REV.	DESCRIPTION	DRAWN / APPD.	DATE
A	FINAL RELEASE FORM	P. WINTERS	11/15/91

The purpose of ringing tests is to check the quality of the coil by discharging a bank of capacitors across the coil and observing the produced waveform of the LC circuit. The waveform will be a function of the capacitance of the caps and the inductance of the coil.

It is desirable to ring the coil at more than one voltage to check that no insulation has broken down when exposed to the higher and higher turn-to-turn voltages.

Three voltages have been chosen. First, the coil will be rung at 100V. This is to check for gross problems with limited danger of damaging the coil. If this checks out O.K., the voltage is increased to 500V and 1000V. The waveforms for these two voltages are then compared to check that the frequency of the ringing has not changed. Since the frequency is a function of the inductance of the coil, a change in frequency would indicate that something (possibly a short) had changed the inductance.

The only reason all three voltages (100V, 500V, and 1000V) are not compared on the same scope display is that the vertical gain and vertical offset for looking at 100V are not the same as those necessary to view the higher voltages.

UNLESS OTHERWISE SPECIFIED:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. TOLERANCES: ±1 mm.
3. DIMENSIONS BASED UPON ANSI Y14.5M-1982.
4. INCH DIMENSIONS ARE FOR REFERENCE ONLY.
5. BREAK ALL SHARP EDGES.
6. DO NOT SCALE DRAWING.
7. MAX. ALL MACH. SURFACES
8. DIMENSION IDENTIFICATION: MILLIMETER; MILLIMETER/INCH INCH

ORIGINATOR	D. KURIK	4/15/91
DRAWN	P. A. WINTERS	11/15/91
CHECKED		
APPROVED		11-21-91

USED ON: N/A

MATERIAL: N/A

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY
SSC

SSC 50MM DIPOLE COLD MASS RINGING TEST PROCEDURES FOR INNER COILS

SCALE	DRAWING NUMBER	SHEET	REV.
	0102-ES-301353	1 of 5	A

CREATED WITH I-DEAS 5.0 | USER NAME: RCAVAX

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	FINAL RELEASE FORM	P. WINTERS	11/15/91

RINGING TEST PROCEDURES FOR INNER COILS

A. RING AT 100V

1. Set scope to "100V Inner" settings. Scope settings have been stored on the scope. To restore these settings, under "SETUP", enter "Recall 1". To check that all of the proper settings have been restored, compare them with the hardcopies provided.

2. Connect ground to electrical conduit.

3. Connect leads to coil under test (polarity is NOT important).

4. Connect scope leads to the coil under test (now polarity IS important).

5. Turn ON the firing circuit and DVM. The DVM is connected to the 1000:1 output on the front panel of the firing circuit. The DVM is used to monitor the voltage across the caps.

6. Remove the safety short across the caps.

7. Turn ON the "Power" to the high voltage power supply. Dial in the output voltage desired (you will actually need to dial in more than 100V to get 100V due to a calibration error). When the READY light comes on, turn ON the "High Voltage" switch. When the voltage reaches 100V (0.100V on the DVM), turn OFF the "High Voltage" switch and push the "Fire Pulse Enable" button on the firing circuit. This discharges the caps across the coil.

UNLESS OTHERWISE SPECIFIED:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. TOLERANCES: ±1 mm.
3. DIMENSIONS BASED UPON ANSI Y14.5M-1982.
4. INCH DIMENSIONS ARE FOR REFERENCE ONLY.
5. BREAK ALL SHARP EDGES.
6. DO NOT SCALE DRAWING.
7. MAX. ALL MACH. SURFACES
8. DIMENSION IDENTIFICATION: MILLIMETER/INCH

ORIGINATOR	D. KUBIK	4/15/91
DRAWN	P. A. WINTERS	11/15/91
CHECKED		
APPROVED		11/21/91
USED ON	N/A	
MATERIAL	N/A	

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY
SSC

SSC 50MM DIPOLE COLD MASS
RINGING TEST PROCEDURES
FOR INNER COILS

SCALE	DRAWING NUMBER	SHEET	REV.
N	0102-ES-301353	2 of 5	A

CREATED WITH I-DEAS 5.0 | USER NAME: RCAVAX

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	FINAL RELEASE FORM	P. WINTERS	11/15/91

A. RING AT 100V (Continued)

8. Using the "delta t/delta v" menu on the scope, measure the voltage and frequency.

9. To display the vertical scale and offset, enter "Show" under "SETUP". Make a hardcopy.

10. If waveform looks reasonable (compare to hardcopy provided), proceed to 500V and 1000V tests.

11. If waveform looks unusual, call an expert.

B. RING AT 500V AND 1000V

1. Set scope to "500V and 1000V Inner" settings. Scope settings have been stored on the scope. To restore the "500V and 1000V Inner" settings, under "SETUP", enter "Recall 2". To check that all of the proper settings have been restored, compare them with the hardcopies provided.

2. Dial in the 500V desired (you will actually need to dial in more than 500V to get 500V due to a calibration error). When the READY light comes on, then turn ON the "High Voltage" switch. When the voltage reaches 500V (0.500V on the DVM), turn OFF the "High Voltage" switch and push the "Fire Pulse Enable" button on the firing circuit. This discharges the capacitors across the coil.

3. If the waveform looks reasonable (compare to hardcopy provided), continue.

4. If waveform looks unusual, call an expert.

UNLESS OTHERWISE SPECIFIED:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. TOLERANCES: ±1 mm.
3. DIMENSIONS BASED UPON ANSI Y14.5M-1982.
4. INCH DIMENSIONS ARE FOR REFERENCE ONLY.
5. BREAK ALL SHARP EDGES.
6. DO NOT SCALE DRAWING.
7. MAX. ALL MACH. SURFACES
8. DIMENSION IDENTIFICATION: MILLIMETER; MILLIMETER/INCH INCH

ORIGINATOR	D. KURIK	4/15/91
DRAWN	P. A. WINTERS	11/15/91
CHECKED		
APPROVED		
USED ON	N/A	
MATERIAL	N/A	

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY
SSC

SSC 50MM DIPOLE COLD MASS RINGING TEST PROCEDURES FOR INNER COILS

SCALE	DRAWING NUMBER	SHEET	REV.
NONE	0102-ES-301353	3 of 5	A

CREATED WITH I-DEAS 5.0 | USER NAME: RCAVAX

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	FINAL RELEASE FORM	P. WINTERS	11/15/91

B. RING AT 500V AND 1000V (Continued)

5. In the case of the 500V and 1000V tests, we want to compare the waveforms on the scope display simultaneously to check that the frequency of the ringing is the same for both voltages. If the frequencies are the same, they will have the same zero-crossings. To display two waveforms simultaneously, the 500V waveform must be saved before the scope is retriggered.

6. Save the 500V waveform by entering the "Waveform Save" menu. Choose the settings on the "Waveform Save" hardcopy and then enter softkey "Store".

7. Dial in the 1000V desired (you will again need more than 1000V to really get 1000V due to a calibration error). When the ready light comes on, turn ON the "High Voltage" switch. When the voltage reaches 1000V (1.000V on the DVM), turn OFF the "High Voltage Switch" and push the "Fire Pulse Enable" button on the firing circuit. The 1000V will be discharged across the coil.

8. Using the "delta t/delta v" function on the scope, measure the voltage and frequency of the 1000V waveform.

9. Check that the 500V and 1000V waveforms have the same zero-crossing. If they do not, call an expert.

UNLESS OTHERWISE SPECIFIED:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. TOLERANCES: ±1 mm.
3. DIMENSIONS BASED UPON ANSI Y14.5M-1982.
4. INCH DIMENSIONS ARE FOR REFERENCE ONLY.
5. BREAK ALL SHARP EDGES.
6. DO NOT SCALE DRAWING.
7. MAX. ALL MACH. SURFACES ✓
8. DIMENSION IDENTIFICATION: MILLIMETER; MILLIMETER/INCH; INCH

ORIGINATOR	D. KUBIK	4/15/91
DRAWN	P. A. WINTERS	11/15/91
CHECKED		
APPROVED		11-21-91
USED ON	N/A	
MATERIAL	N/A	

FERMI NATIONAL ACCELERATOR LABORATORY
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SSC 50MM DIPOLE COLD MASS RINGING TEST PROCEDURES FOR INNER COILS

SCALE	DRAWING NUMBER	SHEET	REV.
NONE	0102-ES-301353	4 of 5	A

CREATED WITH I-DEAS 5.0 | USER NAME: RCAVAX

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	FINAL RELEASE FORM	P. WINTERS	11/15/91

B. RING AT 500V AND 1000V (Continued)

10. Select "Show", under "SETUP", to display the vertical scale and offset. Make a hardcopy.

11. To be certain there is no voltage on the coil or leads, short the coil and replace the short across the caps.

12. Remove the leads.

13. Turn OFF the high voltage power supply and the firing circuit.

UNLESS OTHERWISE SPECIFIED:			
1. ALL DIMENSIONS ARE IN MILLIMETERS.	ORIGINATOR	D. KURIK	4/15/91
2. TOLERANCES: ±1 mm.	DRAWN	P. A. WINTERS	11/15/91
3. DIMENSIONS BASED UPON ANSI Y14.5M-1982.	CHECKED		
4. INCH DIMENSIONS ARE FOR REFERENCE ONLY.	APPROVED		11-21-91
5. BREAK ALL SHARP EDGES.	USED ON	N/A	
6. DO NOT SCALE DRAWING.			
7. MAX. ALL MACH. SURFACES ✓	MATERIAL	N/A	
8. DIMENSION IDENTIFICATION: MILLIMETER; MILLIMETER/INCH [INCH]			

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY
SSC

SSC 50MM DIPOLE COLD MASS RINGING TEST PROCEDURES FOR INNER COILS

SCALE	DRAWING NUMBER	SHEET	REV.
N	0102-ES-301353	5 of 5	A

CREATED WITH I-DEAS 5.0 | USER NAME: RCAVAX