Beef: HMTc Standard

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CORRESPONDENCE

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KEYWORDS

heavy metals, food safety, dietary exposure

PUBLICATION HISTORY

This revision 2026-08.

Abstract

The Heavy Metal Tested & Certified heavy-metal-safety standard for beef in Meat, Poultry, and Eggs, evaluated on as sold, raw or cooked edible portion (wet weight); bone and inedible fat excluded; no dry-to-wet or reconstitution conversion is performed. 4 of 11 panel analytes publish a numeric limit taken from the strictest applicable government maximum; the remainder are held under mandatory control or a substantiated not-material determination.

1 | How every number on this standard is set

HMTc Method v2.0 (government-limit-only initial setting: the strictest applicable sovereign maximum level for this exact product form in its native basis; disclosed read-across where the exact cell is unregulated; control where neither a sovereign number nor a supportable near-neighbour analogue exists; never occurrence-derived)

2 | Master limit table

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

ANALYTE	HMTC LIMIT	BASIS
Lead (Pb)	100	government maximum level (Hong Kong)
Cadmium (Cd)	50	government maximum level (EU 2023/915)

Total arsenic (tAs)	500	government maximum level (Hong Kong)
Inorganic arsenic (iAs)	control	measured every lot; no human-food maximum
Mercury, total (tHg)	50	government maximum level (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	government maximum level (Hong Kong)
Cadmium (Cd)	50	government maximum level (EU 2023/915)
Total arsenic (tAs)	500	government maximum level (Hong Kong)

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Inorganic arsenic (iAs)	control	No credible sovereign government sets an inorganic-arsenic maximum level for terrestrial red-meat muscle tissue. Every credible inorganic-arsenic instrument on the register is scoped elsewhere: EU 2023/915 and EU 2025/1891 to rice, rice products, fruit juices, infant food and seafood; UK, Health Canada and US FDA to rice-based and juice matrices; Hong Kong Cap. 132V to rice and aquatic animals. A NOT-MATERIAL determination is deliberately REJECTED for this cell rather than adopted for convenience: organoarsenical feed additives (roxarsone, nitarsone, arsanilic acid, carbarsone) were lawfully administered to poultry and swine in major producing markets within living memory and are documented to leave arsenic residues in edible tissue, so the programme will not make the affirmative claim that no inorganic-arsenic pathway exists in terrestrial animal food. For the ruminant rows, where no equivalent additive history applies, the absence of that pathway does not by itself substantiate a not-material determination either, because neither a sovereign number nor a supportable near-neighbour analogue exists for the cell in any case. Because no sovereign number governs the cell and no near-neighbour cell is a supportable analogue (a rice or seafood inorganic-arsenic maximum level describes a different contamination mechanism entirely), the cell is a control: testing is mandatory and no ceiling is invented.
Mercury, total (tHg)	50	government maximum level (Hong Kong)

Methylmercury (MeHg)	n/m	Methylmercury is formed by microbial methylation in aquatic sediment and biomagnifies through aquatic food webs. Terrestrial red meat carries no methylation pathway and no aquatic trophic transfer, and methylmercury is in any event a component of total mercury (MeHg <= tHg), so it is bounded by and controlled through the published total-mercury cell (50 ug/kg total mercury, Hong Kong Cap. 132V). No separate methylmercury ceiling is published because none would bind below the total-mercury ceiling and none is set by any credible sovereign government for this product form.
Nickel (Ni)	control	No credible sovereign government sets a nickel maximum level for meat of cattle, pig, goat, sheep or any other terrestrial mammal. The EU nickel maximum levels recorded on the register (the eu2024_ni_* family) are drawn exclusively over plant matrices — cereals, pulses, legume, leafy and root vegetables, tree nuts, oilseeds, cocoa — and the only other credible nickel values are drinking-water statutory limits and a food-contact specific-migration limit, both in bases that cannot govern the content of a food. A plant-commodity nickel maximum level is not a supportable near-neighbour for animal muscle tissue, which accumulates nickel by a different route and at a different order of magnitude, so no read-across is available and no ceiling is invented.

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Tin (Sn)	control	Inorganic tin in food is a tinplate-packaging pathway: tin migrates into the food from the internal surface of an unlacquered or damaged tinplate can, which is why every credible sovereign tin maximum level on the register is written against canned food rather than against the food itself. Fresh, chilled, frozen and vacuum- or modified-atmosphere-packed red meat is not packed in tinplate, so the pathway that the canned-food maximum levels exist to control is absent and no sovereign number governs the cell. A lot of this product form that is retorted or packed in a metal can is not certified against this row at all: it is certified against the canned-meats row, whose tin cell carries the binding canned-foods maximum level. No tin ceiling is invented for the non-canned form.
Aluminium (Al)	control	No credible sovereign government sets an aluminium maximum level for meat, poultry, game or eggs. The credible aluminium values on the register are drinking- and bottled-water statutory limits (EU 2020/2184, US FDA 21 CFR 165.110, Health Canada), a food-contact specific-migration limit (EU 10/2011), toy element-migration limits, and the FSANZ Schedule 19 aluminium maximum levels for infant formula. None can anchor this row: the water and migration values are in a different basis, and an adult food must not borrow an infant-formula maximum level (products marketed for ages 0-5 route to Category 1 by the taxonomy boundary rule). No read-across is supportable and no ceiling is invented.
Total chromium (Cr)	1,000	screening ceiling (Hong Kong)

Hexavalent chromium (Cr-VI)	n/m	Hexavalent chromium is not stable in this matrix. Raw and cooked red-meat muscle tissue is a wet, reducing, protein- and thiol-rich medium; Cr(VI) is reduced to Cr(III) by tissue reductants (cysteine, glutathione, ascorbate) and by the acid and heat of digestion and cooking, so a Cr(VI) figure reported on such a matrix is an artifact of the extraction chemistry of the total-chromium screen rather than a measurement of a species that persists in the food. The determination follows the same reference-method adjudication recorded for the hexavalent-chromium cell in the infant-formula category (data/workbench standards Cr-VI adjudication), applied here to an animal-tissue matrix. Hexavalent chromium is in any event a species of, and bounded by, the published total-chromium screen (Cr-VI <= total Cr).

4 | Cite this standard

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

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References

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

[2] EU 2023/915
Binds Cd.
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.

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.

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/beef-product. 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.

PUBLICATION HISTORY

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