

SANITIZATION FOR FOOD SAFETY USING SANITIZER TEST STRIPS



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WELCOME

TRAINING OUTLINE

1. The Who
2. The Why
3. The What
4. The How





Real-life victims of foodborne illness.
StopFoodbornellness.org



THE WHO

1. Us: Micro Essential Laboratory, Inc.
2. The Regulator - Federal, State, Local
3. Industry

THE WHY

- ✓ Regulations:
 1. Chemical sanitizers require minimum concentrations to ensure proper sanitization.
(Food Code § 4-501.114)
 2. Too much sanitizer could be toxic.
(Food Code § 7-204.11)
- ✓ To prevent, eliminate or reduce pathogens to a safe level.
- ✓ To protect public health and prevent foodborne illness.



THE WHAT

- **CLEANING** - THE REMOVAL OF DIRT, FOOD, OR OTHER SOIL FROM A SURFACE, USUALLY ACCOMPLISHED BY A DETERGENT. REDUCE SURFACE TENSION BETWEEN THE FOOD AND THE SURFACE SO DETERGENT CAN PENETRATE QUICKLY AND LIFT DIRT OFF.

- **SANITIZING** - THE REMOVAL OF PATHOGENS TO A SAFE LEVEL, DEFINED AS A 5-LOG REDUCTION, OR REMOVAL OF 99.999% OF ORGANISMS.

SANITIZING ONLY WORKS WHEN IT FOLLOWS PROPER CLEANING!

THE WHAT



- **DISINFECTION** - ELIMINATES NEARLY ALL RECOGNIZED VEGETATIVE CELLS BUT NOT NECESSARILY ALL MICROBIAL FORMS (E.G., BACTERIAL SPORES) ON INANIMATE OBJECTS.

- **STERILIZATION** - KILLS ALL LIVING CELLS, INCLUDING MICROORGANISM AND HIGH NUMBERS OF BACTERIAL ENDOSPORES. STERILIZATION CAN BE ACCOMPLISHED BY HEAT, ETHYLENE OXIDE GAS, HYDROGEN PEROXIDE GAS, PLASMA, OZONE, AND RADIATION (IN INDUSTRY).

THE WHAT

TEMPERATURE SANITIZATION (HEAT SANITIZING) – FDA MODEL RETAIL FOOD CODE

- ✓ **HOT WATER MANUAL OPERATIONS** BY IMMERSION AT TEMPERATURE OF 171°F (77°C) FOR AT LEAST 30 SECONDS.
- ✓ **HOT WATER MECHANICAL OPERATIONS** BY BEING CYCLED THROUGH CONVEYOR WAREWASHING EQUIPMENT AT A TEMPERATURE OF 180°F (82°C.). THIS IS THE MANIFOLD TEMPERATURE WHICH WILL YIELD A PLATE TEMPERATURE OF 160°F OR ABOVE.



THE WHAT

CHEMICAL SANITIZATION - MANUAL OR MECHANICAL

- ✓ **CHLORINE**
- ✓ **QUATERNARY AMMONIUM COMPOUNDS (QUATS)**
- ✓ **IODINE**
- ✓ **OTHER (PERACETIC OR PEROXYACETIC ACID <PAA>)**

THE
WHAT

CHLORINE- affected by pH when using



Concentration Range (ppm)	Minimum Temperature pH 10 or less	Minimum Temperature pH 8 or less
25 - 49	120°F (49°C)	120°F (49°C)
50 - 99	100°F (38°C)	75°F (24°C)
100	55°F (13°C)	55°F (13°C)

THE WHAT

AS PH INCREASES, CHLORINE BECOMES LESS EFFECTIVE AS A SANITIZER.



- CHLORINE ITSELF IS A STRONG BASE – HAS A HIGH PH (7 – 14)
- **IF THE PH OF THE SOLUTION IS HIGH OR BASIC, CHLORINE WON'T “REACT”**
- IT TAKES A LOWER PH, MORE OF AN ACIDIC ENVIRONMENT, TO GET THE CHLORINE TO REACT IN THE WATER AND ACTUALLY DO WHAT WE WANT IT TO DO; THAT IS, SANITIZE

THE WHAT

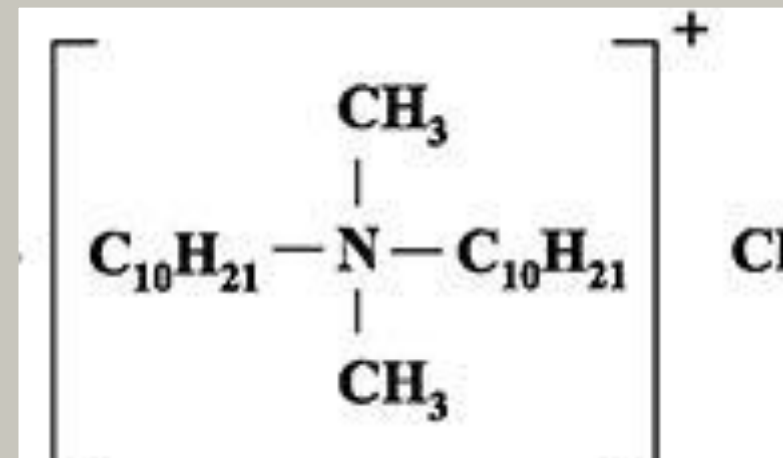
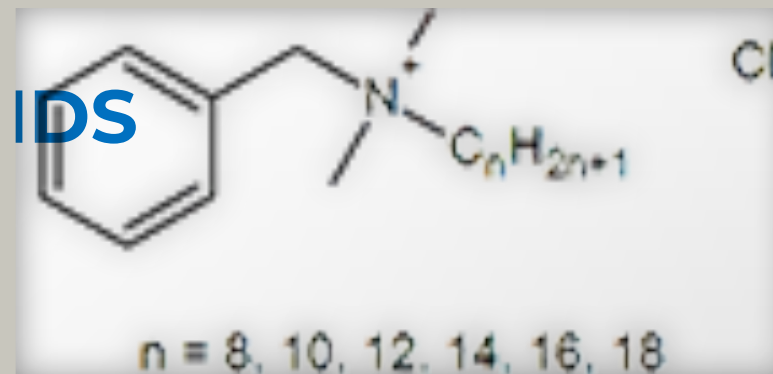


- CHLORINE
 - **IS** EFFECTIVE FOR MOST BACTERIA, VIRUSES, FUNGI, AND BACTERIAL SPORES
- **IS NOT** THE BEST CHOICE TO BREAKDOWN ORGANIC MATTER AND BIOFILMS (GROUPS OF MICROBIAL CELLS HELD TOGETHER BY A KIND OF CELLULOSE; BASICALLY, MICROBIAL SLIME). THESE REQUIRE SCRUBBING, ACIDIC CLEANSERS, AND QUATS.

THE WHAT

QUATERNARY AMMONIUM COMPOUNDS

1. **Surfactant and Sanitizer**
2. **2-Chain quats**
Shorter hydrocarbon chain
Second generation
Exact measurement, 200ppm
3. **4-chain quats**
Longer chain
Fourth generation
Broad range of measurement, 150-400ppm



THE WHAT



QUATS MUST BE:

- ✓ **TESTED** AT 65°F - 75°F (18°C - 24°C) FOR GREATEST ACCURACY
(THIS MAY NOT BE THE SAME AS THE “USE” TEMPERATURE.) WHY?????
- ✓ HAVE A CONCENTRATION AS SPECIFIED UNDER THE FDA FOOD CODE § 7-204.11
AND/OR AS INDICATED BY THE MANUFACTURER’S USE DIRECTIONS INCLUDED IN THE LABELING
- ✓ BE USED ONLY IN WATER WITH **500 MG/L HARDNESS OR LESS** OR IN WATER HAVING A HARDNESS NO GREATER THAN SPECIFIED BY THE EPA-REGISTERED LABEL USE INSTRUCTIONS BECAUSE THE **SURFACTANT MAKES THE QUAT MORE SENSITIVE TO WATER HARDNESS LEVELS.**

**DO YOU KNOW THE HARDNESS OF THE WATER
IN THE ESTABLISHMENT YOU ARE INSPECTING OR OWN?**

DO YOU KNOW WHAT “QUAT
BINDING” IS?

1. YES
2. NO

Poll the Audience! Go!



THE WHAT

WHAT IS QUAT BINDING:

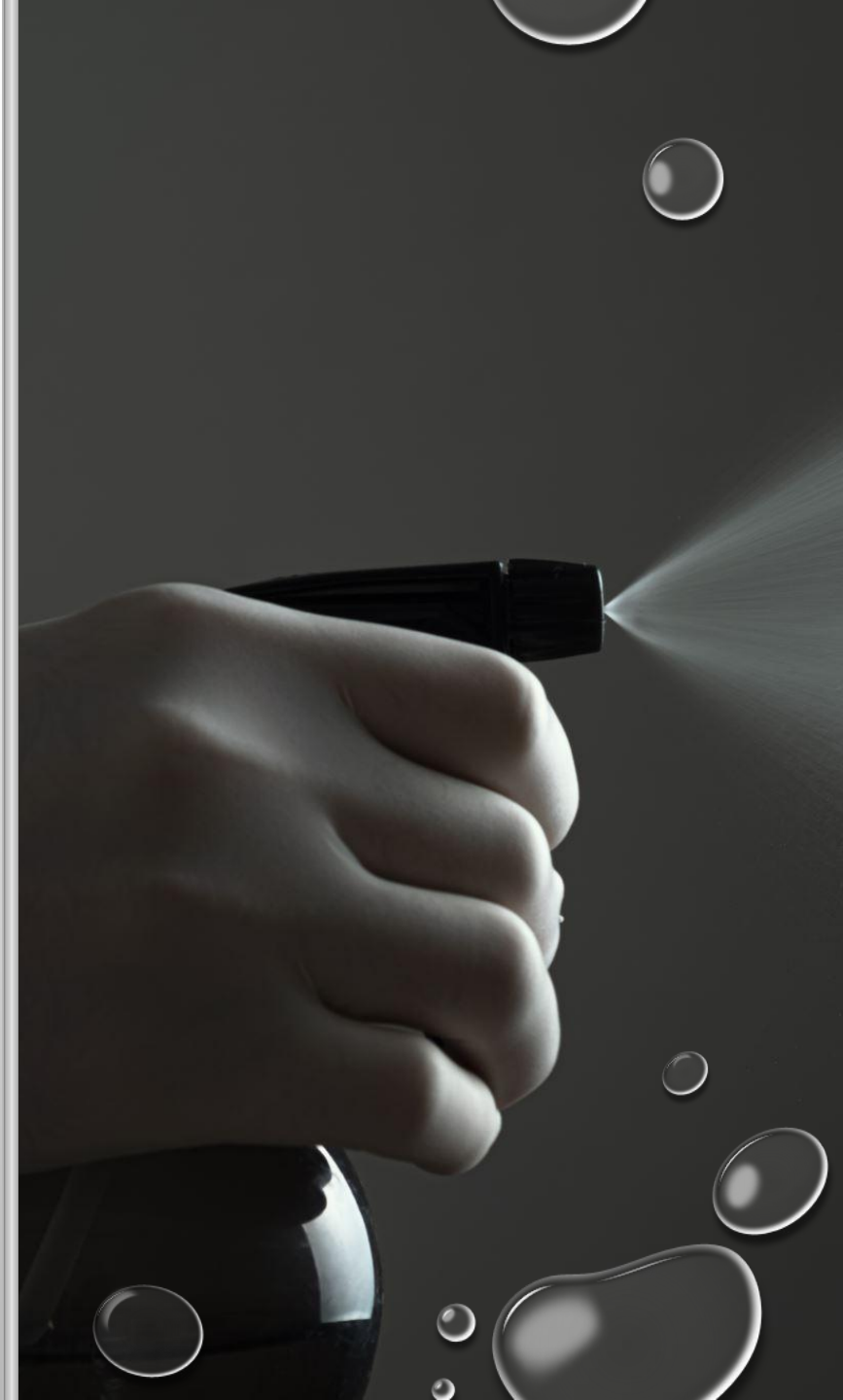
- QUATS BIND TO FABRICS (MICROFIBER CLOTHS BIND LESS THAN COTTON)
- SANITIZER IS “IN THE FABRIC” NO LONGER IN THE SOLUTION
- LEADS TO AN INEFFECTIVE LEVEL OF SANITIZATION ON THE SURFACE/EQUIPMENT
- THE QUAT SOLUTION NEED TO BE TESTED JUST PRIOR TO USE

IF A CLOTH IS SOAKING IN SOLUTION, THERE MAY NOT BE ENOUGH SANITIZER FOR IT TO BE EFFECTIVE IN REDUCING THE NUMBER OF PATHOGENS.

THE WHAT

WHEN USING QUATS, IT IS IMPORTANT TO ...

- ✓ SPRAY AND AIR-DRY,
- ✓ DIP AND AIR-DRY, OR
- ✓ SOAK AN ITEM TO BE SANITIZED IN A SOLUTION, THEN AIR-DRY.



THE WHAT

SOLUTION	PROS	CONS
Chlorine	<ul style="list-style-type: none">• Highly effective on a wide variety of bacteria• Inexpensive• Not affected by water hardness	<ul style="list-style-type: none">• Corrosive and irritating to the skin• Effectiveness depends on solution pH and exposure to light• Loses effectiveness with biofilms/organic matter, requiring more frequent water changes• Not heat stable
Quats	<ul style="list-style-type: none">• Nontoxic, odorless, colorless, noncorrosive, nonirritating,• Effective over a wide pH range and with organic matter• Heat stable	<ul style="list-style-type: none">• Works slower than chlorine• Temperature sensitive• Ineffective with hard water and some detergents

HOW MANY *DIFFERENT* SANITIZER TEST KITS DO YOU CARRY WITH IN YOUR INSPECTION TOOLKIT?

1. ONE
2. TWO
3. THREE
4. FOUR
5. I DON'T HAVE MY OWN TEST KITS

Poll the Audience! Go!



The slide features a decorative background with several water droplets of varying sizes. On the left side, there is a vertical strip containing chemical structures, including a cyclohexane ring with a chlorine atom and a quaternary carbon, and a quaternary ammonium cation. The main title 'THE WHAT' is centered at the top in a large, bold, black font.

THE WHAT

TEST KITS

- **QT-10**, OR “QUAT TEST – 10” IS FORMULATED FOR 2-CHAIN QUAT COMPOUNDS WITH MEASUREMENTS IN THE RANGE OF 0 - 400PPM.
- **QT-40** IS A QUAT TEST PAPER FOR 4-CHAIN QUATS WITH MEASUREMENTS OF 0 - 500PPM.
- **QAC** IS A GENERAL, NON-SPECIFIC MATCH TO TEST FOR ALL QUATS.
- **CHLORINE** TEST PAPERS PROVIDE A MEANS TO MEASURE THE CONCENTRATION OF FREE AVAILABLE CHLORINE IN SOLUTION. MEASUREMENTS RANGE FROM 10 - 200PPM.

NEW, NEW, NEW!!

HYDRION® INSTA-CHEK™ QUAT TEST STRIPS



- QT-500
- RANGE 1 – 500
- FORMULATED TO TEST BOTH 2-CHAIN AND 4-CHAIN QUATS

THE WHAT

[LIST N](#), EPA'S LIST - TELLS YOU THE TYPES OF SURFACES ON WHICH YOU CAN SAFELY USE A PRODUCT.

- **LIST N - FOOD CONTACT**

YOU CAN USE CERTAIN PRODUCTS ON **SURFACES** THAT TOUCH FOOD, SUCH AS DISHES, COOKING UTENSILS, AND COUNTERTOPS.

- **LIST N FOOD CONTACT SURFACE, POST RINSE REQUIRED**

SOMETIMES THE PRODUCT'S DIRECTIONS WILL REQUIRE A USER TO RINSE THE SURFACE AFTER DISINFECTING

- **LIST N FOOD CONTACT SURFACES, NO RINSE**

WHEN A RINSE IS NOT NECESSARY AFTER APPLICATION.

- **THE LABEL**

YOU CAN FIND OUT WHETHER YOU NEED TO RINSE THE SURFACE AFTER DISINFECTION BY READING THE DIRECTIONS ON THE EPA APPROVED PRODUCT LABEL.



THE WHAT

Food Protection Trends published article. Sanitizers and Disinfectants: A Retail Food and Foodservice Perspective

Angela M. Fraser, Jeffrey Anderson, Juan Goncalves, Elaine Black, Anna Starobin, David Buckley, Dale Grinstead, Chip Manuel, Jill Hollingsworth

Food Protection Trends, vol. 41, no. 3, pp. 358-367, May 2021 Volume 41, Issue 3: Pages 358–367

TABLE 1. Attributes of common sanitizer and disinfectant active ingredients

Sanitizer	Spectrum of activity*	Advantages	Disadvantages
Free available chlorine (chlorine, hypochlorous acid, sodium hypochlorite)	Vegetative bacteria and enveloped and nonenveloped viruses	<ul style="list-style-type: none"> • Broad spectrum of activity • Good hard water tolerance 	<ul style="list-style-type: none"> • May be incompatible with some soft metals • Rapidly inactivated by soil • Limited shelf life that varies with pH • Can generate chlorine gas if mixed with acid or ammonia • Can be inactivated by organic matter
Quaternary ammonium compounds	Vegetative bacteria and enveloped and nonenveloped viruses	<ul style="list-style-type: none"> • Broad spectrum of activity • Compatible with most surfaces • Compatible with most surfaces • Very stable with long shelf lives • Less reactive with soil 	<ul style="list-style-type: none"> • Can be inactivated by hard water • Can be inactivated by some surfactants used in cleaners • May bind to cleaning cloths, reducing active levels in a solution • Food Code requires use above 24°C (75°F)
Peroxides	Vegetative bacteria and enveloped and nonenveloped viruses	<ul style="list-style-type: none"> • Minimal residue • Formulated for good hard water tolerance 	<ul style="list-style-type: none"> • May require elevated levels to be effective against catalase-positive organisms. • May be incompatible with some soft metals
Peracids	Vegetative bacteria and enveloped and nonenveloped viruses	<ul style="list-style-type: none"> • Broad spectrum of activity (note that antifungal activity may require a mixture of peracid) • Compatible with most surfaces • Minimal residue 	<ul style="list-style-type: none"> • Pungent odor • Limited shelf life • Inactivated by some types of soil • May be incompatible with some metals
Acid anionics	Vegetative bacteria and enveloped and nonenveloped viruses	<ul style="list-style-type: none"> • Compatible with residual cleaners if rinsing is incomplete • Good cleaning performance • Good material compatibility • Good hard water tolerance 	<ul style="list-style-type: none"> • May be incompatible with some soft metals and some plastic surfaces • Can generate chlorine gas if mixed with chlorine products
Alcohol	Vegetative bacteria and enveloped viruses	<ul style="list-style-type: none"> • Can be used in environments where aqueous sanitizers or disinfectants are undesirable^b • No residue • Limited impact on organic matter 	<ul style="list-style-type: none"> • High flammability • Some alcohols display poor compatibility with certain plastic materials • RTU format only

*Note that the specific spectrum of activity will vary depending on the formulation and will be reflected on the product and EPA approved labels. Consult the label and the supplier of the disinfectant or sanitizer for detailed information.

^bLow-water-activity food production areas.

Antibacterial All Purpose Cleaner

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER: Corrosive. Causes irreversible eye damage and skin burns. Do not get in eyes, on skin, or on clothing. Wear protective eyewear (goggles, face shield or safety glasses), protective clothing and protective (rubber or chemical resistant) gloves. Harmful if swallowed or if absorbed through the skin. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet. Remove contaminated clothing and wash clothing before reuse.

FIRST AID

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing eye.

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes.

IF SWALLOWED: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling poison control center or doctor or going for treatment.

FOR EMERGENCY MEDICAL INFORMATION, CALL TOLL-FREE 1-800-XXX-XXXX OUTSIDE NORTH AMERICA, CALL 1-XXX-XXX-XXXX

EPA Reg. No. 1234-567-8900

EPA Est. No. 1234-DE-1

DISTRIBUTED BY:

Company
1234 Main Street
Anytown, USA 12345

EPA Reg. No. 1234-567-8900

Base Registrant
Company Number

Product Number

Distributor or
Manufacturing Number

Not all products have a two-part EPA Registration Number.
Sub-registered products are three-parts.

ACTIVE INGREDIENTS

Active Ingredient	A XYZ%
Active Ingredient	B XYZ%
Active Ingredient	C XYZ%
Active Ingredient	D XYZ%
OTHER INGREDIENTS:	XX.YZ%
TOTAL:	100.00%

Danger
KEEP OUT OF REACH OF CHILDREN

LIST N SEARCH

Watch
and
Learn!

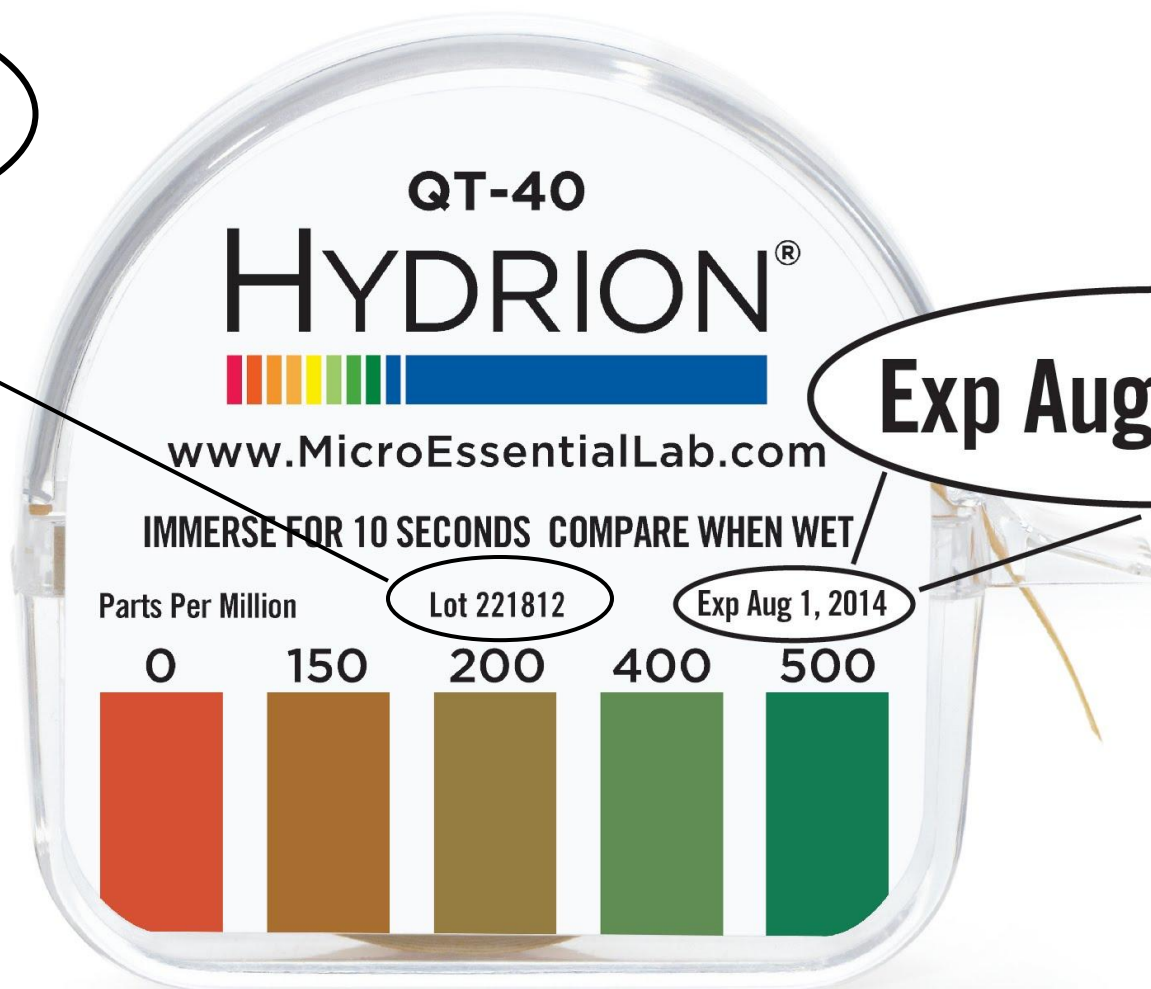


THE HOW

THE HOW



**Lot Number
221812**



Exp Aug 1, 2014

THE HOW



THE HOW

EXPIRED!

THE HOW



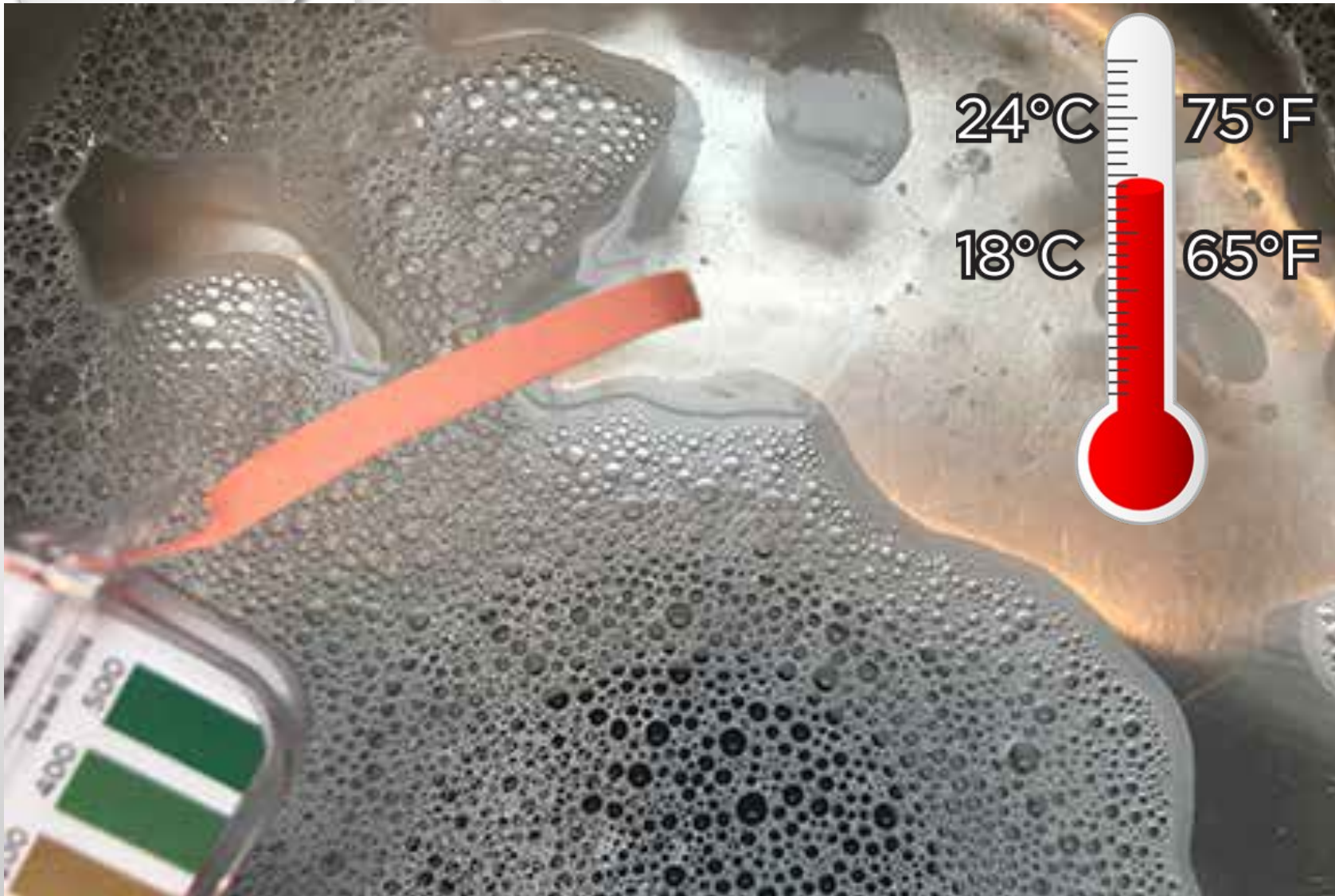


THE HOW

THE HOW

FOLLOW INSTRUCTIONS ON KIT:

- WATER TEMPERATURE FOR TESTING
- FOAM AND SWISHING
- TIME
- BLOTting
- COLOR CHART
- READING THE RESULTS



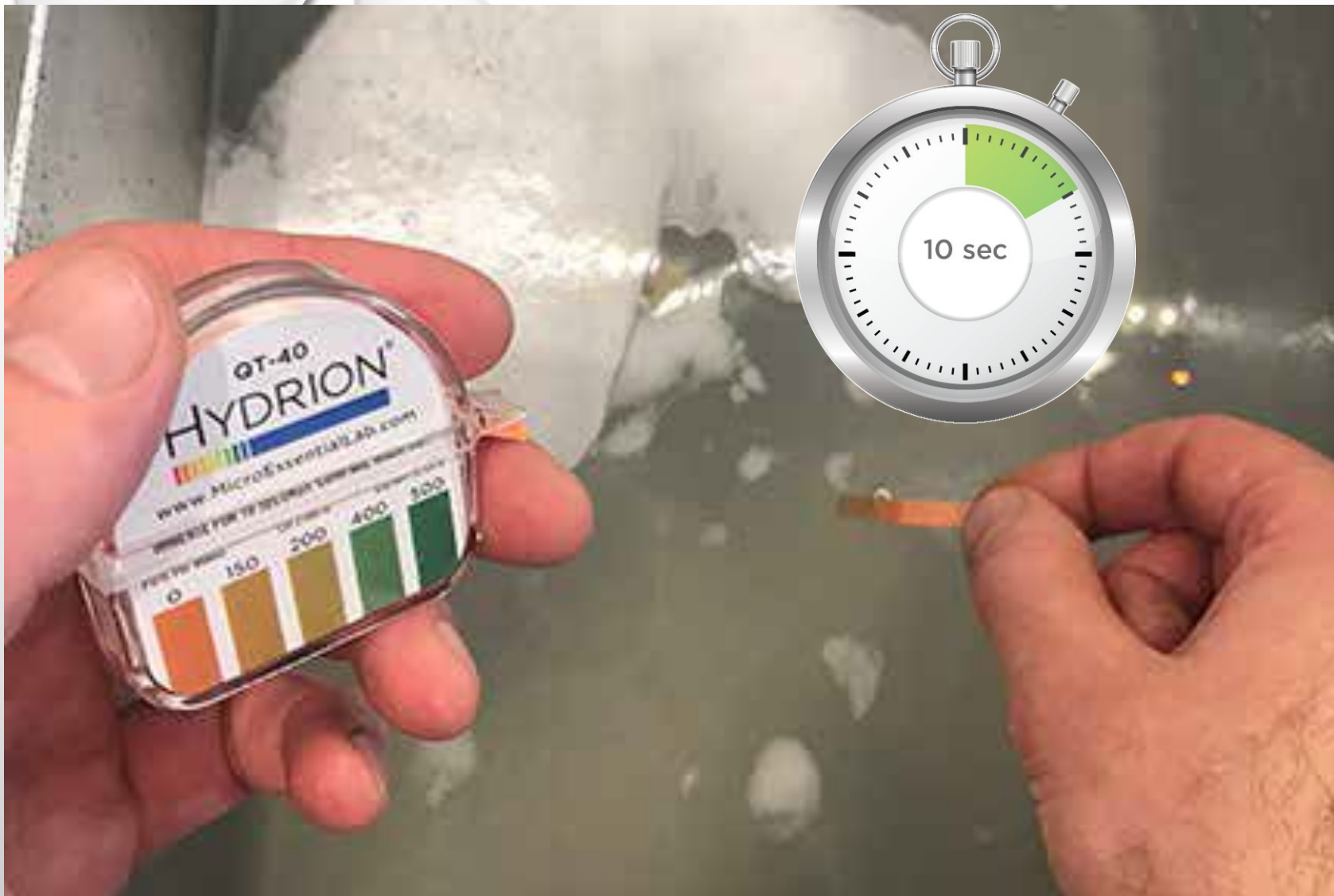
THE HOW – QUAT TESTING



No testing bubbles!

No swishing the strip around!

**The How – QUAT
TESTING**



THE HOW – QUAT TESTING



THE HOW – QUAT TESTING



THE HOW – CHLORINE TESTING



THE HOW – CHLORINE TESTING

**BLO
T**



**THE HOW – CHLORINE
TESTING**



THE HOW – CHLORINE TESTING



THE HOW

Demonstration

You Tube - MicroEssentialLab

English and Spanish Available: 3-minute clip

https://www.youtube.com/watch?time_continue=6&v=SHBCMfk-bfo

we thank you for protecting public health!

MICRO ESSENTIAL



Hydrion® pH and sanitizer test kits since 1934

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