The food industry is nowadays dealing with both the increasing attention of consumers to natural taste, flavour and functional properties of food, and with ever stricter food safety regulations set out by the international authorities. The need for shelf-life extension technologies able to fulfil these two apparently contrasting tasks drove STALAM to the development of the "RF/L" equipment for in-line continuous pasteurisation and sterilisation of liquids, solid-liquid mixtures and high viscosity pumpable products. The use of Radio Frequency fields (at 27.12 MHz) for this application represents today a real alternative to the conventional thermal processing methods. The reason why several European leading fruit and vegetable processors decided to adopt this technology resides in the complete elimination of the usual issues associated with scraped surface, tubular and plate heat-exchangers.

The fluid substrate to be treated is continuously pumped through one or more Teflon tubes having a suitable diameter. The tubes are placed between electrodes, specifically designed depending on the product’s characteristics. The product is directly heated by the RF field, with a combination of dielectric and resistive heating. The intensity of the electromagnetic field, and the consequent heating rate, are controlled by means of a variable capacity coupling circuit. Heating rates from 1 - 2°C/sec (for highly viscous liquids containing suspended solids) up to 50 - 100°C/sec (for low-viscosity liquids with no particulates) are achievable uniformly within the bulk of product, enhancing the thermal inactivation effect on microorganisms, spores and enzymes.
Main benefits of the “RF/L” technology

• Rapid and uniform temperature increase within the product, also in the suspended particulates of any dimension, hence with no risk of over-processing the liquid
• Microbial inactivation at lower temperatures and in shorter time compared to conventional thermal processes
• Better preservation of the sensorial, chemical and physical characteristics of the product, including the structural integrity of solid particulates
• Reduced use of additives such as colours, flavours, thickeners, etc. normally used to compensate for product degradations caused by conventional thermal processes
• Instantaneous heat input and process parameters control
• High operational flexibility
• Modular construction, multiple units can be installed in-line to achieve higher production capacities
• Easy cleaning, no crusting effect thanks to no contact with any heating element, and low maintenance costs
• Reduced factory floor space requirement
• Better working environment
• CIP system can be used for washing
• PIG system can be used for in-line change and recovery of the product
• The equipment sterility can also be maintained in stand-by condition

<table>
<thead>
<tr>
<th>FLOW RATES</th>
<th>ΔT (temperature jump)</th>
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<tbody>
<tr>
<td>RF generators</td>
<td>Tubes in the applicator</td>
</tr>
<tr>
<td>40 kW</td>
<td>2</td>
</tr>
<tr>
<td>85 kW</td>
<td>4</td>
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<tr>
<td>150 kW</td>
<td>6</td>
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