HVAC GENERAL NOTES

1. HVAC SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES.
2. ALL DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED IRON SHEET METAL AND BE FABRICATED ACCORDING TO THE S.M.A.C.N.A. LOW VELOCITY DUCT MANUAL AND ASHRAE HANDBOOK EQUIPMENT VOLUME, 1988. ALL ELBOWS SHALL HAVE PROPER RADIUS, OR HVAC CONTRACTOR SHALL PROVIDE DOUBLE THICKNESS, AIRFOIL TURNING VANES REQUIRED BY S.M.A.C.N.A. NO SQUARE THROAT ELBOWS SHALL BE INSTALLED WITHOUT DOUBLE THICKNESS TURNING VANES.
3. THE HVAC CONTRACTOR SHALL INSTALL HVAC SYSTEMS AS SHOWN, NOTED AND SPECIFIED. EQUIPMENT MAY NOT BE SUBSTITUTED UNLESS WRITTEN APPROVAL BY THE ARCHITECT, ENGINEER, OR OWNER'S REPRESENTATIVE IS OBTAINED. ANY CHANGES TO THE DUCTWORK LAYOUT WILL NECESSITATE SUBMISSION OF SHEET METAL SHOP DRAWINGS FOR ENGINEERS REVIEW. ANY UNAUTHORIZED CHANGES WILL BE REMOVED AT THE CONTRACTOR'S EXPENSE, IF DEEMED NECESSARY BY ARCHITECT, ENGINEER, OR OWNER'S REPRESENTATIVE.
4. THE HVAC CONTRACTOR SHALL COORDINATE DUCTWORK INSTALLATION WITH ARCHITECT/OWNER'S REPRESENTATIVE IN FIELD AND OTHER TRADES. SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND HEIGHTS.
5. ALL DUCT CONNECTIONS TO EQUIPMENT SHALL BE LOADED TYPE VINYL, VIBRATION ELIMINATION CONNECTIONS, (F.C.) FLEXIBLE CONNECTIONS.
6. ALL DUCTWORK TRANSITIONS SHALL BE (FOT) "FLAT ON TOP" UNLESS OTHERWISE SPECIFIED ON PLAN.
7. ALL DUCTWORK AND PIPING SHALL BE ROUTED ABOVE THE SUSPENDED CEILING SPACE UNLESS OTHERWISE NOTED ON THE PLANS.
8. ALL OUTSIDE AIR INTAKES SHALL BE A MINIMUM OF 10'-0" AWAY FROM EXHAUST DISCHARGE OPENINGS AND PLUMBING VENT STACKS.
9. ALL BRANCH SUPPLY DUCTS SHALL HAVE (VD) MANUAL VOLUME DAMPERS INSTALLED FOR BALANCING.
10. ALL NEW SHEET METAL SUPPLY AND RETURN AIR RECTANGULAR/ SQUARE DUCTWORK SHALL BE INSULATED WITH 1-1/2" THICK DUCT LINER. DUCT LINER SHALL BE FASTENED TO INSIDE OF DUCTWORK AS PER MANUFACTURER'S DIRECTIONS AND S.M.A.C.N.A. "DUCT LINER APPLICATION STANDARD". SIZE OF DUCTS SHALL BE INCREASED FOR DUCT LINER INSULATION. SIZES SHOWN ON PLAN ARE INSIDE FREE AREA. ALL NEW SUPPLY, RETURN AND OUTSIDE AIR ROUND/OVAL DUCTWORK SHALL BE INSULATED WITH 2" THICK FLEXIBLE INSULATION, 1 PCF DENSITY FOIL REINFORCED KRAFT FACING. DUCT WRAP SHALL BE FASTENED TO DUCTWORK AS PER MANUFACTURER'S DIRECTIONS. ROUND/OVAL SUPPLY AND RETURN DUCTWORK EXPOSED TO VIEW AND LOCATED IN THE CONDITIONED SPACE SHALL NOT BE INSULATED. ALL INSULATION R-VALUES SHALL CONFORM TO ENERGY CODE. REGARDLESS OF THE DUCT SYSTEMS INDICATED ABOVE, PROVIDE RECTANGULAR LINED DUCTWORK FOR THE FIRST 15 LINEAR FEET DOWNSTREAM OF THE SUPPLY AIR UNIT. DUCTWORK BEYOND 15 LF OF THE SUPPLY AIR UNIT TO BE LINED IF RECTANGULAR OR WRAPPED IF ROUND/OVAL. CONTRACTOR MAY SUBSTITUTE EQUIVALENT SIZED SPIRAL ROUND DUCTWORK IF SPACE IS AVAILABLE AND WITH APPROVAL FROM THE ULTA CONSTRUCTION MANAGER.
11. CORE-DRILL OR SAW-CUT EXISTING WALL, ROOF, ETC. AS REQUIRED FOR PIPING OR DUCTWORK AND FIRE-STOP OPENING AROUND PIPE OR DUCTWORK. VERIFY LOCATION OF STRUCTURAL BEAMS, JOISTS, ETC. BEFORE DRILLING.
12. WHEREVER FOUNDATION WALLS, OUTSIDE WALLS, ROOFS, ETC. ARE CUT FOR INSTALLATION OF SYSTEMS, THEY SHALL BE PATCHED TO MATCH EXISTING CONSTRUCTION AND SEALED WEATHER TIGHT. WORK SHALL BE PERFORMED BY CRAFTSMEN SKILLED IN THEIR RESPECTIVE TRADES.
13. THE MECHANICAL SYSTEMS SHALL BE COMPLETE WITH ALL NECESSARY APPURTENANCES FOR A COMPLETE OPERATING SYSTEM.
14. HVAC CONTRACTOR SHALL INSTALL ALL CONTROL WIRING AS REQUIRED. THERMOSTATS SHALL BE AS SCHEDULED WITH THE EQUIPMENT. PROVIDE TRANSFORMERS AS REQUIRED.
15. PROVIDE UL APPROVED FIRE DAMPERS FOR ALL PENETRATIONS THROUGH FIRE RATED WALLS, PARTITIONS, CEILINGS, AND FLOORS. INSTALL FIRE DAMPERS AS PER MANUFACTURER'S DIRECTIONS AND AS PER UL GUIDELINES.
16. HVAC CONTRACTOR SHALL BALANCE SYSTEM TO AIR QUANTITIES SHOWN ON PLAN. BALANCING CONTRACTOR SHALL USE DUCT MOUNTED MANUAL DAMPERS FOR AIR SYSTEM BALANCING. USE OF TERMINAL DAMPER IS NOT ACCEPTABLE.
17. THE VENTILATION/HEATING AND AIR CONDITIONING CONTRACTOR SHALL SUBMIT WRITTEN REPORTS OF ALL AIR FLOW READINGS, STATIC PRESSURES, TEMPERATURE READINGS, MOTOR AMPERAGE, ETC. TO DOCUMENT PROPERLY BALANCED AIR FLOW IN HVAC SYSTEMS IN ALL AREAS.
18. ALL ROOF PENETRATIONS EXCEEDING 12" X 12" IN SIZE SHALL BE FURNISHED WITH BURGLAR BARS.
19. THE CONTRACTOR SHALL WARRANTEE ALL MATERIAL AND GUARANTEE ALL WORKMANSHIP FOR ONE YEAR FROM SUBSTANTIAL COMPLETION.
20. ALL CONTRACTOR FABRICATED AND MANUFACTURER FABRICATED COMPONENTS OF THE OUTSIDE AIR, SUPPLY AIR, RETURN AIR AND EXHAUST SYSTEMS SHALL BE CONSTRUCTED AND INSTALLED AIR-TIGHT. THE INSTALLED SYSTEMS SHALL BE PRESSURE TESTED AS SPECIFIED. PIPE OPENINGS IN SYSTEM COMPONENT SHALL HAVE SHEET METAL BAFFLES, SET IN SEALANT, TO PREVENT LEAKAGE.
21. DRAWINGS FOR HVAC WORK ARE DIAGRAMMATIC, SHOWING THE GENERAL LOCATION, TYPE, LAYOUT AND EQUIPMENT REQUIRED. THE DRAWINGS SHALL NOT BE SCALED FOR EXACT MEASUREMENTS. REFER TO MANFACTURER'S STANDARD INSTALLATION DRAWINGS FOR EQUIPMENT CONNECTIONS AND INSTALLATION REQUIREMENTS AS REQUIRED. FURNISH AND INSTALL DUCTWORK, CONNECTIONS, ACCESSORIES, OFFSETS AND MATERIALS NECESSARY TO FACILITATE THE SYSTEMS FUNCTIONING AS INDICATED BY THE DESIGN AND THE EQUIPMENT INDICATED. THE WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND ORDINANCES AND SUBJECT TO INSPECTION.
22. FLEX DUCT: PROVIDE FACTORY ASSEMBLED CLASS 1 AIR DUCT (UL 181) WITH FIBERGLASS INSULATION AND REINFORCED OUTER PROTECTIVE COVER/VAPOR BARRIER. FLEX DUCT SHALL MEET NFPA 90A WITH FLAME SPREAD UNDER 25, SMOKE DEVELOPED UNDER 50, AND SHALL BE RATED FOR 2" W.C. PRESSURE AND 0 TO 250 DEGREE TEMPERATURE. MAXIMUM LENGTH SHALL BE PER CODE AND NOT TO EXCEED 5'-0" LONG.
23. ALL MECHANICAL EQUIPMENT ELECTRICAL'S & STRUCTURAL REQUIREMENTS SHALL BE COORDINATED WITH OTHER TRADES PRIOR TO PURCHASE AND INSTALLATION OF THE UNITS. NOTIFY ARCHITECT/ENGINEER WITH DISCREPANCIES IMMEDIATELY.
24. GENERAL CONTRACTOR TO REROUTE FIRE SPRINKLER PIPING IF REQUIRED FOR THE NEW SUPPLY AIR AND RETURN AIR DUCTWORK LAYOUT.
25. ULTA CEILING SPACE IS NOT PLENUM RATED AND SHALL NOT BE USED AS A RETURN AIR PLENUM.
26. PRIOR TO CONSTRUCTION, FIELD VERIFY CEILING SPACE AVAILABILITY TO RUN DUCTWORK AGAINST EXISTING BUILDING STRUCTURAL CONDITION AND CEILING HEIGHT. NOTIFY ARCHITECT/ENGINEER WITH DISCREPANCIES IMMEDIATELY.
27. ALL LOW VOLTAGE WIRING OR CABLING SHOULD RUN ADJACENT TO THE PERIMETER SOFFITS NOT MORE THAN 3' OFF THEIR DEMISING WALLS.
28. MOUNT REMOTE SENSORS AT 60" ABOVE FINISH FLOOR UNLESS NOTED OTHERWISE.
29. CONTRACTOR SHALL VERIFY AVAILABLE DEPTH FOR DUCTWORK PRIOR TO DUCTWORK FABRICATION.
30. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFICATION OF ALL EXISTING CONDTIONS PRIOR TO SUBMITTING HIS BID. NO ADDITIONAL COMPENSATION WILL BE MADE FOR ANY EXTRAS DUE TO CONTRACTOR'S FAILURE TO VISIT THE JOBSITE AND/OR PREDETERMINE ALL EXISTING CONDITIONS BEFORE SUBMITTING HIS BID. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER FOR RESOLUTION.
31. MECHANICAL CONTRACTOR SHALL TAG EACH INDIVIDUAL REMOTE SENSOR WITH THE ROOFTOP UNIT THEY ARE SERVING.
32. PROVIDED MEANS FURNISH AND INSTALL.
33. PAINT PORTION OF DUCTWORK VISIBLE THRU GRILLE, DIFFUSER, LOUVER, ETC. WITH FLAT BLACK PAINT.
34. REMOTE SENSORS, KEY PADS, ETC. ARE NOT TO BE MOUNTED ON MILLWORK. COORDINATE LOCATION WITH ARCHITECTURAL DRAWINGS.

LEGEND

AFF	ABOVE FINISHED FLOOR	DET.	DETAIL
CD	CONDENSATE	DN.	DOWN
DG	DOOR GRILLE, SEE ARCH. DWG'S.	DWG.	DRAWING
EF	EXHAUST AIR FAN	E.A.T.	ENTERING AIR TEMPERATURE
ETR	EXISTING TO REMAIN	E.E.R	ENERGY EFFICIENCY RATIO
FC	FLEXIBLE CONNECTION	E.S.P	EXTERNAL STATIC PRESSURE
FOB	FLAT ON BOTTOM	E.T.R	EXISTING TO REMAIN
FOT	FLAT ON TOP	GA.	GAUGE
MOD	MOTOR OPERATED CONTROL DAMPER	L.A.T.	LEAVING AIR TEMPERATURE
NC	NEW CONNECTION TO EXISTING	MT'D	MOUNTED
NTS	NOT TO SCALE	NIC	NOT IN CONTRACT
RTU	ROOF TOP HVAC UNIT	REQ'D	REQUIRED
S	SENSOR	T.S.P.	TOTAL STATIC PRESSURE
T	THERMOSTAT	TV	TURNING VANE
ARCH	ARCHITECT OR ARCHITECTURAL	UCD	UNDERCUT DOOR
BLD'G	BUILDING	VD	VOLUME DAMPER
B.H.P	BRAKE HORSEPOWER	W.C.	WATER COLUMN
COL.	COLUMN	W/	WITH
CONST'N	CONSTRUCTION	Ø	DIAMETER/ROUND

MECHANICAL SYMBOLS

	MANUAL VOLUME DAMPER (VD) WITH LOCKING HAND QUADRANT HANDLE AND AIR-TIGHT END BEARINGS
(S) DEVICE	SENSOR WITH DEVICE CONTROLLED MOUNTED ON WALL.
(2)	DUCT MOUNTED SMOKE DETECTOR
	TYPICAL SUPPLY DIFFUSER. NECK SIZE / TYPE / CFM
	TYPICAL RETURN OR EXHAUST GRILLE. NECK SIZE / TYPE / CFM
	AIRFOIL TURNING VANES, TYPICAL FOR ALL SQUARE TURNS.

PLAN NOTES

1. CONNECT 28x20 SUPPLY DUCT TO DUCT DROP FROM LANDLORD PROVIDED ROOFTOP UNIT RTU-1. PROVIDE TURNING VANE ELBOWS AT BOTTOM OF RISER.
2. CONNECT 28x20 RETURN DUCT TO DUCT DROP FROM LANDLORD PROVIDED ROOFTOP UNIT RTU-1. PROVIDE TURNING VANE ELBOWS AT BOTTOM OF RISER.
3. CONNECT 30x20 SUPPLY DUCT TO DUCT DROP FROM LANDLORD PROVIDED ROOFTOP UNIT RTU-2. PROVIDE TURNING VANE ELBOWS AT BOTTOM OF RISER.
4. CONNECT 30x20 RETURN DUCT TO DUCT DROP FROM LANDLORD PROVIDED ROOFTOP UNIT RTU-2. PROVIDE TURNING VANE ELBOWS AT BOTTOM OF RISER.
5. CONNECT 24x18 SUPPLY DUCT TO DUCT DROP FROM LANDLORD PROVIDED ROOFTOP UNIT RTU-3. PROVIDE TURNING VANE ELBOWS AT BOTTOM OF RISER.
6. CONNECT 24x18 RETURN DUCT TO DUCT DROP FROM LANDLORD PROVIDED ROOFTOP UNIT RTU-3. PROVIDE TURNING VANE ELBOWS AT BOTTOM OF RISER.
7. SMOKE DETECTOR PER CODE PROVIDED BY LANDLORD. PROVIDE EXTRA SMOKE DETECTOR HEAD FOR REPLACEMENT INSTALLATION AT SUBSTANTIAL COMPLETION FOR ALL DUCT SMOKE DETECTORS.
8. 18"Ø CONNECTION W/ V.D. IN NECK. PROVIDE DUCTWORK, VOLUME DAMPER AND AIR DEVICE.
9. TEMPERATURE SENSOR LOCATION FOR ALL MECHANICAL UNITS WITH SENSORS, TAG NUMBER INDICATED ON THE DRAWINGS. SENSOR FURNISHED WITH MECHANICAL UNIT AND INSTALLED BY EMS CONTRACTOR. EACH REMOTE SENSOR TO BE LABELED WITH ZONE SERVED. DO NOT LOCATE COLUMN MOUNTED SENSORS FACING THE FRONT OF THE STORE, LOCATE THE SENSORS ON THE SIDE OR BACK OF THE COLUMN WHEN VIEWED FROM THE FRONT OF THE STORE. DO NOT ATTACH SENSORS TO STORE FIXTURES. CONTACT ARCHITECT IF THERE APPEARS TO BE A FIXTURE CONFLICT. COORDINATE SENSOR LOCATIONS SO SENSORS ARE NOT ATTACHED TO ARCH UNLESS OTHERWISE NOTED. COORDINATE SENSOR LOCATIONS WITH ARTWORK, GRAPHICS, ETC.

TEMPERATURE ZONES

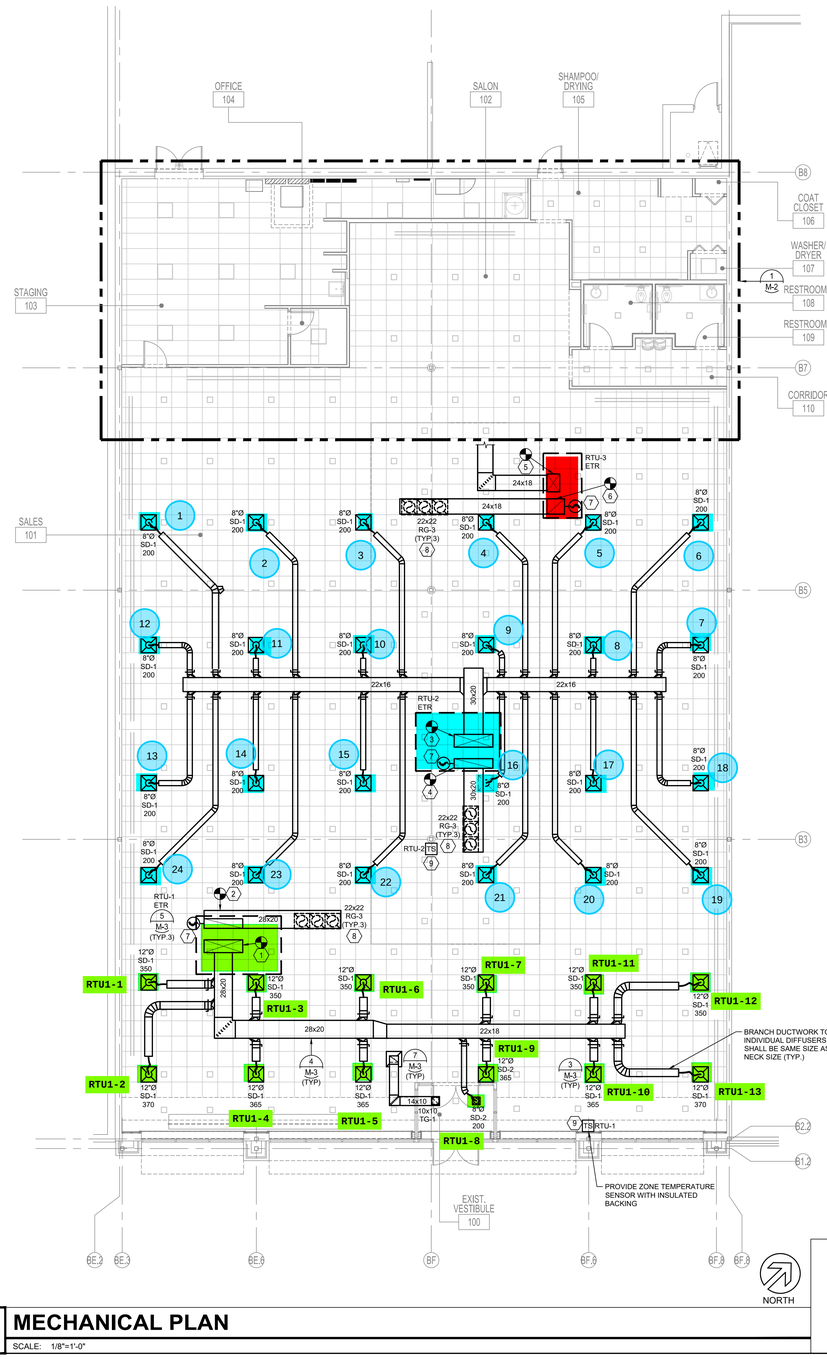
UNIT	ROOMS SERVED
RTU-1	100, 101
RTU-2	101
RTU-3	101, 102, 105, 106, 107, 108, 109, 110
RTU-4	103, 104

NOTE:
MECHANICAL CONTRACTOR SHALL STENCIL THE ROOFTOP UNITS. STENCIL SHALL INDICATE STORE NAME, SPACE NUMBER AND EQUIPMENT DESIGNATION IN LETTERING A MINIMUM OF 2 INCHES IN HEIGHT.

THE CONTRACTORS ARE REQUIRED TO VISIT THE SITE AND FULLY ACQUAINT THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES INVOLVED IN ACCOMPLISHING THE NEW WORK. PROBLEMS, DISCREPANCIES OR INFORMATION NEEDED SHALL BE SUBMITTED TO THE ARCHITECT/ENGINEER IN WRITING PRIOR TO SUBMITTING A PROPOSAL. THE SUBMISSION OF PROPOSAL WILL INDICATE THAT THE CONTRACTOR HAS FULLY UNDERSTOOD AND HAS INCLUDED ALL COSTS FOR THIS PROJECT.

EXISTING CONDITIONS NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD SURVEY AND DOCUMENTING OF EXISTING SYSTEMS. THESE CONTRACT DRAWINGS SHALL SERVE AS GUIDANCE FOR THE CONTRACTOR ALONG WITH FIELD SURVEY INFORMATION TO INSTALL THE DISTRIBUTION SYSTEMS REQUIRED FOR THE NEW EQUIPMENT AND DEVICES.
2. REFER TO THE ARCHITECTURAL DRAWINGS FOR WALLS, CEILINGS, ETC. THAT ARE BEING REMOVED. ALL EXISTING SYSTEMS INCLUDING PIPING, WIRING, ANCHORING, ETC. THAT ARE EXPOSED SHOULD BE REMOVED OR RELOCATED, COORDINATE WITH LANDLORD.



1 MECHANICAL PLAN

SCALE: 1/8"=1'-0"

RGLA
rgla solutions, inc.
5100 River Road, Ste 125
Schiller Park, IL 60176
p: 847.671.7452
f: 847.671.4200
www.rgla.com

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robert g. lyon + associates, inc.
retail architecture
5100 River Road, Ste 125
Schiller Park, IL 60176
T: 847.671.7452
f: 847.671.4200
www.rgla.com

HNY CONSULTING ENGINEERS
240 WEST 37TH STREET, 3RD FLOOR
NEW YORK, NY 10018
TEL 212.413.8400
www.hny-eng.com
2150002894
NC. CORPORATE NUMBER: P-2451
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ULTA #1697
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SELMA, NC 27576

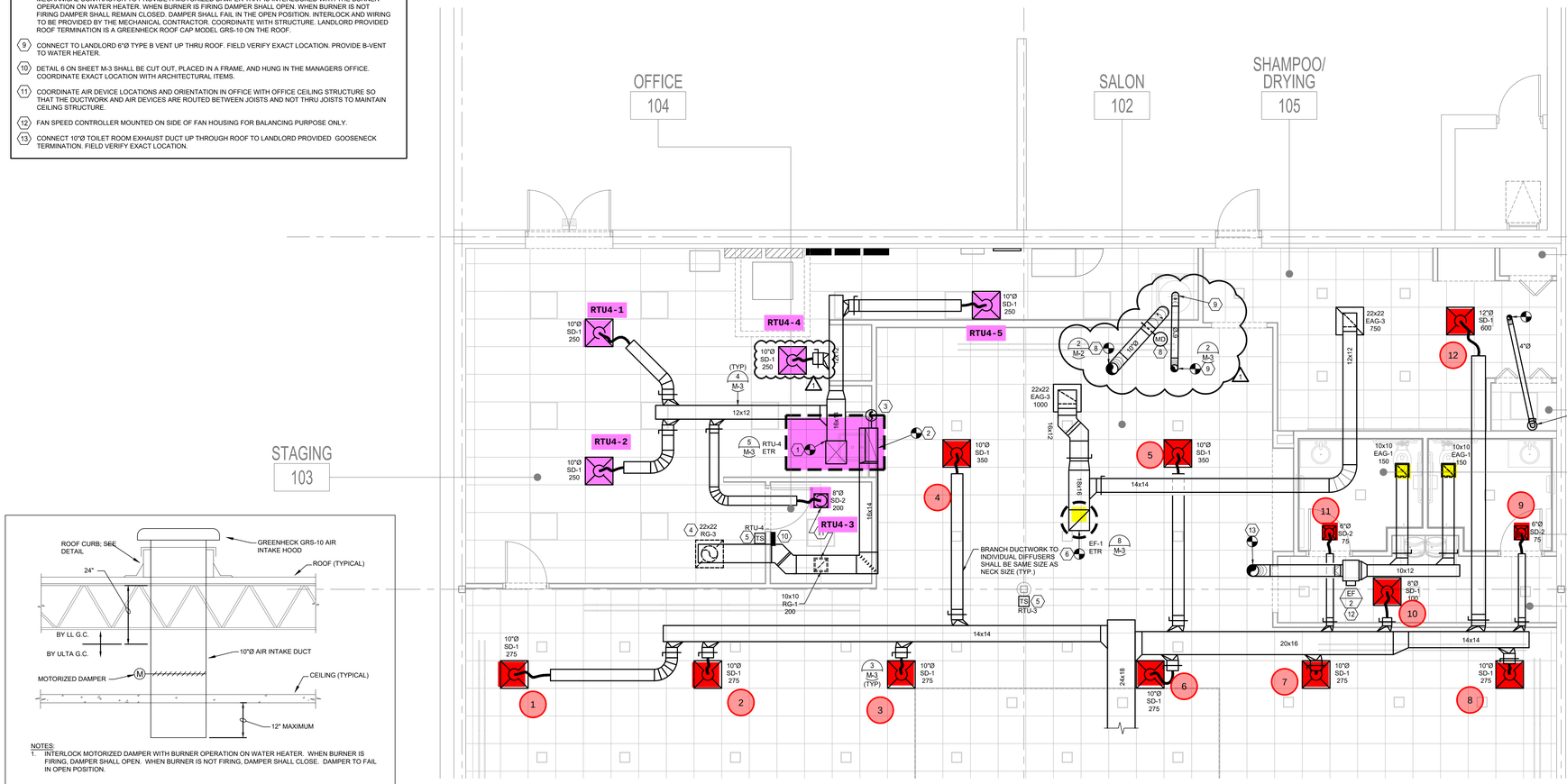
MECHANICAL
REFLECTED CEILING
PLAN, NOTES, AND
SYMBOLS

DRAWN BY	HEI
CHECKED BY	RCB
JOB NUMBER	21359
SHEET NAME	M-1

PLAN NOTES

1. CONNECT 16x14 SUPPLY DUCT TO DUCT DROP FROM LANDLORD PROVIDED ROOFTOP UNIT, RTU-4, PROVIDE TURNING VANE ELBOW AT BOTTOM OF RISER.
2. CONNECT 16x14 RETURN DUCT TO DUCT DROP FROM LANDLORD PROVIDED ROOFTOP UNIT, RTU-4, PROVIDE TURNING VANE ELBOW AT BOTTOM OF RISER.
3. SMOKE DETECTOR PER CODE PROVIDED BY LANDLORD. PROVIDE EXTRA SMOKE DETECTOR HEAD FOR REPLACEMENT INSTALLATION AT SUBSTANTIAL COMPLETION FOR ALL DUCT SMOKE DETECTORS.
4. 14"Ø CONNECTION W/ V.D. IN NECK. PROVIDE VOLUME DAMPER, DUCTWORK FITTINGS, FLEXIBLE DUCTWORK, AND AIR DEVICE.
5. TEMPERATURE SENSOR LOCATION FOR ALL MECHANICAL UNITS WITH SENSORS, TAG NUMBER INDICATED ON THE DRAWINGS. SENSOR FURNISHED WITH MECHANICAL UNIT AND INSTALLED BY EMS CONTRACTOR. EACH REMOTE SENSOR TO BE LABELED WITH ZONE SERVED. DO NOT LOCATE COLUMN MOUNTED SENSORS FACING THE FRONT OF THE STORE, LOCATE THE SENSORS ON THE SIDE OR BACK OF THE COLUMN WHEN VIEWED FROM THE FRONT OF THE STORE. DO NOT ATTACH SENSORS TO STORE FIXTURES. CONTACT ARCHITECT IF THERE APPEARS TO BE A FIXTURE CONFLICT. COORDINATE SENSOR LOCATIONS SO SENSORS ARE NOT ATTACHED TO ARCH. COORDINATE SENSOR LOCATIONS WITH ARTWORK, GRAPHICS, ETC.
6. CONNECT TO 18x18 DUCT DROP FROM EF-1, PROVIDE TURNING VANE ELBOW AT BOTTOM OF RISER. PROVIDE DUCT AND FITTINGS AS NECESSARY.
7. CONNECT DRYER EXHAUST TO LANDLORD PROVIDED DRYER VENT TERMINATION ON ROOF. PROVIDE DRYER BOOSTER FAN, FANTECH MODEL DEDPV-705 UL LISTED WITH BACK DRAFT DAMPER. CONNECT 4"Ø DRYER EXHAUST TO BOOSTER FAN. FURNISH AND INSTALL LINT TRAP MODEL DBLT4 IN DRYER EXHAUST DUCT UPSTREAM OF BOOSTER FAN ACCORDING TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. LINT TRAP TO BE INSTALLED ABOVE DRYER IN VERTICAL DRYER DUCT WHICH IS EASILY ACCESSIBLE TO THE DRYER USER. DRYER EXHAUST DUCTWORK SHALL HAVE A SMOOTH INTERIOR FINISH WITH JOINTS RUNNING IN THE DIRECTION OF THE AIRFLOW. DUCTS SHALL NOT BE CONNECTED OR INSTALLED WITH SHEET METAL SCREWS OR OTHER FASTENERS THAT WILL OBSTRUCT THE FLOW. FLEXIBLE DUCT CONNECTORS SHALL BE METALLIC WITH A MAXIMUM LENGTH OF 8 FEET. TERMINATION SHALL BE A MINIMUM OF 10'-0" FROM OUTSIDE AIR INTAKE LOUVERS. MINIMUM HORIZONTAL DUCT ELEVATION TO BE 9'-6". PROVIDE A PERMANENT TAG OR LABEL IDENTIFYING THE TOTAL DEVELOPED LENGTH OF DRYER DUCT. LOCATE WITHIN SIX FEET OF THE EXHAUST DUCT CONNECTION. MAXIMUM DRYER DUCT LENGTH PER MANUFACTURER'S INSTRUCTIONS WITH FOUR ELBOWS AND BOX HOOD IS 27 FEET. NOTIFY ENGINEER IF INSTALLED DUCT EXCEEDS THIS LENGTH.
8. CONNECT TO LANDLORD PROVIDED 10"Ø DUCT UP THRU ROOF FOR COMBUSTION AIR. THE OPENING SHALL TERMINATE BELOW THE CEILING AND SHALL NOT EXTEND IN EXCESS OF 12" BELOW THE CEILING. MECHANICAL CONTRACTOR TO PROVIDE A MOTORIZED DAMPER THAT IS INTERLOCKED WITH THE BURNER OPERATION ON WATER HEATER. WHEN BURNER IS FIRING DAMPER SHALL OPEN. WHEN BURNER IS NOT FIRING DAMPER SHALL REMAIN CLOSED. DAMPER SHALL FAIL IN THE OPEN POSITION. INTERLOCK AND WIRING TO BE PROVIDED BY THE MECHANICAL CONTRACTOR. COORDINATE WITH STRUCTURE. LANDLORD PROVIDED ROOF TERMINATION IS A GREENHECK ROOF CAP MODEL GRS-10 ON THE ROOF.
9. CONNECT TO LANDLORD 6"Ø TYPE B VENT UP THRU ROOF. FIELD VERIFY EXACT LOCATION. PROVIDE B-VENT TO WATER HEATER.
10. DETAIL 6 ON SHEET M-3 SHALL BE CUT OUT, PLACED IN A FRAME, AND HUNG IN THE MANAGERS OFFICE. COORDINATE EXACT LOCATION WITH ARCHITECTURAL ITEMS.
11. COORDINATE AIR DEVICE LOCATIONS AND ORIENTATION IN OFFICE WITH OFFICE CEILING STRUCTURE SO THAT THE DUCTWORK AND AIR DEVICES ARE ROUTED BETWEEN JOISTS AND NOT THRU JOISTS TO MAINTAIN CEILING STRUCTURE.
12. FAN SPEED CONTROLLER MOUNTED ON SIDE OF FAN HOUSING FOR BALANCING PURPOSE ONLY.
13. CONNECT 10"Ø TOILET ROOM EXHAUST DUCT UP THROUGH ROOF TO LANDLORD PROVIDED GOOSENECK TERMINATION. FIELD VERIFY EXACT LOCATION.

NOTE:
MECHANICAL CONTRACTOR SHALL STENCIL THE ROOFTOP UNITS. STENCIL SHALL INDICATE STORE NAME, SPACE NUMBER AND EQUIPMENT DESIGNATION IN LETTERING A MINIMUM OF 2 INCHES IN HEIGHT.



NOTES:
1. INTERLOCK MOTORIZED DAMPER WITH BURNER OPERATION ON WATER HEATER. WHEN BURNER IS FIRING, DAMPER SHALL OPEN. WHEN BURNER IS NOT FIRING, DAMPER SHALL CLOSE. DAMPER TO FAIL IN OPEN POSITION.

2 COMBUSTION AIR INTAKE DETAIL
SCALE: NO SCALE

1 ENLARGED MECHANICAL PLAN
SCALE: 1/4" = 1'-0"

RGLA
rgla solutions, inc.
5100 River Road, Ste 125
Schiller Park, IL 60176
p: 847.671.7452
f: 847.671.4200
www.rgla.com

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retail architecture
5100 River Road, Ste 125
Schiller Park, IL 60176
p: 847.671.7452
f: 847.671.4200
www.rgla.com

HNY CONSULTING ENGINEERS
240 WEST 37TH STREET, 3RD FLOOR
NEW YORK, NY 10018
TEL 212.413.8400
www.hny-eng.com
2150002894
NC. CORPORATE NUMBER: P2451
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640 SAINT MARK AVE.
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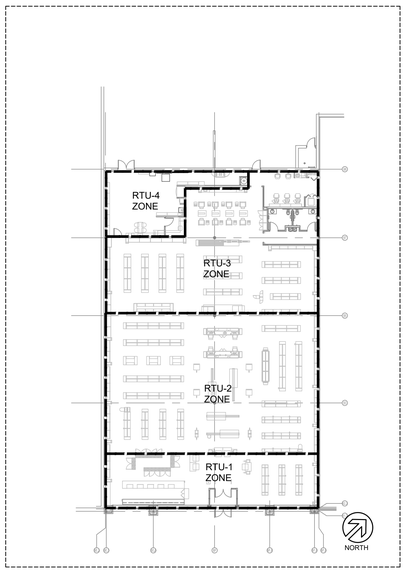
ENLARGED REFLECTED CEILING PLAN

DRAWN BY	HEI
CHECKED BY	RCB
JOB NUMBER	21359
SHEET NAME	M-2

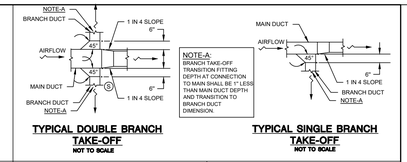


NOTE: GENERAL CONTRACTOR TO CUT ALONG DASHED LINES, PLACE IN FRAME, AND HANG IT IN THE MANAGER'S OFFICE

6 RTU ZONES

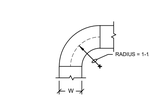
SCALE: NOT TO SCALE

NOTES:
1. ALL DUCTWORK CONSTRUCTED IN ACCORDANCE WITH ASHRAE HANDBOOK AND PRODUCT DIRECTORY 1988 EQUIPMENT VOLUME, CHAPTER NO. 1.
2. ALL CONTRACTOR FABRICATED AND MANUFACTURER FABRICATED COMPONENTS OF THE OUTSIDE AIR, SUPPLY AIR, RETURN AIR AND EXHAUST SYSTEMS SHALL BE CONSTRUCTED AND INSTALLED AIR-TIGHT. REFER TO DUCTWORK SEALANT DETAILS ON THIS SHEET. PIPE OPENINGS IN SYSTEM COMPONENTS SHALL HAVE SHEET METAL BAFFLES, SET IN SEALANT, TO PREVENT LEAKAGE.

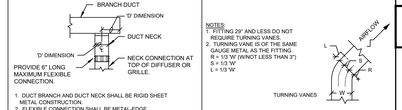


TYPICAL DOUBLE BRANCH TAKE-OFF
NOT TO SCALE

TYPICAL SINGLE BRANCH TAKE-OFF
NOT TO SCALE



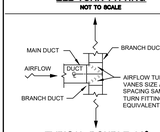
TYPICAL 30° TO 90° RADIUS ELL TURN FITTING
NOT TO SCALE



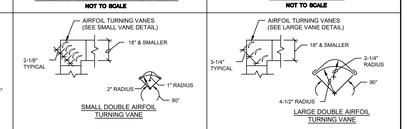
1. DUCT BRANCH AND DUCT NECK SHALL BE RIGID SHEET METAL CONSTRUCTION.
2. FLEXIBLE CONNECTION SHALL BE METAL-EDGE VENTILATION FABRIC OR TRIPLE-LOK FLEXIBLE ALUMINUM AIR DUCT.

TYPICAL TOP CONNECTION TO DIFFUSER OR GRILLE DETAIL
NOT TO SCALE

TYPICAL 30° TO 89° TURN FITTINGS
NOT TO SCALE



TYPICAL DOUBLE 90° TURN FITTING
EQUAL CFM SPLIT, BROWN.
UNEQUAL CFM SPLIT, SIMILAR
NOT TO SCALE

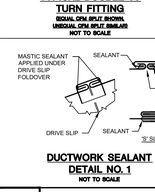


SMALL DOUBLE AIRFOIL TURNING VANE

TYPICAL 90° TURN FITTING
18" AND SMALLER
NOT TO SCALE

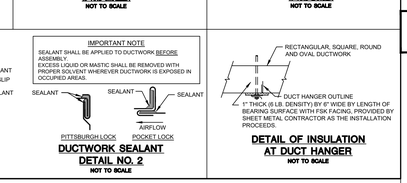
LARGE DOUBLE AIRFOIL TURNING VANE

TYPICAL 90° TURN FITTING
19" AND LARGER
NOT TO SCALE



DUCTWORK SEALANT DETAIL NO. 1
NOT TO SCALE

IMPORTANT NOTE
SEALANT SHALL BE APPLIED TO DUCTWORK BEFORE ASSEMBLY.
EXCESS LIQUID OR MASTIC SHALL BE REMOVED WITH PROPER SOLVENT WHEREVER DUCTWORK IS EXPOSED IN OCCUPIED AREAS.

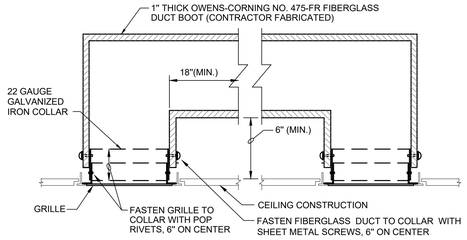


DUCTWORK SEALANT DETAIL NO. 2
NOT TO SCALE

DETAIL OF INSULATION AT DUCT HANGER
NOT TO SCALE

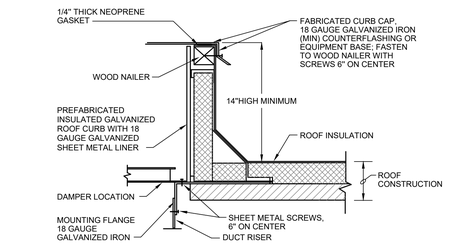
4 DUCTWORK DETAILS

SCALE: NOT TO SCALE



7 TYPICAL RETURN TRANSFER DETAIL

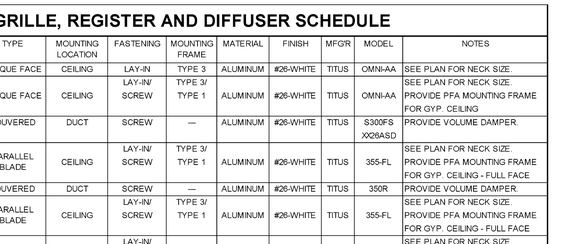
SCALE: NOT TO SCALE



NOTES:
1. CUT AND PATCH EXISTING ROOFING AS REQUIRED FOR NEW CURB INSTALLATION.
2. CURB SHALL BE TAPERED TYPE AND MATCH THE PITCH OF THE ROOF.
3. SECURELY INSTALL CURB TO ROOF; USE FASTENERS AS REQUIRED BY ROOF CONSTRUCTION.

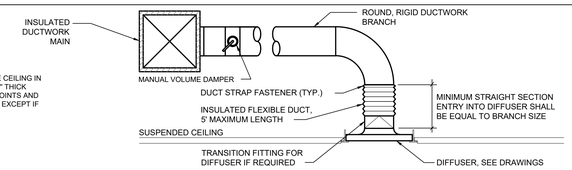
8 TYPICAL PREFABRICATED EF ROOF CURB DETAIL (FURNISHED AND INSTALLED BY LANDLORD)

SCALE: NOT TO SCALE



5 ROOFTOP UNIT DUCT DROP DETAIL (FURNISHED AND INSTALLED BY LANDLORD)

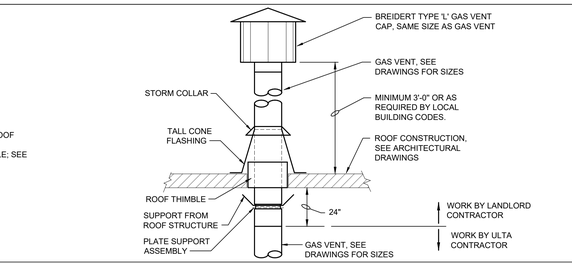
SCALE: NOT TO SCALE



NOTE:
THE ROUND BRANCH DUCTWORK LOCATED ABOVE CEILING IN CONCEALED SPACES SHALL BE INSULATED WITH 1" THICK FIBERGLASS SLEEVE WITH FOIL JACKET AND ALL JOINTS AND TERMINATIONS SEALED WITH FOIL OR DUCT TAPE, EXCEPT IF DUCTWORK IS OF FIBERGLASS CONSTRUCTION.

3 DUCT CONNECTION TO CEILING DIFFUSER DETAIL

SCALE: NOT TO SCALE



NOTE:
METALBESTOS TYPE 'B' GAS VENT UP THRU ROOF WITH ROOF SUPPORT ASSEMBLY, TALL CONE FLASHING, STORM COLLAR, AND ROOF THIMBLE; SEE PLANS FOR SIZES.

2 TYPICAL GAS VENT THRU ROOF DETAIL (FURNISHED AND INSTALLED BY LANDLORD)

SCALE: NOT TO SCALE

FAN SCHEDULE

MARK	MANUFACTURER MODEL NO.	TYPE	CFM	ESP ("W.C.)	DRIVE	ELECTRICAL			ROOF CURB	BACKDRAFT DAMPER	NOTES
						HP / WATTS	PHASE	VOLTAGE			
EF-1	LOREN COOK 150ACEB	ROOF MOUNTED	1,750	0.5	BELT	1/2 HP	1	120	14" HIGH	GRAVITY	LANDLORD TO FURNISH AND INSTALL ROOF MOUNTED EXHAUST FAN WITH BIRDSCREEN.
EF-2	LOREN COOK GNVF-500	IN-LINE	200	0.5	DIRECT	(35 W)	1	115	NONE	INTEGRAL	PROVIDE ECM MOTOR. FAN SPEED CONTROLLER AND ACCESS PANEL FOR SPEED CONTROLLER.

GRILLE, REGISTER AND DIFFUSER SCHEDULE

MARK	SERVICE	MODULE	TYPE	MOUNTING LOCATION	FASTENING	MOUNTING FRAME	MATERIAL	FINISH	MFGR	MODEL	NOTES
SD-1	SUPPLY	24" x 24"	PLAQUE FACE	CEILING	LAY-IN	TYPE 3	ALUMINUM	#26-WHITE	TITUS	OMNI-AA	SEE PLAN FOR NECK SIZE.
SD-2	SUPPLY	12" x 12"	PLAQUE FACE	CEILING	LAY-IN/ SCREW	TYPE 3/ TYPE 1	ALUMINUM	#26-WHITE	TITUS	OMNI-AA	SEE PLAN FOR NECK SIZE. PROVIDE PFA MOUNTING FRAME FOR GYP. CEILING
SD-3		24" x 12"									
SD-4		24" x 24"									
SD-5	SUPPLY	20" x 6"	LOUVERED	DUCT	SCREW	—	ALUMINUM	#26-WHITE	TITUS	S300FS /XQ26ASD	PROVIDE VOLUME DAMPER.
RG-1	RETURN	12" x 12"	PARALLEL BLADE	CEILING	LAY-IN/ SCREW	TYPE 3/ TYPE 1	ALUMINUM	#26-WHITE	TITUS	355-FL	SEE PLAN FOR NECK SIZE. PROVIDE PFA MOUNTING FRAME FOR GYP. CEILING - FULL FACE
RG-2		24" x 12"									
RG-3		24" x 24"									
RG-4	RETURN	24" x 12"	LOUVERED	DUCT	SCREW	—	ALUMINUM	#26-WHITE	TITUS	350R	PROVIDE VOLUME DAMPER.
EAG-1	EXHAUST	12" x 12"	PARALLEL BLADE	CEILING	LAY-IN/ SCREW	TYPE 3/ TYPE 1	ALUMINUM	#26-WHITE	TITUS	355-FL	SEE PLAN FOR NECK SIZE. PROVIDE PFA MOUNTING FRAME FOR GYP. CEILING - FULL FACE
EAG-2		24" x 12"									
EAG-3		24" x 24"									
TG-1	TRANSFER	12" x 12"	PARALLEL BLADE	CEILING	LAY-IN/ SCREW	TYPE 3/ TYPE 1	ALUMINUM	#26-WHITE	TITUS	355-FL	SEE PLAN FOR NECK SIZE. PROVIDE PFA MOUNTING FRAME FOR GYP. CEILING - FULL FACE
TG-2		24" x 12"									
TG-3		24" x 24"									

ROOFTOP UNIT SCHEDULE (EXISTING BY LANDLORD)

MARK	MANUFACTURER AND MODEL	STATUS	NOMINAL TONS	SUPPLY CFM	MIN OA AIR	ESP (IN)	COOLING CAPACITY EAT (DB/WB)	COOLING CAPACITY TH (MBH)	COOLING CAPACITY SH (MBH)	HEATING COIL GAS INPUT (MBH)	HEATING COIL HEAT OUTPUT (MBH)	HEATING COIL MIN. EFFICIENCY	HEATING COIL MIN. NUMBER OF STAGES	ELECTRICAL SUPPLY FAN HP	ELECTRICAL PHASE	ELECTRICAL VOLTS	ELECTRICAL MCA	ELECTRICAL MOCP	EER SEER	APPROX WEIGHT (LBS)	REMARKS
RTU-1	LENNOX LGM156U4E	EXTG BY LL	13	4,500	900	1.00	76.6/64.7	127.2	95.6	260	208	0.8	2	3.00	3	460	34	35	12	2,800	SEE NOTES FOR OPTIONS
RTU-2	LENNOX LGM156U4M	EXTG BY LL	13	4,800	1,055	1.00	77.2/65.0	150.1	103.3	260	208	0.8	2	3.00	3	460	34	35	12	2,800	SEE NOTES FOR OPTIONS
RTU-3	LENNOX LGM120U4E	EXTG BY LL	10	3,200	825	1.00	78.0/65.6	109.1	76.5	180	144	0.8	2	3.75	3	460	25	30	12	1,600	SEE NOTES FOR OPTIONS
RTU-4	LENNOX LGM048U4E	EXTG BY LL	4	1,200	200	1.00	75.9/63.1	43.8	30.2	65	52	0.8	2	1.50	3	460	14	20	13.7	1,100	SEE NOTES FOR OPTIONS

- 2' HIGH ROOF CURB, FLEXIBLE CONNECTORS AND ACOUSTIC LINED SHEET METAL DUCT DROPS EXTENDED TO 24" BELOW DECK FOR TENANT CONNECTION.
- FACTORY PROVIDED HIGH PERFORMANCE ECONOMIZER WITH ENTHALPY CONTROL AND FAULT DIAGNOSTICS PER ENERGY CODE.
- FACTORY PROVIDED POWER EXHAUST FAN.
- HIGH STATIC DRIVE KIT.
- BACNET MODULE WITH MODEL REMOTE SENSOR #94L60.
- LOUVERED CONDENSER COIL HAIL GUARDS.
- FACTORY WIRED AND FACTORY INSTALLED NON-FUSED DISCONNECT.
- FACTORY INSTALLED UNPOWERED GFI WEATHERPROOF CONVENIENCE OUTLET.
- FACTORY INSTALLED SMOKE DETECTORS WIRED BY ELECTRICAL CONTRACTOR. SMOKE DETECTOR TO BE MOUNTED IN SUPPLY AND RETURN AIR DUCT OR AS REQUIRED BY LOCAL CODE.
- FACTORY START-UP
- EACH UNIT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- HUMIDITROL HOT GAS REHEAT AND HUMIDITY SENSOR.
- FACTORY INSTALLED CORROSION PROTECTION (EPOXY COATING) WHEN LOCATED WITHIN 10 MILES OF COASTLINE OR AS REQUIRED BASED ON LOCAL CONDITIONS.
- ATTACH ROOFTOP UNITS TO CURB FOR EARTHQUAKE OR HURRICANE ZONE PER THE LOCAL CODES.
- SMOKE DETECTOR TEST STATIONS.
- INSTALL FACTORY FURNISHED ITEMS SHIPPED LOOSE FOR FIELD INSTALLATION.
- FOLLOW MANUFACTURERS PUBLISHED PROCEDURE FOR TEMPORARY OPERATION OF RTU'S TO MAINTAIN WARRANTY.
- BURGLAR BARS AT DUCT DROP CONNECTION TO CURB.
- STRUCTURAL REINFORCEMENT AS NECESSARY.
- CONDENSATE PIPE ROUTED AND TERMINATED PER CODE.

PROVIDE OUTDOOR LIGHT AT SERVICE SIDE OF ALL RTU'S INCLUDING THE FOLLOWING:
1. LIGHT SWITCH IN WEATHERPROOF HOUSINGS.
2. JELLY JAR LIGHT FIXTURE WITH METAL CAGE TO BE MCGILLE #606 WITH 1435-6 AND 13W MEDIUM BASE LED LAMP (OR APPROVED EQUAL).

LENNOX NATIONAL ACCOUNTS CUSTOMER SERVICE: ULTA SALON, COSMETICS & FRAGRANCE, INC.
FOR QUOTATIONS AND ORDERS CONTACT: NATIONAL ACCOUNT SALES, PHONE 800-367-6285 OPTION 1 EXT 6847, FAX 972-497-5112, EMAIL LENNOXNATIONALACCOUNTS@LENNOXIND.COM.
FOR EQUIPMENT WITH FACTORY INSTALLED ACCESSORIES PLEASE ALLOW 6-8 WEEKS LEAD TIME.
FOR TECHNICAL SUPPORT CONTACT: NATIONAL ACCOUNT TECHNICIAN CONSULTANT, PHONE 800-367-6285 OPTION 2
(HOLD FOR NEXT AVAILABLE CONSULTANT), FAX 800-453-7290, EMAIL NATIONALACCOUNTSTECHNICALSUPPORT@LENNOXIND.COM.
FOR PARTS ORDER CONTACT: COMMERCIAL PARTS CUSTOMER SERVICE, PHONE 800-906-4427, FOR IN-WARRANTY PARTS PROCEDURES CONTACT: EMAIL LNXNATIONALACCOUNTSPARTS@LENNOXIND.COM.
FOR CREDIT/BILLING ISSUES CONTACT: PHONE 800-367-6285 OPTION 1, EMAIL LENNOXNATIONALACCOUNTS@LENNOXIND.COM.
FOR GENERAL ACCOUNT NEEDS IF ABOVE MEMBERS CAN'T ASSIST YOU, CONTACT: RAZI DOLE, NATIONAL ACCOUNT MANAGER, MOBILE 614-886-0719, EMAIL RAZI.DOLE@LENNOXIND.COM.
FOR FACTORY STARTUP CONTACT: LENNOX NAS, PHONE 800-333-4001, FAX 214-576-3873 ATTN: SERVICES, EMAIL LENNOXSERVICES@LENNOXNAS.COM

1 HVAC SCHEDULES

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RGLA
rgla solutions, inc.
5100 River Road, Ste 125
Schiller Park, IL 60176
p: 847.671.7452
f: 847.671.4200
www.rgla.com

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BID ISSUE	04/29/2024
PERMIT ISSUE	04/29/2024
ISSUE FOR CONSTRUCTION: REVISION 1	07/17/2024

robert g. lyon + associates, inc.
retail architecture
5100 River Road, Ste 125
Schiller Park, IL 60176
tel: 847.671.7452
f: 847.671.4200
www.rgla.com

HNY CONSULTING ENGINEERS
240 WEST 37TH STREET, 3RD FLOOR
NEW YORK, NY 10018
TEL 212.413.8400
www.hny-eng.com
2150002894
NC. CORPORATE NUMBER: P-2451
06/30/25

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ULTA BEAUTY

ULTA #1697
EASTFIELD CROSSING
640 SAINT MARK AVE.
SELMA, NC 27576

MECHANICAL SCHEDULES AND DETAILS

DRAWN BY	HEI
CHECKED BY	RCB
JOB NUMBER	21359
SHEET NAME	M-3

SECTION 15050
BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 DESCRIPTION
A. THIS SECTION DEFINES THE GENERAL PROVISIONS WHICH ARE COMMON TO ALL SECTIONS OF DIVISION 15.
B. FURNISH ALL LABOR, MATERIALS, TOOLS AND EQUIPMENT; FABRICATE, AND INSTALL COMPLETE AND IN PLACE, ALL THE FIXTURES, EQUIPMENT AND SYSTEMS AS SHOWN ON THE DRAWINGS, SPECIFIED HEREIN, AND AS REQUIRED FOR A COMPLETE AND OPERABLE INSTALLATION.
C. THE CONTRACTOR SHALL PAY FOR ALL PERMITS, FEES AND CHARGES REQUIRED FOR THIS WORK.

1.02 DRAWINGS AND SPECIFICATIONS
A. DESIGN DRAWINGS: THE DRAWINGS ACCOMPANYING THESE SPECIFICATIONS ARE GENERALLY DIAGRAMMATIC. ANY CHANGES FROM THE GENERAL ROUTING SHOWN ON THE DRAWINGS SUCH AS OFFSETS, BENDS OR CHANGES IN ELEVATION DUE TO COORDINATION WITH THE WORK OF OTHER TRADES AND THE BUILDING CONSTRUCTION SHALL BE DONE WITHOUT ADDITIONAL CHARGE TO THE OWNER.
B. SHOP DRAWINGS: SHOP DRAWINGS SHALL BE SUBMITTED FOR EACH AND EVERY ITEM OF MANUFACTURED MATERIAL AND EQUIPMENT.
C. RECORD DRAWINGS:
1. THE CONTRACTOR SHALL KEEP AN ACCURATE RECORD OF ALL CONCEALED PIPES, DUCTS, VALVES, CONDUITS, ETC. IN ADDITION, HE SHALL RECORD, IN A SPECIAL SET OF CONTRACT DRAWINGS, ALL CHANGES AND DEVIATIONS FROM THE DESIGN DRAWINGS THAT OCCURRED DURING THE INSTALLATION OF THE WORK.
2. AT COMPLETION OF THE JOB, THESE DRAWINGS ILLUSTRATING CHANGES OR DEVIATIONS SHOWING BY DIMENSION AND LOCATION THE EXACT POSITION OF ALL CONCEALED PIPES, VALVES, ETC., SHALL BE DELIVERED TO THE ARCHITECT/ENGINEER.
D. SPECIFICATIONS - REFER TO THE FOLLOWING GENERAL SPECIFICATIONS AS THEY ARE A PART OF ALL SECTIONS OF DIVISION 15.
1. DIVISION 1 - GENERAL REQUIREMENTS; REGARDING BUT NOT LIMITED TO: ALTERATION PROJECT PROCEDURES, SUBMITTALS, CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS, CLEANING DURING CONSTRUCTION, AND PRODUCT OPTIONS AND SUBSTITUTIONS.
2. DIVISION 2 - SITEWORK; REGARDING BUT NOT LIMITED TO: SELECTIVE DEMOLITION, EARTHWORK, EXCAVATION AND BACKFILLING.
3. DIVISION 3 - CONCRETE; REGARDING BUT NOT LIMITED TO: CAST-IN-PLACE CONCRETE, FORMWORK AND REINFORCEMENT.
E. IT IS THE INTENTION OF THIS SPECIFICATION SECTION THAT ALL ITEMS OF MATERIAL AND EQUIPMENT HEREIN SPECIFIED OR SHOWN ON THE DRAWINGS FOR EACH SECTION SHALL BE FURNISHED BY THE CONTRACTOR FOR THAT SECTION, AND INSTALLED BY THAT CONTRACTOR, UNLESS IT IS SPECIFICALLY STATED IN THE SECTION SPECIFICATION, OR SHOWN ON THE DRAWINGS, THAT ANY ITEM OF MATERIAL OR EQUIPMENT IS TO BE FURNISHED BY THE CONTRACTOR OF A SECTION AND INSTALLED BY THE CONTRACTORS OF OTHER SECTIONS, OR FURNISHED BY OTHER SECTION CONTRACTORS AND INSTALLED BY THE CONTRACTOR OF THE SECTION.

1.03 CHASES AND RECESSES
A. ALL CHASES, RECESSES AND MAJOR MASONRY OPENINGS AS SHOWN ON THE DRAWINGS WILL BE PROVIDED BY THE ARCHITECTURAL TRADES.

1.04 LUBRICATION
A. PRIOR TO TESTING, ALL EQUIPMENT SHALL BE PROPERLY LUBRICATED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ONE SET OF TOOLS NECESSARY FOR LUBRICATION SHALL BE DELIVERED TO OWNER. AFTER PROPER LUBRICATING, ALL UNITS SHALL BE STARTED AND SUCCESSFULLY OPERATED BY THE CONTRACTOR IN THE PRESENCE OF THE ARCHITECT AND/OR ENGINEER.
B. EXCEPT FOR SMALL ELECTRICAL MOTORS WHICH UNDER NEMA STANDARDS ARE EQUIPPED WITH LIFETIME LUBRICATION, ALL BEARINGS ON LARGE MOTORS AND MECHANICAL EQUIPMENT SHALL BE EQUIPPED WITH LUBRICATOR FITTINGS EXTENDED TO THE EXTERIOR OF THE HOUSING.

1.05 POWER WIRING
A. MOTORS UP TO AND INCLUDING 1/3 H.P. SHALL BE 120 VOLT, 60 HERTZ, SINGLE PHASE AND MOTORS 1/2 H.P. AND LARGER SHALL BE BUILT FOR 460 VOLTS, 60 HERTZ, THREE PHASE; UNLESS OTHERWISE INDICATED PER DRAWING SCHEDULES, PLANS AND DETAILS.
B. THE ELECTRICAL CONTRACTOR SHALL PROVIDE COMBINATION MAGNETIC STARTERS WITH H.O.A. SWITCH FOR EACH ITEM OF THREE PHASE EQUIPMENT AND UNFUSED DISCONNECTS FOR EACH ITEM OF SINGLE PHASE EQUIPMENT, EXCEPT WHERE STARTERS ARE FURNISHED AS A PART OF WIRED EQUIPMENT.
C. THE ELECTRICAL CONTRACTOR SHALL DO ALL POWER WIRING INCLUDING CONNECTIONS TO THE MOTORS FURNISHED BY THE CONTRACTORS OF THIS DIVISION.
D. REFER TO SECTION 15900 FOR THE WIRING TO BE PERFORMED BY THE TEMPERATURE CONTROL CONTRACTOR AND THE ELECTRICAL CONTRACTOR AS THEY RELATE TO TEMPERATURE CONTROLS.

1.06 FLUSHING AND TESTING
A. ALL NEW WATER PIPING SYSTEMS SHALL BE FLUSHED USING WATER.
B. ALL OPEN SYSTEMS, CONDENSATE DRAINAGE, ETC., SHALL BE TESTED WITH WATER, AT A HEAD OF FIVE (5) FEET ABOVE FINISHED FLOOR OR GRADE.
C. ALL PIPING SYSTEMS SHALL BE TESTED. IF LEAKS OCCUR, THE PIPE OR FITTING SHALL BE REMOVED AND REPLACED AND THE SYSTEM RETESTED.
D. PIPING SHALL NOT BE BACKFILLED OR INSULATED UNTIL TESTED. TESTS MUST BE OBSERVED BY THE ARCHITECT/ENGINEER.

1.07 GUARANTEE
A. IN ADDITION TO GUARANTEE PROVISIONS OF THE GENERAL CONDITIONS, ALL REFRIGERANT COMPRESSORS SHALL HAVE AN EXTENDED WARRANTY OF FOUR (4) YEARS BEYOND THE FIRST YEAR FOR REPLACEMENT OF PARTS AND LABOR TO REPAIR.

1.08 SUPPORTS
A. CONTRACTOR SHALL FURNISH AND INSTALL ALL ANGLES, CHANNELS, PLATES, OR BEAMS REQUIRED FOR THE SUPPORT OF THE EQUIPMENT OF EACH SECTION, WHETHER SHOWN ON THE DRAWINGS OR NOT.
B. FURNISH AND INSTALL ALL RODS, AUXILIARY STRUCTURAL STEEL FRAMES, ATTACHMENTS, BRACKETS AND PLATFORMS REQUIRED FOR SUPPORT OF EQUIPMENT FROM OVERHEAD CONSTRUCTION FOR THE RESPECTIVE SECTION.
C. VERTICAL PIPE RISERS SHALL BE ANCHORED MIDWAY OF THEIR HEIGHT, AND SHALL BE SUPPORTED AT EACH FLOOR BY 1-1/2" X 1/4" BAR CLAMPS ATTACHED TO PIPES AND RESTING ON THE FLOOR CONSTRUCTION.
D. HORIZONTAL PIPING SHALL BE SUPPORTED BY ADJUSTABLE, WROUGHT, CLEVIS TYPE HANGERS, FEE & MASON, ELCEN, OR CRAWFORD. WHERE PARALLEL PIPES ARE INSTALLED AT THE SAME LEVEL, PROVIDE TRAPEZE HANGERS; THE VARIOUS TRADES SHALL COOPERATE IN THE JOINT USE OF SUCH HANGERS. PIPE HANGERS SHALL BE OF SIZE TO SUIT PIPE COVERING PROTECTION SADDLES.
E. PIPES SHALL BE SUPPORTED ONLY FROM THE STRUCTURAL MEMBERS OF THE BUILDING. THEY SHALL BE SUPPORTED AT SUCH INTERVALS AS WILL PREVENT SAGGING, AND SO THAT EXCESSIVE LOADS WILL NOT BE PLACED UPON ANY ONE SUPPORT. SPACING AND ROD SIZES SHALL BE AS FOLLOWS:

PIPE SIZE	MAXIMUM SPACING	MINIMUM ROD SIZE
1/2"	6'-0" AND AT ALL TURNS	3/8"
3/4", 1"	7'-0" AND AT ALL TURNS	3/8"
1-1/4", 1-1/2", 2"	9'-0" AND AT ALL TURNS	3/8"
2-1/2", 3"	10'-0" AND AT ALL TURNS	1/2"

F. HANGER RODS SHALL BE FULL-DIAMETER STEEL WITH THREADED ENDS FOR FIELD CUTTING AND THREAD EXTENDING AS REQUIRED. WHERE THREADED ROD IS SHORTER THAN 6" IT SHALL BE DIPPED IN RUST RESISTANT PAINT PRIOR TO INSTALLATION.
G. AT THE CONTRACTOR'S OPTION, HANGER RODS SHALL BE CONTINUOUS THREADED STEEL WITH GALVANIZED FINISH.
H. HANGER RODS SHALL NOT BE BENT OR ALTERED IN ANY MATTER AND SHALL BE INSTALLED PLUMB AND TRUE. THE ROD SUPPORTING THE HANGER SHALL BE NO LONGER THAN 1/2" BELOW THE LOWER NUT.
I. ALTERNATE WIRE ROPE HANGER SYSTEM (CONTRACTOR OPTION)
A. GENERAL: AT THE OPTION OF THE CONTRACTOR AND IF APPROVED BY AUTHORITIES HAVING JURISDICTION, WIRE ROPE SYSTEM FOR DUCTWORK MAY BE USED IN LIEU OF CONVENTIONAL HANGERS. HANGER SYSTEMS SHALL BE APPROVED IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS (HVAC-DCS) WITH A MINIMUM LOAD SAFETY FACTOR OF 5:1.
B. WIRE ROPE HANGER SYSTEM AND LOCKING DEVICES TO BE ONE OF THE FOLLOWING MANUFACTURED SYSTEMS:
1. DUCTMATE INDUSTRIES, CHARLEROI, PA-CLUTCHER MECHANICAL HANGER SYSTEM WITH ZINC COATED STEEL AIRCRAFT QUALITY ROPE (FIELD CUT TO LENGTH). LOCKING DEVICE TO BE CLUTCHER CAST ZINC HOUSING WITH STAINLESS STEEL SPRINGS.
2. GRIPPLE, INC., BATAVIA, IL-HANG FAST WIRE ROPE HANGING SYSTEM WITH ZINC GALVANIZED STEEL WIRE ROPE. STANDARD LENGTHS OF 5, 10, 15, AND 30 FT WITH A PERFORATED LOOP AT ONE END. LOCKING DEVICE TO BE GRIPPLE ZINC HOUSING WITH STAINLESS STEEL SPRINGS.
3. ERICO, INC., SOLON, OH-CADDY SPEED LINK UNIVERSAL SUPPORT SYSTEM WITH GALVANIZED STEEL AIRCRAFT QUALITY WIRE ROPE. AVAILABLE IN 3.3, 6.6 9.9, 16.4, AND 32.8 FT. LENGTHS WITH FACTORY HOOK AT ONE END. LOCKING DEVICE TO BE ERICO STAINLESS STEEL HOUSING WITH ALL STEEL LOCKING DEVICE.

1.09 EQUIPMENT IDENTIFICATION
A. ALL MECHANICAL EQUIPMENT SHALL BE CLEARLY IDENTIFIED WITH 2" HIGH STENCILED LETTERS, PAINTED ON THE EQUIPMENT (I.E. "RTU-1"). THIS INCLUDES EXTERIOR EQUIPMENT WHERE THE PAINT SHALL BE WEATHER RESISTANT.

PART 2 - PRODUCTS

2.01 DESCRIPTION
A. THIS PART DEFINES THE PIPE AND FITTINGS TO BE USED FOR ALL SERVICES INSTALLED UNDER DIVISION 15.
B. REFER TO THE DRAWING LEGENDS AND SYMBOL SCHEDULES FOR DEFINITION OF THE DESIGNATORS USED IN THE FOLLOWING SPECIFICATION.

2.02 PIPE AND FITTINGS RELATED TO SECTION 15800
A. CONDENSATE DRAIN PIPING:
1. PIPING SHALL BE SCHEDULE 40, ASTM 53 OR ASTM 120, GALVANIZED PIPE AND FITTINGS.
2. POLYVINYL CHLORIDE (PVC), SCHEDULE 40, PIPE AND FITTINGS, ASTM D2665; WITH PRIMER AND SOLVENT CEMENT JOINTS MAY BE USED IF ACCEPTABLE TO LOCAL AUTHORITIES HAVING JURISDICTION.
A. NO CELLULAR CORE OR FOAMED PIPING WILL BE PERMITTED.

2.03 ACCESS DOORS
A. PROVIDE 24" X 24" ACCESS DOORS MANUFACTURED AS AN INTEGRAL UNIT COMPLETE WITH ALL PARTS AND READY FOR INSTALLATION AS MANUFACTURED BY ONE OF THE FOLLOWING:
1. BIRMINGHAM ORNAMENTAL.
2. KARP.
3. MILORD, DIVISION OF INRYCO.
B. PROVIDE FLUSH PANEL DOORS, EXCEPT PROVIDE RECESSED PANEL DOORS WHERE ACCESS DOORS OCCUR IN PLASTER OR ACOUSTICAL TILE GLUED TO GYPSUM LATH.
C. PROVIDE UL "B" LABELED UNITS WHERE ACCESS DOORS OCCUR IN HOUR RATED-CONSTRUCTION.
D. PROVIDE SCREW DRIVER OPERATED CAM LOCKS OF NUMBER REQUIRED BY SIZE OF DOOR.
E. PROVIDE ANCHORAGE APPROPRIATE TO CONSTRUCTION.

PART 3 - EXECUTION

3.01 CUTTING AND PATCHING
A. ALL CUTTING, REPAIRING, FITTING AND REFINISHING OF IN PLACE CONSTRUCTION REQUIRED FOR THE INSTALLATION OF THE WORK OF A SECTION SHALL BE DONE AT THE EXPENSE OF THE CONTRACTOR OF THE SECTION, EXCEPT AS SPECIFICALLY SHOWN ON THE DRAWINGS OR HEREINAFTER SPECIFIED.
B. WORK SHALL BE PERFORMED BY CRAFTSMEN SKILLED IN THEIR RESPECTIVE TRADES.

3.02 OPERATING INSTRUCTIONS
A. THE CONTRACTOR FOR THE SECTION SHALL, WHEN DIRECTED BY THE ARCHITECT/ENGINEER, PROVIDE THE OWNER WITH A COMPETENT TRADESMAN TO INSTRUCT THE OWNER'S PERSONNEL IN THE PROPER OPERATION AND MAINTENANCE OF THE EQUIPMENT HE HAS INSTALLED.
B. PROVIDE COPIES OF OPERATING INSTRUCTIONS, EQUIPMENT MANUALS, AND CONTROL DIAGRAMS PER DIVISION-1 CONTRACT CLOSE-OUT.
C. CONTROL DIAGRAMS AND WRITTEN INSTRUCTIONS SHALL BE FRAMED UNDER GLASS.

3.03 CODES AND STANDARDS
A. PIPING AND APPURTENANCES INSTALLED UNDER THIS DIVISION OF THE SPECIFICATIONS SHALL COMPLY WITH THE REQUIREMENTS OF THE FOLLOWING, WHERE APPLICABLE:
ANSI CODES FOR PRESSURE PIPING
ANSI STANDARDS FOR PIPE AND FITTINGS
B. IN ADDITION, THE WORK SHALL CONFORM TO ALL APPLICABLE STATE AND LOCAL CODES AND ORDINANCES.

3.04 WORK CLEANLINESS
A. CONTRACTOR SHALL KEEP STORED MATERIALS, STORAGE AREAS, AND INSTALLED SYSTEMS FREE OF DIRT AND DEBRIS.
B. ALL EXPOSED ENDS OF INCOMPLETE OR UNCOVERED WORK SHALL BE TEMPORARILY PLUGGED AS EACH PHASE OF PIPING WORK AND DUCTWORK IS COMPLETED.
C. PIPING, DUCTWORK AND EQUIPMENT TO BE PAINTED (EXPOSED TO VIEW IN COMPLETED STRUCTURE) SHALL BE CLEANED BY REMOVING RUST, PLASTER, AND DIRT BY WIRE BRUSHING. GREASE, OIL AND SIMILAR MATERIALS SHALL BE REMOVED BY WIPING WITH CLEAN RAGS AND SUITABLE SOLVENTS.
D. MOTOR, PUMPS, FANS AND OTHER ITEMS WITH FACTORY FINISH SHALL BE REMOVED OF GREASE AND OIL AND LEAVE WITH ALL SURFACES CLEANED AND POLISHED.

3.05 ARRANGEMENT AND ALIGNMENT
A. ALL PIPING SHALL BE ARRANGED AND ALIGNED IN ACCORDANCE WITH THE DRAWINGS. ELEVATIONS AS GIVEN MUST BE HELD. FLOOR ELEVATIONS WHERE GIVEN ARE TO HIGH POINTS OF FLOOR. DIMENSIONS MUST BE HELD AS CLOSELY AS POSSIBLE. ALL DIMENSIONS ARE TO BE FIELD CHECKED FOR ACCURACY BEFORE PIPE IS FABRICATED.
B. INSTALL ALL PIPING STRAIGHT AND DIRECT AS POSSIBLE, GENERALLY FORMING RIGHT ANGLES WITH, OR RUNNING PARALLEL WITH, WALLS OR ADJACENT PIPING. ALL PIPING SHALL BE NEATLY SPACED WITH RISERS AND DROPS RUNNING PLUMB AND TRUE.
C. RUN PIPING IN WALL CHASES, PIPE SHAFTS, HUNG CEILINGS, RECESSES, ETC., WHERE SAME ARE PROVIDED. DO NOT RUN SERVICE PIPING IN FLOOR SLAB FILL UNLESS SPECIFICALLY SO NOTED ON DRAWINGS. PIPING SHALL NOT BE COVERED OR CLOSED UNTIL TESTING IS COMPLETED.
D. DRAWINGS, IN GENERAL, ARE MADE TO SCALE. ALL DIMENSIONS SHALL BE CHECKED IN THE FIELD BY THE CONTRACTOR BEFORE FINAL CONNECTIONS ARE FABRICATED
E. DRAWINGS FOR SMALL PIPING ARE, IN GENERAL, DIAGRAMMATIC AND THE EXACT LOCATION OF THESE LINES SHALL BE DETERMINED BY THE CONTRACTOR FROM FIELD MEASUREMENTS TAKEN BY HIM. THE ACTUAL ARRANGEMENT OF THE SMALL SIZE PIPING, WHEN ERECTED, SHALL FOLLOW THE GENERAL LOCATIONS SHOWN ON THE DRAWINGS AS FAR AS PRACTICABLE. THE INSTALLATION MADE IN THIS WAY SHALL BE NEAT IN APPEARANCE AND CONVENIENT TO OPERATE, AND SHALL PROVIDE FOR PROPER EXPANSION AND DRAINAGE.
F. INSTALLATION OF PIPING SYSTEMS SHALL BE COORDINATED WITH OTHER WORK TO AVOID BLOCKING BUILDING OPENINGS, LIGHT FIXTURES, ETC. PIPING SHALL NOT INTERFERE WITH ACCESS TO VALVES OR EQUIPMENT AND SHALL NOT OBSTRUCT PASSAGEWAYS. PIPING SHALL BE INSTALLED TO PROVIDE WORKING CLEARANCE FOR OPERATION AND MAINTENANCE.

3.06 MODIFICATIONS AND INTERFERENCES
A. CONTRACTOR SHALL CAREFULLY CHECK AND BECOME FAMILIAR WITH THE ARCHITECTURAL, STRUCTURAL, ELECTRICAL AND ALL MECHANICAL DRAWINGS AND DETAILS, AND MAKE NOTE OF ALL LOCATIONS WHERE WALLS, PARTITIONS, CEILINGS, STRUCTURAL MEMBERS, ETC., ARE CALLED FOR TO BE FURRED OR CLOSED-IN.
B. MODIFICATIONS TO THE ARRANGEMENT OF THE PIPING SYSTEM MAY BE REQUIRED TO SUIT STRUCTURAL CONDITIONS, OR TO AVOID INTERFERENCE WITH THE WORK OF OTHER TRADES. CONTRACTOR SHALL FURNISH ALL OFFSETS, ADDITIONAL FITTINGS, ETC., AS REQUIRED TO MEET INSTALLATION CONDITIONS WHETHER DETAILED ON THE DRAWINGS OR NOT.
C. ANY QUESTIONABLE INFORMATION IN THE SPECIFICATIONS OR ON THE DRAWINGS SHALL BE CALLED TO THE ATTENTION OF THE ARCHITECT AND/OR ENGINEER FOR CLARIFICATION BEFORE PROCEEDING WITH FABRICATION OR ERECTION OF THE PARTS AFFECTED. IF, IN THE OPINION OF THE CONTRACTOR, ANY ADDITIONAL DETAIL DRAWINGS ARE NECESSARY, HE SHALL PREPARE THEM AT HIS OWN EXPENSE, TOGETHER WITH ALL BILLS OF MATERIAL.

3.07 PIPE CLEARANCES
A. INSTALL PIPING TO PROVIDE MINIMUM CLEARANCE OF AT LEAST ONE INCH BETWEEN EXTREME PROJECTIONS OF PIPING, FLANGES, FITTINGS, VALVES, ALLOWING FOR INSULATION, PIPE EXPANSION AND THE LIKE.

3.08 DRAINAGE AND VENTING
A. WHERE LINES ARE PURPOSELY PITCHED FOR DRAINAGE OR VENTING, AN ACCURATE GRADE SHALL BE MAINTAINED. LINES SHALL BE SUPPORTED IN SUCH A MANNER AS TO PREVENT DEFLECTION OF THE PIPING SUFFICIENT TO POCKET THE LINES.

3.09 PIPE AND FITTINGS
A. ALL PIPE SIZES REFERRED TO IN THESE SECTIONS SHOULD BE INTERPRETED AS IPS (IRON PIPE SIZE) UNLESS SPECIFICALLY DESIGNATED OTHERWISE, SUCH AS "O.D." FOR TUBING.
B. FULL LENGTHS OF PIPE SHALL BE USED WHEREVER POSSIBLE. SHORT LENGTHS OF PIPE WITH COUPLINGS WILL NOT BE PERMITTED.
C. ALL PIPE SHALL BE CUT TO EXACT MEASUREMENT TO BE INSTALLED WITHOUT FORCING (EXCEPT WHERE COLD SPRINGING IS SPECIFICALLY CALLED FOR). AFTER CUTTING, ENDS SHALL BE REAMED AND CLEANED TO ELIMINATE FOREIGN MATTER.
D. CUTTING OR OTHER WEAKENING OF THE BUILDING STRUCTURE TO FACILITATE PIPING INSTALLATION WILL NOT BE PERMITTED.
E. ALL PIPE AND FITTINGS SHALL BE MARKED BY THE MANUFACTURER IN ACCORDANCE WITH THE MARKING SECTIONS OF THE STANDARDS TO WHICH REFERENCE IS MADE IN THIS SPECIFICATION MANUAL. STANDARD MARKING SYSTEM FOR VALVES, FITTINGS, FLANGES AND UNIONS OF THE MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY.
F. MAKE ALL CHANGES IN SIZE AND DIRECTION OF PIPING WITH FITTINGS. DO NOT USE BENDS, MITER FITTINGS, FACE OR FLUSH BUSHINGS, STREET ELBOWS OR FIELD-FABRICATED REDUCERS.
G. CLOSE NIPPLES SHALL NOT BE PERMITTED; USE ONLY SHOULDER NIPPLES. SHOULDER NIPPLE WITH SHOULDER LENGTH LESS THAN 1-1/2" SHALL BE OF HEAVY WALL PIPE; NIPPLES HAVING SHOULDER LENGTH OF 1-1/2" OR GREATER SHALL BE OF SAME SCHEDULE AS CONNECTED PIPE.

3.10 REDUCING FITTINGS
A. USE ECCENTRIC REDUCING FITTINGS OR ECCENTRIC REDUCING COUPLINGS WHERE REQUIRED TO PREVENT POCKETING OF LIQUID.

3.11 CONNECTIONS TO EQUIPMENT AND SPECIALTIES
A. PIPING SYSTEMS SHALL BE INSTALLED COMPLETE TO EQUIPMENT CONNECTIONS OR TERMINAL USE POINTS.
B. PIPING SHALL BE FABRICATED CAREFULLY AND ACCURATELY TO MEET CONNECTIONS ON EQUIPMENT WITHOUT SPRINGING THE PIPE.
C. PROVIDE UNIONS OR FLANGES AT ALL PIPING CONNECTIONS TO EQUIPMENT, ETC., AT ALL LOCATIONS AS SHOWN ON THE DRAWINGS, AND GENERALLY AS REQUIRED TO DISCONNECT PIPING FROM EQUIPMENT AND APPARATUS. ARRANGE CONNECTIONS SO THAT THE EQUIPMENT SERVED MAY BE REMOVED WITHOUT DISTURBING THE PIPING. WHERE VALVES SERVE TO ISOLATE EQUIPMENT OR SPECIALTIES, THE UNIONS OR FLANGES SHALL BE LOCATED BETWEEN VALVES AND EQUIPMENT OR SPECIALTIES. UNIONS SHALL GENERALLY BE USED FOR PIPE SIZES 2" AND SMALLER AND FLANGES FOR PIPE SIZES 2-1/2" AND LARGER.

3.12 DIELECTRIC CONNECTIONS
A. PROVIDE DIELECTRIC FITTINGS BETWEEN FERROUS AND COPPER PIPING.

3.13 PIPE SLEEVES
A. PROVIDE ALL PIPE OPENINGS THROUGH WALLS, PARTITIONS AND SLABS WITH SLEEVES HAVING AN INTERNAL DIAMETER AT LEAST 1" LARGER THAN THE OUTSIDE DIAMETER OF THE PIPE FOR UNINSULATED LINES OR OF THE THICKNESS OF THE INSULATION FOR INSULATED SERVICES.
B. INSTALL SLEEVES THROUGH INTERIOR WALLS AND PARTITIONS FLUSH WITH FINISHED SURFACES; SLEEVES THROUGH OUTSIDE WALLS ARE TO PROJECT 1/2" ON OUTSIDE OF THE FINISHED WALL. FLOOR SLEEVES ARE TO PROJECT 2" ABOVE FINISHED FLOORS.
C. SET SLEEVES IN PLACE BEFORE POURING CONCRETE OR SECURELY FASTEN AND GROUT IN WITH CEMENT.
D. SLEEVE CONSTRUCTION:
1. INTERIOR PARTITIONS: NO. 22 GAUGE GALVANIZED SHEET STEEL WITH SOLDERED JOINT.
2. INTERIOR MASONRY WALLS AND FLOORS: SCHEDULE 40 GALVANIZED STEEL PIPE.
E. INTERIOR WALLS: FILL THE SPACE BETWEEN OUTSIDE OF PIPE OR INSULATION AND THE INSIDE OF THE SLEEVE OR FRAMED OPENING WITH FIBER GLASS.
F. EXTERIOR WALLS: PACK WITH OAKUM, SEAL WITH LEAD AND WATERTIGHT MASTIC OR ASPHALT.
G. PROVIDE ESCUTCHEONS ON BOTH SIDES OF THE PENETRATION THROUGH THE STRUCTURE FOR ALL PIPES EXPOSED TO VIEW PASSING THROUGH WALLS, FLOORS, CEILINGS, AND PARTITIONS, WHETHER OR NOT INSULATED. FOR PIPES PASSING THROUGH FLOORS, ESCUTCHEONS SHALL FIT OVER THE SLEEVES.
H. FIRE-STOPPING SHALL BE PROVIDED AT ALL OPENINGS TO INCLUDE THE ANNULAR SPACE AROUND DUCTS, PIPING, CONDUITS, ETC. AND SHALL BE U.L. RATED MATERIALS AND METHODS PER THE ARCHITECTURAL SPECIFICATION SECTIONS. SUBMIT THROUGH PENETRATION PROTECTION SYSTEMS FOR ALL FIRE RATED ASSEMBLIES TO THE LOCAL AUTHORITIES AND THE ARCHITECT/ENGINEER FOR REVIEW.

3.14 SCREWED JOINTS
A. CUT THREADS FULL AND CLEAN WITH SHARP DIES.
B. REAM ENDS OF PIPE AFTER THREADING AND BEFORE ASSEMBLY, TO REMOVE BURRS.
C. LEAVE NOT MORE THAN THREE PIPE THREADS EXPOSED AT EACH CONNECTION.
D. USE JOINT SEALANT OR TAPE ON MALE THREADS ONLY.

SECTION 15250

INSULATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. SECTION 15050, "BASIC MATERIALS AND METHODS", APPLIES TO THE WORK SPECIFIED IN THIS SECTION.

PART 2 - PRODUCTS

2.01 INSULATION - COLD PIPING

A. INSULATION FOR DRAINAGE PIPING SYSTEMS (COOLING COIL CONDENSATE) SHALL BE 1" THICK GLASS FIBER.

B. GLASS FIBER INSULATION SHALL BE UL RATED, NONCOMBUSTIBLE, SECTIONAL PIPE INSULATION OF HEAVY DENSITY GLASS FIBER WITH ALL SERVICE JACKET HAVING A COMPOSITE RATING NOT TO EXCEED 25 FLAME SPREAD AND 50 SMOKE DEVELOPED. INSULATION SHALL BE AS SUPPLIED BY CERTAINTEED, OWENS/CORNING, OR KNAUF.

C. EVERY PACKAGE OR STANDARD CONTAINER OF COVERING, ADHESIVE AND COATING DELIVERED AT THE BUILDING FOR USE MUST HAVE THE MANUFACTURER'S STAMP OR LABEL ATTACHED, GIVING NAME OF MANUFACTURER AND BRAND.

D. JACKET LAPS AND BUTT STRIPS SHALL BE SELF-SEALING TYPE.

E. PROVIDE HALF ROUND GALVANIZED 18 GAUGE SHEET METAL HANGER SHIELDS. SHIELDS SHALL BE 12" LONG FOR PIPE SIZES UP TO 3", 18" FOR PIPE SIZES OVER 3" AND UP TO 6", AND 24" LONG FOR PIPE SIZES OVER 6".

2.02 REFRIGERANT - SUCTION PIPING

A. INSULATION SHALL BE 1/2" THICKNESS OF FLEXIBLE FOAMED PLASTIC.

2.03 INSULATION - AIR SYSTEM COMPONENTS

A. INSULATION SHALL BE 2" THICKNESS OF SEMI-RIGID BOARD, 3 PCF DENSITY, FOIL REINFORCED KRAFT FACING.

B. BOARD SHALL BE UL RATED, NONCOMBUSTIBLE GLASS FIBER, 25 FLAME SPREAD, 50 SMOKE DEVELOPED, AS MANUFACTURED BY CERTAINTEED, OWENS/CORNING AND KNAUF.

C. EVERY PACKAGE OR STANDARD CONTAINER OF COVERING, ADHESIVE AND COATING DELIVERED AT THE BUILDING FOR USE MUST HAVE THE MANUFACTURER'S STAMP OR LABEL ATTACHED, GIVING NAME OF MANUFACTURER AND BRAND.

2.04 INSULATION - DUCTWORK

A. INSULATION SHALL BE 2" THICKNESS OF FLEXIBLE INSULATION, 1 PCF DENSITY, FOIL REINFORCED KRAFT FACING, HAVING A COMPOSITE RATING NOT TO EXCEED 25 FLAME SPREAD AND 50 SMOKE DEVELOPED. INSULATION SHALL BE AS SUPPLIED BY OWENS/CORNING, CERTAINTEED OR KNAUF.

B. EVERY PACKAGE OR STANDARD CONTAINER OF COVERING, ADHESIVE AND COATING DELIVERED AT THE BUILDING FOR USE MUST HAVE THE MANUFACTURER'S STAMP OR LABEL ATTACHED, GIVING NAME OF MANUFACTURER AND BRAND.

C. REFER TO SECTION 15800 FOR LINED DUCTS.

PART 3 - EXECUTION

3.01 INSULATED PIPING SYSTEMS

A. PROVIDE INSULATION ON PIPING SYSTEMS AS FOLLOWS:
1. REFRIGERANT SUCTION PIPING.
2. CONDENSATE DRAIN PIPING, AS PER COLD PIPING.

3.02 PIPE HANGER SHIELDS

A. EACH CONTRACTOR INSTALLING HOT OR COLD PIPING SHALL SET THE PIPING UP ON WOOD BLOCKING AT EACH HANGER.

B. THE WOOD BLOCKING THICKNESS SHALL BE THE SAME AS THAT OF THE PIPE INSULATION.

C. THIS CONTRACTOR SHALL REPLACE THE WOOD BLOCKING WITH A FULL SECTION OF HEAVY DENSITY PIPE INSULATION AND A HANGER SHIELD.

3.03 INSTALLATION, GENERAL - COLD PIPING

A. ALL SURFACES MUST BE CLEAN AND DRY AND PIPE LINES TESTED BEFORE APPLYING PIPE INSULATION. IF COVERING IS APPLIED AT THE PIPE COVERER'S OPTION PRIOR TO TESTING, AND DEFECTS IN COVERED WORK APPEAR AT OR BEFORE THE TIME OF INSPECTION AND TESTS, THE COVERING MUST BE REMOVED, AND AFTER DEFECTS HAVE BEEN CORRECTED, MUST BE REINSTALLED WITHOUT EXPENSE TO THE OWNER.

B. COVERING SHALL BE DRY WHEN INSTALLED AND BEFORE AND DURING THE APPLICATION OF ANY FINISH. SURFACES OF COVERING SHALL BE SMOOTH, EVEN AND SUBSTANTIALLY FLUSH WITH ADJACENT PIPE COVERING.

C. MANUFACTURER'S APPLICATION INSTRUCTIONS FOR ALL MATERIALS SHALL BE FOLLOWED.

D. INSULATION SHALL NOT BE APPLIED OVER PIPE PLUGS, BLIND NIPPLES, NAMEPLATES, INSPECTION STAMPS, OR IDENTIFICATION TAGS.
E. INSULATOR MUST EXERCISE EXTREME CAUTION IN THE STORAGE OF FLAMMABLE ADHESIVES AND DURING THEIR APPLICATION.

3.04 INSULATION OF PIPING - COLD PIPING

A. BUTT JOINTS FIRMLY TOGETHER. OVERLAP SEAM SHALL BE DOWNWARD ON SIDE OF PIPE, SEALED TIGHT AND SMOOTH. STAPLE OVERLAP ON 6" SPACING.

B. INSTALL BUTT STRIPS WITH 2" OVERLAP DOWNWARD STAPLE END OF OVERLAP.

C. INSULATION SHALL BE FASTENED WITH 9/16" FLARE TYPE STAPLES.

D. SEAL OVER STAPLES WITH VAPOR-BARRIER MASTIC, CHILDERS NO. CP-32 (WHITE).

3.05 INSULATION OF FITTINGS, VALVES, ETC. - COLD PIPING

A. VALVES AND FITTINGS 3" AND LESS SHALL BE INSULATED BY WRAPPING WITH PRE-CUT FIBER GLASS BLANKET INSULATION AND SECURING WITH JUTE TWINE. A PREFORMED, MOLDED PVC JACKET COVER SHALL BE INSTALLED OVER THE BLANKET INSULATION. THE JACKET SHALL BE FASTENED WITH STAINLESS STEEL TACKS AND BUTT STRIPS OVERLAPPING ONTO THE ADJOINING PIPE INSULATION. A VAPOR-BARRIER MASTIC, CHILDERS NO. CP-32 (WHITE), SHALL BE USED TO SEAL THE JACKET THROAT AND JACKET TO THE PIPE INSULATION PRIOR TO TACK AND BUTT STRIP INSTALLATION.

B. FLANGES SHALL BE INSULATED WITH NESTING PIPE INSULATION. THE FLANGE INSULATION SHALL EXTEND NOT LESS THAN 2" OVER THE ADJACENT PIPE INSULATION ON EACH SIDE OF THE FLANGE. INSULATION ON PIPES IS TO BE STOPPED SHORT OF FLANGES TO PERMIT REMOVAL OF FLANGE BOLTS. THE FLANGE INSULATION SHALL BE APPLIED IN SUCH A MANNER THAT IT MAY BE REMOVED WITHOUT DAMAGE TO THE ADJACENT PIPE INSULATION.

C. UNIONS SHALL BE COVERED WITH NESTING PIPE INSULATION AS SPECIFIED FOR FLANGES.

D. STRAINERS SHALL BE INSULATED AS DESCRIBED ABOVE FOR SMALL VALVES AND FITTINGS. CLEAN-OUT PLUGS SHALL BE LEFT ACCESSIBLE SO THAT THE INSULATION IS NOT DAMAGED BY THEIR REMOVAL.

E. WHEREVER NESTING SIZE SECTIONAL COVERING IS USED, IT SHALL BE CUT TO FIT IN A NEAT WORKMANLIKE MANNER WITH ALL JOINTS BUTTED AND HELD SECURELY IN PLACE WITH JUTE OR GLASS FIBER TWINE. JOINTS SHALL BE POINTED UP WITH INSULATING CEMENT PRIOR TO RECEIVING SURFACE FINISH.

F. FITTINGS, VALVES, STRAINERS, WHERE VAPOR-BARRIER JACKET OR CLOTH TAPE HAS BEEN FITTED FOR NESTED/MITERED APPLICATIONS, AND COLOR DAMAGED JACKETS SHALL BE SEALED AND PAINTED WITH CHILDERS NO. CP-32 (WHITE) AT THE RATE OF 85-100 SQ. FT. PER GALLON.

3.06 INSTALLATION - REFRIGERANT PIPING

A. INSULATION SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS FOR 40EF PIPING.

B. PROVIDE TWO (2) COATS OF WEATHER RESISTANT PAINT FOR EXTERIOR INSTALLATIONS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

3.07 INSULATED DUCT SYSTEMS

A. PROVIDE INSULATION ON THE SUPPLY AND RETURN DUCTWORK SYSTEMS, EXCEPT WHERE DUCTWORK IS INDICATED TO BE LINED.

B. PROVIDE INSULATION ON THE OUTSIDE AIR DUCTWORK OF ALL SYSTEMS FROM THE PLENUM OR HOOD INTAKE TO THE HVAC UNIT, EXCEPT WHERE DUCTWORK IS INDICATED TO BE LINED.

C. PROVIDE INSULATION ON THE EXHAUST AIR DUCTWORK OF ALL SYSTEMS FROM THE SYSTEM EXHAUST AIR CONTROL DAMPER TO THE EXHAUST AIR PLENUM OR HOOD DISCHARGE, EXCEPT WHERE DUCTWORK IS INDICATED TO BE LINED.

D. PROVIDE INSULATION ON THE OUTSIDE AIR INTAKE AND EXHAUST AIR DISCHARGE AIR PLENUMS.

3.08 INSTALLATION, GENERAL - DUCTS

A. NO INSULATION SHALL BE APPLIED UNTIL THE DUCTWORK HAS BEEN TESTED AND PROVEN TIGHT.

B. ALL DUCTWORK SHALL BE CLEANED OF OIL, GREASE, LOOSE DIRT, AND OTHER FOREIGN MATTER BEFORE THE INSULATION IS APPLIED.

C. EXPOSED ENDS OF INSULATION SHALL BE BEVELED TO THE INSULATED SURFACE, AND THE JACKET AND/OR VAPOR BARRIER SHALL BE SEALED TO THE SURFACE.

D. CUTOUTS IN THE INSULATION FOR NAMEPLATES AND EQUIPMENT TAGS SHALL HAVE ALL EDGES TAPERED TO THE SURFACE, AND THE JACKET AND/OR VAPOR BARRIER SEALED.

E. SPECIAL CARE MUST BE TAKEN IN APPLYING INSULATION AROUND SUCH ACCESSORIES AS REHEAT COILS, FLEXIBLE CONNECTIONS, ACCESS DOORS, ETC., TO ALLOW REMOVAL OF THESE ITEMS WITHOUT IN ANY WAY REMOVING THE INSULATION OR BREAKING THE VAPOR SEAL.

3.09 INSTALLATION - DUCTS

A. INSULATION WRAP SHALL BE APPLIED TO THE DUCT WITH 6" WIDE BANDS OF ADHESIVE ON 12" CENTERS. THE ADHESIVE SHALL HAVE A FLAME SPREAD INDEX OF 25 OR LESS. WELDING TYPE FASTENERS SHALL BE APPLIED TO THE BOTTOM OF DUCTS OVER 18" IN WIDTH. THE FASTENERS SHALL BE A MAXIMUM OF 12" ON CENTERS AND PLACED CLOSE TO BUTT ENDS OF THE INSULATION. THE PINS SHALL BE CUT OFF FLUSH WITH THE FASTENER WASHER.

B. ALL JOINTS, CRACKS AND BREAKS, INCLUDING HOLES FOR THE FASTENERS, IN THE VAPOR BARRIER SHALL BE SEALED WITH A VAPOR BARRIER MASTIC, CHILDERS NO. CP-32 (GRAY) AND VAPOR BARRIER JACKET MATERIAL. BREAKS IN THE VAPOR BARRIER CAUSED BY THE ATTACHMENT OF TUBING OR OTHER EQUIPMENT SHALL ALSO BE SEALED. VAPOR BARRIER LAPS SHALL BE SEALED WITH ADHESIVE, CHILDERS NO. CP-82. NO STAPLES SHALL BE USED TO SECURE THE VAPOR BARRIER LAPS.

C. WHERE PINS ARE USED, APPLY VAPOR SEAL PATCHES USING ADHESIVE OVER THE PINS.

3.10 INSULATION - AIR SYSTEM COMPONENTS

A. PROVIDE INSULATION ON THE EXTERIOR SURFACES OF SUPPLY SYSTEM COMPONENTS CONVEYING MECHANICALLY COOLED AIR EXCEPT WHERE SUCH COMPONENTS ARE INDICATED TO BE LINED.

B. INSULATED COMPONENTS SHALL INCLUDE FILTER SECTION, SUPPLY FAN, RETURN FAN, DISCHARGE CONE, COIL SECTION AND ATTENUATOR SECTION.

3.11 INSTALLATION - AIR SYSTEM COMPONENTS

A. BOARDS SHALL BE APPLIED USING MECHANICAL FASTENERS. FASTENERS SHALL BE LOCATED NOT LESS THAN 3" FROM EACH EDGE OR CORNER OF THE BOARD. PIN SPACING ALONG THE PANELS NO GREATER THAN 12" ON CENTERS.

B. APPLY ROUND VAPOR SEAL FSK PATCHES USING ADHESIVE OVER THE PINS.

C. ALL INSULATION EDGES AND BUTT JOINTS ARE TO BE SEALED WITH JOINT SEALING TAPE, TYPE FSK, 5" WIDE, USING ADHESIVE, CHILDERS NO. CP-82.

D. FINISH PINS WITH PLASTIC CAPS

SECTION 15800
AIR DISTRIBUTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS
A. SECTION 15050 BASIC MATERIALS AND METHODS APPLIES TO THE WORK SPECIFIED IN THIS SECTION.
B. IN ADDITION, THE FOLLOWING SECTIONS APPLY: 15250, 15900 AND 15990.

1.02 AIR SYSTEMS
A. PROVIDE HEATING AND COOLING SYSTEMS.
B. PROVIDE VENTILATING SYSTEMS.
C. PROVIDE EXHAUST SYSTEMS.

1.03 SHOP DRAWINGS
A. PROVIDE 1/4" SCALE SHOP DRAWINGS FOR ALL DUCT SYSTEMS.

PART 2 - PRODUCTS

2.01 HVAC UNITS (LANDLORD PROVIDED)
A. PROVIDE PACKAGE HEATING, COOLING AND VENTILATING UNIT AND ACCESSORIES PER DRAWING SCHEDULE, PLANS, AND DETAILS.
B. HEATING SECTION SHALL BE GAS BURNER.
C. COOLING SECTION SHALL BE SELF-CONTAINED REFRIGERATION SYSTEM WITH DIRECT-EXPANSION COIL.

2.02 AIR FILTERS
A. PROVIDE EACH SYSTEM CENTRAL AIR FILTERS AND ACCESSORIES PER DRAWING SCHEDULES, PLANS AND DETAILS.
B. PROVIDE TWO (2) SETS OF FILTERS FOR EACH SYSTEM.

2.03 PLENUM LINING
A. PROVIDE SYSTEMS PLENUMS WITH FIBERGLASS LINING WHERE SHOWN ON THE DRAWING PLANS AND ELEVATIONS.
B. LINER SHALL BE 2" THICK, 3 PCF OR 6 PCF DENSITY AS INDICATED, SEMI RIGID BOARD BONDED WITH THERMOSETTING RESIN AND COATED ONE SIDE WITH FIRE RESISTANT COATING.
C. LINER SHALL HAVE MINIMUM 9.0 FT2 HR F/BTU THERMAL RESISTANCE.
D. LINER SHALL BE SUPPLIED BY OWENS-CORNING, CERTAINTEED OR KNAUF.

2.04 EXHAUST FAN
A. PROVIDE ROOF MOUNTED FANS WITH ACCESSORIES PER DRAWING SCHEDULE, PLANS AND DETAILS.
B. PROVIDE IN-LINE DUCT MOUNTED PANS WITH ACCESSORIES PER DRAWING SCHEDULE, PLANS AND DETAILS.

2.05 GRILLES AND DIFFUSERS
A. PROVIDE GRILLES AND DIFFUSERS PER DRAWING SCHEDULE, PLANS AND DETAILS.

2.06 FLUES
A. PROVIDE FLUES AND ACCESSORIES FOR THE DOMESTIC WATER HEATERS OF SECTION 15400.
B. FLUES SHALL BE OF THE CLASS, MODEL AND WITH THE ACCESSORIES AS DESCRIBED IN LEGENDS ON DRAWINGS RELATING TO THE ABOVE SECTIONS.

2.07 MOTOR OPERATED DAMPERS
A. PROVIDE MOTOR OPERATED DAMPER PER DRAWING SCHEDULE, PLANS AND DETAILS.

2.08 FIRE DAMPERS
A. PROVIDE FIRE DAMPERS PER DRAWING SCHEDULE, PLANS, DETAILS AND WHERE REQUIRED BY CODE.

2.09 CURBS
A. PROVIDE CURBS FOR ALL ROOF OPENINGS.
B. CERTAIN ITEMS OF EQUIPMENT SHALL HAVE CURBS FURNISHED BY THE EQUIPMENT MANUFACTURER.
C. ALL OTHER OPENINGS SHALL HAVE INSULATED, PREFABRICATED CURBS OF GALVANIZED STEEL CONSTRUCTION, PATE OR THY-CURB.
D. CURBS SHALL BE SIZED TO FIT EQUIPMENT BASE.

2.10 FLEXIBLE DUCTWORK
A. PROVIDE FLEXIBLE DUCTWORK PER DRAWING PLANS AND DETAILS.
B. FLEXIBLE DUCTS SHALL CONFORM TO U1-181 AND WITH A FLAME SPREAD RATING NOT OVER 25 AND A SMOKE DEVELOPED RATING NO HIGHER THAN 50. MAXIMUM LENGTH SHALL BE 6'-0" WHEN FULLY EXTENDED.
C. ACCEPTABLE FLEXIBLE DUCTWORK CONNECTORS ARE AS FOLLOWS:
FLEXMASTER MODEL NO. TL-M;
FLEXMASTER MODEL NO. 4-M
THERMAFLEX MODEL NO. M-KC
TECHNAFLEX MODEL NO. 57K

2.11 FLEXIBLE CONNECTIONS
A. PROVIDE 1 LB. DENSITY LOADED VINYL FLEXIBLE CONNECTORS FOR ALL ITEMS OF ROTATING FAN EQUIPMENT.

2.12 PREFABRICATED DUCTWORK
A. PROVIDE PREFABRICATED ROUND AND OVAL DUCTWORK WITH SPIRAL OR LONGITUDINAL SEAMS.
DUCT CONSTUCTION FOR 2" W.C.

DUCT DIAMETER	SPIRAL SEAM GAUGE		ONGITUDINAL SEAM GAUGE	
(INCHES)	GALV. STEEL	ALUM.	GALV. STEEL	ALUM.
UP TO 14"	26	.025"	24	.032"
15" TO 26"	24	.032"	22	.040"
28" TO 36"	22	.040"	20	.050"
38" TO 50"	20	.050"	18	.063"
52" TO 60"	18	.063"	16	.071"

B. SLEEVES, COLLARS, FITTINGS, ETC. SHALL BE OFF A WALL THICKNESS NOT LESS THAN THAT SPECIFIED FOR LONGITUDINAL SEAM STRAIGHT DUCT UNLESS CERTIFIED TESTING DATA INDICATES SUITABILITY AND IS SUBMITTED TO ENGINEER FOR REVIEW.

2.13 DIFFUSER PLENUMS
A. PROVIDE DIFFUSER PLENUMS AS SHOWN ON DRAWING PLANS AND DETAILS.

2.14 DUCT LINING
A. PROVIDE DUCTWORK WITH FIBERGLASS LINING WHERE INDICATED ON THE DRAWINGS.
B. LINING SHALL BE 1.5 INCH THICK, 2.0 PCF DENSITY, FLEXIBLE, WITH FIRE RESISTANT COATING TO BOND THE AIR SIDE SURFACE OF THE FIBERS.
C. LINING SHALL HAVE MINIMUM 3.8 FT2 HR F/BTU THERMAL RESISTANCE.
D. FIRE HAZARD CLASSIFICATION - ASTM E-84-70 TEST METHOD, 25 FLAME SPREAD, 50 SMOKE DEVELOPED.
E. LINING SHALL BE SUPPLIED BY OWENS-CORNING, CERTAINTEED OR KNAUF.

2.15 VIBRATION ISOLATION
A. PROVIDE VIBRATION ISOLATION FOR ALL FAN EQUIPMENT PER DRAWING PLANS AND DETAILS.

PART 3 - EXECUTION

3.01 HVAC UNITS (LANDLORD PROVIDED)
A. UNITS SHALL BE MOUNTED ON STRUCTURAL MEMBERS PROVIDED AS PART OF THE BUILDING STRUCTURAL SYSTEM OF PREFABRICATED EQUIPMENT SUPPORTS, SEE DRAWINGS DETAILS AND LEGENDS.
B. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR OF THIS SECTION TO PROVIDE CERTIFIED DIMENSIONS ON EACH UNIT TO THE STRUCTURAL CONTRACTOR FOR PROPER DESIGN OF THE STRUCTURAL MOUNTING.
C. UNITS SHALL BE SEPARATE FROM THE BUILDING STRUCTURAL SYSTEM WITH 95 % EFFICIENT ISOLATORS EITHER BY INTERNAL OR EXTERNAL ISOLATORS.

3.02 FILTERS
A. INSTALL FILTER HOUSINGS IN SYSTEM PLENUMS AND PROVIDE TRANSITIONS OR BAFFLES TO PREVENT AIR BY-PASS.
B. INSTALL FILTERS BEFORE ANY SYSTEM IS PUT IN OPERATION.

3.03 PLENUM LINING
A. ADHERE LINER WITH A FULL COAT OF ADHESIVE AND MECHANICAL FASTENERS.
B. EXPOSED EDGES SHALL BE FINISHED WITH TROWEL APPLIED MASTIC TO PREVENT ANY POSSIBILITY OF EROSION. MASTIC TO HAVE SAME FIRE HAZARD CLASSIFICATION AS LINER.

3.04 EXHAUST FANS
A. FASTEN ROOF MOUNTED FANS TO CURBS SIX (6) INCHES ON CENTERS USING HEX HEAD SCREWS AND WASHERS.
B. MOUNT IN-LINE FANS TO DUCTWORK WITH VIBRATION ISOLATION SUPPORTS.

3.05 GRAVITY DAMPERS
A. WHERE GRAVITY DAMPERS ARE INSTALLED THIS CONTRACTOR SHALL LUBRICATE THE HINGES AND BE RESPONSIBLE FOR OPERATION IN USE.

3.06 GRILLES AND DIFFUSERS
A. INSTALL ACCESSORY DAMPERS IN THE FULL OPEN POSITION.
B. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO ASSURE THAT ALL DAMPERS ARE FULL OPEN BEFORE AIR BALANCING IS PERFORMED.

3.07 ACCESS DOORS
A. INSTALL ACCESS DOORS IN THE BUILDING CONSTRUCTION WHERE SHOWN ON THE DRAWING PLANS AND WHERE REQUIRED TO ACCESS CONCEALED EQUIPMENT.
B. COORDINATE INSTALLATION WITH THE GENERAL CONTRACTOR.

3.08 FLUES
A. SUBMIT DRAWINGS FROM THE MANUFACTURER OF THE FLUE SYSTEM INCLUDING CONNECTIONS TO THE EQUIPMENT, FLUE SUPPORTS, ROOF PENETRATION AND FLUE CAP.
B. DO NOT ORDER FLUES UNTIL DRAWINGS ARE APPROVED.

3.09 MOTOR OPERATED DAMPERS
A. DAMPERS, WHETHER FURNISHED BY THIS CONTRACTOR OR THE CONTROL CONTRACTOR, SHALL BE INSTALLED SQUARE TO THE DUCT OR CONSTRUCTION.
B. DAMPERS SHALL BE MANUALLY TESTED TO ASSURE FREE AND EASY MOVEMENT.
C. ADJUST DAMPER BLADES FOR FULL CLOSURE.

3.10 FIRE DAMPERS
A. INSTALL DAMPERS IN SLEEVE PER DRAWING NOTE.
B. RELEASE DAMPER LINKAGE AND TEST FOR FREE FALLING CLOSURE BEFORE AND AFTER INSTALLATION.
C. RECONNECT LINKAGE.

3.11 CURBS
A. CURBS SHALL BE TAPER TYPE AND MATCH THE PITCH OF THE ROOF. COORDINATE INSTALLATION OF CURBS WITH THE GENERAL CONTRACTOR.
B. INSTALL STEEL PLATES AND ACCESSORIES AS REQUIRED FOR DUCTWORK OR EQUIPMENT CONNECTIONS.
C. GENERAL CONTRACTOR WILL PROVIDE SHIMMING LEVEL OF CURBS, FASTENING OF CURBS TO ROOF CONSTRUCTION AND ROOF FLASHING.

3.12 DIFFUSER PLENUMS
A. PLENUMS WILL BE RECEIVED WITH FACTORY APPLIED FINISH. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO PROTECT THAT FINISH.
B. IF IN THE OPINION OF THE ARCHITECT'S SITE INSPECTOR THE FINISH IS NOT ACCEPTABLE WHEN READY TO BE TURNED OVER TO THE OWNER, THE DAMAGED PLENUM SECTIONS WILL BE REMOVED AND REPLACED.

3.13 FLEXIBLE DUCTWORK
A. APPLY MASTIC DUCT SEALANT TO RIGID DUCT AND DEVICE TO WHICH CONNECTION IS BEING MADE BEFORE INSTALLING FLEXIBLE DUCT.
B. FASTEN ALUMINUM TYPE FLEXIBLE DUCTWORK WITH #8 SCREWS MINIMUM 6" ON CENTER. COAT SCREWS WITH MASTIC SEALER AFTER TIGHTENING.
C. FASTEN REINFORCED VINYL TYPE FLEXIBLE DUCTWORK WITH DRAWBAND TYPE COMPRESSION FASTENERS.
D. APPLY TWO LAYERS OF NASHAU #357 DUCT TAPE OVER JUNCTURE OF FLEXIBLE DUCTWORK TO DEVICE OR RIGID DUCTWORK, AND THE INSULATION SLEEVE TO DEVICE, RIGID DUCTWORK OR BUTTING TO TO OTHER INSULATION.

3.14 FLEXIBLE CONNECTIONS
A. APPLY MASTIC DUCT SEALANT TO RIGID DUCT AND DEVICE TO WHICH CONNECTION IS BEING MADE BEFORE INSTALLING FLEXIBLE DUCT.
B. APPLY CLAMPS, BOTH ENDS, OF THE SCREW DRIVE TIGHTENING TYPE.
C. COAT CLAMP AND JUNCTURE WITH MASTIC SEALER AFTER TIGHTENING.

3.15 PREFABRICATED DUCTWORK
A. WHERE CONNECTIONS IN OVAL AND ROUND DUCTS ARE NOT MADE UP WITH FLANGES, A MALE END COUPLING SHALL BE USED. "UNITED" DUCT SEALER, OR APPROVED EQUAL, SHALL BE APPLIED TO THE MALE END BEFORE INSERTION OR IMMEDIATELY AFTER IT IS STARTED, APPROXIMATELY 1/2 INCH. PUSH FITTING OR PIPE TO COUPLING BEAD STOP. DRILL AND INSTALL SOLID POP RIVETS, AS REQUIRED, A MINIMUM OF 1/2 INCH FROM THE COUPLING BEAD STOP. AFTER OTHER END OF COUPLING IS INSERTED, SEALED AND RIVETED AS ABOVE, APPLY DUCT SEALER IN A MINIMUM OF 2" WIDE BAND, MAKING SURE RIVET HEADS AND THE JOINT GAP ARE COVERED. APPLY A SINGLE WRAP OF NASHUA NO. 357, OR APPROVED EQUAL, DUCT TAPE OVER THE WET SEALER. DO NOT APPLY SEALER OVER THE TAPE. SAMPLES OF THE DUCT SEALER AND TAPE, INCLUDING SPECIFICATION SHEETS, SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
B. WHERE DUCTWORK IS EXPOSED IN OCCUPIED AREAS, IT SHALL BE INSTALLED NEAT AND CLEAN. FRAGMENTED ENDS, I.E., FIELD CUTS WILL NOT BE ACCEPTED. ALL SUCH DUCTWORK SHALL BE FIELD MEASURED AND FACTORY CUT TO LENGTH. SEALANT WILL BE APPLIED ONLY TO THE INTERIOR SURFACES OF CONNECTING PIECES. ANY SEALANT EXPOSED SHALL BE REMOVED WITH THE PROPER SOLVENT.

3.16 SHOP FABRICATED DUCTWORK
A. DUCTWORK SHALL BE INSTALLED AND SEALED ONLY IN ACCORDANCE WITH THE NOTE ON THE DRAWINGS. ANY OTHER PROCEDURE WHETHER RECOMMENDED BY THE MANUFACTURER OR NOT IS UNACCEPTABLE.
B. SEALANT SHALL BE APPLIED TO JOINTS AND SEAMS DURING FABRICATION. NOT AT THE SITE INSTALLATION.
C. WHERE DUCTWORK IS EXPOSED IN OCCUPIED AREAS, IT SHALL BE INSTALLED NEAT AND CLEAN. FRAGMENTED ENDS, I. E., FIELD CUTS WILL NOT BE ACCEPTED. ALL SUCH DUCTWORK SHALL BE FIELD MEASURED AND SHOP CUT TO LENGTH. SEALANT WILL BE APPLIED ONLY TO THE INTERIOR SURFACES OF CONNECTING PIECES. ANY SEALANT EXPOSED SHALL BE REMOVED WITH THE PROPER SOLVENT.

3.17 DUCT LINING
A. LINING SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS FOR 2000 FPM.
B. A FULL COAT OF ADHESIVE SHALL BE USED WHETHER RECOMMENDED OR NOT. EDGES SHALL BE FINISHED WITH TROWEL APPLIED MASTIC.

RGLA
rgla solutions, inc.
5100 River Road, Ste 125
Schiller Park, IL 60176
p: 847.671.7452
f: 847.671.4200
www.rgla.com

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robert g. lyon + associates, inc.
retail architecture
5100 River Road, Ste 125
Schiller Park, IL 60176
p: 847.671.7452
f: 847.671.4200
www.rgla.com

HNY
CONSULTING ENGINEERS
240 WEST 37TH STREET, 3RD FLOOR
NEW YORK, NY 10018
TEL 212.413.8400
www.hny-eng.com
2150002894
NC. CORPORATE NUMBER: P-2451
06/30/25

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SEAL:

ULTA BEAUTY

ULTA #1697
EASTFIELD CROSSING
640 SAINT MARK AVE.
SELMA, NC 27576

MECHANICAL SPECIFICATIONS

DRAWN BY
HEI
CHECKED BY
RCB
JOB NUMBER
21359
SHEET NAME
M-4

3.18 DUCTWORK
A. PROVIDE DUCTWORK SYSTEMS PER DRAWING PLANS AND DETAILS.
B. THE FOLLOWING DUCT SYSTEMS SHALL BE CONSTRUCTED FOR 2" W.C.
1. ALL SUPPLY AIR DUCTWORK.
2. ALL RETURN AIR DUCTWORK.
3. ALL EXHAUST DUCTWORK.
C. DUCT CONSTRUCTION FOR 2" W.C.
1. ALL DUCTWORK SHALL BE NEAT, ACCURATE, MECHANICALLY TIGHT AND RIGIDLY CONSTRUCTED. OFFSETS OF EXPOSED DUCTWORK SHALL BE MADE ON SIDE OPPOSITE TO WALLS AND CEILINGS, UNLESS OTHERWISE SHOWN OR SPECIFIED. ALL UNINSULATED PANELS WIDER THAN 12 INCHES SHALL BE CROSS-BROKEN.
2. DUCTWORK SHALL BE CONSTRUCTED OF NEW SHEETS OF LOCK-FORMING QUALITY. ENDS OF ALL SHEETS WHICH ARE NOT PERFECTLY SQUARE SHALL BE SO TRIMMED IN SHOP BEFORE LAYOUT IS BEGUN. GAUGES SHALL BE NOT LESS THAN THOSE SHOWN AS FOLLOWS:

LARGEST DIMENSION (INCHES)	GALV. STEEL GAUGE	ALUM. GAUGE
UP TO 12	26	.027"
1 TO 30	24	.035"
31 TO 60	22	.043"
61 TO 90	20	.052"

A. ALL CASINGS AND PLENUM CHAMBERS SHALL BE CONSTRUCTED OF 18 GAUGE MATERIAL, WITH STANDING SEAMS, AND FRAMED WITH 1-1/2" X 1-1/2" X 1/8" GALVANIZED ANGLES.
B. ALL DUCTWORK EXPOSED TO OUTSIDE WEATHER SHALL BE AN 18 GAUGE REGARDLESS OF DIMENSIONS.
3. LONGITUDINAL SEAMS OF RECTANGULAR DUCTWORK SHALL BE EITHER PITTSBURGH LOCK, DOUBLE OR GROOVED. ONLY ONE TYPE OF SEAM SHALL BE USED IN EACH RUN OF DUCT. LONGITUDINAL SEAMS OF ROUND DUCT SHALL BE GROOVED. BUTTON PUNCH SNAP LOCK SEAMS MAY BE USED WHEN INSTALLED WITH SEALANT IN JOINT AND SHEETMETAL SCREWS INSTALLED THRU JOINT PER SMACNA STANDARDS.
4. TRANSVERSE JOINTS OF RECTANGULAR DUCT SHALL BE AS FOLLOWS:
A. LESS THAN 18 INCHES - POCKET, BAR OR S SLIP AND DRIVE SLIPS.
B. B.19 TO 24 INCHES - 3/4 INCH POCKET OR BAR SLIP AND DRIVE SLIP.
5. DRIVE SLIPS SHALL BE USED ON SHORT SIDES OF TRANSVERSE DUCT JOINTS IF SIDE IS LESS THAN 24 INCHES. METAL AND GAUGE OF S SLIPS AND DRIVE SLIPS SHALL BE SAME AS DUCT. ENDS OF DRIVE SLIPS SHALL BE BENT OVER AT LEAST 1/2 INCH AT CORNERS. BAR SLIPS SHALL BE FASTENED WITH SHEET METAL SCREWS ON 12 INCH CENTERS. CORNERS OF ALL BAR SLIP JOINTS SHALL BE FOLDED OVER AND RIVETED. POCKET SLIPS SHALL BE RIVETED TO DUCT ON 6 INCH CENTERS, AND CORNERS SHALL BE OVERLAPPED AND RIVETED.
6. ALL FASTENERS, SUCH AS SHEET METAL SCREWS, MACHINE SCREWS, OR RIVETS SHALL BE CADMIUM-PLATED FOR GALVANIZED DUCT.
7. ALL DUCTS OVER 18 INCHES WIDE SHALL BE PROVIDED WITH TRANSVERSE STIFFENERS OF EITHER JOINT SLIPS OR BRACING ANGLES ON CENTERS OF NOT OVER 4'-0" FOR DUCTS UP TO 60" WIDE ON THE LONG SIDE AND NOT OVER 2'-0" FOR DUCTS WITH LONG SIDE EXCEEDING 60" WIDTH.
8. FITTINGS SHALL BE CONSTRUCTED AS DETAILED ON THE DRAWINGS.
9. WHERE IT IS NECESSARY BECAUSE OF STRUCTURAL REASONS TO CHANGE SHAPES OF DUCTS, THE ARCHITECT WILL BE NOTIFIED IMMEDIATELY FOR RESIZING OR REROUTING. EQUIVALENT AREAS MUST BE MAINTAINED.
10. WHERE RADIUS ELBOWS OR TAKEOFFS ARE INDICATED, THE INSIDE RADIUS SHALL NOT BE LESS THAN THREE-QUARTERS OF THE WIDTH OF THE DUCT OR TAKEOFF. WHERE DIVERGING CHANGES ARE MADE IN DUCT SIZES IN THE DIRECTION OF THE AIR FLOW, THEY SHALL BE AT A SLOPE OF 1 IN 4.
11. ALL TRANSVERSE JOINTS SHALL BE SEALED. USE LIQUID SEALANT ON FLAT SURFACE

SECTION 15950
AUTOMATIC TEMPERATURE CONTROLS

PART 1 - GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE
A. IN ADDITION, THE FOLLOWING SECTIONS APPLY: 15050, AND 15800.

1.02 DESCRIPTION OF WORK
A. SEQUENCE OF OPERATION IS HEREBY DEFINED AS THE MANNER AND METHOD BY WHICH CONTROLS FUNCTION. REQUIREMENTS FOR EACH TYPE OF CONTROL SYSTEM OPERATION ARE SPECIFIED IN THIS SECTION.
B. OPERATING EQUIPMENT, DEVICES AND SYSTEM COMPONENTS REQUIRED FOR CONTROL SYSTEMS ARE SPECIFIED IN OTHER DIVISION-15 CONTROLS' SECTIONS OF THESE SPECIFICATIONS.
C. THIS SECTION DEFINES THE INSTALLATION OF THE AUTOMATIC TEMPERATURE CONTROLS REQUIRED AS SHOWN ON THE DRAWINGS AND AS HEREINAFTER SPECIFIED.

1.03 DEFINITIONS
A. ATC IS AUTOMATIC TEMPERATURE CONTROLS.
B. OPEN FOR MOTORIZED DAMPERS, THE POSITION OF THE BLADES THAT CREATES THE MAXIMUM FREE AREA POSSIBLE OF THE DAMPER WHICH ALLOWS PASSAGE OF AIR.
C. CLOSE FOR MOTORIZED DAMPERS, THE POSITION OF THE BLADES THAT PREVENTS ANY PASSAGE OF AIR.
D. MAXIMUM FOR MOTORIZED DAMPERS, THE POSITION OF THE BLADES OTHER THAN OPEN WHERE THE BLADES ARE ADJUSTED TO GIVE THE REQUIRED MAXIMUM CFM.
E. MINIMUM FOR MOTORIZED DAMPERS, THE POSITION OF THE BLADES OTHER THAN CLOSE WHERE THE BLADES ARE ADJUSTED TO GIVE THE REQUIRED MINIMUM CFM.
F. ENABLED SHALL BE THE CONDITION WHERE THE EQUIPMENT IS ENERGIZED AND/OR OTHERWISE ACTIVATED TO A STAND-BY STATE AWAITING CONTROL SIGNALS FROM THE ATC SYSTEM.
G. DISENABLED SHALL BE THE CONDITION WHERE THE EQUIPMENT IS DE-ENERGIZED.
H. ON SHALL BE THE CONDITION WHERE THE EQUIPMENT IS OPERATING AND PRODUCING THE DESIRED EFFECT.
I. OFF SHALL BE THE CONDITION WHERE THE EQUIPMENT IS NOT OPERATING AND IS STANDING BY IN AN IDLE STATE.

PART 2 - PRODUCTS

2.01 CONTROL SYSTEMS
A. AUTOMATIC TEMPERATURE CONTROL COMPONENTS SHALL BE ELECTRIC AND ELECTRONIC AS SHOWN ON THE DRAWING.
B. THE ATC SYSTEM SHALL CONSIST OF ALL NECESSARY THERMOSTATS, TRANSMITTERS, RECEIVER-CONTROLLERS, DAMPER OPERATORS, RELAYS, CONTROL PANELS, THERMOMETERS, GAUGES, TIME CLOCKS, AND ALL ACCESSORIES AND ELECTRIC WIRING TO FULFILL THE INTENT OF THIS SPECIFICATION.

2.02 CONTRACTOR
A. THE CONTROL SYSTEM SHALL BE SUPERVISED AND INSTALLED BY COMPETENT CONTROL MECHANICS AND ELECTRICIANS REGULARLY EMPLOYED BY THIS CONTROL CONTRACTOR.

2.03 WORK TO BE PERFORMED BY OTHER TRADES
A. THE FOLLOWING INCIDENTAL WORK SHALL BE PROVIDED BY THE MECHANICAL CONTRACTORS UNDER THE SUPERVISION OF THE ATC CONTRACTOR AND ELECTRICAL CONTRACTOR.
1. THE MECHANICAL CONTRACTOR SHALL:
A. INSTALL ALL AUTOMATIC DAMPERS.
B. ASSEMBLE MULTIPLE SECTION DAMPERS WITH REQUIRED INTER-CONNECTING LINKAGES AND EXTEND REQUIRED NUMBER OF SHAFTS THROUGH DUCT FOR EXTERNAL MOUNTING OF DAMPER MOTORS.
C. PROVIDE NECESSARY SHEET METAL BAFFLE PLATES TO ELIMINATE STRATIFICATION AND PROVIDE AIR VOLUMES SPECIFIED. LOCATE BAFFLES BY EXPERIMENTATION AND AFFIX AND SEAL PERMANENTLY IN PLACE ONLY AFTER STRATIFICATION PROBLEM HAS BEEN ELIMINATED.
D. PROVIDE ACCESS DOORS THROUGH DUCTS FOR SERVICE TO CONTROL EQUIPMENT.
E. INSTALL DUCTSTATS.
F. INSTALL SMOKE DETECTORS.

2.04 ELECTRICAL WIRING
A. ALL ELECTRIC WIRING AND WIRING CONNECTIONS REQUIRED FOR THE INSTALLATION OF THE ATC, HEREIN SPECIFIED, SHALL BE PROVIDED BY THE ATC CONTRACTOR UNLESS SPECIFICALLY SHOWN ON THE ELECTRICAL DRAWINGS OR CALLED FOR IN THE ELECTRICAL SPECIFICATIONS. ALL WIRING SHALL COMPLY WITH THE REQUIREMENTS OF SECTION 16000 - ELECTRICAL OF THE SPECIFICATION.

2.05 SHOP DRAWINGS
A. SHOP DRAWINGS OF THE FOLLOWING ARE REQUIRED:
1. ALL ATC CONTROL COMPONENTS.
2. ATC SYSTEM DIAGRAMS COORDINATED TO INCLUDE PROVISION FOR FUTURE INTERFACE WHERE SPECIFIED.
3. CONTROL DRAWINGS WITH DETAILED COMPONENT AND WIRING DIAGRAMS, INCLUDING BILL OF MATERIAL AND DESCRIPTION OF OPERATION FOR ALL SYSTEMS. DRAWINGS SHALL BY 22" X 34" STANDARD SIZE AND SHALL BE MADE FROM 22" X 34" REPRODUCIBLE MYLARS.
4. PANEL LAYOUTS AND NAMEPLATE LISTS FOR ALL LOCAL PANELS, WITH PANEL DIMENSIONS.
5. DATA SHEETS FOR ALL CONTROL SYSTEM COMPONENTS.

2.06 CONTROL DAMPERS
A. REFER TO THE DAMPER SCHEDULES ON THE DRAWINGS FOR DAMPERS TO BE FURNISHED BY THE CONTRACTOR OF THIS SECTION.
B. DAMPERS SHALL BE LOW LEAKAGE, OPPOSED BLADE, GALVANIZED STEEL CONSTRUCTION.

2.07 CONTROL DEVICES
A. ELECTRONIC PROGRAMMABLE THERMOSTAT:
1. THE ELECTRONIC PROGRAMMABLE THERMOSTAT SHALL CONSIST OF THERMISTOR TYPE OF RESISTANCE TEMPERATURE DETECTOR WITH A HIGH REFERENCE RESISTANCE AND BUILT-IN RECALIBRATION MEANS. OR THE THERMOSTAT SHALL CONSIST OF SOLID-STATE PLATINUM RESISTANCE TEMPERATURE DETECTOR WITH A HIGH REFERENCE RESISTANCE. THE THERMOSTAT SHALL BE PROGRAMMABLE AT THE FACE AND HAVE MINIMUM TWO (2) SETTINGS PER DAY, SEVEN (7) DAY PROGRAMMING STEPS AND SKIP-A-DAY FEATURES. THE PROGRAMMABLE INFORMATION SHALL BE MAINTAINED INDEFINITELY, AND THE TIME OF DAY AND DAY OF WEEK SHALL BE MAINTAINED FOR MINIMUM EIGHT (8) HOURS DURING POWER FAILURE. EACH THERMOSTAT SHALL ALSO HAVE AN INTEGRAL 5 MINUTE TIME DELAY BETWEEN STAGING TO THE REFRIGERATION SYSTEM COMPRESSORS.

2.08 CONTROLLED DEVICES
A. DAMPER OPERATORS FOR ALL AUTOMATIC DAMPERS SHALL BE UNIDIRECTIONAL SPRING RETURN TYPE. PROVIDE ALL DAMPERS FOR NORMALLY CLOSED POSITION. DAMPER OPERATORS SHALL BE INSTALLED OUTSIDE OF THE DUCTWORK AND CONNECTED TO AN EXTENDED SHAFT. VOLTAGE SHALL BE 24 VOLTS, 1 PHASE.

2.09 SUPERVISION
A. THE AUTOMATIC TEMPERATURE CONTROL INSTALLER SHALL SUPERVISE THE COMPLETE INSTALLATION OF ALL TEMPERATURE CONTROL DEVICES.

2.10 INSTRUCTIONS
A. UPON COMPLETION OF THE PROJECT, THE ATC CONTRACTOR SHALL:
1. COMPLETELY ADJUST, READY FOR USE, ALL THERMOSTATS, CONTROLLERS, VALVES, DAMPER OPERATORS, RELAYS, TIME CLOCKS, ETC., PROVIDED UNDER THIS SECTION. IN ADDITION, CALIBRATE EACH INSTRUMENT AND CONTROL LOOP, AND INDICATE THE SETTINGS FOR EACH CONTROLLER ON THE "AS-BUILT" DRAWINGS.
2. FURNISH MINIMUM TWO (2) MANUALS CONSISTING OF COMPLETE APPROVED SUBMITTAL DATA COVERING THE FUNCTION AND OPERATION OF THE ENTIRE ATC SYSTEM ON THE PROJECT FOR THE USE OF THE OWNER'S OPERATING PERSONNEL. A TEMPERATURE CONTROL TECHNICIAN SHALL BE PROVIDED FOR INSTRUCTION PURPOSES DURING THE GUARANTEE PERIOD, AFTER AN INITIAL SESSION OF 8 HOURS.
3. THE ATC CONTRACTOR SHALL PROVIDE THE SERVICES OF A QUALIFIED TECHNICIAN FOR THE SYSTEM START-UP AND AIR BALANCING PERIODS.

2.11 GUARANTY
A. THE AUTOMATIC TEMPERATURE CONTROL CONTRACTOR SHALL GUARANTY ALL MATERIALS AND LABOR TO BE FREE OF DEFECTS OF ANY KIND FOR A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE BY THE ENGINEER AND OWNER. ANY DEFECTS FOUND DURING THIS PERIOD SHALL BE REPAIRED OR REPLACED BY THE ATC CONTRACTOR AT NO EXPENSE TO THE OWNER.

PART 3 - EXECUTION

3.01 TEMPERATURE CONTROL
A. PROVIDE A COMPLETE SYSTEM OF TEMPERATURE AND OPERATING CONTROLS, WIRING, CONDUIT, PIPING AND DEVICES AS REQUIRED FOR THE SEQUENCES DESCRIBED IN SEQUENCE OF OPERATION.
3.02 SEQUENCE OF OPERATION
A. HVAC UNITS PROVIDE MATERIALS AND LABOR TO INSTALL PROGRAMMABLE WALL THERMOSTAT WITH REMOTE TEMPERATURE SENSORS.
1. PROGRAMMABLE THERMOSTAT SHALL BE CONFIGURABLE PROGRAMMABLE COMMERCIAL THERMOSTAT WITH ON-AUTO FAN CONTROL, AND HEAT-OFF-COOL-AUTO SYSTEM SWITCHING SWITCHES.
2. INSTALL THERMOSTAT WHERE SHOWN ON PLANS, 60" ABOVE FLOOR OR AS REQUIRED BY LOCAL CODES AND/OR ADA.
3. INSTALL REMOTE TEMPERATURE SENSORS WHERE SHOWN ON PLANS, 60" ABOVE FLOOR OR AS REQUIRED BY LOCAL CODES AND/OR ADA.
4. PROVIDE INITIAL SETTING AND PROGRAMMING OF WALL THERMOSTAT IN ACCORDANCE TO THE OWNER'S BUSINESS SCHEDULE.
5. THERMOSTAT SHALL CYCLE HVAC UNIT HEATING AND COOLING SYSTEMS.
6. HVAC UNIT FAN SHALL RUN CONTINUOUSLY DURING OCCUPIED PERIODS.
7. HVAC UNIT FAN AND HEATING SYSTEM SHALL CYCLE TO MAINTAIN NIGHT SET BACK TEMPERATURES.
B. EXHAUST FANS
1. INTERLOCK EXHAUST FAN MOTOR WITH SUPPLY FAN MOTOR IN ASSOCIATED HVAC UNIT. HVAC UNIT SUPPLY FAN ON, EXHAUST FAN ON; HVAC UNIT SUPPLY FAN OFF, EXHAUST FAN OFF.
2. PROVIDE CONDUITS, WIRING, RELAYS, ETC. AND LABOR TO ACCOMPLISH THE INTERLOCK.

SECTION 15900

TEST AND BALANCE MECHANICAL SYSTEM SPECIFICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. SECTION INCLUDES TESTING, ADJUSTING, AND BALANCING OF AIR, WATER, AND REFRIGERATION SYSTEMS AND MEASUREMENT OF FINAL OPERATING CONDITION OF HVAC SYSTEMS.

1.02 REFERENCES

A. AABC (ASSOCIATED AIR BALANCE COUNCIL) - NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE.

B. NEBB (NATIONAL ENVIRONMENTAL BALANCING BUREAU) - PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS.

C. TABB (TESTING, ADJUSTING AND BALANCING BEUREAU) - INTERNATIONAL STANDARD FOR ENVIRONMENTAL SYSTEMS BALANCE.

1.03 SUBMITTALS

A. TEST REPORTS: THE TAB REPORT SHALL BE IN THE FORMAT OF THE AABC NATIONAL STANDARD REPORT OR THE NEBB CERTIFIED REPORT FORMS AS PUBLISHED IN THEIR MOST CURRENT EDITIONS.

B. FURNISH FOUR COPIES OF REPORTS, COMPLETE WITH TABLE OF CONTENTS PAGE AND INDEXING TABS AND WITH COVER IDENTIFICATION AT FRONT, IDENTIFIED TO CORRESPOND WITH DATA SHEETS, AND INDICATING THERMOSTAT LOCATIONS.

C. INCLUDE A COPY OF AABC NATIONAL PROJECT PERFORMANCE GUARANTY, COPY OF NEBB CERTIFICATE OF CONFORMANCE CERTIFICATION OR TABB QUALITY ASSURANCE PROGRAM FOR ENVIRONMENTAL SYSTEMS BALANCE.

1.04 QUALITY ASSURANCE

A. PERFORM WORK IN ACCORDANCE WITH AABC NATIONAL STANDARDS FOR FIELD MEASUREMENTS AND INSTRUMENTATION, TOTAL SYSTEM BALANCE OR NEBB PROCEDURAL STANDARDS FOR TESTING, BALANCING, AND ADJUSTING OF ENVIRONMENTAL SYSTEMS.

1.05 QUALIFICATIONS

A. THE TESTING, ADJUSTING, AND BALANCING (TAB) OF ALL WORK SHALL BE PERFORMED BY AN INDEPENDENT CONTRACTOR THAT IS CURRENTLY LICENSED BY AABC OR NEBB. THE COMPANY SHALL SPECIALIZE IN TAB OF SYSTEMS SPECIFIED IN THIS SECTION AND SHALL HAVE A MINIMUM THREE YEARS DOCUMENTED EXPERIENCE CERTIFIED BY AABC OR NEBB.

B. PERFORM WORK UNDER SUPERVISION OF AABC CERTIFIED TEST AND BALANCE ENGINEER OR NEBB CERTIFIED TESTING, BALANCING, AND ADJUSTING SUPERVISOR EXPERIENCED IN PERFORMANCE OF THIS WORK AND LICENSED AT PLACE WHERE PROJECT IS LOCATED.

1.06 TIMING

A. THE COMPLETE TAB REPORTS SHALL BE PROVIDED TO THE OWNER NO LATER THAN ONE (1) WEEK PRIOR TO CONSTRUCTION END DATE.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 HVAC CONTRACTOR RESPONSIBILITIES

A. THE HVAC CONTRACTOR SHALL VERIFY THAT THE HVAC SYSTEMS ARE COMPLETE AND OPERABLE BEFORE TAB WORK IS STARTED. THE HVAC CONTRACTOR SHALL BE PRESENT DURING THE TESTING, ADJUSTING, AND BALANCING OF THE HVAC SYSTEM TO PROVIDE ASSISTANCE TO THE TAB CONTRACTOR. REQUIREMENTS INCLUDE THE FOLLOWING:

1. SYSTEMS ARE STARTED AND OPERATING IN SAFE AND NORMAL CONDITION.
2. TEMPERATURE CONTROL SYSTEMS ARE INSTALLED COMPLETE AND OPERABLE.
3. ALL BALANCING DEVICES AND HVAC EQUIPMENT ARE ACCESSIBLE.
4. PROPER THERMAL OVERLOAD PROTECTION IS IN PLACE FOR ELECTRICAL EQUIPMENT.
5. NEW AIR FILTERS ARE INSTALLED JUST PRIOR TO AIR BALANCE AND IMMEDIATELY AFTER PROJECT IS COMPLETE.
6. DUCT SYSTEMS ARE CLEAN OF DEBRIS.
7. FANS ARE ROTATING CORRECTLY.
8. FIRE AND VOLUME DAMPERS ARE IN PLACE AND OPEN.
9. AIR COIL FINS ARE CLEANED AND COMBED.
10. ACCESS DOORS ARE INSTALLED AND CONNECTED.
11. AIR OUTLETS ARE INSTALLED AND CONNECTED.
12. DUCT SYSTEM LEAKAGE IS MINIMIZED.
13. DUCT SYSTEMS ARE FLUSHED, FILLED, AND VENTED.
14. PUMPS ARE ROTATING CORRECTLY.
15. PROPER STRAINER BASKETS ARE CLEAN AND IN PLACE OR IN NORMAL POSITION.
16. SERVICE AND BALANCING VALVES ARE OPEN.

B. IF THE TAB CONTRACTOR DETERMINES THAT A FAN SHEAVE OR BELT REPLACEMENT IS NEEDED TO MEET THE BALANCING REQUIREMENTS, THEN THE HVAC CONTRACTOR SHALL REPLACE THE FAN SHEAVE/BELT AS REQUIRED. THE HVAC CONTRACTOR SHALL NOTIFY THE OWNER IN WRITING OF THE REPLACEMENT WORK.

3.02 INSTALLATION TOLERANCES

A. ALL AIR SYSTEMS MUST BE BALANCED WITHIN PLUS OR MINUS 10% OF DESIGN.

3.03 ADJUSTING

A. VERIFY RECORDED DATA REPRESENTS ACTUAL MEASURED OR OBSERVED CONDITIONS.

B. PERMANENTLY MARK SETTINGS OF VALVES, DAMPERS, AND OTHER ADJUSTMENT DEVICES ALLOWING SETTINGS TO BE RESTORED. SET AND LOCK MEMORY STOPS.

C. AFTER ADJUSTMENT, TAKE MEASUREMENTS TO VERIFY BALANCE HAS NOT BEEN DISRUPTED. IF DISRUPTED, VERIFY CORRECTING ADJUSTMENTS HAVE BEEN MADE.

D. LEAVE SYSTEMS IN PROPER WORKING ORDER, REPLACING BELT GUARDS, CLOSING ACCESS DOORS, CLOSING DOORS TO ELECTRICAL SWITCH BOXES, AND RESTORING THERMOSTATS TO SPECIFIED SETTINGS.

E. AT FINAL INSPECTION, RECHECK RANDOM SELECTIONS OF DATA RECORDED IN REPORT, RECHECK POINTS OR AREAS AS SELECTED AND WITNESSED BY OWNER.

3.04 AIR SYSTEM PROCEDURE

A. ADJUST AIR HANDLING AND DISTRIBUTION SYSTEMS TO OBTAIN REQUIRED OR DESIGN SUPPLY, RETURN, AND EXHAUST AIR QUANTITIES (AT SITE ALTITUDE).

B. MAKE AIR QUANTITY MEASUREMENTS IN MAIN DUCTS BY PITOT TUBE TRAVERSE OF ENTIRE CROSS SECTIONAL AREA OF DUCT.

C. MEASURE AIR QUANTITIES AT AIR INLETS AND OUTLETS.

D. ADJUST DISTRIBUTION SYSTEM TO OBTAIN UNIFORM SPACE TEMPERATURES FREE FROM OBJECTIONABLE DRAFTS.

E. USE VOLUME CONTROL DEVICES TO REGULATE AIR QUANTITIES ONLY TO EXTENT ADJUSTMENTS DO NOT CREATE OBJECTIONABLE AIR MOTION OR SOUND LEVELS. EFFECT VOLUME CONTROL BY USING VOLUME DAMPERS LOCATED IN DUCTS.

F. VARY TOTAL SYSTEM AIR QUANTITIES BY ADJUSTMENT OF FAN SPEEDS. PROVIDE SHEAVE DRIVE CHANGES TO VARY FAN SPEED. VARY BRANCH AIR QUANTITIES BY DAMPER REGULATION.

3.05 REPORTS

A. REFER TO PLANS FOR EQUIPMENT DESIGN DATA SCHEDULES

B. REPORT FORMS.
1. TITLE PAGE:
A. NAME OF TESTING ADJUSTING, AND BALANCING AGENCY
B. ADDRESS OF TESTING, ADJUSTING, AND BALANCING AGENCY
C. TELEPHONE AND FACSIMILE NUMBERS OF TESTING, ADJUSTING, AND BALANCING AGENCY
D. AABC OR NEBB CERTIFICATION NUMBER AND SIGNATURE OF CONTRACTOR
E. PROJECT NAME
F. PROJECT LOCATION
G. PROJECT ARCHITECT
H. PROJECT ENGINEER
I. PROJECT CONTRACTOR
J. PROJECT ALTITUDE
K. DATE TAB WAS PERFORMED

2. SUMMARY COMMENTS:
A. COPY OF CERTIFICATE OF CONFORMANCE WITH NATIONAL STANDARDS (AABC OR NEBB) FOR THIS PROJECT
B. ACTUAL SPACE TEMPERATURES WITH CORRESPONDING THERMOSTAT SET POINTS FOR EACH UNIT
C. DESIGN VERSUS FINAL PERFORMANCE
D. NOTABLE CHARACTERISTICS OF SYSTEM
E. DESCRIPTION OF SYSTEMS OPERATION SEQUENCE
F. SUMMARY OF OUTDOOR AND EXHAUST FLOWS TO INDICATE BUILDING PRESSURIZATION
G. NOMENCLATURE USED THROUGHOUT REPORT
H. TEST CONDITIONS

3. INSTRUMENT LIST:
A. INSTRUMENT
B. MANUFACTURER
C. MODEL NUMBER
D. SERIAL NUMBER
E. RANGE
F. CALIBRATION DATE

4. AIR DISTRIBUTION TEST SHEET:
A. AIR TERMINAL NUMBER
B. ROOM NUMBER/LOCATION
C. TERMINAL TYPE
D. TERMINAL SIZE
E. AREA FACTOR
F. DESIGN VELOCITY
G. DESIGN AIR FLOW
H. TEST (FINAL) VELOCITY
I. TEST (FINAL) AIR FLOW
J. PERCENT OF DESIGN AIR FLOW

5. DUCT TRAVERSE:
A. SYSTEM ZONE/BRANCH
B. DUCT SIZE
C. AREA
D. DESIGN VELOCITY
E. DESIGN AIR FLOW
F. TEST VELOCITY
G. TEST AIR FLOW
H. DUCT STATIC PRESSURE
I. AIR TEMPERATURE
J. AIR CORRECTION FACTOR

6. ELECTRIC MOTORS FOR ALL HVAC EQUIPMENT:
A. MANUFACTURER
B. MODEL/FRAME
C. HP/BHP AND KW
D. PHASE, VOLTAGE, AMPERAGE; NAMEPLATE, ACTUAL, NO LOAD
E. RPM
F. SERVICE FACTOR
G. STARTER SIZE, RATING, HEATER ELEMENTS
H. SHEAVE MAKE/SIZE/BORE

7. V-BELT DRIVE:
A. IDENTIFICATION/LOCATION
B. REQUIRED DRIVEN RPM
C. DRIVEN SHEAVE, DIAMETER AND RPM
D. BELT, SIZE AND QUANTITY
E. MOTOR SHEAVE DIAMETER AND RPM
F. CENTER TO CENTER DISTANCE, MAXIMUM, MINIMUM, AND ACTUAL

8. COOLING COIL DATA:
A. IDENTIFICATION/NUMBER
B. LOCATION
C. SERVICE
D. MANUFACTURER
E. AIR FLOW, DESIGN AND ACTUAL
F. ENTERING AIR DB TEMPERATURE, DESIGN AND ACTUAL
G. ENTERING AIR WB TEMPERATURE, DESIGN AND ACTUAL
H. LEAVING AIR DB TEMPERATURE, DESIGN AND ACTUAL
I. LEAVING AIR WB TEMPERATURE, DESIGN AND ACTUAL
J. WATER FLOW, DESIGN AND ACTUAL
K. WATER PRESSURE DROP, DESIGN AND ACTUAL
L. ENTERING WATER TEMPERATURE, DESIGN AND ACTUAL
M. LEAVING WATER TEMPERATURE, DESIGN AND ACTUAL
N. SATURATED SUCTION TEMPERATURE, DESIGN AND ACTUAL
O. AIR PRESSURE DROP, DESIGN AND ACTUAL

9. AIR MOVING EQUIPMENT:
A. LOCATION
B. MANUFACTURER
C. MODEL NUMBER
D. SERIAL NUMBER
E. ARRANGEMENT/CLASS/DISCHARGE
F. AIR FLOW, SPECIFIED AND ACTUAL
G. RETURN AIR FLOW, SPECIFIED AND ACTUAL
H. OUTSIDE AIR FLOW, SPECIFIED AND ACTUAL
I. TOTAL STATIC PRESSURE (TOTAL EXTERNAL), SPECIFIED AND ACTUAL
J. INLET PRESSURE
K. DISCHARGE PRESSURE
L. SHEAVE MAKE/SIZE/BORE
M. NUMBER OF BELTS/MAKE/SIZE
N. FAN RPM

10. RETURN AIR/OUTSIDE AIR DATA:
A. IDENTIFICATION/LOCATION
B. DESIGN AIR FLOW
C. ACTUAL AIR FLOW
D. DESIGN RETURN AIR FLOW
E. ACTUAL RETURN AIR FLOW
F. DESIGN OUTSIDE AIR FLOW
G. ACTUAL OUTSIDE AIR FLOW
H. RETURN AIR TEMPERATURE
I. OUTSIDE AIR TEMPERATURE
J. REQUIRED MIXED AIR TEMPERATURE
K. ACTUAL MIXED AIR TEMPERATURE

11. AIR COOLED CONDENSER:
A. IDENTIFICATION/NUMBER
B. LOCATION
C. MANUFACTURER
D. MODEL NUMBER
E. SERIAL NUMBER
F. ENTERING DB AIR TEMPERATURE, DESIGN AND ACTUAL
G. LEAVING DB AIR TEMPERATURE, DESIGN AND ACTUAL
H. NUMBER OF COMPRESSORS

12. EXHAUST FAN DATA:
A. LOCATION
B. MANUFACTURER
C. MODEL NUMBER
D. SERIAL NUMBER
E. AIR FLOW, SPECIFIED AND ACTUAL
F. TOTAL STATIC PRESSURE (TOTAL EXTERNAL), SPECIFIED AND ACTUAL
G. INLET PRESSURE
H. DISCHARGE PRESSURE
I. SHEAVE MAKE/SIZE BORE
J. NUMBER OF BELTS/MAKE/SIZE
K. FAN RPM

13. TAB PROCESS & PROCEDURE:
A. TAB CONTRACTOR SHALL PROVIDE INITIAL REPORT TO GENERAL CONTRACTOR FOR REVIEW. IF ANY ITEMS ON TAB REPORT ARE NOT WITHIN PLUS OR MINUS 10% OF DESIGN, TAB AND GENERAL CONTRACTOR SHALL MAKE THE APPROPRIATE CHANGES TO MEET DESIGN SPECIFICATION. IF DESIGN SPECIFICATION CANNOT BE MET, SUBMIT A DEFICIENCY REPORT TO ULTA, INC FOR REVIEW. GENERAL CONTRACTOR TO SUBMIT FINAL TAB REPORT TO ULTA, INC. WHEN ALL ITEMS ARE WITH SPECIFICATION.

B. TESTING ADJUSTING, AND BALANCING REPORT MUST BE COMPLETE AND TURNED OVER TO THE G.C.'S CONSTRUCTION MANAGER 1 WEEK PRIOR TO MERCHANDISING DATE. THE HVAC CONTRACTOR SHALL BE RESPONSIBLE FOR SCHEDULING THEIR WORK AND THE WORK OF THEIR SUBCONTRACTORS WITH THE G.C. TO ALLOW ADEQUATE TIME FOR TABC TO COMPLETE THEIR WORK.

C. THE HVAC CONTRACTOR SHALL COMPLETE THE AIR BALANCE REVIEW START-UP VERIFICATION CHECKLIST BELOW AND FAX A COPY AS NOTED TO TABC. A COPY SHALL ALSO BE PROVIDED TO THE G.C. SUPERINTENDENT AT THIS TIME. IF ALL SYSTEMS ARE NOT OPERATIONAL AT THE TIME OF BALANCING, IT SHALL BE THE HVAC CONTRACTOR'S RESPONSIBILITY TO PAY ALL COSTS ASSOCIATED WITH THE ADDITIONAL TESTING AND BALANCING INCLUDING ALL LABOR, TRAVEL EXPENSES, MEALS, HOTEL COSTS ETC, INCURRED BY TBC.

D. THE HVAC CONTRACTOR SHALL BE PRESENT FOR AIR BALANCE TO VERIFY ACCESSIBILITY TO ALL DEVICES, VERIFY ALL OPERATING SEQUENCES AND INSTALL NEW FILTERS IN ALL UNITS JUST PRIOR TO THE AIR BALANCE. HVAC CONTRACTOR SHALL INSTALL A NEW SET OF FILTERS AFTER PROJECT IS COMPLETE.

TEST AND BALANCE CORPORATION
CHECKLIST

STORE #: ____________
LOCATION: ____________
DATE: ____________

EQUIPMENT DESIGNATION	MECH. CHECK	ELEC. CHECK	CONTROLS CHECK	READY FOR TESTING	
				DATE	INITIAL
RTU-1					
RTU-2					
RTU-3					
RTU-4					
EF-1					
EF-2					

COMPLETE THE ABOVE CHECKLIST ONLY WHEN EQUIPMENT IS INSTALLED BY THE ULTA G.C.

THIS CERTIFIES THAT THIS PROJECT IS FULLY INSTALLED AND OPERATIONAL AND READY FOR INDEPENDENT TESTING AND BALANCING AGENCY TO BEGIN TAB WORK.

MECHANICAL CONTRACTOR (COMPANY) ____________ REPRESENTATIVE (NAME) ____________ DATE ____________

INSTRUCTIONS

COMPLETION OF THIS START-UP VERIFICATION CHECKLIST BY THE APPROPRIATE INSTALLING CONTRACTOR, IS REQUIRED TO ENSURE THAT ALL EQUIPMENT AND SYSTEM COMPONENTS ARE COMPLETE, CORRECTLY INSTALLED, IN OPERATION AND FULLY READY FOR TESTING AND BALANCING WORK TO PROCEED.

THE COMPLETED CHECKLIST SHOULD BE SUBMITTED TOGETHER WITH THE TAB REPORT TO JENNIFER VODAK AT ULTA VIA EMAIL AT: jvodak@ulta.com

TAB REQUIREMENTS

1. TAB CONTRACTOR TO COMPLETE THE FOLLOWING CHECKLIST AS PART OF TAB WORK AND INCLUDE THIS DATA AS PART OF THE TAB REPORT
2. TAB CONTRACTOR TO CONTACT JESSICA PALERMO AT NOVAR VIA TELEPHONE WHILE ON SITE TO COORDINATE OA DAMPER POSITION INCLUDING OA DAMPER ACTUATOR CALIBRATION AND EMS PROGRAMMING. INDICATE JESSICA PALERMO ON TABLE BELOW OR NAME OF OTHER JESSICA PALERMO APPROVED NOVAR TECHNICIAN TO DOCUMENT COORDINATION WITH NOVAR. TAB WORK WILL ONLY BE CONSIDERED COMPLETE IF THE PHONE COORDINATION WITH NOVAR IS COMPLETE AND DOCUMENTED.
3. VERIFY THE SPACE IS POSITIVELY PRESSURIZED
☐ YES ☐ NO
VALUE OF POSITIVE PRESSURE __________ IN.W.C
4. VERIFY OA DAMPER ACTUATORS ARE CALIBRATED WITH NOVAR
☐ YES ☐ NO
5. STORES WILL BE RANDOMLY COMMISSIONED TO VERIFY TAB WORK. DEFICIENCY REPORTS WILL BE FORWARDED TO TAB CERTIFICATION AGENCIES.

NOVAR CONTACT INFO

JESSICA PALERMO
PROJECT MANAGER
NOVAR / HONEYWELL
6060 ROCKSIDE WOODS. BLVD., SUITE 400
CLEVELAND, OH 44131
PHONE: 216-270-3312
CELL: 216-527-0638
EMAIL: Jessica.Palermo@honeywell.com
OR
BILL THOMPSON
APPLICATIONS PROGRAMMER
PHONE: 216-682-1443
EMAIL: bill.thompson@honeywell.com

EQUIPMENT DESIGNATION	OA DAMPER POSITION % OPEN		VERIFIED BY TAB CONTRACTOR		TAB CONTRACTOR TO INDICATE DATE, TIME, AND NOVAR TECHNICIAN WHO COORDINATED OA DAMPER POSITION VIA TELEPHONE FOR EACH RTU		
	*LOW SPEED	HIGH SPEED	DATE	INITIAL	DATE	INITIAL	NOVAR CONTACT
RTU-1							
RTU-2							
RTU-3							
RTU-4							

OA DAMPER POSITION TO BE PROGRAMMED FOR HIGH FAN SPEED AND LOW FAN SPEED OPERATION TO MAINTAIN CODE REQUIRED OA AT BOTH OPERATING CONDITIONS. HIGH SPEED DAMPER POSITION SHALL BE SET BY NOVAR. LOW SPEED DAMPER POSITION SHALL BE PROGRAMMED INTO THE UNIT CONTROLLER. TAB CONTRACTOR TO COORDINATE LOW SPEED DAMPER POSITION WITH RTU MANUFACTURER'S REP. OA DAMPER SETTINGS HAVE BEEN OBSERVED TO BE APPROXIMATELY 40% ON LOW SPEED AND 20% ON HIGH SPEED. CONTACT ULTA CONSTRUCTION MANAGER IMMEDIATELY IF DAMPER POSITION VALUES ARE SIGNIFICANTLY DIFFERENT. BE PREPARED TO DISCUSS CAUSE OF DIFFERENCE ALONG WITH TAB MEANS AND METHODS. TAB CONTRACTOR TO PROVIDE A COMPLETE TAB REPORT TO EMS CONTRACTOR PRIOR TO EMS COMMISSIONING.

GC TO CUT OUT AND COMPLETE FORM FOR INCLUSION IN TAB REPORT. GC TO COORDINATE SIGN OFF WITH INDICATED PARTIES. TAB REPORT IS CONSIDERED COMPLETE ONLY IF THIS DOCUMENT IS INCLUDED AS PART OF THE TAB REPORT

RGLA
rgla solutions, inc.
5100 River Road, Ste 125
Schiller Park, IL 60176
p: 847.671.7452
f: 847.671.4200
www.rgla.com

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robert g. lyon + associates, inc.
retail architecture
5100 River Road, Ste 125
Schiller Park, IL 60176
p: 847.671.7452
f: 847.671.4200
www.rgla.com

HNY
CONSULTING ENGINEERS
240 WEST 37TH STREET, 3RD FLOOR
NEW YORK, NY 10018
TEL 212.413.8400
www.hny-eng.com
2150002894
NC. CORPORATE NUMBER: P-2451
06/30/25

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SEAL:

ULTA BEAUTY

ULTA #1697
EASTFIELD CROSSING
640 SAINT MARK AVE.
SELMA, NC 27576

MECHANICAL SPECIFICATIONS

DRAWN BY
HEI

CHECKED BY
RCB

JOB NUMBER
21359

SHEET NAME
M-5