

# BTC / COPPER BENCHMARK

## PUBLIC METHODOLOGY

**A weekly relative-performance series** that measures Bitcoin against copper, the market's flagship cyclical industrial commodity. The headline is a rebased ratio of a Bitcoin price index over a back-adjusted continuous COMEX High-Grade Copper price index, anchored to a fixed base date. It shows whether Bitcoin is gaining or losing strength against a real-economy industrial-demand reference — manufacturing, grid build-out and electrification — rather than only against financial assets.

|                             |                                                                                                |
|-----------------------------|------------------------------------------------------------------------------------------------|
| Benchmark family            | BBN Benchmarks · Bitcoin Macro Benchmarks                                                      |
| Benchmark name              | BBN BTC / Copper Benchmark                                                                     |
| Primary objective           | Measure Bitcoin's relative performance versus copper as a cyclical industrial-demand reference |
| Update frequency            | Weekly — one end-of-week observation                                                           |
| Headline unit               | Base-100 BTC-to-copper rebased ratio                                                           |
| Headline bounds             | Unbounded above; bounded below by zero (copper is structurally positive)                       |
| Base date / value           | Tuesday, 2 January 2018 · headline = 100.00                                                    |
| Copper reference            | COMEX High-Grade Copper (HG), back-adjusted continuous, USD/lb                                 |
| Copper fallback             | LME Copper Grade A Cash (Official 12:55 London), USD/MT converted to USD/lb                    |
| 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 copper since the base date; below 100 means copper has 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 copper have moved by identical proportional amounts since 2 January 2018.

### POSITIONING

This is the single-flagship industrial-metal signal in the BBN Bitcoin Macro Benchmarks family — a proprietary, directional benchmark for editorial, research and commercial data use. 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 intermarket question: is Bitcoin gaining or losing strength against the cyclical industrial-demand complex, measured from a fixed historical anchor? Where gold compares Bitcoin with a monetary hard asset, copper compares it with cyclical industrial demand — useful when readers want to know whether Bitcoin is leading or lagging a traditional real-economy reference rather than another financial or digital asset.

| ELEMENT                         | WHAT IS MEASURED                                                                                                                               |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BTC leg</b>                  | U.S. dollar price of Bitcoin from the CME CF Bitcoin Reference Rate (BRR) — an institutional-quality reference price.                          |
| <b>Copper leg</b>               | Back-adjusted continuous front-month price of COMEX High-Grade Copper (HG), in U.S. dollars per pound.                                         |
| <b>Headline benchmark</b>       | BTC price index ÷ copper price index, both rebased to 100 on 2 January 2018, then multiplied by 100.                                           |
| <b>Weekly change</b>            | Week-on-week percentage change in the headline — a momentum and outlier-review diagnostic.                                                     |
| <b>Pounds of copper per BTC</b> | BTC price ÷ copper price, published for scale reference only — a constant multiple of the headline that cannot disagree with it directionally. |

## 02 COPPER LEG SPECIFICATION

The headline uses one named contract and one named back-adjustment method, to preserve comparability across time.

| ELEMENT              | SPECIFICATION                                                                              |
|----------------------|--------------------------------------------------------------------------------------------|
| <b>Contract</b>      | COMEX High-Grade Copper (HG), CME Group — COMEX division.                                  |
| <b>Quoted unit</b>   | U.S. cents per pound, stored as U.S. dollars per pound.                                    |
| <b>Contract size</b> | 25,000 pounds of Grade 1 Electrolytic copper.                                              |
| <b>Settlement</b>    | Daily settlement 13:00 Eastern Time, normally published 13:30 ET.                          |
| <b>Active months</b> | March, May, July, September and December (H, K, N, U, Z) — the traditional COMEX HG cycle. |

The weekly series is a back-adjusted continuous price built from the active front-month contract using the Panama (ratio-preserving) method: the roll occurs five trading days before First Notice Day, the active month is the next traditional COMEX month in the cycle (non-traditional months are skipped), and on each roll all historical prices of the rolled-out contract are shifted by the price difference to the rolled-in contract at the roll-date close. This preserves percent changes across rolls and prevents artificial jumps; no smoothing or look-back averaging is applied. When COMEX HG settlement is unavailable, the fallback is the LME Copper Grade A Cash Official price (12:55 London), quoted in USD per metric tonne and converted to USD per pound by dividing by 2,204.62; the substitution is logged in the release note. Both contracts are USD-denominated, so no FX conversion enters the headline.

### 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 — the same source as the other Bitcoin Macro Benchmarks — with BRRNY and then a Bloomberg Bitcoin index as fallbacks. The copper leg uses the COMEX HG official settlement (Panama back-adjusted continuous), with the converted LME Cash price and then a Bloomberg or Refinitiv continuous series as fallbacks. SHFE copper (CNY-denominated), spot physical premia, regional cash markets, ETF NAVs and copper-mining equities are never eligible for the headline.

## 03 OBSERVATION RULE AND CALENDAR

Bitcoin trades continuously while COMEX HG settles on the CME Group calendar, so the benchmark fixes a common weekly observation with explicit timestamps for each leg.

| ELEMENT                   | SPECIFICATION                                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Observation day</b>    | Friday.                                                                                                                                              |
| <b>BTC timestamp</b>      | CME CF BRR fix, 16:00 London time.                                                                                                                   |
| <b>Copper timestamp</b>   | COMEX HG daily settlement, 13:00 ET (normally published 13:30 ET).                                                                                   |
| <b>Fallback timestamp</b> | LME Copper Grade A Cash Official price, 12:55 London time.                                                                                           |
| <b>Alignment</b>          | Both legs are taken on the same calendar Friday; the sequential New York and London windows reflect one business day. Both legs are USD-denominated. |

If copper is unavailable on Friday, the converted LME Cash price is used for the same Friday; if LME is also unavailable, the nearest prior valid COMEX HG settlement is used with the BTC leg moved to match. If Bitcoin is unavailable, BRRNY is used; if both BRR and BRRNY fail, the observation moves to the nearest prior Friday with a valid BRR and copper is aligned to it. If both legs are unavailable, the week is deferred and no headline is published. A forward-fill of either leg beyond five calendar days is not permitted; past that point the week is treated as missing.

## 04 CALCULATION METHODOLOGY

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

### STEP 1 – BTC PRICE INDEX

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

### STEP 2 – COPPER PRICE INDEX

$$\text{CopperIndex}(t) = 100 \times \text{HG}(t) \div \text{HG}(\text{base})$$

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

closed form:  $100 \times [\text{BRR}(t) / \text{BRR}(0)] \div [\text{HG}(t) / \text{HG}(0)]$  · equals 100 on the base date; bounded below by zero, unbounded above

### WEEKLY HEADLINE CHANGE

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

### AUXILIARY DIAGNOSTIC – POUNDS OF COPPER PER BTC

$$\text{CopperPerBTC}(t) = \text{BRR}(t) \div \text{HG}(t)$$

## PUBLICATION LAYERS

Every weekly release falls into exactly one layer. **Full** publication requires the BTC leg from tier-1 BRR and the copper leg from the primary COMEX HG settlement, with no fallback and a forward-fill of at most one day; it carries the headline, weekly change, the copper-per-BTC diagnostic and a release note. **Provisional** applies when either leg uses a tier-2 fallback (BRRNY or Bloomberg for BTC, LME Cash for copper) or is forward-filled by two to five days; the same outputs are published with a “Provisional” label and a deviation note, and may be revised when the primary source returns. **No publication** applies when either leg is unavailable beyond the five-day limit or a verified source error is unreconciled; 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.

| INPUT            | VALUE                               | SOURCE                             |
|------------------|-------------------------------------|------------------------------------|
| Observation date | Friday, 14 June 2024 (illustrative) | Standard weekly Friday             |
| BRR(t)           | \$66,250.00                         | CME CF BRR, 16:00 London           |
| BRR(base)        | \$13,412.44                         | 2 January 2018 anchor              |
| HG(t)            | \$4.55/lb                           | COMEX HG continuous, 14 June 2024  |
| HG(base)         | \$3.27/lb                           | 2 January 2018 COMEX HG continuous |

### STEP 1 – BTC INDEX

$$100 \times 66,250.00 \div 13,412.44 = 493.94$$

### STEP 2 – COPPER INDEX

$$100 \times 4.55 \div 3.27 = 139.14$$

$$\text{Headline} = 100 \times 493.94 \div 139.14 = 354.99$$

### DIAGNOSTIC – POUNDS OF COPPER PER BTC

$$66,250.00 \div 4.55 = 14,560.44 \text{ lb } (\approx 6.6 \text{ metric tonnes})$$

A reading of 354.99 means that since the anchor Bitcoin has appreciated by about 4.94× while copper has appreciated by about 1.39×, so Bitcoin has outperformed copper by roughly 3.55× over the period — the headline divided by 100 expresses that ratio. This places the benchmark in the “Strong BTC outperformance versus copper” band, and the diagnostic shows that one Bitcoin currently represents about 14,560 pounds (6.6 metric tonnes) of refined copper at COMEX settlement prices.

## 06 INTERPRETATION FRAMEWORK

The benchmark does not claim Bitcoin is outperforming the real economy; it says Bitcoin is gaining or losing strength relative to refined copper, the flagship industrial-cycle commodity, since the base date. A rising headline means BTC is gaining against cyclical industrial-demand exposure; a falling headline means that exposure is leading BTC. The four price combinations distinguish whether risk appetite is strong enough to outpace cyclical inflation, whether industrial-cycle strength or a rotation into physical assets is pulling capital from BTC, whether digital-asset demand is outperforming a softening industrial complex (possibly a late-cycle signal), or whether a broad risk-off is dragging both lower.

### BTC-DOMINANT VOLATILITY

Bitcoin runs at roughly 60–80% annualized volatility against copper's 22–28%, so almost all weekly headline variance is driven by the BTC leg. A 5% weekly headline move is far more likely to be a Bitcoin move than a copper move; the underlying BTC and copper prices 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 roughly three times copper'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 copper since the base. |
| 250 – <500  | Strong BTC outperformance     | Pronounced BTC strength relative to copper.                       |
| 150 – <250  | Moderate BTC outperformance   | BTC has clearly outpaced copper.                                  |
| >100 – <150 | Slight BTC outperformance     | BTC has marginally outperformed copper.                           |
| 100         | On the base-date anchor       | Identical proportional moves since the base.                      |
| 75 – <100   | Slight BTC underperformance   | Copper has tightened slightly faster than BTC has risen.          |
| 40 – <75    | Moderate BTC underperformance | Copper has materially outpaced BTC.                               |
| 20 – <40    | Strong BTC underperformance   | Pronounced relative weakness of BTC versus copper.                |
| < 20        | Severe BTC underperformance   | BTC has lost dramatically relative to copper.                     |

## 07 READING GUIDANCE, QUALITY CONTROL AND GOVERNANCE

### STRUCTURAL FEATURES THE HEADLINE REFLECTS

Copper 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-copper consumption is in China, so headline moves driven by Chinese property, infrastructure, electrification or stockpile policy reflect China-specific dynamics. Copper is sensitive to single-mine and single-country supply events — Codelco strikes, mine closures, political disruption in Peru, Zambia or Indonesia — that can produce double-digit weekly moves unrelated to Bitcoin. It is also a financialized market, with LME warehouse stocks, fund positioning, commodity-financing deals and inter-exchange arbitrage all contributing to weekly price formation, and since 2020 a growing share of its variation reflects electric-vehicle, renewable-energy and grid-build-out demand expectations, which shifts the economic interpretation across periods. Because the series is back-adjusted continuous, it reflects pure price change net of roll and is not a tradable total-return reference.

### QUALITY CONTROLS AND OUTLIER HANDLING

On every publication, the COMEX HG settlement is cross-checked against the tier-2 Bloomberg or Refinitiv feed (a discrepancy beyond 0.25% triggers manual review); the copper unit is validated as USD per pound, with any LME fallback validated as USD per metric tonne and converted at the documented factor; every roll is logged with the rolled-out and rolled-in months, the back-adjustment factor and the close prices; 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 appended to an immutable archive. A weekly

headline change of 12% or more, or a single-leg daily change of 8% or more, forces re-verification against tier-2 sources before publication. For stale prices, two consecutive unchanged settlements are flagged, three trigger manual review against the exchange bulletin, and five exclude the leg for that week, after which the substitution chain applies.

## REVISIONS AND VERSIONING

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 exchange data, a unit or contract-specification error, an incorrect roll execution, a calendar-alignment error, a stale-data violation, or an undisclosed source-tier fallback. This is the inaugural publication, Version 1. Any change to the base date, the primary BTC source, the primary copper contract, the back-adjustment method 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. Non-substantive editorial edits are made without notice but recorded in the archive.

## SCOPE, LIMITATIONS AND LEGAL NOTE

This is a single-commodity macro pair, so it has no internal diversification and is fully exposed to copper's idiosyncratic shocks; it is not a clean read on global industrial activity, since copper price formation also reflects financialization, fund positioning, LME warehouse dynamics and China-specific policy. It is a directional indicator, not a tradable spread and not a commodity total-return index — the headline reflects price change only, with no collateral, roll, storage or contango/backwardation effects. Most weekly variance reflects Bitcoin rather than copper; the basket embeds heavy China-demand concentration and a post-2020 energy-transition tilt; the primary contract trades on a U.S. exchange, so U.S. price discovery dominates even for a globally consumed commodity (the LME fallback only partly mitigates this); the level is mechanically dependent on the fixed, disclosed base date; and the weekly cadence captures intraweek events only at the next Friday. Within the BBN macro-pair family this is the only benchmark comparing Bitcoin to a single flagship cyclical industrial commodity, serving as the single-flagship signal ahead of a planned broader Industrial Metals Basket. It is informed by the COMEX HG and LME copper rulebook conventions and the CF Benchmarks BRR for contract, roll and timestamp discipline, but is a proprietary indicator — not an official statistic, a regulated benchmark, an investable index or a price-formation reference, and not IOSCO-aligned. Its 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.