Transport Refrigeration
Food Safety and Quality
Transport Refrigeration Food Safety and Quality

- What are the issues?
- How important is food safety and quality?
- Transport refrigeration unit technology improvements to improve food safety and quality
- Additional factors to consider to improve food safety and quality
- Conclusions
Food Safety and Quality

The Issues

- Tremendous increase in consumer awareness regarding food quality and food safety
- Many retailers are focusing on food quality as a key differentiator
Food Safety and Quality

The Issues

◆ Food Quality is driven by the **Consumer**
  - Product Appearance
  - Product Aroma and Flavor
  - Product Shelf Life

◆ Food Safety is driven by the **Consumer**
  - Heightened awareness *via* media
  - Foodborne Illness cases are touching home
  - Consumers are lobbying their legislators to “do something!”
Food Safety and Quality

How Important is Food Safety?

- Up to 33 million people effect each year
- 7,000 people die each year
- Cost to the Industry is HUGE!

- Remember Jack-in-the-Box incident
- Remember Swanns Ice Cream incident
- Remember Hudson Foods meat incident
Higher Capacities
- Maintaining setpoint
- Pulldown (Pre-cooling)
- Temperature recovery

Transport Refrigeration Technology

125% Improvement

Early
- 11,000 BTU’s

Mid-Range
- 16,500 BTU’s

Today
- 31,000 BTU’s

- 46,000 BTU’s

- 66,000 BTU’s
Transport Refrigeration Technology

Technology Enhancements To Achieve Higher Capacities And Faster Pulldown
Transport Refrigeration Technology

Increased capacity and airflow provide faster temperature recovery after a door opening

Door switch is recommended
Transport Refrigeration Technology

- Higher Capacities
- Microprocessor Control Features
  - IntelliSet Features
  - Easy Of Use Features
  - Communications
    - Satellite
    - Cellular
    - RF Yard Monitoring
- Multiple Language Capability
Transport Refrigeration Technology

- IntelliSet
  - Insures proper setpoint
  - Eliminates potential for driver error
  - Improves product quality
Transport Refrigeration Technology

Ease Of Use Features

Remote Control Panel Option
Transport Refrigeration Technology

- Communications
  - Satellite
  - Cellular
  - Radio Frequency (RF)
Transport Refrigeration Technology

- Advantages of remote communication
  - Provides unit location
  - Verifies proper setpoint, unit operation, etc.
  - Provides temperature record
  - Allows remote control of unit
  - Product quality
Transport Refrigeration Technology

- Multi-language Capability
  - Insures proper unit settings
  - Eliminates driver error
  - Improves product quality

IDIOMAS / LANGUAGE: ESPANOL
TEMP AIRE DE RETORNO: 35.0 F
FUNCTIONAMIENTO OK
Transport Refrigeration Technology

- Higher Capacities
- Microprocessor Control Features
- Air Management
  - Improved Fan Design
  - Air Volume
  - Air Velocity
  - Discharge Configurations
Transport Refrigeration Technology

- Improved fan design
  - Increased airflow
  - Increased air velocity
  - Center discharge

Centrifugal fan
Air distribution nozzle
Transport Refrigeration Technology

- Benefits of improved air management
  - Tighter temperature control
  - Improved product quality
  - Less food waste
  - Extended shelf life
How does temperature control affect product shelf life?

- Chilled pork: Optimum 29 Degrees F
- Rule of thumb: 2 Degree Increase = 10% decrease in shelf life

- 29 F - 100% Life Attainable
- 32 F - 70%
- 34 F - 60%
- 36 F - 50%
- 41 F - 30%
Transport Refrigeration Technology

- Higher Capacities
- Microprocessor Control Features
- Air Management
- Data Recording
  - Electronic recorders
  - Printers
Transport Refrigeration Technology

- **Data Recording**
  - Verifies proper setpoint, unit operation, etc.
  - Provides temperature record
    - At loading
    - During transportation
    - At delivery
  - Maintains record for up to 2 years
Transport Refrigeration Technology

- Printers
  - Immediate proof of product protection
  - Graphic or tabular printouts
  - Easy to use
  - Handheld or trailer mounted
  - Thermal technology
  - Fast / High quality printouts
Transport Refrigeration Technology

- Higher Capacities
- Microprocessor Control Features
- Air Management
- Data Recording
- Multi-temp Units
  - Various Host Units
  - Remote Evaporators
    - 1/2 Width
    - Full Width
    - Single or Dual Discharge
Transport Refrigeration Technology

- Multi-temp Products
  - High performance
  - Independent compartment control
  - Superior product quality
Remote evaporators

- High airflow
- Flexibility
- Dual discharge capability
- Superior product quality
Where Are We Today?

- Higher Capacities
- Microprocessor Control Features
- Air Management
- Data Recording
- Multi-temp Units
- Superior Product Protection!
Additional Factors To Consider

- Refrigeration Unit Selection
- Trailers
- Chutes
- Bulkheads
- Loading Practices
- Data Recorders
Refrigeration Unit Selection

- Know the application before selecting the refrigeration unit
- Setpoint, door openings per day, products to be transported, transit time, operating area, trailer specifications, etc.
- Perform a load calculation to size unit properly for each application
Refrigeration Unit Selection

Consider the Following:
- Capacity Requirements
- Air Management Requirements
- Controller Features
- Multi-temp or Single-temp
- Communication Capabilities
Insulated Trailers

- Heat Transmission Rate
  - Insulation Type / Construction
  - Insulation Thickness
  - Door Type
Insulated Trailers

- Heat Transmission Rate
- Air Leakage
Insulated Trailers

- Heat Transmission Rate
- Air Leakage
- Floor Type
Trailer Duct Floor
Deep Channel Floors
Air Chutes

- Recommended by Refrigerated Transportation Foundation
- Proper Installation Required
Air Chutes
Bulkheads

- Types
  - Solid
  - Lattice

- Proper Design
  - Sealed
  - Adequate Airflow
  - Bulkhead Protection
Bulkheads
Loading Practices

◆ Inspect Equipment
  ● Trailer Damage
  ● Air Chutes
  ● Debris
Inspect Equipment - Damage
Inspect Equipment - Chutes
Inspect Equipment - Chutes
Inspect Equipment - Debris
Loading Practices

- Inspect Equipment
- Pre-Cool Trailer
  - Check Setpoint
  - Check Operating Mode
Pre-Cool Trailers
Pre-Cool Trailers

Pre-cool or pulldown to temperature prior to loading

Removes the heat that has entered the body from the sun
Loading Practices

- Inspect Equipment
- Pre-Cool Trailer
- Load Product at Temperature
Loading Temperatures
Loading Temperatures
Loading Temperatures
Loading Practices

- Inspect Equipment
- Pre-Cool Trailer
- Load Product at Temperature
- Insure Proper Airflow
Loading Practices
Airflow - Top
Top Airflow
Loading Practices
Airflow - Side Walls
Side Airflow
Side Airflow
Side Airflow
Side Airflow
Side Airflow
Loading Practices
Airflow - Rear Doors
Rear Airflow
Rear Airflow
Rear Airflow
Return Airflow
Return Airflow
Return Airflow
Monitor And Record Temperatures

- Use Data Recording Devices
  - Verifies proper setpoint, unit operation, etc.
  - Provides temperature record
    - At loading
    - During transportation
    - At delivery
  - Maintains record for up to 2 years
Summary: Additional Factors To Consider

- Use Proper Equipment
  - Configuration
  - Condition
- Pre-Cool Trailer
- Load Product at Temperature
- Allow for Proper Airflow
- Properly Monitor and Record Temperature
Conclusions

- Understand food safety issues
- Use technology available to improve product protection
- Take all factors into consideration
  - Refrigeration unit selection
  - Trailer specifications
  - Air delivery systems
  - Proper loading procedures
  - Temperature control
  - Record keeping
- Become an “Industry Expert” on the issues
- Educate customers
Food Safety and Quality