

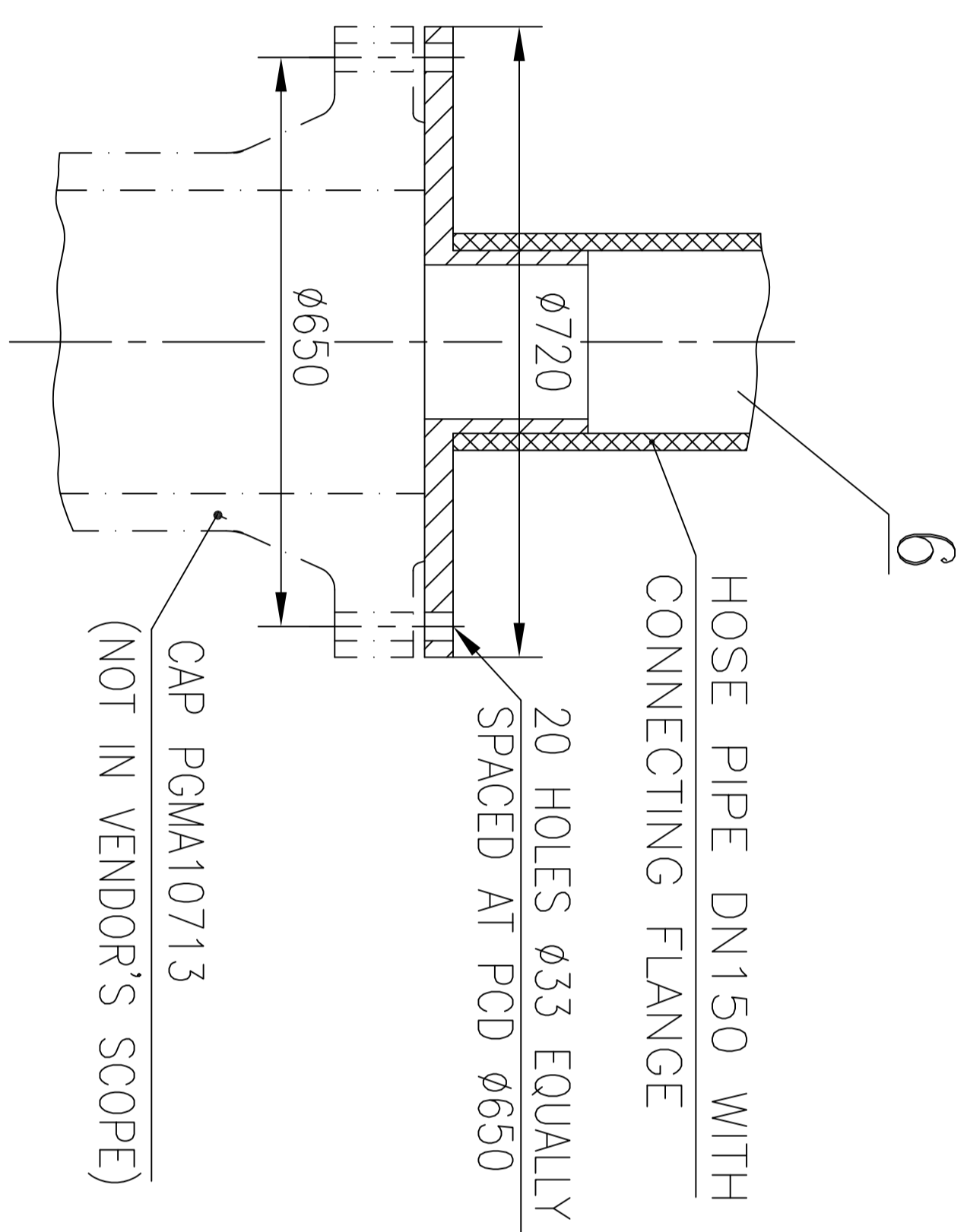
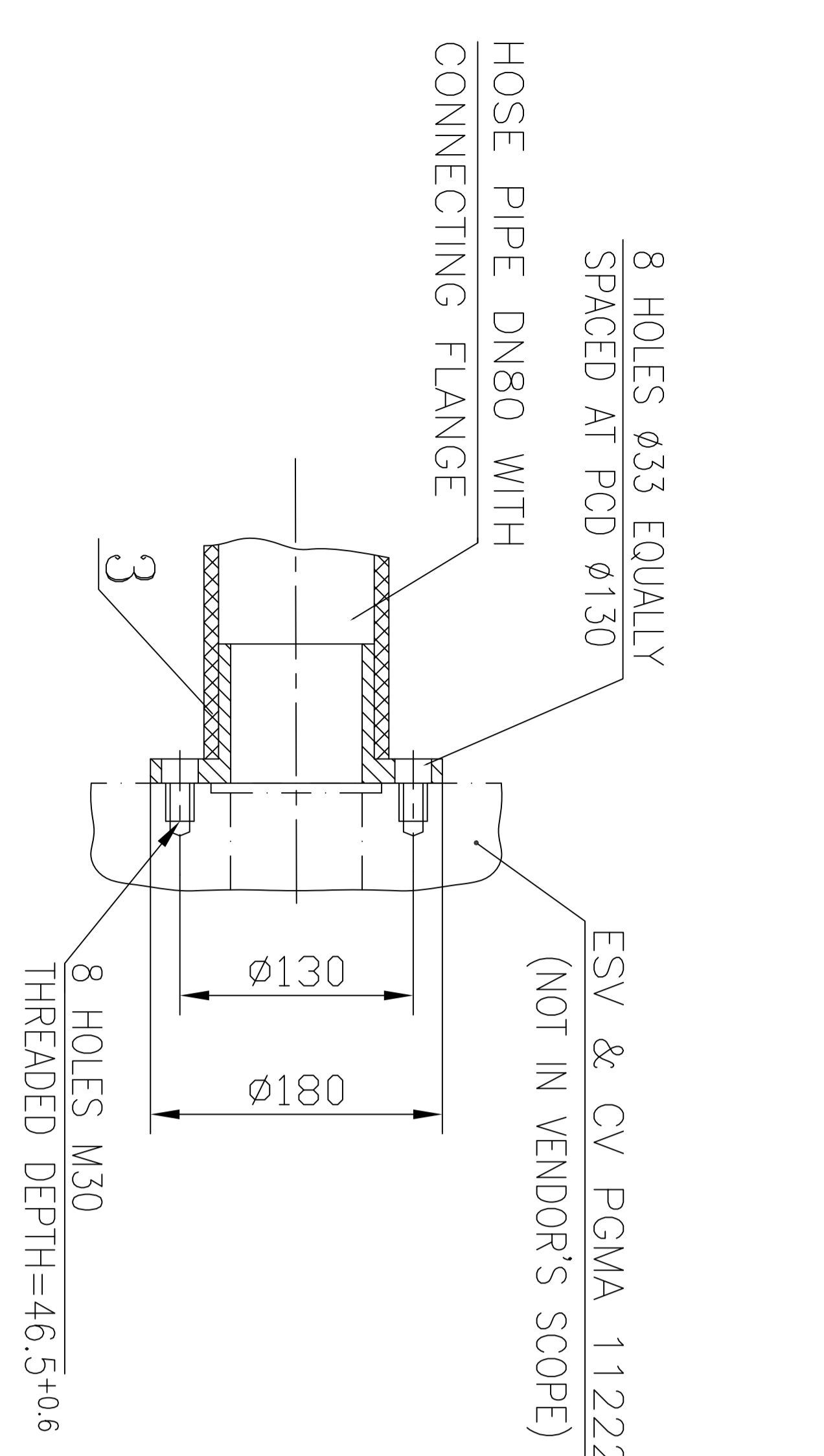
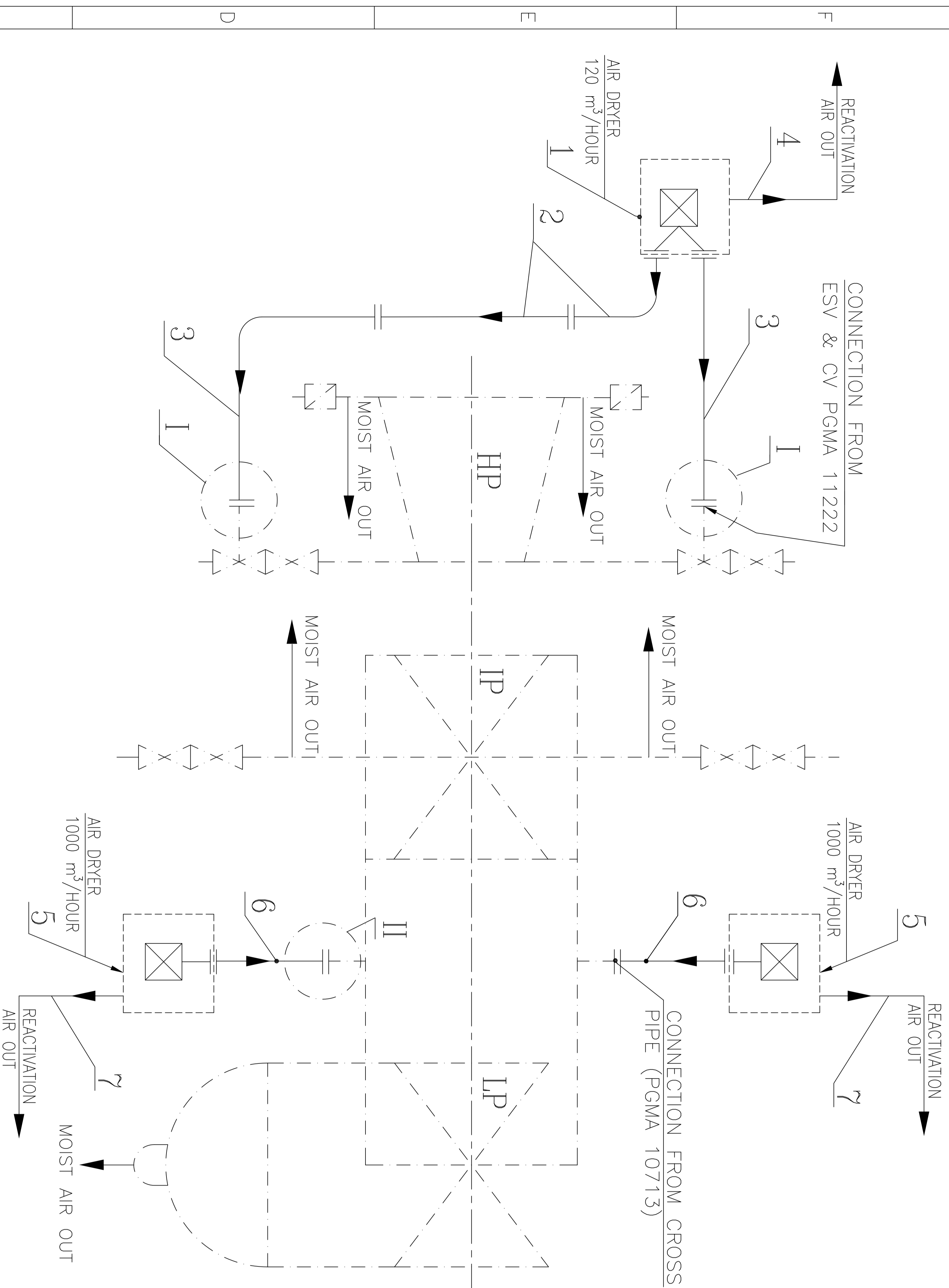
**Index**  
**For tender documents (Technical)**  
**Tender no B/4011/2014/5449V1**

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00017-92021-2

90. GINWARD

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- 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.
- 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 :  
 A. TEMPERATURE OF DRY AIR AT OUTLET MAX. 60 °C.  
 B. RELATIVE HUMIDITY < 11% AT AMBIENT TEMPERATURE.  
 C. PROVISION OF AIR FILTER(S) 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.
- 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. THE EQUIPMENT SHALL BE SKID MOUNTED AND SHOULD NOT REQUIRE ANY FIXING WITH FOUNDATION.  
 D. THE EQUIPMENT SHOULD BE ABLE TO OPERATE WITH 415 V-3 PHASE AND/OR 230 V A.C. MAIN SUPPLY.
- SCOPE OF SUPPLY :**  
 BILL OF MATERIAL -

ITEM NO.	DESCRIPTION	QTY
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 m³/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 m³/hr WITH 2 OUTLETS	01

- PAINTING :**  
 THE EQUIPMENT WILL BE PAINTED WITH FULL GLOSS POLYURETHANE FINISHING PAINT (DFT 200µm), DETAILS AS PER ANNEXURE - B.
- 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.  
 D. PAINTING SCHEME.  
 E. PERFORMANCE TEST PROCEDURE.  
 F. PERFORMANCE CHARACTERISTIC CURVE.  
 G. QUALITY PLAN GIVING IN DETAILS OF THE QUALITY CHECKS CARRIED OUT BY THE VENDOR.
- TEST/GUARANTEE CERTIFICATE :**  
 A. PERFORMANCE CERTIFICATES FOR FLOW RATE, TEMPERATURE AND RELATIVE HUMIDITY OF DRY AIR AT OUTLET.  
 B. PERFORMANCE CERTIFICATES FOR FOR NOISE LEVEL.  
 C. MATERIAL & PERFORMANCE TEST CERTIFICATES OF ALL PARTS/ASSEMBLIES.  
 D. GUARANTEE CERTIFICATE FOR SMOOTH AND RELIABLE FUNCTIONING OF THE EQUIPMENT.
- 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.

REV	DATE	ALTERED	REV	DATE	ALTERED	REV	DATE	ALTERED
8		CHECKED	7		CHECKED	6		CHECKED
5		CHECKED	4		CHECKED	3		CHECKED

GRADE OF UNTOL. DIM	AA0230208 mm
WELDING-CLASS 'B' OF AA0621104	
GAS CUTTING-TABLE 3 OF AA0621101	

AGREED DEPT	NAME	SIGN	DATE

TYPE OF PRODUCT	STEAM TURBINE
OR	
NAME OF CUSTOMER/PROJECT	

NAME	SIGN	DATE
DRN SPS ENGAR	SD/-	25.3.2004
CHD S.BANSAL	SD/-	26.3.2004
APPD A.K. JAIN	SD/-	26.3.2004

DEPT SITE	SCALE	WEIGHT (KG)	CARD CODE
4011			
TITLE : DRY AIR PRESERVATION SYSTEM (500 MW)			
DRAWING NO. 2-12076-41000			
SHEET No. 1	No. OF SHEETS 1		




**Annexure -A**

**Drg.No. 2-12076-41000**  
**Project : 500MW Unchahar**  
**W.O. : 10606A11101**

**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.

  
**(Pradeep Kanaujia)**  
Sr. Engineer, (STE)




**Annexure –B**

**Drg.No. 2-12076-41000**  
**Project : 500MW Unchahar**  
**W.O. : 10606A11101**

**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  $\mu$ 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  $\mu$ m).
  - e. Two finishing coats of Full Gloss Polyurethane Finishing Paint (IS: 13213) shall be applied (Dry Film Thickness – 30 + 30  $\mu$ m).
  - f. The total thickness of the paint shall not be less than 200  $\mu$ m. Primer, High Build Intermediate paint and Finishing paint should be of one make only.
  
2. If paint is damaged/scratched during shipment, one coat of "Full Gloss Polyurethane Finishing Paint" (IS: 13213) shall be applied at site (Dry Film Thickness –30  $\mu$ m).

  
**(Pradeep Kanaujia)**  
Sr. Engineer, (STE)





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MANUFACTURER'S NAME AND ADDRESS		STANDARD QUALITY PLAN				TO BE FILLED BY BHEL		TO BE FILLED BY BHEL		REMARKS		
BHEL	VENDOR'S NAME AND ADDRESS	ITEM	DRY AIR PRESERVATION SYSTEM / DRY BLOWING EQUIPMENT	QP NO.	QA/BE/OP/328	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY	REMARKS		
		DRG. NO.	As Per PO	REV. NO.	02							
		REV. NO.	As Per PO									
		SPEC. NO.	As Per PO									
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	7	8	9	M	B	N	
1	2	3	4	5	6			D			10	11

3.5		Temperature & Relativity of Dry Air at Outlet	Major	Measurement	100%	Drawing BHEL Approved Drawing	BHEL Approved Procedure	Test Report	✓	P	W	-
3.6		Noise Level	Major	Measurement	100%	BHEL Approved Drawing	BHEL Approved Procedure	Test Report	✓	P	W	-
3.7		Performance Characteristic Curve	Major	Measurement	100%	BHEL Approved Drawing	BHEL Approved Procedure	Curve	✓	P	W	-
3.8		Colour Shade, Paint Thickness ( DFT), Finish Aesthetic & Adhesion	Major	Visual	100%	Approved Painting Scheme / Instructions	Approved Painting Scheme / Instructions / Drawing	Inspection Report	✓	P	W	-
4.0		<b>Identification, Labelling, Marking &amp; Packing:</b>										
4.1		Identification & Labelling	Major	Visual	100%	BHEL Approved Drawing	BHEL Approved Drawing	Inspection Report	-	P	V	-
4.1		Marking & Packing	Major	Visual	100%	BHEL Approved Drawing	BHEL Approved Drawing	Inspection Report	-	P	-	-

Note: Manufacturer to maintain calibrated instruments having better accuracy than the item under test. Inspection engineer shall check the same during inspection.

*(Handwritten signature)*

MANUFACTURER / SUBCONTRACTOR	FOR CUSTOMER USE	FOR CUSTOMER USE
	LEGEND: I RECORDS IDENTIFIED WITH 'TICK' (✓) SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER	APPROVED BY: <i>(Signature)</i> Shah BHEL Assurance BHEL Hardwar