

DIVISION 23 - MECHANICAL SPECIFICATIONS

230500 COMMON WORK RESULTS FOR HVAC

- A. PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL HEATING, VENTILATING AND AIR CONDITIONING SYSTEM, COMPLETE AS INDICATED ON THE DRAWINGS, AS REQUIRED BY CODE AND AS SPECIFIED HEREIN.
- B. WITHOUT RESTRICTING THE GENERALITY OF THE FIRST STATEMENT, THE WORK TO BE PERFORMED UNDER THIS DIVISION SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING:
 - 1. HVAC WORK AS DESCRIBED IN SECTIONS 230500 THROUGH 233813.
- C. ELECTRICAL CONTRACTOR, UNLESS OTHERWISE NOTED, SHALL PROVIDE POWER WIRING FOR EACH ITEM OF ELECTRICAL EQUIPMENT AND MAKE FINAL CONNECTION TO MOTORS.
- D. ALL FINISH PAINTING SHALL BE PERFORMED BY GENERAL CONTRACTOR, EXCEPT AS NOTED ELSEWHERE. THIS CONTRACTOR SHALL RESTORE TO ORIGINAL CONDITION ANY PAINTING DEFACED BY THIS CONTRACTOR AFTER ORIGINAL PAINTING.
- E. ALL WORK SHALL CONFORM TO CODES, RULES, AND REGULATIONS:
 - 1. NATIONAL ELECTRICAL CODE.
 - 2. STANDARD FOR THE INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS, NFPA 90A.
 - 3. CODE FOR SAFETY TO LIFE FROM FIRE IN BUILDINGS AND STRUCTURES, NFPA 101.
 - 4. FEDERAL OCCUPATIONAL SAFETY AND HEALTH STANDARDS.
 - 5. STATE MECHANICAL CODE.
 - 6. STATE BUILDING CODE.
 - 7. STATE INDUSTRIAL COMMISSION REQUIREMENTS.
 - 8. LOCAL BUILDING CODE REQUIREMENTS.
 - 9. BUILDING INSURING AGENCY REQUIREMENTS.
 - 10. INTERNATIONAL MECHANICAL CODE.
- F. ALL PERMITS REQUIRED BY LAWS, ORDINANCES AND BUILDING CODES HAVING JURISDICTION SHALL BE OBTAINED AT THE PROPER TIME BY AND AT THE EXPENSE OF THIS CONTRACTOR.
- G. THIS CONTRACTOR SHALL OBTAIN ALL INSPECTIONS REQUIRED BY ALL LAWS, ORDINANCES AND PUBLIC AUTHORITY HAVING JURISDICTION AND SHALL OBTAIN CERTIFICATES OF SUCH INSPECTIONS AND SUBMIT SAME TO THE ARCHITECT AND SHALL PAY ALL FEES, CHARGES, ASSESSMENTS AND OTHER EXPENSES IN CONNECTION THEREWITH.
- H. PIPING AND EQUIPMENT LAYOUT IS SCHEMATIC. EXACT LOCATIONS ARE DETERMINED BY STRUCTURAL AND OTHER CONDITIONS. DESIGN OF SYSTEM MAY NOT BE CHANGED. ONLY EXACT LOCATION OF PIPING AND DUCTS MAY BE REVISED TO SUIT CONSTRUCTION CONDITIONS AND AID IN COORDINATION WITH WORK OF OTHER CONTRACTORS.
- I. MATERIALS AND EQUIPMENT INSTALLED IN THE WORK SHALL MEET THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND NO MATERIALS OR EQUIPMENT SHALL BE ORDERED UNTIL REVIEWED BY THE OWNER. THE ARCHITECT OF RECORD IS RESPONSIBLE FOR REVIEWING AND APPROVING THE HVAC SUBMITTALS. THE HVAC UNITS SHALL NOT BE CONSIDERED AS ORDERED AND IN PROGRESS UNTIL SUBMITTALS ARE FORMALLY APPROVED AND RETURNED TO HVAC SUPPLIER.
- J. CATALOG DATA FOR EQUIPMENT REVIEWED BY THE OWNER SHALL NOT SUPERSEDE THE CONTRACT DOCUMENTS. REVIEW OF PRODUCTS SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR DEVIATIONS FROM DRAWINGS OR SPECIFICATIONS, PROVIDING PROPER CLEARANCE, FABRICATION PROCESS AND COORDINATION WITH OTHER TRADES.
- K. WHEN SUBMITTED FOR REVIEW, SHOP DRAWINGS SHALL BEAR CONTRACTOR'S CERTIFICATION THAT CONTRACTOR HAS REVIEWED, CHECKED AND APPROVED THE SHOP DRAWINGS, THAT THEY ARE IN HARMONY WITH THE REQUIREMENTS OF THE PROJECT AND WITH THE PROVISIONS OF THE CONTRACT DOCUMENTS AND THAT CONTRACTOR HAS VERIFIED ALL FIELD MEASUREMENTS AND CONSTRUCTION CRITERIA, MATERIALS, CATALOG NUMBERS AND SIMILAR DATA. CONTRACTOR SHALL ALSO CERTIFY THAT THE WORK REPRESENTED BY THE SHOP DRAWINGS IS RECOMMENDED BY THE CONTRACTOR AND THE CONTRACTOR'S GUARANTEE WILL FULLY APPLY.
- L. CONTRACTOR SHALL VERIFY LOCATION OF UTILITIES AND NOTE CONDITIONS WHICH WOULD AFFECT THE WORK. ALL DISCREPANCIES SHALL BE REPORTED PRIOR TO THE BID AWARD.
- M. PROVIDE INSTRUCTION TO OWNER'S OPERATING PERSONNEL AS NECESSARY, SHOWING LOCATIONS AND PROPER OPERATION OF MAJOR ITEMS OF EQUIPMENT AND SYSTEM COMPONENTS AND REFERRING TO THE OPERATING INSTRUCTION MANUAL DESCRIBED BELOW AS A GUIDE.
- N. COMPILE WRITTEN MANUAL OF OPERATING INSTRUCTIONS INCLUDING COPIES OF SHOP DRAWINGS AND LISTING OF EQUIPMENT SUPPLIERS. ASSEMBLE IN 8-1/2" X 11" HARD BACKED INDEXED BINDER. MATERIAL SHALL BE AS FOLLOWS:
 - 1. TITLE PAGE: TITLE OF JOB, OWNER, ADDRESS, DATE OF SUBMISSION, CONTRACTOR AND ENGINEER.
 - 2. INDEX.
 - 3. LIST OF MAJOR EQUIPMENT USED IN PROJECT ACCOMPANIED BY CONTRACTOR PURCHASE ORDER NUMBERS AND SUPPLIERS NAMES AND ADDRESSES.
 - 4. ONE COPY OF EACH SHOP DRAWING GROUPED BY TYPES OF EQUIPMENT, I.E., ROOFTOP UNITS, FANS, ETC.
 - 5. SECTION FOR EACH SYSTEM INCLUDING:
 - a. BRIEF DESCRIPTION OF SYSTEM OPERATION WITH LOCATION OF MAJOR COMPONENTS.
 - b. HVAC SYSTEM MAINTENANCE AND CALIBRATION INFORMATION, INCLUDING WIRING DIAGRAMS AND SCHEMATICS.
- O. SUBMIT A COMPLETED COPY TITLED "HVAC OPERATING INSTRUCTION MANUAL" ON THE BINDING EDGE OF BINDER TO ARCHITECT FOR APPROVAL. AFTER ARCHITECT'S REVIEW AND ANY CORRECTIONS REQUIRED ARE COMPLETED, SUBMIT A COPY OF THE MANUAL TO THE OWNER.
- P. WITHIN 90 DAYS AFTER DATE OF SYSTEM ACCEPTANCE, RECORD DRAWINGS OF ACTUAL INSTALLATION SHALL BE PROVIDED TO BUILDING OWNER. RECORD DRAWINGS SHALL INCLUDE AS A MINIMUM THE LOCATION AND PERFORMANCE DATA ON EACH PIECE OF EQUIPMENT, GENERAL CONFIGURATION OF DUCT DISTRIBUTION SYSTEM INCLUDING SIZES, AND AIR DESIGN FLOW RATES.
- Q. THIS CONTRACTOR IS TO BECOME INFORMED OF THE EXACT DIMENSIONS OF FINISHED WORK WHERE PIPES, DUCTS AND EQUIPMENT ARE TO BE PLACED AND WILL ARRANGE THE WORK ACCORDINGLY, ASSUMING ALL RESPONSIBILITY FOR PROPER LOCATION AND COORDINATION OF THE WORK.
- R. IN THE ERECTION OF DUCTWORK, SPECIAL CARE SHALL BE USED PROVIDING SUPPORT.
- S. ALL DUCTWORK SHALL BE PLACED SO AS TO AVOID INTERFERENCES WITH PLUMBING PIPES, ELECTRIC CONDUITS OR PIPES OF OTHER CONTRACTORS.
- T. ALL DUCTWORK SHALL BE PROVIDED WITH SUFFICIENT DISTANCE FROM WALLS, PIPES, AND OTHER OBSTACLES TO PERMIT THE APPLICATION OF FULL THICKNESS OF INSULATION SPECIFIED.

230593 TESTING, ADJUSTING, & BALANCING HVAC

- A. THE CONTRACTOR SHALL COMPLETE INSTALLATION OF HOOD SYSTEM, ROOFTOP EQUIPMENT, AND CONTROL SYSTEM IN ACCORDANCE WITH THE DRAWINGS PRIOR TO PERFORMING TAB. CONTRACTOR SHALL PROGRAM THERMOSTATS IN ACCORDANCE WITH REQUIREMENTS LISTED AND FOLLOWING STATUS AS INDICATED IN THE TAB CONFIRMATION FORM. CONTRACTOR SHALL UTILIZE PERSONNEL AND SUBCONTRACTORS THAT ARE FULLY TRAINED AND CERTIFIED BY THE MANUFACTURER FOR EQUIPMENT BEING INSTALLED.
 - HTTP://WWW.IGNITORLABS.COM/WRV-T-DOC-HOME/
- B. CONTRACTOR SHALL COMPLETE ALL CALIBRATIONS AND TESTS OUTLINED IN WENDY'S TEST PROTOCOLS AND DOCUMENT RESULTS ON DESIGNATED FORMS. COPIES OF FORMS ARE AVAILABLE ONLINE:
 - HTTPS://PORTAL.IGNITORLABS.COM
- C. ALL CONTRACTORS WORKING ON PROJECT ARE REQUIRED TO HAVE COMPLETED THE WENDY'S RESTAURANT VENTILATION COURSE FROM IGNITOR LABS WITHIN THE PAST 12 MONTHS:
 - A COMPLETION CERTIFICATE FROM IGNITOR LABS WITH A SCORE OF 80% OR HIGHER IS REQUIRED. CONTRACTOR IS RESPONSIBLE FOR THE NOMINAL COSTS REQUIRED FOR PROJECT PERSONNEL TO TAKE THE COURSE.
- D. PROCEDURES/CHECKLISTS:

CHECKLIST PROCEDURE TROUBLESHOOTING			
BREAKER PANELS			
WESCO	RQC-2017-013	RQC-2017-014	RQC-2017-015
CPI	RQC-2017-043	RQC-2017-044	RQC-2017-045
ROOFTOP UNITS			
AACN	RQC-2018-073	NA	NA
CARRIER	RQC-2017-033	NA	NA
TRANE	RQC-2017-022	NA	NA
HOOD SYSTEM			
HALLTUN	RQC-2017-050	RQC-2017-051	NA
CAPTIVE AIRE	RQC-2017-060	RQC-2017-061	NA
- E. QUALIFICATIONS:
 - 1. BALANCER SHALL BE A MEMBER IN GOOD STANDING AND CERTIFIED WITH THE ASSOCIATED AIR

- BALANCE COUNCIL (AABC), OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). BALANCER SHALL BE TOTALLY INDEPENDENT, HAVING NO AFFILIATION WITH ANY PROJECT CONTRACTOR, DESIGN PROFESSIONAL, EQUIPMENT MANUFACTURER OR SUPPLIER OF HVAC RELATED EQUIPMENT. BALANCER SHALL HAVE BEEN REGULARLY ENGAGED IN TAB OF HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS FOR RESTAURANTS. BALANCER SHALL PROVIDE PROOF THAT PERSONNEL PERFORMING WORK HAVE SUCCESSFULLY COMPLETED AT LEAST FIVE RESTAURANT PROJECTS OF SIMILAR SIZE AND SCOPE. A COMPLETE LIST OF REFERENCE PROJECTS INCLUDING NAME AND PHONE NUMBER OF CONFIRMING CONTACTS, SHALL BE SUBMITTED WITH QUOTE, IF REQUESTED.
- 2. ALL INSTRUMENTS USED FOR TAB SHALL BE ACCURATELY CALIBRATED WITHIN TWELVE (12) MONTHS OF BALANCING AND MAINTAINED IN GOOD WORKING ORDER. PROVIDE RECORDS OF LAST CALIBRATION (AS REQUESTED) AND INCLUDE THIS SUMMARY IN THE FINAL TAB REPORT. THE ENGINEER OF RECORD, OR THEIR REPRESENTATIVE, MAY OBSERVE TAB ACTIVITIES.
- 3. UNLESS OTHERWISE NOTED RESTAURATEUR SHALL PROCURE THE SERVICES OF AND CONTRACT DIRECTLY WITH AN INDEPENDENT TAB CONTRACTOR (BALANCER) MEETING THE QUALIFICATIONS OF THIS SECTION. BALANCER SHALL TEST, BALANCE, AND ADJUST ALL AIR MOVING EQUIPMENT (RTU'S AND FANS), AIR DISTRIBUTION DUCTS AND AIR DEVICES, EXHAUST SYSTEMS, AND TEMPERATURE CONTROL SYSTEMS.
- 4. IF CONTRACTOR IS REQUIRED TO PROCURE TAB SERVICES DIRECTLY, CONTRACTOR SHALL PROVIDE THE QUALIFICATIONS OF THE BALANCER TO RESTAURATEUR OR THEIR REPRESENTATIVE FOR APPROVAL. CONTRACTOR SHALL CONTRACT BALANCER AS SOON AS POSSIBLE AFTER CONSTRUCTION START TO COORDINATE THEIR WORK WITH OTHER TRADES, WHILE MEETING THE COMPLETION DATE. CONTRACTOR SHALL PREPARE A CRITICAL PATH SCHEDULE, COORDINATED WITH ALL SUBCONTRACTORS, TO ACCOMPLISH ALL TASKS REQUIRED OF BALANCER.
- 5. CONTRACTORS SHALL COOPERATE AND ASSIST BALANCER AS REQUIRED. BALANCER SHALL INSPECT ALL MECHANICAL, EXHAUST, AND CONTROL SYSTEM WORK. ANY DEVIATIONS FROM PLANS AND SPECIFICATIONS THAT MAY AFFECT THE PERFORMANCE OF THE SYSTEM SHALL BE REPORTED IN WRITING TO CONTRACTOR, ARCHITECT OF RECORD, ENGINEER AND RESTAURATEUR.
- F. CONTRACTOR SHALL COMPLETE THE FOLLOWING PRIOR TO TAB: PERMANENT POWER SHALL BE PROVIDED, ROOFTOP UNIT FULL INSTALLED AND STARTED, HOOD SYSTEMS AND FANS STARTED, COMPLETE CONTROLS OPERATIONAL AND PROGRAMMED, ALL DUCTWORK, DIFFUSER AND CEILING INSTALLATION COMPLETED. ADDITIONAL TAB COSTS ARE THE CONTRACTOR'S RESPONSIBILITY IF REQUIRED ITEMS ARE NOT COMPLETE AT START OF TAB PROCEDURES.
- G. DESIGN BALANCE DEVIATION TOLERANCES:
 - 1. KITCHEN HOODS ARE UL LISTED AND SHALL BE BALANCED FROM 100% TO 105% OF DESIGN AIRFLOW. DO NOT SET EXHAUST RATE BELOW THAT SCHEDULED. INCREASE RTU AIRFLOW AS NEEDED TO ACHIEVE POSITIVE PRESSURE IN THE RESTAURANT.
 - 2. TOTAL OF ALL AIR DISTRIBUTION DEVICES ON SAME ROOFTOP UNIT DUCT SYSTEM SHALL BE BALANCED TO 100% TO 105% OF DESIGN.
 - 3. ROOFTOP UNITS SHALL PROVIDE OUTDOOR AIR CFM BETWEEN 100% TO 105% OF DESIGN FOR ALL FAN SPEEDS DURING REGULAR HOURS AND SHALL BE SET TO TRACK AIR VOLUME WITH THE FAN FOR THE FAN SPEED PROVIDED BY THE UNITS.
 - 4. ECONOMIZERS SHALL PROVIDE REQUIRED OUTDOOR AIR WHEN CLOSED FOR BUSINESS (MINIMUM ONLY).
 - 5. OVERALL SYSTEM SHALL BE BALANCED TO POSITIVE CFM AS SHOWN ON THE VENTILATION SCHEDULE WITH ALL FANS IN OPERATION.
 - 6. CONTACT RTU MANUFACTURER TO RESOLVE AIRFLOW DELIVERY IF ROOFTOP UNIT AIRFLOWS ARE BELOW DESIGN. THIS INCLUDES VERIFICATION OF DUCTWORK STATIC PRESSURE, ADJUSTMENT OF FAN RPM, REPLACEMENT OF DRIVES, ETC. THE RESTAURANT SHALL BE LEFT IN A POSITIVE AIR PRESSURE STATE.
- H. PLAN REVIEW: PROVIDE WRITTEN TESTING AND BALANCING PLAN REVIEW WITHIN FIVE (5) BUSINESS DAYS UPON RECEIPT OF CONTRACT. THE PLAN REVIEW SHALL INCLUDE RECOMMENDATIONS TO IMPROVE TESTING AND BALANCING. TRANSMIT THESE COMMENTS DIRECTLY TO CONTRACTOR. REVIEW WENDY'S RESTAURANT VENTILATION EQUIPMENT PRE-START AND START-UP FORMS.
- I. EQUIPMENT SUBMITTAL DATA: CONTRACTOR SHALL PROVIDE RESTAURANT EQUIPMENT SUBMITTAL DATA TO THE BALANCER. COMPLETED EQUIPMENT STARTUP AND CALIBRATION FORMS SHALL BE PROVIDED TO BALANCER PRIOR TO PERFORMING THE TAB.
- J. UPDATED DESIGN REQUIREMENTS: IF ANY, SHALL BE PROVIDED TO BALANCER PRIOR TO TAB. DESIGN REQUIREMENT CHANGES SHALL INCLUDE DATE OF THE CHANGE AND REFERENCES TO THE CONTRACT DOCUMENTS (ADDENDA, CHANGE ORDER, OR CONSTRUCTION CHANGE DIRECTIVE), WHICH DIRECTED THE CHANGE. CHANGES MADE WITHOUT RESTAURATEUR WRITTEN APPROVAL ARE INVALID.
- K. BALANCER TEST AND BALANCE REPORT:
 - 1. PERFORM TAB WORK ASSOCIATED WITH THE RESTAURANT VENTILATION SYSTEM PER DESIGN DOCUMENTS. SUBMIT AN ELECTRONIC PDF COPY OF TABULATED REPORTS IN NEATLY ORGANIZED TYPED FORMS (WITH NUMBERED PAGES) WITH AABC OR NEBB FULLY COMPLETED, STAMPED AND SEALED REPORTS. REPORT SHALL BE PROVIDED WITHIN SEVEN (7) DAYS OF COMPLETION OF TESTS TO ARCHITECT OF RECORD, ENGINEER, CONTRACTOR AND RESTAURATEUR. REPORT SHALL INCLUDE START UP CHECKLIST FORMS AND REPORTS PROVIDED TO BALANCER BY CONTRACTOR, EQUIPMENT TEST DATA AND DRAWINGS TO COINCIDE WITH THE TEST REPORT. IN ADDITION, ALL REPORTS SHALL INCORPORATE:
 - 2. A SUMMARY THAT SHALL INCLUDE A GENERAL DESCRIPTION OF PROJECT (BUILDING TYPE, SYSTEM TYPE, AND EQUIPMENT DESCRIPTION).
 - 3. A DESCRIPTIVE LIST OF ALL EQUIPMENT AND TEST RESULTS THAT DO NOT MEET PLANS AND SPECIFICATIONS (INCLUDE PHOTOGRAPHS).
 - 4. COPIES OF REDUCED PLAN DRAWINGS THAT UNIQUELY IDENTIFY AND CROSS REFERENCE AIR DEVICES AND HVAC EQUIPMENT.
 - 5. PROVIDE BUILDING PRESSURE TABLES THAT INDICATE DESIGN AND ACTUAL RESULTS.
 - 6. REPORTS THAT ARCHITECT AND/OR ENGINEER DETERMINES IS INACCURATE, OR INCOMPLETE, SHALL BE RETURNED FOR CORRECTION, COMPLETION, OR RE-TESTING AT BALANCERS COST. REVISED REPORTS SHALL BE SUBMITTED IN THEIR ENTIRETY. EACH REVISION SHALL BE HIGHLIGHTED AND SHALL INDICATE REVISION DATE. COVER PAGE SHALL INDICATE DATE OF FIRST EDITION AND REVISION DATE.
 - L. TEST & BALANCE CONFIRMATION FORM: BALANCER SHALL COMPLETE A WENDY'S TEST & BALANCE CONFIRMATION FORM WHILE PERFORMING SYSTEM TESTING. IT SHALL BE SIGNED OFF WHEN TAB IS COMPLETE AND INCLUDED AT THE END OF THE TEST AND BALANCE REPORT. A DIGITAL VERSION OF THIS FORM CAN BE FOUND UNDER TEST AND BALANCE REPORTS AT:
 - HTTP://WWW.IGNITORLABS.COM/WRV-T-DOC-HOME/
- M. CONTRACTOR'S RESPONSIBILITIES FOR TAB:
 - 1. CONTRACTOR SHALL BE COMPLETELY FAMILIAR WITH ALL PROVISIONS AND RESPONSIBILITIES OF THE BALANCER AND SHALL PROVIDE COOPERATION AND SUPPORT REQUIRED.
 - 2. CONTRACTOR SHALL CORRECT OR REPAIR DEFICIENCIES NOTED BY BALANCER IMMEDIATELY. IF DEFICIENCIES ARE NOT CORRECTED WHILE BALANCER IS ON SITE, AND DEFICIENCIES PREVENT COMPLETION OF TAB WORK, CONTRACTOR SHALL ASSUME COSTS FOR EXTENDING TAB, OR FOR FOLLOW UP TAB VISITS.
 - 3. CONTRACTOR SHALL PROVIDE DOCUMENTATION OF CORRECTION OF ANY OPEN ISSUES PRIOR TO SUBMISSION OF FINAL REPORT. SHOULD ANY OPEN HVAC SYSTEM ITEMS BE INCAPABLE OF CORRECTION WITHIN THE SEVEN DAY PERIOD FOR THE FINAL BALANCING REPORT, CONTRACTOR SHALL INFORM BALANCER AND OWNER IMMEDIATELY AND CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS, DELAYS, AND RESCHEDULING REQUIRED.
 - 4. CONTRACTOR IS RESPONSIBLE FOR CORRECTION OF IDENTIFIED ITEMS AND FOR SUBSEQUENT TESTS IN THE EVENT OF THE FOLLOWING:
 - a. NO PERMANENT POWER FOR THE RESTAURANT.
 - b. DIFFUSERS NOT INSTALLED FOR THE TEST.
 - c. CEILING TILES NOT INSTALLED.
 - d. PASSWORD FOR RTU THERMOSTATS NOT PROVIDED.
 - e. INOPERABLE EQUIPMENT.
 - f. THERMOSTATS NOT PROGRAMMED.

- 5. ADDITIONAL RESPONSIBILITIES INCLUDE: PROVIDE REQUIRED SHOP DRAWINGS AND EQUIPMENT DATA INCLUDING ANY APPROVALS OF DESIGN MODIFICATIONS, PROVIDE SAFE AND CLEAR ACCESS TO ALL HVAC SYSTEMS AS NEEDED TO PERFORM TAB WORK (LADDERS, LIFTS, ROOF ACCESS, ACCESS PANELS AND THE LIKE), PROVIDE ACCESS TO TEST OPENINGS AS REQUIRED FOR TESTING AND BALANCING HVAC SYSTEMS, PROVIDE UPDATED JOB SCHEDULE AND TIMELY NOTICE PRIOR TO SCHEDULED EVENTS, MAKE TESTS AND CALIBRATION TO ESTABLISH ADEQUACY, QUALITY, SAFETY, COMPLETED STATUS, AND SATISFACTORY OPERATION OF HVAC SYSTEMS AND COMPONENTS.
- 6. DURING TAB PERIOD, OPERATE ALL HVAC EQUIPMENT AS NECESSARY TO PERMIT SYSTEMS TO BE TESTED AND BALANCED AS FULLY OPERATING FUNCTIONAL SYSTEMS. WORK HARMONIOUSLY WITH BALANCER TO EXPEDITE THE WORK. REMOVE AND REPLACE CEILING AS NECESSARY TO PERMIT TAB OPERATIONS. REMOVE AND REPLACE EQUIPMENT, LIGHTS, OR OTHER ITEMS WHICH OBSTRUCT TESTING AND BALANCING OPERATIONS (WHERE EQUIPMENT, LIGHTS, OR OTHER ITEMS INTERFERE WITH FUTURE ADJUSTMENTS OF HVAC SYSTEM. SUCH EQUIPMENT, LIGHTS, OR OTHER ITEMS SHALL BE RELOCATED BY CONTRACTOR AS DIRECTED BY ENGINEER OF RECORD.
- 7. REPLACE BELTS AND DRIVES AS REQUIRED FOR PROPER BALANCING - DRIVES SHALL BE ADJUSTED AND ALIGNED BY CONTRACTOR TO PREVENT ABNORMAL BELT WEAR AND VIBRATION. ADJUST FAN SPEED AS REQUIRED NOT TO EXCEED MOTOR CAPACITY. CONTRACTOR SHALL ADJUST DAMPERS FOR THE BALANCER DURING TAB WORK. IDENTIFY CONCEALED DAMPER LOCATIONS WITH ORANGE TAPE. MANUALLY OPEN AND TEST DAMPERS FOR SMOOTH VIBRATION-FREE OPERATION AND TIGHTEN PRIOR TO COMMENCEMENT OF TAB WORK. VERIFY THAT ALL CONTROLS ARE INSTALLED AND OPERATING AS REQUIRED IN BOTH STORE OPEN AND CLOSED MODES. BEFORE REQUESTING FINAL TESTING AND BALANCING, SUBMIT SIGNED STATEMENT THAT HVAC SYSTEMS ARE INSTALLED, ADJUSTED, SERVICED, OPERATING SATISFACTORYLY, AND ARE READY FOR USE.
- N. SYSTEM READY NOTICE: ALLOW ADEQUATE TIME TO PERFORM TESTING AND BALANCING WORK. ALL TAB IS REQUIRED TO BE PERFORMED PRIOR TO RESTAURANT OPENING. NOTIFY BALANCER UPON COMMENCEMENT OF WORK RELATED TO HVAC SYSTEM AND COORDINATE PROPER TIME FOR NOTICE TO SCHEDULE TRAVEL AND PROVIDE THE DURATION REQUIRED FOR TEST AND BALANCING AND FOR ANY POSSIBLE CORRECTIONS.
- O. BALANCER RESPONSIBILITIES:
 - 1. RECORD DATA REQUIRED BY AABC OR NEBB FORMS. TEST AND ADJUST SYSTEMS FOR DESIGN CFM OF SUPPLY, OUTSIDE AIR (IN MULTIPLE FAN SPEEDS), AND EXHAUST AIR. KITCHEN APPLIANCES SHOULD BE OPERATIONAL WHILE MAKING ADJUSTMENTS (NO SMOKE BOMB TESTING ALLOWED). HOOD SIDE SKIRTS SHALL BE IN PLACE ON THE CORRECT ENDS OF HOODS (FRY HOOD DUMP SKIRT HAS A CUT OUT). TEST AND RECORD SYSTEM STATIC PRESSURE PROFILES. ADJUST SUPPLY AND RETURN DUCTS TO DESIGN AIRFLOW. TEST AND ADJUST FANS. ADJUST ALL DIFFUSERS, GRILLES, AND REGISTERS TO MINIMIZE DRAFTS. PROVIDE BUILDING DIFFERENTIAL PRESSURE (INSIDE TO OUTSIDE) AT ALL OPERATIONAL CONDITIONS AND INCLUDE IN THE FINAL REPORT.
 - 2. PROVIDE TABLE IN THE REPORT THAT ITEMIZES ALL SUPPLY AND EXHAUST AIR CFM (SPECIFIED AND ACTUAL) TO SHOW THAT BUILDING SHOULD BE UNDER POSITIVE PRESSURE. SIZE, AS CATALOG FACTORS OF DIFFUSERS, GRILLES, REGISTERS, AND ALL TESTED EQUIPMENT SHALL BE IDENTIFIED AND LISTED. READINGS AND TEST OF DIFFUSERS, GRILLES, AND REGISTERS SHALL INCLUDE REQUIRED VELOCITY (FFM), REQUIRED CFM, AND RESULTANT CFM. WHEN DIRECT CFM MEASURING INSTRUMENTS ARE USED, VELOCITIES ARE NOT REQUIRED.
 - 3. BALANCER SHALL COMPLETE A WENDY'S TEST & BALANCE CONFIRMATION FORM WHILE PERFORMING SYSTEM TESTING. IT SHALL BE SIGNED OFF WHEN TAB IS COMPLETE AND INCLUDED AT THE END OF THE TEST AND BALANCE REPORT.

230700 HVAC INSULATION

- A. DUCT INSULATION AND APPURTENANCES SHALL HAVE FLAME SPREAD RATING NOT EXCEEDING TWENTY-FIVE (25) AND SMOKE DEVELOPED RATING NOT EXCEEDING FIFTY (50).
- B. ALL CONCEALED SUPPLY DUCTWORK SHALL HAVE FLEXIBLE FIBERGLASS DUCT WRAP LAMINATED TO FOIL REINFORCED KRAFT VAPOR BARRIER FACING WITH 2" STAPLING FLANGE OF SUFFICIENT DENSITY AND THICKNESS TO MEET THE LOCAL CODE REQUIREMENTS. ONLY COMMERCIAL GRADE INSULATION PRODUCTS MAY BE USED.
- C. INSULATION SHALL NOT BE APPLIED UNTIL CONSTRUCTION HAS PROGRESSED SUFFICIENTLY TO ENSURE AGAINST PHYSICAL OR MOISTURE DAMAGE TO INSULATION. ALL INSULATION DAMAGED THROUGH FAILURE TO OBSERVE THIS DIRECTIVE SHALL BE REPLACED AT THIS CONTRACTOR'S EXPENSE.
- D. HANGER RODS SHALL BE PERPENDICULAR TO DUCTWORK BEFORE INSULATION IS INSTALLED.
- E. INSTALL ALL INSULATION ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
- F. INSULATION SHALL BE APPLIED OVER FLANGES, JOINTS AND SEAMS IN PIPING AND DUCTWORK.
- G. ALL JOINTS AND SEAMS IN INSULATION SHALL BE PROPERLY SEALED TO MAINTAIN VAPOR BARRIER.
- H. INSULATION SHALL BE OWENS-CORNING. EQUAL PRODUCT BY ARMSTRONG, CERTAINTEED, SCHULLER OR KNAUF MAY BE PROVIDED AT CONTRACTOR'S OPTION.

230800 COMMISSIONING OF HVAC

- A. THIS CONTRACTOR SHALL COORDINATE COMMISSIONING OF HVAC SYSTEMS AND SHALL ASSIST OWNERS TEST AND BALANCE CONTRACTOR TO COMPLETION. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR CORRECTING DEFICIENCIES NOTED IN THE TEST AND BALANCE REPORT.
- C. CONTRACTOR SHALL PROVIDE DOCUMENTATION OF ALL TESTING AND COMMISSIONING TO BE INCLUDED IN OPERATING INSTRUCTIONS MANUAL (SEE GENERAL REQUIREMENTS). DOCUMENTATION SHALL INCLUDE:
 - 1. CONSTRUCTION AND SYSTEM CHECKLISTS.
 - 2. CERTIFICATE OF READINESS.
 - 3. INTERIM AND FINAL TEST AND INSPECTION REPORTS AND CERTIFICATES.
 - 4. APPROVED SUBMITTALS.
 - 5. CERTIFICATE OF COMPLETION.
 - 6. AS-BUILT DOCUMENTATION.

233133 METAL DUCTS

- A. THIS SECTION INCLUDES SPECIFICATIONS FOR ALL DUCTWORK EXCEPT 'GREASE DUCT' (EXHAUST DUCT CONNECTED TO TYPE I HOODS WHERE GREASE LADEN VAPORS MAY BE PRESENT). REFER TO PLANS AND DETAILS FOR INFORMATION ON 'GREASE DUCT'.
- B. THIS CONTRACTOR SHALL PROVIDE COMPLETE DUCT SYSTEM CONSISTING OF DUCTWORK, PLENUMS, FITTINGS AND CONNECTORS OF SIZE AND LOCATION AS INDICATED ON DRAWINGS. DUCT SYSTEM SHALL BE CONSTRUCTED AND INSTALLED PER LATEST EDITION OF SMACNA 'HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE'.
- C. ALL PORTIONS OF DUCT SYSTEM SHALL BE DESIGNED, FABRICATED AND INSTALLED PER THE FOLLOWING REQUIREMENTS:
 - 1. LATEST EDITION OF SMACNA 'HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE'.
 - 2. RIGID GALVANIZED SHEET METAL OF THICKNESS AND WITH STIFFENERS AS INDICATED IN SMACNA PER 2" WATER COLUMN CHART.
 - 3. AIR VELOCITIES NO MORE THAN 2000 FPM AND STATIC PRESSURE IN DUCT OF 2" OR LESS.
 - 4. SEALING PER SMACNA 'CLASS B' OR AS REQUIRED TO MEET AIR BALANCE.
 - 5. CROSS-BREAKING, STIFFENING, BRACES, TOES, ANGLES AND OTHER BRACING AND SUPPORT REQUIRED TO MAINTAIN DUCT CONFORMITY TRUE TO SHAPE, PREVENT BUCKLING OR CAVITATION).
 - 6. ALL VERTICAL DUCTS SHALL BE ABLE TO CARRY AN ADDITIONAL 100 LBS. SUSPENDED LOAD FROM HANGERS WITHOUT BUCKLING.
 - 7. SEAMS OF ALL DUCTS AND JOINTS SHALL BE HAMMERED TO A SMOOTH SURFACE ON THE INSIDE.
- D. FLEXIBLE CONNECTIONS SHALL BE INSTALLED AT ROOFTOP UNIT SUPPLY AND RETURN AIR CONNECTIONS. CONNECTIONS SHALL BE AT LEAST 6" LONG, MADE OF NFPA 90A APPROVED FLAMEPROOF FABRIC.
- E. PROVIDE VOLUME CONTROLLER AND EXTRACTOR AT ALL BRANCH TAKEOFFS IN SUPPLY AND RETURN AND AT OTHER LOCATIONS IN SUPPLY AND RETURN MAIN DUCTS AS REQUIRED TO PROPERLY BALANCE SYSTEMS. DAMPER SHALL BE AS SPECIFIED IN SECTION 23 33 00.
- F. PROVIDE TURNING VANES IN ALL ELBOWS OF RECTANGULAR DUCTS. THE BLADES SHALL BE

HOLLOW-FORMED DOUBLE THICKNESS VANES.

- G. PROVIDE SUPPLY, RETURN, AND EXHAUST REGISTERS, GRILLES AND DIFFUSERS AS INDICATED ON DRAWINGS AND/OR SCHEDULES. VERIFY AIR DEVICE REQUIREMENTS WITH GENERAL CONTRACTOR PRIOR TO ORDERING.
- H. PROVIDE FLEXIBLE SUPPLY AIR DUCTWORK WITH 1" THICK FIBERGLASS BLANKET INSULATION WITH METALIZED FILM VAPOR BARRIER OUTER JACKET IN LENGTHS THAT DO NOT EXCEED FIVE FEET, AT ALL AIR DEVICE CONNECTIONS (GRILLES, REGISTERS AND DIFFUSERS).

233300 DAMPERS

- A. THIS CONTRACTOR SHALL PROVIDE RECTANGULAR AND ROUND GALVANIZED STEEL MANUAL AND/OR MOTORIZED VOLUME CONTROL DAMPERS THAT SHALL BE:
 - 1. NO MORE THAN 6" IN ONE DIMENSION (LARGER DAMPERS SHALL BE OPPOSED-BLADE WITH EACH BLADE BEING NO MORE THAN 6").
 - 2. MINIMUM OF 16 GAUGE AND AT LEAST 2 GAUGES HEAVIER THAN DUCT INSTALLED IN.
 - 3. CHANNEL FRAME WITH BRACED CORNERS, CONCEALED LINKAGE, TEFLON FILLED BEARINGS, BLADE STOPS.
 - 4. REPLACEABLE BUTYL RUBBER SEALS INSTALLED ALONG TOP, BOTTOM AND SIDES OF FRAME AS WELL AS ALONG ALL SIDES OF EACH BLADE.
 - 5. 6" LONG CONTROL SHAFT WITH INSULATION STAND-OFF.
 - 6. LOCKING QUADRANT MANUAL HANDLES OR MOTORIZED OPERATORS COMPATIBLE WITH CONTROL SYSTEM.
 - 7. OPERATE FROM FULL OPEN TO FULL CLOSED.
 - B. PROVIDE ACCESS AND PROPER CLEARANCES AS REQUIRED TO OPERATE DAMPERS.
 - C. CHECK DAMPERS FOR PROPER OPERATION BEFORE AND AFTER INSTALLATION.
 - D. INSTALL BALANCE DAMPERS WHERE INDICATED ON DRAWINGS AND ELSEWHERE AS NECESSARY TO OBTAIN PROPER SYSTEM BALANCE.
- 233713 AIR DISTRIBUTION DEVICES**
- A. ALL DIFFUSERS, REGISTERS AND GRILLES SHALL BE PROVIDED BY CONTRACTOR.
 - B. COORDINATE AIR DISTRIBUTION DEVICE LOCATIONS WITH ALL AFFECTED CONTRACTORS BEFORE INSTALLING DUCTWORK. CHANGES IN LOCATION FROM THE DRAWINGS MUST BE APPROVED BY OWNER BEFORE INSTALLATION.
 - C. SUSPEND CEILING AIR DEVICES FROM STRUCTURE ON WIRE HANGERS OR FROM RIGID DUCTWORK. CEILING MUST NOT BE USED TO SUPPORT AIR DISTRIBUTION DEVICES.
 - D. SECURELY FASTEN SIDE WALL AIR DEVICES TO RIGID DUCTWORK OR STRUCTURE.

SITE NUMBER:	00495
BUILDING TYPE:	3076
ASSET TYPE:	FREE STANDING
CLASSIFICATION:	REFRESH
OWNER:	STARBOARD
BASE VERSION:	2021 SPRING
UPGRADE CLASSIFICATION:	
	N/A
PROJECT YEAR:	2022
DESIGN TYPE:	(2.0) UM BRIGHT
DRAWING RELEASE:	2021 SPRING



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12540 W. ATLANTIC BLVD.
CORAL SPRINGS, FL 33071
OFFICE: (954)255-2266

Wendy's.
#00495 (STARBOARD #504)
1501 HILLSBOROUGH AVE.
TAMPA, FL 33610

REV.	DATE	DESCRIPTION

ISSUE DATE: 12/13/2021
PROJECT NUMBER: 21-120
DRAWN BY: MS/BS
CHECKED BY: AR/CF



12/13/21

SHEET NAME
MECHANICAL SPECIFICATIONS

SHEET NUMBER
SP5