November 14, 2023

Reading the Room:
Verification and Certification of Water Quality Test Devices for Drinking Water

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Today's Speaker

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AGENDA

01 About WQTDs: Key Terms

02 P524: Development and Basic Requirements

03 Certification Process

04 Listing and Monitoring

05 Questions and Answers

About WQTDs

Key Terms:

Water Quality Test Device (WQTD):

A product designed to measure a water quality test parameter. A WQTD is a device or method to provide visual indication of water quality parameter and may include one or more reagents and accessory items.

-Bench top style that give readings on discrete aliquots of water
  -Sensors that attach to a smart phone
  -Test kits
  -Test strips

-In-line style devices that provide continuous readings
  -Probe style sensors
  -Flow-through sensors

Key Terms:

Water Quality Test Parameter:

The physical or chemical property(ies) measured by a specific WQTD

- -Chemical Properties
  - -Contaminant Concentrations
  - -Water quality characteristics (e.g. hardness, alkalinity)
  - -pH
- -Physical Properties
  - -Turbidity
    - -Color
    - -Conductivity
  - -Temperature

Key Terms:

Operating Range

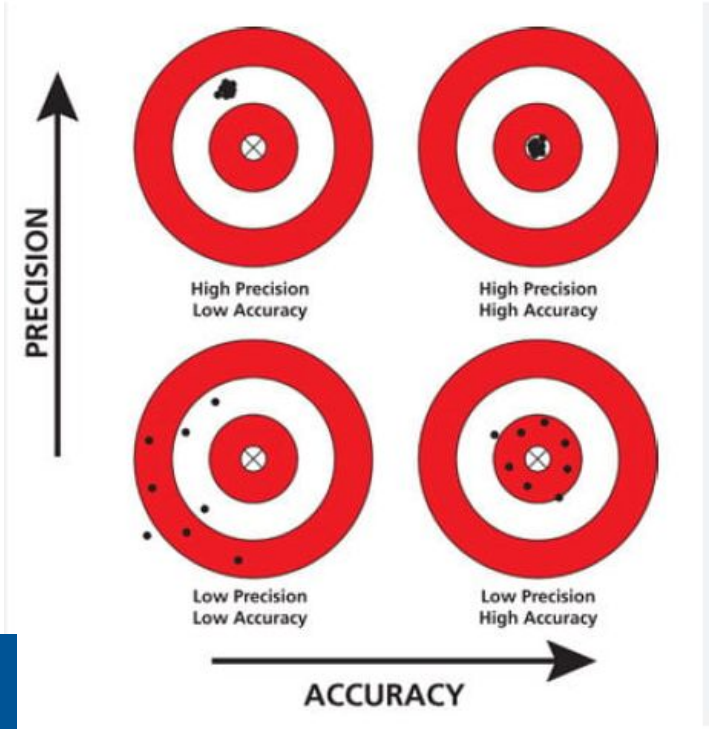
The range for a parameter within which a WQTD provides acceptable performance as specified by the manufacturer

Accuracy

The difference between the measured value or calculated sample value and the true value of the sample.

Precision

The degree of mutual agreement among individual measurements. Provides an estimate of random error.



P524 verifies the accuracy and precision claims made by the manufacturer over the client-specified operating range of the WQTD

P524 Development

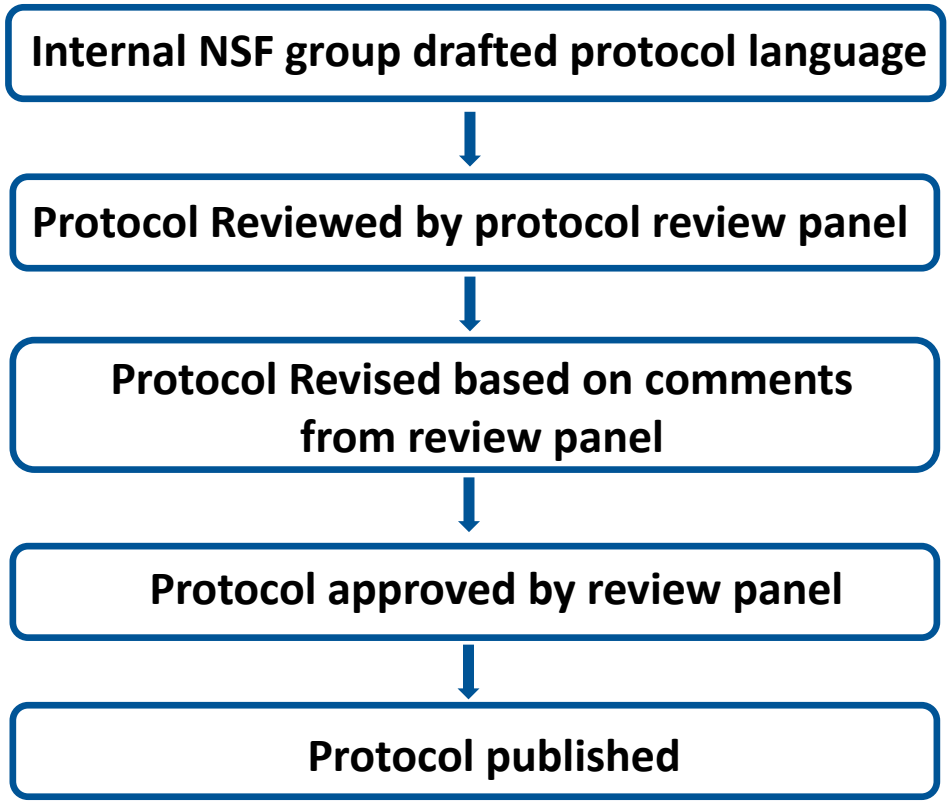
Protocol Development Process

NSF Protocol P524 Review Panel

Membership from:

U.S. EPA
U.S. Army
California Waterboards
Sensor Manufacturers
NSF

Protocol Development Process



P524 Requirements

Purpose and Scope of P524

Purpose

"The purpose of this protocol is to establish minimum performance requirements for water quality testing devices (WQTD) used to measure water quality parameters in water."

Scope

"… covers any device, sensor, or test kit used to measure water quality parameters in drinking water where the operation of the kit does not require access to laboratory facilities or equipment and provides results in real time or after a short wait period…"

"…does not address the use of WQTD with untreated water, waste or graywater, recreational/pool water, or industrial waters."

Scope

Products NOT Covered:

-Flow meters
-Pressure sensors
-Leak Detecting Sensors

-Sensors for use with water other than drinking water

General Requirements:

Published Instructions:

The manufacturer's written (published) instructions shall specify the performance claims, including operating range, precision and accuracy level as applicable for each parameter measured by the WQTD.

Protocol includes additional, specific requirements for the manufacturer's instructions, including the use of a disclaimer regarding the test water.

General Requirements:

Health Effects:

WQTD that contact drinking water (e.g. in-line WQTD) are required to also be certified to NSF 61.

-This does not apply to benchtop devices that measure test aliquots/samples of water or to in-line devices that only contact water that will not be consumed.

General Requirements:

Testing:

A Product Specific Test Plan (PSTP) shall be prepared for each model to be tested.

- Details the testing to be performed and may include variations from the test method and/or test schedule in the protocol, if necessary, based on design of WQTD.

- Should be designed to provide a conservative evaluation of the performance of the WQTD against the claims made by the manufacturer.

Test Water

- NSF 53 “general test water”
  - Public tap water adjusted to meet specifications for pH, temperature, TDS, TOC, and Turbidity.

General Requirements:

Testing:

Test Protocol

1. Prepare test solutions at low, mid, and high ends of claimed operating range.
2. Testing at least 2 WQTD units, 3 times each, with each solution and record results.
3. Measure each test solution using reference method.
4. Compare results from WQTD to those from the lab reference method.
    1. Calculate accuracy
    2. Calculate precision
5. Product passes testing if calculated accuracy and precision match manufacturer's claims AND manufacturer's use instructions meet protocol requirements.

Table 5.2: Test Protocol Overview

	Number of replicate readings		
	WQTD Unit 1	WQTD Unit 2	Lab Reference
low-range solution	3	3	1
mid-range solution	3	3	1
high-range solution	3	3	1

Certification Process

Listing and Monitoring

NSF International

OFFICIAL LISTING

NSF certifies that the products appearing on this Listing conform to the requirements of
Protocol - Water Quality Testing Devices for Drinking Water
P524
This is the Official Listing recorded on November 4, 2022.

46810
46810 address line1
46810 address line2
46810 address line3
Cleveland, OH 44115
111-111-1111
111-111-1111

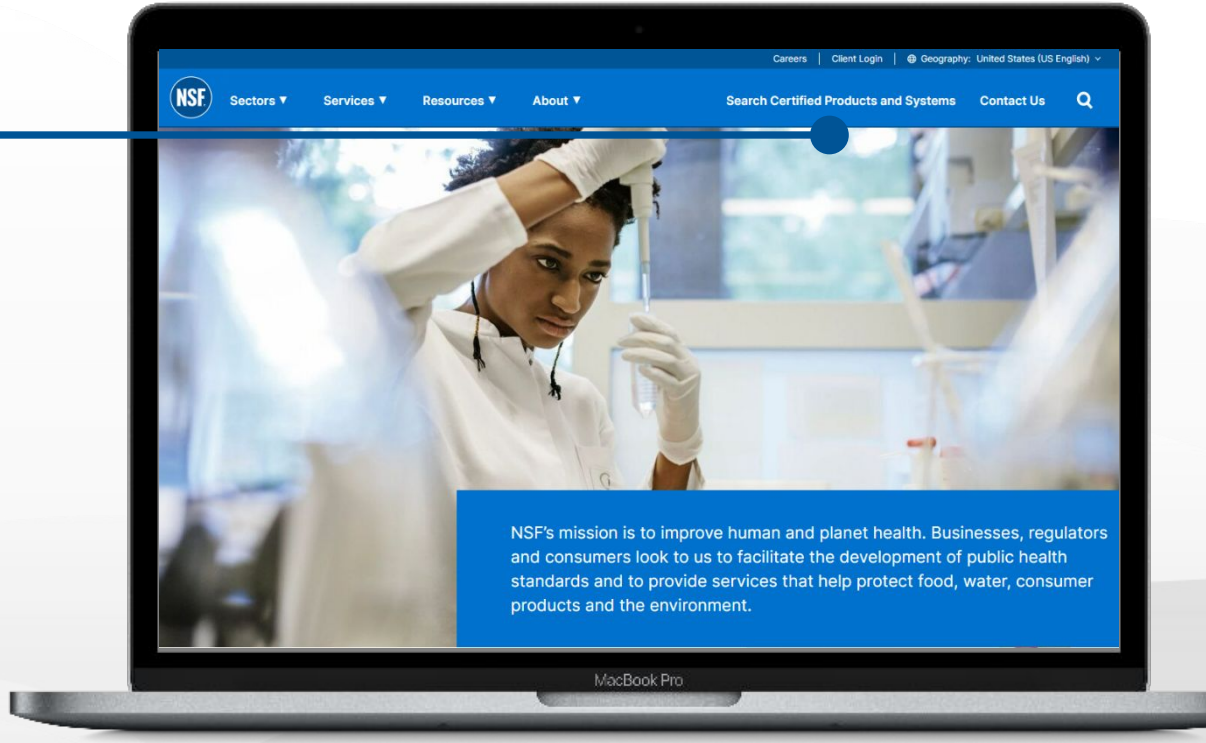
Facility: Andover, KS

Trade Designation	Parameters	Operational Range	Accuracy	Precision	Water Type
Water Quality Test Device	ORP	400 - 900 mV	L1	0.2	Drinking Water

NSF Protocol P524
Water Quality Testing Devices for Drinking Water

NSF Public Listings

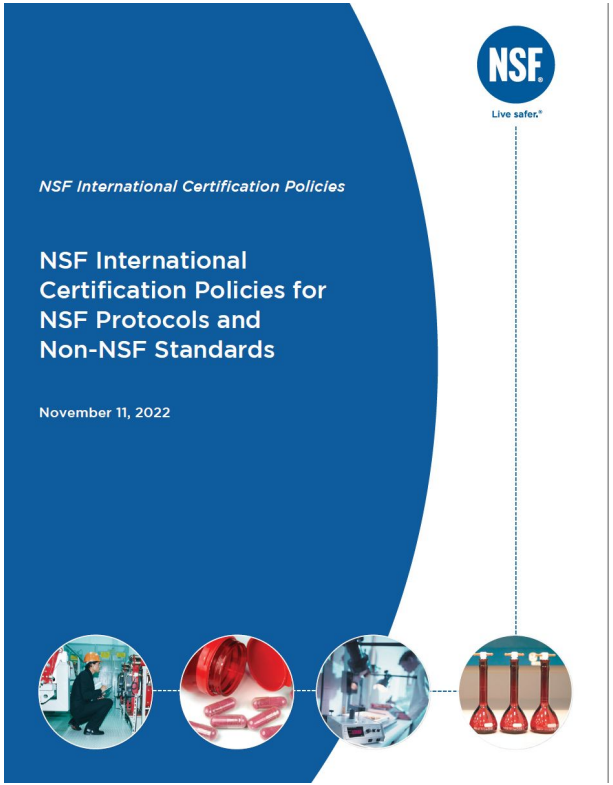
Real-time certification listings are available publicly via nsf.org



Certification Process

Monitoring Requirements:

- Annual audit
- 5-year retesting



Q&A