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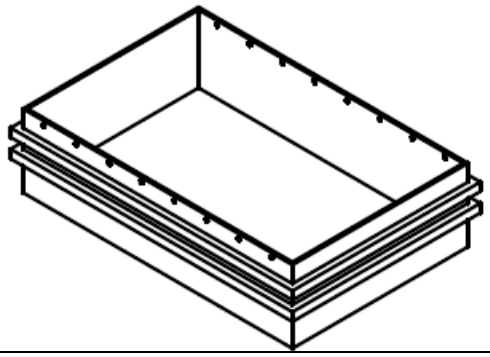
ASTM-2009 Phantom for Testing Compliance of Implants within MRI Environments

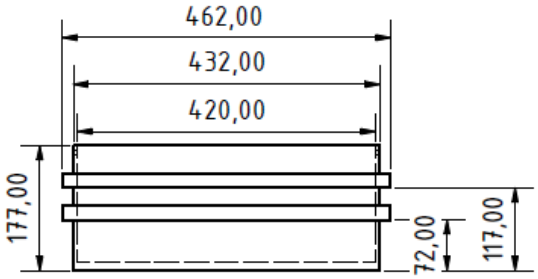
Introduction

The ASTM-2009 phantom has been designed according to the ASTM F2182-09 standard [1] for evaluation of induced heating near a passive medical implant and its surroundings during Magnetic Resonance Imaging (MRI). Compared to the previous ASTM F2182-02 standard [2] a simplification in the phantom geometry allows for a rectangular phantom compared to the "torso-phantom". Further, the implant location is changed from a physiological location to an area of maximum heating. The phantom is compatible with MITS1.5 and MITS3.0 in horizontal mode.

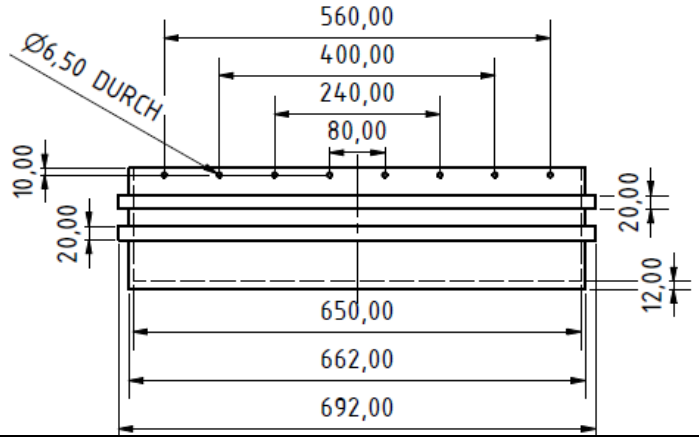
Dimensions (mm)



Front View



Side View

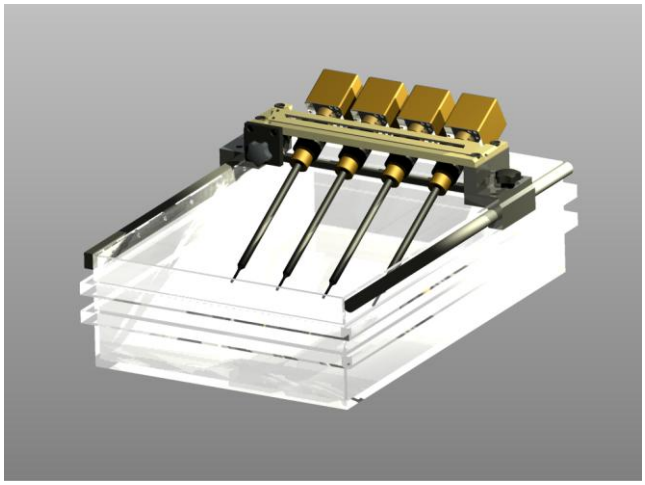


Sidewall thickness:
6 ± 0.2mm
Bottom thickness:
12 ± 0.2mm
Inside depth:
165.1 ± 0.2mm
Outside Height:
177.1 ± 0.2mm
Empty weight:
approx. 7.2kg
Material:
transparent Plexiglas (PMMA)

Liquid Compatibility

The phantom material is compatible with sugar- and oil-based tissue simulating liquids. It is **not** compatible with Triton or DGBE based liquids.

Probe Positioner



A probe positioner made of PMMA has been developed for the phantom. This positioner can be adjusted along 3 axes, allowing accurate positioning of all SPEAG probes. The compatible field probes include E-field, H-field, dosimetry (SAR) and temperature probes and can be used inside a clinical MRI scanner. The positioner enables repeatable measurements in the empty and liquid filled phantom of ±2mm.

References

[1] Standard F2182–09, "Standard Test Method for Measurement of Radio Frequency Induced Heating Near Passive Implants During Magnetic Resonance Imaging", ASTM International. For referenced ASTM standards, visit the ASTM website, www.astm.org.

[2] Standard F2182–02, "Standard Test Method for Measurement of Radio Frequency Induced Heating Near Passive Implants During Magnetic Resonance Imaging", ASTM International. For referenced ASTM standards, visit the ASTM website, www.astm.org.