

# RMI Winery, Brewery and Food Science Lab



UCD Milk Processing Lab



RMI



# Raw Milk Processing System

- Separates whole milk into skim & cream
  - Raw milk, skim & cream tanks
  - Milk pump
  - Heat exchanger
  - Separator
- Recovers heat added to milk for separation
- Separates 100 gallon of milk in 1 hour
- Keeps raw milk, skim & cream cool



# Raw Milk Receiving Tank

- Receives pre-chilled ( $\sim 5^{\circ}\text{C}$ ) milk from UC Davis dairy herds
- 100 gallon capacity
- Provides agitation
- Jacketed for chilled water to maintain raw milk at  $\sim 5^{\circ}\text{C}$



# Heat Exchanger

- 3-section sanitary design
  - Section #1 for pre-heating cold raw milk with separated warm skim milk (i.e., cooling skim milk with cold raw milk)
  - Section #2 for further heating raw milk with hot water for efficient separation into skim and cream
  - Section #3 for further cooling skim milk for holding at  $\sim 40^{\circ}$  F before processing



# Milk Separator

- 100 gallon/hr capacity
- Runs with raw milk at 21-57 ° C (70-135 ° F)
- $\leq 0.1\%$  skim efficiency
- 10-40% milkfat cream



# Skim and Cream Receiving Tanks

- Receive milk from separator
- Skim milk tank: 100 gallon capacity
- Cream tank: 25 gallon capacity
- Provide agitation
- Jacketed for chilled water



# Milk, Skim or Cream Heat Processing

- Pasteurization/UHT Unit
- Homogenizer for milk
- Ultra-clean filler for heat-processed milk, skim or cream





# Homogenizer

- Manufactured by GEA Niro Soavi, an industry leader
- Variable speed motor to match flow of pasteurizer/UHT unit
- 2 homogenizing stages for most effective homogenization
- Sterilizable by pasteurizer/UHT unit
- CIP cleanable



# Filler with Automatic Fill Control

- Ultra-clean filling environment
  - Room air is HEPA filtered
  - Filler hood has shower of additionally HEPA filtered sterile air
- Produces packaged product suitable for research studies:
  - Refrigerated shelf life studies
  - Product-package interaction studies
  - Sensory panels
  - Clinical trials



# Membrane Filtration System

- Manufactured by GEA Process Engineering
- Capable of micro-, ultra-, nano-filtration and reverse osmosis for separating milk into its components
- Module for simultaneously screening several flat-sheet membranes
- Module for separations using larger spiral membrane



# Additional Equipment

- Delta LactoScope FTIR Advanced complete dairy analyzer
  - Lipids
  - Protein
  - Carbohydrates
  - Total Solids
  - Free Fatty Acids
  - Citric Acids
  - NPN/Calculated Urea
  - True Protein
  - Casein
  - Density
  - Freezing Point



