Fresh and frozen fruit: 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 fresh and frozen fruit in Fruits, Vegetables, and Produce, evaluated on fresh or frozen fruit as sold, wet weight, edible portion after washing and removal of stones, stems and inedible peel. 5 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; the strictest applicable sovereign maximum level for the row's product form in the row's native basis, a disclosed read-across where the exact cell is unregulated, a substantiated not-material determination, or a control; 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 (CH)
Cadmium (Cd)	20	government maximum level (CH)
Total arsenic (tAs)	300	government maximum level (Mercosur)
Inorganic arsenic (iAs)	60	government maximum level (Israel)

Mercury, total (tHg)	30	government maximum level (Israel)
Methylmercury (MeHg)	control	measured every lot; no human-food maximum
Nickel (Ni)	control	measured every lot; no human-food maximum
Tin (Sn)	n/m	not material in this matrix
Aluminium (Al)	control	measured every lot; no human-food maximum
Total chromium (Cr)	control	measured every lot; no human-food maximum
Hexavalent chromium (Cr-VI)	control	measured every lot; no human-food maximum

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 (CH)
Cadmium (Cd)	20	government maximum level (CH)
Total arsenic (tAs)	300	government maximum level (Mercosur)
Inorganic arsenic (iAs)	60	government maximum level (Israel)
Mercury, total (tHg)	30	government maximum level (Israel)

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Methylmercury (MeHg)	control	No credible sovereign government sets a methylmercury maximum level for this product form: the routed corpus reports no methylmercury measurement in this matrix, and the only credible methylmercury maximum levels in force (US FDA CPG 540.600; HK Cap. 132V item 11) are scoped to fish, shellfish and crustaceans, so neither supplies an applicable ceiling for a fruit. 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 for this row (methylmercury cannot exceed total mercury). No methylmercury ceiling is invented.
Nickel (Ni)	control	No credible sovereign government sets a nickel maximum level for fruit. EU Reg. 2024/1987, the only comprehensive dietary nickel instrument in existence, enumerates leafy, fruiting, brassica, root, tuber, bulb and legume vegetables, fresh herbs, cereals, pseudocereals, pulses, tree nuts, seeds, cocoa, seaweed and juices, and deliberately sets no maximum level for fruit; the Swiss VHK nickel rows mirror it and likewise omit fruit. Because no instrument reaches the commodity at all, HMTc publishes no nickel number for fresh fruit rather than borrowing the fruiting-vegetable value of 400 ug/kg from a different commodity class.

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Tin (Sn)	n/m	Every tin maximum level in the register is scoped to canned product: EU Reg. 2023/915 sets 200000 ug/kg for canned foods and 100000 ug/kg for canned beverages, Codex CXS 193-1995 and AU-NZ Schedule 19 set 250000 ug/kg for canned foods, and Hong Kong Cap. 132V sets 250000 ug/kg for canned food other than canned beverages. Those limits regulate one contamination pathway, dissolution of tin from tinplate into the packed food. This row is not packed in tinplate, so the pathway that every sovereign tin limit addresses is physically absent and any tin present is dietary background rather than packaging migration. Fresh and frozen fruit is sold loose, in fibre punnets, in film or in polymer trays. Hermetically sealed tinplate presentations of this commodity route to the canned-foods row in Category 7 and carry the canned-foods tin maximum level there.
Aluminium (Al)	control	No credible sovereign government sets an aluminium contaminant maximum level for any fruit, vegetable or produce form in any jurisdiction. The register's aluminium limits are drinking-water and bottled-water parameters, infant-formula maximum levels, a food-contact plastics specific migration limit, toy migration limits, and permitted-additive levels for baked and starch foods; none of them regulates aluminium as a contaminant of produce. Aluminium is also the third most abundant element in the earth's crust and appears in produce largely as soil-derived and root-associated mineral content rather than as process contamination, so no near-neighbour read-across is supportable either. Under the government-limit-only method HMTc publishes no standalone aluminium number for this row.

Total chromium (Cr)	control	No credible sovereign government sets a total-chromium maximum level for this product form. The only dietary total-chromium maximum levels in the register are Hong Kong Cap. 132V item 7 for vegetables (500 ug/kg) and pulses, cereals, meat, fish and dairy powder rows under the same item, plus drinking-water and color-additive specifications. The Hong Kong vegetable row does not reach fruit, and no jurisdiction writes a total-chromium maximum level for fruit. Under the government--limit-only method HMTc publishes no standalone total-chromium number for this row; total chromium is screened on every lot and hexavalent chromium is controlled by reflex speciation.
Hexavalent chromium (Cr-VI)	control	No credible sovereign government sets a hexavalent-chromium maximum level for any solid food in any jurisdiction: the register's only ingested Cr(VI) parameters are drinking-water maxima (Australia NHMRC 2025, 50 ug/L; California SWRCB, 10 ug/L), which are water-basis parameters that do not reach a solid produce row and whose issuers are not admitted to this category's credible set as food regulators, and every other Cr(VI) row in the register is an article or material limit. This row also has no published total-chromium parent to bound the species against: the only dietary total-chromium maximum level in the register from a regulator in this category's admitted credible set, Hong Kong Cap. 132V item 7, is scoped to vegetables and does not reach this product form (the register's remaining dietary total-chromium rows are Chinese GB 2762 milk and milk-powder rows, a different commodity from a regulator outside the admitted set). With neither a species limit nor a published parent, HMTc publishes no hexavalent-chromium number and controls the species by mandatory reflex speciation.

4 | Cite this standard

Pendergrass, K. (2026). *Fresh and frozen fruit: HMTc standard*. Institute of Contaminant Standards.

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References

[1] CH
Binds Pb, Cd.
MAXIMUM LEVEL

[2] Mercosur
Binds tAs.
MAXIMUM LEVEL

[3] Israel
Binds tHg, iAs.
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/fresh-fruit. 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/fresh-fruit.