

# Basic Cleaning or “Common Sense” Sanitation

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Today, Sanitation is More  
than “Washing-Down” a  
Food Plant on Third Shift.

## Food Safety

Requires a Top Down  
Commitment to

Do it Right



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## What Is Sanitation

- Clean  
To Remove Soil from a Surface.
- Soil  
Any Unwanted, Undesirable Material  
on a Given Surface.
- Sanitizing  
The Treatment of a *Cleaned* Surface to  
Reduce Total Bacteria to a Safe Level.



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**Types of Soils**  
**Organic**

Fat, Starch, Proteins, Oils,  
Grease



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**Types of Soils**  
**Inorganic**

Rust, Scale



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**Types of Soils**  
**Combination: "Stones"**

Milkstone – Beerstone  
Mineral Oil Stone



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## Chemistry of Cleaning

If all soils were water soluble, we wouldn't need any cleaning agent besides water.

Chemicals used to aid in cleaning:

Acids and Alkalis



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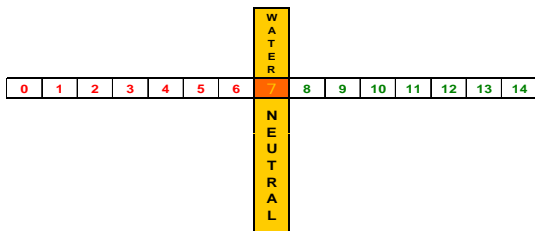
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## The pH Scale



The pH Scale is the measurement of the acidity or the alkalinity of a chemical solution.  
It ranges from 0 to 14.  
The number "7" represents a neutral solution.

PLEASE READ YOUR MSDS SHEET



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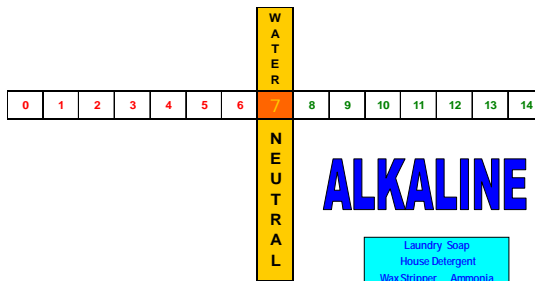
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## The pH Scale



PLEASE READ YOUR MSDS SHEET



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## Alkaline Cleaners

Alkaline or Caustic  
Cleaners Remove  
**Organic Soils**



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## Alkaline Cleaners

Sodium Hydroxide - Potassium Hydroxide

**NaOH - KOH**

**Heat Activated**



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## Alkaline Cleaners



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**Additives**

**Gluconate -  
Glucoheptonates**

**EDTA**

**Sodium Metasilicate**



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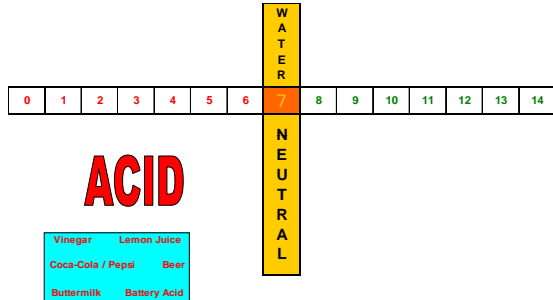
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**The pH Scale**



**ACID**

Vinegar    Lemon Juice  
Coca-Cola / Pepsi    Beer  
Buttermilk    Battery Acid


**W  
A  
T  
E  
R**

**7**

**N  
E  
U  
T  
R  
A  
L**

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

PLEASE READ YOUR MSDS SHEET



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**Acid Cleaners**

**Acid Cleaners Remove  
Inorganic Soils**



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# Acid Cleaners

## Phosphoric Acid

## Nitric Acid

Sulfuric - Sulfamic - Citric



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# Acid Cleaners



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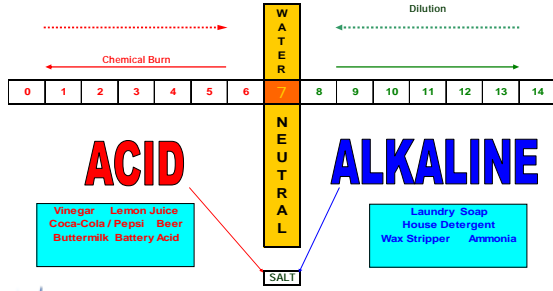
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# The pH Scale



WATER

NEUTRAL

SALT

ACID

ALKALINE

Vinegar, Lemon Juice, Coca-Cola/Pepsi, Beer, Buttermilk, Battery Acid


Laundry Soap, House Detergent, Wax Stripper, Ammonia

Chemical Burn

Dilution

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

READ YOUR M.S.D.S. SHEETS



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**Combination Soils**  
**Multiple Washes with**  
**Alkaline & Acid**  
**Products**  
**Special Additives**



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**Combination Soils**



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**Sodium Hypochlorite**  
**or**  
**Chlorine**

**“Everyone's Favorite  
Chemical”**



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## Sodium Hypochlorite

- Forms OCl (Hypochlorite ion) in Alkaline Solution
- Forms HOCl (Hypochlorous Acid in Neutral to Acidic Solution)
- Both Kill, HOCl is 80X more effective



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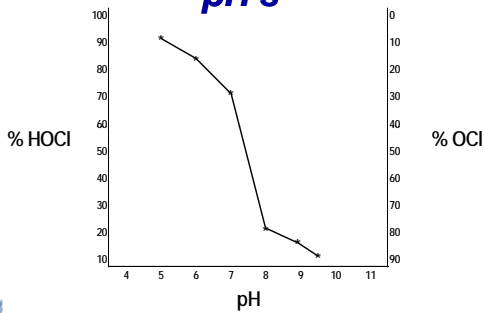
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## Ratios of HOCl-OCl at various pH's



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## Role of Chlorine

Chlorine used with an Alkaline Product:

Removes Protein



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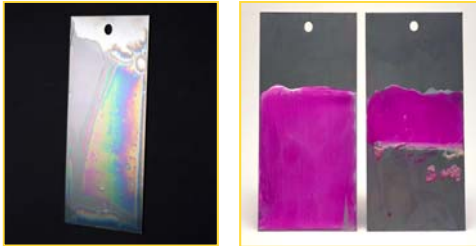
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## Role of Chlorine During Cleaning



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## Role of Chlorine

Used as a:

**Sanitizer**



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## Chlorine Sanitizer

- 25 ppm on E. Coli Contamination:
- pH <7: 15-30 Seconds
- pH 8: 5 Minutes
- pH 10: 10 Minutes



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### Rinse - Rinse - Rinse

- The Pre-Rinse Removes 90% - 98% of the Gross Soils.
- Should be Ambient Temperature to 110° F, but not Hot Water.
- Reduces Cleaning Chemical Usage.

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### Time

- Time Availability
- Soil Type
- Soil Amount
- Process Temperature
- Equipment Being Cleaned

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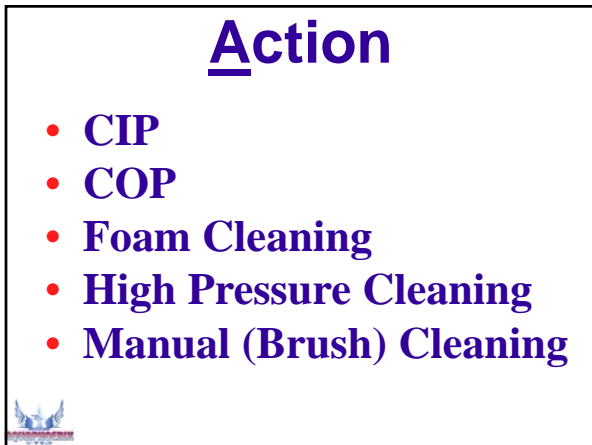
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**CIP Action Is Velocity**

| PIPE SIZE | VELOCITY | FLOW GPM |
|-----------|----------|----------|
| 1.5 in.   | 5 Ft/Sec | 24       |
| 2.0 in.   | 5 Ft/Sec | 43       |
| 2.5 in.   | 5 Ft/Sec | 69       |
| 3.0 in.   | 5 Ft/Sec | 101      |
| 4.0 in.   | 5 Ft/Sec | 180      |

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## Concentration



- Depends on Nature of the Soil:
- Chemical Type:



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## pH and CONCENTRATION

|                                 |       |      |      |
|---------------------------------|-------|------|------|
| Caustic<br>ounces<br>per gallon | 1/8   | 1/2  | 1    |
| pH                              | 12.9  | 12.9 | 13.1 |
| Conc.                           | .137% | .55% | 1.1% |



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## Test – Test - Test



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# Temperature



- **Rule of Thumb** – Clean at 10°F Higher than Process Temperature.
- For every 18°F Increase in Temperature – Doubles the Activity of the Cleaner.
- **Chlorinated – Alkali – Acid**



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## Temperature & Butterfat Removal

|                               |                |
|-------------------------------|----------------|
| Butterfat begins melting      | 98° F          |
| Butterfat becomes liquid      | 100° F -110° F |
| Triglycerides completely melt | 122° F         |

“Rule of 18” – to double the cleaning efficiency + 18° F



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# Temperature

## Cleaning is Enhanced with the Correct Temperature



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# TACT

Cleaning Parameters are  
linked together.

Changes in One Variable  
Effects the Others



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## Rule of “Four”

- Time                    4
  - x
  - Action                4
  - x
  - Concentration      4
  - x
  - Temperature        4
  - 4
- = 256



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## Rule of “Four”

- Time                    2
  - x
  - Action                4
  - x
  - Concentration      4
  - x
  - Temperature        4
  - 4
- = 128



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**Rule of “Four”**

- Time                    2
- Action                4
- Concentration       8
- Temperature        4

= 256



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**WINS**



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**Water**



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## Individual




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## Nature of Soil

| DEPOSIT            | DESCRIPTION  | CAUSE   | REMOVAL   | PREVENTION  |
|--------------------|--|---|---|---|
| Protein            | Blue rainbow hue<br>Varnish like<br>"applesauce"           | Use of non-chlorinated cleaner<br>Inadequate pre-rinse<br>Less than twice a day cleaning<br>Old or cheap cleaner with<br>insufficient chlorine level  | Shock treatment<br>with high chlorine-<br>alkaline<br>concentration<br>followed by an acid<br>rinse | Use chlorinated alkaline<br>detergent<br>Use correct concentration<br>Do correct pre-rinse  |
| Fat                | Water droplets<br>Greasy (white)<br>appearance and<br>feel | Too cold pre-rinse<br>End of wash cycle temperature<br>too low<br>Weak detergent concentration<br>Excessive recirculation<br>Cleaning procedures not done<br>systematically<br>Mechanical problem | Shock treatment<br>with high alkaline-<br>chlorine<br>concentration<br>followed by an acid<br>rinse | Ensure end of wash cycle<br>>105°F<br>Increase water heater to 165°F<br>Limit recirculation time under<br>10 minutes<br>Use correct concentration of<br>detergent and follow cleaning<br>procedures |
| Mineral            | White to yellow<br>Chalky to gray                          | Improper rinsing<br>Detergent fails to condition<br>water hardness<br>Incorrect or no acid rinse<br>Water very hard   | Acid shock<br>treatment   | Use detergent compatible with<br>water hardness<br>Acid rinse after each wash-<br>cycle with a pH 5 solution<br>Water softener  |
| Black              | Black residue<br>deposit                                   | Reaction of rubber parts with<br>chlorine<br>rubber parts too old   | Acid rinse<br>replace rubber<br>parts   | Acid rinse after each wash<br>cycle   |
| Corrosion          | red to brown<br>rust                                       | Water contains iron<br>Too much chlorine<br>Improper acid rinse   | Acid wash<br>Repolish surface if<br>in bad shape  | Regular acid rinse<br>Water treatment<br>Use appropriate detergents   |
| Pipeline<br>"roof" | Gray film or<br>white deposits                             | Incorrect water slugs   | Shock treatment   | Adjust air injection  |




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## Surface




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## Basic Cleaning Cycle

- Pre-Rinse
- Alkaline Wash
- Rinse
- Acid (Wash or Rinse)
- Rinse
- Sanitize
- Inspect



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## Acid Override

Start with Acid Wash

Do Not Rinse

Add Caustic Cleaner to  
Wash System



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98% Clean Equipment

Is

**Dirty Equipment**

Only Clean Equipment

Can be Sanitized



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**Quality Begins with  
Clean Equipment**



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**Food Safety  
Requires  
Clean Equipment**



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**Thank you!**



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