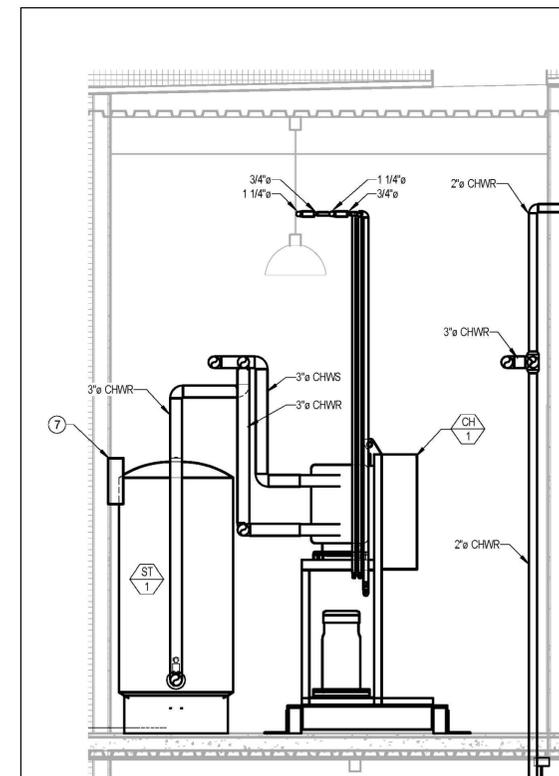


KEY NOTES

- ① 8" FLUE VENT UP THRU ROOF, COMPLETE WITH ROOF-VENT CAP.
- ② INDICATES MINIMUM SERVICE CLEARANCE.
- ③ 2" CHWS & CHWR DOWN TO GROUND LEVEL CEILING SPACE.
- ④ 2" HHWS & HHWR DOWN TO GROUND LEVEL CEILING SPACE.
- ⑤ 2" CHWS & CHWR. FOR CONTINUATION, SEE MECHANICAL SHEET M3.3.
- ⑥ 2" HHWS & HHWR. FOR CONTINUATION, SEE MECHANICAL SHEET M3.3.
- ⑦ PHOTOACOUSTIC INFRARED REFRIGERANT MONITOR WITH INTEGRAL VISUAL, AND AUDIBLE ALARM, 120V.
- ⑧ REMOTE REFRIGERANT DISPLAY MODULE.
- ⑨ REMOTE COMBINATION STROBE LIGHT AND AUDIBLE ALARM, 120V.
- ⑩ 1 1/8" RS AND 5/8" RL REFRIGERANT LINES UP THRU ROOF AND CONNECT TO ACC-1 AS REQUIRED.



SECTION SCALE: 1/2" = 1'-0" M5.0 M5.0

CHILLER ROOM VENTILATION	
VENTILATION SYSTEM SIZED BY CALIFORNIA MECHANICAL CODE, 2007, SECTION 1108	
1108.2.2	CONTINUOUSLY EXHAUST AT 0.5 CFM PER GROSS FLOOR AREA CHILLER ROOM GROSS AREA = 170 SQUARE FEET Q = 0.5 x Agf = .5 x 170 SF Q = 85 CFM EXHAUST AIR
1108.2.3	LIMIT TEMPERATURE RISE TO MAX 104°F THE MAXIMUM OUTSIDE AIR SUMMER TEMPERATURE IS 92° F. TOTAL HEAT REJECTION FROM ONE CHILLER: 0 BTUH TOTAL HEAT REJECTION FROM ONE PUMP: 0 BTUH q (TOTAL LOAD) = 600 BTUH Q = $\frac{q}{\Delta T \times 1.08} = \frac{600}{20 \times 1.08} = 28$ CFM SUPPLY AIR
1108.2.4	EMERGENCY PURGE OF ESCAPING REFRIGERANT Q = 100 G G (LARGEST SYSTEM) = CH-1 = 44 LBS Q = 100 44 = 660 CFM EXHAUST AIR

NOTES	
1. REFRIGERANT MONITORING SYSTEM SHALL BE TRANE TRUESENSE SD.	
CHILLER ROOM VENTILATION SEQUENCE OF OPERATION	
A.	EXHAUST FAN, EE-13, ECM MOTOR SHALL BE SET FOR A MINIMUM AND MAXIMUM AIR FLOW OF 85 CFM AND 660 CFM RESPECTIVELY.
B.	A STANDALONE DDC CONTROL PANEL WILL RECEIVE INPUTS FROM THE PRESSURE DIFFERENTIAL SENSOR AND THE CHILLER ROOM TEMPERATURE SENSOR. 1. THE PRESSURE DIFFERENTIAL SENSOR WILL SEND SIGNAL TO DDC PANEL TO MODULATE MOTORIZED DAMPER CLOSE AS REQUIRED TO MAINTAIN DIFFERENTIAL PRESSURE OF 0.05" BETWEEN CHILLER ROOM AND ADJACENT AREA. 2. THE CHILLER ROOM TEMPERATURE SENSOR WILL SEND SIGNAL TO DDC PANEL.
C.	UPON A REFRIGERANT SPILL IN THE CHILLER ROOM, A RELAY IN EITHER OF THE TWO SENSOR MODULES WILL CLOSE, ENERGIZING CONTROL CIRCUIT TO SIGNAL EXHAUST FAN VFD TO GO TO MAXIMUM AIR FLOW OF 660 CFM.

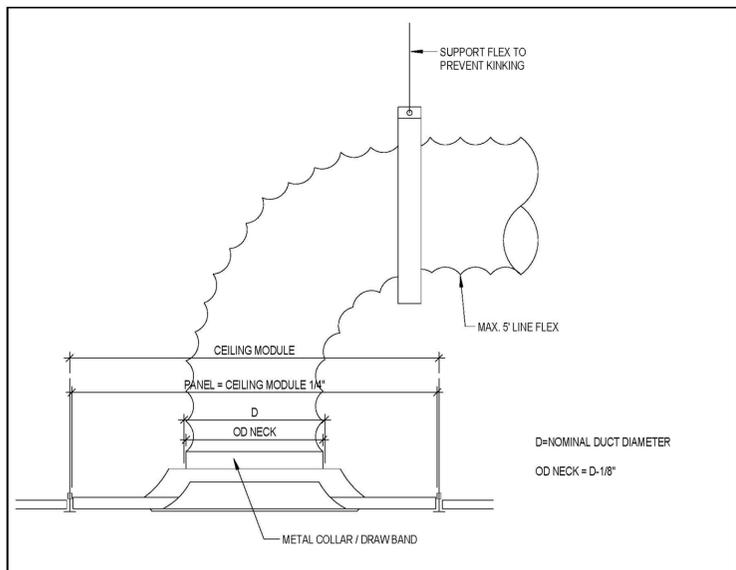
ENLARGED MECHANICAL CHILLER/BOILER ROOM PLAN

SCALE: 1/2" = 1'-0" M3.3 M5.0

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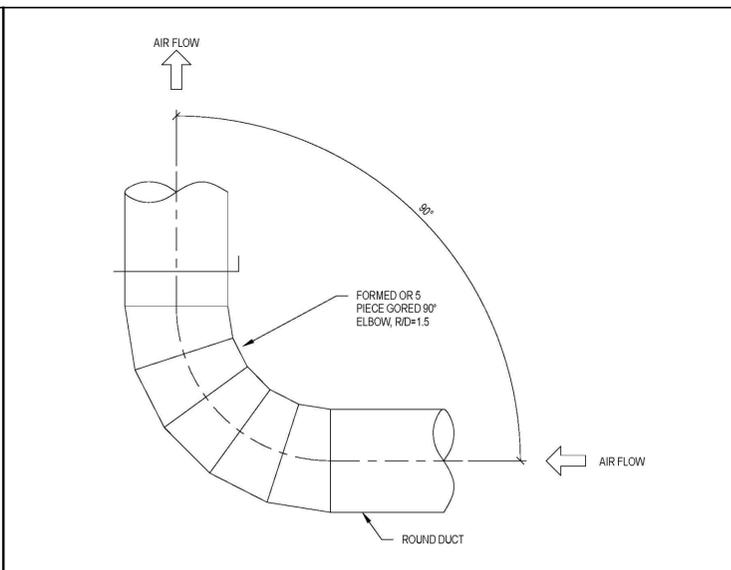
DATE	SYM	REVISION	BY	A/PD

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION		APPROVALS		DATE
DRYDEN FLIGHT RESEARCH CENTER EDWARDS, CA		Chief, Facilities Engineering		8-18-11
		Project Requestor/Custom		8-18-11
MECHANICAL ENLARGED PLAN		Facilities Project Manager		8-18-11
		Chief, Office of Protective Services		8-18-11
PROJECT TITLE 8-18-11 FACILITIES SUPPORT CENTER 100% FINAL DESIGN SUBMITTAL		Chief - Safety, Health and Environmental Office		8-18-11
		DFRC Chief Information Officer		8-18-11
DATE STRD	11/04/10	DATE PRNTD	05/23/11	
DRAWN BY	SCALE		EDM-1703	
AS NOTED	TRADE		SH No.	
FILE NAME	M5.0		SHEET No. 125 of 195	



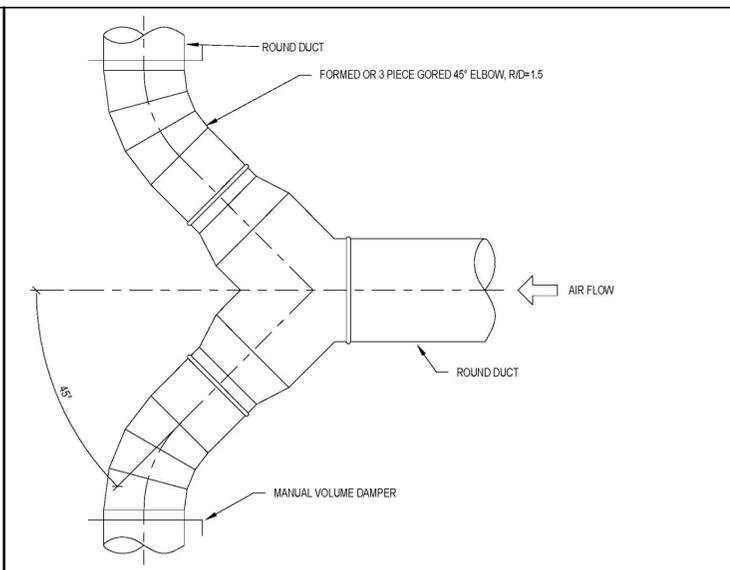
CEILING DIFFUSER DETAIL

SCALE: 1
NONE M2.1 M6.9



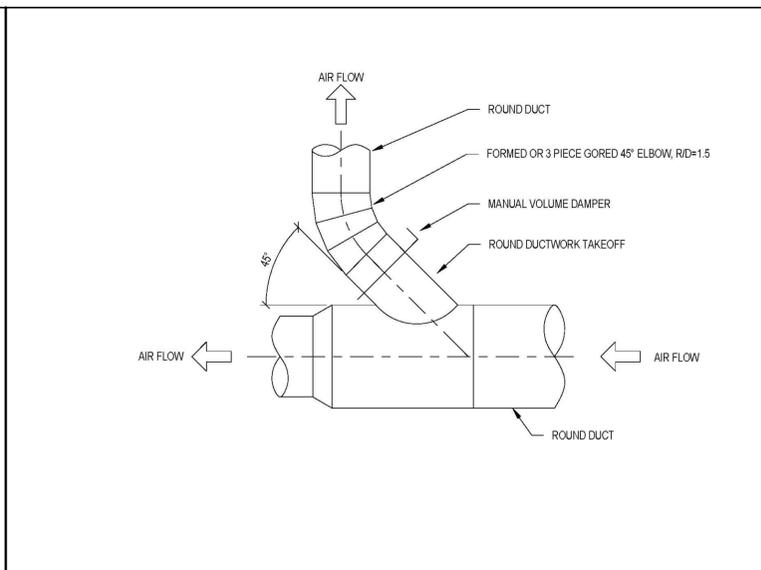
90 DEG. TURN - ROUND DUCT DETAIL

SCALE: 2
NONE M2.1 M6.9



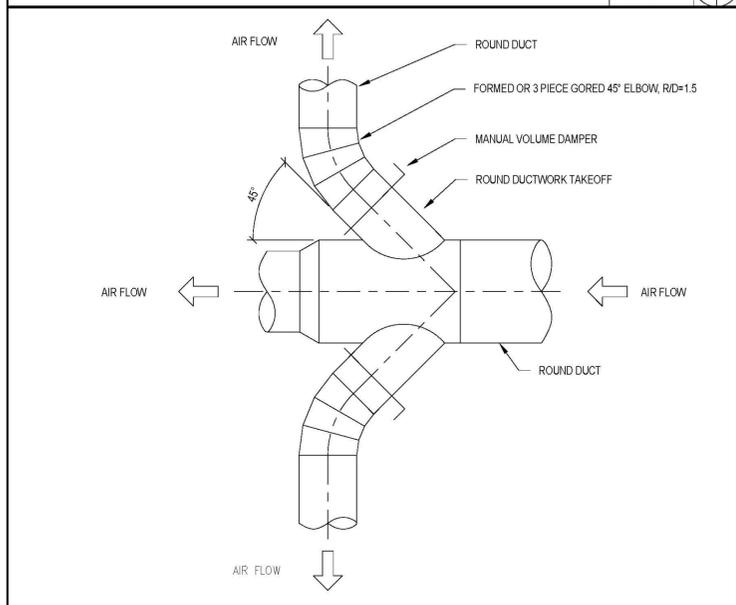
SUPPLY DUCT - ROUND TO ROUND

SCALE: 3
NONE M2.1 M6.9



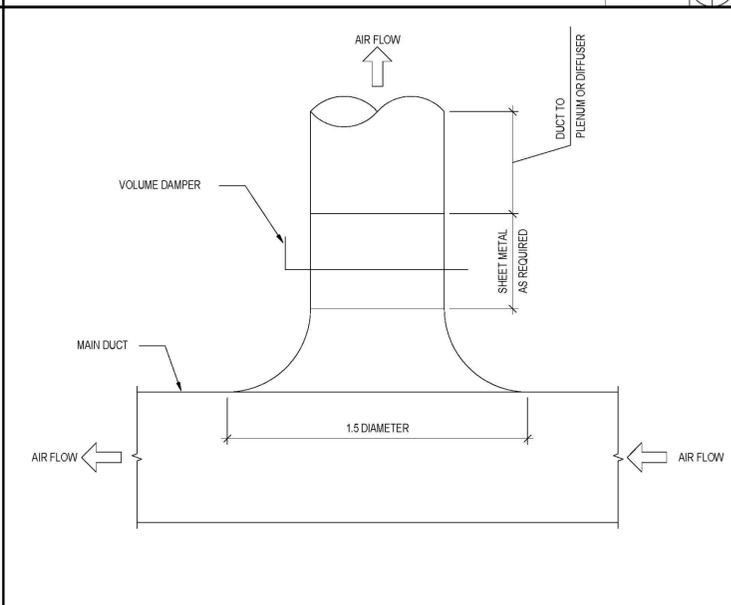
SUPPLY DUCT - ROUND TO ROUND

SCALE: 4
NONE M2.1 M6.9



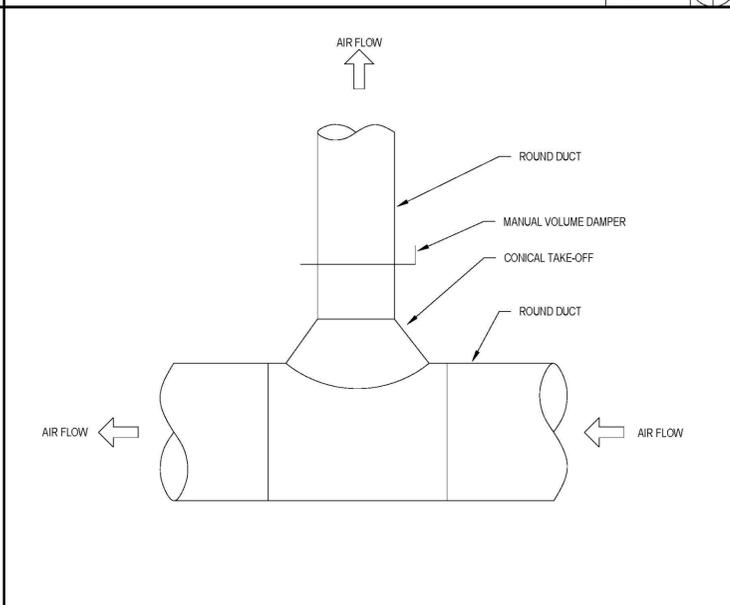
SUPPLY DUCT - ROUND TO ROUND

SCALE: 5
NONE M2.1 M6.9



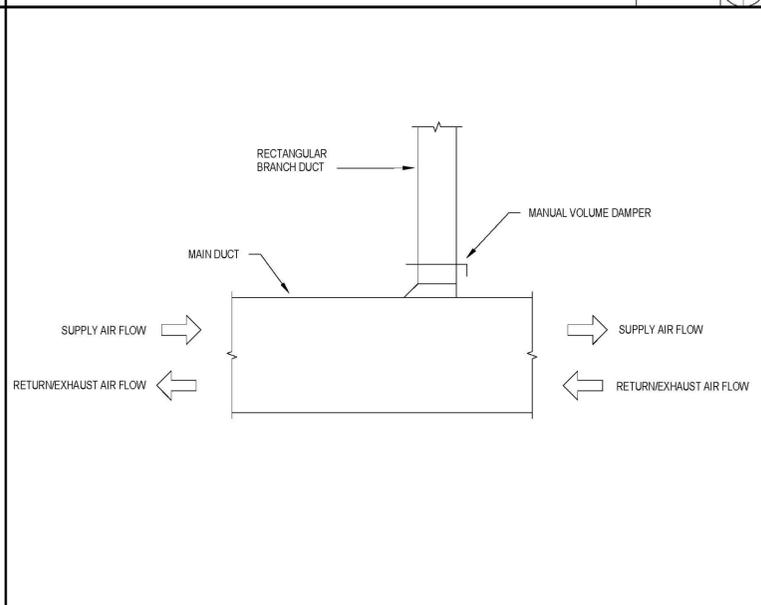
ROUND SUPPLY DUCT CONN. DETAIL

SCALE: 6
NONE M2.1 M6.9



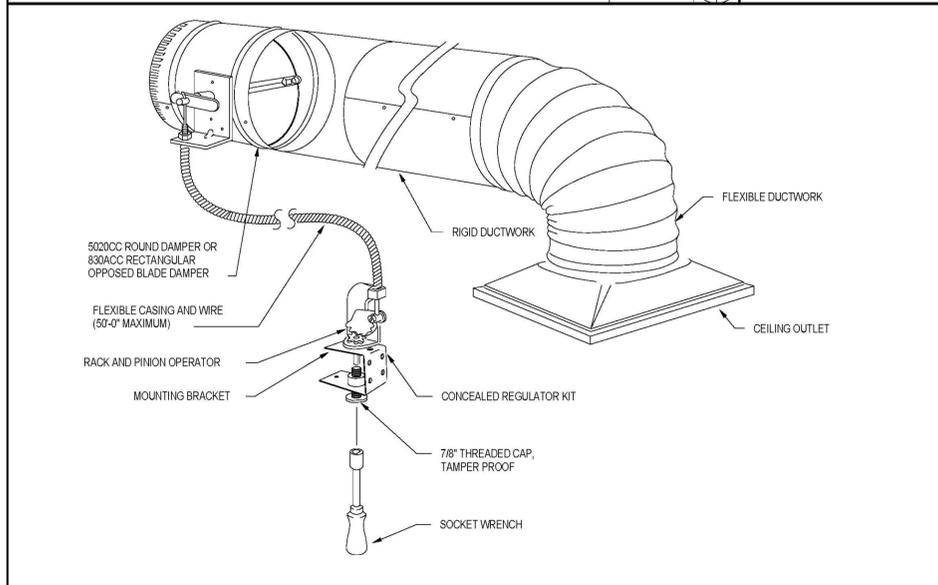
SUPPLY BRANCH - CONICAL DETAIL

SCALE: 7
NONE M2.1 M6.9



RECT. DUCT BRANCH CONN. DETAIL

SCALE: 8
NONE M2.1 M6.9



YOUNGS REGULATOR CONTROL DETAIL

SCALE: 9
NONE M2.1 M6.9

270-896 BOWDEN CABLE CONTROL SYSTEM

- NOTE:**
- COORDINATE EXACT LOCATION OF CEILING MOUNTED CONCEALED REGULATOR WITH ARCHITECT PRIOR TO INSTALLATION.
 - THE 270-896 BOWDEN CABLE CONTROL SYSTEM IS DESIGNED TO BE IMBEDDED IN THE CEILING FLUSH WITH THE FINISHED SURFACE.
 - CABLE SHALL CONSIST OF BOWDEN CABLE 0.054" STAINLESS STEEL CONTROL WIRE ENCAPSULATED IN 1/16" FLEXIBLE GALVANIZED SPIRAL WIRE SHEATH.
 - LOCKING RACK AND PINION GEAR DRIVE SHALL BE CONSTRUCTED OF 14 GAUGE STEEL AND SHALL BE USED TO CONVERT ROTARY MOTION INTO PUSH-PULL MOTION.
 - CONTROL SHAFT SHALL BE "D"-STYLE FLATTENED 1/4" DIAMETER WITH 265° ROTATION PROVIDING 1-1/2" LINEAR TRAVEL CAPABILITY.

REGISTERED PROFESSIONAL ENGINEER
MECHANICAL
 STATE OF CALIFORNIA
 No. 11654
 Exp. 9-30-11

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 EDWARDS, CA

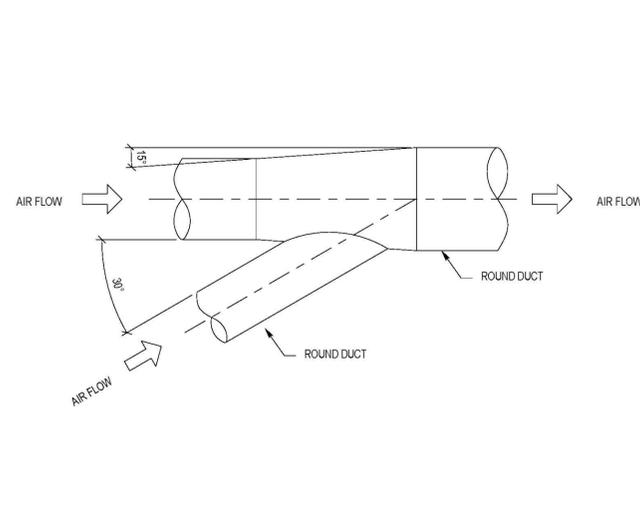
APPROVALS

NAME	DATE
DAN CROWLEY	8-18-11
DAN CROWLEY	8-18-11
GENMA FLORES	8-18-11
JOHN ZELLMER	8-18-11
DAN MULLEN	8-18-11
KEN NORLIN	8-18-11

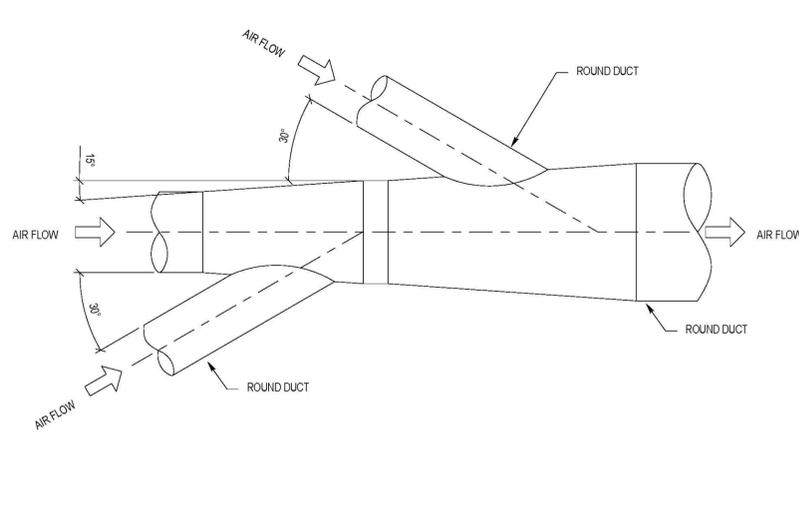
DRAWING TITLE
 MECHANICAL DETAILS

PROJECT TITLE
 FACILITIES SUPPORT CENTER
 100% FINAL DESIGN SUBMITTAL

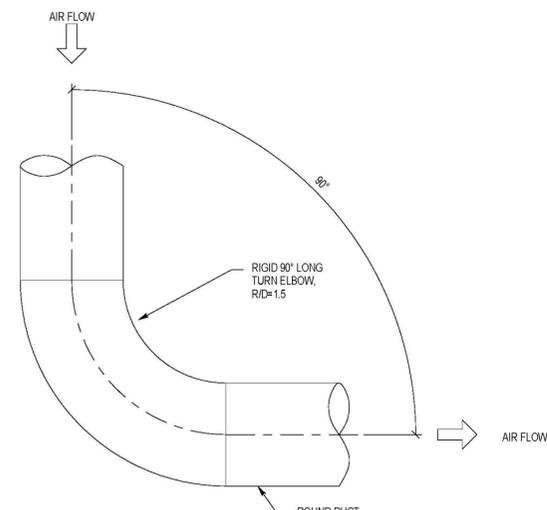
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 SCALE: AS NOTED TRADE SH. No.
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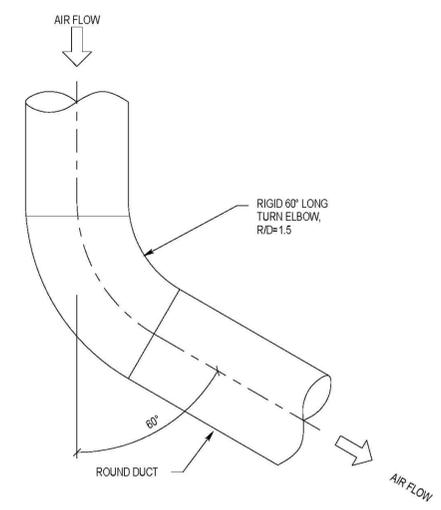
EXHAUST DUCT - DUST COLLECTOR



EXHAUST DUCT - DUST COLLECTOR



EXHAUST DUCT 90° TURN - DUST COLLECTOR



EXHAUST DUCT 60° TURN - DUST COLLECTOR

EXHAUST DUCT DUST COLLECTOR DETAIL

SCALE: 1
NONE M2.1 M6.2

WOODWORKING SHOP DUST COLLECTING SYSTEM DUCTWORK

A. FURNISH AND INSTALL A DUST COLLECTION SYSTEM CONSISTING OF DUCTWORK, FITTINGS, EXHAUST HOODS AND CONNECTIONS TO EACH PIECE OF SHOP EQUIPMENT AND FLOOR SWEEPS, ALL AS HEREIN SPECIFIED OR SHOWN ON THE DRAWINGS AND REQUIRED FOR A COMPLETE OPERATING SYSTEM.

B. DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED SHEET STEEL AND MEET ALL SMACNA AND INDUSTRIAL VENTILATION MANUAL STANDARDS. CONVEYING VELOCITY IN BRANCH DUCTS SHALL BE 4,500 FEET PER MINUTE. DUCTWORK SHALL BE RATED FOR 20" WG NEGATIVE PRESSURE AND BE OF SPIRAL, LOCKING SEAM CONSTRUCTION. DUCT AND FITTING GAUGES SHALL BE AS FOLLOWS:

DIAMETER	DUCT GAUGE	FITTING GAUGE
UP TO 8"	24	20
9" TO 15"	22	18
16" TO 18"	20	16
19" TO 25"	18	14

C. ELBOWS SHALL HAVE A MINIMUM CENTERLINE RADIUS OF 1-1/2 TIMES THE DUCT DIAMETER.

D. PROVIDE DEAD-END CAPS WITHIN 6" OF LAST BRANCH OF ALL MAIN OR SUB-MAINS. PROVIDE CLEANOUTS EVERY 20 FEET NEAR EACH ELBOW IN HORIZONTAL SECTIONS.

E. TRANSITIONS IN MAINS AND SUB-MAINS SHALL BE TAPERED. TAPER 5' LONG FOR EACH 1" CHANGE IN DIAMETER.

F. SLIDE GATES SHALL BE FULL STYLE, WITH LOCKING SCREW AND PROVIDED FOR BALANCING THE SYSTEM. LOCATE GATE NEAR CONNECTION TO EACH MACHINE AND FLOOR SWEEP. DO NOT MAKE A CONNECTION TO ANY SPARK-PRODUCING MACHINE, SUCH AS A GRINDING WHEEL.

G. LOCATE 6" FLOOR SWEEP(S), WHERE SHOWN ON THE PLANS. IF PROVIDED WITH HINGED DOOR, FOR SAFETY REASONS, ATTACH CHAIN FROM DOOR TO VERTICAL DUCT AT 5' AFF.

H. FLEXIBLE HOSE CONNECTIONS FROM BRANCH DUCTS TO HOODS SHALL BE KEPT AT A MINIMUM AND BE MATERIAL HANDLING TYPE (NOT PVC), WITH WIRE REINFORCEMENT.

DUST COLLECTING DUCT GAUGE SCALE: 3
NONE M6.2 M6.3

DUST COLLECTOR SPECIFICATION

FURNISH AS COMPLETE INTERMITTENT DUTY, SHAKER FABRIC FILTER DUST COLLECTION AS SHOWN ON THE PLANS AND/OR LISTED ON THE EQUIPMENT SCHEDULE. THE SYSTEM SHALL PROVIDE CLEANING FOR A VOLUMETRIC FLOW RATE OF _____ CFM @ _____" F @ _____ FEET ELEVATION. THE COLLECTOR SYSTEM SHALL HAVE A MINIMUM OF 450 SQUARE FEET OF 8 OZ WOVEN POLYESTER FILTER MEDIA.

THE COLLECTOR WILL INCLUDE A FAN SECTION, FILTER SECTION AND HOPPER(S) WITH LEGS AND QUICK RELEASE SEAL MECHANISM FOR CONNECTION TO INTEGRAL DUST BIN.

THE COLLECTOR HOUSING, HOPPER(S) AND SUPPORTS SHALL BE CONSTRUCTED OF CARBON STEEL AND THE HOUSING REINFORCED FOR MAXIMUM PRESSURE OF THE INTEGRAL FAN.

THE INTERIOR AND EXTERIOR OF THE COLLECTOR HOUSING WILL HAVE A BAKED ON POWDER PAINT FINISH. ALL INTERNAL COMPONENTS SHALL HAVE A BAKED ON ELECTROPHORETICALLY APPLIED EPOXY PAINT FINISH.

THE COLLECTOR WILL HAVE DUST BIN(S) SEALED TO THE HOPPER BOTTOM(S) BY A HAND OPERATED QUICK RELEASE SEAL MECHANISM OR WILL HAVE MECHANISM DESIGNED TO ACCEPT 55-GALLON DRUM (NO FASTENERS OR CLAMPS ARE REQUIRED). THE HOPPER(S) SHALL HAVE A DEFLECTOR PLATE AT THE DIRTY AIR INLET TO DIRECT LARGE PARTICLES DIRECTLY INTO THE DUST BIN AND DISTRIBUTE THE AIR. THE HOPPER SHALL BE SUPPLIED WITH COVERED OPENINGS SO AIR INLETS MAY BE LOCATED ON EITHER SIDE OR THE REAR. DUST LADEN AIR WILL FLOW UPWARD INTO THE FILTER SECTION WHICH SHALL CONTAIN A SINGLE, MULTI-ENVELOPE FILTER WITH SPRING STEEL WIRE MESH INSERTS FITTED WITH WEAR LINERS. THE SLIDE OUT FILTER ASSEMBLY SHALL BE SUPPORTED ON RUNNERS RETAINED BY A QUICK RELEASE LEVER. THE FILTERED AIR SHALL FLOW INTO THE FAN SECTION. THE FAN SHALL BE A WHEEL DESIGN DIRECTLY DRIVEN BY A 3450 RPM TEFC MOTOR.

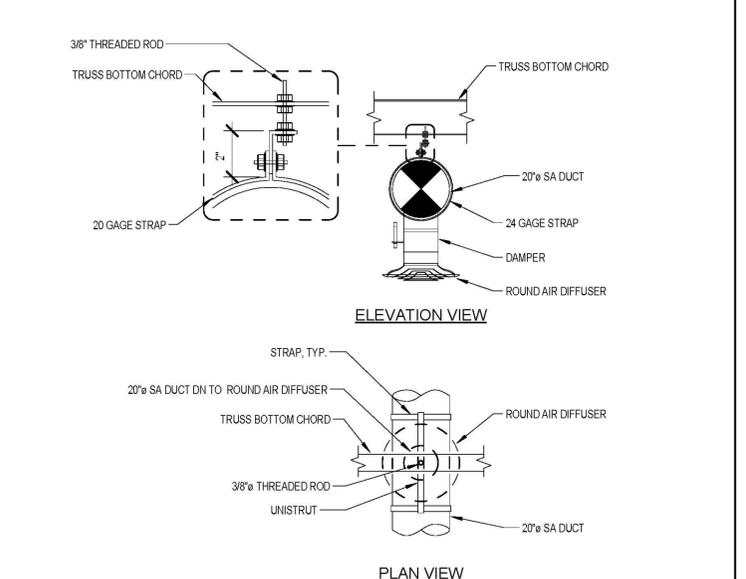
FILTER CLEANING OCCURS AFTER EACH FAN SHUT DOWN. FILTER SHAKING IS VIA AN ECCENTRIC MOUNTED TENV MOTOR LOCATED ON THE SIDE OF THE HOUSING.

A CONTROLLER SHALL BE FURNISHED, CONSISTING OF START/STOP PUSHBUTTONS, TIMER AND MOTOR CONTACTORS WITH OVERLOADS FOR THE FAN AND SHAKER MOTORS. ALL IN A NEMA 12 ENCLOSURE. THE CONTROLLER SHALL AUTOMATICALLY ACTIVATE THE FILTER SHAKER MOTOR FOR 35 SECONDS EACH TIME THE FAN IS SHUT OFF.

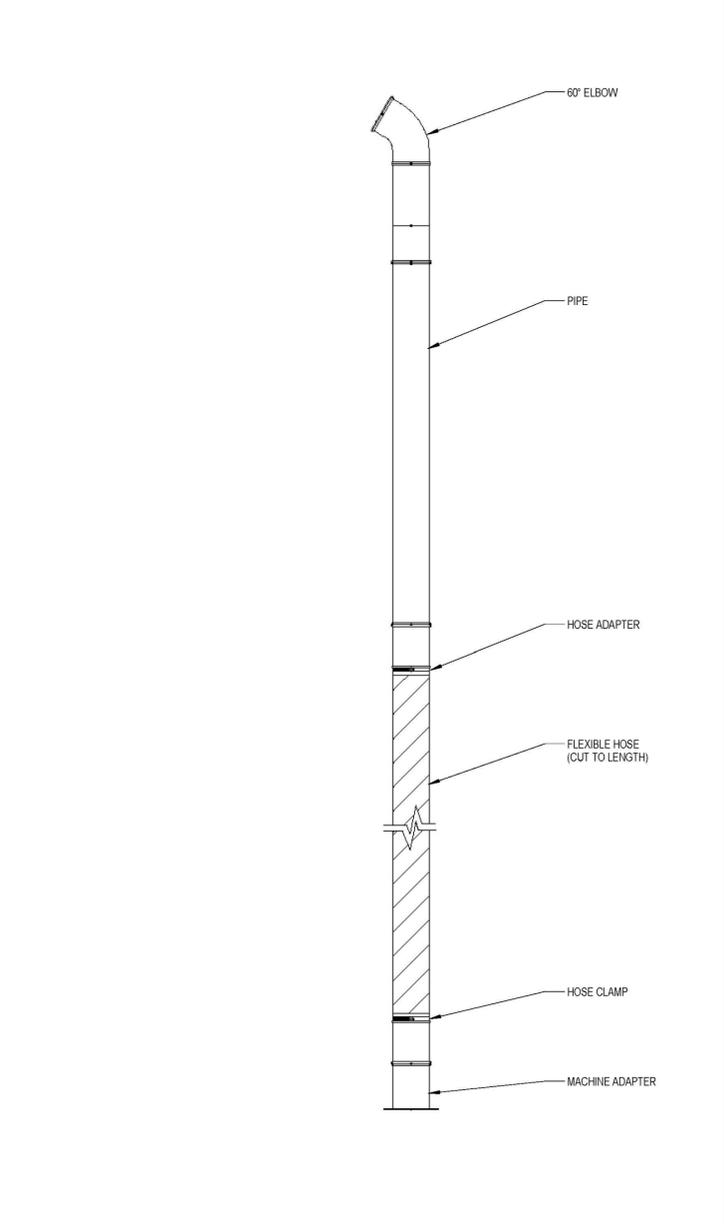
THE COLLECTOR WILL BE SUPPLIED WITH LIFT-OFF HINGED DOORS FOR ACCESS TO THE FAN AND FILTER CHAMBER. NO TOOLS SHALL BE REQUIRED FOR FILTER REMOVAL AND REPLACEMENT.

THE FAN SHALL DISCHARGE INTO A SPECIAL FAN CHAMBER DESIGNED FOR NOISE REDUCTION. THE NOISE LEVEL SHALL NOT EXCEED _____ DB(A) AT 1 METER RADIUS FROM THE COLLECTOR HOUSING.

DUST COLLECTION SPECIFICATION SCALE: 4
NONE M6.2 M6.3



DUCT MOUNTING DETAIL SCALE: 5
NONE M2.1 M6.2



DUST COLLECTOR BRANCH DETAIL SCALE: 2
NONE M2.1 M6.2

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 DRYDEN FLIGHT RESEARCH CENTER
 EDWARDS, CA

DRAWING TITLE
 MECHANICAL DETAILS

PROJECT TITLE
 FACILITIES SUPPORT CENTER
 100% FINAL DESIGN SUBMITTAL

APPROVALS		DATE
Chief, Facilities Engineering	<i>Dan Crowley</i>	8-18-11
Project Requestor/Custom	<i>Dan Crowley</i>	8-18-11
Facilities Project Manager	<i>Gemma Flores</i>	8-18-11
Chief, Office of Protective Services	<i>John Zellmer</i>	8-18-11
Chief - Safety, Health and Environmental Office	<i>Dan Millen</i>	8-18-11
DFRC Chief Information Officer	<i>Ken Norlin</i>	8-18-11

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