



BAKINGTECH 2018

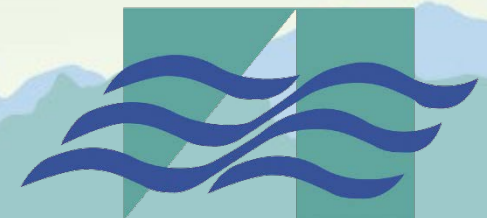
SUSTAINABILITY-SUCCESS THROUGH PEOPLE

PRODUCTS AND PRODUCTIVITY

Creating the Environment for Increased Food Safety & Quality – Enclosed Product Conditioning Systems

Presented by

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Building Energy & Environmental Services

Knowing Your Product

Product Cooling Variables

- **Time**
- **Temperature**
- **Humidity**
- **Moisture Loss**
- **Velocity**
- **Formulation**
- **Exposure**

Systematic Solutions

- ✓ **Reliable Dwell Times**
- ✓ **Steady Environmental Conditions**
- ✓ **Consistent Quality Control**
- ✓ **Remove or Recycle Humidity**
- ✓ **Uniform Airflow Protects Product**
- ✓ **No Seasonal Changes for Conditions**
- ✓ **Filtration and Pressurization**

Engineering Quality Through Conditioning Systems

- **Consistent Temperatures**
- **Space Pressurization**
- **Ease of Sanitation**
- **Molds and Airborne Contaminants Protection**
- **Indirect Humidity Control**
- **Significant Energy Savings**

Cooler Enclosure Types

Applications

- **Spiral Coolers**
- **Step Coolers**
- **Overhead “Racetrack” Coolers**
- **Cooling Tunnels**
- **Cooler to Wrap Conveyor Tunnels**

Enclosure Methods

IMP Enclosure

- ✓ **4” Thick Insulated Metal Panels Caulked and Sealed**
- ✓ **May be Supported from Floor or Hung from Ceiling**
- ✓ **Sanitary Designed Stainless Steel or Painted Galvanized**

Fabric/Plastic Curtains

- ✓ **Racetrack Coolers**
- ✓ **Existing System Retrofits**
- ✓ **Ease of Cooler Maintenance**
- ✓ **Structural Limitations**

Sanitary Design Advantages

Minimal Ductwork Options

- ✓ **Pressurized Ceiling Plenum**
- ✓ **Spiral Single or Double Wall**
- ✓ **Anti-Microbial Fabric**
- ✓ **Integrated Duct Access Doors**
- ✓ **Adjustable Vertical Discharge**

Constructed for Cleanliness

- ✓ **Not in Production Space**
- ✓ **Stainless Steel Lined**
- ✓ **Corrosion Resistant**
- ✓ **Full Drain Pans**
- ✓ **Easy Interior Accessibility**

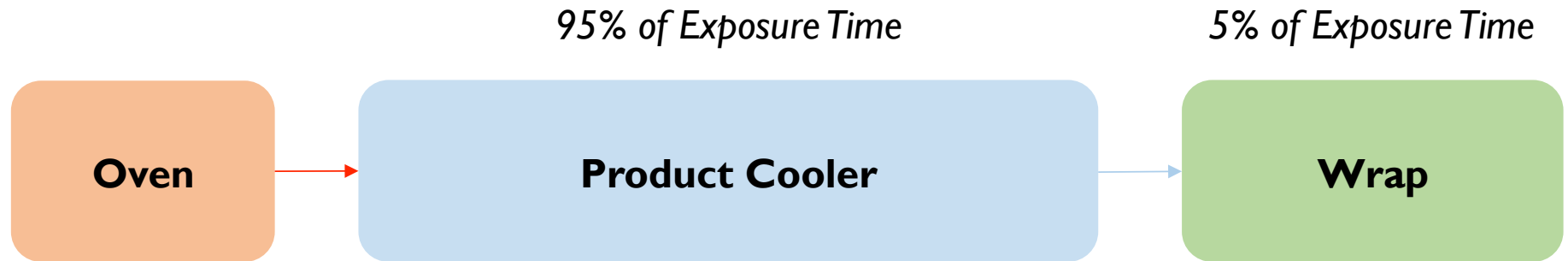
Superior Food Safety

Filtration & Pressurization

- ✓ Extended Product Shelf Life
- ✓ Reduce Mold Complaints
- ✓ Maintain Consistent Quality
- ✓ Decrease Unsaleable Waste
- ✓ UV Lighting Available
- ✓ Anti-Microbial Ductwork

MERV Rating	Dust Spot Efficiency*	Typical Controlled Contaminant	Applications	Air Filter Type
1	<20%	>10.0 micron Particle Size Pollen, Dust Mites, Sanding Dust, Spray Paint Dust, Textile Fibers, Carpet Fibers	Minimal Filtration Residential Window A/C Units	Throwaway - Disposable fiberglass or synthetic panel filter Washable - Aluminum mesh Electrostatic - Self charging woven panel filter
2	<20%			
3	<20%			
4	<20%			
5	<20%	3.0-10.0 micron Particle Size Mold Spores, Hair Spray, Fabric Protector, Dusting Aids, Cement Dust, Pudding Mix	Commercial Buildings Better Residential Industrial Workplace Paint Booth Inlet	Pleated Filters - Disposable, extended surface area, thick with cotton-polyester blend media, cardboard frame Cartridge Filters - Graded density viscous coated cube or pocket filters, synthetic media Throwaway - Disposable synthetic panel filter
6	<20%			
7	25-30%			
8	30-35%			
9	40-45%	1.0-3.0 micron Particle Size Legionella, Humidifier Dust, Lead Dust, Milled Flour, Auto Emissions, Welding Fumes	Better Commercial Superior Residential Hospital Laboratories Welding Booth Inlet	Bag Filter - Nonsupported microfine fiberglass or synthetic media, typically 6" - 36" deep, 6 - 12 pockets Box Filter - Rigid style cartridge filters typically 4" - 12" deep may use lofted or paper media
10	50-55%			
11	60-65%			
12	70-75%			
13	89-90%	.30-1.0 micron Particle Size All Bacteria, Most Tobacco Smoke, Propriet Nuceli (Sneeze)	Superior Commercial General Surgery Hospital Rooms Smoking Lounge	Bag Filter - Nonsupported microfine fiberglass or synthetic media, typically 6" - 36" deep, 6 - 12 pockets Box Filter - Rigid style cartridge filters typically 4" - 12" deep may use lofted or paper media
14	90-95%			
15	>95%			
16	>95%			

Enclosed Product Conditioning Systems



Average Product Mold Exposure

1,000 m ³	=	Exposed Cooling Conveyors (1,000 * 95%)	+	Exposed to Wrap (1,000 * 5%)
51 m ³	=	Enclosed Cooling Conveyors (5 * 95%)	+	Exposed to Wrap (1,000 * 5%)
1 m ³	=	Enclosed Cooling Conveyors (5 * 95%)	+	Enclosed to Wrap (5 * 5%)

Based on average mold spore count of 1,000 per cubic meter

Energy Efficiency and Sustainability

Return on Investment

- ✓ **50%-90% Energy Savings**
- ✓ **Fully Automated Controls**
- ✓ **Variable Frequency Drives**
- ✓ **Reduced Compressor Wear**
- ✓ **Lower Refrigerant Charge**

Refrigerant Options

- ✓ **Chemical Refrigerants (410A)**
- ✓ **Ammonia (717)**
- ✓ **Propylene Glycol and Water**
- ✓ **Carbon Dioxide (744)**
- ✓ **“Next Gen” Chemical Blends**

Financial Considerations

Self-Contained Conditioning System

- **Low Refrigerant Charge**
- **Shortest Compressor Runtime**
- **No Additional Infrastructure**
- **\$42,000 average Energy Savings vs Evaporators**

“Traditional” Refrigerated System

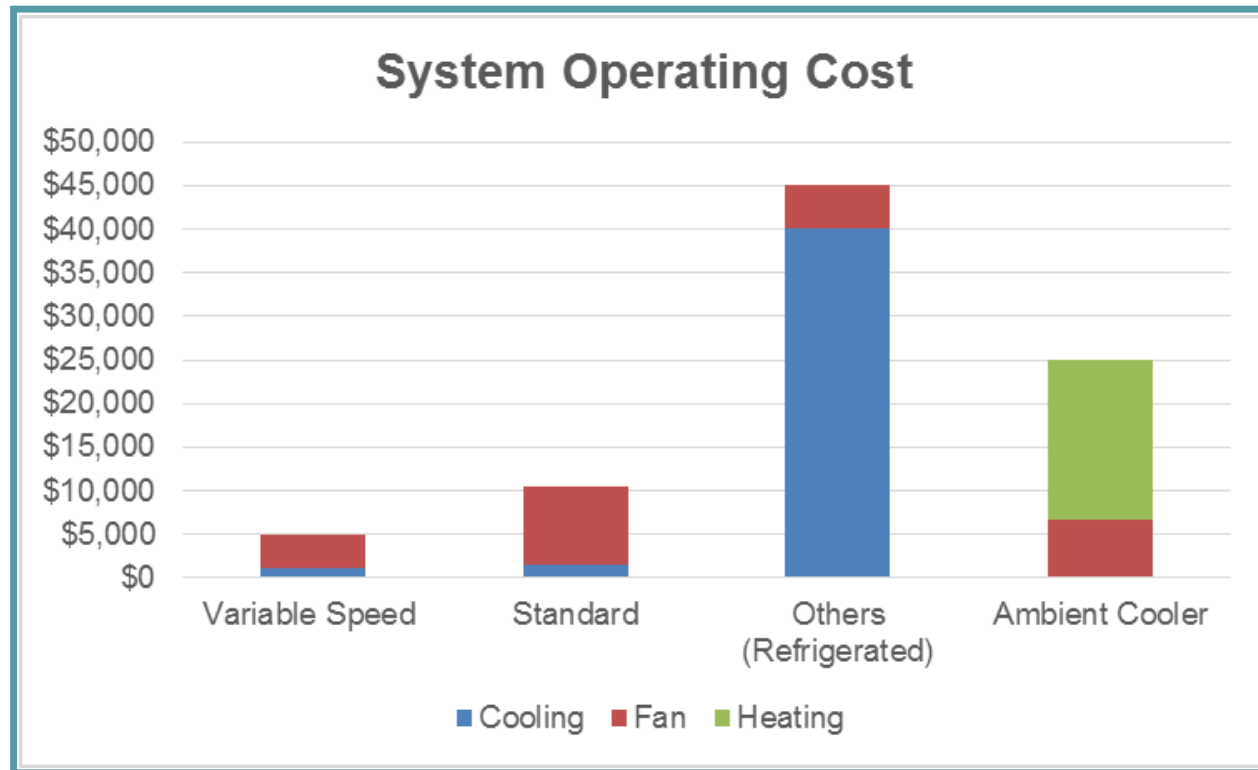
- **No Space Pressurization**
- **No Molds or Foreign Matter Protection**
- **Equipment in Space Increases Sanitation**
- **Highest Energy Consumption for Mechanical Cooling**

Ventilation Only System

- **No Temp or Humidity Control**
- **Hot & Humid Air Released Into Production Areas**
- **Additional Equip Needed Elsewhere**
- **Little to Negative Savings vs Self-Contained**

Enclosed Product Conditioning Systems

Bread Line - Energy Savings Comparison





Questions and Comments

Enclosed Product Conditioning Systems



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