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

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CORRESPONDENCE

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KEYWORDS

heavy metals, food safety, dietary exposure

PUBLICATION HISTORY

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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	HMTC LIMIT	BASIS
Lead (Pb)	20	read-across (Hong Kong)
Cadmium (Cd)	40	read-across (EU 2023/915)

Total arsenic (tAs)	500	read-across (Hong Kong)
Inorganic arsenic (iAs)	50	read-across (European Union)
Mercury, total (tHg)	10	read-across (Hong Kong)
Methylmercury (MeHg)	control	measured every lot; no human-food maximum
Nickel (Ni)	400	read-across (EU 2024/1987)
Tin (Sn)	control	measured every lot; no human-food maximum
Aluminium (Al)	control	measured every lot; no human-food maximum
Total chromium (Cr)	500	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)	20	read-across (Hong Kong)
Cadmium (Cd)	40	read-across (EU 2023/915)
Total arsenic (tAs)	500	read-across (Hong Kong)
Inorganic arsenic (iAs)	50	read-across (European Union)
Mercury, total (tHg)	10	read-across (Hong Kong)
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 19 (none); Health Canada and UK dietary instruments (none); US FDA CPG 540.600, which sets a methylmercury action level of 1000 ug/kg for fish, shellfish, crustaceans and other aquatic animals but not for a composite

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Nickel (Ni)	400	read-across (EU 2024/1987)
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_-

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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	screening ceiling (Hong Kong); Vegetables, other than pulses
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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References

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

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

[3] EU 2024/1987
Binds Ni.
READ-ACROSS

[4] European Union
Binds iAs.
READ-ACROSS

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/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.

PUBLICATION HISTORY

This revision 2026-08. The full dated record is maintained at https://heavymetalcertified.com/standards/mixed-meals-prepared-foods.