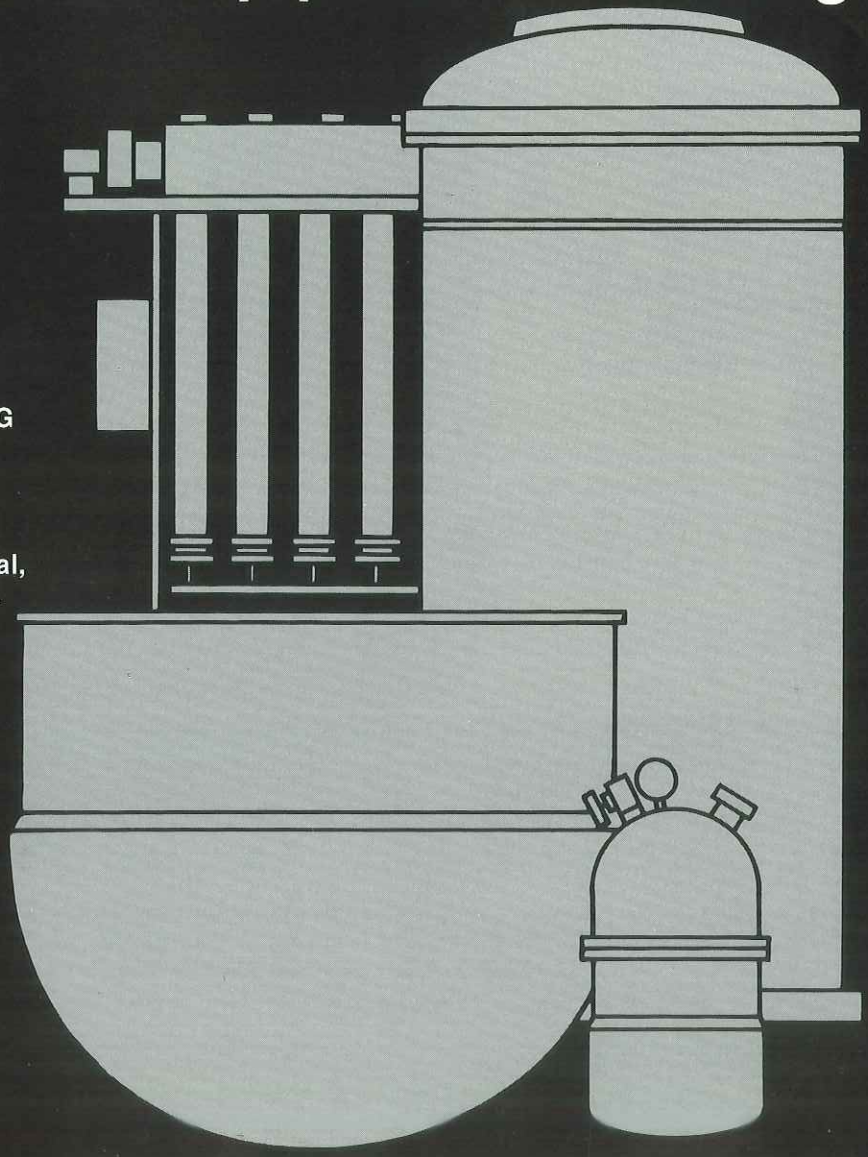
GROEN Process Equipment MiniCatalog

Long recognized as the World's largest manufacturer of the highest quality STEAM JACKETED KETTLES, GROEN offers you much more: CONTINUOUS PROCESSING EQUIPMENT including THIN FILM EVAPORATORS, SCRAPED SURFACE HEAT EXCHANGERS, COATING and BLENDING EQUIPMENT, and complete engineered processing systems for the Food, Confectionery, Cosmetic, Pharmaceutical, and Chemical Industries.



GROEN

2

Quality and Craftsmanship A GROEN Trademark

A system approach to solving complex processing problems.

This Mini-Catalog gives you an overview of the broad range of design expertise GROEN offers you. Since 1907, GROEN has been solving complex processing problems for major firms across the nation. We offer you a complete line of processing equipment, from individual steam jacketed laboratory kettles through complete continuous processing systems.

GROEN's experienced staff of engineers, designers, and production personnel will aid you in all stages of operation, from initial planning, through testing and development, to final design and implementation.

MADE IN USA™

It's the People

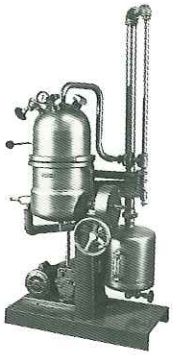
GROEN has the most highly skilled welders in the industry who insure the long lasting durability typical of GROEN equipment.

The impeccable appearance and cleanability of GROEN equipment... our finishing specialists take pride in giving you the quality you expect.

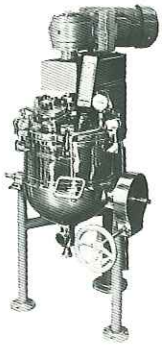
GROEN'S expert mechanics know the importance of continuous trouble free operation...which they skillfully build into every GROEN piece of equipment.

RA (V/P)

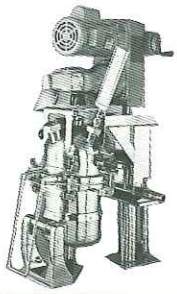
DN (V)



DN/TA (V/P)



TDC/2/RA (V/P)



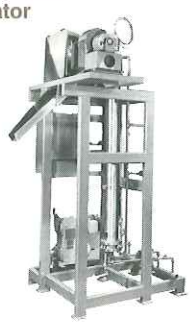
GROEN offers both standard and custom-designed steam jacketed laboratory kettles for research and development use in pilot plants, test labs, and test kitchens.

The laboratory models are designed for atmospheric processing, or can be fitted with sealed lids for processing under vacuum or pressure. These stainless steel kettles can be provided with various style high speed agitators, scraper type mixers, temperature control systems, and other accessories. Jacket pressures available from 25 to 100 PSI, ASME code for heating and/or cooling, in most models.

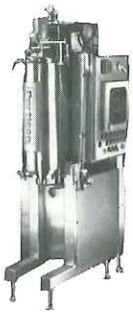
TDC/2/TA/2

TDB/7/TA/2

372 Pilot Plant Evaporator



PARTICON - 6 Scraped Surface Heat Exchanger



RA (V/P)
Incorporating the heavy duty RA scraped surface agitation, this unit is designed for processing under vacuum or pressure. Unit furnished with tilt-off head, sight and light glass, shaft seals and instrumentation. Also available with other GROEN agitation systems. Unit can be portable or stationary and furnished with or without vacuum system.

DN (V)
Designed for vacuum cooking, this unit includes a special DN-20 quart steam jacketed kettle unit, hinged dome cover complete with vacuum line, vacuum breaker, sight and light glass, and vacuum gauge. Vacuum line is provided with rotary joint/hinge cover mechanism. Unit is also provided with condensor, receiver and vacuum pumping system.

DN/TA (V/P)
Designed for processing under pressure or vacuum, this unit features the "DN" floor mounted tilting kettle and a dome shaped, gasketed cover, fitted with sight and light glass, pressure/vacuum gauge, rotary seal for agitator shaft, product thermometer and quick acting eccentric type cover clamps. Unit is provided with a heavy duty TA twin shaft scraper type mixer with variable speed drive. The cover and mixer unit is manually hinged out of the kettle assisted by a spring actuated counterbalanced mechanism, assuring fast, easy operation.

TDC/2/RA (V/P)
This direct steam operated, table top tilting agitator kettle is designed for vacuum and/or pressure operation. This superior lab unit combines the efficient TDC/2 unit with a dome shaped cover, containing sight and light glass, rotary seal for agitator shaft, and vacuum line complete with rotary joint. Agitator is RA model single motion anchor/scraper agitator design which features complete, continuous mixing and sidewall scraping. Unit is available in 10 and 20 quart capacities.

TDC/2/TA/2
This agitator kettle is a direct steam operated, tilting, table top model that combines the efficient TDC/2 unit with a hinge out, heavy duty, variable-speed TA twin shaft scraper type mixer. Motor, drive, gears and electrical components are enclosed in polished stainless steel housing. Agitator assembly is balanced for easy hinge out; kettle tilts independently of agitator unit. Available in 20 quart capacity. Requires 115 volt, 1 phase, 60 Hz electric for mixer only. Base measures 19″ wide by 24″ deep.

Model TDB/7/TA/2
This self-contained, electric, table top tilting agitator kettle contains its own heat source for top speed, steam jacketed kettle processing. Thermostatically controlled lab kettle combines the convenience and flexibility of Model TDB/7 atmospheric processing unit with a heavy duty, variable speed TA twin shaft scraper type mixer. Standard working pressure is 50 PSI. Available in 20 (6 KW) and 40 (12 KW) quart capacities in 208 or 240 or 480 volt, 1 or 3 ph, 60 Hz. Requires 115 volt, 1 ph, 60 Hz for mixer only. Easy installation merely requires 2 electrical hook ups. Base measures 27″ wide by 22″ deep for 20 quart model; 27.5″ wide by 30.5″ deep for 40 quart model.

Model 372 Evaporator
The 372 Thin Film Evaporator is available in pilot plant sizes for in-field testing to determine production capacity requirements and performance. Many types of products can be concentrated in a Series 372 System from as low as 4% solids up to 98% solids, without the necessity of preheating or using a vacuum. The concentrator tube is dual jacketed to provide a heat transfer surface on both the inner and outer walls of the narrow product annulus.

Model DR & PARTICON Scraped Surface Heat Exchangers
Both the Model DR/DR(C) and new PARTICON large particulate scraped surface heat exchangers are available as pilot size units for testing product applications. The DR Model has both an inner and outer heat exchange jacket, forming a 5/8″ product annulus. The PARTICON unit has a single, outer heat exchange jacket with a large 2″ wide product annulus and special scraper blade design to faciliate processing products with large and fragile whole particulates. (See page 9 for more details.)

4

GROEN Direct Steam Jacketed Kettles for Heating and Cooling

GROEN builds heavy duty, stainless steel, jacketed heating and cooling processing units which offer top speed efficiency, superior draining features and excellent sanitation capabilities.

Optional features on these general purpose units include:

1. Separate heating and/or cooling jacketed sections.
2. Insulated outer casings.
3. Various manually or automatically operated drain valves.
4. Various style lift-off or hinged covers.
5. Vacuum or pressure sealed covers.
6. Portable agitator brackets.
7. Various heavy duty scraper-type mixer configurations (see pp. 6 & 7).
8. Stainless steel legs.
9. Mounting lugs in lieu of legs.

N
This versatile, direct steam operated unit is 2/3 jacketed and available in standard sizes from 20 to 1,000 gallons, with working pressures from 5 PSI to 150 PSI. Stainless steel unit is mounted on mild steel legs as standard.

GN
This fully jacketed, shallow, direct steam unit, with its large diameter and low working height provides the maximum heating surface available per unit volume in a kettle, and furnishes extremely fast heating capacity for any type processing. Available in 20 to 500 gallon capacity.

DN
This 2/3 jacketed tilting kettle is a self-locking, quick acting geared unit, which stops in any desired position. The tilt mechanism is a totally enclosed worm and gear unit. Available in 10 to 500 gallon capacity.

F
This 2/3 jacketed direct steam model is designed for medium duty heating and/or cooling of many products. Available in 20 to 100 gallon Models and a choice of 25, 45, 100 or 125 PSI operating pressure. Stainless steel legs and round reinforced bar rim standard.

TDC/ 3
This direct steam operated, table-top kettle offers smaller processors a safe, efficient method of handling their products. Unit features 8″ clearance under pouring lip and requires only 13″ base space. Kettle is provided in 10 or 20 quart capacities and can be supplied singly or mounted in batteries on a T5C Table as shown.

N

GN

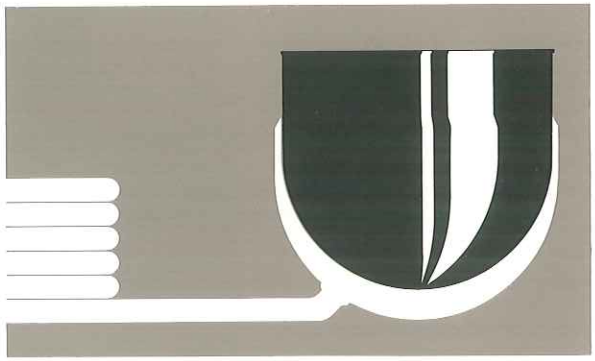
DN

Model F

Model TDC/3

TDC/3 on T5C Table

Kettle Control Systems



Kettle Control Systems
You can monitor and control your kettle cooking and cooling operations with a reliable Groen Kettle Control Package. These simple to operate control systems assure consistent processing temperatures and batch-to-batch consistency. Ideal for heating, holding and cooling of fruit products, meal entrees, sauces, pharmaceuticals, cosmetics and most kettle processed products. Groen control packages work with any direct steam kettle, install easily and come complete with digital temperature controller and thermocouple. Dual kettle control systems are also available for controlling two kettles at the same time.

GROEN Self-Contained Steam Jacketed Kettles

DH Model

EE Model

Model AH/1

Model AH/INA/2

NE

DEE/4 Model

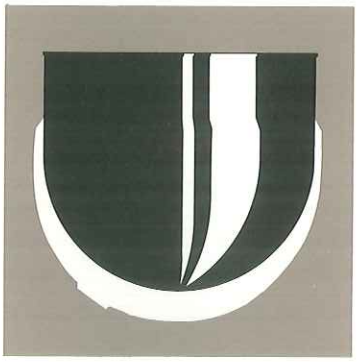
DEE/4/TA/3

Model TDB/7

For fast, gentle processing and maximum ease of production, GROEN self-contained steam jacketed kettles offer high speed performance, increased productivity, and eliminate product loss from burning and scorching.

All self-contained kettles are thermostatically controlled to heat and hold any product at desired temperature, insuring product stability and uniformity of temperature. Units are factory charged with a permanent supply of chemically pure water, with rust inhibitor added, to insure long life and minimum maintenance. No direct water connection required.

Jacketed sections are built for 30 to 55 lbs. working pressure, are of ASME Code construction and provide a product temperature range of 150° to 298° F. Installation requires merely a gas line and/or electrical power hookup.



DH Model
Gas-fired, self-contained tilting steam jacketed kettle is another first from GROEN. Completely self-contained, this convenient tilting kettle is as versatile and efficient as the popular AH/1 Model with the added ease of pouring, cleaning, and emptying. DH Models are available in 20, 40 and 60 gallon capacities. Energy saving Electronic Spark Ignition is standard.

EE Model
Electric, self-contained steam jacketed kettles are available in 20, 30, 40, 60 and 80 gallon capacities. All units are fitted with one piece hinged covers. 60 and 80 gallon sizes are provided with No. 51 counterbalanced cover mechanisms.

Model AH/1
Gas-fired, self-contained steam jacketed kettle, with optional energy saving electronic spark ignition. Available in 20, 30, 40, 60 and 80 gallon capacities, all units are fitted with one piece hinged covers. 60 and 80 gallon kettles are additionally furnished with No. 51 counterbalanced cover mechanisms.

Model AH/INA/2
Self-contained, gas Model AH kettles can be fitted with deluxe INA/2 agitator configurations for top speed processing of delicate products requiring uniform suspension. This patented inclined agitator enters the product on an angle, furnishing a gentle lifting and folding action. Available in 20-80 gallon standard capacities, specify natural, propane or butane gas when ordering. USDA approved design.

NE
Furnished with same efficient self-contained features as the Model EE. Whereas the EE is available in standard sizes up to 80 gallons, the NE is designed for larger applications requiring batch sizes from 100 to 500 gallons.

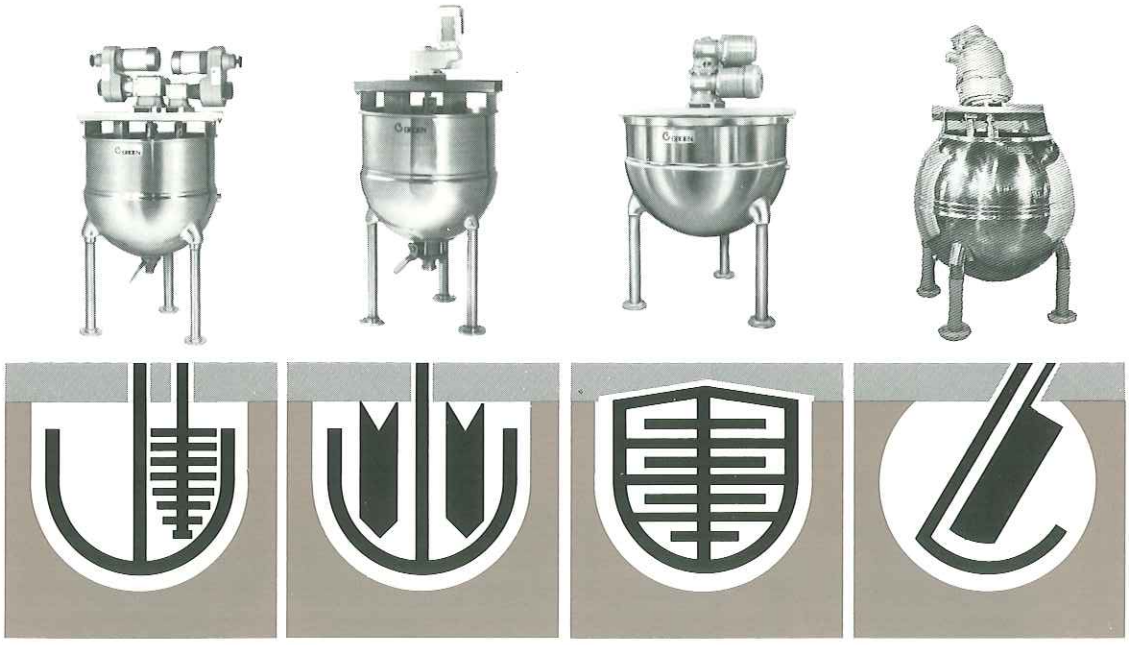
DEE/4 Model
Is an electric, self-contained tilting steam jacketed kettle available in 20, 40 and 60 gallon capacities. Convenient tilting feature provides ease of pouring and fast clean up. The unit is compact and furnishes low working height. Optional extras include No. 31 or No. 51 counterbalanced covers, product drain valve, and TA/3 heavy duty scraper mixer.

DEE/4/TA/3
Self-contained floor model agitator kettle, combines the speed and dependability of steam jacketed kettle processing with the efficiency of the TA/3 twin shaft agitator for fast cooking, continuous sidewall scraping, and thorough product blending. Unit is available in 40 and 60 gallon sizes. Low cost installation requires two electrical power connections, one for kettle, one for mixer.

Model TDB/7
Self-contained TDB/7 units are available in 20 and 40 quart capacities. Space saving tilting table top kettles can be mounted individually or in batteries on any existing counter or table top, or support stands can be provided as shown. Jackets are built for 50 lbs. working pressure. Low cost installation requires just an electrical connection.

GROEN Agitator Kettles

GROEN provides many different standard agitator configurations for everything from light, medium and heavy material agitation. Agitators furnish mixing capabilities ranging from top speed, heavy duty agitation to delicate lifting and folding action. Tell GROEN your mixing needs and we will recommend the most efficient, dependable agitator kettle available. Custom designed agitator kettles are also available for very specialized mixing applications.



TA | RA | DA/1 & DA/2 | INA

TA
Designed for heavy duty processing, this strong, reliable agitator kettle features twin shaft agitation with a GROEN twin shaft gearbox. This deluxe agitator provides finger-like scraper blades which scrape side walls and swirl the processed material toward the secondary mixer for continuous, all-inclusive agitation. For ultimate sanitation, the TA features exclusive GROEN quick disconnect couplings which permit the entire agitator assembly to be taken apart in a few seconds. Available in 40 to 1,000 gallon capacities with standard agitator speeds for 180 gallon units and smaller: Main — 36 R.P.M.; Secondary — 90 R.P.M.; For 200 to 600 gallon units: Main — 24 R.P.M.; Secondary — 72 R.P.M. Over 600 gallons, agitator drives are specified on application. USDA approved design.

RA
Designed for processing light to medium-heavy materials, this agitator configuration features single anchor-type agitator frame with finger-type scrapers which carry processed material from kettle wall into two large "V" shaped baffle plates, providing "Figure 8" type blending action. Also features exclusive GROEN quick disconnect shaft couplings for easy removal and cleaning. Standard unit is available in 40 to 1,000 gallon capacities. Agitator speed for 150 gallons and smaller: 36 R.P.M. For 200-600 gallons: 25 R.P.M. Over 600 gallons, agitator drive is specified on application. USDA approved design.

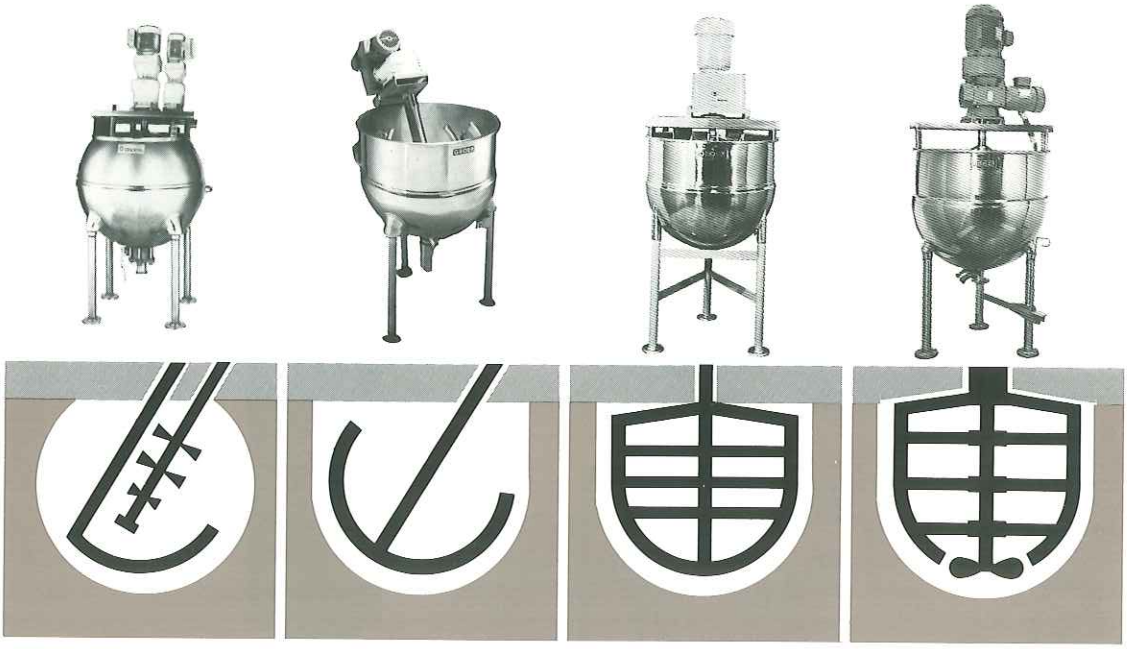
DA/1 & DA/2
Incorporates the GROEN double motion agitator design with counter rotating blades, which can be rotated singly or concurrently in the same or opposite directions. Agitator drive unit, mounted on channel shaped bridge support, is comprised of dual heavy duty hollow shaft gearhead motors in a piggyback configuration. Standard unit is available in 40 to 1,000 gallon capacities. Approximate agitator speeds: 40-125 gallons: 35 R.P.M. 150-300 gallons: 29 R.P.M. Over 300 gallons: 23 R.P.M., depending on application. USDA approved design.

Tilting Models

DN/TA

INA
Designed to handle medium to heavy viscous materials containing solid particles that tend to settle or float, the GROEN INA features a patented inclined single motion baffle/scraper mixer to provide a thorough, gentle lifting and folding action for uniform homogeneity of product. Agitator frame is readily removable; baffle is permanently mounted on drive support frame. Available in standard capacities of 60 to 300 gallons. USDA approved design.

DN/TA
For use where viscous products must be poured from tilting kettle while the agitator is free of the kettle. Eliminates obstruction of the product flow. Note the powerful, fast, smooth-acting hydraulic cylinder which tilts out the agitator assembly. Permits complete freedom of the tilting kettle, and easy cleaning of agitator components. ***This option available in most GROEN agitator kettles.*** USDA approved design.



INA/TA | INA/2 | SA (F) | NEM

INA/TA
Designed to handle medium to heavy viscous materials containing solid particles that tend to settle or float, the patented GROEN twin shaft inclined agitation features dual heavy duty TA type mixing motion to provide a thorough, lifting and folding action for uniform homogeneity of product. Agitators are readily removable for cleaning. Available in standard capacities of 100, 200, 250 and 300 gallons. USDA approved design.

INA/2
The INA/2 kettle, with gentle inclined agitator mixing action, solves problems experienced with other style mixers. This patented agitator's lifting/folding motion thoroughly blends and mixes with positive action. Particles and ingredients are quickly dispersed through the batch, and held in suspension to insure homogeneity. USDA approved design.

SA (F)
For applications not requiring robust mixing, the SA (F) is designed for slow speed blending. The fluted frame type agitator provides ideal product movement for holding or cooling applications. Standard sizes from 40 to 1,000 gallons with larger sizes available on application. USDA approved design.

NEM
Specifically designed for products requiring high shear mixing in addition to sweep type blending, the NEM has a high speed propeller in the center bottom for fast wetting out and mixing combined with a counter-rotating fluted sweep-type scraper agitator providing thorough blending of finished product. Heavy duty piggyback drive offers long term maintenance free operation. USDA approved design.

Vacuum/Pressure Models

RA (V/P)

RA (V/P)
Incorporating the heavy duty RA scraped surface agitation, this unit is designed for processing under vacuum or pressure. Unit furnished with access manway, sight and light glass, shaft seals and instrumentation. Also available with other GROEN agitation systems. ***Almost any design can be provided with vacuum/pressure capabilities.***

Series 372 and 696
Thin Film Type Heat Exchanger/Evaporator

The Series 372/696 are unique thin film type design evaporators designed to concentrate many types of products from as low as 40% solids up to 98% + solids without the necessity of preheating the product or using vacuum.

Each unit is comprised of a concentric tube concentrator element which is so designed that the product reaches boiling within the first 6″ to 10″ of travel through the concentrator tube, and as steam is generated, it is progressively superheated and drives the product along. A powerful scrubbing action is thus developed by the combination of the superheated steam and the tube back pressure. These driving forces approach the action of a mechanical scraper and give unusually high heat transfer rates. The product makes a single pass through the concentrator where residence time can be as little as 5-15 seconds. By banking elements, any required total production capacity can be obtained.

Each Series 372 unit has 9 square feet of heat exchange surface, while the 696 Series has 22.5 square feet per tube.

The great ability of the GROEN continuous concentrators to transfer heat has led to their use as a straight heater with no evaporation taking place. Various syrups and slurries are readily handled, the capacity being generally high though somewhat reduced for high viscosity feeds.

It is obviously more expensive to transfer heat to a liquid by passing it over heated stainless steel walls than to inject steam directly into it. However, GROEN tubes are tremendously efficient heat transfer devices and accomplish this difficult heating with a minimum surface area. By reason of spreading the liquid into a thin film (3/32″ thick) during the heating, the speed and uniformity of cooking is excellent. For instance, in heating a viscous liquid with direct steam injection, it is not possible to obtain a perfect mixture, therefore condensation occurs in some regions and not in others nearby. This can be a fairly pronounced effect and results in uneven heating of the liquid as well as uneven deposition of condensate throughout the original liquid. The direct steam system also poses the problem of injection of droplets of water carrried over from the boiler. Despite all that can be done to control boiler water treatment and blowdown, there is potential contamination from this source.

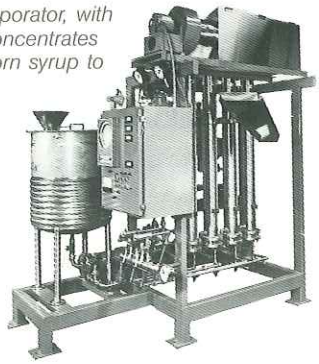
All of this equipment is custom designed complete with feed pump with variable speed drive and tachometer, prescribed number of tubular elements, automatic temperature control, temperature indicator, steam traps and all internal wiring and piping. The unit will be mounted on a suitable enamelled framework with control panel for necessary gauges, switches, etc.

1E-372-R3

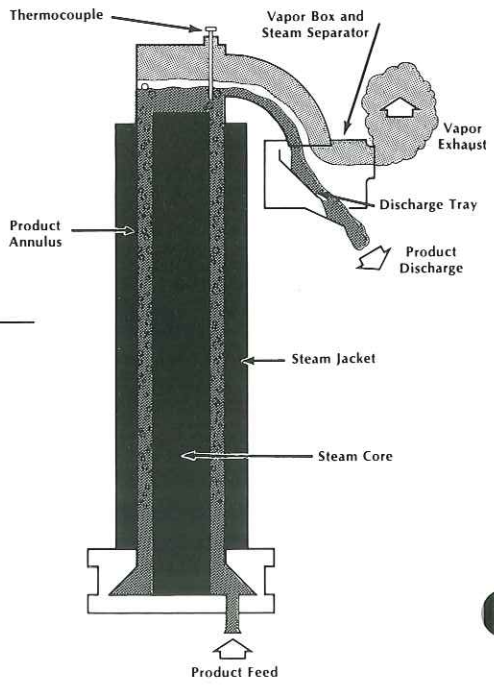
1E-372-R3 One Tube Evaporator Assembly, with provision for additional tube, concentrates sorbitol to 98% total solids at 300 lbs./hr.

4E-372-R3

4E-372-R3 Four Tube Evaporator, with clean in place system, concentrates 2,800 lbs./hr. of 42DE corn syrup to 88% total solids.

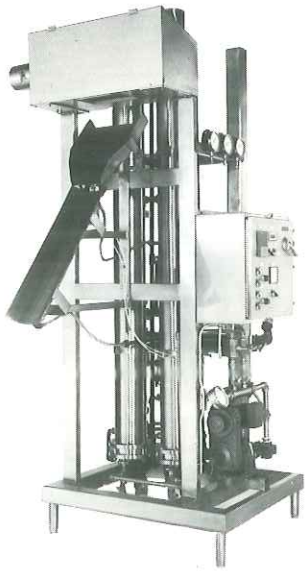


CROSS SECTION



2E-696-R3

Two tube 696 can concentrate a 70% total solids pre-mix blend to 98.5% final solids pure sugar candy, at a rate of 1,200 lbs./hr.

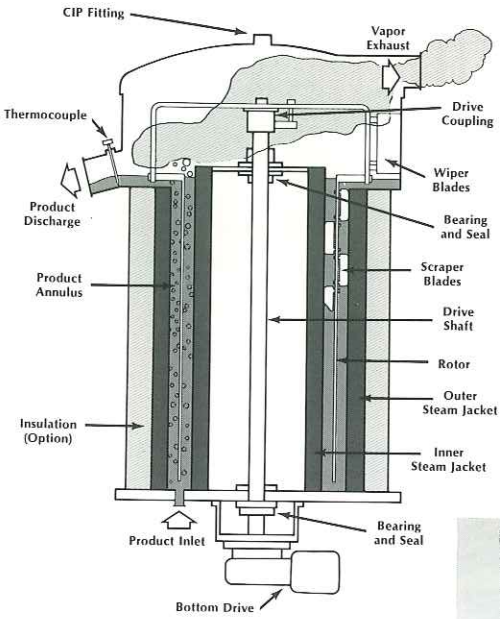


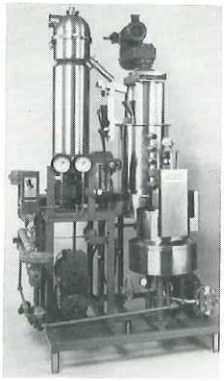
Your Choice Of Scraped Surface Heat Exchange Technology

9

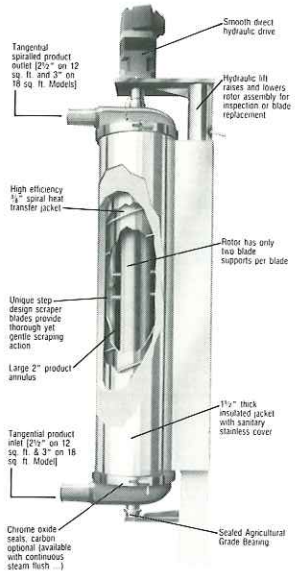
DR Series
Scraped Surface
Heat Exchanger/Evaporator

Particon®
Large Particulate Scraped
Surface Heat Exchanger





DR-1248
A DR-1248 (product annulus is 12" in diameter and 48" high) can produce 750 lbs. of milk caramel per hour in a confectionary application.



Particon - 18
A Particon-18 provides 18 square feet of heat exchange area per unit.

DR Series
Scraped Surface
Heat Exchanger/Evaporator
The Groen DR Series Scraped Surface Continuous Evaporator and Heat Exchanger is versatile, highly efficient and provides both precise control and high quality output, for evaporating and heating/cooling applications.

The DR is available for atmospheric, vacuum or pressure processing applications and can be constructed of various types of stainless steels. The product annulus in the DR is jacketed on both inner and outer surfaces. Twice the heat transfer surface is provided as compared to other scraped surface units requiring the same amount of floor space. In addition, the narrow annulus plus the unique scraper design insures complete homogenous mixing and uniform heating and cooling of many types of products. Each jacket is fabricated to ASME code.

The rigid concentric tubular design of the DR allows for high working pressures in both jackets. This means that products can be exposed to higher temperatures allowing for more production with shorter product residence time. Thermal degradation is held to a minimum, insuring high quality product output.

The revolutionary design of the scraper rotor frame minimizes maintenance. The self-alignment of the DR rotor eliminates costly and meticulous adjustment upon reinsertion. The scraper blades are easily removed for cleaning and inspection, and are available in several types of plastics and metal alloys, consistent with product characteristics and temperature.

The DR is designed for use with clean in place (CIP) systems, simplifying sanitizing operations and reducing down time.

The scraper/rotor design not only eliminates product fouling, but provides the necessary agitation to insure homogeneity and good heat transfer throughout the product during processing. The 5/8" wide product annulus allows for processing of some materials with suspended particulates. (See Particon For Products With Large Particulates).

The DR Series Evaporator/Heat Exchanger is offered in standard sizes ranging from 4 square feet up to 170 square feet of heat transfer surface. Standard units are furnished with variable speed rotor and product feed pump drives with tachometers, automatic temperature controller, jacket pressure indicators, valving and piping for heating or cooling medium, and a pre-wired enclosure containing all control and monitoring equipment. The DR System is completely automatic and requires only one operator for start-up or shut-down.

Particon®
Large Particulate Scraped
Surface Heat Exchanger
The Particon® Scraped Surface Heat Exchanger is designed to continuously heat, cool or concentrate a wide variety of products including those with large particulates up to 1.5" in diameter. The design of the product annulus, scraper blades and spiral steam jacket provides very efficient heat transfer and minimizes stress on delicate products.

The PARTICON processor is designed to be compact, easy to clean, simple to maintain and provide a broad spectrum of product processing capabilities. It can be used for atmospheric, pressure or vacuum heating or cooling. PARTICON processing units are available in a 6 square foot pilot plant version and a production model with 18 square feet of heat transfer surface.

The PARTICON processor is a vertical stainless steel cylinder mounted on an all stainless steel supporting frame. The product annulus is surrounded by a 1.5" thick insulating jacket. (See Unit Cross Section) Within the product annulus is the rotor with scraper blades positioned to continuously scrape the heat transfer surface to prevent fouling. The rotor drive unit is powered by a variable speed hydraulic system that also operates the rotor lift assembly. Product inlet and outlet are horizontally tangential to the cylinder to maximize product flow and reduce product shear.

The 3/8" wide heat transfer jacket is provided with a tight spiral core design which increases the velocity of heat transfer mediums and the resulting heat transfer coefficients.

The full 2" product annulus, plus the unique rotor and scraper blade design, allows for the efficient processing of products with solids up to 1.5" in diameter, with little or no damage to delicate solids. For example whole cherry and apple slice pie filling can be rapidly heated at a flow rate of 5400 lbs/hour in a single 18 sq. ft. PARTICON processor. At a rotor speed of 160 RPM, product quality and integrity is excellent. (Contact Groen for performance data on specific product applications.)

All scraper blades are fabricated from a food grade plastic material. Each blade is attached to the rotor at only two points to minimize contact with delicate products within the annulus.

Both product feed inlet and outlet are spiralled tangentially to the cylinder circumference which prevents bridging, maximizes product flow and minimizes damage to product. This design allows for product pressures up to 150 PSI. A special non-tangential design is available for product pressure up to 450 PSI.

Standard relay controls are provided to operate unit and monitor production conditions. Programmable controls available as an option.

Explosive Melt Kettles
GROEN offers the custom designed melt/mix kettles for explosive ammunition manufacturing. Used in projectile loading areas, these units are designed in accordance with the most rigid safety requirements for the melting and mixing of such products as TNT and composition B. GROEN also offers engineering design/fabrication services for complete melt/pour systems.

DN (V/P)
For applications requiring controlled cooking or cooling under vacuum or pressure, the DN (V/P) is furnished with tilting jacketed kettle, tiltout head with sightglasses, gauges, and relief valve and optional vacuum system.

Pressure Cooker
Ideally suited for fast cooking of poultry and meat products. The GROEN Pressure Cookers are furnished standard with 45 PSI steam jacket, 15 PSI chamber, quick opening tiltout head and optional basket insert.

CapKold ® Cook-Chill Production System
Groen pioneered the development of the cook and rapid chill production of meal entrees, soups, sauces and other pumpable food products, with safe REFRIGERATED shelf life of up to 45 days.

The patented CapKold® process employs Groen INA/2 Inclined Agitator Kettles for cooking of pumpable food products. The INA/2 kettle ensures gentle yet thorough mixing of ingredients and maintains food solids in uniform suspension during transfer and bulk packaging.

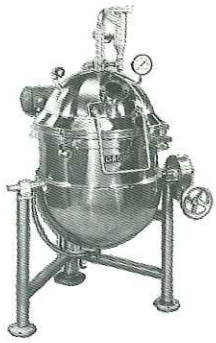
A Pump/Fill station is used to pump cooked product directly from the kettle into special plastic casings, at 180°F. Its special pump maintains particulate indentity (soups, stews, etc.) with food solids up to 1.25″.

Filled and sealed bulk casings are transferred by conveyor into a rotating tumble chiller, which uses ice water to rapidly reduce product temperature from 180°F to 40°F in less than one hour. This uniform rapid chilling is the key to extended safe refrigerated storage of CapKold prepared products, with just cooked flavor.

Kettle and Casing Cooler Control Systems monitor product temperature and processing times. See Cook Tank for meat and poultry processing applications.

Explosive Melt Kettles

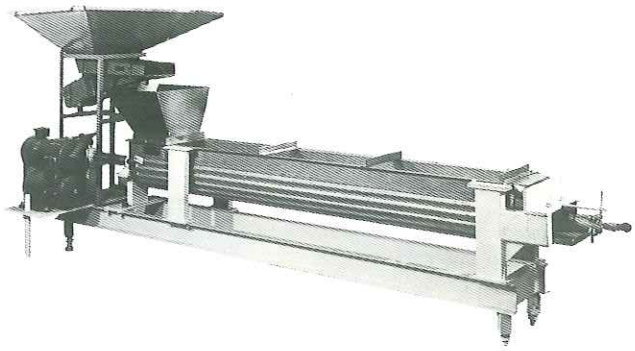
DN (V/P)



Pressure Cooker

Continuous Screw Blender
GROEN Screw Blenders are widely used for confectionery coating of popcorn and extruded snack foods, as well as other applications requiring continuous blending, enrobing and cooking. Steam jacketed trough and heated screw insure uniform heating throughout product and prevents premature setting up of coating material. Variable speed screw and adjustable trough angle allow for a wide range of residence times.

Continuous Screw Blender



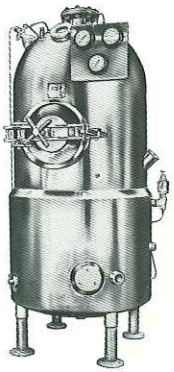
CapKold Cook-Chill Production System

Cook Tank
GROEN Cook Tanks are specifically designed for slow cooking of meats in vacuumized bags. Minimum shrinkage is assured (up to 90% yield by weight) with GROEN's precision engineered water heating and circulation system, which controls cook temperature to within ±2° F. Unit is furnished standard with water circulation system, automatic recording temperature controller, timer and 5 racks with holddown screen for cooking 500-2000 lbs. of meat per batch.

Cook Tank

Custom Designed Equipment

N (V)

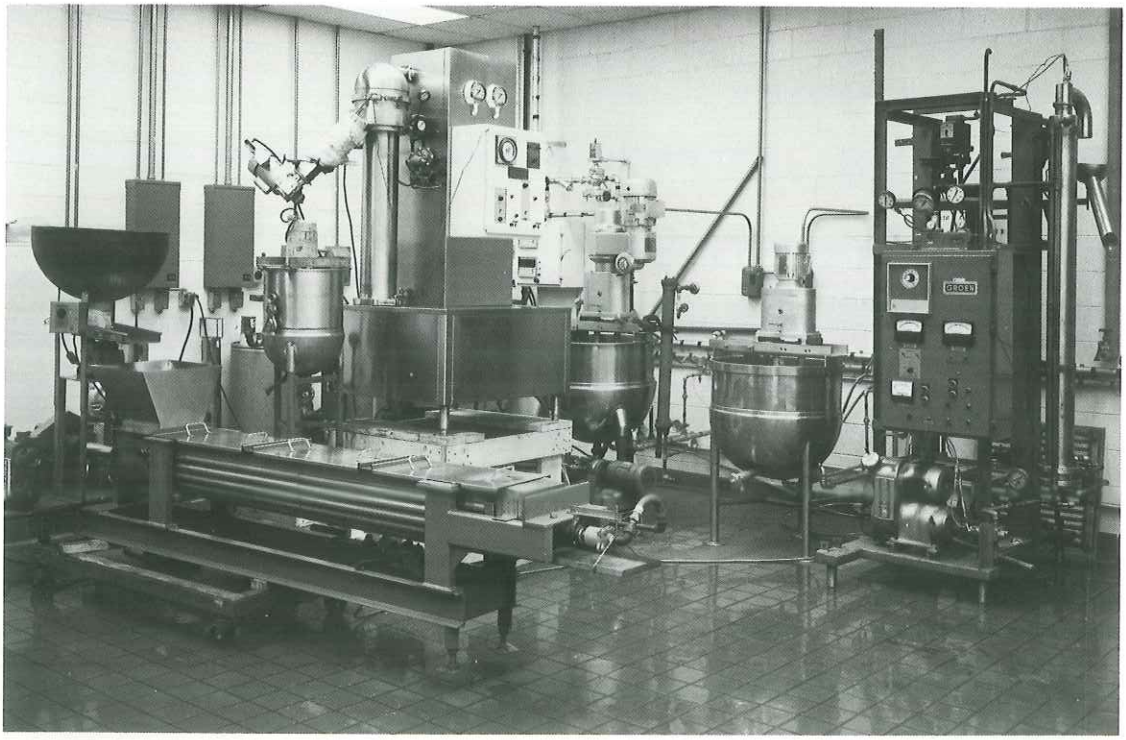


Reactors

N (V)
GROEN's heavy duty vacuum pans are custom engineered for precise cooking of high quality fruit preserves and many other applications requiring delicate vacuum cooking. Rugged sanitary construction available with or without vacuum system insures many long years of trouble-free service. Normally furnished with GROEN standard high performance hemispherical jacket, spiral jacketing and immersible heating colandrias available for extra fast batch turnover cycles.

Reactors
Jacketed Reactors, for processing under pressure or vacuum, are available in sizes up to 3,000 gallons. Units can be furnished with or without agitation and are fabricated in a wide range of materials to suit process requirements.

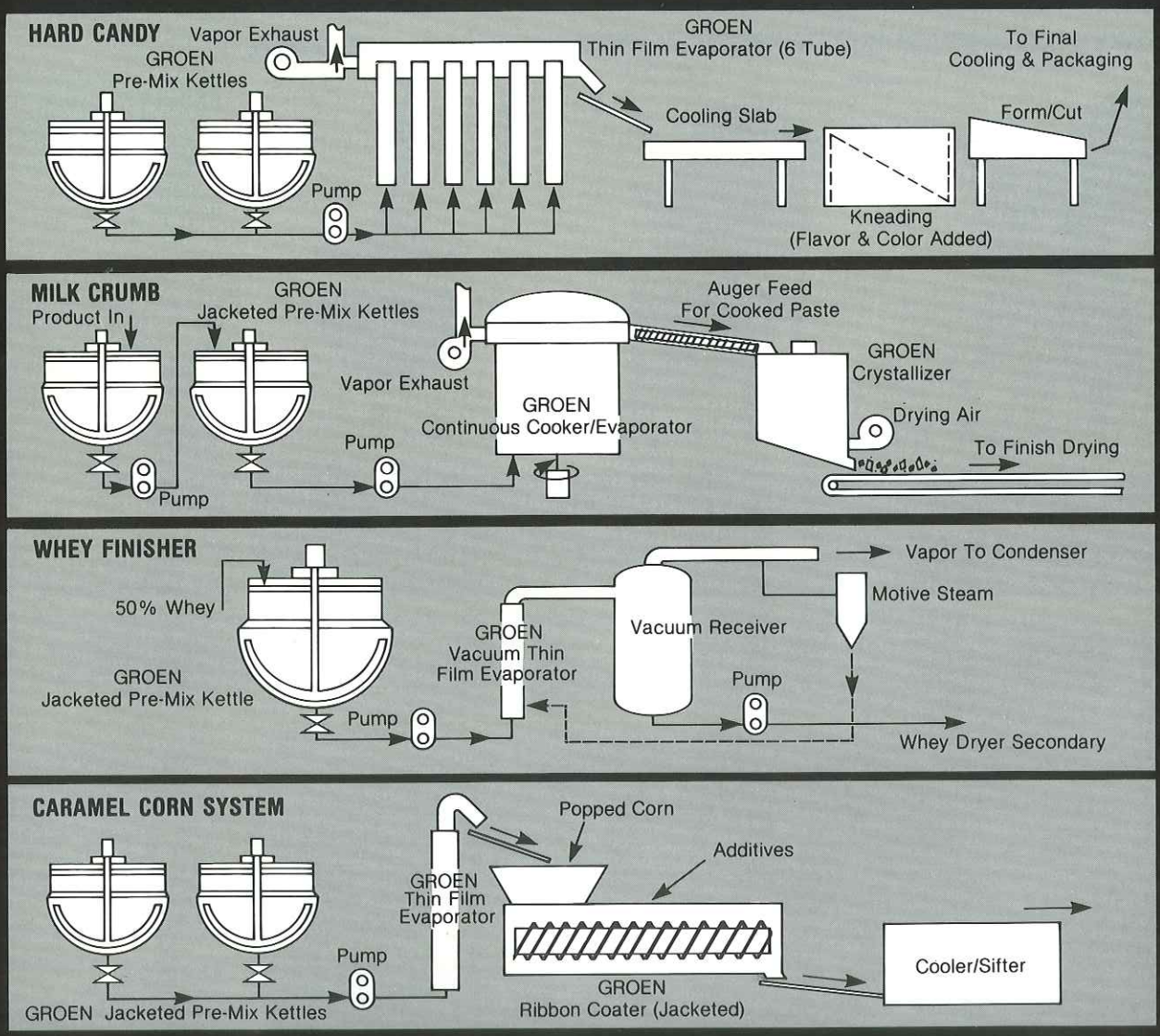
GROEN Test Programs



GROEN Test Programs
GROEN offers the convenience of a completely equipped test laboratory in Elk Grove Village, Illinois. Performance of GROEN process equipment can be demonstrated for process feasibility and for sizing of production machines. We also have both batch and continuous processing pilot plant sized equipment available for in-field testing.

Please contact your GROEN representative and we will be pleased to arrange a personal meeting to discuss your requirements.

Typical GROEN Continuous Processing Systems ... The Logical Choice!



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