

**GENERAL**

**A. BASIS OF ACCEPTANCE**

1. BASIS FOR ACCEPTANCE IS COMPLIANCE WITH REQUIREMENTS SET FORTH IN SUBCONTRACT, AND OTHER TERMS AND CONDITIONS OF SUBCONTRACT. CORRECT REJECTED DELIVERABLE ITEMS IN ACCORDANCE WITH APPLICABLE CLAUSES.

**TESTING**

**A. SCOPE OF TESTING**

1. PROVIDE THIRD PARTY ENGINEERING TECHNICIAN, CERTIFIED BY A NATIONAL ORGANIZATION AND WITH RELEVANT EXPERIENCE, FOR ELECTRICAL ACCEPTANCE AND FUNCTION TESTS TO ENSURE TOTAL SYSTEM OPERATION OF PROVIDED ELECTRICAL EQUIPMENT IS OPERATIONAL WITHIN INDUSTRY AND MANUFACTURERS' TOLERANCES, AND AS SPECIFIED.

**B. ELECTRICAL TESTS**

1. ONLY THE FOLLOWING TESTS ARE REQUIRED . SECTIONS NOTED ARE FROM NETA ATS:  
a. LOW-VOLTAGE CIRCUIT BREAKERS: VISUAL AND MECHANICAL INSPECTIONS AND TESTS PER SECTION 7.6.1.1(A) & (C) ONLY.

b. LOW-VOLTAGE, 250 AMP FRAME AND HIGHER CIRCUIT BREAKERS: REMOVE AND DELIVER TO SITE 200 CIRCUIT BREAKER TESTING FACILITY.

c. GROUNDING SYSTEM PER SECTION 7.13.

d. LOW-VOLTAGE CABLES, 600 VOLTS MAXIMUM: VISUAL AND MECHANICAL INSPECTIONS AND TESTS PER SECTION 7.3.2 FOR ALL CONDUCTORS. ELECTRICAL INSPECTIONS AND TESTS PER SECTION 7.3.2 FOR CONDUCTORS #1 AWG AND LARGER. FIELD MEGGER AND TORQUE TESTS WITH REPORTS. USE BOTH LOW-RESISTANCE OHMMETER AND TORQUE-WRENCH METHOD WHEN INSPECTING BOLTED ELECTRICAL CONNECTIONS FOR HIGH RESISTANCE PER SECTION 7.3.2.A.3. DO NOT USE THERMOGRAPHIC SURVEY.

e. BOLT-TORQUE VALUES FOR ELECTRICAL CONNECTIONS MUST BE IN ACCORDANCE WITH MANUFACTURERS PUBLISHED DATA. IN ABSENCE OF MANUFACTURERS PUBLISHED DATA, USE TABLE 100.12.1 IN NETA ATS.

f. LICENSED ELECTRICIAN MUST TORQUE ALL ELECTRICAL CONNECTIONS AND BEAHJ OR DELEGATED AUTHORITY MUST WITNESS. TORQUE TEST VERIFICATION MUST BE PERFORMED BY BEAHJ OR DELEGATED AUTHORITY.

g. SWITCHGEAR AND SWITCHBOARD ASSEMBLIES PER SECTION 7.1.

h. TRANSFORMERS PER SECTION 7.2.

i. MOTOR CONTROL CENTERS AND MOTOR STARTERS PER SECTION 7.16.

j. ADJUSTABLE SPEED DRIVE SYSTEMS PER SECTION 7.17.

k. SURGE ARRESTERS PER SECTION 7.19.

l. OUTDOOR BUS STRUCTURES PER SECTION 7.21.

m. EMERGENCY SYSTEMS: ENGINE GENERATOR, UNINTERRUPTIBLE POWER SYSTEMS, AND AUTOMATIC TRANSFER SWITCHES PER SECTION 7.22.

**COMMISSIONING**

**A. SCOPE OF COMMISSIONING**

1. ENSURE THAT SYSTEMS ARE COMPLETE, FUNCTIONING IN ACCORDANCE WITH THE DESIGN INTENT.

2. PROVIDE DOCUMENTED CONFIRMATION THAT THE FACILITY FULFILLS THE FUNCTIONAL AND PERFORMANCE REQUIREMENTS. ESTABLISH DESIGN INTENT/CRITERIA; VERIFY AND DOCUMENT COMPLIANCE WITH THESE CRITERIA THROUGHOUT CONSTRUCTION, START-UP, AND THE INITIAL PERIOD OF OPERATION. COMPLETE OPERATION AND MAINTENANCE MANUALS.

3. DEVELOP FUNCTIONAL TEST PROCEDURES FOR COMMISSIONED EQUIPMENT AND ASSEMBLIES, AND DEVELOP FUNCTIONAL TEST REPORT FOR REVIEW AND APPROVAL.

4. ENSURE THAT COMMISSIONING ACTIVITIES ARE INCLUDED IN THE PROJECT SCHEDULES, KEPT UP TO DATE, AND COMMUNICATED TO THE STR.

5. DEVELOP A START-UP AND INITIAL SYSTEMS CHECK PLAN FOR SELECTED EQUIPMENT.

6. DOCUMENT SYSTEMS START-UP; REVIEW START-UP REPORTS.

7. COORDINATE FUNCTIONAL TESTING FOR COMMISSIONED SYSTEMS AND ASSEMBLIES.

8. AFTER MANUAL TESTING AND INITIAL TROUBLE-SHOOTING IS COMPLETE, MONITOR SYSTEM OPERATION AND PERFORMANCE FOR SELECTED DATA POINTS FOR UP TO ONE WEEK BY REQUESTING TREND LOGS. ANALYZE MONITORED DATA TO VERIFY OPERATION AND PERFORMANCE AND ISSUE A REPORT (INCLUDE IN FINAL COMMISSIONING REPORT).

9. REVISE CONSTRUCTION PHASE COMMISSIONING PLANS AS NECESSARY.

10. COMPILE A COMMISSIONING RECORD.

11. EQUIPMENT MANUFACTURER, IF APPLICABLE, MUST BE ENGAGED DURING COMMISSIONING AND START-UP.

**B. COMMISSIONING REQUIREMENTS**

1. IMPLEMENT FINAL ADJUSTMENTS ON PROTECTIVE DEVICE SETTINGS PER COORDINATION STUDY AND REPORT.

2. LIGHTING SYSTEM: PERFORM THE FOLLOWING FUNCTION TESTS FOR APPLICABLE LIGHTING CONTROL DEVICES:  
a. OCCUPANCY SENSORS: SIMULATE OCCUPIED AND UNOCCUPIED STATES. VERIFY OPERATION MATCHES DESIGN DRAWING INTENT. LIGHTS MUST TURN ON, OFF, OR DIM WITHOUT FLICKER.

b. DIMMABLE WALL SWITCHES: TEST DIMMABLE STATES FOR FULL RANGE OF DIMMING SWITCH CAPABILITIES. LIGHTS MUST NOT FLICKER AT ANY POINT.

c. INDOOR PHOTO SENSORS: PERFORM FULL, PARTIAL, AND NO DAYLIGHT TESTS TO ENSURE PROPER OPERATION. DAYLIGHT SENSORS MUST BE COORDINATED WITH SHADE OPERATION IF APPLICABLE.

d. OUTDOOR PHOTO SENSORS: VERIFY LIGHTS TURN ON WHEN NO DAYLIGHT IS AVAILABLE.

3. MEASURE AND VERIFY LIGHTING LEVEL PER DESIGN DRAWINGS, AND SET ALL ADJUSTMENTS ON LIGHTING DEVICES AND LIGHTING CONTROL PANELS PER DESIGN DRAWINGS OR MANUFACTURER REQUIREMENTS. PROVIDE THE FOLLOWING DATA: AVERAGE LIGHT LEVEL FOR EACH SPACE TYPE FROM A MINIMUM OF NINE POINTS SPREAD OUT UNIFORMLY IN THE SPACE.

4. AFTER INSTALLATION AND INSPECTION APPROVAL, BUT BEFORE APPLYING CIRCUIT LABELS, VERIFY BRANCH CIRCUIT RECEPTACLES ARE CONNECTED TO APPROPRIATE CIRCUIT BY OPENING CORRESPONDING BRANCH CIRCUIT BREAKER AND TESTING FOR VOLTAGE. RECORD CONNECTED BRANCH CIRCUIT IF DIFFERENT TO WHAT IS ON PLAN. BRANCH CIRCUITING MUST FOLLOW DESIGN INTENT, LATEST BULLETIN, AND UPDATED PANEL SCHEDULES.

**CLOSEOUT DOCUMENTATION**

A. AT COMPLETION OF PROJECT, THE FOLLOWING DOCUMENTS MUST BE PROVIDED:

1. ALL CONSTRUCTION DOCUMENT MARKUPS MUST BE PROVIDED TO THE DESIGNER OF RECORD, EVALUATED, AND INCORPORATED INTO THE FINAL RECORD DOCUMENTS.

2. ALL FINAL SHOP DRAWINGS

3. ALL WARRANTY DOCUMENTATION FOR EQUIPMENT

4. ALL UPDATED PANEL SCHEDULES

B. PROVIDE TRAINING FOR NEW SYSTEMS TO RELEVANT PERSONNEL

A

B

C

D

E

F

**INSPECTIONS**

**A. SCOPE OF INSPECTIONS**

1. STR WILL INSPECT DELIVERABLES FOR CONTENT, COMPLETENESS, ACCURACY, AND CONFORMANCE TO SUBCONTRACT REQUIREMENTS. INSPECTION MUST INCLUDE VALIDATION AND/OR TESTING OF THE DELIVERABLES, AS SPECIFIED IN THE SUBCONTRACT.

Sheet Title  
**ELECTRICAL NOTES**

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