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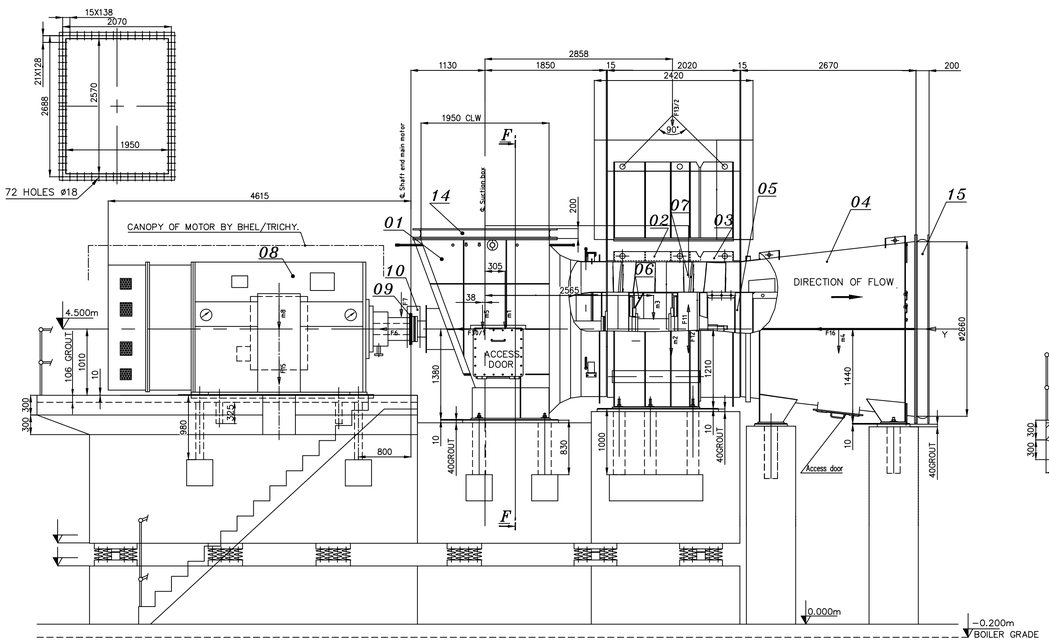
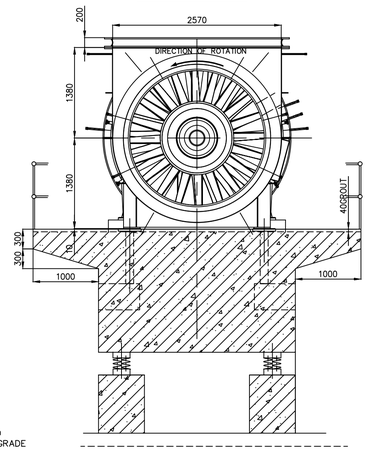
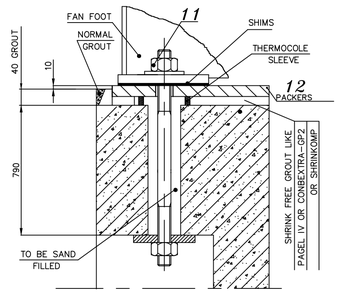
SUCTION FLANGE



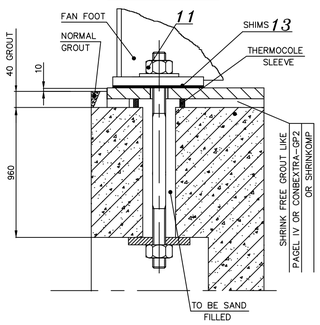
SECTION–FF



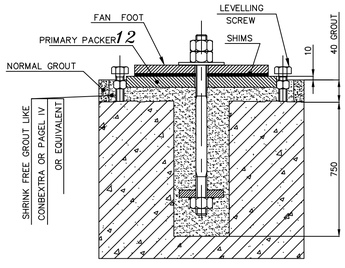
SECTION–AA



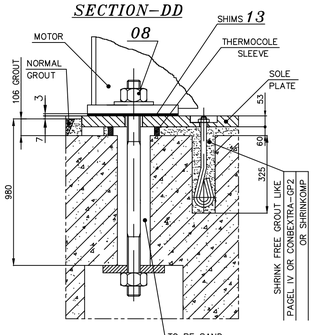
SECTION–BB



SECTION–CC



SECTION–DD



KEY PLAN

NOTES:–

01. THE LOADS INDICATED ON FOUNDATION ARE WITHOUT ALLOWANCES FOR VIBRATIONS. CIVIL DESIGNERS 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 15% AWAY FROM THE DOUBLE OF THE SPEED FREQUENCY, 2 X fnmax. THIS MEANS: 0.8xfn TO 1.2xfn and 0.85x(2xfn) TO 1.15x(2xfn).
SPEED FREQUENCY fnmax = 25 HZ
(2 * fnmax) = 50 HZ
03. THE STIFFNESS OF THE FOUNDATION HAS TO BE AT LEAST CF > 1.0E+06 N/mm IN LONGITUDINAL, TRNSVERSAL 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 25.
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 SCOPE OF ERECTION GROUP OF BHEL/AUTHORISED AGENCY.
16. HANDRAILS, STEEL PLATFORMS, LADDERS & CANOPY FOR MOTOR AND 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. BASE FRAME, SOLE PLATE, FOUNDATION BOLTS, FDN. SLEEVE & FASTENERS RELATED TO MOTORS WILL BE IN THE SCOPE OF MOTOR SUPPLIER (BHEL BHOPAL UNIT)

FAN DETAILS:

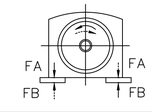
TYPE	: PAF 20.5/11.2–2
NO. OF FANS PER BOILER	: TWO (IDENTICAL)
WEIGHT OF ROTATING PARTS	: 2900 kg
GD^2 OF FAN	: 1200 kg.m^2
SPEED OF FAN	: 1490 RPM

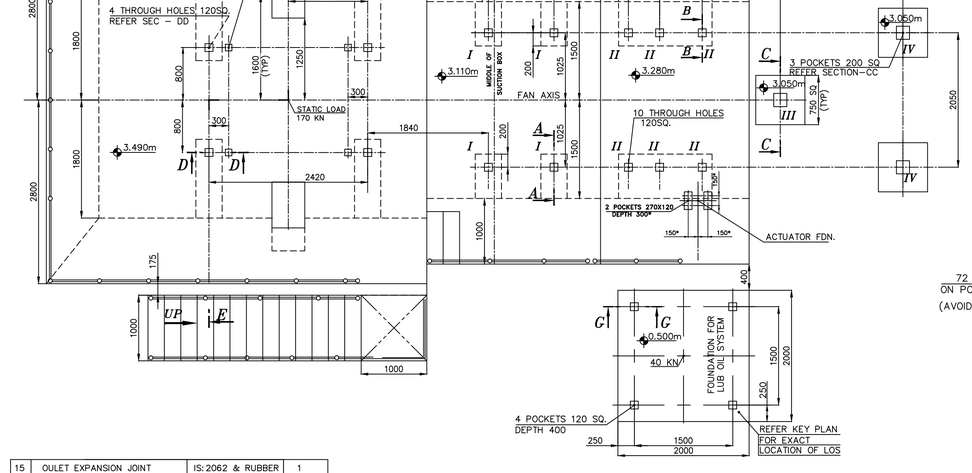
MOTOR DETAILS:

RATING	: 4125 kw/1494 RPM/11000 V
TYPE	: 1LA7925–4
MAKE	: M/s. BHEL/BHOPAL
WEIGHT OF MOTOR	: 15800 KG
WEIGHT OF ROTATING PARTS	: 4500 KG
GD^2OF ROTOR	: 1236 KGM^2
MOTOR DRG. NO.	: 1 402 00 41257

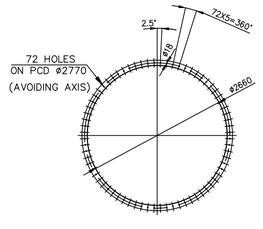
FOUNDATION LOAD OF MOTOR

MAX. FORCE CALCULATED FROM THE MAX. IMPULSE TORQUE – FM = 170 KN
FORCE EXERTED BY WEIGHT ON EACH SIDE---------- FG = 79 KN
FOUNDATION LOAD ON EACH SIDE COMPRESSION – FA = FM+FG = 249 KN
TENSILE FORCE -------- FB = FM–FG = 91 KN
THE FORCE OCCUR ALTERNATIVELY INDEPENDENT OF THE DIRECTION OF ROTATION.





DELIVERY FLANGE

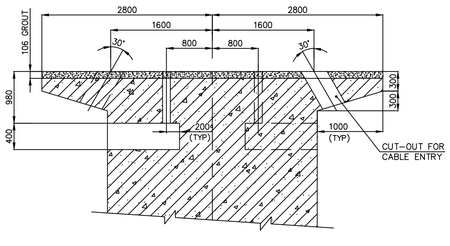


30/2		10617	Stat. and dyn. forces caused by air stream of suction box in vert. direction
30/1		25410	Stat. and dyn. forces caused by air stream of suction box in horiz. direction
16		33545	Axial thrust of the fan (due to pressure increase)
15		226830	Load during starting sequence by short–circuit torque of the motor
14	–		Foundation
13/2		21860	Max. load when lifting the fan housings upper part
13/1		20780	Max. load when lifting the rotor assembly
12		90070	Unbalance in case of damage
11		11128	Max. rotating load due to unbalance of the fan rotor
10	–		Oil supply unit with oil filling
9	–		Frame of the motor
8	–		Drive motor
7		3630	Radial load on motor shaft
6		2133	Axial thrust on motor shaft for motor with fixed bearing
5	660		Intermediate shaft with coupling
4	3030		Diffuser with tail fairing
3	2900		Complete rotor assembly
2	4950		Fan housing with straightener vane section
1	3130		Suction box with nose fairing & inlet nozzle and intermediate shaft cover
ID. NO.	(m) MASS IN (KG) INCLUDING INSULATION	(F) FORCE IN (N)	DESIGNATION

FOUNDATION LOAD DATA

LOAD POINT	+↓ FORCE [N] STATIC VERTICAL	+↓ ↑− FORCE [N] DYNAMIC VERTICAL	+ FORCE [N] STATIC HORIZONTAL IN AXIAL DIRECTION	+ ↔ − FORCE [N] STATIC HORIZONTAL ACROSS TO AXIS	+ ↔ − FORCE [N] DYN. HORIZONTAL ACROSS TO AXIS
I	+25300	±400	±7900	±1500	±400
II	+31100	±2200 ±18300	±5600	±800	±1900 ±15600
III	+15600	±500		±2100	±500
IV	+10400	±500		±2100	±500

SECTION–EE



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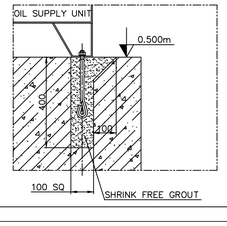
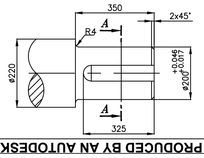
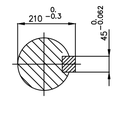


MOTOR SHAFT END



SECTION–AA



SL NO	DESCRIPTION	MATERIAL	QTY
15	OULET EXPANSION JOINT	IS: 2062 & RUBBER	1
14	INLET EXPANSION JOINT	IS: 2062 & RUBBER	1
13	SHIMS	S.S	AS REQD.
12	PRIMARY PACKER	IS : 2062	8
11	FOUNDATION FASTENERS FOR FAN	ASTM A105	15
10	COUPLING GUARD	IS : 2062	1
09	SPACER COUPLING	STEEL	1
08	MOTOR WITH FNDN. FASTENERS	4125 KW /1494 RPM	1
07	BLADES	ENAC–AlSi9MgT6	36
06	IMPELLER HUB	S355J2G3	1
05	HOUSING CORE	IS : 2062	1
04	DIFFUSER	IS : 2062	1
03	OUTLET GUIDE VANE ASSY.	IS : 2062	1
02	IMPELLER HOUSING	IS : 2062	1
01	SUCTION CHAMBER	IS : 2062	1

BILL OF MATERIAL

REV	DESCRIPTION	DATE	DRAWN BY	CHECKED BY	APPR'D BY
00	ISSUED FOR NTPC REVIEW	05.09.2013	P.S.N	S.AGARWAL	V.P SHYAM

BHEL CUSTOMER NOS. R815 & R816

NTPC DRG NO 9572–102–RPT–PVM–B–009

CUSTOMER NTPC — NTPC LIMITED. (A Government of India Enterprise)

PROJECT GADARWARA SUPER THERMAL POWER PROJECT
STAGE–1 2 x 800MW
STEAM GENERATOR PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED.,
BOILER AUXILIARIES PLANT
RANIPET – 632 406

TITLE GA DRAWING FOR PA FAN WITH FOUNDATION PLAN AND LOADING DATA PAF 20.5/11.2–2

ALL DIMENSIONS IN MILLIMETRE
PROJECTION SCALE NTS
BHEL DRG. NO. 1–00–100–28804
REV. 00

Size A1

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