

Description

The DUAL ROTOTEX (DR) Series Scraped Surface Heat Exchanger/Evaporator is designed to heat, cool or concentrate a wide variety of products particularly highly viscous, proteinaceous or heat sensitive liquids which tend to stick to or foul a heat transfer surface. The DR Series achieves extremely high heat transfer rates by incorporating jackets on both the inner and outer walls of a narrow product annulus. This dual jacketed design provides twice the heat transfer area of conventional scraped surface heat exchangers of the same size. During operation, the inner and outer wall of the product annulus are continuously scraped which prevents sticking or scorching of product feeds. The scraper blades provide for even heat transfer and homogeneity of product throughout processing.

The DUAL ROTOTEX (DR) Series is available in 48 different sizes for atmospheric, vacuum or pressure operation custom designed to accommodate a wide variety of product applications.

Construction

The DUAL ROTOTEX (DR) Series Scraped Surface Heat exchanger/Evaporator is constructed of Type 304 or 316 stainless steel on all interior product contact surfaces with Type 304 stainless steel outer jackets. Other types of corrosion resistant alloys are available by special order. The systems can be designed for either sanitary or NPT connection. DR Series units are constructed with an exclusive high efficiency uniflow outer jacket system and open annulus steam core. ASME approved for a maximum working pressure of 120 psi for heating and 150 psi for cooling.

Heat Transfer Area

GPE manufactures 48 different sizes of DR Series Scraped Surface Heat Exchangers custom designed for each application, with heat transfer areas ranging from 12 – 154 square feet. DR's with annular diameter of 12" or less are constructed with a 5/8" wide product annulus, while larger DR units contain an 11/16" wide product annulus.

Scraper/Rotor

Rotor drives are direct coupled to the bottom entry drive shaft — **no seals or bearings in product contact areas**. Rotor speeds range from 10 – 120 RPM, depending on the size and application of the DUAL ROTOTEX unit. The stainless steel rotor and drive shaft are segregated to allow for rotor removal and replacement of seals and bearings without interfering with rotor shaft alignment.

Base Assembly

Units are furnished with standard components including variable speed rotor, product feed pump and CIP pump drives, automatic temperature controller, jacket pressure indicators, valving and piping for heating or cooling medium and a pre-wired enclosure containing all control and indicating equipment. The DUAL ROTOTEX (DR) System is automatic and requires only one operator for start-up or shut-down. Addition or deletion of support components and instrumentation is possible to suit each particular application.



Vacuum Operation

For heat sensitive products, the DUAL ROTOTEX (DR) Series can be designed for vacuum operation. Vacuum systems are useful in concentrating products up to high total solids (99.8%) at low temperatures, and in increasing evaporative rates. Vacuum systems are equipped with a vacuum receiver, vacuum pump, condenser, condensate receiver, product feed pump, and condensate take-away pumps.

Chilling Operation (Chilled water or glycol)

The DUAL ROTOTEX (DRC) Series can use chilled water or a water/glycol mixture for cooling medium.

DR SERIES SCRAPED SURFACE HEAT EXCHANGER/EVAPORATOR

Finish

All product contact surfaces shall have a No. 4 sanitary finish conforming to industry sanitary standards.

Approvals

The DUAL ROTOTEX (DR) Series Scraped Surface Heat Exchanger/Evaporator is approved by the U.S. Department of Agriculture and conforms to the latest ASME codes (alternate certification and approvals available).

Performance

Evaporative rates obtained using the DUAL ROTOTEX (DR) Series Scraped Surface Heat Exchanger depend on product viscosity, thermal conductivity, density, heat capacity, hygroscopicity and flow rate, along with steam pressure in the DUAL ROTOTEX (DR) jackets. Highly concentrated liquids (over 95% total solids) have been found to evaporate water at rates of up to 10 lbs./hr./ft² of heat transfer surface, while less concentrated feeds have been found to evaporate at 20 lbs./hr./ft². Discharge product concentrations of 99% + total solids have been achieved. Overall heat transfer U values of 150 BTU/hr./ft² °F are typical in food production applications. The DUAL ROTOTEX (DR) Series Scraped Surface Heat Exchanger can handle product flow rates from 500 lbs./hr. to 10,000 lbs./hr.

The simple, durable design of the DUAL ROTOTEX (DR) Series allows for easy disassembly of the unit for inspection, cleaning or blade replacement. The top dome is removed and the rotor assembly simply lifted off of the drive shaft and out of the jacket assembly to replace the blades.

Applications

The DUAL ROTOTEX (DR) Series has been successfully used for a wide variety of products, especially those in the food, pharmaceutical and cosmetic industries. Typical applications include:

Heating

Milk caramels, chocolate crumb, chocolate liquor, pie fillings, gravies, purees, sauces, corn sugar (syrup), maple syrup, molasses, flavors, cereal coatings, candies, salad dressings and other products.

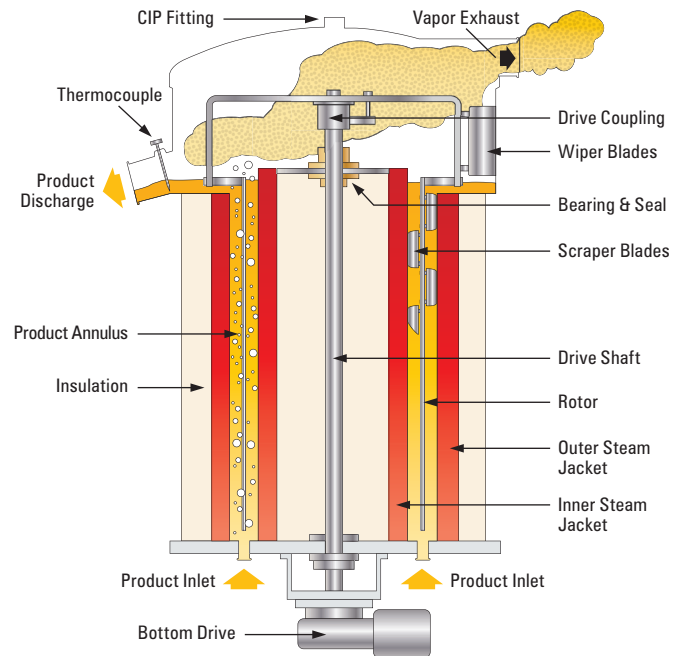
Cooling

Creams, lotions, fondants, marshmallow, peanut butter, shortening, margarine, vegetable oil chilling and crystallization, fruit juices and other products.

Vacuum

Cheese products, whey, juices, jams, jellies, sorbitol and other heat sensitive products.

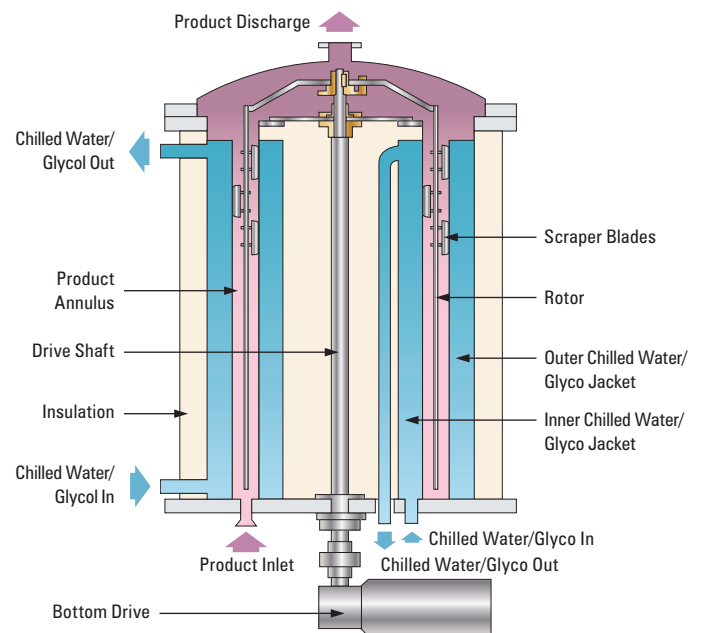
DR SERIES — Evaporative Heating



Dual Jacketed Design

The DUAL ROTOTEX (DR) Series achieves extremely high heat transfer rates by incorporating jackets on both the inner and outer walls of the product annulus. During operation, these walls are continuously scraped, which prevents product fouling and also provides for uniform product throughout processing. For chilling operations, this dual jacketed design and narrow product annulus provides greater efficiencies than conventional scraped surface heat exchangers.

DR SERIES — Cooling Applications



GPE-GROEN PROCESS EQUIPMENT CASE STUDY

Introduction

When a North American manufacturer of Caramel Corn & Coated Snack Food Products required a higher quality sugar based syrup coating, and a more efficient and less costly means to produce their variety of sugar coatings, they turned to the expertise of our engineers at GPE for assistance. GPE is a premier manufacturer of Continuous Operation Scraped Surface Heat Exchangers/Evaporators, Thin Film Evaporators, Screw Coaters, Steam Jacketed Kettles/Tanks, Mixers, and a complete line of Sanitary Ball Valves.

The Task At Hand

Traditional steam jacketed kettle or tank batching methods of cooking/ concentrating of sugar based syrups is labor intensive & the residence times involved in the cooking process lend to a lesser quality finished syrup that has lost its desired shine/crisp bite and smooth texture.

Their existing method of sugar coating used multiple traditional scraped surface heat exchangers with independent flash chambers and additional kettles or tanks for preheating. This system consumed an excessive amount of electricity, yet provided a dull, grainy finished product. It also made it difficult to maintain a consistent throughput rate, requiring a surge vessel, transfer pump and piping as well as a means to control final metering into the coating equipment.

The Efficient Solution

GPE Engineers sized & designed our DR Series Scraped Surface Heat Exchanger with built in flash chamber for the required calculated heat transfer surface area to be provided in a single pass/single unit evaporator to produce the desired production rate on a continuous basis, with the desired final solids syrup gravity fed to the coating equipment. This design eliminated the need for multiple heat exchangers (4) (which freed up approx. 75% floor space and reduced drive electrical consumption by approx. 75%), and eliminated the need for a surge vessel & metering system, while cutting labor costs by 50%.

Conclusion

The properly sized and designed GPE Sugar Coatings Evaporator is now producing a premium snack food coating at the desired rate on a continuous basis, with significant reduction in energy, floor space, labor and maintenance costs.

Statement

GPE would welcome the opportunity to size & provide a system to meet your continuous production needs for Snack Foods Coatings, Cereal Coatings, Confectionery Products, Starch & Fruit Based Products Needs.

Typical DR Evaporative Heating Applications

END PRODUCT	BASIC INGREDIENTS	% SOLIDS		RATE (LB/HR /SQ.FT)		TEMPERATURE (°F)		STEAM PRESSURE AT COOKER (PSIG)
		FEED	FINISH	FEED	FINISH	FEED	FINISH	
Coating, Popcorn Snack Foods	Sugar, Water, Corn Syrup, Butter	74	98	36	27	180	305	110
Coating , Cereal	Sugar, Water, Corn Syrup, Flavors	67	86	69	54	180	241	110
Milk Caramel (SOFT)	Sugar, Water, Corn Syrup, Whole Milk	75	90	81	68	160	241	100
Milk Caramel (HARD)	Sugar, Water, Corn Syrup, Whole Milk	75	94	64	51	180	255	105
Milk Crumb	White Milk Powder, Liquid Sugar	74	96	36	28	150	275	70
Chocolate Crumb	White Milk Powder, Liquid Sugar, Liquor	74	96	39	30	150	275	80
Toffee	Sugar, Water, Butter	75	98	29	22	180	320	110
Simple Candies (SOFT)	Liquid Sugar, Invert Sugar	67	82	82	67	80	230	100
Sugar Syrups	Liquid Sugar, Invert Sugar	67	90	57	42	80	254	100
Pulled Candy	Liquid Sugar, Invert Sugar	67	97	35	24	80	305	110
Hard Candy	Sugar / Corn Syrup 80/20	67	87	63	48	180	240	100
Hard Candy	Sugar / Corn Syrup 80/20	74	94	51	40	180	280	110
Hard Candy	Sugar / Corn Syrup 80/20	74	98	29	22	180	320	110
Fruit Juices (Prune, Grapefruit,ect.)	Fruit Juice (No Pulp)	8	32	27	7	70	213	90
Fruit Juices (Prune, Grapefruit,ect.)	Fruit Juice (Some Pulp)	18	70	26	7	70	221	90
Food Plant Equip Cleaning Water	Wash Water W/2% Remaining Solids	2	8	27	7	180	220	125

Custom Control Packages

Save time, money and labor while ensuring production run efficiency, with a custom designed control package from GPE. Simple to operate control systems are ideal for caramel corn and snack food coating systems. Control a single processing component or an entire system with advanced

PC control technology. GPE Control Systems work with any combination of GPE process equipment. They can be integrated into the component framework or remote mounted, allowing you to control an entire system from ingredient premix to final processing.

Continuous Snack Processing Systems From GPE

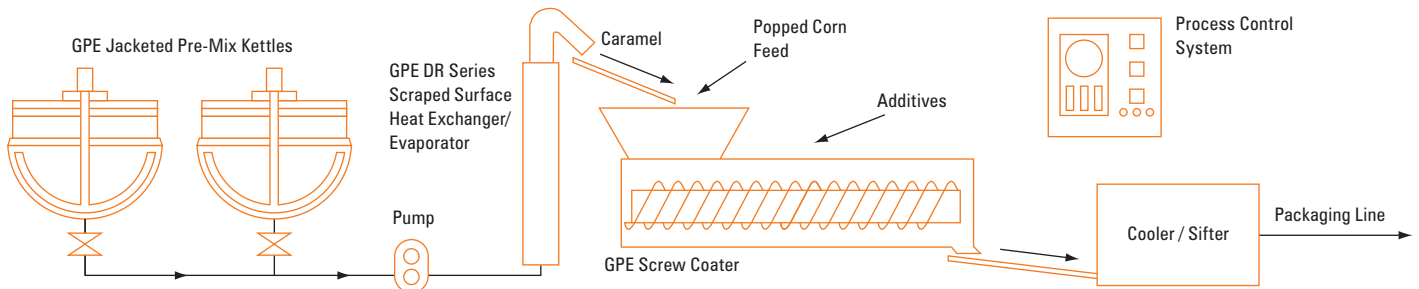
While best known for high quality steam jacketed kettles, we also design complete continuous processing systems manufactured with the same craftsmanship and care that goes into all of our process equipment. Whether it's caramel corn, hard candy or other snack food, GPE can custom tailor a complete process system to suit your product formulation and output requirements.

screw coasters / blenders, for uniform product coating. Customized control packages can be designed to integrate and monitor the entire process. With GPE you will always get the right combination of equipment, to help you produce perfect product — for less.

Choose from a wide variety of hemispheric bottom kettles and agitator configurations for ingredient batching and pre-mix operations. GPE thin film evaporators or scraped surface heat exchangers can be used to heat and concentrate ingredients continuously, prior to feeding into our continuous

GPE process systems are known through-out the world for their high quality and reliability. If you are planning to start up a caramel corn or other snack food operation, or need to expand an existing production line, call the GPE Process Equipment Group today. We'll help you design a continuous snack foods processing system for your production needs.

Typical Caramel Corn System



Steam Jacketed Agitator Kettles

GPE steam jacketed kettles are world renowned for their high performance and incredible durability. From 2-1/2 to 2,000 gallons, 2/3 or fully jacketed, self-contained or direct steam heated, GPE has the solution for large batch processing or pre-mix needs of continuous snack food processors.

Tell us your mixing needs and budget and we will recommend the most efficient, dependable agitator kettle available. Custom designed ingredient feeds, product extraction, insulated jackets and multiple zone heating are also available for specialized processing applications.

With two distinct agitator kettle lines, traditional Premiere Kettles™ for uncompromising quality and our economical Elite Kettle™ line, we offer the largest selection of agitator configurations, sizes and options for processors.

Optional Agitator Kettle Features

GPE hemispheric bottom steam jacketed kettles are ideal for ingredient batching, mixing, premixing, heating, cooling and holding. Special agitators provide mixing capabilities ranging from high speed, high shear heavy duty agitation, to a delicate lifting and folding action required by whole fruit and some prepared foods.

- Pressure or vacuum processing
- Water or hydraulic tilt out agitator assemblies and manual or hydraulic tilting kettles
- Separate heating and cooling jackets
- A wide selection of product outlets including GPE's own sanitary flush mounted and in-line ball valves