

FRONT VIEW
CL. A-C

SIDE VIEW
CL. B

FRONT VIEW
CL. B

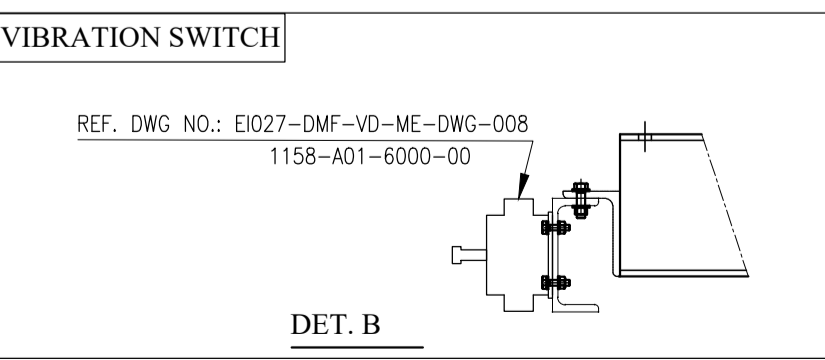
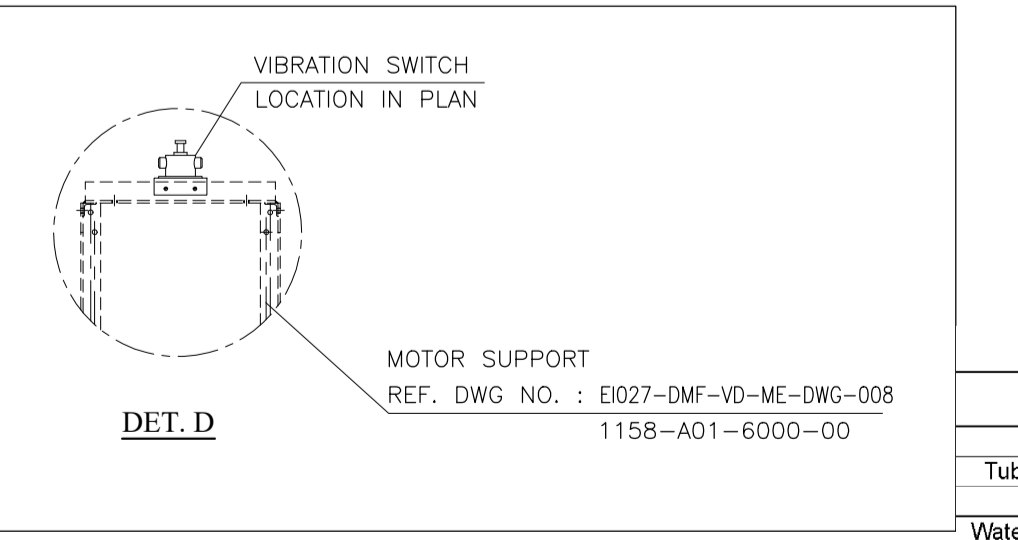
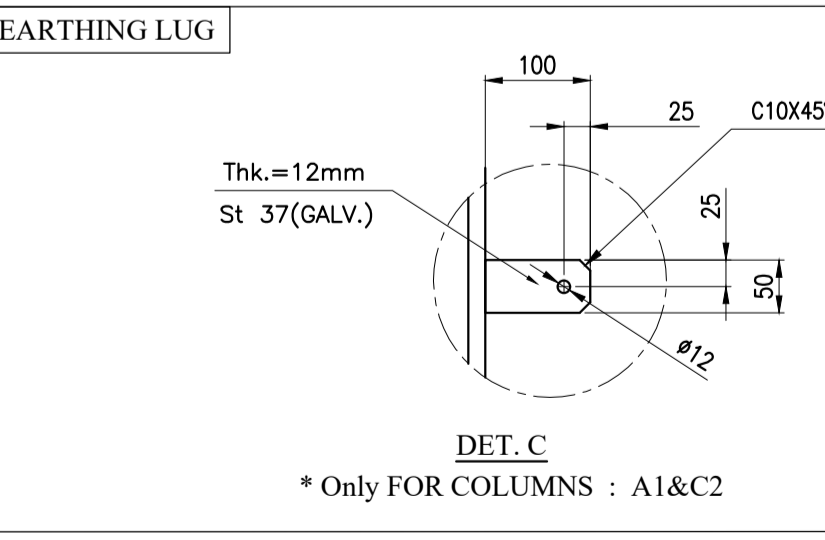
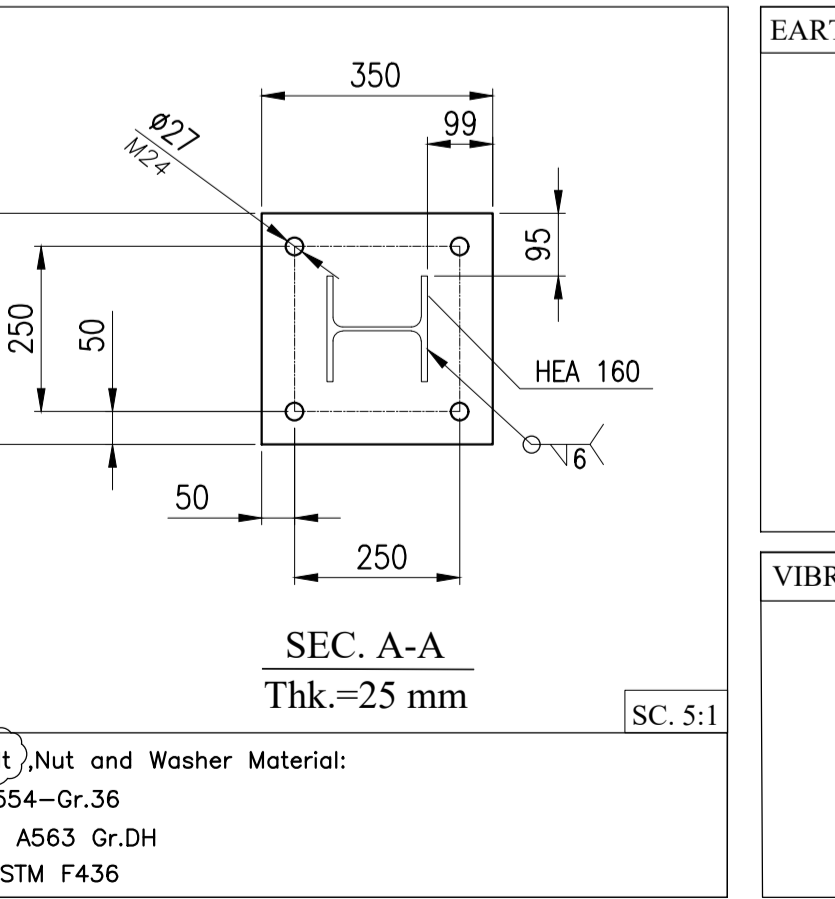
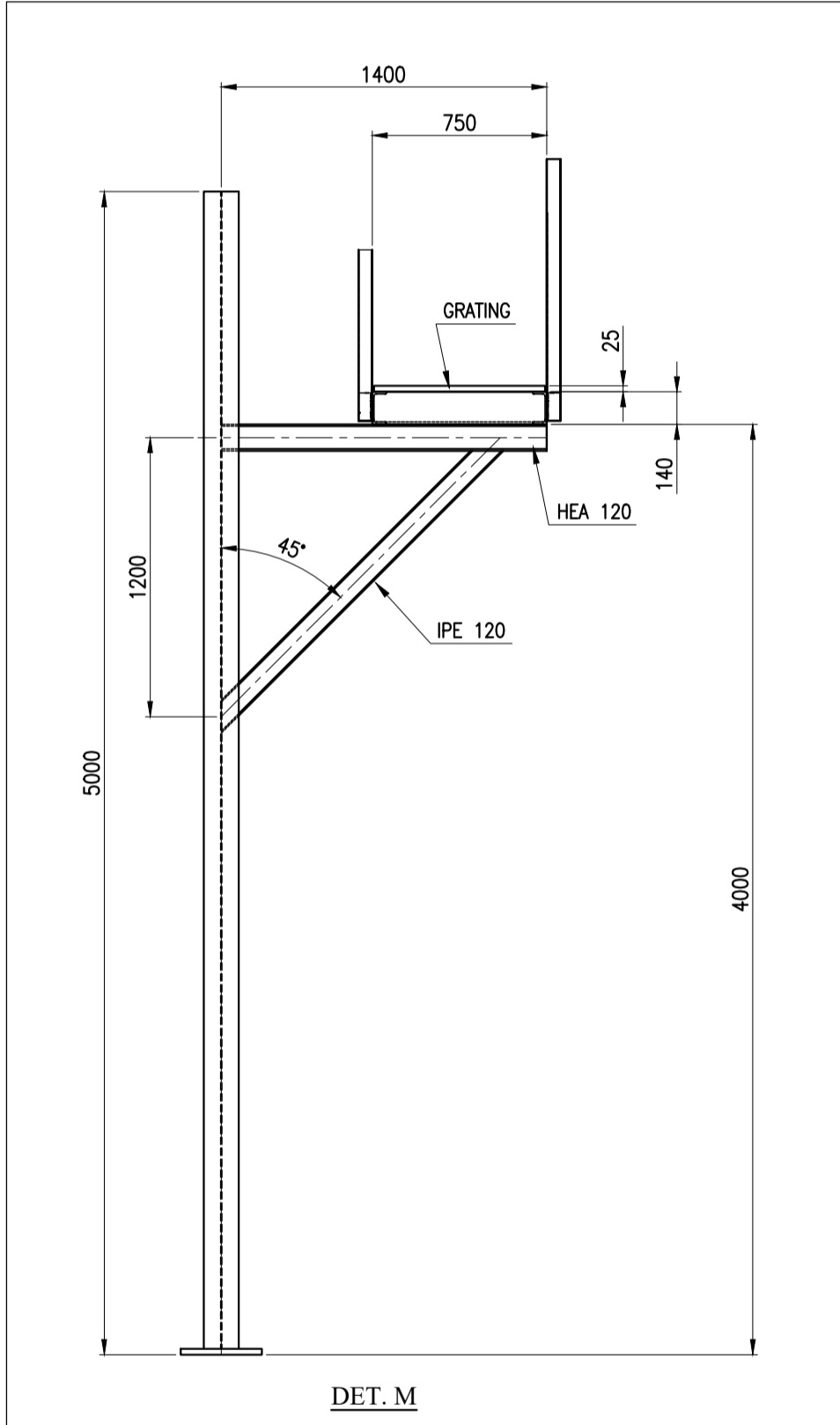
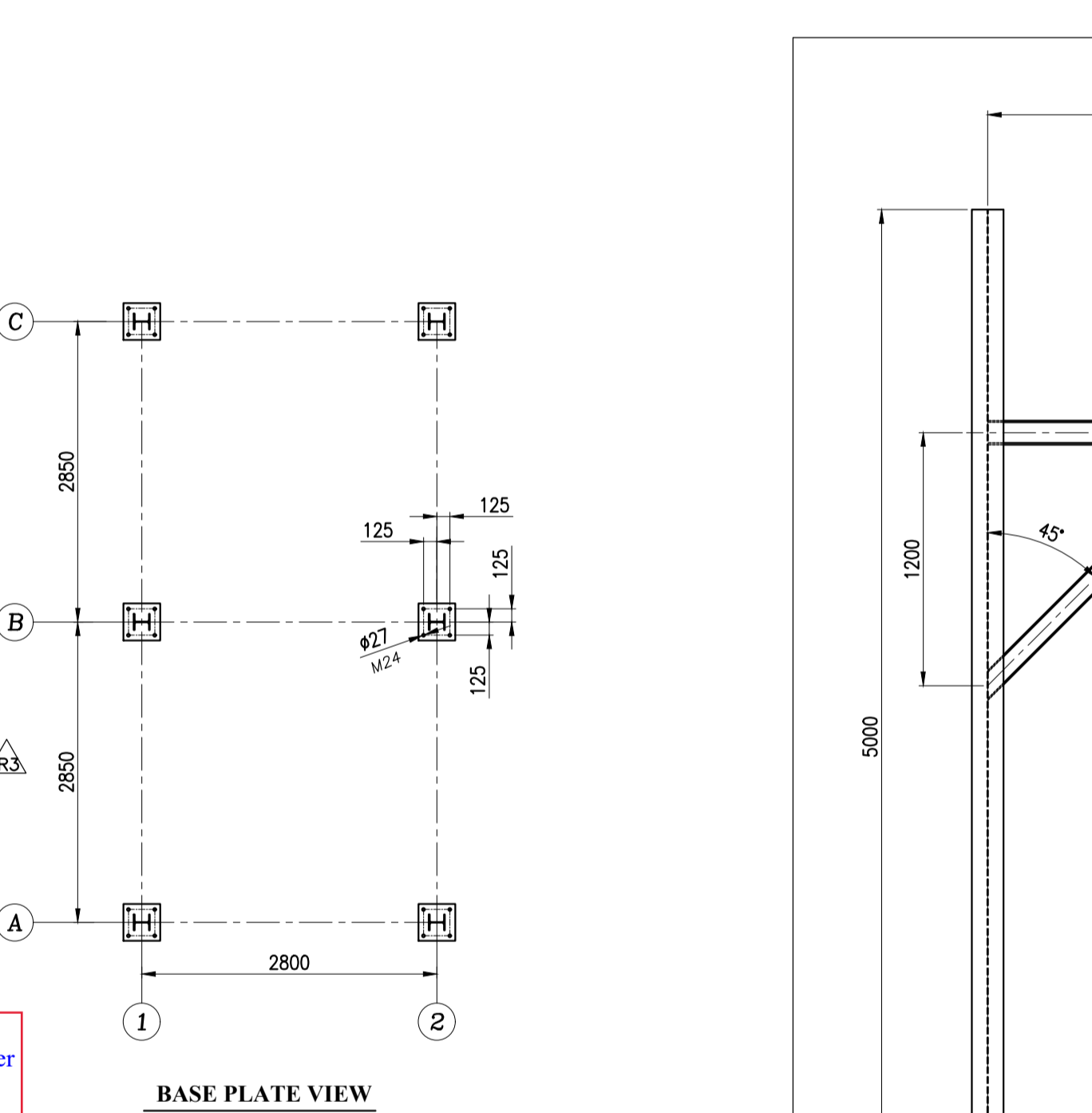
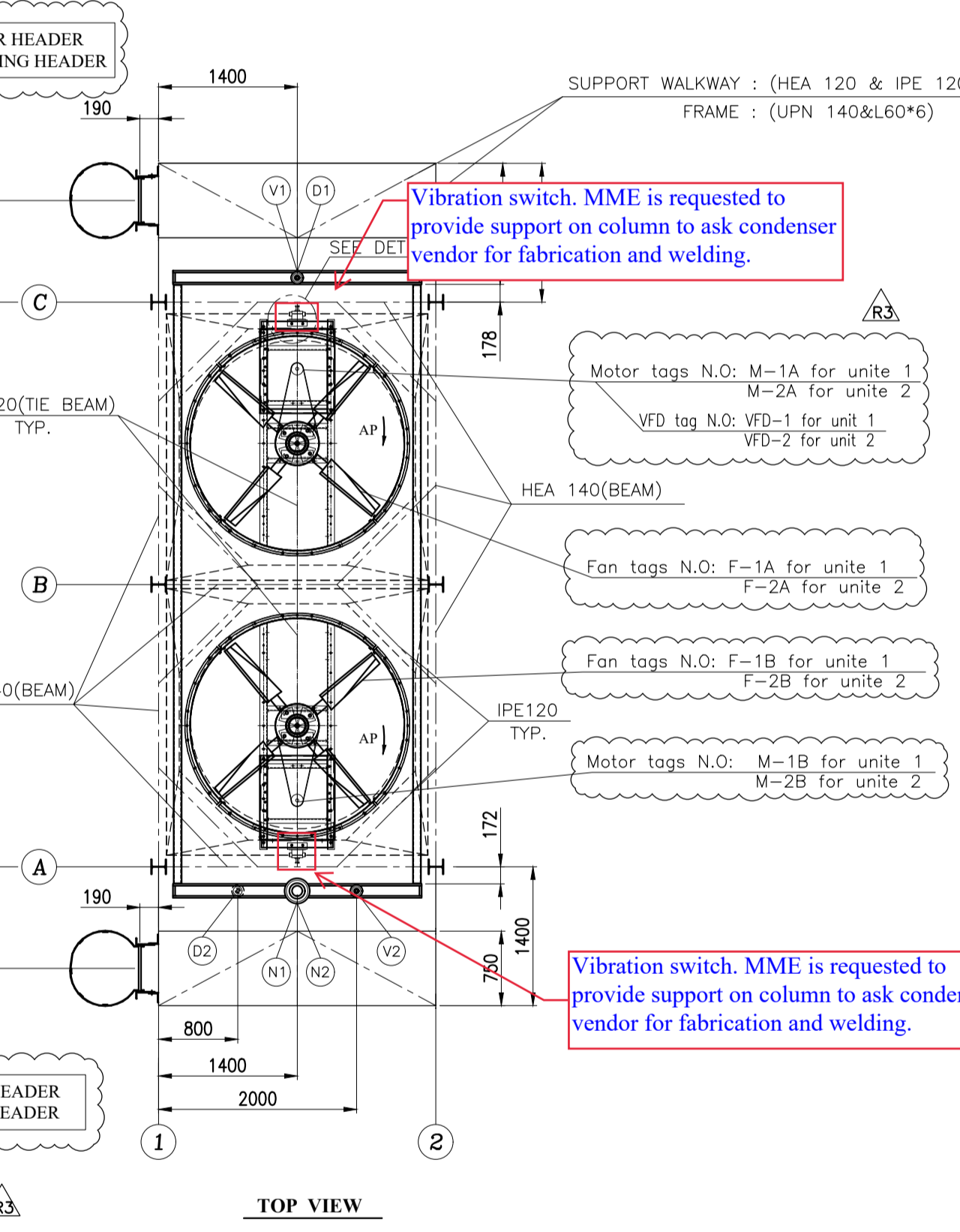


TABLE: Joint Reactions

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	547.61
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	-0.0000289	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	EQX	24.65	-1.56	193.87
B-1	EQY	-985.73	4.1	-1834.5
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+12
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:**
- 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
 - Fans
-100% AP(Adjustable pitch-manual)
 - 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
 - All Dimensions Are In Millimeter Unless Otherwise Specified.
 - All Dimensions Tolerances Are According to API 661.(Figure 10)
 - Bolts which are used for fixing headers to side frame , on sliding side should be removed after erection.
 - PROTECTION(SEE Galvanizing Specification and Inspection Procedure: EIO27-DMF-VD-QC-PRO-024
 - RADIOGRAPHIC TEST (FULL/SPOT) SHALL BE IN COMPLIANCE WITH THE REQUIREMENTS OFASME SEC. VIII DIV.1 UW-11 & UW-12.
 - 50% motors per unit to be VFD.

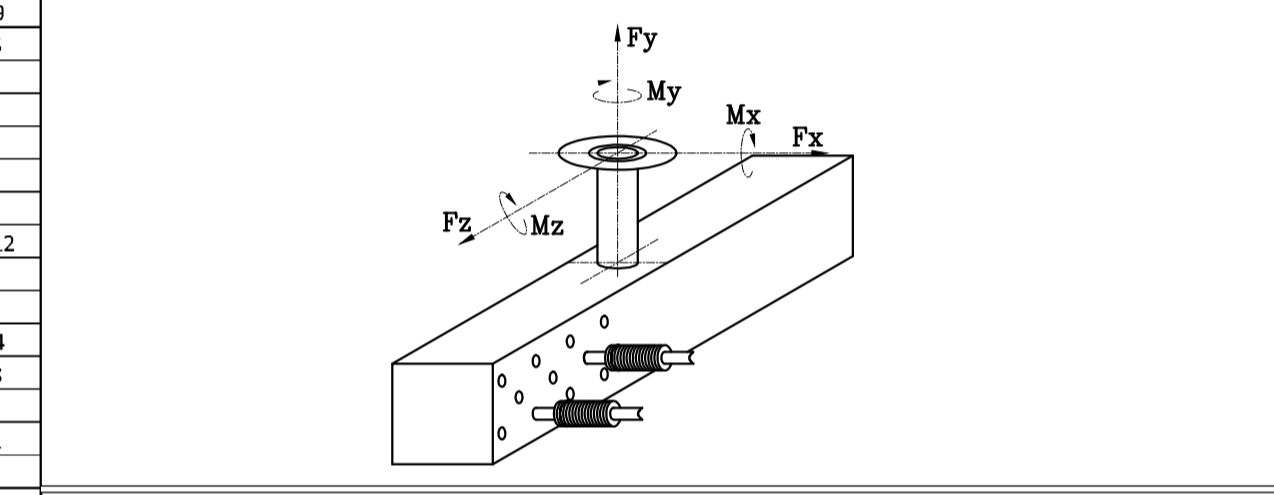
LOAD DEFINITION*

LOAD	DESCRIPTION
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.: EIO27-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(7.1.1.0.1))

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



CONNECTIONS

NO.	REP.	QTY. PER BAY/UNIT	DIA	DESIGNATION
N1	INLET NOZZLE/FLANGE	1/2	4"	FLANGE ANSI B16.5,300MM,RF,SCH.160,SA-350 LF2 CL1,N,THK=14.3
N2	OUTLET NOZZLE/FLANGE	1/2	2"	FLANGE ANSI B16.5,300MM,RF,SCH.160,SA-350 LF2 CL1,N,THK=14.3
V1&V2	VENT	2/4	1"	FLANGE ANSI B16.5,300MM,RF,SCH.160,SA-350 LF2 CL1,N,THK=14.3
D1&D2	DRAIN	2/4	1"	FLANGE ANSI B16.5,300MM,RF,SCH.160,SA-350 LF2 CL1,N,THK=14.3
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

GENERAL DATA

ITEM NO. -

DESIGN CODE BUNDLE/STRUCTURE ASME SEC.VIII DIV.1(2019), API661(2013-7th EDITION)/Standard No. 2800

INLET PRESSURE/PRESSURE HRO. (ALLOWABLE/CALC) 19.8 Bar / (0.1/0.016) Bar

DESIGN PRESSURE 22+F.V. (barg)

HYDROSTATIC TEST PRESSURE 28.6 (bar)

TEMPERATURE IN/OUT(TUBE SIDE) 73.5°C/56.32°C

DESIGN TEMPERATURE 120 °C

MINIMUM DESIGN METAL TEMPERATURE -45°C

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

NUMBER OF BAY PER UNIT 1

NOZZLE SIZE(INLET/OUTLET/RATING/TYP) 1x4"/1x2"/SCH.160/#300

PROCESS FLUID NAME PROPANE

SERVICE PROPANE

PASSES PER BUNDLE 4

FINNED-TUBES/BUNDLE NO.140 TUBES,OD=25.4,SEAMLESS MIN.W.BWG16,THK=1.65,1-6096 mm

Tube to tube sheet joint STRENGTH WELD + EXPANDED

Fin (Type,material, OD,FFI) EXTRUDE,AL 1060,57,15.11

STEAM COIL No

LOUVER/TYP NO/-

PLENUM / FAN RING FORCED TYPE/CONICAL L/D=0.05

VIBRATION SWITCH YES(FOR EACHFAN) MANUAL & ELECTRIC RESIST

FAN SPECIFICATION RPM/DIAMETER 382/7 Ft

Pitch angle (for fan) 8.5°

BLADE NO. / MATERIAL 4/ALUMINIUM

AIR QUANTITY FOR FAN 26.879 m3/S

STATIC PRESSURE 102.95 Pa

TEMPERATURE IN/OUT 48°C/52.28°C

SPEED REDUCER TYPE V BELT

REDUCTION RATIO 3.76

MOTOR TYPE ELECTRIC-Exe.IIB-T3-IP55

VOLTAGE/Freq./PHASES 400/50/3

RPM/KW 1500/7.5 Kw

Motor VFD per unit 50%

S.P.L. 1m all side of fan: <85 dB(A)1m all sides

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
Water in Tubes & Headers	1	0.48	1	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				6800

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	EIO27-DMF-VD-ME-DWG-025
Bundle Frame Drawing	1158-A01-2400-00	EIO27-DMF-VD-ME-DWG-007
Fan Drive Assembly Drawing	1158-A01-6000-00	EIO27-DMF-VD-ME-DWG-008
Fan Ring Drawing	1158-A01-5067-00	EIO27-DMF-VD-ME-DWG-009
Support Mechanism Drawing	1158-A01-5167-00	EIO27-DMF-VD-ME-DWG-010
Plenum Drawing	1158-A01-5110-00	EIO27-DMF-VD-ME-DWG-011
Steel Structure Drawing	1158-A01-1100-00	EIO27-DMF-VD-ME-DWG-013
Header Walkway Drawing	1158-A01-1200-00	EIO27-DMF-VD-ME-DWG-014
Ladder Drawing	1158-A01-1920-00	EIO27-DMF-VD-ME-DWG-015
Surface Preparation and Painting Procedure for Air Cooler	1158-A01-Q501-00	EIO27-DMF-VD-QC-PRO-024

CLIENT: _____ CONTRACTOR: _____

ENBR TEKNOLOJİ

PROJECT:
AIR COOLER FOR
Toase-che Park Sanati Gohar Ofogh Petrochemical Co.

General Arrangement Drawing
1158-A01-1000-00

dt Damafin thermal technology
Factory : Km 14 special Karaj road

DWG. NO. EIO27-DMF-VD-ME-DWG-003
SCALE: N.T.S. SIZE: A1 REV: R3
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