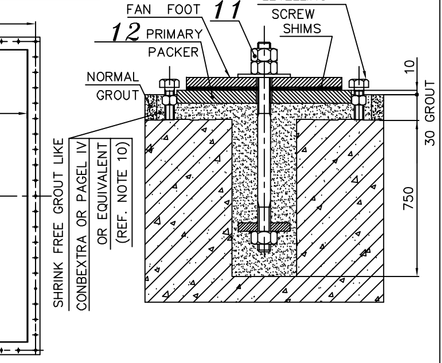
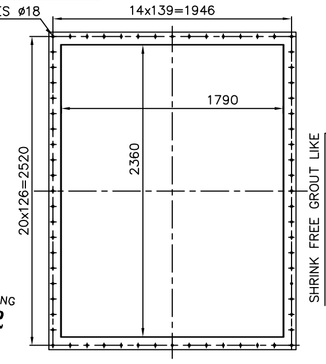
ACTUATOR DETAILS:
MODEL : GF100.2/SAR6 epac Actuator (LR VERSION).
MAKE : M/s. AUMA (INDIA) PVT LTD. BANGALORE

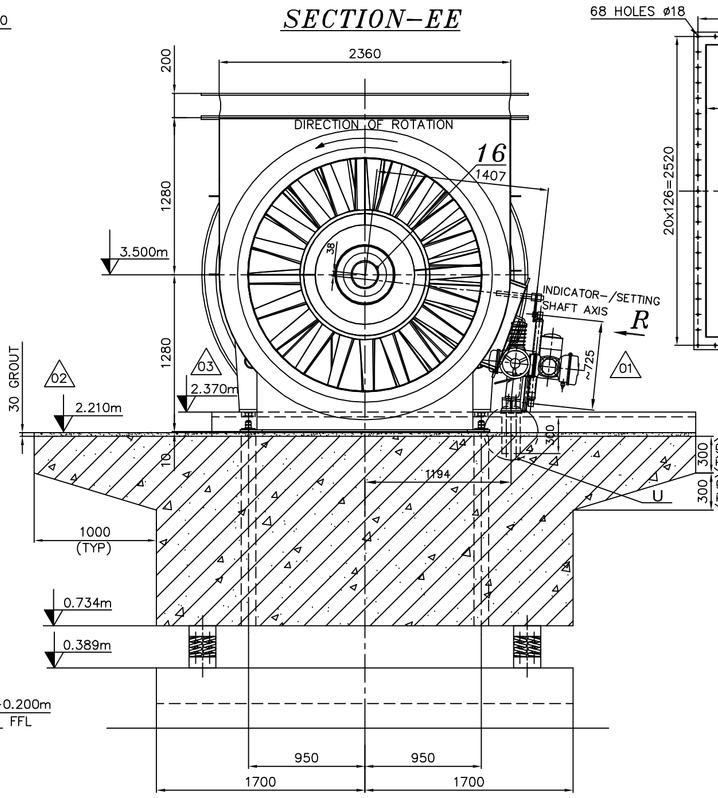
SECTION–AA 01 02



SUCTION FLANGE



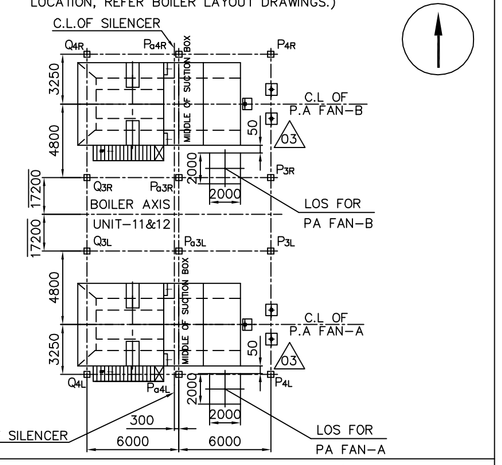
SECTION–EE



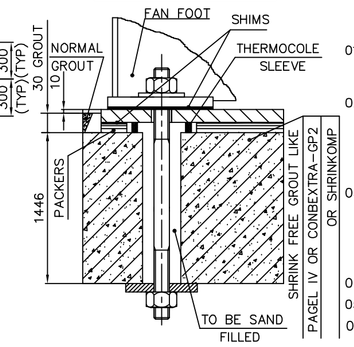
KEY PLAN 01

REFER DRG. NO. 0-00-022-75007
(KEY PLAN SHOWN IS INFORMATIVE ONLY. FOR EXACT LOCATION, REFER BOILER LAYOUT DRAWINGS.)

NORTH



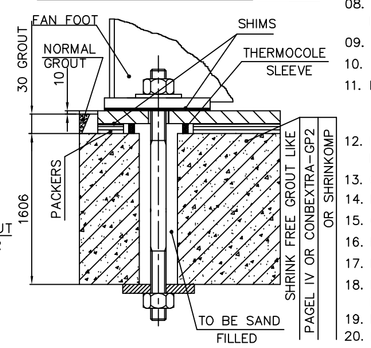
SECTION–BB 01 02



NOTES:– 01

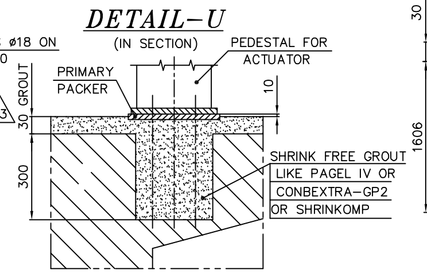
01. THE LOADS INDICATED ON FOUNDATION ARE WITHOUT ALLOWANCES FOR VIBRATIONS. CIVIL DESIGNERS (PEM, ARE RESPONSIBLE FOR PROPER DESIGN OF FOUNDATION TAKING INTO ACCOUNT OF THE ALLOWANCES FOR VIBRATION ALSO.
02. THE DIFFERENT NATURAL FREQUENCIES OF THE FOUNDATION HAVE TO BE 20% AWAY FROM THE SPEED FREQUENCY, fnmax = n/60 AND 20% AWAY FROM THE DOUBLE OF THE SPEED FREQUENCY, 2 X fnmax. THIS MEANS: 0.8xfn TO 1.2xfn and 0.8x(2xfn) TO 1.2x(2xfn).
SPEED FREQUENCY fnmax = 24.83 HZ
(2 * fnmax) = 49.66 HZ
03. THE STIFFNESS OF THE FOUNDATION HAS TO BE AT LEAST OF > 1.0E+06 N/mm IN LONGITUDINAL, TRANSVERSAL AND VERTICAL DIRECTIONS RELATING TO THE FAN AXIS. IT HAS TO BE TAKEN INTO CONSIDERATION THAT ON SETTLING THE FOUNDATION THE TOTAL NATURAL FREQUENCIES OF THE FOUNDATION CAN ARISE DUE TO THE SOIL COMPACTION AND THE RESULTING INCREASES OF THE ELASTIC MODULUS. AN UNEVEN SETTLING OF THE FOUNDATION HAS TO BE EXCLUDED.
04. THE RATIO OF THE FOUNDATION MASS TO THE ROTOR MASS HAS TO BE GREATER THAN 20. 02
05. ADOPT IS: 2974 / PART–IV FOR THE FOUNDATION DESIGN.
06. THE CONNECTING DUCTS AT INLET AND OUTLET OF FAN MUST BE SELF SUPPORTED AND SHOULD NOT BE WELDED WITH EXPANSION JOINTS.
07. FOUNDATION POCKETS SHOULD BE PERPENDICULAR TO THE FLAT SURFACES OF FOUNDATION.
08. ACCURATE TEMPLATES SHALL BE USED FOR LOCATING CORES FOR POCKET HOLES TO ENSURE THEIR DIMENSIONAL ACCURACY.
09. TOLERANCE BETWEEN ANY TWO POCKET CENTRES IS ±5 mm.
10. TOLERANCE ON CONCRETE LEVELS $^{+0}_{-25}$ mm.
11. IN AREAS WHERE SOLE PLATES AND ANCHOR PLATES ARE TO BE INCORPORATED IN FOUNDATION CONCRETE, THE SIZE OF THE COARSE AGGREGATE USED SHALL NOT EXCEED 20 mm AND DOWN GRADED TO FACILITATE CHIPPING AND SCRAPPING AND THEREBY ENSURING MAXIMUM CONTACT ON THE MATING AREAS.
12. NON–SHRINK GROUT IS TO BE USED. REFER GENERAL SPECIFICATIONS ISSUED BY BHEL/RANIPET FOR NON–SHRINK GROUT. THIS ALSO CONTAINS THE PREPARATIONS OF PRIMARY PACKERS & SHIMS.
13. GROUTING SHOULD BE DONE ONLY AFTER FINAL ALIGNMENT OF FAN.
14. ELEVATIONS & POCKET DEPTH SHOWN IN FOUNDATION PLAN ARE INCLUDING GROUTING THICKNESS.
15. GROUTING IS IN THE SCOPE OF ERECTION GROUP.
16. HANDRAILS, STEEL PLATFORMS, STEEL STAIRS, LADDERS & THEIR EMBEDMENTS ARE IN THE SCOPE OF BHEL/TRICHY.
17. FAN FOUNDATION SHOULD NOT BE USED AS SUPPORT FOR OTHER STRUCTURES OR EQUIPMENTS.
18. FOUNDATION CONFIGURATION SHOWN IN THIS DRAWING IS ONLY INFORMATIVE/TYPICAL. TYPE AND DETAILS OF FOUNDATION ARE TO BE FINALISED BY CIVIL DESIGNERS
19. FOR MOTOR ERECTION, REFER MOTOR SUPPLIER'S ERECTION MANUAL.
20. LUB OIL SYSTEM SCHEME DRAWING NUMBER 2–00–107–21942.
21. MAX. AMPLITUDE REFERRED TO SUPPORTING AREA – TOP EDGE OF FOUNDATION IS 100 MICRONS.
22. ALL ELEVATIONS ARE W.R.T.EL 0.000M WHICH CORRESPONDS TO RL(+) 281m.
23. THE NATURAL FREQUENCY OF THE DUCTS AND SUPPORTING STRUCTURES SHOULD BE CLEARLY AWAY FROM THE OPERATING FREQUENCY OF FAN.
24. LOAD DUE TO SHORT CIRCUITING OF MOTOR SHOULD BE TAKEN INTO ACCOUNT WHILE DESIGNING THE FOUNDATION.
25. SUITABLE DRAIN HOLES ARE TO BE PROVIDED IN THE FOUNDATION.
26. ALL THE INSERTS,EMBEDMENTS,HANDRAILS,FOUNDATION BOLT ASSY,GROUTS AND GROUTING ARE IN THE SCOPE OF BHEL.
27. THE DRAIN LINE FROM THE FAN SHALL BE SUITABLY ROUTED TO THE NEAREST TRENCH BY BHEL/PIPING CENTRE.

SECTION–B1B1 01 02

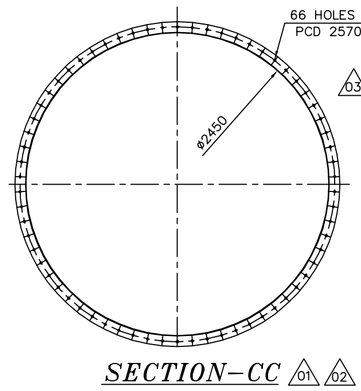


DETAIL–U

(IN SECTION)



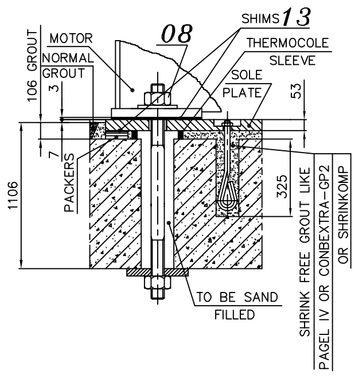
DELIVERY FLANGE



16	BEARINGS	NU330EM1.C3	–	2
		7234B.MP.UA	–	3
15	OULET EXPANSION JOINT	IS:2062 & RUBBER	–	1
14	INLET EXPANSION JOINT	IS:2062 & RUBBER	–	1
13	SHIMS	S.S	2	AS REQD.
12	PRIMARY PACKER	IS : 2062	20	10
11	FOUNDATION FASTENERS FOR FAN	ASTM A105	–	17
10	COUPLING GUARD	IS : 2062	–	1
09	SPACER COUPLING	STEEL	–	1
08	MOTOR WITH FNDN. FASTENERS	3500 kW / 1495 RPM	–	1
07	BLADES	ENAC–AlSi9MgT6,BHN MIN 75	–	40
06	IMPELLER HUB	S355J2G3	–	2
05	HOUSING CORE	IS : 2062	6	1
04	DIFFUSER	IS : 2062	6	1
03	OUTLET GUIDE VANE ASSY.	IS : 2062	6	1
02	IMPELLER HOUSING	IS : 2062	20	1
01	SUCTION CHAMBER	IS : 2062	6	1
SL NO	DESCRIPTION	MATERIAL	THICKNESS (mm)	QTY

BILL OF MATERIAL

SECTION–CC 01 02



FAN DETAILS: 01

TYPE	:	PAF 19/10.6–2
NO. OF FANS PER BOILER	:	TWO
WEIGHT OF ROTATING PARTS	:	3060 kg
GD^2 OF FAN	:	1400 kg.m^2
SPEED OF FAN	:	1490 RPM
MAKE	:	BHEL/TLT (ROTORS ONLY FOR FIRST UNIT)

MAX.ADMISSBLE AMPLITUDE REFERRED TO SHAFT LEVEL
HORIZONAL :100 MICRON
VERTICAL :100 MICRON
AXIAL :100 MICRON
TORQUE REQUIRED TO OPERATE SERVOMOTOR : 10 kg.m

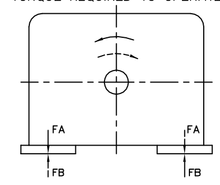
MOTOR DETAILS: 01 02

RATING	:	3500 kw/1495 RPM/11000 V
MAKE	:	M/s BHEL/BHOPAL
TYPE	:	1LA7924–4
GD^2 OF MOTOR	:	1060 Kg.m^2
WEIGHT OF MOTOR	:	15500 Kg (INCLUDING ROTATING
WEIGHT OF ROTATING PARTS	:	4000 Kg PART LOAD)
MOTOR DRAWING NUMBER	:	14020040911/02

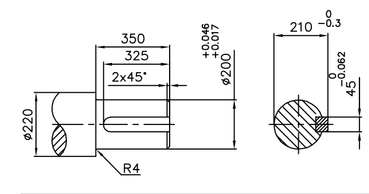
BEARING LUBRICATION TYPE : FORCED OIL LUBRICATION
OIL TYPE: ISO VG 68.

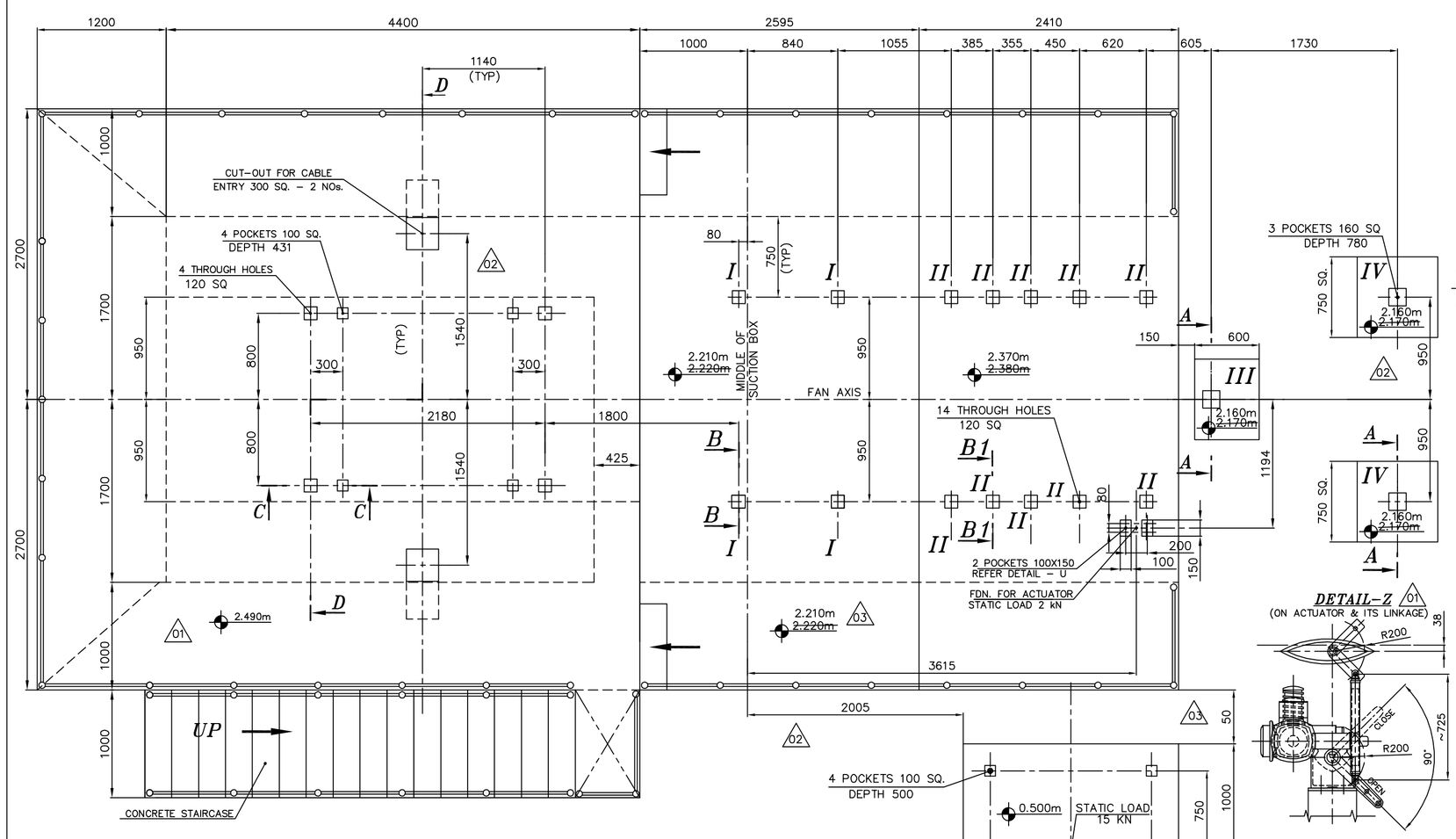
FOUNDATION LOAD OF MOTOR 01

MAX. FORCE CALCULATED FROM THE MAX. IMPULSE TORQUE – FM = 142 kN
FORCE EXERTED BY WEIGHT ON EACH SIDE–––––––––– FG = 78 kN
FOUNDATION LOAD ON EACH SIDE COMPRESSION – FA = FM+FG = 220 kN
TENSILE FORCE – FB = FM–FG = 64 kN
THE FORCE OCCUR ALTERNATIVELY INDEPENDENT OF THE DIRECTION OF ROTATION.



MOTOR SHAFT END 01

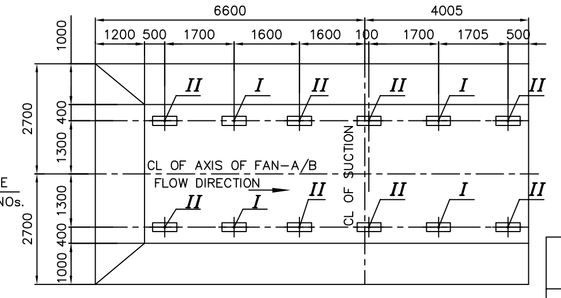




DETAIL–Z 01

(ON ACTUATOR & ITS LINKAGE)

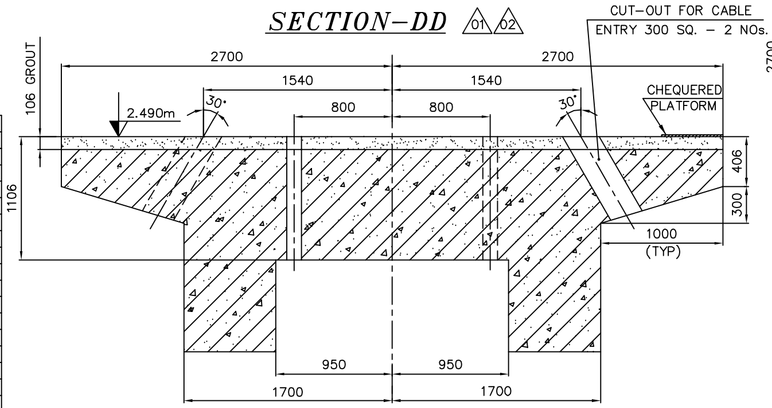
GENERAL ARRANGEMENT OF SPRING & VISCOUS DAMPER ELEMENTS ON THE SOFFIT OF PA FAN DECK 02



ITEM	TYPE	NO. OFF
1	GPV8.4–711/741	4
2	GP 8.4–711/741	8

	FORCE [N]	FORCE [N]	FORCE [N]	FORCE [N]	FORCE [N]
01 LOAD POINT	STATIC VERTICAL	DYNAMIC VERTICAL	STATIC HORIZONTAL IN AXIAL DIRECTION	STATIC HORIZONTAL ACROSS TO AXIS	DYN. HORIZONTAL ACROSS TO AXIS
I	+14800	±400	±5100	±100	±400
II	+15500	±1700 ±10200	±2800	±100	±1500 ±8700
III	+10500	±600		±100	±600
IV	+6400	±600		±100	±600

SECTION–DD 01 02



ID. NO.	MASS IN (KG) INCLUDING INSULATION	(F) FORCE IN (N)	01 DESIGNATION
30/2		8153	STAT. AND DYN. FORCES CAUSED BY AIR STREAM OF SUCTION BOX IN VERTICAL DIRECTION
30/1		20161	STAT. AND DYN. FORCES CAUSED BY AIR STREAM OF SUCTION BOX IN HORIZONTAL DIRECTION
16		27895	AXIAL THRUST OF THE FAN (DUE TO PRESSURE INCREASE)
02 14	141370		FOUNDATION(EXCLUDING MACHINE WEIGHT)
13/2		16380	MAX. LOAD WHEN LIFTING THE FAN HOUSINGS UPPER PART
13/1		28660	MAX. LOAD WHEN LIFTING THE ROTOR ASSEMBLY
12		82040	UNBALANCE IN CASE OF DAMAGE
11		14251	MAX. ROTATING LOAD DUE TO UNBALANCE OF THE FAN ROTOR
10	1850		OIL SUPPLY UNIT WITH OIL FILLING
9	–		FRAME OF THE MOTOR
8	15500		DRIVE MOTOR
7		3630	RADIAL LOAD ON MOTOR SHAFT
6		1327	AXIAL THRUST ON MOTOR SHAFT FOR MOTOR WITH FIXED BEARING
5	660		INTERMEDIATE SHAFT WITH COUPLING
4	2350		DIFFUSER WITH TAIL FAIRING
3	2921		COMPLETE ROTOR ASSEMBLY
2	3710		FAN HOUSING WITH STRAIGHTENER VANE SECTION
1	2290		SUCTION BOX WITH NOSE FAIRING AND INLET NOZZEL

STATUS : CONTRACT					
DISTRIBUTION :					
TO					
No.OF					
REV.	DATE	ALTD:	CHKD:	APPD: V.P.S	
03	23.09.11	R. GIRI	TSSR		

01.DRAWING UPDATED AS PER CUSTOMER COMMENTS VIDE TRANSMITTAL REF:CC:PE:2250:3:9248. DT. 13.10.10

STATUS : CONTRACT					
DISTRIBUTION :					
TO					
No.OF					
REV.	DATE	ALTD:	CHKD: R.G	APPD: V.P.S	
02	13.09.10	S.M/OL	R.Giridharan		

01.DRAWING UPDATED AS PER CUSTOMER COMMENTS VIDE TRANSMITTAL REF:CC:PE:2250:3:1390. DT. 31.12.09.AND CIVIL DRGS.2250–315–POC–C–318 REV 0, DT.06.09.10 AND 2250–315–POC–C–320 REVO, DT.06.09.10
a.FAN AND MOTOR FOUNDATION DETAILS UPDATED.
b.GROUTING IN FAN AREA CONSIDERED AS 30mm INSTEAD OF 40mm.
c. NOTE 4 CORRECTED.
d. BLADE HARDNESS INDICATED.

STATUS : CONTRACT					
DISTRIBUTION :					
TO					
No.OF					
REV.	DATE	ALTD:	CHKD: R.G	APPD: P.S.P	
01	05.12.2009	S.M/OL	sd;,,,,,,,,,,	sd;,,,,,,,,,,	

01. DRAWING UPDATED AS PER CUSTOMER COMMENTS VIDE TRANSMITTAL REF:CC:PE:
a. MOTOR AND ITS FOUNDATION DETAILS UPDATED.
b. LOAD DATA UPDATED.
c. NOTES ADDED.
d. ACTUATOR AND ITS FOUNDATION DETAILS UPDATED.
e. KEYPLAN UPDATED.

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NTPC DRG. NO. 2250–101–01–RN–PVM–B–004A

PROJECT
NTPC LTD.
VINDHYACHAL SUPER THERMAL POWER PROJECT
STAGE–IV (2X500 MW)
STEAM GENERATOR WITH ELECTROSTATIC PRECIPITATOR PACKAGE

BHARAT HEAVY ELECTRICALS LTD.
BOILER AUXILIARIES PLANT
RANIPET – 632 406

DEPT CODE		NAME	SIGN	DATE
M	DRN	S.MOHAHA/OL		13.10.2009
	DESN	K.N.R	sd.....	13.10.2009
	CHD	R.G	sd.....	13.10.2009
	APPD	V.P.S	sd.....	13.10.2009

TITLE
GENERAL ARRANGEMENT OF PRIMARY AIR FAN PAF 19/10.6–2

ALL DIMENSIONS ARE IN mm	SCALE 1:35	DRAWING NO. RP–DC–335–106–0202
BHEL/RANIPET DRG. NO. 1–00–100–21759		SHEET 01 OF 01 REV. 03

CUSTOMER NO. : R540 & R541

Size A1