

BTC / INDUSTRIAL METALS BASKET BENCHMARK

PUBLIC METHODOLOGY

A **weekly relative-performance series** that measures Bitcoin against a diversified, fixed-weight basket of six industrial metals priced through London Metal Exchange (LME) Cash Official auction references — copper, aluminum, nickel, zinc, lead and tin. The headline is a rebased ratio of a Bitcoin price index over a price-relative basket index, anchored to a fixed base date. It shows whether Bitcoin is gaining or losing strength against the broad industrial-metals complex tied to manufacturing, construction, electrification and the energy transition, rather than against any single metal.

Benchmark family	BBN Benchmarks · Bitcoin Macro Benchmarks
Benchmark name	BBN BTC / Industrial Metals Basket Benchmark
Primary objective	Measure Bitcoin's relative performance versus a diversified six-component industrial-metals basket
Update frequency	Weekly — one end-of-week observation
Headline unit	Base-100 BTC-to-basket rebased ratio
Headline bounds	Unbounded above; bounded below by zero (basket is structurally positive)
Base date / value	Tuesday, 2 January 2018 · headline = 100.00
Basket components	Six LME Cash Official references — core 90% + satellite 10%
Reference exchange	London Metal Exchange (LME); all components USD/metric tonne
Material revision threshold	0.5 index points (headline)
Methodology version	Version 1 — inaugural public release
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HOW TO READ IT — AND WHAT 100 MEANS

A headline above 100 means Bitcoin has outperformed the industrial-metals complex since the base date; below 100 means industrial metals have outpaced Bitcoin. Unlike a BBN Index, which is scored around a 50 mid-point, the 100 here is not a neutral or trailing-norm point — it is a fixed anchor. A headline of exactly 100 would mean Bitcoin and the basket have moved by identical proportional amounts since 2 January 2018.

POSITIONING

This is the broad-industrial-complex signal in the BBN Bitcoin Macro Benchmarks family — a proprietary, directional benchmark for editorial, research and commercial data use. It complements BTC / Copper (single-flagship metal), BTC / Gold (defensive monetary asset) and the agriculture and energy baskets. It is not an IOSCO-aligned regulated financial benchmark, not a tradable instrument, not a commodity total-return index, and not an investment recommendation.

01 WHAT THE BENCHMARK MEASURES

The benchmark answers one cross-asset question: is Bitcoin gaining or losing strength against the broad industrial-metals complex, measured from a fixed historical anchor? Copper alone is a powerful cyclical signal — captured separately in BTC / Copper — but a single metal can be distorted by idiosyncratic mine disruption, contract-specific liquidity or regional inventory dynamics. Combining six liquid LME base metals into one normalized basket gives a broader, steadier read on real-economy industrial demand.

ELEMENT	WHAT IS MEASURED
BTC leg	U.S. dollar price of Bitcoin from the CME CF Bitcoin Reference Rate (BRR) — an institutional-quality reference price.
Basket leg	Weighted, price-relative basket of six LME Cash Official references, all in U.S. dollars per metric tonne — the broad industrial-metals complex across the major base metals.
Headline benchmark	BTC price index ÷ industrial-metals basket index, both rebased to 100 on 2 January 2018, then multiplied by 100.
Weekly change	Week-on-week percentage change in the headline — a momentum and outlier-review diagnostic.
Basket purchasing power	BTC price ÷ basket index, published for scale reference only — a constant multiple of the headline that cannot disagree with it directionally.

The basket uses LME Cash Official references for all six metals. Of the six, only copper has meaningful liquidity on COMEX; aluminum, nickel, zinc, lead and tin are essentially LME-only markets globally, so anchoring all six to the LME delivers internal consistency, removes roll mechanics and ties the basket to the global standard for industrial-metals price discovery. This is a deliberate difference from the standalone BTC / Copper benchmark, which uses COMEX High-Grade Copper as a U.S.-centric flagship view; here, the copper component is LME Copper Grade A Cash, consistent with the global industrial-complex framing of the basket.

02 BASKET CONSTRUCTION

The basket is built from six liquid, USD-denominated, LME-quoted industrial metals, each identified by its LME contract code and Cash Official reference. Every component is rebased to 100 on the common base date before weighting, so no metal dominates because of its nominal price level. Core metals (copper, aluminum, nickel, zinc) carry 90% of the weight; satellite metals (lead, tin) carry 10%. The weights sum to exactly 100%, and all six are quoted in USD per metric tonne, so no FX or unit conversion enters the basket.

METAL	LME CASH OFFICIAL REFERENCE	CODE	WEIGHT	CATEGORY
Copper	Copper Grade A Cash Official	CA	40%	Core
Aluminum	Primary Aluminum High Grade Cash Official	AH	25%	Core
Nickel	Primary Nickel Cash Official	NI	15%	Core
Zinc	Special High Grade Zinc Cash Official	ZS	10%	Core
Lead	Standard Lead Cash Official	PB	5%	Satellite
Tin	Tin Cash Official	SN	5%	Satellite

LME Cash Official is the daily benchmark price for immediate-delivery contracts in each metal, set at the second-ring close (normally 12:55 London time) and published shortly after. It is a cash-market reference, not a futures contract, so it requires no roll cycle, back-adjustment or splicing — each metal is a single continuous cash-price series. The same no-roll architecture is used for BTC / Gold (LBMA Gold Price PM) and BTC / Emerging Markets (MSCI cash equity index), in contrast to the futures-based agriculture and energy baskets.

ELIGIBILITY AND EXCLUSIONS

To be eligible, a metal must have clear industrial use, trade through an LME-listed cash contract with a published daily USD/MT Cash Official price, clear a liquidity floor of roughly 1,000 lots per day over a 90-day window, carry at

least seven years of continuous history at the base date, pass the quality controls, and represent the metal itself rather than producer shares or fund products. Excluded by design are precious metals (covered by BTC / Gold; a monetary rather than cyclical role); iron ore (priced via Platts assessments, not LME-listed, treated as a separate ferrous complex); lithium and cobalt (LME contracts exist but liquidity is still below the floor — candidates for a future review); steel and ferroalloys (sub-floor liquidity, heavily regional); SHFE metals (CNY-denominated, would mix in an FX signal); COMEX/NYMEX alternatives (negligible liquidity outside North America); and mining equities, ETFs and leveraged or inverse products (corporate and path-dependent effects rather than pure metal exposure).

DATA SOURCES

Source choices are fixed; any substitution is a documented methodology change. The BTC leg uses the CME CF BRR at the 16:00 London fix, with BRRNY and then a Bloomberg Bitcoin index as fallbacks. Each metal uses its LME Cash Official price, with a Bloomberg or Refinitiv distribution of the same price, and then the LME 3-month Official as successive fallbacks; any substitution beyond same-day Cash Official is logged and treated as Provisional. SHFE prices, COMEX (used only for standalone BTC / Copper), mining equities, ETF NAVs and OTC physical premia are never eligible for the headline basket.

03 OBSERVATION RULE, CALENDAR AND MISSING-COMPONENT HANDLING

Bitcoin trades continuously while LME Cash Official prices are set once each business day at the second-ring close, so the benchmark fixes a common weekly observation with explicit timestamps for both legs and a deterministic substitution chain.

ELEMENT	SPECIFICATION
Observation day	Friday.
BTC timestamp	CME CF BRR fix, 16:00 London time.
Metals timestamp	LME Cash Official prices, second-ring close, normally 12:55 London time.
Alignment	BTC and all six metals are taken on the same calendar Friday; the 12:55 London LME close precedes the 16:00 BRR fix by about three hours, and both reflect the same London business day.
Currency	All six metals USD/MT on the LME; no FX conversion is applied.

If a single metal is unavailable on Friday, its nearest prior valid LME Cash Official is used while the BTC leg and other metals stay on the standard Friday; if several are unavailable, the nearest-prior rule is applied to each. A whole-exchange holiday or disruption moves all six metals — and the BTC leg — to the nearest prior valid LME trading day. If Bitcoin is unavailable, BRRNY is used; if both BTC sources fail, the entire observation moves to the nearest prior Friday with a valid BTC fix. A forward-fill of any metal beyond five calendar days is not permitted; past that point the metal is treated as missing and the reweighting rule applies. (A documented LME suspension, such as the March 2022 nickel halt, is treated as a gap: no Cash Official is synthesized, and the next valid price after the suspension is the next observation.)

REWEIGHTING AND PUBLICATION THRESHOLD

When a subset of components is missing, the survivors are reweighted pro rata so their weights again sum to one; the original weights return once all components are available.

PRO-RATA REWEIGHTING

$$w'_i(t) = w_i \div (1 - \sum w_{\text{missing}}) \text{ for each surviving component } i$$

$$\text{Basket}(t) = \sum_{\text{surviving } i} w'_i(t) \times \text{MetalIndex}_i(t)$$

Because copper and aluminum together carry 65% of the weight, both must be present for any publication. All six present gives a full release; exactly five present with both copper and aluminum included gives a provisional release naming the missing component; fewer than five components, or either copper or aluminum missing, means no publication for that week. Reweighting the basket without copper or aluminum would leave it structurally unrepresentative even after pro-rata scaling, so their presence is mandatory; missing any of nickel, zinc, lead or tin is recoverable.

04 CALCULATION METHODOLOGY

The headline is built in deterministic steps from the weekly observation set. Values are held to four decimals internally and reported to two.

STEP 1 – COMPONENT PRICE INDICES

$$\text{MetalIndex}_i(t) = 100 \times P_i(t) \div P_i(\text{base}), \quad i \in \{ \text{CA, AH, NI, ZS, PB, SN} \}$$

STEP 2 – INDUSTRIAL-METALS BASKET INDEX

$$\text{Basket}(t) = \sum w_i \times \text{MetalIndex}_i(t), \quad w = [0.40, 0.25, 0.15, 0.10, 0.05, 0.05]$$

STEP 3 – BTC PRICE INDEX

$$\text{BTCIndex}(t) = 100 \times \text{BRR}(t) \div \text{BRR}(\text{base})$$

$$\text{Headline BBN BTC/IM}(t) = 100 \times \text{BTCIndex}(t) \div \text{Basket}(t)$$

each component index and the basket equal 100 on the base date · bounded below by zero, unbounded above

WEEKLY HEADLINE CHANGE

$$\text{WeeklyChange}(t) = [\text{BBN BTC/IM}(t) \div \text{BBN BTC/IM}(t-1 \text{ week}) - 1] \times 100\%$$

AUXILIARY DIAGNOSTIC – BASKET PURCHASING POWER

$$\text{BasketPurchasingPower}(t) = \text{BRR}(t) \div \text{Basket}(t)$$

PUBLICATION LAYERS

Every weekly release falls into exactly one layer. Full publication requires the BTC leg from tier-1 BRR and all six metals from tier-1 LME Cash Official, with no tier-2 fallback beyond a single calendar day; it carries the headline, weekly change, the basket purchasing-power diagnostic, a per-component contribution table and a release note. Provisional applies when the BTC leg uses a tier-2 fallback, any metal is substituted to the LME 3-month Official, exactly five of six components are present with both copper and aluminum, any component is forward-filled by two to five days, or reweighting is applied; the same outputs carry a "Provisional" label and a deviation note and may be revised when missing components return. No publication applies when copper or aluminum is missing beyond the five-day limit, fewer than five components are present, or both BTC sources are unavailable beyond Friday plus five days; a short coverage note is issued and the next valid Friday resumes the series, with no back-fill.

05 WORKED EXAMPLE

A hypothetical Friday observation illustrates the full chain. Base values are the 2 January 2018 anchors; week values are illustrative.

COMPONENT	BASE P_0 (\$/MT)	WEEK P_t (\$/MT)	INDEX	WEIGHT	CONTRIBUTION
Copper (CA)	7,170	9,720	135.56	0.40	54.22
Aluminum (AH)	2,235	2,520	112.75	0.25	28.19
Nickel (NI)	12,560	17,800	141.72	0.15	21.26
Zinc (ZS)	3,330	2,800	84.08	0.10	8.41
Lead (PB)	2,520	2,180	86.51	0.05	4.33
Tin (SN)	19,650	32,500	165.39	0.05	8.27
Basket index				1.00	124.68

BTC INDEX

$$100 \times 66,250.00 \div 13,412.44 = 493.94 \text{ (BRR base \$13,412.44; BRR week \$66,250.00)}$$

STEP 2 – BASKET INDEX (SUM OF CONTRIBUTIONS)

$$54.22 + 28.19 + 21.26 + 8.41 + 4.33 + 8.27 = 124.68$$

$$\text{Headline} = 100 \times 493.94 \div 124.68 = 396.18$$

A reading of 396.18 means that since the 2 January 2018 anchor Bitcoin has appreciated by about 4.94× while the industrial-metals basket has appreciated by about 1.25×, so Bitcoin has outperformed the complex by about 3.96× over the period — the headline divided by 100. This places the benchmark in the "Strong BTC outperformance versus industrial metals" band. The composition was led by tin (a 65% gain, contributing 8.3 from a 5% weight) and copper (a 36% gain, contributing 54.2 from a 40% weight), with zinc and lead the only components below their base values.

06 INTERPRETATION FRAMEWORK

The benchmark does not claim Bitcoin is outperforming the real economy; it says Bitcoin is gaining or losing strength relative to the industrial-metals complex since the base date. A rising headline means BTC is gaining against cyclical industrial exposure; a falling headline means that exposure is leading BTC. The four price combinations then distinguish risk-on strength outpacing rising real-asset prices, industrial-cycle strength or a rotation into physical assets pulling capital from Bitcoin, digital-asset demand outperforming a softening complex (a possible late-cycle signal), or a broad risk-off dragging both lower.

BTC-DOMINANT VOLATILITY

Bitcoin runs at roughly 60–80% annualized volatility against the basket's 20–25%, so most weekly headline variance is BTC-driven — about three times the basket's volatility, less extreme than gold (4–5×) but more pronounced than energy (1.5–2×). Within the basket, nickel contributes outsized variance, having historically realized 35–45% annualized volatility, well above the basket average. The underlying BTC and component levels published with each release show which leg drove a given week.

HEADLINE BANDS

The bands partition the full positive range of possible readings with no gaps or overlaps; boundaries are thresholds — a band runs from its lower figure up to (but not including) the next. They are deliberately asymmetric around 100 because Bitcoin's volatility is several times the basket's, so over multi-year horizons the headline drifts up whenever BTC appreciates and the upper bands widen geometrically.

HEADLINE	BAND	MEANING
≥ 500	Severe BTC outperformance	BTC has appreciated dramatically more than the basket since the base.
250 – <500	Strong BTC outperformance	Pronounced BTC strength relative to the industrial-metals complex.
150 – <250	Moderate BTC outperformance	BTC has clearly outpaced the basket.
>100 – <150	Slight BTC outperformance	BTC has marginally outperformed the basket.
100	On the base-date anchor	Identical proportional moves since the base.
75 – <100	Slight BTC underperformance	The basket has tightened slightly faster than BTC has risen.
40 – <75	Moderate BTC underperformance	The industrial-metals complex has materially outpaced BTC.
20 – <40	Strong BTC underperformance	Pronounced relative weakness of BTC versus industrial metals.
< 20	Severe BTC underperformance	BTC has lost dramatically relative to industrial metals.

07 READING GUIDANCE, QUALITY CONTROL AND GOVERNANCE

STRUCTURAL FEATURES, SCOPE AND LIMITATIONS

The basket carries structural features that the headline mechanically reflects but that readers should not read as a Bitcoin signal; the benchmark discloses rather than adjusts for them. Roughly half of global refined industrial-metals consumption is in China, so headline moves driven by Chinese property, infrastructure, stimulus or stockpile policy reflect China-specific dynamics. Copper and aluminum together carry 65% of the weight, so the basket tracks these two closely while nickel, zinc, lead and tin add breadth rather than equal influence. Since 2020 the economic reading has shifted with the energy transition, which lifts copper, aluminum and nickel demand expectations in particular. LME-listed metals are sensitive to warehouse stocks, queues and rent dynamics that create financial-market effects the basket inherits; Russian aluminum (Rusal) and nickel (Norilsk) exposure has produced persistent post-2022 dislocations, reinforced by LME restrictions on Russian metal in 2024; and individual metals are exposed to single-mine and single-country shocks that can move a component double digits in a week. The March 2022 LME nickel suspension is a documented discontinuity handled through the missing-component rule. The benchmark anchors to LME prices throughout, with parallel SHFE pricing kept out of the headline.

The basket is a fixed-weight, price-relative index of six LME Cash Official references — not a tradable instrument and not a commodity total-return index, so the headline reflects price change only, with no warehouse rent, contango or backwardation effects. Most weekly variance is BTC-led, though the metals contribute meaningfully, nickel especially. Lithium, cobalt and iron ore are excluded for liquidity or pricing-convention reasons. The level is mechanically dependent on the fixed, disclosed base date, and the weekly cadence captures intraweek events only at the next Friday observation.

QUALITY CONTROL AND MAINTENANCE

On every publication each LME Cash Official price is cross-checked between the LME direct feed and Bloomberg or Refinitiv, with any discrepancy beyond 0.10% triggering manual review; each metal is validated as USD per metric tonne against its contract specification and confirmed to have produced a valid second-ring Cash Official; the single Friday alignment and USD denomination are confirmed; and the series is checked for missing weeks, duplicates and consistent base-date application, with each release archived with source and computed values, the layer and any reweighting flags. A weekly headline change of 12% or more, or a single-metal daily change of 10% or more — a higher threshold than the agriculture basket's 8%, reflecting nickel's structurally higher volatility — forces re-verification against tier-2 sources before publication. For stale prices, two consecutive unchanged Cash Official values are flagged, three trigger manual review against the LME bulletin, and five exclude the metal for that week; a documented suspension is treated as a gap, not an outlier. Composition and weights are reviewed in the first two weeks of January, with no change as the default unless a documented improvement in representativeness or liquidity can be shown. A component is replaced if its 90-day LME volume falls below the floor for 90 consecutive trading days, if the LME delists it or makes a material rule change, or if it fails the quality controls for three consecutive months; lithium and cobalt may be added at a future review once their liquidity and history reach the eligibility floor. Any change outside the missing-component rule is applied prospectively, with no restatement of past headline values.

REVISIONS, VERSIONING AND LEGAL NOTE

A material revision is a change of 0.5 index points or more to a published headline, or any methodology change that would have produced such a difference; smaller corrections are archived without public notice. Revisions are triggered by republished or corrected LME prices, a unit or contract-specification error, a calendar-alignment error, a stale-data violation, an undisclosed source-tier fallback, or republication of a suspension or cancellation after retrospective settlement. This is the inaugural publication, Version 1. Any change to the base date, the primary BTC source, the basket composition or weights, the LME reference, the reweighting rule or the headline formula is a material methodology change, carrying at least 30 calendar days' public notice, a parallel-published transition of at least four weeks, a versioned changelog entry and a new version number. The benchmark draws on the LME Rulebook and on diversified industrial-metals index conventions for reference selection and timestamp discipline, and on the CF Benchmarks BRR for the BTC leg, but is a proprietary indicator — not an official statistic, a regulated benchmark, an investable index or a price-formation reference, and not IOSCO-aligned. LME Cash Official prices are used under applicable terms; the LME does not endorse this benchmark and has no responsibility for it. The methodology, tables and historical series are proprietary to BitBullMedia Pte. Ltd.; full-series redistribution, replication, cloning, resale or commercial republication requires prior written permission. Nothing here is investment, legal, accounting or tax advice, and users are responsible for complying with the source providers' terms.