

PROJECT PROFILE HOUSTON METHODIST HOSPITAL



Intra-Operative MRI Facility

Houston Methodist is the leading hospital in Houston for delivering superior patient care. Located in the Texas Medical Center, Houston Methodist has an international reputation for excellence. Through an expansive network of hospitals, Houston Methodist offers primary and acute care for a variety of diseases and conditions.

When Houston Methodist expanded their MRI diagnostic capabilities, they turned to the veteran experts in MRI shielding, ETS-Lindgren. The quality of images produced by the MRI is measured by the tesla, a unit of measurement for magnets: the higher the tesla of the MRI, the higher the quality of images produced by the MRI. Houston Methodist demanded the highest tesla level clinically available and the newest MRI service currently available: Intra-Operative MRI.

ETS-Lindgren provided an Intra-Operative MRI facility to house the 3T magnet. As a pioneer in this technology, ETS-Lindgren integrated various radiologic modalities for invasive and non-invasive patient procedures and treatments. Intra-Operative MRI is defined by the use of an MRI magnet during a surgical or treatment procedure. This can be achieved with a moving magnet that is brought into the theatre or by moving the patient to the room containing the magnet. In both cases, imaging is performed prior to, during and after the surgical or treatment procedure. The real time availability of the high resolution MR images is improving patient outcomes in a widening arena including, but not limited to, neurosurgery, cardiovascular and radiation oncology.

The MRI facility included specialty shielding and components to ensure high quality images, including:

Shielded Enclosure

- Dimensions: 6.4 m (21 ft) x 8.84 m (29 ft) x 3.66 m (12 ft).
- 2mm Galvanized Modular RF shield system w/remote Silicon Steel, MRI System Siemens 3.0T SKYRA.

RF Shielded Doors

- AutoSeal-II™ STC40 Pneumatic RF shielded doors with Door-Gard™ cipher security/logic interface system.
- SSD™ Single Sliding door with field tested STC40 acoustic package, each having two Human-Machine Interface (HMI) 30.5 cm x 30.5 cm (12 in x 12 in) touch screens with a keyed lockout to prevent unauthorized use.

RF Flooring System

ETS-Lindgren provided a 2mm galvanized modular shielding for the base floor and Inplace™ Epoxy Grout RF floor around the sliding door system. The Monolithic Epoxy/Grout RF floor is water resistant, seamless, and structurally bonded to parent floor with self-leveling properties and does not present any biohazard due to rotting or mold or bacterial growth.

RF Windows

A 3.0 m x 1.2 m (10 ft x 4 ft) Clearshield™ Window was installed as the control room view window. All ETS-Lindgren RF windows are manufactured using precision aluminum frame extrusions. The RF screens are constructed from very fine, 304 stainless steel, wire cloth. All

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glazing is .64 cm (.25 in) safety glass and conforms to all building codes.

Safety System

ETS-Lindgren provided interlock functionality on the RF shielded sliding doors to help maintain the highest level of safety required when integrating an MRI and surgical suite. Hospital staff uses a card reader with a personal code for the sliding door entry; this enables both sliding doors to open simultaneously.

Magnetic Shielding

The magnet installation kit included one cryogen exhaust waveguide, one RF door interlock switch, one MRI penetration panel kit, and patient table anchoring. The shielding was comprised of:

- Rear Wall Silicon: 6mm M36 Silicon steel mounted to the parent structure at 4.78 m x 3.05 m (15.67 ft x 10 ft) from finish floor on all walls.

- Floor Steel: 4.78 m x 8.99 m (15.67 ft x 29.6 ft) x 4 mm M36 Silicon embedded within the RF epoxy grout floor system.

- Sub-Floor Steel: 2.49 m x 3 m (8.17 ft x 9.83 ft) x 10 mm M36 Silicon as pre-fabricated panels consisting of 1.22 m x 1.22 m x .02 m (4 ft x 4 ft x .75 in) plywood.

RF Testing

ETS-Lindgren provided two RF testing services: the initial testing immediately after completion of the enclosure and the final RF test upon the delivery of the magnet and closing of the shield.

Turnkey Project

ETS-Lindgren provided a turn-key MRI shielded facility, including the plumbing system, RF electrical filters and HVAC waveguides. This ensured the entire RF shielded enclosure housing the magnet was technically superior with zero “leakage” that would degrade the performance of the 3T magnet.

About ETS-Lindgren

ETS-Lindgren is an international manufacturer of components and systems that measure, shield, and control electromagnetic and acoustic energy. The company's products are used for electromagnetic compatibility (EMC), microwave and wireless testing, electromagnetic field (EMF) measurement, radio frequency (RF) personal safety monitoring, magnetic resonance imaging (MRI), and control of acoustic environments.

Headquartered in Cedar Park, Texas, ETS-Lindgren has manufacturing facilities in North America, Europe and Asia. The company is a wholly owned subsidiary of ESCO Technologies, a leading supplier of engineered products for growing industrial and commercial markets. ESCO is a New York Stock Exchange listed company (symbol ESE) with headquarters in St. Louis, Missouri. Additional information about ETS-Lindgren is available at www.ets-lindgren.com. Additional information about ESCO and its subsidiaries is available at www.escotechnologies.com.