



IA 500 Benchmark Methodology

IA 500 / IA Large Select comparison benchmark

METHODOLOGY VERSION	1.2
EFFECTIVE DATE	August 12, 2026
CALCULATION ENGINE	1.3.3
DOCUMENT STATUS	Current methodology

This document defines the construction, calculation, maintenance, and governance of IA 500 and its IA Large Select comparison benchmark.

Contents

1. Introduction
2. Benchmark Summary
3. Core Principles
4. Data and Testing Framework
5. IA 500 Construction
6. IA Large Select Comparison Benchmark
7. Benchmark Calculation and Indexing
8. Missing Prices and Coverage Controls
9. Corporate Actions
10. Publication and Validation
11. Governance
12. Disclaimers

Methodology document

1. Introduction

This document describes the construction, calculation, maintenance, and governance of the **IA 500**, Intelligent Alpha's principal large-cap benchmark. It also describes **IA Large Select**, the earlier live-tested large-cap benchmark presented as a comparison because of its longer operating history.

The IA 500 uses a broad ensemble of frontier artificial-intelligence model families to create and maintain a diversified benchmark portfolio. IA Large Select uses three frontier model families and represents an earlier generation of the same model-driven benchmarking concept. The two benchmarks share a common return-calculation framework but have distinct selection, universe, and rebalance processes.

Model families, model generations, prompts, and approved inputs may evolve as frontier-model capabilities improve. The construction, calculation, validation, and governance rules in this document provide continuity across model generations.

2. Benchmark Summary

Benchmark	Objective	Selection unit	Target/final size	Rebalance
IA 500	Aggregate the stock-selection views of eligible AI model families across a U.S. large-cap universe	Three approved 100-stock runs per model family	Maximum 500 names	Quarterly
IA Large Select	Present the earlier Intelligent Alpha large-cap benchmarking process with a longer live-tested track record	One 100-stock portfolio from each of OpenAI GPT, Anthropic Claude, and Google Gemini	Full union; normally more than 100 names	No fixed calendar

The IA 500 is the canonical product and primary subject of this methodology. IA Large Select is included to document the earlier comparison series and the important differences between its operating process and the IA 500 process.

3. Core Principles

- **Frontier-model selection.** Each eligible model family independently completes the approved selection exercise using a common information set.
- **Distinct universe controls.** IA 500 selection outputs are validated against the approved universe before a source portfolio is eligible for construction. IA Large Select historically used its supplied universe as the starting opportunity set rather than an absolute constituent boundary; its canonical history may therefore include model-selected additions outside the initial source list.
- **Long-only construction.** Both benchmarks hold positive long positions and do not use leverage or short positions.
- **Equal model-family influence.** Each eligible IA 500 model family receives an equal sleeve weight. Each of the three IA Large Select model sleeves receives one-third of its aggregate.
- **Fixed shares between rebalances.** Target weights are converted to shares at each effective rebalance and those shares drift with market prices until the next effective rebalance.
- **Gross and net total return.** Cash distributions are reinvested at the benchmark level. Gross total return does not deduct investor taxes, transaction costs, management fees, or implementation costs. Net total return deducts the standardized annual fee described in Section 7.6: 0.25% for IA 500 and 0.50% for IA Large Select.
- **Canonical net return.** Public presentation uses the applicable net-total-return variant as the canonical series. Gross return remains available as secondary published data or a diagnostic.
- **Fail-closed publication.** A missing, incomplete, mixed-date, or insufficiently priced source prevents advancement of the applicable production release.

4. Data and Testing Framework

4.1 Constituent-selection data

Depending on the selection period, model-visible data may include security identifiers, industry classifications, market capitalization, valuation, growth, profitability, capital efficiency, balance-sheet strength, estimate revisions, earnings expectations, and price momentum.

The exact fields, analytical instructions, and prompt design may evolve as data quality and model capabilities improve. All eligible IA 500 model families within a rebalance receive the same approved information set.

4.2 Market data

The calculation process uses an approved third-party data source for historical closes and cash distributions, supplemented by approved ticker fixes, aliases, exact corporate-action terms, and documented manual price records where necessary. Split-adjusted historical closes and split-adjusted cash distributions are used where available. Prices denominated in a currency other than the benchmark's base currency require an approved foreign-exchange conversion. A missing required conversion is treated as missing market data, not as a one-for-one exchange rate.

4.3 Backtested and live-tested history

IA 500 results through the third quarter of 2026 include retrospectively constructed model sleeves. The historical model ensemble was applied to the approved universes and calculation periods using model versions whose knowledge cutoff preceded the applicable selection period. MiniMax is used through Q2 2026. By administrator decision, Muse Spark 1.1 replaces the MiniMax family sleeve beginning with the Q3 2026 construction.

Beginning with the next scheduled rebalance, the approved IA 500 panel is intended to be live-tested. The model selection process for those future periods must be completed without using subsequent-period outcomes.

IA Large Select is live-tested from inception. Its selections were produced through the operating process in effect at the time rather than reconstructed as a retrospective model ensemble.

5. IA 500 Construction

5.1 Objective

The IA 500 measures the aggregate stock-selection view of a diversified panel of eligible AI model families applied to a common U.S. large-cap dataset. It is designed to answer:

What would an equal-weighted ensemble of independently generated AI model-family portfolios own when each model family receives the same approved large-cap information set?

The IA 500 is not weighted by market capitalization or free float.

5.2 Eligible universe and source constraints

The approved large-cap universe is a closed list of U.S. large-cap equities for the applicable rebalance. Each family receives the same allowed-symbol list and the same approved model-visible field set for that quarter and run type.

Each source model portfolio targets 100 securities and 100% total weight, subject to:

- positive weights;
- a 7.0% maximum single-security weight;
- a 30.0% maximum sector weight;
- approved-universe membership; and
- no duplicate securities.

The 7.0% single-security ceiling is enforced when a source portfolio is validated for benchmark construction.

The 30.0% sector limit is applied to each source model portfolio. The final equal-family benchmark does not apply a separate sector overlay because it combines already diversified source portfolios.

5.3 Target model families

IA 500 targets a broad panel of leading model families:

- Alibaba Qwen;
- Anthropic Claude;
- DeepSeek;
- Google Gemini;
- Meta Muse (committee beginning Q3 2026);
- MiniMax (historical committee through Q2 2026);
- Moonshot Kimi;
- NVIDIA Nemotron;
- OpenAI GPT;
- xAI Grok; and
- Zhipu GLM.

MiniMax remains in the committee through the Q2 2026 construction. Meta Muse Spark 1.1 replaces it beginning with Q3 2026 and remains the target family for subsequent rebalances, using the approved Muse generation for each period.

The specific generation used for each family may change as models improve. Selection prompts are maintained for current-generation model capability, and the approved family roster for each rebalance may vary based on availability and successful completion. Each eligible family receives equal weight.

5.4 Model-family portfolio

For each quarter and eligible model family:

1. run the approved selection process three times independently using the applicable model family, universe, data, prompt, and run settings;
2. verify that each source run totals 100%, normalizing only when necessary to correct rounding or consolidation differences;
3. assign each source run one-third of the family sleeve; and
4. aggregate identical tickers across the three source runs.

For security i in family f :

$$w_{i,f} = (1) / (3) \sum_r w_{i,f,r}$$

In this formula, i identifies a security, f identifies a model family, and r identifies one of the three independent selection runs. $w_{i,f,r}$ is security i 's submitted weight in run r for family f , and $w_{i,f}$ is the security's resulting weight in the blended family portfolio. A security absent from a source run has a weight of zero.

This process rewards both submitted conviction and repeat selection. A family portfolio can contain more than 100 securities because the three source runs need not select identical names.

5.5 Ensemble construction

At each quarterly rebalance:

1. identify all model families with approved family portfolios;
2. assign each eligible family an equal sleeve weight;
3. sum each security's contribution across families;
4. apply approved ticker aliases and corporate-action treatments within the affected family before ensemble construction;
5. rank securities by aggregate target weight, descending;
6. if aggregate weights are exactly equal, rank first the security whose ticker symbol comes first in alphanumeric order, solely to make the result reproducible;
7. retain the first 500 securities; and
8. proportionally normalize retained weights only if securities were removed or the aggregate total otherwise differs from 100%.

For F eligible families:

$$w_i^{(raw)} = (1) / (F) \sum_f w_{i,f}$$

For the retained set R of no more than 500 securities:

$$w_i = (w_i^{(raw)}) / (\sum_{j \in R} w_j^{(raw)})$$

Here, F is the number of eligible model families, $w_{i,f}$ is security i 's weight in family f , and w_i^{raw} is its aggregate weight before the constituent limit is applied. R is the retained set, j represents each security in that set, and w_j is security j 's final benchmark weight.

A model family without a qualifying portfolio is omitted. Its weight is not assigned to a proxy family. Equal-family weights are recalculated across the remaining eligible families.

5.6 Rebalance

The IA 500 rebalances quarterly. The target portfolio becomes effective on the approved rebalance boundary. The outgoing basket earns through the effective rebalance-date close, and the incoming basket is anchored at that close under calculation engine version 1.0.

There is no daily target-weight reset. Security weights drift between rebalances.

6. IA Large Select Comparison Benchmark

6.1 Status and objective

IA Large Select is the earliest version of the Intelligent Alpha large-cap benchmarking process. It is presented with IA 500 because its longer live-tested track record provides a useful comparison with the current IA 500 process. It uses frontier models to construct a high-conviction, long-only U.S. large-cap portfolio and has been live-tested since inception.

The official launch date is **July 21, 2023**, the first date in the canonical calculation set.

6.2 Starting universe

IA Large Select begins with an approved source universe of U.S. large-cap companies.

Historically, a model could add a security outside the initial source list. The canonical constituent history, rather than the initial source universe alone, therefore defines the approved historical benchmark portfolio. This differs from IA 500, whose source outputs must pass closed-universe validation.

6.3 Target model families

IA Large Select targets three model families:

- Anthropic Claude;
- Google Gemini; and
- OpenAI GPT.

Each model is asked to construct a 100-stock portfolio beginning from the same approved source universe. Prompts are optimized for current-generation models and may evolve as model capabilities improve. A fixed factor score is not part of the methodology.

6.4 Model portfolio construction

Each approved model sleeve uses positive weights and totals 100%. A historical sleeve may include a model-selected addition outside the initial source list when that selection is retained in the canonical constituent record. Normalization is applied only when necessary to correct rounding or consolidation differences. Model instructions encourage diversification and conviction-sensitive weighting.

IA Large Select does not apply a separate hard sector cap or top-ten aggregate cap at the benchmark aggregation stage.

6.5 Multi-model aggregate

IA Large Select uses independently generated GPT, Claude, and Gemini portfolios. The aggregate is the full union of the three model sleeves:

1. verify that each model sleeve totals 100%, normalizing only if necessary;
2. assign each model an equal one-third sleeve;
3. sum duplicate securities across sleeves; and
4. normalize the final aggregate only if its total differs from 100%.

A security selected by multiple models receives contributions from multiple sleeves. The aggregate normally contains more than 100 names and does not impose IA 500's final 500-name cap.

6.6 Rebalance and oversight

IA Large Select has no fixed rebalance calendar. Rebalances are initiated through the legacy operating process. After the models complete their selections, the human committee performs a final oversight check limited to identifying major model hallucinations or clear processing errors. The committee does not select, remove, rank, reweight, or otherwise change securities based on investment judgment. The approved constituent history is the authoritative record of rebalance dates.

7. Benchmark Calculation and Indexing

7.1 Base level

Each benchmark is indexed to a default starting value of 1000:

$$I_0=1000$$

Here, I_0 is the benchmark level on its first calculation date. The subscript 0 identifies that starting date.

7.2 Rebalance shares

Before shares are established, repeated rows for the same security are consolidated by summing their weights. The aggregate target portfolio is proportionally normalized only if necessary to make its total equal 100%.

At a valid rebalance R , a constituent without an approved rebalance close may be excluded only when its weight is within the benchmark's missing-weight limit in Section 8. The remaining priced constituents form the live set L_R , and their weights are proportionally normalized:

$$w^{(L)}_{i,R} = (w_{i,R}) / (\sum_{j \in L_R} w_{j,R})$$

The live target weight $w^{(L)}_{i,R}$ is converted to shares using the current benchmark level I_R and approved rebalance close $P_{i,R}$:

$$\text{shares}_{i,R} = (I_R \times w^{(L)}_{i,R}) / (P_{i,R})$$

Here, i identifies a constituent, R identifies the effective rebalance, $w_{i,R}$ is the constituent's source target weight, L_R is the set of constituents with approved rebalance closes, and j represents each security in that set. $w^{(L)}_{i,R}$ is constituent i 's live target weight after any permitted exclusion, I_R is the benchmark level at the rebalance, $P_{i,R}$ is the constituent's approved closing price, and $\text{shares}_{i,R}$ is the share quantity established for the new basket. Shares remain fixed until the next rebalance, except for explicit corporate actions.

7.3 Daily market value and drift

$$MV_{i,t} = \text{shares}_i \times P_{i,t}$$

$$\text{BasketMV}_t = \sum_i MV_{i,t}$$

$$\text{DriftedWeight}_{i,t} = (MV_{i,t}) / (\text{BasketMV}_t)$$

Here, t is a calculation date, shares_i is the constituent's fixed share quantity from the most recent rebalance, and $P_{i,t}$ is its approved price on date t . $MV_{i,t}$ is the constituent market value, BasketMV_t is the sum of all constituent market values, and $\text{DriftedWeight}_{i,t}$ is the constituent's resulting share of the basket.

The displayed current constituent weight is therefore normally a drifted weight, not the last target weight.

7.4 Price return

$$\text{PRReturn}_t = (\text{BasketMV}_t) / (\text{BasketMV}_{t-1}) - 1$$

$$\text{PRLevel}_t = \text{PRLevel}_{t-1} \times (1 + \text{PRReturn}_t)$$

Here, $t-1$ is the prior calculation date, $PRReturn_t$ is the basket's price return from $t-1$ to t , and $PRLevel_t$ is the price-return benchmark level after applying that return. Cash dividends are excluded.

7.5 Gross total return

For cash dividend $D_{i,t}$:

$$DividendCash_t = \sum_i \text{shares}_i \times D_{i,t}$$

$$TRReturn_t = (BasketMV_t + DividendCash_t) / (BasketMV_{t-1}) - 1$$

$$TRLevel_t = TRLevel_{t-1} \times (1 + TRReturn_t)$$

Here, $D_{i,t}$ is the approved split-adjusted cash distribution per share assigned to constituent i on calculation date t , and $DividendCash_t$ is the sum of those distributions across the basket's fixed shares. $TRReturn_t$ is gross total return from the prior calculation date, and $TRLevel_t$ is the resulting gross-total-return level. Regular and special cash distributions are included when supported by the approved data. If a reported distribution date is not a calculation date, its cash is assigned to the next calculation date. Dividend cash is carried through any date skipped by a coverage control and applied on the next published calculation date. Investor personal taxes are not deducted.

7.6 Net total return

Each benchmark has a net-total-return variant designed to approximate the effect of an annual fee if the benchmark were tracked through an ETF-like vehicle. IA 500 uses 0.25%; IA Large Select uses 0.50%. The net variant begins at the same base level and uses the same constituents, corporate actions, distributions, and rebalance dates as the gross-total-return benchmark.

The fee is accrued by calendar time using an ACT/365 convention. For d_t calendar days since the prior calculation date:

$$FeeRetention_t = (1 - F_s / 365)^{(d_t)}$$

$$NRLevel_t = NRLevel_{t-1} \times (1 + TRReturn_t) \times FeeRetention_t$$

Here, d_t is the number of calendar days since the prior calculation date, and F_s is the applicable annual fee expressed as a decimal: 0.0025 for IA 500 or 0.005 for IA Large Select. $FeeRetention_t$ is the portion of value retained after fee accrual for the interval. $NRLevel_{t-1}$ is the prior net level, $TRReturn_t$ is current gross total return, and $NRLevel_t$ is the resulting net-total-return level.

Weekend and market-holiday fee accrual is reflected on the next calculation date. This produces an effective annual deduction of 25 basis points for IA 500 or 50 basis points for IA Large Select, before investor-specific taxes, trading costs, bid/ask spreads, custody charges, or tracking difference. It is a standardized benchmark assumption, not the expense ratio of an existing fund.

7.7 Rebalance boundary

Calculation engine version 1.0 uses the first close on or after the stated rebalance date at which both the outgoing and incoming baskets satisfy their rebalance-price coverage requirements. The outgoing basket earns through that jointly executable close. The incoming basket is established at the same close and begins earning returns on the following calculation date. This treatment accommodates weekends, market holidays, and temporarily unavailable incoming prices without omitting or duplicating a day's return. If no jointly executable close is available through the applicable calculation date, the calculation fails and the prior approved release remains in place.

8. Missing Prices and Coverage Controls

IA 500 applies the following calculation guardrails:

- maximum missing target weight at rebalance: 0.5%;
- minimum daily priced or valid stale-carried weight: 99.5%; and
- maximum ordinary stale-price age: seven days.

Priced weight is the portion of the basket valued with a valid close for the current calculation date. Stale-carried weight is the portion temporarily valued with its most recent valid close when a current close is unavailable, provided that price is no more than seven days old. The sum of priced weight and valid stale-carried weight must be at least 99.5%.

If missing weight exceeds 0.5%, stale prices exceed the permitted age, or combined available weight falls below 99.5%, IA 500 calculation and publication stop until the issue is resolved. When a documented historical treatment requires a constituent to be removed, remaining live weights are proportionally normalized only as necessary to restore the basket to 100%. Daily coverage is then measured against that live basket. Any constituent excluded at a rebalance and its source target weight remain identified in the calculation record.

IA Large Select applies the following calculation guardrails:

- maximum missing target weight at rebalance: 2.0%;
- minimum daily priced or valid stale-carried weight: 90.0%; and
- maximum ordinary stale-price age: seven days.

For either benchmark, an unresolved missing price, required foreign-exchange conversion, ticker treatment, or corporate action prevents publication when the applicable limit is exceeded. A valid price history preceding a detected price discontinuity is retained; the affected security is treated under the stale-price and missing-data controls from the discontinuity forward until the issue is resolved.

9. Corporate Actions

9.1 Splits

Split-adjusted closes are used where available. Split events and any explicit share adjustment are retained for audit.

9.2 Cash dividends

Cash dividends are excluded from price return and reinvested at the benchmark level for gross total return. Distribution timing follows Section 7.5, including roll-forward to the next calculation date when necessary. Net total return begins with gross total return and then applies the standardized fee accrual.

9.3 Symbol changes

Documented aliases are applied only when the mapping and effective period are known. Price and distribution histories are stitched across an approved symbol change so the economic position remains continuous. The calculation record retains the source and mapped symbols.

9.4 Mergers, acquisitions, delistings, and cash dispositions

An acquired or delisted constituent requires an approved documented treatment. Depending on the evidence and calculation engine support, that treatment may include:

- mapping to the surviving listed security;
- applying an exact cash term;
- applying an exact replacement-share or successor-security term;
- continuing the proceeds as cash-like value;
- applying a spin-off term that preserves the parent position and adds the approved component value and distributions;
- applying an explicit terminal value, including zero where the security is determined to have no remaining value; or
- excluding a demonstrably invalid historical row and normalizing at the affected rebalance.

Linked successor and component terms are applied through the full documented chain. An unexplained stale price is not an acceptable substitute for a corporate-action or terminal-value treatment.

10. Publication and Validation

10.1 Required calculation artifacts

Each canonical calculation maintains approved rebalance constituents, price-return, gross-total-return and net-total-return levels, daily constituent weights, corporate-action records, benchmark comparisons, and a calculation summary. Published releases are subject to quality validation.

10.2 IA 500 publication

IA 500 must:

1. target the most recent completed U.S. market session;
2. pass completeness, continuity, date, and price-coverage checks;
3. use approved construction records and ticker treatments;
4. advance only through an immutable approved release; and
5. retain the prior approved release if validation fails.

10.3 IA Large Select publication

IA Large Select publication uses the completed model selections, final oversight check, canonical constituent history, ticker treatments, and quality status. A new rebalance or daily extension is published only after the benchmark passes validation. A failed validation retains the prior approved release.

11. Governance

11.1 Responsibilities and oversight

Intelligent Alpha is the benchmark administrator. It maintains this methodology, approved universes, model inputs, constituent histories, ticker and corporate-action treatments, calculation records, quality controls, and published benchmark levels.

For IA Large Select, the human committee serves only as a final oversight layer. It checks for major hallucinations and clear processing errors after model selection is complete. It does not critique or alter model investment selections, rankings, or weights. IA 500 follows its systematic quarterly selection, aggregation, and validation process.

11.2 IA 500 model-family membership

The IA 500 model panel is designed to represent a compact, diverse group of leading AI model families rather than only the families with the strongest recent investment performance.

Eligibility and continued membership consider model-family relevance and capability, callable availability, operational reliability, output quality, continuity across generations, evaluation history, and diversity of provider, architecture, geography, and observed investment behavior. Recent results may inform monitoring, but membership is not changed or reweighted solely because a family recently outperformed or underperformed.

The eligible roster is documented before each investment period. A proposed new family should first be evaluated under the same data, prompt, validation, and aggregation controls. Historical benchmark levels are not ordinarily rewritten because a revised roster would have performed better. Any administrator-approved retrospective model use must be identified for the affected periods.

11.3 Corrections

For source-holding, ticker, price, distribution, or calculation errors, governance determines materiality, affected dates, any required restatement, and user notification.

12. Disclaimers

IA 500 and IA Large Select are experimental, AI-powered financial benchmarks developed for educational and informational purposes only. They are not financial products, investment vehicles, index funds, or investable strategies. They do not represent a recommendation to buy, sell, or hold any security. No assets are managed according to these benchmarks, and they should not be used as the sole basis for an investment decision.

The benchmarks reflect hypothetical, backtested, and/or live-tested results generated by AI models. They do not reflect actual portfolio performance, real-world trading, transaction costs, slippage, taxes, or every other factor that would affect realized returns. Hypothetical and model-generated results have inherent limitations and should not be interpreted as indicative of future performance. Past performance, whether actual or simulated, is not indicative of future results.

IA 500 results through the third quarter of 2026 include retrospective model selections. Muse Spark 1.1 is excluded from Q2 and, by administrator decision, included in the Q3 committee in place of MiniMax. Historical results may also be affected by source-universe construction, revised data, survivorship, implementation assumptions, or other forms of look-ahead and model-memory risk. IA 500 periods should be described as live-tested only when every included committee sleeve was produced before the relevant forward period. IA Large Select remains live-tested from inception.

The benchmarks use large language models and related analytical systems to assist in the construction, evaluation, and documentation of model-driven equity portfolios. These systems process structured inputs such as company data, market information, portfolio constraints, ranking criteria, and methodology instructions. They are used to generate or support portfolio selections, qualitative assessments, and comparative analysis under a defined methodology.

AI tools do not independently verify all underlying data and should not be understood as providing investment advice, fiduciary judgment, or a guarantee of future performance. Outputs depend on the quality, completeness, timeliness, and accuracy of the data and instructions provided. Results may be incorrect, incomplete, stale, or misleading if source data is inaccurate, market conditions change rapidly, relevant company information is unavailable or misinterpreted, model assumptions are inappropriate, or an AI system makes a reasoning, classification, or calculation error.

The models used to generate the benchmarks may change over time. AI-generated outputs may reflect limitations in training data, model design, prompt construction, data availability, or benchmark implementation. Human oversight, defined portfolio-construction rules, approved-universe controls, and review procedures are intended to reduce these risks but cannot eliminate them. The resulting portfolios and benchmark results should be evaluated as model-assisted analytical outputs, not predictions, recommendations, or assurances of investment performance. Intelligent Alpha makes no representation or warranty regarding the accuracy, reliability, or completeness of the information provided.

Intelligent Alpha's stock-related benchmarks may have different inception dates or start periods, may apply different fees or hypothetical fee assumptions as determined by Intelligent Alpha, and may be relevant to different traditional benchmarks based on their respective objectives and universes. Intelligent Alpha makes best efforts to make its benchmarks comparable with one another and, where relevant, with external benchmarks; however, these differences may limit direct comparisons.

Gross benchmark returns do not reflect transaction costs, market impact, bid/ask spreads, management fees, custody costs, taxes, liquidity constraints, or the cost of tracking the benchmark. Net benchmark variants reflect only the applicable 0.25% or 0.50% annual fee described in Section 7.6 and do not reflect those other costs. A live portfolio or fund can therefore underperform either benchmark variant.

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