# *Listeria monocytogenes* Intervention & Control Workshop

**Blue Sky Sanitary Design**

**Rudi Groppe**

UNITED FRESH
PRODUCE ASSOCIATION

# Hygienic Design – What are the next steps?

- Know the Enemy
- Sanitary Design Guiding Principles
- Zone Definitions
- Facility Design
- Sanitary Methods of Manufacturing

Focus: How do I ask the right questions?

HEINZEN™

YOUR PARTNER IN FOOD SAFE INNOVATION

# Where does *Listeria* "hang-out" in equipment?

- **Laminations**
  Bolt Connections, Sandwich joints
- **Surface Finishes**
  Poor welds
  Exposed aggregate flooring
  Corrosion (rusting, pitting)
- **Control Panels**
  Condensation, Buttons, Unmaintained gaskets
- **Hollow Areas**
  Tubing
  Product Containers (Bins/Totes)
  Product Utensils (Shovels, Paddles)
  Whether purposely penetrated or not
- **Floors Drains**
- **Air Blowers, Cooling Evap Coils**

N.B.C.

**Sanitary Design Guiding Principles**

- AMI, GMA, 3A, EHEDG (*But what is my risk?)*
- Method to implement sanitary design across all process zones

## Facility Design Guiding Principles

1. Defined Hygienic Zoning
2. Controlled Flows
3. Controlled Floor Systems
4. Controlled Room Temperatures
5. Controlled Room Pressures
6. Sanitarily Designed Facility Exterior
7. Sanitarily Designed Doors, Walls & Ceilings
8. Sanitation & Maintenance Access
9. Sanitarily Designed Support Equipment
10. GMP-based Facility Design

## Equipment Design Guiding Principles

1. Microbiological Clean
2. Made of Compatible Materials
3. Accessible
4. No Liquid Collection
5. Hollow Areas Hermetically Sealed
6. No Niches
7. Sanitary Operational Performance
8. Hygienic Design of Maintenance Enclosures
9. Hygienic Compatibility
10. Validated SSOPs

# How do we embed the Principles of Sanitary Design into our Core Values?

- Develop a Vendor Qualification Program
  - Internal teams – Proactive training?
    - Facility Contractors
    - Equipment Suppliers
    - Equipment Installers


Are we armed and dangerous?
Who owns it?
How do we handle it?

# We all own a piece!

## DEPARTMENTS AT H

1. Sales: Responsible for selling of custom & standarc

2. Estimating: Responsible to ensure accurate quotes
ers with direction from Sales.

3. Accounting: Responsible for payables and receivab

4. Engineering: Responsible for the layout and design

5. Purchasing/Warehouse: Responsible for the purcha
ment, and kitting in the warehouse, ensuring productio
the specific build.

6. Metal Prep: Sheets of stainless steel are cut, bent a
the pieces that will be welded together.

7. Machining: Processes various material through vari
parts for Fabrication and Assembly.

8. Fabrication: The welders of the process. They reac

# Definition of Design Zones

The development of Design Zones is critical for the development of  the sanitation master plan, and standardized methods of sanitary design and methods of manufacturing.

The Zone concept is designed to work with a Master Sanitation plan to include the testing and verification process.

## COLD

Zone 4

Remote: doorways, walls, drains (non-processing)

## WARM

Zone 3

Below the production flow, still subject to environmental and sanitation concerns for a RTE (ready to eat) food processing facility.

## GETTING WARMER

Zone 2

Non-Food Contact: table legs, floors, drains, aprons

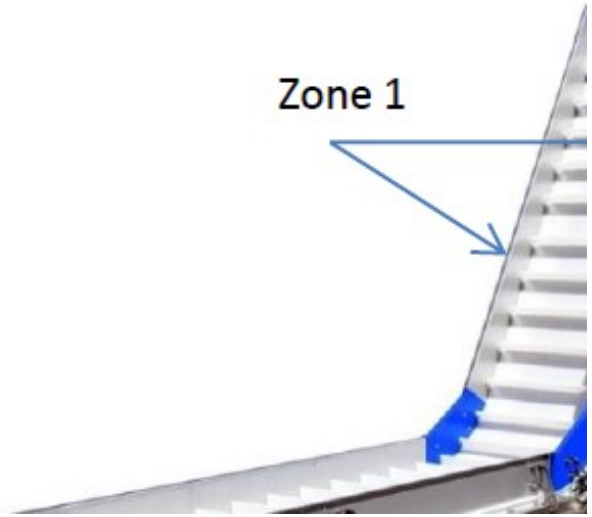
## FOUND IT

Zone 1

Product Contact Surfaces

Incidental Product Contact Surfaces :

- Drip
- Drain
- Drawn
- Diffuse



# Sanitary Plant Design

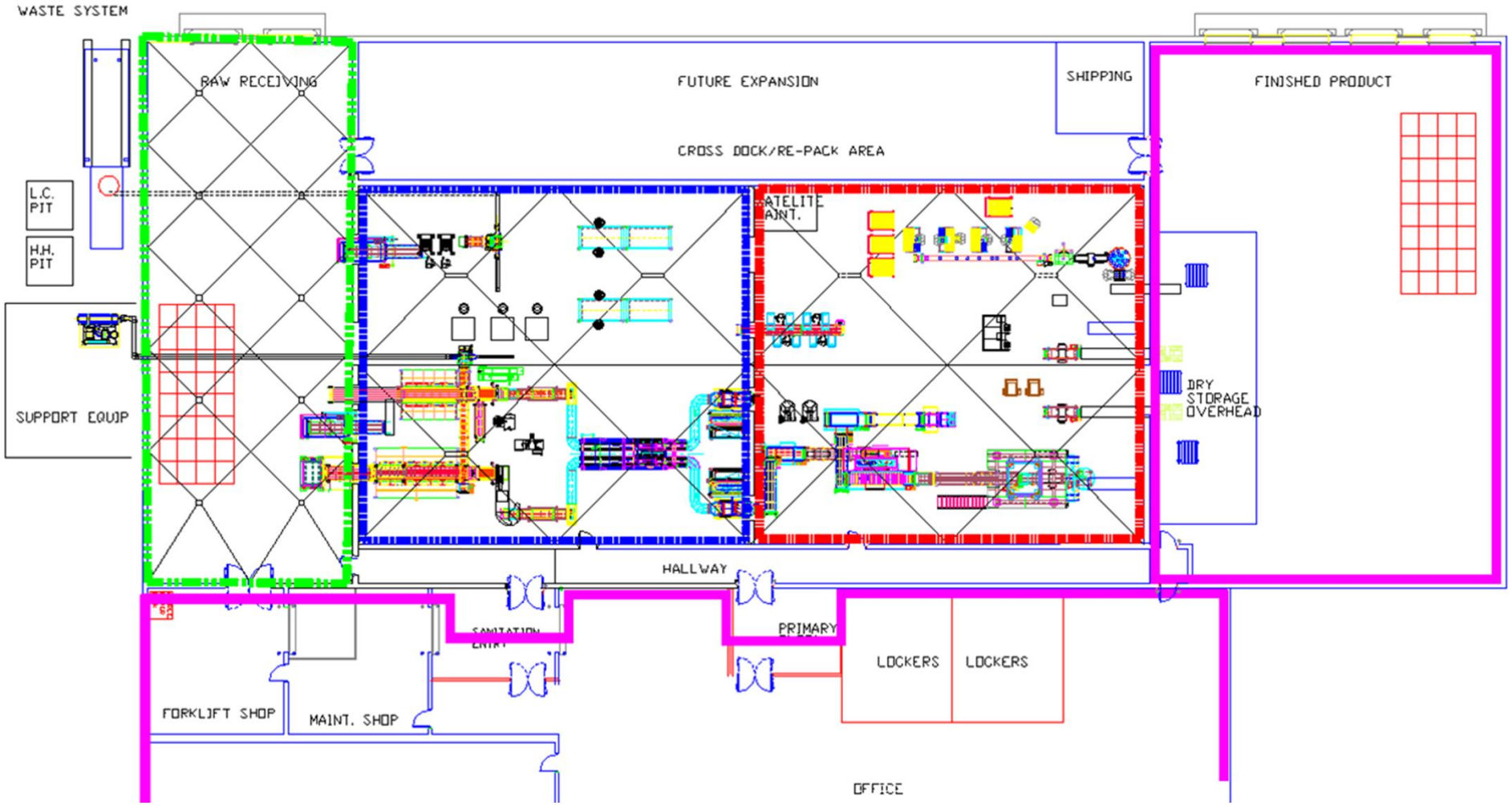
## Defined Hygienic zones based on a Low Risk to High Risk definition

RAW — Incoming product storage area, pallets, wood, cardboard.

RTE — Ready to Eat, zone where the product is undergoing microbial reduction.

HH — High Hygienic, product is in its cleanest state, just prior to packaging.

LR — Low Risk, Finished Product, Offices, Locker rooms.



# Facility Design Guiding Principles

Best Practices:  How do we all get on the same page?

*Luck favors the prepared!*

- Floors
- Floor Drains
- Walls
- Electrical and Plumbing Contractors
- Evaporator Units
- Equipment Anchoring

**Floor Systems:** What is the risk with a compromised floor system?

***What's the cost of not doing it right the 1st time?***

- Sloped Floors typically 1/8 inch to 1/4 inch per foot (Specify Non-Pooling)
    - 3/16" per foot in Critical Processing areas
    - High forklift traffic areas

- Floor Coatings

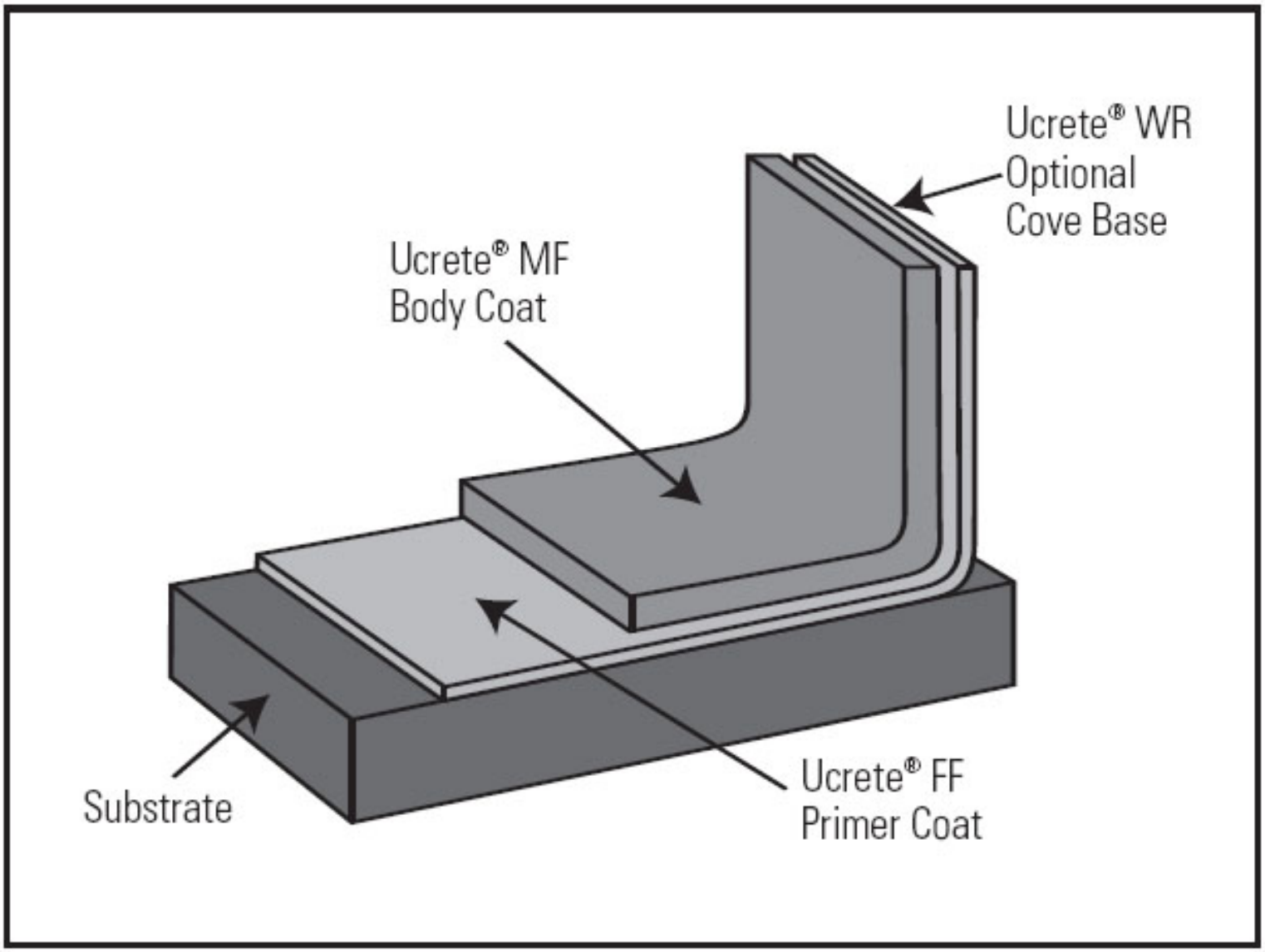
  Polyester base, Epoxy Base, Urethane Base

  Urethane Floors, Set in 12 hours @ 36 degrees in wet cond.

- Retrofitting Existing Facilities
    - Preparation is 90% of the work
    - Urethanes cures fast in cold, now available in high build

# FLOOR PREP FAILURE

# URETHANE FLOOR COATINGS



GREAT YOUTUBE VIDEOS!

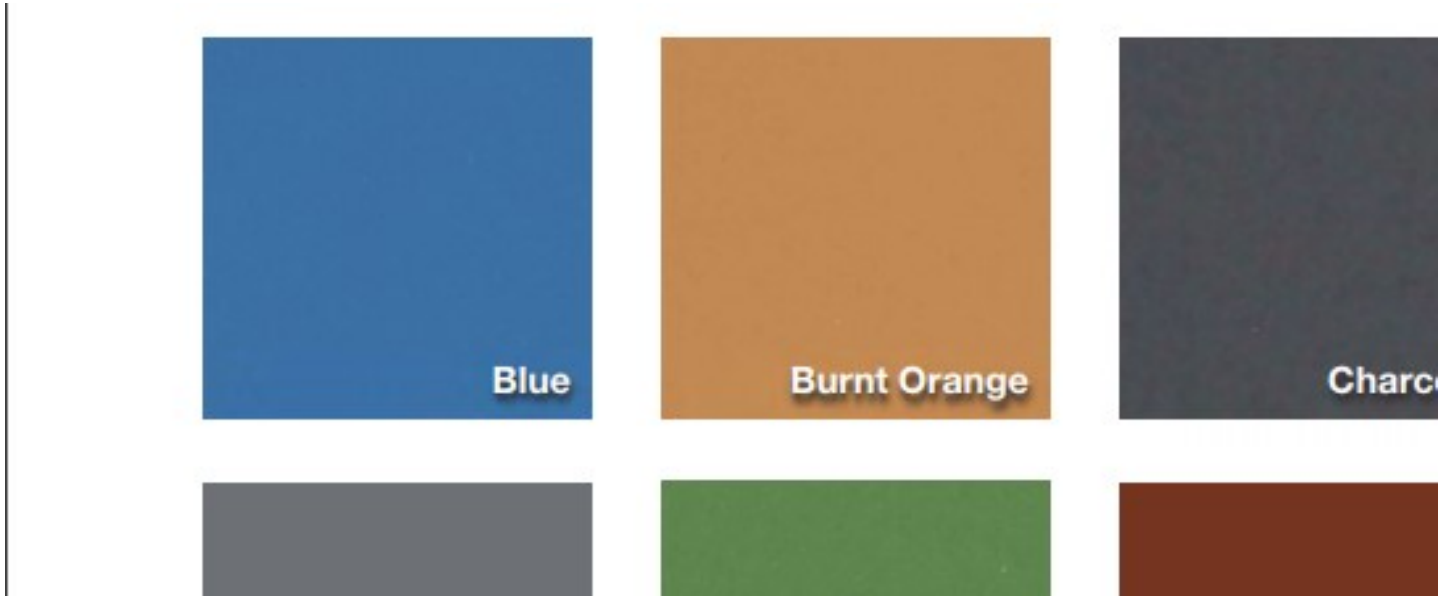
# POLY-CRETE HF

**DESCRIPTION**

POLY-CRETE HF is a 100% solids, aromatic, cementitious urethane system. It is a pigmented, trowel applied floor system. It is typically applied 1/4 -3/8 inch thick depending on design requirements. POLY-CRETE HF is designed to

**PACKAGING/STOR**

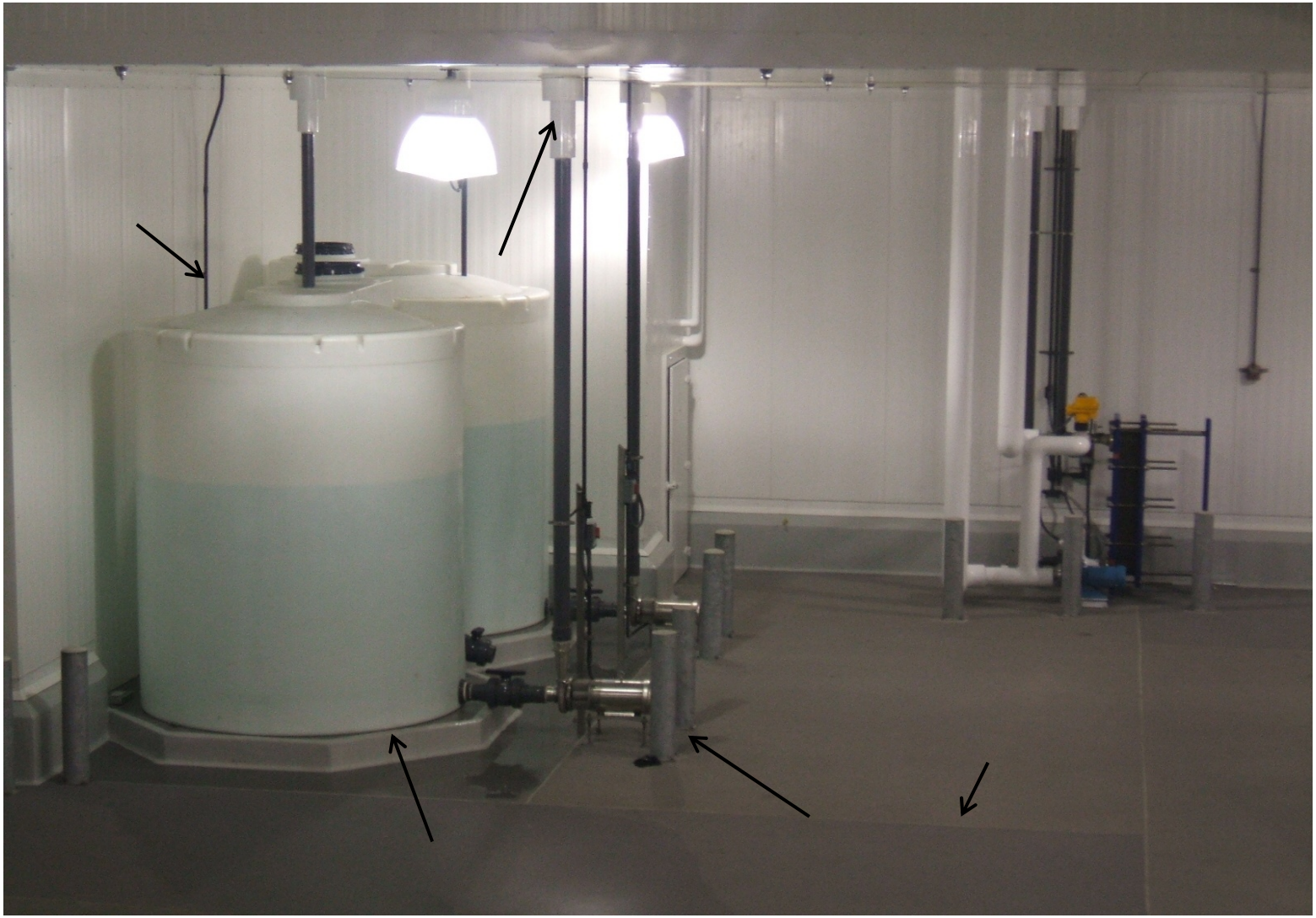
POLY-CRETE HF is
cover 18 Sq Ft. at ¼ i
CRETE HF must be st
aggregate. Do not allo




DUR-A-FLEX

95 Goodwin Street, East Hartford,
3969 East Guasti Road, Suite B, Onta

# Lamination Control and Mobile Equipment Protection

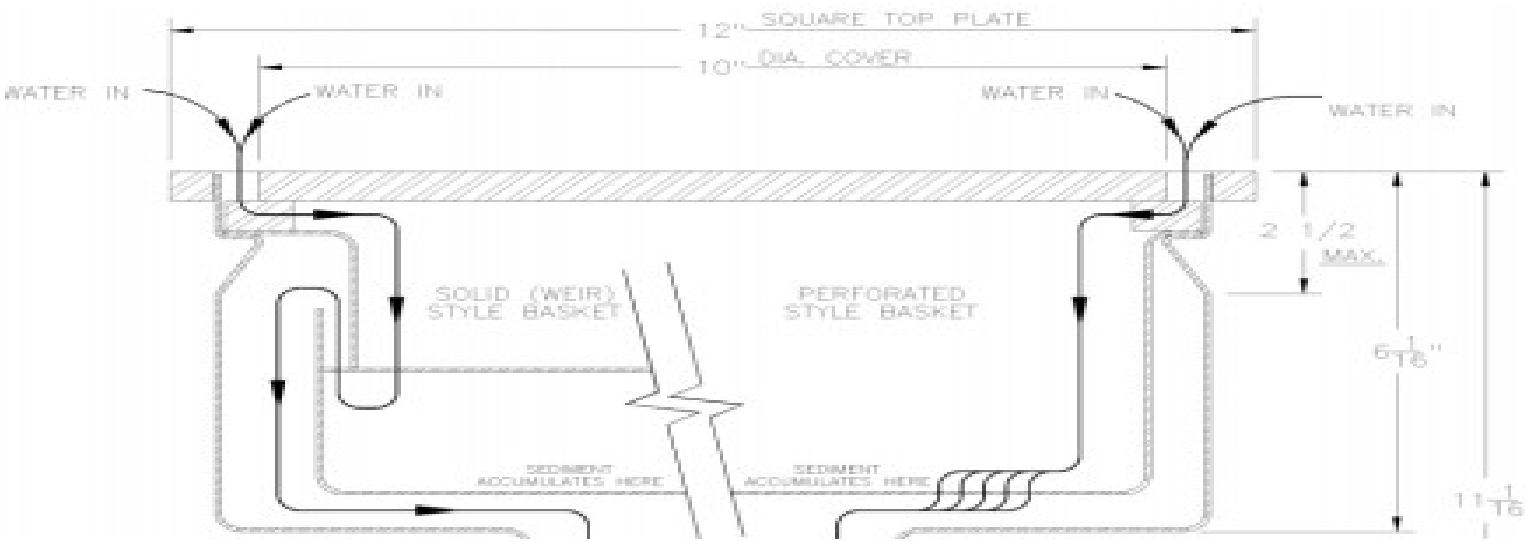


What can we improve on in this picture?

## Floor Drain Systems:

- Short trench drains versus long trench drains
    - Stainless Steel, design allows concrete to “key” to prevent de-lamination
    - 12” x 12” Drain Box
    - 8” x 48” Area Drains for high flow.

# KE SERIES FLOOR DRAIN




820
WAT
PHO
FAX:
SALE
WWW

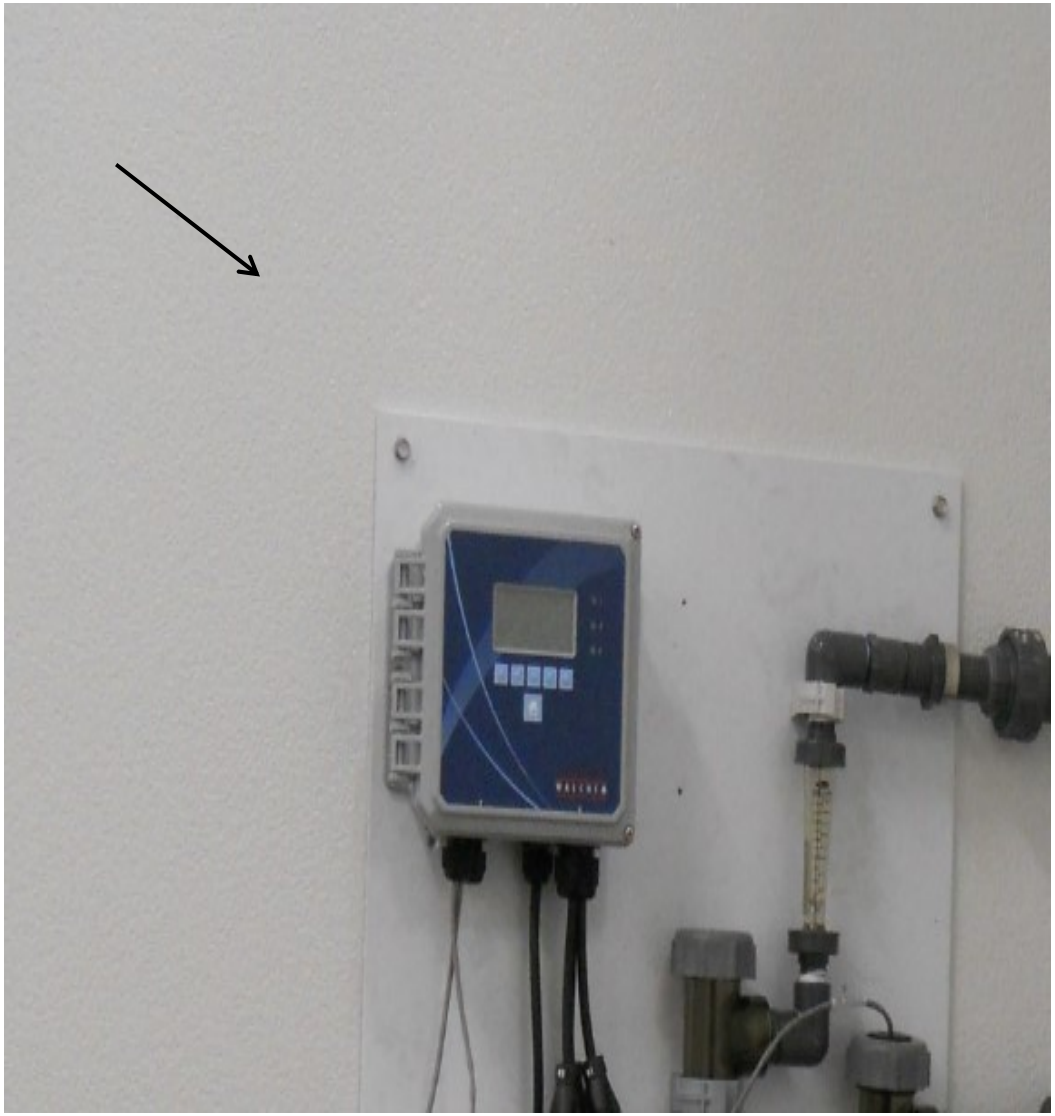
## Walls, Ceilings, How to handle Laminations and Penetrations?

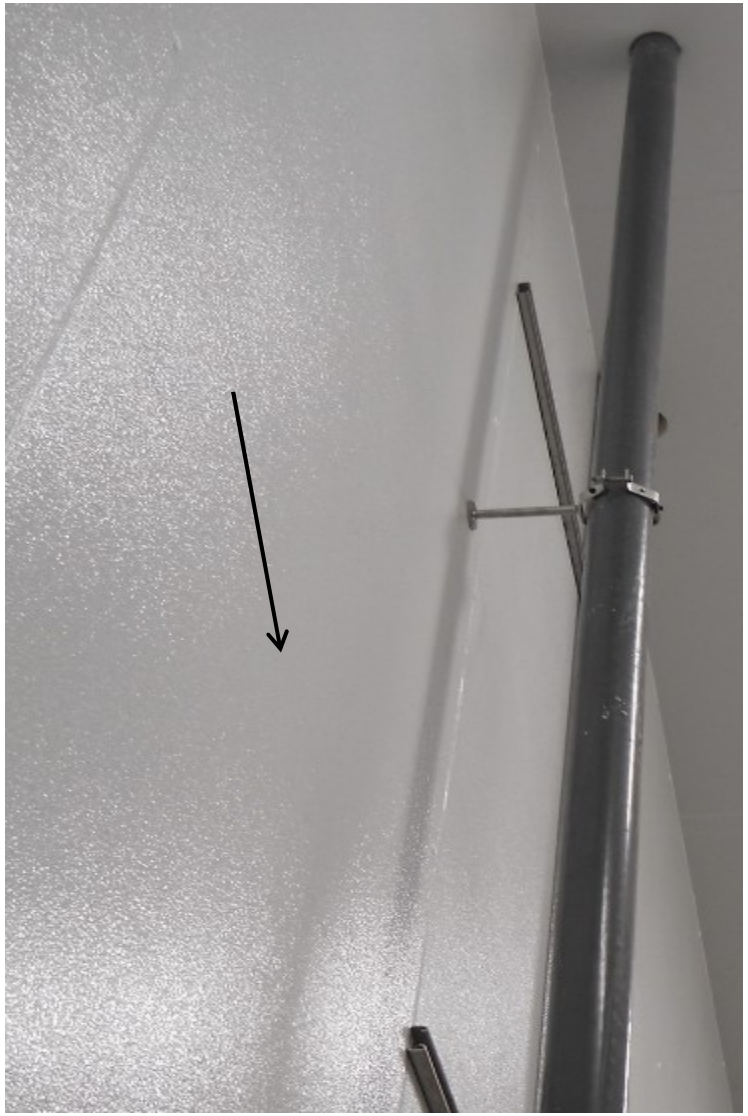
- Ceiling Height, 25’-30’
- Raised curb system with sloped ledge and epoxy coated or Stainless Steel Base
- Wall systems use, 3” Urethane Insulated Metal Panel (FRP)
- Walk on roof system, 4” Urethane Insulated Metal Panel

## Retrofitting existing walls, need creative work arounds & EFFECTIVE COMMUNICATION

# Sub Contractors – Pre Qualified

## Sanitary wall connections





**Evaporators in Process Room**

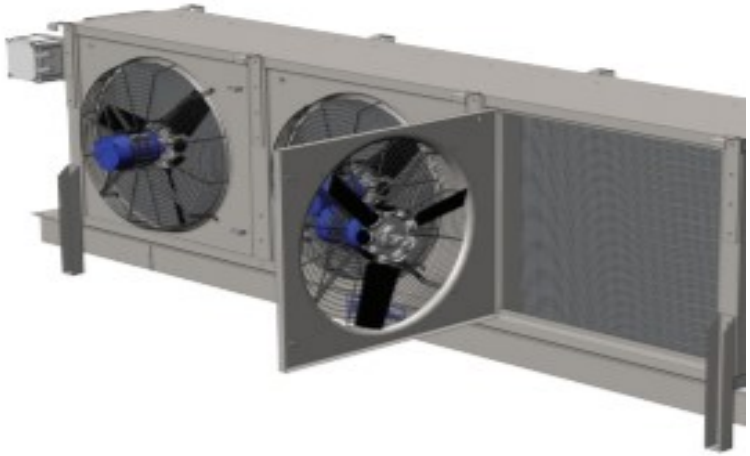
- Flush Hung to Roof
- Stainless Steel Coils
- Axial Fan vs Centrifugal Fan Types
- Water Wash and Flush Systems

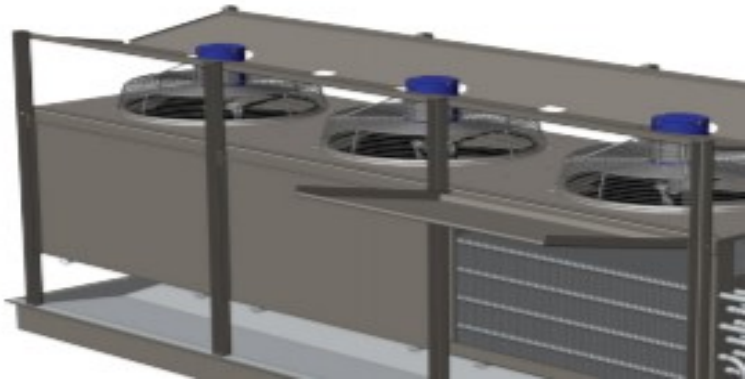
Visit www.colmaccoil.com for m

**CLEANABILITY IS STANDARD**

*Cabinet Materials:* Cabinet sheet meta
galvanized steel, aluminum, or stainless s

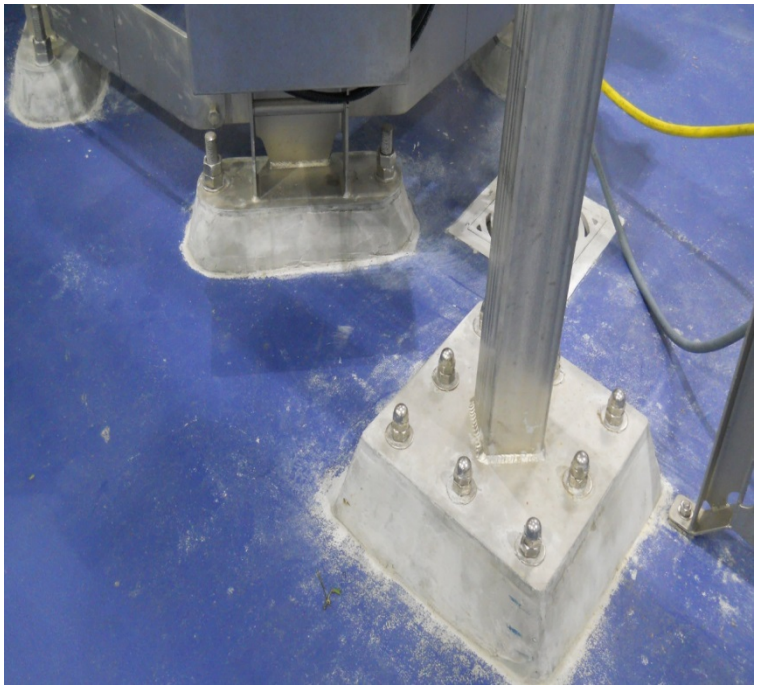
*Hinged Fan Panels:* Fan panels on all A
and A+R air coolers are hinged for eas
cleaning, and service. The A+D has an
fan panel.





## Equipment Anchoring

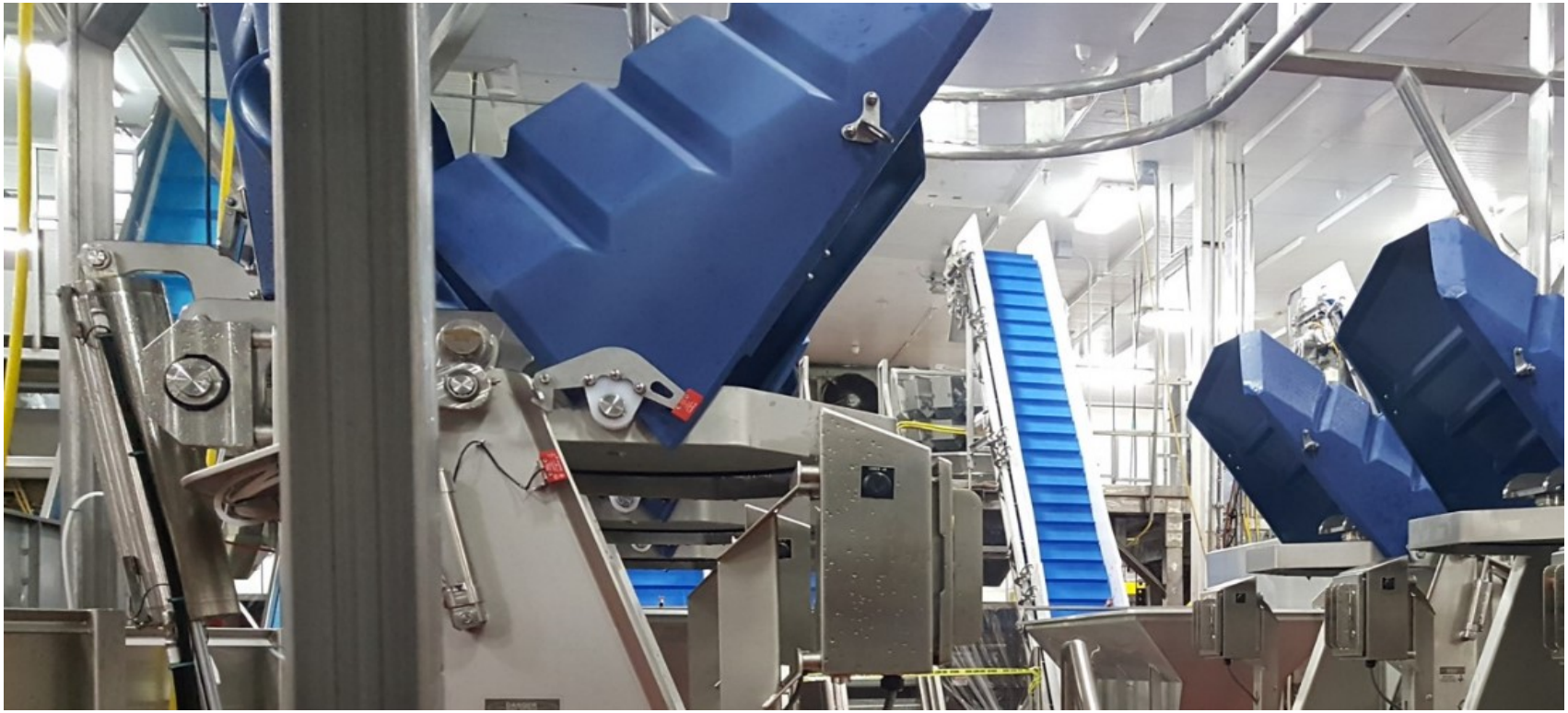
- Insure grout is sealed to the edge of base plate
- Cap anchors to cover exposed threads
- Quality of grout and contractor training
- Equipment removal procedure to clean all connections



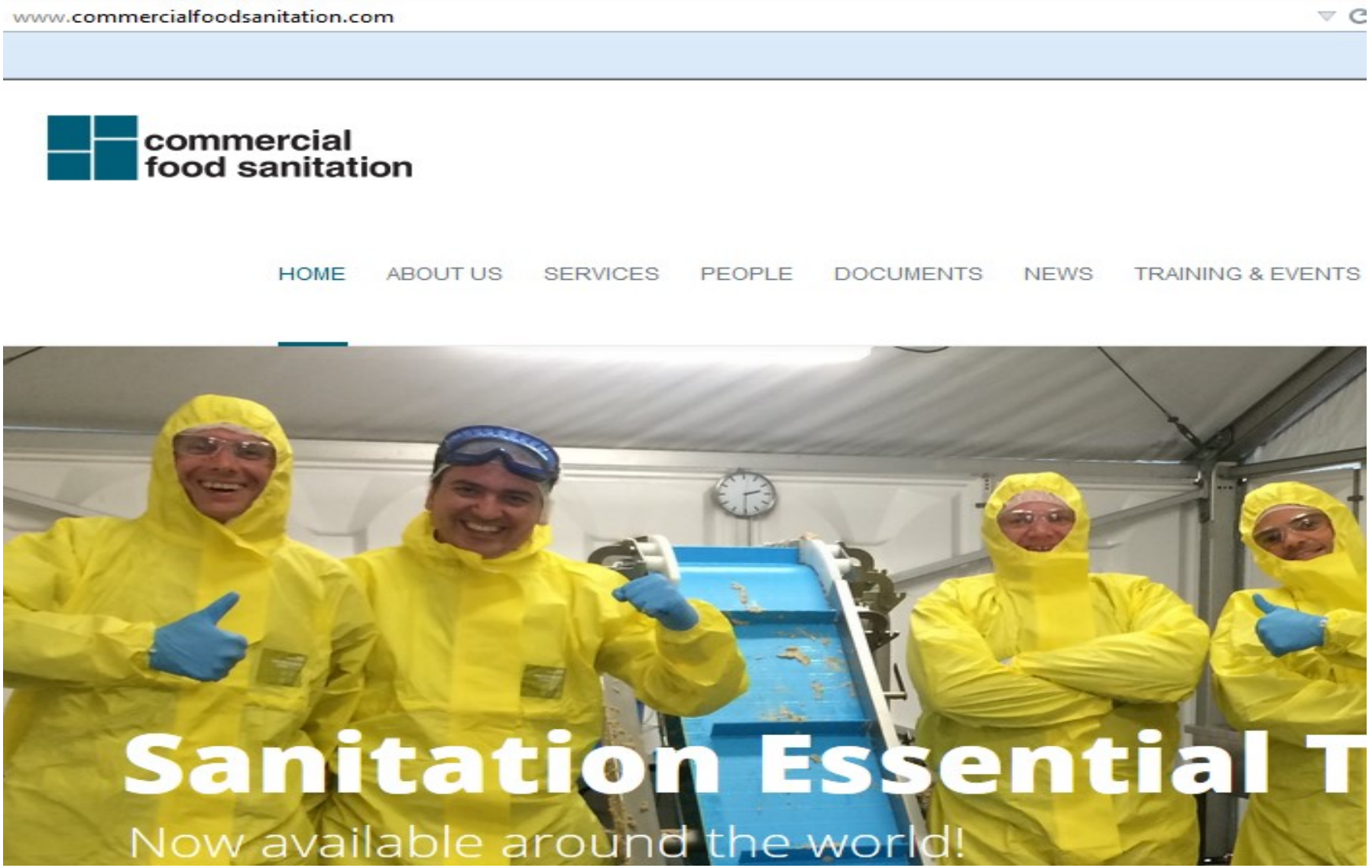
## Equipment Design Guiding Principles

Best Practices:  How do we implement the 10 Principles of Sanitary Design?

- Training
- Review of each principle with updated equipment checklist
- Examples
- #1 TRUST BUT VERIFY



# How do we find discipline?



# What does it mean?……HOW DO I CLEAN IT?

*Did you ask your plant Engineer? Are expectations clear?*

commercial food sanitation

**Equipment Sanitary Design Checklist for Produce and Fruit**

Supplier:
Review Date: 8/29/2018
Review Location:
Equipment Description:
Model #: 239562C02
Serial #: 42507
Date of Manufacture:

S = Satisfactory
M = Marginal
U = Unsatisfactory
The Score will automatically calculate on the Summary page

| PRINCIPLE #1 - Cleanable to a Microbiological Level | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| # | Criteria | S | M | U | NA | Comments | Points | Points Available |
| 1.1 | Equipment is designed to be constructed & maintained in a cleanable condition to prevent the ingress, survival & multiplication of microorganisms (measured post installation). | | | | | | 0 | 20 |
| 1.2 | All surfaces are cleanable as measured by <1 CFU per 25 square centimeters, <1 CFU per 10 ml when the item is rinsed, acceptable RLU (device specific) when measured by residual ATP, and/or negative for residual protein or carbohydrate when using swabs to detect residual protein or carbohydrate (measured post installation). | | | | | | 0 | 20 |
| 1.3 | All surfaces are accessible for mechanical action during cleaning & treatment to prevent biofilms formation (measured post installation). | | | | | | 0 | 20 |
| 1.4 | When requested, data are available to demonstrate that soiled equipment is cleanable (as defined above) by an individual using the cleaning protocol provided by the equipment supplier (measured post installation). | | | | | | 0 | 20 |
| 1.5 | Surfaces are clean visually and to touch, & pass pre-op inspections using sight, touch & smell (measured post installation). | | | | | | 0 | 20 |
| 1.6 | A HACCP based product risk assessment was completed during the design phase to understand risks associated with the product type | | | | | | 0 | 20 |
| 1.7 | Method of cleaning needed for the product risk was incorporated into the chosen design of the equipment | | | | | | 0 | 20 |
| 1.8 | Equipment has no apparent flaws that will fail over its life and make it uncleanable | | | | | | 0 | 20 |
| | | | | | | | 0 | 160 |

| PRINCIPLE #2 - MADE OF COMPATIBLE MATERIALS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| # | Criteria | S | M | U | NA | Comments | Points | Points Available |
| 2.1 | Product Contact Surfaces must be made with materials which are corrosion resistant, non-toxic, and non-absorbent and approved. | x | | | | | 20 | 20 |
| 2.2 | In general, Stainless Steel shall be AISI 300 series or better. | x | | | | | 15 | 15 |
| 2.3 | Composites & plastics remain intact without changes in shape, structure & function thru cleaning & sanitation protocols. These should be easily removed and replaced as needed. | | x | | | | 5 | 10 |
| 2.4 | Plated, painted & coated surfaces are not used for food contact surfaces or for surfaces above the product zone areas. | x | | | | | 10 | 10 |
| 2.5 | Cloth back belts are not used. | x | | | | | 10 | 10 |
| 2.6 | Metals used are compatible with one another. | x | | | | | 10 | 10 |
| 2.7 | Seals and O-rings will be designed to minimize product contact. | x | | | | | 10 | 10 |
| 2.8 | Materials used in construction are compatible with the product, the environmental conditions they will be exposed and cleaning methods & chemicals. | x | | | | | 15 | 15 |
| | | | | | | | 95 | 100 |

| PRINCIPLE #3 - ACCESSIBLE FOR INSPECTION, MAINTENANCE, & CLEANING SANITATION | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| # | Criteria | S | M | U | NA | Comments | Points | Points Available |
| 3.1 | All product zone surfaces are readily accessible for cleaning and inspection | x | | | | | 15 | 15 |
| 3.2 | Product zone components with inaccessible surfaces can be easily dis-assembled without tools. | x | | | | | 15 | 15 |
| 3.3 | Where access or disassembly is not possible, the entire assembled unit is cleaned via a COP (clean out of place) tank. | x | | | | | 10 | 10 |
| 3.4 | Parts remain attached or are hung on the equipment for easy cleaning & to prevent damage or loss. Separate parts carts are supplied as an alternative. | | x | | | | 5 | 10 |
| 3.5 | Machinery and chain guards drain away from product zones and are easily removed. | x | | | | | 15 | 15 |
| 3.6 | Product catch pans or drip pans are easily removable for clean-up so that they are not lost or separated from the equipment. | x | | | | | 10 | 10 |
| 3.7 | All belting is easily removable or the belt tension is released easily without tools so the surfaces underneath can be cleaned. | x | | | | | 20 | 20 |
| 3.8 | Installation will maintain an 18" floor clearance for any product contact areas or conveyor travel paths. Equipment design has 12 inches of clearance to the floor. | x | | | | | 20 | 20 |
| 3.9 | Equipment is designed for location to be located 30 inches from overhead structures and 36 inches from the nearest stationary object. NA if not known. | | | | x | End user to determine final installation clearances. | 0 | 0 |
| 3.91 | All air, vacuum, & product hoses are transparent or opaque, & meet product contact | x | | | | All process piping is stainless steel. | 15 | 15 |

# OEM DESIGN GUIDE

## Sanitary Operational Perform

*Sanitary Operational Performance is assurance of food s*
*such as processing, sanitation and maintenance. The e*
*to unsanitary conditions nor promote harborage and gr*
*designed and maintained.*

| | |
|---|---|
| 1 | Food contact materials meet the FDA criteria for surfac corrosive, non-contaminating, non-absorbent and clear |
| 2 | Product area (Zone 1) disassembly is conducted with n and/or maintenance purposes. |
| 3 | All removable components/covers have a designated p |

## Component Fasteners

*Fasteners are what temporarily (or permanently) hold pie*
*nuts, bolts, acorn nuts, etc. and should not be installe*
*contribute to harborage and contamir*

| | |
|---|---|
| 15 | Product area surfaces (Zone 1) are free of bolts, nuts, c |
| 16 | Horizontal surfaces are free of recessed fasteners (e.g. |

## Fabricated Weldments

*Fabricated weldments are critical to ensure the main*
*equipment is cleanable as desired. The main component*
*metal, welds, surface finishes, and corne*

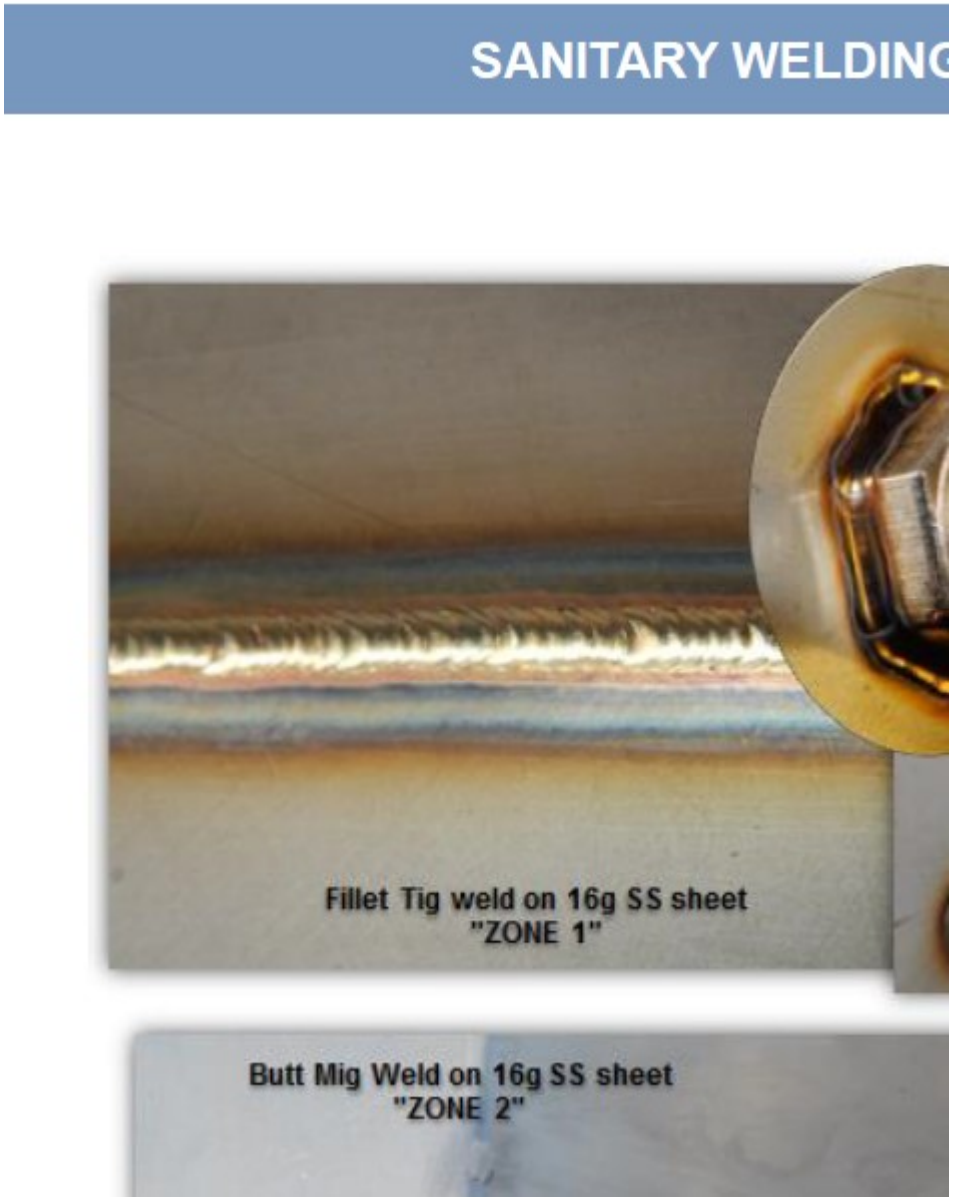
| | |
|---|---|
| 6 | Weldments are designed so there are no areas for mois |
| 7 | Fabricated components are paint/coating-free. |
| 8 | Product area (Zone 1) Stainless surfaces are equivalent non-grained. |
| 9 | Corners are formed (non-welded) with a large radius to f (3/16" minimum, 1" preferred) |
| 10 | All joints and welds are free of pitting and are smooth (u |
| 11 | Weldments are free of skip welds and/or over-lapping w |

## Motor Controls and Electric

*With electrical, comes cords which need to provide pow*
*wires and cords should be routed and installed in a*
*contributing to potential contaminat*

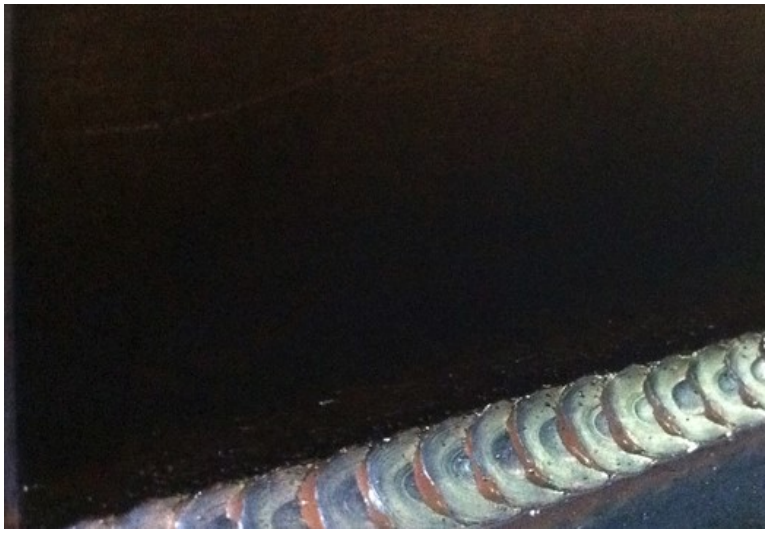
| | |
|---|---|
| 27 | Slope-top enclosures which are NEMA 4X are stand-off penetrations from bottom of panel. |
| 28 | Wire and cording is routed and mounted using sanitary |

# Heinzen Weld Standards - Zone 1



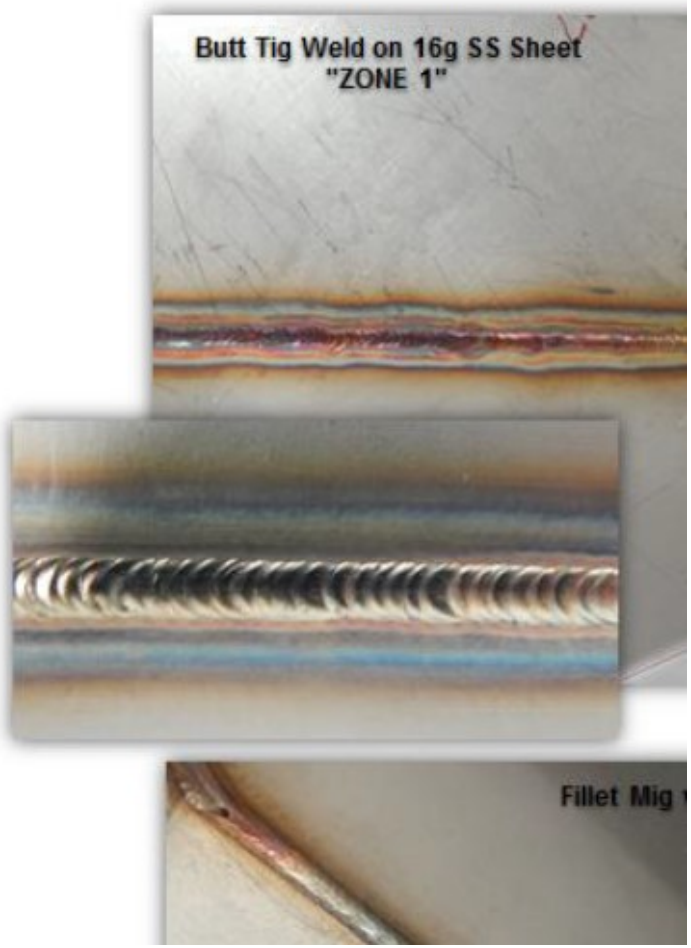

The “Stack of Dimes”

Not Acceptable

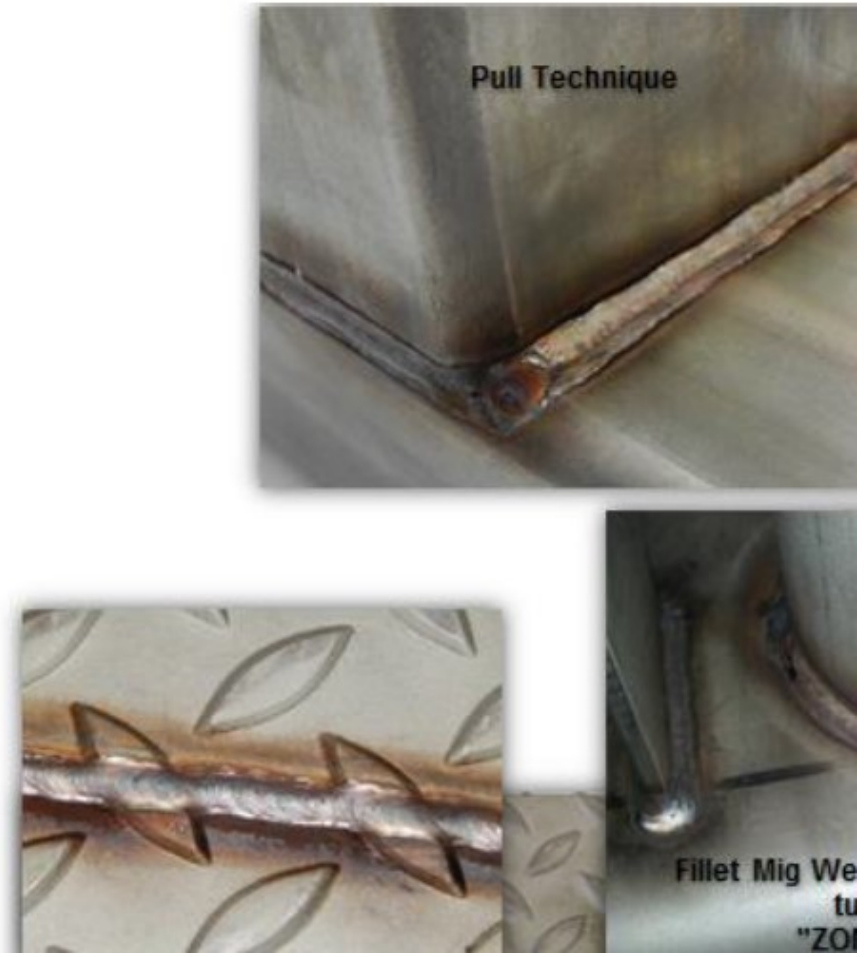


# Heinzen Weld Standards

## SANITARY WELDING




## SANITARY WELDING



Examples of bad welds, field repairs by unqualified welder

Inspect what you expect!

# *Fabrication Inspection Report*

| WO# | | SO# | | Customer | |
|---|---|---|---|---|---|
| Description | | | | | |

| Fabrication CHK Score | | | | Notes |
|---|---|---|---|---|
| Dimensioned | | 2 | | Look at the drawings and check measurements. Ch to drawings? Does |
| Mechanics | P | F | (Circle One) | Does it work, do parts clear, moving pieces move? for QC check off. If it can be welded in fab, |
| Top rails | | 2 | | Corners matched properly, sanded smooth, no divo on rail to know down scratches and blend we |
| Deburred | P | F | (Circle One) | Areas that were affected by the Fabricator. Shee hand rails are finger sm |
| Splatter removed | P | F | (Circle One) | No dingle berries, spatter, wire or ground arc |
| Weld Quality | | | | See Sanitary Welding in the Workm |

# You get what you pay for!

| tem | Reference | Description | Qu |
|---|---|---|---|
| 5 | | **SANITARY DESIGN EQUIPMENT MANUAL ELECTRONIC VERSION PROVIDED, HARD COPY ON REQUEST**<br><br>At Heinzen, we give our customers the tools to be<br>clean equipment ordered from standard to custom.<br><br>To be included in each manual:<br>• Spare Parts List<br>• Drawings<br>• Inspection Reports<br>• Sanitary Design Checklists<br>• Sanitation Passport™ | |

Sheet metal - Zone 1, The importance of large radius corners

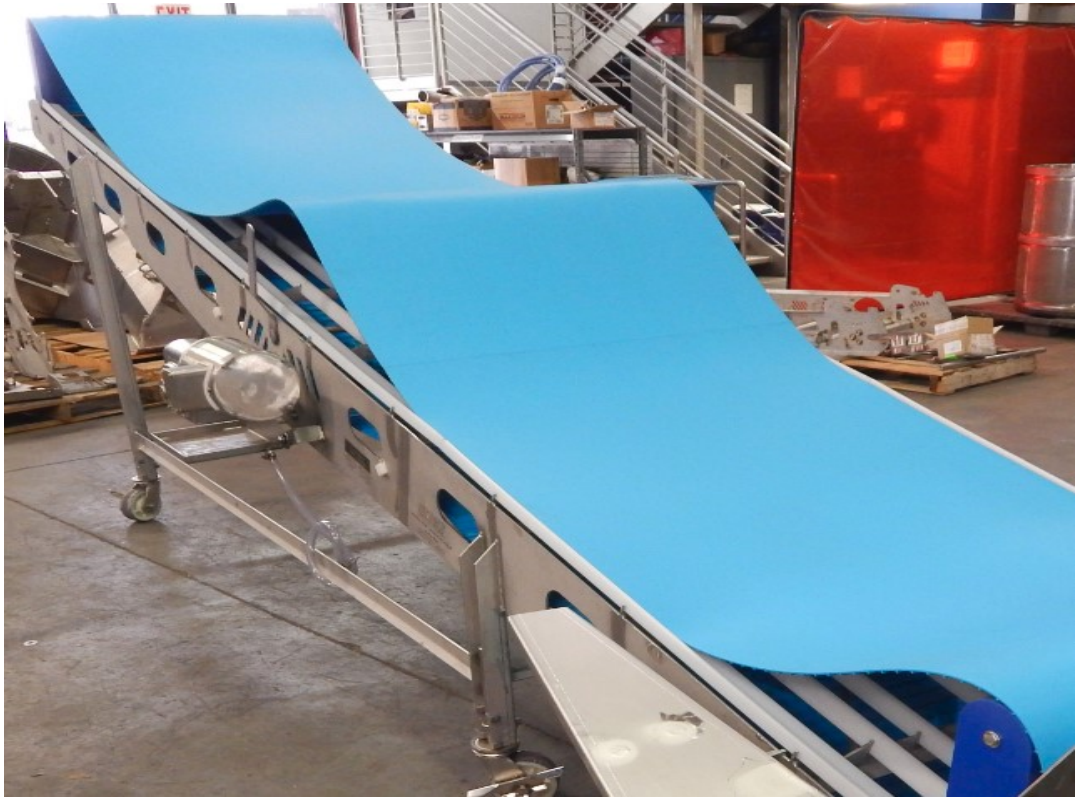
- TIG, Butt Weld in the flat – Not corner
- Large radius Formed Corners (not welded)

# Channelized®

## Eliminates hollow tube and threaded leg adjusters

Easy to clean is available

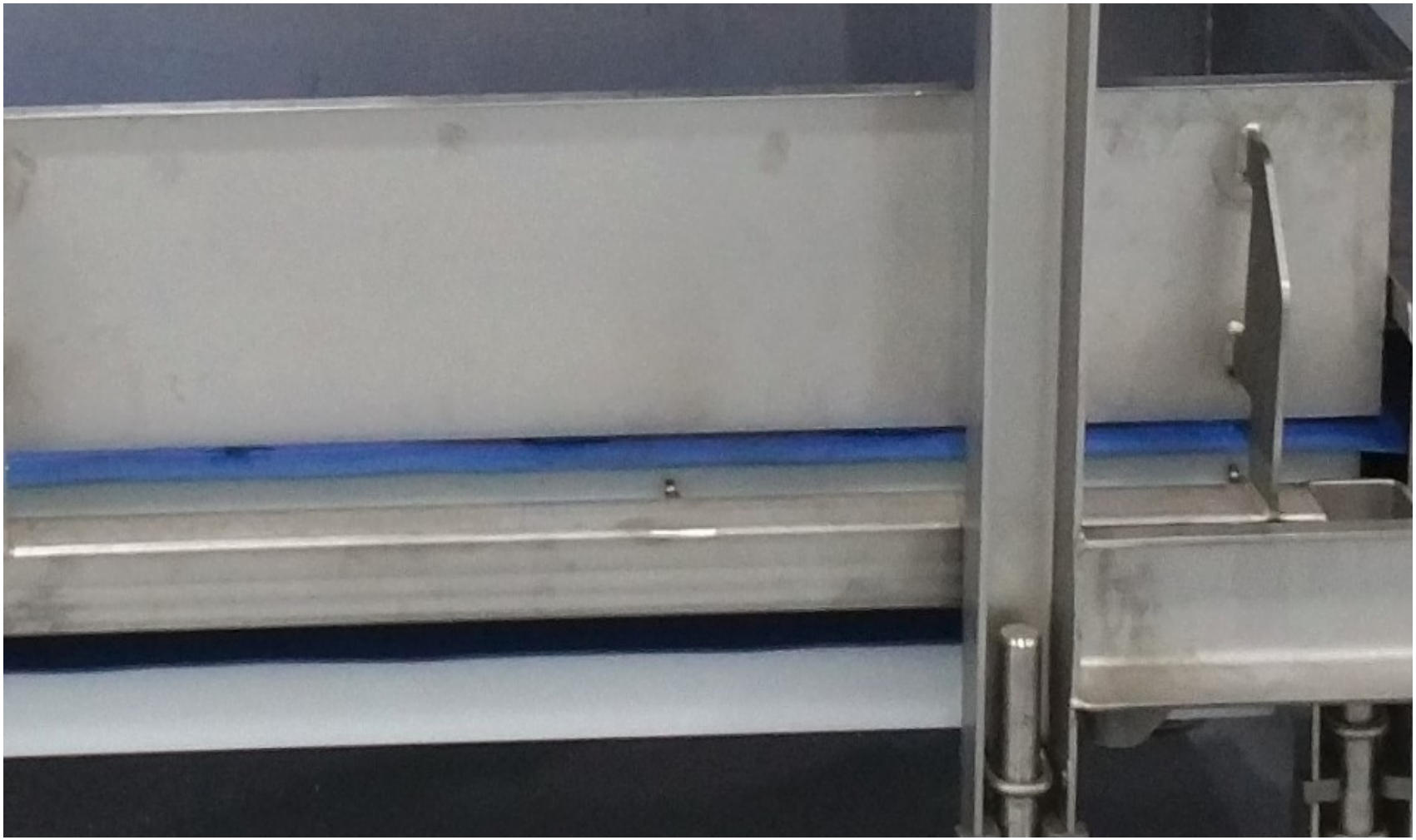
*It needs to be specified*



Belt Lifters

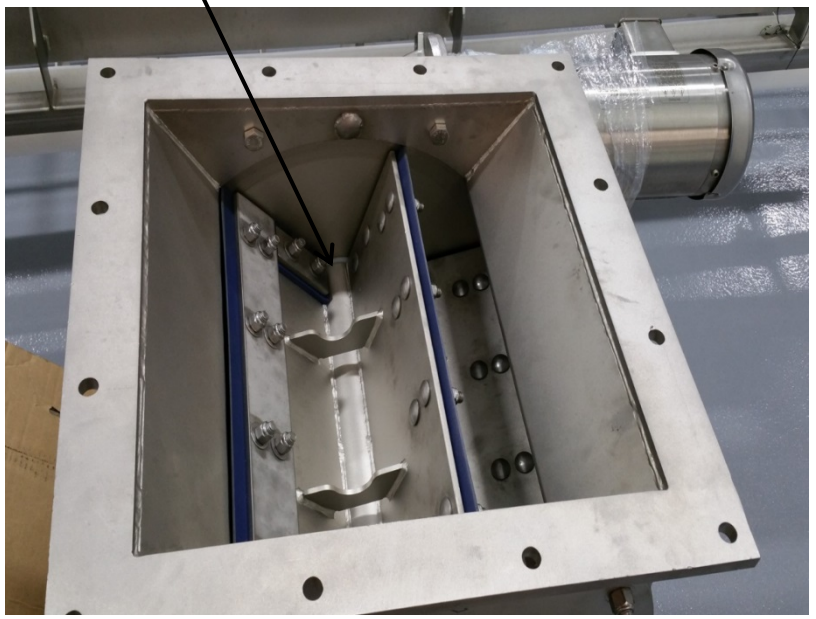
# Hingeable Drip Pan

# Patented Thread-less
# Adjustable Food Pad



# Etched Marking & Serialization


# Rotary Valves with Flexible Lip Seals

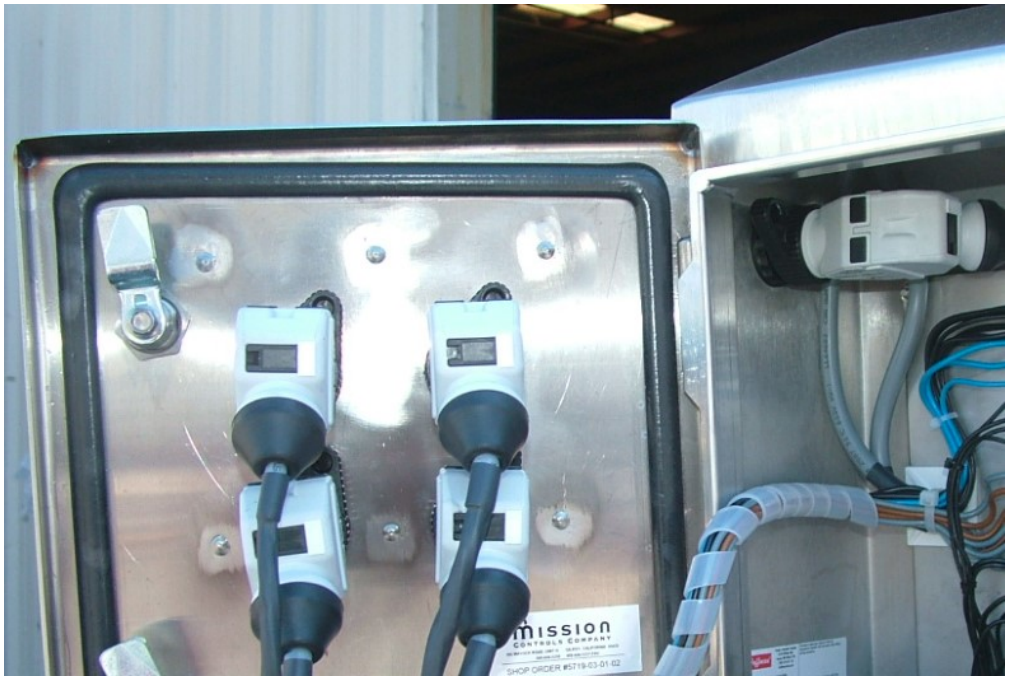


# Sloped Top of Motor Control Panel (MCC)

- **WATERTITE®** (IP67) Pin-&-Sleeve Devices: Plugs, Connectors, Receptacles, Angled Inlets and Mechanical Interlocks

Woodhead pin and sleeve wiring devices conform to IEC 309-1 and 309-2 standards which are a worldwide pin and sleeve standard established by the International Electrotechnical Commission. They also meet the requirements of Section 410-56(g) of the National Electrical Code (NEC). Watertite® pin and sleeve products are rated at IP67 while Safeway® pin and sleeve products are rated IP44. Both styles feature impact and chemical-resistant type G nylon housings and dead front construction. A latching mechanism prevents accidental disengagement while internal and external strain relief provides pull-out protection and cable bend relief.


<<Safe Connectors




Hermetically sealed push buttons

<<Cable Enters Bottom of Panel

# Compressed Air Dry

## Cabinet Dryers Eliminate Moistu
## Electrical Cabinets and Motors

### Product Features:

- Designed specifically for was
- Protects electrical cabinet co
  damage caused by water and
- Minimizes pools of water insi
- Positive pressure keeps dust
- Adds no heat to the cabinet
- Reduces cabinet humidity to
  10% RH
- Requires no electricity, low o
- Easy to install and maintain

### Do Your Cabinets Look Like Thi

Corrosion leads to premature component failure

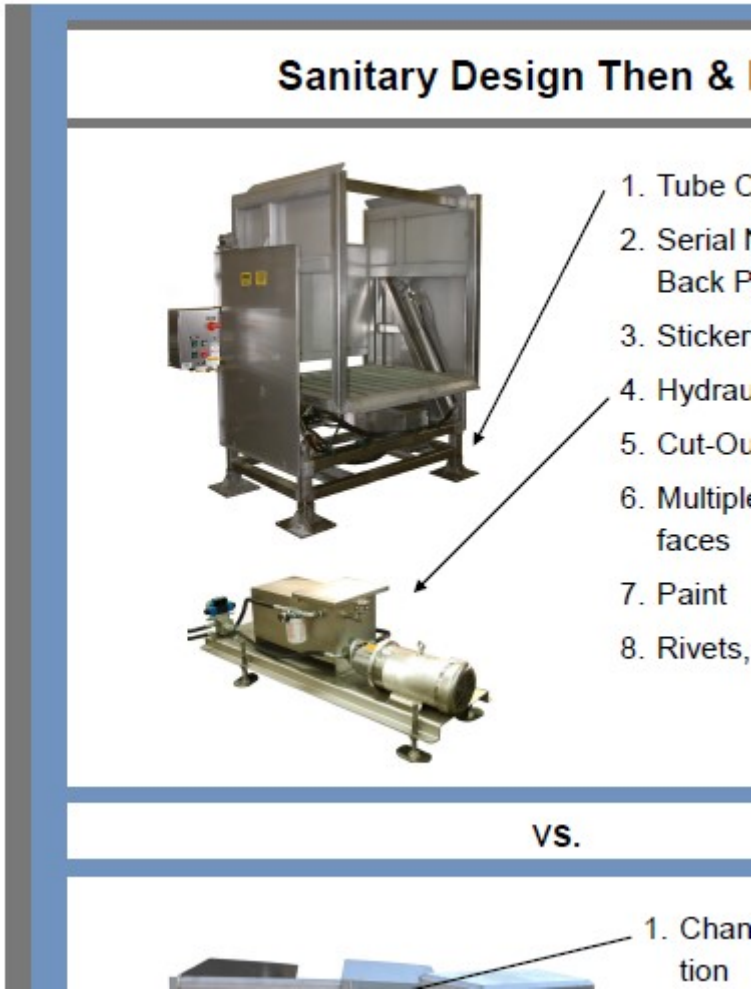
Water accu
cabinet

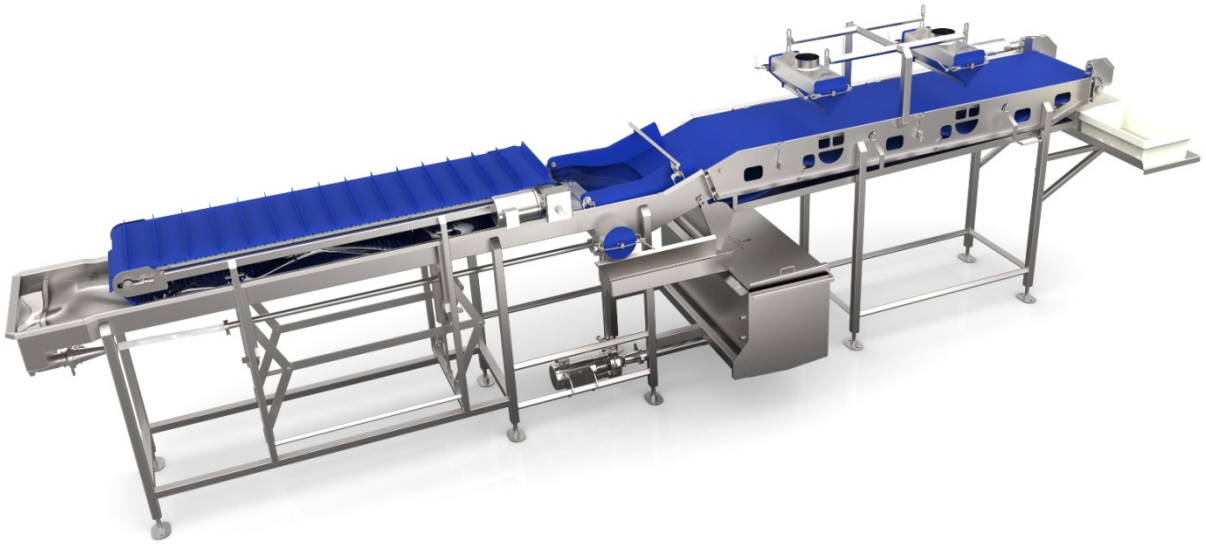
### A Cabinet Dryer will keep your
### looking as good as new

Engineering

Sanitary Equipment

Food Safety





Thank you!

HEINZEN™

YOUR PARTNER IN FOOD SAFE INNOVATION

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**rudi@heinzen.com**