DEVCOM ARMAMENTS CENTER

ELECTROCHEMICAL MACHINING LABORATORY

LABORATORY INFORMATION FACT SHEET

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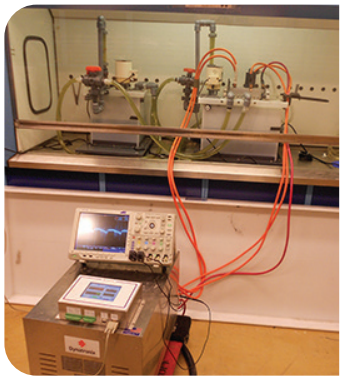
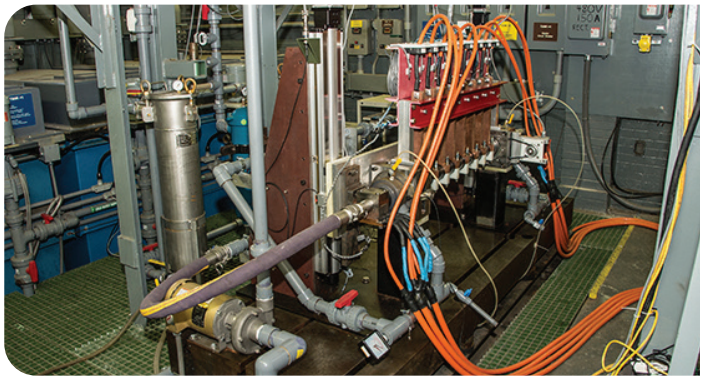
Electrochemical Machining (ECM), located at Benét Laboratories, is a non-conventional machining method that is well suited to the fabrication of complex components from difficult to machine materials.

TECHNOLOGY/FACILITY DESCRIPTION:

Unlike conventional machining processes, ECM is not affected by material strength, hardness, or toughness. High tolerance material removal with superior surface finish is well within the capabilities of ECM. Components machined with ECM have a significantly reduced residual stress compared to conventional machining methods due to the lack of contact of a cutting tool. The ECM lab consists of several small and medium test cells to evaluate metal dissolution and machined surface quality. The lab also develops large and full-scale prototype machines to rifle, drill, and die sink metallic components. Current metallic materials machined are Inconel, copper, steel, tantalum and titanium.





EQUIPMENT AND EXPERTISE AVAILABLE:

- Prototype cell capable of rifling steel, tantalum and cobalt alloy barrels ranging from 5.56mm to 155mm barrel Progressive twist, variable depth and tapered bore rifling capabilities
- 10-100 gallon Electrochemical Test Cell
- DL850 ScopeCorder
- Flow box with up to 1"x 4" rectangular sample size
- Flow channel with up to 1" diameter samples
- Potentiostat
- One 9.6 kW pulse reverse rectifier
- One 18 kW pulse rectifier
- One 4 kW pulse reverse rectifier
- One 8 channel 76 kW pulse reverse rectifier
- 60 mm Mortar ECM cell
- Hass Milling machine for ECM die sinking
- 200 gallon electrolyte storage/pump skid
- Deep hole drilling
- Guide bore drilling
- Die sinking ECM
- 7.62 mm and 155 mm rifling
- Machining of Inconel, Steel, Titanium, Copper and Tantalum
- Machining surface finish of 4-6 Ra