PROPRIETARY - FOR NSF TASK GROUP WORK ONLY
NSF Nitrate Task Group

R&D testing protocol for determining high nitrate removal capability of residential reverse osmosis devices

Purpose: Determine the feasibility of adding a claim in NSF/ANSI Standard 58 for a higher level of nitrate removal. The current claim is based on an influent level of 30 mg/L nitrate as N (132 mg/L as NO_3). In light of much higher concentrations found in California (up to and greater than about 70 mg/L as N – 300 mg/L as NO_3), some regulatory and environmental groups have asked NFS to determine if reverse osmosis devices certifiable to Standard 58 would be capable of reducing these higher concentrations to a safe level (≤ 10 mg/L as N – 44 mg/L as NO_3).

Procedure: Testing shall be based on *NSF/ANSI Standard 58 – Reverse Osmosis Drinking Water Treatment Systems*, Section 7.1.3.
Exception: The influent concentration shall be 300 mg/L as NO_3 (68 mg/L as N) **without** any addition of nitrite ion (NO_2^-).

Equipment:
1. Test rig as depicted in Standard 58, Fig. 2 – Example Test Apparatus, or equivalent.
2. Residential reverse osmosis systems (2) –
    a. Designed to use an air pressurized bladder storage tank with automatic shut-off
    b. Provided with the highest rejection RO membrane module from the manufacturer
    c. Provided with a recovery rating of 12 ± 3% (manufacturer adjusted, if necessary) (confirm and record per section 6.9.7.1).
3. High pressure booster pump capable of delivering an inlet pressure of 100 psi to the RO systems.

Protocol:
1. Determine and record the air pressure in the pressurized storage tanks. If necessary, adjust to the manufacturer's setting.
2. Connect the RO units to the test rig and condition in accordance with Standard 58, section 6.9.6. NOTE: Prior to conditioning, add the appropriate amount of sodium nitrate ($NaNO_3$) to the test water (section 7.1.3.3, 750 ± 40 mg/L TDS as NaCl) to achieve the 300 mg/L as NO_3 inlet challenge concentration.
3. Start the test in accordance with section 7.1.3.4 at an inlet pressure of 50 ± 3 psig.
4. Sample according to section 7.1.3.5.1.
5. On Day 7, after collecting the 'last sample', disconnect the inlet tubing to the storage tank to let the permeate run to atmospheric pressure. Continue the challenge for one additional hour then collect a 'to atmosphere' sample. [50 psig TEST COMPLETE].
6. Repeat the above test at 100 ± 3 psig.