



Modern technologies for Optimized use of Energy and Ressources

Ohmic heating

By

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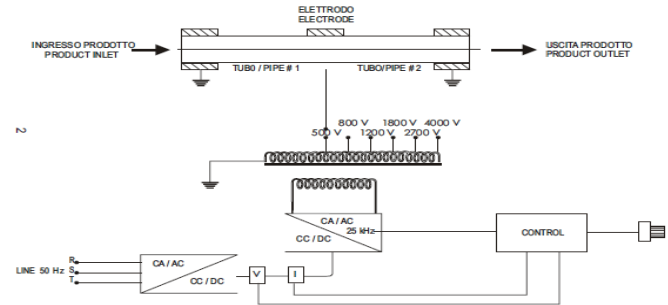
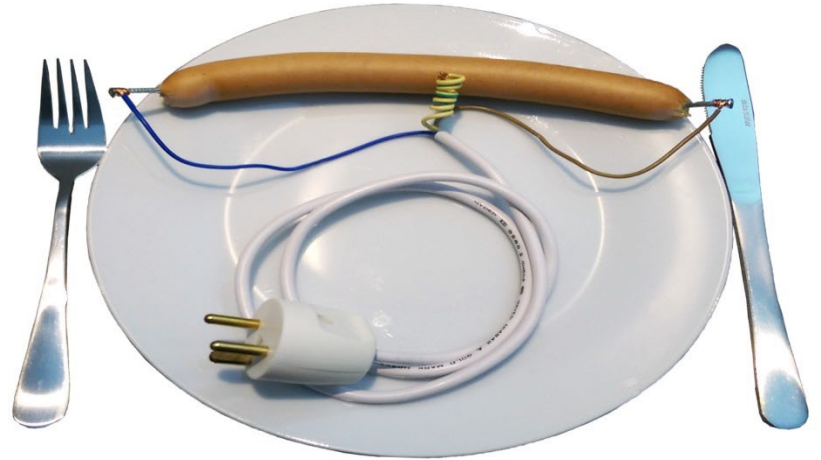
Ohmic heating is not a new method

- 1993 First test with ohmic heating
- 1996 Starting to produce ohmic heating plants
- 1996 Production of own power supply
- 2013 First ohmic heating plants installed in Denmark



What is Ohmic heating

- Ohmic heating, also known as Joule heating, offers great possibilities for rapid and uniform heating of products, securing safe microbiology and high product quality.
- The energy is converted into heat due to the electrical resistance the current meet. 96% of the supplied energy is converted to heat.



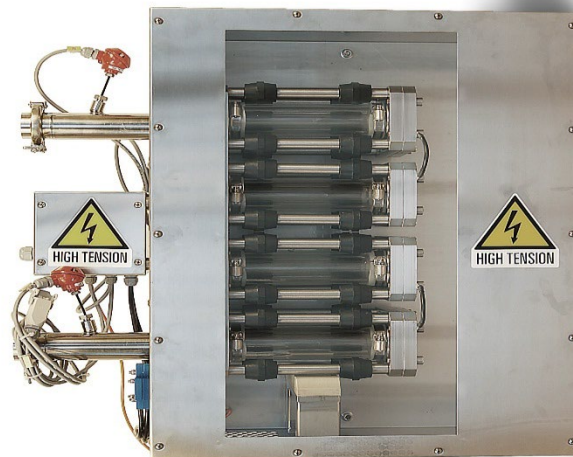
Applications

- Products:
 - Fruit mix (Jam – large pieces of fruit)
 - Tomato puré
 - Ready meals (Soups – Sauce)
 - Dairy products (Creme cheese – Concentrates etc.)
- Pasteurisation/U.H.T. of products, where the heating time is short and holding time as wished.
- Handling of viscous products with a limited pressure loss.
- Can be implemented in existing installations



Technical information

- Product wetted parts (electrodes) AISI 316, carbon or titanium
- Product wetted parts (insulating pipe) borosilicat, composit, or ceramic
- Cabinet in AISI 304, IP65
- Heating up to 148 °C (298°F)
- 96% efficiency



Capacity

Power kW	Throughputs referred to the required thermal jump			Absorbed power I_{RMS} Ampere	Cooling water Q l/h
	ΔT 30°C Kg/h	ΔT 50°C Kg/h	ΔT 70°C Kg/h		
20	500	300	200	30	air cooling
60	1400	900	600	90	120
120	2900	1700	1200	190	240
240	5700	3500	2500	380	480
360	8600	5200	3700	570	720
480	11500	6900	4900	750	960
600	14400	8600	6200	940	1200
720	17200	10300	7400	1130	1440

Why choose ohmic heating

Ohmic heating is a continuous process for pumpable products. This technology offers multiple advantages:

- The whole product is heated homogeneously;
- Products with poor thermal conductivity can be heated;
- Easy regulation;
- Viscosity of the product is no longer an impediment;
- Adapted technology for both homogeneous and heterogeneous products;
- Texture and taste of the product are not degraded;
- Sterilization and pasteurization can be achieved with a single energy source;
- Less space required and reduced maintenance;
- Build up in sections;
- Easy cleaning;
- No fouling;

Advantages

- Less product waste
- Longer production time
- Energy savings
- Lower cleaning costs
- Green profile
- Small footprint, flexible installation

References

- Installed base of 18 plants in Denmark.
 - 15 pc installed to heat up dairy products
 - 3 pc pilot plants in Denmark
- Approximately 150 plants installed world wide





Thank You

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