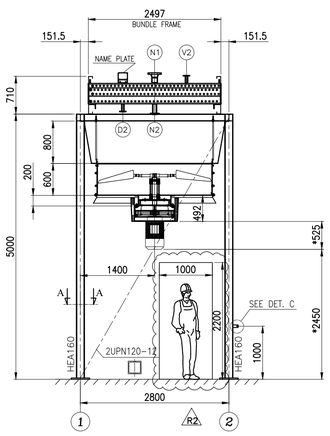
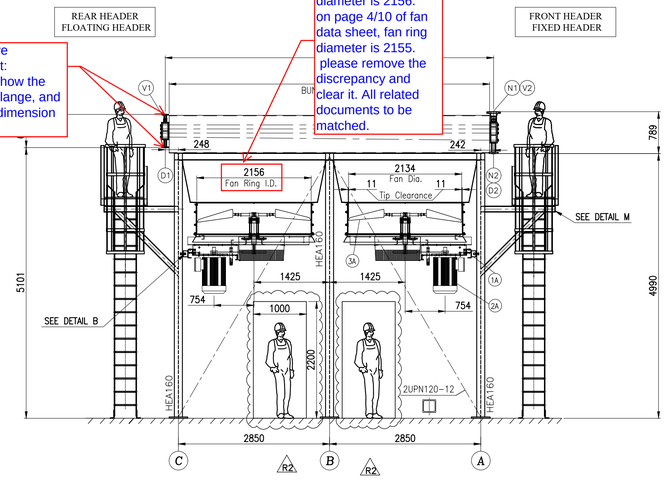


FRONT VIEW
CL. A,C

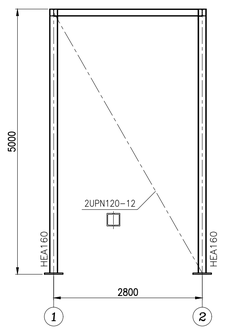
* THIS DIMENSION WILL BE FINALIZED AFTER APPROVED OF MOTOR DATA SHEET

Repetitive comment:
Please show the raise of flange, and set the dimension with it.

On page 3/10 of fan data sheet , fan ring diameter is 2156.
on page 4/10 of fan data sheet, fan ring diameter is 2155.
please remove the discrepancy and clear it. All related documents to be matched.



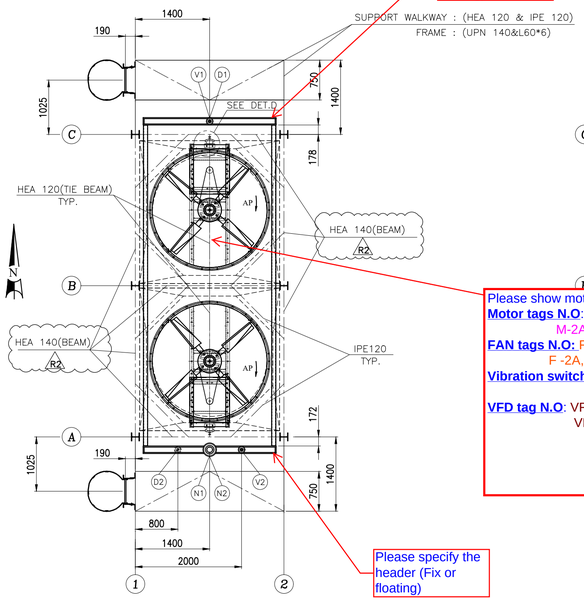
SIDE VIEW



FRONT VIEW
CL. B

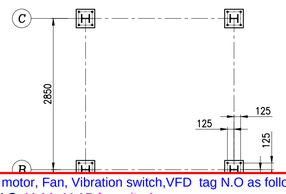
Please add a sketch for lifting the bundle.

Please specify and show the support of cable tray for vibration switch.

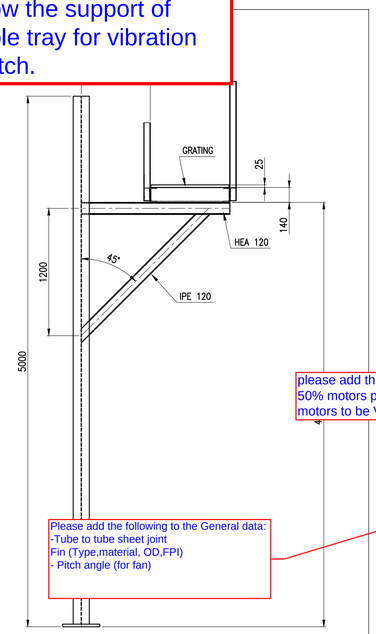


Please specify the header (Fix or floating)

Please show motor, Fan, Vibration switch,VFD tag N.O as following :
Motor tags N.O: M-1A, M-1B for unite 1
M-2A, M-2B for unite 2
FAN tags N.O: F-1A, F-1B for unite 1
F -2A, F-2B for unite 2
Vibration switch tag N.O: VS-1A, VS-1B for unite 1
VS-2A, VS-2B for unite 2
VFD tag N.O: VFD-1 for unit 1
VFD-2 for unit 2



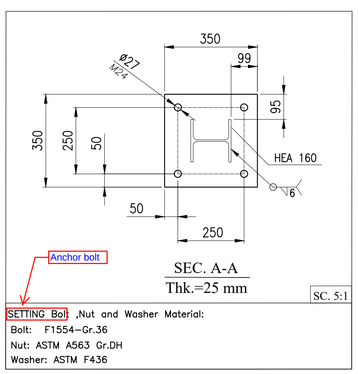
BASE PLATE VIEW



DET. M

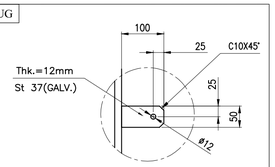
please add this note:
50% motors per unit to be VFD. All motors to be VFD compatible.

Please add the following to the General data:
-Tube to tube sheet joint
Fin (Type,material, OD,FPI)
- Pitch angle (for fan)



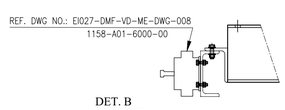
SETTING Bolt ,Nut and Washer Material:
Bolt: F1554-Gr.36
Nut: ASTM A563 Gr.DH
Washer: ASTM F436

EARTHING LUG

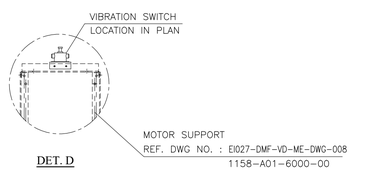


DET. C
* Only FOR COLUMNS : A1&C2

VIBRATION SWITCH



DET. B



DET. D

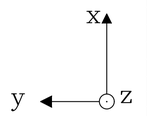


Table 1. Weight of equipments For 1 Units (Total Units = 2)

	Total No in one Unit	Total Weight in one Unit (tonf)	Total No. for One Bay	Weight for One Bay (kgf)
Bundle Frame	1	0.865	1	865
Tube Bundle & Headers	1	2.635	1	2635
sum				**3500**
Water in Tubes & Header	1	0.48	1	480
sum				**480**
Plenum	2	0.245	2	490
Fan Ring	2	0.13	2	260
Motor	2	0.07	2	140
Fan	2	0.0275	2	55
Speed Reducer	2	0.25	2	500
Machinery Mount	2	0.32	2	640
Fan Guard	2	0.0325	2	65
sum				**2150**
Fabrication Weight For 1 Units				5650
Operation Weight For 1 Units				6130
Hydrotest Weight For 1 Units				6130
Total Weight of Main structure, Ladder for 1 Units				**5600**

TABLE: Joint Reactions

Joint	OutputCase	Fx	Fy	Fz
Text	Text	Kgf	Kgf	Kgf
A-1	DEAD_S	16.65	-45	861.98
A-1	DEAD	49.34	-158.83	1640.14
A-1	DEAD_OP	4.08	-14.37	92.37
A-1	DEAD_N	-1631.93	429.16	-2881.5
A-1	LIVE	3.34	25.54	1383.73
A-1	WX	31.57	329.34	-352.72
A-1	WY	-387.76	93.94	-669.09
A-1	SNOW	9.74	-24.99	547.6
A-1	EQX	106.43	1146.34	-1764.17
A-1	EQY	-1561.76	337	-3289.21
A-1	EQXO	210.24	2295.43	-3529.78
A-1	EQYO	-3123.79	673.24	-6571.39
A-2	DEAD_S	-20.6	1.599E-13	380.54
A-2	DEAD	-33.06	-0.00000289	811.07
A-2	DEAD_OP	-0.21	-3.963E-07	55.27
A-2	DEAD_N	-10.59	-1.13	-378.95
A-2	LIVE	-76.47	6.353E-13	402.18
A-2	WX	1.165E-12	49.87	8.288E-13
A-2	WY	-54.91	-1.269E-13	-353.83
A-2	SNOW	-19.58	-8.653E-07	221.21
A-2	EQX	0.004107	45.8	0.09216
A-2	EQY	-48.82	-0.38	-1465.12
A-2	EQXO	0.00889	92.7	0.18
A-2	EQYO	-98.54	-0.78	-2927.34
A-3	DEAD_S	16.65	45	861.98
A-3	DEAD	49.34	158.83	1640.17
A-3	DEAD_OP	4.08	14.37	92.37
A-3	DEAD_N	39.17	235.02	482.86
A-3	LIVE	3.34	-25.54	1383.73
A-3	WX	-31.57	329.34	352.72
A-3	WY	-387.76	-93.94	-669.09
A-3	SNOW	9.74	24.99	547.61
A-3	EQX	-106.49	1146.49	1764.07
A-3	EQY	-1071.77	-428.48	-2570.23
A-3	EQXO	-210.36	2295.75	3529.6
A-3	EQYO	-2144	-856.2	-5134.3
B-1	DEAD_S	34.11	-1.44	482.68
B-1	DEAD	174.23	-2.24	983.92
B-1	DEAD_OP	16.3	0.03128	81.45
B-1	DEAD_N	-670.87	1.33	2555.04
B-1	LIVE	-43.74	-6.51	64.14
B-1	WX	-255.25	0.99	-374.63
B-1	WY	-1.33	-70.96	504.74
B-1	SNOW	24.65	-1.56	193.87
B-1	EQX	-985.73	4.1	-1834.5
B-1	EQY	-51.12	28.6	2619.38
B-1	EQXO	-1968.03	8.18	-3658.39
B-1	EQYO	-102.38	-57.85	5233.15
B-2	DEAD_S	-3.76E-15	-9.82	342.79
B-2	DEAD	-1.168E-10	-61.15	847.79
B-2	DEAD_OP	-1.602E-11	-8.01	77.09
B-2	DEAD_N	-0.0003857	-403.24	720.08
B-2	LIVE	8.844E-15	82.81	-147.91
B-2	WX	-56.07	3.583E-12	-6.399E-13
B-2	WY	-8.004E-14	-439.42	682.53
B-2	SNOW	-3.498E-11	3.21	131.34
B-2	EQX	0.02819	0.04229	-0.07544
B-2	EQY	0.006383	-1570.51	2804.88
B-2	EQXO	-0.2	0.08416	-0.15
B-2	EQYO	0.0007535	-3138.25	5603.81
B-3	DEAD_S	-34.11	-1.44	482.68
B-3	DEAD	-174.23	-2.24	983.9
B-3	DEAD_OP	-16.3	0.03128	81.45
B-3	DEAD_N	-670.07	1.26	1104.47
B-3	LIVE	43.74	-6.51	64.14
B-3	WX	-255.25	-0.99	374.63
B-3	WY	1.33	-70.96	504.74
B-3	SNOW	-24.65	-1.56	193.87
B-3	EQX	-985.8	-4.09	1834.58
B-3	EQY	-40.75	-28.68	1900.29
B-3	EQXO	-1968.16	-8.15	3658.54
B-3	EQYO	-81.36	-57.83	3796.07

NOTES:

1) Loading Data
WIND :ASCE7-16,VELOCITY :125Km/h, EXPOSURE : C
Earthquake: Standard No. 2800,A=0.3,B=2.75,I=1.4,R=3.5,SOIL TYPE=IV
2) Fans
-100% AP(Adjustable pitch-manual)
3) Miscellaneous
- The Inlet Header Boxes Are Fixed In The Direction Of Fin Tubes, Refer To Table For The Lateral Displacement In Y Direction
- Flange Face Detail : ASME ANSI B16.5
4) All Dimensions Are In Millimeter Unless Otherwise Specified.
5) All Dimensions Tolerances Are According to API 661.(Figure 10)
6) Bolts which are used for fixing headers to side frame , on sliding side should be removed after erection.
7) PROTECTION(SEE Galvanizing Specification and Inspection Procedure: EI027-DMF-VD-QC-PRO-024
8) RADIOGRAPHIC TEST (FULL/SPOT) SHALL BE IN COMPLIANCE WITH THE REQUIREMENTS OFNASME SEC. VIII DIV.1 UW-11 & UW-12.

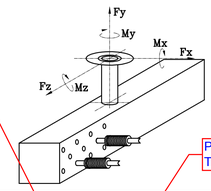
LOAD DEFINITION*

DEAD	DEAD LOAD(PLENUMS+FAN RINGS+FAN GUARDS+FAN+MOTOR+SPEED REDUCERS+GRATING+ +TUBE BUNDLE EMPTY)+HEADER WALK WAY
DEAD OP	WEIGHT OF LIQUID WITHIN EACH TUBE BUNDLE& STEAM COIL(WATER)
DEADS	SELF WEIGHT OF STRUCTURE
DEADN	NOZZEL LOAD
LIVE	WALKWAY LOAD 250 Kg/m2
EQX	SEISMIC LOAD DIR.X
EQY	SEISMIC LOAD DIR.Y
WX	WIND LOAD DIR.X
WY	WIND LOAD DIR.Y
SNOW	66 Kg/m2

* Further Definition Check the Steel Structure Calculation.Doc No.: EI027-DMF-VD-ST-CAL-004
1158-A01-0030-00

THE MAXIMUM ALLOWABLE MOMENTS AND FORCES PER EACH NOZZLE (IF LOADS ARE DIVIDED EQUALLY FOR NOZZLES ACCORDING TO 3xAPI 661(7.1.10.1)

SIZE	Fx(N)	Fy(N)	Fz(N)	Mx(N.m)	My(N.m)	Mz(N.m)
4"	10020	8010	10020	2430	3660	2430
2"	3060	3990	3060	450	720	450



Please clear it.
QTY.PER BAY/ 2 unites

Please add Sch & Thk for nozzles

CONNECTIONS

NO.	REP.	QTY. PER BAY/UNIT	DIA	DESIGNATION
N1	INLET NOZZLE/FLANGE	1/2	4"	FLANGE ANSI B16.5,#300,WN,RF,SCH.160,SA-333 Gr.6 /SA-350 LF2 CL.1N
N2	OUTLET NOZZLE/FLANGE	1/2	2"	FLANGE ANSI B16.5,#300,LWN,RF,SA-350 LF2 CL.1N
V1&V2	VENT	2/4	1"	FLANGE ANSI B16.5,#300,LWN,SA-350 LF2 CL1 N
D1&D2	DRAIN	2/4	1"	FLANGE ANSI B16.5,#300,LWN,SA-350 LF2 CL1 N
~~1A~~	VIBRATION SWITCH	2/4	–	SEE FAN DRIVE ASSEMBLY DRAWING
~~2A~~	MOTOR(7.5Kw)	2/4	–	SEE FAN DRIVE ASSEMBLY DRAWING
~~3A~~	FAN	2/4	7ft	SEE FAN DRIVE ASSEMBLY DRAWING

LATERAL DISPLACEMENT OF HEADERS (DIRECTION X) INSIDE BUNDLE FRAME IN RELATION WITH EXPANSION FORCES ON NOZZLES (mm) (ACCORDING TO API661 7-1-1-2)

MAXIMUM DISPLACEMENT	INLET/OUTLET : ±9

* FOR MORE DETAILS FOR EACH COMPONENT OF AIR COOLER REFER TO BELOW DRAWING & DOCUMENTS.

REFERENCED DWG&DOC.

TITLE	VENDOR DOCUMENT NO.	CLIENT DOCUMENT NO.
Tube Bundle Drawing	1158-A01-2000-00	EI027-DMF-VD-ME-DWG-005
Bundle Frame Drawing	1158-A01-2400-00	EI027-DMF-VD-ME-DWG-007
Fan Drive Assembly Drawing	1158-A01-6000-00	EI027-DMF-VD-ME-DWG-008
Fan Ring Drawing	1158-A01-5067-00 1158-A01-5167-00	EI027-DMF-VD-ME-DWG-009
Support Mechanism Drawing	1158-A01-6307-00	EI027-DMF-VD-ME-DWG-010
Plenum Drawing	1158-A01-5110-00	EI027-DMF-VD-ME-DWG-011
Steel Structure Drawing	1158-A01-1100-00	EI027-DMF-VD-ST-DWG-013
Header Walkway Drawing	1158-A01-1200-00	EI027-DMF-VD-ST-DWG-014
Ladder Drawing	1158-A01-1520-00	EI027-DMF-VD-ST-DWG-015
Surface Preparation and Painting Procedure for Air Cooler	1158-A01-QS01-00	EI027-DMF-VD-QC-PRO-024

GENERAL DATA

ITEM NO.	– R2
DESIGN CODE BUNDLE/STRUCTURE	ASME SEC.VIII DIV.1(2019), API661(2013-7th EDITION)/Standard No. 2800
INLET PRESSURE/PRESSURE DRO. (ALLOWABLE/CALC.)	19.8 Bar /(0.1/0.016) Bar
DESIGN PRESSURE	22+F.V. (barg)
HYDROSTATIC TEST PRESSURE	28.6 (bar) R2
TEMPERATURE IN/OUT(TUBE SIDE)	73.5°C/56.32°C
DESIGN TEMPERATURE	120 °C
MINIMUM DESIGN METAL TEMPERATURE	-45°C R2
AIR INLET/OUTLET TEMPERATURE (AIR SIDE)	48 / 52.28 °C
MINIMUM DESIGN AMBIENT TEMPERATURE	5 °C
CORROSION ALLOWANCE	3 mm
ULTRASONIC TEST	YES(Full)[See note 8]
RADIOGRAPHY	YES(Full)[See note 8]
STRESS RELIEVING	YES
BARE/FINNED SURFACE PER UNIT	68.101/1579.2 m2
NUMBER OF BUNDLE PER BAY	1
NUMBER OF UNIT	2 R2
NUMBER OF BAY PER UNIT	1
NOZZLE SIZE(INLET/OUTLET/RATING/TYPE)	1x4"/1x2"/SCH.160/#300
PROCESS FLUID NAME	PROPANE
SERVICE	PROPANE
PASSES PER BUNDLE	4
FINNED-TUBES/BUNDLE	NO.140 TUBES , OD=25.4 MIN.W THK.=1.65, L=6096 mm
STEAM COIL	NO
LOUVER/TYPE	NO/–
PLENUM / FAN RING	FORCED TYPE/CONICAL L/D=0.05
VIBRATION SWITCH	YES(FOR EACHFAN) MANUAL & ELECTRIC RESET
FAN SPECIFICATION RPM/DIAMETER	382/7 Ft
BLADE NO./ MATERIAL	4/ALLUMINUM
AIR QUANTITY FOR FAN R2	26.879 m3/S
STATIC PRESSURE	102.95 Pa
AIR TEMPERATURE IN/OUT	48°C/52.28°C
SPEED REDUCER TYPE	V BELLT
REDUCTION RATIO	3.78
MOTOR TYPE	ELECTRIC-Exe,IIB-T3-IP55
VOLTAGE/Freq./PHASES	400/50/3
RPM/KW	1500/7.5 Kw
S.P.L. 1m all side of fan:	<85 dB(A)1m all sides

should be match with electrical motor data sheet

Please add the VFD specification in a separate row:
(Motor VFD per unit 50%)

R2	08/10/2024	ISSUED FOR APPROVAL	F.SZ	J.M.	J.B.L	A.GHZ
R1	07/22/2024	ISSUED FOR APPROVAL	F.SZ	J.M.	J.B.L	A.GHZ
R0	06/30/2024	ISSUED FOR APPROVAL	F.SZ	J.M.	J.B.L	A.GHZ
REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY	APPROVED BY	FINAL APPROVED BY

CLIENT:

CONTRACTOR:

Please add seamless and mention the tube rows.

PROJECT :
AIR COOLER FOR
Toase-ehe Park Sanati Gohar Ofogh Petrochemical Co.
rrangement Drawing
A01-1000-00

DWG. NO.	EI027-DMF-VD-ME-DWG-003	
SCALE : N.T.S.	SIZE : A1	REV. : R2

Damafin
thermal technology
Factory : Km 14 special Karaj road

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