CHANGE…..Can you?

- Change is difficult and hard
- Doing the same things over and over and expecting different results = INSANITY.
- Those who adapt and change, doing it the right way, are usually successful in what they want to accomplish.

Technology has advanced our production except…

Cleaning and Disinfecting …

Most other areas of production…

Biosecurity

- Cleaning and Disinfecting should be a part of any good Biosecurity program.
- Important to know that C&D is only part of your overall Biosecurity program. There are a lot of steps and details besides C&D….. But C&D is very important and probably the most overlooked.
- Allow the advanced technologies in this part of the biosecurity program to make it a better overall program.

Why the C&D process is important

- Influenza virus by nature is easy to 'kill'. Having said that let's make sure the C&D process is done correctly and efficiently
- Make sure the A.I. 'process' hasn't created more problems then we are trying to solve.
- You have a chance to take care of potential problems that have been causing issues in the past
- These reasons among other things is why the C&D process is so important.
- Don't let a poor process cause you more down time.

Before anything begins with C&D phase…

- Pest control must be completed and continuously watched before C&D can take place
- Important to apply insect and rodent control products as soon as birds are euthanized and composting process begins.
- This is an EXTREMLY important process. Control flies, beetles and rodents as best you can.

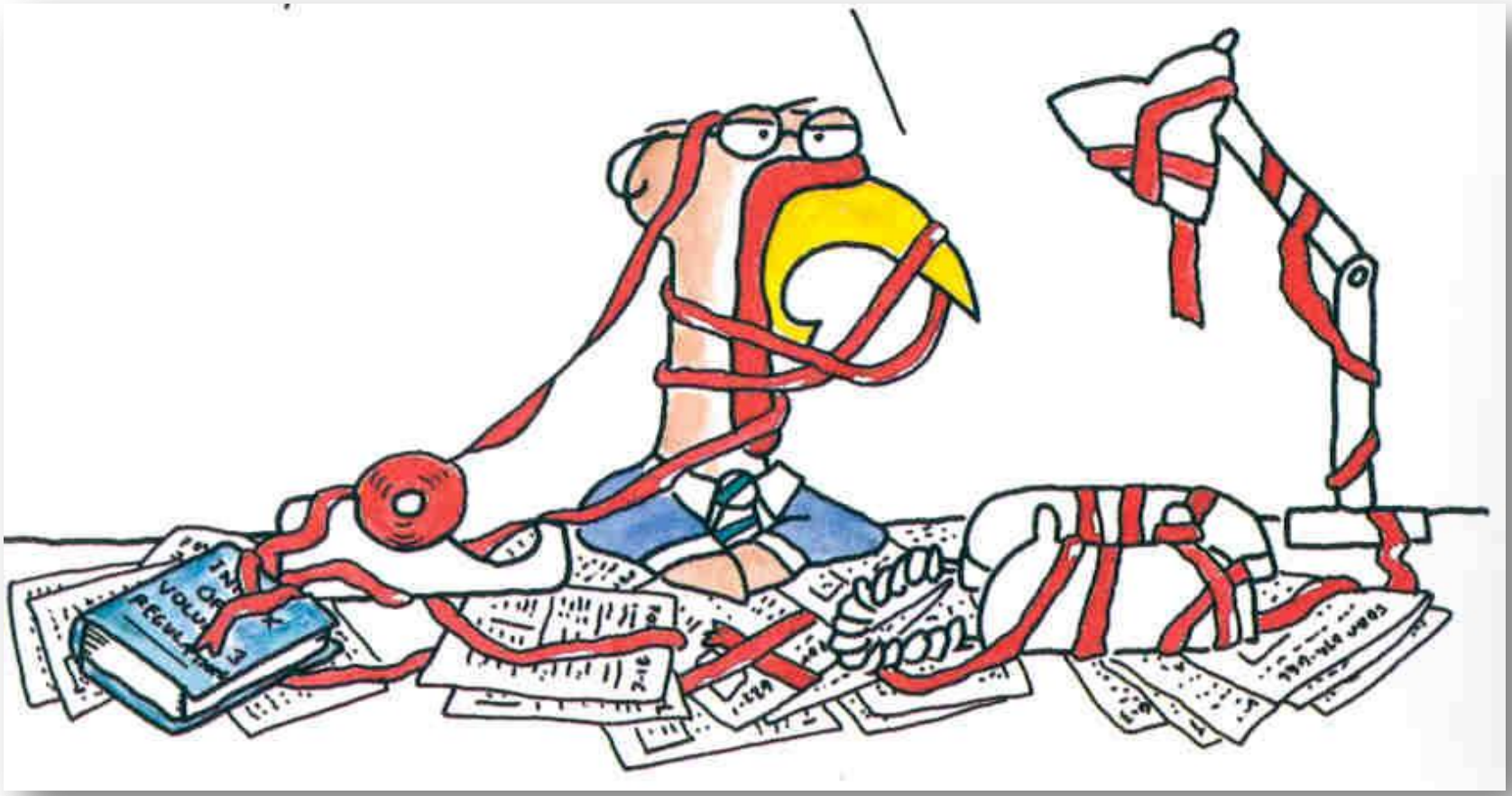
It's a process…. And not an easy process

- Remove excess organic matter (litter, left over feed etc.)
- **Apply detergent (foam)**
- **Wash**
- **Let surfaces dry**
- **Apply Disinfectant (foam or spray)**
- Set up building
- **Apply a secondary disinfectant (fogging)**

C&D is a very important piece of the puzzle but we need to remember…..

- **K** – Keep
- **I** – It
- **S** – Simple
- **S** – Stupid

The more complicated a procedure is, the less likely that people will understand it and do it correctly



And we can't have communication like this……

“Dry cleaning” steps

- Dry Cleaning consists of removing large debris like manure or bedding to specific location on site plan.
- Take out any equipment that can not remain in buildings during ‘cleaning’ phase.
- While dry cleaning turn off all fans, ventilation system and even spray any debris that may cause dust. Crucial to avoid spreading of pathogens during this process.

CFU Reduction Test From North Carolina State University

House Status	CFU / Sq. In.	% Reduction
Dirty	3,000,000	
Blown Down (air)	2,900,000	3.4%
Air Out (fans on)	2,000,000	31%
Washed w/ water	900,000	70%
Washed w/ detergent	100,00	80%

CLEANING IS IMPORTANT

'Preparing the surface for disinfecting'

<u>Cleaning comes first</u>!!!

- Removal of organic and inorganic dirt should allow for an 80 – 85% reduction of micro-organisms on the surface
- Where the disinfectant can reduce the rest of the pathogens easier.
- Very important to understand that cleaning and disinfecting are TWO separate ideas. Be very careful with products or protocol's that emphasize 'cleaning / sanitation / disinfection' as one step.

Why should I use a detergent?

- Only so many times a year you have a chance to reduce pathogen load (bacterial and viral) and break the cycle.
- Bacteria and viruses protect themselves with an organic barrier know as 'biofilm'.
- This protective barrier allows bacteria and viruses to remain unharmed by disinfection alone and continue reproducing

What kind of chemical or product should I use to clean my house?

- Alkaline cleaners
- Heavy duty alkaline cleaners are the best for every time cleaning
- Acid cleaners
- Acid type products should only be used for 'special' cleaning purposes or as a one time rotation to your alkaline cleaner

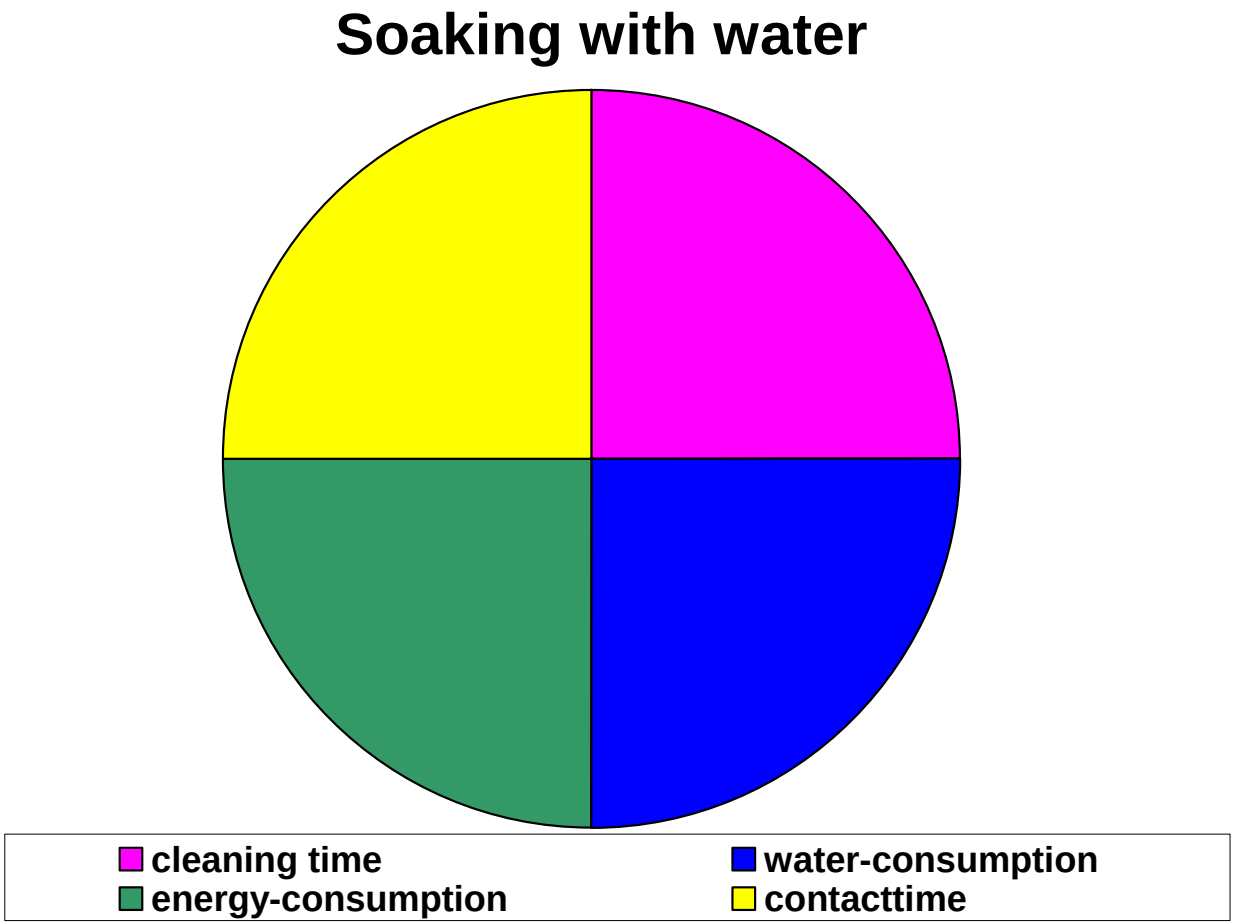
Why are Alkaline cleaners best

- Animal manure is acidic. Alkaline products 'neutralize' those deposits and therefore make them easier to remove.
- Removes fat, proteins and feed byproducts more effectively
- Is less corrosive on equipment and more user friendly on people, vehicles etc.

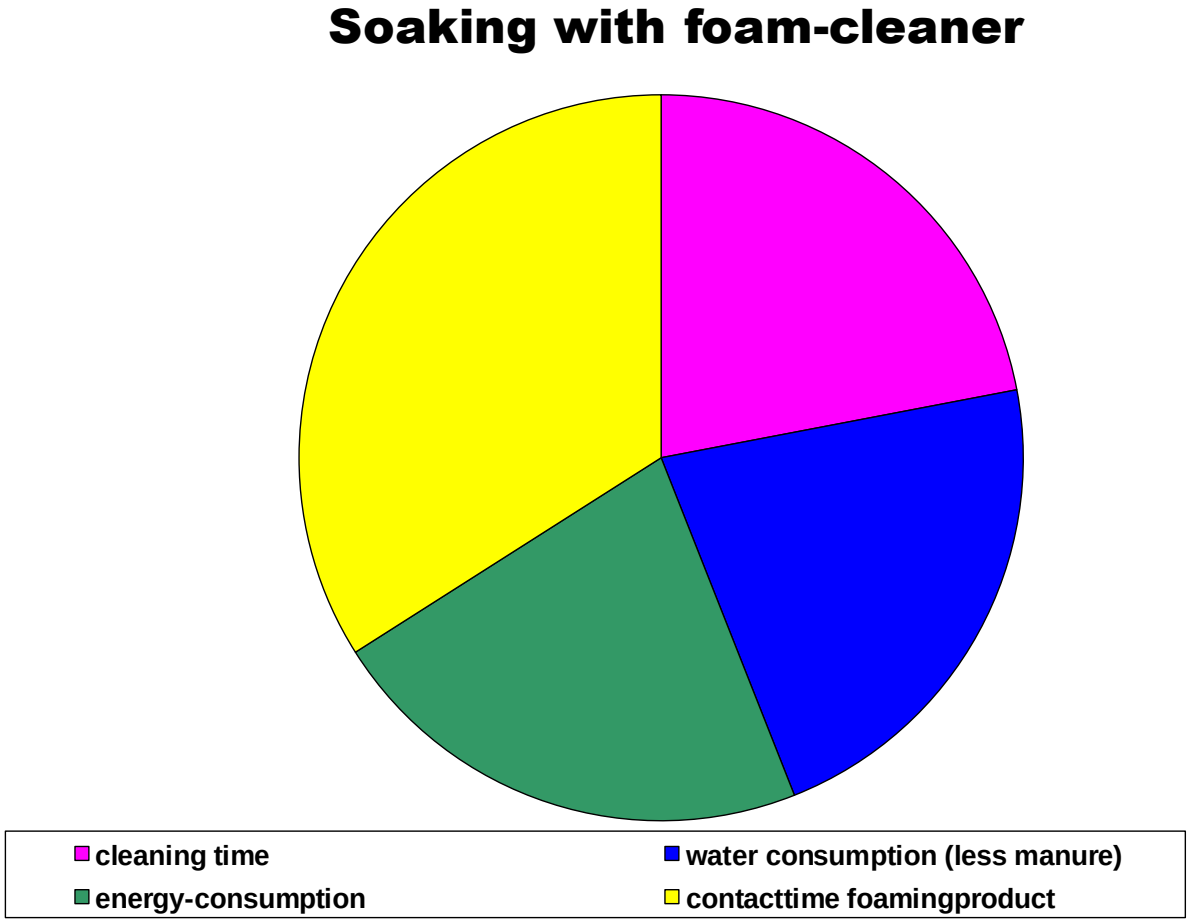
When to use Acid products

- Remove scale or mineral deposits. Scale is very alkaline hence an acid will help 'neutralize' and remove.
- Good for descaling drinkers with an acid foaming product.
- Acid based products are best used for 'specialty' type of cleaning applications.

CLEANING WITH WATER

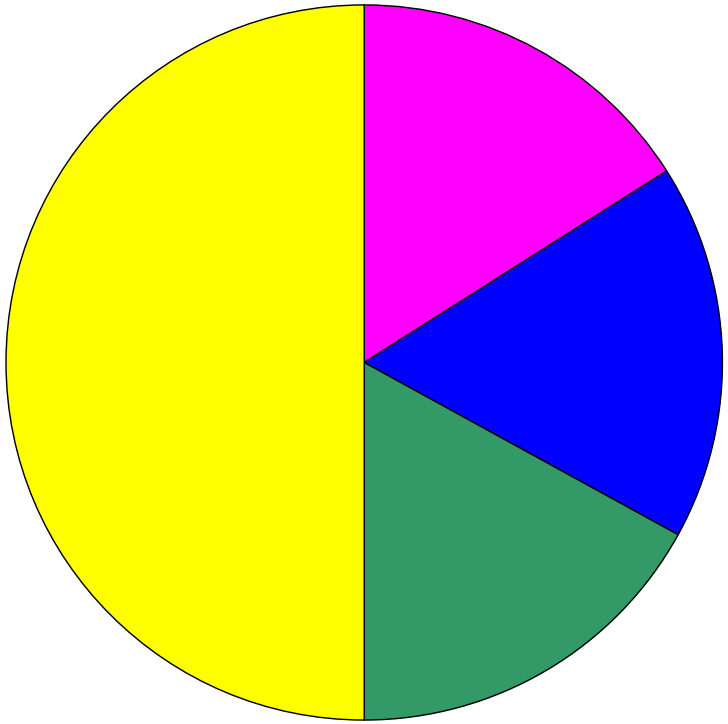


CLEANING WITH FOAM



CLEANING WITH GEL

Soaking with BIO-GEL



- cleaning time
- water-consumption (less manure)
- energy-consumption
- contacttime BIO-GEL

What is foam / gel?

- 90% air generated from foaming wand and pressure
- 9.8% water
- .2% chemical

Why should we use a foaming detergent

- Labor for cleaning consists of almost 85% of total cleaning and disinfecting cost
- Most claim using a gel based detergent saves 30 to 50% of the time it takes to clean
- In 60 minutes with a pressure washer that discharges 150 gallons per hour, 75 gallons of water may be saved in that time
- Huge $$$$ savings potential.
- Big environmental impact. Less water and product is used.

- Low pressure with garden hose application is unrealistic
- High pressure foamers allow you to cover surface area required in larger buildings
- Allows for a more consistent foam
- 700 to 1,000 PSI works good; 1,500 to 2,000 PSI works great.
- Detergent must be able to foam under high pressure

HANDY FOAMER

Whatever the foaming equipment it should have easy access to any equipment

Handy Foamer easily connects to any high pressure or washing system

The goal is to get this clean or prepared for the disinfecting step….

Video of Bio Gel being applied

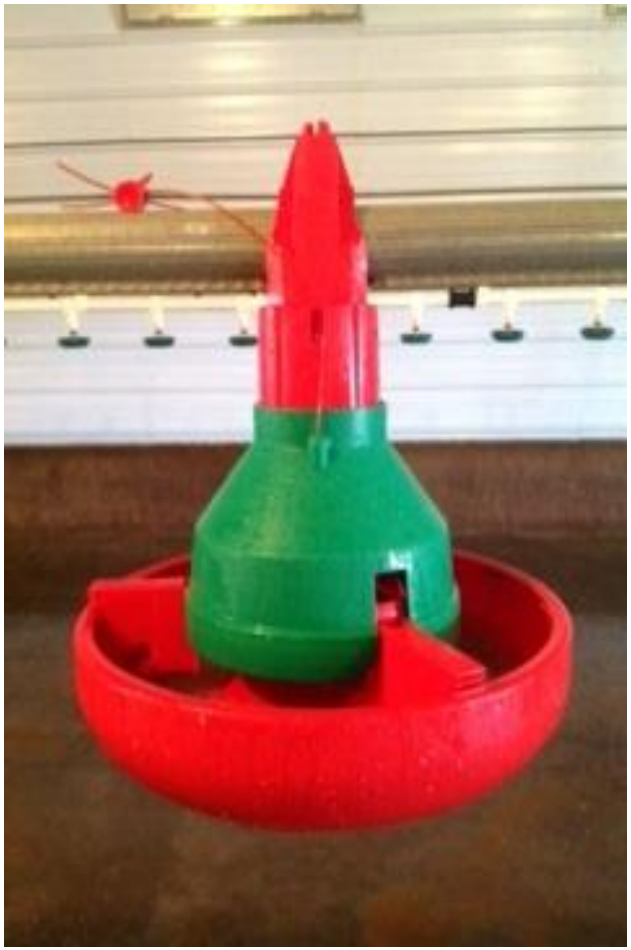
Video of Kenosan being applied

Let the detergent do the work for you….

After the foam is applied

- Product needs to be washed with water
- Foam will allow for less water and pressure needed
- This allows for a much safer and effective process
- No damage to equipment

This is the goal…..CLEAN before disinfecting



Safe and effective on transportation equipment including poult / chick and live haul trailers


HOULE
COMMERCIAL MANURE
APPLICATOR #1218CMS
JEWELL, IA
9500

Behind a great disinfectant
Stands a great cleaner

BVS
BEST VETERINARY SOLUTIONS, INC.

Let it dry before disinfecting

- Water creates a barrier that could prevent the disinfectant from reaching the surface
- Wet surfaces dilutes the disinfectant
- 1 mm of water on 360 sq. ft. of floor space equals 1 gallon of water. If you dilute the disinfectant at 1/3 oz per gallon in reality its diluted down to 1/6 oz per gallon in this scenario.
- Just in case the detergent and disinfectant don't match pH ranges. Low pH disinfectants should be used with low pH detergents and vice versa.
- If you do apply the disinfectant on a wet surface you need to double the dilution of your recommended dilution.
- If you utilize the dry ice cleaning this step is not necessary. You will need to remove the organic matter left behind from this process instead.

What are the trends in disinfecting products

- HBTA phenols have been banned in Europe ("*toxic*" and "*poor biodegradability*")
- Phenols are less efficacious (Phenol Coefficient) / Not sporicidal
- Formaldehyde has been classified as "*human carcinogen*" by the WHO's Int'l Agency for Research on Cancer (glutaraldehyde NOT !). Application limitations.
- QAC only (BKC) don't eliminate Pseudomonas (Gaidar, U. of Galway, …) and are not effective on fungi.
- Oxidizers (Quick Kill) are good for certain applications and good for rotation of traditional disinfectants but they to have there limitations. Too acidic and not as effective in presence of organic matter
- The market is changing : QAC/glut combination is the TREND: synergistic, efficacious, cost effective and safe (for people, animals, surfaces and the environment)

EPA approved Glut / QAC products on the market

Glutex GQ1

2.5% S.C. QAC

14% Glutaraldehyde

16.5% Total

1:256 label usage

½ oz per gallon

Synergize

26% S.C. QAC

7% Glutaraldehyde

33% Total

1:256 label usage

½ oz per gallon

VIROCID

17% S.C. QAC

7.5% T.C. QAC

10.7% Glutaraldehyde

14.5% Alcohol

49.7% Total

1:400 label usage

1/3 oz per gallon Only.

EPA approved Glut / QAC products on the market

Glutex GQ1	Synergize	VIROCID
Approved to 'sanitize' against A.I.	Approved to Disinfect against A.I. 1:256	Approved to Disinfect against A.I. 1:400
Registered as Sanitizer-Disinfectant	Registered as Cleaner-Disinfectant	**Registered as Broad Spectrum Disinfectant**
*Not on approved list	*On approved list	*On approved list

GLUT / QAC

Synergistic Mode of Action

1. The alcohol removes the lipids from cell wall
2. The QAC penetrate the cell wall
3. and "*drag*" the glut with them, to "*kill*" the nucleus

→in the case of 2 different QAC: more synergy and better efficacy with organic matter!

***This is why glutaraldehyde products that include other ingredients like Alcohol and QAC's work more efficiently then straight glutaraldehyde products.**

Glutaraldehyde based products according to 'Handbook of Disinfectants and Antiseptics'.

- Enveloped viruses like Influenza required a .2% (1:400) dilution and 1 MIN of contact time to inactivate the virus at room temperature.
- Noneveloped viruses needed a 1% (1:100) dilution and 1 MIN of contact time to inactivate the virus at room temperature.
- 'Organic Soil, which adversely affects many other types of chemical agents has little affect on the veridical activity of glutaraldehyde.'

Glutaraldehyde exposure limits
in the air (aerosols)

MEL (Maximum Exposure Limit) = 0.05 ppm

15 min exposure time

VIROCID sprayed @ 0.5 % (1:200) = 0.019 ppm (less than half)

VIROCID **foamed** @ 0.5 % (1:200) = 0.016 ppm (less than a third !)

VIROCID fogged @ 10 % (1:10) < 0.04

Conclusion : **VIROCID complies vey well with the MEL**

‘Oxidizer’ disinfectants

- M.O.A.:

  - It instantly ruptures the micro organism’s cell walls

  - It interferes with their enzyme systems
  - It disrupts their protein metabolism

- ‘Quick Kill’ disinfectants. Kills within seconds, not minutes like traditional disinfectants.

Peracetic Acid (PAA) disinfectants

- 26 % Stabilized Hydrogen Peroxide (H_2O_2)
- 5 % Peroxyacetic Acid
- + buffering agents, stabilizers, sequestering agents, corrosion inhibitors, wetting agents (surfactants = foams!)

- **Keno X5 and Peraside are examples of EPA registered PAA disinfectants**

- PAA products break down into 3 natural elements; CO_2, H_2O and O_2 (carbon dioxide, water, oxygen)

Peroxygen Compounds – KMPS

- 21.41% Potassium peroxymonosulfate
- 1.5% Sodium Chloride
- Combination of organic acids and inorganic buffers

- **Virkon-S is an example of an EPA registered Peroxygen disinfectant**

- KMPS breakdown into Cl, OH and O (Chlorine, Hydroxide and Oxygen)

- Most PAA and Peroxygen products are considered Broad Spectrum disinfectants and are very effective when used at the appropriate dilutions.

- Foot Dips – Because of its quick kill properties. Much more applicable then traditional disinfectants. Must renew solution daily.

- Pad and floor acidification

- Products can be fogged if the fogger has stainless steal gaskets.

Downside to 'oxidizer' disinfectants

- Typically more corrosive and have application limitations because of low pH or oxidizer properties of the product.
- More affected by the presence of organic matter so higher dilutions are required. Typically 1:50 to 1:100 dilution making the products more costly.

Chlorine Dioxide

- Can be more effective in the presence of organic matter compared to other 'oxidizer' chemicals and is less corrosive compared to other 'oxidizer' chemicals.
- **Most effective way to use Chlorine Dioxide is for preventive measures like continuous water sanitation / disinfection.**
- Downside to Chlorine Dioxide is properly 'activating' the product on site for effective results. The product is not Ready to Use which results in the chemistry not being utilized properly. When activated a CLO2 gas is generated.
- Can be effective at fogging for terminal disinfection. Surface still needs 'cleaned' before using CLO2.
- **CLO2 'canisters' are great for fogging feed bins, egg trucks etc.**

Characteristics of Ingredients

	Efficacy					Corrosivity				Influence
Products	Uncap Virus	Naked Virus	Bacteria	Spore	Fungi Yeast	Metal	Plastic	Paint	Concrete	Organic matter
Soda	yes	yes	yes	yes	yes	yes	yes	yes	no	Weak
Peracetic acid	yes	yes	yes	yes	yes	yes	no	yes	yes	Strong
Chlorine	yes	yes	yes	yes	yes	yes	no	no	yes	Strong
Iodine	yes	no	yes	no	yes	yes	no	no	no	Strong
Aldehydes	yes	yes	yes	yes	yes	no	no	no	no	Weak
Alcohol	yes	no	yes	no	yes	no	no	no	no	Strong
QAC	yes	no	yes	no	yes	no	no	no	no	Weak
Amfoteres	yes	no	yes	no	yes	no	no	no	no	Weak
Phenolics	yes	no	yes	no	yes	no	no	no	no	Strong
KMPS	yes	yes	yes	yes	yes	yes	no	yes	yes	Strong

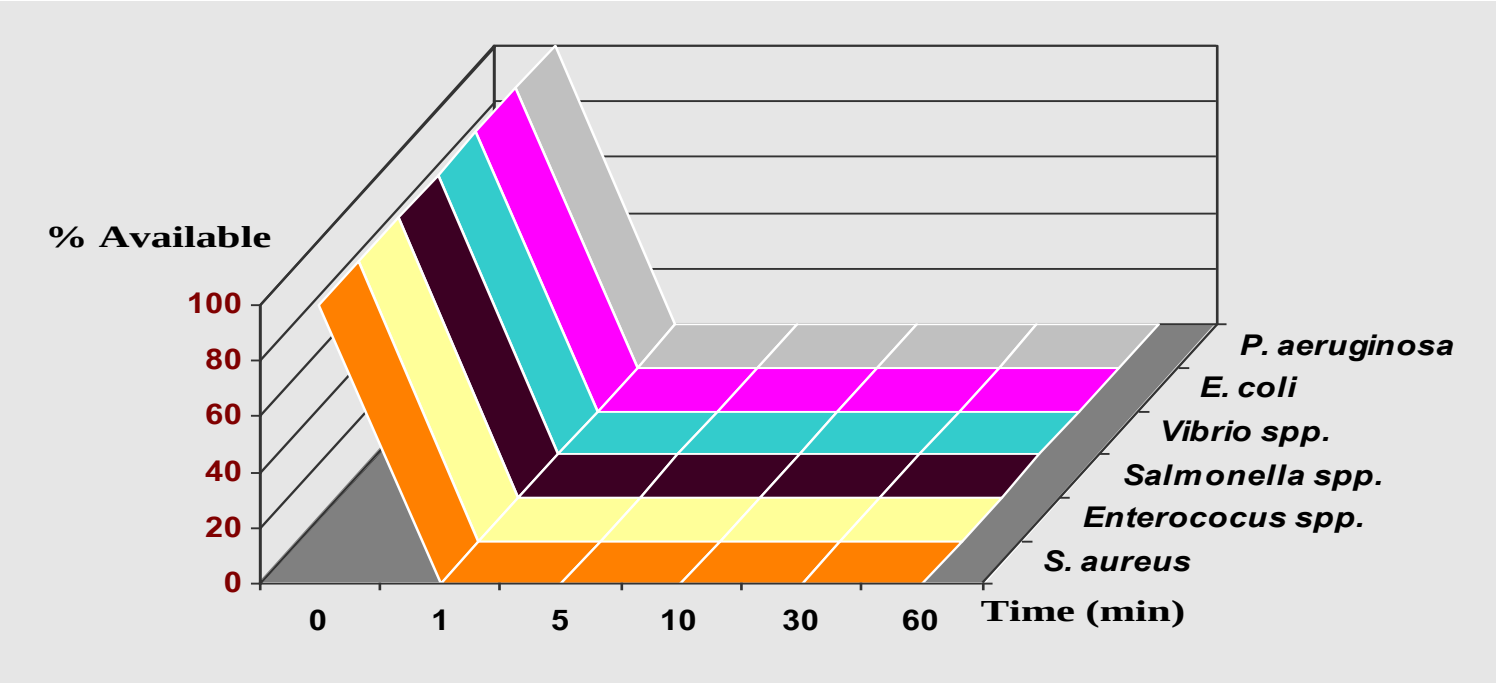
Why foam disinfectants

- Seeing is believing. You can physically see areas you have and have not covered
- Foam allows the disinfectant to have more contact time with the area you are disinfecting
- Use less water to apply the disinfectant. Less water left in the environment / building.
- Allows the disinfectant to stay wet longer. They longer the disinfectant stays wet, they longer it stays active. Once a disinfectant dries it loses its activity.
- Use less product

Foam on equipment 20 minutes after application

Contact time for most disinfectants is the key. Most need at least 1 minute of contact time to kill any bug

Residual = how much time will the bug not reappear.
This graph shows up to 1 hour. NO disinfectant can have a residual for days or weeks.



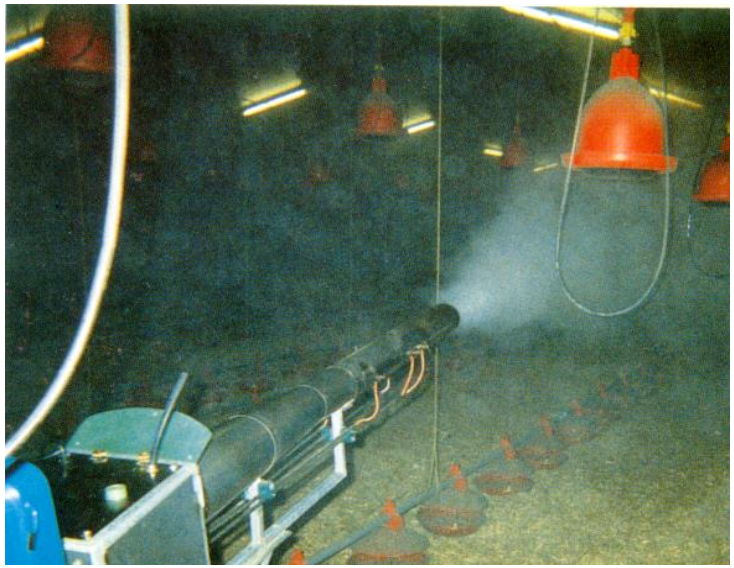
Pump up foamers for disinfecting vehicle tires etc.

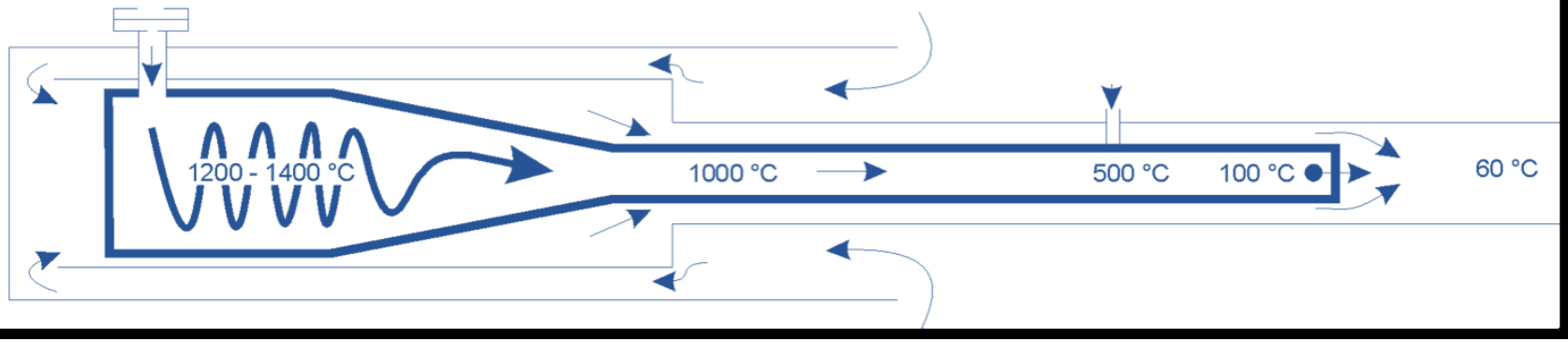
Foaming truck disinfection systems

*Systems from Innovative Cleaning Equipment

Fogging as a dry disinfecting step

- Fogging is NOT burning smoke but propelling a mist
- Chemical only remains in exhaust for .005 to .1 seconds so there is no heat effect
- Can propel product up to 250 feet
- Fogging is a good secondary disinfection procedure





- IF the surface or area being disinfected has been properly cleaned fogging can be a good alternative to traditional applications for disinfecting if a wet disinfecting (foaming) application is not applicable
- Fogging allows for areas to be covered that may be missed by foaming or spraying
- Fogging could be a good alternative for layer facilities not wanting to introduce water into their facility.
- There are tests and documents that show fogging alone can reduce pathogen load in buildings and can effectively control pathogens. (testing data available)

- Best to find products that can fog with out enhancers or the need to add other chemicals
- A perfect S.O.P would include both a wet disinfecting application followed by a dry fogging application
- IF your cleaning procedures are not up to par and there is 'organic matter' left behind I would highly recommend a wet disinfectant application (foaming) first before a dry fogging application

Dramm K-22 O Fogger

10 minutes later

20 minutes later

30 minutes later

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SAFETY FIRST

- Follow MSDS precautions and directions for disposal
- Always wear appropriate PPE
- Apply product under label usage directions

Summary

- Utilize the technologies and products at hand to make this process as efficient (time and cost) and effective as it can be.
- The entire C&D process is a lot of work but try and remember to K.I.S.S.
- If you want to make this process more efficient let the companies / growers take charge of this process. Give them direction and possibly a set amount of $ to complete the process and they will figure out how to get it done and what is best for them.
- Some companies may not feel this process is important. That is up to them.

- An ounce of prevention is worth a pound of cure!