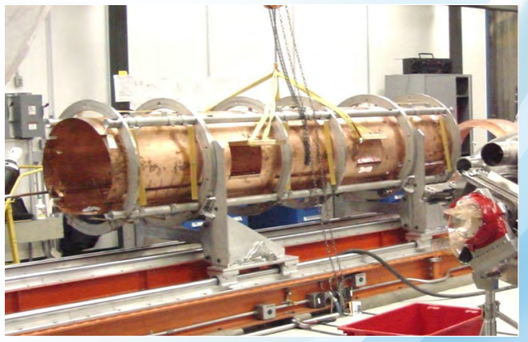
Cavity Parts for Jefferson Laboratory

ADC fabricated 24 sets of the space frame and thermal shield assemblies for the U.S. Department of Energy Spallation Neutron Source program (SNS). This contract was through Jefferson Lab. This work involved sheet metal rolling, bending, ASME certified brazing operation, precision machining, ASME certified welding, vacuum cleaning, cryogenic and vacuum testing. Each system underwent complete testing and inspection which included thermal shock, leak checking, and precise physical measurements.



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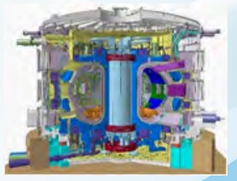


** A cutaway of the ITER Tokamak

** The ITER Tokamak

The ITER Tokamak will be nearly 30 metres tall, and weigh 23,000 tonnes. The ITER Tokamak is made up of an estimated one million parts.

ITER Pellet Selector

ADC provided the design, engineering, and procurement of material, manufacture, assembly, inspection, test, and installation of a pre-prototype pellet selector as a part of the ITER project.

* Designed in Unison with ITER USA.
** Via https://www.usiter.com

20-0hm DC Break *

The DC Break is designed to have a standoff voltage of 3 kV over both the inner and outer conductors. Water cooling systems have been developed for both the inner and outer conductors to maintain the component temperatures to reasonable levels. The DC Break is 500mm long, 480 mm tall and 480 mm wide. The estimated mass is 160 kg (350 lbs.) and the maximum DC voltage across it is 3 kV.

ECH Switch Box *

The EC system performs several functions in the ITER machine including plasma heating, non-inductive current drive, neoclassical tearing modes instability suppression, plasma start-up, and vacuum vessel discharge cleaning. The Waveguide Switch requires extensive hands on machining to achieve tolerances of .01 mm and a near perfect repeatability.

Rotary Joint for Coaxial RF Conductor *

Rotary Joint for Coaxial RF Conductor is a rotating joint to be placed at intervals in the ITER coaxial RF conduction system. This joint reduces stress in the line by rotating slightly as the surrounding structures expand and contract from heating and cooling. It must rotate with minimum resistance while containing nitrogen gas inside the line at high pressure. The design minimizes the number of parts required, minimizes the length and weight, and uses standard, commercially available bearings and seals.

Water Cooled Inner Conductor *

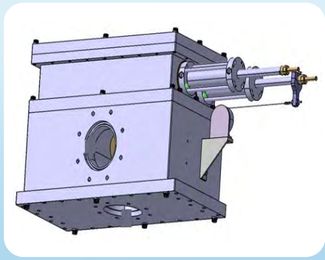
These transmission lines will be used to transport power between different components in the reactor as part of the Ion Cyclotron Heating System being developed by US ITER and Oak Ridge National Laboratory.

Tuning Stub Outer and Inner Conductors and Sliding Short *

Design and engineering for Tuning Stub Outer and Inner Conductors and Sliding Short for the Ion Cyclotron Heating (ICH) system on the ITER fusion reactor.

140 Degree Miter Bend *

Miter bend for ITER is a water cooled, reflecting surface made from Copper-Chromium,-Zirconium alloy (UNS C18150). The reflecting surface is polished to a surface roughness of 1000 angstroms over the entire reflecting surface. The reflecting surface mounts to a framework that is also water cooled and provides connections for incoming and outgoing ECH waveguides. The tolerances associated with this assembly are quite stringent as are the required inspection methods.



ECH Waveguide *

The waveguides will be used to transport RF waves used to inject microwave beam power into the plasma used in the fusion reactor. In order to transport this energy efficiently and safety, the waveguides must meet several critical tolerances requiring state of the art machining. This plan includes processes for every step in the fabrication process from stock selection, drilling, machining, and etching to inspection, cleaning, packing, and shipping. The fabrication process will involve the manufacture of roughly 1,500 waveguide tubes over the course of several years. These tubes will range in length from 350mm to 4200mm.

Transport Magnet for Jefferson Laboratory

ADC fabricated a large order of magnet material for Jefferson Laboratory's 12 GeV upgrade. All the magnet materials had to come from the same heat from a mill supplier; material had to be heat treated with very tight tolerances, then the magnet material was rough cut. Strict material handling procedures were implemented including barring the use of magnetic lifting devices (as to not magnetize the material). The parts were then machined using large machining centers to achieve the tight machining tolerances for large pieces. After this, the parts were then painted and delivered for assembly at JLab. ADC received Jefferson Lab Distinguished 12 GeV CEBAF Upgrade Vendor Award for this project