

Mixed and prepared meals (frozen dinners, boxed meals, ready-to-eat): HMTc Standard

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heavy metals, food safety, dietary exposure

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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.

Abstract

The Heavy Metal Tested & Certified heavy-metal-safety standard for mixed and prepared meals (frozen dinners, boxed meals, ready-to-eat) in Prepared and Packaged Meals, evaluated on as consumed / ready-to-eat (wet weight). A composite meal has no sovereign maximum of its own, so 6 of 11 panel analytes publish a disclosed read-across from the strictest applicable principal-component 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 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	TIER	HMTc LIMIT	BASIS
Lead (Pb)	Tier 1	20	human-grade read-across ()
Cadmium (Cd)	Tier 1	40	human-grade read-across ()

Total arsenic (tAs)	Tier 2	500	human-grade read-across ()
Inorganic arsenic (iAs)	Tier 1	50	human-grade read-across ()
Mercury, total (tHg)	Tier 1	10	human-grade read-across ()
Methylmercury (MeHg)	Tier 1	control	measured every lot; no human-food maximum
Nickel (Ni)	Tier 2	400	human-grade read-across ()
Tin (Sn)	Tier 2	control	measured every lot; no human-food maximum
Aluminium (Al)	Tier 2	control	measured every lot; no human-food maximum
Total chromium (Cr)	Tier 2	500	screening ceiling (Hong Kong)
Hexavalent chromium (Cr-VI)	Tier 2	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 - /
Lead (Pb)	20	human-food analog
Cadmium (Cd)	40	human-food analog
Total arsenic (tAs)	500	human-food analog
Inorganic arsenic (iAs)	50	human-food analog
Mercury, total (tHg)	10	human-food analog
Methylmercury (MeHg)	control	No credible sovereign government sets a methylmercury maximum level for this product form: authors2025-the-icp-ms-study--on-the-release-of and hwang2022-home-meal--replacement-heavy-metals measured methylmercury in this matrix, so the species is not absent and no not-material determination is supportable. Methylmercury is therefore held under mandatory analytical control rather than recorded not-material, and it remains bounded by identity below the published total-mercury ceiling of 10 ug/kg for this row (methylmercury cannot exceed total mercury). No methylmercury ceiling is invented. INSTRUMENTS CHECKED, so the negative claim is auditable: EU 2023/915 (no methylmercury entry); Codex CXS 193 (none); FSANZ Schedule 40 (none); Health Canada and UK dietary instruments (none); US FDA CPG 540.600, which sets a

Nickel (Ni)	400	— human-food analog
Tin (Sn)	control	Inorganic tin is a tinplate/canned-food migration pathway, not a background dietary contaminant of a frozen or boxed meal. A CANNED prepared meal (canned ravioli, canned chili) is governed by the canned-foods tin ML (Codex CXS 193, 250 mg/kg = 250000 ug/kg); a frozen, chilled, or dry-packaged prepared meal has no tin source. Total tin is reported; a signal on a non-canned form triggers packaging-source investigation. 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 value, and the EU instrument's own carve-out for canned dried and canned powdered products is independent confirmation that a tin maximum level does not reach a dry soup mix or a bouillon powder. Stricter still, and disclosed rather than adopted because they reach a different form: canned beverages at 100 mg/kg (eu2023_sn_canned_beverages_-

Aluminium (Al)	control	No credible regulator sets an aluminium maximum level for a prepared meal or for any principal 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 three 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), and toy migration limits. Permitted-additive maxima for aluminium-containing additives in baked goods and starch noodles 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.
Total chromium (Cr)	500	government maximum level
Hexavalent chromium (Cr-VI)	n/m	Hexavalent chromium is not stable in a cooked, wet, organic-rich food matrix: it is reduced to trivalent chromium (Cr-III) by the food's reducing environment during cooking and digestion. A Cr-VI result in prepared food is a measurement artifact of the total-chromium screen, not a real exposure. No credible regulator sets a Cr-VI food ML.

4 | Cite this standard

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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 reference draws on are listed in full in the references above and on the briefing page at <https://heavymetalcertified.com/standards/mixed-meals-prepared-foods>. 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 briefing 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/mixed-meals-prepared-foods>.