3.13 TRAINING

A. TRAIN THE DESIGNATED STAFF OF OWNER'S REPRESENTATIVE AND OWNER TO ENABLE THEM TO PROFICIENTLY OPERATE THE SYSTEM; CREATE, MODIFY AND DELETE PROGRAMMING; ADD, REMOVE AND MODIFY PHYSICAL POINTS FOR THE SYSTEM; ADD ADDITIONAL PANELS WHEN REQUIRED.

B. THESE OBJECTIVES WILL BE DIVIDED INTO THREE LOGICAL GROUPINGS; PARTICIPANTS MAY ATTEND ONE OR MORE OF THESE, DEPENDING ON LEVEL OF KNOWLEDGE REQUIRED:

1. DAY–TO–DAY OPERATORS
2. SYSTEM TROUBLESHOOTER
3. SYSTEM MANAGER: PARTS

C. PROVIDE COURSE OUTLINE AND MATERIALS AS PER PART 1 OF THIS SECTION. THE INSTRUCTOR(S) SHALL PROVIDE ONE COPY OF TRAINING MATERIAL PER STUDENT.

D. THE INSTRUCTOR(S) SHALL BE FACTORY–TRAINED INSTRUCTORS EXPERIENCED IN PRESENTING THIS MATERIAL.

E. CLASSROOM TRAINING SHALL BE DONE USING A NETWORK OF WORKING CONTROLLERS REPRESENTATIVE OF THE INSTALLED HARDWARE OR AT THE CUSTOMER'S SITE.

3.14 FIELD QUALITY CONTROL

A. ALL WORK, MATERIALS AND EQUIPMENT SHALL COMPLY WITH THE RULES AND REGULATIONS OF APPLICABLE LOCAL, STATE, AND FEDERAL CODES AND ORDINANCES AS IDENTIFIED IN PART 1 OF THIS SECTION.

B. CONTRACTOR SHALL CONTINUALLY MONITOR THE FIELD INSTALLATION FOR CODE COMPLIANCE AND QUALITY OF WORKMANSHIP. ALL VISIBLE PIPING AND OR WIRING RUNS SHALL BE INSTALLED PARALLEL TO BUILDING LINES AND PROPERLY SUPPORTED.

C. CONTRACTOR SHALL ARRANGE FOR FIELD INSPECTIONS BY LOCAL AND/OR STATE AUTHORITIES HAVING JURISDICTION OVER THE WORK.

D. INSTALLING CONTRACTOR SHALL BE GIVEN AN INSTALLATION VERIFICATION CHECKLIST SEVEN DAYS PRIOR TO THE PROGRAMMING AND COMMISSIONING OF THE JOB. THE INSTALLATION VERIFICATION CHECKLIST WILL CONTAIN SPECIFIC INFORMATION TO BE COMPLETED BY THE INSTALLING CONTRACTOR AND BE DEVELOPED BY THE CONTROL SYSTEM CONTRACTOR.

3.15 ACCEPTANCE

A. THE CONTROL SYSTEMS WILL NOT BE ACCEPTED AS MEETING THE REQUIREMENTS OF COMPLETION UNTIL ALL TESTS DESCRIBED IN THIS SPECIFICATION HAVE BEEN PERFORMED TO THE SATISFACTION OF BOTH THE ENGINEER AND OWNER. ANY TESTS THAT CANNOT BE PERFORMED DUE TO CIRCUMSTANCES BEYOND THE CONTROL OF THE CONTRACTOR MAY BE EXEMPT FROM THE COMPLETION REQUIREMENTS IF STATED AS SUCH IN WRITING BY THE OWNER'S REPRESENTATIVE. SUCH TESTS SHALL THEN BE PERFORMED AS PART OF THE WARRANTY.

PART 4 – SEQUENCE OF OPERATION

4.1 GENERAL

A. ALL SETPOINTS AND VALUES LISTED IN THE FOLLOWING SEQUENCES ARE TO BE FIELD ADJUSTABLE.

4.2 TRANSFER FANS

A. PROVIDE TWO SPACE HUMIDITY SENSORS IN THE AUDITORIUM CEILING SPACE IN THE APPROXIMATE LOCATIONS THAT THEY ARE SHOWN ON THE MECHANICAL PRINTS.

B. TRANSFER FANS ARE TO REMAIN POWERED OFF WHEN BOTH OF THE SENSORS REGISTER BELOW 50% RH

C. WHEN ONE OR BOTH OF THE HUMIDITY SENSORS REGISTERS ABOVE 50%, BOTH FANS ARE TO BE ENGAGED AT THEIR MINIMUM SPEED (15% OF MAX)

D. WHEN FANS ARE ENGAGED, THEIR SPEED IS TO BE MODULATED LINEARLY FROM THEIR MINIMUM SPEED AT STARTUP TO THEIR MAXIMUM SPEED AT A MEASUREMENT OF 60% RH. THE HIGHEST REGISTERED RH OF THE TWO SENSORS SHALL BE USED TO DETERMINE FAN SPEED.

E. WHEN THE RH DROPS BELOW 50% AS REGISTERED BY BOTH OF THE HUMIDITY SENSORS, THE TRANSFER FANS ARE TO BE SWITCHED OFF

F. ON ANY SMOKE OR FIRE ALARM, TRANSFER FANS ARE TO BE IMMEDIATELY SHUT OFF.

4.3 MODULATING AIR DAMPERS

A. PROVIDE TWO SETS OF DIFFERENTIAL PRESSURE SENSORS. ONE SENSOR OF EACH PAIR IS TO BE AN OUTDOOR SENSOR MOUNTED ON THE EXTERIOR OF THE BUILDING AS SHOWN IN THE MECHANICAL DETAILS. THE OTHER SENSOR OF EACH PAIR IS TO BE MOUNTED IN THE AUDITORIUM CEILING SPACE IN THE APPROXIMATE LOCATION SHOWN IN THE MECHANICAL PRINTS.

B. AIR DAMPERS ARE TO BE NORMALLY CLOSED AND INTERLOCKED TO OPEN ONLY WHEN TRANSFER FANS ARE OPERATING. THE DAMPERS ASSOCIATED WITH AHU 3–3W12 AND 3–3W13 SHALL BE INTERLOCKED TO TF–2 AND THE DAMPERS ASSOCIATED WITH AHU 3–3W16 AND AHU 3–3W17 SHALL BE INTERLOCKED TO TF–1.

C. EACH PAIR OF DAMPERS SHALL MODULATE TOGETHER WHILE THEIR ASSOCIATED TRANSFER FAN IS RUNNING TO MAINTAIN THE CEILING SPACE AT A POSITIVE DIFFERENTIAL PRESSURE OF 0.1" WCG WITH RESPECT TO THE OUTSIDE AIR PRESSURE, AS REGISTERED BY THEIR ASSOCIATED DIFFERENTIAL PRESSURE SENSOR.

D. ON ANY SMOKE OR FIRE ALARM, MODULATING AIR DAMPERS ARE TO BE DRIVEN TO THEIR FULLY CLOSED POSITION.

4.4 EXISTING EXHAUST FANS

A. THE EXISTING EXHAUST FANS IN THE CEILING SPACE ABOVE THE AUDITORIUM ARE TO BE CONTROLLED TO PROVIDE RELIEF AS FOLLOWS, IN ADDITION TO ANY OTHER EXISTING PROGRAMMING.

B. IF EITHER OF THE DIFFERENTIAL PRESSURE SENSORS MEASURES THE CEILING SPACE TO HAVE A POSITIVE PRESSURE RELATIVE TO OUTSIDE AIR OF 0.125" WCG, 20% OF THE EXISTING EXHAUST FANS SHALL BE ENGAGED.

C. IF EITHER OF THE DIFFERENTIAL PRESSURE SENSORS MEASURES THE CEILING SPACE TO HAVE A POSITIVE PRESSURE RELATIVE TO OUTSIDE AIR OF 0.2" WCG, 30% OF THE EXISTING EXHAUST FANS SHALL BE ENGAGED.

D. IF EITHER OF THE DIFFERENTIAL PRESSURE SENSORS MEASURES THE CEILING SPACE TO HAVE A POSITIVE PRESSURE RELATIVE TO OUTSIDE AIR OF 0.3" WCG, 100% OF THE EXISTING EXHAUST FANS SHALL BE ENGAGED.

E. WHEN THE DIFFERENTIAL PRESSURE ON BOTH SENSORS DROPS BELOW 0.115" WCG, ALL EXHAUST FANS ARE TO BE SWITCHED OFF.

4.5 POINTS LISTS

A. TO BE PROVIDED BY SIEMENS

END OF SECTION 15960

SECTION 15990 – TESTING, ADJUSTING, AND BALANCING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS APPLY TO WORK OF THIS SECTION.

B. RELATED SECTIONS:

1. OTHER DIVISION–15 SECTIONS SPECIFY BALANCING DEVICES AND THEIR INSTALLATION, AND MATERIALS AND INSTALLATIONS OF MECHANICAL SYSTEMS.

1.2 SUMMARY

A. THIS SECTION SPECIFIES THE REQUIREMENTS AND PROCEDURES TOTAL MECHANICAL SYSTEMS TESTING, ADJUSTING, AND BALANCING. REQUIREMENTS INCLUDE MEASUREMENT AND ESTABLISHMENT OF THE AIR QUANTITIES OF THE MECHANICAL SYSTEMS AS REQUIRED TO MEET DESIGN SPECIFICATIONS, AND RECORDING AND REPORTING THE RESULTS.

B. TEST, ADJUST, AND BALANCE THE FOLLOWING MECHANICAL SYSTEMS:

1. TRANSFER AIR SYSTEMS;

C. THIS SECTION DOES NOT INCLUDE:

1. SPECIFICATIONS FOR MATERIALS AND INSTALLATION OF ADJUSTING AND BALANCING DEVICES. IF DEVICES MUST BE ADDED TO ACHIEVE PROPER ADJUSTING AND BALANCING, REFER TO THE RESPECTIVE SYSTEM SECTIONS FOR MATERIALS AND INSTALLATION REQUIREMENTS.

2. REQUIREMENTS AND PROCEDURES FOR DUCTWORK SYSTEMS.

1.3 DEFINITIONS

A. SYSTEMS TESTING, ADJUSTING, AND BALANCING IS THE PROCESS OF CHECKING AND ADJUSTING ALL THE BUILDING ENVIRONMENTAL SYSTEMS TO PRODUCE THE DESIGN OBJECTIVES. IT INCLUDES:

1. THE BALANCE OF AIR DISTRIBUTION

2. ADJUSTMENT OF TOTAL SYSTEM TO PROVIDE DESIGN QUANTITIES

3. ELECTRICAL MEASUREMENT

4. VERIFICATION OF PERFORMANCE OF ALL EQUIPMENT AND AUTOMATIC CONTROLS

B. TEST: TO DETERMINE QUANTITATIVE PERFORMANCE OF EQUIPMENT.

C. ADJUST: TO REGULATE THE SPECIFIED AIR FLOW RATE AND AIR PATTERNS AT THE TERMINAL EQUIPMENT (E.G., REDUCE FAN SPEED, THROTTLING).

D. BALANCE: TO PROPORTION FLOWS WITHIN THE DISTRIBUTION SYSTEM (SUB–MAINS, BRANCHES, AND TERMINALS) ACCORDING TO SPECIFIED DESIGN QUANTITIES.

E. PROCEDURE: STANDARDIZED APPROACH AND EXECUTION OF SEQUENCE OF WORK OPERATIONS TO YIELD REPRODUCIBLE RESULTS.

F. REPORT FORMS: TEST DATA SHEETS ARRANGED FOR COLLECTING TEST DATA IN LOGICAL ORDER FOR SUBMISSION AND REVIEW. THESE DATA SHOULD ALSO FORM THE PERMANENT RECORD TO BE USED AS THE BASIS FOR REQUIRED FUTURE TESTING, ADJUSTING, AND BALANCING.

G. TERMINAL: THE POINT WHERE THE CONTROLLED FLUID ENTERS OR LEAVES THE DISTRIBUTION SYSTEM. THESE ARE TRANSFER INLETS ON AIR TERMINALS SUCH AS REGISTERS, GRILLES, DIFFUSERS, ETC.

H. MAIN: DUCT CONTAINING THE SYSTEM'S MAJOR OR ENTIRE FLUID FLOW.

I. BRANCH: DUCT SERVING A SINGLE TERMINAL.

1.4 SUBMITTALS

A. AGENCY DATA:

1. SUBMIT PROOF THAT THE PROPOSED TESTING, ADJUSTING, AND BALANCING AGENCY MEETS THE QUALIFICATIONS SPECIFIED BELOW.

2. ENGINEER AND TECHNICIANS DATA:

d. SUBMIT PROOF THAT THE TEST AND BALANCE ENGINEER ASSIGNED TO SUPERVISE THE PROCEDURES, AND THE TECHNICIANS PROPOSED TO PERFORM THE PROCEDURES MEET THE QUALIFICATIONS SPECIFIED BELOW.

3. PROCEDURES AND AGENDA: SUBMIT A SYNOPSIS OF THE TESTING, ADJUSTING, AND BALANCING PROCEDURES AND AGENDA PROPOSED TO BE USED FOR THIS PROJECT.

4. MAINTENANCE DATA: SUBMIT MAINTENANCE AND OPERATING DATA THAT INCLUDE HOW TO TEST, ADJUST, AND BALANCE THE BUILDING SYSTEMS.

5. SAMPLE FORMS: SUBMIT SAMPLE FORMS, IF OTHER THAN THOSE STANDARD FORMS PREPARED BY THE AABC ARE PROPOSED.

6. SAMPLE FORMS: SUBMIT SAMPLE FORMS, IF OTHER THAN THOSE STANDARD FORMS PREPARED BY THE NEBB ARE PROPOSED.

7. CERTIFIED REPORTS: SUBMIT TESTING, ADJUSTING, AND BALANCING REPORTS BEARING THE SEAL AND SIGNATURE OF THE TEST AND BALANCE ENGINEER. THE REPORTS SHALL BE CERTIFIED PROOF THAT THE SYSTEMS HAVE BEEN TESTED, ADJUSTED, AND BALANCED IN ACCORDANCE WITH THE REFERENCED STANDARDS; ARE AN ACCURATE REPRESENTATION OF HOW THE SYSTEMS HAVE BEEN INSTALLED; ARE A TRUE REPRESENTATION OF HOW THE SYSTEMS ARE OPERATING AT THE COMPLETION OF THE TESTING, ADJUSTING, AND BALANCING PROCEDURES; AND ARE AN ACCURATE RECORD OF ALL FINAL QUANTITIES MEASURED, TO ESTABLISH NORMAL OPERATING VALUES OF THE SYSTEMS. FOLLOW THE PROCEDURES AND FORMAT SPECIFIED BELOW:

8. DRAFT REPORTS: UPON COMPLETION OF TESTING, ADJUSTING, AND BALANCING PROCEDURES, PREPARE DRAFT REPORTS ON THE APPROVED FORMS. DRAFT REPORTS MAY BE HAND WRITTEN, BUT MUST BE COMPLETE, FACTUAL, ACCURATE, AND LEGIBLE. ORGANIZE AND FORMAT DRAFT REPORTS IN THE SAME MANNER SPECIFIED FOR THE FINAL REPORTS. SUBMIT 2 COMPLETE SETS OF DRAFT REPORTS. ONLY 1 COMPLETE SET OF DRAFT REPORTS WILL BE RETURNED.

9. FINAL REPORT: UPON VERIFICATION AND APPROVAL OF DRAFT REPORTS, PREPARE FINAL REPORTS, TYPE WRITTEN, AND ORGANIZED AND FORMATTED AS SPECIFIED BELOW. SUBMIT 2 COMPLETE SETS OF FINAL REPORTS.

10. REPORT FORMAT: REPORT FORMS SHALL BE THOSE STANDARD FORMS PREPARED BY THE REFERENCED STANDARD FOR EACH RESPECTIVE ITEM AND SYSTEM TO BE TESTED, ADJUSTED, AND BALANCED. BIND REPORT FORMS COMPLETE WITH SCHEMATIC SYSTEMS DIAGRAMS AND OTHER DATA IN REINFORCED, VINYL, THREE–RING BINDERS. PROVIDE BINDING EDGE LABELS WITH THE PROJECT IDENTIFICATION AND A TITLE DESCRIPTIVE OF THE CONTENTS. DIVIDE THE CONTENTS OF THE BINDER INTO THE BELOW LISTED DIVISIONS, SEPARATED BY DIVIDER TABS:

a. GENERAL INFORMATION AND SUMMARY

b. AIR SYSTEMS

c. CONTROL SYSTEMS

B. REPORT CONTENTS: PROVIDE THE FOLLOWING MINIMUM INFORMATION, FORMS AND DATA:

1. GENERAL INFORMATION AND SUMMARY: INSIDE COVER SHEET TO IDENTIFY TESTING, ADJUSTING, AND BALANCING AGENCY, CONTRACTOR, OWNER, ENGINEER, AND PROJECT. INCLUDE ADDRESSES, AND CONTACT NAMES AND TELEPHONE NUMBERS. ALSO INCLUDE A CERTIFICATION SHEET CONTAINING THE SEAL AND NAME ADDRESS, TELEPHONE NUMBER, AND SIGNATURE OF THE CERTIFIED TEST AND BALANCE ENGINEER. INCLUDE IN THIS DIVISION A LISTING OF THE INSTRUMENTATIONS USED FOR THE PROCEDURES ALONG WITH THE PROOF OF CALIBRATION.

2. THE REMAINDER OF THE REPORT SHALL CONTAIN THE APPROPRIATE FORMS CONTAINING AS A MINIMUM, THE INFORMATION INDICATED ON THE STANDARD REPORT FORMS PREPARED BY THE AABC AND NEBB, FOR EACH RESPECTIVE ITEM AND SYSTEM. PREPARE A SCHEMATIC DIAGRAM FOR EACH ITEM OF EQUIPMENT AND SYSTEM TO ACCOMPANY EACH RESPECTIVE REPORT FORM.

C. CALIBRATION REPORTS: SUBMIT PROOF THAT ALL REQUIRED INSTRUMENTATION HAS BEEN CALIBRATED TO TOLERANCES SPECIFIED IN THE REFERENCED STANDARDS WITHIN A PERIOD OF SIX MONTHS PRIOR TO STARTING THE PROJECT.

1.5 QUALITY ASSURANCE

A. EMPLOY THE SERVICES OF AN INDEPENDENT TESTING, ADJUSTING, AND BALANCING AGENCY MEETING THE QUALIFICATIONS SPECIFIED BELOW, TO BE THE SINGLE SOURCE OF RESPONSIBILITY TO TEST, ADJUST, AND BALANCE THE BUILDING MECHANICAL SYSTEMS IDENTIFIED ABOVE, TO PRODUCE THE DESIGN OBJECTIVES. SERVICES SHALL INCLUDE CHECKING INSTALLATIONS FOR CONFORMITY TO DESIGN, MEASUREMENT AND ESTABLISHMENT OF THE FLUID QUANTITIES OF THE MECHANICAL SYSTEMS AS REQUIRED TO MEET DESIGN SPECIFICATIONS, AND RECORDING AND REPORTING THE RESULTS.

B. THE INDEPENDENT TESTING, ADJUSTING, AND BALANCING AGENCY CERTIFIED BY NEBB OR AABC IN THOSE TESTING AND BALANCING DISCIPLINES REQUIRED FOR THIS PROJECT, AND HAVING AT LEAST ONE PROFESSIONAL ENGINEER REGISTERED IN THE STATE IN WHICH THE SERVICES ARE TO BE PERFORMED, CERTIFIED BY NEBB AS A TEST AND BALANCE ENGINEER.

C. CODES AND STANDARDS:

1. NEBB: "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS."

2. AABC: "NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE".

3. ASHRAE: ASHRAE HANDBOOK, 1987 SYSTEMS VOLUME, CHAPTER 57, TESTING, ADJUSTING, AND BALANCING.

D. PRE–BALANCING CONFERENCE: PRIOR TO BEGINNING OF THE TESTING, ADJUSTING, AND BALANCING PROCEDURES, SCHEDULE AND CONDUCT A CONFERENCE WITH THE ENGINEER AND REPRESENTATIVES OF INSTALLERS OF THE MECHANICAL SYSTEMS. THE OBJECTIVE OF THE CONFERENCE IS FINAL COORDINATION AND VERIFICATION OF SYSTEM OPERATION AND READINESS FOR TESTING, ADJUSTING, AND BALANCING.

1.6 PROJECT CONDITIONS

A. SYSTEMS OPERATION: SYSTEMS SHALL BE FULLY OPERATIONAL PRIOR TO BEGINNING PROCEDURES.

1.7 SEQUENCING AND SCHEDULING

A. TEST, ADJUST AND BALANCE TRANSFER SYSTEM DURING SUMMER SEASON, INCLUDING AT LEAST A PERIOD OF OPERATION AT OUTSIDE CONDITIONS WITHIN 5 DEG F WET BULB TEMPERATURE OF MAXIMUM SUMMER DESIGN CONDITION. TAKE FINAL TEMPERATURE READINGS DURING SEASONAL OPERATION.

PART 2 – PRODUCTS

2.1 NOT USED

PART 3 – EXECUTION

3.1 PRELIMINARY PROCEDURES FOR AIR SYSTEM BALANCING

A. BEFORE OPERATING THE SYSTEM, PERFORM THESE STEPS:

1. OBTAIN DESIGN DRAWINGS AND SPECIFICATIONS AND BECOME THOROUGHLY ACQUAINTED WITH THE DESIGN INTENT.

2. OBTAIN COPIES OF APPROVED SHOP DRAWINGS OF ALL AIR HANDLING EQUIPMENT, OUTLETS (SUPPLY, RETURN, AND EXHAUST) AND TEMPERATURE CONTROL DIAGRAMS.

3. COMPARE DESIGN TO INSTALLED EQUIPMENT AND FIELD INSTALLATIONS.

4. WALK THE SYSTEM FROM THE SYSTEM AIR HANDLING EQUIPMENT TO TERMINAL UNITS TO DETERMINE VARIATIONS OF INSTALLATION FROM DESIGN.

5. CHECK FILTERS FOR CLEANLINESS.

6. CHECK DAMPERS (BOTH VOLUME AND FIRE) FOR CORRECT AND LOCKED POSITION, AND TEMPERATURE CONTROL FOR COMPLETENESS OF INSTALLATION BEFORE STARTING FANS.

7. PREPARE REPORT TEST SHEETS FOR BOTH FANS AND OUTLETS. OBTAIN MANUFACTURER'S OUTLET FACTORS AND RECOMMENDED PROCEDURES FOR TESTING. PREPARE A SUMMATION OF REQUIRED OUTLET VOLUMES TO PERMIT A CROSSCHECK WITH REQUIRED FAN VOLUMES.

8. DETERMINE BEST LOCATIONS IN MAIN AND BRANCH DUCTWORK FOR MOST ACCURATE DUCT TRAVERSES.

9. PLACE OUTLET DAMPERS IN THE FULL OPEN POSITION.

10. PREPARE SCHEMATIC DIAGRAMS OF SYSTEM "AS–BUILT" DUCTWORK AND PIPING LAYOUTS TO FACILITATE REPORTING.

11. LUBRICATE ALL MOTORS AND BEARINGS

12. CHECK FAN BELT TENSION

13. CHECK FAN ROTATION

3.2 MEASUREMENTS

A. PROVIDE ALL REQUIRED INSTRUMENTATION TO OBTAIN PROPER MEASUREMENTS, CALIBRATED TO THE TOLERANCES SPECIFIED IN THE REFERENCED STANDARDS. INSTRUMENTS SHALL BE PROPERLY MAINTAINED AND PROTECTED AGAINST DAMAGE.

B. PROVIDE INSTRUMENTS MEETING THE SPECIFICATIONS OF THE REFERENCED STANDARDS.

C. USE ONLY THOSE INSTRUMENTS WHICH HAVE THE MAXIMUM FIELD MEASURING ACCURACY AND ARE BEST SUITED TO THE FUNCTION BEING MEASURED.

D. APPLY INSTRUMENT AS RECOMMENDED BY THE MANUFACTURER.

E. USE INSTRUMENTS WITH MINIMUM SCALE AND MAXIMUM SUBDIVISIONS AND WITH SCALE RANGES PROPER FOR THE VALUE BEING MEASURED.

F. WHEN AVERAGING VALUES, TAKE A SUFFICIENT QUANTITY OF READINGS WHICH WILL RESULT IN A REPEATABILITY ERROR OF LESS THAN 5 PERCENT. WHEN MEASURING A SINGLE POINT, REPEAT READINGS UNTIL 2 CONSECUTIVE IDENTICAL VALUES ARE OBTAINED.

G. TAKE ALL READING WITH THE EYE AT THE LEVEL OF THE INDICATED VALUE TO PREVENT PARALLAX.

H. TAKE MEASUREMENTS IN THE SYSTEM WHERE BEST SUITED TO THE TASK.

3.3 PERFORMING TESTING, ADJUSTING, AND BALANCING

A. PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM IDENTIFIED, IN ACCORDANCE WITH THE DETAILED PROCEDURES OUTLINED IN THE REFERENCED STANDARDS.

B. CUT INSULATION, DUCTWORK, AND PIPING FOR INSTALLATION OF TEST PROBES TO THE MINIMUM EXTENT NECESSARY TO ALLOW ADEQUATE PERFORMANCE OF PROCEDURES.

C. PATCH INSULATION, DUCTWORK, AND HOUSINGS, USING MATERIALS IDENTICAL TO THOSE REMOVED.

D. SEAL DUCTS AND TEST FOR AND REPAIR LEAKS.

E. SEAL INSULATION TO RE–ESTABLISH INTEGRITY OF THE VAPOR BARRIER.

F. MARK EQUIPMENT SETTINGS, INCLUDING DAMPER CONTROL POSITIONS, VALVE INDICATORS, FAN SPEED CONTROL LEVERS, AND SIMILAR CONTROLS AND DEVICES, TO SHOW FINAL SETTINGS. MARK WITH PAINT OR OTHER SUITABLE, PERMANENT IDENTIFICATION MATERIALS.

G. RETEST, ADJUST, AND BALANCE SYSTEMS SUBSEQUENT TO SIGNIFICANT SYSTEM MODIFICATIONS, AND RESUBMIT TEST RESULTS.

3.4 RECORD AND REPORT DATA

H. RECORD ALL DATA OBTAINED DURING TESTING, ADJUSTING, AND BALANCING IN ACCORDANCE WITH, AND ON THE FORMS RECOMMENDED BY THE REFERENCED STANDARDS, AND AS APPROVED ON THE SAMPLE REPORT FORMS.

I. PREPARE REPORT OF RECOMMENDATIONS FOR CORRECTING UNSATISFACTORY MECHANICAL PERFORMANCES WHEN SYSTEM CANNOT BE SUCCESSFULLY BALANCED.

3.5 DEMONSTRATION

A. TRAINING:

1. TRAIN THE OWNER'S MAINTENANCE PERSONNEL ON TROUBLESHOOTING PROCEDURES AND TESTING, ADJUSTING, AND BALANCING PROCEDURES. REVIEW WITH THE OWNER'S PERSONNEL, THE INFORMATION CONTAINED IN THE OPERATING AND MAINTENANCE DATA SPECIFIED IN DIVISION 1 AND SECTION 15100.

2. SCHEDULE TRAINING WITH OWNER THROUGH THE ENGINEER WITH AT LEAST 7 DAYS PRIOR NOTICE.

END OF SECTION 15990

These plans and specifications have been prepared by or under our close personal supervision and to the best of our knowledge and belief they comply with all city requirements, and that we are not providing field observation of the work.

Engineer

License Number LA 22463

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MORIAL CONVENTION CENTER
AUDITORIUM REVISIONS

Revisions

No.	by	REVISIONS/SUBMISSIONS	Date
1			
2			
3			

ERNEST N. MORIAL CONVENTION CENTER

NEW ORLEANS, LOUISIANA

seal

STATE OF LOUISIANA
Lawrence W. Blanchette
LICENSE NO. 22463
REGISTERED
PROFESSIONAL ENGINEER
7/9/10

ADG project number 09247	phase •
file name 09247 M8.DWG	drawing number
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