

Sterideal® Ohmic



For aseptic treatment of high and low acid products

Heat generation in a resistive conductor



Liquid Eggs

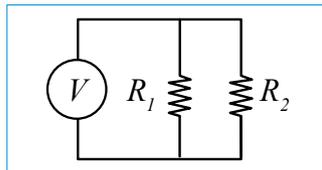
Theory

- An electric current is passed through the product
- The electrical resistance of the food causes the power to be transformed into heat: the product temperature goes up quickly!
- There is no heat transfer: the heat is generated inside the product

Heat generation in a resistive conductor:

- R = electrical resistance of conductor [Ω]
- V = applied voltage [V]
- I = current intensity [A]

$$Q = V \cdot I = R \cdot I^2$$



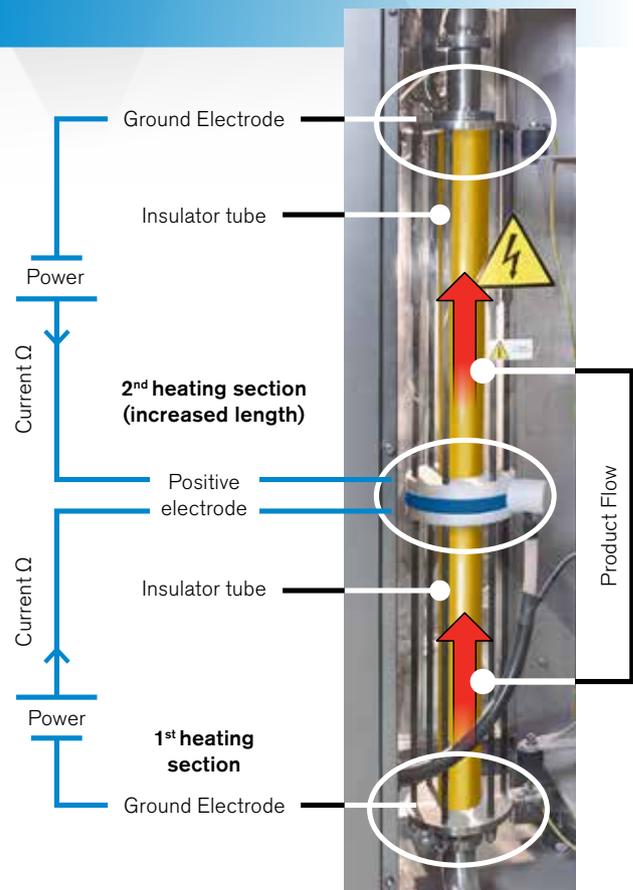
Heating Section

Each heating section may be seen as two electrical resistors in parallel. The system is safe for both the product and the people using the system

Why Ohmic Heating?

To overcome typical problems of conventional heat exchangers:

- By this method a product undergoes a minimum structural damage, retain its nutritional value. This technique gives excellent processed quality products in minimum operating time.
- Additionally research revealed that there is no protein denaturation at high temperature when heated with ohmic heating
- Ohmic heating volumetrically heats the entire mass of the food material and therefore a homogeneous treatment



- When dealing with liquid foods containing large particles there is no overheating of the liquid due to the low heat transfer rate by conduction to the center of particles as in conventional heat exchangers
- Provides a very fast heating of 40÷50°C, maximum error range 0,2°C are achieved in few seconds
- Not subjected to fouling (absence of a hot wall)
- Very low pressure drop because there is no need of high product speed
- Does not damage particles as do scraped surface heat exchangers.



Premium Citrus Juice



Fruit Dices and Fruit Preparation



Soup

Working Details

- The system chooses an initial voltage knowing the product electrical conductivity
- It continuously adjusts the power given to the product to reach and maintain temperature set points
- The system is self protected and it shuts down when it detects anomalies in the electricity parameters. The system automated boots up very shortly afterwards.

Products

Products that can be treated to achieve significant quality advantages compared to standard technology:

- Product with dices - fruit jam with dices, fruit dices
- Liquid eggs
- Fruit and vegetable juices and purees
- Isotonic/energy drinks
- Soup and sauces with fish and meat.

The Industrial Systems

- When combined with holding and traditional cooling the system is the ideal solution for aseptic treatment of high and low acid products
- We can provide systems from quite a little to medium - high throughput from 1000 l/h to 20000 l/h
- The system is modular and flexible
- In typical applications the temperature profile is 65°C to 115°C (high acid) or 85°C to 135°C (low acid). The system is not restricted to this as it can be used for a much wider temperature profile and up to 150°C and more
- For big capacities a traditional pre-heating system can be used, to save electricity consumption and, therefore, money.

Upgrade Existing Plants

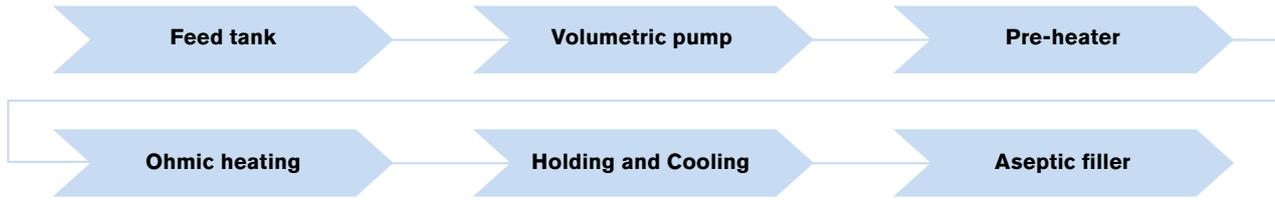
The ohmic heater is the ideal solution to upgrade an existing sterilizer. The existing heating would work as pre-heater. Ohmic as final heater

- Higher capacity and higher quality as double results
- Pressure drop, no need to change pumps minimal extra.

Advantages:

- Preservation of color, texture and taste
- Process temperature reached faster
- More uniform product heating
- No product overcooking
- Reduced fouling thanks to the absence of heat transfer surfaces
- Instant shutdown (no residual heat transfer)
- High energy efficiency (92-95%)
- Reduced maintenance cost
- The only necessary conditions for the product is electric conductivity
- High electricity frequency is used. No galvanic effect with electrode corrosion and dissolution into the product
- Investment cost is aligned or just slightly higher than the traditional heating system. Higher product quality compensates the additional cost
- Very wide range of product treated without system modifications or with minimal modification (just change the diameter/or length of the glass pipes for example)
- Optimized treatment of particulates (no overcooking of the liquid medium and dice surface)
- Reduced pressure loss in the system
- Minimized mechanical damage to food particles
- Extreme flexibility, the same machine can process different product: viscous, particles etc.
- Very easy to operate, Modular, Compact
- Little mechanical and electronic changes to the existing system.

JBT Sterideal® Ohmic, configuration available for customer test at JBT Parma RTC



JBT Sterilization Technologies

Suitable configurations and type					
Sterideal® Ohmic	Sterideal® TS (Tube-in-Shell)	Sterideal® QT (Quad Tube Design)	Sterideal® DT (Dimple Tube)	Sterideal® Coil SteriTwin-Coil™	Sterideal® DR (Direct Regeneration)
		 Product with fiber Product without fiber			

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OUR BRANDS



Europe

John Bean Technologies SpA
Via Mantova 63/A
43122 Parma
Italy
Phone: +39 0521 908 411
Fax: +39 0521 460 897

John Bean Technologies NV
Breedstraat 3
9100 Sint-Niklaas
Belgium
Phone: +32 3 780 1211
Fax: +32 3 777 7955

John Bean Technologies Foodtech Spain S.L.
Autovía A-2, Km 34,400 - Edificio 1 y 3
28805 Alcala de Henares
Madrid, Spain
Phone: +34 91 304 0045
Fax: +34 91 327 5003

Latin America

JBT de México S de RL de CV
Camino Real a San Andrés Cholula No. 2612
Col. San Bernardino Tlaxcalancingo
72820 San Andrés Cholula, Puebla
México
Phone: +52 222 329 4902
Fax: +52 222 329 4903

North America

John Bean Technologies Corporation
400 Fairway Avenue
Lakeland, FL 33801
USA
Phone: +1 863 683 5411
Fax: +1 863 680 3672

John Bean Technologies Corporation
2300 Industrial Avenue
Madera CA 93639
USA
Phone: +1 559 661 3200
Fax: +1 559 661 3156

South America

John Bean Technologies Máq. e Equip. Ind. Ltda.
Av. Eng Camilo Dinucci 4605
14808-900 Araraquara, São Paulo
Brazil
Phone: +55 16 3301 2000
Fax: +55 16 3301 2144

Asia Pacific

John Bean Technologies (Shanghai) Co., Ltd.
Room 1908, Hongwell International Plaza,
1600 West Zhongshan Road,
Xuhui District, Shanghai 200235,
PRC
Phone: +86 21 3339 1588
Fax: +86 21 3339 1599

John Bean Technologies (Thailand) Ltd.
No. 159/26 Serm-Mit Tower
Room no. 1602-3 Sukhumvit 21 Road
Klongtoey Nua Sub-district, Wattana District
Bangkok 10110 Thailand
Phone: +66 2 257 4000
Fax: +66 2 261 4099

South Africa

John Bean Technologies (Pty) Ltd.
Koper Street
Brackenfell
Cape Town, South Africa 7560
Phone: +27 21 982 1130
Fax: +27 21 982 1136



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