

Magnets for Ultra High Field MRI systems

Since its introduction in the 1980 magnetic resonance imaging has imposed itself as one of the main diagnostic techniques, as it is witnessed by the ever growing number of installation of MRI machines per year since then. Low sensitivity of MRI imaging has always been a limitation to the number body regions that could be analysed by this technique, thus the necessity of developing technologies that could enhance the signal to noise ratio (SNR) of the MRI images. Ultra high field MRI, i.e. the magnetic resonance imaging using magnetic fields of intensity equal to or higher than 7T is currently becoming the main method of obtaining high SNR images.

Since 2015, ASG is designing and manufacturing magnet systems for UHF MRI in close collaboration with some of the most illustrious luminary sites for MRI related scientific research around the globe.



MAGNETS
FOR FUSION



MAGNETS FOR HIGH
ENERGY PHYSICS



MAGNETS FOR
MEDICAL
APPLICATIONS



SYSTEMS
FOR ENERGY



SERVICES & REPAIRS

UHF MAGNET 17.6/210 ALLEGRISSIMO



MAGNETS FOR FUSION



MAGNETS FOR HIGH ENERGY PHYSICS



MAGNETS FOR MEDICAL APPLICATIONS



SYSTEMS FOR ENERGY



SERVICES & REPAIRS



ASG Superconductors has been awarded contract by Agilent Technologies Inc., on behalf of the USA National Institute of Health, for the design and manufacture of a 17.6T magnet system for applications in Magnetic Resonance Imaging (MRI) system for preclinical research.

MAGNET OPERATING PARAMETERS

Central field	17.6 T
Bore tube diameter	210 mm
Magnetic field decay from 17.6 T, 7 days after ramping	<=0.03 ppm/h
Stray magnetic field 5 gauss line from the centre of magnet without environmental contribution (Axial and Radial)	16.8 m (Axial) - 13.3 m (Radial)
MAGNET HOMOGENEITY - FACTOR ACCEPTANCE	
Field Homogeneity specifications Magnet fully shimmed with superconducting shims and iron room	<5 ppm peak to peak
MAGNET SYSTEM REFERENCE WEIGHT	<15000 kg

UHF MAGNET 14/700 VIVO



MAGNETS FOR FUSION



MAGNETS FOR HIGH ENERGY PHYSICS



MAGNETS FOR MEDICAL APPLICATIONS



SYSTEMS FOR ENERGY



SERVICES & REPAIRS



MAGNET OPERATING PARAMETERS

Central field	14 T
Warm Bore diameter	700-900 mm
MAGNET HOMOGENEITY - FACTOR ACCEPTANCE	
Field Homogeneity specifications Magnet fully shimmed with superconducting shims and iron room	<5 ppm peak to peak
MAGNET SYSTEM REFERENCE WEIGHT	<150000 kg

UHF MAGNET 11.74/700 ALLEGRO



MAGNETS FOR FUSION



MAGNETS FOR HIGH ENERGY PHYSICS



MAGNETS FOR MEDICAL APPLICATIONS



SYSTEMS FOR ENERGY



SERVICES & REPAIRS



ASG Superconductors has been awarded contracts by Agilent Technologies Inc., on behalf of the USA National Institute of Health, and by the Gachon University "Gil" Medical Centre, Incheon Seoul, for the design and manufacture of two 11.74T magnet systems for applications in Magnetic Resonance Imaging (MRI) system for neuroimaging.

The magnet is designed to produce a very stable static magnetic field of 11.74 Tesla.

The magnetic field is generated by superconducting coils. The coils are wound using over 600 km of superconducting NbTi wire. The coils operate in a bath of liquid helium.

The superconducting coils and the LHe container are suspended inside a vacuum insulated vessel to minimise heat energy transferring from room temperature to the helium bath. Refrigeration units are used to cool the shields contained in vacuum, in order to reduce heat radiating into the helium bath.

The overall weight of the cold mass is about 60 t. This is the highest field magnet ever employed for medical imaging of humans.

MAGNET OPERATING PARAMETERS

Central field	11.74 T
Bore tube diameter	700 mm
Magnetic field decay from 11.74 T, 72h after ramping	<=0.015 ppm/h
Stray magnetic field 5 gauss line from the centre of magnet without environmental contribution (Axial and Radial)	27.0 m (Axial) - 21.4 m (Radial)
MAGNET HOMOGENEITY - FACTOR ACCEPTANCE	
Field Homogeneity specifications Magnet fully shimmed with superconducting shims and iron room	<5 ppm peak to peak
MAGNET SYSTEM REFERENCE WEIGHT	<66000 kg

UHF MAGNET 7/700 RAPIDO



MAGNETS FOR FUSION



MAGNETS FOR HIGH ENERGY PHYSICS



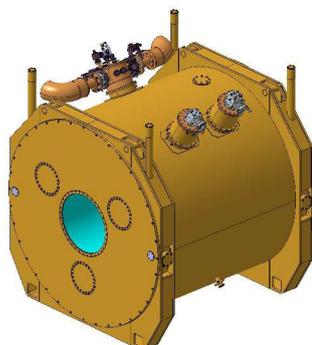
MAGNETS FOR MEDICAL APPLICATIONS



SYSTEMS FOR ENERGY



SERVICES & REPAIRS



MAGNET OPERATING PARAMETERS

Central field	7 T
Bore tube diameter	700 mm
Magnetic field decay from 17.6 T, 7 days after ramping	<=0.025 ppm/h
Stray magnetic field 5 gauss line from the centre of magnet without environmental contribution (Axial and Radial)	6.0 m (Axial) – 4.2 m (Radial)
MAGNET HOMOGENEITY - FACTOR ACCEPTANCE	
Field Homogeneity specifications Magnet fully shimmed with superconducting shims and iron room	<5 ppm peak to peak
MAGNET SYSTEM REFERENCE WEIGHT	<25000 kg