Anco Batch Pasteurizer Collection

Anco Equipment
1070 E. Glenbrook Drive - Pulaski, WI 54162
www.ancoequipment.com

Table of Contents	
About our Batch Pasteurizer	3
Tank Specifications and Options	4
Batch Pasteurizer Overview	5
Cleaning Instructions	7
Sizing your Boiler	8
Tank Basics	9
Jacket Port Install	10
Leak Detection Valve Install, Handling & Maintenance	16
Air Space Heater	19
Anderson Chart Recorder Overview	22
Spray Ball Maintenance and Technical Information	21
Test Run Procedure	26
Pasteurizing Procedure	27
Warranty	34
Conclusion	35

About Anco Batch Pasteurizers

Vat Batch Pasteurizers are insulated, jacketed, process tanks. When used with a boiler and chilling system tanks can heat and cool almost any food, dairy, beverage or chemical products.

The most common use for batch pasteurizers is in the dairy industry for milk pasteurization. The Anco Batch Pasteurizers are available in standard or custom sizes. They typically range from 50 to 2,000 gallons in size.

The Anco Combo Vat is an open-top designed tank for the small cheesemaker; it allows for milk pasteurization and cheesemaking in one vat.

Batch Pasteurizer Specifications and Tank Options

Capacity Range:	50-2,000 gallon
Tank Top:	Flat top with removable covers, Wing-Top, Dome Top with Manhole
Tank Bottom:	Slight slope toward outlet
Tank Interior Shell:	Cylindrical vertical, 11 gauge type 304 or 316 stainless steel
Interior Finish:	Number 4 finish food grade
Jacket:	(1-4) Zones available, 304 stainless steel full vertical side wall and bottom dimple plate jacket, max. pressure rating of 70 PSI
Insulation:	2" polyurethane insulation
Tank Exterior Shell:	Cylindrical vertical, 14 gauge type 304 or 316 stainless steel
Exterior Finish:	Number 4 finish
Outlet:	1.5” or 2” leak detect valve ready
Agitation:	Bottom Sweep, Full Sweep, Side Scrape, Curd Blade Shaft. Euro-Drive and Motor with or without VSD control.
Ports:	2" TC and 1.5” TC and Inlet port (s) available
Air Vent:	3” on dome top tanks only
Leg:	Three or Four stainless steel pipe legs with adjustable ball feet

Batch Pasteurizer Overview

Tank Inspection

To ensure each tank is in good working order, Anco Equipment inspects every aspects of our equipment before we ship our product. We ask all our clients to do the same.

Immediately upon arrival of the equipment, confirm the tank has not been scratched, dented, or missing any parts during transit. Call Anco Equipment immediately if you find something wrong with your order.

Prepping Instructions

Cleaning your vat: after the manufacturing and shipping process, it is important to thoroughly wash and degrease your vat. Please see further in this manual or contact your chemical cleaning supplier for recommendations.

Prior to tank use: be sure to clean and sanitize the vat, pump, outlet valve, supply lines and spray balls (if present). If you decide to use a chemical based cleaning process; be sure to follow all manufacture's instruction. **To avoid pitting of your equipment NEVER let highly chlorinated water stand more than ten minutes.**

Boiler Installation Instructions

Please use a licensed boiler technician or licensed Pipe Fitter when installing the tank.

The tanks dimple plated jacket is designed to heat and/or cool with Glycol, a hot water boiler or a steam boiler system. The jacket is tested and rate for 70 maximum pounds per square inch (PSI). Low pressure boilers are recommended. If you are using a high pressure boiler confirm with your state rules and regulations that no additional safety valves or documentation are required (example: ASME).

A properly sized boiler can have your product at pasteurizing temperature within 25 minutes or less. You will need a licensed plumber or boiler technician to install your boiler system. There should be pressure valves installed to protect the tank jacket from reaching more than the maximum PSI allowed. Please see further in this manual for proper boiler sizing.

If you are heating with steam; the steam inlet is the top port of jacket on the side. If the tank has 2 or more zones the bottom zone ports are interchangeable. See diagram further in this manual.

If you are heating or cooling with water or Glycol the inlet is the bottom or lowest port of jacket. If the tank has 2 or more zones, the bottom zone ports are interchangeable. See diagram further in this manual.

- Motor/Gearbox
  - A licensed electrician is needed to hard wire the motor/gear and variable speed drive (if applicable). **Agitator must run clockwise.**
  - Frequently check the oil level plug and add oil if needed. Food grade oil is recommended.
- Gaskets
  - Only food grade gaskets can be used on all ports and valves. Gaskets should be inspected regularly for cracks or worn areas. The gaskets must be replaced every 18 months for moderate use or when worn or damaged.
- Clean In Place-Spray Ball Cleaning Nozzles
  - Unless otherwise noted, your tank is equipped with (2) Food Grade spray ball nozzles. Please see diagram further in this manual for step by step cleaning and maintenance procedure.
- Leak Detection Valve Instructions and Maintenance
  - Each valve purchase includes a food-grade gasket and a tube of PetroLube.
  - To install; clean the area of the tank where the gasket is place. Apply PetroLube to both sides of the gasket and place on to the tank bolts. Lubricate the inner guts of valve before setting in place. The PetroLube is a food-grade lubricant and is allowed to have product contact. Please see diagram further in this manual.
  - Also find video reference on YouTube under Anco Equipment.
- Adjustable Ball Feet
  - Any threads showing on the tank's adjustable ball feet must be sealed with a food grade sealant.
- Exterior Threaded Ports:
  - When connecting any process lines or tubing to the tank's threaded ports; use a Food Grade Anti-Seize & Lubricating Compound on the threaded area. This will help resist acid, chemical corrosion & oxidation. Follow manufactures instructions.
- Electric Airspace Heater
  - The electric airspace (if needed) will be installed on the lid or roof of tank. Please use a licensed electrician for proper installation.

Cleaning your Batch Pasteurizer

Degreasing your tank prior to passivation is a very simple but important step in preparing your tank. You may consult your chemical supply provider or use these steps below.

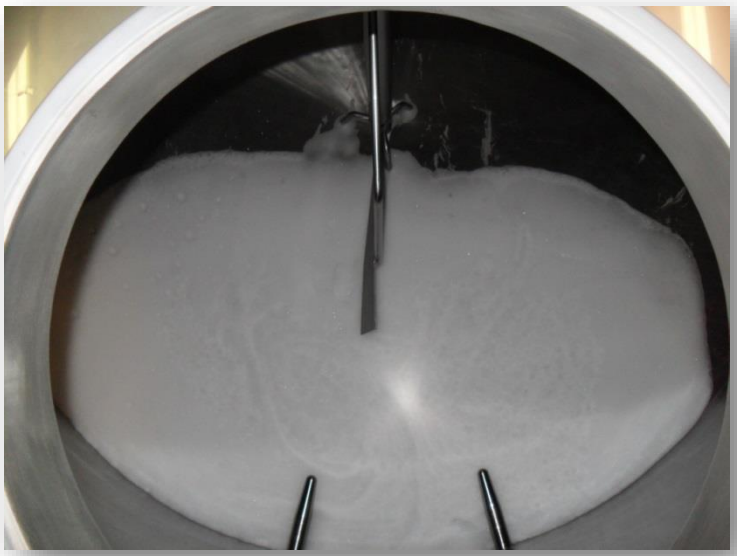
1. Fill tank about 10% full with hot water.

2. Add degreaser.

3. Using a circulating pump, rotate the water from the tank outlet to the CIP spray balls.

4. Run the cycle for 15 minutes.

5. Drain soapy water and rinse.



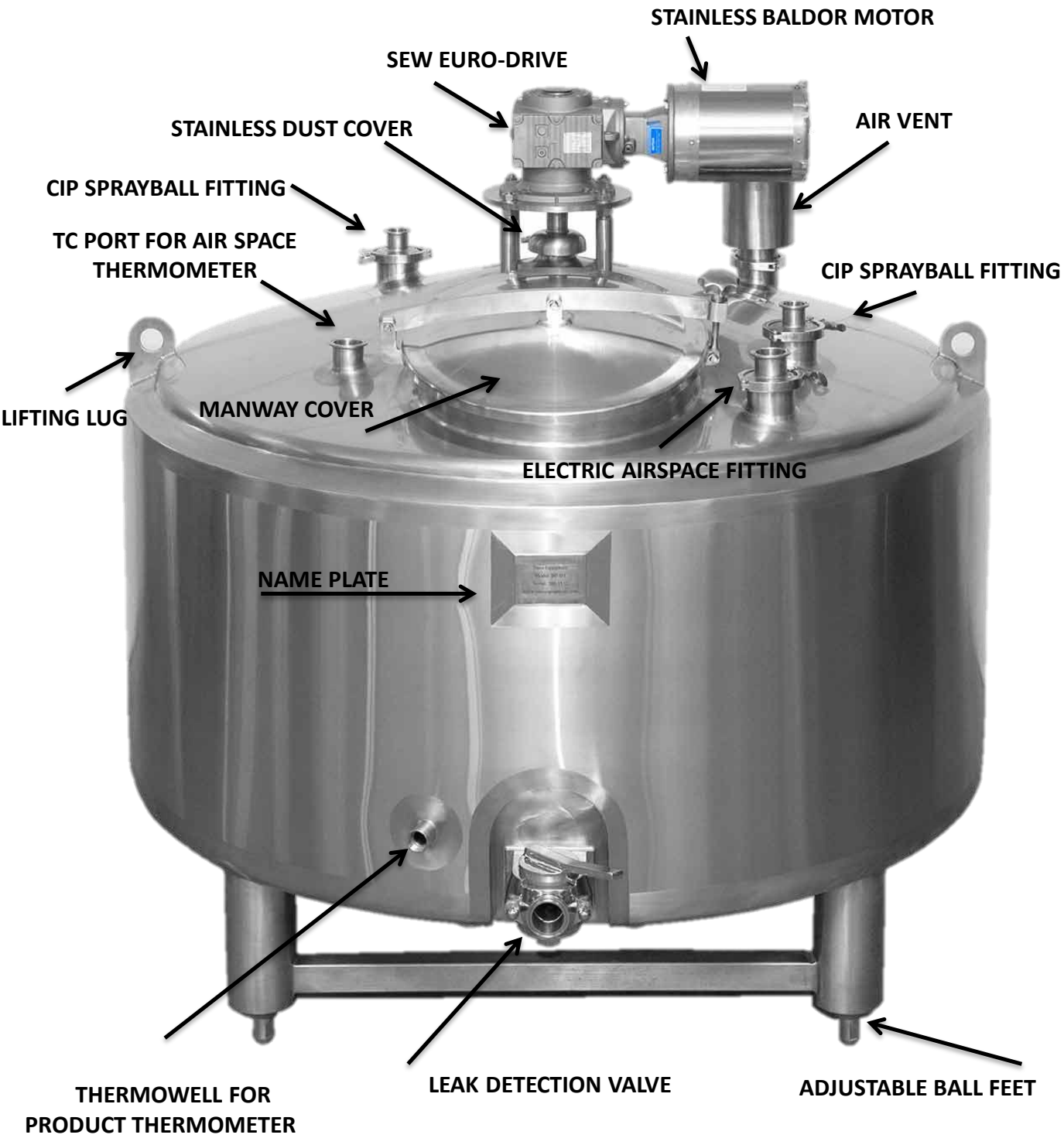
Sizing your Boiler

A properly sized boiler is the key to pasteurizing in a quick timely manner. Since the tank jackets are only rated to 70 pounds per square inch, we recommend using a hot water or low-pressure steam boiler. Check the boiler regulations in your state before purchasing a boiler.

Note: Figures below are based on a standard tank and may vary if tank dimensions change.

Tank Size in Gallons	Side Jacket in Gallons	Side Jacket in Sq. Ft.	Bottom Jacket in Gallons	Bottom Jacket in Sq. Ft.	BTU's Required
50	1.8	12	1.4	7	100,000
75	2	13	1.4	7	150,000
100	3	18	1.4	7	200,000
150	4	26	1.4	7	265,000
200	5	33	1.4	7	350,000
300	7	42	2	11	525,000
400	8	48	2	13	600,000
500	9	54	3	17	750,000
600	10	60	3	18	900,000
800	11	68	3	19	1,200,000
1,000	12	82	3.5	20	1,500,000
1,200	16	136	4	22	1,800,000
1,500	18.5	166	4.5	24	2,250,000
2,000	22	204	5	26	3,000,000

ANCO BATCH PASTEURIZER



Bottom Inlet & Outlet Ports are Interchangeable

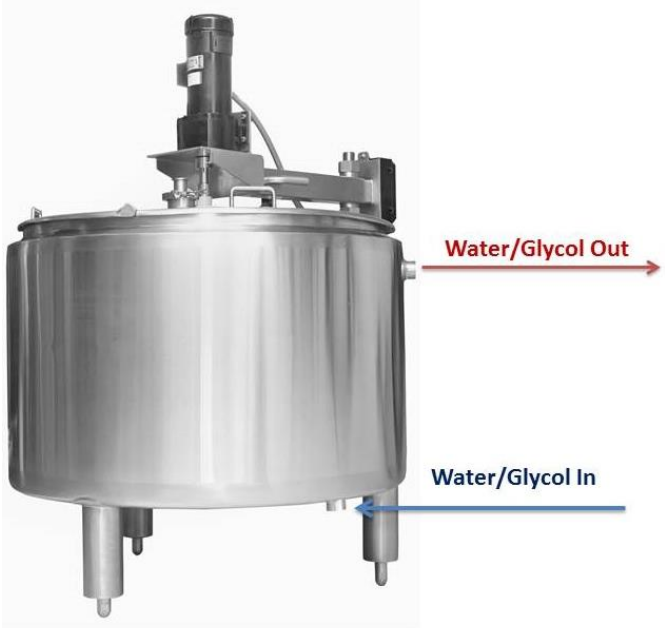
Underneath the tank you will find two ports for the bottom zone or jacket. Connect your steam, water, or Glycol lines here. The ports are interchangeable so either port can be the inlet or the outlet. .

Bottom Jacket Ports
These ports are interchangeable

Inlet & Outlet-Single Zone Jacket Install

Steam must always enter from the top inlet jacket and exit from the bottom or lower jacket port.

Water or Glycol must always enter from the lower inlet port of the jacket and exit from the top or higher jacket port.



Inlet & Outlet-Two Zone Jacket Install

Steam must always enter from the top inlet jacket and exit from the bottom or lower jacket port.

Bottom ports are interchangeable.

Water or Glycol must always enter from the lower inlet port of the jacket and exit from the top or higher jacket port.

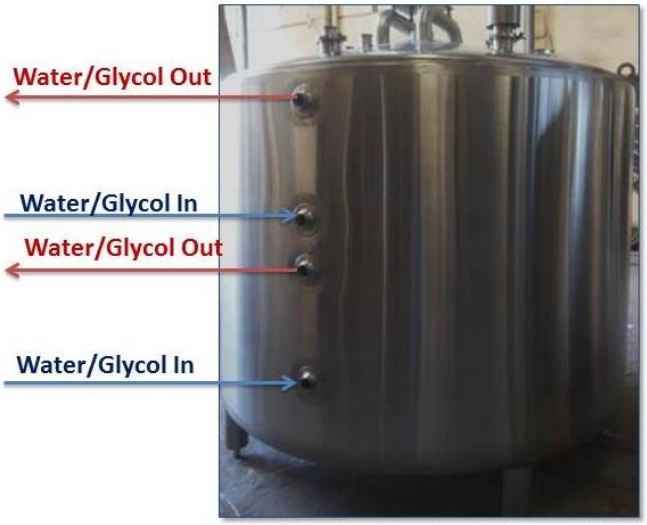
Bottom ports are interchangeable.

Inlet & Outlet-Three Zone Jacket Install

Bottom Ports are interchangeable.

Steam must always enter from the top inlet jacket and exit from the bottom or lower jacket port.

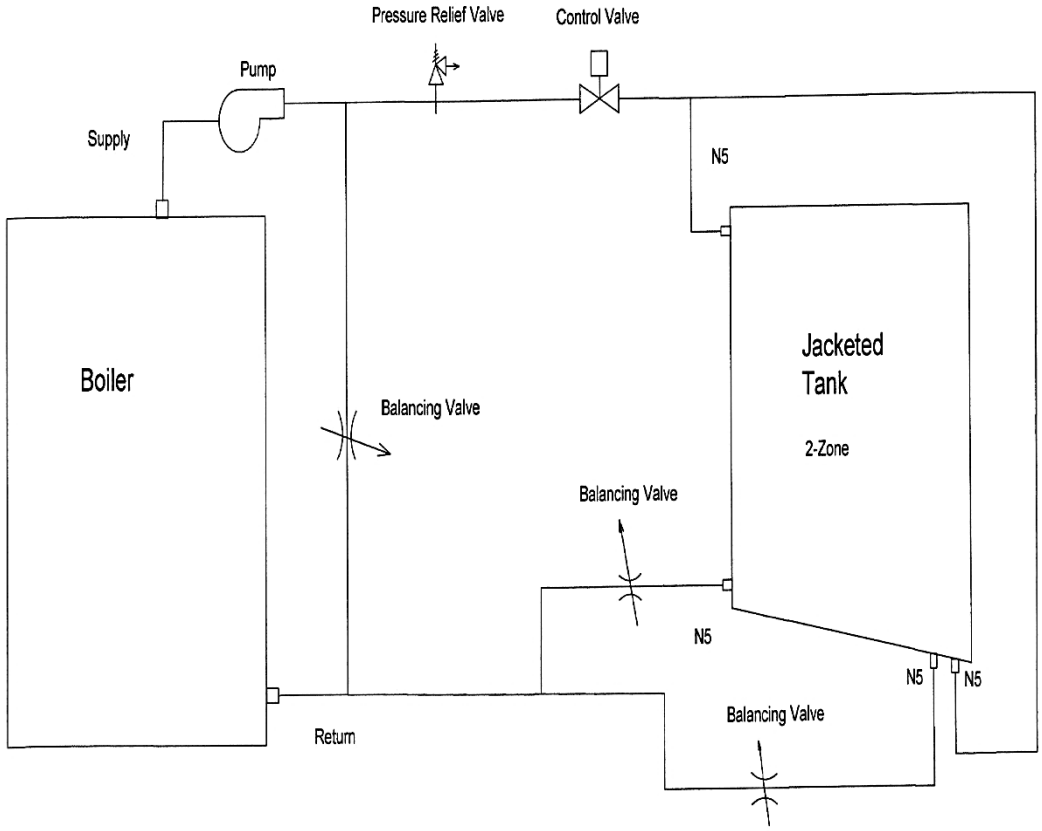
Water or Glycol must always enter from the lower inlet port of the jacket and exit from the top or higher jacket port.



Bottom Ports are interchangeable.

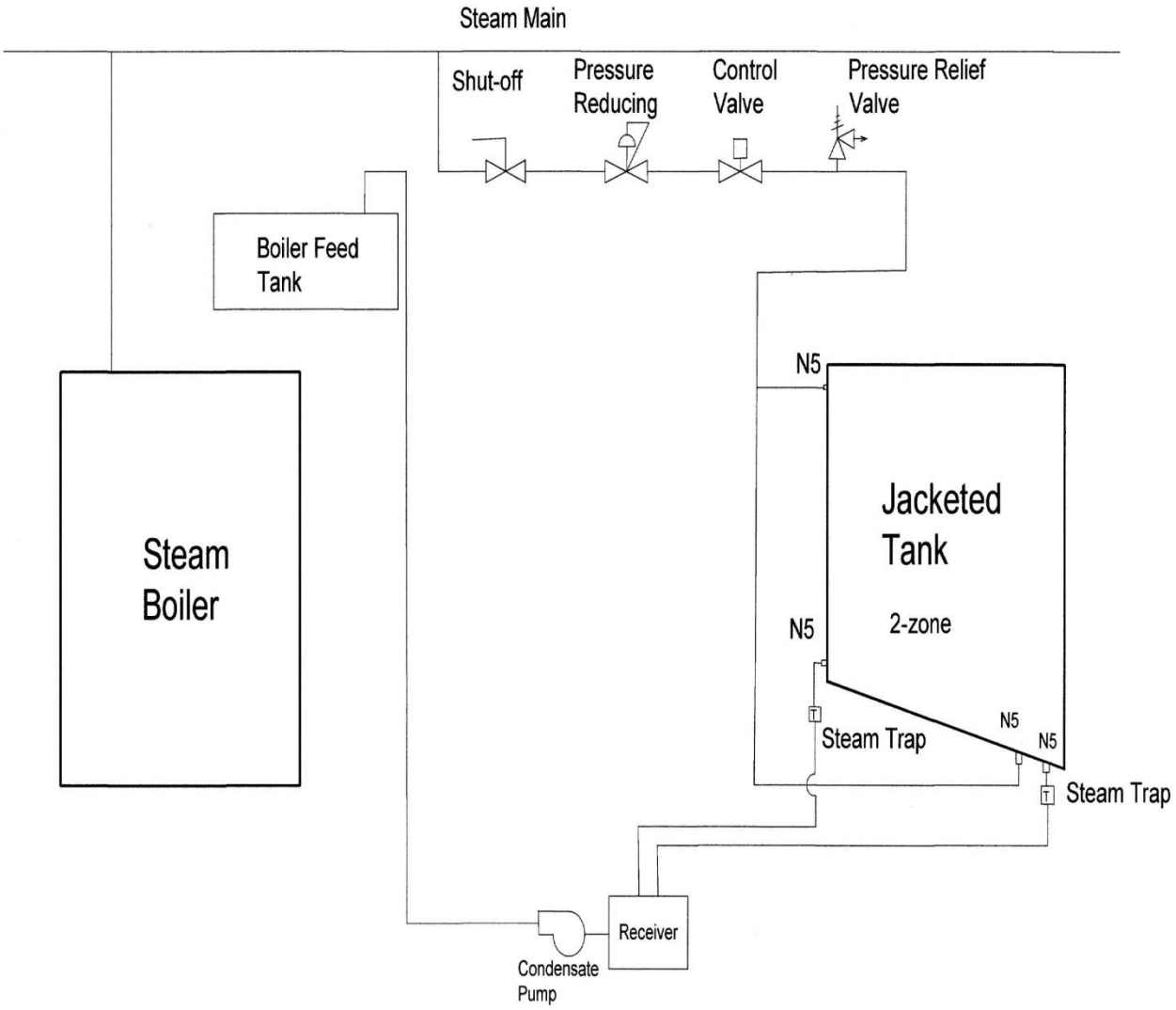
Hot Water Boiler Install Diagram Sample

Additional components will be required for a complete system. Consult with a qualified professional for design and integration with a specific boiler and plant steam system



Steam Boiler Install Diagram Sample

This diagram is a graphical representation of a typical steam supply and condensate return system for a jacketed tank. Additional components will be required for a complete system. Consult with a qualified professional for design and integration with a specific boiler and plant steam system.



Proper Valve Maintenance & Handling

DO's	DON'Ts
Handle with Care (see Figure 1)	Handle improperly (see Figure 1)
Use Petro Gel a food-grade lubricant around the valve gasket, plug, nut, and inside the body to seal. (see Figure 2)	Never throw or drop valve parts into cleaning tank, nicks in the valve will cause leaking
Keep valve parts away from each other when valve is not in use to reduce nicks from hitting each other	Do not let valve come in contact with non-stainless steel parts
Nicks inside the valve will cause leaking, use a fine file to remove nicks from plug.	Never use steel wool on valve or put it into cleaning tank with iron or steel material
Place valve in wash sink carefully and away from other parts to prevent scratching and dents	Do not interchange plug parts. Each valve and plug are mated during the manufacturing process
Keep valve parts away from any steel or iron material	Never open or close a valve without first loosening the bottom nut
Inspect valve plug before placing back into valve body for nicks or scratches	Never open valve by hammering it as this will decrease its service life
If a valve is leading look for the cause which is usually improper installation	Never tighten the bottom nut too tightly. Excess tightening will not cause a leaking valve to stop leaking.

Figure 1

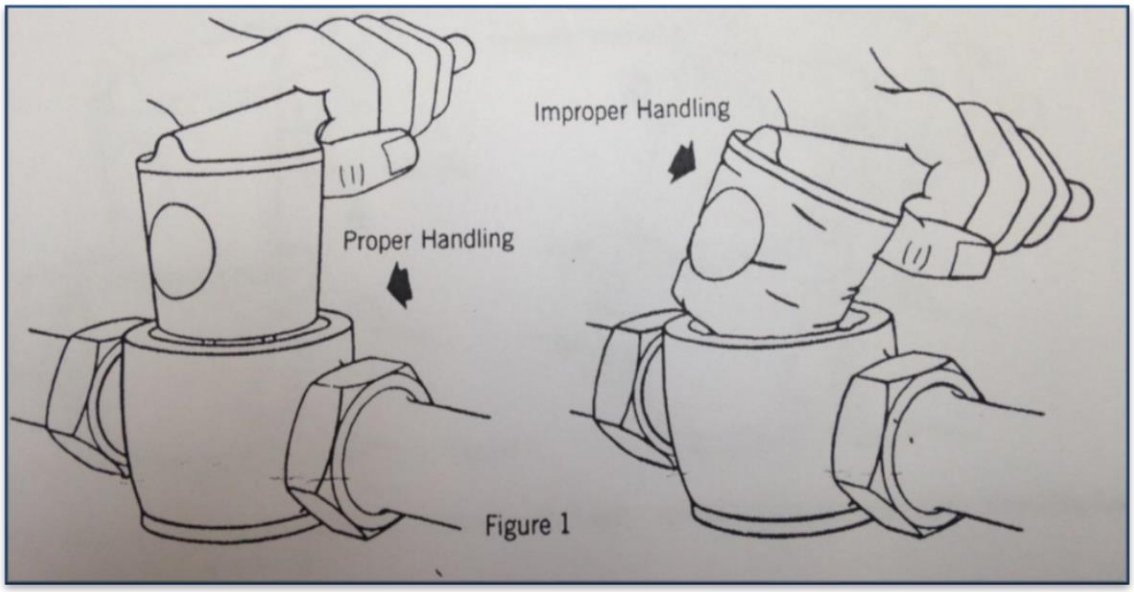
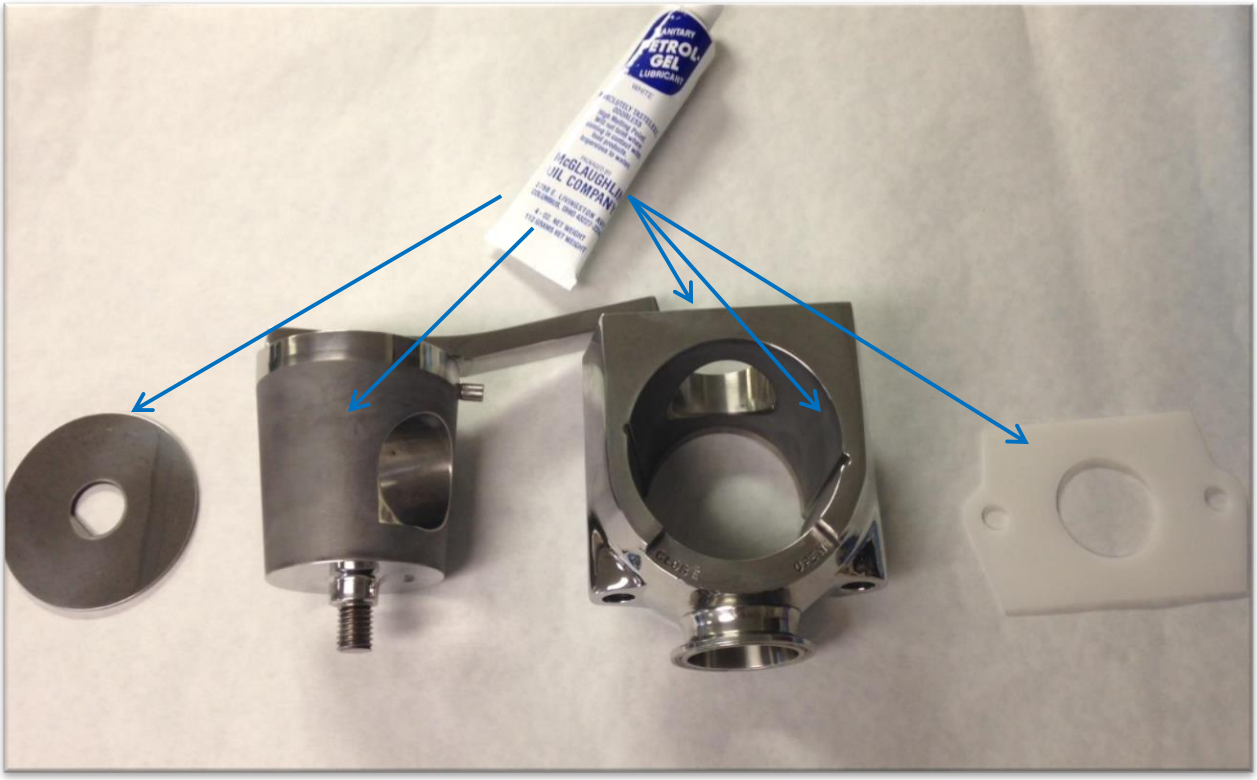


Figure 2



Leak Detection Valve

Each Valve Purchase includes a 2” PMO Leak Detect Valve, a Plastic Gasket, and a Tube of Food Grade Petrol Gel.

Installing the Valve

1. Apply Petrol Lube to the gasket and stick it to the base of tank.
2. Apply generously to the front of gasket and back of valve.
3. Apply Lube inside the guts of the valve.
4. Test the valve.
5. If there is a leak apply lube to leaking area.

Anco Electric Air Space Heater

The element needs to be wired to single phase power. It should be positioned in the tank angled to the center making sure it does not interfere with the agitator shaft or CIP spray balls.

The Rheostat control allows you to adjust the amount of electrical current running to the heating element and control the heat of the air space. The Rheostat needs to be installed by a licensed electrician.

The Air Space Heater fits into a 3” sanitary ferrule and element is self supporting. The top agitation blade helps move the air in the head space.

Anco Electric Air Space Heater

***To be installed by a licensed electrician**

Anderson Chart Recorder and Temperature Probes

Get full Anderson manual on our website under technical information.

FLOW
LEVEL
PRESSURE
ANALYTICAL
TEMPERATURE
INSTRUMENTATION
PASTEURIZATION CONTROLS

AJ-300 Recorder/Recording Controller

- *12" chart for maximum readability and accuracy*
- *Nema 4X Case withstands repeated washdowns, high humidity*
- *Modular relay and 4-20mA output options*
- *Universal, field selectable input type*
- *Simple Keypad Programming*
- *3 Year Warranty*

The AJ-300 family of recorders and recording controllers is designed specifically for sanitary fluid processing applications. Available in single or dual pen versions, these units record on the largest charts in the industry for maximum resolution and readability, easily meeting all health-code requirements. Housed in a NEMA 4X enclosure, the unit withstands high humidity environments and frequent "wash-downs". The case is designed for surface or panel mounting.

Universal inputs are factory or field programmable via the front keypad using a user-friendly menu. Relay and 4-20mA outputs are modular for maximum cost effectiveness. A 24Vdc loop supply is available which powers one or two transmitters. Of course, the 4-20mA outputs are fully isolated to insure freedom from ground loop problems when interfacing with additional instrumentation.

Either or both pens can be specified with full PID control including auto/manual control, and remote setpoint capability.

For virtually any one or two pen application, the AJ-300 provides the optimum solution. Combined with Anderson's sanitary sensors and applications expertise, it's the only solution you'll need.

ANDERSON INSTRUMENT CO., INC • 156 AURIESVILLE RD. • FULTONVILLE, NY 12072 • USA • 800-833-0081 • FAX 518-922-8997
ANDERSON INSTRUMENT CO. LP • 400 BRITANNIA RD. EAST, UNIT 1 • MISSISSAUGA, ONTARIO L4Z 1X9 • CANADA • 905-568-1440 • FAX 905-568-1652
NEGELE MESSTECHNIK GmbH (A Division of Anderson) • RAIFFEISENWEG 7 • D-87743 EGG A. D. GÜNZ • GERMANY • +49 (0) 8333/9204-0 • FAX +49 (0) 8333/9204-49

www.andinst.com

Installation Information

A hard copy of the complete installation manual will be included with your Anderson Equipment.

ANDERSON

Anderson Instrument Co., Inc.
156 Auriesville Rd. ~ Fultonville, NY 12072
Phone: 518-922-5315 or 800-833-0081

Literature and Specifications available at:
www.andinst.com

Key Product

- AJ Series Chart Recorder
- CT/SA Temperature Sensors

Industry

Dairy

Application

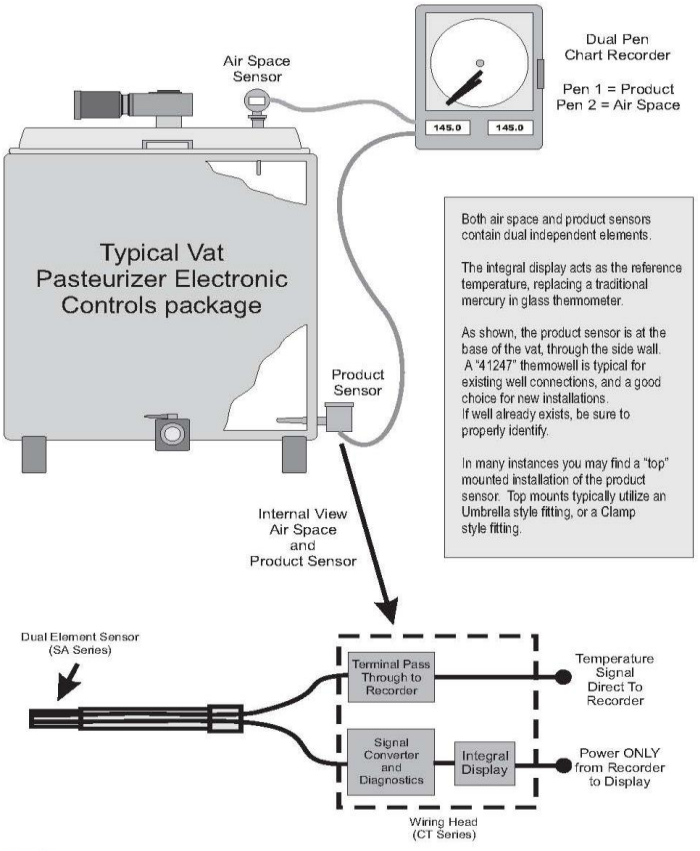
- Specialized controls for VAT Pasteurization
- System over view
- Wiring diagram

This document contains a system over view drawing, as well as detailed wiring information.

Material is designed to supplement the AJ 300 Series Chart Recorder Installation, Wiring and Operations manual. Be sure to follow proper guidelines for mounting, as well as the connection to an AC power source.

Technical Bulletin

VAT Pasteurization - Electronic Controls Package Wiring Diagrams



Both air space and product sensors contain dual independent elements.

The integral display acts as the reference temperature, replacing a traditional mercury in glass thermometer.

As shown, the product sensor is at the base of the vat, through the side wall. A "41247" thermowell is typical for existing well connections, and a good choice for new installations. If well already exists, be sure to properly identify.

In many instances you may find a "top" mounted installation of the product sensor. Top mounts typically utilize an Umbrella style fitting, or a Clamp style fitting.

NOTE

As shown, this system addresses all requirements of the Pasteurized Milk Ordinance (PMO) section covering "Combination Electronic Thermometers for Batch Pasteurizers." This "concept" was approved at the 2005 National Conference on Interstate Milk Shipments (NCIMS). The upcoming re-write of the Pasteurized Milk Ordinance will include these new details.

For any additional Regulatory issues pertaining to the use of these components as described, please contact:

Gary Ratajczak 800-833-0081 x577

Revision 1.0 DOC 1134 Page 1 of 2

Spray Ball Installation and Maintenance

3-A PTFE Tank Cleaning Nozzles

Effective Dec. 8, 2009
Article number 2171

Lechler, Inc.
445 Kautz Road
St. Charles, IL 60174-5301
630-377-6611
1-800-777-2926
Fax 630-377-6657
Quality spray nozzles and systems

1. Storage Instructions:

1.1. Protection from weather, such as rain, is required to avoid deterioration of the packing material.
1.2. Keep product in packaging material until ready for installation to reduce the possibility of product damage.
1.3. Use care to avoid damaging the nozzle orifice(s).
1.4. Lechler, Inc. does not suggest stacking of packaging except for wooden crates (maximum 2 high).

2. Installation Procedure:

2.1. Attach nozzle to pipe/tube. Insert "R-Clip" through nozzle and pipe/tube assembly.
2.2. Save label from packaging in order to be able to have a record of the nozzle manufacturer and nozzle part number for reordering purposes.

3. Operation Procedure:

3.1. To protect the nozzle's inner workings, we suggest the use of a line strainer with a 200 mesh size to be installed after the pump and before the nozzle.
3.2. Suggested operating pressure is 20-30 PSIG. Increasing the operating pressure will help increase impact until the threshold is reached (50-60 PSIG). Beyond the threshold pressure, sprays tend to atomize more, which reduces cleaning efficiency. Experiment to see what pressure works best for your application.
3.3 Please note that if the nozzle is mounted in a horizontal orientation it might not drain completely if the body (rotating element of the nozzle) ends up in a position where the nozzle orifice straddles the bottom of the nozzle.

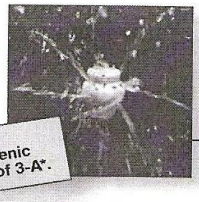
4. Maintenance Instructions:

4.1. Lechler Tank Washing nozzles require little or no maintenance, though periodic inspection is advised to ensure proper performance.
4.2. Non-uniform spray appearance will result if the nozzles are partially clogged or worn. If blockage occurs, depressurize the system, remove nozzle from connection and remove foreign debris.
4.3. Disassembly of nozzles is not recommended.

While every effort has been made to ensure its accuracy, Lechler makes no express or implied warranty of any kind respecting the information contained in this manual or the materials referred to therein. Anyone making use of the information or material contained herein does so at their own risk and assumes any and all liability resulting from such use. All data contained herein is subject to change without notice.

Spray Ball Specification Sheet

PTFE Whirly – especially designed for sanitary requirements
Series 583 / 573



3-A® Slip-on version fulfills the hygienic requirements of 3-A*.

Series 583 / 573

Product features:
- Corrosion resistance
- Lightweight
- Balanced rotating action
- Operates in every position
- 3/4" size fits through a 2" opening
- Slip-on version design meets 3A standards
- Smooth surface finish
- Free spinning, self-lubricating, and self-flushing
- FDA-compliant (see page 24)

Applications:
- For rinsing of small and medium-sized vessels, e.g. in the dairy, chemical, pharmaceutical or food industries

Max. tank diameter:
Rinsing: 18 ft.
Cleaning: 10 ft.

Operating pressure:
20 – 40 psi, max. 90 psi

Max. fluid temperature:**
200°F

Weight:
3/4" .32 lb.
1" .68 lb.

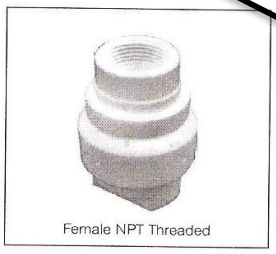
Material:
PTFE
R-Clip made of 316L stainless steel included with the tube slip-on. For reordering:
095.022.1Y.50.88.E (3/4")
095.022.1Y.50.60.E (1")

Bearing: Sleeve bearing

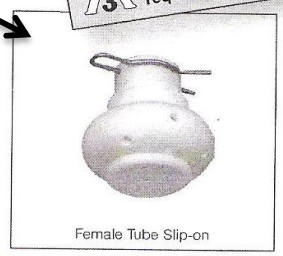
Filtration:
Line strainer with 50 mesh size

Please note: We do not recommend operation of these products with compressed air, steam, or gases. To protect the products' inner workings, we suggest use of a line strainer with a 50 mesh size. For further information, please contact Lechler.

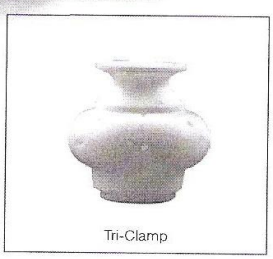
The nozzles with a slip-on connection type fitting may have a higher flow rate than listed due to the self-flushing design around the customer's tube which is inserted into the nozzle socket.



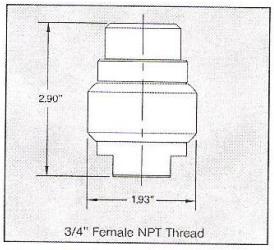
Female NPT Threaded



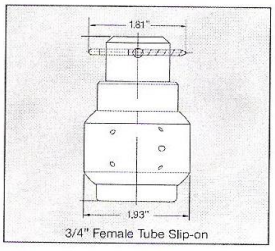
Female Tube Slip-on



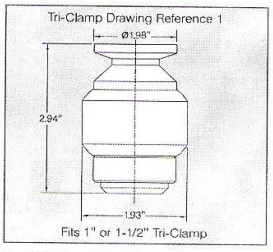
Tri-Clamp



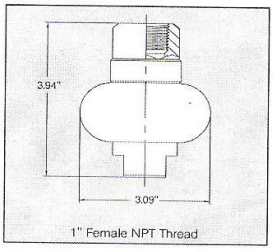
3/4" Female NPT Thread



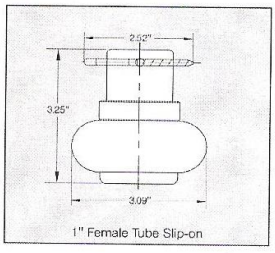
3/4" Female Tube Slip-on



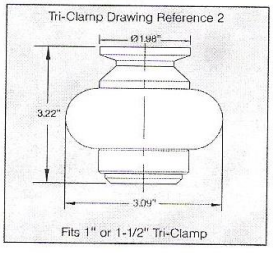
Fits 1" or 1-1/2" Tri-Clamp



1" Female NPT Thread



1" Female Tube Slip-on



Fits 1" or 1-1/2" Tri-Clamp

Spray Angle	Type	Ordering no. Connection: 3/4" Female NPT	1" Female NPT	Sanitary Pin: 3/4" Slip-on	Sanitary Pin: 1" Slip-on	1" 1½" Tri-Clamp	Free Passage (in.)	Flow Rate (Gallons Per Minute): 20 psi	liters per minute 2 bar	40 psi	60 psi	Tri-Clamp Drawing Reference
270° up	583. 116. 55	BL	-	TF07	-	15	.081	16	67	21	25	1
	583. 266. 55	BL	-	TF07	-	15	.133	32	145	45	55	1
270° down	573. 266. 55	BL	-	TF07	-	15	.133	32	145	45	55	1
360°	583. 119. 55	BL	-	TF07	-	15	.056	13	58	18	22	1
	583. 209. 55	BL	-	TF07	-	15	.136	22	100	31	38	1
	583. 269. 55	BL	-	TF07	-	15	.187	32	145	45	55	1
	583. 279. 55	-	BN	-	TF10	15	.146	33	150	47	58	2
	583. 349. 55	-	BN	-	TF10	15	.219	50	226	70	86	2

Example for ordering: Type 583. 266. 55. + Conn. BL = Ordering no. 583. 266. 55. BL

** Contact Lechler for maximum ambient temperature.

* The slip-on version has been authorized to use the 3-A* Symbol by the 3-A® Sanitary Symbol Council Administrative Council for Spray Cleaning Devices (78-01). See page 24.

For various configurations to mount your tank cleaning nozzle, see the Lances and Nozzle Headers section beginning on page 137.

Running your Batch Pasteurizer

- Once your boiler and electrical components are installed and your tank is degreased and passivated; we recommend running a test batch with water prior to running your product. This will also help get a feel for your boiler to maintain a steady temperature.

- The **agitator must be turning clock-wise** and should be operating at all times while product is being heated during the pasteurization cycle. Always fill tank from the top of your pasteurizer using the product inlet.

- The Product and Airspace thermometer along with chart recorder should be on and in place.

- Hot water or steam should be reduced shortly before reaching pasteurizing temperature or the temperature may overshoot. This will give you the opportunity to make any final adjustments to the pressure valves, pumps, timing, etc.

- Closely monitor both the product and airspace temperature recordings until full pasteurization of product is reached in 30 min per the PMO guidelines. Please remember if any manholes, wing doors, or ports are opened during the 30 min pasteurization process, you will have to start your 30 min pasteurization over.

- Turn the air space heater off at the end of pasteurization before starting to cool the vat. Keep covers on until product is withdrawn from the vat unless you will be using the vat for further production.

- To cool your product following pasteurization it's important to prevent a "thermal shocking" the dimple jacket or vessel. Thermal shocking is caused when there is a sudden temperature change on the stainless steel causing stress on the jacket material and welds. To prevent this, there should be no more that a 25°F change in cooling media per minute. We recommend using well water or a media 45°F or above after pasteurization of 145°F. This is a great way to gradually bring down the temperature before using your chilling unit.

Batch Pasteurizing Standards

(Rules and procedures may vary from state to state, please check with your local inspector)

1. All components must be added to the batch prior to beginning pasteurization. This includes liquid sugar and sweeteners, water, milk powders and all other flavorings, stabilizers and vitamins. Certain flavoring ingredients may be added after pasteurization. These include ingredients that have a water activity of 0.85 or less, high acid content, dry sugars, fruits and roasted nuts, safe and suitable bacterial culture organisms and flavorings containing a high alcohol content. Fruits and vegetables may be added to cultured products having a pH of 4.7 or less. Such ingredient addition shall be done in a sanitary manner and the ingredients must be of safe and wholesome quality.

2. Pasteurization must be performed in properly designed and operated equipment that ensures that every particle of product will be held continuously for the minimum time and temperature. The product should be heated to pasteurization temperature in as short a time as practicable and in no case should this time exceed 4 hours. Following pasteurization the product must *be cooled to 45°F or less* as soon as possible. The only exception is for cultured product processing.

3. If, for any reason the lid or any cover is lifted or mechanical failure of any kind occurs after beginning the pasteurization process, the timing process must be restarted and notes to that effect must be made on the recording chart by the operator.

4. The official thermometer is the indicating thermometer and the recording thermometer functions only to provide a record of the pasteurization cycle. The operator must verify the accuracy of the recording thermometer, for each batch, with the indicating thermometer. No batch of milk shall be pasteurized unless the sensors of both thermometers are covered.

5. The air space thermometer reading must also be recorded on the recording chart during pasteurization. To assure the minimum air space temperatures are being maintained, the air space indicating thermometer shall be *read at the beginning and at the end of the holding period.* The air space temperature must *never be less than 5°F above the minimum legal pasteurization temperature* required for the product in the vat.

6. Recording charts must be used only for the length of time it has been designed for. *Overlapping information on circular charts is never acceptable.* Required information on the chart must be legible and meet all the requirements of the PMO.

7. The outlet valve is *designed to detect and expel any leakage* past the valve seat and is *close coupled* to prevent cold pockets of product from accumulating in the valve or piping. *At no time during the pasteurization cycle or following may the outlet piping be directly attached to any line or vessel containing raw milk or any other contaminating substance*.

Assurance of Holding Periods

1. Vats must be operated so that every particle of milk is held for *at least 30 minutes at or above the minimum required temperature* for the specific product processed.

2. When the milk product is heated to pasteurization temperature in the vat and is partially cooled in the vat before opening the outlet valve, the recorder chart must show *at least 30 minutes at or above the minimum pasteurization temperature*.

3. When the milk product is preheated to pasteurization temperature prior to entering the vat, the recorder chart must show a *holding time of 30 minutes plus the filling time of the vat from the level of the recorder bulb sensor to the maximum level* of normal operation.

4. When cooling is begun after the outlet valve is opened or is done entirely outside the vat, the chart must show a *holding time of 30 minutes plus the time necessary to empty the vat to the level of the recording thermometer bulb.*

5. The operator must *indicate filling and/or emptying times on the chart* by inscribing the start and end of the official 30 minute holding time.

6. Vat pasteurization *charts must clearly show the four identifying holes* (marks) which verify the chart has not been rotated or manually turned to give a false time line accuracy.

PMO Guideline for Dairy Products
Taken from PMO Guideline Book

TABLE 2
PASTEURIZATION REQUIREMENTS FOR SELECTED DAIRY PRODUCTS

	Product Group	Batch Pasteurization	HTST Pasteurization
(a)	Milk, skim milk, or buttermilk	145°F. (63°C.) for 30 minutes	161°F. (72°C.) for 15 seconds
(b)	Cream and fluid dairy products having more than 10% milkfat	150°F. (66°C.) for 30 minutes	166° F. (75°C.) for 15 seconds
(c)	Cream for butter	165°F. (74°C.) for 30 minutes	185°F. (85°C.) for 15 seconds
(d)	Condensed dairy products including condensed products in group (a) and blends of those products	150°F. (66°C.) for 30 minutes	166°F. (75°C.) for 15 seconds
(e)	High total solids products (>18%)	150°F. (66°C.) for 30 minutes	166°F. (75°C.) for 15 seconds
(f)	Frozen dessert mixes	155°F. (69°C.) for 30 minutes	175°F. (80°C.) for 25 seconds or 180°F. (83°C.) for 15 seconds
(g)	Egg nog	155° F. (69°C.) for 30 minutes	175°F. (80°C.) for 25 seconds or 180°F. (83°C.) for 15 seconds
(h)	Process cheese	150°F. (66°C.) for 30 seconds	—

INDICATING AND RECORDING THERMOMETERS

VAT PASTEURIZER THERMOMETER CRITERIA

THERM TYPE	SPAN	GRADS	ACCURACY	CHART SPEED
INDICATING	25°F	1°F	0.5°F	N/A
RECORDING	140-160°F	1°F	0.5°F	1 REV/ 12 HRS.
AIR SPACE	25°F	1°F	1°F	

PASTEURIZATION GREATER THAN 160°F

THERM TYPE	SPAN	GRADS	ACCURACY	CHART SPEED
INDICATING	25°F	1°F	0.5°F	N/A
RECORDING	150-170°F	2°F	0.5°F	1 REV/24HRS
AIR SPACE	25°F	2°F	1°F	

1.Indicating thermometers shall be mercury actuated, direct reading type, scaled to a minimum of 0.625 of an inch, with a span of not less than 25 F. The span must include the pasteurization temperature (plus or minus 5° F) and be graduated in 1° F and accurate to within 0.5°F.

2.The sensing bulb of the indicating (official) thermometer must be designed to extend fully into the product during pasteurization.

3.An approved air space must be provided that is graduated in 2-degree maximum increments and accurate to pus or minus 1°F. The bottom of the bulb chamber must not be less than 2 inches or more than 3.5 inches below the underside of the top enclosure or cover. The bottom of the bulb must never be less than 1 inch from the top surface of the product during pasteurization.

4.The vat must be equipped with a recording thermometer graduated in 1°F increments between140° and 155°F. The chart must be graduated in time scale divisions of not more than 10 minutes for a maximum record of twelve hours and designed for the recorder used.

5.On vats used solely for pasteurization at temperatures above 160°F, the recording chart may be graduated in 2°F within a 150° to 170°F range. The chart for this type of vat may be graduated in 15 minutes for a maximum of 24 hours.

6. Review the recording charts for the following information: (PMO, Part II, Section 7, item 16p(E)(1)(b)).

    1. Date
    2. Chart # if more than one used during a product day
    3. Name or number of pasteurization unit
    4. Cut-in and cut-out temperature recorded at the beginning of the run, with a reference mark
    5. Indicating thermometer temperature at a given time or reference point as indicated on chart
    6. Position of FDD (Forward Flow or Diverted Flow) recorded by mechanical "event" pen on the thermal limit controller
    7. Amount and identification of each product noted on the chart
    8. Record of and reason for each unusual occurrence if any
    9. Signature or initials of operator
    10. Name of plant
    11. Record of Quality Control

GENERAL CLEANING AND SANITIZING OF PASTEURIZING EQUIPMENT

Milk-stone is a hard deposit or encrustation that is a combination of milk solids and washing powder that may build on milk equipment. The minerals contained in hard water also contribute to its formation. It is a chemical reaction that is accelerated by heat causing more deposits on heating surfaces than elsewhere. Aside from these contributing factors the primary cause of milk-stone is improper cleaning.

Phosphatase Test – Is a test used to determine the effectiveness of the pasteurization process. Phosphatase is an enzyme normally present in raw milk that is easily destroyed or inactivated by pasteurization. When milk that is contaminated with raw product or not held at the proper temperature long enough active phosphatase will be present in larger amounts than found in properly pasteurized milk.

A positive coliform test is indicative of post-pasteurization contamination. Coliform organisms are easily killed by pasteurization. The following steps can prevent post-pasteurization contamination: Clean and sanitized equipment and containers. No hand capping or bottling or other handling of milk equipment. Prevent exposure to potential contaminate such as flies, dust, dirt, drip or splash.

Milk spoilage, bacterial breakdown of milk proteins:
Sour - milk held at temperature of 65-75 will allow souring type organisms grow.
Bitter - milk that is held at temperatures below 50 would more often become bitter for the same reason.
Ropy - thermoduric spore-formers that may survive the heat process, traced to stagnant water on the farm.
Sweet curdle - fermentation and coagulation of milk with no acid production by organisms surviving the heat process that may destroy acid producing organisms.
Thermoduric -organisms that survive pasteurization temperatures. Thermo-philic-organisms that grow freely in milk at temperatures above 140°F

Sanitation - mere cleaning of equipment does not remove or destroy all disease causing organisms that may have been present. Even very small numbers remaining may grow to dangerous proportions since many grow rapidly in milk. All milk equipment must be treated with a sanitizing agent just prior to usage. Cleaning must be thorough before sanitation can be effective since the presence of organic material such as, milk-stone and soil can inactivate the sanitizer.

The number and type of bacteria present in raw milk, faulty equipment or soiled, unsanitary contact surfaces of equipment may influence efficiency of pasteurization.

Cleaning and Sanitization Methods

1. Steam

This method can be used successfully only in confined areas. All parts of equipment must be exposed to a temperature of at least 170°F for at least 5 minutes.

2. Hot Water

This method is difficult to use on assembled equipment, particularly where hot water flows over a surface cooler. The temperature and exposure time is the same as steam.

3. Chemical

An approved chemical sanitizing solution, such as chlorine or quaternary ammonia is circulated or pumped through assembled equipment. Equipment may also be dipped in a solution to expose all the surfaces to the sanitizer. The strength of a chlorine solution should be 100 parts per million (ppm) for 30 seconds of contact time or 50 ppm for 2 minutes contact time.

Warranty

Equipment & Parts manufactured by ANCO Equipment, LLC:
ANCO Equipment, LLC warrants to the first user (the "Buyer") that the equipment manufactured by ANCO will be free from factory defects in materials and workmanship under normal use and proper maintenance for a period of twelve (12) months from the date the equipment is shipped from its facility.

Parts, Components & Materials manufactured by others:
Parts, components and materials manufactured by others are warranted only to the extent of the warranty given to ANCO by the manufacturer of such parts, components and materials. Said manufacturers' sole judgment shall determine the extent of allowance for, or replacement of, any such parts claimed defective.
ANCO Equipment, LLC does not warrant the corrosive resistance of stainless steel nor other metal parts for any purpose whatsoever.

Company Obligation:
ANCO Equipment, LLC's obligation under its warranty is strictly and exclusively limited to the repair or replacement, at the company's location in Pulaski, Wisconsin, of such components of its manufacture as are found by the company to be defective in materials or workmanship on the condition that the buyer gives prompt written notice to the company of any claimed breach of warranty within such twelve (12) month period and delivers to the company the claimed defective component within such time period or a reasonable time thereafter. All costs of packing and shipping claimed defective components and replacement and replacement or repaired components shall be paid by the buyer. The company reserves the right to satisfy its warranty obligation in full by the payment of the full purchase price upon return of the equipment to it at Pulaski, Wisconsin. IN NO EVENT SHALL THE COMPANY BE HELD LIABLE FOR CLAIMS (BASED ON BREACH OF EXPRESS OR IMPLIED WARRANTY, NEGLIGENCE, OR OTHERWISE) FOR ANY OTHER DAMAGES, WHETHER DIRECT, IMMEDIATE, INCIDENTAL, FORESEEABLE, CONSEQQUENTIAL, OR SPECIAL, INCLUDING DAMAGES ARISING OUT OF PERSONAL INJURIES.

The Company's warranty stated herein cannot be modified except by a writing signed by an officer of the Company.

Anco Equipment strives on 100% satisfaction on all their equipment. For any additional questions or concerns please check out our website at www.ancoequipment.com or call at (920) 569-3530.