CASE STUDY GE

ETS-Lindgren has a long history with General Electric (GE) in providing dozens of RF shielded enclosure systems for GE's MRI facilities. Some of these projects involved ETS-Lindgren providing improvements to the testing facilities at GE, including updating shields for new magnets as well as testing of shields and repairs to ensure the shielding performance meets today's RF shielding requirements. Over the years, GE knows they can count on ETS-Lindgren to provide excellent service as well as a high quality shielded environment that complements their state-of-the art magnets. Recently, GE selected ETS-Lindgren as its preferred partner among its RF shielded enclosure providers. This designation recognizes ETS-Lindgren's high quality turnkey product provided in a timely and professional manner. We are proud to announce this ETS-Lindgren - GE Partnership! As a result of this partnership, following is a summary of the RF enclosures to be provided to GE over two phases. ETS-Lindgren looks forward to a long and productive relationship with GE to advance technology and exceed the expectations of healthcare administrators, doctors and patients.

Copper Self-Supporting RF Shielded Enclosure

ETS-Lindgren installed two RF shielded enclosures, each with dimensions of 4.2 m x 7.9 m x 3.9 m H (14 ft x 26 ft x 13 ft H), fabricated of an all copper, freestanding, modular RF shield. ETS-Lindgren also performed RF testing. The rooms feature a copper monolithic floor system of 14 mm (5/8 in) thickness with the shield frame pressure treated in accordance with ASTM E-84 and NER-577. One enclosure was standard and the second enclosure was turnkey. The turnkey enclosure included all electrical as well as finishes inside and outside the enclosure.

The modular shielded enclosure is self-supporting at the walls and independent of the parent room walls. For the highest RF attenuation available, all RF seams are constructed using a 44 mm (1 3/4 in) wide compliant material bolted on 203 mm (8 in) centers. The RF ceiling panels are supported by tension rods hung from the parent structure overhead. This contractor friendly interior allows wall framing and utility items to be attached to the interior surface of the shielded enclosure.

Doors and Windows

- EVO™ Sound Transmission Class (STC) 40 personnel doors were provided with windows, including a double 3 m (10 ft) door for magnet delivery with increased support and a 610 mm x 610 mm (24 in x 24 in) window.
- Aluminum frame RF windows included a 1.2 m x 1.2 m (4 ft x 4 ft) control room vision panel with screen constructed from very fine, 304 stainless steel wire cloth with 6.3 mm (1/4 in) safety glass glazing rated at STC 40.

Installation of Turnkey Enclosure

- *Structural:* ETS-Lindgren removed a 2.4 m x 2.4 m (8 ft x 8 ft) area with 25 mm (1 in) concrete depression, scarified RF room area and then leveled the area to +/- 6.3 mm (1/4 in) for the shield installation. A poured monolithic epoxy ramp was provided for in and out access with a 14 mm (5/8 in) rise at the doors.
- *Framing:* The free-standing enclosure area parent wall was framed with 0.6 m x 1.8 m (2 ft x 6 ft) at 3.9 m (13 ft) high, attached to the RF beams above. ETS-Lindgren preformed rough in and insulate, sheet-rock (two layers inside and one layer outside) for acoustic measures.
- *Electrical:* All conduit is 19 mm (3/4 in) with 20 amp wiring. ETS-Lindgren installed its ZXR-LED lighting with a dimmer, conduits and wire for outlets inside the RF shielded enclosure, line side and load side wiring, panels, transformer, breakers, etc., for a turnkey electrical system.
- *Wireway:* An aluminum wire duct provides interconnect cable support of the wireway for two levels (some inside and some outside).

RF Shielding Performance

Both RF enclosures were tested to GE standards both for 3T and 1.5T magnets, meeting and exceeding their requirements.

ETS-Lindgren - GE Partnership

In December 2017, ETS-Lindgren completed Phase 1 of the project, including the installation of a turnkey enclosure. ETS-Lindgren and GE recognized the hard work of the ETS-Lindgren installers and project managers as well as Revels Contracting Services for their efforts in producing a hospital like atmosphere in the scan room for the final testing of the GE MRI system. These collective efforts ensured a high quality product with the best possible image quality. Moving on to Phase 2, this involves GE completing their magnet factory expansion. ETS-Lindgren will install up to 11 additional turnkey RF shielded enclosures per the GE schedule with completion of Phase 2 expected by the end of the 2018.

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