	Opp	S	D	We	SWe
1	1845	0	-12	0.48	-0.48	1	1845	0	-70	0.40	-0.40	1	1845	0	-48	0.43	-0.43
2	1938	0	-105	0.36	-0.36	2	1938	0	-163	0.28	-0.28	2	1938	0	-141	0.31	-0.31
3	1961	1	-128	0.33	0.67	3	1961	0	-186	0.26	-0.26	3	1961	0	-164	0.28	-0.28
4	1775	0	58	0.58	-0.58	4	1833	1	-58	0.42	0.58	4	1833	0	-36	0.45	-0.45
5	1797	1	36	0.55	0.45	5	1797	1	-22	0.47	0.53	5	1775	0	22	0.53	-0.53
6	1739	1	94	0.63	0.37	6	1739	1	36	0.55	0.45	6	1739	1	58	0.58	0.42
7	1278	1	400	0.92	0.08	7	1278	0	400	0.92	0.08	7	1278	1	400	0.92	0.08
					0.15						0.70						-1.50
Brown, R=1739, K=30						Behm, R=1278, K=35											
No.	Opp	S	D	We	SWe	No.	Opp	S	D	We	SWe						
1	1845	0	-106	0.36	-0.36	1	1845	0	-567	0.02	-0.02						
2	1938	0	-199	0.24	-0.24	2	1938	0	-660	0.01	-0.01						
3	1961	0	-222	0.22	-0.22	3	1961	0	-683	0.01	-0.01						
4	1833	0	-94	0.37	-0.37	4	1833	0	-555	0.03	-0.03						
5	1775	0	-36	0.45	-0.45	5	1775	1	-497	0.04	0.96						
6	1797	0	-58	0.42	-0.42	6	1797	0	-519	0.03	-0.03						
7	1278	1	400	0.92	0.08	7	1739	0	-461	0.05	-0.05						
					-1.98						0.81						

The rating change for each player is:

Salimu: $2.04 \times 20 = +40.8$

Fredericks: $0.70 \times 30 = +21.0$

Davies: $1.26 \times 20 = +25.2$

Willenberg: $-1.50 \times 20 = -30$

James: $0.02 \times 20 = -0.40$

Brown: $-1.98 \times 30 = -59.4$

Ntho: $0.15 \times 20 = +3.0$

Behm: $0.81 \times 35 = +28.35$

REAL EXAMPLE 2 (not all players rated – assume this is an u10 section)

The following example is based on the actual results of the 2013 Western Province Closed Championships (X-Section). These results are used solely for the purpose of explain the rating system where some players are rated. We also assume that all games were played (no defaults).

No.	K	Name	Rating	1	2	3	4	5	6	7	8
1	0	CHATEAU, CLIFTON	0	■	1	0	1	1	1	1	1
2	0	JANSEN, BEUNAY	0	0	■	1	1	1	1	0	1
3	0	GAVIN, DEAN	0	1	0	■	0	1	1	1	1
4	35	STADLER, CHRISTOFF	417	0	0	1	■	1	1	1	1
5	35	STADLER, LALI	621	0	0	0	0	■	1	1	1
6	35	GANI, RIYAAZ	627	0	0	0	0	0	■	1	1
7	0	JACOBS, TERRENCE	0	0	1	0	0	0	0	■	½
8	0	AFRICA, WARRICK	0	0	0	0	0	0	0	½	■

STEP 1: Calculate the average rating of the rated players and floor the answer.

$$\text{Average} = \frac{417 + 621 + 627}{3} = 555$$

Floor = 500

STEP 2: Tread all unrated players as 500 and recalculate the average rating of ALL players. Floor the answer.

$$\text{Average} = \frac{500 + 500 + 500 + 417 + 621 + 627 + 500 + 500}{8} = 520$$

Floor = 500.

The process no stops and we assign 500 to each unrated player.

No.	K	Name	Rating	1	2	3	4	5	6	7	8
1	0	CHATEAU, CLIFTON	500	■	1	0	1	1	1	1	1
2	0	JANSEN, BEUNAY	500	0	■	1	1	1	1	0	1
3	0	GAVIN, DEAN	500	1	0	■	0	1	1	1	1
4	35	STADLER, CHRISTOFF	417	0	0	1	■	1	1	1	1
5	35	STADLER, LALI	621	0	0	0	0	■	1	1	1
6	35	GANI, RIYAAZ	627	0	0	0	0	0	■	1	1
7	0	JACOBS, TERRENCE	500	0	1	0	0	0	0	■	½
8	0	AFRICA, WARRICK	500	0	0	0	0	0	0	½	■

STEP 3: Calculate the temporary performance rating for each of the unrated players, using the actual ratings of the rated opponents and the floor for each of the unrated opponents.

Calculate the percentage score for each of the unrated players.

No.	Player	Rating	Scr	%
1	Chateau	500	6	86
2	Jansen	500	5	71
3	Gavin	500	5	71
4	Jacobs	500	1.5	21
5	Africa	500	0.5	7

Chateau has a %>50. So we use the formula $P_u = A + 30 \left(S - \frac{N}{2} \right)$

$$\text{Thus, } P_u = \frac{500+500+417+621+627+500+500}{7} + 30 \left(6 - \frac{7}{2} \right) = 523.57 + 30(2.5) = 523.57 + 75 = 599$$

Jansen has a %>50. So we use the formula $P_u = A + 30 \left(S - \frac{N}{2} \right)$

$$\text{Thus, } P_u = \frac{500+500+417+621+627+500+500}{7} + 30 \left(5 - \frac{7}{2} \right) = 523.57 + 30(1.5) = 523.57 + 45 = 569$$

Gavin has a %>50. So we use the formula $P_u = A + 30 \left(S - \frac{N}{2} \right)$

$$\text{Thus, } P_u = \frac{500+500+417+621+627+500+500}{7} + 30 \left(5 - \frac{7}{2} \right) = 523.57 + 30(1.5) = 523.57 + 45 = 569$$

Jacobs has a %<50. So we use the formula $P_u = A + D_p$

$$P_u = \frac{500 + 500 + 417 + 621 + 627 + 500 + 500}{7} + (-230) = 523.57 - 230 = 294$$

Africa has a %<50. So we use the formula $P_u = A + D_p$

$$P_u = \frac{500 + 500 + 417 + 621 + 627 + 500 + 500}{7} + (-422) = 523.57 - 422 = 102$$

We now substitute these performances back into the original tournament table and use them to update the ratings of the rated players.

No.	K	Name	Rating	1	2	3	4	5	6	7	8
1	0	CHATEAU, CLIFTON	599	■	1	0	1	1	1	1	1
2	0	JANSEN, BEUNAY	569	0	■	1	1	1	1	0	1
3	0	GAVIN, DEAN	569	1	0	■	0	1	1	1	1
4	35	STADLER, CHRISTOFF	417	0	0	1	■	1	1	1	1
5	35	STADLER, LALI	621	0	0	0	0	■	1	1	1
6	35	GANI, RIYAAZ	627	0	0	0	0	0	■	1	1
7	0	JACOBS, TERRENCE	294	0	1	0	0	0	0	■	½
8	0	AFRICA, WARRICK	102	0	0	0	0	0	0	½	■

STEP 4: Calculate the rating change of the rated players taking ALL opponent ratings into account.

Stadler C, R=417, K=35						Stadler L, R=621, K=35						Gani, R=627, K=35					
No.	Opp	S	D	We	SWe	No.	Opp	S	D	We	SWe	No.	Opp	S	D	We	SWe
1	599	0	-182	0.26	-0.26	1	599	0	22	0.53	-0.53	1	599	0	28	0.54	-0.54
2	569	0	-152	0.30	-0.30	2	569	0	52	0.57	-0.57	2	569	0	58	0.58	-0.58
3	569	1	-152	0.30	0.70	3	569	0	52	0.57	-0.57	3	569	0	58	0.58	-0.58
4	621	1	-204	0.24	0.76	4	417	0	204	0.76	-0.76	4	417	0	210	0.77	-0.77
5	627	1	-210	0.23	0.77	5	627	1	-6	0.49	0.51	5	621	0	6	0.51	-0.51
6	294	1	123	0.67	0.33	6	294	1	327	0.87	0.13	6	294	1	333	0.88	0.12
7	102	1	315	0.86	0.14	7	102	1	400	0.92	0.08	7	102	1	400	0.92	0.08
					2.14						-1.71						-2.78

Stadler C: $2.14 \times 35 = +74.9$

Stadler L: $-1.71 \times 35 = -59.85$

Gani: $-2.78 \times 35 = -97.3$

STEP 5: Calculate tournament performance ratings of the unrated players by using the actual rating of the rated opponents and the temporary performance ratings of the unrated opponents. **NB! - Use the performance rating formula for rated players.**

Chateau	Jansen	Gavin
$A = \frac{569 + 569 + 417 + 621 + 627 + 294 + 102}{7}$ $= 457$	$A = \frac{599 + 569 + 417 + 621 + 627 + 294 + 102}{7}$ $= 461.29$	$A = \frac{599 + 569 + 417 + 621 + 627 + 294 + 102}{7}$ $= 461.29$
W = 6 L = 1	W = 5 L = 2	W = 5 L = 2
$P = 457 + 400 \left(\frac{6 - 1}{7} \right) = 743$	$P = 461.29 + 400 \left(\frac{5 - 2}{7} \right) = 633$	$P = 461.29 + 400 \left(\frac{5 - 2}{7} \right) = 633$
Jacobs	Africa	
$A = \frac{599 + 569 + 569 + 417 + 621 + 627 + 102}{7}$ $= 500.57$	$A = \frac{599 + 569 + 569 + 417 + 621 + 627 + 294}{7}$ $= 528$	
W = 1 L = 5	W = 0 L = 6	
$P = 500.57 + 400 \left(\frac{1 - 5}{7} \right) = 272$	$P = 528 + 400 \left(\frac{0 - 6}{7} \right) = 185$	

REAL EXAMPLE 3 (all players are unrated)

The following example is based on the actual results of the 2013 Western Province Closed Championships (Y-Section). These results are used solely for the purpose of explain the rating system where all players are unrated. We also assume that all games were played (no defaults).

No.	Name	Rating	1	2	3	4	5	6	7	8
1	MATSHIDZE, ALUWANI	0		1	½	½	1	1	1	1
2	MBETE, YONWABISA	0	0		1	1	1	1	1	1
3	LOUW, ENRICO	0	½	0		0	1	1	1	1
4	MAKANJEE, PRAVEER	0	½	0	1		½	1	0	1
5	KARAPEN, MARK	0	0	0	0	½		1	1	1
6	MATHELELI, MORONGOE	0	0	0	0	0	0		1	1
7	MAVANGWA, MILLER	0	0	0	0	1	0	0		1
8	LE ROUX, KAYRIAL	0	0	0	0	0	0	0	0	

STEP 1: Because all players are unrated, we assign a manual floor. If this was an u8 event the floor would have been 500, otherwise it's 600. For this example, let's assume this is a Beginner tournament and the floor is 600. Our table will now look like this (the last column indicating each player's percentage score).

No.	Name	Rating	1	2	3	4	5	6	7	8	Score	%
1	MATSHIDZE, ALUWANI	600		1	½	½	1	1	1	1	6	86
2	MBETE, YONWABISA	600	0		1	1	1	1	1	1	6	86
3	LOUW, ENRICO	600	½	0		0	1	1	1	1	4.5	64
4	MAKANJEE, PRAVEER	600	½	0	1		½	1	0	1	3.5	50
5	KARAPEN, MARK	600	0	0	0	½		1	1	1	3.5	50
6	MATHELELI, MORONGOE	600	0	0	0	0	0		1	1	2	29
7	MAVANGWA, MILLER	600	0	0	0	1	0	0		1	2	29
8	LE ROUX, KAYRIAL	600	0	0	0	0	0	0	0		0	0

STEP 2: Calculate the tournament performance rating for each player. The average opponent rating for each player is obviously 600.

Player	Rating	Score	%	W	L	N
MATSHIDZE, ALUWANI	600	6	86	5	0	7
MBETE, YONWABISA	600	6	86	6	0	7
LOUW, ENRICO	600	4.5	64	4	2	7
MAKANJEE, PRAVEER	600	3.5	50	3	2	7
KARAPEN, MARK	600	3.5	50	3	3	7
MATHELELI, MORONGOE	600	2	29	2	5	7
MAVANGWA, MILLER	600	2	29	2	5	7
LE ROUX, KAYRIAL	600	0	0	0	7	7

Matshidze has a %>50. So we use the formula $P_u = A + 400 \left(\frac{W-L}{N} \right)$

$$\text{Thus, } P = 600 + 400 \left(\frac{5-0}{7} \right) = 886$$

Mbete has a %>50. So we use the formula $P_u = A + 400 \left(\frac{W-L}{N} \right)$

$$\text{Thus, } P = 600 + 400 \left(\frac{6-0}{7} \right) = 943$$

Louw has a %>50. So we use the formula $P_u = A + 400 \left(\frac{W-L}{N} \right)$

$$\text{Thus, } P = 600 + 400 \left(\frac{4-2}{7} \right) = 714$$

Makanjee has a %=50. So we use the formula $P_u = A$

$$\text{Thus, } P = 600$$

Karapen has a %=50. So we use the formula $P_u = A$

$$\text{Thus, } P = 600$$

Karapen has a %<50. So we use the formula $P_u = A + D_p$

$$\text{Thus, } P = 600 - 158 = 442$$

Mawangwa has a %<50. So we use the formula $P_u = A + D_p$

$$\text{Thus, } P = 600 - 158 = 442$$

Le Roux has a %<50. So we use the formula $P_u = A + D_p$

$$\text{Thus, } P = 600 - 800 = -200$$

But because this is less than 100, we set $P = 100$.