NSF/ANSI Standard
for Drinking Water Treatment Units –

# Drinking water distillation systems

## 5 Performance

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### 5.6 Product rate

The product rate of the system shall be that verified in accordance with annex D.

**Table 1 – Contaminant reduction requirements**

| Contaminant | Average influent challenge[1] (mg/L) | Individual influent sample point limits[4] mg/L | Maximum product water concentration (mg/L) |
|---|---|---|---|
| arsenic[3] | 0.30 (added as trivalent) | 0.30 ± 25% | ~~0.05~~ 0.010 |
| barium[3] | 10.0 | 10.0 ± 25% | 2.0 |
| cadmium[3] | 0.03 | 0.03 ± 25% | 0.005 |
| chromium[2, 3] | 0.3 (added as hexavalent) | 0.3 ± 25% | 0.1 |
| chromium[2, 3] | 0.3 (added as trivalent) | 0.3 ± 30% | 0.1 |
| copper[3] | 4.0 | 4.0 ± 25% | 1.3 |
| fluoride | 8.0 | 8.0 ± 25% | 2.0 |
| lead[3] | 0.15 | 0.15 ± 25% | 0.015 |
| mercury | 0.006 (added as mercuric chloride) | 0.006 ± 25% | 0.002 |
| nitrate (as N)[3] | 30.0 | 30.0 ± 20% | 10.0 |
| perchlorate | 0.10 | 0.10 ± | 0.006 |
| selenium[3] | 0.10 (added as ½ selenite and ½ selenate) | 0.10 ± 25% | 0.05 |
| total dissolved solids (TDS) (Surrogate) | 1000 | 1000 ± 25% | 10.0 |

[1] Average influent challenge shall be as specified with a tolerance of ± 10%.

[2] Chromium shall be added as chromate for hexavalent chromium reduction and measured as total chromium. Trivalent chromium reduction may be claimed only by an additional test.

[3] Based on the study "Evaluation of Total Dissolved Solids as a Surrogate Parameter for the Reduction of Inorganic Contaminants by Distillation Systems," conducted for the Water Quality Association by NSF International, 1991, TDS may be used as a surrogate for verifying the reduction of arsenic, barium, cadmium, chromium, copper, lead, nitrate, and selenium to equal to or below the MCL when tested in accordance with annex B. (See annex F for rationale and supporting data.)

[4] Equals average influent challenge concentration variability plus one of the following, in order of availability:
1. Acceptable Continuing Calibration Verification (CCV) limits stated in the appropriate USEPA method.
2. Acceptable spike recoveries as stated in the appropriate USEPA method.
3. Opinion of laboratory professionals – no guidance available in USEPA method.

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# Annex B
(normative)

**Contaminant reduction test methods**

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## B.4 Contaminants

Reduction of inorganic contaminants may be verified together using the TDS challenge water or they may be tested separately using the chemical reduction challenge waters. Add the following substances to either the TDS or the chemical reduction challenge water(s) to achieve the required challenge level as specified in table 1 of NSF/ANSI 62.

| | |
|---|---|
| arsenic | add sodium arsenite, $NaAsO_2$ |
| barium | add barium chloride, $BaCl_2$[1] |
| cadmium | add cadmium chloride, $CdCl_2$[1] |
| copper | add cupric sulfate $Cu_2(SO_4)_3$ |
| chromium (hexavalent) | add sodium dichromate $Na_2Cr_2O_7 \cdot 2H_20$ |
| chromium (trivalent) | add chromic chloride, $CrCl_3 \cdot 6H_2O$ |
| fluoride | add sodium fluoride, NaF |
| lead | add lead chloride, $PbCl_2$[1] |
| mercury | add mercuric chloride, $HgCl_2$ |
| nitrate | add sodium nitrate, $NaNO_3$ |
| perchlorate | add magnesium perchlorate, $MgClO_4$[1] |
| selenium | add a 50/50 mix of sodium selenite, $Na_2SeO_3$, and sodium selenate, $Na_2SeO_4$ |
| NOTE – Trivalent arsenic is readily converted to pentavalent arsenic, so an anion exchange water treatment unit may be installed into the test apparatus to treat the challenge water, to remove the pentavalent arsenic, leaving trivalent arsenic. | |

[1] Metal salts using alternate counterions may be used if interferences and synergistic effects are avoided.