PROJECT DESIGN CRITERIA

LOCATION	
CITY	COSTA MESA
STATE	CA
APPLICABLE CODES	
BUILDING	2022 CBC
MECHANICAL	2022 CMC
PLUMBING	2022 CPC
ENERGY	2022 CALI. ENER. CODE
ELECTRICAL	2022 CALI. ELEC. CODE
OUTDOOR DESIGN CONDITIONS	
ELEVATION (FT)	54
SUMMER [DB (°F) / MCWB (°F)]	89.8 / 65.3
WINTER [DB (°F)]	42.8
INDOOR DESIGN CONDITIONS	
COOLING - [DB (°F) / RH (%)]	75 / 50
HEATING [DB (°F)]	70

HVAC ABBREVIATIONS

ABBREVIATIONS	DESCRIPTION
ACU	AIR CONDITIONING UNIT
AD	ACCESS DOOR
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
AS	AIR SEPARATOR
BTU	BRITISH THERMAL UNIT
BHP	BRAKE HORSEPOWER
CAV	CONSTANT AIR VOLUME TERMINAL
CC	COOLING COIL
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CHWP	CHILLED WATER PUMP
CP	CONDENSATE PUMP
CRAC	COMPUTER ROOM AIR CONDITIONER
CR	CEILING REGISTER
CT	COOLING TOWER
CU	CONDENSING UNIT
CUH	CABINET UNIT HEATER
CWP	CONDENSER WATER PUMP
DB	DRY BULB
EAT	ENTERING AIR TEMPERATURE
EF	EXHAUST FAN
ECM	ELECTRICALLY COMMUTATED MOTOR
EDH	ELECTRIC DUCT HEATER
EHC	ELECTRIC HEATING COIL
ER	EXHAUST REGISTER
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EUH	ELECTRIC UNIT HEATER
EXH	EXHAUST
°F	DEGREES FAHRENHEIT
FCU	FAN COIL UNIT
FD	FIRE DAMPER
FLA	FULL LOAD AMPS
FPB	FAN POWERED BOX
FPM	FEET PER MINUTE
FT	FEET
GUH	GAS UNIT HEATER
GPM	GALLONS PER MINUTE
H	HUMIDIFIER
HP	HEAT PUMP
HP	HORSEPOWER
HRC	HEAT RECOVERY UNIT
HVAC	HEATING, VENTILATION, & AIR CONDITIONING
HVLS	HIGH VOLUME LOW SPEED
HVU	HEATING AND VENTILATION UNIT
HX	HEAT EXCHANGER
IN	INCHES
IN WC	INCHES WATER COLUMN
KEF	KITCHEN EXHAUST FAN
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LB	POUNDS (WEIGHT)
MCA	MINIMUM CURRENT AMPACITY
MOCP	MAXIMUM OVER-CURRENT PROTECTION
OA	OUTSIDE AIR
OAF	OUTSIDE AIR FAN
PRV	PRESSURE REDUCING VALVE
RA	RETURN AIR
RAF	RETURN AIR FAN
RAG	RETURN AIR GRILLE
RAR	RETURN AIR REGISTER
RHC	REHEAT COIL
RPM	REVOLUTIONS PER MINUTE
RTU	ROOFTOP A/C UNIT
SA	SUPPLY AIR
SC	STEAM COIL
SF	SUPPLY FAN
SG	SUPPLY GRILLE
SR	SUPPLE REGISTER
SP	STATIC PRESSURE
SRV	SAFETY RELIEF VALVE
TEF	TOILET EXHAUST FAN
UH	UNIT HEATER
VAV	VARIABLE AIR VOLUME TERMINAL UNIT
VFD (VSD)	VARIABLE FREQUENCY (SPEED) DRIVE
VRF	VARIABLE REFRIGERANT FLOW
VTR	VENT THROUGH ROOF
W	WATTS
WB	WET BULB
WCC	WATER COOLED CHILLER

NOTE: NOT ALL ABBREVIATIONS USED

HVAC DUCTWORK LEGEND

SINGLE LINE DUCTWORK	DESCRIPTION	DOUBLE LINE DUCTWORK
	ROUND ELBOW DOWN	
	ROUND ELBOW UP	
	OFFSET TO CHANGE ELEVATION (AT 30° WHEN POSSIBLE. ARROW SLOPES DOWN, U.O.N.)	
	ROUND RADIUS ELBOW R = 1	
	90° STRAIGHT TEE	
	90° CONICAL TEE	
	45° LATERAL TAP	
	45° LATERAL CONICAL TEE	
	SIZE OR SHAPE TRANSITION	
	ROUND FLEXIBLE DUCT	
	RECTANGULAR ELBOW DOWN	
	RECTANGULAR ELBOW UP	
	OFFSET TO CHANGE ELEVATION (AT 30° WHERE POSSIBLE. ARROW SLOPES DOWN., U.O.N)	
	RECTANGULAR RADIUS ELBOW R = 1	
	RECTANGULAR ELBOW WITH TURNING VANES	
	SPLIT BRANCH TAKE-OFF WITH SQUARE ELBOW & SPLITTER DAMPER	
	SPLIT BRANCH TAKE-OFF WITH RADIUS ELBOW & SPLITTER DAMPER	
	SPLIT BRANCH TAKE-OFF TEE WITH STATIONARY SPLITTER DAMPER	
	BRANCH TAKE-OFF WITH 45° LEAD IN TAP	
	INSULATED / LINED DUCTWORK (U.O.N.)	
	SQUARE FACED CEILING DIFFUSER 4-WAY DIRECTIONAL THROW (U.N.O.)	
	ROUND FACED CEILING DIFFUSER	
	CEILING RETURN OR EXHAUST AIR GRILLE OR REGISTER	
	SIDEWALL SUPPLY GRILLE OR REGISTER	
	SUPPLY DUCT RISER	
	RETURN, EXHAUST OR OUTSIDE AIR DUCT RISER	
	MANUAL BALANCING DAMPER	
M	AUTOMATIC (MOTOR-OPERATED) DAMPER	M
FD	FIRE DAMPER	FD
GD	GRAVITY BACKDRAFT DAMPER	GD
FS	COMBINATION FIRE AND SMOKE DAMPER WITH SMOKE DETECTOR	FS
SD	SMOKE DAMPER (AUTOMATIC) WITH SMOKE DETECTOR	SD
	RETURN GRILLE W/ RETURN AIR BOOT	
	EXISTING DUCTWORK TO BE DEMOLISHED	
	EXISTING DUCTWORK TO REMAIN	
	NEW DUCTWORK	

NOTE: NOT ALL SYMBOLS USED

GENERAL NOTES:

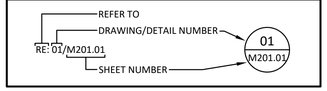
1. "CONSTRUCTION DOCUMENTS" ARE DEFINED AS ALL DRAWINGS AND SPECIFICATIONS TOGETHER. CONTRACTOR SHALL FULLY EXAMINE AND BECOME FAMILIAR WITH THE CONSTRUCTION DOCUMENTS IN THEIR ENTIRETY. ANY DISCREPANCY OR UNCLEAR INFORMATION FOUND IN THE CONSTRUCTION DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND ARCHITECT PRIOR TO PERFORMING ANY WORK INVOLVING ANY CONFLICTING INFORMATION. ALL COSTS SUBMITTED SHALL BE BASED ON THOROUGH KNOWLEDGE OF ALL PRODUCTS, MATERIALS, AND LABOR REQUIRED FOR COMPLETE, COORDINATED, PROPERLY INSTALLED, AND FUNCTIONING SYSTEMS. ANY ADDITIONAL COSTS DUE TO FAILURE TO COMPLY WITH THIS REQUIREMENT ARE THE RESPONSIBILITY OF THE CONTRACTOR.
2. DRAWINGS ARE DIAGRAMMATIC AND SHOW ONLY GENERAL ARRANGEMENT OF WORK. NOT ALL TRANSITIONS, OFFSETS, SLOPES, ETC. ARE SHOWN THAT MAY BE REQUIRED FOR PROPER INSTALLATION. DRAWINGS DO NOT SHOW DIMENSIONS FOR LOCATING ANY WORK AND SHALL NOT BE SCALED FOR BIDDING, ORDERING, INSTALLATION, OR ANY OTHER PURPOSE.
3. CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL REQUIREMENTS OF HIS WORK WITH ALL OTHER TRADES. THIS INCLUDES, BUT IS NOT LIMITED TO: POWER REQUIREMENTS; LOCATIONS OF EQUIPMENT, AIR DEVICES, DUCTWORK, AND PIPING; PROPER SERVICE AND CODE-REQUIRED WORKING CLEARANCES; CONTROLS REQUIREMENTS; ETC.
4. SUBMITTAL REVIEW: SUBMITTALS ARE REVIEWED BY THE ENGINEER ONLY FOR GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR ALL DIMENSIONS, MEANS AND METHODS OF CONSTRUCTIONS, AND COMPLIANCE WITH THE CONTRACT DOCUMENTS. CONTRACTOR IS FULLY RESPONSIBLE FOR ALL SUBMITTALS PROVIDED - EITHER BY HIM DIRECTLY, OR INDIRECTLY BY HIS VENDORS OR SUB-CONTRACTORS. SUBMITTALS PROVIDED BY VENDORS OR SUB-CONTRACTORS SHALL BE THOROUGHLY REVIEWED BY THE SUBMITTING CONTRACTOR FOR COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS AND COORDINATION WITH ALL OTHER TRADES PRIOR TO SUBMITTAL TO THE ENGINEER.
5. IN THE EVENT THERE ARE ANY ISSUES RELATED TO QUALITY OF MATERIALS AND/OR OPERATIONS OF ANY MECHANICAL, ELECTRICAL OR PLUMBING EQUIPMENT, THE OWNER SHALL PUT INTO FORCE ANY ARTICLES OF THE CONTRACT BETWEEN THE OWNER AND THE CONTRACTOR RELATED TO ITEMS STATED ABOVE.
6. IN THE EVENT ANY ITEMS ARE DEEMED TO BE POOR QUALITY, NOT IN WORKING ORDER OR ANY OTHER DEFICIENCY, THE CONTRACTOR SHALL HAVE THE RIGHT TO ENFORCE ANY AND ALL WARRANTY LANGUAGE AS STATED BETWEEN THEIR (OWNER AND CONTRACTOR) AGREEMENT.
7. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ALL NECESSARY MATERIALS AND LABOR WHETHER SHOWN ON THE DRAWINGS OR NOT. THE OWNER MAINTAINS ALL RIGHTS AND FIRST REFUSAL FOR ANY SUBSTITUTIONS FOR ANY MATERIALS REQUIRED FOR THE COMPLETION OF THIS CONSTRUCTION PROJECT.
8. THE ARCHITECT AND ENGINEER SHALL BE HELD HARMLESS FOR ANY INSTALLATIONS NOT PREVIOUSLY REVIEWED OR DESIGNED.
9. ALL CONDUIT, RACEWAYS, PIPING, DUCTWORK, AND EQUIPMENT SHALL BE APPROVED BY OWNER PRIOR TO INSTALLATION AND COMMENCEMENT OF ANY WORK.
10. INSTALL ALL NEW CONDUIT, PIPING, UTILITIES, ETC. WITHIN NEW WALLS. ALL DUCTWORK SHALL BE INSTALLED CONCEALED ABOVE THE CEILING UNLESS NOTED OTHERWISE.

NOT FOR CONSTRUCTION

SYMBOL LEGEND

SYMBOL	DESCRIPTION
V	SPEED CONTROLLER
T	THERMOSTAT
H	HUMIDISTAT
	3/4" DOOR UNDERCUT
	CONNECT TO EXISTING

DRAWING DETAIL REFERENCE KEY



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MECHANICAL COVER SHEET

M-000

MECHANICAL SPECIFICATIONS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. FURNISH AND INSTALL ALL MATERIALS, EQUIPMENT AND LABOR REQUIRED AND NECESSARY TO COMPLETE THE WORK SHOWN ON THE DRAWINGS AND ALL OTHER WORK AND MISCELLANEOUS ITEMS, NOT SPECIFICALLY MENTIONED BUT REASONABLE INFERRED FOR A COMPLETE INSTALLATION, INCLUDING ALL ACCESSORIES AND APPURTENANCES REQUIRED FOR TESTING THE SYSTEM. IT IS THE INTENT OF THE DRAWINGS AND SPECIFICATIONS THAT ALL SYSTEMS BE COMPLETE AND READY FOR OPERATION.

B. ALL WORK BY THIS CONTRACTOR SHALL CONFORM TO ALL APPLICABLE, FEDERAL, STATE AND LOCAL BUILDING CODES.

C. CONTRACTOR SHALL SECURE AND PAY FOR ALL CONSTRUCTION PERMITS AND LICENSES AND SHALL PAY ALL GOVERNMENTAL AND PUBLIC UTILITY CHARGES AND INSPECTION FEES NECESSARY FOR THE EXECUTION OF THE WORK.

D. CONTRACTOR SHALL ARRANGE FOR AND PAY FOR ALL REQUIRED ENGINEER STAMPS, LICENSES, PERMITS AND INSPECTION FEES FOR DEFERRED DESIGN AND INSPECTION SCOPES OF WORK.

E. SAFETY: THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS ON THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK.

F. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEWING THE EXISTING CONDITIONS AT THE JOBSITE BEFORE SUBMITTING PROPOSALS. SUBMISSION OF PROPOSALS SHALL BE TAKEN AS EVIDENCE THAT SUCH INSPECTIONS HAVE BEEN MADE. CLAIMS FOR EXTRA COMPENSATION FOR WORK THAT COULD HAVE BEEN FORESEEN BY SUCH INSPECTIONS, WHETHER SHOWN ON THE CONTRACT DOCUMENTS OR NOT SHALL NOT BE ACCEPTED OR PAID.

G. MATERIALS AND EQUIPMENT FURNISHED UNDER THIS CONTRACT SHALL BE NEW AND SHALL BEAR THE U.L. LABEL WHERE APPLICABLE UNLESS NOTED OTHERWISE. ALL WORK SHALL BE GUARANTEED AGAINST DEFECTIVE MATERIALS AND WORKMANSHIP FOR A PERIOD OF NOT LESS THAN ONE (1) YEAR AFTER COMPLETION AND ACCEPTANCE BY THE OWNER UNLESS SPECIFICALLY STATED OTHERWISE FOR A PARTICULAR PIECE OF EQUIPMENT, COMPONET OR SYSTEM.

H. COORDINATION: COORDINATE WORK WITH OTHER TRADES TO AVOID CONFLICT AND TO PROVIDE CORRECT ROUGH-IN AND CONNECTION FOR EQUIPMENT FURNISHED UNDER OTHER TRADES. VERIFY EQUIPMENT DIMENSIONS AND REQUIREMENTS WITH PROVISIONS SPECIFIED UNDER THIS SECTION. CHECK ACTUAL JOB CONDITIONS BEFORE FABRICATING WORK. REPORT NECESSARY CHANGES IN TIME TO PREVENT NEEDLESS RE-WORK.

I. DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF EQUIPMENT, DUCTWORK AND PIPING SYSTEMS. CONTRACTOR SHALL CHECK ALL INFORMATION AND REPORT ANY APPARENT DISCREPANCIES BEFORE SUBMITTING BID.

2. WHERE THE OWNER HAS ELECTED TO PROCURE SOME EQUIPMENT FOR THE PROJECT, IT IS THE INTENT OF THESE SPECIFICATIONS THAT THE CONTRACTOR SHALL ACCEPT RESPONSIBILITY OF THIS EQUIPMENT AND PROVIDE THE FOLLOWING:

a. COORDINATE SHOP DRAWING PREPARATION.

b. PROVIDE SUPERVISION TO COORDINATE SHIPPING AND ACCEPT DELIVERY.

c. INSTALL AND SET IN PLACE.

d. PROVIDE POWER AND CONTROL WIRING TO PROVIDE FUNCTIONS IN ACCORDANCE WITH THESE SPECIFICATIONS.

e. DELIVER THE EQUIPMENT TO THE OWNER IN A WORKABLE, OPERATING, AND TESTED CONDITION.

f. PROVIDE SUPERVISION TO COORDINATE FACTORY AND ON-SITE TESTING, START-UP, AND COMMISSIONING IN ACCORDANCE WITH THESE SPECIFICATIONS.

g. PROVIDE SUPERVISION TO COORDINATE OWNER TRAINING AND PREPARATION OF O&M MANUALS.

3. COORDINATE LIST OF EQUIPMENT PROVIDED BY OWNER WITH OWNER.

4. THE MECHANICAL CONTRACTOR SHALL REPLACE ANY OWNER EQUIPMENT/SYSTEMS UNDER HIS CONTROL OR SUPERVISION IF DAMAGED.

K. INSPECTING AND SERVICING EXISTING MECHANICAL SYSTEMS

1. CONTRACTOR SHALL INSPECT AND SERVICE THE EXISTING EQUIPMENT, ROOF TOP UNITS AND EXHAUST FANS INDICATED TO REMAIN IN SERVICE. THE INSPECTION AND SERVICE SHALL PLACE THE EXISTING EQUIPMENT IN GOOD WORKING ORDER AND AS A MINIMUM INCLUDE THE FOLLOWING:

c. VARIABLE AIR VOLUME TERMINAL UNITS:

1) CHECK THE CONDITION OF THE UNITS' CABINET AND CASING.

2) CHECK THE CONDITION OF THE FAN BLOWER MOTOR, WHEEL AND SHROUD.

3) CLEAN THE FAN HOUSING AND BLOWER WHEEL.

4) CHECK THE CONDITION AND OPERATION OF THE HOT WATER COIL AND CONTROL VALVE.

5) CHECK THE CONDITION AND OPERATION OF THE ELECTRIC HEATING COIL AND SAFTEY SWITCHES.

6) CHECK THE CONDITION AND OPERATION OF THE TERMINAL UNITS PRIMARY AIR DAMPER AND ACTUATOR AND FLOW RING.

7) CHECK THE CONDITION AND CALIBRATION OF THE SPACE SENSOR.

8) CHECK THE CONDITION OF THE CONTROLS AND COMMUNICATION WIRING.

2. SUBMIT A SERVICE REPORT TO THE ARCHITECT AT THE COMPLETION OF THE INSPECTION AND SERVICE. IDENTIFY ADDITIONAL SERVICE WORK REQUIRED TO PLACE THE EXISTING EQUIPMENT IN GOOD WORKING ORDER.

1.2 CODE COMPLIANCE

A. MATERIALS AND WORKMANSHIP SHALL COMPLY WITH THE CONTRACT DOCUMENTS AND APPLICABLE CODES AND STANDARDS.

B. IN CASE OF DIFFERENCE BETWEEN APPLICABLE CODES AND STANDARDS AND THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL PROMPTLY NOTIFY THE ARCHITECT/ENGINEER AND THE OWNER IN WRITING OF SUCH DIFFERENCE.

C. SHOULD THE CONTRACTOR PERFORM ANY WORK THAT DOES NOT COMPLY WITH THE REQUIREMENTS OF APPLICABLE CODES AND STANDARDS, CONTRACTOR SHALL BEAR ALL COSTS ARISING IN CORRECTING SUCH DEFECTS. APPLICABLE CODES AND STANDARDS SHALL INCLUDE ALL ORDINANCES, UTILITY COMPANY REGULATIONS, AND APPLICABLE REQUIREMENTS OF NATIONALLY ACCEPTED CODES AND STANDARDS.

1.3 GENERAL DEMOLITION REQUIREMENTS:

A. CONTRACTOR SHALL PROTECT THE EXISTING HVAC EQUIPMENT AND SYSTEMS INDICATED TO REMAIN OPERATIONAL PERMANENTLY OR TEMPORARILY. IF DAMAGED OR DISTURBED IN THE COURSE OF THE DEMOLITION WORK, REMOVE DAMAGED PORTIONS AND REPAIR OR REPLACE WITH NEW PRODUCT OF EQUAL CAPACITY, QUALITY AND FUNCTIONALITY.

B. CONTRACTOR SHALL MAKE "SAFE" ALL HVAC EQUIPMENTS. CONTRACTOR SHALL COORDINATE WITH THE OWNER TO ARRANGE THE SHUT OFF OF UTILITIES. THE CONTRACTOR SHALL LOCATE, IDENTIFY, DISCONNECT, AND SEAL OR CAP OFF UTILITIES SERVING BUILDING PRIOR TO PROCEEDING WITH THE REMOVAL OF THE HVAC SYSTEMS. THE CONTRACTOR SHALL NOT RELY ON AN OPERABLE ISOLATION VALVE TO SECURELY ISOLATE A PIPING SYSTEM. CONTRACTOR SHALL PERMANENTLY CAP OR PLUG ALL OPEN PIPE ENDS.

C. CONTRACTOR SHALL ENGAGE THE BUILDING AUTOMATION SYSTEM (BAS) CONTRACTOR SELECTED BY THE OWNER TO REMOVE AND DISCONNECT ANY BAS DEVICE AND COMMUNICATION NETWORK.

D. EXISTING BELOW GRADE UTILITIES:

1. ABANDON EXISTING UTILITIES AND BELOW-GRADE UTILITY STRUCTURES. CUT UTILITIES AT LEAST 12 INCHES BELOW FINISH FLOOR.

2. DEMOLISH EXISTING UTILITIES AND BELOW-GRADE UTILITY STRUCTURES THAT ARE WITHIN 5 FEET OUTSIDE FOOTPRINT INDICATED FOR NEW CONSTRUCTION. ABANDON UTILITIES OUTSIDE THIS AREA.

3. FILL ABANDONED UTILITY STRUCTURES WITH SATISFACTORY SOIL MATERIALS ACCORDING TO PROJECT BACKFILL REQUIREMENTS.

E. CONTRACTOR SHALL BOX AND/OR PALLETIZE ALL HVAC EQUIPMENT AND PROTECT ON SITE UNTIL THE OWNER DETERMINES THE EQUIPMENT'S SALVAGE VALUE. THE CONTRACTOR SHALL REMOVE THESE ITEMS FROM THE SITE AFTER AT THE DIRECTION OF THE OWNER.

F. THE CONTRACTOR SHALL UTILIZE A CERTIFIED REFRIGERANT RECOVERY TECHNICIAN TO EVACUATE THE AIR-CONDITIONING AND REFRIGERATION EQUIPMENT AND RECOVER THE REFRIGERANT IN ACCORDANCE TO 40 CFR 82 AND REGULATIONS OF AUTHORITIES HAVING JURISDICTION BEFORE STARTING DEMOLITION AND REMOVAL OF THE EQUIPMENT. CONTRACTOR SHALL PROVIDE A STATEMENT SIGNED BY REFRIGERANT RECOVERY TECHNICIAN RESPONSIBLE FOR RECOVERING REFRIGERANT, STATING THAT ALL REFRIGERANT THAT WAS PRESENT WAS RECOVERED AND THAT RECOVERY WAS PERFORMED ACCORDING TO EPA REGULATIONS. INCLUDE NAME AND ADDRESS OF TECHNICIAN AND DATE REFRIGERANT WAS RECOVERED.

G. INSTALL TEMPORARY MECHANICAL SYSTEMS LEVEL AND PLUMB, PARALLEL AND PERPENDICULAR TO OTHER BUILDING SYSTEMS AND COMPONENTS, EXCEPT WHERE PITCH IS REQUIRED FOR PROPER DRAINAGE.

H. CUTTING AND PATCHING: ALL CUTTING AND PATCHING REQUIRED FOR WORK OF IN THIS DIVISION IS PROVIDED BY THE CONTRACTOR. COORDINATION OF THE WORK WITH THE GENERAL CONTRACTOR IS IMPERATIVE. CONTRACTOR SHALL RECIEVE WRITTEN APPROVAL FROM THE GENERAL CONTRACTOR PRIOR TO SAW-CUTTING OR CORING ANY STRUCTURAL SLABS OR MEMBERS.

I. PROVIDE HANGERS, SUPPORTS AND ANCHORS AS REQUIRED.

1.4 GENERAL REQUIREMENTS

A. INSTALL MECHANICAL AND ELECTRICAL SYSTEMS LEVEL AND PLUMB, PARALLEL AND PERPENDICULAR TO OTHER BUILDING SYSTEMS AND COMPONENTS, EXCEPT WHERE PITCH IS REQUIRED FOR PROPER DRAINAGE.

B. INSTALL MECHANICAL AND ELECTRICAL SYSTEMS TO FACILITATE SERVICING, MAINTENANCE, REPAIR OR REPLACEMENT OF EQUIPMENT COMPONENTS. AS MUCH AS PRACTICAL, CONNECT EQUIPMENT FOR EASE OF DISCONNECTING WITH MINIMUM OF INTERFERENCE WITH OTHER INSTALLATIONS.

C. SHOULD THE CONTRACTOR SUPPLY EQUIPMENT DIFFERING FROM THE SCHEDULED EQUIPMENT IN THE CONTRACT DOCUMENTS, CONTRACTOR SHALL BEAR ALL COSTS TO COORDINATE REQUIRED DESIGN MODIFICATIONS AND INSTALLATION.

D. DELIVERY, STORAGE, AND HANDLING OF MATERIAL AND EQUIPMENT SHALL BE STORED AND HANDLED PER MANUFACTURER'S RECOMMENDATIONS. COMPLY WITH MANUFACTURER'S PRODUCT DATA, INCLUDING TECHNICAL BULLETINS, PRODUCT CATALOG INSTALLATION INSTRUCTIONS.

E. EQUIPMENT ROUGH-IN: ROUGH-IN EQUIPMENT LOCATIONS SHOWN ON THE DRAWINGS ARE APPROXIMATE ONLY. OBTAIN EXACT ROUGH-IN LOCATIONS FROM GENERAL CONTRACTOR AND/OR OWNER.

F. PROVIDE HANGERS, SUPPORTS AND ANCHORS AS REQUIRED.

G. CUTTING AND PATCHING: ALL CUTTING AND PATCHING REQUIRED FOR WORK OF IN THIS DIVISION IS PROVIDED BY THE CONTRACTOR. COORDINATION OF THE WORK WITH THE GENERAL CONTRACTOR AND OWNER IS IMPERATIVE.

H. FOR THROUGH WALL PENETRATION PROTECTION SYSTEMS COMPLY WITH UL C-AJ 1001 FOR CONCRETE FLOOR AND WALL PENETRATIONS AND UL W-L 1039 FOR GYPSUM WALL BOARD PENETRATIONS.

1.5 SUBMITTALS

A. PRODUCT DATA: SUBMIT MANUFACTURER'S TECHNICAL PRODUCT DATA TO MEET THE FOLLOWING REQUIREMENTS:

1. SHOW COMPLIANCE WITH THE BASIS OF DESIGN

a. ALL EQUIPMENT DESIGNATED ON THE DRAWINGS

b. ALL EQUIPMENT LISTED IN A SCHEDULE

c. ALL DEVICES WHICH IS VISIBLE OR USED BY THE END-USER

2. SUBMIT MANUFACTURER'S ASSEMBLY_TYPE SHOP DRAWING FOR EACH ITEM INDICATING MATERIALS AND METHODS OF ASSEMBLY OF COMPONENTS.

3. SUBMIT MANUFACTURER'S TECHNICAL PRODUCT DATA AND INSTALLATION INSTRUCTIONS FOR METAL DUCTWORK MATERIALS AND PRODUCTS.

4. SUBMIT MANUFACTURER'S TECHNICAL PRODUCT DATA AND INSTALLATION INSTRUCTIONS FOR EACH TYPE OF MECHANICAL INSULATION. SUBMIT SCHEDULE SHOWING MANUFACTURER'S PRODUCT NUMBER, K_VALUE, THICKNESS, AND FURNISHED ACCESSORIES FOR EACH MECHANICAL SYSTEM REQUIRING INSULATION.

5. SUBMIT MAINTENANCE DATA, INCLUDING CLEANING INSTRUCTIONS FOR FINISHES, AND SPARE PARTS LISTS.

1.6 SUBSTITUTIONS: WHEREVER POSSIBLE, MORE THAN ONE MANUFACTURER HAS BEEN LISTED FOR VARIOUS ITEMS OR EQUIPMENT, ANY ONE OF WHICH WILL BE ACCEPTABLE. BASE THE BID ON USE OF MATERIALS SPECIFIED. IF, AFTER AWARD OF THE CONTRACT, A SUBSTITUTE IS PROPOSED, THE REQUEST FOR PERMISSION TO SUBSTITUTE SHALL BE ACCOMPANIED WITH A STATEMENT OF THE AMOUNT OF MONEY TO REDUCE THE CONTRACT IF THE SUBSTITUTION IS PERMITTED. THE OWNER IS THE SOLE JUDGE OF ACCEPTABILITY OF PROPOSED SUBSTITUTIONS. IF A SUBSTITUTE IS PERMITTED AND ANY REDESIGN EFFORT IS THEREBY NECESSITATED, THE REQUIRED REDESIGN SHALL BE AT THE CONTRACTOR'S EXPENSE.

1.7 CONSTRUCT THE HVAC SYSTEM IN COMPLIANCE WITH THE FOLLOWING STANDARDS:

A. SMACNA STANDARDS: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE", THIRD EDITION, 2005, FOR FABRICATION AND INSTALLATION OF METAL DUCTWORK.

B. SMACNA 1985: SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL, 1985.

C. SMACNA ROUND INDUSTRIAL DUCT CONSTRUCTION STANDARDS.

D. ASHRAE STANDARDS: COMPLY WITH 2012 ASHRAE HANDBOOK - HVAC SYSTEMS AND EQUIPMENT, CHAPTER 19 "DUCT CONSTRUCTION", FOR FABRICATION AND INSTALLATION OF METAL DUCTWORK.

E. NFPA COMPLIANCE: COMPLY WITH NFPA 90A "STANDARD FOR THE INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS" AND NFPA 90B "STANDARD FOR THE INSTALLATION OF WARM AIR HEATING AND AIR CONDITIONING SYSTEMS".

F. ACGIH: INDUSTRIAL VENTILATION - A MANUAL OF RECOMMENDED PRACTICE, 20TH EDITION, AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS.

1.8 HYDRONIC PIPING SYSTEMS

A. PIPE AND FITTING MATERIALS, JOINING METHODS, SPECIAL-DUTY VALVES, AND SPECIALTIES FOR THE FOLLOWING SYSTEMS:

1. HOT-WATER HEATING PIPING.

2. CHILLED-WATER PIPING.

3. CONDENSATE-DRAIN PIPING.

4. AIR-VENT PIPING.

B. PERFORMANCE REQUIREMENTS

1. HYDRONIC PIPING COMPONENTS AND INSTALLATION SHALL BE CAPABLE OF WITHSTANDING THE FOLLOWING MINIMUM WORKING PRESSURE AND TEMPERATURE:

a. HOT-WATER HEATING PIPING: 150 PSIG AT 200 DEG F.

b. CHILLED-WATER PIPING: 150 PSIG AT 100 DEG F.

c. CONDENSATE-DRAIN PIPING: 100 DEG F.

d. AIR-VENT PIPING: 100 DEG F.

C. QUALITY ASSURANCE

1. INSTALLER QUALIFICATIONS:

a. INSTALLERS OF PRESSURE-SEALED JOINTS: INSTALLERS SHALL BE CERTIFIED BY THE PRESSURE-SEAL JOINT MANUFACTURER AS HAVING BEEN TRAINED AND QUALIFIED TO JOIN PIPING WITH PRESSURE-SEAL PIPE COUPLINGS AND FITTINGS.

2. STEEL SUPPORT WELDING: QUALIFY PROCESSES AND OPERATORS ACCORDING TO AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE - STEEL."

3. WELDING: QUALIFY PROCESSES AND OPERATORS ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE: SECTION IX.

a. COMPLY WITH PROVISIONS IN ASME B31 SERIES, "CODE FOR PRESSURE PIPING."

b. CERTIFY THAT EACH WELDER HAS PASSED AWS QUALIFICATION TESTS FOR WELDING PROCESSES INVOLVED AND THAT CERTIFICATION IS CURRENT.

4. ASME COMPLIANCE: COMPLY WITH ASME B31.9, "BUILDING SERVICES PIPING," FOR MATERIALS, PRODUCTS, AND INSTALLATION. SAFETY VALVES AND PRESSURE VESSELS SHALL BEAR THE APPROPRIATE ASME LABEL. FABRICATE AND STAMP AIR SEPARATORS AND EXPANSION TANKS TO COMPLY WITH ASME BOILER AND PRESSURE VESSEL CODE: SECTION VIII, DIVISION 1.

PART 2 - PRODUCTS

2.1 AIR DIFFUSERS, GRILLES AND REGISTERS

A. GENERAL: PROVIDE MANUFACTURER'S STANDARD CEILING AIR DIFFUSERS AND GRILLES WHERE SHOWN; OF SIZE, SHAPE, CAPACITY AND TYPE INDICATED, AND WITH ACCESSORIES AND FINISHES AS LISTED ON AIR DEVICE SCHEDULE. COLOR SELECTION SHALL BE FROM MANUFACTURER'S STANDARD COLOR CHIPS.

B. CEILING COMPATIBILITY: PROVIDE DIFFUSERS WITH BORDER STYLES THAT ARE COMPATIBLE WITH ADJACENT CEILING SYSTEMS, AND THAT ARE SPECIFICALLY MANUFACTURED TO FIT INTO CEILING MODULE WITH ACCURATE FIT AND ADEQUATE SUPPORT. REFER TO ARCHITECTURAL REFLECTIVE CEILING PLANS, ROOM FINISHING SCHEDULE AND SPECIFICATIONS FOR TYPES OF CEILING AND WALLS SYSTEMS WHICH WILL CONTAIN EACH TYPE OF CEILING AIR DIFFUSER, GRILLE AND REGISTERS. ALL AIR DEVICES INSTALLED IN PLASTER, GYP BOARD OR OTHER HARD CEILINGS OR WALLS SHALL BE PROVIDED WITH A SEPARATE MOUNTING FRAME.

C. PROVIDE REMOTE MANUAL BALANCE DAMPER OPERATORS FOR ALL AIR DEVICE WHERE THE BALANCING DAMPER IS ABOVE AN SOLID CEILING. THE MANUAL OPERATOR SHALL BE AN IN THE DUCT OR OUT OF AIR STREAM TYPE WITH A CABLE EXTENDED TO AN ACCESSIBLE LOCATION - EQUAL TO MAT ROTO-TWIST CABLE OPERATED DAMPERS. OUT OF THE AIR STREAM TYPE CABLE SHALL BE TERMINATED AT INCONSPICUOUS WALL OR CEILING LOCATION WITH A MOUNTING BRACKET FOR ACTUATION CABLE SUPPORT WITH A CAP TO SEAL ACCESS HOLE - EQUAL TO MAT RT-CCM.

D. MANUFACTURER: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE DIFFUSERS OF ONE OF THE FOLLOWING:

1. TITUS

2. KRUEGER

3. PRICE

4. METALAIRE

2.2 DUCTWORK INSULATION MATERIALS

A. MINERAL FIBER BOARD - 3.0 PCF: ASTM C612 TYPE 1A OR 1B WITH FACTORY APPLIED FSK JACKET.

B. MINERAL FIBERGLASS BLANKET - 1.0 PCF: ASTM C 553 TYPE II, ASTM C 1290 TYPE III WITH FACTORY APPLIED FRK JACKET.

C. JACKETS FOR DUCTWORK INSULATION: ASTM C 921, TYPE II FOR DUCTWORK WITH TEMPERATURES BELOW AMBIENT; TYPE I FOR DUCTWORK WITH TEMPERATURES ABOVE AMBIENT.

D. DUCTWORK INSULATION ACCESSORIES: PROVIDE STAPLES, BANDS, WIRES, TAPE, ANCHORS, CORNER ANGLES AND SIMILAR ACCESSORIES AS RECOMMENDED BY INSULATION MANUFACTURER FOR APPLICATIONS INDICATED.

E. DUCTWORK INSULATION COMPOUNDS: PROVIDE CEMENTS, ADHESIVES, COATINGS, SEALERS, PROTECTIVE FINISHES AND SIMILAR COMPOUNDS AS RECOMMENDED BY INSULATION MANUFACTURER FOR APPLICATIONS INDICATED.

F. APPLICATION SCHEDULE

1. ITEMS NOT INSULATED:

a. FACTORY INSULATED FLEXIBLE DUCTS

b. METAL DUCTS WITH DUCT LINER OF SUFFICIENT THICKNESS TO COMPLY THE ENERGY CODE MINIMUM INSULATION R-VALUES.

2. CONCEALED SUPPLY AND RETURN AIR DUCT INSULATION:

a. MATERIAL: MINERAL-FIBER BLANKET

b. THICKNESS: 2 INCHES AND 1.0 PCF

3. EXPOSED SUPPLY AND RETURN AIR DUCT INSULATION:

a. MATERIAL: MINERAL-FIBER BOARD

b. THICKNESS: 2 INCHES AND 3.0 PCF

4. EQUIP CLEANING (EF-2) EXHAUST AIR

a. MATERIAL: MINERAL-FIBER BLANKET

b. THICKNESS: 2 INCHES AND 1.0 PCF

2.3 DUCTWORK CONSTRUCTION

A. HVAC DUCTWORK MATERIALS

1. GALVANIZED STEEL DUCTWORK: SHALL BE CONSTRUCTED WITH G-90 OR BETTER GALVANIZED STEEL (ASTM A 653/A 653M) LFQ, CHEM TREAT.

2. STAINLESS-STEEL SHEETS: COMPLY WITH ASTM A 480/A 480M, TYPE 304 OR 316, AS INDICATED IN THE "DUCT SCHEDULE" ARTICLE; COLD ROLLED, ANNEALED, SHEET. EXPOSED SURFACE FINISH SHALL BE NO. 2B, NO. 2D, NO. 3, OR NO. 4 AS INDICATED IN THE "DUCT SCHEDULE" ARTICLE.

3. ALUMINUM SHEETS: COMPLY WITH ASTM B 209 ALLOY 3003, H14 TEMPER; WITH MILL FINISH FOR CONCEALED DUCTS, AND STANDARD, ONE-SIDE BRIGHT FINISH FOR DUCT SURFACES EXPOSED TO VIEW.

B. APPLICATION SCHEDULE

1. MEDIUM PRESSURE SUPPLY AIR:

a. MATERIAL: G-90 GALVANIZED STEEL

b. PRESSURE CLASS: +4 IN WG

2. LOW PRESSURE SUPPLY AIR:

a. MATERIAL: G-90 GALVANIZED STEEL

b. PRESSURE CLASS: +2 IN WG

3. RETURN AIR AND GENERAL TOILET EXHAUST AIR:

a. MATERIAL: G-90 GALVANIZED STEEL

b. PRESSURE CLASS: -1 IN WG

4. EQUIP CLEANING (EF-2) EXHAUST AIR:

a. MATERIAL: TYPE 304 STAINLESS STEEL

b. PRESSURE CLASS: -1 IN WG

c. FINISH: NO 2B.

C. MISCELLANEOUS DUCTWORK MATERIALS

1. GENERAL: PROVIDE MISCELLANEOUS MATERIALS AND PRODUCTS TO COMPLETE THE DUCTWORK SYSTEM REQUIREMENTS INCLUDING PROPER CONNECTION OF DUCTWORK AND EQUIPMENT.

2. FITTINGS: PROVIDE RADIUS TYPE FITTINGS FABRICATED OF MULTIPLE SECTIONS WITH MAXIMUM 15º CHANGE OF DIRECTION PER SECTION. UNLESS SPECIFICALLY DETAILED OTHERWISE, USE 45º LATERALS AND 45º ELBOWS FOR BRANCH TAKEOFF CONNECTIONS. WHERE 90º BRANCHES ARE INDICATED, PROVIDE CONICAL TYPE TEES.

3. DUCT LINER:

a. FIBROUS GLASS, COMPLYING WITH THERMAL INSULATION MANUFACTURER'S ASSOCIATION (TIMA) AHC-101; OF THICKNESS INDICATED, WITH ANTIMICROBIAL NEOPRENE COATING ADJACENT TO AIR STREAM.

b. MANUFACTURERS:

1) CERTAINTEED "ULTRA*LINER".

2) KNAUF TYPE "M".

3) JOHNS MANSVILLE "LINACOUSTIC".

4) OWENS-CORNING "AEROFLEX".

c. DUCT LINER ADHESIVE:

1) COMPLY WITH ASTM C 916 "SPECIFICATIONS FOR ADHESIVES FOR DUCT THERMAL INSULATION." APPLICATION SHALL CONFORM TO MANUFACTURER'S WRITTEN RECOMMENDATIONS FOR THE APPARENT APPLICATION.

2) ADHESIVES SHALL BE NON-INFLAMMABLE AFTER CURING.

3) MANUFACTURERS:

a) Benjamin-Foster.

b) Duro Dyne "FPG".

c) Kinco 15-137.

d) Miracle PF-91.

d. DUCT LINER FASTENERS:

1) COMPLY WITH SMACNA "INSTALLATION STANDARDS FOR RECTANGULAR DUCTS USING FLEXIBLE LINER", ARTICLES S2.0 THROUGH S2.11.

2) COMPLY WITH LINING DETAILS AS SHOWN IN THE REFERENCED SMACNA SECTION, FIGURES 2-22 AND 2-23.

3) CLINCHED-PIN TYPE FASTENERS SHALL BE "GRIP-NAIL", OR APPROVED EQUAL.

4) PROJECTING PINS IN TYPE 3 OR TYPE 4 APPLICATIONS SHALL BE CLIPPED OFF CLOSE ENOUGH TO THE RETAINING DISC TO PROVIDE PROPER ANCHORING AND TO PREVENT INJURY TO PERSONNEL.

D. DUCT SEALANT:

1. DUCT SEALER SHALL BE FLEXIBLE, WATER-BASED, ADHESIVE SEALANT DESIGNED FOR USE IN ALL PRESSURE DUCT SYSTEMS. AFTER CURING, IT SHALL BE RESISTANT TO ULTRAVIOLET LIGHT AND SHALL SEAL OUT WATER, AIR, AND MOISTURE. SEALER SHALL BE UL LISTED AND CONFORM TO ASTM E 84.

2. COMPLY WITH REQUIREMENTS TABLE 1-1 IN SMACNA "HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE"

3. MANUFACTURERS:

a. BENJAMIN-FOSTER

b. DUCTMATE - PROSEAL.

c. DURO DYNE S2.

d. HARDCAST.

e. UNITED SHEET METAL.

E. DUCTWORK SUPPORT MATERIALS:

1. GENERAL:

a. EXCEPT AS OTHERWISE INDICATED, PROVIDE HOT-DIPPED GALVANIZED STEEL FASTENERS, ANCHORS, RODS, STRAPS, TRIM AND ANGLES FOR SUPPORT OF DUCTWORK.

b. COMPLY WITH APPLICABLE PROVISIONS SMACNA "HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE"; CHAPTER 5.

F. FLEXIBLE DUCTS

1. GENERAL:

a. EITHER SPIRAL WOUND SPRING STEEL WITH FLAMEPROOF VINYL SHEATHING, OR CORRUGATED ALUMINUM; COMPLYING WITH UL181.

b. COMPLY WITH APPLICABLE PROVISIONS OF SMACNA "HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE", CHAPTER 3.

c. INSTALLATION SHALL CONFORM TO CONDITIONS UNDER WHICH UL LISTING WAS GRANTED.

2. INSULATION:

a. INSULATE ALL FLEXIBLE DUCTS, BOTH SUPPLY AND RETURN, WITH NOMINAL 2" THICK CONTINUOUS FLEXIBLE FIBERGLASS SHEATH WITH UL APPROVED VINYL BARRIER JACKET.

b. INSULATION DENSITY SHALL BE 3/4 LBS/CU.FT.

c. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE FLEXIBLE DUCTS MANUFACTURED BY ONE OF THE FOLLOWING:

1) ATCO.

2) GENFLEX.

3) THERMAFLEX.

2.4 DUCTWORK FABRICATION

A. SHOP-FABRICATE DUCTWORK IN STANDARD LENGTHS, UNLESS OTHERWISE INDICATED OR REQUIRED TO COMPLETE RUNS. PREASSEMBLE WORK IN SHOP TO GREATEST EXTENT POSSIBLE, SO AS TO MINIMIZE FIELD ASSEMBLY OF SYSTEMS. DISASSEMBLE SYSTEMS ONLY TO EXTENT NECESSARY FOR SHIPPING AND HANDLING. MATCH MARK SECTIONS FOR REASSEMBLY AND COORDINATED INSTALLATION.

B. SHOP-FABRICATE DUCTWORK OF GAUGES AND REINFORCEMENT COMPLYING WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE" AS FOLLOWS:

1. RECTANGULAR, STEEL: CHAPTER 2.

2. FITTINGS AND CONSTRUCTION, CHAPER 4.

3. ROUND, OVAL AND FLEXIBLE DUCT: CHAPTER 3.

4. RECTANGULAR DUCT LONGITUDINAL SEAMS: PITTSBURGH LOCK SHALL BE USED ON ALL LONGITUDINAL SEAMS. ALL LONGITUDINAL SEAMS WILL BE SEALED WITH MASTIC SEALANT.

5. ROUND DUCT SHALL BE EQUAL TO SPIRAL SEAM RL-1. ROUND DUCT WITH SNAPLOCK SEAMS SHALL IS LIMITED TO THE FINAL BRANCH RUN-OUT TO A SINGULAR AIR DIFFUSER NO LONGER THAN 10 FEET IN LENGTH.

6. DUCTMATE OR W.D.C.I. PROPRIETARY DUCT CONNECTION SYSTEMS WILL BE ACCEPTABLE. DUCT CONSTRUCTED USING THESE SYSTEMS WILL REFER TO THE MANUFACTURERS GUIDELINES FOR SHEET GAUGE, INTERMEDIATE REINFORCEMENT SIZE AND SPACING, AND JOINT REINFORCEMENTS.

7. FORMED ON FLANGES (T.D.C./T.D.F./T-25A/T-25B) WILL ONLY BE ACCEPTABLE WHEN SUBMITTED FOR APPROVAL PRIOR TO INSTALLATION OF ANY DUCTWORK. FORMED ON FLANGES WILL BE CONSTRUCTED AS SMACNA T-25 FLANGES.. NO OTHER CONSTRUCTION PERTAINING TO FORMED ON FLANGES WILL BE ACCEPTABLE. FORMED ON FLANGES SHALL BE ACCEPTABLE FOR USE ON DUCTWORK 42" WIDE OR LESS, WITH 2" POSITIVE PRESSURE STATIC OR LESS, AND MUST INCLUDE THE USE OF CORNERS, BOLTS AND CLEAT.

8. FABRICATE DUCT FITTINGS TO MATCH ADJOINING DUCTS, AND TO COMPLY WITH DUCT REQUIREMENTS AS APPLICABLE TO FITTINGS. EXCEPT AS OTHERWISE INDICATED, FABRICATE ELBOWS WITH CENTER LINE RADIUS EQUAL TO ASSOCIATED DUCT WIDTH; AND FABRICATE TO INCLUDE TURNING VANES IN ELBOWS WHERE SHORTER RADIUS IS NECESSARY. LIMIT ANGULAR TAPERS TO 30º FOR CONTRACTING TAPERS AND 20º FOR EXPANDING TAPERS.

9. FABRICATE DUCTWORK WITH DUCT LINER IN EACH SECTION OF DUCT WHERE INDICATED. LAMINATE LINER TO INTERNAL SURFACES OF DUCT IN ACCORDANCE WITH INSTRUCTIONS BY MANUFACTURERS OF LINING AND ADHESIVE, AND FASTEN WITH MECHANICAL FASTENERS.

10. ROUND DUCT JOINTS:

a. 6"-14" DIAMETER, INTERIOR SLIP COUPLING BEADED AT CENTER, FASTENED TO DUCT WITH SEALING COMPOUND APPLIED CONTINUOUSLY AROUND JOINT BEFORE ASSEMBLING AND AFTER FASTENING.

11. PRESSURE CLASSIFICATIONS:

a. STATIC PRESSURE RATINGS FOR DUCTWORK SYSTEMS ARE NOTED IN APPLICATION SCHEDULE.

b. GAUGES OF METAL AND REINFORCING METHODS SHALL CONFORM TO SMACNA REQUIREMENTS.

PART 3 - EXECUTION

3.1 INSPECTION

A. GENERAL: EXAMINE AREAS AND CONDITIONS UNDER WHICH METAL DUCTWORK IS TO BE INSTALLED. DO NOT PROCEED WITH WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED IN MANNER ACCEPTABLE TO INSTALLER.

3.2 INSTALLATION OF METAL DUCTWORK

A. INSTALLATION: INSTALL METAL DUCTWORK IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS.

B. GENERAL: ASSEMBLE AND INSTALL DUCTWORK IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES WHICH WILL ACHIEVE AIR TIGHT (5% LEAKAGE FOR SYSTEMS RATED 3 IN WG AND UNDER; 1% FOR SYSTEMS RATED OVER 3 IN WG) AND NOISELESS (NO OBJECTIONABLE NOISE) SYSTEMS, CAPABLE OF PERFORMING EACH INDICATED SERVICE. INSTALL EACH RUN WITH MINIMUM NUMBER OF JOINTS. ALIGN DUCTWORK ACCURATELY AT CONNECTIONS, WITHIN 1/8" MISALIGNMENT TOLERANCE AND WITH INTERNAL SURFACES SMOOTH. SUPPORT DUCTS RIGIDLY WITH SUITABLE TIES, BRACES, HANGERS AND ANCHORS OF TYPE WHICH WILL HOLD DUCTS TRUE TO SHAPE AND TO PREVENT BUCKLING. SUPPORT VERTICAL DUCTS AT EVERY FLOOR.

C. FIELD FABRICATION: COMPLETE FABRICATION OF WORK AT PROJECT AS NECESSARY TO MATCH SHOP FABRICATED WORK AND ACCOMMODATE INSTALLATION REQUIREMENTS.

D. DUCT ROUTING:

1. LOCATE DUCTWORK RUNS, EXCEPT AS OTHERWISE INDICATED, VERTICALLY AND HORIZONTALLY TO THE BUILDING'S WALLS AND STRUCTURE AND AVOID DIAGONAL RUNS WHEREVER POSSIBLE. LOCATE DUCT AS INDICATED BY DIAGRAMS, DETAILS AND NOTATIONS OR, IF NOT OTHERWISE INDICATED, RUN DUCTWORK IN SHORTEST ROUTE WHICH DOES NOT OBSTRUCT USEABLE SPACE OR BLOCK ACCESS FOR SERVICING BUILDING AND ITS EQUIPMENT.

2. HOLD DUCTS CLOSE TO WALLS, OVERHEAD CONSTRUCTION, COLUMNS, AND OTHER STRUCTURAL AND PERMANENT ENCLOSURE ELEMENTS OF BUILDING. PROVIDE CLEARANCE TO 1 INCH WHERE FURRING IS SHOWN FOR ENCLOSURE OR CONCEALMENT OF DUCTS, ALLOW FOR INSULATION THICKNESS.

3. WHEREVER POSSIBLE IN FINISHED AND OCCUPIED SPACES, CONCEAL DUCTWORK FROM VIEW, BY LOCATING IN MECHANICAL SHAFTS, HOLLOW WALL CONSTRUCTION OR ABOVE SUSPENDED CEILINGS.

4. DO NOT ENCASE HORIZONTAL RUNS IN SOLID PARTITIONS, EXCEPT AS SPECIFICALLY SHOWN.

5. COORDINATE LAYOUT WITH STRUCTURAL MEMBERS, SUSPENDED CEILING, LIGHTING LAYOUTS, SPRINKLER PIPING, PLUMBING SYSTEMS AND SIMILAR FINISHED WORK.

E. INSTALLATION OF EXPOSED DUCTWORK

1. PROTECT DUCTS EXPOSED IN FINISHED SPACES FROM BEING DENTED, SCRATCHED, OR DAMAGED. REMOVE / CLEAN ALL TAGS AND SHOP FABRICATION MARKS FROM DUCTWORK.

2. TRIM DUCT SEALANTS FLUSH WITH METAL. CREATE A SMOOTH AND UNIFORM EXPOSED BEAD. DO NOT USE TWO-PART TAPE SEALING SYSTEM.

3. GRIND WELDS TO PROVIDE SMOOTH SURFACE FREE OF BURRS, SHARP EDGES, AND WELD SPLATTER. WHEN WELDING STAINLESS STEEL WITH A NO. 3 OR 4 FINISH, GRIND THE WELDS FLUSH, POLISH THE EXPOSED WELDS, AND TREAT THE WELDS TO REMOVE DISCOLORATION CAUSED BY WELDING.

4. MAINTAIN CONSISTENCY, SYMMETRY, AND UNIFORMITY IN THE ARRANGEMENT AND FABRICATION OF FITTINGS, HANGERS AND SUPPORTS, DUCT ACCESSORIES, AND AIR OUTLETS.

5. REPAIR OR REPLACE DAMAGED SECTIONS AND FINISHED WORK THAT DOES NOT COMPLY WITH THESE REQUIREMENTS.

F. ALL HVAC EQUIPMENT AND DUCT SYSTEMS MUST BE PROTECTED FROM COLLECTING DUST AND DEBRIS DURING THE FABRICATION, DELIVERY AND INSTALLATION OF HVAC SYSTEMS. CONTRACTOR SHALL IMPLEMENT CONTROL PROCEDURES TO PROTECT THE CLEANINESS OF THE HVAC EQUIPMENT AND DUCT SYSTEMS. CONTRACTOR SHALL WIPE CLEAN THE INTERIOR OF ALL SUPPLY AND RETURN DUCT WORK SEGEMENTS PRIOR TO INSTALLATION. DURING CONSTRUCTION THE CONTRACTOR SHALL SEAL ALL SUPPLY AND RETURN AIR DUCT OPENINGS WITH PLASTIC. WHEN THE HVAC SYSTEMS ARE PLACED INTO OPERATION PRIOR TO OWNER ACCEPTANCE, THE CONTRACTOR SHALL INSTALL AND MAINTAIN TEMPORARY FILTER MEDIA AT ALL RETURN AIR INLET AND IMPLEMENT LOCAL EXHAUST CAPTURE OF HIGH DUST PRODUCING CONSTRUCTION ACTIVITIES. THE TEMPORARY FILTER MEDIA SHALL A MERV RATING OF 8 AND WITH A TACKIFIER TO ENHANCE DUST RETENTION.

G. ELECTRICAL EQUIPMENT SPACES: DO NOT ROUTE DUCTWORK THROUGH TRANSFORMER VAULTS AND THEIR ELECTRICAL EQUIPMENT SPACES AND ENCLOSURES.

H. PENETRATIONS: WHERE DUCTS PASS THROUGH INTERIOR PARTITIONS AND EXTERIOR WALLS, AND ARE EXPOSED TO VIEW, CONCEAL SPACE BETWEEN CONSTRUCTION OPENING AND DUCT OR DUCT INSULATION WITH SHEET METAL FLANGES OF SAME GAUGE AS DUCT. OVERLAP OPENING ON 4 SIDES BY AT LEAST 1-1/2". FASTEN TO DUCT AND SUBSTRATE.

I. WHERE DUCTS PASS THROUGH FIRE RATED FLOORS, WALLS, OR PARTITIONS, PROVIDE FIRE STOPPING BETWEEN DUCT AND SUBSTRATE.

J. COORDINATION: COORDINATE DUCT INSTALLATIONS WITH INSTALLATION OF ACCESSORIES, DAMPERS, COIL FRAMES, EQUIPMENT, CONTROLS AND OTHER ASSOCIATED WORK OF DUCTWORK SYSTEM.

3.3 LOCATE CEILING AIR DIFFUSERS, REGISTERS, AND GRILLES, AS INDICATED ON GENERAL CONSTRUCTION "REFLECTED CEILING PLANS". UNLESS OTHERWISE INDICATED, LOCATE UNITS IN CENTER OF ACOUSTICAL CEILING MODULES.

3.4 DUCTWORK SYSTEM INSULATION

A. INSTALL INSULATION MATERIALS, ACCESSORIES, AND FINISHES WITH SMOOTH, STRAIGHT, AND EVEN SURFACES; FREE OF VOIDS THROUGHOUT THE LENGTH OF DUCTS AND FITTINGS.

B. INSTALL INSULATION MATERIALS, VAPOR BARRIERS OR RETARDERS, JACKETS, AND THICKNESSES REQUIRED FOR EACH ITEM OF DUCT SYSTEM AS SPECIFIED IN INSULATION SYSTEM SCHEDULES.

C. INSTALL ACCESSORIES COMPATIBLE WITH INSULATION MATERIALS AND SUITABLE FOR THE SERVICE. INSTALL ACCESSORIES THAT DO NOT CORRODE, SOFTEN, OR OTHERWISE ATTACK INSULATION OR JACKET IN EITHER WET OR DRY STATE.

D. INSTALL INSULATION WITH LONGITUDINAL SEAMS AT TOP AND BOTTOM OF HORIZONTAL RUNS.

E. INSTALL MULTIPLE LAYERS OF INSULATION WITH LONGITUDINAL AND END SEAMS STAGGERED.

F. KEEP INSULATION MATERIALS DRY DURING APPLICATION AND FINISHING.

G. INSTALL INSULATION WITH TIGHT LONGITUDINAL SEAMS AND END JOINTS. BOND SEAMS AND JOINTS WITH ADHESIVE RECOMMENDED BY INSULATION MATERIAL MANUFACTURER.

H. INSTALL INSULATION WITH LEAST NUMBER OF JOINTS PRACTICAL.

I. WHERE VAPOR BARRIER IS REQUIRED, SEAL JOINTS, SEAMS, AND PENETRATIONS IN INSULATION AT HANGERS, SUPPORTS, ANCHORS, AND OTHER PROJECTIONS WITH VAPOR-BARRIER MASTIC.

1. INSTALL INSULATION CONTINUOUSLY THROUGH HANGERS AND AROUND ANCHOR ATTACHMENTS.

2. FOR INSULATION APPLICATION WHERE VAPOR BARRIERS ARE INDICATED, EXTEND INSULATION ON ANCHOR LEGS FROM POINT OF ATTACHMENT TO SUPPORTED ITEM TO POINT OF ATTACHMENT TO STRUCTURE. TAPER AND SEAL ENDS AT ATTACHMENT TO STRUCTURE WITH VAPOR-BARRIER MASTIC.

3. INSTALL INSERT MATERIALS AND INSTALL INSULATION TO TIGHTLY JOIN THE INSERT. SEAL INSULATION TO INSULATION INSERTS WITH ADHESIVE OR SEALING COMPOUND RECOMMENDED BY INSULATION MATERIAL MANUFACTURER.

J. APPLY ADHESIVES, MASTICS, AND SEALANTS AT MANUFACTURER'S RECOMMENDED COVERAGE RATE AND WET AND DRY FILM THICKNESSES.

3.5 INSTALLATION OF DUCT LINER

A. GENERAL: INSTALL DUCT LINER IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS, PAGES 2-25 THRU 2-29.

B. DUCT LINER SHALL BE INSTALLED ONLY AS INDICATED ON PLANS AND ACCORDING TO THE FOLLOWING:

1. FIRST 15 FEET OF DUCT WORK DOWN STREAM OF AIR TERMINALS, FAN COILS OR RTU'S SHALL BE INTERNAL LINED EQUAL TO MANVILLE/SCHULLER PERMACOTE LINACOUSTIC OR EQUAL, 1-1/2" THICK, 1.5 LB. DENSITY GLASS FIBER ACOUSTIC DUCT LINER.

3.6 INSTALLATION OF FLEXIBLE DUCTS

A. MAXIMUM LENGTH: FOR ANY DUCT RUN USING FLEXIBLE DUCTWORK, DO NOT EXCEED 6'0" EXTENDED LENGTH.

B. INSTALLATION: INSTALL IN ACCORDANCE WITH CHAPTER 3 OF SMACNA "HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE".

3.7 EQUIPMENT CONNECTIONS

A. GENERAL: CONNECT METAL DUCTWORK TO EQUIPMENT AS INDICATED, PROVIDE FLEXIBLE CONNECTION FOR EACH DUCTWORK CONNECTION TO EQUIPMENT MOUNTED ON VIBRATION ISOLATORS, AND/OR EQUIPMENT CONTAINING ROTATING MACHINERY. PROVIDE ACCESS DOORS AS INDICATED.

3.8 FIELD QUALITY CONTROL

A. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.

3.9 CLEANING

A. AFTER COMPLETING SYSTEM INSTALLATION, INCLUDING OUTLET FITTINGS AND DEVICES, INSPECT EXPOSED FINISH. REMOVE BURRS, DIRT, AND CONSTRUCTION DEBRIS, AND REPAIR DAMAGED FINISHES.

3.10 TESTING AND BALANCING

A. CONTRACTOR SHALL TEST AND BALANCE THE HVAC SYSTEMS TO THE SCHEDULED AIR AND WATER CAPACITIES WITH A N.E.B.B OR A.A.B.C APPROVED TESTING AND BALANCED CONTRACTOR. THE TESTING AND BALANCING ACTIVITIES SHALL BE RECORD ON N.E.B.B, A.A.B.C OR SMANCA STANDARD FORMS. TESTING AND BALANCINGS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW.

3.13 FIELD RECORD & AS-BUILT DRAWINGS AND SUBMITTAL AND OPERATING & MAINTENACE MANUALS

A. CONTRACTOR SHALL KEEP A CLEAN SET OF CONTRACT DRAWINGS ON THE JOB, NOTING DAILY ALL CHANGES MADE IN THESE DRAWINGS IN CONNECTION WITH THE FINAL INSTALLATION INCLUDING EXACT DIMENSIONED LOCATIONS OF ALL NEW AND UNCOVERED EXISTING UTILITIES.

B. CONTRACTOR SHALL OBTAIN ORIGINALS OF THE FOLLOWING PROJECT INFORMATION TO PROVIDE THREE (3) THREE RING BINDERS TO BE TURNED OVER TO THE ARCHITECT FOR REVIEW AND SUBSEQUENT DELIVERY TO THE OWNER.

1. ALL WARRANTIES AND GUARANTEES FOR EQUIPMENT AND MATERIAL COVERED BY THE CONTRACT INCLUDING THE NAMES, ADDRESSES AND TELEPHONE NUMBERS OF THE MANUFACTURER'S REPRESENTATIVE.

2. APPROVED PRODUCT AND EQUIPMENT SUBMITTAL DATA.

3. APPROVED SHOP DRAWINGS.

4. OPERATING AND MAINTENANCE INSTRUCTIONS FOR MECHANICAL AND PLUMBING SYSTEMS. INCLUDE THE FOLLOWING INFORMATION:

a. DESCRIPTION OF FUNCTION, NORMAL OPERATING CHARACTERISTICS AND LIMITATIONS, PERFORMANCE CURVES, ENGINEERING DATA AND TESTS, AND COMPLETE NOMENCLATURE AND COMMERCIAL NUMBERS OF ALL REPLACEABLE PARTS.

b. MANUFACTURER'S PRINTED OPERATING PROCEDURES TO INCLUDE START_UP, BREAK-IN, ROUTINE AND NORMAL OPERATING INSTRUCTIONS; REGULATION, CONTROL, STOPPING, SHUTDOWN, AND EMERGENCY INSTRUCTIONS; AND SUMMER AND WINTER OPERATING INSTRUCTIONS.

c. MAINTENANCE PROCEDURES FOR ROUTINE PREVENTATIVE MAINTENANCE AND TROUBLESHOOTING; DISASSEMBLY, REPAIR, AND REASSEMBLY; ALIGNING AND ADJUSTING INSTRUCTIONS.

d. SERVICING INSTRUCTIONS AND LUBRICATION CHARTS AND SCHEDULES.

e. MAINTENANCE BROCHURES SHALL BE CLEARLY MARKED TO INDICATE THE ACTUAL EQUIPMENT MODEL NUMBERS, ACCESSORIES, FEATURES, OPTIONAL FEATURES, ETC. FURNISHED ON THIS SPECIFIC PROJECT. ALL EQUIPMENT BROCHURES SHALL REFERENCE THE IDENTIFYING LABELS USED ON THE PROJECT DRAWINGS.

5. TEST AND BALANCE REPORTS REQUIRED BY THESE SPECIFICATIONS.

6. OTHER TEST AND INSPECTION REPORTS, PRODUCT DATA AND/OR DRAWINGS REQUIRED DURING CONSTRUCTION.

C. CONTRACTOR SHALL TWO-WEEKS PRIOR TO REQUESTING A FINAL INSPECTION, TURN OVER THE PROJECT THREE RING BINDERS AND TWO COPIES OF THE FIELD RECORD DRAWING MARKED AS "AS INSTALLED" WORK TO THE ARCHITECT FOR SUBSEQUENT REVIEW AND TRANSMITTAL TO THE OWNER. CONTRACTOR SHALL NOTE ALL CONSTRUCTION CHANGES, DATE EACH SHEET AND LABEL "AS-BUILTS" IN THE REVISION BLOCK ON THE DRAWINGS. PROJECT CLOSE-OUT INFORMATION MUST BE SUBMITTED AND APPROVED PRIOR TO REQUESTS FOR FINAL PAYMENT.

D. CONTRACTOR SHALL PROVIDE TWO ELECTRONIC COPIES OF ALL REQUIRED CLOSE-OUT DOCUMENTATION INDICATED ABOVE.

NOT FOR CONSTRUCTION

MECHANICAL SPECIFICATIONS

M-001

SE # P:\0824029.010

CERTIFICATE OF COMPLIANCE	NRCC-MCH-E
This document is used to demonstrate compliance for mechanical systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.4, or 141.0(b)2 for alterations.	
Project Name: Milan Laser - Costa Mesa, CA	**Report Page:** (Page 1 of 14)
Project Address: Costa Mesa Courtyards - 1835 Newport Blvd, Costa Mesa, CA 92627	**Date Prepared:** 2024-04-30T18:40:34-04:00

A. GENERAL INFORMATION

01	Project Location (city)	Costa Mesa	04 Total Conditioned Floor Area	1304
02	Climate Zone	6	05 Total Unconditioned Floor Area	0
03	Occupancy Types Within Project:		06 # of Stories (Habitable Above Grade)	1

● Office ● All Other Occupancies

B. PROJECT SCOPE

This table includes mechanical systems or components that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.4, 170.2(b) or 141.0(b)2 and 180.2(b)2 for alterations.

01 Air System(s)	02 Wet System Components	03 Dry System Components
☒ Heating Air System	☐ Water Economizer	☐ Air Economizer
☒ Cooling Air System	☐ Pumps	☐ Electric Resistance Heat
Mechanical Controls	☐ System Piping	☒ Fan Systems
☒ Mechanical Controls (existing to remain, altered or new)	☐ Cooling Towers	☒ Ductwork (existing to remain, altered or new)
	☐ Chillers	☒ Ventilation
	☐ Boilers	☐ Zonal Systems/ Terminal Boxes

CERTIFICATE OF COMPLIANCE	NRCC-MCH-E
Project Name: Milan Laser - Costa Mesa, CA	**Report Page:** (Page 2 of 14)
	Date Prepared: 2024-04-30T18:40:34-04:00

C. COMPLIANCE RESULTS

Table C will indicate if the project data input into the compliance document is compliant with mechanical requirements. This table is not editable by the user. If this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D, or the table indicated as not compliant for guidance.

01		02		03		04		05		06		07		08	09
System Summary 110.1, 110.2, 140.4, 170.2(c)	AND	Pumps 140.4(k), 170.2(c)4I	AND	Fans/ Economizers 140.4(c), 140.4(e), 170.2(c)	AND	System Controls 110.2, 120.2, 140.4(f), 170.2(c)	AND	Ventilation 120.1, 160.2	AND	Terminal Box Controls 140.4(d), 170.2(c)4B	AND	Distribution 120.3, 140.4(l), 160.2, 160.3	AND	Cooling Towers 110.2(e)2	Compliance Results
(See Table F)		(See Table G)		(See Table H)		(See Table I)		(See Table J)		(See Table K)		(See Table L)		(See Table M)	
Yes	AND		AND	Yes	AND	Yes	AND	Yes	AND		AND	Yes	AND		COMPLIES with Exceptional Conditions
Mandatory Measures Compliance (See Table Q for Details)										COMPLIES					

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

The permit applicant has indicated on Table J that ventilation calculations have been attached or included elsewhere on the plans.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Space Conditioning System Information

01 System Name	02 Quantity	03 System Serving	04 System Status	05 Space Type	06 Utilizing Recovered Heat
(E)RTU-1	1	Single zone	Alteration		☐

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F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Space Conditioning System Information

01 System Name	02 Quantity	03 System Serving	04 System Status	05 Space Type	06 Utilizing Recovered Heat
AC-1,2	2	Single zone	New/ Addition	All Other Occupancies	☐

Dry System Equipment Sizing (includes air conditioners, condensers, heat pumps, VRF, furnaces and unit heaters and DOAS systems)

01	02	03	04	05	06	07	08	09	10	11
Name or Item Tag	Equipment Category per Tables 110.2, 140.4(a)2 and 170.2(c)3aii	Equipment Type per Tables 110.2 and Title 20	Smallest Size Available[1] 140.4(a) and 170.2(c)1	Equipment Sizing per Mechanical Schedule (kBtu/h) 140.4(a&b), 170.2(c)1 & 170.2(c)2						
				Heating Output[2,3]			Cooling Output[2,3]		Load Calculations[3,4]	
				Per Design (kBtu/h)	Rated (kBtu/h)	Supp. Heating Output (kBtu/h)	Sensible Per Design (kBtu/h)	Rated (kBtu/h)	Total Heating Load (kBtu/h)	Total Sensible Cooling Load (kBtu/h)
(E)RTU-1	Unitary Heat Pumps (no elec. resistance)	Air-cooled, pkg (1phase)	NA: Altered per 141.0(b)2E and 180.2(b)2	30	30	0	25	29.4	19.7	27
AC-1,2	Unitary AC/ Cond. (no elec. resistance)	AC, air cooled, split (1 phase)	Yes				15.3	18		18

[1] FOOTNOTES: Equipment shall be the smallest size, within the available options of the desired equipment line, necessary to meet the design heating and cooling loads of the building per 140.4(a) and 170.2(c)1. Healthcare facilities are excepted.
[2] It is common practice to show rated output capacity on the equipment schedule. Sensible cooling output comes from specification sheet tables.
[3] If equipment is heating only, leave cooling output and load blank. If equipment is cooling only, leave heating output and load blank.
[4] Authority Having Jurisdiction may ask for load calculations used for compliance per 140.4(b) and 170.2(c).

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F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Dry System Equipment Efficiency (other than Package Terminal Air Conditioners (PTAC) and Package Terminal Heat Pumps (PTHP), DX-DOAS and Dual Fuel Heat Pumps)

01	02	03	04	05	06	07	08	09
		Heating Mode				Cooling Mode		
Name or Item Tag	Size Category (Btu/h)	Rating Condition (°F)	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency
(E)RTU-1	<65,000		HSPF2	6.7	7.5	SEER2	13.4	14.3
AC-1,2	<45,000					EER2 SEER2	9.8 14.3	12 17.1

G. PUMPS

This section does not apply to this project.

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H. FAN SYSTEMS & AIR ECONOMIZERS

This table is used to demonstrate compliance with prescriptive requirements found in 140.4(c), 140.4(e), 140.4(m), 170.2(c)3, and 170.2(c)4A for fan systems. Fan systems serving only process loads are exempt from these requirements and do not need to be included in Table H.

System Name	EF-1,2	Quantity	2	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	125	Site Elevation	100	Economizer	NA: <=33 kBtu/h cooling
01	02	03	04			05		06	07	08	09			10	11

						Allowance		Design		
Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Component Allowance	Fan Allowance (watt/cfm)[3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
EF-1,2	Exhaust	1	Fully ducted, or Systems that maintain pressure differential between rooms	100		0.11	0.116	Manufacturer provided		0.12
Supply Fan Base Allowance (kW)			Exhaust/Return/Relief/Transfer Fan Base Allowance(kW)			Fan System Allowance (kW)[3]			Fan System Electrical Output (kW)	0.12

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H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	(E)RTU-1	Quantity	1	Fan System Status	Alteration	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	1,000	Site Elevation	80	Economizer	NA: <=33 kBtu/h cooling
01	02	03	04			05		06	07	08	09			10	11

						Allowance		Design		
Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Component Allowance	Fan Allowance (watt/cfm)[3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
(E)RTU-1	Supply	1	Hydronic/DX cooling coil or heat pump coil	100		0.13	0.417	Default per Table 140.4-D	<1	0.96
			MERV 13-16 Filter upstream of thermal conditioning equipment	100		0.13				
			Supply Fan System	100		0.13				
Supply Fan Base Allowance (kW)			Exhuast/Return/Relief/Transfer Fan Base Allowance(kW)			Fan System Allowance (kW)[3]			Fan System Electrical Output (kW)	0.96

System Name	AC-1,2	Quantity	2	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	580	Site Elevation	100	Economizer	NA: <=33 kBtu/h cooling
01	02	03	04			05		06	07	08	09			10	11

						Allowance		Design		
Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Component Allowance	Fan Allowance (watt/cfm)[3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
AC-1,2	Supply	1	Hydronic/DX cooling coil or heat pump coil	100		0.13	0.139	Default per Table 140.4-D	<1	0.96
Supply Fan Base Allowance (kW)			Exhuast/Return/Relief/Transfer Fan Base Allowance(kW)			Fan System Allowance (kW)[3]			Fan System Electrical Output (kW)	0.96

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H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	EF-3	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	50	Site Elevation	100	Economizer	NA: <=33 kBtu/h cooling
01	02	03	04			05		06	07	08	09			10	11

						Allowance		Design		
Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Component Allowance	Fan Allowance (watt/cfm)[3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
EF-3	Exhaust	1	Fully ducted, or Systems that maintain pressure differential between rooms	100		0.11	0.116	Manufacturer provided		0.01
Supply Fan Base Allowance (kW)			Exhuast/Return/Relief/Transfer Fan Base Allowance(kW)			Fan System Allowance (kW)[3]			Fan System Electrical Output (kW)	0.01

[1] FOOTNOTES: Fans serving spaces with design background noise goals below NC35
[2] Low-turndown single-zone VAV fan system must be capable of and configured to reduce airflow to 50 percent of design airflow and use no more than 30 percent of the design wattage at that airflow. No more than 10 percent of the design load served by the equipment shall have fixed loads.
[3] Fan system allowance includes fan system base allowance.
[4] Filter pressure loss can only be counted once per fan system.
[5] Complex Fan System means a fan system that combines a single cabinet fan system with other supply fans, exhaust fans, or both.
[6] Computer room economizers must meet requirements of 140.9(a) and will be documented on the NRCC-PRC-E document.

Fan Energy Index (FEI)

01 Name or Item Tag	02 FEI Exception	03 FEI
EF-1,2	<1.00 HP or 0.89 kW	
(E)RTU-1	<1.00 HP or 0.89 kW	

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Fan Energy Index (FEI)

AC-1,2	<1.00 HP or 0.89 kW	
EF-3	<1.00 HP or 0.89 kW	

I. SYSTEM CONTROLS

This table is used to demonstrate compliance with mandatory controls in 110.2 and 120.2 and prescriptive controls in 140.4(f) and (n), 170.2(c)4D 170.2(c)4L or requirements in 141.0(b)2E 180.2(b)2 for altered space conditioning systems.

01 System Name	02 System Zoning	03 Conditioned Floor Area Being Served (ft²)	04 Thermostats 110.2(b) & (c)[1]. 120.2(a) 160.3(a)2A or 141.0(b)2E & 180.2(b)2	05 Shut-Off Controls 120.2(e) & 160.3(a)2D	06 Isolation Zone Controls 120.2(g) & 160.3(a)2F	07 Demand Response 110.12 120.2(b) & 160.3(a)2B	08 Supply Air Temp. Reset 140.4(f) & 170.2(c)4D	09 Window Interlocks per 140.4(n) & 170.2(c)4D	10 Direct Digital Control (DDC) per 120.2
(E)RTU-1	Single zone	<= 25,000 ft²	Setback	NA: 7 day per 120.2(e)1	NA: Single Zone	NA: PTAC, PTHP, Rm AC, HP	NA: Single Zone	NA: No operable windows	NA: Single Zone
AC-1,2	Single zone	<= 25,000 ft²	Setback	NA: 7 day per 120.2(e)1	NA: Single Zone	NA: PTAC, PTHP, Rm AC, HP	NA: Single Zone	NA: No operable windows	NA: Single Zone

[1] FOOTNOTES: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, non-central electric heaters, fireplaces or decorative gas appliances, wood stoves are not required to have setback thermostats.

J. VENTILATION AND INDOOR AIR QUALITY

This table is used to demonstrate compliance with mandatory ventilation requirements in 120.1 120.2(e)3B 140.4(p) and 140.4(q) for all nonresidential and hotel/motel and d:t24refnolink/}160.2, 160.3(a)3D, 170.2(a)4N, 170.2(a)4O for high-rise residential occupancies. For alterations, only ventilation systems being altered within the scope of the permit application need to be documented in this table. In lieu of this table, the required outdoor ventilation rates and airflows may be shown on the plans or the calculations can be presented in a spreadsheet.

01	☒	Check the box if the project is showing ventilation calculations on the plans, or attaching the calculations instead of completing this table.
02	☐	Check this box if the project included Nonresidential, Hotel/Motel Spaces or Multifamily Common Use Spaces
	☐	
03	☐	Check the box if the project is using natural ventilation in any nonresidential or hotel/motel spaces to meet required ventilation rates per 120.1(c)2.

NOT FOR CONSTRUCTION

SE # P:\08240029.010

MECHANICAL
NRCC FORMS

M-002

K. TERMINAL BOX CONTROLS

This section does not apply to this project.

L. DISTRIBUTION (DUCTWORK and PIPING)

This table is used to show compliance with mandatory pipe insulation requirements found in 120.3 and mandatory requirements found in 120.4(g) for duct sealing.

01	☐	Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather shall be installed with a cover suitable for outdoor service. Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall have a Class I or Class II vapor retarder. All penetrations and joints of which shall be sealed.

Duct Leakage Testing

The answers to the questions below apply to the following duct systems:	M-101 - SUPPLY	**NR/ Common Use:** Duct leakage testing shall not exceed 15% per NA7.5.3 required for these systems?	No

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 15% or duct system to outside shall not exceed 10% per RA3.1.4 required for systems?	---
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	No	The scope of the project includes only duct systems serving healthcare facilities		
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	Yes	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15	No	The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17	Yes	All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18	Yes	All ductwork is an extension of an existing duct system		
19	No	Ductwork serving individual dwelling unit		
20	No	< 25 ft of new or replacement space conditioning ducts installed		
21	R-6	Duct Insulation R-value		
22	Yes	Ductwork Existing To Remain		
23	Yes	Duct System Connected To Altered Space Conditioning System		
The answers to the questions below apply to the following duct systems:		M-101 - RETURN	**NR/ Common Use:** Duct leakage testing shall not exceed 15% per NA7.5.3 required for these systems?	No

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 15% or duct system to outside shall not exceed 10% per RA3.1.4 required for systems?	---
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	No	The scope of the project includes only duct systems serving healthcare facilities		
12	No	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	Yes	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15	No	The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17	Yes	All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18	Yes	All ductwork is an extension of an existing duct system		
19	No	Ductwork serving individual dwelling unit		
20	No	< 25 ft of new or replacement space conditioning ducts installed		
21	R-6	Duct Insulation R-value		
22	Yes	Ductwork Existing To Remain		
23	Yes	Duct System Connected To Altered Space Conditioning System		
The answers to the questions below apply to the following duct systems:		M-101 - EXHAUST	**NR/ Common Use:** Duct leakage testing shall not exceed 15% per NA7.5.3 required for these systems?	No

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 15% or duct system to outside shall not exceed 10% per RA3.1.4 required for systems?	---
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	No
11	No	The scope of the project includes only duct systems serving healthcare facilities		
12	No	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.		
14	Yes	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15	No	The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17	Yes	All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18	Yes	All ductwork is an extension of an existing duct system		
19	No	Ductwork serving individual dwelling unit		
20	Yes	< 25 ft of new or replacement space conditioning ducts installed		
21	R-0.0	Duct Insulation R-value		
22	Yes	Ductwork Existing To Remain		
23	Yes	Duct System Connected To Altered Space Conditioning System		

M. COOLING TOWERS

This section does not apply to this project.

N. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency-4

Form/Title
NRCI-MCH-01-E - Must be submitted for all buildings

O. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency-4

Form/Title	Systems/Spaces To Be Field Verified
NRCA-MCH-02-A - Outdoor Air must be submitted for all newly installed HVAC units. Note: MCH-02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.	

P. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

There are no NRCV forms required for this project.

Q. MANDATORY MEASURES DOCUMENTATION LOCATION

This table is used to indicate where mandatory measures are documented in the plan set or construction documentation.

01		02
Compliance with Mandatory Measures documented through MCH Mandatory Measures Note Block	Yes	Plan sheet or construction document location: M-002 and M-003

NOT FOR CONSTRUCTION

SE # P:\0824029.010

MECHANICAL NRCC FORMS

M-003

Space Conditioning Mandatory Measures:

110.2 CERTIFICATION BY MANUFACTURERS
ANY SPACE CONDITIONING EQUIPMENT LISTED IN §110.2 SHALL ONLY BE INSTALLED IF CERTIFIED TO THE ENERGY COMMISSION TO MEET ALL APPLICABLE §110.2 REQUIREMENTS.

110.2(a) SPACE CONDITIONING EQUIPMENT EFFICIENCY
EQUIPMENT SHALL MEET APPLICABLE EFFICIENCY REQUIREMENTS IN TABLE 110.2-A THROUGH TABLE 110.2-N.

110.2(c) SETBACK THERMOSTATS
ALL HEATING OR COOLING SYSTEMS NOT CONTROLLED BY A CENTRAL ENERGY MANAGEMENT CONTROL SYSTEM (EMCS) SHALL HAVE A SETBACK THERMOSTAT WITH CLOCK MECHANISM THAT ALLOWS THE BUILDING OCCUPANT TO PROGRAM THE TEMPERATURE SETPOINTS FOR AT LEAST FOUR PERIODS WITHIN 24 HOURS.

110.5 PILOT LIGHTS PROHIBITED FOR NATURAL GAS EQUIPMENT
PILOT LIGHTS ARE PROHIBITED ON NATURAL GAS FAN-TYPE CENTRAL FURNACES, POOL HEATERS, SPA HEATERS, AND FIREPLACES.

110.8(a) INSULATION CERTIFICATION
INSTALLED INSULATION SHALL BE CERTIFIED BY THE DEPARTMENT OF CONSUMER AFFAIRS PER TITLE 24, PART 12, CHAPTERS 12-13, ARTICLE 3 "STANDARDS FOR INSULATING MATERIAL."

110.8(b) UREA FORMALDEHYDE INSULATION
UREA FORMALDEHYDE INSULATION SHALL NOT BE INSTALLED UNLESS IN EXTERIOR SIDE WALLS WITH A FOUR-MIL-THICK PLASTIC POLYETHYLENE VAPOR RETARDER OR EQUIVALENT PLASTIC SHEATHING VAPOR RETARDER INSTALLED BETWEEN THE UREA FORMALDEHYDE FOAM INSULATION AND THE INTERIOR SPACE.

110.8(c) INSULATING MATERIAL
ALL INSULATING MATERIALS SHALL BE INSTALLED IN COMPLIANCE WITH THE FLAME SPREAD RATING AND SMOKE DENSITY REQUIREMENTS OF THE CALIFORNIA BUILDING CODE.

110.8(d) DUCTS
IF INSULATION IS INSTALLED ON AN EXISTING SPACE-CONDITIONING DUCT, IT SHALL COMPLY WITH SECTION 604.0 OF THE CMC.

120.1(a) GENERAL VENTILATION AND INDOOR AIR QUALITY REQUIREMENTS
ALL OCCUPIABLE SPACES IN HOTEL/MOTEL AND NONRESIDENTIAL BUILDINGS OTHER THAN HEALTHCARE SHALL COMPLY WITH APPLICABLE REQUIREMENTS OF §120.1(a) THROUGH (g). THE REQUIRED OUTDOOR AIR VENTILATION RATE AND AIR-DISTRIBUTION SYSTEM DESIGN SHALL BE CLEARLY IDENTIFIED ON THE PLANS.

120.1(c)2 NATURAL VENTILATION
NATURALLY VENTILATED SPACES SHALL BE DESIGNED IN ACCORDANCE WITH 120.1(c)2A THROUGH 120.1(c)2C AND INCLUDE A MECHANICAL VENTILATION SYSTEMS DESIGNED IN ACCORDANCE WITH 120.1(c)3.

120.1(c)3 MECHANICAL VENTILATION
OCCUPIABLE SPACES SHALL BE VENTILATED WITH A MECHANICAL VENTILATION SYSTEM CAPABLE OF PROVIDING AN OUTDOOR AIRFLOW RATE (V_{ot}) TO THE ZONE NO LESS THAN EQUATION 120.1-F.

120.1(d) TIMES OF OCCUPANCY
MINIMUM OUTDOOR AIR RATE SHALL BE MET AT TIMES WHEN THE SPACE IS USUALLY OCCUPIED IN ACCORDANCE WITH 120.1(c).

120.1(d)2 PRE-OCCUPANCY
THE LESSER OF THE MINIMUM RATE OF OUTDOOR AIR REQUIRED BY SECTION 120.1(c) OR THREE COMPLETE AIR CHANGES SHALL BE SUPPLIED TO THE ENTIRE BUILDING DURING THE 1-HOUR PERIOD IMMEDIATELY BEFORE THE BUILDING IS NORMALLY OCCUPIED.

Space Conditioning Mandatory Measures:

120.1(d)3 REQUIRED DEMAND CONTROL VENTILATION
DCV CONTROLS ARE REQUIRED FOR A SPACE WITH A DESIGN OCCUPANCY DENSITY >= 25 PEOPLE/1,000 FT2 IF THE SYSTEM SERVING THE SPACE HAS ONE OR MORE OF THE FOLLOWING
- AN AIR ECONOMIZER
- MODULATING OUTSIDE AIR CONTROL
- DESIGN OUTDOOR AIRFLOW RATE > 3,000 CFM

120.1(f) DESIGN AND CONTROL REQUIREMENTS FOR QUANTITIES OF OUTDOOR AIR

120.1(f)1 ALL MECHANICAL VENTILATION AND SPACE-CONDITIONING SYSTEMS SHALL BE DESIGNED WITH AND HAVE INSTALLED DUCTWORK, DAMPERS, AND CONTROLS TO ALLOW OA RATES TO BE OPERATED AT NO LESS THAN THE LARGER OF: 120.1(c)3 MINIMUMS OR THE RATE REQUIRED FOR MAKE-UP OF EXHAUST SYSTEMS FOR AN EXEMPT OR COVERED PROCESS, CONTROL OF ODORS, OR CONTAMINANT REMOVAL IN A SPACE.

120.1(f)3 MEASURED OA RATES OF CONSTANT VOLUME SYSTEMS SHALL BE TESTED TO CONFIRM THEIR ABILITY TO OPERATE WITHIN 10% OF THE DESIGN MINIMUM OUTSIDE AIR RATE.

120.1(g) AIR CLASSIFICATION AND RECIRCULATION LIMITATIONS
AIR CLASSIFICATION AND RECIRCULATION LIMITATIONS OF AIR SHALL BE BASED ON TABLE 120.1-A OR TABLE 120.1-C, AND IN ACCORDANCE WITH 120.1(g)1 THROUGH 4.

120.2(a) THERMOSTAT CONTROLS
HEATING AND COOLING SUPPLY TO EACH SPACE-CONDITIONING ZONE OR DWELLING UNIT SHALL BE CONTROLLED BY AN INDIVIDUAL THERMOSTATIC CONTROL THAT RESPONDS TO TEMPERATURE IN THE ZONE AND MEETS 120.2(b) REQUIREMENTS.

120.2(b) ZONAL THERMOSTAT CONTROLS

120.2(b)4 THERMOSTATIC CONTROLS FOR ALL SINGLE ZONE AIR CONDITIONERS AND HEAT PUMPS SHALL COMPLY WITH THE REQUIREMENTS OF 110.2(c) AND 110.12(a) AND, IF EQUIPPED WITH DDC TO THE ZONE LEVEL WITH THE AUTOMATIC DEMAND SHED CONTROLS OF 110.12(b).

120.2(e)1 AUTOMATIC SHUT-OFF FOR SPACE-CONDITIONING SYSTEMS
EACH SPACE-CONDITIONING SYSTEM SHALL BE INSTALLED WITH ONE OF THE FOLLOWING CONTROLS CAPABLE OF AUTOMATICALLY SHUTTING OFF THE SYSTEM DURING PERIODS OF NONUSE:
- AUTOMATIC TIME SWITCH CONTROL PER 110.9, WITH ACCESSIBLE MANUAL OVERRIDE ALLOWING SYSTEM OPERATION FOR UP TO 4 HOURS, OR
- AN OCCUPANCY SENSOR, OR
- A 4-HOUR TIMER THAT CAN BE MANUALLY OPERATED.

120.2(e)2 AUTOMATIC RESTART FOR SPACE-CONDITIONING SYSTEMS
EACH SPACE-CONDITIONING SYSTEM SHALL BE INSTALLED WITH CONTROLS THAT SHALL AUTOMATICALLY RESTART AND TEMPORARILY OPERATE THE SYSTEM AS REQUIRED TO MAINTAIN:
- 120.2(e)2A A SETBACK HEATING THERMOSTAT SETPOINT IF THE SYSTEM PROVIDES MECHANICAL HEATING, AND
- 120.2(e)2B A SETUP COOLING THERMOSTAT SETPOINT IF THE SYSTEM PROVIDES MECHANICAL COOLING.

120.2(f) DAMPERS FOR AIR SUPPLY AND EXHAUST EQUIPMENT
OUTDOOR AIR SUPPLY AND EXHAUST EQUIPMENT SHALL BE INSTALLED WITH DAMPERS THAT AUTOMATICALLY CLOSE UPON FAN SHUTDOWN.

Space Conditioning Mandatory Measures:

120.2(i) ECONOMIZER FAULT DETECTION AND DIAGNOSTICS (FDD)
ALL NEWLY INSTALLED AIR-COOLED PACKAGED DIRECT-EXPANSION UNITS, WITH AN AIR HANDLER MECHANICAL COOLING CAPACITY GREATER THAN 33,000 BTU/HR AND AN INSTALLED AIR ECONOMIZER SHALL INCLUDE A STAND-ALONE OR INTEGRATED FDD SYSTEM IN ACCORDANCE WITH THE FOLLOWING:
1. TEMPERATURE SENSORS SHALL BE PERMANENTLY INSTALLED TO MONITOR SYSTEM OPERATION: OUTSIDE AIR, SUPPLY AIR, AND WHEN REQUIRED FOR DIFFERENTIAL ECONOMIZER OPERATION, A RETURN AIR SENSOR.
2. TEMPERATURE SENSORS SHALL HAVE AN ACCURACY OF +/- 2 °F OVER THE RANGE OF 40 °F TO 80 °F.
3. CONTROLLER SHALL HAVE THE CAPABILITY OF DISPLAYING THE VALUE OF EACH SENSOR AND
4. PROVIDE SYSTEM STATUS BY INDICATING: FREE COOLING AVAILABLE, ECONOMIZER ENABLED, COMPRESSOR ENABLED, HEATING ENABLED (IF AVAILABLE), MIXED AIR LOW LIMIT CYCLE ACTIVE.
5. CONTROLLER SHALL ALLOW MANUAL INITIATION OF EACH OPERATING MODE SO THAT THE OPERATION OF COOLING SYSTEMS, ECONOMIZERS, FANS, AND HEATING SYSTEMS CAN BE INDEPENDENTLY TESTED AND VERIFIED.
6. FAULTS SHALL BE REPORTED IN ONE OF THE FOLLOWING WAYS:
   - REPORTED TO AN EMCS REGULARLY MONITORED BY FACILITY STAFF.
   - ANNUNCIATED LOCALLY ON ONE OR MORE ZONE THERMOSTATS, OR A DEVICE WITHIN 5 FT OF ZONE THERMOSTAT(S), CLEARLY VISIBLE, AT EYE LEVEL, AND WITH INSTRUCTIONS TO CONTACT APPROPRIATE BUILDING STAFF OR AN HVAC TECHNICIAN. IN BUILDINGS WITH MULTIPLE TENANTS, ANNUNCIATION SHALL EITHER BE WITHIN PROPERTY MANAGEMENT OFFICES OR IN A COMMON SPACE ACCESSIBLE BY THE PROPERTY OR BUILDING MANAGER
   - REPORTED TO A FAULT MANAGEMENT APPLICATION WHICH AUTOMATICALLY PROVIDES NOTIFICATION OF THE FAULT TO REMOTE HVAC SERVICE PROVIDER.
7. THE FDD SHALL DETECT: AIR TEMPERATURE SENSOR FAILURE/FAULT, FAILURE TO ECONOMIZE, ECONOMIZING WHEN NOT ADVISED, DAMPER NOT MODULATING, AND EXCESSIVE OUTDOOR AIR.
8. THE FDD SYSTEM SHALL BE CERTIFIED BY THE ENERGY COMMISSION AS MEETING REQUIREMENTS OF 120.2(i)1 THROUGH 120.2(i)7 IN ACCORDANCE WITH 110.0 AND JOINT APPENDIX JA6.3

120.2(j) DIRECT DIGITAL CONTROLS (DDC)
DDC TO THE ZONE SHALL BE PROVIDED AS SPECIFIED BY TABLE 120.2-A. THE DDC SYSTEM SHALL MEET CONTROL LOGIC REQUIREMENTS OF 120.1(D), 110.12(a) AND 110.12(b) AND BE CAPABLE OF ALL OF THE FOLLOWING:
1. MONITORING ZONE AND SYSTEM DEMAND FOR FAN PRESSURE, PUMP PRESSURE, HEATING AND COOLING
2. TRANSFERRING ZONE AND SYSTEM DEMAND INFORMATION FROM ZONES TO AIR DISTRIBUTION SYSTEM CONTROLLERS AND FROM AIR DISTRIBUTION SYSTEMS TO HEATING AND COOLING PLANT CONTROLLERS
3. AUTOMATICALLY DETECTING THE ZONES AND SYSTEMS THAT MAY BE EXCESSIVELY DRIVING THE RESET LOGIC AND GENERATE AN ALARM OR OTHER INDICATION TO THE SYSTEM OPERATOR
4. READILY ALLOW OPERATOR REMOVAL OF ZONE(S) FROM THE RESET ALGORITHM
5. FOR NEW BUILDINGS, TRENDING AND GRAPHICALLY DISPLAYING INPUT AND OUTPUT POINTS
6. RESETTING HEATING AND COOLING SETPOINTS IN ALL NON-CRITICAL ZONES UPON RECEIPT OF A SIGNAL FROM A CENTRALIZED CONTACT OR SOFTWARE POINT AS DESCRIBED IN 110.12(b).

Space Conditioning Mandatory Measures:

120.4 AIR DISTRIBUTION SYSTEM DUCTS AND PLENUMS
PORTIONS OF SUPPLY- AND RETURN-AIR DUCTS CONVEYING HEATED OR COOLED AIR LOCATED IN ONE OR MORE OF THE FOLLOWING SPACES SHALL BE INSULATED TO A MINIMUM INSTALLED LEVEL OF R-8:
- OUTDOORS
- IN A SPACE BETWEEN THE ROOF AND AN INSULATING CEILING
- IN A SPACE DIRECTLY UNDER A ROOF WITH FIXED VENTS OR OPENINGS TO THE OUTSIDE OR UNCONDITIONED SPACES
- UNCONDITIONED SPACES, SUCH AS UNCONDITIONED CRAWLSPACE

PORTIONS OF SUPPLY-AIR DUCTS THAT ARE NOT IN ONE OF THESE SPACES, INCLUDING DUCTS BURIED IN CONCRETE SLAB, SHALL BE INSULATED TO A MINIMUM INSTALLED LEVEL OF R-4.2 (OR ANY HIGHER LEVEL REQUIRED BY CMC 605.0), OR BE ENCLOSED IN DIRECTLY CONDITIONED SPACE.

120.4(b) DUCT AND PLENUM MATERIALS
120.4(b) FACTORY-FABRICATED DUCT SYSTEMS MUST:
- COMPLY WITH UL 181 FOR DUCTS AND CLOSURE SYSTEMS AND BE LABELED AS COMPLYING WITH UL 181
- ALL PRESSURE SENSITIVE TAPES, HEAT ACTIVATED TAPES, AND MASTICS USED IN MANUFACTURE OF RIGID FIBERGLASS DUCTS SHALL COMPLY WITH UL 181 AND UL 181A
- ALL PRESSURE SENSITIVE TAPES, AND MASTICS USED IN MANUFACTURE OF FLEXIBLE DUCTS SHALL COMPLY WITH UL 181 AND L 181B
- JOINTS AND SEAMS SHALL NOT BE SEALED WITH CLOTH BACK RUBBER ADHESIVE DUCT TAPES UNLESS COMBINED WITH MASTICS AND DRAWBANDS.

FIELD-FABRICATED DUCT SYSTEMS:
- FACTORY-MADE RIGID FIBERGLASS AND FLEXIBLE DUCTS FOR FIELD-FABRICATED DUCT SYSTEMS SHALL COMPLY WITH UL 181. ALL CLOSURE SYSTEMS, INCLUDING PRESSURE SENSITIVE TAPES, MASTICS, AND AEROSOL SEALANTS, SHALL MEET THE APPLICABLE REQUIREMENTS OF UL 181, UL 181A AND UL 181B.
- MASTIC SEALANTS SHALL:
  - COMPLY WITH APPLICABLE REQUIREMENTS OF UL 181, UL 181A, AND UL 181B AND BE NONTOXIC AND WATER RESISTANT.
  - PASS ASTM C731 AND D2202, IF USED IN BUILDING INTERIOR,
  - PASS ASTM C731, C732, AND D2202, IF USED ON EXTERIOR.
  - SEALANTS AND MESHES SHALL BE RATED FOR EXTERIOR USE.
- PRESSURE SENSITIVE TAPES SHALL COMPLY WITH APPLICABLE REQUIREMENTS IN UL 181, UL 181A, AND UL 181B.
- JOINTS AND SEAMS SHALL NOT BE SEALED WITH CLOTH BACK RUBBER ADHESIVE DUCT TAPES UNLESS COMBINED WITH MASTICS AND DRAWBANDS.
- DRAWBANDS USED WITH FLEXIBLE DUCTS SHALL:
  - BE EITHER STAINLESS STEEL WORM-DRIVE HOSE CLAMPS OR UV-RESISTANT NYLON DUCT TIES
  - HAVE A MINIMUM TENSILE STRENGTH RATING OF 150 LBS.
  - BE TIGHTENED AS RECOMMENDED BY THE MANUFACTURER
- AEROSOL SEALANT CLOSURES SHALL:
  - MEET REQUIREMENTS OF UL 723 AND BE APPLIED ACCORDING TO MANUFACTURER SPECIFICATIONS
  - TAPES OR MASTICS USED IN COMBINATION WITH AEROSOL SEALING SHALL COMPLY WITH APPLICABLE REQUIREMENTS OF UL 181, UL 181A, AND UL 181B, ASTM C731, C732 AND D2202.

120.4(c)
ALL DUCT INSULATION PRODUCT R-VALUES SHALL BE BASED ON INSULATION ONLY AND TESTED IN ACCORDANCE WITH ASTM C518 OR ASTM C177 AND CERTIFIED PER §110.8.

Space Conditioning Mandatory Measures:

120.4(d)
INSTALLED THICKNESS OF DUCT INSULATION USED TO DETERMINE ITS R-VALUE SHALL BE DETERMINED AS FOLLOWS:
- DUCT BOARD, LINER, AND FACTORY-MADE RIGIDS: USE NOMINAL INSULATION THICKNESS
- DUCT WRAP: USE 75% (25% COMPRESSION) OF NOMINAL THICKNESS
- FACTORY-MADE FLEXIBLE AIR DUCTS: DIVIDE THE DIFFERENCE BETWEEN THE ACTUAL OUTSIDE DIAMETER AND NOMINAL INSIDE DIAMETER BY TWO.

120.4(e)
INSULATED FLEXIBLE DUCT PRODUCTS INSTALLED TO MEET THIS REQUIREMENT MUST INCLUDE LABELS (MAX INTERVALS OF 3 FT) SHOWING THERMAL RESISTANCE PERFORMANCE R-VALUE FOR THE DUCT INSULATION ITSELF BASED ON TESTS IN 120.4(c). AND INSTALLED THICKNESS DETERMINED BY 120.4(d)3.

120.4(f) PROTECTION OF INSULATION
INSULATION SHALL BE PROTECTED FROM DAMAGE BY SUNLIGHT, MOISTURE, EQUIPMENT MAINTENANCE AND WIND. CELLULAR FOAM INSULATION SHALL BE PROTECTED, OR BE PAINTED WITH A WATER RETARDANT COATING THAT PROVIDES SHIELDING FROM SOLAR RADIATION.

NOT FOR CONSTRUCTION

SE # P:\0824029.010

MECHANICAL
NRCC FORMS

M-004

GENERAL DEMOLITION NOTES:

A. FIELD VERIFY THE SIZES AND LOCATIONS OF EXISTING DUCTWORK AND PIPING PRIOR TO DEMOLITION OF ANY EXISTING WORK. THE DEMOLITION WORK SHALL BE COORDINATED WITH THE NEW WORK TO ASSURE PROPER LIMITS OF DEMOLITION.

B. REMOVE ALL EXISTING EQUIPMENT AND ASSOCIATED PIPING THAT IS NO LONGER REQUIRED, WHETHER SPECIFICALLY INDICATED OR NOT FOR REMOVAL. WITHIN THE LIMITS OF THE RENOVATION AREA, NO HVAC EQUIPMENT OR DISTRIBUTION SYSTEMS SHALL REMAIN ABANDONED IN PLACE.

C. WHENEVER EQUIPMENT REQUIRING ELECTRICAL POWER IS RELOCATED OR REMOVED FROM SERVICE COORDINATE WITH THE ELECTRICAL CONTRACTOR FOR REMOVAL OF THE EXISTING POWER WIRING AND CONDUIT BACK TO SOURCE. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL POWER WIRING AND CONDUIT.

D. REMOVE AND CAP EXISTING BRANCH PIPING AND DUCTWORK AT THE ASSOCIATED MAIN NO LONGER REQUIRED TO REMAIN AS PART OF AN ACTIVE SYSTEM. WHEN DUCTWORK IS REMOVED, REMOVE ALL INSULATION, HANGERS, DAMPERS, CONTROLS, GRILLES, REGISTERS, AND DIFFUSERS. WHEN PIPING IS REMOVED, REMOVE ALL INSULATION, HANGERS, VALVES, CONTROL VALVES AND CONTROLS.

E. ANY PIPING AND DUCTWORK WHICH MUST REMAIN AS PART OF AN ACTIVE SYSTEM AND IS IN CONFLICT WITH THE NEW LAYOUT SHALL BE RELOCATED.

F. ALL EXISTING DIFFUSERS, EQUIPMENT AND PIPING REMOVED DURING CONSTRUCTION SHALL REMAIN THE PROPERTY OF THE OWNER AND SHALL BE STORED, REMOVED FROM THE JOB SITE OR DISPOSED OF AS DIRECTED BY THE OWNER'S REPRESENTATIVE.

G. OPENINGS REMAINING G IN DUCTWORK AS A RESULT OF DEMOLITION SHALL BE SEALED WITH AS AIRTIGHT SHEET METAL CAP, UNLESS OTHERWISE NOTED ON THE DRAWINGS.

H. CONTRACTOR SHALL SEAL ALL LEAKS IN EXISTING DUCTWORK WITHIN THE LIMITS OF THE RENOVATED AREAS.

I. CONTRACTOR SHALL REPAIR DAMAGED DUCT AND PIPING INSULATION SYSTEM WITHIN THE LIMITS OF THE RENOVATED AREAS.

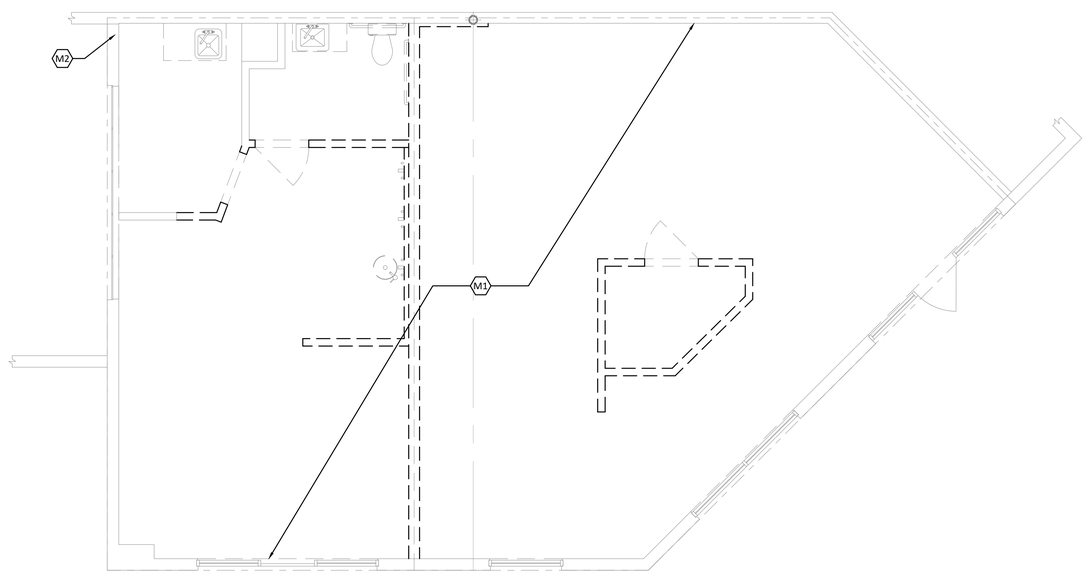
J. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND/OR DISPOSING OF ALL ITEMS THAT ARE NOT NECESSARY FOR THE COMPLETION OF THE PROJECT AND SHALL CLEAN THE AREA OF CONSTRUCTION AFTER THE COMPLETION OF THE PROJECT.

K. ALL WALL AND FLOOR PENETRATIONS OF DEMOLISHED DUCTS OR PIPES THROUGH FIRE RATED WALLS AND FLOORS, SHALL BE PATCHED TO MATCH THE CONSTRUCTION AND FIRE RATING OF THE EXISTING WALL AND FLOOR.

NOTES BY SYMBOL (THIS SHEET ONLY) 〈MX〉

1. EXISTING DUCTWORK TO BE DEMOLISHED BACK TO MAIN SUPPLY AND RETURN DUCT DROPS AND PROPERLY DISPOSED OF. DEMO ASSOCIATED DUCT ACCESSORIES, AIR TERMINALS, AND CONTROLS SERVING SPACE AND PROPERLY DISPOSE OF.
2. CLEAN AND REPAIR EXISTING EXHAUST DUCTWORK AND TERMINATION AS NEEDED. CAP EXHAUST DUCTWORK FOR FUTURE RENOVATION WORK.

NOT FOR CONSTRUCTION



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01 FLOOR PLAN - DEMOLITION - HVAC
SCALE : 1/8" = 1'-0"

SE #:P:\0824029.010

FLOOR PLAN
- DEMOLITION -
HVAC

MD101

GENERAL NOTES:

A. COORDINATE THE LOCATION OF ALL AIR DISTRIBUTION DEVICES WITH THE ARCHITECTURAL REFLECTED CEILING PLAN INCLUDING LIGHT FIXTURES AND LIFE SAFETY DEVICES.

B. VERIFY LOCATION OF THERMOSTATS/TEMPERATURE SENSORS WITH THE ARCHITECT/ENGINEER PRIOR TO INSTALLATION TO COORDINATE WITH THE LATEST FURNITURE AND MILLWORK PLANS. INSTALL DEVICES AT 48" AFF, UNLESS NOTED OTHERWISE ON THE PLANS.

C. ALL WORK SHALL COMPLY WITH THE LOCAL BUILDING, PLUMBING, AND MECHANICAL CODES, NFPA 90A, AND ANY OTHER APPLICABLE CODES.

D. SEAL NEW OR EXISTING PENETRATIONS IN ALL FLOORS, RATED PARTITIONS, AND CORRIDOR WALLS. USE FIRESTOP AT ALL RATED PARTITIONS.

E. COORDINATE ALL FLOOR AND ROOF PENETRATIONS WITH STRUCTURAL.

F. FLEX DUCT LENGTH NOT TO EXCEED 5'-0". PROVIDE MANUAL DAMPER AT ALL TAKE-OFFS.

G. ALL DUCTWORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST SMACNA STANDARDS.

H. ALL DUCTWORK DIMENSIONS ARE CLEAR INSIDE DIMENSIONS. ADJUST METAL SIZES TO ACCOMMODATE INTERNAL DUCT LINER AS REQUIRED.

I. TURNING VANES ARE REQUIRED AT EACH TURN IN THE DUCT. EXTRACTORS ARE REQUIRED AT EACH SPLIT.

J. PROVIDE FLEXIBLE CONNECTION AT INTAKE AND DISCHARGE OF MOTOR DRIVEN EQUIPMENT.

K. LABEL ALL AIR VOLUME DAMPERS ON OUTSIDE OF DUCT INSULATION.

L. FIELD VERIFY ALL LOCATIONS OF MECHANICAL EQUIPMENT AND EXHAUST FANS TO MAINTAIN A MINIMUM OF 10'-0" OF CLEARANCE BETWEEN ANY NEW AND/OR EXISTING OUTSIDE AIR INTAKES OR OPENINGS INTO BUILDING AND ANY EXHAUST OR VENT DISCHARGES.

M. EQUIPMENT SHALL BE PROVIDED ACCESS TO PER SECTION 304.3 OF THE 2022 CALIFORNIA MECHANICAL CODE. EXACT LOCATION AND REQUIREMENTS FOR ACCESS SHALL BE COORDINATED WITH ARCHITECT. REFER TO EXACT CODE SECTION FOR ADDITIONAL SPECIFIC REQUIREMENTS.

   a. ALL EQUIPMENT SHALL BE PROVIDED WITH A CLEAR WORKING SPACE NOT LESS THAN 30" DEEP AND 30" WIDE IN FRONT OF CONTROL AREA AND ANY OTHER AREA REQUIRING ACCESS FOR MAINTENANCE, PER 2022 CMC 304.3.

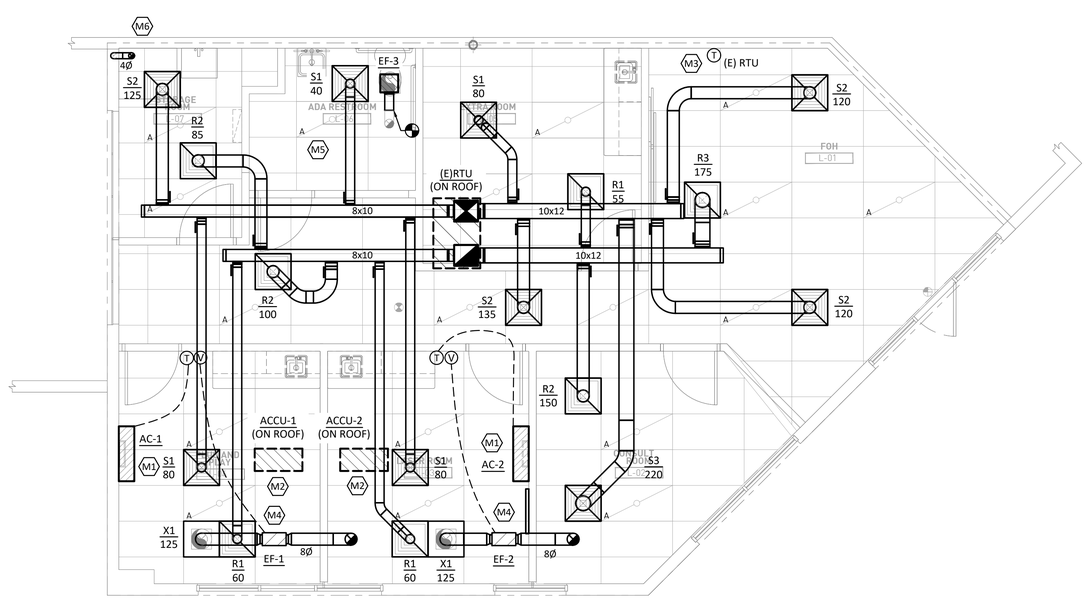
   b. EQUIPMENT IN ATTICS SHALL HAVE AN UNOBSTRUCTED PASSAGEWAY MEASURING NOT LESS THAN 30" HIGH x 22" WIDE. PASSAGEWAYS WITH HEIGHTS LESS THAN 6'-0" SHALL NOT EXCEED 20'-0" IN LENGTH ALONG THE PATH BACK TO THE ACCESS OPENING WITH CONTINUOUS, LEVEL FLOORING NOT LESS THAN 24" WIDE. ACCESS OPENING SHALL BE LARGE ENOUGH TO REMOVE THE LARGEST PIECE OF EQUIPMENT, BUT NOT LESS THAN 20"x30", PER 2022 CMC 304.3.

   c. EQUIPMENT ON ROOFS OR ELEVATED STRUCTURES ABOVE 15'-0" SHALL BE PROVIDED WITH PERMANENT ACCESS, PER 2022 CMC 304.3.

NOTES BY SYMBOL (THIS SHEET ONLY) ⟨MX⟩

1. FURNISH AND INSTALL NEW SPLIT SYSTEM AIR CONDITIONING UNIT WITH ASSOCIATED CONDENSING UNIT ON ROOF. SUPPORT UNIT FROM STRUCTURE WITH WALL MOUNT BRACKET. INSTALL REFRIGERANT PIPING BETWEEN FAN COIL UNIT AND CONDENSING UNIT. COORDINATE PIPE ROUTING WITH LANDLORD. SIZE PIPING PER MANUFACTURER'S INSTRUCTIONS. DISABLE HEATING CAPABILITY FOR COOLING-ONLY OPERATION. PROVIDE AIR CONDITIONING UNIT WITH BUILT-IN CONDENSATE PUMP AND ROUTE CONDENSATE PIPING TO UTILITY SINK IN BACK OF HOUSE ROOM. FURNISH MINISPLIT CONTROLLER AND INSTALL ON WALL ADJACENT TO LIGHT SWITCHES.
2. FURNISH AND INSTALL NEW AIR-COOLED CONDENSING UNIT ON ROOF. VERIFY APPROVED LOCATION OF NEW UNIT WITH LANDLORD. SUPPORT UNIT ON SLEEPERS FLASHED INTO ROOFING SYSTEM. USE LANDLORD-APPROVED ROOFING CONTRACTOR FOR ALL ROOFING WORK ASSOCIATED WITH INSTALLATION OF NEW UNIT.
3. THERMOSTAT FOR UNIT INDICATED. INSTALL AT 4'-0" AFF. MOUNT DUCT SMOKE DETECTOR TEST SWITCH/ANNUNCIATOR ABOVE THERMOSTAT AT 7'-6" AFF. PROVIDE SMOKE DETECTOR TO SUPPLY AND RETURN DUCT. INSTALL DUCT SMOKE DETECTOR BY ELECTRICAL CONTRACTOR. SMOKE DETECTOR SHALL SHUT DOWN HVAC UNIT UPON DETECTION OF SMOKE.
4. FURNISH AND INSTALL INLINE EXHAUST FAN. SUPPORT UNIT FROM STRUCTURE ABOVE WITH VIBRATION ISOLATING HANGERS. ROUTE 8"Ø EXHAUST DUCT UP THRU ROOF. TERMINATE WITH RAIN CAP AND BIRDSCREEN. EXHAUST OUTLET SHALL BE A MINIMUM OF 10 FT FROM ANY OUTDOOR AIR INTAKE. COORDINATE ROOF PENETRATION LOCATION WITH LANDLORD. PROVIDE INLINE FAN WITH SPEED CONTROLLER DIAL AND MOUNT ON WALL IN ROOM NEAR DOOR.
5. NEW CEILING MOUNTED EXHUAST FAN. ROUTE 6"Ø TOILET EXHAUST DUCT FROM FAN AND CONNECT TO EXISTING 6"Ø (MINIMUM) TOILET EXHAUST DUCT. FIELD VERIFY LOCATION OF EXISTING DUCTWORK.
6. PROVIDE DRYER BOX IN WALL WITH APPROPRIATE UL FIRESTOP METHOD IF NEEDED TO MAINTAIN CONSTRUCTION RATING. EXTEND 4"Ø DRYER VENT FROM CLOTHES DRYER UP VERTICALLY TO DECK. ROUTE HORIZONTALLY AS SHOWN, ROUTE UP THROUGH ROOF AND TERMINATE WITH VENT CAP. PROVIDE CLEAN OUT AT BASE OF CUT. COORDINATE ROOF PENETRATION LOCATION WITH LANDLORD AND MAINTAIN VENT TERMINATION MINIMUM 10FT CLEARANCE FROM ANY INTAKE.

NOT FOR CONSTRUCTION



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01 FLOOR PLAN - OVERALL - HVAC

SCALE : 1/4" = 1'-0"

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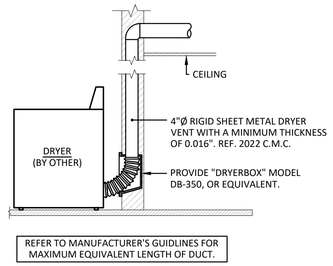
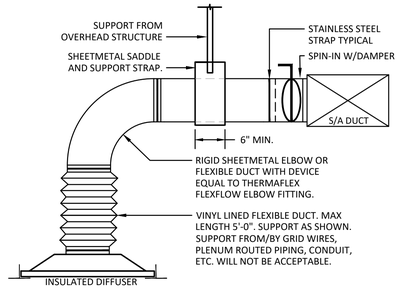
FLOOR PLAN - OVERALL - HVAC

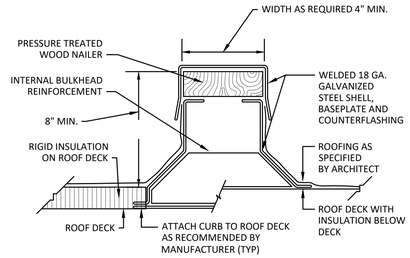
M-101



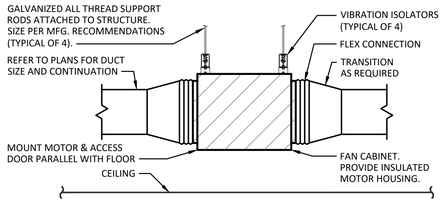
06 DRYER EXHAUST DETAIL
SCALE: NTS



03 TYPICAL DIFFUSER DETAIL
SCALE: NTS

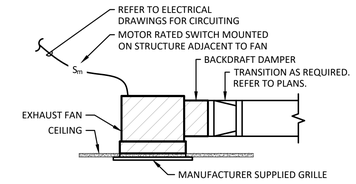


05 TYPICAL PIPE/EQUIPMENT ROOF SUPPORT
SCALE: NTS

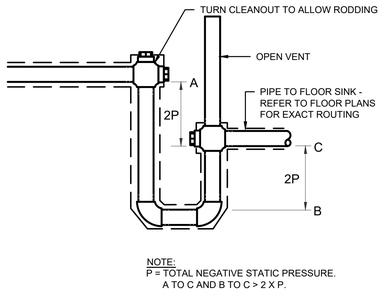


02 IN-LINE FAN DETAIL - SUSPENDED
SCALE: NTS

NOT FOR CONSTRUCTION

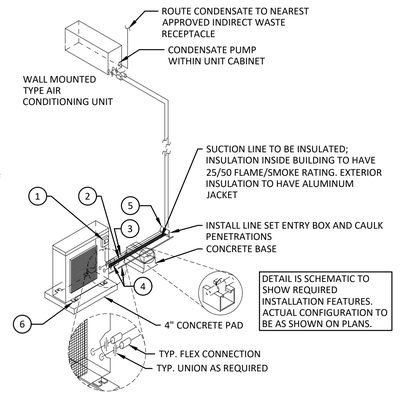


07 RESTROOM EXHAUST FAN DETAIL
SCALE: NTS



04 CONDENSATE DRAIN DETAIL
SCALE: NTS

1. DISCONNECT SWITCH, WP, MOUNTED ON CONDENSING UNIT WITH GALVANIZED FASTENERS, AVOID MOUNTING ON ACCESS CONNECTOR (BY E.C.).
2. LOW VOLTAGE CONTROL WIRING BY HVAC CONTRACTOR.
3. LIQUIDTIGHT FLEX CONDUIT WITH APPROVED FITTINGS. CLAMPS TO UNIT TO MINIMIZE STRAIN ON CONNECTOR (BY E.C.). MAX 48".
4. LIQUID AND SUCTION REFRIGERANT LINES. SUPPORT ON GALVANIZED UNISTRUT CHANNEL IF MORE THAT 24" FROM BUILDING. PROVIDE PIPE CLAMP AND VIBRATION-ISOLATION CUSHION, UNISTRUT NO. P2600 OR EQUAL.
5. SEAL WALL PENETRATION NEATLY WITH CONSTRUCTION SEALANT (BY HVAC CONTRACTOR). PROVIDE PIPE SLEVE. PROVIDE SHEET METAL WEATHERHOOD OVER REFRIGERANT LINES ENTRY.
6. COMPRESSOR/CONDENSING UNIT ON RIBBED NEOPRENE MOUNTING PADS, LOAD NO GREATER THAN 25 PSI, AMBER/BOOTH CO. AMPAD TYPE NRC OR EQUAL. UNIT TO BE BOLTED TO EQUIPMENT SUPPORTS WITH GALVANIZED BOLTS.



01 DUCTLESS SPLIT SYSTEM
SCALE: NTS

SE # P:\0824029.010

MECHANICAL DETAILS

M-501

HVAC MATERIALS SCHEDULE

SYSTEM	MATERIAL	INSULATION VALUE
SUPPLY/RETURN (INDOORS)	G-90 OR BETTER GALVANIZED SHEET METAL, SEE NOTE 1	R-6
SUPPLY/RETURN (OUTDOORS)		R-8 (CLIMATE ZONE 0-4)
		R-12 (CLIMATE ZONE 5-8)
GENERAL EXHAUST		N/A
SUPPLY/RETURN FLEX DUCT	UL 181 HELICAL SPRING STEEL W/ VINYL FILM	R-6
CONDENSATE DRAIN (INDOORS)	TYPE L COPPER (PLENUM)	R-3
	PVC	
CONDENSATE DRAIN (OUTDOORS)	TYPE L COPPER (PLENUM)	N/A
	PVC	
REFRIGERANT PIPING (SUCTION)	TYPE K COPPER	R-3
REFRIGERANT PIPING (LIQUID)	TYPE K COPPER	N/A

NOTES:
1. REFER TO SMACNA 1 IN. WG PRESSURE CLASS FOR DUCT CONSTRUCTION STANDARDS.
2. REFER TO EQUIPMENT MANUFACTURER'S INSTALLATION MANUAL FOR REFRIGERANT PIPING SIZING AND LINE LENGTH LIMITATIONS.
3. NOT ALL SYSTEMS MAY APPEAR IN PROJECT

VENTILATION CALCULATION

ZONE	ROOM	OCCUPANCY TYPE	SUPPLY AIR CFM	AREA SQFT	AREA OUTDOOR RATE, Ra CFM/SQFT	VENTILATION CFM
RTU-1	FOH	LOBBY	240	285	0.15	43
	CONSULT ROOM	OFFICE	220	160	0.15	24
	PLUG AND PLAY	BEAUTY/SALON	80	150	0.4	60
	LASER ROOM	BEAUTY/SALON	80	155	0.4	62
	EXTRA ROOM	OFFICE	80	160	0.15	24
	CORRIDOR	CORRIDOR	135	190	0.15	29
	BOH	OFFICE	125	90	0.15	14
	ADA RESTROOM	RESTROOM	40	75	0	0
					REQUIRED VENTILATION	256
					SCHEDULED VENTILATION CFM	320

NOTES

1.	REFERENCE TABLE 120.1-A OF THE 2022 CALIFORNIA ENERGY CODE (CEC) FOR THE VENTILATION REQUIREMENTS USED ABOVE.

AIR BALANCE CALCULATION

FLOOR PLAN	OUTSIDE AIR (CFM)	EXHAUST AIR (CFM)	PRESSURE RELATION (CFM)
LEVEL 1	320	300	20

MINI-SPLIT SCHEDULE

MARK	SERVES	MANUFACTURER	NOM. TON.	MODEL INDOOR	MODEL OUTDOOR	COOLING CAPACITY (MBH)	HEATING TYPE	HEATING CAPACITY (MBH)	AIRFLOW CFM	EFFICIENCY SEER	EFFICIENCY HSPF	ELECTRICAL DATA VOLT/Ø	ELECTRICAL DATA MCA	ELECTRICAL DATA MOCP	WEIGHT (LBS) INDOOR	WEIGHT (LBS) OUTDOOR	REFRIGERANT	ACCESSORIES
AC-1/ACCU-1	LASER ROOM	DAIKIN	1.5	FTK18NMVJU	RK18NMVJU	18	NONE	-	580	18	-	208/1	18.3	20	27	97	R-410A	1-7
AC-2/ACCU-2	PLUG AND PLAY	DAIKIN	1.5	FTK18NMVJU	RK18NMVJU	18	NONE	-	580	18	-	208/1	18.3	20	27	97	R-410A	1-7

ACCESSORIES (PROVIDE AS NOTED):

1. EQUIPMENT CAPACITY IS BASED ON THE FOLLOWING AMBIENT TEMPERATURES - COOLING = 95°F
2. SIZE AND ROUTE REFRIGERANT PIPING PER MANUFACTURER'S RECOMMENDATIONS. FIELD VERIFY EXACT LOCATION AND REQUIREMENTS.
3. OUTDOOR UNIT PROVIDES POWER TO INDOOR UNIT.
4. PROVIDE WITH 2022 CEC COMPLIANT 7-DAY PROGRAMMABLE THERMOSTAT.
5. PROVIDE MFG. RECOMMENDED INTEGRAL CONDENSATE PUMP.
6. PROVIDE SYSTEM WITH WIRED CONTROLLER, CONTROLLER FURNISHED BY MECHANICAL CONTRACTOR, WIRED BY ELECTRICAL CONTRACTOR.
7. PROVIDE BUILT-IN CONTROL TRANSFORMER (12VDC CONTROL VOLTAGE)

REMARKS:

A. MITSUBISHI MSY-GL18NA-U1/MUY-GL18NA-U1 OR EQUAL ALTERNATIVE ACCEPTABLE. ALTERNATES MUST BE APPROVED IN ADVANCE BY MILAN LASER HAIR REMOVAL. MSY-GL18NA-U1/MUY-GL18NA-U1 SYSTEM MCA - 14.0 A

FAN SCHEDULE

MARK	MANUFACTURER	MODEL	FAN TYPE	CONTROL	CFM	ESP (IN. WG)	MOTOR DATA HP	MOTOR DATA V / PH	ACCESSORIES
EF-1	SOLAR & PALAU	TD-200	EXHAUST	SWITCH	105-125	0.4	122 W	115/1	1-4
EF-2	SOLAR & PALAU	TD-200	EXHAUST	SWITCH	105-125	0.4	122 W	115/1	1-4
EF-3	GREENHECK	SP-LP0511-1	EXHAUST	SWITCH	50	0.5	12 W	115/1	3,5

ACCESSORIES (PROVIDE AS NOTED):

1. SUPPORT FROM STURCTURE. ISOLATE FAN FROM CEILING, STRUCTURE, AND ASSOCIATED DUCTWORK.
2. PROVIDE WITH VARIABLE SPEED CONTROLLER.
3. PROVIDE WITH BACK DRAFT DAMPER.
4. MANUAL SWITCH PROVIDED BY ELECTRICAL.
5. INTERLOCK OPERATION WITH RESTROOM LIGHTS.

NOTES:

A. SET VARIABLE SPEED CONTROLLER TO PROVIDE A MAXIMUM OF 125 CFM AND A MINIMUM OF 105 CFM OF EXHAUST.

HVAC CONTROLS

ROOFTOP UNIT, DX COOLING AND HEATING:

THERMOSTAT
HONEYWELL VISION PRO 8000, OR APPROVED EQUAL, 7-DAY PROGRAMMABLE MULTI-STAGE HEATING/COOLING AUTOMATIC CHANGEOVER THERMOSTAT TO CONTROL THE OPERATION OF EACH UNIT.

SEQUENCE OF OPERATION
COOLING CYCLE - OCCUPIED HOURS:
UPON A RISE IN SPACE TEMPERATURE ABOVE THE OCCUPIED COOLING SETPOINT OF THE THERMOSTAT, THE REFRIGERATION SYSTEM SHALL CYCLE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AT THE THERMOSTAT SETPOINT. THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY AND THE OUTDOOR AIR DAMPER SHALL BE OPEN TO THE MINIMUM POSITION.

HEATING CYCLE - OCCUPIED HOURS:
UPON A DROP IN SPACE TEMPERATURE BELOW THE OCCUPIED HEATING SETPOINT OF THE THERMOSTAT, THE REFRIGERATION SYSTEM SHALL CYCLE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AT THE THERMOSTAT SETPOINT. THE SUPPLY FAN SHALL CYCLE AS REQUIRED AND THE OUTDOOR AIR DAMPER SHALL BE OPEN TO THE MINIMUM POSITION.

COOLING CYCLE - UNOCCUPIED HOURS:
UPON A RISE IN SPACE TEMPERATURE ABOVE THE UNOCCUPIED COOLING SETPOINT OF THE THERMOSTAT, THE REFRIGERATION SYSTEM SHALL CYCLE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AT THE THERMOSTAT SETPOINT. THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY AND THE OUTDOOR AIR DAMPER SHALL BE OPEN TO THE MINIMUM POSITION.

HEATING CYCLE - UNOCCUPIED HOURS:
UPON A DROP IN SPACE TEMPERATURE BELOW THE UNOCCUPIED HEATING SETPOINT OF THE THERMOSTAT, THE REFRIGERATION SYSTEM SHALL CYCLE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AT THE THERMOSTAT SETPOINT. THE SUPPLY FAN SHALL CYCLE AS REQUIRED AND THE OUTDOOR AIR DAMPER SHALL BE OPEN TO THE MINIMUM POSITION.

ECONOMIZER CYCLE:
WHEN, UPON A CALL FOR COOLING, THE OUTDOOR AIR ENTHALPY IS BELOW THE RETURN AIR ENTHALPY, THE REFRIGERATION SYSTEM OPERATION SHALL BE CONTROLLED BY THE ECONOMIZER. THE ECONOMIZER SHALL MODULATE THE OUTDOOR AIR AND RETURN AIR DAMPERS IN ORDER TO INTRODUCE UP TO THE 100% OUTDOOR TO SATISFY THE COOLING LOAD IN THE SPACE. IF THE COOLING EFFECT OF THE OUTDOOR AIR IS NOT SUFFICIENT TO COOL THE SPACE, THE REFRIGERATION SYSTEM SHALL CYCLE AS REQUIRED TO SUPPLEMENT THE ECONOMIZER.

AIR DEVICE SCHEDULE

MARK	MANUFACTURER	MODEL	MAX CFM	MAX NC	NECK SIZE	FACE SIZE	DESCRIPTION
S1	TITUS	TMSA	95	25	6"	24" X 24"	3-CONE DIFFUSER
S2	TITUS	TMSA	205	25	8"	24" X 24"	3-CONE DIFFUSER
S3	TITUS	TMSA	380	25	10"	24" X 24"	3-CONE DIFFUSER
R1	TITUS	50F	70	25	6"	24" X 24"	EGGCRATE GRILLE
R2	TITUS	50F	160	25	8"	24" X 24"	EGGCRATE GRILLE
R3	TITUS	50F	290	25	10"	24" X 24"	EGGCRATE GRILLE
X1	TITUS	50F	160	25	8"	24" X 24"	EGGCRATE GRILLE

NOTES: (PROVIDE TO ALL)

1. COORDINATE BORDER AND FINISH WITH ARCHITECTURAL DOCUMENTS
2. PROVIDE CEILING RADIATION DAMPER AT RATED ASSEMBLIES
3. PROVIDE MANUAL BALANCER DAMPER FOR EACH SUPPLY AIR DEVICE
4. INSULATE BACK OF ALL DIFFUSERS, GRILLES, AND SLOT DIFFUSERS.
5. PROVIDE SQUARE-TO-ROUND ADAPTER (SRG) FOR ALL DUCTED 50F GRILLES.

BRANCH DUCT SIZING

DUCT SIZE	ROUND METAL DUCT CFM	FLEXIBLE DUCT CFM
4" Ø	0 - 30	-
6" Ø	35 - 95	0 - 70
8" Ø	100 - 205	75 - 160
10" Ø	210 - 380	165 - 295
12" Ø	385 - 620	-

EXISITING PACKAGED ROOF-TOP UNIT SCHEDULE

DESIG.	SERVES	EXISTING EQUIPMENT INFO. MANUFACTURER	MODEL	NOMINAL TONNAGE	SUPPLY FAN CFM	O.A. CFM	ELECTRICAL VOLT/ PHASE	FLA	MCA	MOCP
(E)RTU	ALL.	CARRIER	50VR-C30---30TP	2.5	1000	320	SEE REMARK 1.			

REMARKS:

1. CONTRACTOR TO FIELD VERIFY EQUIPMENT AND INFORM E.O.R. OF FINDINGS
2. SEE GENERAL DEMO NOTES FOR EQUIPMENT REFURBISHING REQUIREMENTS
3. SET EQUIPMENT TO OPERATE AT THE PARAMETERS LISTED ABOVE. ORIGINAL INSTALL YEAR - 2021

NOT FOR CONSTRUCTION

SE # P:\0824029.010

MECHANICAL DIAGRAMS

M-601

PLUMBING SPECIFICATIONS

I. GENERAL CONDITIONS

A. THE SCOPE OF THE WORK SHALL INCLUDE THE FURNISHING AND INSTALLATION OF THE NECESSARY MATERIAL AND LABOR TO ACCOMPLISH THE WORK INDICATED BY THE DRAWINGS AND HEREIN SPECIFIED. ALL WORK BY THIS CONTRACTOR SHALL CONFIRM TO ALL APPLICABLE, FEDERAL, STATE AND LOCAL BUILDING CODES.

B. MATERIALS AND EQUIPMENT FURNISHED UNDER THIS CONTRACT SHALL BE NEW AND SHALL BEAR THE U.L. LABEL WHERE APPLICABLE UNLESS NOTED OTHERWISE. ALL WORK SHALL BE GUARANTEED AGAINST DEFECTIVE MATERIALS AND WORKMANSHIP FOR A PERIOD OF NOT LESS THAN ONE (1) YEAR AFTER COMPLETION AND ACCEPTANCE BY THE OWNER.

C. CONTRACTOR SHALL INSTALL PLUMBING SYSTEMS WITHOUT INTERFERENCE AND IN STRICT COORDINATION WITH OTHER TRADES.

D. MATERIALS AND WORKMANSHIP SHALL COMPLY WITH THE CONTRACT DOCUMENTS AND APPLICABLE CODES AND STANDARDS. IN CASE OF DIFFERENCE BETWEEN APPLICABLE CODES AND STANDARDS AND THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL PROMPTLY NOTIFY THE ARCHITECT/ENGINEER AND THE OWNER IN WRITING OF SUCH DIFFERENCE. SHOULD THE CONTRACTOR PERFORM ANY WORK THAT DOES NOT COMPLY WITH THE REQUIREMENTS OF APPLICABLE CODES AND STANDARDS, CONTRACTOR SHALL BEAR ALL COSTS ARISING IN CORRECTING SUCH DEFECTS. APPLICABLE CODES AND STANDARDS SHALL INCLUDE ALL ORDINANCES, UTILITY COMPANY REGULATIONS, AND APPLICABLE REQUIREMENTS OF NATIONALLY ACCEPTED CODES AND STANDARDS. SHOULD THE CONTRACTOR SUPPLY EQUIPMENT DIFFERING FROM THE SPECIFIED ITEMS IN THE CONTRACT DOCUMENTS WITHOUT NOTIFICATION TO THE ENGINEER, CONTRACTOR SHALL BEAR ALL COSTS TO UPGRADE DEFICIENCIES ARISING FROM SUCH.

E. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION AND DEPTH OF ALL PIPING BELOW SLAB PRIOR TO SAW CUTTING. SAW CUT ONLY WHERE NECESSARY TO INSTALL NEW PIPING AND DOWEL REPAIRED SECTION INTO ADJACENT EXISTING SLAB AND MAKE FLUSH WITH FINISHED FLOOR.

II. PRODUCT AND EXECUTION

A. SANITARY DRAIN LINES (SOIL, WASTE AND VENT) SHALL BE SERVICE WEIGHT CAST IRON OR DWV COPPER PIPE. JOINTS SHALL BE FABRICATED BY THE USE OF COMPRESSION JOINTS SIMILAR TO TYLER PIPE AND FOUNDRY'S "TY-SEAL" FOR CAST IRON PIPE OR SOLDER FOR DWV COPPER PIPE. NO-HUB CAST IRON PIPE ASSEMBLED WITH STAINLESS STEEL/NEOPRENE HUBLESS COUPLINGS SHALL BE LIMITED TO ABOVE GROUND INSTALLATIONS, OR AT THE CONTRACTORS OPTION, UNDERGROUND WASTE PIPING MAY BE, IF CODE APPROVED, AMERICAN MANUFACTURED ASTM D-2665 SCHEDULE 40 PVC PIPE, MANUFACTURED WITH VIRGIN RESINS, AND ASSEMBLED WITH CHEMICALLY WELDED PVC JOINTS IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATION.

B. DOMESTIC WATER PIPING ABOVE GROUND SHALL BE AMERICAN MANUFACTURED TYPE "L" HARD DRAWN COPPER ASSEMBLED WITH 95/5 SOLDER JOINT FITTINGS.

C. DOMESTIC WATER PIPING BELOW GROUND SHALL BE AMERICAN MANUFACTURED TYPE "K" COMMERCIALLY PURE SOFT COPPER. AVOID USING JOINTS UNDER SLAB - SHOULD JOINTS BE REQUIRED, ASSEMBLED WITH 95/5 SOLDER JOINT FITTINGS.

D. FURNISH AND INSTALL ALL REQUIRED WATER, WASTE, SOIL, AND VENT CONNECTIONS TO ALL PLUMBING FIXTURES AND EQUIPMENT, TOGETHER WITH ALL FITTINGS, SUPPORTS, FASTENING DEVICES, COCKS, VALVES, TRAPS, ETC., LEAVING ALL IN COMPLETE WORKING ORDER.

E. PIPE, EQUIPMENT, ETC., SHALL BE PROPERLY SUPPORTED FROM STRUCTURE WITH THE USE OF APPROVED TYPE CLEVIS, TRAPEZE HANGERS OR FLOOR STANDS WITH SPACING AS FOLLOWS. COORDINATE WITH STRUCTURAL REQUIREMENTS:

1. STEEL PIPE - 8 FOOT INTERVALS.
2. COPPER TUBING - 1-1/4" OR LESS, 6 FOOT INTERVALS.
3. CAST IRON - ONE (1) HANGER PER LENGTH OF PIPE AND NOT EXCEEDING 10'-0" O.C.
4. FITTINGS - WITHIN 2'-0" OF EACH CHANGE OF DIRECTION.

F. INSULATION SHALL BE PROTECTED AT HANGERS.

G. PROVIDE AND INSTALL UNIONS AT PROPER POINTS TO PERMIT REMOVAL OF A PIPE, EQUIPMENT, ETC., WITHOUT INJURY TO OTHER PARTS OF THE SYSTEM AND TO PREVENT CORROSION DUE TO ELECTROLYSIS. ALL EQUIPMENT SHALL BE INSTALLED IN A MANNER TO PERMIT ACCESS FOR SERVICE WITHOUT DISASSEMBLY. UNIONS SHALL BE DIELECTRIC WHERE DISSIMILAR MATERIALS OCCUR. PRESSURE RATINGS SAME AS FITTINGS.

SPECIFICATIONS CONTINUED:

H. ISOLATION VALVES FOR DOMESTIC WATER SYSTEMS SHALL BE EQUAL TO TWO PIECE COPPER-ALLOY BALL VALVES.

I. INSULATION, JACKETS, ADHESIVE, ETC., SHALL HAVE A COMPOSITE FLAME SPREAD RATING NOT OVER 25 AND A SMOKE DEVELOPED RATING NOT OVER 50.

J. ALL DOMESTIC COLD WATER AND HOT WATER PIPE AND FITTINGS SHALL BE INSULATED WITH, 1/2" THICK FOR COLD WATER PIPE AND 1" THICK FOR HOT WATER PIPE, OWENS-CORNING FIBERGLASS 25 ASJ/SSL OR APPROVED EQUAL EXCEPT HORIZONTAL BRANCH PIPING WITHIN THE PIPE CHASE WILL NOT REQUIRE INSULATION EXCEPT THAT PIPING ADJACENT TO AN EXTERIOR WALL SHALL BE INSULATED INCLUDING THE AIR CHAMBERS AND HYDRAULIC SHOCK ABSORBERS. COLD WATER PIPE/FITTINGS TO HAVE VAPOR BARRIER.

K. CONDENSATE DRAIN SHALL BE INSULATED WITH 1/2" THICK OWENS-CORNING FIBERGLASS 25 ASJ/SSL OR EQUAL. AUXILIARY DRAIN PAN SHALL BE INSULATED WITH 3/8" THICK ARMAFLEX "AP" 25/50 SHEET INSULATION.

L. FITTINGS AND PIPING CONNECTED WITH PLUMBING FIXTURES SHALL BE BRASS AND, WHEREVER EXPOSED, SHALL BE POLISHED CHROME-PLATED.

III. RECORDS FOR THE OWNER

A. CONTRACTOR SHALL KEEP A CLEAN SET OF DRAWINGS ON THE JOB, NOTING DAILY ALL CHANGES MADE IN THESE DRAWINGS IN CONNECTION WITH THE FINAL INSTALLATION INCLUDING EXACT DIMENSIONED LOCATIONS OF ALL NEW AND UNCOVERED EXISTING UTILITIES AND SHALL TURN OVER A CLEAN, NEATLY MARKED SET OF REPRODUCIBLES SHOWING "AS INSTALLED" WORK TO THE ARCHITECT FOR SUBSEQUENT REVIEW AND TRANSMITTAL TO THE OWNER. CONTRACTOR SHALL NOTE ALL CONSTRUCTION CHANGES, DATE EACH SHEET AND LABEL "AS-BUILTS" IN THE REVISION BLOCK ON THE DRAWINGS. CONTRACTOR SHALL ALSO FURNISH ONE (1) SET OF BLUELINE PRINTS FROM THE "AS-BUILTS" REPRODUCIBLE DRAWINGS.

B. IN ADDITION TO THE ABOVE, CONTRACTOR SHALL ACCUMULATE DURING THE JOB'S PROGRESS, THE FOLLOWING DATA, IN TRIPLICATE, PREPARED IN A NEAT BROCHURE OR PACKET FOLDER AND TURNED OVER TO THE ARCHITECT FOR REVIEW AND SUBSEQUENT DELIVERY TO THE OWNER.

1. ALL WARRANTIES AND GUARANTEES AND MANUFACTURER'S DIRECTIONS ON EQUIPMENT AND MATERIAL COVERED BY THE CONTRACT INCLUDING THE NAMES, ADDRESSES, AND TELEPHONE NUMBERS OF THE MANUFACTURER'S REPRESENTATIVE.
2. APPROVED FIXTURE BROCHURES, WIRING DIAGRAMS AND CONTROL DIAGRAMS (ORIGINAL DATA, NO COPIES).
3. COPIES OF APPROVED SHOP DRAWINGS.
4. TEST AND BALANCE REPORTS REQUIRED BY THESE SPECIFICATIONS.
5. ANY AND ALL OTHER DATA AND/OR DRAWINGS REQUIRED DURING CONSTRUCTION.
6. REPAIR PARTS LISTS OF ALL MAJOR ITEMS AND EQUIPMENT INCLUDING NAME ADDRESS AND TELEPHONE NUMBERS OF LOCAL SUPPLIER OR AGENT.

C. ALL OF THE ABOVE DATA SHALL BE SUBMITTED TO THE ARCHITECT FOR REVIEW LESS THAN TWO WEEKS BEFORE FINAL INSPECTION.

PLUMBING ABBREVIATIONS

ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
AD	AREA DRAIN	MPG	MEDIUM PRESSURE GAS
AFC	AUTOMATIC FLOW CONTROL	MB	MOP BASIN
AFF	ABOVE FINISHED FLOOR	MS	MOP SINK
AHR	AIR HOSE REEL	MUV	AUTOMATIC MAKE-UP VALVE
AP	ACCESS PANEL	NF	NON -FREEZE
BD	BLOWDOWN	NFWH	NON-FREEZE WATER HYDRANT
BFD	BACK FLOW PREVENTER	NPW	NON POTABLE WATER
BH	BOX HYDRANT	OD	OUTSIDE DIAMETER
BV	BALANCE VALVE	OFD	OVERFLOW DRAIN
CB	CATCH BASIN	OSD	OPEN SITE DRAIN
CD	CONDENSATE	OS&Y	OUTSIDE SCREW & YOKE
CI	CAST IRON	PIV	POST INDICATOR VALVE
CL	CENTERLINE	RD	ROOF DRAIN
CO	CLEANOUT	RECIRC	RECIRCULATING
CW	DOMESTIC COLD WATER	RIV	ROOF INTAKE VENT
DCO	DOUBLE CLEANOUT	RPZ	REDUCED PRESSURE BACKFLOW PREVENTER
DF	DRINKING FOUNTAIN	RRV	ROOF RELIEF VENT
DS	DOWNSPOUT	SAN	SANITARY
DSN	DOWNSPOUT NOZZLE	SH	SHOWER HEAD
ET	EXPANSION TANK	SD	SHOWER DRAIN
EEW	EMERGENCY EYE WASH	SK	SINK
EWC	ELECTRIC WATER COOLER	SK	SINK
EWH	ELECTRIC WATER HEATER	SS	SERVICE SINK
ETP	ELECTRONIC TRAP PRIMER	TD	TRENCH DRAIN
FD	FLOOR DRAIN	TP	TRAP PRIMER
FDC	FIRE DEPARTMENT CONNECTION	TYP	TYPICAL
FHR	FIRE HOSE RACK	UR	URINAL
FHV	FIRE HOSE VALVE	V	SANITARY VENT
FLE	FLOW LINE ELEVATION	VS	VENT STACK
FS	FLOOR SINK	VTR	VENT THRU ROOF
HB	HOSE BIBB	W	WASTE
HD	HUB DRAIN	WC	WATER CLOSET
HTG	HEATING	WCO	WALL CLEANOUT
HSA	HYDRAULIC SHOCK ABSORBER	WF	WASH FOUNTAIN
HW	DOMESTIC HOT WATER	WH	WATER HEATER
INV. EL.	INVERT ELEVATION	WHA	WATER HAMMER ARRESTOR
IW	INDIRECT WASTE	WS	WASTE STACK
IWH	INSTANTANEOUS WATER HEATER	YH	YARD HYDRANT
LAV	LAVATORY		

PLUMBING PIPE FITTINGS

SYMBOL	DESCRIPTION
A	AUTOMATIC AIR VENT
CO	CLEANOUT
DCO	DOUBLE CLEANOUT
FCO	FLOOR CLEANOUT
GCO	GRADE CLEANOUT
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	ELBOW
	ELBOW DOWN
	ELBOW UP
	END CAP
	FLOOR DRAIN
	FLOOR SINK
	TEE SANITARY
	TEE DOWN
	TEE UP
	TEMPERATURE GAUGE
	WATER HAMMER ARRESTER
	GAS REGULATOR
	HOSB BIBB / NFWH
	WALL CLEANOUT

PLUMBING PIPING

SYMBOL	DESCRIPTION
A	COMPRESSED AIR
D	CONDENSATE DRAIN
DI	DEIONIZED WATER
	DOMESTIC COLD WATER
	DOMESTIC HOT WATER
	DOMESTIC HOT WATER RETURN
FW	FILTERED WATER
FOS	FUEL OIL SUPPLY
FOR	FUEL OIL RETURN
G	GAS: LOW PRESSURE
MPG	GAS: MEDIUM PRESSURE
GW	GREASE WASTE
IW	INDUSTRIAL WASTE
O	OXYGEN
NO	NITROUS OXIDE
	STORM DRAIN
	SANITARY WASTE
TP	TRAP PRIMER LINE
	VENT

PLUMBING VALVE SYMBOLS

SYMBOL	DESCRIPTION
	BALL VALVE
	BUTTERFLY VALVE
	CHECK VALVE
	GATE VALVE
	GLOBE VALVE
	OS&Y VALVE
	PLUG VALVE
	PRESSURE REDUCTING VALVE
S	SOLENOID VALVE
	THERMOSTATIC MIXING VALVE
	UNION
	VALVE IN DROP

FIRE PROTECTION SYSTEM

SYMBOL	DESCRIPTION
FDC	FIRE DEPARTMENT CONNECTION PIPING
TH	TEST HEADER PIPING
SP	STANDPIPE
F	FIRE LINE
	FIRE HYDRANT
	SIAMESE HOSE CONNECTION

GENERAL NOTES:

1. ALL BELOW GRADE TIE-INS TO HAVE SOLVENT JOINTS.
2. ALL BELOW GRADE PIPING TO BE BEDDED WITH SAND.
3. TRENCHES ARE TO BE COMPACTED AT BACKFILL.
4. ALL OVERHEAD PIPING IS TO BE HUNG PROPERLY TO STRUCTURE.
5. ALL FLOOR DRAINS, FLOOR SINKS AND HUB DRAINS ARE TO BE PROVIDED WITH AN APPROVED TRAP GUARD.

MISCELLANEOUS PLUMBING NOTES:

1. PROVIDE SHUT-OFF VALVES FOR EACH APPLIANCE AND FIXTURE IN ACCESSIBLE LOCATIONS. REFRIGERATOR ICEMAKERS SHALL BE PROVIDED WITH PREFABRICATED ICEMAKER SUPPLY BOX (ISB) CONNECTION. PROVIDE SHUT-OFF VALVES TO ISOLATE GROUPS OF TWO OR MORE FIXTURES COMPLETE WITH VALVE ACCESS PANEL LOCATED WITHIN THE CHASE WALL OF THE ACCESSIBLE WATER CLOSET OR NEAR TO THE UNDERSIDE OF LAVATORY COUNTERTOPS.
2. PROVIDE ISOLATION BALL VALVE IN ACCESSIBLE LOCATION TO CONTROL THE WATER SUPPLY TO INDIVIDUAL WALL HYDRANTS, HOSE BIBBS AND NON-FREEZE ROOF HYDRANTS.
3. PROVIDE HYDRAULIC SHOCK ABSORBERS FOR WATER SUPPLIES SERVING FLUSH VALVE WATER CLOSETS AND URINALS. SIZE AND PLACEMENT SHALL BE IN ACCORDANCE WITH P.D.I. STANDARDS.
4. PROVIDE INDIRECT WASTE PIPING FOR APPLIANCES WITH DRAIN CONNECTIONS AND ROUTE TO INDIRECT WASTE RECEPTOR.

NOT FOR CONSTRUCTION

SE # P-00824029.010

PLUMBING COVER SHEET

P-000

A. GENERAL INFORMATION

01	Project Location (city)	Costa Mesa	02	Climate Zone	6
03	Occupancy Types Within Project (select all that apply):				

● Office ● All Other Occupancies

B. PROJECT SCOPE

This table includes domestic water heating systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive paths outlined in 140./ 170.2(d) and 141.0(a)/ 180.1, or 141.0(b)2N / 180.2 for additions or alterations. Solar water heating systems are documented on the NRCC-SAB compliance document. Combined hydronic water heating systems are documented on the NRCC-MCH compliance document.

01	02	03		
My project consists of (check all that apply):	System Type[1,2]	System Components		
☒ New system (DHW system being installed for the first time)	Central System (serving nonresidential spaces)	☒ Equipment	☒ Distribution	☒ Controls
☐ System Alteration (equipment, distribution or controls)		☐ Equipment	☐ Distribution	☐ Controls

[1] *FOOTNOTES: Point of use water heaters, or other non-central systems used to serve nonresidential spaces, are considered individual systems.*
[2] *Dwelling units refers to hotel/motel guest rooms and units in a multifamily residential occupancy.*
[3] *DHW systems serving 2 or more dwelling units are considered "Central Systems" for multifamily occupancies*

C. COMPLIANCE RESULTS

Table C will indicate if the project data input into the compliance document is compliant with water heating requirements. If this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. or the table indicated as not compliant for guidance.

01	02	03	04
Domestic Hot Water Equipment	Distribution Systems	Controls	**Compliance Results**
Table F	Table G	Table H	
Yes	Yes	Yes	COMPLIES

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. DOMESTIC HOT WATER EQUIPMENT

This table is used to demonstrate compliance with mandatory equipment requirements in 110.1 and 110.3. Compliance with prescriptive requirements in 140.5(c) / 170.2(d) must also be demonstrated and with 141.0 / 180.1/ 180.2 for addition and alteration scopes.

Equipment Schedule: Water Heating Efficiency and Standby Loss

03	04			05		06		
System Name	WH-1	Exception to 140.5(c)/ 170.2(d)3	Exceptions Do Not Apply	☐	Gas Service Water Heating System >= 1MMBtu/h[1]	Capacity-weighted Average Efficiency %		
07	08	09	10	11	12	13	14	15
Name or Item Tag	Equipment Type	Volume (gal)	Rated Input Capacity (Btu/h)	Max GPM/ First Hour Rating (FHR)	Rated Efficiency	Minimum Efficiency Required	Efficiency Unit	Designed Standby Loss	Maximum Standby Loss
WH-1	Commercial Electric Storage Water Heater	40	20,472					0.97	0.98

[1] *FOOTNOTE: In systems >= 1MMBtu/h with multiple units, gas water heaters with input capacity > 100,000 Btu/h may meet 90% Et requirements via an input capacity-weighted average.*
[2] *FOOTNOTE: Compliant equipment may be found in the Modernized Appliance Efficiency Database System (MAEDBS) on the Energy Commission website: https://cacertappliances.energy.ca.gov/Pages/Search/AdvancedSearch.aspx*

Water Heating Equipment All Occupancies

	Yes	No	Not Applicable	Requirement
18	☐	☐	☒	Unfired storage tank insulation shall have Internal + External >=R-16 OR External >=R-3.5. Label required per 110.3(c)3
19	☐	☐	☒	New state buildings 60% of energy for service water heating from site solar energy or recovered energy per 110.3(c)5
20	☐	☐	☒	Isolation valves for instantaneous water heater with input rating >6.8 kBTUH or 2 kW has been specified per 110.3(c)6
21	☐	☐	☒	School buildings < 25,000 ft^2 and < 4 stories must install a heat pump water heating system per 140.5(a)1. Water heating systems serving an individual bathroom space may be an instantaneous electric water heater.

G. DOMESTIC HOT WATER DISTRIBUTION SYSTEM

This table is used to demonstrate compliance for nonresidential occupancies with distribution requirements in 120.3 and 140.5. For multifamily and hotel/motel occupancies, compliance is demonstrated with requirements 110.3(c), 160.4, 170.2(d).

Recirculation Loops in Central Systems Serving Dwelling Units or Nonresidential Spaces

	Yes	No	Not Applicable	Requirement
01	○	○	●	Air release valve or vertical pump installation per 110.3(c)4A
02	●	○	○	Check valve or similar located between recirculation pump and water heating equipment to prevent backflow per 110.3(c)4B
03	○	○	●	Hose bibb installed between pump and equipment and isolation valve between hose bibb and equipment per 110.3(c)4C
04	●	○	○	Isolation valves on both sides of the pump per 110.3(c)4D
05	●	○	○	Cold water and recirculation loop piping shall not be connected to the hot water storage tank drain port per 110.3(c)4E
06	●	○	○	Check valve installed on cold water supply between hot water system and next closest tee on cold water supply per 110.3(c)4F
07	○	○	●	DWELLING UNITS ONLY: For central systems serving multiple dwelling units, design includes a recirculation system serving separate dwelling units per 170.2(d) unless building has <=8 dwelling units.
08	○	○	●	DWELLING UNITS ONLY: For heat pump water heating systems, the hot water return from the recirculation loop shall connect to a recirculation loop tank and shall not directly connect to the primary heat pump water heater inlet or the primary thermal storage tanks per 170.2(d)2A.
09	○	○	●	DWELLING UNITS ONLY: For heat pump water heating systems, the fuel source for the recirculation loop tank shall be electricity if auxiliary heating is needed. The recirculation loop heater shall be capable of multi-pass water heating operation per 170.2(d)2B.

G. DOMESTIC HOT WATER DISTRIBUTION SYSTEM

Mandatory Pipe Insulation All Occupancies

13	☐	For systems serving dwelling units, pipe insulation must meet the minimum insulation requirements in Table 160.4-A (see below) except: • Piping that penetrates metal framing shall use grommets, plugs, wrapping or other insulating material to assure that no contact is made with the metal framing. Insulation shall abut securely against all framing members • Piping installed in interior or exterior walls shall not be required to have pipe insulation if all of the requirements are met for compliance with Quality Insulation Installation (QII) as specified in the Reference Residential Appendix RA3.5. • Piping surrounded with a minimum of 1 inch of wall insulation, 2 inches of crawlspace insulation, or 4 inches of attic insulation, shall not be required to have pipe insulation.
14	☒	For systems serving nonresidential spaces, pipe insulation for the following applications is specified to comply with Table 120.3-A (see below) per 120.3: • Recirculating system piping, including supply and return piping of the water heater • The first 8 ft of hot and cold outlet piping, including between storage tank and heat trap, for a nonrecirculating storage system • Pipes that are externally heated
15	☒	Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather shall be installed with a cover suitable for outdoor service per 120.3(b) / 160.4(f). Pipe insulation buried below grade must be installed in a water proof and non-crushable casing or sleeve.

TABLE 120.3-A / 160.4-A PIPE INSULATION THICKNESS

Fluid Temperature Range (°F)	Conductivity Range (Btu-in per hour per ft^2 per °F)	Insulation Mean Rating Temp (°F)	Nominal Pipe Diameter (in)			
			< 1	1 to < 1.5	1.5 to < 4	1.5 to < 4 Multifamily & Hotel/Motel
			Minimum Insulation Required			
105-140	0.22 - 0.28	100	1.0 in or R-7.7	1.5 in or R-12.5	1.5 in or R-11	2.0 in or R-16

H. DOMESTIC HOT WATER CONTROLS

This table is used to demonstrate compliance with control requirements in 110.3 for all occupancies. For multifamily residential and hotel/motel occupancies, compliance is also demonstrated with requirements in 160.4(e) / 170.2(d).

	Yes	No	Not Applicable	Requirement
01	☒	☐	☐	Construction documents require manufacturer certification that service water-heating systems are equipped with automatic temperature controls capable of adjusting temperature settings per 110.3(a).
02	☐	☐	☒	Systems with capacity > 167,000 BTUH equipped with outlet temperature controls per 110.3(c)1 unless covered by California Plumbing Code 613.0.
03	☒	☐	☐	Controls for circulating pumps or electrical heat trace systems are capable of automatically turning off the system per §110.3(c)2 unless systems serves healthcare facility.
04	☐	☐	☒	For recirculation systems serving multiple dwelling units, design includes automatic pump controls per 170.2(d) or 180.1(b)3 for additions.
05	☐	☐	☒	For recirculation systems serving individual dwelling units, design includes manual on/off controls as specified in Reference Appendix RA4.4.9 per 170.2(d).
06	☐	☐	☒	Combustion air positive shut-off shall be provided per 160.4(3).on all newly installed commercial boilers as follows: • Boilers with input capacity >= 2.5 MMBtu/h, in which the boiler is designed to operate with a nonpositive vent static pressure • Boilers where one stack serves two or more boilers with a total combined input capacity per stack of 2.5 MMBtu/h.
07	☐	☐	☒	Boiler combustion air fans with motor >= 10 hp shall meet one of the following • The fan motor shall be driven by a variable speed drive OR • The fan motor shall include controls that limit the fan motor demand to <=30% of the total design wattage at 50% of the design air volume.
08	☐	☐	☒	Newly installed boilers with an input capacity (d:gte/] 5MMBtu/h and a steady state full-load combustion efficiency < 90% shall maintain excess (stack-gas) oxygen concentrations <= 5% by volume on a dry basis over firing rates of 20-100%. Combustion air volume shall be controlled with respect to firing rate or flue gas oxygen concentration. Use of a common gas and combustion air control linkage or jack shaft is prohibited.

I. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in this document. If any selection have been changed by permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online

Form/Title
NRCI-PLB-E - Must be submitted for all buildings

J. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

There are no forms required for this project.

K. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

There are no forms required for this project.

NOT FOR CONSTRUCTION

SE # P:\0824029.010

PLUMBING
NRCC FORM

P-001

Service Water Heating Mandatory Measures:
110.3(a) CERTIFICATION BY MANUFACTURERS ANY SERVICE WATER HEATING SYSTEM OR EQUIPMENT MAY BE INSTALLED ONLY IF CERTIFIED TO THE ENERGY COMMISSION TO MEET ALL APPLICABLE 110.3 REQUIREMENTS
110.3(a)1 TEMPERATURE CONTROLS SERVICE WATER HEATING SYSTEMS SHALL BE EQUIPPED WITH AUTOMATIC TEMPERATURE CONTROLS CAPABLE OF BEING ADJUSTED FROM LOWEST TO HIGHEST ACCEPTABLE TEMPERATURES FOR THE INTENDED USE AS LISTED IN TABLE 3, CHAPTER 50 OF THE ASHRAE HANDBOOK, HVAC APPLICATIONS VOLUME, OR TABLE 613.1 OF THE CALIFORNIA PLUMBING CODE FOR HEALTHCARE FACILITIES. RESIDENTIAL OCCUPANCIES ARE EXEMPT FROM TEMPERATURE CONTROL REQUIREMENTS
110.3(b) EFFICIENCY EQUIPMENT SHALL MEET THE APPLICABLE REQUIREMENTS OF THE APPLIANCE EFFICIENCY REGULATIONS AS REQUIRED BY 110.1.
110.3(c)2 CONTROLS FOR HOT WATER DISTRIBUTION SYSTEMS SERVICE HOT WATER SYSTEMS WITH CIRCULATING PUMPS OR WITH ELECTRICAL HEAT TRACE SYSTEMS SHALL BE CAPABLE OF AUTOMATICALLY TURNING OFF THE SYSTEM.
110.8(a) INSULATION CERTIFICATION INSTALLED INSULATION SHALL BE CERTIFIED BY THE DEPARTMENT OF CONSUMER AFFAIRS PER TITLE 24, PART 12, CHAPTERS 12-13, ARTICLE 3 "STANDARDS FOR INSULATING MATERIAL."
110.8(b) UREA FORMALDEHYDE INSULATION UREA FORMALDEHYDE INSULATION SHALL NOT BE INSTALLED UNLESS IN EXTERIOR SIDE WALLS WITH A FOUR-MIL-THICK PLASTIC POLYETHYLENE VAPOR RETARDER OR EQUIVALENT PLASTIC SHEATHING VAPOR RETARDER IS INSTALLED BETWEEN THE UREA FORMALDEHYDE FOAM INSULATION AND THE INTERIOR SPACE.
110.8(c) INSULATING MATERIAL ALL INSULATING MATERIALS SHALL BE INSTALLED IN COMPLIANCE WITH THE FLAME SPREAD RATING AND SMOKE DENSITY REQUIREMENTS OF THE CALIFORNIA BUILDING CODE.

NOT FOR CONSTRUCTION

SE # P:\0824029.010

PLUMBING
NRCC FORM

P-002

GENERAL PLUMBING NOTES

A. ABOVE GRADE WATER PIPING SHALL BE TYPE L COPPER. CONDENSATE DRAIN LINES SHALL BE DWV COPPER. GAS PIPING SHALL BE SCHEDULE 40 BLACK STEEL. REFER TO SPECIFICATIONS SECTION FOR ADDITIONAL DETAILS.

B. ALL POTABLE WATER SYSTEMS SHALL BE DISINFECTED ACCORDING TO LOCAL CODES.

C. ALL EXPOSED DRAIN AND WATER LINES SHALL BE COPPER.

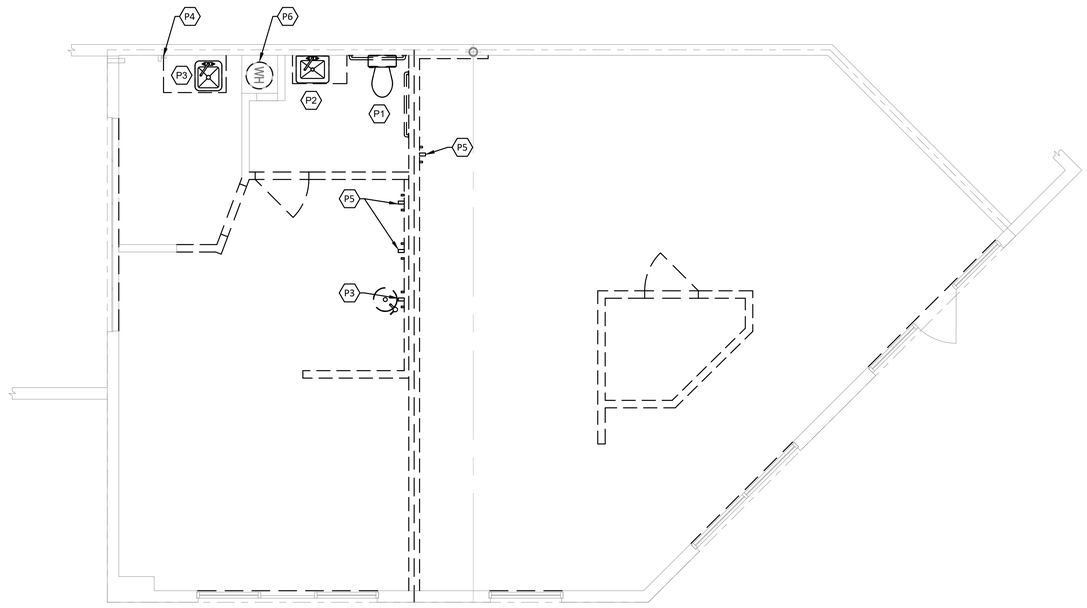
D. SPILL CONDENSATE DRAIN FROM EACH AIR HANDLING UNIT INTO FLOOR DRAIN OR ACCEPTABLE INDIRECT RECEPTACLE WITH OPEN SITE CONNECTION.

E. PLUMBING SYSTEM INCLUDING FIXTURES AND PIPING SHOWN ON THE DRAWINGS IS ONLY DIAGRAMMATIC AND ALL ITEMS INCLUDING NECESSARY FITTINGS REQUIRED SHALL BE PROVIDED TO MAKE THE SYSTEM COMPLETE AND IN SAFE WORKING ORDER, AND SHALL BE COORDINATED WITH OTHER TRADES.

NOTES BY SYMBOL (THIS SHEET ONLY) ' (PX) '

1. REMOVE EXISTING WATER CLOSET. PREPARE EXISTING SANITARY, VENT, & CW PIPING FOR CONNECTION TO NEW WATER CLOSET IN EXISTING LOCATION.
2. REMOVE EXISTING LAVATORY. PREPARE EXISTING SANITARY, VENT, CW & HW PIPING FOR CONNECTION TO NEW LAVATORY IN EXISTING LOCATION.
3. REMOVE EXISTING PLUMBING FIXTURE, TRIM AND ALL ASSOCIATED PIPING AND ACCESSORIES. CAP SANITARY PIPING BELOW FINISHED FLOOR AND VENT/WATER PIPING AT MAIN. REPAIR FLOOR TO MATCH EXISTING.
4. EXISTING WASHING MACHINE CONNECTION TO REMAIN.
5. REMOVE EXISTING PLUMBING STUB-OUTS, TRIM AND ALL ASSOCIATED PIPING AND ACCESSORIES. CAP SANITARY PIPING BELOW FINISHED FLOOR AND VENT/WATER PIPING AT MAIN. REPAIR FLOOR TO MATCH EXISTING.
6. REMOVE EXISTING WATER HEATER. REMOVE ALL ASSOCIATED PIPING AND ACCESSORIES. CAP PIPING AT MAIN.

NOT FOR CONSTRUCTION



N

01 FLOOR PLAN - DEMOLITION - PLUMBING

SCALE : 1/4" = 1'-0"

SE # P:\0824029.010

FLOOR PLAN - DEMOLITION - PLUMBING

PD101

GENERAL PLUMBING NOTES

A. ABOVE GRADE WATER PIPING SHALL BE TYPE L COPPER. CONDENSATE DRAIN LINES SHALL BE DWV COPPER. GAS PIPING SHALL BE SCHEDULE 40 BLACK STEEL. REFER TO SPECIFICATIONS SECTION FOR ADDITIONAL DETAILS.

B. ALL POTABLE WATER SYSTEMS SHALL BE DISINFECTED ACCORDING TO LOCAL CODES.

C. ALL EXPOSED DRAIN AND WATER LINES SHALL BE COPPER.

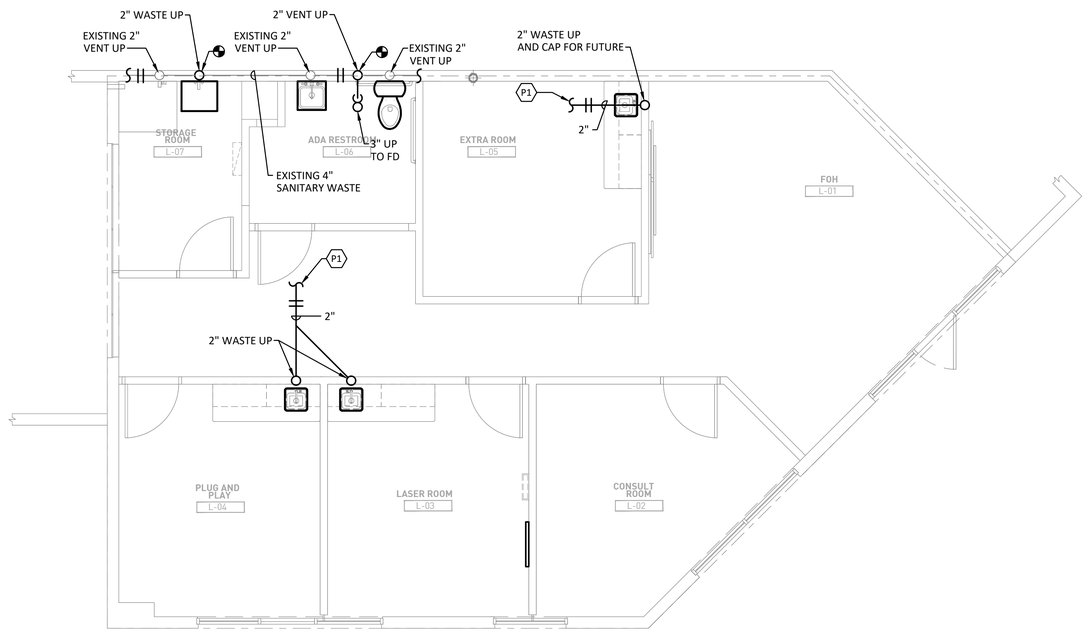
D. SPILL CONDENSATE DRAIN FROM EACH AIR HANDLING UNIT INTO FLOOR DRAIN OR ACCEPTABLE INDIRECT RECEPTACLE WITH OPEN SITE CONNECTION.

E. PLUMBING SYSTEM INCLUDING FIXTURES AND PIPING SHOWN ON THE DRAWINGS IS ONLY DIAGRAMMATIC AND ALL ITEMS INCLUDING NECESSARY FITTINGS REQUIRED SHALL BE PROVIDED TO MAKE THE SYSTEM COMPLETE AND IN SAFE WORKING ORDER, AND SHALL BE COORDINATED WITH OTHER TRADES.

NOTES BY SYMBOL (THIS SHEET ONLY) ' (PX) '

1. CONNECT NEW SANITARY WASTE TO EXISTING SANITARY WASTE PIPING UNDER FLOOR. VERIFY EXACT SIZE LOCATION AND DEPTH OF EXISTING PIPING ON SITE.

NOT FOR CONSTRUCTION



N

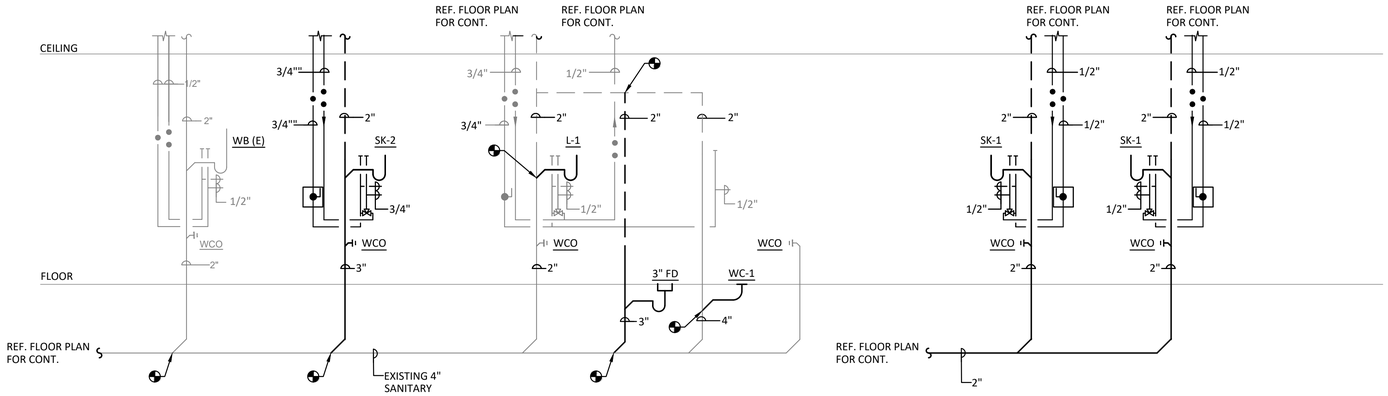
01 UNDERFLOOR PLAN - OVERALL - PLUMBING

SCALE : 1/4" = 1'-0"

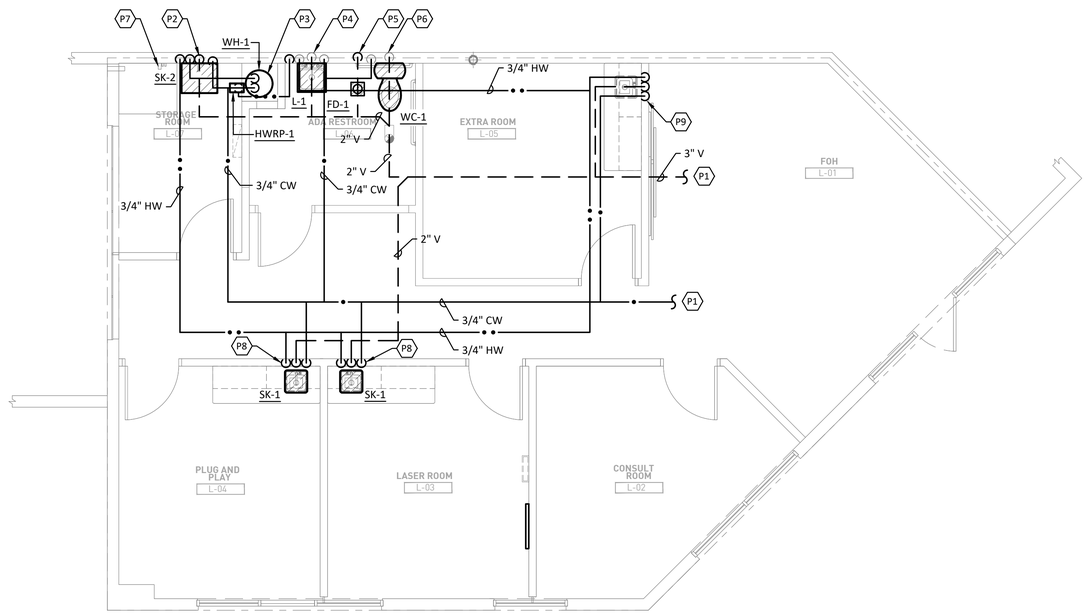
SE # P:\0824029.010

UNDERFLOOR PLAN - OVERALL - PLUMBING

PU101



02 PLUMBING RISER DIAGRAM
NO SCALE



01 FLOOR PLAN - OVERALL - PLUMBING
SCALE : 1/4" = 1'-0"

GENERAL PLUMBING NOTES

A. ABOVE GRADE WATER PIPING SHALL BE TYPE L COPPER. CONDENSATE DRAIN LINES SHALL BE DWV COPPER. GAS PIPING SHALL BE SCHEDULE 40 BLACK STEEL. REFER TO SPECIFICATIONS SECTION FOR ADDITIONAL DETAILS.

B. ALL POTABLE WATER SYSTEMS SHALL BE DISINFECTED ACCORDING TO LOCAL CODES.

C. ALL EXPOSED DRAIN AND WATER LINES SHALL BE COPPER.

D. SPILL CONDENSATE DRAIN FROM EACH AIR HANDLING UNIT INTO FLOOR DRAIN OR ACCEPTABLE INDIRECT RECEPTACLE WITH OPEN SITE CONNECTION.

E. PLUMBING SYSTEM INCLUDING FIXTURES AND PIPING SHOWN ON THE DRAWINGS IS ONLY DIAGRAMMATIC AND ALL ITEMS INCLUDING NECESSARY FITTINGS REQUIRED SHALL BE PROVIDED TO MAKE THE SYSTEM COMPLETE AND IN SAFE WORKING ORDER, AND SHALL BE COORDINATED WITH OTHER TRADES.

NOTES BY SYMBOL (THIS SHEET ONLY) ' (PX) '

1. CONNECT NEW VENT AND WATER PIPING TO EXISTING UTILITIES. VERIFY EXACT SIZE AND LOCATION OF EXISTING UTILITIES ON SITE.
2. 2" VENT, 3/4"CW & (2) 3/4" HW DOWN TO PLUMBING FIXTURE. HW PIPING SERVING LAVATORIES IS TO BE NO MORE THAN 2 FT. FROM SERVICE PIPING.
3. 3/4" CW/HW DOWN TO WATER HEATER (WH-1) & 1/2" HWR DOWN TO HWRP-1. REFER 01/P601.01. EXTEND 3/4" CW/HW TO SK-2 (UTILITY SINK).
4. RECONNECT NEW LAVATORY TO EXISTING UTILITIES. VERIFY EXACT SIZE AND LOCATION OF EXISTING UTILITIES ON SITE.
5. CONNECT NEW 2" VENT TO EXISTING UTILITIES. VERIFY EXACT SIZE AND LOCATION OF EXISTING UTILITIES ON SITE.
6. RECONNECT NEW WATER CLOSET TO EXISTING UTILITIES. VERIFY EXACT SIZE AND LOCATION OF EXISTING UTILITIES ON SITE.
7. CONNECT NEW WASHING MACHINE TO EXISTING WASHING MACHINE BOX.
8. 2" VENT & 1/2" CW/HW DOWN TO PLUMBING FIXTURES.
9. 2" VENT AND 1/2"/HW DOWN AND CAP FOR FUTURE.

NOT FOR CONSTRUCTION

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FLOOR PLAN - OVERALL - PLUMBING

P-101

WATER HEATER SCHEDULE

SYMBOL	LOCATION	RECOVERY GPH / RISE	STORAGE CAPACITY	TEMPERATURE IN °F	TEMPERATURE OUT °F	ELECTRICAL DATA KW	ELECTRICAL DATA VOLTS	ELECTRICAL DATA PHASE	CONNECTIONS INLET	CONNECTIONS OUTLET	MANUFACTURER AND MODEL NUMBER	NOTES
WH-1	STORAGE ROOM	25 / 80°F	40 GAL	65	140	(2)3 KW	208	3	3/4"	3/4"	AO SMITH DEL 40D SIMULTANEOUS ELEMENTS	1

NOTES:
1. WATER HEATER TO BE PROVIDED WITH LOW TEMPERATURE THERMOSTAT CAPABLE OF MAINTAINING A WATER TEMPERATURE OF 90 DEGREE F.

DOMESTIC WATER CALCULATIONS

SYMBOL	FIXTURE TYPE	LOAD VALUE (WSFU)	QUANTITY	SUB-TOTAL FIXTURE UNTIS
WC	WATER CLOSET (PUBLIC)FT	5	1	5.0
LAV	LAVATORY (PUBLIC)	1	1	1.0
EWC	ELECTRIC WATER COOLER	0.5	0	0.0
SK-1	SINK (1-COMP)	2	2	4.0
SK-2	UTILITY SINK	3	1	3.0
SK-1	FUTURE SINK	2	1	2.0
TOTAL FIXTURE UNITS:				15.0
GPM:				17.5
MINIMUM SERVICE SIZE (8.0 FPS MAXIMUM):				1"

NOTES:
1. A 3/4" CW LINE IS ABSOLUTE MINIMUM IF NEEDED.

WATER HAMMER/SHOCK ARRESTOR (HSA) SCHEDULE

PDI UNIT TYPES	'A'	'B'	'C'	'D'	'E'
RANGE OF FIXTURE UNITS SERVED	1-11	12-32	33-60	114-154	155-330

PUMP SCHEDULE

MARK	SERVICE	GPM	HEAD (FT)	SHUT-OFF HEAD (FT)	RPM	H.P. (MIN.)	POWER V/~/Hz	NOTES - REMARKS
HWRP 1	HOT WATER	3	15	---	3500	1/12	120/1/60	BELL & GOSSETT ALL BRONZE IN-LINE SERIES PL-30 CIRCULATOR WITH BELL & GOSSETT AQUASTAT AQS-3/4 AND TIMER KIT MODEL TC-1

PLUMBING FIXTURE SCHEDULE

SYMBOL	FIXTURE TYPE	MANUFACTURER AND MODEL #	MIN.SIZE OF CONNECTIONS CW	HW	SAN	VENT	DESCRIPTION
WC-1	WATER CLOSET (ADA)	AMERICAN STANDARD 215CA.104	1/2"	-	4"	2"	FLOOR MOUNTED, FLUSH TANK, HET, 1.28 GALLON/FLUSH, ELONGATED BOWL AND AMERICAN STANDARD No. 5257A65MT.020 OPEN-FRONT, SELF SUSTAINING SEAT.
L-1	LAVATORY (ADA)	AMERICAN STANDARD 0356.028	1/2"	1/2"	2"	2"	VITREOUS CHINA, WALL MOUNTED, WHEELCHAIR LAVATORY WITH SPEAKMAN MODEL SC-3084-LD FAUCET WITH 4" WRIST BLADE HANDLES AND 0.5 GPM FLOW CONTROL. PROVIDE CHROME PLATED CAST BRASS P-TRAP WITH CLEANOUT, CHROME PLATED RIGID TYPE SUPPLY WITH WALL ESCUTCHEON, LOOSE-KEY WALL STOPS AND OFFSET ELBOW AND GRID STRAINER. PROVIDE WITH TRUEBRO MODEL 103 P-TRAP AND ANGLE VALVE INSULATION KIT.
SK-1	HAND SINK **(ADA)**	JOHN BOOS PB-DISINK 151506	1/2"	1/2"	2"	2"	SINGLE COMPARTMENT, 18 GA. TYPE 304 STAINLESS STEEL, 2-HOLE PUNCHED WITH JOHN BOOS FAUCET No. PBF-4DM WITH FAUCET MOUNTING KIT PB-DMMK AND LK-35 CUP STRAINER. PROVIDE CHROME PLATED CAST P-TRAP WITH CLEANOUT, CHROME PLATED FLEX SUPPLIES, WALL STOPS AND WALL ESCUTCHEONS.
SK-2	UTILITY SINK	ELKAY B1C18X18	3/4"	3/4"	2"	2"	18 GAUGE STAINLESS STEEL, FREESTANDING, SINGLE COMPARTMENT SINK. ELKAY MODEL LK940TS08T4H FAUCET WITH 4" WRIST BLADE HANDLES AND 2.2 GPM FLOW CONTROL. PROVIDE CHROME PLATED CAST BRASS P-TRAP WITH CLEANOUT, CHROME PLATED RIGID TYPE SUPPLY WITH WALL ESCUTCHEON, LOOSE-KEY WALL STOPS AND OFFSET ELBOW AND GRID STRAINER. PROVIDE WITH TRUEBRO MODEL 103 P-TRAP AND ANGLE VALVE INSULATION KIT.
WCO	WALL CLEANOUT	JOSAM 58790	-	-	-	-	COATED CAST IRON CLEANOUT TEE WITH RECESSED, TAPPED PLUG AND POLISHED STAINLESS STEEL COVER.
FD	FLOOR DRAIN	JOSAM SERIES 30000-A-50	-	-	3"	2"	CAST IRON DRAIN WITH SATIN NICKALOY STRAINER, CAST IRON FLASHING COLLAR AND PRO SET TRAP GUARD.
AP	ACCESS PANEL	ACUDOR Z-5030	-	-	-	-	12" x 12" FLUSH MOUNTED STAINLESS STEEL ACCESS DOOR WITH KEYED LOCK. REFER TO ARCHITECTURAL FOR FINISH.

NOTES:
1. REFER TO ARCHITECTURAL DOCUMENTS FOR ADDITIONAL PLUMBING FIXTURE REQUIREMENTS.
2. LAVATORY/SINK FAUCETS ARE TO BE PROVIDED WITH UNDER COUNTER MOUNTED THERMOSTATIC MIXING VALVES.

FIRE SPRINKLER AND FIRE ALARM NOTES

THE GENERAL CONTRACTOR MUST INCLUDE COST IN BID FOR FIRE ALARM AND FIRE SPRINKLER WORK, HOWEVER:

1. FIRE SPRINKLER APPROVALS ARE NOT INCLUDED UNDER THIS PERMIT. BEFORE COMMENCING ANY WORK, ENGINEERED FIRE SPRINKLER PLANS MUST BE SUBMITTED TO AND APPROVED BY THE BUILDING DEPARTMENT. THE SYSTEM MUST BE INSPECTED AND APPROVED BY THE BUILDING DEPARTMENT PRIOR TO CERTIFICATE OF OCCUPANCY.
2. FIRE ALARM APPROVALS ARE NOT INCLUDED UNDER THIS PERMIT. BEFORE COMMENCING ANY WORK, ENGINEERED FIRE ALARM PLANS AND CUST SHEETS MUST BE SUBMITTED TO AND APPROVED BY THE BUILDING DEPARTMENT. THE SYSTEM MUST BE INSPECTED AND APPROVED BY THE BUILDING DEPARTMENT PRIOR TO CERTIFICATE OF OCCUPANCY.

MISCELLANEOUS PLUMBING NOTES:

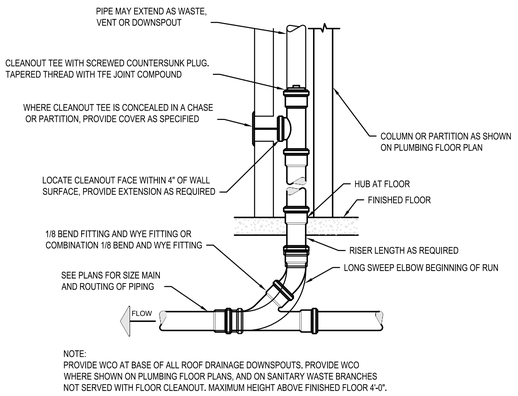
1. PROVIDE SHUT-OFF VALVES FOR EACH APPLIANCE AND FIXTURE IN ACCESSIBLE LOCATIONS. REFRIGERATOR ICEMAKERS SHALL BE PROVIDED WITH PREFABRICATED ICEMAKER SUPPLY BOX (ISB) CONNECTION. PROVIDE SHUT-OFF VALVES TO ISOLATE GROUPS OF TWO OR MORE FIXTURES COMPLETE WITH VALVE ACCESS PANEL LOCATED WITHIN THE CHASE WALL OF THE ACCESSIBLE WATER CLOSET OR NEAR TO THE UNDERSIDE OF LAVATORY COUNTERTOPS.
2. PROVIDE ISOLATION BALL VALVE IN ACCESSIBLE LOCATION TO CONTROL THE WATER SUPPLY TO INDIVIDUAL WALL HYDRANTS, HOSE BIBBS AND NON-FREEZE ROOF HYDRANTS.
3. ROUTE DRAIN PIPING FROM THE DRAIN PORT NON-FREEZE ROOF HYDRANTS TO CODE-APPROVED INDIRECT DRAIN RECEPTOR.
4. PROVIDE HYDRAULIC SHOCK ABSORBERS FOR WATER SUPPLIES SERVING FLUSH VALVE URINALS AND WASHING MACHINES. SIZE AND PLACEMENT SHALL BE IN ACCORDANCE WITH P.D.I. STANDARDS.
5. PROVIDE INDIRECT WASTE PIPING FOR APPLIANCES WITH DRAIN CONNECTIONS AND ROUTE TO INDIRECT WASTE RECEPTOR.

BACKFLOW PROTECTION DEVICE SCHEDULE

APPLIANCE, EQUIPMENT, PROCESS, ETC.	TYPE OF BACKFLOW PROTECTION
CARBONATORS	RPZA
ICE MAKERS	DCVA
COFFEE, JUICE AND TEA MACHINE INCLUDING JUICE DISPENSERS	DCVA
FIRE PROTECTION MAIN SERVICE	DCDA
MAIN BUILDING DOMESTIC WATER SERVICES	RPZ
WALL HYDRANTS / HOSE BIBBS	AVB
CAR WASH WATER SUPPLY	RPZA
DISHWASHER (RESIDENTIAL)	AIR GAP FITTING
WATER HEATERS	MINIMUM 6" AIR GAP ON T&P DRAIN LINE

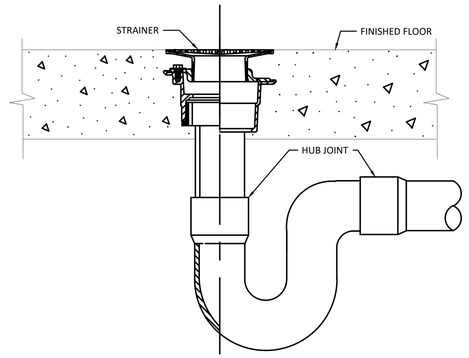
LEGEND:
RPZA = REDUCED PRESSURE ZONE ASSEMBLY
DCVA = DOUBLE CHECK VALVE ASSEMBLY
DCDA = DOUBLE CHECK DETECTOR ASSEMBLY
AVB = ATMOSPHERIC VACUM BREAKER

NOT FOR CONSTRUCTION



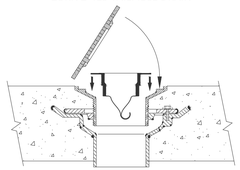
NOTE:
PROVIDE WCO AT BASE OF ALL ROOF DRAINAGE DOWNSPOUTS, PROVIDE WCO WHERE SHOWN ON PLUMBING FLOOR PLANS, AND ON SANITARY WASTE BRANCHES NOT SERVED WITH FLOOR CLEANOUT. MAXIMUM HEIGHT ABOVE FINISHED FLOOR 4'-0".

04 WALL CLEANOUT DETAIL
NO SCALE



02 FLOOR DRAIN DETAIL
NO SCALE

CAN BE USED ABOVE OR BELOW GROUND FLOOR
TRAP GUARD INSERT FITTING FITS
ZURN Z-415 TAILPIECE DRAIN



☐ PART NO. TG33-ZURN 3" INSERT FITS INSIDE Z-415 DRAINS

IMPORTANT NOTES :

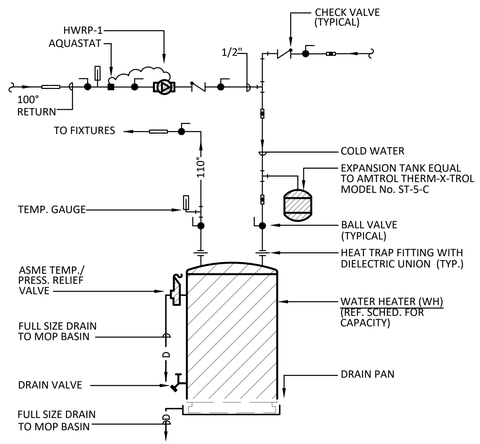
2. The extra wide flange needs to have an adhesive type caulk installed around the bottom edge.
3. Most Z415 tailpieces have 4 protrusions inside the 3-1/2" opening so the seal must be made around the edge of the TG flange. Make sure inside of tailpiece is clean.
1. This Trap Guard insert can be installed into any Zurn # 415 drain tops to prevent sewer gas emission. If the trap guard device should get damaged or impaired in any way, the device can be easily removed by using a sharp screw driver under the flange.

Note: Care should be taken not to touch the elastomeric flexible material with the primer.

NO FIRE RATINGS ARE REQUIRED FOR UNDERGROUND PIPING OR OPENINGS

ProSet® SYSTEM FIRESTOP PENETRATOR™

03 PROSET TRAP GUARD DETAIL
NO SCALE



NOTE:
1. WATER HEATER TO BE PROVIDED WITH LOW TEMPERATURE THERMOSTAT CAPABLE OF MAINTAINING A WATER TEMPERATURE OF 90°F.
2. PROVIDE MOISTURE DETECTION SYSTEM IN DRAIN PAN.

01 WATER HEATER PIPING DIAGRAM
NO SCALE

SE # P:\0824029.010

PLUMBING DETAILS & SCHEDULES

P-601