

SECTION 15700 - MECHANICAL SPECIFICATIONS
GENERAL

1. GENERAL CONDITIONS:
 - a. CONFORM TO APPLICABLE PROVISIONS OF THE GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, AND THE GENERAL REQUIREMENTS.
 - b. DEFINITIONS: FURNISH MEANS TO SUPPLY AND DELIVER TO PROJECT SITE, READY FOR INSTALLATION. INSTALL MEANS TO PLACE IN POSITION AND MAKE CONNECTIONS FOR SERVICE OR USE. PROVIDE MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR INTENDED USE.
 2. SCOPE OF WORK:
 - a. PROVIDE ALL LABOR, EQUIPMENT, MATERIALS, TOOLS, ERECTION, HOISTING, AND INCIDENTAL: REQUIRED TO PROVIDE HEATING, VENTILATION, GRAVE EXHAUST, AND AIR CONDITIONING SYSTEMS.
 - b. PROVIDE EQUIPMENT INDICATED ON THE DRAWINGS, AND AS REQUIRED FOR A COMPLETE FUNCTIONING SYSTEM.
 3. RULES AND REGULATIONS:
 - a. ALL WORK SHALL COMPLY WITH STATE AND LOCAL CODE REQUIREMENTS AS APPROVED AND AMENDED BY THE GOVERNING CITY. PURCHASE ALL PERMITS ASSOCIATE WITH THE WORK. OBTAIN ALL INSPECTIONS REQUIRED BY CODE.
 - b. WHERE THE STANDARDS OF THE DRAWINGS AND SPECIFICATIONS FOR MATERIALS AND/OR WORKMANSHIP ARE HIGHER THAN THE REQUIREMENTS CITED ABOVE, THE DRAWINGS AND SPECIFICATIONS SHALL TAKE PRECEDENCE.
 4. WARRANTY:
 - a. PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTIVE PARTS AND MATERIALS AS REQUIRED FOR ONE YEAR AFTER OWNER ACCEPTANCE OF THE COMPLETED PROJECT. PROVIDE A SEPARATE LINE ITEM DEDUCT AMOUNT ON THE PROPOSAL FORM TO DELETE WARRANTY SERVICE, AT THE OWNER'S OPTION.
 5. COORDINATION:
 - a. COORDINATE WITH THE WORK OF OTHER SECTIONS. EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE.
 - b. CONTRACTOR SHALL EXECUTE WORK SO THAT PROGRESS WILL HARMONIZE WITH THAT OF THE OTHER TRADES, AND SO THAT ALL WORK MAY PROCEED AS EXPEDITIOUSLY AS POSSIBLE.
 - c. TO THE FULLEST EXTENT POSSIBLE, THE WORK UNDER THIS CONTRACT HAS BEEN INDICATED ON THE DRAWINGS IN SUCH POSITIONS AS TO SUIT AND ACCOMMODATE THE WORK OF OTHER TRADES, BUT THE WORK AS INDICATED IS LARGELY DIAGRAMMATIC AND THE FINAL POSITION OF ALL EQUIPMENT AND MATERIALS CANNOT BE INDICATED; THEREFORE, THE CONTRACTOR IS DIRECTLY RESPONSIBLE FOR THE CORRECT PLACEMENT OF WORK AND THE PROPER LOCATION AND CONNECTION OF WORK IN RELATION TO WORK OF OTHER TRADES.
 6. LOCATION AND SPACE REQUIREMENTS:
 - a. VERIFY SPACE, DIMENSIONS, LOCATION, AND CONDITIONS REQUIRED FOR INSTALLATION OF ALL HVAC AND RELATED WORK.
 - b. OBTAIN NECESSARY PUGH-IN DATA AND DIMENSIONS OF FIXTURES, EQUIPMENT, TENANT FURNISHED EQUIPMENT, OWNER FURNISHED EQUIPMENT, AND EQUIPMENT FURNISHED UNDER OTHER SECTIONS.
 - c. NO EXPOSED DUCTS WILL BE PERMITTED TO SHOW ON INTERIOR OF BUILDINGS IN FINISHED ROOMS, WHERE THIS WOULD OCCUR, EXPOSED PORTION SHALL BE FURRED AND PLASTERED, OR CASED WHEN NOT ADJACENT TO THE WALL.
 - d. MAINTAIN SUFFICIENT CLEARANCE AND ACCESSIBILITY. INTERFERENCE BETWEEN WORK OF VARIOUS TRADES WILL BE RESOLVED BY THE ARCHITECT AND OWNER IN CONSULTATION WITH THE ENGINEER. RELOCATE OR OFFSET WORK AS REQUIRED TO ACCOMMODATE WORK OF OTHER TRADES. MAINTAIN CEILING HEIGHTS AND AVOID EXCESSIVE FURRING REQUIREMENTS.
 - e. IF NOT PRECISELY LOCATED ON DRAWINGS, OBTAIN LOCATION OF FIXTURES, EQUIPMENT, AND APPLIANCES, FROM ARCHITECT AND FOOD SERVICE EQUIPMENT SUPPLIER. NO DEVIATION WILL BE ALLOWED.
 7. MEASUREMENTS:
 - a. ALL DIMENSIONS OF WORK OF OTHER TRADES WHICH REQUIRE VERIFICATION SHALL BE VERIFIED FROM SHOP DRAWINGS OF SUCH WORK OR FROM ACTUAL MEASUREMENTS AT BUILDING, WHICHEVER IS THE MOST ACCURATE AND PRACTICAL IN THE JUDGMENT OF THE CONTRACTOR, WHO SHALL BE RESPONSIBLE FOR THE ACCURACY OF SUCH MEASUREMENTS.
- PRODUCTS
1. GENERAL MATERIALS:
 - a. ALL MATERIALS SHALL CONFORM TO APPLICABLE ACHRAE AND SMACNA STANDARDS.
 - b. BRANDS OF MATERIALS MENTIONED ARE USED AS A STANDARD AND REQUESTS FOR SUBSTITUTION WILL BE CONSIDERED WHEN SUBMITTED TO THE ENGINEER IN ACCORDANCE WITH THE PROVISIONS SET FORTH IN THE SUPPLEMENTARY GENERAL CONDITIONS.
 - c. APPROVED EQUAL REFER: TO MATERIALS WHICH, IN THE OPINION OF THE ENGINEER, ARE SIMILAR AND EQUAL IN ALL RESPECTS TO MATERIAL OR METHOD INDICATED ON DRAWING OR AS SPECIFIED. ENGINEER IS NOT REQUIRED TO PROVE THAT A SUBSTITUTE MATERIAL IS NOT EQUAL TO SPECIFIED MATERIAL. CONTRACTOR SHALL SUBMIT IN WRITING TO ENGINEER EVIDENCE SUPPORTING HIS CONTENTION THAT SUBSTITUTED MATERIAL IS EQUAL TO MATERIAL SHOWN ON DRAWING OR SPECIFIED. ENGINEER PRESERVES RIGHT TO REJECT MATERIAL AND WORKMANSHIP, EITHER BEFORE OR AFTER INSTALLATION, THAT ARE NOT SHOWN ON DRAWINGS OR SPECIFICATIONS, OR SUBSTITUTIONS THAT HAVE NOT BEEN APPROVED BY ENGINEER IN WRITING.
 2. DUCTWORK:
 - a. DUCT DIMENSIONS: UNLESS OTHERWISE NOTED, DUCT DIMENSIONS ON THE DRAWINGS ARE INSIDE CLEAR DIMENSIONS.
 - b. SHEET METAL DUCTWORK: PROVIDE SHEET METAL DUCTWORK FABRICATED AND INSTALLED IN ACCORDANCE WITH ASHRAE AND SMACNA STANDARDS. FOR 1" W.G. PRESSURE CLASS, SEAL CLASS "A". SHEET METAL SHALL BE GALVANIZED SHEET STEEL OF LOCK FORMING QUALITY, ASTM-A525. ALL ANGLE IRON USED FOR SUPPORT SHALL BE GALVANIZED. CONNECTIONS TO WALLS OR FLOOR SHALL BE TIGHT WITH ANGLE IRON AND CAULKING. SEAL ALL DUCT SEAMS, TRANSVERSE, AND LONGITUDINAL, AIR TIGHT. PROVIDE TURNING VANES ALL 90-DEGREE ELBOWS.
 - c. ROUND SHEET METAL DUCT: PROVIDE SPIRAL SEAM (ALL SIZES) SNAP LOCK (DUCT SIZES UP TO 10") GALVANIZED STEEL CONFORMING TO SMACNA STANDARDS. SPIRAL SEAM DUCTWORK SHALL BE SMACNA SEAM TYPE RL-1.
 - d. FLEXIBLE DUCT: PROVIDE FACTORY ASSEMBLED CLASS A FLEXIBLE DUCT (UL 181) WITH 1" THICK 1 PLY FIBERGLASS INSULATION AND REINFORCED OUTER PROTECTIVE COATING. VAPOR BARRIER. FLEXIBLE DUCT SHALL MEET NFPA 90A WITH FLAME HEAD UNDER ZERO SMOKE DEVELOPED UNDER 50" AND SHALL BE RATED FOR MINIMUM 2" W.G. PRESSURE AND 0 TO 100°F TEMPERATURE. USE TWIST-LOCK CONICAL CONNECTORS AT CONNECTIONS INTO SHEET METAL DUCTWORK. MAXIMUM EXTENDED LENGTH OF FLEXIBLE DUCT SHALL NOT EXCEED 6 FEET.
 - e. EXPOSED DUCTWORK: EXPOSED DUCTWORK SHALL BE CLEANED OF DEBRIS AND OIL, THEN WIPED DOWN WITH VINEGAR OR OTHER SURFACE PREPARING CHEMICAL TO PREPARE DUCT FOR PAINT.
 - f. DUCT SEALANT: PROVIDE POLYMERIC RUBBER TYPE SEALANT FOR USE ON BOTH INTERIOR LOCATED DUCTWORK AND DUCTWORK EXPOSED TO OUTDOOR CONDITIONS. SEALER SHALL HAVE HIGH BONDING STRENGTH FOR SURE, FIRST TIME SEALING OF JOINTS IN LOW, MEDIUM, AND HIGH PRESSURE DUCT SYSTEMS.
 - g. DUCT TURNING VANES: PROVIDE FABRICATED TURNING VANES AND VANE RUNNERS, CONSTRUCTED IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS. PROVIDE TURNING VANES CONSTRUCTED OF CURVED BLADES, SUPPORTED WITH BARS PERPENDICULAR TO BLADES, AND SET INTO SIDE STRIPS SUITABLE FOR MOUNTING IN DUCTWORK. FOLLOW SMACNA GUIDELINES FOR SPACING SUPPORT, AND CONSTRUCTION. ALL BLADES SHALL BE DOUBLE THICKNESS AIRFOIL TYPE.

3. DUCTWORK ACCESSORIES:
 - a. FLEXIBLE DUCT CONNECTORS: PROVIDE UL LABELED 30 OUNCE NEOPRENE COATED FIBERGLASS FABRIC DUCT CONNECTORS.
 - b. DUCT ACCESS DOORS: PROVIDE HINGED ACCESS DOORS IN DUCTWORK WHERE REQUIRED FOR ACCESS TO EQUIPMENT. PROVIDE INSULATED ACCESS DOORS FOR INSULATED DUCTWORK. CONSTRUCT OF SAME OR THICKER GAUGE SHEET METAL AS DUCT IN WHICH IT IS INSTALLED. PROVIDE FLUSH FRAMES FOR UNINSULATED DUCTS, AND EXTENDED FRAMES FOR EXTERNALLY INSULATED DUCTS. PROVIDE CONTINUOUS HINGE ON ONE EDGE, WITH ONE HANDLE-TYPE LATCH FOR ACCESS DOORS 12" HIGH AND SMALLER, AND TWO HANDLE-TYPE LATCHES FOR LARGER ACCESS DOORS.
 - c. ROUND VOLUME DAMPERS: PROVIDE MINIMUM 20 GAUGE GALVANIZED STEEL FRAME AND BLADES, MINIMUM 3/8" SQUARE STEEL AXLE, MOLDED SYNTHETIC BEARINGS, WITH LOCKING POSITION REGULATOR. REGULATOR SHALL BE POSITIONED WITH SHEET METAL BRACKET BEYOND DUCT COVERING, WHERE POSITIONING REGULATOR IS NOT ACCESSIBLE. PROVIDE COUPLING AND EXTENSION ROD WITH REGULATOR FOR CEILING OR WALL INSTALLATION, AS REQUIRED.
 - d. RECTANGULAR VOLUME DAMPERS: PROVIDE MINIMUM 16 GAUGE GALVANIZED STEEL CHANNEL FRAME, 16 GAUGE GALVANIZED STEEL BLADES, MINIMUM 1/2" HEXAGONAL AXLE, BOLDED SYNTHETIC BEARINGS, WITH 3/8" SQUARE FLATED STEEL CONTROL SHAFT LINKAGES. SHALL BE CONCEALED IN THE FRAME. OPERATING SHAFT SHALL EXTEND BEYOND FRAME AND DUCT TO A LOCKING QUADRANT WITH ADJUSTABLE LEVER. MAXIMUM BLADE WIDTH SHALL NOT EXCEED 6".
 4. FIRE DAMPERS/SMOKE DAMPERS:
 - a. CURTAIN FIRE DAMPERS: PROVIDE CURTAIN TYPE FIRE DAMPERS, SUITABLE FOR VERTICAL OR HORIZONTAL INSTALLATION AS REQUIRED FOR THE LOCATION SHOWN. CURTAIN TYPE FIRE DAMPERS SHALL HAVE MINIMUM 24 GAUGE GALVANIZED STEEL BLADES, COMPLETELY OUT OF THE AIR STREAM. CURTAIN TYPE DAMPERS SHALL CONFORM TO UL STANDARD 555, WHICH INCLUDES TESTING TO CLOSE UNDER DYNAMIC AIRFLOW CONDITIONS, AND SHALL BE UL LABELED AS A DYNAMIC RATED FIRE DAMPER. DAMPERS SHALL BE 1-1/2 OR 3 HOUR RATED AS REQUIRED BY LOCATION, AND SHALL HAVE 212-DEGREE F FUSIBLE LINK.
 - b. CEILING FIRE DAMPERS: PROVIDE CEILING TYPE FIRE DAMPERS CONSTRUCTED AND TESTED IN ACCORDANCE WITH CURRENT EDITION OF UL STANDARD 555C. CEILING FIRE DAMPERS SHALL HAVE MINIMUM 20 GAUGE GALVANIZED STEEL BLADES, WITH UL LABELED INSULATION AND MINIMUM 20 GAUGE GALVANIZED STEEL FRAME. CEILING FIRE DAMPERS SHALL HAVE A 212-DEGREE F FUSIBLE LINK. PROVIDE DIFFUSER RADIATION SHIELDS CONSTRUCTED OF REFRACTORY CERAMIC FIBER AS APPLICABLE.
 - c. COMBINATION FIRE/SMOKE DAMPERS: PROVIDE COMBINATION FIRE/SMOKE DAMPERS CONSTRUCTED AND TESTED IN ACCORDANCE WITH CURRENT EDITION OF UL STANDARD 555S. COMBINATION FIRE/SMOKE DAMPERS SHALL HAVE GALVANIZED STEEL AIRFOIL BLADES WITH SILICONE RUBBER GASKET SEALS AND FLEXIBLE STAINLESS STEEL JAMB SEALS. FRAMES SHALL BE MINIMUM 16 GAUGE GALVANIZED STEEL. AXLES SHALL BE MINIMUM 1/2" PLATED STEEL. PROVIDE 212-DEGREE F FUSIBLE LINK. PROVIDE EXPOSED BLADE CONFIGURATION LINKAGES SHALL BE CONCEALED IN THE FRAME. LEAKAGE RATING SHALL BE UL 555S CLASS 1 (4 CFM/2F AT 1.0" W.G.). PROVIDE FACTORY INSTALLED ACTUATOR, LOCATED OUT OF THE AIR STREAM. COMBINATION FIRE/SMOKE DAMPERS SHALL BE POWERED OPEN, SPRING CLOSED.
 - d. PROVIDE APPROVED FIRE DAMPERS AT ALL LOCATIONS INDICATED ON THE PLANS AND/OR REQUIRED BY BUILDING CODE.
 - e. FIRE DAMPERS AND FUSIBLE LINKS SHALL BE ACCESSIBLE THROUGH ACCESS DOORS OR PANELS IN DUCTS AND ACCESS PANELS IN THE BUILDING STRUCTURE OR CEILINGS.
 - f. FIRE DAMPERS FURNISHED AS AN INTEGRAL PART OF DIFFUSERS OR GRILLES SHALL BE ACCESSIBLE BY MEANS OF REMOVABLE GRILLE OR DIFFUSER FACE.
 5. DUCT INSULATION:
 - a. BLANKET TYPE DUCT INSULATION: PROVIDE MINIMUM 1-1/2" THICK BLANKET TYPE FIBERGLASS INSULATION COMPLYING WITH ASTM C-553, TYPE II, WITH FACTORY APPLIED BRAST BONDED TO ALUMINUM FOIL REINFORCED WITH FIBERGLASS VAPOR BARRIER/JACKET. JACKET SHALL CONFORM TO ASTM C-1136, TYPE II.
 - b. DUCT LINER: PROVIDE MINIMUM 1/4" THICK, 2 PLY DENSITY, NEOPRENE COATED, LONG TEXTILE FIBER TYPE DUCT LINER, WITH COATING ON THE AIR STREAM SIDE CONFORMING TO NFPA 90A. DUCT LINER ADHESIVE SHALL BE AS RECOMMENDED BY DUCT LINER MANUFACTURER, AND SHALL COMPLY WITH ASTM C-916. DUCT LINER FASTENERS SHALL COMPLY WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS, LATEST EDITION.
 - c. CONCEALED CONDITIONED SUPPLY AND RETURN AIR DUCTS SHALL BE INSULATED WITH BLANKET TYPE DUCT INSULATION, INSTALLED IN ACCORDANCE WITH INSULATION MANUFACTURER'S INSTALLATION INSTRUCTIONS.
 - d. CONDITIONED SUPPLY AIR AND RETURN AIR DUCTS AND PLENUMS EXPOSED TO VIEW OR WHERE REQUIRED FOR ACoustICAL PURPOSES SHALL BE LINED WITH DUCT LINER. INSTALL DUCT LINER IN ACCORDANCE WITH LINER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
 6. CONTROL SYSTEMS:
 - a. PROVIDE COMPLETE CONTROL SYSTEMS INCLUDING INSTRUMENTS, CONTROLS, THERMOSTATS, RELAYS, SENSORS, LOW VOLTAGE WIRING, TRANSFORMERS, AND NEUTRAL AND GROUND TIES. LOW VOLTAGE WIRING SHALL BE INSTALLED IN ACCORDANCE WITH ELECTRIC SPECIFICATIONS.
- EXECUTION
1. TESTING, ADJUSTING, AND BALANCING:
 - a. TEST, ADJUST, AND BALANCE ALL MECHANICAL SYSTEMS AND EQUIPMENT TO ENSURE PROPER BALANCE AND OPERATION. PERFORM TESTS TO ACCORDANCE WITH ASHRAE AND ASHRAE STANDARDS. ELIMINATE VIBRATION AND NOISE, AND ENSURE PROPER FUNCTION OF CONTROLS. SUBMIT COMPLETED CERTIFIED TEST AND BALANCE REPORT TO OWNER'S REPRESENTATIVE. BALANCING CONTRACTOR SHALL BE AN INDEPENDENT NEER OR AASO CERTIFIED TEST AND BALANCE CONTRACTOR. BALANCE ALL SYSTEMS TO WITHIN 5% OF AIR FLOWS INDICATED ON THE DRAWINGS, AND REPORT ALL DISCREPANCIES TO HVAC INSTALLER FOR CORRECTION. MARK FINAL BALANCE POSITIONS ON DAMPERS WITH PERMANENT MARKER. FINAL STORE BALANCE SHALL BE POSITIVE WITH RESPECT TO OUTDOORS.
 2. VIBRATION AND NOISE:
 - a. ELIMINATE VIBRATION AND NOISE FROM THE OPERATION OF FANS, MOTORS, AND EQUIPMENT TO THE EXTENT THAT THEY WILL NOT BE HEARD OUTSIDE OF THE ROOM IN WHICH INSTALLED. ADJUSTMENTS AND CHANGES TO PRODUCE SATISFACTORY QUIETNESS TO BE MADE WITHOUT EXPENSE TO OWNER.
 3. OPERATING AND MAINTENANCE MANUALS:
 - a. PROVIDE COMPLETE OPERATIONS AND MAINTENANCE MANUALS FOR ALL MECHANICAL EQUIPMENT INSTALLED ON PROJECT. INCLUDE INDEX OF EQUIPMENT, DIRECTORY INCLUDING SUPPLIER, TELEPHONE NUMBERS, AND LIST OF RECOMMENDED SPARE PARTS. MANUALS SHALL BE FURNISHED IN 1/4" BINDER, CLEARLY LABELED "OPERATION AND MAINTENANCE MANUAL FOR CHECK-CASHIERS". PROVIDE 2 COPIES OF EACH MANUAL. PROVIDE INSTRUCTIONS BY QUALIFIED TECHNICIAN TO OWNER'S REPRESENTATIVE.
 4. CLEANING:
 - a. MACHINERY AND APPARATUS: THOROUGHLY CLEAN CEMENT AND PLASTER AND OTHER MATERIALS, REMOVE GREASE AND OIL SPOTS WITH CLEANING SOLVENT. CAREFULLY WIRE SURFACES. CLEAN.
 - b. EXPOSED METAL WORK: CAREFULLY CLEAN WITH STEEL BRUSH, REMOVING ALL RUST AND SOILED SPOTS, AND PROVIDE TOUCH-UP PAINT AS REQUIRED.
 - c. FINAL CLEANING: REMOVE ALL SCRAPS AND INSTALLATION-RELATED DEBRIS FROM AREA. LEAVE ENTIRE INSTALLATION AREA IN A NEAT, CLEAN, AND READY-TO-USE CONDITION.

2009 IECC (INTERNATIONAL ENERGY CONSERVATION CODE) COMMISSIONING REQUIREMENTS

- 408.2.1 PRELIMINARY COMMISSIONING REPORT. A PRELIMINARY REPORT OF COMMISSIONING TEST PROCEDURES AND RESULTS SHALL BE COMPLETED AND CERTIFIED BY THE REGISTERED DESIGN PROFESSIONAL OF APPROVED AGENCY AND PROVIDED TO THE BUILDING OWNER OR OWNER'S AUTHORIZED AGENT. THE REPORT SHALL BE ORGANIZED WITH MECHANICAL AND SERVICE HOT WATER FINDINGS IN SEPARATE SECTIONS TO ALLOW INDEPENDENT REVIEW. THE REPORT SHALL BE IDENTIFIED AS "PRELIMINARY COMMISSIONING REPORT" SHALL INCLUDE THE COMPLETED COMMISSIONING COMPLIANCE CHECKLIST, 408.2.4, AND SHALL IDENTIFY:
1. IDENTIFICATION OF DEFICIENCIES FOUND DURING TESTING REQUIRED BY THIS SECTION THAT HAVE NOT BEEN CORRECTED AT THE TIME OF REPORT PREPARATION.
 2. DEFERRED TESTS THAT CANNOT BE PERFORMED AT THE TIME OF REPORT PREPARATION BECAUSE OF CLIMATIC CONDITIONS.
 3. CLIMATIC CONDITIONS REQUIRED FOR PERFORMANCE OF THE DEFERRED TESTS.
 4. RESULTS OF FUNCTIONAL PERFORMANCE TESTS.
 5. FUNCTIONAL PERFORMANCE TEST PROCEDURES USED DURING THE COMMISSIONING PROCESS, INCLUDING MEASURABLE CRITERIA FOR TEST ACCEPTANCE.
- 408.2.4.1 ACCEPTANCE OF REPORT. BUILDINGS OR PORTIONS THEREOF SHALL NOT BE CONSIDERED ACCEPTABLE FOR A FINAL INSPECTION PURSUANT TO SECTION 408.2.6 UNTIL THE CODE OFFICIAL HAS RECEIVED THE PRELIMINARY COMMISSIONING REPORT FROM THE BUILDING OWNER OR OWNER'S AUTHORIZED AGENT.
- 408.2.4.2 COPY OF REPORT. THE CODE OFFICIAL SHALL BE PERMITTED TO REQUIRE THAT A COPY OF THE PRELIMINARY COMMISSIONING REPORT BE MADE AVAILABLE FOR REVIEW BY THE CODE OFFICIAL.
- 408.2.5 DOCUMENTATION REQUIREMENTS. THE CONSTRUCTION DOCUMENTS SHALL SPECIFY THAT THE DOCUMENTS DESCRIBED IN THIS SECTION BE PROVIDED TO THE BUILDING OWNER OR OWNER'S AUTHORIZED AGENT WITHIN 90 DAYS OF THE DATE OF RECEIPT OF THE CERTIFICATE OF OCCUPANCY.
- 408.2.5.1 SYSTEM FUNCTIONAL REPORT. A WRITTEN REPORT DESCRIBING THE ACTIVITIES AND EQUIPMENT COMPLETED IN ACCORDANCE WITH SECTION 408.2.2.
- 408.2.5.2 FINAL COMMISSIONING REPORT. A REPORT OF TEST PROCEDURES AND RESULTS IDENTIFIED AS "FINAL COMMISSIONING REPORT" SHALL BE DELIVERED TO THE BUILDING OWNER OR OWNER'S AUTHORIZED AGENT USED FOR AIR-BALANCING AND ARE PROHIBITED. CONSTANT-VOLUME FANS AND VARIABLE-VOLUME FANS WITH MOTORS TO HP 1.05 (KW) AND LARGER AIR SYSTEMS SHALL BE BALANCED IN A MANNER TO FIRST MINIMIZE THROTTLING LOSSES. THE FAN WITH THE HIGHEST POWER OF GREATER THAN 1 HP (0.746 KW), FAN SPEED SHALL BE ADJUSTED TO MEET DESIGN FLOW CONDITIONS.
- EXCEPTION: FANS WITH MOTORS OF 1 HP (0.74 KW) OR LESS ARE NOT REQUIRED TO BE PROVIDED WITH A MEANS FOR AIR BALANCING.
- 408.2.5.3 HYDRONIC SYSTEMS BALANCING. INDIVIDUAL HYDRONIC HEATING AND COOLING COILS SHALL BE EQUIPPED WITH MEANS FOR BALANCING AND MEASURING FLOW. HYDRONIC SYSTEMS SHALL BE PROPORTIONATELY BALANCED IN A MANNER TO FIRST MINIMIZE THROTTLING LOSSES, THEN THE PUMP IMPELLER SHALL BE TRIMMED OR PUMP SPEED SHALL BE ADJUSTED TO MEET DESIGN FLOW CONDITIONS. EACH HYDRONIC SYSTEM SHALL HAVE EITHER THE CAPABILITY TO MEASURE PRESSURE ACROSS THE PUMP, OR TEST PORTS AT EACH SIDE OF EACH PUMP.
- EXCEPTIONS: THE FOLLOWING EQUIPMENT IS NOT REQUIRED TO BE EQUIPPED WITH A MEANS FOR BALANCING OR MEASURING FLOW:
1. PUMPS WITH PUMP MOTORS OF 5 HP (3.7 KW) OR LESS.
 2. WHERE THROTTLING RESULTS IN NO GREATER THAN 5 PERCENT OF THE NAMEPLATE HORSEPOWER DRAW ABOVE THAT REQUIRED IF THE IMPELLER WERE TRIMMED.
- 408.2.3 FUNCTIONAL PERFORMANCE TESTING. FUNCTIONAL PERFORMANCE TESTING SPECIFIED IN SECTIONS 408.2.3.1 THROUGH 408.2.3.3 SHALL BE CONDUCTED.
- 408.2.3.1 EQUIPMENT. EQUIPMENT FUNCTIONAL PERFORMANCE TESTING SHALL DEMONSTRATE THE INSTALLATION AND OPERATION OF COMPONENTS, SYSTEMS, AND SYSTEM-TO-SYSTEM INTERFACING RELATIONSHIPS IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS SUCH THAT OPERATION, FUNCTION, AND MAINTENANCE SERVICEABILITY FOR EACH OF THE COMMISSIONED SYSTEMS IS CONFIRMED. TESTING SHALL INCLUDE ALL MODES AND SEQUENCE OF OPERATION, INCLUDING UNDER FULL-LOAD, PART-LOAD AND THE FOLLOWING EMERGENCY CONDITIONS:
1. ALL MODES AS DESCRIBED IN THE SEQUENCE OF OPERATION.
 2. REMANENT OR AUTOMATIC BACK-UP MODE.
 3. PERFORMANCE OF ALARMS.
 4. MODE OF OPERATION UPON A LOSS OF POWER AND RESTORATION OF POWER.
- EXCEPTION: UNITARY OR PACKAGED HVAC EQUIPMENT LISTED IN TABLES 408.2.3(1) THROUGH 408.2.3(3) THAT DO NOT REQUIRE SUPPLY AIR ECONOMIZERS.
- 408.2.3.2 CONTROLS. HVAC AND SERVICE WATER-HEATING CONTROL SYSTEMS SHALL BE TESTED TO DOCUMENT THAT CONTROL DEVICES, COMPONENTS, EQUIPMENT AND SYSTEMS ARE CALIBRATED AND ADJUSTED AND OPERATE IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS. SEQUENCES OF OPERATION SHALL BE FUNCTIONALLY TESTED TO DOCUMENT THEY OPERATE IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS.
- 408.2.3.3 ECONOMIZERS. AIR ECONOMIZERS SHALL UNDERGO A FUNCTIONAL TEST TO DETERMINE THAT THEY OPERATE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

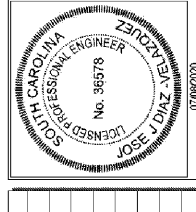
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PROJECT NAME
Caliber Collision Five Forks (161)
1215 East Bayshore Rd
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