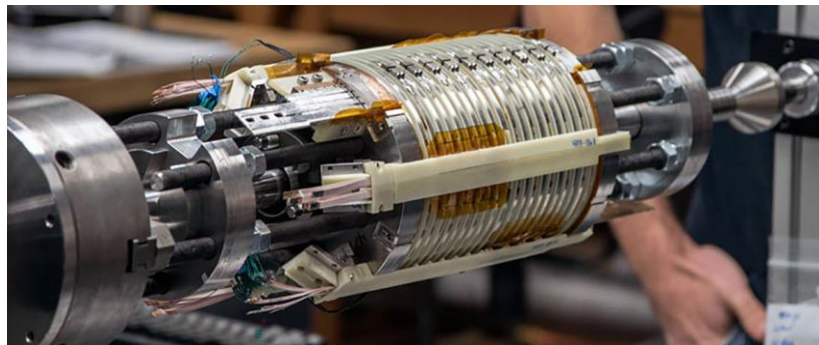


World's Strongest Magnets Made On Showmark Winder

Showmark, LLC is proud to have worked with Scientists from the National High Magnetic Field Laboratory (MagLab) to develop a winding machine for producing some of the world's most powerful superconducting electromagnets.

MagLab is the largest laboratory of its kind in the world. With facilities at Florida State University, the University of Florida and Los Alamos National Laboratory in New Mexico, the MagLab offers scientists from across the globe free access to unique instruments and expertise, advancing basic science and engineering in the 21st century.

An important part of MagLab's work involves building superconducting magnets for their own use as research tools. The strength of a magnetic field is measured in tesla or gauss (1 tesla = 10,000 gauss). MagLab maintains the record holding 45 tesla Hybrid Magnet. It is a 22ft tall, 35-ton, \$14 million dollar monster. By comparison, the magnets in a typical MRI produce fields of 3 tesla. Common refrigerator magnets produce a 10 gauss (.001 tesla) field. The Earth's magnetic field is 0.5 gauss (.00005 tesla).



32 Tesla Superconducting Magnet

Made of a combination of conventional "low-temperature" and novel "high-temperature" superconductors, this is the strongest all-superconducting magnet in the world. (2009)

A superconducting magnet is usually produced by winding a series of large coils made from strips of copper based superconducting materials. Many coils are linked together to form the magnet. The coils must be precisely wound in unique patterns. In extreme cases, if stretched out, all of the copper used would be 4 miles long! Previously, technicians required several months to produce the coils on available equipment. Many more months were needed to build other parts of the magnet system. The winding machine made by Showmark does not eliminate the operator, but its 5-axis motion control system and easy to use operator interface makes it an ideal tool for producing the coils. Its programmability also allows the coil pattern information to be pre-entered before the winding begins, so that less reliance on an operator's expertise is required. The Showmark system cuts winding time down to weeks instead of months.

All of the coils together, often weighing several tons, are wrapped in many layers of insulation and plumbing, and finally enclosed in a steel casing. Each finished magnet is suspended in a dedicated "garage." Liquid helium and up to 4,000 gallons per minute of chilled water are continuously pumped through the plumbing to maintain it at a temperature of -271 Celsius (-456 Fahrenheit). It takes at least six weeks to reach this temperature; so they never let it cool down. This is in addition to the 33 megawatts of power it uses. It costs \$3,000 per hour to operate! The magnetic field is generated within an area the size of a long test tube down the center core of the magnet. This small space is where invaluable biological, chemical, and materials research are conducted.

Want to discuss your unique application for winding? Contact us to talk through your project so that we can recommend the perfect solution for you!