

Index
For tender documents (Technical)
Tender no B/4011/2016/1489V1

Content	Page no. of pdf file
Drawing no 0-12076-59000 rev 01	Pg. 2
Drawing no 2-12076-41000 rev 02	Pg. 3
Annexure-A to Drawing no 2-12076-41000	Pg. 4
Annexure-B to Drawing no 2-12076-41000	Pg. 5

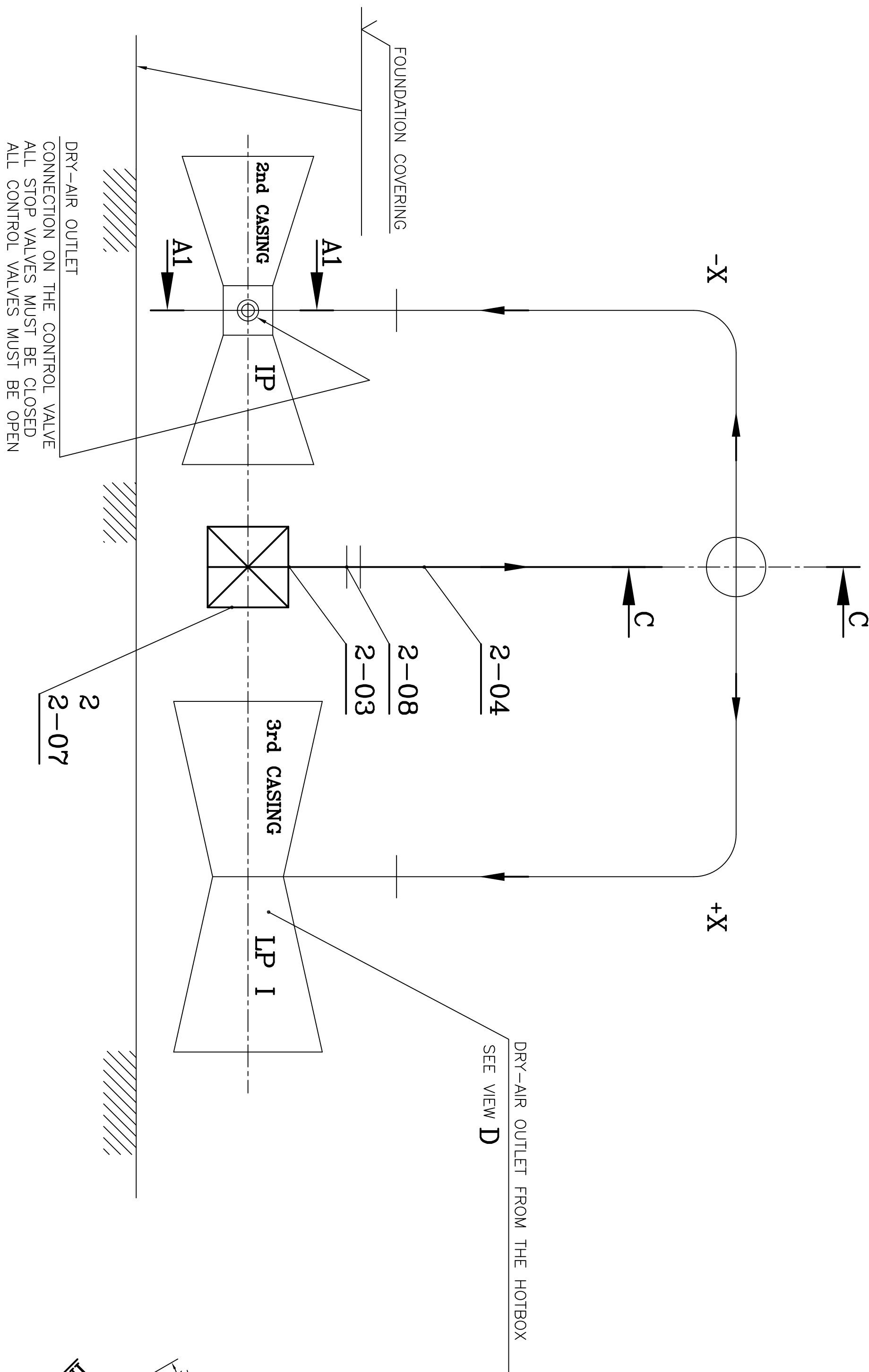


Figure 1 is a schematic diagram of the control valve in cross-section. The diagram shows a central valve body with a piston and a control valve assembly on the right. A dashed circle highlights the control valve assembly, which is labeled 'Z' and 'THE CONTROL VALVE'.

W & CY CHAINS

Z1

PRE-AIR OUTLET ON THE CONTROL VALVE

BEFORE ASSEMBLY OF THE DRY-AIR EQUIPMENT
CLOSE THE DRY-AIR CONNECTION OF THE VALVE CASING AFTER
DISMANTLING OF THE DRY-AIR EQUIPMENT

6. **TEST/GUARANTEE CERTIFICATE :**

a. PERFORMANCE CERTIFICATES FOR FLOW RATE, TEMPERATURE, AND RELATIVE HUMIDITY OF DRY AIR AT OULET.

b. PERFORMANCE CERTIFICATES FOR NOISE LEVEL.

c. CERTIFICATE OF COMPLIANCE (COO) FOR MATERIAL & PERFORMANCE TEST OF ALL PARTS / ASSEMBLES.

7. **OPERATING MANUAL :**

10 DVD (9 DVD FOR PROJECT SITE AND 1 DVD FOR BHEL, HARDWAR) OF OPERATION & MAINTENANCE MANUAL, COVERING ALL ASPECTS OF INSTALLATION, OPERATION AND MAINTENANCE, ARE TO BE SUPPLIED.

TO DVD (3 DVD FOR PROJECT SITE AND 1 DVD FOR OPERATION AND MAINTENANCE, ARE TO BE SUPPLIED.

DIRECTION OF DRY-AIR FLOW

ITEM NO.	DESCRIPTION	MATERIAL	QTY.	REMARK
1	DRYING PLANT M120: HMN-SERIES		1	ASSEMBLY
1-1	N-PIPE DN100/80/80	STEEL	1	PART
1-2	PLUG CONNECTOR DN80	STEEL	1	PART
1-3	CONNECTION DN80; PCD 130	STEEL	2	PART
1-4	HOSE CLAMP	STEEL	6	PART
1-5	HOSE DN80*5000	PVC	3	PART
1-6	HEXAGON HEAD SCREW M30*35	~S8	16	PART
1-7	DEGENERATING BEARING M120*40*750/P2.1, 28KW (47717-0098)		1	PART
2	DRYING PLANT ML100		1	ASSEMBLY
2-02	COVER DN200 PITCH DIAMETER-D320	STEEL	1	PART
2-03	HOSE CLAMP DN200	STEEL	2	PART
2-04	HOSE DN200*10000	PVC	1	PART
2-06	SLUDGE 33.7*2.645	STEEL	12	PART
2-07	DEHYDRATING BEARING ML100*400*500H/12.75KW		1	PART
2-08	REDUCER PIECE DN250/DN200	STEEL	1	PART

TABLE-1 (SEE NOTE)

1. APPLICATION OF EQUIPMENT :
DRY AIR BLOWING EQUIPMENT SHALL BE USED FOR REMOVING THE MOIST AIR FROM TURBINE AND REPLACING IT WITH DRY AIR DURING SHUT DOWN OF TURBINE TO PREVENT CORROSION.
2. SPECIFICATION :
TWO UNITS OF DRY AIR BLOWING EQUIPMENT AS PER BILL OF MATERIAL WITH THE FOLLOWING OUTLET CONDITIONS :
 - A. TEMPERATURE OF DRY AIR AT OUTLET MAX. 60 °C.
 - B. RELATIVE HUMIDITY < 11% AT AMBIENT TEMPERATURE.
 - C. PROVISION OF AIR FILTERS IN THE SYSTEM TO PREVENT THE DUST PARTICLES > 55 MICRON.
 - D. NOISE LEVEL AT FULL LOAD < 85 db(A), WHEN MEASURED AT A DISTANCE OF 1 METRE AND HEIGHT OF 1.5 METRE.
3. GENERAL DESIGN FEATURES :
 - A. THE DRY AIR BLOWER(S) SHOULD BE SINGLE, COMPACT, PORTABLE, & READY TO SWITCH IN UNIT AT SITE.
 - B. IT SHOULD BE CAPABLE TO HANDLE TOTAL PRESSURE DROP IN THE SYSTEM.
 - C. SUITABLE CONNECTION FOR CONNECTING THE HOSE PIPES SHALL BE DESIGNED AND INCORPORATED IN THE DRY AIR PRESERVATION SYSTEM BY THE SUPPLIER.
 - D. THE EQUIPMENT SHOULD BE ABLE TO OPERATE WITH 415 V-3 PHASE AND/OR 240 V A.C. MAIN SUPPLY.
4. PAINTING :
COLOUR SHADE RAL7035 (LIGHT GREY) OR 631 OF 15.5.
5. DOCUMENTS FOR ONE TIME APPROVAL :
 - A. VENDOR'S OWN DRAWINGS INCLUDING BILL OF MATERIAL.
 - B. POWER WIRING DIAGRAM OF MOTORS, HEATERS AND CONTROLS.
 - C. DATA SHEETS OF MOTORS, HEATERS AND CONTACTORS.

DETAIL--Z1

FOR DRY-AIR OPERATION, EACH PART HAS TO BE REMOVED

NOTE:— ALL THE ITEMS SHOULD BE OFFERED AS PER TABLE-1 OR EQUIVALENT MODEL ACCEPTED BY B.H.E.L. .

[illegible]

COPYRIGHT AND CONFIDENTIAL
THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETERIMENTAL TO THE INTEREST OF THE COMPANY.

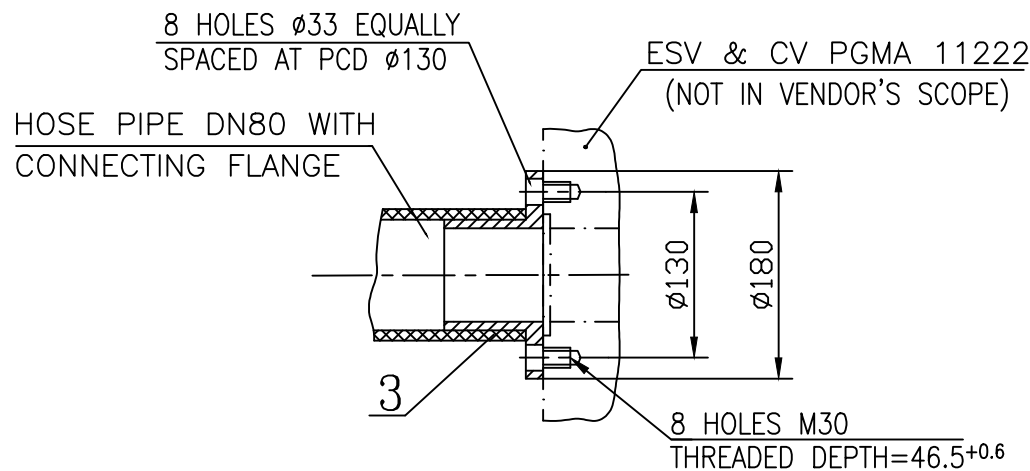
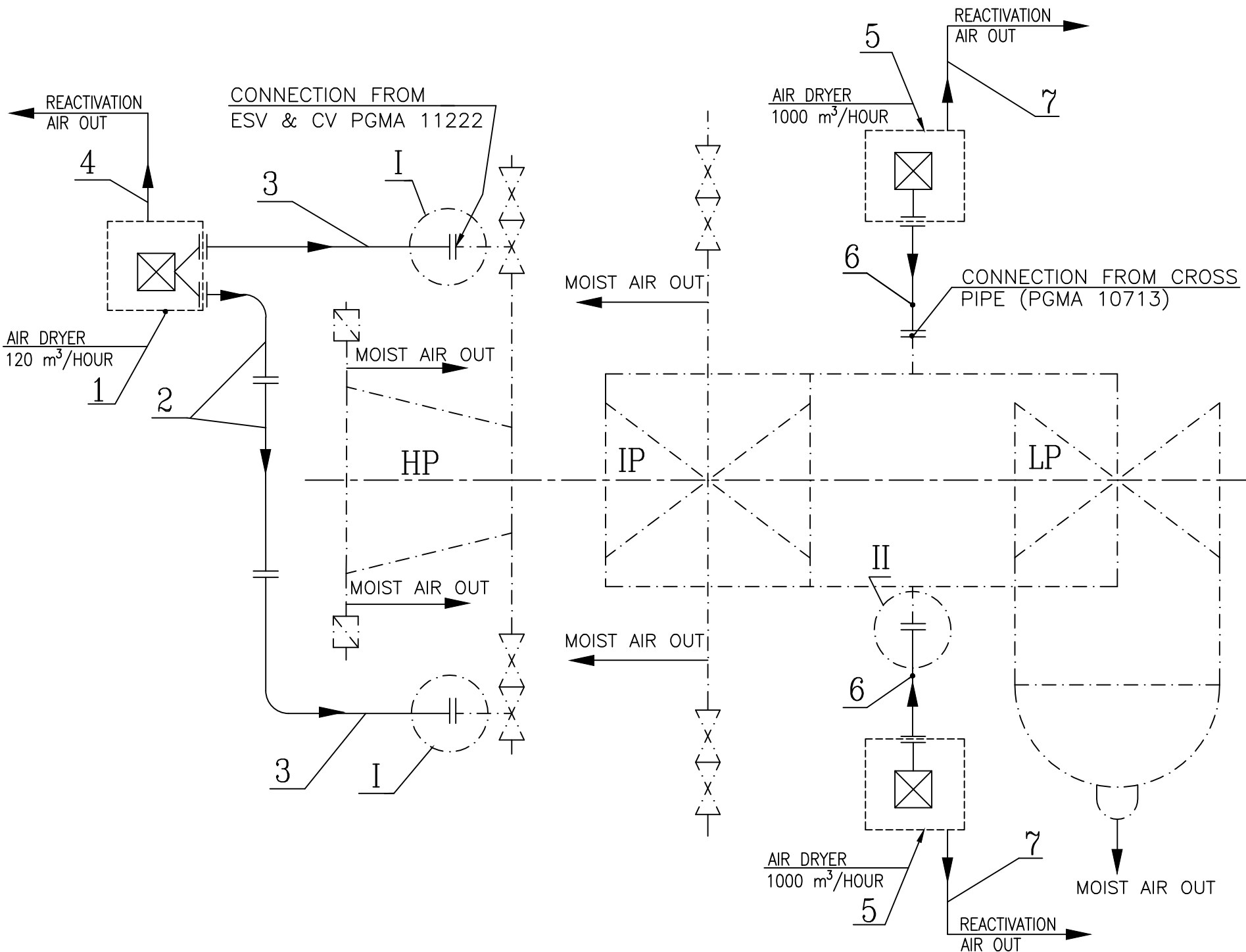
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

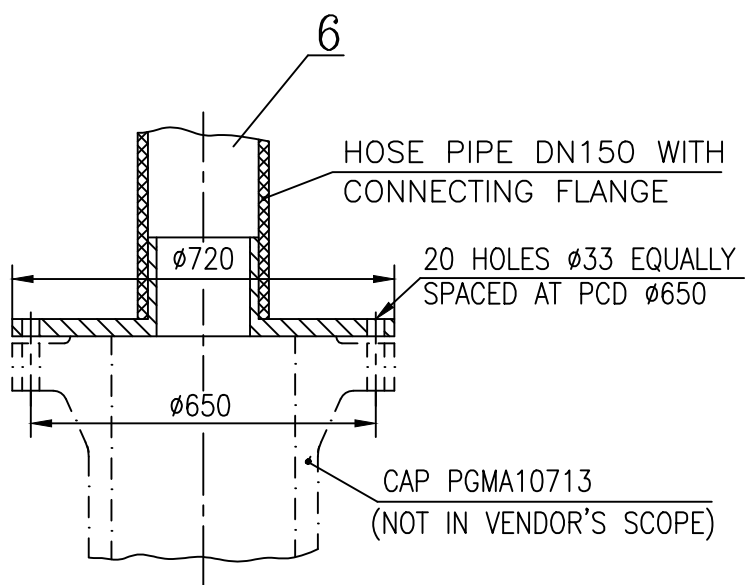
FORM DG 44(B)

2-12076-41000

DRAWING No.



DETAIL-I



DETAIL-II

1. APPLICATION OF EQUIPMENT :

DRY AIR BLOWING EQUIPMENT SHALL BE USED FOR REMOVING THE MOIST AIR FROM TURBINE AND REPLACING IT WITH DRY AIR DURING SHUT DOWN OF TURBINE TO PREVENT CORROSION.

2. SPECIFICATION :

THREE UNITS OF DRY AIR BLOWING EQUIPMENT (ONE UNIT OF ATLEAST 120 m³/hr CAPACITY AND TWO UNITS OF ATLEAST 1000 m³/hr CAPACITY) AS PER ANNEXURE – A, WITH FOLLOWING OUTLET CONDITIONS :

- TEMPERATURE OF DRY AIR AT OUTLET MAX. 60 °C.
- RELATIVE HUMIDITY < 11% AT AMBIENT TEMPERATURE.
- PROVISION OF AIR FILTER(S) IN THE SYSTEM TO PREVENT THE DUST PARTICLES > 55 MICRON.
- NOISE LEVEL AT FULL LOAD < 85 dB(A), WHEN MEASURED AT A DISTANCE OF 1 METRE AND HEIGHT OF 1.5 METRE.

3. GENERAL DESIGN FEATURES :

- THE DRY AIR BLOWER(S) SHOULD BE SINGLE, COMPACT, PORTABLE & READY TO SWITCH IN UNIT AT SITE.
- IT SHOULD BE CAPABLE TO HANDLE TOTAL PRESSURE DROP IN THE SYSTEM.
- THE EQUIPMENT SHALL BE SKID MOUNTED AND SHOULD NOT REQUIRE ANY FIXING WITH FOUNDATION.
- THE EQUIPMENT SHOULD BE ABLE TO OPERATE WITH 415 V-3 PHASE AND/OR 230 V A.C. MAIN SUPPLY.

4. SCOPE OF SUPPLY :

BILL OF MATERIAL –

9	INSTRUMENTS FOR MEASURING THE AIR CONDITIONS AT INLET & OUTLET OF TURBINE	4 SETS
8	FASTENERS-BOLTS/NUTS/CLAMPS-FOR CONNECTING FLANGES/HOSES etc.	1 SET
7	HOSE PIPE DN150, L=30 m WITH SUITABLE CONNECTION FOR REACTIVATION AIR	02
6	HOSE PIPE DN150, L=5 m WITH SUITABLE FLANGE AS PER DETAIL-II	02
5	AIR DRYER OF CAPACITY ATLEAST 1000 m ³ /hr WITH ONE OUTLET	02
4	HOSE PIPE DN80, L=30 m WITH SUITABLE CONNECTION FOR REACTIVATION AIR	01
3	HOSE PIPE DN80, L=5 m WITH SUITABLE FLANGE AS PER DETAIL-I	02
2	HOSE PIPE DN80, L=5 m WITH SUITABLE END CONNECTIONS	02
1	AIR DRYER OF CAPACITY ATLEAST 120 m ³ /hr WITH 2 OUTLETS	01
ITEM NO.	DESCRIPTION	QTY

5. PAINTING :

THE EQUIPMENT WILL BE PAINTED WITH FULL GLOSS POLYURETHANE FINISHING PAINT (DFT 200µm). DETAILS AS PER ANNEXURE – B.

6. DOCUMENTS FOR ONE TIME APPROVAL :

- VENDOR'S OWN DRAWINGS INCLUDING BILL OF MATERIAL.
- POWER WIRING DIAGRAM OF MOTORS, HEATERS AND CONTROLS.
- DATA SHEETS OF MOTORS, HEATERS AND CONTACTORS.
- PAINTING SCHEME.
- PERFORMANCE TEST PROCEDURE.
- PERFORMANCE CHARACTERISTIC CURVE.
- QUALITY PLAN GIVING IN DETAILS OF THE QUALITY CHECKS CARRIED OUT BY THE VENDOR.

7. TEST/GUARANTEE CERTIFICATE :

- PERFORMANCE CERTIFICATES FOR FLOW RATE, TEMPERATURE AND RELATIVE HUMIDITY OF DRY AIR AT OUTLET.
- PERFORMANCE CERTIFICATES FOR FOR NOISE LEVEL.
- MATERIAL & PERFORMANCE TEST CERTIFICATES OF ALL PARTS/ASSEMBLIES.
- GUARANTEE CERTIFICATE FOR SMOOTH AND RELIABLE FUNCTIONING OF THE EQUIPMENT.

8. OPERATING MANUAL :

22 COPIES (20 FOR SITE AND 2 FOR BHEL, HARDWAR) OF OPERATION & MAINTENANCE MANUAL, COVERING ALL ASPECTS OF INSTALLATION, OPERATION AND MAINTENANCE, ARE TO BE SUPPLIED.

GRADE OF UNTOL. DIM
M/GG.- AA0230208 m
WELDING-CLASS 'B' OF AA0621104
GAS CUTTING-TABLE 3 OF AA0621101

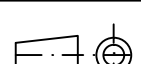
GMS No./ CBOM No.	STATUS OF DRG
AGREED DEPT	NAME
SIGN	DATE

TYPE OF PRODUCT STEAM TURBINE
OR
NAME OF CUSTOMER/PROJECT

BH BHARAT HEAVY ELECTRICALS LTD.
RANIPUR, HARDWAR

NAME	SIGN	DATE	NO. OF VAR
SPS ENGAR	SD/-	25.3.2004	-
S.BANSAL	SD/-	26.3.2004	-
A.K. JAIN	SD/-	26.3.2004	73 74

DEPT STE
CODE 4011



SCALE

WEIGHT (KG)

REF. TO ASSY. DRG.

ITEM No.

NO. OF ITEMS

TITLE : DRY AIR PRESERVATION
SYSTEM (500 MW)

CARD CODE

DRAWING NO.
2-12076-41000

SHEET No. 1 No. OF SHEETS 1

SIZE A2

Bharat Heavy Electricals Limited, Hardwar

Steam Turbine Engineering



Annexure -A

Drg. No. 2-12076-41000

Project: TUTICORIN STAGE IV: 525 MW

W.O.: 10623A11101

DRY AIR PRESERVATION SYSTEM

1. Dry Air Preservation System should be capable to handle total pressure drop in the system.
2. Suitable connection for connecting the hose pipes shall be designed and incorporated in the Dry Air Preservation System by the supplier.
3. The supplier shall carry out performance tests. Procedure for performance tests, test schemes and norms shall be furnished by the supplier for approval by BHEL/customer. Parameters to be checked during performance testing are to be clearly specified.
4. Necessary guidance for operation and maintenance of the Dry Air Preservation System shall be imparted to the site personnel during commissioning of the equipment.
5. 22 copies of Operation & Maintenance manual (20 copies for site and 2 copies for BHEL, Hardwar) are to be provided.
6. Painting is to be carried out as per Annexure-B.
7. The noise level of the equipment, measured at a distance of one meter from the nearest surface of the equipment and at a height of 1.5 meters shall not be more than 85 dB (A).
8. The aesthetic look of the equipment should be excellent. All the fabrication and sheet metal work should be done with utmost care.


(MUNENDRA MITTAL)
Sr. Engineer, (STE)

Bharat Heavy Electricals Limited, Hardwar

Steam Turbine Engineering



Annexure -B

Drg. No. 2-12076-41000

Project: TUTICORIN STAGE IV: 525 MW

W.O.: 10623A11101

PAINTING SCHEME / INSTRUCTIONS

FOR DRY AIR PRESERVATION SYSTEM

1. The equipment will be painted with Full Gloss Polyurethane Finishing Paint as follows:-
 - a. The colour shade of the Finishing paint shall be "Light Grey", colour no. 631 of IS: 5.
 - b. Prior to application of paint, surfaces to be painted shall be cleaned/prepared for painting as per IS: 8629 -Part 2.
 - c. Two coats of Epoxy Based Zinc Rich Primer Paint (IS: 14589) shall be applied (Dry Film Thickness - 35 + 35 μ m).
 - d. One coat of High Build Intermediate Epoxy Paint [BHEL Specification AA56112, equivalent Epilux 4 HB Epoxy Coating (Berger Paints) or Epilac HB Epoxy Paint (Jenson & Nicholson Paints)] shall be applied thereafter (Dry Film Thickness - 70 μ m).
 - e. Two finishing coats of Full Gloss Polyurethane Finishing Paint (IS: 13213) shall be applied (Dry Film Thickness - 30 + 30 μ m).
 - f. The total thickness of the paint shall not be less than 200 μ m. Primer, High Build Intermediate paint and finishing paint should be of one make only.


(MUNENDRA MITTAL)
Sr. Engineer, (STE)