



**REVISION CONTROL SHEET**

LETTER	DESCRIPTION	DATE	AUTHOR	APPROVED BY	CURRENT OVERSIGHT
A	First Issue, created from an uncontrolled document from P. Kroon files, formalized with this issue to be deactivated and maintained for future reference	3/26/2007	D. Lynch	n/a	D. Lynch
De-activated	Test completed long ago. This procedure may be revised/re-activated in the future when and as necessary for maintenance/ upgrade or decommissioning purposes.	3/27/2007	D. Lynch	D. Lynch, R. Pisani, P. Giannotti for PHENIX	D. Lynch

# FEE Chassis Water Pressure Test Procedure

## 1 Purpose and Scope

The purpose of this procedure is to provide direction for the testing of each MuTr FEE chassis for water leaks at the nominal operating pressure of 125 psi and at the safety limit required of 250 psi. This procedure will outline the possible hazards and give instructions for a safe testing procedure for water leaks. There is one chassis for each octant of Stations 1, 2 and 3 of the MuTr detector. There are 8 subassemblies for Stations 2 and 3 and two semicircular plates for Station 1. The testing will be done in the alleyway outside of the MuTr assembly area.

## 2 Responsibilities

### 2.1 Supervision

All operations will be done under the direction of Donald Isenhower, Ray Savino or their designee for a "person in charge."

### 2.2 Lifting hazards-none

Since each subassembly is light and will be tested while on the floor, there are no lifting hazards for this test.

### 2.3 Stop Work order

At any time, any person working on or observing the operation may halt work or issue a stop work order if they feel any aspect of their work is unsafe or is being done with unsafe procedures. Any such complaint will be reviewed by the directors of the test and if necessary the BNL ES&H Services.

## 3 Prerequisites

### 3.1 Training

All personnel involved in this test shall have reviewed this procedure and be fully knowledgeable of the layout of the water tubing on the Fee subassemblies.

### 3.2 Safety Awareness training

All personnel involved in this process shall have basic safety awareness training.

## **4 Precautions**

### **4.1 Primary hazard-low**

The primary safety concern for this test is a possible small leak resulting in a high pressure stream of water exiting the system or one of the water lines popping off. Since the volume of compressed fluid is limited to the water contained in the subassembly and a short connection hose, any such leak will present a relatively low hazard as long as the following precaution is observed.

### **4.2 Safety perimeter**

The area immediately around the subassembly under test will have a safety perimeter indicated on the floor that will be at least twice the length of any water line that could possibly blow off and strike personnel.

### **4.3 Eye protection**

Personnel working near the subassembly under test will wear safety goggles anytime that the water system is pressurized.

### **4.4 Safety for repair issues**

Personnel will observe the area for water leaking at any location to recognize where potential hazards are and will depressurize the system before attempting any repair of leaks due to items such as loose connections.

## **5 Equipment List**

### **5.1 Pressurization system**

The testing apparatus to be used is a standard system so no additional safety approval should be needed for its use. It consists of a set of valves to allow water to circulate at low pressure until all air is purged from the system and an air driven diaphragm pump to produce the needed 125 and 250 psi.

### **5.2 Water connection tubing**

Proper tubing will be needed to attach the pump to the input of the subassembly. In addition, tubing will be needed for the output of the water system that includes a plug to seal off the system after flushing the air out.

### **5.3 Water removal**

Low pressure air system will be needed to blow all of the water out of the system after it is disconnected.

## 6 Procedure

### 6.1 Important Note

If at any point during this procedure a water leak is found, the leak's position is to be noted and the system immediately depressurized to repair the leak. Under no circumstance is any work to be done repairing leaks while the system remains under pressurization.

### 6.2 Attachment of pressurization system

Attach the input hose from the pump system to the FEE subassembly as well as a hose from the output.

### 6.3 Flushing of system

Flow water through the system to remove all air from the system and then close off the output hose.

### 6.4 Test to 125 psi

Begin pressurization in 25 psi steps up to 125 psi. Then let system remain at this pressure for 1 minute while watching for leaks.

### 6.5 Test to 250 psi

Continue pressurization in 25 psi steps up to 250 psi. Then let system remain at this pressure for 2 minutes while watching for leaks.

### 6.6 Cycling test to 125 psi

Bring the pressure back down to 50 psi and then repeat the previous two steps three more times, finally leaving the system at 125 psi for 2 minutes.

### 6.7 Rapid cycling test to 250 psi

Cycle the pressure between 125 and 250 psi rapidly four times, waiting at 250 psi for 1 minute and finally leave the pressure at 250 psi on the fifth time and watch the system for leaks for 5 minutes.

### 6.8 Disconnection from system

Depressurize the system and disconnect from the pressurization system if no leaks are found.

## 6.9 Water removal

Once disconnected, the water system should be flushed out with low pressure air to be certain all water is removed from each cooling system.