



Ratings Bureau

How South African ratings are calculated

Following are the Rules and Regulations for the calculation and updating of South African ratings which will come into force on 01 January 2015. In this document, any gender references (e.g. his, him, etc.) also refers to the female equivalent.

Age Groups and Section

Calculation of age group

A player's age (and thus age group) for a specific tournament is calculated by subtracting his year-of-birth from the year in which the tournament is held. The month-in and day-on which the player is born is ignored. This is based on the FIDE age definition which reads (e.g. u12): "A player may not have reached the age of 12 years old before 01 January of the year in which the tournament is held".

The following table indicates the age groups and the year-of-birth for the following 2 years, starting with 2015. Subsequent years are calculated in the same way.

Age	2015	2016
U8	2007 or later	2008 or later
U10	2005-2006	2006-2007
U12	2003-2004	2004-2005
U14	2001-2002	2002-2003
U16	1999-2000	2000-2001
U18	1997-1998	1998-1999
U20	1995-1996	1996-1997

Thus, a player can be (e.g.) 14 years old and still be u14.

The above age group calculations are applicable to ALL rated tournaments held within the borders of RSA.

It is VERY IMPORTANT to remember that for qualification to participate in the CHESSA Junior Closed (which in turn is used to select players for international participation), the year in which the Junior Closed is held (and also FIDE events) is used to calculate age groups.

E.g. for participation in the 2016 Junior Closed (and possibly FIDE events), all tournaments held in RSA (CHESSA, Regional/Union, etc.) in 2015: age groups must be calculated using the year 2016. All rating calculations, performances, Grand Prix points, etc. will be calculated as such.

Beginner Section

A beginner section is defined as follows where all of the following are satisfied:

- Regardless of age group.
- At least 67% of the players are unrated (no official published ratings).

Other

All other sections not covered by the above.

Number of players per tournament

The minimum number of players is:

- 1 At least 6 players per section, and
- 2 At least 10 players in total for the whole tournament.

Sections that have less than 6 players will not be rated and this number will also not count towards the tournament total.

Time Control and type of Rating

- 1 The time control for a game is defined as:
The original (base/main) thinking time on the clock plus 60 times any increment per move.
- 2 There are 3 types of rating. The minimum time control for each is:
 - 2.1 Standard: At least 60 minutes per player.
 - 2.2 Rapid: More than 10 but less than 60 minutes per player.
 - 2.3 Blitz: 10 minutes or less per player.

Example 1: The time control is 45/45 with an increment of 30 seconds per move.
 $45\text{min} + (60 \times 30\text{sec}) = 45\text{min} + 30\text{min} = 75\text{min}$. This is STANDARD.

Example 2: Time control is 30/30 with an increment of 20 seconds per move.
 $30\text{min} + (60 \times 20\text{sec}) = 30\text{min} + 20\text{min} = 50\text{min}$. This is RAPID.

Example 3: Time control is 5/5 with 3sec increment per move.
 $5\text{min} + (60 \times 3\text{sec}) = 5\text{min} + 3\text{min} = 8\text{min}$. This is BLITZ.

- 3 For u8, u10, combination of u8 and u10, Beginners: The minimum time control for updating Standard Ratings will be 30/30.
- 4 Where a tournament has multiple time controls, the time control for all rounds must fall within the same rating type. If not, then the fastest of these will determine the type of ratings to be updated.

K-Factor (K)

- 1 K is 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 and is only determined once he receives his first official rating.
- 3 Standard ratings are classed into 7 groups with each group having a different K-factor. A player's K-factor may decrease but never increase. That is, once a player's rating changes to a higher rating group, his K-factor will change to that of the group and will never increase again, even if his rating drops to a lower group.
- 4 The K-factors for the different type of ratings are:
 - 4.1 Standard
 - 4.1.1 K=10: Rating 2200+
 - 4.1.2 K=15: Rating 2000-2199
 - 4.1.3 K=20: Rating 1800-1999
 - 4.1.4 K=25: Rating 1600-1799
 - 4.1.5 K=30: Rating 1300-1599
 - 4.1.6 K=35: Rating 1000-1299
 - 4.1.7 K=40: Rating below 1000
 - 4.2 Rapid: K=30 (regardless of rating)
 - 4.3 Blitz: K=40 (regardless of rating)

Rating floor

No players' rating and performance will be allowed to drop below 100. If it does, then it will be adjusted back to 100.

50% Rule

- 1 Only tournaments with a minimum of 5 rounds will be rated, ***unless special dispensation for fewer rounds have been granted by the CHESSA Ratings Committee*** (Organisers must apply at least 7 days before the start of the tournament and WITH GOOD REASON).
- 2 For Braille tournaments the minimum number of rounds will be 4.
- 3 A player may only gain rating points if he has played at least 50% (rounded upwards) of the total number of scheduled tournament rounds.
Meaning, if a player's rating change is positive then he will only receive these points if he has played at least 50% of the total number of rounds, otherwise not.
- 4 If a player's rating change is negative, he will be rated regardless of the number of rounds played.
- 5 Rounds where a player received a Bye or won a game by Default, will not be taken into account for any calculations but will count towards "activity".

- 6 The 50% Rule is not applicable to team tournaments (where a player will be rated even though he has only played 1 game).
- 7 **A player who defaults any round after 50% (rounded down) of the tournament rounds have been completed will have these games rated as if he lost actual games. However, this will not affect the opponent (who will not be rated as if he won the game and will not receive rating points).**
Example: A tournament has 7 rounds. 50% is 3. Any player who defaults in rounds 4, 5, 6 and/or 7 will have these games rated as losses.
- 8 A player will only receive a performance rating if he has played at least 50% (rounded upwards) of the total number of tournament rounds. Performances will be used towards the calculation of Grand Prix Points.

Activity (number of games played)

The following games will count towards activity (number of games played) for the purpose of Grand Prix Points:

- 1 All games vs. unrated opponents.
- 2 Games where a player won on default (opponent did not arrive in time for the game).
- 3 Only applicable to Individual Swiss tournaments: where a player received a Bye as determined by the pairing software used.
- 4 Games where a player did not play (gave notice) and/or lost a game on default (did not arrive in time for the game) and/or where the player requested a ½-point Bye will NOT count towards activity.

1st Official rating for currently unrated players

- 1 An unrated player will receive his first official rating (and K-factor) once he has played at least 12 games (per rating type).
- 2 All actual games (regardless if the opponent is rated or not) will count towards the calculation of his first official rating.
- 3 His new rating will be calculated as if he played one big tournament. That is, all results of his past tournaments will be considered as "one tournament" (pooled). The new rating will be calculated immediately after the player has played 12+ games and not only at the end of the month.
In other words, the player could receive his first official rating within a month before the publication of the "new" ratings on the 1st day of the following month. If the player participates in another tournament within that same month, then his new rating will be used for all calculations (rating change, opponents, Grand Prix, etc.).

Games vs. unrated opponents

Rated vs. Unrated

For u8, u10 and Beginners, all games vs. unrated opponents will be rated and count towards calculation of performances REGARDLESS of the section they participate in. The unrated opponent will be assigned a "temporary" rating which is equal to his tournament performance. For all other age-groups/groups, games vs. unrated opponents will not count towards updating ratings and calculation of performances but only for activity.

Unrated vs. Unrated

All games will be rated and count towards performance calculation, 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 which is equal to their performances for that tournament. This is NOT an official rating and is only used to calculate the rating changes and performances of their opponents.

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.
- 2 If all players are unrated then the floor will be assigned manually and is:
 - 2.1 500 for u8
 - 2.2 600 for u10, Beginner or combination of u8 & u10.
- 3 Assign the floor to each unrated player (treat them as rated players) and recalculate the average of all players. Floor the 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 by using the actual rating of the rated opponents and the floor for the unrated opponents.
- 6 The tournament is then rated using these performances of the unrated players.

How to calculate the rating floor for unrated players

E.g. there are 10 players in a tournament.

Player	Rating
A	1243
B	1201
C	1119
D	1056
E	940
F	827
G	0
H	0
I	0
J	0

The average rating of the rated players is:

$$Average = \frac{1243 + 1201 + 1119 + 1056 + 940 + 827}{6} = 1064$$

The floor is 1000.

The table now looks like this:

Player	Rating
A	1243
B	1201
C	1119
D	1056
E	940
F	827
G	1000
H	1000
I	1000
J	1000

The new average is:

$$Average = \frac{1243 + 1201 + 1119 + 1056 + 940 + 827 + 1000 + 1000 + 1000 + 1000}{10} = 1039$$

The floor is 1000.

We now stop the process because the last two floors have the same value (1000). So we assign 1000 to each unrated player and will use these to calculate their performances.

How to calculate Performance Ratings (players scoring >0% and <100%)

Table 1 was constructed using the following formula. However, the table, as shown, is used for calculation purposes.

$$P = R_{aor} - 400 \left[\frac{\ln\left(\frac{n}{s} - 1\right)}{\ln 10} \right]$$

Where

P = Performance rating

Raor = Average opponent rating

n = Number of tournament games played (excluding defaults and byes)

s = Tournament score achieved (excluding defaults and byes)

Table 1

%	Dp	%	Dp	%	Dp	%	Dp	%	Dp	%	Dp
100	MAF	83	+273	66	+117	49	-7	32	-133	15	-296
99	+677	82	+262	65	+110	48	-14	31	-141	14	-309
98	+589	81	+251	64	+102	47	-21	30	-149	13	-322
97	+538	80	+240	63	+95	46	-29	29	-158	12	-336
96	+501	79	+230	62	+87	45	-36	28	-166	11	-351
95	+470	78	+220	61	+80	44	-43	27	-175	10	-366
94	+444	77	+211	60	+72	43	-50	26	-184	9	-383
93	+422	76	+202	59	+65	42	-57	25	-193	8	-401
92	+401	75	+193	58	+57	41	-65	24	-202	7	-422
91	+383	74	+184	57	+50	40	-72	23	-211	6	-444
90	+366	73	+175	56	+43	39	-80	22	-220	5	-470
89	+351	72	+166	55	+36	38	-87	21	-230	4	-501
88	+336	71	+158	54	+29	37	-95	20	-240	3	-538
87	+322	70	+149	53	+21	36	-102	19	-251	2	-589
86	+309	69	+141	52	+14	35	-110	18	-262	1	-677
85	+296	68	+133	51	+7	34	-117	17	-273	0	MAF
84	+284	67	+125	50	0	33	-125	16	-284		

- 1 Calculate a player's % score (PS): $PS = \left(\frac{\text{score}}{\text{games}}\right) \times 100$ (rounded to the nearest integer).
- 2 Calculate his Average Opponent Rating (AOR).
- 3 Find the corresponding Dp value in Table 1.
- 4 His Performance (P) is calculated by adding AOR and Dp: $P = AOR + Dp$

Example 1:

A player scored 5/7. His average opponent rating is 1500.

$$PS = \left(\frac{5}{7}\right) \times 100 = 71$$

$$Dp = +158$$

$$P = AOR + Dp = 1500 + 158 = 1658$$

Example 2:

A player scored 1.5/6. His average opponent rating is 1500.

$$PS = \left(\frac{1.5}{6}\right) \times 100 = 25$$

$$Dp = -193$$

$$P = AOR + Dp = 1500 - 193 = 1307$$

How to calculate Performance Ratings (players scoring 0% or 100%)

The above formula (Table 1) is logarithmic and thus open-ended. There exist no Dp values for players scoring 0% or 100%. To compensate for this, the formula is adapted by doing the following:

- 1 Increase the player's number of games by 1.
- 2 Increase the player's tournament score by 0.5.
- 3 Add the player's own rating to the Total Opponent Rating. NB! If a player is unrated, the tournament floor is used instead.

The formula is thus:

$$P = \frac{Tor + R}{n + 1} - 400 \left[\frac{\text{Ln} \left(\frac{n + 1}{s + 0.5} - 1 \right)}{\text{Ln}10} \right]$$

Where

P = Performance rating

Tor = Total opponent rating

R = Player's own rating

n = Number of tournament games played (excluding defaults and byes)

s = Tournament score achieved (excluding defaults and byes)

Example 1:

A player rated 1400 scores 7/7 against opponents rated 1000, 1100, 1200, 1300, 1400, 1500 and 1600.

His performance is thus:

$$P = \frac{1000 + 1100 + 1200 + 1300 + 1400 + 1500 + 1600 + 1400}{7 + 1} - 400 \left[\frac{\text{Ln} \left(\frac{7 + 1}{7 + 0.5} - 1 \right)}{\text{Ln}10} \right] = 1313 + 470 = 1783$$

Difference in rating (D)

- 1 D is calculated by subtracting the opponent's rating (Ro) from the player's own rating (R). Thus:

$$D = R - R_o$$

- 2 For the higher rated player: D may not be more than +400. If it is, treat D as if it was 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 if it was -736 (as if the opponent was only rated 736 rating points more).

Example

Player A is rated 2000.

Player B is rated 1100.

For Player A: $D = 2000 - 1100 = 900$. Because $D > 400$ we change D to 400 (as if the opponent was rated 1600).

For player B: $D = 1100 - 2000 = -900$. Because $D < -736$ we change it to -736 (as if the opponent was rated 1836).

NB! The above is only used for calculating rating changes. The actual opponent ratings are used when calculating performances.

When new ratings are calculated

- 1 New ratings are calculated based on tournaments received for that month and published on the 1st day of the following month.
- 2 A player's current rating will be used to calculate his total rating change for that month, regardless of the number of tournaments he participates in.
E.g. a player's new published rating is 1400. For each and every tournament he participates in that month, his rating change for each tournament will be based on 1400. His total rating change for that month will then be added to his current rating to determine his new published rating for the next month.

Players winning a tournament

All players (regardless of the number) ending in joint 1st place may not lose rating points for that tournament. If they do, their rating change will be set to 0.

How to calculate a rated player's rating change after a tournament

- 1 Calculate his Expected Score (We) for each game played.
- 2 Sum these expected scores (SWe).
- 3 His rating change (Rc) is calculated by subtracting SWe from his score and multiplying with his K-factor.

$$Rc = (S - SWe) \times K$$

How to calculate Expected Scores (We)

NB! For the use of rated vs. rated players only.

Table 2

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			

- 1 A player's Expected Score (We) for a particular game depends on the difference in rating (D).
- 2 Calculate D for each game and find the difference in the column marked "D".
- 3 For the higher rated player: read the value to the immediate right in the "H" column.
- 4 For the lower rated player: read the value to the immediate right in the "L" column.
- 5 This final value is a player's We for that particular game.

Example 1:

Player A is rated 1456. Player B is rated 1107.

For Player A: $D = 1456 - 1107 = +349$. His We = 0.89

For Player B: $D = 1107 - 1456 = -349$. His We = 0.11

This means: because of the rating difference (D), Player A is expected to score 0.89 and Player B 0.11 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 $D = 400$. Thus, We = 0.92

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

Example: Calculating rating changes and performances

The following table has been constructed to illustrate the calculation of rating changes and performance ratings.

No.	Player	Rating	K	1	2	3	4	5	6	7	8	Score	Gms	%
1	A	2000	15	█	0	1	½	1	0	0	½	3	7	43
2	B	1800	20	1	█	½	1	0	0	0	1	3½	7	50
3	C	1600	25	0	½	█	1	1	1	½	1	5	7	71
4	D	1400	30	½	0	0	█	½	½	½	½	2½	7	36
5	E	900	40	0	1	0	½	█	1	1	1	4½	7	64
6	F	0	-	1	1	0	½	0	█	0	0	2½	7	36
7	G	0	-	1	1	½	½	0	1	█	0	4	7	57
8	H	0	-	½	0	0	½	0	1	1	█	3	7	43

1 Because unrated players participated, we need to calculate their temporary performance ratings.

1.1 Calculate the AR of the rated players and floor the answer: $AR = \frac{2000+1800+1600+1400+900}{5} = 1540$

Floor = 1500.

1.2 Calculate the AR of all players and floor the answer.

$AR = \frac{2000 + 1800 + 1600 + 1400 + 900 + 1500 + 1500 + 1500}{8} = 1525$

Floor = 1500. We now stop and assign 1500 to each unrated player.

No.	Player	Rating	K	1	2	3	4	5	6	7	8	Score	Gms	%
1	A	2000	15	█	0	1	½	1	0	0	½	3	7	43
2	B	1800	20	1	█	½	1	0	0	0	1	3½	7	50
3	C	1600	25	0	½	█	1	1	1	½	1	5	7	71
4	D	1400	30	½	0	0	█	½	½	½	½	2½	7	36
5	E	900	40	0	1	0	½	█	1	1	1	4½	7	64
6	F	1500	-	1	1	0	½	0	█	0	0	2½	7	36
7	G	1500	-	1	1	½	½	0	1	█	0	4	7	57
8	H	1500	-	½	0	0	½	0	1	1	█	3	7	43

2 Calculate the performance ratings of the unrated players. The AOR for each of the unrated players will

obviously be the same: $AOR = \frac{2000+1800+1600+1400+900+1500+1500}{7} = 1529$

Player F	Player G	Player H
AOR = 1529	AOR = 1529	AOR = 1529
Dp = -102	Dp = +50	Dp = -50
Temp perform = 1529 - 102 = 1427	Temp perform = 1529 + 50 = 1579	Temp perform = 1479

These temporary performances will now be used.

No.	Player	Rating	K	1	2	3	4	5	6	7	8	Score	Gms	%
1	A	2000	15	█	0	1	½	1	0	0	½	3	7	43
2	B	1800	20	1	█	½	1	0	0	0	1	3½	7	50
3	C	1600	25	0	½	█	1	1	1	½	1	5	7	71
4	D	1400	30	½	0	0	█	½	½	½	½	2½	7	36
5	E	900	40	0	1	0	½	█	1	1	1	4½	7	64
6	F	1427	-	1	1	0	½	0	█	0	0	2½	7	36

7	G	1579	-	1	1	½	½	0	1	0	4	7	57
8	H	1479	-	½	0	0	½	0	1	1	3	7	43

Calculating the rating changes and performances of the rated players (NOT u8, u10 or Beginner tournament)

For the rated players, we only consider their rated opponents.

In each cell:

- Top number: game results
- Middle number: Difference in rating (D) (red indicates adjusted D).
- Bottom number: We

No.	Player	Rating	K	1	2	3	4	5	SWe	Score	Change	%	Dp	AOR	Perform
1	A	2000	15	0	+200 0.76	+400 0.92	+400 0.92	+400 0.92	3.52	2.5	-15.3	63	+95	1425	1520
2	B	1800	20	1	-200 0.24	+200 0.76	+400 0.92	+400 0.92	2.84	2.5	-6.8	63	+95	1475	1570
3	C	1600	25	0	-400 0.08	-200 0.24	+200 0.76	+400 0.92	2.00	2.5	+12.5	63	+95	1525	1620
4	D	1400	30	½	-600 0.02	-400 0.08	-200 0.24	+400 0.92	1.26	1.0	-7.8	25	-193	1575	1382
5	E	900	40	0	-736 0.00	-736 0.00	-700 0.01	-500 0.04	0.05	1.5	+58.0	38	-87	1700	1613

Calculating the performance ratings of the unrated players (regardless of the age group or section)

No.	Player	%	Dp	AOR	Perform
6	F	36	-102	1537	1435
7	G	57	+50	1515	1565
8	H	43	-50	1529	1479

Calculating an unrated player's 1st rating

An unrated player has participated in the following tournaments. His total number of games played is more than 12. His 1st official rating can now be calculated. This rating will be equal to his overall performance for all these events (as seen as one big tournament).

Tournament 1			Tournament 2			Tournament 3		
Round	Opponent	Result	Round	Opponent	Result	Round	Opponent	Result
1	983	1	1	745	1	1	444	1
2	1002	0	2	810	1	2	533	1
3	746	½	3	945	1	3	1148	½
4	575	½	4	1043	0	4	999	0
5	824	1	5	1106	0	5	876	1
						6	1045	½
						7	1055	0

We now consider these results as one big tournament.

Total games: 17

Total score: 10

Percentage: 59

Dp: +65

Average opponent rating: 875

First official rating: $875 + 65 = 940$