



# Equipping a Cheese Plant...

## An in-depth look at cheese vats

# The Decision... New or Used Equipment?

- New

- Some things you just can't find used any more.
  - Cheese vats
  - Small batch pasteurizers
- Some new items are much more efficient.
  - HTST systems
- Some used equipment doesn't pass current regulatory requirements
  - Requires investigation

# The Decision... New or Used Equipment?

- Used
  - Often is a great option.
    - It lowers up front costs.
    - It may be a better value for the money spent.
      - “They just don’t build things like they used to.”
  - Be careful!
    - Demand has exploded and prices have skyrocketed.
      - Many buyers lack experience.
      - Some sellers don’t have the integrity that they should have.



# The Decision... New or Used Equipment?

- Used
  - Generally requires more effort.
    - Research on line and/or watching for used equipment ads.
    - Travel to see the equipment and/or poring over photos
    - Decisions on rebuilding
      - What needs rebuilt?
      - Who will do the rebuilding?

# Don't get burned!

- The used equipment market is subject to a lot of abuses – we have heard our share of horror stories.
- You spell assume with two dollar signs (a\$\$ume).
- Look before you leap.
- Let common sense prevail.
- Work with someone who understands the small processing equipment market.

# What are the deciding factors?

- What meets my needs?
  - Do I know my needs? What cheese(s) will be made?
- What can I afford?
- What equipment will allow me to produce a spectacular product?
  - There are a lot of mediocre cheeses on the market today.
- What is the most efficient way to go?
  - Efficiency is an important factor, but sometimes cost becomes an overriding factor.
  - Generally, you will trade reduced capital investment for an increased operating cost.



# The Cheese Vat...

- The heart of the system.
- From the equipment standpoint, it can have the highest impact on product quality.
- Comes in a wide range of investment, function, and features.

# What are my options? ...a tote from Wal-Mart.

- The pros...
  - Very inexpensive
  - Allows for very small batches
  - Versatile... carry it around, etc.
  - Plastic... indestructible and easy to clean





# What are my options? ...a tote from Wal-Mart.

- The cons...
  - All manual – requires more work.
    - Agitation
    - Handling
  - Too small for large scale production.
  - It is hard to regulate the temperature effectively.



# What are my options? ...a used milk tank.

- Types of milk tanks that can work as a cheese vat.
  - Round bottom / Flat top
  - Square... freon cooled
  - Square... water cooled (Ice Bank, Esco, etc.)





# What are my options? ...a used milk tank.

- The pros...
  - Economical
  - Might be the only used option available
  - Gets you into larger scale cheese production without purchasing an expensive new vat.





# What are my options? ...a used milk tank.

- The cons...
  - Consistent curd cutting can be difficult.
  - Agitation is often compromised
  - Slow heating is par for the course
  - Hot spots are also the norm – freon plates don't make good water plates.
  - Can require some rebuilding (water cooled)



# What are my options? ...a used milk tank. How do I convert it?

- Freon cooled
  - Connect hot water lines to the freon plates.
    - Either circulate through a heat exchanger.
    - Or plumb the output side to a drain.
  - Remove the agitator altogether – for manual agitation.
  - Remove the bridge and remount the agitator, making it removable.



# What are my options? ...a used milk tank. How do I convert it?

- Water cooled
  - Replace existing spray piping – ability to handle hot water.
  - Update the circulator pump.
  - Add a heat source.
    - Circulator pump through a heat exchanger.
    - Live steam into water reservoir and then circulate.
  - Remove the agitator altogether – for manual agitation.
  - Remove the bridge and remount the agitator, making it removable.



# What are my options? ...a used milk tank. How do I convert it?

- Agitator options
  - NONE... manual agitation
  - Convert the existing agitator
    - Made for moving milk over the cooling plate... not for gentle handling of cheese curd.
    - Needs to be removable for effective cutting of the curd.
  - Purchase a custom agitation package.
    - Gentle, effective, and complete agitation for making better quality cheeses.
    - Significantly adds to the cost.

# What are my options? ...a used cheese vat.

- The pros...
  - Economical
  - As opposed to a used milk tank, a used vat is designed for the job.





# What are my options? ...a used cheese vat.

- The cons...
  - Rarely available in small sizes.
  - Older vats tend to be atmospheric versions – less energy efficient because they discharge hot water to drain.





# What are my options? ...a used cheese vat. What is available?

- Old atmospheric vats
  - Water dumped to drain.
  - Can sometimes be converted for circulation.
- Traveling agitator vats.
  - Only practical for larger scale operators.
  - A poor solution due to sporadic stirring of curds in whey
- On rare occasions, a modern cheese vat becomes available.



# What are my options? ...a dual purpose cheese vat / pasteurizer

- The pros...
  - One piece of equipment to do two functions... generally more economical
  - Saves space in a small plant.
  - Allows the production of fresh cheeses as well as aged cheeses – raw or pasteurized.





# What are my options? ...a dual purpose cheese vat / pasteurizer

- The cons...
  - Some combos are seriously compromised
    - making neither a good pasteurizer or a good cheese vat.
  - Agitation
  - Outlet size / valves
  - Uniform heating





# What are my options? ...a new cheese vat.

- The pros...
  - The right equipment for the job... enabling you to make world-class cheese.
  - Agitation that is just right for blending and curd handling.
  - Uniform heating.
  - Versatile for many types of cheese.



# What are my options? ...a new cheese vat.

- The cons...
  - Requires a large investment.



# Understanding the world of vats

- Shape
  - Round
    - Requires dual action agitation
    - Agitators generally double as curd-cutting
    - Difficult to pre-press under the whey
  - Double-O... looks like a Figure 8
    - Same concept as a round vat – generally used for larger sizes
  - Rounded End
    - Cannot cut curd uniformly
    - Generally provides for good agitation because there are no corners
  - Square
    - Uniform curd cut
    - Generally not the best agitation – one agitator in the center
  - Rectangular
    - Very uniform curd cutting
    - With properly designed agitation, this can be a great vat design.
      - Curd is constantly in motion with low shear agitation
      - Uses the corners to create turbulence and prevent curd lumping



# Understanding the world of vats

- Construction
  - Single Shell
    - Allows for no heating or cooling
  - Atmospheric uninsulated
    - Economical but not energy efficient
  - Atmospheric Triple-wall insulated
    - Requires return circulation pump or dumping of hot water to drain.
  - Pressure-wall / Triple-wall insulated
    - The ultimate in energy efficiency and versatility.

# Understanding the world of vats

- Agitation – stationary or traveling
  - Integrated with curd cutting
    - Multi-rotation for round vats
    - Traveling rotation for long rectangular vats
    - Overlapping multi-rotation for Double-O vats
  - Removable and separate from curd cutting
    - Stationary
    - Paddles are removed to allow for curd cutting
    - Entire agitator is removed
    - Excellent for high cook alpine cheeses because curd does not sit on the hot heating surface and bleed butterfat.



# Understanding the world of vats

- Agitation – effectiveness
  - Complete and thorough distribution of culture.
  - If a dual-purpose vat, it must meet the requirements of the PMO for less than one degree differential
  - Gentle low shear handling of the curd
    - Fat losses less than 0.2%
    - Higher yields
    - Agitation without creating fine particles for more consistent cheeses.



# Understanding the world of vats

- Pre-Pressing under the whey
  - Requires a rectangular vat
  - Requires a removable agitator
  - Requires baffles and press plates
  - Provides for uniform division of the curd for consistent cheese weights
    - No air pockets in the curd.

# Understanding the world of vats

- Removal of the curds and whey
  - Large unobstructed valve or U-Tube
  - Jabsco positive displacement pumps for moving the curd.
    - Centrifugal pump can be used for discharging the whey.

# It's just a cheese vat...

- But it can make or break your operation.
- But there are so many options that it can make your head spin.
- But you should research your options carefully and know what your needs are.
- But it can be the most valuable tool in the production of high quality cheeses.





*Thank-You*