INSULATION TESTS
TWO-WINDING TRANSFORMERS

Your Company Logo

OWNER Example Owner | PAGE 1

PLANT Example Plant | AMBIENT TEMP. °F | DATE 10/13/2014

SUBSTATION POWER FACTOR TESTS | HUMIDITY % | JOB # POWER FACTOR

POSITION DOBLE | ASSET ID

TRANSFORMER | MFR | SERIAL NO. | WEATHER | TOP OIL TEMP.

AGE | TYPE/CLASS | kVA | GALLONS OF OIL | DATE LAST TEST | LAST SHEET NO.

OIL ☐ ASKAREL ☐ AIR ☐ GAS ☐ | FREE BREATHING ☐ SEALED ☐ GAS BLANKETED ☐ CONSERVATOR ☐

COPIES TO

HIGH SIDE kV WYE ○ DELTA ○

LOW SIDE kV WYE ○ DELTA ○

NEUTRAL

BUSHINGS

MFR.	TYPE	CLASS	DWG. NO.	CAT. NO.	kV	YEAR

OVER-ALL TESTS

TEST	TEST CONNECTIONS: WINDING ENERGIZED	WINDING GROUNDED	WINDING GUARDED	TEST kV	EQUIVALENT 2.5 kV READINGS: MILLIVOLTAMPERES METER READING	MULTIPLIER	mVA	MILLIWATTS METER READING	MULTIPLIER	mW	% POWER FACTOR: MEASURED	COR. 20°C	G = GOOD D = DETERIORATED I = INVESTIGATE B = BAD (REMOVE OR RECONDITION)	INSULATION RATING
1	HIGH	LOW												
2	HIGH		LOW											
3	LOW	HIGH												
4	LOW		HIGH											
CALCULATED RESULTS														

BUSHING TESTS

LINE NO.		BUSH NO.	PHASE	BUSHING SERIAL NO.	TEST kV	EQUIVALENT 2.5 kV READINGS: MILLIVOLTAMPERES METER READING	MULTIPLIER	mVA	MILLIWATTS METER READING	MULTIPLIER	mW	% POWER FACTOR: MEASURED	COR. 20°C	COLLAR TESTS (mW/mVA): TOP		INSULATION RATING
HIGH SIDE	1															
	2															
	3															
	4	N														
LOW SIDE	5															
	6															
	7															
	8	N														
	9															
	10															
	11															
	12	N														
	13															
	14															
	15															
	16															
	17															
	18															
	19	OIL SAMPLE												OIL TEMP.	°C	

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED:

TESTED BY: Default Administrator

INSULATION TESTS
MISCELLANEOUS EQUIPMENT

Your Company Logo

OWNER Example Owner | PAGE 2

PLANT Example Plant | AMBIENT TEMP. °F | DATE 10/13/2014

SUBSTATION POWER FACTOR TESTS | HUMIDITY % | JOB # POWER FACTOR

POSITION DOBLE | ASSET ID

EQUIPMENT TESTED | DATE LAST TEST | LAST TEST SHEET NO.

COPIES TO | WEATHER | OIL TEMP. | EQPT. TEMP.

LINE NO.	SERIAL NO.	TEST kV	EQUIVALENT 2.5 kV READINGS						% POWER FACTOR				INSULATION RATING
			MILLIVOLTAMPERES			MILLIWATTS							
			METER READING	MULTIPLIER	mVA	METER READING	MULTIPLIER	mW	MEASURED	COR. 20°C			
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
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22													
23													
24													
25													
26													
27													
28													
29													

KEY TO INSULATION RATING

BUSHINGS - INSULATORS - ETC.	WOOD MEMBERS - OIL - ETC.	WINDINGS
G = GOOD	XG = GOOD	WG = GOOD
D = DETERIORATED	XD = DETERIORATED	WD = DETERIORATED
I = INVESTIGATE	XI = INVESTIGATE	WI = INVESTIGATE
B = BAD (REMOVE OR RECONDITION)	XB = BAD (REMOVE OR RECONDITION)	WB = BAD (REMOVE OR RECONDITION)

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: | TESTED BY: Default Administrator

INSULATION TESTS
CABLES AND POTHEADS

Your Company Logo

OWNER Example Owner | PAGE 3

PLANT Example Plant | AMBIENT TEMP. °F | DATE 10/13/2014

SUBSTATION POWER FACTOR TESTS | HUMIDITY % | JOB # POWER FACTOR

POSITION DOBLE | ASSET ID

CIRCUIT | WEATHER | EARTH TEMP. | DUCT TEMP. | DEPTH

COPIES TO | DATE LAST TEST | LAST TEST SHEET NO.

CABLE			
MFR. AND TYPE			
LOCATION			
IDENTIFICATION			
RATED kV			
OPER kV			
AMPS. (LOAD)			
LENGTH - OUTDOOR			
LENGTH - INDOOR			
AGE			
TYPE: DRY, OIL-FILLED, OIL RESERVOIR, GAS RESERVOIR			
NO. COND.			
SIZE AWG, MCW			
INSULATION MATERIAL			
INSULATION THICKNESS			
INSULATION TYPE BELTED, SHIELDED			
JACKET LEAD, ARMOR, BRAID			
DUCT TRAY METALLIC, NONMETALIC			

POTHEAD						
MFR. AND TYPE						
LOCATION						
IDENTIFICATION						
RATED kV						
OPER kV						
AMPS. (RATED)						
OUTDOOR - INDOOR						
AGE						
TYPE: DRY, CPD-FILLED, OIL-FILLED						
NO. COND.						
SIZE AWG, MCM						
PORCELAIN SINGLE MULTIPIECE						
TERM. TYPE CAP NUT, SOLDER SEALED						
AERIAL CONN. RIGID, FLEXIBLE						
JOINTS INSULATED, WIPED, COMPRESSED						

LINE NO.	IDENTIFICATION	PHASE	TEST kV	EQUIVALENT 2.5 kV READINGS						% POWER FACTOR	D. C. MEGOHMS	INSULATION RATING CABLE	POTHEAD HOT-COLLAR TESTS mW / mVA			INSULATION RATING POTHEAD
				MILLIVOLTAMPERES			MILLIWATTS						LOCATION	TOP		
				METER READING	MULTIPLIER	mVA	METER READING	MULTIPLIER	mW							
1																
2																
3																
4	N															
5																
6																
7																
8	N															
9																
10																
11																
12	N															
13																
14																
15																

KEY TO INSULATIN RATING
G = GOOD
D = DETERIORATED
I = INVESTIGATE
B = BAD (REMOVE OR RECONDITION)

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: | TESTED BY: Default Administrator

INSULATION TEST
THREE-WINDING TRANSFORMER

Your Company Logo

OWNER Example Owner | PAGE 4

PLANT Example Plant | AMBIENT TEMP. °F | DATE 10/13/2014

SUBSTATION POWER FACTOR TESTS | HUMIDITY % | JOB # POWER FACTOR

POSITION DOBLE | ASSET ID

TRANSFORMER | MFR. | SERIAL NO. | WEATHER | TOP OIL TEMP.

AGE | TYPE/CLASS | kVA | GALLONS OF OIL | DATE LAST TEST | LAST SHEET NO.

OIL ☐ ASKAREL ☐ AIR ☐ GAS ☐ | FREE BREATHING ☐ SEALED ☐ GAS BLANKETED ☐ CONSERVATOR ☐

COPIES TO

HIGH SIDE kV WYE ◯ DELTA ◯

LOW SIDE kV WYE ◯ DELTA ◯

NEUTRAL

BUSHINGS

MFR.	TYPE	CLASS	DWG. NO.	CAT. NO.	kV	YEAR

OVER-ALL TESTS

TEST	TEST CONNECTIONS: WINDING ENERGIZED	WINDING GROUNDED	WINDING GUARDED	TEST kV	EQUIVALENT 2.5 kV READINGS: MILLIVOLTAMPERES: METER READING	MULTIPLIER	mVA	MILLIWATTS: METER READING	MULTIPLIER	mW	% POWER FACTOR: MEASURED	COR. 20°C	KEY TO INSULATION RATING: G = GOOD, D = DETERIORATED, I = INVESTIGATE, B = BAD (REMOVE OR RECONDITION)	INSULATION RATING
1	HIGH	LOW	TERT.											
2	HIGH		LOW AND TERT.										C_H	
3	LOW	TERT.	HIGH											
4	LOW		HIGH AND TERT.										C_L	
5	TERT.	HIGH	LOW											
6	TERT.		HIGH AND LOW										C_T	
7	ALL												CHECK TEST (SHOULD EQUAL CH = CL = CT)	
CALCULATED RESULTS													C_{HL} (TEST 1 MINUS TEST 2)	
													C_{LT} (TEST 3 MINUS TEST 4)	
													C_{HT} (TEST 5 MINUS TEST 6)	

BUSHING TESTS

	LINE NO.	BUSH NO.	PHASE	BUSHING SERIAL NO.	TEST kV	EQUIVALENT 2.5 kV READINGS: MILLIVOLTAMPERES: METER READING	MULTIPLIER	mVA	MILLIWATTS: METER READING	MULTIPLIER	mW	% POWER FACTOR: MEASURED	COR. 20°C	COLLAR TESTS (mW/mVA): TOP		INSULATION RATING
HIGH SIDE	1															
	2															
	3															
	4	N														
LOW SIDE	5															
	6															
	7															
	8	N														
TERTIARY	9															
	10															
	11															
	12	N														
	13															
	14	OIL SAMPLE												OIL TEMP.	°C	

N = NEUTRAL

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: | TESTED BY: Default Administrator

INSULATION TESTS
CIRCUIT BREAKERS

Your Company Logo

OWNER Example Owner | PAGE 5

PLANT Example Plant | AMBIENT TEMP. °F | DATE 10/13/2014

SUBSTATION POWER FACTOR TESTS | HUMIDITY % | JOB # POWER FACTOR

POSITION DOBLE | ASSET ID

CIRCUIT BREAKER | WEATHER | OIL TEMP.

BREAKER MFR. | TYPE | AGE

BREAKER SERIAL NO. | kV | A

DATE LAST INSP. | DATE LAST TEST | LAST TEST SHEET NO. | EQUIP. TEMP.

COPIES TO | BUSHING MFR. | BUSHING (TYPE - FORM - DWG. NO.)

	BUSH NO.	BUSHING SERIAL NO.	SIDE	PHASE	FEET OF BUS	INS. IN PAR'LL	EQUIVALENT 2.5 kV READINGS						% POWER FACTOR		COLLAR TESTS mW / mVA	INSULATION RATING
							MILLIVOLTAMPERES			MILLIWATTS						
							METER READING	MULTIPLIER	mVA	METER READING	MULTIPLIER	mW	MEASURED	COR. 20°C		
CIRCUIT BREAKER OPEN	1															
	2															
	3															
	4															
	5															
	6															
C.B. CLOSED	TANK 1															
	TANK 2															
	TANK 3															

LINE NO.	OTHER TESTS															
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																

KEY TO INSULATION RATING

BUSHINGS - INSULATORS - ETC.	WOOD MEMBERS - OIL - ETC.	WINDINGS
G = GOOD	XG = GOOD	WG = GOOD
D = DETERIORATED	XD = DETERIORATED	WD = DETERIORATED
I = INVESTIGATE	XI = INVESTIGATE	WI = INVESTIGATE
B = BAD (REMOVE OR RECONDITION)	XB = BAD (REMOVE OR RECONDITION)	WB = BAD (REMOVE OR RECONDITION)

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: | TESTED BY: Default Administrator

EXCITATION - CURRENT TEST

Your Company Logo

OWNER Example Owner | PAGE 6

PLANT Example Plant | AMBIENT TEMP. °F | DATE 10/13/2014

SUBSTATION POWER FACTOR TESTS | HUMIDITY % | JOB # POWER FACTOR

POSITION DOBLE | ASSET ID

SINGLE PHASE

ENERGIZE	UST
H_1	H_2 (or H_0)
H_2 (or H_0)	H_1

THREE - PHASE WYE (1)

ENERGIZE	UST	PHASE
H_1	H_0	A
H_2	H_0	B
H_3	H_0	C

THREE - PHASE WYE

ENERGIZE	UST	PHASE
H_1	H_0 X_0	A
H_2	H_0 X_0	B
H_3	H_0 X_0	C

THREE - PHASE DELTA (1)

ENERGIZE	UST	GROUND	PHASE
H_1	H_2	H_3	A
H_2	H_3	H_1	B
H_3	H_1	H_2	C

MANUFACTURER | SERIAL NO.

NLTC POSITION (CHECK) : 1 (A) ☐ 2 (B) ☐ 3 (C) ☐ 4 (D) ☐ 5 (E) ☐

TAP CHANGER FOUND / LEFT ON POSITION : | TEST VOLTAGE : kV (2)

LINE NO.	(3) ULTC POSITION	MILLIVOLTAMPERES PHASE A METER READING	PHASE A MULTI-PLIER	PHASE A mVA	PHASE B METER READING	PHASE B MULTI-PLIER	PHASE B mVA	PHASE C METER READING	PHASE C MULTI-PLIER	PHASE C mVA	REMARKS
1											
2											
3											
4											
5											
6											
7											
8											
9											
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25											
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27											
28											

NOTES:
1. IF THE LOW-VOLTAGE WINDING IS WYE CONNECTED, THEN Xo IS CONNECTED AS IN SERVICE (USUALLY, THIS WOULD MEAN GROUNDING Xo).
2. ALL TESTS SHOULD BE PERORMED ROUTINELY AT THE SAME VOLTAGE.
3. INDICATE TAP POSITION: RAISED, LOWERED OR NEUTRAL.

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: | TESTED BY: Default Administrator

INSULATION TEST
AUTO TRANSFORMERS

Your Company Logo

OWNER Example Owner | PAGE 7

PLANT Example Plant | AMBIENT TEMP. °F | DATE 10/13/2014

SUBSTATION POWER FACTOR TESTS | HUMIDITY % | JOB # POWER FACTOR

POSITION DOBLE | ASSET ID

TRANSFORMER | MFR. | SERIAL NO. | WEATHER | TOP OIL TEMP.

AGE | TYPE | FORM | CLASS | DATE LAST TEST | LAST SHEET NO.

COPIES TO | DRY TYPE ☐ | EQUIPMENT TEMP.

			BUSHINGS	MFR.	TYPE	FORM	CLASS	DWG. NO.	CAT. NO.	kV	AMP	YEAR
HIGH SIDE kV	WYE ◯	DELTA ◯										
LOW SIDE kV	WYE ◯	DELTA ◯										
TERT. SIDE kV	WYE ◯	DELTA ◯										

OVER-ALL TESTS

TEST	TEST CONNECTIONS: WINDING ENERGIZED	WINDING GROUNDED	WINDING GUARDED	TEST kV	EQUIVALENT 2.5 kV READINGS: MILLIVOLTAMPERES: METER READING	MULTIPLIER	mVA	MILLIWATTS: METER READING	MULTIPLIER	mW	% POWER FACTOR: MEASURED	COR. 20°C	KEY TO INSULATION RATING: G = GOOD, D = DETERIORATED, I = INVESTIGATE, B = BAD (REMOVE OR RECONDITION)	INSULATION RATING
1	HIGH LOW	TERT.												
2	HIGH LOW		TERT.										C_H	
3	TERT.	HIGH LOW												
4	TERT.		HIGH AND TERT.										C_T	
CALCULATED RESULTS													C_{HT} (TEST 1 MINUS TEST 2)	
													(TEST 3 MINUS TEST 4) X	

X mVA AND mW SHOULD COMPARE WITH THOSE FOR C_{HT}

BUSHING TESTS

	LINE NO.	BUSH NO.	PHASE	BUSHING SERIAL NO.	TEST kV	EQUIVALENT 2.5 kV READINGS: MILLIVOLTAMPERES: METER READING	MULTIPLIER	mVA	MILLIWATTS: METER READING	MULTIPLIER	mW	% POWER FACTOR: MEASURED	COR. 20°C	COLLAR TESTS (mW/mVA): TOP		INSULATION RATING
HIGH	1															
	2															
	3															
LOW	4															
	5															
	6															
	7	N														
TERTIARY	8															
	9															
	10															
	11	N														
	12															
	13															
	14	OIL SAMPLE												OIL TEMP. °C		

N = NEUTRAL

COMMENTS:

DEFICIENCIES:

TEST EQUIPMENT USED: | TESTED BY: Default Administrator