Bone broth: HMTc Standard

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CORRESPONDENCE

Corrections are logged publicly on the article page, each with its date, the affected value, and the source that resolved it.

KEYWORDS

heavy metals, food safety, dietary exposure

PUBLICATION HISTORY

This revision 2026-08.

Abstract

The Heavy Metal Tested & Certified heavy-metal-safety standard for bone broth — long-simmered animal-bone and connective-tissue stock (Prepared and Packaged Meals), evaluated as consumed. Each limit is a disclosed read-across from the strictest credible-government maximum level for the product's principal animal components: lead 100 (FSANZ meat), cadmium 50 (EU meat), total mercury 50 (Hong Kong Cap 132V meat of animal). Where no government regulates a component the analyte is a mandatory control, and the species cells (inorganic arsenic, methylmercury, hexavalent chromium) are substantiated not-material determinations bounded by their measured total.

1 | How every number on this standard is set

HMTc Method v2.0 (government-limit default; COMPOSITE — disclosed read-across from strictest applicable principal-component sovereign ML; never occurrence-derived)

2 | Master limit table

All values in ppb (µg/kg), as consumed basis. A brand meeting every value qualifies for the mark.

ANALYTE	HMTC LIMIT	BASIS
Lead (Pb)	100	read-across (Australia / New Zealand)
Cadmium (Cd)	50	read-across (EU 2023/915)
Total arsenic (tAs)	500	read-across (Hong Kong)

Inorganic arsenic (iAs)	n/m	not material in this matrix
Mercury, total (tHg)	50	read-across (Hong Kong)
Methylmercury (MeHg)	n/m	not material in this matrix
Nickel (Ni)	control	measured every lot; no human-food maximum
Tin (Sn)	control	measured every lot; no human-food maximum
Aluminium (Al)	control	measured every lot; no human-food maximum
Total chromium (Cr)	1,000	screening ceiling (Hong Kong)
Hexavalent chromium (Cr-VI)	n/m	not material in this matrix

3 | Derivation — where each number comes from

Every cell traces to one named sovereign maximum level (the strictest for the nearest analog), or to an explicit control, not-material, or species-bounded determination. No occurrence statistic selects a certification value.

ANALYTE	HMTC	SOVEREIGN ANALOG / DETERMINATION
Lead (Pb)	100	read-across (Australia / New Zealand)
Cadmium (Cd)	50	read-across (EU 2023/915)
Total arsenic (tAs)	500	read-across (Hong Kong)
Inorganic arsenic (iAs)	n/m	There is no inorganic-arsenic source in a terrestrial-animal bone broth: no rice, no marine bioaccumulation, and no arsenical-treated plant component. Inorganic arsenic is bounded by the PUBLISHED total-arsenic ceiling of 500 ug/kg on the tAs cell (iAs <= tAs), and reflex speciation is triggered rather than waived. Fish-bone broth (rare) inherits the Category 6 seafood inorganic-arsenic ceiling.
Mercury, total (tHg)	50	read-across (Hong Kong)

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Methylmercury (MeHg)	n/m	Methylmercury has no formation pathway in a terrestrial-animal bone broth and is a component of total mercury (MeHg <= tHg). It is bounded by the total-mercury cell. Only a seafood-derived bone broth carries a methylmercury pathway, and that inherits the Category 6 seafood ceiling.
Nickel (Ni)	control	No credible regulator sets a nickel maximum level for meat, bone, offal or animal-derived stock. Instruments checked: Commission Regulation (EU) 2024/1987 amending 2023/915, whose nickel maximum levels are plant-matrix only (fruiting vegetables 400, brassica 500, leafy vegetables 500, fruit/vegetable juices and nectars 250, cereals 800, root/tuber/bulb vegetables 900, legume vegetables 1000, pulses 4000, chocolate and cocoa products 2500 to 7000 ug/kg) plus infant-scoped rows that are Category 1 scope; EU 2023/915 itself (no nickel entry before the 2024/1987 amendment); Codex CXS 193 (no nickel entry); FSANZ Schedule 19 (no nickel entry); Hong Kong Cap. 132V Part 2 Schedule, whose only nickel rows are packaged-drinking-water and natural-mineral-water parametric values (70 and 20 ug/kg) in a different basis family that this row's basis_guard refuses; US FDA (bottled-water parametric value 100 ug/kg only); Health Canada and UK dietary instruments (no nickel ML). v1.2 CORRECTS A CITATION ERROR: v1.1 attributed the nickel maximum levels to 'EU 2024/1252', an unrelated instrument. Every nickel row in the register is Commission Regulation (EU) 2024/1987 (regulation_page regulations/eu-2024-1987--nickel-maximum-levels). The substantive conclusion is unchanged and was independently re-verified: every credible nickel food row is plant-matrix, infant formula, baby food or chocolate, so none reaches an animal-derived stock and no near-neighbour read-across is supportable. Nickel is therefore a mandatory reported cell with no invented ceiling; claim analyte. INGREDIENT-WATER RULING, and a correction to what the basis_guard can actually do. The Cap. 132V packaged-drinking-water and natural-mineral-water rows sit in the SAME basis string as Cap.

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Tin (Sn)	control	Inorganic tin is a tinplate migration pathway confined to the canned form; carton (RTD), frozen and refrigerated bone broth have no tin source, so no ceiling is asserted for them. A CANNED bone broth is verified against the canned-foods tin ML, on which three credible regulators converge at 250 mg/kg (250000 ug/kg): Codex CXS 193 (canned foods), FSANZ Schedule 19 (all canned foods) and HK Cap. 132V (canned food other than canned beverages). Instruments checked for a non-canned form: EU 2023/915 (tin appears only as canned-food and canned-beverage MLs), Codex CXS 193, FSANZ Schedule 19, Cap. 132V, US FDA, Health Canada and UK dietary instruments; none sets a tin maximum level for a broth outside a can. The Cap. 132V canned-beverage row (150 mg/kg) is stricter but is not adopted: a ready-to-drink carton broth is not a canned beverage and has no tinplate contact. THE STRICTEST APPLICABLE CANNED-FOOD TIN ML IS THE EU ROW AT 200 mg/kg, NOT THE 250 mg/kg FIGURE v1.1 NAMED. Commission Regulation (EU) 2023/915 sets tin at 200000 ug/kg (200 mg/kg) for canned foods other than canned beverages, except canned dried and canned powdered products (eu2023_sn_canned_foods_-200000, basis product as placed on the market). It is stricter than the three rows v1.1 named as converging at 250 mg/kg (codex_cxs193_sn_canned_-250000, aunz_sch19_sn_canned_250000, hk_cap132v_sn_canned-food--other-than-canned-beverages_-250000), it is a credible-regulator maximum level in a basis this row accepts, and it was neither named nor dispositioned. This defect was found by hand during the v1.2 remediation and NOT by the compiler safety-net, because the soups row's audit_exclude_scope contained the term beverage, which matched the phrase 'canned beverages' inside the EU row's own scope string and suppressed it from every scan; the same class of regex self-defeat the v1.2 audit identified elsewhere. The term is removed. The canned form is verified against the EU

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Aluminium (Al)	control	No credible regulator sets an aluminium maximum level for bone broth, for any animal-derived stock, or for any animal-tissue component of one. Instruments checked: EU 2023/915 and EU 2024/1987 (no aluminium entry), Codex CXS 193 (no aluminium entry), FSANZ Schedule 19 (aluminium appears only as infant-formula MLs of 500 and 1000 ug/kg, which are Category 1 scope), Hong Kong Cap. 132V Part 2 Schedule (no aluminium entry), and US FDA, Health Canada and UK dietary instruments (no aluminium ML). Aluminium reaches the credible register only in basis families that cannot anchor a food-content cell: drinking-water parametric values (EU 2020/2184 and US 21 CFR 165.110 at 200 ug/L, Health Canada at 2900 ug/L), food-contact-material specific migration limits (EU 10/2011, a migration figure into a simulant), and toy migration limits. Permitted-additive maxima for aluminium-containing additives exist only in non-credible-tier instruments and are additive-use levels rather than contaminant ceilings. Aluminium is therefore a mandatory reported cell with no invented ceiling; claim analyte.
Total chromium (Cr)	1,000	screening ceiling (Hong Kong); Meat of animal
Hexavalent chromium (Cr-VI)	n/m	Hexavalent chromium is reduced to Cr-III in a cooked, wet, protein-rich broth; a Cr-VI result is an artifact of the total-chromium screen. No credible regulator sets a Cr-VI food ML.

4 | Cite this standard

Pendergrass, K. (2026). *Bone broth: HMTc standard*. Institute of Contaminant Standards.

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References

[1] Australia / New Zealand
Binds Pb.
READ-ACROSS

[2] EU 2023/915
Binds Cd.
READ-ACROSS

[3] Hong Kong
Binds tAs, tHg, Cr.
MAXIMUM LEVEL

STATUS AND LICENCE

A normative certification standard, editorially reviewed and version-controlled in-house; every value traces to a named sovereign maximum level, disclosed in the derivation. © 2026 Institute of Contaminant Standards / Heavy Metal Certified. All rights reserved.

DATA AVAILABILITY

The works this standard draws on are listed in full in the references above and on the standard page at https://heavymetalcertified.com/standards/bone-broth. Primary legal instruments and expert-body assessments are named with their public identifiers; the underlying occurrence and toxicology corpus is maintained on the Heavy Metal Index.

COMPETING INTERESTS

This standard is published by the Heavy Metal Tested & Certified (HMTc) program, operated by the Institute of Contaminant Standards. Its statements about government regulations, toxicology, and occurrence are sourced to the cited primary and expert-body records and to the independently maintained Heavy Metal Index; the program's own certification thresholds are not used as evidence for any factual claim made here.

PUBLICATION HISTORY

This revision 2026-08. The full dated record is maintained at https://heavymetalcertified.com/standards/bone-broth.