CABLE INSULATION
POWER FACTOR TESTS

Your Company Logo

OWNER Example Owner PAGE 1

PLANT Example Plant AMBIENT TEMP. °F DATE 10/10/2014

SUBSTATION CABLES HUMIDITY % JOB # CABLES

POSITION AUTOMATED ASSET ID

CABLE NAMEPLATE

MFR. AND TYPE LOCATION IDENTIFICATION

RATED kV OPERATING kV AMPS (LOAD) LENGTH - OUTDOOR LENGTH - INDOOR

AGE TYPE NUMBER OF CONDUCTORS SIZE

INSULATION MATERIAL INSULATION THICKNESS INSULATION TYPE

JACKET DUCT TRAY CIRCUIT WEATHER

EARTH TEMP. DUCT TEMP. DEPTH

TEST FREQUENCY: *60*

MULTIPLE QUICK TESTS

TEST NO	INSULATION TESTED	TEST MODE	SUPPRESS.	TEST kV	Test Freq	L(H) CAP.(pF)		POWER FACTOR %			DIRECT		%VDF	IR
								MEAS.	@ 20°C	CORR.	mA	WATTS		
1		UST-R	On							1.000				

INSULATION RATING KEY (IR)
- G = GOOD
- D = DETERIORATED
- I = INVESTIGATE
- B = BAD
- Q = QUESTIONABLE

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: TESTED BY: Default Administrator

Serial Number: Firmware Information: Calibration Date:

CABLE POLARIZATION INDEX (PI)TEST

OWNER Example Owner PAGE 2

PLANT Example Plant AMBIENT TEMP. °F DATE 10/10/2014

SUBSTATION CABLES HUMIDITY % JOB # CABLES

POSITION AUTOMATED ASSET ID

CABLE SOURCE CABLE TERMINATION POINT

OPERATING VOLTAGE kV INSTALLED IN LENGTH FT

MANUFACTURER INSULATION TYPE INSULATION THICKNESS MILS

SIZE KCMIL NO. OF CONDUCTORS CONDUCTOR MATERIAL

RATED VOLTAGE kV (●) GROUNDED ( ) UNGROUNDED (●) BELTED ( ) SHIELDED AGE

PHASE IDENTIFICATION: PHASE A PHASE B PHASE C

CONNECTED EQUIPMENT CABLE TEMPERATURE °C

TEST VOLTAGE kVDC Enter TCF Manually: ☐ TEMPERATURE CORRECTION FACTOR TO 20°C, TCF

K = INSULATION RESISTANCE CONSTANT IN MEGOHMS 20,000 TEST CONDUCTED (●) BEFORE ( ) AFTER HIGH POTENTIAL TEST

D = OUTSIDE DIAMETER OF INSULATION d = INSIDE DIAMETER OF INSULATION

$R = [K \text{ Log}_{10} (\frac{D}{d})] (\frac{1000}{L \text{ (ft)}})$ Use Instrument PI Value: ☐

MINUTES	PHASE A MEGOHMS			PHASE B MEGOHMS			PHASE C MEGOHMS		
	READING (megohms)	TEMP. CORR. FACTOR	20°C READING (megohms)	READING (megohms)	TEMP. CORR. FACTOR	20°C READING (megohms)	READING (megohms)	TEMP. CORR. FACTOR	20°C READING (megohms)
0.25									
0.50									
0.75									
1.00									
2.00									
3.00									
4.00									
5.00									
6.00									
7.00									
8.00									
9.00									
10.00									
P.I.									

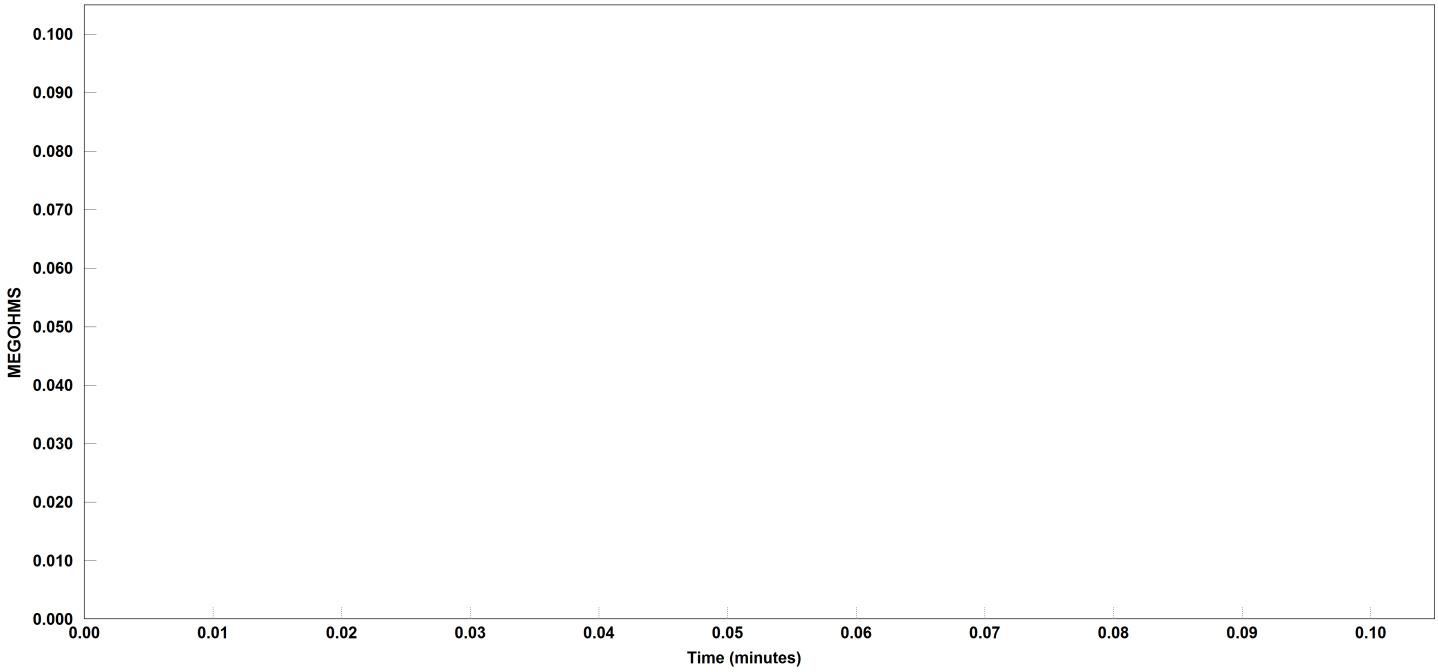
POLARIZATION INDEX = 10 MINUTE READING / 1 MINUTE READING

* MINIMUM DESIGN INSULATION RESISTANCE, R = MEGOHMS

Press F1 for form help

TEST EQUIPMENT USED: TESTED BY: Default Administrator

POLARIZATION CURVE



Phase A: Red Square

Phase B: Blue Circle

Phase C: Green Triangle

COMMENTS:	
DEFICIENCIES:	

TIME DOMAIN REFLECTOMETER

OWNER	Example Owner			PAGE	4
PLANT	Example Plant	AMBIENT TEMP.	°F	DATE	10/10/2014
SUBSTATION	CABLES	HUMIDITY	%	JOB #	CABLES
POSITION	AUTOMATED	ASSET ID			

Select the Memory Locations to Download

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐

MEMORY LOCATION	WAVE TYPE	METER RANGE	PULSE WIDTH (ns)	GAIN (dB)	VELOCITY FACTOR	TRACE STYLE	DATE

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: _____ TESTED BY: Default Administrator

VLF CABLE TEST

Your Company Logo

OWNER Example Owner | PAGE 5

PLANT Example Plant | AMBIENT TEMP. °F | DATE 10/10/2014

SUBSTATION CABLES | HUMIDITY % | JOB # CABLES

POSITION GENERAL | ASSET ID

OPERATING VOLTAGE kV | INSTALLED IN ☐ CONDUIT ☐ TRAY | LENGTH FT | CABLE TEMPERATURE °C

MANUFACTURER | INSULATION TYPE | INSULATION THICKNESS MILS

SIZE MCM | NO. OF CONDUCTORS | CONDUCTOR MATERIAL ☐ CU ☐ AL

RATED VOLTAGE kV | ☐ GROUNDED ☐ UNGROUNDED ☐ RESISTANCE GROUND | ☐ SHIELDED ☐ UNSHIELDED ☐ CONCENTRIC NEUTRAL | ☐ BELTED (PILC) | AGE

CABLE SOURCE | CABLE TERMINATION POINT

CONNECTED EQUIPMENT | ISOLATE CABLE ☐ Y ☐ N | ☐ ARRESTERS ☐ POT FUSES

NUMBER OF MANHOLES | NUMBER OF TERMINATIONS | NUMBER OF SPLICES

TERMINATION / SPLICES ☐ HAND TAPED ☐ 3-M TERM. KIT ☐ RAYCHEM KIT ☐ OTHER

RMS TEST VOLTAGE kV | BREAKDOWN ☐ YES ☐ NO | PLANNED TEST DURATION ☐ 1 MIN ☐ 15 MIN ☐ 30 MIN ☐ 60 MIN | START TIME

TEST FREQUENCY Hz | TIME TO FAILURE MIN

SHIELD RESISTANCE A-B OHMS | B-C OHMS | C-A OHMS

WAVE SHAPE ☐ SINE ☐ COSINE / RECTANGULAR ☐ OTHER | END TIME

TEST TYPE ☐ WITHSTAND ☐ PASS / FAIL ☐ DIAGNOSTIC SEE COMMENT BELOW

	☐ PHASE A OR ☐ PHASE A, B, C			☐ PHASE B			☐ PHASE C		
TESTS (MINUTES)	MEGOHMS	NANO FARADS	MICRO AMPS	MEGOHMS	NANO FARADS	MICRO AMPS	MEGOHMS	NANO FARADS	MICRO AMPS
1									
5									
10									
15									
20									
25									
30									
45									
60									

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: | TESTED BY: Default Administrator

BUS DUCT INSULATION TEST

OWNER Example Owner
PLANT Example Plant
SUBSTATION CABLES
POSITION GENERAL

PAGE 6
AMBIENT TEMP. ____ °F
DATE 10/10/2014
HUMIDITY ____ %
JOB # CABLES
ASSET ID ____

MANUFACTURER ____ TYPE ____ VOLTAGE CLASS ____
VERTICAL RATING ____ A HORIZONTAL RATING ____ A NEUTRAL RATING ____ A GROUND RATING ____ A
CONFIGURATION 3 WIRE ○ 4 WIRE ○ 5 WIRE ○ CONDUCTOR COPPER ○ ALUMINUM ○ DATE MANUFACTURED ____
CATALOG NO. ____ SERIAL NO. ____ CURRENT WITHSTAND RATING ____ kA

TEST VOLTAGE ____ kVDC EQUIPMENT TEMPERATURE ____ °C TEMPERATURE CORRECTION FACTOR TO 20°C, TCF ____

IDENTIFICATION	FROM / TO	PHASE									
	TO	A - GND	B - GND	C - GND	N - GND	A - B	A - C	B - C	A - N	B - N	C - N

ACTUAL READING / SHADING INDICATES TEMPERATURE CORRECTED VALUES

ALL INSULATION VALUES ARE IN MEGOHMS

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: ____

TESTED BY: Default Administrator

CABLE HIGH POTENTIAL TEST

Your Company Logo

OWNER Example Owner | PAGE 7

PLANT Example Plant | AMBIENT TEMP. °F | DATE 10/10/2014

SUBSTATION CABLES | HUMIDITY % | JOB # CABLES

POSITION GENERAL | ASSET ID

CABLE SOURCE | CABLE TERMINATION POINT

OPERATING VOLTAGE kV | INSTALLED IN | LENGTH FT

MANUFACTURER | INSULATION TYPE | INSULATION THICKNESS MILS

SIZE KCMIL | NO. OF CONDUCTORS | CONDUCTOR MATERIAL

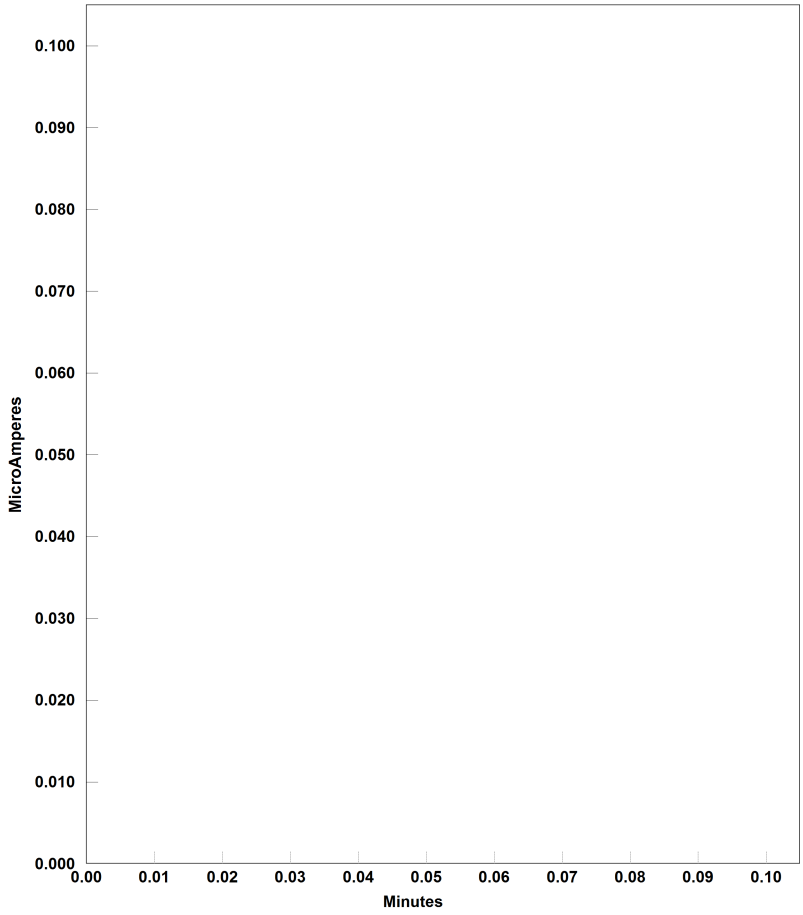
RATED VOLTAGE kV | (●) GROUNDED ( ) UNGROUNDED | (●) BELTED ( ) SHIELDED | AGE

CONNECTED EQUIPMENT

TEST VOLTAGE	TIME (min.)	PHASE A µA	TIME (min.)	PHASE B µA	TIME (min.)	PHASE C µA
4						
8						
12						
16						
20						
24						
26						
26						
26						
26						
26						
26						
26						
26						
0						
DECAY TO 5kV; SECS				0.00	0.00	0.00
TOTAL TIME for the TEST						

PHASE IDENTIFICATION

PHASE A: RED PHASE B: WHITE PHASE C: BLUE



COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: | TESTED BY: Default Administrator

TAN DELTA CABLE TEST

Your Company Logo

OWNER Example Owner | PAGE 8

PLANT Example Plant | AMBIENT TEMP. °F | DATE 10/10/2014

SUBSTATION CABLES | HUMIDITY % | JOB # CABLES

POSITION GENERAL | ASSET ID

OPERATING VOLTAGE kV | INSTALLED IN ☐ CONDUIT ☐ TRAY | LENGTH FT | CABLE TEMPERATURE °C

MANUFACTURER | INSULATION TYPE | INSULATION THICKNESS MILS

SIZE MCM | NO. OF CONDUCTORS | CONDUCTOR MATERIAL ☐ CU ☐ AL

RATED VOLTAGE kV | ☐ GROUNDED ☐ UNGROUNDED ☐ RESISTANCE GROUND | ☐ SHIELDED ☐ UNSHIELDED ☐ CONCENTRIC NEUTRAL | ☐ BELTED (PILC) | AGE

CABLE SOURCE | CABLE TERMINATION POINT

CONNECTED EQUIPMENT | ISOLATE CABLE ☐ Y ☐ N | ☐ ARRESTERS ☐ POT FUSES

NUMBER OF MANHOLES | NUMBER OF TERMINATIONS | NUMBER OF SPLICES

TERMINATION / SPLICES ☐ HAND TAPED ☐ 3-M TERM. KIT ☐ RAYCHEM KIT ☐ OTHER

SYSTEM VOLTAGE | BREAKDOWN ☐ YES ☐ NO | PLANNED TEST DURATION PER STEP ☐ 1 MIN ☐ 5 MIN ☐ 10 MIN | START TIME

TEST FREQUENCY | TIME TO FAILURE MIN | END TIME

WAVE SHAPE ☐ SINE ☐ COSINE / RECTANGULAR ☐ OTHER

TEST TYPE ☐ WITHSTAND ☐ PASS / FAIL ☐ DIAGNOSTIC

☐ PHASE A OR ☐ PHASE A, B, C ☐ PHASE B ☐ PHASE C

TEST VOLTAGE kV ☐ 5kV CABLE ☐ 15 kV CABLE		TAN DELTA	NANO FARADS	MICRO AMPS	TAN DELTA	NANO FARADS	MICRO AMPS	TAN DELTA	NANO FARADS	MICRO AMPS
1.0	2									
1.5	3.5									
2.0	5									
2.4	7									

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: | TESTED BY: Default Administrator

SWITCHBOARD BUS CONNECTION TEST

OWNER	Example Owner			PAGE	9
PLANT	Example Plant	AMBIENT TEMP.	°F	DATE	10/10/2014
SUBSTATION	CABLES	HUMIDITY	%	JOB #	CABLES
POSITION	GENERAL	ASSET ID			

NAMEPLATE DATA

MANUFACTURER		SERIAL NO.		TYPE	
CATALOG NO.		DRAWING NO.		VOLTAGE CLASS	
PHASE AMPACITY	A	WITHSTAND RATING	kA	CONDUCTOR	○ CU ○ AL

IDENTIFICATION	FROM / TO	RESISTANCE IN MICRO-OHMS A	B	C	N	G

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED:

TESTED BY: Default Administrator

LOW VOLTAGE CABLE INSULATION TEST

OWNER Example Owner

PLANT Example Plant

SUBSTATION CABLES

POSITION GENERAL

PAGE 10

AMBIENT TEMP. °F

DATE 10/10/2014

HUMIDITY %

JOB # CABLES

ASSET ID

MANUFACTURER

DATE MANUFACTURED

INSULATION TYPE 1: ☐ TW ☐ THW ☐ THHW ☐ XHHW ☐ THHN

EQUIPMENT TEMPERATURE °C

INSULATION TYPE 2: ☐ RH ☐ RHW

OTHER

TEST VOLTAGE kVDC

TEMPERATURE CORRECTION FACTOR TO 20°C, TCF INS. TYPE 1 INS. TYPE 2

IDENTIFICATION	NO. & COND. SIZE	FROM		PHASE									
		TO		A - GND	B - GND	C - GND	N - GND	A - B	B - C	C - A	A - N	B - N	C - N
			RDG										
			20°C										
			RDG										
			20°C										
			RDG										
			20°C										
			RDG										
			20°C										
			RDG										
			20°C										
			RDG										
			20°C										
			RDG										
			20°C										
			RDG										
			20°C										
			RDG										
			20°C										
			RDG										
			20°C										

ALL INSULATION VALUES ARE IN MEGOHMS

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED:

TESTED BY: Default Administrator

CABLE HIGH POTENTIAL TEST AND INSULATION RESISTANCE

Your Company Logo

OWNER Example Owner | PAGE 11

PLANT Example Plant | AMBIENT TEMP. °F | DATE 10/10/2014

SUBSTATION CABLES | HUMIDITY % | JOB # CABLES

POSITION GENERAL | ASSET ID

CABLE SOURCE | CABLE TERMINATION POINT

OPERATING VOLTAGE kV | INSTALLED IN | LENGTH FT

MANUFACTURER | INSULATION TYPE | INSULATION THICKNESS MILS

SIZE KCMIL | NO. OF CONDUCTORS | CONDUCTOR MATERIAL

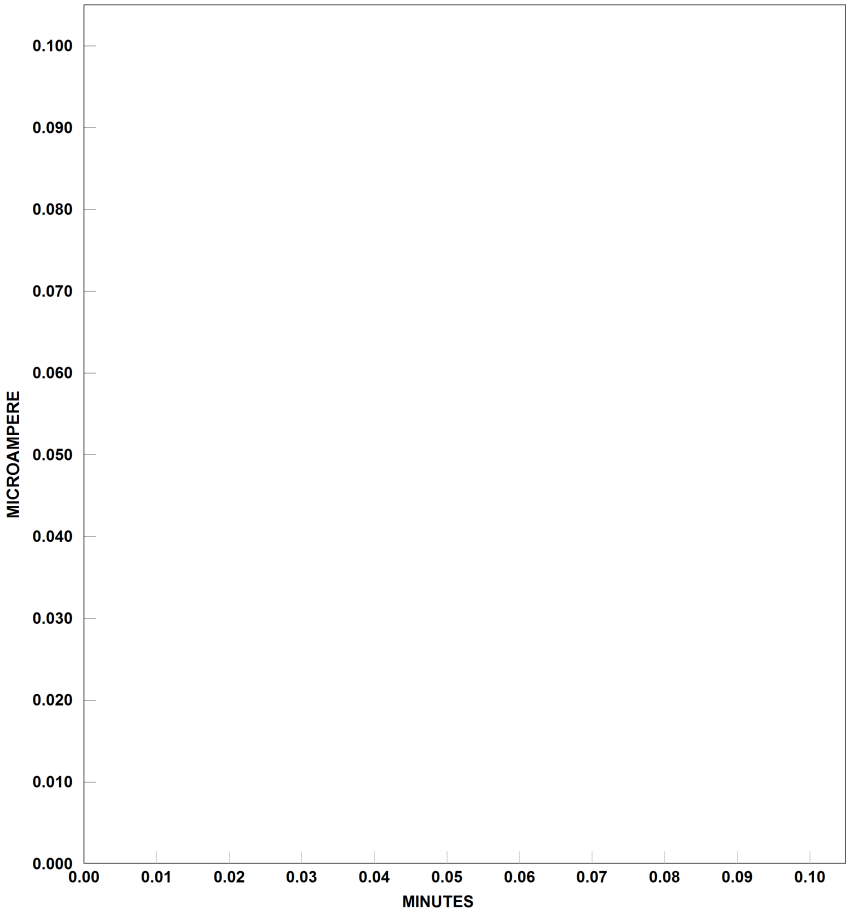
RATED VOLTAGE kV | (●) GROUNDED ( ) UNGROUNDED | (●) BELTED ( ) SHIELDED | AGE

CONNECTED EQUIPMENT

TIME MINUTES	TEST kV	PHASE A µA	PHASE B µA	PHASE C µA
0.25				
0.50				
0.75				
1.00				
1.25				
1.50				
1.75				
2.00				
3.00				
4.00				
5.00				
6.00				
7.00				
8.00				
9.00				
10.00				
11.00				
12.00				
13.00				
14.00				
15.00				
16.00				
17.00				
18.00				
19.00				
20.00				
21.00				
22.00				
23.00				
24.00				
25.00				
DECAY TO 5kV; SECS				
SHIELD RESIST.- OHMS				
INSULATION RESISTANCE		GIGA-OHMS @ 0.000	0.000	kV 0.000

PHASE IDENTIFICATION

PHASE A: BROWN PHASE B: ORANGE PHASE C: YELLOW



COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: | TESTED BY: Default Administrator

CABLE HIGH POTENTIAL TEST

Your Company Logo

OWNER Example Owner | PAGE 12

PLANT Example Plant | AMBIENT TEMP. °F | DATE 10/10/2014

SUBSTATION CABLES | HUMIDITY % | JOB # CABLES

POSITION GENERAL | ASSET ID

CABLE SOURCE | CABLE TERMINATION POINT

OPERATING VOLTAGE kV | INSTALLED IN | LENGTH FT

MANUFACTURER | INSULATION TYPE | INSULATION THICKNESS MILS

SIZE KCMIL | NO. OF CONDUCTORS | CONDUCTOR MATERIAL

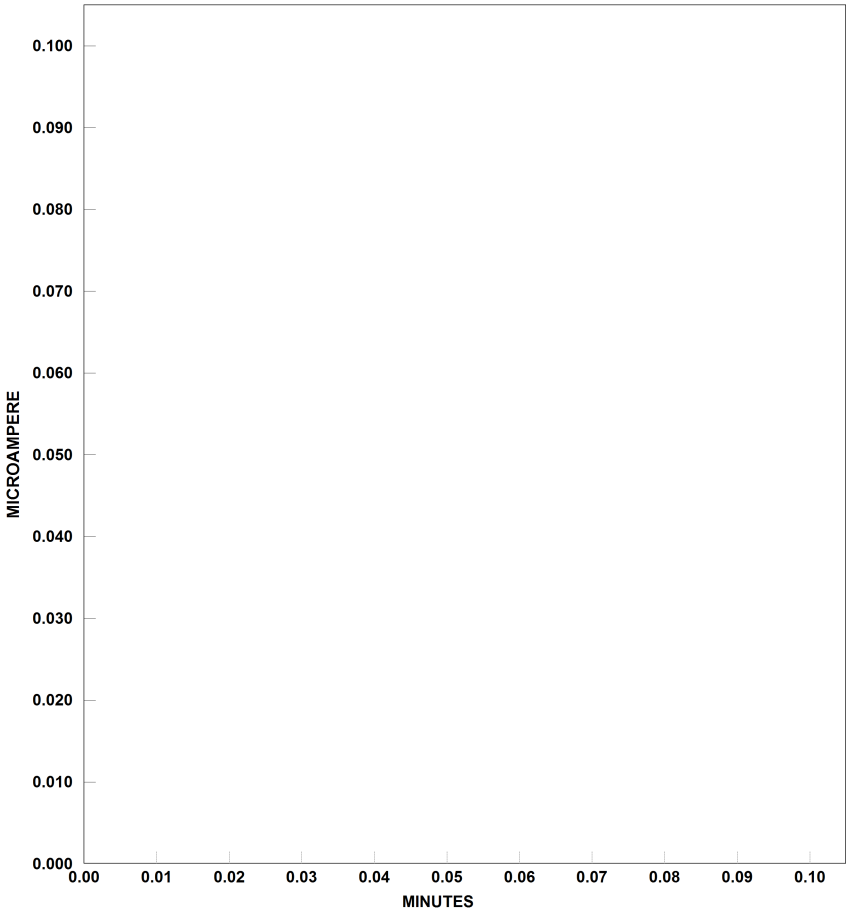
RATED VOLTAGE kV | (●) GROUNDED ( ) UNGROUNDED | (●) BELTED ( ) SHIELDED | AGE

CONNECTED EQUIPMENT

TIME MINUTES	TEST VOLTAGE	PHASE A µA	PHASE B µA	PHASE C µA
0.25				
0.50				
0.75				
1.00				
1.25				
1.50				
1.75				
2.00				
3.00				
4.00				
5.00				
6.00				
7.00				
8.00				
9.00				
10.00				
11.00				
12.00				
13.00				
14.00				
15.00				
16.00				
17.00				
18.00				
19.00				
20.00				
21.00				
22.00				
23.00				
24.00				
25.00				
DECAY TO 5kV; SECS				
SHIELD RESIST.- OHMS				

PHASE IDENTIFICATION

PHASE A: BROWN PHASE B: ORANGE PHASE C: YELLOW



COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: | TESTED BY: Default Administrator