The Emprint™ Ablation System with Thermosphere™ Technology
Technology overview
EMPRINT™ ABLATION SYSTEM
WITH THERMOSPHERE™ TECHNOLOGY

- 100 W generator with an intuitive user interface and customizable power settings for simplified set-up and operation
- 15 cm, 20 cm, and 30 cm antenna lengths
When it comes to procedure results, achieving sufficient ablative margin is a top predictor of local tumor control\(^1\)
Historically, manufacturer ex vivo liver ablation recommendations have not accurately predicted clinical results\(^2,3\)

<table>
<thead>
<tr>
<th>Ablation Margins</th>
<th>Expected</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiofrequency</td>
<td><img src="image1.png" alt="Expected" /></td>
<td><img src="image2.png" alt="Achieved" /></td>
</tr>
<tr>
<td>Microwave</td>
<td><img src="image3.png" alt="Expected" /></td>
<td><img src="image4.png" alt="Achieved" /></td>
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</tbody>
</table>
All thermal ablation devices affect tissue by means of two distinct heating zones – called the active and passive zones.

Controlling the active heating zone and minimizing reliance on the passive zone to grow ablation volume increases predictability.

- **Active heating** occurs where the tissue is absorbing intense electrical energy delivered from the ablation probe.

- **Passive heating** is transfer of heat by thermal conduction or thermal convection into tissues surrounding the ablation probe.

- An **ablation zone** results where the combination of active and passive heating exceed thermally toxic tissue temperatures for a sufficient period of time.
Over time, microwave technology has evolved, gradually delivering better control of the active heating zone.

With next generation Thermosphere™ technology, repeatable, spherical results have arrived.4
Thermosphere™ Technology Overview

The First and Only Technology with Three Types of Control

**Thermal Control**

As the ablation starts, elements in the antenna begin to conduct heat. Thermosphere™ technology has thermal control with advanced antenna cooling. This prevents heat from traveling up the antenna shaft and contributing to the ablation zone.

**Wavelength Control**

As the tissue properties change over time, Thermosphere™ technology uses wavelength control to prevent the microwaves from elongating down the antenna shaft.

**Field Control**

Thermosphere™ technology has advanced antenna geometry that focuses energy at the tip of the device into a precise spherical electromagnetic field.
**Only Thermosphere™ Technology Has Wavelength Control**

Wavelength control is unique to next generation microwave ablation technology.

It minimizes microwave energy elongation on the radiator. This allows for field control to effectively create a robust and stable spherical electromagnetic field across a range of tissue types.4

<table>
<thead>
<tr>
<th>Variable Active Heating Without Wavelength Control Conventional Microwave.</th>
<th>Stable Active Heating With Wavelength Control Thermosphere™ Technology.</th>
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<tbody>
<tr>
<td><strong>DESSICATE TISSUE</strong></td>
<td><strong>LIVER</strong></td>
</tr>
<tr>
<td><img src="image1" alt="Diagram of DESSICATE TISSUE LIVER" /></td>
<td><img src="image2" alt="Diagram of LUNG KIDNEY" /></td>
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<tr>
<td><strong>LUNG</strong></td>
<td><strong>KIDNEY</strong></td>
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<td><img src="image3" alt="Diagram of LUNG KIDNEY" /></td>
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</tbody>
</table>
ADVANCED ANTENNA DESIGN ENABLES WAVELENGTH CONTROL

Conventional Microwave Technology

Conventional Technology with Ceramic Loading Dielectric

Thermosphere™ Technology

Ceramic
Cooling fluid
Polymer plastic
Metal
Fiberglass
Composite

Time zero
1 minute
5 minutes

Time zero
1 minute
5 minutes

Time zero
1 minute
5 minutes

Thermosphere™ Technology Overview
Conventional Microwave
Probe trajectory planning with elliptical ablations

Thermosphere™ Technology
Probe trajectory planning with spherical ablations
AND ACHIEVE TRULY PREDICTABLE OUTCOMES WITH A SINGLE PROBE

Conventional Microwave Technology
65 W, 5 min\(^5\)

- **Two Antenna**
  - maximum inscribed diameter: 2.27 cm ± 0.79
- **Three Antenna**
  - maximum inscribed diameter: 3.3 cm ± 0.68

Thermosphere ™ Technology
100 W, 5 min\(^5\)

- **Single Antenna**
  - maximum inscribed diameter: 3.3 cm ± 0.5

Maximum inscribed diameter was defined as the maximum circle diameter that fits inside the ablation zone, which is more indicative of the area that could be treated with the ablation than minimum or maximum diameter.\(^1\)
THE DIFFERENCE IS CLINICALLY PROVEN

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Thermosphere™ Technology Overview

Clinical Article – Liver
Clinical Abstract
Pre-clinical Abstract
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REFERENCES


DISCLAIMER: Animal data is not necessarily indicative of human clinical outcomes.
PREDICTABILITY FOR YOU.
OPTIONS FOR YOUR PATIENTS.

The Emprint™ Ablation System with Thermosphere™ Technology

For more information, please visit medtronic.eu/product-catalog

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