

Vacuum Pans



LEE INDUSTRIES
Processing Perfection.™

Lee Industries' vacuum pans are used extensively when processing jams, jellies and other concentrations (such as chicken broth). Under vacuum conditions, products can evaporate at lower temperatures and avoid the damage caused by higher temperature boiling.

Vacuum pan capacities range from 10 gallons through 1,000 gallons, with larger sizes available upon special request. They are available with hemispherical conventional jackets or in dished/coned/pitched bottom Uniflow jackets. Lee's Uniflow jackets can be installed to the cylindrical section of the hemispherical vessels to give additional heat transfer surface. Total systems for vacuum pan processing, from initial engineering to final start-up, are available from Lee.

Vacuum Pan Standard Features

All Lee Vacuum Pans Feature:

- #4 finish inside and out
- Various certifications such as ASME and USDA

Lee Vacuum Pan Outlet Features:

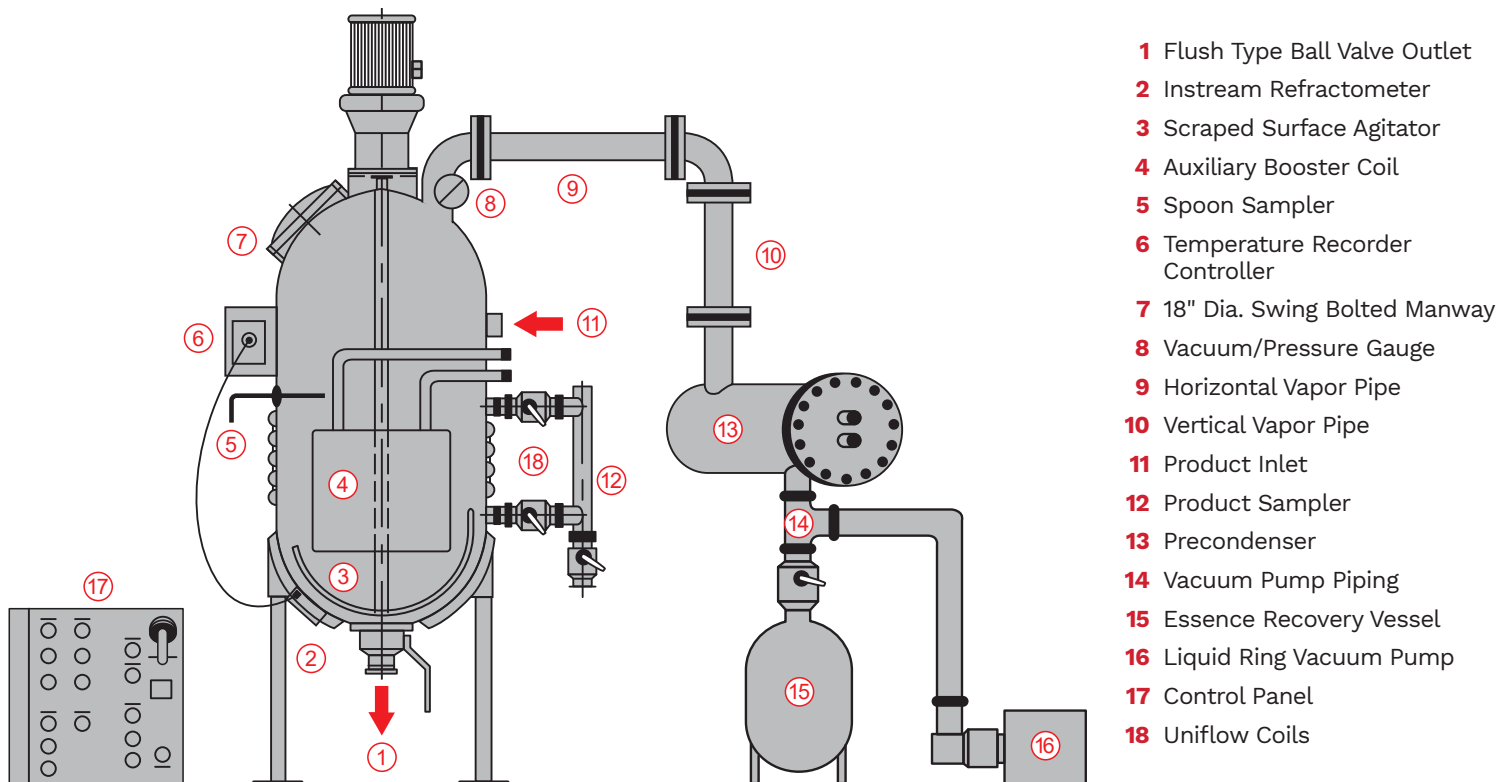
- Exclusive Lee designs permit shorter outlet fitting

Lee Vacuum Pan Support Features:

- Stainless steel pipe legs



VACUUM PANS



Case Histories

Preserves Processing

Jams and Jellies: using a Lee 300 gallon vacuum pan, 2700# of product is introduced and boiled at 145°-150°F. 70% fructose is used as a sweetener. The product is concentrated to 65.5 brix, producing 2250# of product. The vacuum is then broken to allow the preserves to reach a temperature of 190°F for direct packaging. The entire process timing for one batch is 35 to 40 minutes. Twelve batches per 8 hour shift can be produced.

Vacuum Brining

A single shell vessel is used for impregnating brines or sugar solutions into fruits and vegetables. Load apple slices through top manway, close manway and pull vacuum. Hold at 26" Hg, break vacuum, drain liquid and dispense apple slices through bottom swing manway.

Pastes And Concentrates

Standard vacuum pan with booster coil is required for concentrating tomato pastes. Tomatoes should be reduced in open-top pumping tanks to produce a tomato puree. Draw into vacuum pan to concentrate further. Booster coil should be turned on as paste thickens to produce a rolling boil.

Lipstick Manufacturing

Lipstick is made by melting high-point waxes and using high-speed mixing to blend in pigments and stabilizers. The product is cooled in bullet molds and placed in a dispenser. As a final packaging step, a cool flame is passed over the bullet to give a smooth and shiny appearance. The presence of small air bubbles in the bullet ruins the surface appearance after flaming. To totally avoid air incorporation, the process can be done in a vacuum processing kettle.

VACUUM PANS

Specifications

CAPACITY GALLONS	INSIDE DIAMETER INCHES	INSIDE DEPTH INCHES	FLOOR TO DOME TOP INCHES	INLET	OUTLET	STEAM CONN. I.P.S.	VAPOR ELBOW INCHES
10	17 ⁵ / ₈	23 ¹ / ₂	54	2	2	³ / ₄	2
25	23	48	67	2	2	³ / ₄	3
50	29 ¹ / ₂	54	74	2	2	³ / ₄	4
75	32	64	84	2	2	1	5
100	36	75	97	2	3	1	5
125	38	76	98	2	3	1	5
150	42	72	95	2	3	1 ¹ / ₂	6
200	48	78	100	2	3	1 ¹ / ₂	6
300	54	83	105	3	3	1 ¹ / ₂	8
400	58	94	116	3	3	1 ¹ / ₂	8
500	62	96	118	3	3	1 ¹ / ₂	8
1000	72	108	126	3	3	2	12

All standard units 50 gallon capacity and larger have 18" manways mounted in top dome.
10 & 25 gallon units have removable top domes in place of 18" manways.

Evaporating Capabilities

CAPACITY GALLONS	HEATING AREA SQUARE FEET	EVAPORATION GAL./HOUR	BOILER H.P. REQUIRED	COOLING WATER G.P.H. - 26" VACUUM			VACUUM PUMP H.P.
				60	70	80	
10	3	15	4	200	240	320	³ / ₄
25	5 ¹ / ₂	28	8	500	600	800	³ / ₄
50	9	47	12	910	1145	1525	³ / ₄
75	11	57	15	1035	1295	1725	2
100	14	73	19	1170	1460	1945	2
125	15	78	20	1300	1620	2160	2
150	19	99	25	1520	1900	2640	2
200	25	130	33	1910	2400	3180	3
300	32	167	42	2450	3060	4080	3
400	36	188	47	3240	4050	5400	5
500	42	219	55	3960	4950	6600	5
1000	56	292	73	5280	6600	8800	10

*Based on use with water sealed vacuum pump and precondenser.

**With the addition of internal booster coils, evaporation rate can be increased as much as 3 times.

Case Histories Continued...

Essence Recovery

Essence recovery is becoming more popular with the producers of jams and jellies. This requires the use of stainless steel vapor piping, an enlarged stainless steel condenser, and a special recovery vessel. The essence can be further distilled and used as natural flavorings or added back into the product for better aroma and taste.

Vacuum Cooling

Heated material can be cooled by applying vacuum. Since the boiling temperature is reduced under negative pressures, excess heat in the product is used to produce vapors, which the vacuum system removes. Temperature can be reduced rapidly by using this process. Additional concentration of the product also occurs during this process. Vacuum cooling is used mainly in the pharmaceutical and cosmetic industries.

Chicken Broth Concentration

This chicken broth concentration process is accomplished by pulling a vacuum on the broth and simultaneously heating it, thus reducing processing time while yielding a more consistent product. A two-stage evacuator system is used to pull the vacuum. "Foaming" is controlled by an extended sidewall, while an agitator is used to keep the broth in motion so a "film" layer does not form on the top. Scrapers are used to prevent burn-on to the interior.

Deaeration / Improved Dispersion

Eliminate transfer pumps by using vacuum to pull raw ingredients and premixes directly into processing vessels. With Lee's Tri-Mix Turbo-Shear with vacuum capability, improved dispersion and reduced mixing time are achieved by pulling ingredients in through the bottom outlet, directly into contact with the high-shear mixing head. Upon completion of the mixing cycle, vacuum is used to deaerate the batch for a superior quality product.



Other Vacuum Processing Capabilities

Vacuum can be used with the Lee Tri-Mix Turbo-Shear to quickly draw powders or hard-to-wet products through the bottom outlet and directly into the high-speed mixer head. Also, all of Lee's agitated vessels can be fabricated for vacuum processing for deaeration, cooling, temperature control, or other processing advantages.

Portable vessels can be equipped with vacuum capabilities for use in deaeration, or product transfer. (Call to request additional portable vessel literature).

With Lee's Uniflow vacuum systems, processing from cooking to cooling can be done in one vessel. These systems have been used for such products as: jams, jellies, chicken broth, stews, chili, gravy, cream sauces, soups, tomato sauces and also for lotions in the cosmetic and pharmaceutical industries.

Vacuum Pan Options & Accessories

Our vacuum pans are often purchased as part of a larger system. For example, a typical total jam and jelly system would include premix kettles, a vacuum pan with vacuum precondenser, vapor piping and often a final standardization vessel. All of the equipment is sized, designed, and supplied by Lee Industries to fit your specific processing requirements.

Regardless of whether you're in need of a vacuum pan or a system, you have the opportunity to choose from several accessories.

Internal Booster Coil

- Sanitary stainless steel booster coil added to vacuum pan
- Provides additional heat transfer area for increased evaporation
- Increases rolling/mixing action

Electropolishing and Finishing

We recognize the demand for high-quality, durable, ultra-sanitary finishes. We provide world-class mechanical finishes and can also provide electropolish finishes on all of our parts and products.

Control Panels

Lee can supply NEMA 4 control panels to meet any processing specifications. Available in stainless steel enclosures.

Samplers

Spoon Sampler

- Designed to easily remove small quantities of product during vacuum processing

Product Sampler

- Designed using fluid transfer USDA/3A standard inline ball valves
- Easily remove larger quantities of product during vacuum processing

Instream Refractometer

Provides accurate manual or continuous measurement of product concentration.

Scrape Surface Agitation

Lee USDA approved style No. 9M, No. 7, or No. 5 agitation can be added to the vacuum pan to prevent product burn-on and to enhance heat transfer. (See Lee Agitator product sheet.)

Precondenser and Vacuum Pump

- Shell and tube exchanger is a standard carbon steel with cast iron water bonnets and tubes (available in stainless steel for essence recovery)
- Vacuum pump is cast iron furnished with base, coupling, coupling guard and silencer
- Standard electrics are 230/460 volt, 60 cycle, 3 phase, TEFC

Outlet Valve

Recommended Fluid Transfer USDA approved/3A standard full-port flush bottom ball valve in sizes 1½" through 4". Also available with a variety of actuators. (See Lee Manual and Automatic Ball Valve product sheets).

Instrumentation

Temperature recording and control can play a critical role in your processing technique. Our temperature sensing or control instruments can ensure you yield the desired results in heat transfer vessels.

We Offer:

- A wide variety of temperature-sensing control and recording instruments
- Probe-type sensors for non-agitated kettles
- Stainless steel, flush-mounted sensors for scraper blade agitator installations



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