Balanced start pairs in Double Fischer Random Chess: a computational search with multi-engine verification

Roman Morozov CH960 (ch960.com) 21 October 2026 v1.2 CC BY 4.0

Abstract

In Double Fischer Random Chess (DFRC) White and Black start from independently chosen Chess960 back ranks, so a game is defined by an ordered pair of setups, 921,600 in all. Most such pairs give one side a clear starting edge. We asked whether there are pairs in which neither side starts better, and how many of the candidates survive when the search budget keeps growing and when other engines look at the same position. 460,800 pairs, one representative of each pair and its left–right mirror image, were screened with Stockfish 17.1 in a staged search whose windows were calibrated on the ordinary symmetric Chess960 starts as a built-in control; a mirror image is a different position, because castling always ends on fixed files, so this covers half of the space. Candidates were then taken through a budget ladder of 400 M, 800 M, 1.6 G and 4 G nodes, a subset to 8 G and 16 G nodes, and every candidate was re-evaluated by two engines of a different construction, Berserk 14 and Lc0 0.32.1. The admission rule is a corridor, $|cp| \le 5$ at every budget at which a pair has been evaluated, with no consistently one-sided reading, confirmed by both other engines below their own median on symmetric positions. 436 pairs satisfy it. The verified pairs behave differently from the best symmetric starts: when the budget grows, the symmetric starts drift towards White only, while the pairs that leave zero move both ways; swapping the two setups of a balanced pair gives White a median edge of +76 cp; and in 6,450 engine games from 43 of the pairs White scores 49.2 %, a small deficit that is statistically visible game by game and borderline when games are clustered by pair. The mirror twins of the balanced pairs are not balanced: only 22 of 236 stay within the corridor on the whole ladder, and at 4 G nodes they read 21.3 cp from zero on average. A funnel audit of 1000 pairs rejected just outside the windows finds 4.1 % of them even at 400 M nodes. All data, run passports and the exact engine builds are published, so every number here can be recomputed.

1. Introduction

Chess960 removes opening preparation by shuffling the back rank, but it keeps the two armies mirror images of each other. Double Fischer Random Chess goes one step further and draws the two back ranks independently [1]. The space of starts grows from 960 to $960 \times 960 = 921{,}600$, and with it grows the chance that a start is unfair: at a quick glance about a quarter of the pairs favour Black, and most of the rest favour White by more than 10 centipawns.

That unfairness is also an opportunity. If White's first move is worth a few tens of centipawns, then somewhere in the space there should be pairs where Black's back rank is worth exactly that much more than White's, so that the two sides start even. Such pairs would be interesting for

play, since they remove the first-move advantage without changing the rules of movement, and they are interesting as objects of study, because they let one ask what a setup is "worth" on its own.

This paper reports a staged search for such pairs over half of the DFRC space and the programme that was run to find out whether the balance found by one engine at one budget is a property of the position or an artefact of the measurement. The work was done for CH960, a free Chess960 platform, between 18 September and 9 October 2026; the search continues, and this text describes the state of the data on the snapshot date given in Section 9. A first draft of this text, circulated on 8 October 2026, treated a position and its mirror image as equivalent and compared spreads across sets of different composition; both errors are corrected here (Sections 3.1 and 5.1), and the title no longer calls the search exhaustive.

Three things are, to our knowledge, new. First, the target: previous engine passes over the DFRC space selected positions by their draw rate, which is what engine testing needs, not by closeness to equality. Second, the method: a staged search whose promotion windows are set by a control experiment rather than by guesswork, a budget ladder that goes an order of magnitude beyond the usual evaluation depth, and an admission rule that requires two engines of a different design to agree. Third, the published result: a verified, reproducible set of balanced pairs together with the raw data behind every claim.

2. Related work

The DFRC scheme itself is not ours. The Top Chess Engine Championship has run DFRC events since 2022 and later made DFRC the format of its "FRD" finals [1, 2]; its rules say that start positions are generated at random or picked by a bookmaker, and no selection criterion is published. An early request for the same variant on Lichess, under the name "Chess 960²", notes that in a small sample White was almost always ahead by at most half a pawn [3].

The closest prior work is in the opening-book repository of the Stockfish project. In July 2022 it received a file with all 921,600 DFRC start positions, with the remark that some of them are "really unbalanced by nature" [4]. In May 2025 R. Nürnberg added a book built from a complete pass over all 921,600 positions with Stockfish 17.1 at depth 22: 105,883 positions had a model draw rate between 40 % and 60 % and 20,797 between 48 % and 52 %; the latter set was published as `DFRC_4852_v1.epd` [5]. That pass filtered on the draw share of Stockfish's win–draw–loss model, the quantity that matters for engine testing, not on the centipawn evaluation, and it covered the whole space rather than one representative per mirror pair.

Balance of the 960 *symmetric* starts has been studied several times. Gunderson evaluated all 960 with Stockfish 9 at depth 39–40 and found a range from 0.00 to +0.57 pawns with 27 positions at 0.00 and the classical start at +0.22 [6]. Barthelemy evaluated them with Stockfish 17.1 at depth 30, reports a mean White advantage of +0.33 ± 0.12 pawns, and studies their complexity [7]. Molas analysed more than fourteen million Lichess games and found no start position whose practical results differ from the others by more than noise [8]. Our own baseline for the symmetric starts is the Morozov Balance Index, described in Section 3.5.

Castling in Chess960 and the numbering of the 960 setups follow Scharnagl's scheme [9]; the notation for castling rights follows Shredder-FEN, in which the rights are written as the files of the rooks [10].

3. Definitions and conventions

3.1 Pairs, mirror images and coverage

A *pair* (w, b) means that White starts from Scharnagl setup w and Black from setup b, each numbered 0–959, with the classical start being 518. Pawns stand on their usual ranks, castling is ordinary Chess960 castling for each side on its own rank, and all other rules are unchanged.

Reflecting the board left to right maps a setup w to its mirror image mirror(w) and a pair (w, b) to (mirror(w), mirror(b)). The reflected position is *not* equivalent to the original, because Chess960 castling always ends on fixed squares — king on c1 and rook on d1, or king on g1 and rook on f1 (c8/d8 and g8/f8 for Black) [12] — and the pairs of files c/d and g/f are not mirror images of each other. A position and its reflection therefore have different castling options: with the back rank BBQNRKRN White can castle on the first move, while with its reflection NRKRNQBB no castling is possible until pieces have moved. The difference is not a curiosity. All 960 symmetric starts were evaluated individually at 400 M nodes for the Morozov Balance Index (Section 3.5), which gives 480 pairs of mirror twins measured by the same engine with the same budget: the twins differ by 9.8 cp on average (median 8, maximum 53); 61 % of the twin pairs differ by more than 5 cp and 37 % by more than 10 cp; the correlation between twins is only r = 0.50; the classical start reads +11 cp and its mirror image, setup 534, reads +49 cp. For comparison, raising the budget from 400 M to 1.2 G nodes moves the evaluation of one and the same position by 5.3 cp on average, so twins differ about twice as much as a tripling of the budget does.

The search nevertheless treated a pair and its reflection as one class and evaluated only the lexicographically smaller of the two. No setup is its own mirror image (0 of 960, because the king and queen change sides), so the 921,600 ordered pairs fall into 460,800 such classes, and the search covers exactly 460,800 representatives: one half of the space. Every published pair is a pair that was actually evaluated; the value of its mirror twin is not inferred from it. The mirror twins of the published pairs were evaluated directly on the same budget ladder, and they are not balanced (Section 5.8); the other half of the space is scheduled for the same staged search and will be reported in a later version. The 480 classes with w = b are the ordinary Chess960 starts; they are kept in the search as a control and are excluded from the results.

3.2 Notation and sign convention

Positions are written in Shredder-FEN; the castling field lists the file letters of each side's rooks on its own rank. All evaluations are in centipawns from White's point of view: a negative value means that Black stands better.

3.3 Engine settings and the score rule

The main engine is Stockfish 17.1 (SHA-256 5f95eaea0d4eb697381989187ce6eb4d6ad59283c34421765ecc73cdb09ba766) with `Threads = 1`, `UCI_Chess960 = true`, a hash size fixed per stage, and a search limited by nodes rather than time. Each position is searched after `ucinewgame`. The score taken is the one reported at the last *completed* iteration of iterative deepening; an iteration cut short by the node limit reports a bound rather than a settled value and is not used. With these settings a search is a deterministic function of the position and the budget: the same build on any machine returns the same number, so every value in this paper can be reproduced bit for bit.

3.4 Budgets

Budgets are written in nodes. The screening stages run from 100 k to 128 M nodes (Section 4); the verification ladder runs at 400 M, 800 M, 1.6 G and 4 G nodes, with a subset at 8 G and 16 G. For orientation, 400 M nodes of single-thread Stockfish 17.1 reach a nominal depth in the mid-forties on these positions, and 16 G nodes reach depths of 60–74.

3.5 The symmetric baseline: the Morozov Balance Index

The 960 symmetric starts were evaluated with the same engine, settings and score rule at 400 M nodes; the result is published as the Morozov Balance Index (MBI) [11]. Over the 960 positions the evaluation runs from −7 to +83 cp with median +26 and mean +27.3; 947 positions favour White, 9 read exactly 0 and 4 read slightly negative. 64 positions lie within ±10 cp and 147 within ±15 cp; the classical start reads +11. The mean over the 480 lexicographically smaller twins — the representatives the search uses — is +25.5 cp, over their mirror images +29.1 cp: the two halves of the space are not interchangeable even on average. The index itself is the rank of a position by |cp|, rescaled so that 100 is the most balanced. It was validated against 3,000 engine games from 60 positions (Spearman 0.76, bootstrap 95 % interval 0.63–0.85). In this paper the symmetric starts serve two purposes: their 400 M evaluations calibrate the search windows, and the most balanced of them are the control group against which the pairs are compared at every deeper budget and with every other engine.

4. The search

4.1 Stages and windows

The search is staged. Stage 0 evaluates every one of the 460,800 representatives with a small budget; a pair advances to the next stage only if its |cp| at the current stage is within that stage's *window*. Table 1 lists the stages.

Stage	Nodes	Hash, MB	Window |cp|
0	100 k	16	50
1	500 k	16	40
2	2 M	32	41
3	8 M	64	32

Stage	Nodes	Hash, MB	Window |cp|
4	32 M	128	30
5	128 M	256	35

Table 1. Screening stages: node budget, hash size and the promotion window.

Beyond the last regular stage, verified pairs are deepened from 400 M nodes, the MBI budget, by doubling: 800 M, 1.6 G, 3.2 G. Stage 0 traverses the representatives in a fixed seeded shuffle (seed 20,260,918), so that the set of pairs evaluated at any moment is reproducible. Waves are served depth-first: the deepest stage with pending candidates goes first, and within a stage the most even candidates go first, so verified pairs appear while screening is still running. Since 26 September 2026 most of the compute has gone into deepening rather than into screening new pairs; the actual share is written into the run passport (0.97 at the snapshot).

4.2 Why the windows are wide: the control experiment

A shallow search does not simply add noise to the deep value; it is biased. To measure both the noise and the bias, the 93 symmetric representatives with |MBI evaluation| ≤ 15 cp were run through every stage outside the windows and compared, each with its own 400 M value. Table 2 gives the result.

Stage	Nodes	Shift vs 400 M, cp	Noise σ, cp	r within ±15	Median |cp| of even	95th pct of even
0	100 k	+17.9	±12	−0.08	27.5	45
1	500 k	+17.4	±10.6	0.04	26	39
2	2 M	+15.4	±10.7	−0.00	23.5	36
3	8 M	+13.7	±8.8	0.12	21	32
4	32 M	+9.8	±7.4	0.20	18	27
5	128 M	+7.1	±6	0.44	16	23

Table 2. The control experiment: 93 symmetric starts within ±15 cp at 400 M nodes, run through every stage outside the windows. The shift is the mean difference from the 400 M value; r is the correlation with it; the last two columns are over the 48 starts within ±10 cp at 400 M.

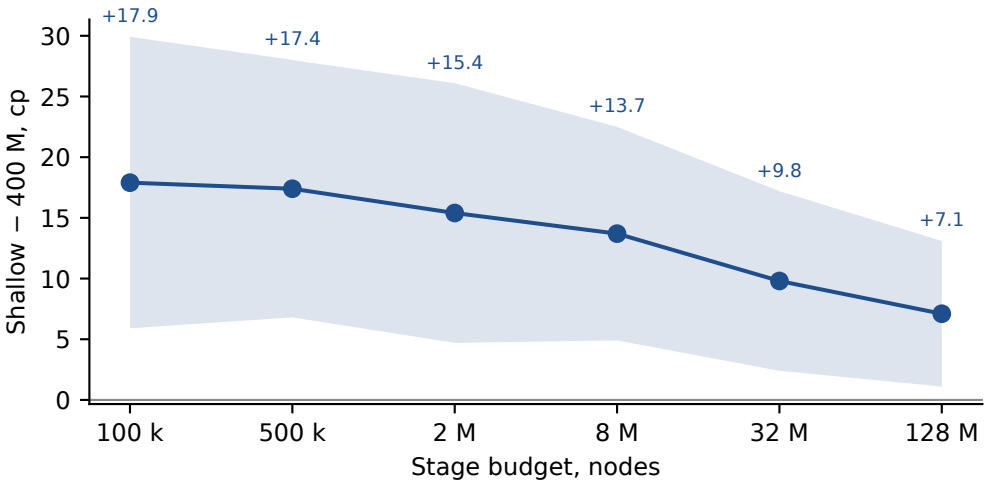


Figure 2. The control experiment: mean shift of the shallow evaluation from the 400 M value (line) and its spread (band) across the stages, for the symmetric starts within ±15 cp.

At 100 k nodes the engine reads an even position at about +18 cp for White with a spread of ±12 cp; at 128 M nodes the shift is still +7 cp. Within the band of near-even positions the shallow value hardly correlates with the deep one (r from −0.08 to 0.20 up to 32 M nodes), so early stages can only reject a clear advantage; which of two near-even positions is the more even is decided by depth alone. The practical rule follows: a stage's window is the 95th percentile of |cp| among the control positions that are even at depth (|cp| ≤ 10 at 400 M, 48 representatives), so that at least 95 % of the even control positions survive each stage. The windows in Table 1 were set this way on 19 September 2026; the original, narrower windows of 30/25/20/15/12/10 cp would have discarded most of the even control positions at the middle stages, and all pairs were re-screened after the change.

Two caveats belong here. The 95 % figure holds per stage; over five promotions, if misses were independent, about 77 % of even positions would reach the end of screening. And the calibration set consists of symmetric positions; that the same windows retain even *asymmetric* pairs at the same rate was tested directly by a funnel audit: 1000 pairs rejected at stages 0–3 with |cp| at most 30 cp beyond the window were re-evaluated at 400 M nodes regardless of the filter. 41 of them (4.1 %) read within ±5 cp and 72 within ±10 cp; the mean |cp| is 40.7. Even right at the window edge the windows lose few pairs that are even at 400 M, and an even reading at 400 M is only the first rung of the admission ladder.

The bias is visible already at stage 0 across the 480 symmetric representatives: the mean |cp| is 36.6 at 100 k nodes against 25.5 at 400 M, and the correlation between the two is only r = 0.41.

4.3 The shape of the space at stage 0

Stage 0 was completed on the first evening of the search. Over all 460,800 representatives the median |cp| is 63, the 90th percentile 137 and the maximum 499; 330,760 pairs favour White by more than 10 cp, 100,028 favour Black by more than 10 cp, and 30,012 lie within ±10 cp. 114,115 pairs (24.8 %) read negative, which never happens at depth for a symmetric start: Black's back rank can indeed outweigh White's move.

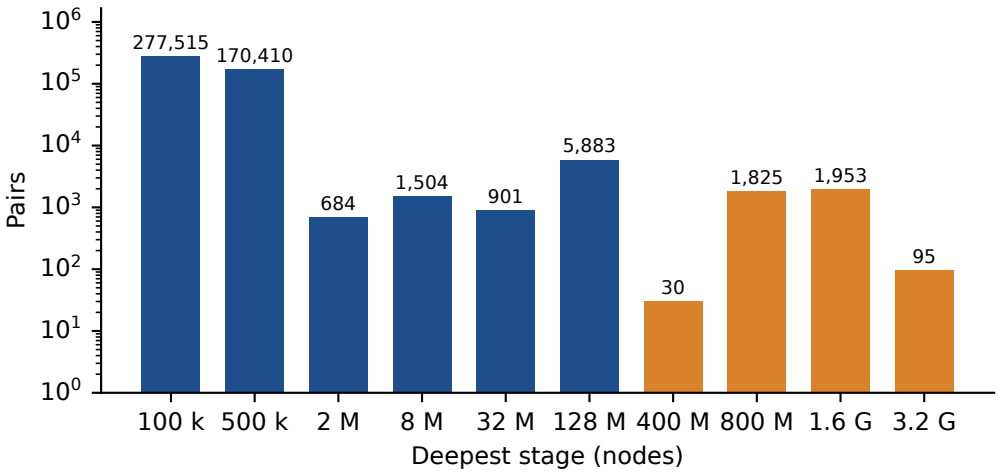


Figure 1. Pairs by the deepest stage reached at the snapshot (log scale). Screening stops most pairs at 100 k or 500 k nodes; the right-hand bars are the verification ladder.

4.4 Compute

At the snapshot the search journal holds 699,622 evaluations of all 460,800 representatives; the sum of their nominal budgets is 1.0×10^{13} nodes. The verification runs of Section 5 add about half as much again. All runs were made on one workstation with 24 physical cores and 128 GB of memory, with 10 to 20 single-thread engine processes in parallel; parallelism changes only the wall-clock time, never a number.

5. Verification

Verification started from the first published set of 52 pairs, frozen on 21 September 2026 after reading exactly 0.00 cp at 400 M, 800 M and 1.6 G nodes. The question was whether that zero is a property of the pair. Unless stated otherwise, the experiments of this section concern this first set and its subsets, not the full published set of Section 6.

5.1 The budget ladder: 4 G, 8 G, 16 G

All 52 pairs were re-evaluated at 4 G nodes, the survivors at 8 G, and their survivors at 16 G (Table 3).

Budget	Pairs	Exactly 0	Drifted to Black	Drifted to White	Mean, cp	SD, cp	Depth
4 G	52	43	7	2	−0.83	3.6	54–67
8 G	43	39	1	3	0.47	2.1	59–70
16 G	39	35	2	2	−0.05	1.7	60–74

Table 3. The budget ladder for the first set of 52 pairs.

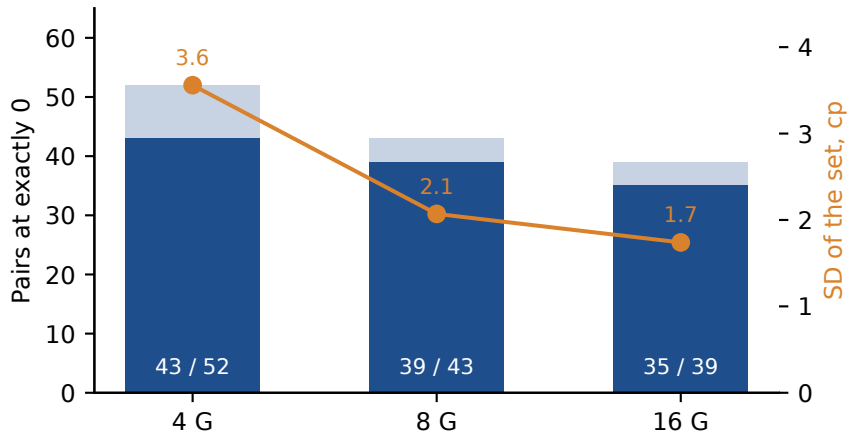


Figure 3. The budget ladder: pairs still reading exactly 0 (bars) and the standard deviation of the whole set (line) at 4 G, 8 G and 16 G nodes.

At each doubling roughly one pair in ten leaves exact zero: 52 → 43 → 39 → 35. The standard deviation in Table 3 falls from 3.6 to 2.1 to 1.7 cp, but the three rows describe sets of different composition, since only survivors went deeper; the fall therefore says nothing about depth by itself. On the fixed set of 52 pairs evaluated at all three budgets the standard deviation is 3.56 / 4.43 / 5.40 cp, with 43 / 40 / 37 pairs at exactly zero. The honest reading is that "exactly zero" was never the right description of these pairs: a deeper search redistributes a residual of a few centipawns, and whether that residual grows or shrinks with depth has to be measured on one and the same set — the fixed set of all 52 pairs above. On it the residual does not shrink: the spread grows with the budget (3.6 → 4.4 → 5.4 cp) while the mean stays within a centipawn of zero (−0.8 / −0.4 / −0.8 cp). Deeper search finds small errors on both sides of a balance that stays centred, which is why the admission rule asks for a band at every budget rather than for exact zero.

5.2 Direction of drift: pairs versus symmetric starts

What distinguishes a balanced pair from a merely lucky symmetric start is the *direction* in which the value moves with depth. The 13 most balanced symmetric starts, re-evaluated at the same 4 G nodes, moved to a median of +9 cp (range 0 to +20); the 9 of them that read exactly 0 at 400 M now read between +5 and +20, and not one went negative. A further 134 symmetric starts re-evaluated at 1.2 G nodes moved by a median of +3 cp, again with none going negative. The pairs that left zero moved both ways: at 4 G, 7 towards Black and 2 towards White; at 8 G, 1 and 3; at 16 G, 2 and 2. A symmetric start has an unpaid tempo that depth gradually prices in; a balanced pair has a structural compensation, and depth finds small errors on either side of it.

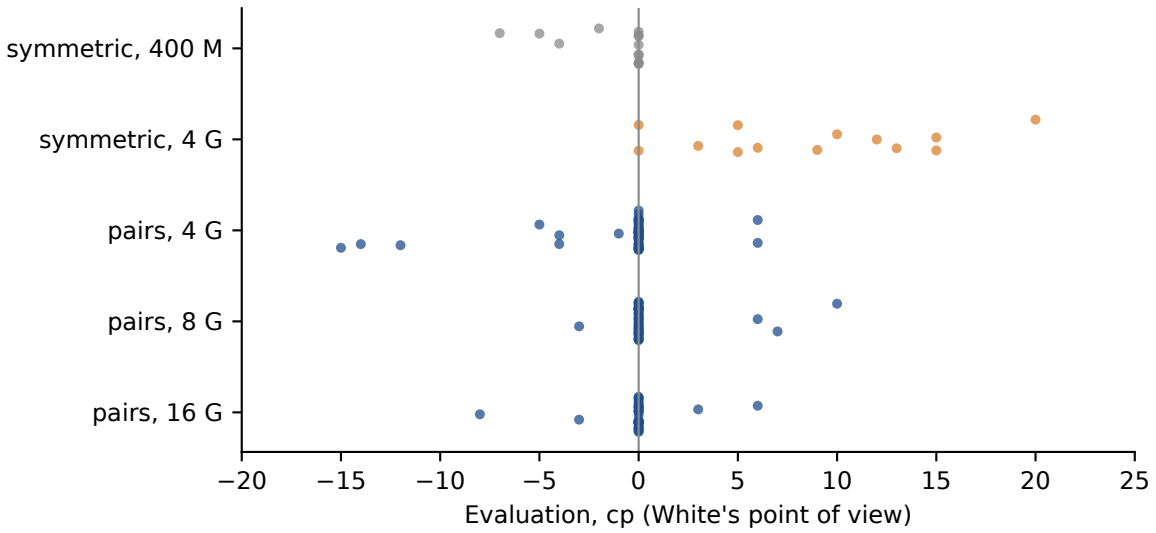


Figure 4. Where the value goes with depth. Top: the most balanced symmetric starts at 400 M (grey) and the same positions at 4 G nodes (orange). Below: the first set of pairs at 4 G, 8 G and 16 G nodes (blue). Each dot is one position.

5.3 Depth predicts survival; self-play does not

At 4 G nodes the non-survivors had reached nominal depths of 54–60, while all 29 pairs that reached depth 61 or more held zero. Already at 1.6 G nodes a depth threshold of 56 would have kept 37 pairs of which only 2 later left zero, at the cost of discarding 8 good ones. Engine self-play at a modest budget, by contrast, does not separate the two groups at all: every one of the 9 pairs that left zero at 4 G had scored 10 draws out of 10 games in the earlier self-play.

5.4 Reversed pairs

If the balance of a pair is a real compensation, swapping the two setups should destroy it. For the 43 pairs that held zero at 4 G, the reversed pair (b, w) was evaluated at 400 M nodes: every one of them favours White, with a median of +76 cp, mean +79.1, range +22 to +175. The same set of two back ranks, handed out the other way round, turns an even start into one that is close to won. At stage 0 the reversed pairs had read a median of +93 cp, so this property is visible even to a shallow search. The result is established for these 43 pairs; it has not been measured for the pairs admitted later.

5.5 Independent engines

Two engines of a different construction were run on the same positions: Berserk 14, an alpha-beta engine with its own, independently trained network, at 400 M nodes; and Lc0 0.32.1 with network 791556, a Monte-Carlo tree search engine with a large neural network, at 100 k tree nodes. Each engine was first run on the 13 most balanced symmetric starts to learn how it reads an ordinary even Chess960 position: Berserk gives them a median of +10 cp (range 0 to +22), Lc0 a median of +18 cp (range +14 to +20). Neither engine puts any symmetric start below zero.

On the 43 pairs that held zero at 4 G, Berserk reads a mean of 0.1 ± 0.8 cp (median 0) and Lc0 a mean of +0.5 ± 2.1 cp (median +1); Berserk puts 9 of them below zero and Lc0 19. The two

engines agree with each other on the pairs with r = 0.45. The claim this supports is the one used in the admission rule: by the reading of an independent engine, a balanced pair is closer to equality than a typical balanced symmetric start.

5.6 Setup weights

Is the balance of a pair the sum of two independent setup values plus a tempo? To test this, every setup X was given a *weight*: the evaluation of "X as White against the classical setup 518 as Black" at 400 M nodes. Weights run from −61 to +183 cp (mean +54.3, median +49, SD 44.8); 91 setups have a negative weight, that is, as White against the classical array they stand worse; the classical array itself weighs +11 cp, which is simply the evaluation of the classical start at this budget. A linear model cp ≈ k·(W_w − W_b) + T fitted over all 460,800 stage-0 evaluations gives k = 0.80, a tempo T = +47.2 cp and r = 0.73: the additive model explains 54 % of the variance of the shallow evaluation, and the residual standard deviation is 47 cp against 70 cp for the raw values. The balanced pairs have, as the model requires, a systematically negative weight difference: mean −48.4 cp over the 43 pairs held at 4 G and median −33 cp over the published set, where 349 of 436 pairs give the heavier setup to Black. The model is useful as a prior, not as a judge: the window of predictions within ±10 cp holds 10.1 % of the space but 20.6 % of the published set, an enrichment of ×2.0; the rest of the balance is interaction between the two ranks that no sum of weights captures.

5.7 Self-play

The 43 pairs held at 4 G were played out by the engine against itself, 150 games per pair at 500,000 nodes per move with four random opening plies kept within 15 cp of the best line: 6,450 games, 116 White wins, 6,114 draws, 220 Black wins, a White score of 49.19 %. The uncertainty of that score must be computed from the actual outcomes 0, ½ and 1, not from a two-outcome binomial model: with 95 % draws the per-game standard error gives a 95 % interval of ±0.28 percentage points, and the deficit of White is 5.7 standard errors from equality. Games from the same pair are not independent samples of the population of positions, however; clustering by pair (43 clusters) widens the interval to ±0.94 points and the deficit to 1.7 standard errors. The direction is consistent: 21 pairs score below 50 % for White and 8 above, and Black wins the decisive games about two to one (116 against 220). Self-play at this budget measures practical play, not the evaluation; what it shows is a small but real practical edge for Black in these pairs at 500,000 nodes per move, of the order of one percentage point, not equality within noise.

5.8 Mirror twins of the balanced pairs

Section 3.1 showed on the symmetric starts that a position and its mirror image are different positions. The direct test is to take the balanced pairs themselves and evaluate their mirror twins on the same ladder. This was done for the 236 pairs of the edition of 10 October 2026 at 400 M, 800 M, 1.6 G and 4 G nodes (Table 4).

Budget	Twins	within ±5 cp	within ±10 cp	mean |cp|	median	above +5	below −5
400 M	237	34	57	24.7	0	95	108
800 M	237	44	62	23.3	0	94	99

Budget	Twins	within ±5 cp	within ±10 cp	mean |cp|	median	above +5	below −5
1.6 G	236	48	71	22.5	0	87	101
4 G	236	52	81	21.3	0	86	98

Table 4. Mirror twins of the balanced pairs on the budget ladder (evaluation in cp from White's point of view).

Only 22 of the 236 twins (9 %) stay within ±5 cp at every budget, as every pair of the set does by construction; at 4 G nodes the twins read 21.3 cp from zero on average, 86 of them favour White by more than 5 cp and 98 favour Black. The median stays near zero, so the twins are not systematically better for one side; they are simply not balanced. The mirror twin of a balanced pair is therefore no more likely to be balanced than a pair near the search windows, and the balance of a pair cannot be transferred to its reflection: each half of the space has to be searched on its own.

6. The admission rule and the published set

6.1 Criterion v2

The first set had been admitted by "exactly 0.00 at 400 M, 800 M and 1.6 G nodes, one engine". Section 5 shows why that rule is wrong: it selects the luckiest pairs rather than the most balanced ones, since about one in ten leaves exact zero at every doubling. The rule that replaced it on 26 September 2026, extended on 9 October 2026 to every evaluated budget, requires all at once:

- **A.** |cp| ≤ 5 at each of 400 M, 800 M, 1.6 G and 4 G nodes (Stockfish 17.1, score rule of Section 3.3), and the same corridor at every deeper budget (8 G, 16 G) at which the pair has been evaluated: a corridor instead of a knife edge, with no known deeper reading hidden behind a formal threshold.
- **B.** The mean over the four core values is within ±2 cp and the four values are not all of the same sign. This is a preference against a consistently one-sided reading (a pair that reads +4 everywhere is not what we mean by balanced), not a test of drift: four readings of +1 show no drift, and four readings alternating in sign show no stability.
- **C.** Berserk 14 at 400,000,000 nodes reads the pair strictly closer to zero than its own median over the balanced symmetric starts (+10 cp).
- **D.** Lc0 0.32.1 at 100,000 tree nodes reads the pair strictly closer to zero than its own median over the balanced symmetric starts (+18 cp).

Conditions C and D are not arbitrary thresholds: each engine is compared with its own reading of ordinary even Chess960 positions, so the statement is the same for all three engines and can be checked by anyone with the published builds.

6.2 Calibration on the first set and the published composition

Applied to the 52 pairs of the first set, the core rule (the four rungs and the two engines) kept 33 and rejected 19; the extension to deeper budgets removed a further 5 pairs that read +6 to +10 cp

at 8 G nodes. The rejections are informative: of the 24 pairs removed in total, 11 fail the Lc0 condition, 7 the Berserk condition, 14 leave the corridor at 4 G or deeper and 3 fail condition B (a pair can fail several). Pairs admitted by the same rule as their verification completed bring the published set to 436 pairs (Table 5); there is one set and one rule, the search's candidates join it as their verification completes, and the 24 former pairs remain published with the reason for their removal.

Date	Admitted	Set size
21 September 2026	28	28
3 October 2026	122	150
9 October 2026	73	223
10 October 2026	13	236
15 October 2026	87	323
21 October 2026	113	436

Table 5. Growth of the published set: pairs admitted by criterion v2 on each date as their verification completed, and the size of the set after that date.

6.3 Properties of the set

Over the 436 pairs, the 4 G evaluation reads exactly 0 for 385, negative for 33 and positive for 18 (range −5 to +5, mean −0.04, SD 1.08); 254 pairs read 0 at all four rungs. Berserk reads the set with median 0, SD 3.5 and range −9 to +9 (104 below zero, 105 above); Lc0 with median +1, SD 8.8 and range −17 to +17 (179 below, 224 above). 10 engine games per pair at 500,000 nodes per move, available for 436 of the 436 pairs at the snapshot, give 4,360 games with a White score of 49.30 % (99 wins, 4,101 draws, 160 losses), 2.8 standard errors below equality when clustered by pair — the same small practical edge for Black as in Section 5.7. The full list, with the deeper budgets where they exist, is given in Appendix A.

7. Discussion and limitations

What the evaluation is. An engine evaluation is a statement about best play as the engine sees it at a given budget, not the game-theoretic value of the position and not a prediction of human results. The verification shows that the statement is stable in the ways that matter: the balance survives a forty-fold increase in budget to within a few centipawns, it is confirmed by engines of a different design, and it disappears when the setups are swapped.

What "balanced" means here. We do not claim that any pair is exactly zero in a theoretical sense, and we do not claim that the residual shrinks with depth. The defensible claim, and the one encoded in the admission rule, is that each pair is balanced to within 5 cp at every budget at which it has been evaluated, with the residual scattered on both sides of zero, in contrast to the symmetric starts, whose residual lies on one side only.

Coverage is half of the space. The search evaluated one representative of each mirror pair, and mirror twins are different positions (Section 3.1). Nothing is claimed about the pairs that

were not evaluated; in particular, the mirror twin of a published pair is not a balanced pair until it has been verified itself.

One engine family dominates. Stockfish does the screening and the ladder; the other two engines act as referees, not as independent searchers. A pair that Stockfish misreads at every budget would never reach the referees. The control experiment of Section 4.2 bounds this risk at the screening stage for symmetric positions, and the wide windows were chosen for that reason, but it cannot remove it; the funnel audit (Section 4.2) puts the loss at the window edge at 4.1 % of rejected pairs.

Budgets are not comparable across engines. Lc0's 100 k tree nodes and Berserk's 400 M alpha-beta nodes are different quantities; each engine is therefore compared only with its own reading of the symmetric control, never with another engine's number.

Self-play is a weak but not an empty instrument. At the budgets affordable for thousands of games the draw rate is about 94 %, and the few decisive games are decided by play. Still, both self-play experiments show a practical edge for Black of about one percentage point with Black winning the decisive games about two to one. That is compatible with an evaluation of zero at the root — the evaluation measures the position, the games measure how two copies of the same engine handle it at 500 k nodes per move — but it is a finding, not noise, and it is published as such.

The search continues. New pairs reach the ladder and some will be admitted; counts, ranks and the deepest stage of a given pair change over time. Every number in this paper is computed from the data snapshot of Section 9, and the site shows the live state. The mirror twins were evaluated for the edition of 10 October 2026 (236 pairs); the twins of pairs admitted later, and the other half of the space, will be reported in a later version.

8. Conclusions

A staged search over 460,800 representatives of the 921,600 DFRC start positions, one from each pair of mirror images, with windows calibrated on the symmetric starts as a control, finds a set of 436 pairs in which neither side starts better by the reading of three engines, to within 5 cp at every budget examined. The set has properties that no selection by a single evaluation could guarantee: the pairs that leave zero at deeper budgets move both ways while symmetric starts move only towards White, swapping the setups of a verified pair hands White a large advantage, and a simple additive model of setup weights explains about half of the balance and no more. Mirror images are different positions, so the other half of the space remains to be searched. The data and the engine builds are published so that each of these statements can be recomputed.

9. Data and code availability

All primary data are published under CC BY 4.0 together with this paper: the search journal with every evaluation, the run passports with engine builds and settings, the ladder, reverse-pair, weight, Berserk, Lc0 and self-play runs, the symmetric control, and the composition with the

reasons for every removal. The snapshot used for this text was taken on 2026-10-21 (699,622 journal records). The live rating, the encyclopedia of pairs with a page per pair, and the methodology are at ch960.com/asym; the symmetric baseline is at ch960.com/balance. The tools that run the search, the ladder and the dataset build, and the script that computes every number in this text from the data, are part of the CH960 repository.

Acknowledgements

The computational pipeline (search scheduler, verification runs, dataset builds) and the draft of this text were prepared with the assistance of Claude Code, an AI assistant by Anthropic, working under the author's direction; the research questions, the design decisions and the responsibility for the content are the author's. The author thanks the reviewer of the first draft for identifying the mirror-image error, the selection effect in the spread comparison and the mistaken confidence interval of Section 5.7. The engines are the work of their respective teams: Stockfish, Berserk (Jay Honnold) and Leela Chess Zero.

References

1. Wikipedia, "Chess960", section Tournaments: DFRC/FRD at TCEC since 2022. https://en.wikipedia.org/wiki/Chess960
2. TCEC wiki, "TCEC DFRC rules" and "TCEC FRD rules". https://wiki.chessdom.org/TCEC_DFRC_rules, https://wiki.chessdom.org/TCEC_FRD_rules
3. Lichess forum, "Chess 960² (feature request)". https://lichess.org/forum/lichess-feedback/chess-960-feature-request
4. J. VandeVondele, "All DFRC opening positions", official-stockfish/books, pull request #31, 3 July 2022. https://github.com/official-stockfish/books
5. R. Nürnberg, "add two DFRC books", official-stockfish/books, pull request #67, 24 May 2025 (file `DFRC_4852_v1.epd`). https://github.com/official-stockfish/books/pull/67
6. S. H. Gunderson's evaluation of all 960 positions, reported in M. Klein, "What's The Most Unbalanced Chess960 Position?", Chess.com, 14 March 2018. https://www.chess.com/article/view/whats-the-most-unbalanced-chess960-position
7. M. Barthelemy, "Not all Chess960 positions are equally complex", arXiv:2512.14319, December 2025 (v3 March 2026). https://arxiv.org/abs/2512.14319
8. A. Molas, "Analyzing Chess960 Data", January 2023. https://alexmolas.com/2023/01/11/chess-960-initial-position.html
9. R. Scharnagl, *Fischer-Random-Schach (FRC/Chess960) – Die revolutionäre Zukunft des Schachspiels*, 2004, ISBN 3-8334-1322-0; numbering scheme: https://en.wikipedia.org/wiki/Chess960_numbering_scheme
10. Shredder-FEN and X-FEN notation for Chess960 castling rights: https://en.wikipedia.org/wiki/X-FEN
11. R. Morozov, "Chess960 Balance Index (MBI)", ch960.com/balance, 2026, CC BY 4.0. https://ch960.com/methodology/balance

12. FIDE Laws of Chess, Guidelines II: Chess960 rules (castling ends with the king on c1/g1 and the rook on d1/f1). https://handbook.fide.com/chapter/E012023
13. Stockfish 17.1, released 30 March 2025. https://github.com/official-stockfish/Stockfish/releases/tag/sf_17.1
14. Berserk 14, released 24 May 2026. https://github.com/jhonnold/berserk/releases/tag/14
15. Leela Chess Zero v0.32.1, released 23 November 2025. https://github.com/LeelaChessZero/lc0/releases/tag/v0.32.1

Appendix A. The published set

#	White	Black	Since	400 M / 800 M / 1.6 G / 4 G	8 G / 16 G	Berserk	Lc0
1	4	837	2026-10-09	0 / −1 / 0 / −1	— / —	+1	−6
2	5	16	2026-10-03	0 / 0 / −4 / −4	— / —	0	−7
3	6	99	2026-10-21	0 / +4 / 0 / 0	— / —	0	+4
4	7	512	2026-10-21	0 / +3 / 0 / 0	— / —	+6	+9
5	7	592	2026-10-21	0 / −2 / −3 / −1	— / —	+2	−2
6	7	595	2026-10-10	0 / 0 / 0 / 0	— / —	0	+6
7	7	850	2026-10-15	+3 / −1 / 0 / 0	— / —	0	+10
8	8	513	2026-10-10	0 / 0 / 0 / 0	— / —	0	+13
9	9	60	2026-10-21	−3 / 0 / 0 / +1	— / —	−9	−2
10	9	772	2026-10-10	0 / 0 / −3 / 0	— / —	0	+8
11	9	850	2026-10-10	0 / 0 / 0 / 0	— / —	−6	−1
12	9	949	2026-10-10	0 / 0 / +3 / 0	— / —	−5	−14
13	12	7	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	+9
14	13	297	2026-10-21	0 / 0 / 0 / 0	— / —	+8	+9
15	14	641	2026-10-10	+3 / 0 / 0 / 0	— / —	0	−1
16	15	203	2026-10-21	+1 / 0 / 0 / 0	— / —	+1	+6
17	15	658	2026-10-03	0 / 0 / +1 / 0	— / —	0	−2
18	17	823	2026-10-21	0 / 0 / 0 / 0	— / —	+8	+1
19	19	400	2026-10-09	+1 / 0 / 0 / −3	— / —	0	0
20	20	846	2026-10-10	0 / 0 / 0 / 0	— / —	+1	0
21	21	392	2026-10-09	0 / 0 / 0 / −2	— / —	+1	−9
22	23	115	2026-10-21	0 / 0 / 0 / 0	— / —	+3	−8
23	24	98	2026-10-21	0 / 0 / 0 / 0	— / —	+3	+8
24	26	743	2026-10-21	0 / 0 / 0 / 0	— / —	+1	+6
25	27	43	2026-10-03	−2 / 0 / 0 / 0	— / —	−5	+4
26	27	488	2026-10-03	0 / 0 / 0 / 0	— / —	−8	+5
27	28	132	2026-10-21	+4 / 0 / 0 / 0	— / —	0	−9
28	29	723	2026-10-09	0 / 0 / 0 / 0	— / —	+8	+13

#	White	Black	Since	400 M / 800 M / 1.6 G / 4 G	8 G / 16 G	Berserk	Lco
29	30	357	2026-10-03	+3 / 0 / −2 / 0	— / —	+4	−3
30	30	848	2026-10-09	0 / 0 / 0 / 0	— / —	−6	0
31	31	573	2026-10-09	0 / 0 / 0 / 0	— / —	0	−7
32	32	211	2026-10-09	0 / 0 / 0 / 0	— / —	0	−7
33	33	35	2026-09-21	0 / 0 / 0 / 0	0 / 0	−5	−12
34	33	38	2026-10-10	0 / 0 / 0 / 0	— / —	0	+7
35	33	483	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	−9
36	35	401	2026-10-21	0 / 0 / 0 / 0	— / —	−8	−10
37	36	753	2026-10-03	0 / 0 / 0 / 0	— / —	+6	−3
38	36	817	2026-10-03	0 / 0 / 0 / 0	— / —	0	−6
39	37	822	2026-10-03	0 / 0 / −1 / 0	— / —	0	+4
40	39	164	2026-10-21	0 / 0 / 0 / 0	— / —	+7	+2
41	40	289	2026-10-10	−5 / 0 / 0 / 0	— / —	0	+16
42	40	838	2026-10-21	0 / −2 / 0 / 0	— / —	0	+1
43	42	528	2026-10-21	0 / 0 / 0 / 0	— / —	0	+11
44	44	865	2026-10-21	0 / 0 / 0 / 0	— / —	+6	+10
45	45	146	2026-10-03	0 / 0 / 0 / −3	— / —	0	−7
46	45	180	2026-10-21	0 / 0 / 0 / 0	— / —	0	+3
47	45	459	2026-10-09	0 / 0 / 0 / 0	— / —	0	+11
48	46	147	2026-10-10	0 / 0 / 0 / 0	— / —	0	+5
49	46	583	2026-10-10	0 / 0 / +1 / −2	— / —	−7	+1
50	46	643	2026-10-10	0 / 0 / 0 / 0	— / —	+6	−1
51	48	902	2026-10-10	0 / 0 / 0 / 0	— / —	0	+9
52	49	103	2026-10-03	0 / 0 / 0 / 0	— / —	+2	+4
53	49	563	2026-10-21	0 / +4 / 0 / 0	— / —	0	−7
54	51	499	2026-10-03	0 / 0 / 0 / 0	— / —	−2	−5
55	51	516	2026-10-15	0 / 0 / 0 / 0	— / —	0	+17
56	54	116	2026-10-09	0 / 0 / 0 / 0	— / —	−8	+6
57	54	117	2026-10-21	0 / 0 / 0 / 0	— / —	−5	+13
58	56	37	2026-10-09	+2 / 0 / 0 / 0	— / —	+8	+3
59	56	854	2026-10-09	0 / 0 / 0 / 0	— / —	0	+13
60	58	547	2026-09-21	0 / 0 / 0 / 0	0 / 0	+1	+8
61	58	593	2026-10-15	0 / 0 / 0 / 0	— / —	0	+12
62	59	42	2026-10-03	0 / 0 / 0 / 0	— / —	−7	+1
63	59	290	2026-10-21	0 / 0 / 0 / 0	— / —	+5	+17
64	60	216	2026-10-03	0 / 0 / 0 / 0	— / —	−2	0
65	60	340	2026-10-09	0 / 0 / 0 / 0	— / —	0	+15

#	White	Black	Since	400 M / 800 M / 1.6 G / 4 G	8 G / 16 G	Berserk	Lco
66	61	284	2026-10-03	−2 / 0 / 0 / 0	— / —	−4	+12
67	61	423	2026-10-09	0 / 0 / 0 / −2	— / —	−6	−1
68	61	429	2026-10-21	0 / −2 / +2 / 0	— / —	0	+12
69	61	903	2026-10-15	+4 / 0 / +1 / 0	— / —	0	−10
70	62	109	2026-10-21	0 / 0 / 0 / 0	— / —	−3	−4
71	62	543	2026-10-03	0 / −3 / −3 / −1	— / —	0	−10
72	63	31	2026-09-21	0 / 0 / 0 / 0	0 / 0	−1	0
73	63	609	2026-10-03	−2 / +1 / 0 / 0	— / —	0	+4
74	64	35	2026-10-21	0 / 0 / 0 / 0	— / —	0	−1
75	65	39	2026-10-09	−2 / 0 / 0 / −1	— / —	−8	+13
76	65	103	2026-10-21	−5 / +1 / 0 / 0	— / —	0	−3
77	65	213	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	+6
78	65	955	2026-10-21	+3 / +3 / 0 / 0	— / —	0	−8
79	66	242	2026-10-09	0 / 0 / 0 / 0	— / —	0	−5
80	66	880	2026-10-15	0 / 0 / 0 / 0	— / —	−3	−1
81	69	740	2026-10-09	0 / 0 / 0 / 0	— / —	+4	+2
82	70	639	2026-09-21	0 / 0 / 0 / 0	0 / 0	−5	−11
83	70	658	2026-10-03	0 / −1 / +1 / 0	— / —	0	+3
84	70	850	2026-10-03	0 / 0 / 0 / 0	— / —	+1	+10
85	71	98	2026-10-15	0 / 0 / 0 / 0	— / —	0	−14
86	71	851	2026-10-21	0 / 0 / 0 / 0	— / —	0	+17
87	72	12	2026-10-21	0 / 0 / 0 / −2	— / —	0	+10
88	73	782	2026-10-21	+5 / 0 / 0 / 0	— / —	0	−13
89	73	926	2026-10-15	−5 / 0 / 0 / 0	— / —	0	−12
90	74	319	2026-10-03	0 / 0 / 0 / 0	— / —	0	+5
91	74	365	2026-10-03	0 / +2 / +3 / 0	— / —	−6	+2
92	74	692	2026-10-03	0 / 0 / 0 / 0	— / —	0	−11
93	74	835	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	−14
94	75	1	2026-10-15	0 / 0 / 0 / 0	— / —	−8	−7
95	76	140	2026-10-21	+2 / 0 / 0 / 0	— / —	+4	+16
96	76	692	2026-10-15	0 / 0 / 0 / 0	— / —	0	0
97	78	126	2026-10-21	0 / 0 / 0 / 0	— / —	0	+4
98	78	527	2026-10-03	0 / 0 / 0 / 0	— / —	0	+5
99	79	927	2026-10-09	0 / 0 / 0 / 0	— / —	0	+13
100	81	651	2026-10-09	−5 / 0 / 0 / 0	— / —	−9	0
101	82	609	2026-09-21	0 / 0 / 0 / 0	0 / 0	+3	+12
102	82	815	2026-10-21	0 / 0 / 0 / −5	— / —	0	+9

#	White	Black	Since	400 M / 800 M / 1.6 G / 4 G	8 G / 16 G	Berserk	Lco
103	83	919	2026-10-15	0 / 0 / 0 / 0	— / —	0	+1
104	84	120	2026-10-03	0 / 0 / 0 / 0	— / —	0	−11
105	84	653	2026-10-09	−3 / 0 / 0 / 0	— / —	+4	−15
106	85	68	2026-10-15	0 / 0 / 0 / 0	— / —	−3	−8
107	85	541	2026-10-03	0 / 0 / −1 / 0	— / —	+1	−7
108	86	55	2026-10-09	0 / 0 / 0 / 0	— / —	−2	−11
109	86	150	2026-10-15	0 / 0 / −1 / 0	— / —	−4	−8
110	86	735	2026-10-15	0 / 0 / 0 / 0	— / —	+1	−10
111	87	692	2026-10-03	0 / 0 / 0 / 0	— / —	−4	−6
112	87	757	2026-10-09	0 / 0 / 0 / 0	— / —	+3	+2
113	88	266	2026-10-21	0 / +1 / 0 / 0	— / —	0	−2
114	89	157	2026-10-15	0 / 0 / 0 / 0	— / —	−6	+2
115	90	573	2026-10-09	0 / 0 / 0 / 0	— / —	0	+1
116	90	958	2026-10-21	0 / +4 / 0 / 0	— / —	0	−5
117	92	127	2026-10-03	0 / 0 / 0 / 0	— / —	0	0
118	93	81	2026-10-15	0 / 0 / 0 / 0	— / —	+1	−17
119	99	28	2026-10-21	0 / −3 / 0 / 0	— / —	0	+5
120	99	164	2026-10-03	0 / 0 / 0 / 0	— / —	0	−12
121	102	577	2026-10-15	−5 / 0 / 0 / 0	— / —	+1	+6
122	102	855	2026-10-21	0 / 0 / 0 / 0	— / —	+6	0
123	103	115	2026-10-09	0 / 0 / 0 / −2	— / —	+5	−1
124	103	596	2026-10-15	+1 / 0 / 0 / 0	— / —	0	+2
125	103	673	2026-10-21	0 / +2 / +2 / 0	— / —	−7	+7
126	104	859	2026-10-15	−3 / 0 / +5 / 0	— / —	+8	+14
127	106	40	2026-10-03	0 / 0 / 0 / 0	— / —	+9	+15
128	106	499	2026-10-09	0 / 0 / 0 / −4	— / —	+6	+1
129	107	59	2026-10-21	0 / 0 / 0 / 0	— / —	+5	+15
130	107	291	2026-10-21	0 / −5 / 0 / 0	— / —	−2	+15
131	107	811	2026-10-03	0 / 0 / 0 / 0	— / —	0	+4
132	108	144	2026-10-15	0 / 0 / −2 / 0	— / —	−6	+2
133	108	180	2026-10-15	0 / 0 / 0 / 0	— / —	0	−1
134	109	28	2026-10-15	0 / +1 / 0 / +1	— / —	+3	+11
135	109	53	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	−1
136	109	283	2026-10-15	−1 / 0 / 0 / +4	— / —	−1	0
137	109	667	2026-10-03	0 / 0 / 0 / +4	— / —	−1	+3
138	111	107	2026-10-03	−1 / 0 / 0 / 0	— / —	+6	−16
139	111	562	2026-10-15	0 / 0 / 0 / 0	— / —	−3	−5

#	White	Black	Since	400 M / 800 M / 1.6 G / 4 G	8 G / 16 G	Berserk	Lco
140	112	385	2026-10-03	0 / 0 / 0 / 0	— / —	0	−15
141	115	124	2026-10-15	0 / 0 / 0 / 0	— / —	+6	+10
142	121	209	2026-10-03	0 / 0 / 0 / 0	— / —	0	+12
143	123	131	2026-10-15	+2 / −1 / 0 / 0	— / —	+8	+13
144	123	596	2026-10-21	−3 / −5 / 0 / 0	— / —	−1	+8
145	126	150	2026-10-15	0 / 0 / 0 / 0	— / —	−2	−3
146	126	501	2026-10-15	0 / 0 / 0 / 0	— / —	−5	−8
147	127	224	2026-10-03	−4 / 0 / 0 / 0	— / —	0	+11
148	127	755	2026-10-21	0 / 0 / 0 / 0	— / —	0	+3
149	129	918	2026-10-03	+4 / 0 / 0 / 0	— / —	+1	0
150	134	440	2026-10-15	0 / 0 / +4 / 0	— / —	0	+10
151	135	423	2026-10-21	−2 / −2 / 0 / 0	— / —	0	+11
152	136	839	2026-10-15	0 / 0 / 0 / 0	— / —	0	−11
153	138	40	2026-10-03	0 / 0 / 0 / 0	— / —	+2	+9
154	138	58	2026-10-09	0 / 0 / 0 / 0	— / —	0	+5
155	139	304	2026-09-21	0 / 0 / 0 / 0	0 / 0	−1	+9
156	140	488	2026-09-21	0 / 0 / 0 / −1	0 / 0	0	+10
157	140	865	2026-10-03	0 / 0 / 0 / 0	— / —	−1	+15
158	141	567	2026-10-21	−2 / −5 / 0 / 0	— / —	+3	+11
159	144	355	2026-10-21	0 / 0 / 0 / 0	— / —	0	+17
160	144	821	2026-10-15	0 / 0 / 0 / 0	— / —	+8	−13
161	146	608	2026-10-21	0 / 0 / 0 / 0	— / —	0	+16
162	147	115	2026-10-21	0 / −4 / −2 / 0	— / —	0	+5
163	148	949	2026-10-21	0 / 0 / 0 / 0	— / —	+7	+15
164	149	349	2026-10-21	0 / 0 / 0 / +4	— / —	0	+13
165	149	939	2026-10-15	0 / 0 / 0 / 0	— / —	0	+1
166	149	941	2026-10-09	0 / 0 / 0 / 0	— / —	0	+2
167	150	104	2026-10-03	+2 / 0 / 0 / 0	— / —	+2	+13
168	150	421	2026-10-03	−1 / 0 / 0 / 0	— / —	−7	0
169	151	613	2026-10-15	0 / 0 / 0 / 0	— / —	+1	+2
170	151	896	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	−1
171	155	183	2026-10-09	0 / 0 / 0 / 0	— / —	0	−4
172	155	226	2026-10-21	0 / −3 / 0 / 0	— / —	+6	+12
173	155	722	2026-10-03	−2 / 0 / 0 / 0	— / —	0	−1
174	158	525	2026-10-15	0 / 0 / 0 / 0	— / —	−1	+2
175	158	549	2026-10-15	−4 / 0 / 0 / 0	— / —	0	−1
176	159	244	2026-10-03	0 / 0 / 0 / 0	— / —	0	0

#	White	Black	Since	400 M / 800 M / 1.6 G / 4 G	8 G / 16 G	Berserk	Lco
177	159	546	2026-10-15	0 / 0 / 0 / 0	— / —	+1	+4
178	161	163	2026-10-03	−1 / 0 / −3 / 0	— / —	−9	−5
179	161	283	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	+5
180	162	241	2026-10-03	+1 / 0 / 0 / 0	— / —	+6	+3
181	164	216	2026-10-15	0 / 0 / 0 / 0	— / —	−7	+5
182	164	482	2026-10-21	+3 / 0 / 0 / 0	— / —	0	+15
183	166	533	2026-10-03	0 / 0 / 0 / 0	— / —	0	−1
184	167	236	2026-10-21	0 / +4 / +2 / 0	— / —	0	+8
185	167	543	2026-10-15	0 / 0 / 0 / 0	— / —	0	−6
186	167	578	2026-10-09	0 / 0 / 0 / 0	— / —	+6	+1
187	167	691	2026-10-21	0 / 0 / −2 / −4	— / —	0	0
188	168	226	2026-10-03	0 / 0 / 0 / 0	— / —	0	+4
189	169	629	2026-10-21	+1 / 0 / 0 / +4	— / —	−1	+3
190	169	771	2026-10-15	0 / 0 / 0 / 0	— / —	0	−4
191	170	370	2026-10-21	+4 / 0 / −1 / 0	— / —	+3	0
192	171	745	2026-10-09	0 / 0 / 0 / 0	— / —	−1	−5
193	172	244	2026-10-15	−1 / 0 / +1 / 0	— / —	0	+11
194	173	319	2026-10-03	0 / 0 / 0 / 0	— / —	0	−6
195	173	621	2026-10-21	0 / 0 / 0 / 0	— / —	0	−3
196	174	783	2026-10-09	0 / 0 / 0 / 0	— / —	0	−4
197	176	583	2026-10-03	0 / 0 / 0 / 0	— / —	0	−16
198	177	145	2026-09-21	0 / 0 / 0 / 0	0 / 0	−1	+16
199	177	213	2026-10-03	0 / 0 / −1 / 0	— / —	−6	+2
200	177	787	2026-10-15	0 / −1 / 0 / 0	— / —	−1	−8
201	178	75	2026-10-21	0 / 0 / 0 / 0	— / —	0	+1
202	178	729	2026-10-21	0 / 0 / 0 / 0	— / —	+8	0
203	179	496	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	+1
204	179	951	2026-10-03	−1 / 0 / 0 / 0	— / —	0	−1
205	180	717	2026-10-15	0 / 0 / 0 / 0	— / —	−3	+13
206	181	589	2026-10-03	0 / 0 / 0 / 0	— / —	−6	−6
207	182	519	2026-10-21	−5 / +2 / +2 / 0	— / —	0	0
208	182	935	2026-10-15	0 / −1 / 0 / −2	— / —	+7	+3
209	183	597	2026-10-21	−2 / −4 / 0 / 0	— / —	0	−7
210	183	899	2026-10-21	−2 / +3 / −3 / 0	— / —	−8	+8
211	185	315	2026-10-03	0 / 0 / 0 / 0	— / —	0	+8
212	186	247	2026-09-21	0 / 0 / 0 / 0	0 / 0	+3	0
213	186	545	2026-10-03	0 / 0 / 0 / 0	— / —	+3	0

#	White	Black	Since	400 M / 800 M / 1.6 G / 4 G	8 G / 16 G	Berserk	Lco
214	186	562	2026-10-09	−4 / 0 / 0 / 0	— / —	0	−5
215	187	558	2026-10-09	0 / 0 / 0 / +4	— / —	0	+1
216	188	216	2026-10-03	0 / 0 / 0 / 0	— / —	−9	+6
217	188	753	2026-09-21	0 / 0 / 0 / 0	0 / 0	+6	−11
218	190	67	2026-10-09	+1 / 0 / 0 / 0	— / —	−8	−7
219	190	943	2026-10-15	0 / 0 / 0 / 0	— / —	0	+1
220	191	50	2026-10-21	+4 / −4 / 0 / 0	— / —	−6	−17
221	191	496	2026-10-03	0 / 0 / 0 / 0	— / —	+6	−3
222	193	113	2026-10-03	0 / 0 / 0 / 0	— / —	0	−7
223	194	99	2026-10-21	+5 / +2 / 0 / 0	— / —	+7	+4
224	194	148	2026-10-03	0 / 0 / 0 / 0	— / —	−1	+4
225	194	899	2026-10-03	0 / 0 / 0 / −5	— / —	0	+15
226	196	195	2026-10-09	0 / 0 / 0 / 0	— / —	0	−12
227	197	784	2026-10-03	0 / 0 / 0 / 0	— / —	0	−9
228	198	325	2026-10-09	−5 / 0 / 0 / 0	— / —	−1	+9
229	198	722	2026-10-21	+5 / −4 / 0 / 0	— / —	0	+4
230	199	291	2026-10-15	−2 / −1 / 0 / 0	— / —	0	+4
231	199	691	2026-10-15	0 / 0 / +2 / 0	— / —	−3	−10
232	201	768	2026-10-15	0 / 0 / 0 / 0	— / —	−7	−6
233	202	270	2026-10-03	−1 / 0 / 0 / 0	— / —	0	−9
234	202	657	2026-10-03	0 / 0 / −4 / 0	— / —	+4	−10
235	202	931	2026-10-15	0 / −1 / +2 / 0	— / —	−5	−8
236	204	935	2026-10-15	0 / 0 / 0 / 0	— / —	−3	−9
237	205	870	2026-10-03	+1 / 0 / 0 / 0	— / —	0	+1
238	206	646	2026-10-15	−3 / +1 / 0 / 0	— / —	0	+1
239	207	96	2026-10-15	0 / 0 / 0 / 0	— / —	0	+13
240	207	136	2026-10-09	0 / 0 / 0 / 0	— / —	0	+13
241	207	514	2026-10-03	0 / 0 / 0 / 0	— / —	+3	+7
242	207	839	2026-10-09	0 / 0 / 0 / 0	— / —	+1	−9
243	210	435	2026-10-03	0 / 0 / 0 / 0	— / —	+1	+8
244	213	212	2026-10-15	0 / 0 / 0 / 0	— / —	0	0
245	213	403	2026-10-21	0 / +4 / +2 / 0	— / —	0	+11
246	213	731	2026-10-03	0 / 0 / 0 / 0	— / —	0	−13
247	214	356	2026-10-03	−3 / 0 / 0 / 0	— / —	0	−1
248	214	412	2026-10-21	0 / −2 / −1 / 0	— / —	0	−11
249	216	192	2026-10-03	0 / 0 / 0 / 0	— / —	0	+6
250	221	518	2026-10-15	+5 / +1 / 0 / 0	— / —	−3	+13

#	White	Black	Since	400 M / 800 M / 1.6 G / 4 G	8 G / 16 G	Berserk	Lco
251	221	572	2026-10-15	0 / 0 / 0 / 0	— / —	0	+14
252	222	279	2026-10-15	0 / 0 / 0 / 0	— / —	0	−1
253	223	208	2026-10-09	0 / 0 / 0 / 0	— / —	0	+10
254	226	179	2026-10-15	−1 / 0 / 0 / −3	— / —	−9	0
255	226	243	2026-10-03	0 / 0 / 0 / 0	— / —	−5	−4
256	227	483	2026-10-15	+2 / 0 / 0 / 0	— / —	0	−9
257	229	162	2026-10-03	0 / 0 / 0 / 0	— / —	0	+10
258	229	687	2026-10-09	0 / 0 / 0 / −2	— / —	0	−16
259	229	812	2026-10-15	0 / 0 / 0 / −1	— / —	−3	−16
260	229	849	2026-10-09	0 / 0 / 0 / 0	— / —	0	−3
261	230	43	2026-10-03	+2 / 0 / 0 / 0	— / —	0	−3
262	230	214	2026-10-03	0 / 0 / 0 / 0	— / —	0	+10
263	230	306	2026-10-03	0 / 0 / 0 / 0	— / —	−5	+3
264	230	447	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	−6
265	231	187	2026-10-03	0 / 0 / 0 / 0	— / —	+2	+8
266	232	3	2026-10-09	0 / 0 / 0 / 0	— / —	0	−4
267	232	839	2026-10-15	+4 / 0 / 0 / 0	— / —	0	−7
268	233	866	2026-10-15	0 / 0 / 0 / +1	— / —	0	+8
269	237	87	2026-10-21	0 / +4 / 0 / 0	— / —	+6	+15
270	237	446	2026-10-15	0 / 0 / 0 / 0	— / —	−6	−3
271	237	569	2026-10-09	0 / 0 / 0 / 0	— / —	0	−16
272	239	68	2026-10-03	0 / 0 / 0 / 0	— / —	0	+2
273	240	211	2026-10-15	0 / 0 / 0 / 0	— / —	−8	+2
274	241	535	2026-10-21	0 / 0 / 0 / 0	— / —	+6	+17
275	241	543	2026-10-21	0 / 0 / 0 / 0	— / —	0	−14
276	241	596	2026-10-21	0 / 0 / 0 / 0	— / —	0	−3
277	241	613	2026-10-15	0 / −1 / 0 / 0	— / —	0	+3
278	241	916	2026-10-21	0 / 0 / 0 / 0	— / —	0	0
279	242	179	2026-10-15	0 / 0 / 0 / 0	— / —	+1	−5
280	242	267	2026-10-21	0 / 0 / −5 / −2	— / —	+8	+12
281	242	354	2026-10-21	+5 / 0 / 0 / −3	— / —	+2	+7
282	242	516	2026-10-03	0 / 0 / −1 / −1	— / —	−2	+4
283	243	103	2026-10-03	0 / 0 / 0 / 0	— / —	−6	+3
284	246	705	2026-10-09	+3 / 0 / 0 / −4	— / —	0	−2
285	247	255	2026-10-03	0 / 0 / 0 / 0	— / —	+1	+4
286	247	737	2026-10-21	0 / 0 / 0 / 0	— / —	0	+16
287	247	784	2026-10-15	0 / 0 / 0 / 0	— / —	0	−5

#	White	Black	Since	400 M / 800 M / 1.6 G / 4 G	8 G / 16 G	Berserk	Lco
288	248	647	2026-10-15	0 / 0 / 0 / 0	— / —	0	−2
289	249	647	2026-10-15	0 / 0 / 0 / 0	— / —	0	+8
290	250	533	2026-10-09	0 / 0 / 0 / 0	— / —	+4	+12
291	252	405	2026-10-15	−1 / +1 / +4 / 0	— / —	+1	−16
292	253	61	2026-10-21	0 / −5 / 0 / 0	— / —	0	+10
293	254	897	2026-10-09	0 / 0 / 0 / 0	— / —	0	−7
294	255	53	2026-10-09	0 / 0 / 0 / −3	— / —	0	+3
295	255	134	2026-10-03	0 / 0 / 0 / 0	— / —	−6	−1
296	255	396	2026-10-21	0 / 0 / 0 / 0	— / —	+8	+12
297	255	947	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	+14
298	257	43	2026-10-21	0 / −3 / −1 / 0	— / —	+1	−13
299	257	353	2026-10-15	0 / 0 / 0 / +3	— / —	−4	+4
300	258	119	2026-10-09	0 / 0 / 0 / 0	— / —	−5	−11
301	258	834	2026-10-09	−4 / 0 / 0 / 0	— / —	0	−3
302	261	630	2026-10-09	0 / 0 / 0 / 0	— / —	−1	−11
303	263	737	2026-10-21	0 / −5 / 0 / +4	— / —	0	+17
304	264	817	2026-10-21	0 / −1 / −2 / 0	— / —	0	−6
305	265	21	2026-10-21	0 / 0 / −2 / 0	— / —	0	−10
306	266	286	2026-10-03	0 / 0 / +2 / +5	— / —	0	0
307	267	672	2026-10-09	0 / 0 / 0 / 0	— / —	0	−4
308	269	914	2026-10-03	0 / 0 / 0 / 0	— / —	+1	−8
309	270	45	2026-10-15	0 / 0 / 0 / 0	— / —	−1	+16
310	271	831	2026-10-15	0 / 0 / 0 / 0	— / —	0	+5
311	272	705	2026-10-09	0 / 0 / 0 / 0	— / —	0	+14
312	272	861	2026-10-15	0 / 0 / 0 / 0	— / —	+6	+15
313	273	42	2026-10-15	0 / 0 / 0 / +5	— / —	0	−13
314	273	541	2026-10-21	0 / 0 / 0 / 0	— / —	0	+15
315	273	611	2026-10-03	0 / 0 / 0 / −5	— / —	−7	+9
316	275	403	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	−2
317	277	904	2026-10-21	0 / 0 / 0 / 0	— / —	+8	−2
318	279	596	2026-10-15	0 / 0 / 0 / 0	— / —	0	−7
319	279	845	2026-10-15	0 / 0 / 0 / 0	— / —	0	+4
320	280	21	2026-10-15	0 / 0 / 0 / 0	— / —	0	−15
321	281	306	2026-10-03	0 / 0 / 0 / 0	— / —	+6	+7
322	281	502	2026-10-03	0 / 0 / 0 / 0	— / —	0	−6
323	281	683	2026-10-21	0 / −4 / 0 / 0	— / —	−4	−16
324	282	692	2026-10-15	0 / 0 / 0 / 0	— / —	+6	−13

#	White	Black	Since	400 M / 800 M / 1.6 G / 4 G	8 G / 16 G	Berserk	Lco
325	284	406	2026-10-03	0 / 0 / 0 / 0	— / —	0	−7
326	284	764	2026-10-09	0 / 0 / 0 / 0	— / —	0	−17
327	287	401	2026-10-21	−2 / 0 / 0 / 0	— / —	0	+12
328	287	847	2026-10-15	0 / 0 / 0 / 0	— / —	−9	+4
329	289	97	2026-10-03	0 / 0 / 0 / 0	— / —	0	+14
330	291	405	2026-10-15	0 / 0 / 0 / 0	— / —	−1	−6
331	293	448	2026-10-15	0 / 0 / 0 / 0	— / —	−2	−14
332	295	123	2026-10-15	0 / 0 / −2 / 0	— / —	0	0
333	295	139	2026-10-09	0 / 0 / 0 / −1	— / —	+1	0
334	295	751	2026-10-09	0 / 0 / 0 / 0	— / —	0	−14
335	299	567	2026-10-03	−3 / 0 / 0 / 0	— / —	0	−5
336	304	386	2026-10-15	0 / 0 / 0 / 0	— / —	+1	−7
337	306	733	2026-10-15	0 / 0 / 0 / 0	— / —	+7	−6
338	307	759	2026-10-03	0 / 0 / 0 / 0	— / —	0	+4
339	310	868	2026-10-03	−1 / 0 / 0 / 0	— / —	−6	−1
340	313	625	2026-10-09	0 / 0 / 0 / 0	— / —	+8	0
341	314	740	2026-10-03	0 / 0 / 0 / 0	— / —	0	−2
342	317	79	2026-10-03	+2 / 0 / 0 / 0	— / —	0	+2
343	317	198	2026-10-03	0 / 0 / 0 / 0	— / —	0	+17
344	318	524	2026-10-15	+2 / +1 / 0 / 0	— / —	+8	−10
345	318	624	2026-10-15	0 / 0 / −3 / −1	— / —	0	−9
346	320	128	2026-10-03	0 / 0 / 0 / 0	— / —	0	−17
347	321	401	2026-10-15	0 / 0 / −4 / 0	— / —	−3	−5
348	321	672	2026-10-15	0 / 0 / 0 / 0	— / —	−1	−17
349	321	901	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	−17
350	325	781	2026-10-15	0 / 0 / 0 / 0	— / —	+1	−6
351	326	486	2026-10-21	−1 / 0 / 0 / 0	— / —	0	+9
352	326	635	2026-10-21	0 / 0 / 0 / 0	— / —	0	−11
353	331	163	2026-10-09	−2 / 0 / 0 / +3	— / —	−5	0
354	334	578	2026-10-03	0 / 0 / 0 / 0	— / —	+9	−14
355	335	143	2026-09-21	0 / 0 / 0 / 0	0 / 0	+1	+11
356	335	547	2026-10-03	0 / 0 / 0 / 0	— / —	0	−17
357	335	959	2026-10-03	0 / 0 / 0 / 0	— / —	0	+2
358	389	96	2026-10-03	−4 / 0 / 0 / 0	— / —	+4	+16
359	390	516	2026-10-09	+4 / 0 / 0 / 0	— / —	+6	+12
360	391	119	2026-10-03	0 / 0 / 0 / 0	— / —	+1	−2
361	391	547	2026-10-21	0 / 0 / 0 / 0	— / —	−1	+11

#	White	Black	Since	400 M / 800 M / 1.6 G / 4 G	8 G / 16 G	Berserk	Lco
362	396	423	2026-10-03	0 / 0 / 0 / 0	— / —	−1	−7
363	398	466	2026-10-09	0 / 0 / 0 / +1	— / —	−5	+15
364	407	755	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	+7
365	411	26	2026-10-03	0 / 0 / 0 / 0	— / —	−1	−5
366	412	44	2026-10-03	0 / 0 / 0 / 0	— / —	0	+3
367	414	415	2026-10-03	0 / 0 / 0 / 0	— / —	+3	0
368	415	309	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	+15
369	418	54	2026-10-21	+3 / 0 / 0 / 0	— / —	0	+8
370	424	401	2026-10-03	+1 / 0 / 0 / 0	— / —	0	+6
371	426	119	2026-10-21	0 / 0 / 0 / 0	— / —	−3	−7
372	427	140	2026-10-21	−5 / 0 / 0 / 0	— / —	+4	−16
373	429	180	2026-10-09	0 / 0 / +1 / 0	— / —	+8	+10
374	429	754	2026-10-09	+3 / 0 / 0 / 0	— / —	−7	−11
375	430	536	2026-10-03	0 / 0 / 0 / 0	— / —	+6	−3
376	432	835	2026-10-03	0 / 0 / 0 / 0	— / —	0	−15
377	433	571	2026-10-09	0 / 0 / 0 / 0	— / —	0	+3
378	436	692	2026-10-21	0 / 0 / 0 / +5	— / —	+1	+11
379	437	176	2026-10-21	0 / 0 / 0 / 0	— / —	0	+13
380	443	340	2026-10-03	+1 / 0 / −2 / 0	— / —	0	+7
381	444	637	2026-10-03	0 / 0 / 0 / 0	— / —	0	−14
382	446	422	2026-10-03	0 / 0 / 0 / 0	— / —	0	−3
383	447	4	2026-10-21	0 / 0 / 0 / 0	— / —	0	+10
384	449	19	2026-10-03	0 / 0 / 0 / 0	— / —	−6	−9
385	451	844	2026-10-21	0 / 0 / 0 / 0	— / —	0	0
386	452	897	2026-10-03	+3 / 0 / 0 / 0	— / —	−5	+1
387	453	242	2026-10-21	0 / 0 / 0 / 0	— / —	+1	−9
388	453	396	2026-10-21	0 / 0 / +1 / 0	— / —	0	+2
389	454	318	2026-10-03	0 / 0 / 0 / 0	— / —	+1	+8
390	455	900	2026-10-21	0 / 0 / 0 / 0	— / —	0	+6
391	456	241	2026-10-21	0 / +1 / +1 / +4	— / —	−1	+16
392	457	505	2026-10-03	0 / 0 / 0 / 0	— / —	−2	+9
393	458	335	2026-10-09	0 / 0 / 0 / 0	— / —	0	+14
394	459	719	2026-10-03	0 / +3 / +3 / 0	— / —	+1	+16
395	460	707	2026-10-09	0 / 0 / 0 / −2	— / —	+1	+2
396	461	241	2026-10-09	0 / 0 / 0 / 0	— / —	0	+3
397	461	268	2026-10-09	0 / 0 / +2 / 0	— / —	+9	0
398	461	722	2026-10-03	0 / 0 / 0 / −2	— / —	0	+5

#	White	Black	Since	400 M / 800 M / 1.6 G / 4 G	8 G / 16 G	Berserk	Lco
399	461	899	2026-10-21	+4 / 0 / 0 / 0	— / —	0	−6
400	468	49	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	+8
401	468	164	2026-10-09	0 / 0 / 0 / +4	— / —	−6	+1
402	469	514	2026-10-03	0 / 0 / 0 / 0	— / —	−1	−3
403	470	887	2026-10-21	0 / 0 / 0 / 0	— / —	+5	+1
404	474	175	2026-10-09	−5 / 0 / 0 / 0	— / —	0	−3
405	475	467	2026-10-21	0 / 0 / 0 / 0	— / —	+1	+7
406	475	672	2026-10-21	+1 / 0 / 0 / 0	— / —	0	+2
407	478	54	2026-10-09	0 / 0 / 0 / 0	— / —	0	−1
408	479	675	2026-10-03	0 / 0 / 0 / 0	— / —	0	0
409	482	130	2026-10-21	+3 / 0 / 0 / −5	— / —	0	−6
410	483	387	2026-10-21	−3 / 0 / 0 / 0	— / —	−3	+14
411	483	750	2026-10-09	0 / 0 / 0 / 0	— / —	0	+6
412	485	2	2026-10-21	−3 / 0 / 0 / 0	— / —	0	−2
413	485	768	2026-10-21	+2 / 0 / 0 / 0	— / —	0	+1
414	488	466	2026-10-03	−1 / 0 / 0 / 0	— / —	0	+8
415	488	640	2026-10-21	−2 / 0 / 0 / 0	— / —	0	+8
416	491	12	2026-10-09	0 / 0 / 0 / 0	— / —	+5	+8
417	498	144	2026-09-21	0 / 0 / 0 / 0	0 / 0	0	+10
418	502	423	2026-10-03	0 / 0 / 0 / 0	— / —	−2	−7
419	502	870	2026-10-21	0 / 0 / 0 / 0	— / —	0	−11
420	503	498	2026-10-03	+1 / 0 / 0 / −1	— / —	0	+16
421	503	754	2026-10-21	0 / 0 / 0 / 0	— / —	−9	−2
422	504	753	2026-10-21	+5 / 0 / 0 / 0	— / —	+3	−12
423	505	641	2026-10-21	0 / 0 / −5 / 0	— / —	0	+3
424	507	907	2026-10-09	+4 / 0 / 0 / 0	— / —	0	0
425	510	955	2026-10-03	0 / 0 / −1 / 0	— / —	0	−4
426	514	144	2026-10-21	−2 / 0 / +5 / +5	— / —	−4	+7
427	514	226	2026-10-21	+2 / 0 / 0 / 0	— / —	0	0
428	516	720	2026-10-21	−4 / 0 / 0 / 0	— / —	0	+16
429	517	316	2026-10-21	0 / 0 / 0 / 0	— / —	−8	+6
430	518	260	2026-10-09	0 / 0 / 0 / 0	— / —	−1	+10
431	518	884	2026-10-09	0 / 0 / 0 / 0	— / —	0	+6
432	519	424	2026-10-03	0 / 0 / 0 / 0	— / —	0	−6
433	519	595	2026-09-21	0 / 0 / 0 / 0	0 / 0	−2	+2
434	522	622	2026-10-03	0 / 0 / −3 / 0	— / —	0	+3
435	524	739	2026-10-03	0 / 0 / 0 / 0	— / —	−6	−17

#	White	Black	Since	400 M / 800 M / 1.6 G / 4 G	8 G / 16 G	Berserk	Lc0
436	526	591	2026-10-03	−4 / 0 / 0 / 0	— / —	0	−14

Table A1. The published set: Stockfish evaluations along the ladder (cp, White's point of view), Berserk 14 at 400 M nodes, Lc0 0.32.1 at 100 k tree nodes.

Appendix B. Former pairs

White	Black	Failed	400 M / 800 M / 1.6 G / 4 G	Berserk	Lc0
7	676	C D	0 / 0 / 0 / 0	+16	+30
25	902	D	0 / 0 / 0 / 0	0	−19
33	930	A	0 / 0 / 0 / 0	0	+9
39	571	A	0 / 0 / 0 / 0	0	−1
41	928	D	0 / 0 / 0 / 0	+5	+21
61	620	A C	0 / 0 / 0 / 0	−17	−12
66	138	A B C D	0 / 0 / 0 / −15	−17	−24
73	705	A	0 / 0 / 0 / −4	0	+1
85	256	A	0 / 0 / 0 / +6	0	+12
106	955	D	0 / 0 / 0 / 0	0	+18
143	885	A D	0 / 0 / 0 / 0	+8	+24
188	896	A B	0 / 0 / 0 / −14	0	+3
196	480	C	0 / 0 / 0 / 0	−12	−2
198	819	D	0 / 0 / 0 / 0	−8	−24
223	767	D	0 / 0 / 0 / 0	0	−29
303	48	D	0 / 0 / 0 / 0	0	−20
303	823	A D	0 / 0 / 0 / 0	0	−26
317	934	A B C	0 / 0 / 0 / −12	−13	+1
328	184	A	0 / 0 / 0 / −5	0	+4
335	829	D	0 / 0 / 0 / 0	0	−20
394	672	A	0 / 0 / 0 / 0	0	+13
466	726	C	0 / 0 / 0 / 0	+12	+9
473	353	A	0 / 0 / 0 / +6	0	+6
495	851	A C	0 / 0 / 0 / −4	−15	+2

Table B1. Pairs of the first set removed by criterion v2 on 5 October 2026, with the conditions they fail.

Appendix C. Revision history

- **1.0 (8 October 2026, draft).** The first complete text: the staged search with windows calibrated on the symmetric control, the budget ladder to 16 G nodes, the reversed pairs, the

setup weights, the independent engines Berserk and Lc0, self-play, criterion v2 and the symmetric baseline (MBI).

- **1.1 (9 October 2026, draft).** The response to the first review. A mirror image is a different position, because Chess960 castling ends on fixed files (c/d and g/f) that do not reflect into each other; the search therefore covers half of the space, and nothing is claimed about the twins of the published pairs. The self-play standard error is computed from the variance of the 0/½/1 outcomes and clustered by pair; the ladder is compared on a fixed set of pairs rather than on the survivors; the corridor of condition A applies at every evaluated budget; condition B is stated as a preference, not as a test of drift.
- **Between 1.1 and 1.2.** The mirror twins of the balanced pairs were evaluated on the ladder (Section 5.8, Table 4); the funnel was audited for balanced pairs lost at the window edge (Section 4.2); the ladder was re-examined on a fixed set of pairs; the published set grew as the verification of new candidates completed (Table 5).
- **1.2 (21 October 2026).** The first published version. The set grows to 436 pairs under the same rule; Table 5 records every admission date; every number is recomputed from the snapshot of 2026-10-21. A copy of this version is kept in the Internet Archive.