



Process Tanks & Batch Pasteurizer Collection



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

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SECTION I

Process Tanks and Batch Pasteurizers

ANCO Equipment's to provide reliable, efficient, and sanitary solutions for a wide range of food, beverage, dairy, cosmetic, and industrial processing applications. Built from high-quality stainless steel and engineered for durability, ANCO tanks allow manufacturers to safely mix, heat, cool, hold, and process products with precision and consistency.

Our batch pasteurization tanks are specifically designed to meet the demands of temperature-controlled processing, providing uniform heating and cooling through jacketed vessel technology while supporting proper pasteurization procedures.

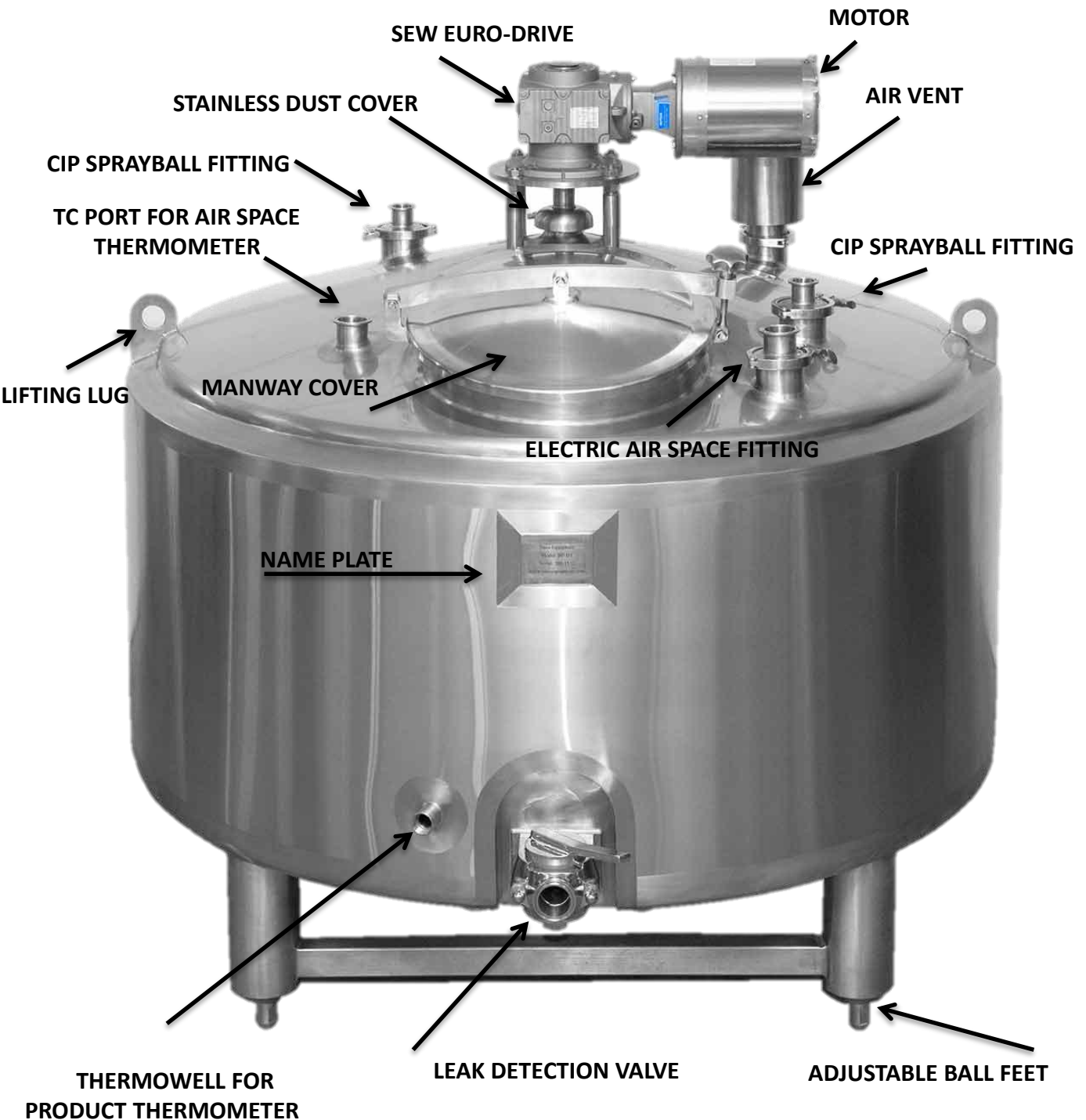
From dairy products and specialty foods to beverages, sauces, and other liquid-based products, ANCO Equipment tanks deliver the performance, sanitation, and flexibility needed for today's growing processing operations.



Specifications and Tank Options

Capacity Range:	50-2,500 gallon
Tank Top:	Flat top with removable covers, Wing-Top with Center Bridge, 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", 2", 3" leak detect valve or TC ready
Agitation:	Bottom Sweep, Full Sweep, Side Scrape, Curd Blade Shaft. Euro-Drive and Motor with or without VSD control.
Instrument Ports:	1.5"-3" TC and Inlet port (s) available
Thermowell:	Anderson-Negele temperature probe
Air Vent:	3" on dome top tanks only
CIP:	(2) stainless spray balls
Legs:	Three or four stainless steel pipe legs with adjustable ball feet

Process and Batch Pasteurizer Tank Features



Choosing the Correct Boiler

Boiler Sizing & Performance Expectations

Proper boiler sizing is essential for achieving consistent heating performance and efficient pasteurization results.

The tank jacket is designed for operation with a maximum working pressure of **70 PSI**. For this reason, a **hot water system or low-pressure steam boiler** is recommended.

Boiler Selection

When selecting a boiler, consider the following factors:

1. Tank size and jacket surface area
2. Product type and viscosity
3. Starting product temperature
4. Desired operating temperature
5. Required heat-up time
6. Available utility capacity (steam, gas, or electric)

A qualified boiler technician or mechanical contractor should be consulted to ensure proper system sizing and compatibility with the tank.

Performance Expectations

Actual heat-up and processing times will vary based on:

1. Batch volume
2. Initial product temperature
3. Product composition and density
4. Boiler output capacity (BTU or steam generation rate)
5. System design and heat transfer efficiency

Under properly designed and installed conditions, a correctly sized boiler system can typically bring product to pasteurization temperature in approximately **25–60 minutes**, depending on operating conditions.

Safety & Compliance

Before installation, verify all applicable local, state, and federal regulations. Certain jurisdictions may require additional safety devices, inspections, or certifications when connecting to boiler systems.

The boiler system must include appropriate pressure controls and safety devices to ensure the jacket pressure never exceeds the maximum allowable working pressure of **70 PSI**.

Boiler Sizing Information Requirements

Provide the following information to a boiler manufacture or supplier to ensure the correct boiler is recommended for your jacketed tank system.

 1. TANK DETAILS	- Tank size (capacity): _____ - Tank construction material: _____ - Jacket configuration: ☐ One-Zone ☐ Two-Zone ☐ Three-Zone - Jacket connection size(s): _____
 2. HEATING MEDIUM	- Medium type: ☐ Steam ☐ Hot Water ☐ Glycol (Water/Glycol) - Required operating temperature: _____ °F / °C - Maximum allowable jacket pressure: _____ PSI / kPa
 3. PERFORMANCE REQUIREMENTS	- Heat-up time requirement: _____ - Required heat input: _____ BTU/hr / kW - Process duty (maintain / heat / cool / etc.): _____
 4. OPERATING CONDITIONS	- System operating pressure (normal): _____ PSI / kPa - Minimum / Maximum operating pressure: _____ PSI / kPa - Altitude (if above sea level): _____ ft / m
 5. POWER & UTILITIES	- Available electrical power: _____ (V / Phase / Hz) - Fuel type (if applicable): _____ - Feedwater quality / treatment: _____
 6. CONTROL & ACCESSORIES	- Required controls or features: _____ - Safety or code requirements: _____ - Additional accessories (economizer, VFD, etc.): _____
 7. APPLICABLE CODES	- Governing codes: _____ - Local jurisdiction: _____ - Certification requirements (ASME, CRN, etc.): _____

NOTES:

- Accurate information helps ensure proper boiler sizing, efficiency, and system reliability.
- Provide any process flow diagrams, P&IDs, or special requirements when available.
- Consult with your boiler supplier for confirmation of final selection.

Recommended Boiler Sizing Information

This information applies to jacketed tanks heated with hot water, glycol, or low-pressure steam. Boiler selection should be based on the heating medium and operating conditions of the installation.

The values shown are approximate and are intended to assist in selecting a properly sized boiler. Actual boiler requirements may vary depending on product type, starting product temperature, desired heating time, ambient conditions, jacket efficiency, and system piping. **Consult your boiler manufacturer to verify the appropriate boiler capacity for your application.**

Tank Size in Gallons	Side Jacket in Gallons	Side Jacket in Sq. Ft.	Bottom Jacket in Gallons	Bottom Jacket in Sq. Ft.	Recommended Minimum Boiler Output BTU/hr
50	1.8	12	1.4	7	90,000
75	2	13	1.4	7	125,000
100	3	18	1.4	7	170,000
150	4	26	1.4	7	200,000
200	5	33	1.4	7	250,000
300	7	42	2	11	400,000
400	8	48	2	13	500,000
500	9	54	3	17	625,000
600	10	60	3	18	700,000
800	11	68	3	19	825,000
1,000	12	82	3.5	20	1,000,000
1,200	16	136	4	22	1,200,000
1,500	18.5	166	4.5	24	1,500,000
2,000	22	204	5	26	2,000,000

Figures above are based on a Anco standard tank design and may vary if tank dimensions change.

Boiler Installation Instructions

The boiler system should be installed by a licensed boiler technician or licensed pipe fitter in accordance with all applicable local, state, and federal codes.

The tank's dimple plate jacket is designed for heating and/or cooling with glycol, hot water, or low-pressure steam. The jacket has been **factory pressure tested to 70 PSI**. Do not exceed a working pressure of 70 PSI. Low-pressure boiler systems are recommended.

If you plan to connect the tank to a high-pressure boiler system, verify that your installation complies with all applicable codes and regulations. Depending on your jurisdiction, additional safety devices, pressure relief valves, inspections, or documentation (such as ASME requirements) may be required.

The boiler system must include properly sized pressure relief devices and controls to ensure the jacket pressure never exceeds the maximum allowable working pressure of **70 PSI**. Refer to the Boiler Sizing section of this manual for recommendations on selecting the proper boiler capacity for your tank.

Under normal operating conditions, a properly sized boiler can typically bring product to pasteurization temperature in approximately **25-60 minutes**, depending on batch size, starting temperature, product characteristics, and boiler output.

Heating & Cooling Jacket Connections

The tank jacket may be used with steam, hot water, or glycol systems. Proper flow direction must be followed to ensure efficient heat transfer and prevent system malfunction.

Bottom Jacket Port

Located beneath the tank are two ports for the lower jacket zone. These ports are used for steam, hot water, or glycol connections.

Either port may be used as the inlet or outlet, as the ports are interchangeable. Ensure all connections are properly secured and sealed in accordance with standard installation practices.



Bottom Jacket Ports
These ports are interchangeable

Unless otherwise specified, inlet/outlet orientation may vary depending on installation design. Always verify system flow direction prior to operation.

One Zone Jacket-Inlet/Outlet

A **one-zone jacket** means the bottom and sidewall jackets are connected together so the entire jacket operates as one continuous zone. Proper flow direction must be maintained at all times to ensure correct heat transfer and system performance.



Steam Applications

Steam must enter through the **upper jacket inlet port** and exit through the **lower jacket outlet port**.

Hot Water or Glycol Applications

For hot water or glycol systems, the fluid must enter through the **lower jacket inlet port** and exit through the **upper jacket outlet port**.



Two Zone Jacket-Inlet/Outlet

A two-zone jacket consists of two independently connected jacket circuits, typically divided into an upper (sidewall) zone and a lower (bottom) zone. Each zone may be supplied and controlled separately to allow more precise heating or cooling control.



Bottom ports are interchangeable.

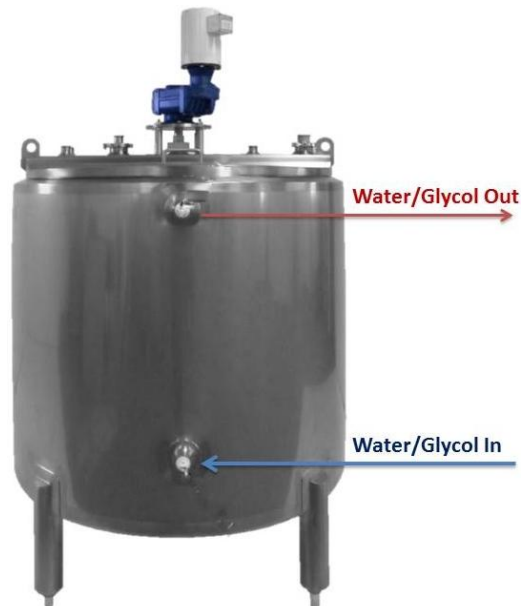
Steam Applications

For steam heating applications, steam must enter through the **upper jacket inlet port** and exit through the **lower jacket outlet port**. The bottom jacket ports are interchangeable.

Hot Water or Glycol Applications

For hot water or glycol systems, fluid must enter through the **lower jacket inlet port** and exit through the **upper jacket outlet port**. The bottom jacket ports are interchangeable.

This applies to both heating and cooling operations.



Bottom ports are interchangeable.

Three-Zone Jacket Inlet & Outlet

A three-zone jacket consists of three independently controlled jacket circuits, typically divided into upper sidewall, lower sidewall, and bottom zones. Each zone operates as an independent heating or cooling circuit, allowing for enhanced temperature control, efficiency, and process flexibility.



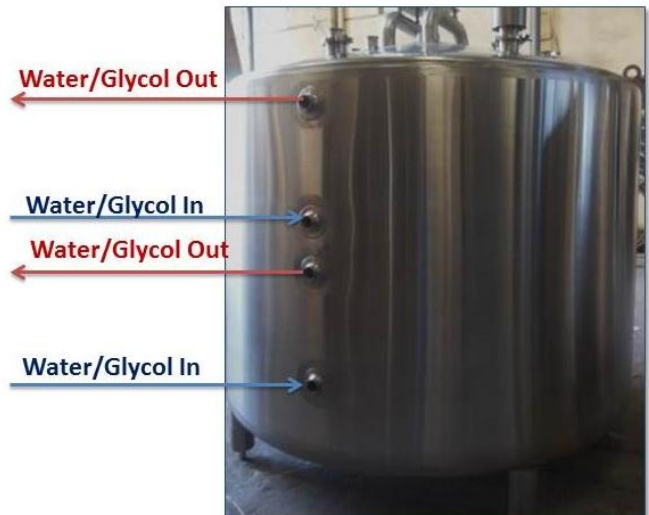
Bottom Ports are interchangeable.

Steam Applications

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

Hot Water or Glycol Applications

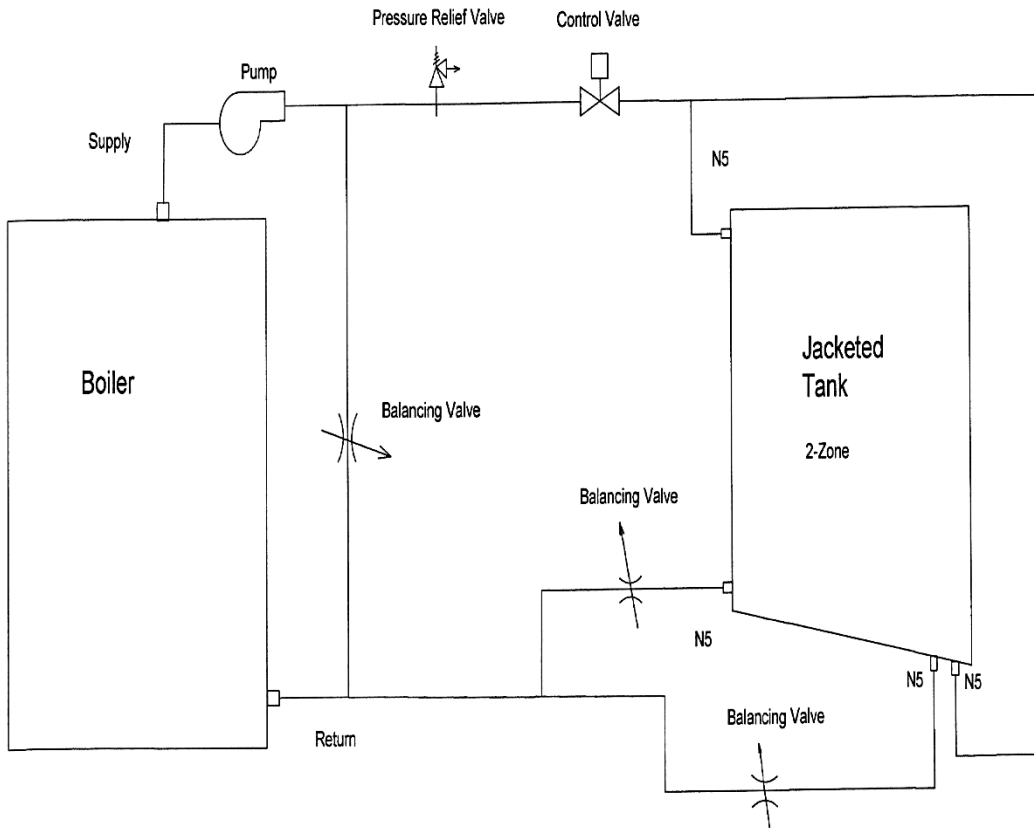
Water or Glycol must always enter from the lower inlet port of each jacket and exit from the top or higher jacket port. The bottom jacket ports are interchangeable.



Bottom Ports are interchangeable.

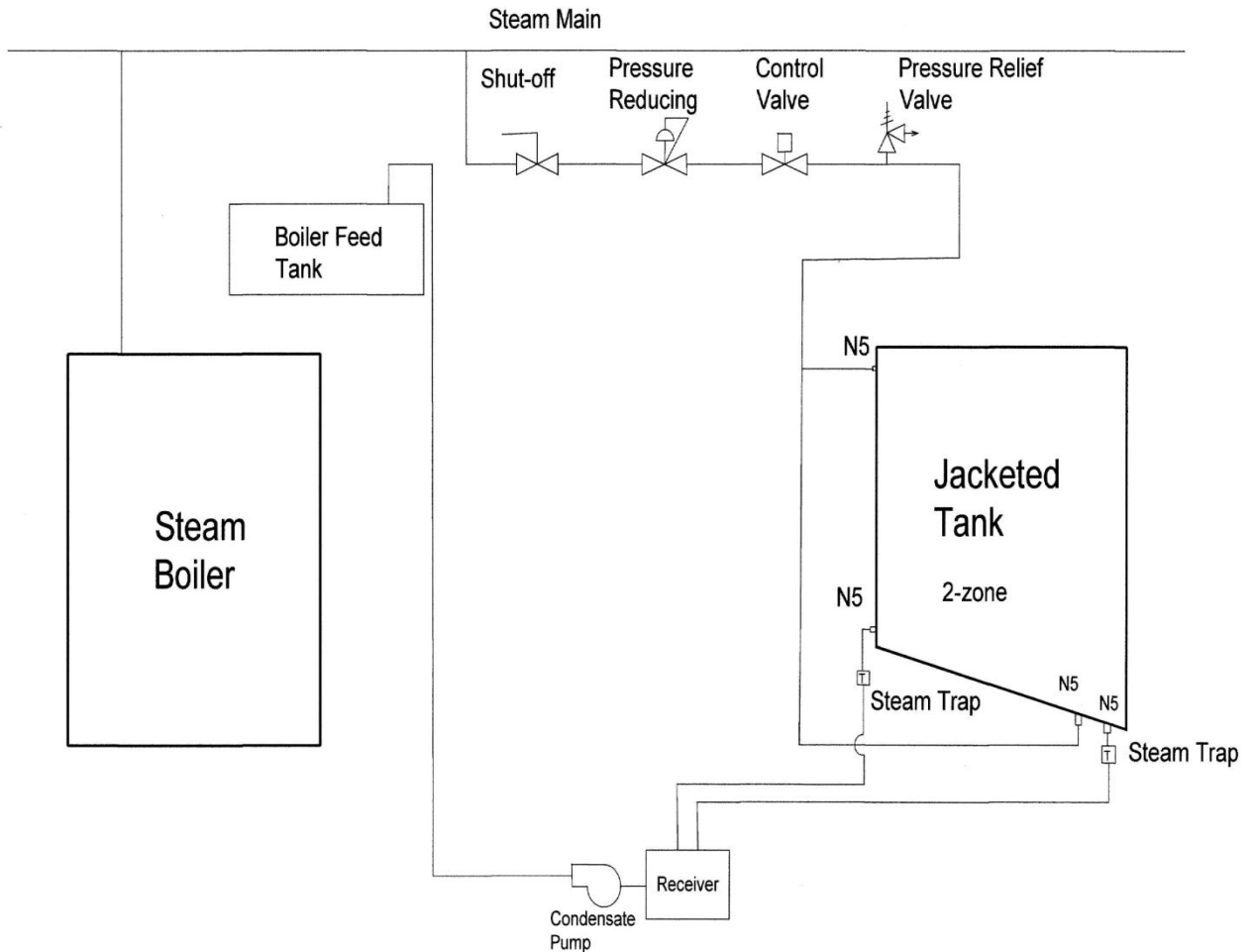
Hot Water Boiler Install Diagram Sample

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.



Manual Tank Inspection

To ensure every tank is in proper working condition, Anco Equipment thoroughly inspects every piece of equipment before it leaves our facility. We ask that all customers perform a careful inspection upon delivery.

Immediately upon receiving your equipment, inspect the tank for any scratches, dents, shipping damage, or missing parts. If you discover any damage or discrepancies, contact Anco Equipment immediately before installing or operating the equipment.

Motor / Gearbox

A licensed electrician is required to hard-wire the motor, gearbox, and variable speed drive (if applicable). The agitator must rotate **clockwise** during operation. Regularly check the gearbox oil level through the sight plug and refill as needed. Use food-grade oil only.

Gaskets

Only food-grade gaskets may be used on all ports and valves. Gaskets should be inspected regularly for cracks, wear, or deformation and replaced as needed. Under normal operating conditions, gaskets should be replaced at least every **18 months**, or sooner if damage or wear is observed.

Clean-In-Place (CIP) Spray Ball Nozzles

Unless otherwise specified, the tank is equipped with two (2) food-grade stainless steel CIP spray ball nozzles. These nozzles are designed to provide internal tank coverage when used with a properly configured Clean-In-Place (CIP) system. If a CIP system will not be used for cleaning, remove the spray ball nozzles and replace them with sanitary stainless steel caps. This will prevent unnecessary openings in the tank system and maintain proper sanitary conditions during operation. Always ensure all fittings, caps, and components installed on product-contact surfaces are food-grade and suitable for sanitary processing applications.

Adjustable Ball Feet

Any exposed threads on adjustable ball feet must be sealed using a food-grade sealant to prevent contamination and corrosion.

Exterior Threaded Ports

When connecting process lines or tubing to threaded ports, apply a food-grade anti-seize and lubricating compound to all threaded connections. This helps prevent galling, acid corrosion, and oxidation. Always follow the lubricant manufacturer's instructions for proper use.

Degreasing Prior to Passivation

Degreasing the tank prior to passivation is a simple but critical step in preparing stainless steel surfaces. You may consult your chemical supplier for appropriate degreasing agents and concentrations.

Procedure:

1. Fill the tank to approximately **10% capacity** with hot water.
2. Add an approved food-grade degreasing solution according to the chemical manufacturer's instructions.
3. Using a circulation or CIP pump, circulate the solution from the tank outlet through the CIP spray balls to ensure full internal coverage.
4. Run the cleaning cycle for approximately **15 minutes**.
5. Drain the solution completely.
6. Rinse the tank thoroughly with clean water to remove all residual detergent.

Ensure all chemical cleaning agents are fully flushed prior to passivation or product contact use.



Glossary of Terms

Airspace-The area inside a tank or vessel above the level of the product being processed. The airspace allows for product expansion, foaming, agitation, and safe operation without overflow. During batch pasteurization, the airspace temperature must be monitored because it can be cooler than the product temperature and may affect proper pasteurization validation. Many pasteurization standards require monitoring both the product temperature and the airspace temperature.

CIP (Clean-In-Place)-A method of cleaning equipment without requiring disassembly. Cleaning solutions are circulated through the equipment to remove product residue, soils, and microorganisms from internal surfaces. CIP systems commonly use spray balls, pumps, and controlled flow rates to clean the interior surfaces of process tanks and pasteurizers.

Typical CIP Process: 1. Pre-rinse with water 2. Circulate cleaning solution (detergent/degreaser) 3. Rinse with clean water 4. Sanitize before production

Holding Time-The length of time that a product must remain at or above the required pasteurization temperature to ensure the destruction of harmful microorganisms. Holding time begins only after the entire product has reached the required pasteurization temperature. The product must remain at that temperature continuously for the required period before cooling begins.

Thermal Shock-A rapid temperature change that causes stress within a material due to uneven expansion or contraction. Thermal shock can occur when a hot stainless-steel tank is suddenly exposed to cold water or when a cold tank is rapidly heated with steam or hot water. Excessive thermal shock can cause stress on welds, fittings, gaskets, and metal surfaces.
Prevention: Gradually increase or decrease temperatures and avoid introducing extreme temperature differences too quickly.

Passivation-A chemical treatment process used on stainless steel to remove free iron and contaminants from the surface and enhance the natural protective chromium oxide layer.

Passivation improves corrosion resistance and helps maintain sanitary conditions by reducing the possibility of rust formation and surface contamination. New stainless-steel tanks are often passivated after fabrication, welding, and cleaning to restore corrosion resistance before food production use.

Product-Contact Surface: Any surface of equipment that comes into direct contact with food, ingredients, or product during processing, storage, or transfer.

Equipment Application: Product-contact surfaces must be constructed from sanitary materials such as 304 or 316 stainless steel, have a smooth finish, be corrosion resistant, and be designed to allow effective cleaning and sanitizing.

Examples: Tank interior walls, agitator blades, outlet fittings, spray balls, product piping connections

Thermal Shock-A rapid temperature change that causes stress within a material due to uneven expansion or contraction.

Equipment Application: Thermal shock can occur when a hot stainless-steel tank is suddenly exposed to cold water or when a cold tank is rapidly heated with steam or hot water. Excessive thermal shock can cause stress on welds, fittings, gaskets, and metal surfaces.

Prevention: Gradually increase or decrease temperatures and avoid introducing extreme temperature differences too quickly.

Water Activity (aw)-A measurement of the amount of available water in a food product that microorganisms can use for growth and reproduction.

Important Note: Water activity is different from moisture content. A product may contain water but have a low water activity if the water is bound to sugars, salts, or other ingredients.

Food Safety Application: High water activity (above approximately 0.85): Microorganisms can grow more easily and require stronger preservation controls. Low water activity (0.85 or below): Many harmful bacteria cannot grow.

Examples: Fresh milk: high water activity, Dried foods, candies, and concentrated products: lower water activity

Cleaning & Sanitizing Methods

Proper sanitation is essential to producing a safe, high-quality product. Before sanitizing, all equipment must be thoroughly cleaned to remove milk residues, fats, proteins, mineral deposits, and other soils. Sanitizers are effective only when applied to clean surfaces. The following sanitation methods are commonly used for dairy processing equipment.

1. Steam Sanitation

Steam is an effective sanitizing method when used in enclosed systems where all product-contact surfaces can be uniformly exposed. For effective sanitation, all product-contact surfaces should reach a minimum temperature of **170°F (77°C)** for **at least 5 minutes**, or as required by applicable regulations. Steam sanitation should only be performed on equipment designed to withstand steam temperatures and pressures.

2. Hot Water Sanitation

Hot water may be used to sanitize equipment when all product-contact surfaces can be completely exposed to the required temperature. For effective sanitation, all product-contact surfaces should be maintained at **170°F (77°C)** for **at least 5 minutes**, or as required by applicable regulations. Care should be taken to ensure the required temperature is maintained throughout the entire system during the sanitizing cycle.

3. Chemical Sanitation

Chemical sanitizers are the most common method of sanitizing dairy processing equipment. Approved food-grade sanitizers, including chlorine-based sanitizers, quaternary ammonium compounds (quats), peracetic acid (PAA), iodine-based sanitizers, or other approved sanitizing agents, may be circulated through assembled equipment or applied by spraying, foaming, or immersion. Always follow the chemical manufacturer's recommendations for:

- Concentration
- Water temperature
- Contact time
- Rinsing requirements (if applicable)

Safe handling procedures

As a general guideline, chlorine sanitizers are commonly used at:

100 ppm with a minimum **30-second** contact time, or **50 ppm** with a minimum **2-minute** contact time, unless otherwise specified by the chemical manufacturer or regulatory authority.

General Cleaning & Sanitation of Stainless-Steel Equipment

Proper cleaning and sanitation are essential for producing safe, high-quality dairy products. Effective cleaning removes milk residues, fats, proteins, minerals, and other soils from equipment surfaces. Proper sanitation destroys microorganisms that may remain after cleaning.

Important: Cleaning and sanitizing are two separate processes. Equipment must always be thoroughly cleaned before applying a sanitizer, as organic soils and mineral deposits can reduce the effectiveness of sanitizing agents.

- Prepare fresh sanitizing solutions daily or as recommended by the chemical manufacturer.
- Verify sanitizer concentration using the appropriate test strips or testing equipment.
- Sanitize all product-contact surfaces immediately prior to production.
- Drain excess sanitizer before introducing product unless a no-rinse sanitizer is being used according to the manufacturer's instructions.

Stainless Steel Care

Include guidance such as:

- ❖ Never use steel wool or carbon steel brushes.
- ❖ Avoid prolonged exposure to chlorides.
- ❖ Rinse thoroughly after chemical cleaning.
- ❖ Use only cleaners approved for stainless steel.
- ❖ Inspect gaskets and valves during every cleaning cycle.

CIP Cleaning Sequence Option

1. Pre-rinse (100–120°F water)
2. Alkaline wash
3. Intermediate rinse Acid rinse (daily or as needed to remove mineral deposits)
4. Final rinse (if required by the cleaning chemical)
5. Sanitize immediately before production



Pre-Operation Instructions

Initial Cleaning

During the manufacturing and shipping process, residue from fabrication, polishing, packaging, and transportation may remain on the tank. Before placing the tank into service, thoroughly wash and degrease all product-contact surfaces. Refer to the cleaning section of this manual or consult your chemical cleaning supplier for recommended cleaning products and procedures.

Prior to First Use

Before operating the tank, thoroughly clean and sanitize the following components:

1. Tank interior
2. Pump (if equipped)
3. Outlet valve
4. Product supply lines
5. Spray balls (if equipped)
6. If using a chemical cleaning process, always follow the chemical manufacturer's instructions for proper concentration, temperature, and contact time.

Important:

Never allow highly chlorinated water or chlorine-based cleaning solutions to remain in contact with stainless steel surfaces for more than 10 minutes, as prolonged exposure may cause pitting or corrosion.

SECTION II

PMO Batch Pasteurization Section

The information presented in the first section of this manual applies to all ANCO process tanks. The following section contains instructions specific to **Batch Pasteurization Tanks** and should be used by operators responsible for pasteurizing dairy and other food products. Topics include equipment operation, pasteurization procedures, temperature monitoring, holding times, cleaning requirements, preventive maintenance, and PMO guidelines where applicable.

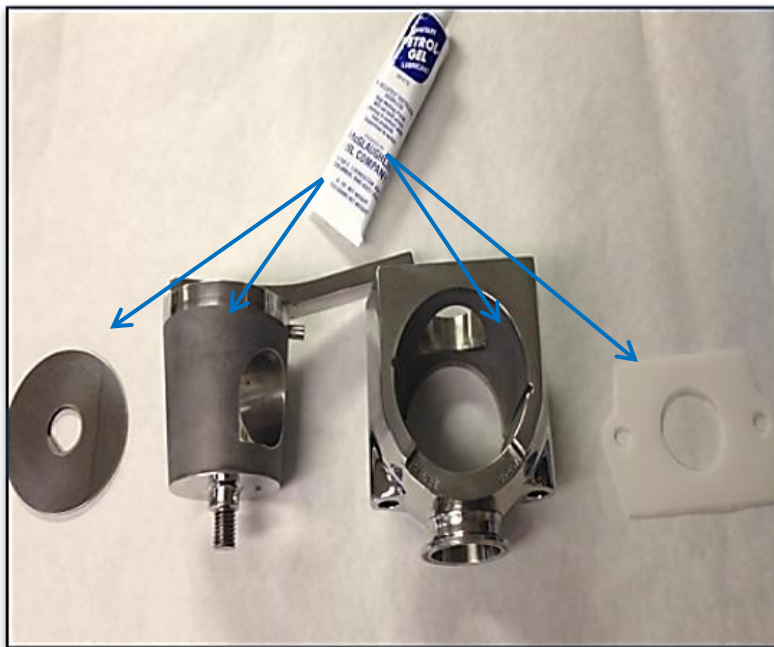


Leak Detection Valve – Installation & Maintenance

Each valve assembly includes a food-grade gasket and a tube of PetroLube. PetroLube is a food-grade lubricant approved for incidental product contact.

Installation:

1. Clean the tank surface where the gasket will be installed.
2. Apply PetroLube to both sides of the gasket.
3. Install the gasket onto the tank flange/bolt area.
4. Apply PetroLube to the internal components of the valve prior to installation.
5. Install the valve assembly.
6. Refer to the diagrams in this manual for additional installation guidance.
7. A video reference is also available on the Anco Equipment YouTube channel.



Leak Detection Valve Installation

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



1. Apply a generous amount of Petrol Lube to the gasket and press the gasket firmly onto the valve mounting surface of the tank.
2. Apply Petrol Lube generously to both the front of the gasket and the back sealing surface of the valve.
3. Slide the valve assembly onto the mounting posts.
4. Apply Petrol Lube to the internal sealing surfaces ("guts") of the valve, then insert the valve plug into the valve body.
5. Install the retaining nuts and tighten them by hand. Do not overtighten.
6. Test the valve for proper operation and check for leaks.
7. If a leak is detected, apply additional Petrol Lube to the leaking area and retest.
8. If the leak persists, inspect the gasket and valve components for damage or improper installation.



Valve Maintenance & Handling

DO'S

Handle the leak detection valve with care during installation, cleaning, and maintenance (see Figure 1).

Apply Petro Gel® or another food-grade lubricant to the gasket, plug, retaining nut, and sealing surfaces before reassembly (see Figure 2).

Store valve components separately when disassembled to prevent contact damage.

Inspect the valve plug and sealing surfaces for nicks, scratches, or wear before reassembly. Remove minor imperfections with a fine file or polishing stone if appropriate.

Place valve components carefully in the wash sink or on a clean surface to prevent dents and scratches.

Keep valve parts away from iron and carbon steel during storage and maintenance.

Verify that all components are clean, lubricated, and properly aligned before tightening the retaining nut.

If leakage occurs, inspect the valve for proper assembly, damaged sealing surfaces, worn gaskets, or foreign material before returning the valve to service.

DON'TS

Do not mishandle the valve or its components, as damage may result (see Figure 1).

Do not drop or throw valve components into sinks or cleaning tanks. Even small nicks can prevent a proper seal and cause leaks.

Do not allow valve components to contact carbon steel or other non-stainless materials, which can contaminate or damage the stainless-steel surfaces.

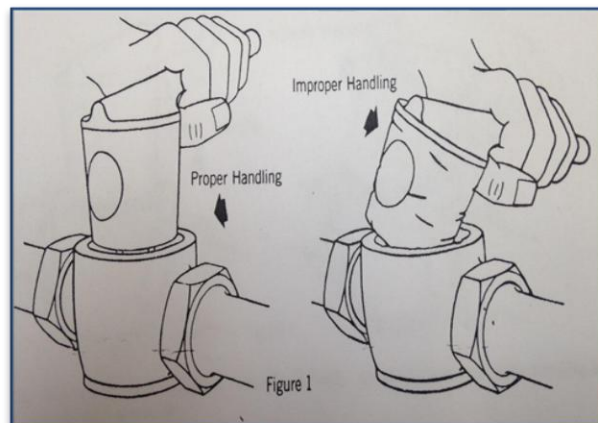
Do not use steel wool or abrasive steel tools on valve components or place them in cleaning tanks containing iron or steel parts.

Do not interchange valve plugs between valves. Each plug is precision-matched to its valve body during manufacturing.

Do not operate the valve without first loosening the retaining (bottom) nut as instructed.

Do not use a hammer or excessive force to open or close the valve. This can damage sealing surfaces and shorten valve life.

Do not overtighten the retaining (bottom) nut. Excessive tightening will not stop a leak and may damage the valve or reduce gasket life.



Anderson Chart Recorder and Temperature Probes

A complete copy of the Anderson-Negele Instrument instruction manual is available for download in the *Technical Information* section of the **ANCO Equipment website**. Refer to this manual for detailed operating instructions, maintenance procedures, troubleshooting, and replacement parts 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) • RAIFFEISENWEIG 7 • D-87743 EGG A. D. GUNZ • GERMANY • +49 (0) 8333/8204-0 • FAX +49 (0) 8333/8204-49

www.andinst.com

Installation Diagram

The complete installation manual will be supplied in hard copy format with your Anderson-Negele Instruments. Please retain this manual for future reference, installation guidance, maintenance procedures, and safe operation of the equipment.



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

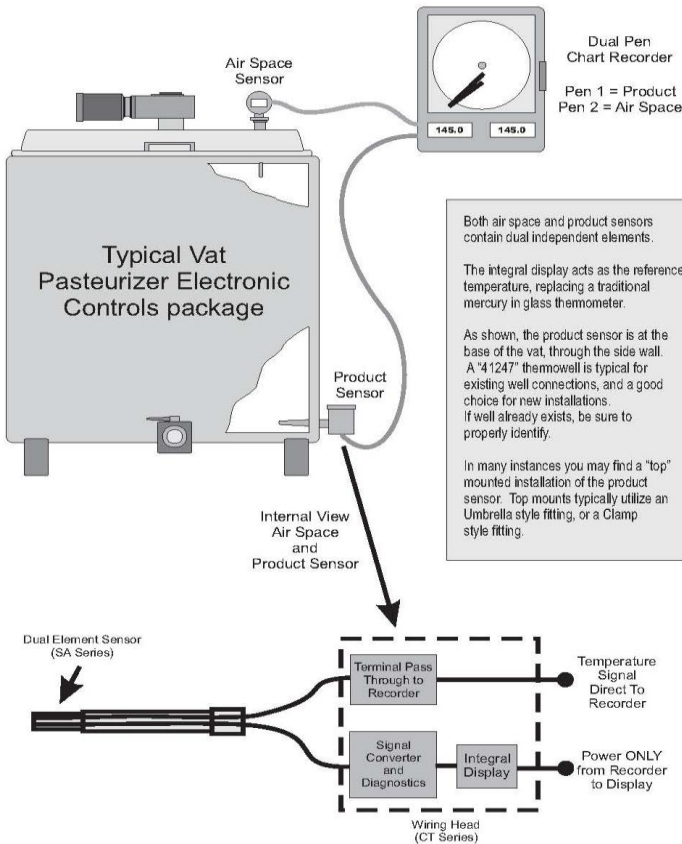
- ▶Specialized controls for VAT Pasteurization
- ▶System over view
- ▶Wiring diagram

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



Typical Vat Pasteurizer Electronic Controls package

Dual Pen Chart Recorder
Pen 1 = Product
Pen 2 = Air Space

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.

Internal View Air Space and Product Sensor

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

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Vat Pasteurizer Thermometer Specifications

Specifications shown are intended for traditional mechanical recording thermometers. Digital recording systems shall meet or exceed the accuracy and recording requirements of the applicable regulatory authority.

Vat Pasteurizer Thermometer Criteria

Thermometer Type	Span	Graduations	Accuracy	Chart Speed
Indicating Thermometer	25°F	1°F	±0.5°F	N/A
Recording Thermometer	140–160°F	1°F	±0.5°F	1 Revolution / 12 Hours
Airspace Thermometer	25°F	1°F	±1°F	N/A

Note: Thermometers and recording devices must comply with the current requirements of the **Pasteurized Milk Ordinance (PMO)** or the applicable regulatory authority. Recording thermometers shall be checked against the official indicating thermometer before each day of operation, or as required by the governing regulatory agency.

Pasteurization Greater Than 160°F

Thermometer Type	Span	Graduations	Accuracy	Chart Speed
Indicating Thermometer	25°F	1°F	±0.5°F	N/A
Recording Thermometer	150–170°F	2°F	±0.5°F	1 Revolution / 12 Hours
Airspace Thermometer	25°F	2°F	±1°F	N/A

Thermometer & Recording Device Requirements

Note: Thermometers and recording devices shall comply with the current requirements of the **Pasteurized Milk Ordinance (PMO)** and all applicable federal, state, and local regulations.

Indicating (Official) Thermometer

The indicating (official) thermometer shall be a direct-reading, approved thermometer designed for batch pasteurization service. The thermometer shall:

- Have a minimum scale span of **25°F (14°C)**.
- Include the required pasteurization temperature within **±5°F** of the scale range.
- Be graduated in **1°F increments**.
- Be accurate to **±0.5°F**.
- The sensing bulb shall extend completely into the product during pasteurization to ensure an accurate indication of product temperature.

Note: Where permitted by the governing regulatory authority, approved digital indicating thermometers meeting or exceeding these accuracy requirements may be used.

Airspace Thermometer

An approved airspace thermometer shall be provided for monitoring the temperature of the airspace above the product during pasteurization. The airspace thermometer shall:

- Be graduated in increments of **2°F or less**.
- Be accurate to **±1°F**.
- For proper installation:
 - The bottom of the thermometer bulb chamber shall be located **not less than 2 inches and not more than 3½ inches** below the underside of the tank cover.
 - During pasteurization, the bottom of the sensing bulb shall remain **at least 1 inch above the product surface**.

Recording Thermometer

The recording thermometer provides a permanent record of each pasteurization cycle. For standard vat pasteurizers, the recorder shall:

- Be graduated in **1°F increments**.
- Have a temperature range of **140°F to 155°F**.
- Record on a chart with time divisions of **10 minutes or less**.
- Use a chart designed for the recorder with a maximum recording period of **12 hours** and designed for the recorder used.

For Pasteurization Above 160°F

For vats used exclusively for pasteurization temperatures above **160°F**, the recording thermometer may:

- Be graduated in **2°F increments**.
- Have a temperature range of **150°F to 170°F**.
- Use a chart graduated in **15-minute intervals** with a maximum recording period of **24 hours**.

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

Recording Chart Requirements

Each recording chart shall be completed accurately and legibly. At a minimum, the following information should be recorded:

1. Date
2. Chart number (if more than one chart is used during the production day)
3. Pasteurizer identification (name or unit number)
4. Cut-in and cut-out temperatures recorded at the beginning of the run, including the appropriate reference mark
5. Indicating thermometer reading recorded at a designated reference point
6. Position of the Flow Diversion Device (FDD), if applicable, as recorded by the event pen or electronic recording system
7. Product identification and batch size (or quantity processed)
8. Documentation of any unusual occurrence, interruption, or corrective action taken
9. Operator's signature or initials
10. Plant name or identification
11. Quality Control verification, if required by plant procedures



Electric Airspace Heater Installation

The electric airspace heater is designed to maintain and control the temperature of the tank headspace during processing. The heater assembly installs into a **3-inch sanitary ferrule located on the tank lid/roof**.

Electrical Installation

The electric airspace heater **must be installed and wired by a licensed electrician**. Verify that the electrical supply matches the heater specifications before installation. The heating element requires **single-phase electrical power**.

Heater Placement

Install the heater element through the **3-inch sanitary ferrule** on the tank lid. Position the element at an angle toward the center of the tank. Confirm that the heater element does **not interfere with the agitator shaft, agitator blades, or CIP spray equipment**.

Controller Installation

The rheostat control allows adjustment of the electrical current supplied to the heating element, providing control of the airspace temperature. The rheostat controller must be installed by a licensed electrician and mounted in an accessible location for operation.

Final Inspection

Verify that all electrical connections are secure and properly grounded. Confirm that the heater element is properly supported and cannot contact moving components. Before operating the tank with product, perform a test run with water to verify proper heater operation and temperature control.



Electric Air Space Heater Options

Large Element Air Space Heater:

Includes:

- 29.75" L x 4.5" Depth Stainless Steel Electrical Element Connected to a 3" Tri-Clamp Ferrule
- Rheostat NEMA4 Controller

Requirements:

- 3" Port
- 3,000 Watt Heater
- Single Phase 230 Volt
- 15 Amps

3" Tri-clamp



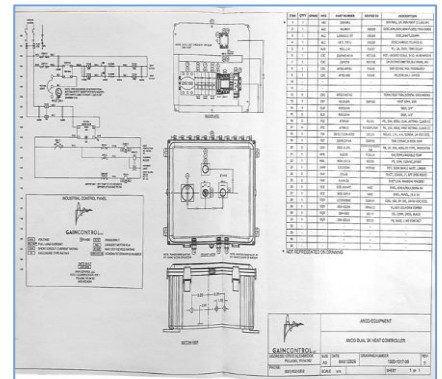
Dual Large Element Air Space Heater:

Includes:

- (2) Stainless Steel Electrical Elements Connected to a 3" Tri-Clamp Ferrule
- Rheostat NEMA4 Controller

Requirements:

- (2) 3" Ports
- (2) 3,000 Watt Heater
- Single Phase 230 Volt
- 30 Amps (15 Amps per element)



Pre-Pasteurization Checklist

- ☐ Tank cleaned and sanitized
- ☐ Chart recorder installed
- ☐ Indicating thermometer verified
- ☐ Airspace heater operational
- ☐ Agitator rotation confirmed (clockwise)
- ☐ Outlet valve closed
- ☐ Boiler operating normally
- ☐ Product level above agitator
- ☐ All ingredients added
- ☐ Covers and ports secured

Factors Affecting Pasteurization Effectiveness

Several factors influence the effectiveness of pasteurization and overall product quality, including:

1. Initial bacterial count of the raw milk
2. Equipment design and condition
3. Proper cleaning and sanitation
4. Accurate temperature measurement
5. Correct pasteurization time and temperature
6. Proper equipment maintenance
7. Prevention of post-pasteurization contamination

Routine cleaning, preventive maintenance, and proper operating procedures are essential for maintaining consistent product quality and regulatory compliance.

Product Preparation

Note: Batch pasteurization requirements may vary by jurisdiction. Always follow the requirements of the **Pasteurized Milk Ordinance (PMO)**, your state or local regulatory agency, and your plant's approved operating procedures.

All required ingredients shall be added to the batch before pasteurization begins. This includes, but is not limited to:

- ❖ Milk and dairy ingredients
- ❖ Water
- ❖ Liquid sugars and sweeteners
- ❖ Milk powders
- ❖ Stabilizers
- ❖ Vitamins
- ❖ Flavoring ingredients requiring pasteurization

Certain ingredients may be added after pasteurization when permitted by applicable regulations and when added under sanitary conditions. These may include:

- ❖ Ingredients with a water activity (aw) of **0.85 or less**
- ❖ High-acid ingredients
- ❖ Dry sugars
- ❖ Fruits and roasted nuts
- ❖ Safe and suitable bacterial culture organisms
- ❖ Flavorings containing a high alcohol content
- ❖ Fruits and vegetables may be added to cultured dairy products having a **pH of 4.7 or less**, provided the ingredients are wholesome and the addition is performed under sanitary conditions.

Pasteurization Requirements

1. Pasteurization shall be performed using properly designed, installed, and maintained equipment that ensures every particle of product is held continuously at the required pasteurization temperature for the minimum required holding time.
2. Product should be heated to the required pasteurization temperature as quickly as practical. Under PMO requirements, the heating period should not exceed **4 hours**.
3. Following completion of the pasteurization cycle, the product shall be cooled to **45°F (7°C) or below** quickly, unless processing cultured products or following another approved process.

Initial Pasteurizer Start-up

Once the boiler, electrical components, and all process connections have been installed, and the tank has been properly degreased and passivated, Anco Equipment recommends performing an initial test run using water before processing product. This allows you to verify proper system operation, check for leaks, and become familiar with your boiler controls before beginning production.

- During operation, the agitator must rotate **clockwise** and remain in continuous operation throughout the entire heating and pasteurization cycle. Always fill the tank through the product inlet located on the top of the pasteurizer.
- Before starting a batch, verify that the product thermometer, airspace thermometer, and chart recorder (if equipped or required) are properly installed and operating correctly.
- As the product approaches the desired pasteurization temperature, gradually reduce the hot water or steam input to prevent temperature overshoot. This provides an opportunity to make any final adjustments to the boiler controls, pressure settings, pump operation, and process timing.
- Closely monitor both the product and airspace temperatures throughout the pasteurization cycle. Once the required pasteurization temperature has been reached, maintain the required time and temperature in accordance with applicable **Pasteurized Milk Ordinance (PMO)** requirements or your governing regulatory authority.
- **Important:** If a manway, wing door, lid, or product port is opened during the required pasteurization holding period, the holding time must be restarted in accordance with applicable regulatory requirements.
- At the completion of the pasteurization cycle, turn off the airspace heater before beginning the cooling process. Keep all covers and access openings closed until the product is removed from the tank or additional processing is performed.

- When cooling product after pasteurization, it is important to avoid **thermal shock** to the jacket and vessel. Thermal shock occurs when stainless steel is exposed to a rapid temperature change, creating excessive stress on the jacket material and welded joints.
- To minimize thermal shock, the temperature of the cooling medium should not change by more than **25°F (14°C) per minute**. Following pasteurization at approximately **145°F (63°C)**, Anco Equipment recommends using well water or another cooling medium at **45°F (7°C) or warmer** to gradually reduce product temperature before switching to a chilled water or glycol system for final cooling.
- Following these procedures will help protect the jacket, extend equipment life, and promote consistent process performance.
- **WARNING:** Rapid cooling of the jacket with excessively cold media may cause thermal stress and damage to the jacket or vessel. Always follow the recommended cooling procedures.

Minimum Pasteurization Requirements for Selected Dairy Products

Note: The following temperatures and holding times are based on traditional batch (vat) and HTST pasteurization standards. Always follow the current **Pasteurized Milk Ordinance (PMO)** and your local regulatory authority, as requirements may change.

Product	Batch (Vat) Pasteurization	HTST Pasteurization
Milk, Skim Milk, Buttermilk	145°F (63°C) for 30 minutes	161°F (72°C) for 15 seconds
Cream and Fluid Dairy Products (>10% Milkfat)	150°F (66°C) for 30 minutes	166°F (75°C) for 15 seconds
Cream for Butter	165°F (74°C) for 30 minutes	185°F (85°C) for 15 seconds
Condensed Dairy Products (including products in the Milk group and blends)	150°F (66°C) for 30 minutes	166°F (75°C) for 15 seconds
High Total Solids Products (>18%)	150°F (66°C) for 30 minutes	166°F (75°C) for 15 seconds
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
Egg Nog	155°F (69°C) for 30 minutes	175°F (80°C) for 25 seconds or 180°F (83°C) for 15 seconds
Process Cheese	150°F (66°C) for 30 seconds*	165°F for 30 seconds

** Process cheese pasteurization requirements vary depending on the specific product and applicable regulations. Verify requirements with the current PMO or the governing regulatory authority.*

Process Interruptions

If the lid, manway, wing door, or any product-contact cover is opened after pasteurization has begun, or if any mechanical or process failure occurs that could affect pasteurization, the holding time shall be restarted in accordance with regulatory requirements. The operator shall document the interruption and corrective action on the recording chart or approved production record.

Temperature Monitoring

- The **indicating thermometer** is the official temperature reference.
- The **recording thermometer** provides a permanent record of the pasteurization cycle.
- Before each batch, the operator shall verify that the recording thermometer agrees with the indicating thermometer within the allowable regulatory tolerance.
- Pasteurization shall not begin unless the sensing elements of both thermometers are completely immersed in the product.

Airspace Temperature

- ❖ The airspace temperature shall be monitored and recorded throughout the pasteurization cycle.
- ❖ To verify proper operation, the airspace indicating thermometer should be checked at both the beginning and the end of the holding period.
- ❖ During pasteurization, the airspace temperature shall remain at least **5°F (3°C)** above the minimum required pasteurization temperature for the product being processed.

Recording Charts

- Recording charts shall be appropriate for the recorder and recording period being used.
- Charts shall be completed legibly and contain all information required by the PMO or the applicable regulatory authority.
- Overlapping or unreadable chart recordings are not acceptable.

Outlet Valve Requirements

- ❖ The outlet valve is designed to detect and discharge any leakage past the valve seat while minimizing product retention and eliminating cold pockets within the valve assembly.
- ❖ At no time during or after pasteurization shall the outlet piping be directly connected to any line, vessel, or equipment containing raw milk or any other potential source of contamination unless specifically permitted by an approved sanitary piping arrangement.

Assurance of Holding Periods

Note: The following guidance is based on generally accepted batch pasteurization practices. Always comply with the current **Pasteurized Milk Ordinance (PMO)** and all applicable federal, state, and local regulations.

Every particle of product must be held at or above the minimum required pasteurization temperature for **at least 30 minutes**, or as otherwise required for the product being processed.

Product Heated in the Vat

- When the product is heated to the required pasteurization temperature within the vat and partially cooled before the outlet valve is opened, the recording chart shall document a minimum holding time of **30 minutes** at or above the required pasteurization temperature.

Product Preheated Before Entering the Vat

- When the product is preheated to the required pasteurization temperature before entering the vat, the recorded holding period shall include:
- The required **30-minute** holding time, **plus**
- The time required to fill the vat from the level of the recording thermometer sensing element to the normal operating level.

Cooling After the Outlet Valve Is Opened

- When cooling begins after the outlet valve is opened, or when cooling occurs entirely outside the vat, the recorded holding period shall include:
- The required **30-minute** holding time, plus the time required to empty the vat from the normal operating level to the level of the recording thermometer sensing element.

Recording Requirements

- The operator shall clearly identify the beginning and end of the official holding period on the recording chart by marking the filling and/or emptying times, as applicable.
- Vat pasteurization recording charts shall clearly display the chart recorder's identifying index marks (or equivalent manufacturer identification marks) to verify that the chart has not been manually rotated or altered during the pasteurization cycle.

Cleaning Troubleshooting

Milkstone

Milkstone is a hard mineral deposit that forms on dairy processing equipment. It is composed of milk proteins, milk solids, mineral deposits from hard water, and detergent residues.

Milkstone formation is accelerated by:

- ❖ Hard water minerals
- ❖ High processing temperatures
- ❖ Improper cleaning procedures
- ❖ Inadequate detergent concentrations
- ❖ Insufficient cleaning frequency

Heating surfaces are particularly susceptible to milkstone buildup.

Effects of Milkstone Buildup:

- ❖ Harbor bacteria
- ❖ Reduce heat transfer efficiency
- ❖ Affect product quality
- ❖ Shorten equipment life
- ❖ Increase cleaning time

Regular acid cleaning or descaling, as recommended by your chemical supplier, will help prevent milkstone accumulation.

Phosphatase Testing

The phosphatase test is used to verify the effectiveness of the pasteurization process. Phosphatase is a naturally occurring enzyme found in raw milk that is destroyed during proper pasteurization.

Detectable phosphatase activity after pasteurization may indicate:

- ❖ Inadequate pasteurization time
- ❖ Insufficient pasteurization temperature
- ❖ Post-pasteurization contamination with raw milk
- ❖ Phosphatase testing should be performed in accordance with applicable regulatory requirements and quality assurance procedures.

Coliform Testing

Coliform bacteria are commonly used as indicators of post-pasteurization contamination. Because coliform organisms are readily destroyed during pasteurization, their presence in finished product generally indicates contamination occurring after pasteurization.

To help prevent post-pasteurization contamination:

1. Thoroughly clean and sanitize all equipment before use.
2. Clean and sanitize all product-contact containers and utensils.
3. Avoid unnecessary handling of product-contact surfaces.
4. Protect equipment and product from dust, insects, condensation, splash, and other environmental contaminants.
5. Follow proper employee hygiene and sanitation procedures.

Common Types of Milk Spoilage

Improper processing or storage conditions may result in spoilage caused by various microorganisms.

- **Sour Milk**-Generally caused by acid-producing bacteria that grow rapidly when milk is held between **65°F and 75°F (18°C–24°C)**.
- **Bitter Milk**-Often caused by psychotropic bacteria that produce heat-stable enzymes while milk is stored at refrigeration temperatures.
- **Ropy Milk**-Caused by slime-producing bacteria, including certain thermoduric organisms. Poor sanitation, stagnant water, and contaminated equipment are common sources.
- **Sweet Curdling**-Occurs when heat-resistant microorganisms coagulate milk proteins without significant acid production.
- **Thermoduric Organisms**-Thermoduric bacteria are capable of surviving normal pasteurization temperatures but generally do not grow rapidly at pasteurization temperatures.
- **Thermophilic Organisms**-Thermophilic bacteria grow best at elevated temperatures, generally above **113°F (45°C)**, and may become established in improperly cleaned heated processing equipment.

Anco Equipment 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, CONSEQUENTIAL, OR SPECIAL, INCLUDING DAMAGES ARISING OUT OF PERSONAL INJURIES.

Limited Warranty

Equipment Manufactured by ANCO Equipment, LLC

ANCO Equipment, LLC ("ANCO") warrants to the original purchaser ("Buyer") that equipment manufactured by ANCO will be free from defects in materials and workmanship under normal use, proper operation, and routine maintenance for a period of **twelve (12) months** from the date the equipment is shipped from ANCO's facility.

This warranty applies only to the original purchaser and is not transferable.

Parts, Components & Materials Manufactured by Others

Parts, components, accessories, and materials manufactured by third parties are covered only by the warranties provided by their respective manufacturers, if any.

ANCO Equipment, LLC's responsibility for such items is limited to the extent of the warranty provided to ANCO by the original manufacturer. The determination of whether a third-party component is defective, and the appropriate remedy, shall be made solely by the original manufacturer. ANCO Equipment, LLC makes no independent warranty regarding third-party components.

Stainless Steel

ANCO Equipment, LLC does not warrant the corrosion resistance of stainless steel or any other metal components under any specific operating conditions or for any particular application. Proper cleaning, passivation, chemical compatibility, water quality, maintenance practices, and operating conditions are the responsibility of the Buyer.

Warranty Obligation

ANCO Equipment, LLC's obligation under this warranty is strictly limited, at its sole discretion, to the repair or replacement of components manufactured by ANCO that are determined by ANCO to be defective in materials or workmanship.

Warranty repairs or replacements shall be performed at ANCO Equipment, LLC's facility located in **Pulaski, Wisconsin**, unless otherwise authorized in writing by ANCO.

Limitation of Liability

THE REMEDIES PROVIDED IN THIS WARRANTY ARE THE BUYER'S SOLE AND EXCLUSIVE REMEDIES. TO THE MAXIMUM EXTENT PERMITTED BY LAW, ANCO EQUIPMENT, LLC SHALL NOT BE LIABLE FOR ANY INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL, EXEMPLARY, OR PUNITIVE DAMAGES, INCLUDING, BUT NOT LIMITED TO:

- Loss of production
- Loss of profits
- Product loss or spoilage
- Downtime
- Loss of business
- Loss of use
- Damage to other equipment
- Labor costs
- Personal injury
- Property damage

This limitation applies regardless of whether the claim is based on breach of warranty, breach of contract, negligence, strict liability, or any other legal theory.

Warranty Exclusions

This warranty does not apply to equipment that has been:

- Improperly installed.
- Misused, abused, or neglected.
- Modified or altered without written authorization from ANCO Equipment, LLC.
- Operated outside the equipment's intended design limits.
- Damaged by improper cleaning chemicals, chlorides, corrosion, freezing, scaling, thermal shock, or inadequate maintenance.
- Damaged by accidents, natural disasters, fire, flooding, electrical surges, or other events beyond ANCO's control.

- Serviced by unauthorized personnel in a manner that affects equipment performance or safety.

Normal wear items, including but not limited to gaskets, seals, O-rings, lubricants, and similar consumable items, are not covered unless determined by ANCO to be defective in materials or workmanship.

Entire Warranty

This Limited Warranty constitutes the entire warranty provided by ANCO Equipment, LLC. No employee, distributor, dealer, representative, or agent is authorized to modify, expand, or waive any provision of this warranty unless such modification is made in writing and signed by an authorized officer of ANCO Equipment, LLC.

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.



Your Source for Stainless Steel Equipment

