# MECHANICAL SPECIFICATIONS

## PART 1 - GENERAL

### 1.1 GENERAL CONDITIONS

A. THE CONTRACTOR SHALL FURNISH ALL PLANT, LABOR, EQUIPMENT, AND SHALL PERFORM ALL OPERATIONS IN CONNECTION WITH THE AIR CONDITIONING SYSTEMS(S) AS OUTLINED IN THE DRAWINGS AND IN STRICT ACCORDANCE WITH THE CONDITIONS OF THE CONTRACT. ANY INCIDENTAL WORK NOT SHOWN OR SPECIFIED WHICH CAN REASONABLY BE TAKEN OR INFERRED AS BELONGING TO THE WORK AND NECESSARY TO PROVIDE THE SYSTEM DESCRIBED OR SHOWN SHALL BE THE CONTRACTOR'S RESPONSIBILITY, THE WORK SHALL BE COMPLETE AND READY FOR SERVICE AS SHOWN AND/OR SPECIFIED, AND BE SATISFACTORY TO THE ARCHITECT.

B. REFER TO ARCHITECTURAL SPECIFICATIONS FOR CORRELATIONS AND GENERAL REQUIREMENTS.

### 1.2 WORK INCLUDED

A. THE SYSTEMS TO BE INSTALLED CONSIST ESSENTIALLY OF THE FOLLOWING:
1. EXHAUST FANS AND DUCTWORK.
2. SUPPLY AND RETURN DUCTWORK, AND CEILING OUTLETS.
3. TESTING AND ADJUSTING OF THE COMPLETE SYSTEM.

B. OTHER ITEMS AS MAY BE SPECIFIED OR SHOWN ON THE DRAWINGS.

### 1.3 WORK NOT INCLUDED

A. THE FOLLOWING IS NOT INCLUDED IN THIS PARTICULAR WORK:
1. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL LINE VOLTAGE WIRING, AND ALL LINE VOLTAGE CONDUIT, DISCONNECTS, MANUAL STARTERS, AND CONNECT UP ALL MOTORS COMPLETE. AIR CONDITIONING CONTRACTOR TO PROVIDE WIRING DIAGRAM AS REQUESTED.

### 1.4 WORKMANSHIP

WHERE OTHER INSTRUCTIONS ARE NOT GIVEN, EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER AND THE BEST STANDARD PRACTICE FOR THIS TYPE OF WORK.

### 1.5 RULES, REGULATIONS, AND CODES

A. ALL WORK AND MATERIALS SHALL BE IN FULL ACCORDANCE WITH THE LATEST RULES, CODES, AND REGULATIONS OF THE FOLLOWING:
1. NATIONAL FIRE PROTECTION ASSOCIATION.
2. STATE FIRE MARSHAL.
3. PART - 5, T24 CALIFORNIA CODE OF REGULATIONS.
4. STATE HEALTH DEPARTMENT.
5. STATE INDUSTRIAL ACCIDENT COMMISSION'S SAFETY ORDERS.
6. RULES OF LOCAL UTILITY.
7. CALIFORNIA MECHANICAL CODE.
8. CALIFORNIA BUILDING CODE.
9. CALIFORNIA PLUMBING CODE.
10. CALIFORNIA ELECTRIC CODE.

B. RULING AND INTERPRETATIONS OF THE ENFORCING AGENCY WILL BE CONSIDERED PART OF THE REGULATIONS.

C. NOTHING IN THESE SPECIFICATIONS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THE ABOVE, AND EXPENSE IN COMPLIANCE WITH THE ABOVE SHALL BE BORNE BY THE CONTRACTOR.

D. WHENEVER THE SPECIFICATIONS AND DRAWINGS REQUIRE HIGHER STANDARDS OR LARGER SIZES THAN THOSE REQUIRED BY THE ORDINANCES AND STATUTES, THE SPECIFICATIONS AND DRAWINGS SHALL TAKE PRIORITY OVER THE SPECIFIC ORDINANCES AND STATUTES.

### 1.6 SITE EXAMINATION AND CONDITIONS

THE CONTRACTOR SHALL EXAMINE THE SITE, VERIFY DIMENSIONS AND LOCATIONS AGAINST THE DRAWINGS AND INFORM HIMSELF OF ALL CONDITIONS UNDER WHICH WORK IS TO BE DONE BEFORE SUBMITTING HIS PROPOSAL. NO ALLOWANCE WILL BE MADE IN HIS BEHALF FOR EXTRA EXPENSE ON ACCOUNT OF ERROR.

### 1.7 AS BUILT DRAWINGS

A. SUPPLEMENTING THE REQUIREMENTS OF THE GENERAL CONDITIONS AND SUPPLEMENTARY GENERAL CONDITIONS, AS-BUILT DRAWINGS SHALL SHOW INVERT ELEVATIONS OF SANITARY SEWERS, RAIN WATER LEADERS AND STORM SEWERS OF CRITICAL LOCATIONS, LOCATIONS OF SHUT-OFF VALVES AND STUB-OUTS FOR FUTURE, AND ALL CHANGES MADE DURING THE COURSE OF THE WORK. FURNISH REPRODUCIBLE DRAWINGS WHEN WORK IS COMPLETE.

B. THE GRADE OR QUALITY OF MATERIALS DESIRED IS INDICATED BY THE TRADE NAMES OR CATALOG NUMBERS STATED HEREIN.

C. DIMENSIONS, SIZES, AND CAPACITIES SHOWN ARE A MINIMUM AND SHALL NOT BE CHANGED WITHOUT PERMISSION OF THE ARCHITECT.

### 1.8 MATERIAL LIST AND SUBSTITUTIONS

A. PRIOR TO COMMENCEMENT OF WORK, AND WITHIN 35 DAYS AFTER SIGNING OF THE CONTRACT BY THE OWNER AND GENERAL CONTRACTOR, THIS CONTRACTOR SHALL SUBMIT IN QUINTUPLE TO THE ARCHITECT FOR APPROVAL A COMPLETE LIST OF EQUIPMENT AND MATERIALS TO BE FURNISHED, INCLUDING ALL SUBSTITUTIONS. PARTIAL OR INCOMPLETE LISTS OF MATERIALS WILL NOT BE CONSIDERED. NO SUBSTITUTIONS WILL BE CONSIDERED THEREAFTER. ONLY ONE (1) REQUEST FOR SUBSTITUTION WILL BE CONSIDERED ON EACH ITEM OF MATERIAL OR EQUIPMENT.

B. IF THE CONTRACTOR DESIRES TO MAKE A SUBSTITUTION, HE SHALL SUBMIT COMPLETE INFORMATION OR CATALOG DATA TO SHOW THE QUALITY OF THE EQUIPMENT OR MATERIAL OFFERED TO THAT SPECIFIED. NO SUBSTITUTION WILL BE ALLOWED UNLESS REQUESTED AND APPROVED IN WRITING. MATERIALS OF EQUAL MERIT AND APPEARANCE IN THE OPINION OF THE ARCHITECT WILL BE APPROVED FOR USE. ARCHITECT RESERVES THE RIGHT TO REQUIRE ORIGINALLY SPECIFIED ITEM.

C. INSTALLATION OF APPROVED SUBSTITUTION IS THE CONTRACTOR'S RESPONSIBILITY. ANY CHANGES REQUIRED FOR INSTALLATION OF APPROVED SUBSTITUTED EQUIPMENT MUST BE MADE WITHOUT ADDITIONAL COST.

D. SUBMIT TO ARCHITECT FOR APPROVAL, WITHIN A REASONABLE TIME AFTER AWARD OF CONTRACT AND IN AMPLE TIME TO AVOID DELAY OF CONSTRICTION, SHOP DRAWINGS OR SUBMITTALS ON ALL ITEMS OF EQUIPMENT AND MATERIALS COVERED IN LIST MENTIONED ABOVE. SHOP DRAWINGS SHALL BE SUBMITTED IN FIVE (5) COPIES AND IN COMPLETE PACKAGE. PARTIAL SUBMITTALS WILL NOT BE CONSIDERED.

### 1.9 FEES, PERMITS, AND UTILITY SERVICES

THIS CONTRACTOR SHALL ARRANGE TO OBTAIN AND TO PAY FOR ALL PERMITS AND SERVICE CHARGES REQUIRED IN THE INSTALLATION OF HIS WORK, ARRANGE FOR REQUIRED INSPECTIONS, AND SECURE APPROVALS FROM AUTHORITIES HAVING JURISDICTION. CONTRACTOR SHALL ARRANGE FOR UTILITY CONNECTIONS AND PAY CHARGES INCURRED, INCLUDING EXCESS SERVICE CHARGES, IF ANY.

### 1.10 GUARANTEE

AFTER COMPLETION OF THE INSTALLATION OF EQUIPMENT HEREIN SPECIFIED, THE CONTRACTOR SHALL GUARANTEE SAME AGAINST DEFECTS OF WORKMANSHIP OR MATERIAL FOR A PERIOD OF ONE (1) YEAR. IF WITHIN THE SPECIFIED PERIOD FROM THE DATE OF ACCEPTANCE ANY OF THE SYSTEM IN PROVEN TO BE DEFECTIVE IN WORKMANSHIP AND/OR MATERIAL, IT WILL BE ADJUSTED, REPAIRED, OR REPLACED FREE OF CHARGE BY THIS CONTRACTOR.

### 1.11 ACCESSIBILITY

CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUFFICIENCY OF SIZE AND THICKNESS OF PARTITIONS FOR ADEQUATE INSTALLATION OF HIS WORK, ANY EQUIPMENT REQUIRING ACCESS FOR OPERATION OR SERVICE SHALL BE MADE ACCESSIBLE BY THE USE OF ACCESS DOORS AS REQUIRED.

## PART 2 - PRODUCTS

### 2.01 DUCTWORK

A. MATERIAL EXPOSED WITHIN DUCTS OR PLENUMS SHALL HAVE A FLAME SPREAD RATING OF NOT MORE THAN 25 AND A SMOKE PRODUCTION OF NOT MORE THAN 50.
1. ALL SHEET METAL DUCTWORK SHALL BE MADE OF COMMERCIAL GRADE GALVANIZED STEEL.
2. BROKEN PIECES IN COATING MADE IN FORMING SHALL BE COMPLETELY SOLDERED OVER.
3. WEIGHTS OF SHEETS SHALL NOT BE LESS THAN THE FOLLOWING:

| SIZE OF DUCTS | US GAUGE GALV IRON |
|---|---|
| 0" TO 12" | 26 |
| 13" TO 30" | 24 |
| 31" TO 54" | 22 |
| 55" AND LARGER | 20 |

### 2.02 INSULATED FLEXIBLE DUCT

A. FLEXIBLE DUCT MAY BE USED ON SUPPLY & RETURN DUCTS 18" & SMALLER AND SHALL BE THERMAFLEX MODEL MK-E CONSISTING OF AN INNER CORE, INSULATION AND AN OUTER MOISTURE BARRIER. THE INNER CORE SHALL BE CONSTRUCTED OF A CHLORINATED POLYETHYLENE (CPE) BONDED TO THE COATED WIRE HELX FOR MAXIMUM STRENGTH AND DURABILITY. AN INSULATING BLANKET WOVEN OF FIBERGLASS SHALL ENCASE THE INNER CORE AND SHALL BE SHEATHED WITH AN OUTER VAPOR BARRIER OF METALLIZED POLYESTER FILM. THE VAPOR BARRIER SHALL BE .05 PERM PER ASTM E96, PROCEDURE A. THE FLEXIBLE DUCT SHALL BE RATED FOR A MAXIMUM WORKING VELOCITY OF 5500 FPM AND SHALL BE CERTIFIED BY THE UNDERWRITERS LABORATORIES UNDER THEIR UL 181 STANDARDS AS CLASS 1 DUCT, AND BEAR UL STAMP.

B. FLEXIBLE DUCTS SHALL BE SUPPORTED AT 4'-0" O.C. WITH 3" WIDE 28 GAUGE STEEL HANGER COLLAR ATTACHED TO THE STRUCTURE WITH AN APPROVED DUCT HANGER. COLLARS SHALL HAVE HEMMED EDGES TO PREVENT CUTTING OF FLEXIBLE DUCT. INSTALLATION SHALL MINIMIZE SHARP RADIUS TURNS OR OFFSETS.
1. DUCT MATERIAL SHALL HAVE A MINIMUM 'R' VALUE OF 8.
2. FLEXIBLE DUCTS MAY BE USED TO CROSS SEISMIC JOINTS WITHOUT OFFSETS.
3. ALL MATERIAL EXPOSED WITHIN DUCTS OR PLENUMS SHALL HAVE A FLAME-SPREAD RATING OF NOT MORE THAN 25 AND A SMOKE-DEVELOPED RATING OF NOT MORE THAN 50.
4. DUCT LEAKAGE SHALL NOT BE MORE THAN 6% OF TOTAL AIR FLOW AND SHALL BE VERIFIED.

### 2.03 BALANCING DAMPERS

A. BALANCING DAMPERS SHALL BE FURNISHED AND INSTALLED AT LOCATIONS INDICATED ON THE DRAWINGS.

B. DAMPERS SHALL HAVE LOCKING AND INDICATING QUADRANT PARKER-KALON COMPANY'S, ELGIN, OR EQUAL, DAMPERS INSTALLED IN INACCESSIBLE LOCATIONS SHALL HAVE DAMPER RODS EXTENDED AND TERMINATED WITH CEILING, WITH A YOUNG COMPANY'S ELGIN, OR EQUAL, ADJUSTABLE COVER CONCEALED DAMPER REGULATOR.

C. DAMPERS IN SQUARE OR RECTANGULAR DUCTS NOT SHOWN AS SPLATTER OR BUTTERFLY DAMPERS SHALL BE OF THE MULTI-LOUVER TYPE ARRANGED FOR OPPOSED BLADE OPERATION AND SHALL BE CONTROLAIR, KRUEGER, OR EQUAL TO CONTROLAIRE OPP-MD. BUTTERFLY AND SPLITTER TYPE DAMPER BLADES SHALL BE OF U.S. 16 GAUGE GALVANIZED STEEL, MINIMUM, AND SHALL HAVE A MINIMUM SHAFT SIZE OF 3/8". DAMPERS IN ROUND DUCTS SHALL BE SINGLE BLADE TYPE, CONTROL AIR OR EQUAL, WITH EXTENDED SHAFT AS REQUIRED.

D. MARK DUCTS TO INDICATE PERMANENT DAMPER POSITION AFTER THE SYSTEM HAS BEEN TESTED AND BALANCED.

### 2.04 FLEXIBLE CONNECTIONS

A. FLEXIBLE CONNECTIONS SHALL BE FURNISHED AND INSTALLED WHERE SHOWN. DUCT CONNECTIONS SHALL ALSO BE FURNISHED AND INSTALLED WHERE SHOWN. DUCT CONNECTIONS SHALL BE VENT-FABRICS, BAUER AND BLACK FIBERGLASS THERMOSETTING ADHESIVE TAPES NO. 263 AND 281. APPLY PER MANUFACTURER'S RECOMMENDATIONS. WIDTH OF FLEXIBLE CONNECTIONS SHALL BE SUFFICIENT TO ALLOW ONE INCH (1") MINIMUM FREE SPACE BETWEEN TWO METAL COLLARS TO BE CONNECTED. PROVIDE COVER OVER FLEX-CONNECTONS TO PROTECT THEM FROM THE SUN.

### 2.05 FILTERS

A. GENERAL
1. AIR FILTERS SHALL BE OF AN APPROVED TYPE TESTED IN ACCORDANCE WIT TEST METHOD SCFM-12-71-1 AS SHOWN IN PART 12, T-24, CALIFORNIA CODE OF REGULATIONS. PREFORMED FILTERS HAVING COMBUSTIBLE FRAMING SHALL BE TESTED AS COMPLETE ASSEMBLY.
2. AIR FILTERS IN ALL OCCUPANCIES SHALL BE CLASS 2 OR BETTER, AS DEFINED IN THE TEST METHOD ABOVE.
3. AIR FILTERS SHALL BE ACCESSIBLE FOR CLEANING OR REPLACEMENT.
4. THE CONTRACTOR SHALL FURNISH THE OWNER WITH ONE (1) ADDITIONAL COMPLETE FILTER CHANGE FOR ALL UNITS UPON ACCEPTANCE OF THE MECHANICAL SYSTEM.

B. UNIT FILTERS: ALL FILTERS SHALL BE AMERICAN FILTER- AMER-GLAS AG-5, FARR, LOW VELOCITY FILTERS, 2" THICK, WITH FRAMES AND ACCESS PANELS.

### 2.06 GRILLES, REGISTERS, AND DIFFUSERS

1. CEILING SUPPLY DIFFUSERS SHALL BE METALAIRE MODULAR CORE (SERIES 9000) OR EQUAL, WITH LAY-IN OR SURFACE TYPE FRAME, AS SPECIFIED, OPPOSED BLADE DAMPER AND EXTRACTOR. DIFFUSER SHALL BE PROVIDED WITH FACTORY APPLIED OFF WHITE FINISH, ALL AS SCHEDULED ON THE DRAWINGS.
2. CEILING RETURN GRILLE AND EXHAUST SHALL BE METALAIRE (SERIES SRH) OR EQUAL, MADE OF STEEL WITH FACTORY APPLIED FINISH TO MATCH THE SUPPLIES, ALL AS SCHEDULED ON THE DRAWINGS.
3. WALL SUPPLIES SHALL BE METALAIRE V4004 WITH OPPOSED BLADE DAMPER. REGISTER SHALL BE PROVIDED WITH FACTORY APPLIED WHITE FINISH.
4. WALL RETURN SHALL BE METALAIRE RH WITH A WHITE FINISH TO MATCH THE SUPPLY.
5. DOOR LOUVERS SHALL BE J & J SERIES 700 PRIME PAINTED.
6. OUTSIDE AIR AND COMBUSTION AIR LOVERS SHALL BE RUSKIN WITH INSECT SCREEN AND MOUNTING FRAME. LOUVERS SHALL BE PRIME PAINTED.
7. GRILLES SHALL BE SELECTED AND APPROVED BY MANUFACTURER TO OPERATE WITHOUT OBJECTIONABLE NOISE OR DRAFT.

### 2.07 EQUIPMENT

A. INLINE EXHAUST FAN:
1. INLINE EXHAUST FANS SHALL HAVE THE CAPACITY AS SHOWN ON THE DRAWINGS. THEY SHALL INCLUDE WALL OR ROOF CAP AS APPLICABLE, AND REQUIRED DUCTWORK. FANS SHALL BE CONTROLLED BY WALL SWITCHES. EXHAUST FAN SHALL BE SCHEDULED ON THE DRAWINGS AND BE COMPLETE AS FOLLOWS:
2. MOTOR AND FAN SHALL BE MOUNTED ON RUBBER ISOLATORS AND BE VIBRATION FREE AND QUIET OPERATING. CAPACITY AND RPM SHALL BE AS SCHEDULED ON THE DRAWINGS.

### 2.08 TEMPERATURE CONTROL

A. GENERAL: THE WIRING AND LOW VOLTAGE TEMPERATURE CONTROL EQUIPMENT IN ACCORDANCE WITH THE WIRING DIAGRAMS AND THE FUNCTIONAL OPERATION OF THE TEMPERATURE CONTROL SYSTEM SHALL BE THE WIRING, AND ALL LINE AND LOW VOLTAGE CONDUIT, DISCONNECTS, MANUAL AND AUTOMATIC STARTERS, AND CONNECT UP ALL MOTORS COMPLETE.

B. DRAWINGS OF TEMPERATURE CONTROL SYSTEM ARE DIAGRAMMATIC ONLY, AND ANY APPARATUS NOT SHOWN, SUCH AS RELAYS, ACCESSORIES, ETC., BUT REQUIRED TO MAKE THE SYSTEM OPERATIVE TO THE COMPLETE SATISFACTION OF THE ARCHITECT SHALL BE FURNISHED AND INSTALLED WITHOUT ADDITIONAL COST.

C. ALL ELECTRIC CONNECTIONS TO BE IDENTIFIED AND LABELED AS TO FUNCTION AND POSITION WITH PERMANENTLY ENGRAVED NAMEPLATES.

D. ALL EQUIPMENT FURNISHED BY THIS CONTRACTOR THAT IS NORMALLY WIRED BEFORE INSTALLATION SHALL BE FURNISHED COMPLETELY WIRED. TEMPERATURE CONTROL WIRING NORMALLY PERFORMED IN THE FIELD WILL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.

E. PRIOR TO INSTALLATION, THE MECHANICAL CONTRACTOR SHALL SUBMIT DIAGRAMS, COMPONENT DATA AND DESCRIPTION OF SEQUENCE OF OPERATION TO ARCHITECT FOR APPROVAL.

F. ENTIRE SYSTEM SHALL BE GUARANTEED FOR ONE YEAR WITH EMERGENCY SERVICE FOR AN ADDITIONAL YEAR WITHOUT CHARGE TO THE OWNER FROM THE DATA OF ACCEPTANCE OF THE COMPLETED BUILDING. AFTER COMPLETION OF THE INSTALLATION, THE MECHANICAL CONTRACTOR SHALL REGULATE AND ADJUST ALL THERMOSTATS, DAMPERS, MOTORS AND OTHER TEMPERATURE CONTROL EQUIPMENT PROVIDED UNDER THIS CONTRACT.

G. ENTIRE SYSTEM SHALL BE AS SHOWN ON THE DRAWINGS.

## PART 3 - EXECUTION

### 3.01 SYSTEM BALANCE AND ADJUSTMENT

A. GENERAL:
1. THE HEATING AND AIR CONDITIONING CONTRACTOR SHALL BALANCE THE COMPLETE SYSTEM AND SHALL SUBMIT TWO (2) COPIES OF THE BALANCING REPORT TO THE ENGINEER FOR EVALUATION AND APPROVAL.
2. THIS REPORT SHALL INCLUDE AS A MINIMUM, BUT NOT BE LIMITED TO, THE FOLLOWING DESIGN AND ACTUAL INFORMATION: HORSEPOWER, BRAKE HORSEPOWER, REVOLUTIONS PER MINUTE, ACTUAL AMPERAGE AND FULL LOAD RATED CURRENT OF ALL MOTORS AND FANS; CUBIC FEET PER MINUTE, STATIC PRESSURE AND OUTLET VELOCITY AND CUBIC FEET PER MINUTE OF EACH OUTLET OF EACH UNIT OR ZONE; AIR TEMPERATURES OF ALL ROOMS SERVICED BY AIR DISTRIBUTION SYSTEM, AND ALL OTHER INFORMATION REQUIRED TO ESTABLISH COMPLETELY BALANCED SYSTEM.

B. ALLOWANCE SHALL BE MADE FOR AIR FILTER RESISTANCE A THE TIME

C. STATIC PRESSURE READINGS SHALL BE TAKEN WITH AN INCLINED MANOMETER; AIR VELOCITY READINGS SHALL BE TAKEN WITH INSTRUMENTS OF RECENT CALIBRATION. THE FINAL VELOCITY READINGS SHALL BE TAKEN WITH AN ALNOR VELOMETER, ANEMOTHERN, OR A VANE TYPE ANEMETER CALIBRATED PRIOR TO THE TEST AND RECALIBRATED AT THE END OF THE TEST.

D. TESTS SHALL BE RUN WIT SUPPLY, RETURN, AND EXHAUST SYSTEMS OPERATING WITH ALL DOORS, WINDOWS, ETC., CLOSED OR UNDER REGULAR TRAFFIC.

E. CONTRACTOR SHALL ADJUST DEFLECTION OF ALL SUPPLY OUTLETS TO INSURE PROPER AND UNIFORM AIR DISTRIBUTION THROUGHOUT THE AREAS SERVED BY SUCH OUTLETS.

### 3.02 TEST AND ADJUSTMENT

A. UPON COMPLETION OF THE WORK, ALL EQUIPMENT AND SYSTEMS SHALL BE OPERATED AND TESTED FOR A PERIOD OF AT LEAST THREE (3) CONSECUTIVE DAYS TO DEMONSTRATE THEIR SATISFACTORY OVERALL OPERATION. ON THE LAST DAY OF THIS PERIOD, THE CONTRACTOR SHALL ARRANGE FOR AN ACCEPTANCE TEST AND FINAL INSPECTION TO BE CONDUCTED BY THE ENGINEER IN THE PRESENCE OF THE CONTRACTOR OR HIS REPRESENTATIVE. THE ENGINEER SHALL BE NOTIFIED OF THIS MEETING AT LEAST ONE WEEK IN ADVANCE OF THE TIME PROPOSED BY THE CONTRACTOR AND A MUTUALLY AGREEABLE TIME ARRANGED. THE CONTRACTOR SHALL MAKE ALL NECESSARY ADJUSTMENTS AND CORRECTIONS TO THE SYSTEMS PRIOR TO ACCEPTANCE TEST SO THAT THE SYSTEMS ARE OPERATING SMOOTHLY AND PROPERLY AND ARE ABSOLUTELY READY FOR CHECK AND ACCEPTANCE AT THIS TIME.

B. ANY EQUIPMENT, SYSTEM, OR WORK FOUND DEFICIENT DURING THE TEST SHALL BE REPLACED OR REVISED AS REQUIRED TO THE ENTIRE SATISFACTION OF THE ENGINEER.

C. DURING THIS TIME, A REPRESENTATIVE OF THE ENGINEER SHALL BE INSTRUCTED IN THE PROPER CARE AND OPERATION OF THE EQUIPMENT AND CONTROLS. A SET OF TYPEWRITTEN INSTRUCTIONS GIVING PERTINENT OPERATING DATA SHALL BE FRAMED UNDER GLASS AND MOUNTED IN A LOCATION AS DIRECTED BY THE ENGINEER. THIS INCLUDES WIRING AND SCHEMATIC DIAGRAMS OF ALL CONTROLS, THERMOSTATS, ETC.

# MECHANICAL SYMBOL LEGEND

## MECHANICAL DUCTWORK

- FLEXIBLE SUPPLY AIR DUCT
- FLEXIBLE RETURN AIR DUCT
- RIGID SUPPLY AIR DUCT
- RIGID RETURN AIR DUCT

## MECHANICAL SYMBOLS

- VOLUME DAMPER
- DUCT DROP / RISE
- EXHAUST FAN
- SMOKE DETECTOR (SD)
- THERMOSTAT (T)
- CONDENSATE DRAIN LINE (CD)

## MECANICAL ABBREVIATIONS

| | |
|---|---|
| ABV | ABOVE |
| AD / AP | ACCESS DOOR / ACCESS PANEL |
| AFF | ABOVE FINISH FLOOR |
| BEL | BELOW |
| CFH | CUBIC FEET PER HOUR (1000 BTU) |
| CFM | CUBIC FEET PER MINUTE |
| CLG | CEILING |
| CONC. | CONCRETE |
| (E) | EXISTING |
| GPM | GALLONS PER MINUTE |
| MBH | THOUSANDS OF BTU'S PER HOUR |
| (N) | NEW |
| NIMC | NOT IN MECHANICAL CONTRACT |
| OSA | OUTSIDE AIR |
| POC | POINT OF CONNECTION |
| TCP | TEMPERATURE CONTROL PANEL |
| UC | 1" DOOR UNDERCUT |
| V | VALVE |

## MECHANICAL REGISTERS

- SUPPLY AIR REGISTER
- RETURN AIR GRILL

REGISTERS:
- FIRST LETTER - LOCATION
  - C - CEILING
  - W - WALL
  - F - FLOOR
- SECOND LETTER - NUMBER
  - S - SUPPLY
  - R - RETURN
  - E - EXHAUST
- THIRD LETTER - TYPE
  - SEE SCHEDULE

# EQUIPMENT SCHEDULE

## MECHANICAL UNIT SHEDULE

| MARK | MANUFACTURER / MODEL | FAN | | | ELECTRICAL CHARACTERISTICS | | | | | WT. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SEER | HEAT | COOL | FLA | MCA | MOCP | VOLT | PHASE | | |
| AC-1 | MITSUBISHI ELECTRIC MSZ-GE09NA | 21 | 8.7K | 9K | .76 | 1 | 15 | 208/230 | 1 | 22 LB | |
| CU-1 | MITSUBISHI ELECTRIC MUZ-GE09NA | 21 | 8.7K | 9K | 0.50 000 | 12 | 15 | 208/230 | 1 | 66 LB | |

## EXHAUST FAN SHEDULE

| MARK | MANUFACTURER / MODEL | FAN | | | | ELECTRICAL CHARACTERISTICS | | | | WT. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CFM | ESP | RPM | SONE | ITEM | LOAD | VOLT | PHASE | | |
| EF-1 | LOREN COOK ACE-101C15D WITH WALL SWITCH CONTROL | 768 | 0.25 | 1550 | 9.2 | HP | ¼ | 115 | 1 | 30 LB | (1) |
| EF-2 | LOREN COOK GC-164 WITH LIGHT SWITCH INTERLOCK | 135 | 0.25 | 1109 | 3.30 | WATT | 112 | 115 | 1 | 20 LB | (2) |

## MAKE-UP AIR HOOD SHEDULE

| MARK | MANUFACTURER / MODEL | SIZE | CONTROL | ESP | REMARKS |
|---|---|---|---|---|---|
| MUA-1 | COOK GRAVITY INTAKE HOOD | 18" X 24" | INTERLOCK WITH EF-1 | MAX ΔP=0.05 | (3) |

### MECHANICAL UNIT KEYNOTE SCHEDULE

### EXHAUST FAN KEYNOTE SCHEDULE:

(1) PROVIDE ROOF MOUNTED EXHAUST FAN WITH THE FOLLOWING OPTIONS:
1. MOUNTED ON PRE-MANUFACTURED CURBS
2. BAROMETRIC BACKDRAFT DAMPER
3. BIRDSCREEN
4. DISCONNECT SWITCH

(2) PROVIDE CEILING MOUNTED EHAUST FAN WITH THE FOLLOWING OPTIONS:
1. BAROMETRIC BACKDRAFT DAMPER
2. TIME DELAY SWITCH FAN TO OPERATE FOR 15 MINUTES AFTER THE LIGHTS ARE TURNED OFF

### MAKE-UP AIR HOOD KEYNOTE SCHEDULE

(3) PROVIDE ROOF MOUNTED MAKE-UP AIR HOOD WITH THE FOLLOWING OPTIONS:
1. MOUNTED ON PRE-MANUFACTURED CURB, MINIMUM 8" HIGH
2. BIRDSCREEN

| REVISIONS | BY |
|---|---|
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| | |


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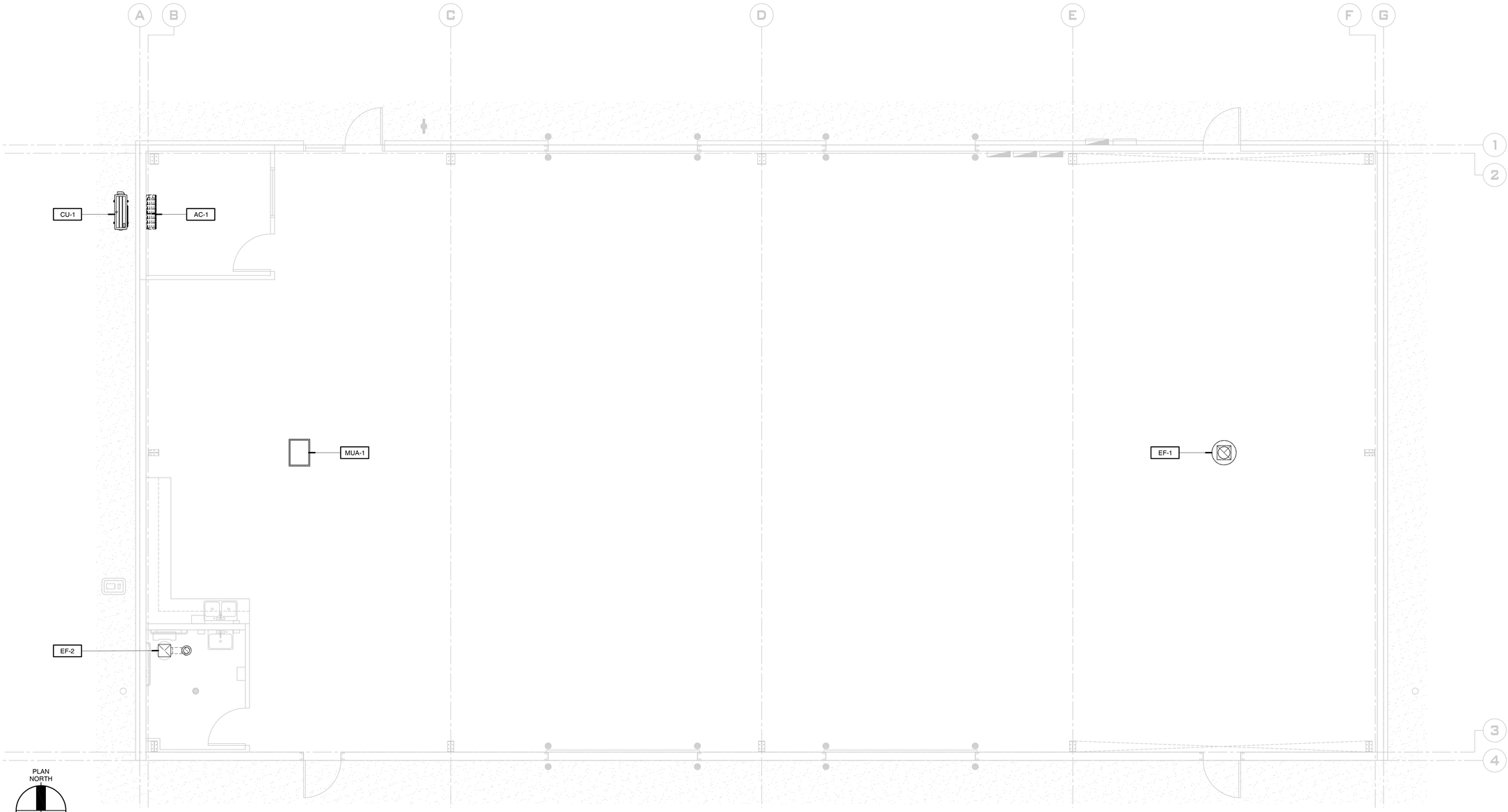
LICENSED ARCHITECT
THEODORE J. BRANDVOLD
C-25449
6-30-15
RENEWAL DATE
STATE OF CALIFORNIA

PROJECT : WAREHOUSE & MAINTENANCE
STORAGE BUILDING
CLIENT : KEYSTONE CORPORATION
LOCATION : KEYSTONE PACIFIC PARKWAY
PATTERSON, CA 95363
A.P.N.: 021-085-020

| | |
|---|---|
| DRAWN | SLW |
| CHECKED | TJB |
| DATE | 8/25/15 |
| SCALE | AS SHOWN |
| JOB NO. | 15-101 |
| SHEET | M-1.0 |
| OF | SHEETS |




PLAN NORTH

TRUE NORTH

## MECHANICAL FLOOR PLAN

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

| | |
|---|---|
| # | SEE DRAWING M-1.0 FOR MECHANICAL SCHEDULE AND SPECIFICATIONS |

## VENTILATION CALCULATION

PER 2013 CALIFORINIA NON-RESIDENTIAL COMPLIANCE
REQUIRED VENTILATION IN WAREHOUSE AREA TO BE .15 CFM / SF

REQUIRED VENTILATION IS AS FOLLOWS:

| | | |
|---|---|---|
| VENTILATION | = | WAREHOUSE SF x .15 CFM |
| | = | 4950 SF / .15 |
| | = | 742.5 CFM |

THE FOLLOWING SHALL BE USED TO PROVIDE REQUIRED VENTILATION:

| | | |
|---|---|---|
| EXHAUST | EF-1 | 768 CFM |
| MAKE-UP | MUA-1 | 768 CFM |

| REVISIONS | BY |
|---|---|
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| | |
| | |
| | |


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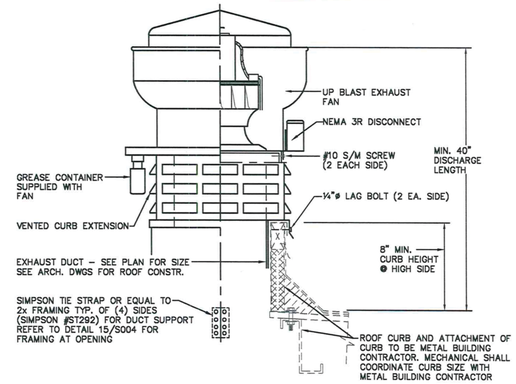
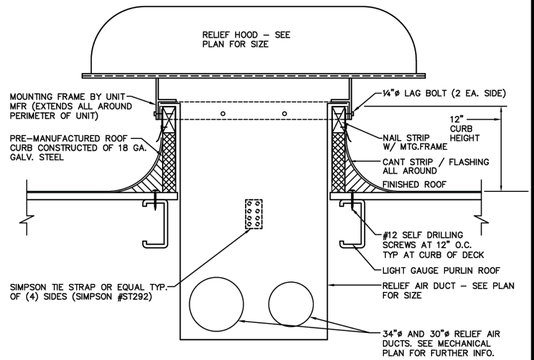
LICENSED ARCHITECT
THEODORE J. BRANDVOLD
C-25449
6-30-15
RENEWAL DATE
STATE OF CALIFORNIA

PROJECT : WAREHOUSE & MAINTENANCE
STORAGE BUILDING
CLIENT : KEYSTONE CORPORATION
LOCATION : KEYSTONE PACIFIC PARKWAY
PATTERSON, CA 95363
A.P.N.: 021-065-020

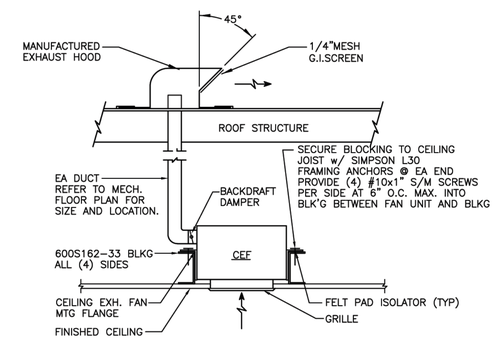
| | |
|---|---|
| DRAWN | SLW |
| CHECKED | TJB |
| DATE | 8/25/15 |
| SCALE | AS SHOWN |
| JOB NO. | 15-101 |
| SHEET | M-2.0 |
| OF | SHEETS |




1 EXHAUST FAN MOUNTING DETAIL NO SCALE




2 MAKE-UP AIR HOOD MOUNTING NO SCALE




3 CEILING EXHAUST FAN MOUNTING NO SCALE

| REVISIONS | BY |
|---|---|
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COMMERCIAL ARCHITECTURE INC.
THEODORE J. BRANDVOLD, ARCHITECT
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PH (209) 571-8158 FAX (209) 571-8160


LICENSED ARCHITECT
THEODORE J. BRANDVOLD
C-25449
6-30-15
RENEWAL DATE
STATE OF CALIFORNIA

PROJECT : WAREHOUSE & MAINTENANCE
STORAGE BUILDING
CLIENT : KEYSTONE CORPORATION
LOCATION : KEYSTONE PACIFIC PARKWAY
PATTERSON, CA 95363
A.P.N.: 021-085-020

| | |
|---|---|
| DRAWN | SLW |
| CHECKED | TJB |
| DATE | 8/25/15 |
| SCALE | AS SHOWN |
| JOB NO. | 15-101 |
| SHEET | M-3.0 |
| OF | SHEETS |