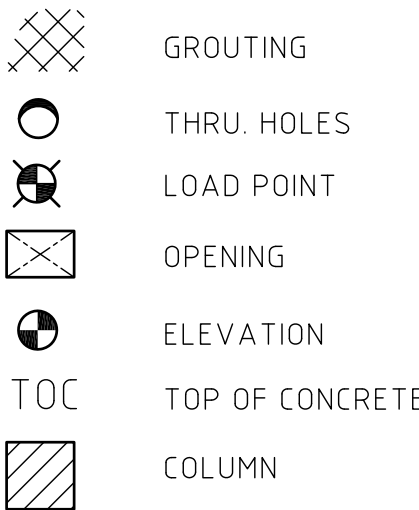







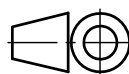


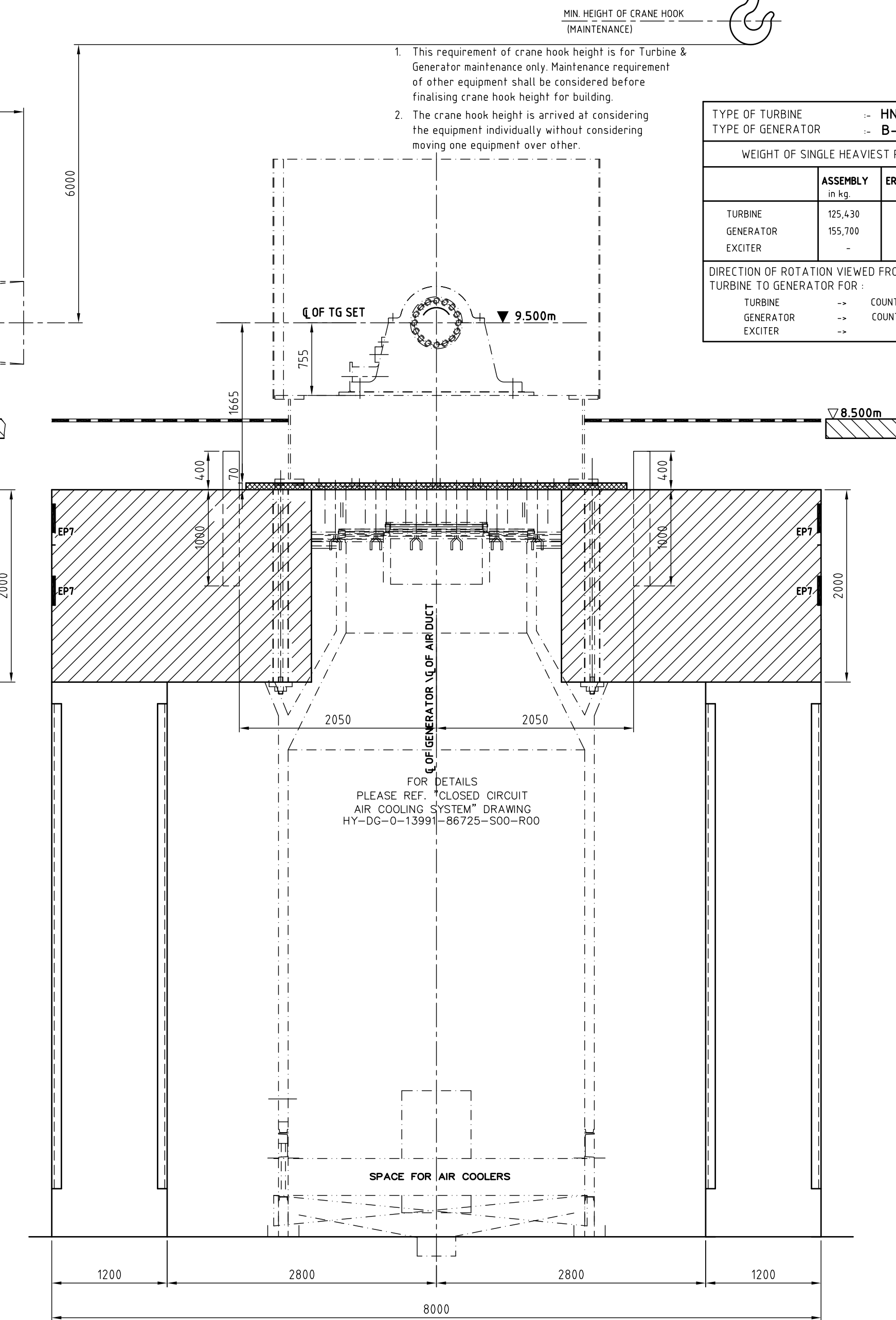
1. ALLOWABLE TOLERANCE IN HORIZONTAL AND VERTICAL DIRECTION :
 - a) FOUNDATION DIMENSIONS $\pm 10\text{mm}$
 - b) LOCATION OF EMBEDDED ANCHOR BOLTS $\pm 5\text{mm}$
 - c) LOCATION OF SLEEVES FOR PIPING AND THROUGH HOLES FOR ANCHOR BOLTS $\pm 10\text{mm}$
2. SOUND CONCRETE MATERIAL IS EXPECTED BELOW EQUIPMENT BASEPLATES PERMITTING COMPLETE ADHERENCE OF SECONDARY GROUT CEMENT.
3. IF FIX POINTS ARE EMBEDDED IN A WRONG LOCATION THERE IS NO POSSIBILITY OF ADJUSTMENT OR CORRECTION ON MACHINE PARTS.
4. ALL EMBEDDED STEEL SECTIONS (FLATS & ANGLES) TO BE EMBEDDED MATCHING WITH CONCRETE SURFACE.
5. ALL THE COLUMN DIMENSIONS AND DECK THICKNESS ARE ONLY INFORMATIVE. CIVIL DESIGNER TO DECIDE THE DIMENSIONS.
6. ALL DIMENSIONS ARE IN "mm" AND ELEVATION ARE IN METRES.
7. * DIMENSIONS TO BE DECIDED BY CIVIL DESIGNER.
8. ALL ELEVATIONS CORRESPOND TO FINISHED CONCRETE LEVELS.
9. TG DECK AREA SHALL BE COVERED BY GRATING AFTER COMPLETION OF PIPING CABLING & ERECTION ETC. TOP OF GRATING SHALL BE AT EL. 8.500m. GRATING AND CORRESPONDING SUPPORTS NOT IN B.E.L. SCOPE.

LEGEND:



	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
			CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD
ZONE				ZONE			ZONE			ZONE	03.10.15	ALTERED C.BALAJI CHD/APPD S.J.H/MAH	ZONE	16.09.15	ALTERED C.BALAJI CHD/APPD S.J.H/MAH	ZONE	24.08.15	ALTERED C.BALAJI CHD/APPD S.J.H/MAH	ZONE	31.07.15	ALTERED C.BALAJI CHD/APPD S.J.H/MAH
												REVISED AS PER CUSTOMER CIVIL DRAWING FOR GENERATOR TRENCHES & MARKED AS & AS MARKED 			REVISED AS PER CUSTOMER COMMENTS, GENERATOR DETAIL & EP'S FOR ENCLOSURE & OTHER DIMENSIONS & AS MARKED 			REVISED FOR DECK THICKNESS ON GENERATOR SIDE & TRENCHES. MARKED AS 			REVISED FOR 1 CASING STEAM AND DRAIN FLANGE CONNECTIONS IN SH.3 OF 4. 2.CUSTOMER COMMENTS & MARKED AS 

CLIENT:				1x 60 MW STG SET DCM SHRIRAM LIMITED UNIT: SHRIRAM ALKALI AND CHEMICALS Bharuch, Gujarat				STATUS: FINAL	
 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD				DRN:	C.BALAJI	DATE	27.06.15	NO. OF VAR.	
				CHD:	S.J.HUSSAIN	DATE	27.06.15	-NA-	
				APPD:	M.A.HASEEB	DATE	27.06.15	-NA-	
DEPT.		UNTOL. DIMS. GR	SCALE	REF. TO ASSY. DRG.		ITEM NO.		NO. OF ITEMS	
TECP	415	OR CHAF	N.T.S.	-NA-		-NA-		-NA-	
									
TITLE				BHEL DRG NO.		(1-313-01-14135)		04	
TEAM TURBO GENERATOR MACHINERY ARRANGEMENT AND FOUNDATION				HY-DC-1-31301-14135					
N.A.		SHT. No 01		NO. OF SHT.		04			



SECTION B-B

FOR CUTOUT IN CEP PIPING, CONDENSER
HOTWELL & COOLING WATER TRENCH
REFER TG EQUIPMENT LAYOUT DRAWING

TYPE OF TURBINE	→	HNK 63/2.8-3	
TYPE OF GENERATOR	→	B-CATG-50-2P-261	
WEIGHT OF SINGLE HEAVIEST PIECE FOR			
	ASSEMBLY in kg	ERECTION in kg	MAINTENANCE in kg
TURBINE	125,430	40,000	34,000
GENERATOR	155,700	155,700	21,000
EXCITER	-	2,000	2,000
DIRECTION OF ROTATION VIEWED FROM TURBINE TO GENERATOR FOR :			
TURBINE	→	COUNTER CLOCKWISE	
GENERATOR	→	COUNTER CLOCKWISE	
EXCITER	→		

[illegible]

STATUS:FINAL

CLIENT:

1x 60 MW STG SET
DCM SHRIRAM LIMITED
UNIT: SHRIRAM ALKALI AND CHEMICALS
Bharuch, Gujarat

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

ORIN	NAME	SIGNATURE	DATE	NO OF VAR.
CBD	C.B.ALAJI		27.06.15	
CHD	S.J.HUSSAIN		27.06.15	-N-A-
APPD	M.A.HASEEB		27.06.15	-N-A-

DEPT.	TCEP	UNTOI DIMS.	GR	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO	NO OF ITEMS
CODE	415			1:4.0	-N-A-	-N-A-	-N-A-	-N-A-

TITLE	REV. DRC No	(1-313-01-14135)	04
STEAM TURBO GENERATOR MACHINERY ARRANGEMENT AND FOUNDATION		HY-DG-1-31301-14135	

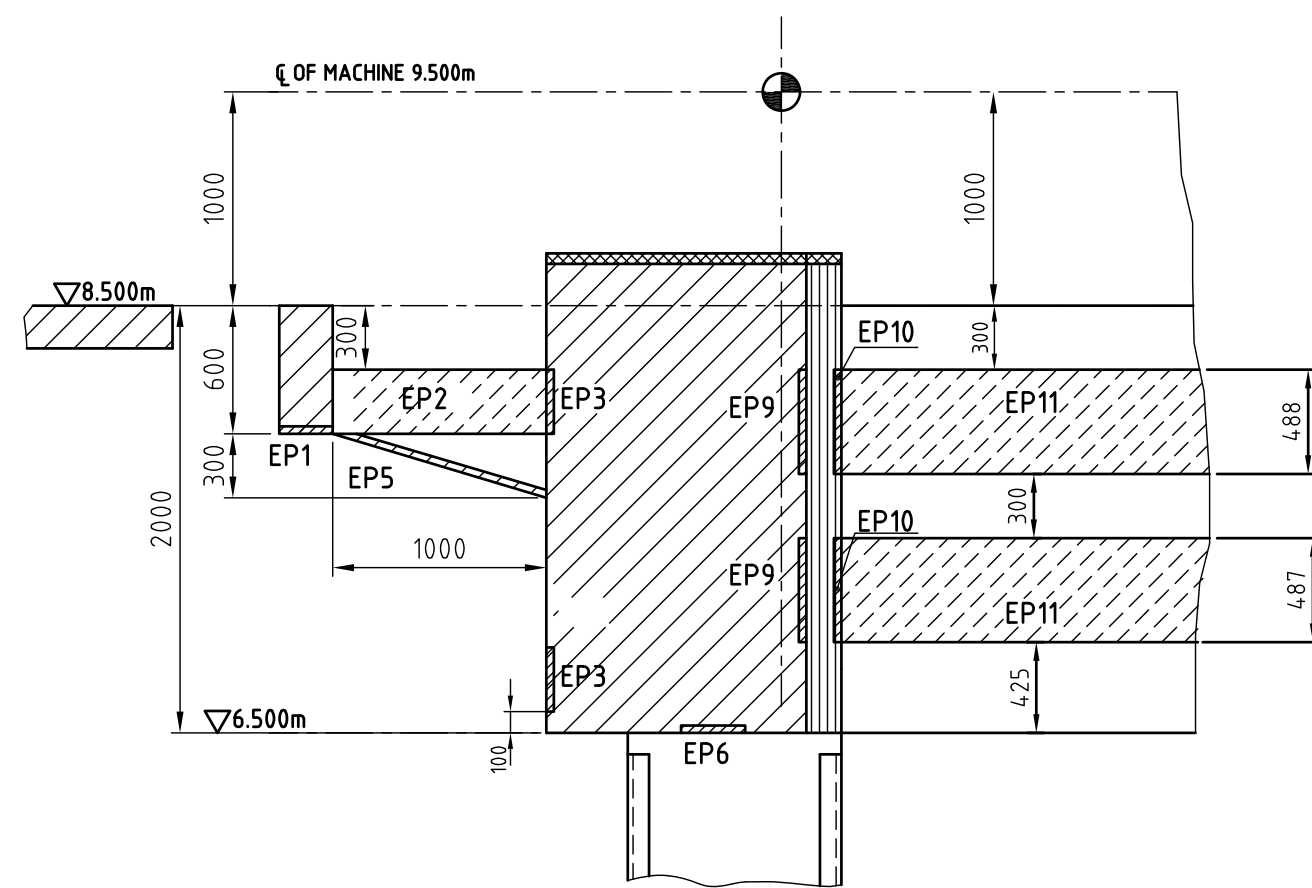
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11

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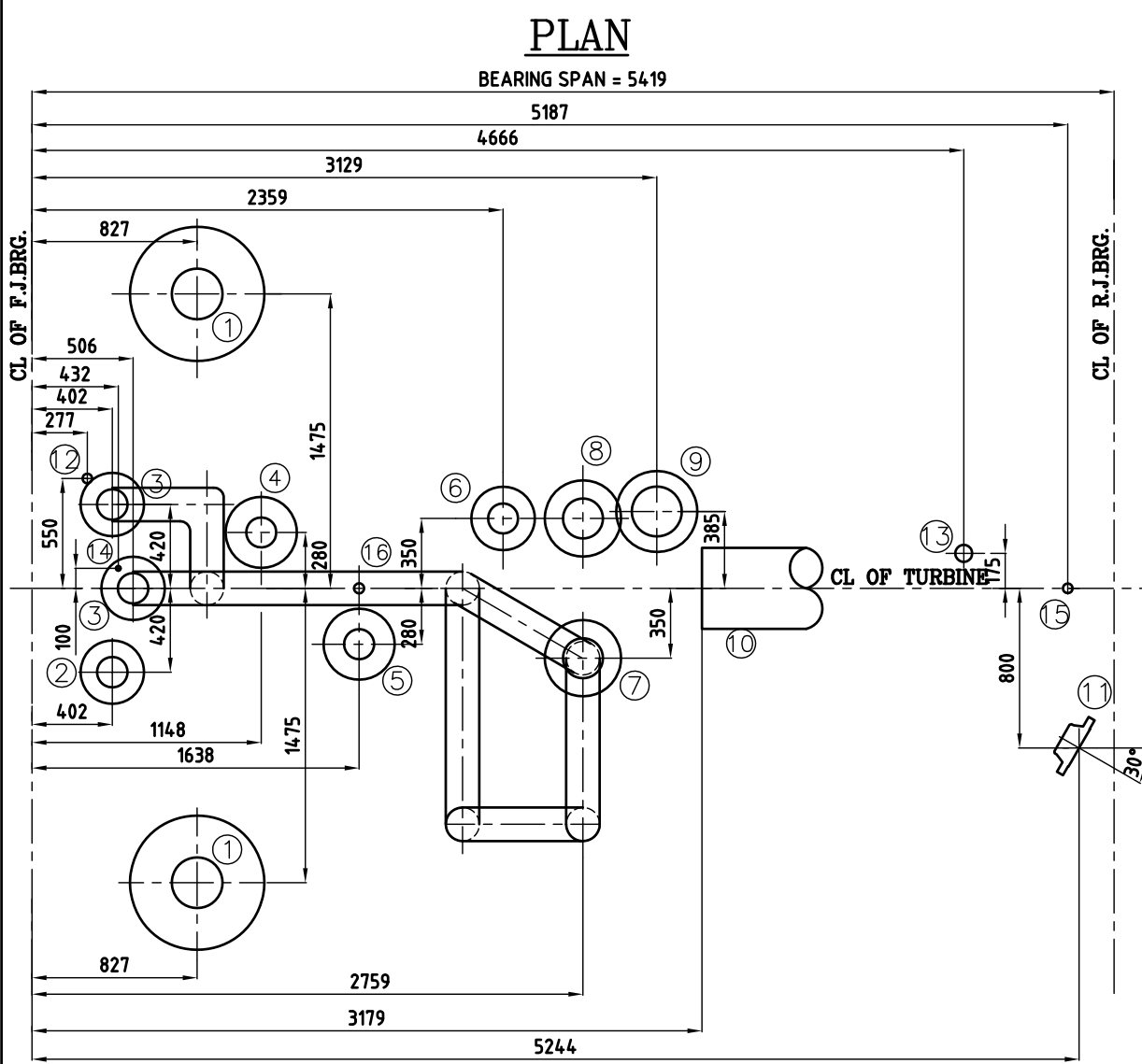
N.A	SHT. No 02	NO OF SHT. 04
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GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261



(NOT IN B.H.E.L SCOPE OF SUPPLY)

PLATE	SIZE	LOAD (IN Kg/M)	LOCATION	QTY.
EP1	PL. 12x300x8000	1000	BOTTOM OF DECK	1
EP2	PL. 12x300x1000	2000	C/L OF PLATE EL. 8.050m	2
EP3	PL. 12x300x3700	2000	TURBINE FRONT CUTOUT	2
EP4	PL. 12x300x931	2000	TOP OF DECK	2
EP5	PL. 12x300x1281	2000	BOTTOM OF CANTILEVER	2
EP6	PL. 12x300x1000	2000	BOTTOM OF DECK	1
EP7	PL. 12x300x13520	2000	C/L OF PLATE EL. 7.465m/6.840m	4
EP8	PL. 12x300x4000	2000	TOP AND BOTTOM OF DECK	1
EP8-A	PL. 12x650x3270	2000	TOP AND BOTTOM OF DECK	1
EP8-B	PL. 12x650x2128	2000	TOP AND BOTTOM OF DECK	1
EP8-C	PL. 12x650x740	2000	TOP AND BOTTOM OF DECK	1
EP8-D	PL. 12x300x2128	2000	TOP AND BOTTOM OF DECK	1
EP9	PL. 12x300x1152	2000	TURBINE CUTOUT	2
EP10	PL. 12x300x1110	2000	TURBINE CUTOUT	4
EP11	PL. 12x300x2478	3000	TURBINE CUTOUT	4
EP12	PL. 12x300x300	600 Kg EACH	GENERATOR CUT OUT EL. 7.510 /m	4
EP13	PL. 12x300x2660	1000	BOTTOM OF DECK	1
EP14	PL. 12x300x2660	1000	C/L OF PLATE EL. 7.150m	2
EP15	PL. 12x400x400	4500 for Each	Bottom of the Deck	1
EP16	PL. 12x350x275	400 for Each	TOP OF THE DECK	4
EP17	PL. 12x350x275	250 for Each	TOP OF THE DECK	23







SL. NO.	DESCRIPTION	QTY	TYPE OF FLANGE	REMARKS
1.	MAIN STEAM INLET FLANGE	2	10" #2500 WNR,F,NON-STD34MMTHK	SA182F22
2.	FRONT GLAND INLET CONN	1	6" #300 WNR,F,SCH=40	SA182F11
3.	B.P.GLAND CONN	2	6" #300 WNR,F,SCH=40	SA182F11
4.	UNCONTROLLED EXTRACTION TO PROCESS	1	6" #900 WNR,J,SCH=80	SA182F11
5.	UNCONTROLLED EXTRACTION (4PH-2)	1	6" #600 WNR,J,SCH=80	SA182F11
6.	UNCONTROLLED EXTRACTION (4PH-1)	1	8" #300 WNR,F,SCH=40	SA 105
7.	B.P GLAND LEAK OFF INTO THE CASING	2	6" #300 WNR,F,SCH=40	SA182F11
8.	UNCONTROLLED EXTRACTION (DEA)	1	8" #300 WNR,F,SCH=40	SA182F11
9.	UNCONTROLLED EXTRACTION (LPH-2)	1	10" #150 WNR,F,SCH=20	SA 105
10.	PIPE DIA 406.4x6.35 (LPH-1)	1	PIPE DIA 406.4x6.35	SA 105
11.	REAR STEAM GLAND INLET	2	3" #300 WNR,F SCH=40	SA 105
12.	FRONT STEAM VENT	1	PIPE DIA 48.3x5.08	CS
13.	REAR STEAM VENT	1	PIPE DIA 48.3x5.08	CS
14.	FRONT STEAM GLAND DRAIN	1	PIPE DIA 10.2x2	CS
15.	REAR STEAM GLAND DRAIN	1	G 1/4" DIKO UNION	CS
16.	B.P PIPING DRAIN	1	1" SOCKET	SS

STATUS: FINAL

CLIENT:

1x 60 MW STG SET
DCM SHRIRAM LIMITED
UNIT: SHRIRAM ALKALI AND CHEMICALS
Bharuch, Gujarat

 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		NAME	SIGN	DATE	NO
	DRN.	C.BALAJI		27.06.15	V
	CHD.	S.J.HUSSAIN		27.06.15	-N
	APPD.	M.A.HASEEB		27.06.15	

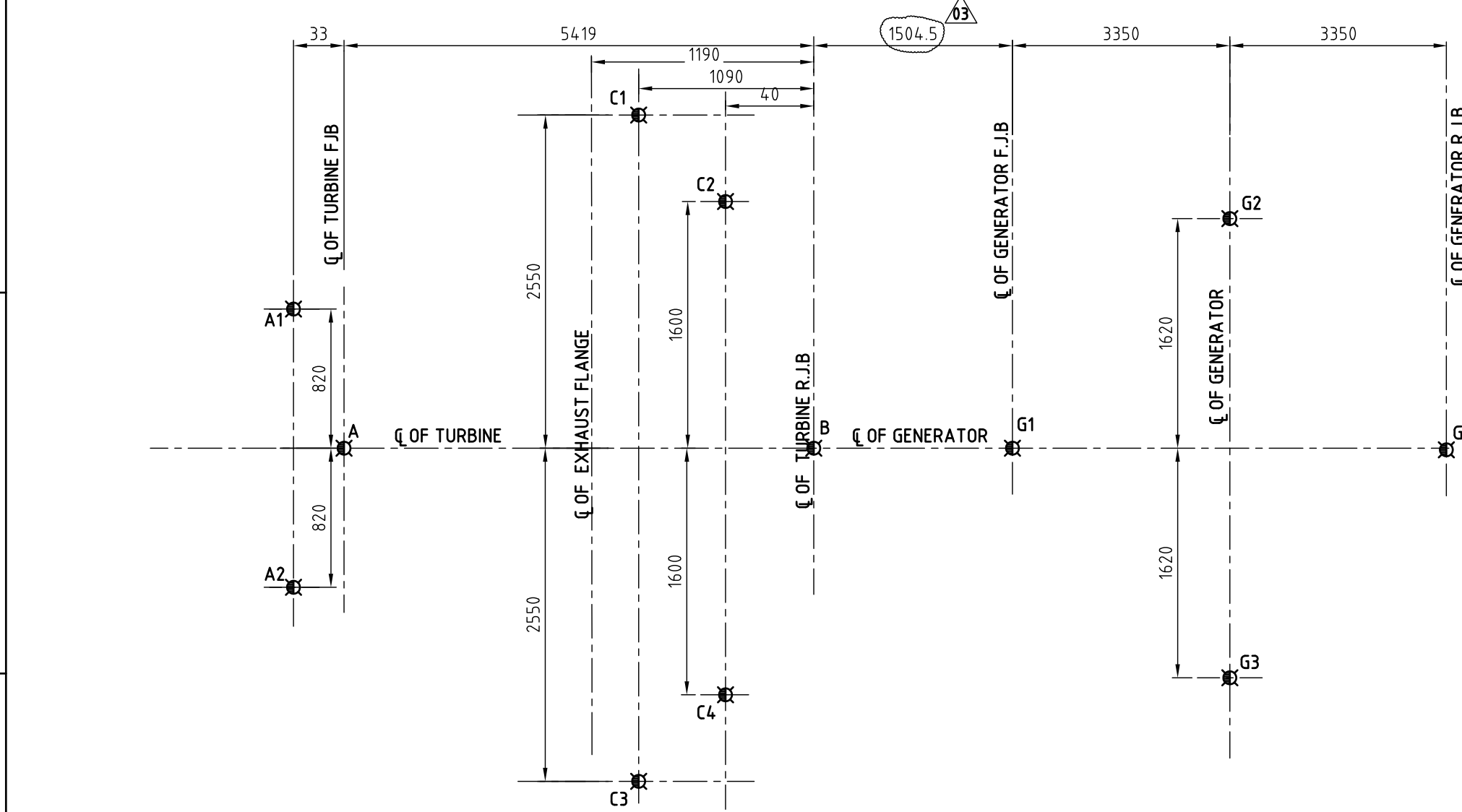
TITLE STEAM TURBO GENERATOR
MACHINERY ARRANGEMENT
AND FOUNDATION

(1-313-01-14135)		04
HY-DG-1-31301-14135		
SHT. No	03	NO. OF SHT. 04

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FIRST ANGLE PROJECTION

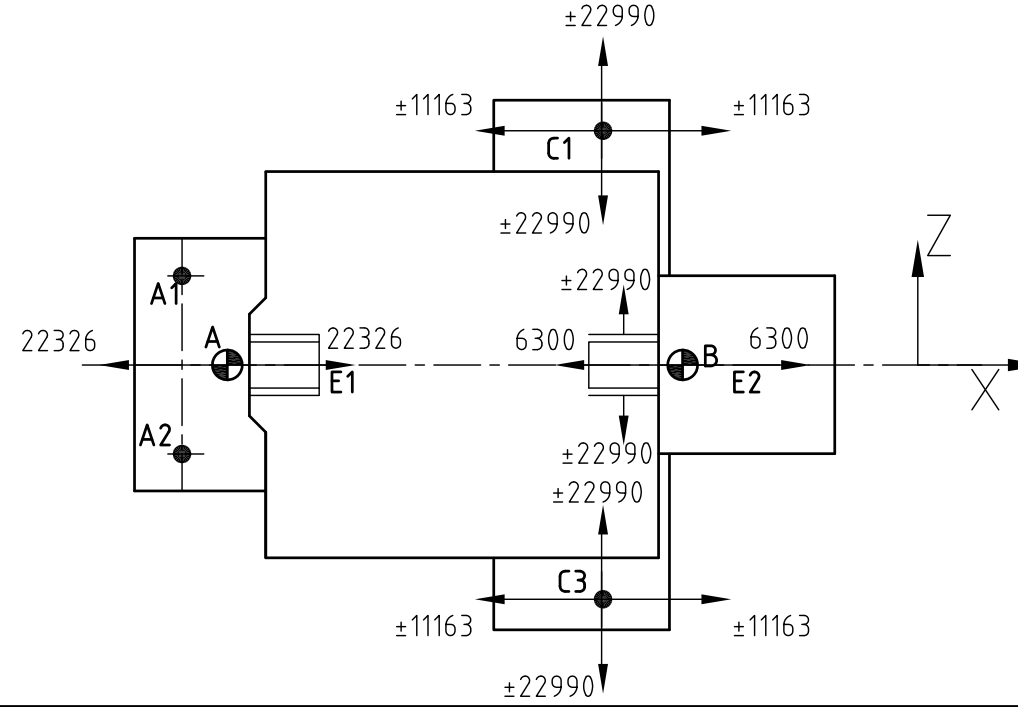
SEI 11-101E1E-1-DG-AH ON 'D' SH



HORIZONTAL FRICTIONAL FORCES IN kgf

A, Working point of forces : AT 0m C.O.F. TURBINE below turbine axis
C1, C3 Working point of forces : 820 mm
B Working point of forces : 695 mm

THESE FORCES ARE IN ALTERNATE IN DIRECTION

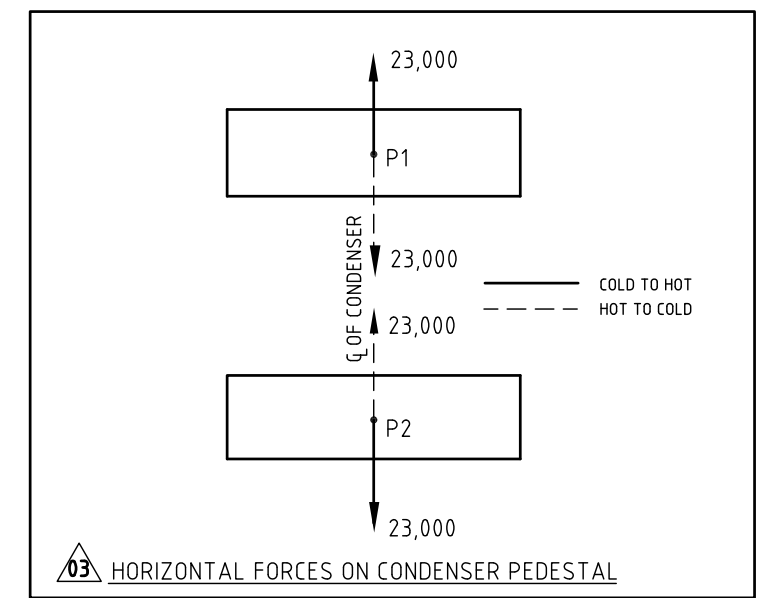


SEISMIC LOAD IN HORIZONTAL DIRECTION FOR TURBINE:

FRONT: A1, A2 : ±3600 Kg
REAR: C1, C3 : ±8666 Kg

Speeds in rpm

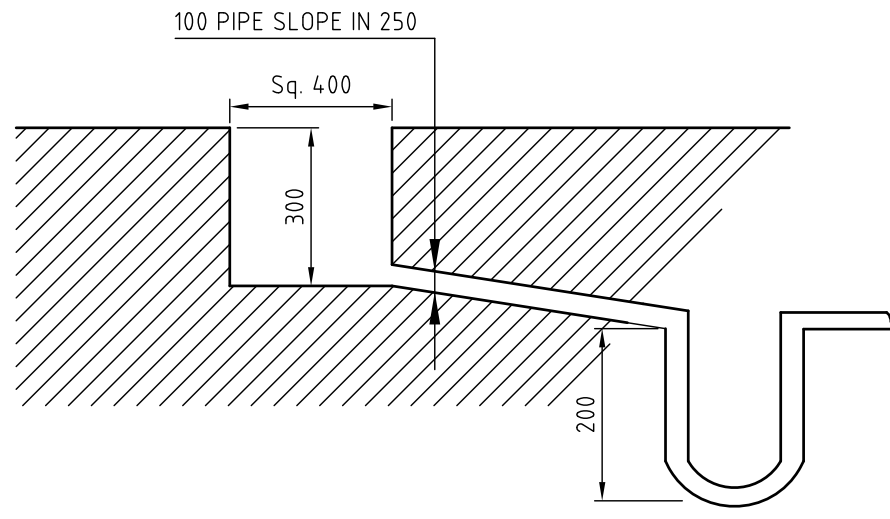
EQUIPMENT	RATED SPEED	CRITICAL SPEEDS	
		FIRST	SECOND
TURBINE	3000	1230	1770
GENERATOR	3000	1130	3480



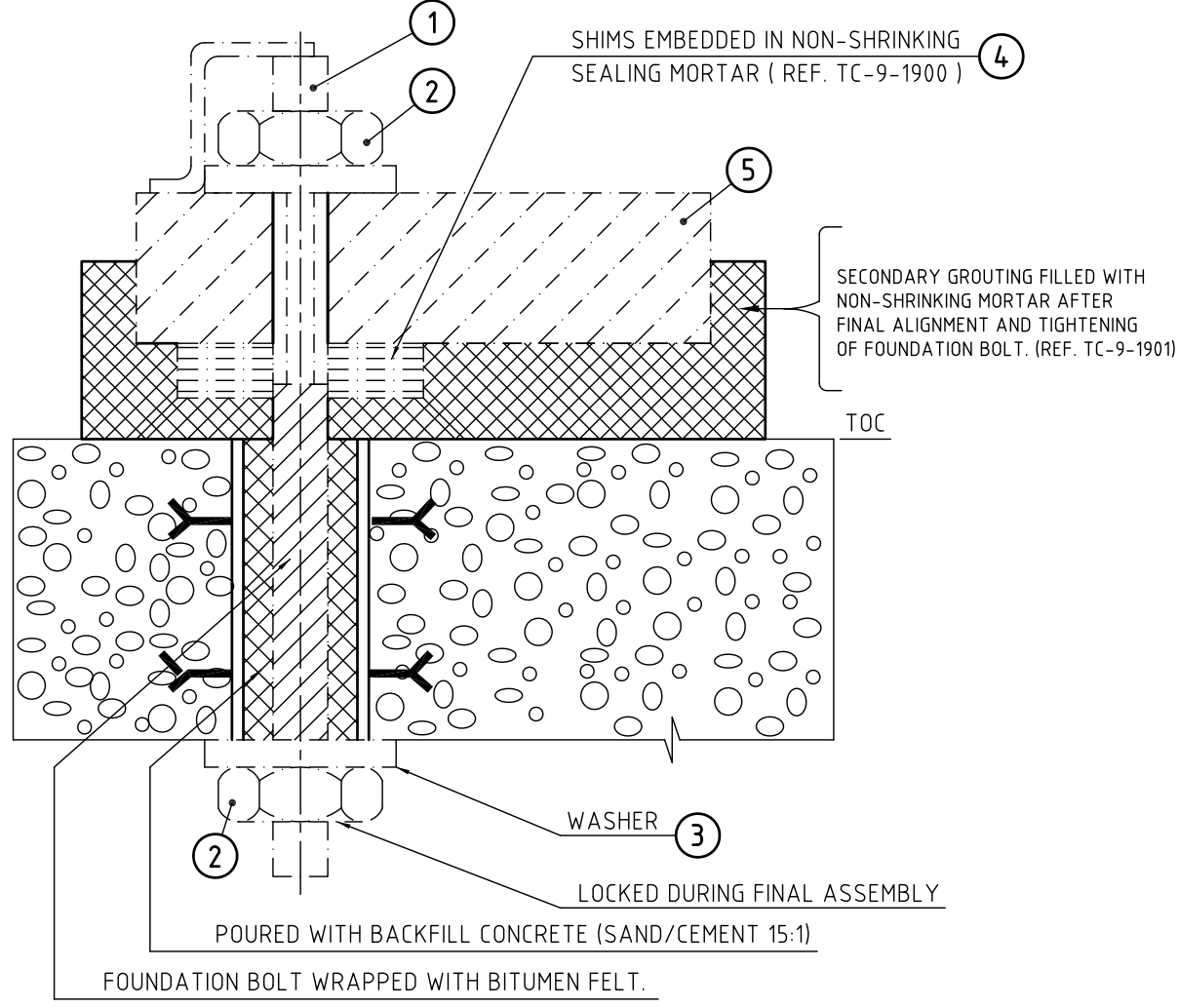
FORCES ON FOUNDATION IN kgf

LOAD POINT	LOAD CONDITION	FORCES ON FOUNDATION IN kgf							PIPING FORCE	SEISMIC LOAD
		1	2	3	4	5	6	7		
TURBINE	A	-	8593	-	-	-	1720	10320	-	-
	A1	17800	-	4950	-	6530	-	-	±1000	±2434
	A2	17800	-	4950	-	-6530	-	-	±1000	±2434
	B	4150	11207	-	-	-	2240	13440	-	-
	C1	16363	-	23100	-	1050	-	-	±1000	±2930
	C2	16363	-	1650	-	-1673	-	-	±1000	±2930
	C3	16363	-	23100	-	1050	-	-	±1000	±2930
	C4	16363	-	1650	-	-1673	-	-	±1000	±2930
GENERATOR	G1	3000	8050	-	-	-	10120	20240	-	-
	G2	35000	-	-	±58605	±5200	-	-	-	-
	G3	35000	-	-	±58605	±5200	-	-	-	-
	G4	5000	8050	-	-	-	10120	20240	-	-
CONDENSER	P1	1,15,000	-	-	-	-	-	-	-	-
	P2	1,15,000	-	-	-	-	-	-	-	-
AIR DUCT	R1 to R4	2500Kg EACH	-	-	-	-	-	-	-	-

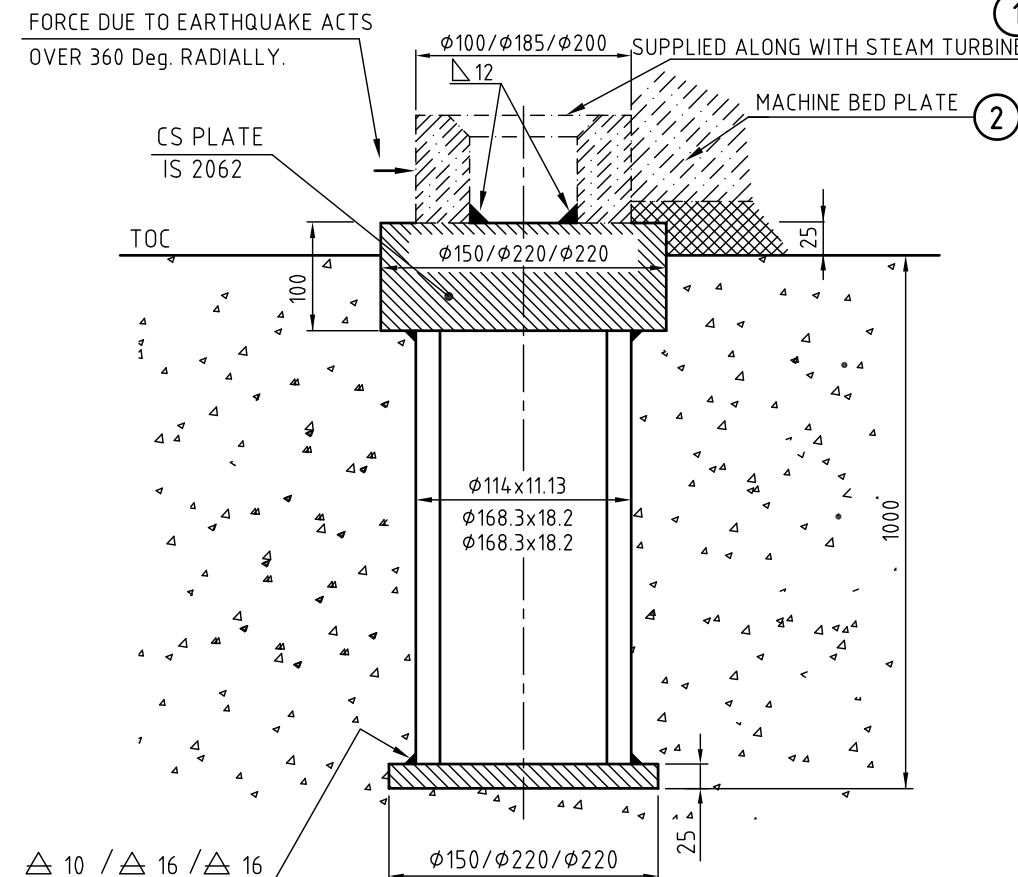
DETAIL 'DR'
AIR DUCT DRAIN



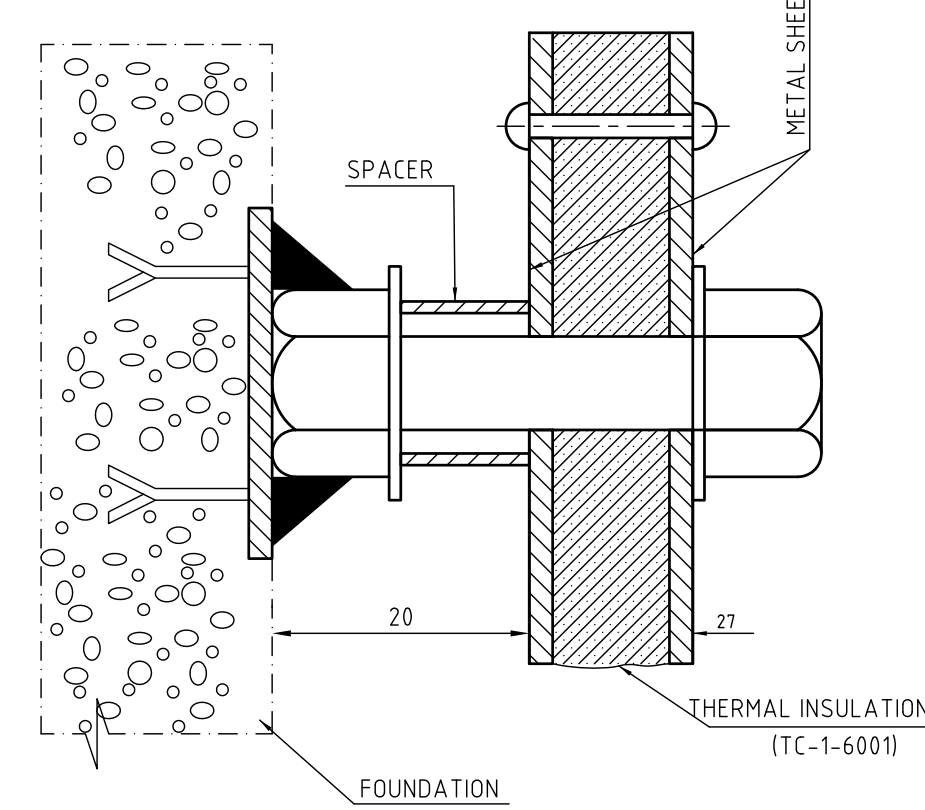
DETAIL 'SP-N'



DETAIL 'EQ-TG'

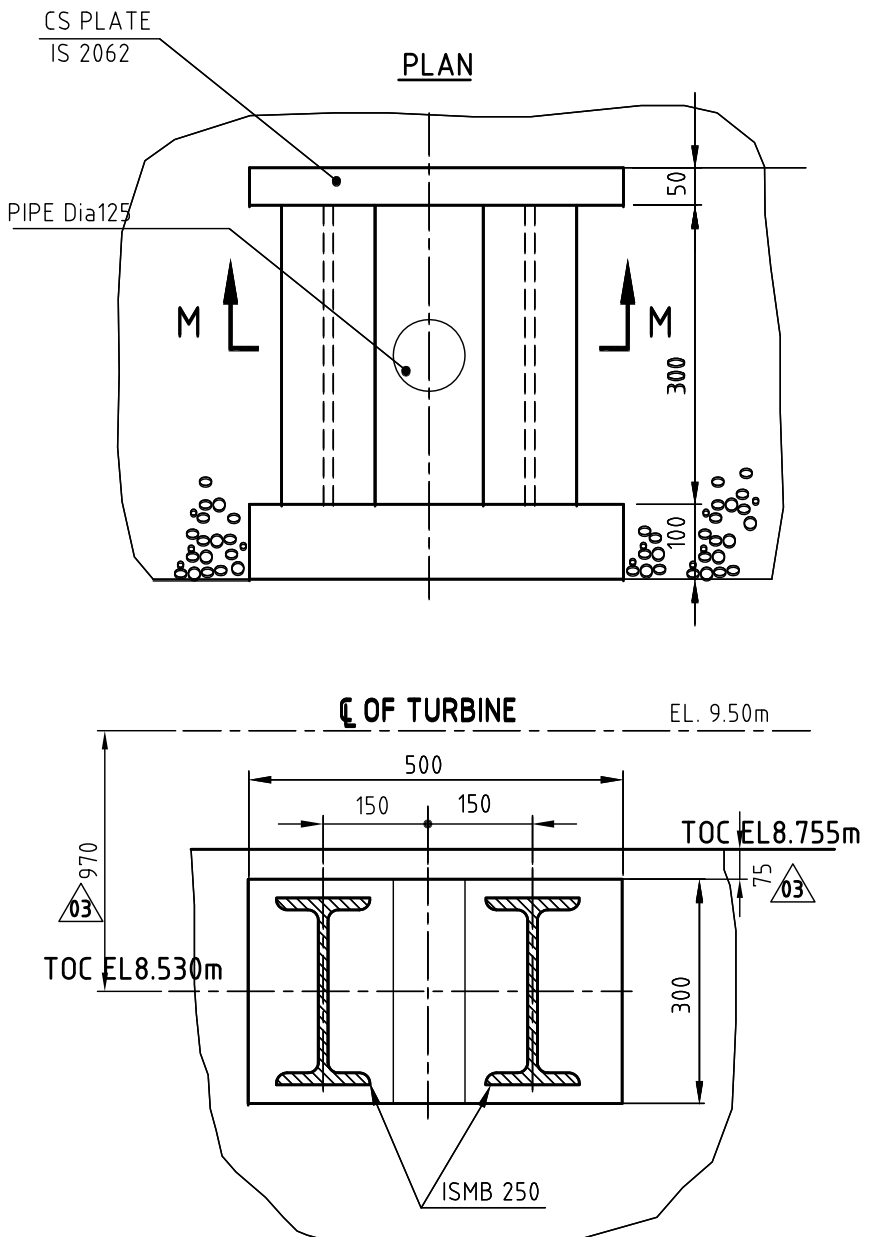


DETAIL 'INS'



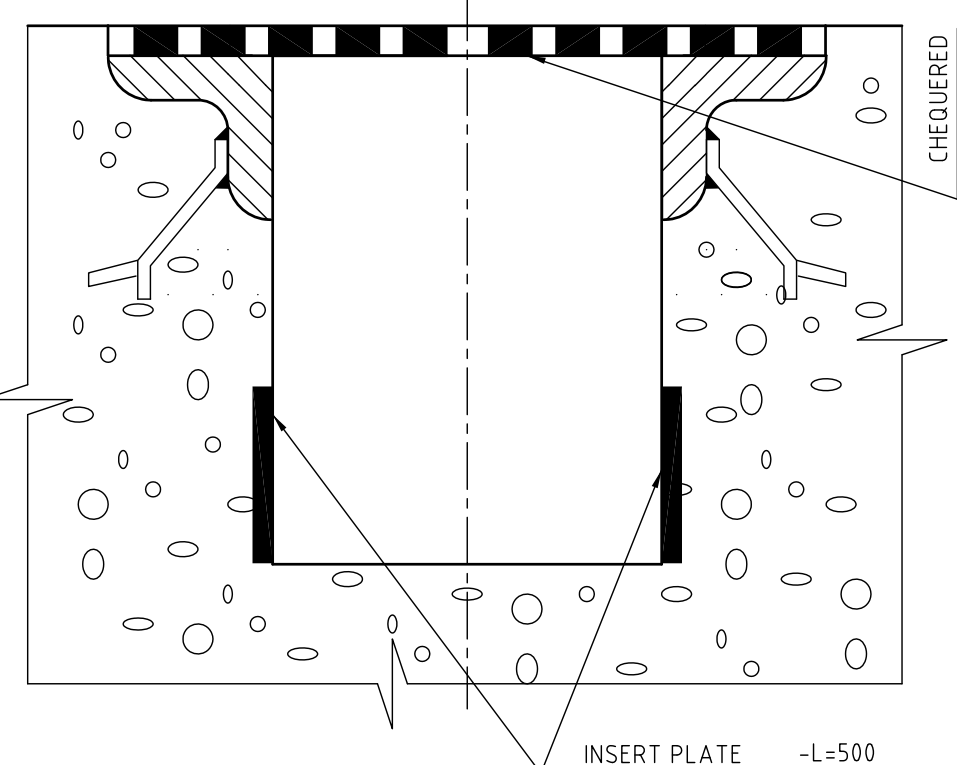
DETAIL 'GUIDE'

(For Exhaust hood Guide support)



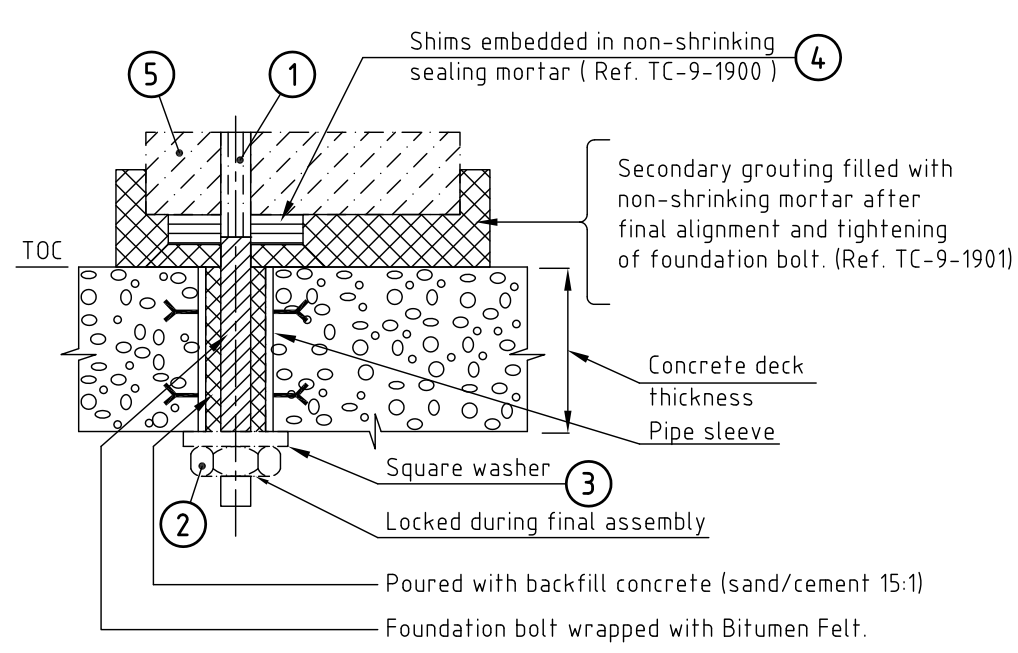
DETAIL 'TRENCH'

PROPOSED TRENCH COVER
(FOR ALL TRENCHES)

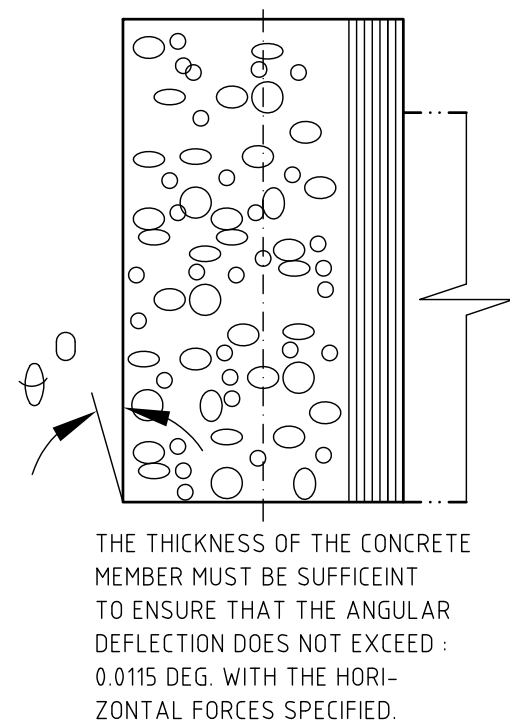


DETAIL 'SP-WN'

FOUNDATION BOLT ASSEMBLY



DETAIL 'PED'



- ** At each supporting point acting in radial direction over 360 deg.**
*** Loads on either side of TG axis act in opposite directions and the direction changes at 50 cycles/sec.**
NOTE :- DOWNWARD FORCES ARE POSITIVE
- NOTES :-**
- All dimensions are in mm and elevations are in metres.
 - This foundation drawing is only intended as a basis for preparing the layout for foundation (by the customer). All civil structural dimensions are tentative and same shall be decided by the civil engineer concerned. The foundation design calculations shall consider all the static and dynamic loads acting simultaneously.
 - Suitable earth quake coefficient applicable for the project site should be adopted for seismic design of foundation as per IS 1893.
 - The foundation block should be designed so that natural frequencies of foundation are sufficiently away from the frequencies of machines. The design shall be as per DIN 4024 standard and IS 2974 part III.
 - Design of the foundation shall consider the allowable limits of vibration behaviour of machines (Group - 1) as per VDI 2056.
 - Bearing failure loads are less than failure load condition loads specified in col. 7 of the "Forces on Foundation" table.
 - It is recommended that at all corners of the foundation columns, embedded iron angles of size 100 x 100 x 8 mm shall be provided to support pipes, instruments etc.
 - Dynamic loads in axial direction are negligible.
 - Magnitude of unbalanced forces can be taken in vertical and horizontal directions as equal.
 - Max. live load on top of the deck is : 2000 kg/sqm.
 - Foundation block must not be joined to any other structure to avoid vibration transmission.
 - Portions shown thus in top deck are filled with secondary grouting. The concrete surface in these areas is to be ensured free from dust, grease and oil. Any wooden plugs present in these areas are to be removed. The packing plates below the machine sole plates shall be embedded into a 20 mm thick layer of special grout (local to plates) and are to be levelled horizontally. later, total secondary grouting may be completed.
 - For grouting instructions ref. TC-9-1901 (4 sheets). And for grouting cement specification ref. TC-9-1900.
 - All embedded plates, angles, sleeves, pipes, ducts and any other structural are NOT part of B.H.E.L. scope of supply unless otherwise specified.

STATUS: FINAL

CLIENT:		1x 60 MW STG SET DCM SHRIRAM LIMITED UNIT: SHRIRAM ALKALI AND CHEMICALS Bharuch, Gujarat			
DEPT.	TCEP	NAME	SIGNED	DATE	NO OF VAR.
CODE	415	C.BALAJI		27.06.15	-N.A.-
CHD.		S.J.HUSSAIN		27.06.15	-N.A.-
APPD.		M.A.HASEEB		27.06.15	-N.A.-
BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		ITEM NO. (1-313-01-14135) HY-DG-1-31301-14135			
TITLE: TEAM TURBO GENERATOR MACHINERY ARRANGEMENT AND FOUNDATION		04			