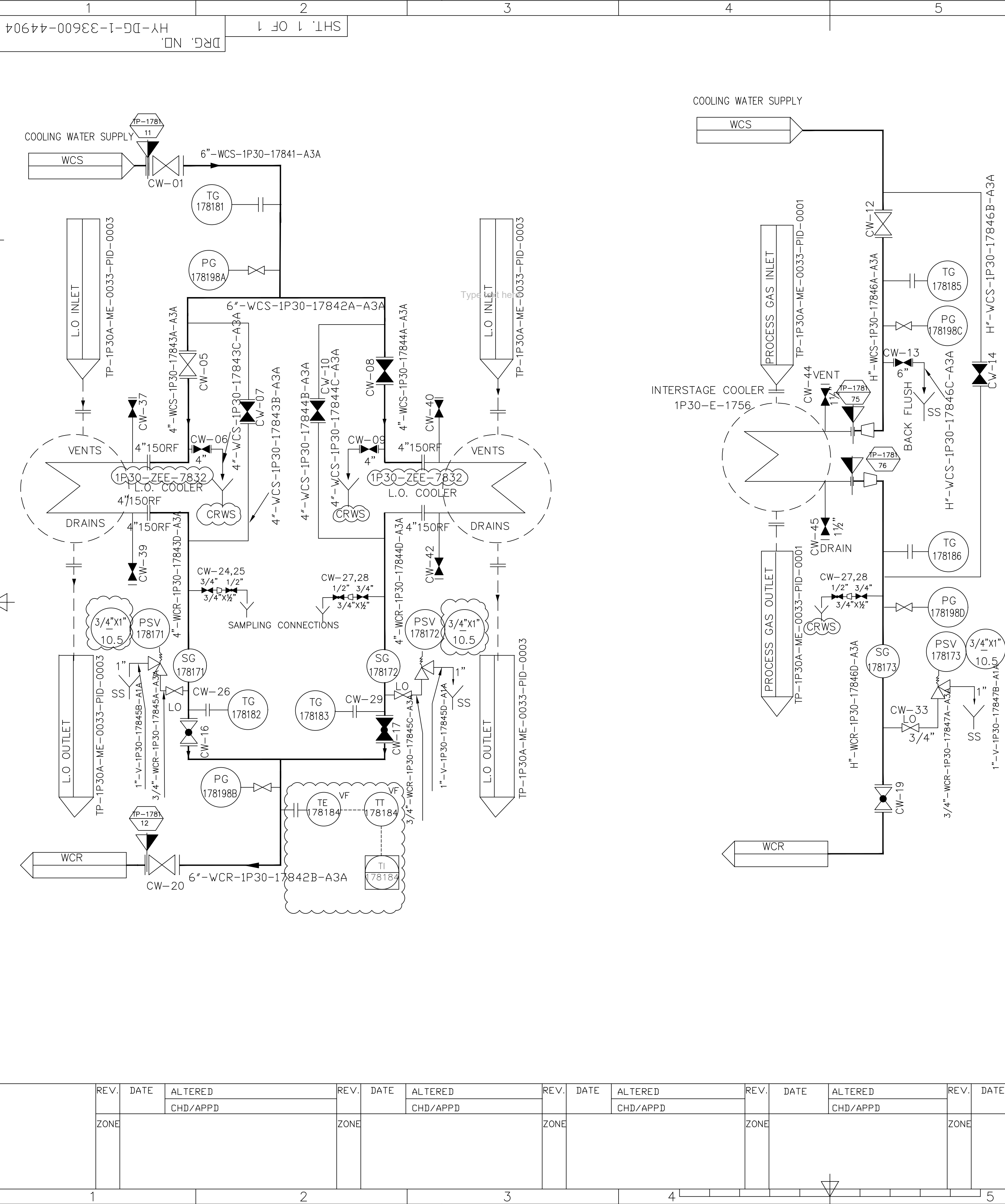


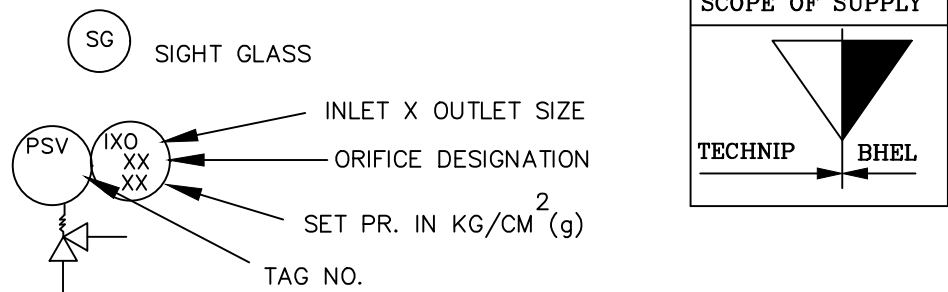
INVENTORY NO. SIGN AND DATE REF. DRG. NO. COMPUTER FILE NAME THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

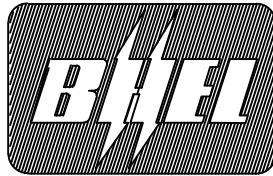


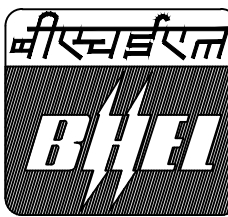
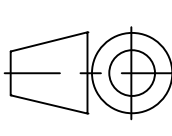


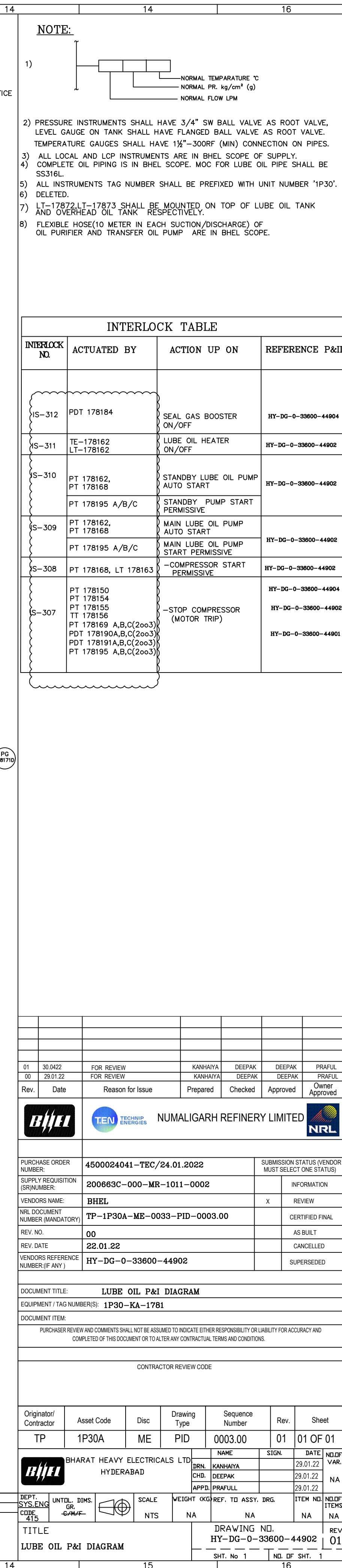
NOTE:

- 1) ALL PRESSURE INSTRUMENTS SHALL BE PROVIDED WITH 3/4"SW GATE VALVE AS ROOT VALVE. THERMOWELL CONNECTION FOR ALL TEMPERATURE INSTRUMENTS SHALL BE 1/2" 300# FLANGED FOR LINES.
- 2) INSTRUMENTS FOR LUBE OIL COOLER ARE IN BHEL SCOPE. INSTRUMENTS FOR INTERSTAGE COOLER ARE NOT IN BHEL SCOPE.
- 3) ALL INSTRUMENTS TAG NUMBER SHALL BE PREFIXED WITH UNIT NUMBER 1P30'.
- 4) DELETED.

LEGEND:

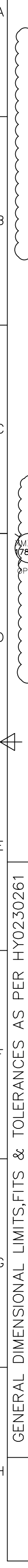


01	02.05.22	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK	PRAFUL		
00	28.01.22	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK	PRAFUL		
Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner Approved		
				NUMALIGARH REFINERY LIMITED				
PURCHASE ORDER NUMBER:			4500024041-TEC/24.01.2022		SUBMISSION STATUS (VENDOR MUST SELECT ONE STATUS)			
SUPPLY REQUISITION (SR)NUMBER:			200663C-000-MR-1011-0002			INFORMATION		
VENDORS NAME:			BHEL		X	REVIEW		
NRL DOCUMENT NUMBER (MANDATORY)			TP-1P30A-ME-0033-PID-0004.00			CERTIFIED FINAL		
REV. NO.			00			AS BUILT		
REV. DATE			22.01.22			CANCELLED		
VENDORS REFERENCE NUMBER:(IF ANY)			HY-DG-0-33600-44905			SUPERSEDED		
DOCUMENT TITLE: COOLING WATER P&I DIAGRAM								
EQUIPMENT / TAG NUMBER(S): 1P30-KA-1781								
DOCUMENT ITEM:								
PURCHASER REVIEW AND COMMENTS SHALL NOT BE ASSUMED TO INDICATE EITHER RESPONSIBILITY OR LIABILITY FOR ACCURACY AND COMPLETED OF THIS DOCUMENT OR TO ALTER ANY CONTRACTUAL TERMS AND CONDITIONS.								
CONTRACTOR REVIEW CODE								
Originator/ Contractor	Asset Code		Disc	Drawing Type	Sequence Number	Rev.	Sheet	
TP	1P30A		ME	PID	0004.00	01	01 OF 01	
 <div>BHARAT HEAVY ELECTRICALS LTD. HYDERABAD</div>					NAME	SIGN.	DATE	NO.OF VAR. NA
				DRN.	KANHAIYA		28.01.22	
				CHD.	DEEPAK		28.01.22	
				APPD.	PRAFULL		28.01.22	
DEPT. SYS.ENG. CODE 415	UNTOL. DIMS. GR. g/m/f		SCALE NTS	WEIGHT (KG) NA	REF. TO ASSY. DRG. NA		ITEM NO. NA	NO.OF ITEMS NA
TITLE PIPING & INSTRUMENTATION DIAGRAM COOLING WATER SYSTEM					CARD CODE	DRAWING NO. HY-DG-1-33600-44904		REV. 01
						SHT. No 1	NO. OF SHT. 1	



INVENTORY NO

1064




- 1) 'VF' MARKED INSTRUMENTS ARE IN BHEL SCOPE OF SUPPLY.
- 2) FOR COMPRESSOR SUCTION STRAINERS, FILTER ELEMENT WITH MESH 20 (TEMP. STRAINER) SHALL BE USED DURING START-UP AND FILTER ELEMENT WITH MESH SIZE 8 (PERM. STRAINER) SHALL BE USED FOR NORMAL OPERATION
- 3) SUCTION STRAINER IS T TYPE BUTT WELD END CONNECTION.
- 4) ALL THE PRESSURE AND TEMPERATURE INSTRUMENTS CONNECTIONS ON PIPES SHALL BE AS PER TECHNIP STD AS SPECIFIED IN MR.
- 5) STRAIGHT LENGTH REQUIREMENT UPSTREAM OF COMPRESSOR SUCTION NOZZLE IS $5xD$, WHERE D IS PIPE OD.
6. THIS P&ID TO BE REFERRED FOR BHEL SUPPLIED EQUIPMENT/INSTRUMENTS ONLY. FOR OTHER DETAILS, LICENSORS P&ID NO. 1P30A-PR-PID-00057/58/59.. TO BE REFERRED.
7. THE NRV 'P-02' SHOULD BE LOCATED VERY NEAR TO THE COMPRESSOR DISCHARGE.
8. ALL THE INSTRUMENT TAG NOS SHALL BE PREFIXED BY THE 1781
9. THE SPEED SIGNAL FROM VFD IS CONNECTED TO ASC THROUGH DCS.
10. THE DCS/ESD INDICATION FOR THE INSTRUMENTS ARE IN TECHNIP SCOPE.
- 11) COMPRESSOR SUCTION & DISCHARGE COMPANION FLANGES ALONG WITH GASKETS,NUTS BOLTS ETC ARE NOT IN BHEL SCOPE OF SUPPLY.
- 12) ANTISURGE VALVE TO BE LOCATE CLOSE TO COMPRESSOR DISCHARGE.

1. LICENSOR P&ID: 1P30A-PR-PID-00057/58/59.
2. LUBE OIL P&ID: TP-1P30A-ME-0033-PID-0003
3. SEAL GAS P&ID: TP-1P30A-ME-0033-PID-0002
4. COOLING WATER P&ID: TP-1P30A-ME-0033-PID-0004

DOCUMENT TITLE:	PROCESS GAS P&I DIAGRAM
EQUIPMENT / TAG NUMBER(S):	1P30-KA-1781
DOCUMENT ITEM:	
PURCHASER REVIEW AND COMMENTS SHALL NOT BE ASSUMED TO INDICATE EITHER RESPONSIBILITY OR LIABILITY FOR ACCURACY AND COMPLETED OF THIS DOCUMENT OR TO ALTER ANY CONTRACTUAL TERMS AND CONDITIONS.	

Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TP	1P30A	ME	PID	0001.00	00	01 OF 01

DEPT.	UNTOL. DIMS.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS
DEPT.	OR C/M/F		N.T.S	-N.A.-	-N.A.-	-N.A.-	-N.A.-

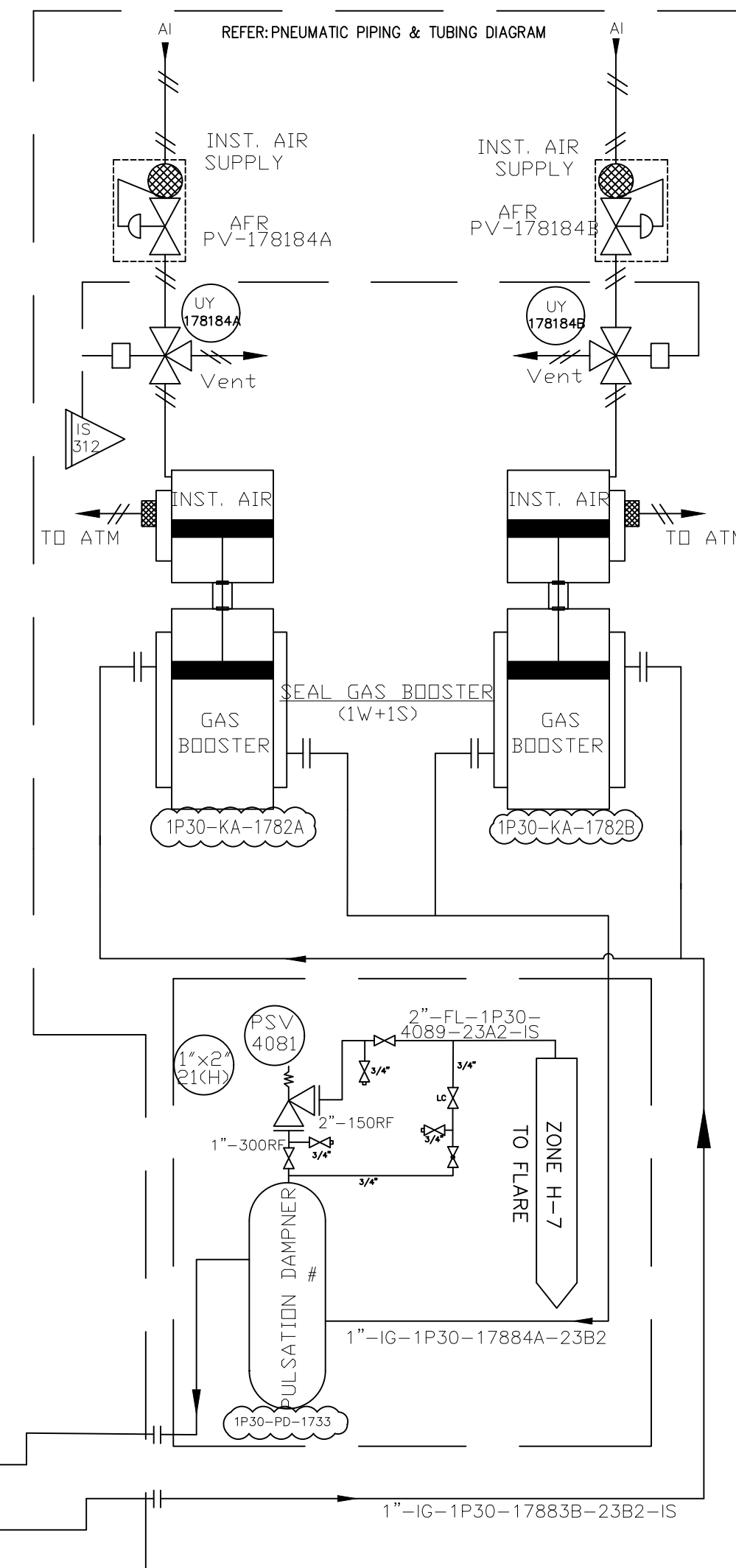
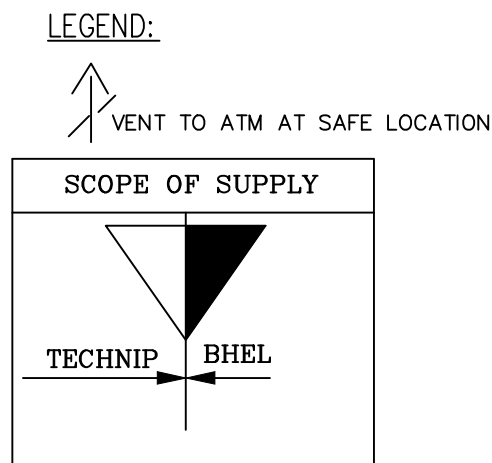
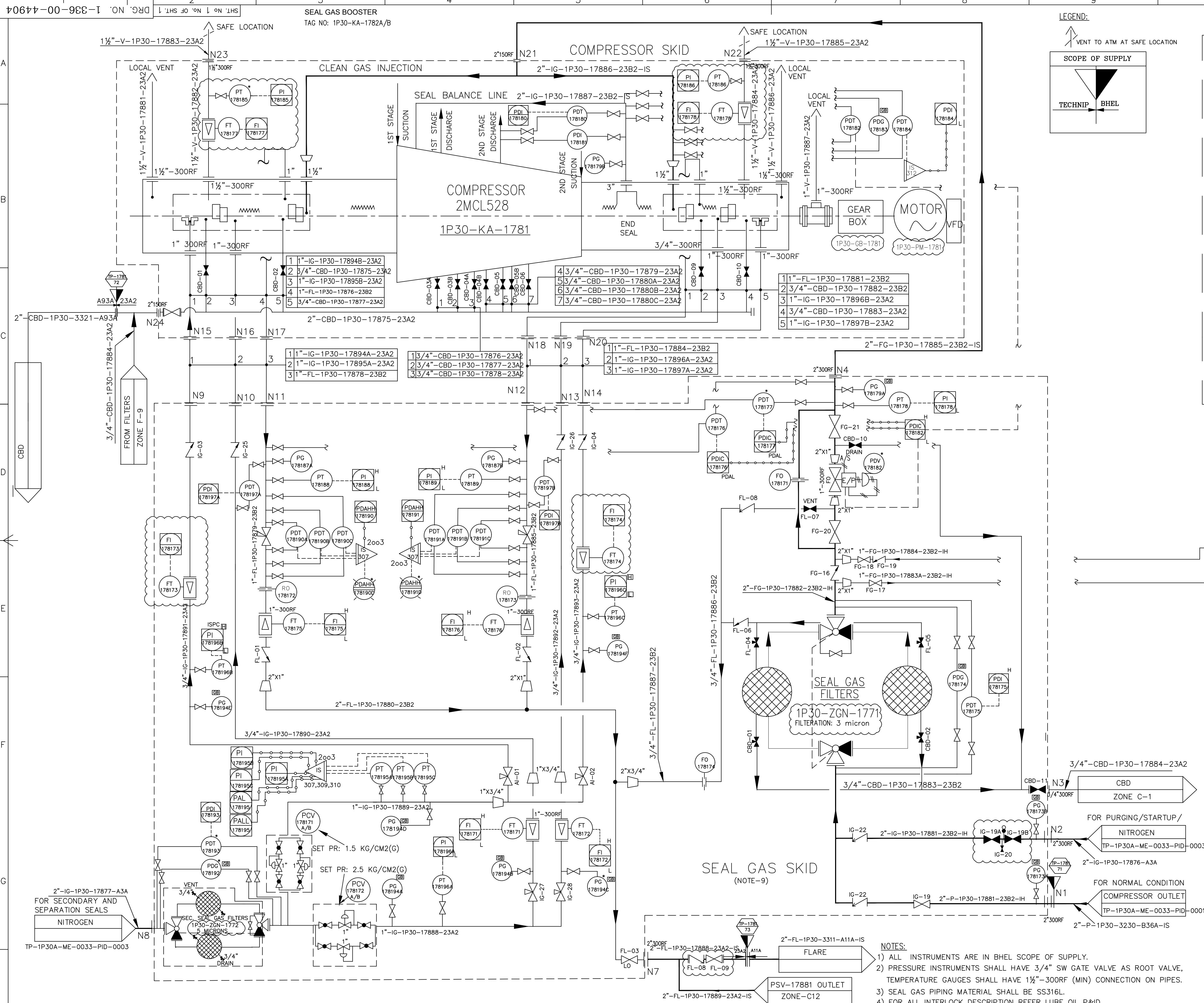
10	11	12
----	----	----

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

INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)



01	04.05.22	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK	PRAFUL
00	29.01.22	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK	PRAFUL
Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner Approved
BHEL			NUMALIGARH REFINERY LIMITED			NRL
PURCHASE ORDER NUMBER: 4500024041-TEC/24.01.2022			SUBMISSION STATUS (VENDOR MUST SELECT ONE STATUS)			
SUPPLY REQUISITION (SR) NUMBER: 200663C-000-MR-1011-0002			INFORMATION			
VENDORS NAME: BHEL			X REVIEW			
NRL DOCUMENT NUMBER (MANDATORY): TP-1P30A-ME-0033-PID-0002.00			CERTIFIED FINAL			
REV. NO. 00			AS BUILT			
REV. DATE 22.01.22			CANCELLED			
VENDORS REFERENCE NUMBER (IF ANY): HY-DG-0-33600-44904			SUPERSEDED			

DOCUMENT TITLE: SEAL GAS P&ID DIAGRAM	
EQUIPMENT / TAG NUMBER(S): 1P30-KA-1781	
DOCUMENT ITEM:	
PURCHASER REVIEW AND COMMENTS SHALL NOT BE ASSUMED TO INDICATE EITHER RESPONSIBILITY OR LIABILITY FOR ACCURACY AND COMPLETED OF THIS DOCUMENT OR TO ALTER ANY CONTRACTUAL TERMS AND CONDITIONS.	

CONTRACTOR REVIEW CODE					
Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.
TP	1P30A	ME	PID	0002.00	00

Bharat Heavy Electricals Ltd. Hyderabad		NAME	SIGN.	DATE	NO. OF VAR.
DRN. KANHAIYA				29.01.22	
CHD. DEEPAK JHA				29.01.22	
APPD. PRAFUL				29.01.22	
DEPT. SYS. ENGG. UNCL. DMS. OF CMF		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO. NO. OF ITEMS
DEPT. 415		N.T.S.	-N.A.-	-N.A.-	-N.A.-
TITLE: SEAL GAS P&ID DIAGRAM		DRAWING NO. HY-DG-3-33600-44904		REV. 01	
		SHT. No 1		NO. OF SHT. 1	

- NOTES:**
- ALL INSTRUMENTS ARE IN BHEL SCOPE OF SUPPLY.
 - PRESSURE INSTRUMENTS SHALL HAVE 3/4" SW GATE VALVE AS ROOT VALVE, TEMPERATURE GAUGES SHALL HAVE 1 1/2"-300RF (MIN) CONNECTION ON PIPES.
 - SEAL GAS PIPING MATERIAL SHALL BE SS316L.
 - FOR ALL INTERLOCK DESCRIPTION REFER LUBE OIL P&ID
 - ALL LOW POINT SHALL BE PROVIDED WITH DRAIN VALVE.
 - ALL INSTRUMENTS MARKED AS 'CB' IN FILTER SKID AND CONTROL SKID ARE MOUNTED ON GAUGE BOARD OF RESPECTIVE SKID.
 - ALL INSTRUMENTS TAG NUMBER SHALL BE PREFIXED WITH UNIT NUMBER '1P30'.
 - DELETED.
 - SINGLE SEAL GAS SKID IS PROPOSED. ACTUAL NUMBER OF SKID SHALL BE INFORMED AFTER RECEIPT OF SUB VENDOR INPUT

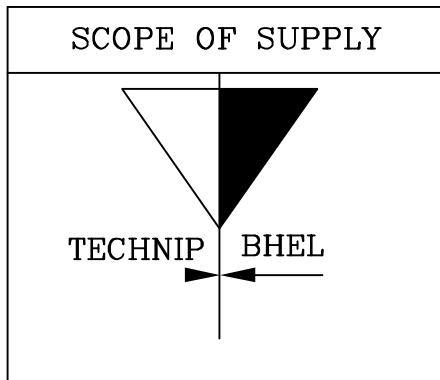
50805-44805-2-DG-HY
DRG. NO. SH. 1 OF 3

GLAND STEAM CONDENSER L.O. COOLER
1P31-KA-2783-E-51 1P31-KA-2783-E-50A/B

NOTES:

- 1) ALL INSTRUMENT TAG NO'S SHALL BE PREFIXED WITH UNIT NO.'1P31'
- 2) ALL INSTRUMENTS WILL BE SUPPLIED FOLLOWING THE TYPICAL HOOKUP DOC.(TP-1ZZZA-IC-STD-0003) FOR INSTALLATION.
- 3) ALL TIE IN POINT NUMBER SHALL BE PREFIXED WITH UNIT NO '1P31'.
- 4) 'VF' MARKED INSTRUMENTS ARE IN BHEL SCOPE OF SUPPLY.

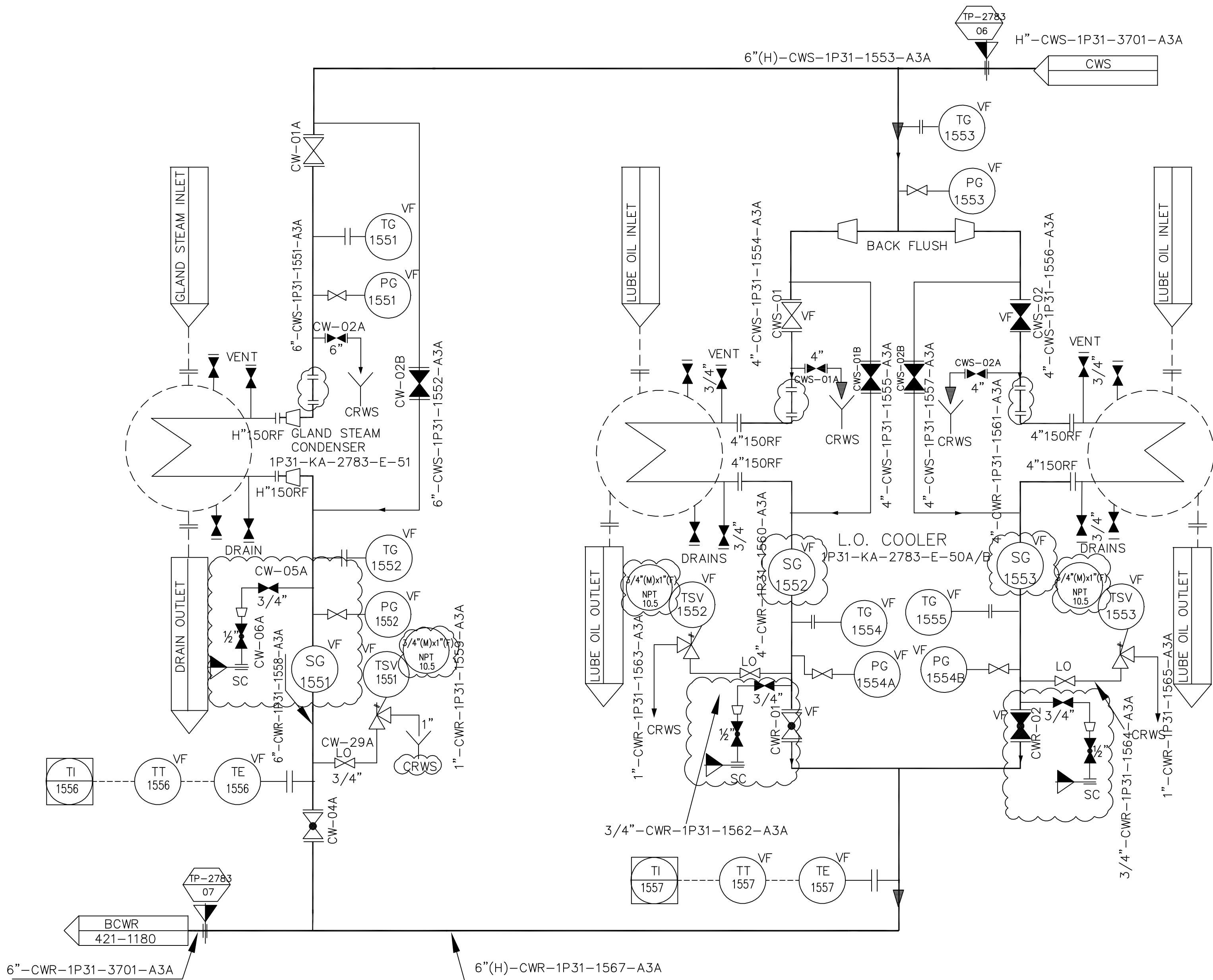
LEGEND:



SC: SAMPLING CONNECTION

P&ID TO BE REFERRED AND READ IN CONJUNCTION WITH PROCESS GAS PID ARE:

- 1. STEAM AND DRAIN P&ID (CLIENT DOC NO. TP-1P31A-ME-0032-PID-0008.00)
- 2. UTILITY CONSUMPTION LIST (CLIENT DOC NO.TP-1P31A-ME-0032-UTS-000)
- 3. LUBE OIL P&ID (CLIENT DOC NO. TP-1P31A-ME-0032-PID-0003.00)
- 4. TABLE OF TERMIONATION POINTS (CLIENT DOC NO.TP-1P31A-ME-0032-DTL-0001)



01	16.05.22	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK	PRAFUL
00	29.01.22	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK	PRAFUL
Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner Approved



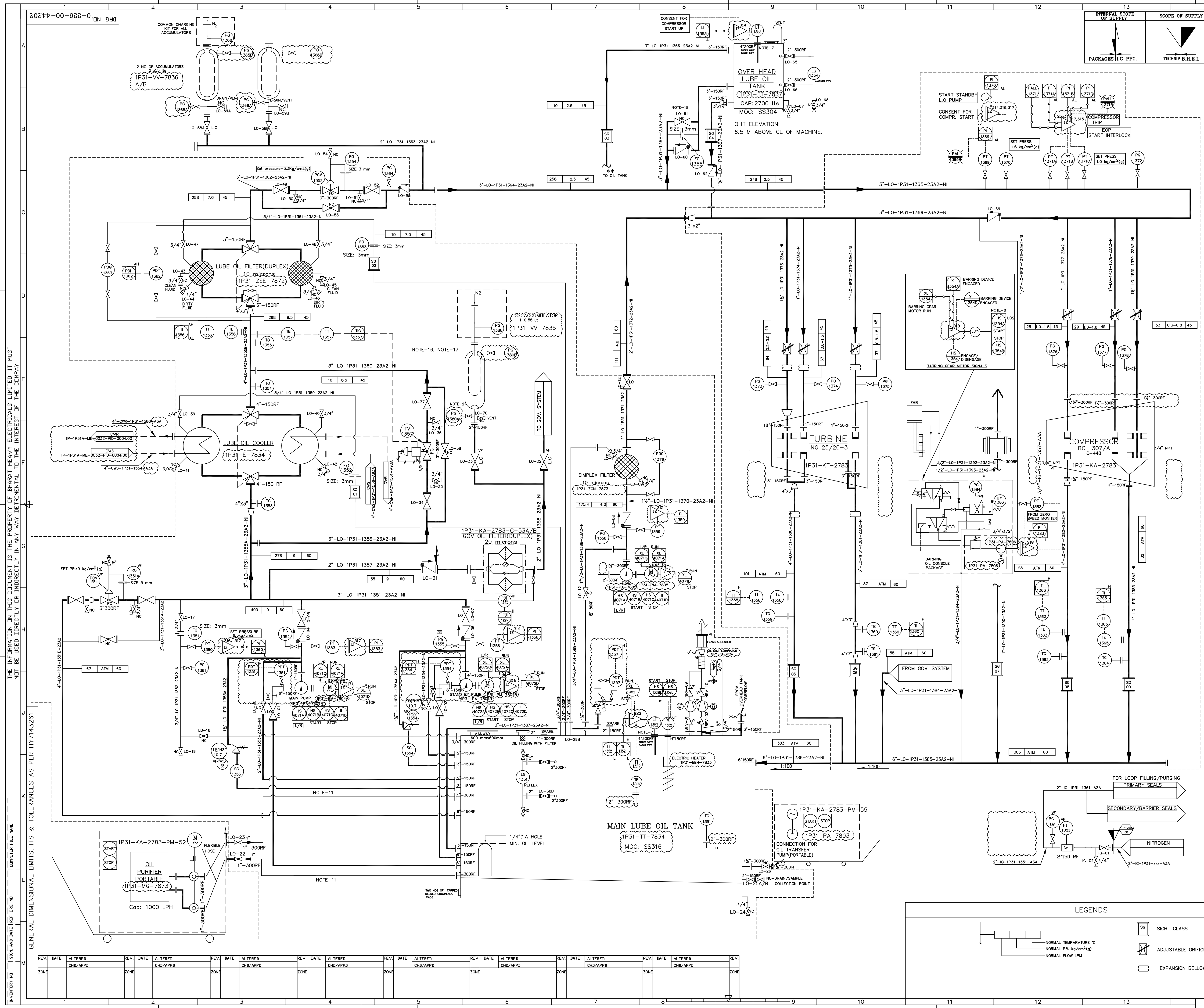
NUMALIGARH REFINERY LIMITED



PURCHASE ORDER NUMBER:	4500024042-TEC/24.01.2022	SUBMISSION STATUS (VENDOR MUST SELECT ONE STATUS)	
SUPPLY REQUISITION (SR)NUMBER:	200663C-000-MR-1011-0001		INFORMATION
VENDORS NAME:	BHEL	X	REVIEW
NRL DOCUMENT NUMBER (MANDATORY)	TP-1P31A-ME-0032-PID-0004.00		CERTIFIED FINAL
REV. NO.	01		AS BUILT
REV. DATE	10.05.2022		CANCELLED
VENDORS REFERENCE NUMBER:(IF ANY)	HY-DG-1-33600-44805		SUPERSEDED

DOCUMENT TITLE:	COOLING WATER P&I DIAGRAM
EQUIPMENT / TAG NUMBER(S):	1P31-KA-2783
DOCUMENT ITEM:	
PURCHASER REVIEW AND COMMENTS SHALL NOT BE ASSUMED TO INDICATE EITHER RESPONSIBILITY OR LIABILITY FOR ACCURACY AND COMPLETED OF THIS DOCUMENT OR TO ALTER ANY CONTRACTUAL TERMS AND CONDITIONS.	
CONTRACTOR REVIEW CODE	

Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TP	1P31A	ME	PID	0004.00	00	01 OF 01
BHARAT HEAVY ELECTRICAL LIMITED HYDERABAD						
DEPT. SYS.ENGG. DEPT. 415	UNTOL. DIMS. OR C/M/F	SCALE N.T.S	WEIGHT (KG) -N.A.-	REF. TO ASSY. DRG. -N.A.-	ITEM NO. -N.A.-	NO.OF ITEMS -N.A.-
TITLE COOLING WATER P & ID			DRAWING NO. HY-DG-1-33600-44805		REV. 01	



NOTE:

- 1) NORMAL TEMPERATURE °C
NORMAL PR. kg/cm² (g)
NORMAL FLOW LPM
- 2) PRESSURE INSTRUMENTS SHALL HAVE 3/4" SW BALL VALVE AS ROOT VALVE. LEVEL GAUGE ON TANK SHALL HAVE FLANGED BALL VALVE AS ROOT VALVE. TEMPERATURE GAUGES SHALL HAVE 1/2"-300RF (MIN) CONNECTION ON PIPES.
- 3) * MARKED INSTRUMENTS ARE IN BHEL SCOPE OF SUPPLY.
- 4) COMPLETE OIL PIPING IS IN BHEL SCOPE. MOC FOR LUBE OIL PIPE SHALL BE SS316L.
- 5) ALL INSTRUMENTS TAG NUMBER SHALL BE PREFIXED WITH UNIT NUMBER 'IP31'.
- 6) ALL TIE IN NUMBER SHALL BE PREFIXED WITH 'IP-IP31'.
- 7) LT-1352/1353 SHALL BE MOUNTED ON TOP OF LUBE OIL TANK AND OVERHEAD OIL TANK RESPECTIVELY.
- 8) FLEXIBLE HOSE(10 METER IN EACH SUCTION/DISCHARGE) OF OIL PURIFIER AND TRANSFER OIL PUMP ARE IN BHEL SCOPE.

INTERLOCK NO.	ACTUATED BY	ACTION UP ON	REFERENCE P&ID
IZ 324	PT-1258	SEAL GAS OOSTER ON/OFF	SEAL GAS P&ID
IZ 323	TT-1352-OFF FOR TANK	LUBE OIL HEATER ON/OFF	LUBE OIL P&ID
IZ 321,322	ZSH 0401A ZSH 0401B	PST ESU(UV-0401A) PST ESU (UV-0401B)	GOVERNING SCHEME P&ID
IZ 319,320	LT-1452	CIP START/STOP	STEAM & DRAIN P&ID
IZ-318	PT 1383 TURBINE ZERO SPEED MONITOR	BARRING DEVICE START PERMISSIVE	LUBE OIL P&ID
IZ-317	PT 1360 PT 1370 PT 1276(A,B,C)	TURBINE DRIVEN LUBE OIL PUMP AUTO START MAIN LOP INLET STEAM SOV 041453 EMERGENCY LOP START PERMISSIVE (TURBINE DRIVEN)	LUBE OIL P&ID SEAL GAS P&ID
IZ-316	PT 1360 PT 1370 PT 1276(A,B,C)	MOTOR DRIVEN LUBE OIL PUMP AUTO START LOP START PERMISSIVE (MOTOR DRIVEN)	LUBE OIL P&ID SEAL GAS P&ID
IZ-315	PT 1371 A,B,C(2003)	EMERGENCY OIL PUMP AUTO START	LUBE OIL P&ID
IZ-314	PT 1370 LT 1353	-COMPRESSOR START PERMISSIVE	LUBE OIL P&ID
IZ 313	PT 3741 A,B,C(2003) TT 3706 A,B,C (2003) PT 1457 A,B,C(2003) PT 1371 A,B,C(2003) PT 1266 A,B,C(2003) PT 1267 A,B,C(2003) PT 1276 A,B,C(2003) PT 0802 A,B,C(2003)	-STOP COMPRESSOR (TURBINE TRIP)	PROCESS GAS P&ID STEAM & DRAIN P&ID LUBE OIL P&ID SEAL GAS P&ID GOVERNING SCHEME P&ID

REFERENCE PID NOS

STEAM & DRAIN P&ID	TP-IP31A-ME-0032-PID-0005.00
PROCESS GAS P&ID	TP-IP31A-ME-0032-PID-0001.01
SEAL GAS P&ID	TP-IP31A-ME-0032-PID-0002.00
LUBE OIL P&ID	TP-IP31A-ME-0032-PID-0003.00

Rev.	Date	Reason for Issue	Prepared	Checked	Approved
01	16.05.22	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK
00	29.01.22	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK

NUMALIGARH REFINERY LIMITED

PURCHASE ORDER NUMBER: 4500024042-TEC/24.01.2022

SUPPLY REGISTRATION NUMBER: 200663C-000-MR-1011-0001

VENDOR NAME: BHEL

NRL DOCUMENT NUMBER (MANDATORY): TP-IP31A-ME-0032-PID-0003.00

REV. NO.: 01

REV. DATE: 10.05.22

VENDORS REFERENCE NUMBER (IF ANY): HY-DG-0-33600-44802

DOCUMENT TITLE: LUBE OIL P&ID DIAGRAM

EQUIPMENT / TAG NUMBER(S): IP31-KA-2783

CONTRACTOR REVIEW CODE

Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TP	IP31A	ME	PID	0003.00	00	01 OF 01

BHARAT HEAVY ELECTRICAL LIMITED
HYDERABAD

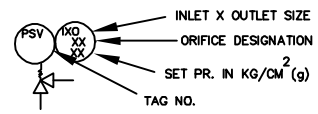
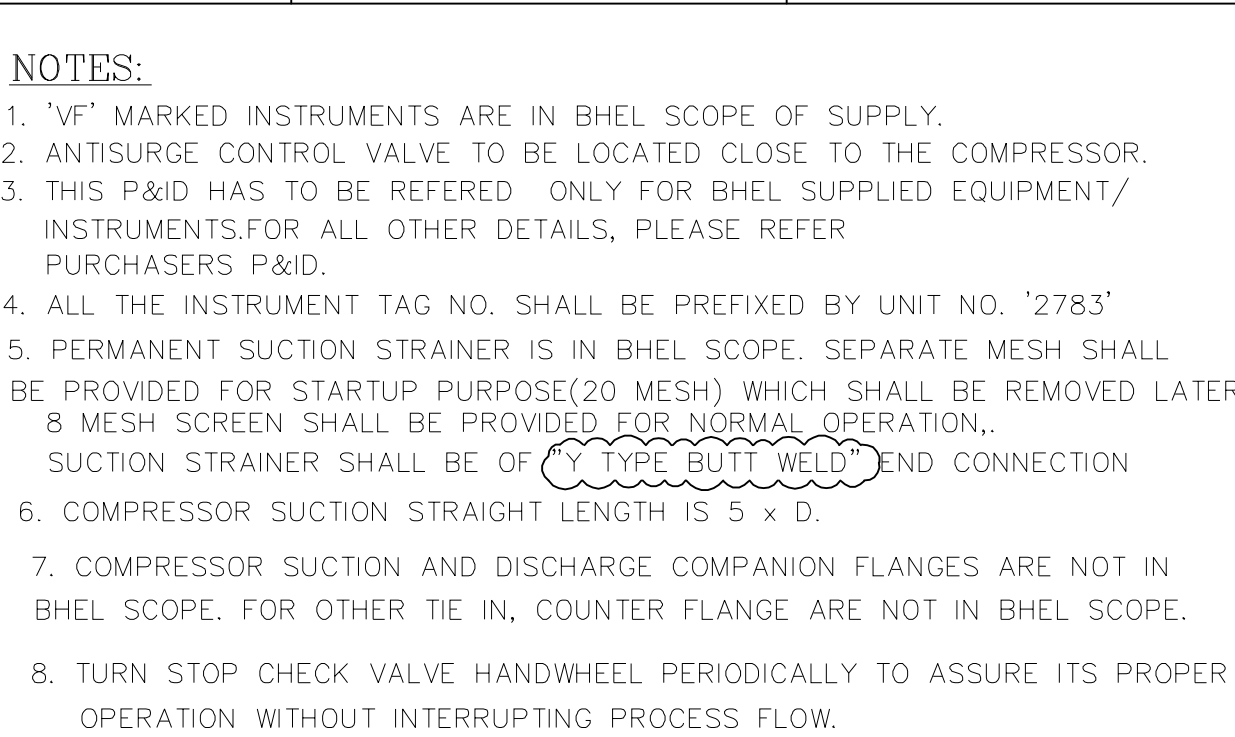
DEPT.	UNITS	DIMS.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS
415	2	2	N.T.S	-N.A.-	-N.A.-	-N.A.-	-N.A.-

DRAWING NO. HY-DG-0-33600-44802

LUBE OIL P&ID DIAGRAM




INVENTORY NO	SIGN. AND DATE	REF. DRG. NO.	COMPUTER FILE NAME
--------------	----------------	---------------	--------------------

	ALTE
	CHD





& ID TO BE REFERRED AND READ IN CONJUNCTION WITH PROCESS GAS PID ARE:

- 1. STEAM AND DRAIN P&ID (CLIENT DOC NO. TP-1P31A-ME-0032-PID-0008.00)
- 2. DRY GAS SEAL P&ID (CLIENT DOC NO. TP-1P31A-ME-0032-PID-0002.00)
- 3. LUBE OIL P&ID (CLIENT DOC NO. TP-1P31A-ME-0032-PID-0003.00)
- 4. COOLING WATER P&ID (CLIENT DOC NO. TP-1P31A-ME-0032-PID-0004.00)

01	16.05.2022	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK	PRAFUL			
00	29.01.22	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK	PRAFUL			
Rev.	Date	Reason for issue	Prepared	Checked	Approved	Owner Approved			
									
<p align="center">NUMALIGARH REFINERY LIMITED</p>									
PURCHASE ORDER NUMBER:			4500024042 –TEC/24.01.2022			SUBMISSION STATUS (VENDOR MUST SELECT ONE STATUS)			
SUPPLY REQUISITION (MANDATORY) NUMBER:			200663C –000 –MR –1011 –0001					INFORMATION	
VENDORS NAME:			BHEL			X		REVIEW	
NRL DOCUMENT NUMBER (MANDATORY)			TP –1P31A –ME –0032 –PID –0001.00					CERTIFIED FINAL	
REV. NO.			01					AS BUILT	
REV. DATE			10.05.22					CANCELLED	
VENDORS REFERENCE NUMBER:(IF ANY)			HY –DG –1 –33600 –44801					SUPERSEDED	

DOCUMENT TITLE: PROCESS GAS P&I DIAGRAM						
EQUIPMENT / TAG NUMBER(S): 1P31-KA-2783						
DOCUMENT ITEM: A0103						
PURCHASER REVIEW AND COMMENTS SHALL NOT BE ASSUMED TO INDICATE EITHER RESPONSIBILITY OR LIABILITY FOR ACCURACY AND COMPLETED OF THIS DOCUMENT OR TO ALTER ANY CONTRACTUAL TERMS AND CONDITIONS.						
CONTRACTOR REVIEW CODE						
Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TP	1P31A	ME	PID	0001.00	00	01 OF 01

<div></div> <div>BHARAT HEAVY ELECTRICAL LIMITED</div> <div>HYDERABAD</div>							
DEPT. SYS. CODE 415	UNTL. DIMS. GR. Ø/M/Y		SCALE N.T.S.	WEIGHT (KG) -N.A.-	REF. TO ASSY. DRG. -N.A.-	ITEM NO. -N.A.-	NO. OF ITEMS -N.A.-
PROCESS GAS P&I DIAGRAM				DRAWING NO. HY-DG-0-33600-44801		REV. 01	

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

INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME

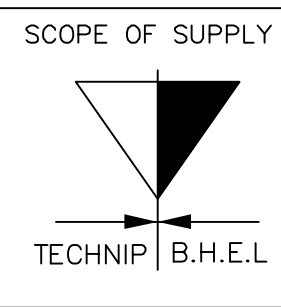
DRG. NO. 1-336-00-44808

REFERENCE DRAWINGS

1. LUBE OIL P&I DIAGRAM
2. COOLING WATER P&I DIAGRAM
3. GOVERNING SCHEME
4. LICENSOR'S P&I
5. TABLE OF TERMINATING POINTS
6. STEAM AND TURBINE GAD:
7. MMS P&I (TSI SCHEME)

NOTES:

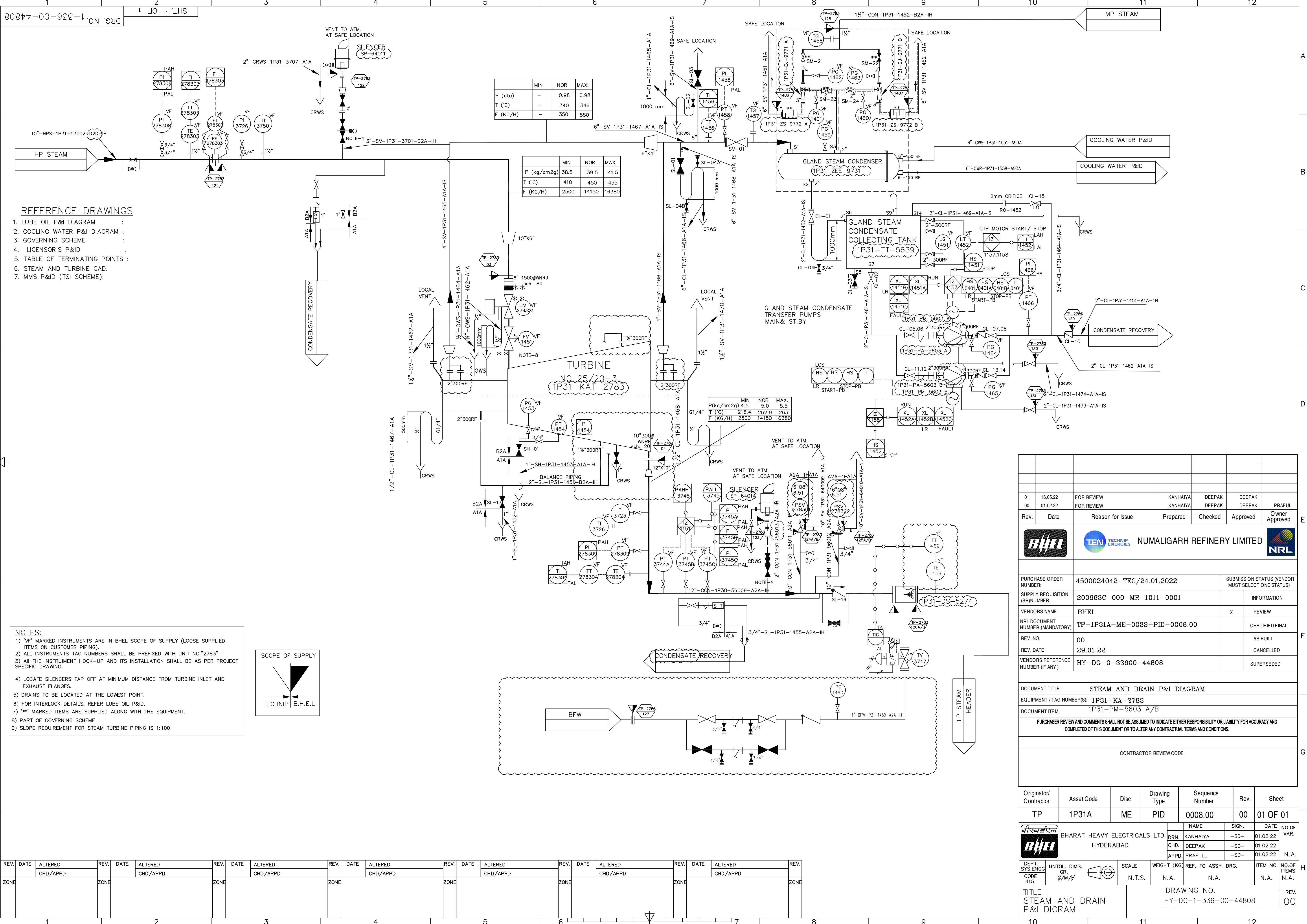
- 1) "VF" MARKED INSTRUMENTS ARE IN BHEL SCOPE OF SUPPLY (LOOSE SUPPLIED ITEMS ON CUSTOMER PIPING).
- 2) ALL INSTRUMENTS TAG NUMBERS SHALL BE PREFIXED WITH UNIT NO."2783"
- 3) ALL THE INSTRUMENT HOOK-UP AND ITS INSTALLATION SHALL BE AS PER PROJECT SPECIFIC DRAWING.
- 4) LOCATE SILENCERS TAP OFF AT MINIMUM DISTANCE FROM TURBINE INLET AND EXHAUST FLANGES.
- 5) DRAINS TO BE LOCATED AT THE LOWEST POINT.
- 6) FOR INTERLOCK DETAILS, REFER LUBE OIL P&I.
- 7) "***" MARKED ITEMS ARE SUPPLIED ALONG WITH THE EQUIPMENT.
- 8) PART OF GOVERNING SCHEME
- 9) SLOPE REQUIREMENT FOR STEAM TURBINE PIPING IS 1:100



	MIN	NOR	MAX.
P (ata)	-	0.98	0.98
T (°C)	-	340	346
F (KG/H)	-	350	550

	MIN	NOR	MAX.
P (kg/cm2g)	38.5	39.5	41.5
T (°C)	410	450	455
F (KG/H)	2500	14150	16380

	MIN	NOR	MAX.
P(kg/cm2g)	4.5	5.0	5.5
T (°C)	216.4	262.9	263
F (KG/H)	2500	14150	16380



01	16.05.22	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK	
00	01.02.22	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK	PRAFUL
Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner Approved
PURCHASE ORDER NUMBER: 4500024042-TEC/24.01.2022			SUBMISSION STATUS (VENDOR MUST SELECT ONE STATUS)			
SUPPLY REQUISITION (SR) NUMBER: 200663C-000-MR-1011-0001			INFORMATION			
VENDORS NAME: BHEL			X REVIEW			
NRL DOCUMENT NUMBER (MANDATORY): TP-1P31A-ME-0032-PID-0008.00			CERTIFIED FINAL			
REV. NO. 00			AS BUILT			
REV. DATE 29.01.22			CANCELLED			
VENDORS REFERENCE NUMBER (IF ANY): HY-DG-0-33600-44808			SUPERSEDED			
DOCUMENT TITLE: STEAM AND DRAIN P&I DIAGRAM						
EQUIPMENT / TAG NUMBER(S): 1P31-KA-2783						
DOCUMENT ITEM: 1P31-PM-5603 A/B						
PURCHASER REVIEW AND COMMENTS SHALL NOT BE ASSUMED TO INDICATE EITHER RESPONSIBILITY OR LIABILITY FOR ACCURACY AND COMPLETED OF THIS DOCUMENT OR TO ALTER ANY CONTRACTUAL TERMS AND CONDITIONS.						
CONTRACTOR REVIEW CODE						
Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TP	1P31A	ME	PID	0008.00	00	01 OF 01
			NAME		SIGN.	DATE
			DRN. KANHAIYA		-SD-	01.02.22
			CHD. DEEPAK		-SD-	01.02.22
			APPD. PRAFULL		-SD-	01.02.22
DEPT. SYS. ENGG	UNTO. DIMS. GR.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS
415	g/m/f	N.T.S.	N.A.	N.A.	N.A.	N.A.
TITLE: STEAM AND DRAIN P&I DIAGRAM				DRAWING NO. HY-DG-1-336-00-44808		REV. 00

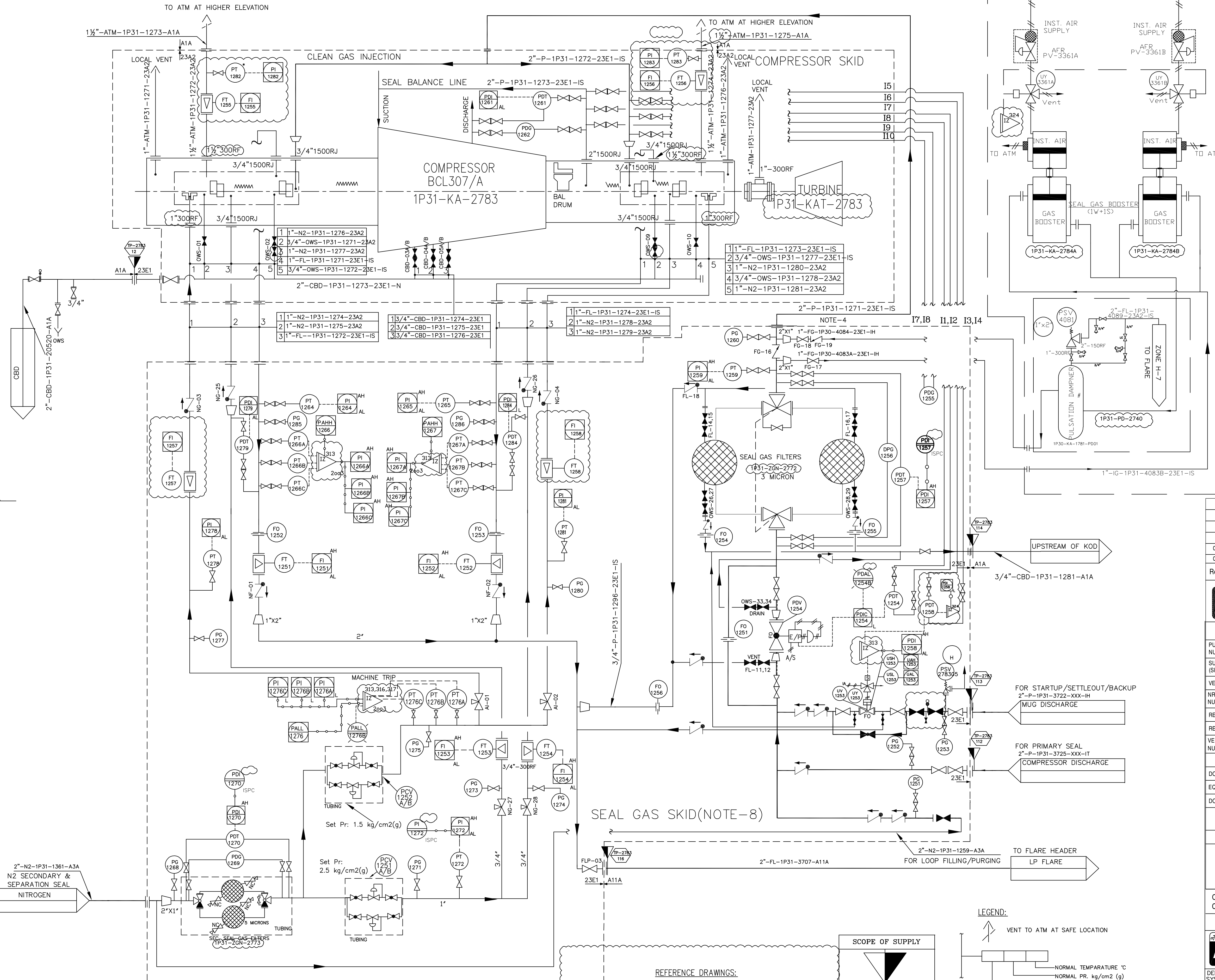
THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

INVENTORY NO. SIGN AND DATE REF. DRG. NO. COMPUTER FILE NAME

FIRST ANGLE PROJECTION

DRG. NO. 1-336-00-44204

SEAL GAS FILTER
1P31-KA-2783-G-50A/B
SECONDARY/SEPARATION GAS FILTER
1P31-KA-2783-G-51A/B



NOTES:

- 1) ALL INSTRUMENT TAG NO'S SHALL BE PREFIXED WITH UNIT NO.'1P31'
- 2) ALL THE INSTRUMENT HOOK-UPS AND ITS INSTALLATION SHALL BE AS PER PROJECT SPECIFIC DRAWINGS.
- 3) SEAL GAS PIPING MATERIAL SHALL BE SS316/SS316L. BHEL STANDARD PMS SHALL BE FOLLOWED FOR SEAL GAS.
- 4) LOW POINT DRAIN IN PRIMARY SEAL GAS INTERCONNECTING PIPING SHALL BE PROVIDED WITH DRAIN VALVE.
- 5) FOR INTERLOCK DETAILS REFER LUBE OIL P&ID.
- 6) ALL LOCAL AND LCP MOUNTED INSTRUMENTS SHOWN IN THIS P&ID ARE IN BHEL SCOPE OF SUPPLY.
- 7) ALL TIE IN POINT NUMBER SHALL BE PREFIXED WITH UNIT NO '1P31'.
- 8) SINGLE SEAL GAS SKID IS PROPOSED. HOWEVER, ACTUAL NUMBER OF SKID SHALL BE INFORMED AFTER RECEIPT OF SUB VENDOR INPUT.

01	16.05.2022	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK	PRAFUL
00	29.01.22	FOR REVIEW	KANHAIYA	DEEPAK	DEEPAK	PRAFUL
Rev.	Date	Reason for issue	Prepared	Checked	Approved	Owner Approved

NUMALIGARH REFINERY LIMITED

PURCHASE ORDER NUMBER:	4500024042-TEC/24.01.2022	SUBMISSION STATUS (VENDOR MUST SELECT ONE STATUS)
SUPPLY REQUISITION (SR) NUMBER:	200663C-000-MR-1011-0001	INFORMATION
VENDORS NAME:	BHEL	X REVIEW
NRI DOCUMENT NUMBER (MANDATORY):	TP-1P31A-ME-0032-PID-0002.00	CERTIFIED FINAL
REV. NO.	01	AS BUILT
REV. DATE	10.05.2022	CANCELLED
VENDORS REFERENCE NUMBER (IF ANY)	HY-DG-0-33600-44804	SUPERSEDED

DOCUMENT TITLE: SEAL GAS P&I DIAGRAM
EQUIPMENT / TAG NUMBER(S): 1P31-KA-2783
DOCUMENT ITEM:
PURCHASER REVIEW AND COMMENTS SHALL NOT BE ASSUMED TO INDICATE EITHER RESPONSIBILITY OR LIABILITY FOR ACCURACY AND COMPLETED OF THIS DOCUMENT OR TO ALTER ANY CONTRACTUAL TERMS AND CONDITIONS.

CONTRACTOR REVIEW CODE

Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TP	1P31A	ME	PID	0002.00	00	01 OF 01

BHARAT HEAVY ELECTRICAL LIMITED
HYDERABAD

DEPT. 415

SCALE N.T.S.

WEIGHT (KG) -N.A.-

REF. TO ASSY. DRG. -N.A.-

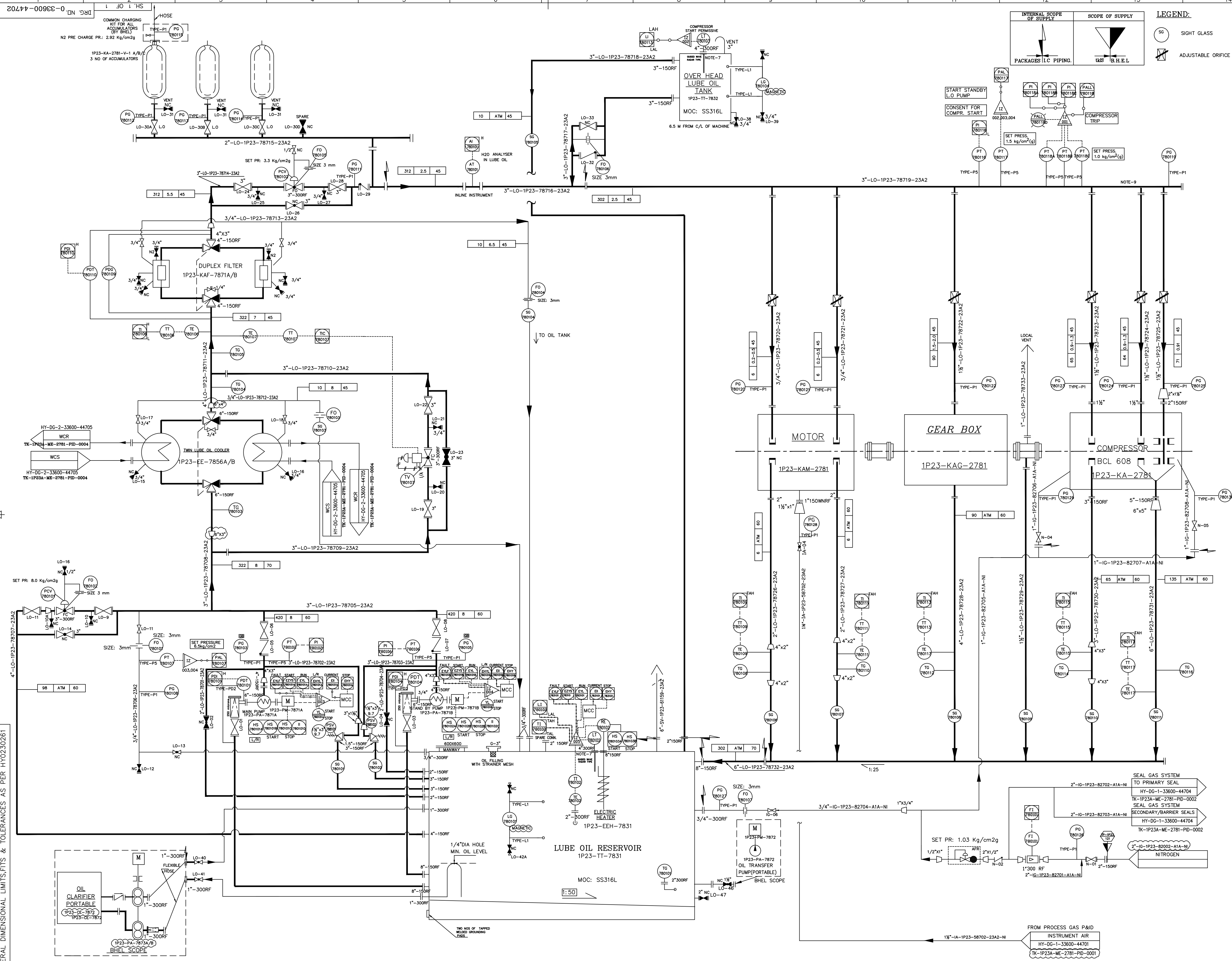
ITEM NO. -N.A.-

NO. OF ITEMS -N.A.-

TITLE SEAL GAS P & I DIAGRAM

DRAWING NO. HY-DG-1-336-00-44804

REV. 00



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

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

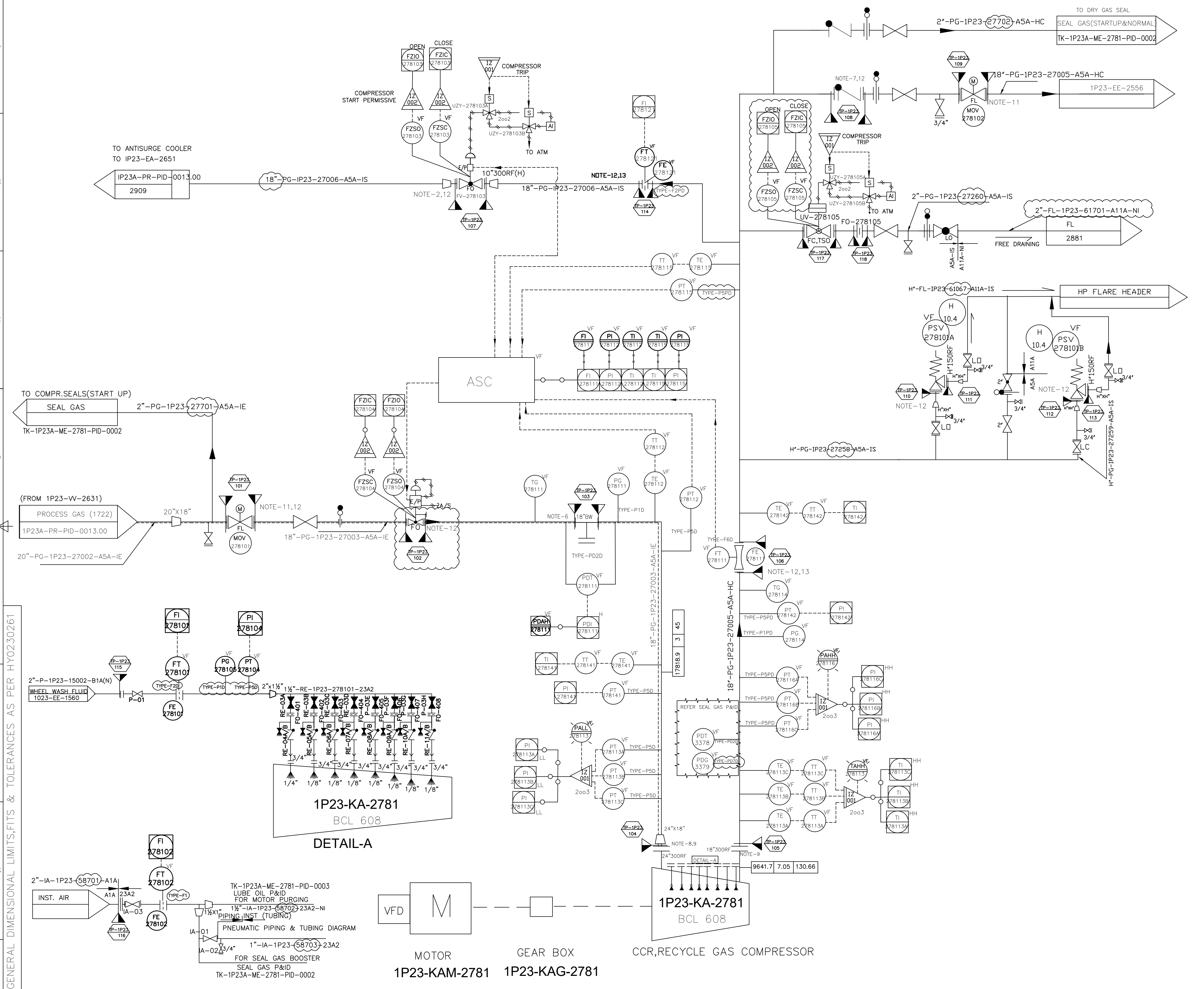
INVENTORY NO

SIGN. AND DATE

REF. DRG. NO.

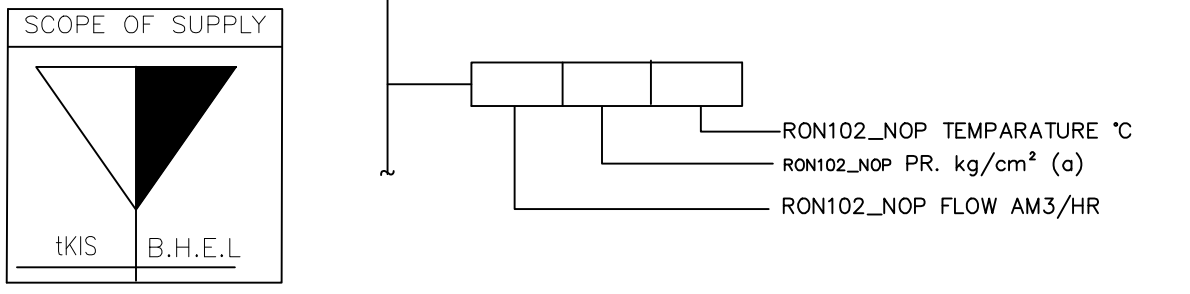
COMPUTER FILE NAME

ALTERED		REV.	DATE	ALTERED		REV.	DATE	ALTERED		REV.	DATE	ALTERED		REV.	DATE	ALTERED		REV.	DATE	ALTERED		REV.	DATE	ALTERED		REV.	DATE	ALTERED		REV.	DATE	ALTERED		REV.	DATE
CHD/APPD				CHD/APPD				CHD/APPD				CHD/APPD				CHD/APPD				CHD/APPD				CHD/APPD				CHD/APPD				CHD/APPD			
			ZONE				ZONE				ZONE				ZONE				ZONE				ZONE				ZONE				ZONE				ZONE
1				2				3				4				5				6				7				8				9			



- NOTES:
- 'VF' MARKED INSTRUMENTS ARE IN BHEL SCOPE (LOOSE SUPPLY).
 - ANTISURGE CONTROL VALVE ARE LOCATED (40 meter) FROM COMPRESSOR DISCHARGE.
 - THIS P&ID HAS TO BE REFERRED ONLY FOR BHEL SUPPLIED EQUIPMENT/INSTRUMENTS. FOR ALL OTHER DETAILS, PLEASE REFER PURCHASERS P&ID.
 - ALL THE INSTRUMENT TAG NO. SHALL BE PREFIXED BY UNIT NO. '1P23'.
 - REFER TK11ZZZA-PR-PID-0001.01, 02, 03 FOR ISOLATION VALVE SIZES FOR PRESSURE INSTRUMENTS, LEVEL INSTRUMENTS AND FLOW TRANSMITTERS. THERMOWELL CONNECTION FOR ALL TEMPERATURE INSTRUMENTS SHALL BE 1 1/2\"/>

- PRESSURE DROP ACROSS COMPRESSOR SUCTION STRAINER SHALL NOT EXCEED 0.01-0.02 KG/CM2. SUPPLY IS IN BHEL SCOPE. SEPARATE MESH SHALL BE PROVIDED FOR STARTUP PURPOSE (20 MESH) WHICH SHALL BE REMOVED LATER. COARSE MESH SCREEN (8 mesh) SHALL BE PROVIDED FOR NORMAL OPERATION. SUCTION STRAINER SHALL BE OF "T TYPE BUTT WELD" END CONNECTION.
- LOW DIFFERENTIAL PRESSURE NON RETURN VALVE IN DISCHARGE SHALL BE SUPPLIED BY BHEL. LOCATION (WITHIN 32 meter) FROM COMPRESSOR DISCHARGE.
- COMPRESSOR SUCTION STRAIGHT LENGTH IS 5 x D.
- COMPRESSOR SUCTION AND DISCHARGE MATCHING COMPANION FLANGES, GASKETS, BOLTS, NUTS ETC ARE IN BHEL SCOPE.
- PSV (1W+1S) ARE LOOSE SUPPLIED BY BHEL.
- COMPRESSOR SUCTION AND DISCHARGE MOV SHALL BE OPEN FULLY FOR COMPRESSOR START PERMISSIVE. THE SAME VALVE TO BE CLOSED AFTER COMPRESSOR COMES TO STANDSTILL (AROUND 30 SEC AFTER ZERO SPEED.)
- COMPANION FLANGES ALONGWITH GASKETS, NUTS, BOLTS ETC FOR ALL LOOSE SUPPLIED ITEMS MOUNTED IN PROCESS PIPING ARE IN BHEL SCOPE OF SUPPLY.
- STRAIGHT LENGTH REQUIREMENT FOR 278111 & 278121 SHALL BE INFORMED LATER.



- REFERENCE DRAWINGS:
- COMPRESSOR GAD: TK-1P23A-ME-2781-GAS-0006
 - SAFETY VALVE DATA SHEET: TK-1P23A-ME-2781-RFP-0002
 - CONTROL VALVE DATA SHEET: TK-1P23A-ME-2781-RFP-0001
 - LOGIC DIAGRAM: TK-1P23A-ME-2781-LOP-0001

tkIS India / Vendor		tkIS India / Vendor	
Category Codes (Submission purpose)	<input type="checkbox"/> 1 For Approval	Acceptance Codes (Approved Codes)	<input type="checkbox"/> 1 Approved
	<input type="checkbox"/> 2 For Review / Comments		<input type="checkbox"/> 2 Approved for Manufacturing / Fabrication With Comments as Marked
	<input type="checkbox"/> 3 For Information		<input type="checkbox"/> 3 Not Approved/Resubmit
	<input type="checkbox"/> 4 For Engineering		<input type="checkbox"/> 4 Retained for Information/Records
	<input type="checkbox"/> 5 For Enquiry		<input type="checkbox"/> 5 Reviewed
	<input type="checkbox"/> 6 For Order Placement		<input type="checkbox"/> 6 Reviewed as Noted/Resubmit
	<input type="checkbox"/> 7 Final & Approved		
	<input type="checkbox"/> 8 Released for Construction		
Date : _ / _ / _		Name : _	

Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner	Approved
02	24.05.22	REVISED SUBMISSION	KK	DKJ	DKJ	PDM	
01	25.04.22	REVISED SUBMISSION	KK	DKJ	DKJ	PDM	
00	11.02.22	FIRST SUBMISSION	KK	DKJ	DKJ	PDM	

thyssenkrupp

thyssenkrupp Industrial Solutions (India) Private Limited

NRL's PO No.: PUR-PRJNUM-1002671/LOA/BHEL

Vendor's PO No.: MCA-1073

Vendor's Document No.: HY-DG-0-33600-44701

NRL NUMALIGARH REFINERY LIMITED

PROJECT: NRL EXPANSION PROJECT

UNIT/FACILITY: CCR RGC

DRAWING TITLE: PROCESS GAS P&I DIAGRAM

SYSTEM DESCRIPTION: RECYCLE GAS COMPRESSOR (1P23-KA-2781)

Scale: NTS

Dwg. Size: A1

Originator/Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TK	1P23	ME-2781	PID	001	02	01 OF 01

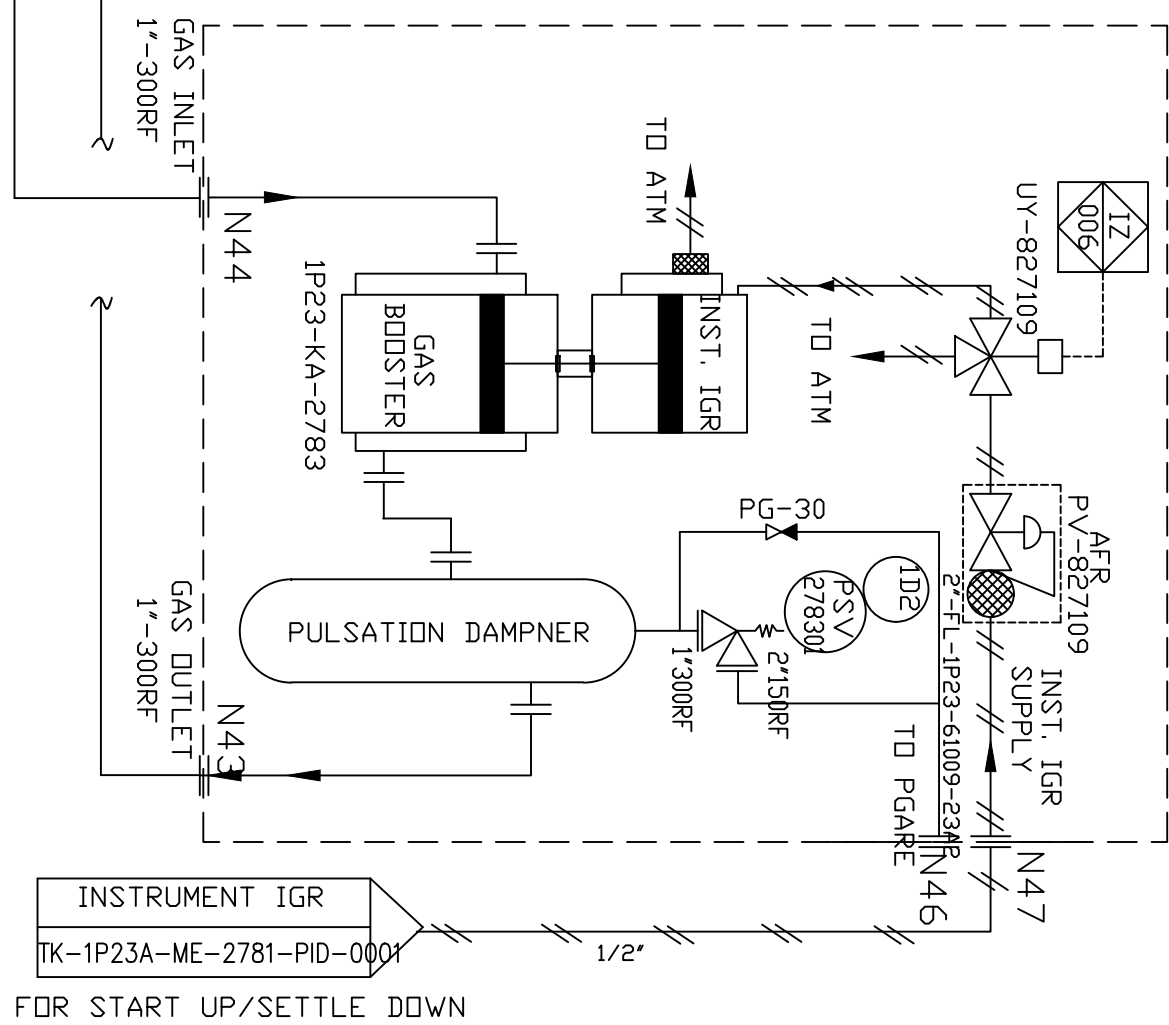
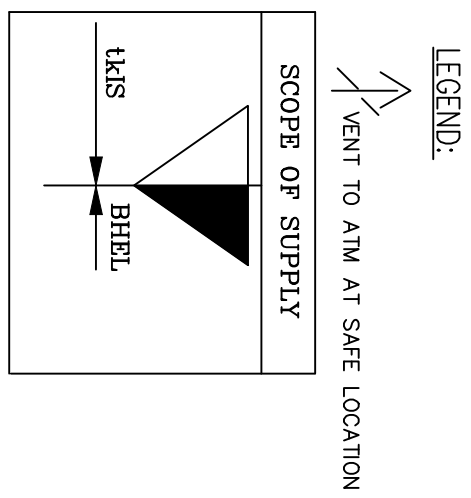
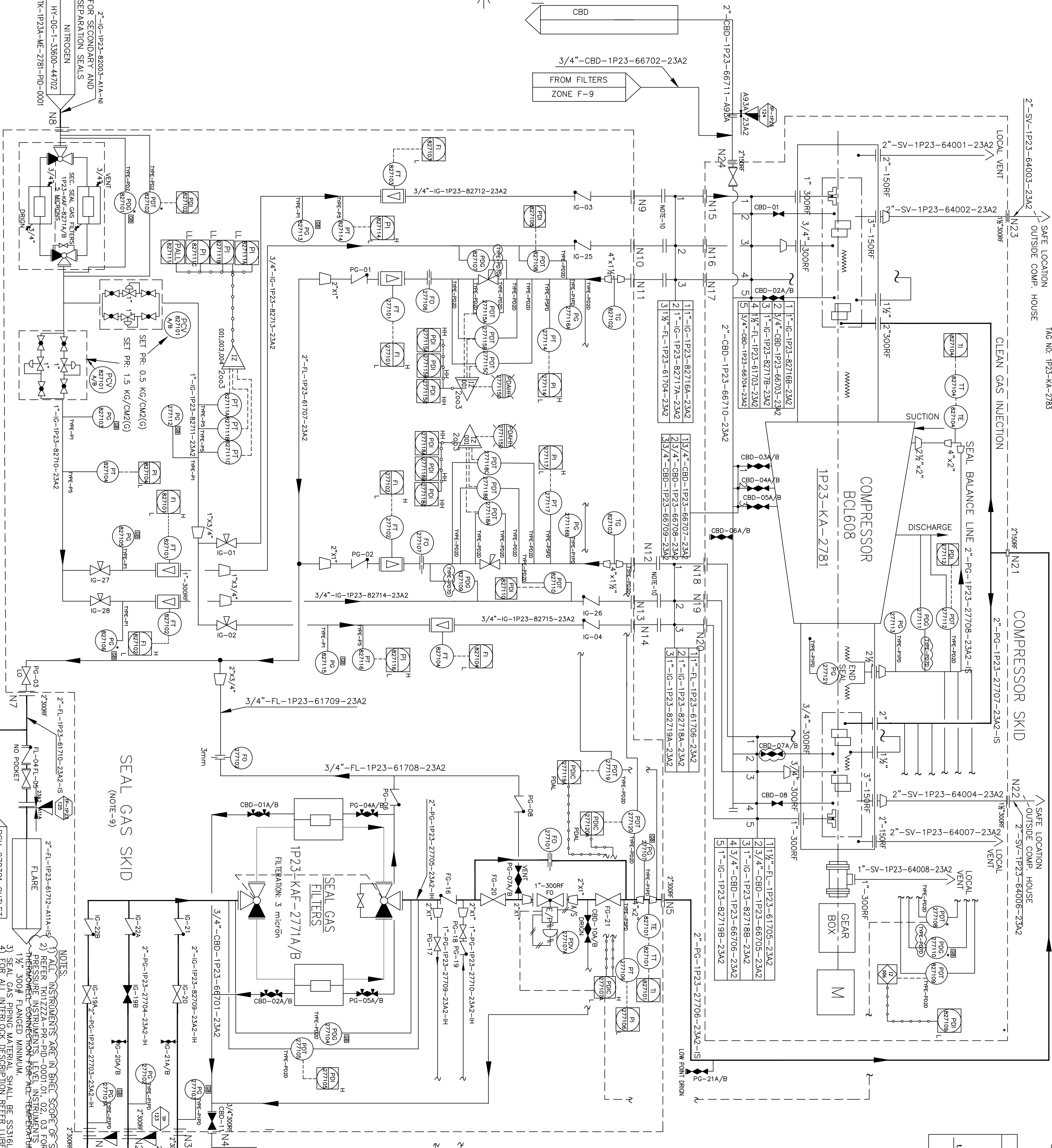
BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		NAME	SIGN.	DATE	NO. OF VAR.
		DEN. KANHAIYA		12.02.22	
		CHD. DEEPAK		12.02.22	NA
		APPD. PRAFULL		12.02.22	

DEPT. SYS. ENG. CDR. 415	UNTOOL. DIMS. GR. 6444	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS
		NTS	NA	NA	NA	NA
TITLE		DRAWING NO.		REV. 02		
PROCESS GAS P&I DIAGRAM		HY-DG-0-33600-44701				
		SHT. No. 1			NO. OF SHT. 1	

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

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



REFERENCE DRAWINGS:
1) SEAL GAS SKID GAO: TK-IP23A-ME-2781-GAS-0009
2) SEAL SKID INST DATA SHEET: TK-IP23A-ME-2781-DAT-0005
3) LOGIC DIAGRAM: TK-IP23A-ME-2781-LOG-0001

Category Codes (Submission purpose)		thysenkrupp	
<input type="checkbox"/> 1 For Approval	<input type="checkbox"/> 1 Approved	<input type="checkbox"/> 1 Approved	<input type="checkbox"/> 1 Approved
<input type="checkbox"/> 2 For Information	<input type="checkbox"/> 2 Fabrication With Comments	<input type="checkbox"/> 2 Fabrication With Comments	<input type="checkbox"/> 2 Fabrication With Comments
<input type="checkbox"/> 3 For Engineering	<input type="checkbox"/> 3 Not Approved/Resubmit	<input type="checkbox"/> 3 Not Approved/Resubmit	<input type="checkbox"/> 3 Not Approved/Resubmit
<input type="checkbox"/> 4 For Enquiry	<input type="checkbox"/> 4 Relieved for Information/Records	<input type="checkbox"/> 4 Relieved for Information/Records	<input type="checkbox"/> 4 Relieved for Information/Records
<input type="checkbox"/> 5 For Order Placement	<input type="checkbox"/> 5 Reviewed	<input type="checkbox"/> 5 Reviewed	<input type="checkbox"/> 5 Reviewed
<input type="checkbox"/> 6 Released for Construction	<input type="checkbox"/> 6 Reviewed as Noted/Resubmit	<input type="checkbox"/> 6 Reviewed as Noted/Resubmit	<input type="checkbox"/> 6 Reviewed as Noted/Resubmit

Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner
02	25.04.22	REVISED SUBMISSION	KK	DKJ	DKJ	PDW
01	05.04.22	REVISED SUBMISSION	KK	DKJ	DKJ	PDW
00	11.02.22	FIRST SUBMISSION	KK	DKJ	DKJ	PDW



thysenkrupp

thysenkrupp Industrial Solutions (India) Private Limited
NRL's PO No.: PUR-PRJNUM-1002671/LOA/BHEL
Vendor's PO No.: MCA-1073
Vendor's Document No.: HY-DG-0-33600-44704

NRL
NUMALGARH REFINERY LIMITED

PROJECT: NRL EXPANSION PROJECT
UNIT/FACILITY: CCR RGC
DRAWING TITLE: SEAL GAS P&I DIAGRAM
SYSTEM DESCRIPTION: RECYCLE GAS COMPRESSOR (IP23-KA-2781)

Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TK	IP23	ME-2781	PID	002	01	01 OF 01

DEPT. SYSTEMS/ENGRG		UNTO. DIMS.		SCALE		WEIGHT (KG)		REF. TO ASSY. DRG.		ITEM NO.		NO. OF ITEMS	
DEPT 415						N.T.S		-N.A.-		-N.A.-		-N.A.-	

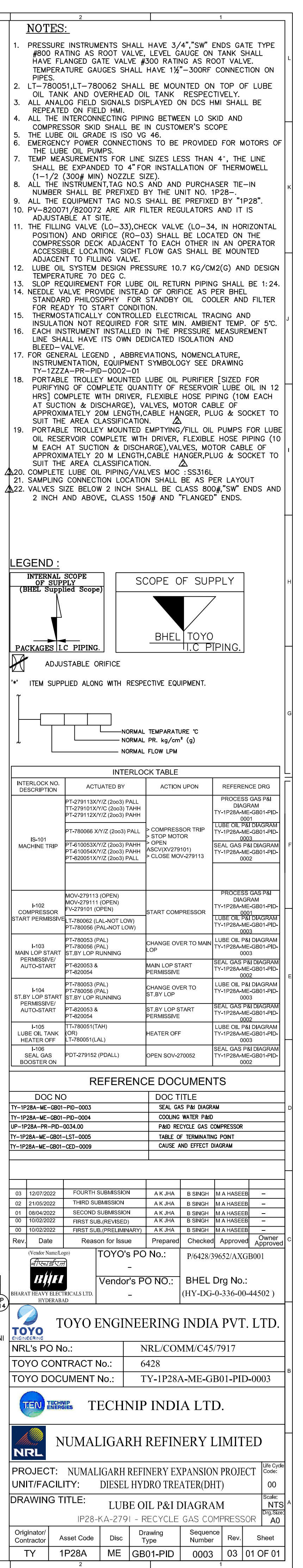
TITLE	DRAWING NO.	REV.
SEAL GAS P&I DIAGRAM	HY-DG-3-33600-44704	02
10	SHT. No. 1	NO. OF SHT. 1

INVENTORY NO.	SIGN. AND DATE	REF. DRG. NO.	COMPUTER FILE NAME
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

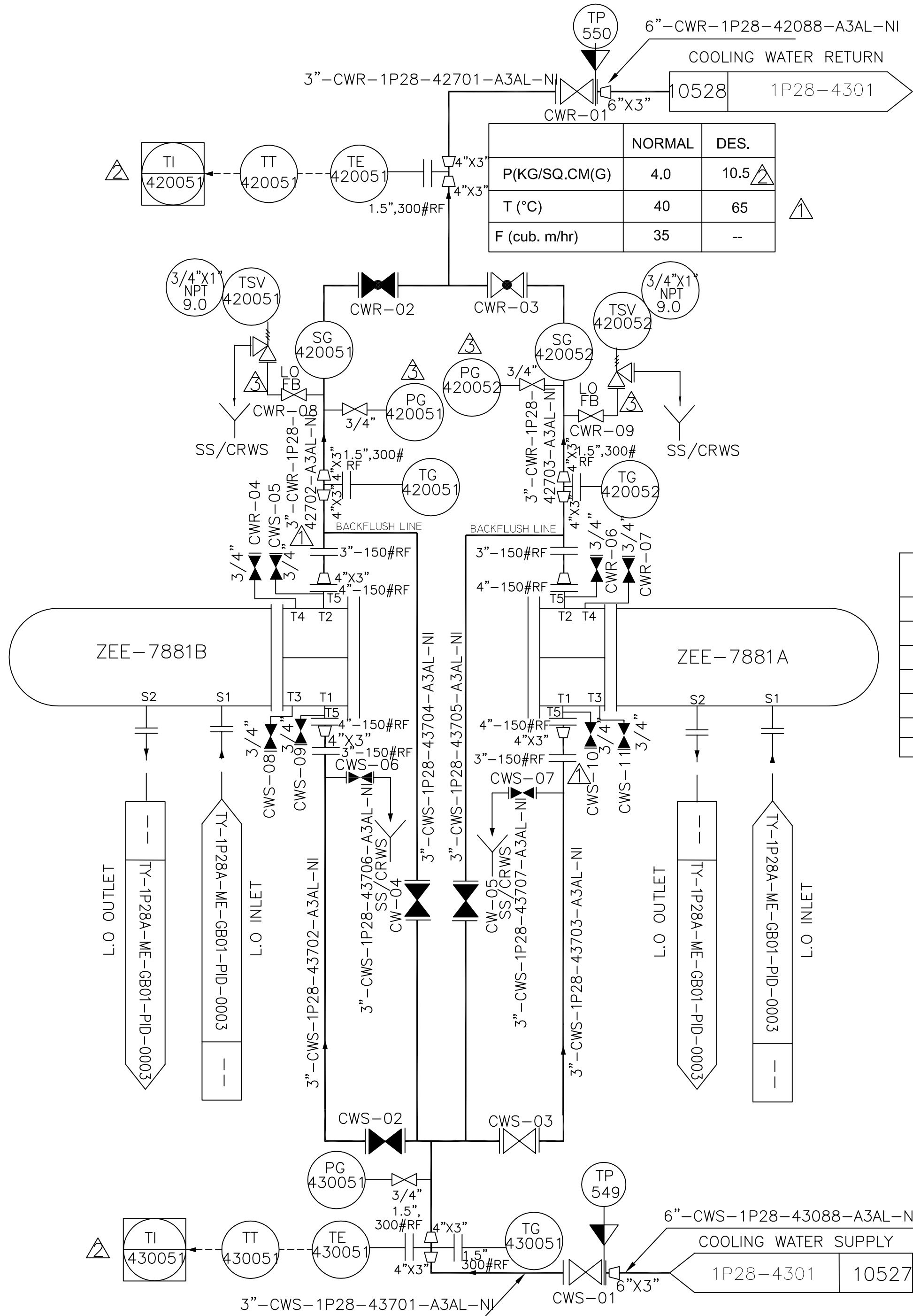
REV.	DATE	CHD/APPD	ZONE
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

REV.	DATE	CHD/APPD	ZONE
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

NOTES:
1) ALL INSTRUMENTS ARE IN THE SCOPE OF SUPPLY.
2) REFER KIKIZZA-PR-PID-0001.01, 02, 03 FOR ISOLATION VALVE SIZES FOR PRESSURE INSTRUMENTS, LEVEL INSTRUMENTS AND FLOW TRANSMITTERS.
3) REFER KIKIZZA-PR-PID-0001.01, 02, 03 FOR ISOLATION VALVE SIZES FOR PRESSURE INSTRUMENTS, LEVEL INSTRUMENTS AND FLOW TRANSMITTERS.
4) ALL INSTRUMENTS SHALL BE PROVIDED WITH DRUG VALVE.
5) ALL LOW POINT SHALL BE PROVIDED WITH DRUG VALVE.
6) ALL INSTRUMENTS MARKED AS 'OB' IN FILTER SKID AND CONTROL SKID ARE MOUNTED ON GAUGE BOARD OF RESPECTIVE SKID.
7) ALL INSTRUMENTS TAG NUMBER SHALL BE PREFIXED WITH UNIT NUMBER 'IP23'.
8) ALL TIE IN NUMBER SHALL BE PREFIXED WITH 'IP-IP23'.
9) SINGLE SEAL GAS SKID IS PROPOSED. ACTUAL NUMBER OF SKID SHALL BE INFORMED AFTER RECEIPT OF SUB VENDOR INPUT.
10) BREAKUP FLANGE FOR MAINTENANCE PURPOSE.
11) MINIMUM LINE SIZE OF 4" IS CONSIDERED FOR INSTALLING THERMOWELL.
12) COMPANION FLANGES ALONGWITH GASKETS, NUTS/BOLTS ETC FOR ALL LOOSE SUPPLIED ITEMS AND ALL TIE IN ARE IN THE SCOPE OF SUPPLY.



THIS DRAWING IS THE PROPERTY OF NUMALIGARH REFINERY LTD. AND SHALL NOT BE REPRODUCED, COPIED, LENT OR DISPOSED WITHOUT NUMALIGARH REFINERY LTD. PERMISSION FOR OTHER PURPOSE.



	NORMAL	DES.
P(KG/SQ.CM(G)	4.0	10.5
T (°C)	40	65
F (cub. m/hr)	35	--

ZEE-7881A ZEE-7881B			
LUBE OIL COOLER			
TYPE	SHELL AND TUBE		
TEMA TYPE	TEMA C AES		
	SHELL	TUBE	
DESIGN PR	kg/cm2(g)	10.7	10.5
DES TEMP	Deg C	80	65
MOC	SS316	SS316L	

	NORMAL	DES.
P(KG/SQ.CM(G)	5.0	10.5
T (°C)	35	65
F (cub. m/hr)	35	--

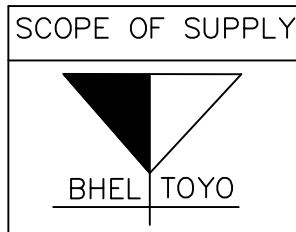
GENERAL NOTES:

- FOR GENERAL LEGEND, ABBREVIATIONS, NOMENCLATURE, INSTRUMENTATION, EQUIPMENT SYBOLOGY SEE DWGS TP-1ZZA-PR-PID-0002-01.
- ALL THE INSTRUMENT TAG NO., EQUIPMENT TAG NO. AND PURCHASER TIE-IN NO. SHALL BE PREFIXED BY UNIT NO. 1P28-.

NOTES:

- ALL THE PRESSURE GAUGES SHALL HAVE A PROCESS CONNECTION OF 3/4" SW CLASS 800, GATE VALVE. THE TEMPERATURE GAUGES SHALL HAVE A PROCESS CONNECTION OF 1 1/2" 300# RF.
- INSTRUMENTS OF THIS P&ID ARE IN BHEL SCOPE OF SUPPLY.
- REFER LUBE OIL PID (TY-1P28A-ME-GB01-PID-0003) FOR INTERLOCK DETAILS
- VALVES/FITTINGS BELOW 2" ARE "SW" ENDS, VALVES OF 2" AND ABOVE ARE "RF" FLANGED END.


LEGEND :



REFERENCE DOCUMENTS

DOC NO	DOC TITLE	REV.
TY-1P28A-ME-GB01-PID-0003	LUBE OIL P&ID DIAGRAM	00
UP-1P28A-PR-PID-0034.00	LICENSOR'S P&ID	B2
TY-1P28A-ME-GB01-LST-0005	TABLE OF TERMINATING POINTS	00
TY-1P28A-ME-GB01-CED-0009	CAUSE & EFFECT MATRIX	00

Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner Approved
03	15/07/2022	FOURTH SUBMISSION	A K JHA	B SINGH	M A HASEEB	--
02	21/05/2022	THIRD SUBMISSION	A K JHA	B SINGH	M A HASEEB	--
01	01/04/2022	SECOND SUBMISSION	A K JHA	B SINGH	M A HASEEB	--
00	09/02/2022	FIRST SUB.(REVISED)	A K JHA	B SINGH	M A HASEEB	--
00	05/01/2022	FIRST SUB.(PRELIMINARY)	A K JHA	B SINGH	M A HASEEB	--

(Vendor Name/Logo)		TOYO's PO No.:	P/6428/39652/AXGB001
		-	
BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		Vendor's PO NO.:	BHEL's Drg No.: HY-DG-3-336-00-44504
		-	

		TOYO ENGINEERING INDIA PVT. LTD.	
---	--	----------------------------------	--

NRL's PO No.:	NRL/COMM/C45/7917
TOYO CONTRACT No.:	6428
TOYO DOCUMENT No.:	TY-1P28A-ME-GB01-PID-0004

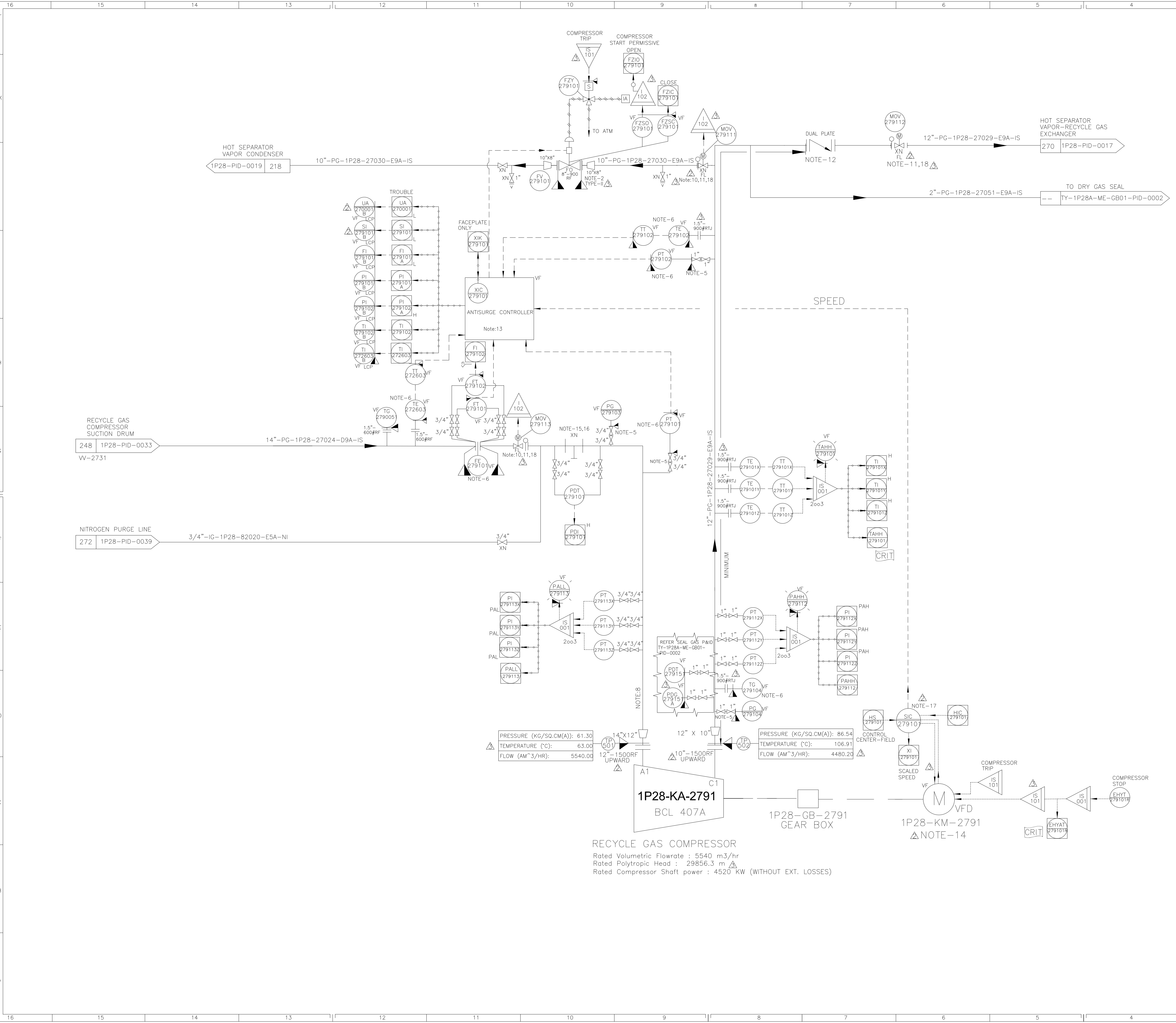
	TECHNIP INDIA LTD.
---	--------------------

	NUMALIGARH REFINERY LIMITED
---	-----------------------------

PROJECT: NUMALIGARH REFINERY EXPANSION PROJECT		Life Cycle Code:	00
UNIT/FACILITY: DIESEL HYDRO TREATER(DHT)			
DRAWING TITLE: COOLING WATER P&ID		Scale:	NTS
IP28-KA-2791 - RECYCLE GAS COMPRESSOR		Dwg. Size:	A3

Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TY	1P28A	ME	GB01-PIDPID	0004	03	01 OF 01

THIS DRAWING IS THE PROPERTY OF NUMALIGARH REFINERY LTD. AND SHALL NOT BE REPRODUCED, COPIED, LENT OR DISPOSED WITHOUT NUMALIGARH REFINERY LTD.'S PERMISSION FOR OTHER PURPOSE.



NOTES:

1. 'VF' MARKED INSTRUMENTS ARE IN BH&L SCOPE OF SUPPLY.



2. ANTISURGE CONTROL VALVE TO BE LOCATED AT THE SHORTEST POSSIBLE DISTANCE FROM THE COMPRESSOR DISCHARGE

3. THIS P&ID HAS TO BE REFERRED ONLY FOR BH&L SUPPLIED EQUIPMENT/ INSTRUMENTS.FOR ALL OTHER DETAILS, PLEASE REFER CUSTOMER PID- NO.TY-1P28-PR-PID-0034.01

4. ALL THE INSTRUMENT TAG NO.,PURCHASER TIE-IN NO.,SHALL BE PREFIXED BY UNIT NO. '1P28-'

5. PRESSURE INSTRUMENT ROOT VALVES ARE IN CUSTOMER SCOPE. THERMOWELL CONNECTION FLANGE RATING FOR ALL TEMPERATURE INSTRUMENTS SHALL BE AS PER PMS (IN CUSTOMER SCOPE).

6. ANTI SURGE VALVE (FV-279101), COMPRESSOR SUCTION PT-279101, TE/TT-279102 ONLY BARE INSTRUMENT WILL LOOSE SUPPLY BY BH&L. CABLING, JB, INSTALLATION, ETC. BY TOYO

7. FOR GENERAL LEGEND, ABBREVIATIONS, NOMENCLATURE, INSTRUMENTATION, EQUIPMENT SYMBOLOLOGY SEE DWGS TY-1ZZZZA-PR-PID-0002-01THRU 0014.02.  UOP SPECIFIC LEGEND SEE DWGS TY-1P28A-PR-PID-0066 THRU 0068. 

8. COMPRESSOR SUCTION STRAIGHT LENGTH SHALL BE 5 TIMES OF LINE SIZE.

9. REFER LUBE OIL P&ID (TY-1P28A-ME-GB01-PID-0003) FOR INTERLOCK DETAILS.

10. THE VALVE MUST BE FULLY OPEN BEFORE COMPRESSOR CAN START

11. THE MOTOR OPERATED VALVES (MOV-279111 / 279112 / 279113) SHALL BE CLOSED WITH 30 SECONDS DELAY AFTER COMPRESSOR SHUTDOWN (COMPLETE STANDSTILL) TO PREVENT COMPRESSOR DAMAGE.

12. WITHIN 12 M FROM COMPRESSOR DISCHARGE.

13. ANTI-SURGE CONTROLLER WITH ALL REQUIRED ACCESSORIES / CABINETS LOCATED IN SRR IS BY BH&L.

14. REFER "SINGLE LINE DIAGRAM VFD" DOCUMENT FOR MOTORS /VFD/MCC DCS/ESD INTERFACE SIGNAL

15. STRAINER TO BE LOCATED NEAR TO COMPRESSOR SUCTION.

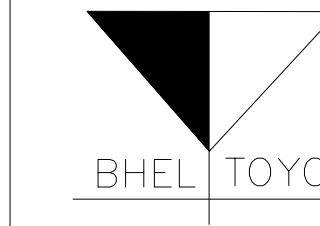
16. STRAINER MESH SIZE IS 8 FOR NORMAL OPERATION (PERMANENT STRAINER) AND FOR START UP (TEMPORARY STRAINER) 0.08 INCH DIAMETER WIRE OF 0.253 m2 CLEAR OPENING -57.6% OPEN AREA.

17. FOR ANTI-SURGE CONTROL SPEED FEEDBACK IS FROM MOTOR-VFD AS PER BH&L'S STANDARD.

18. VALVE/ACTUATORS ETC. WITHIN A FIRE SCENARIO ENVELOPE ARE TO BE FIRE SAFE/FIRE PROOFED IN ACCORDANCE WITH API 553.


LEGEND :


SCOPE OF SUPPLY



REFERENCE DOCUMENTS

DOC NO	DOC TITLE
TY-1P28A-ME-GB01-PID-0002	SEAL GAS P&ID DIAGRAM
TY-1P28A-ME-GB01-PID-0003	LUBE OIL P&ID DIAGRAM
UP-1P28A-PR-PID-0034.00	LICENSOR'S P&ID
TY-1P28A-ME-GB01-LST-0005	TABLE OF TERMINATING POINTS
TY-1P28A-ME-GB01-CED-0009	CAUSE & EFFECT MATRIX
TY-1P28A-ME-GB01-FLD-0037	LOGIC DIAGRAMS

03	12/07/2022	FOURTH SUBMISSION	A K JHA	B SINGH	M A HASEEB	
02	12/05/2022	THIRD SUBMISSION	A K JHA	B SINGH	M A HASEEB	
01	27/03/2022	SECOND SUBMISSION	A K JHA	B SINGH	M A HASEEB	
00	09/02/2022	FIRST SUB.(REVISED)	A K JHA	B SINGH	M A HASEEB	
00	06/01/2022	FIRST SUB.(PRELIMINARY)	A K JHA	B SINGH	M A HASEEB	
Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner Approved
(Vendor Name/Logo)		TOYO's PO No.:	--	P/6428/39652/AXGB001		
 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		Vendor's PO NO.:	--	BH&L Drg No.: HY-DG-1-336-00-44501		



TOYO ENGINEERING INDIA PVT. LTD.

NRL's PO No.:


NRL/COMM/C45/7917

TOYO CONTRACT No.:


6428

TOYO DOCUMENT No.:

TY-1P28A-ME-GB01-PID-0001



TECHNIP INDIA LTD.



NUMALIGARH REFINERY LIMITED

PROJECT: NUMALIGARH REFINERY EXPANSION PROJECT

UNIT/FACILITY: DIESEL HYDRO TREATER(DHT)

DRAWING TITLE: PROCESS GAS SYSTEM OF 1P28-KA-2791 RECYCLE GAS COMPRESSOR

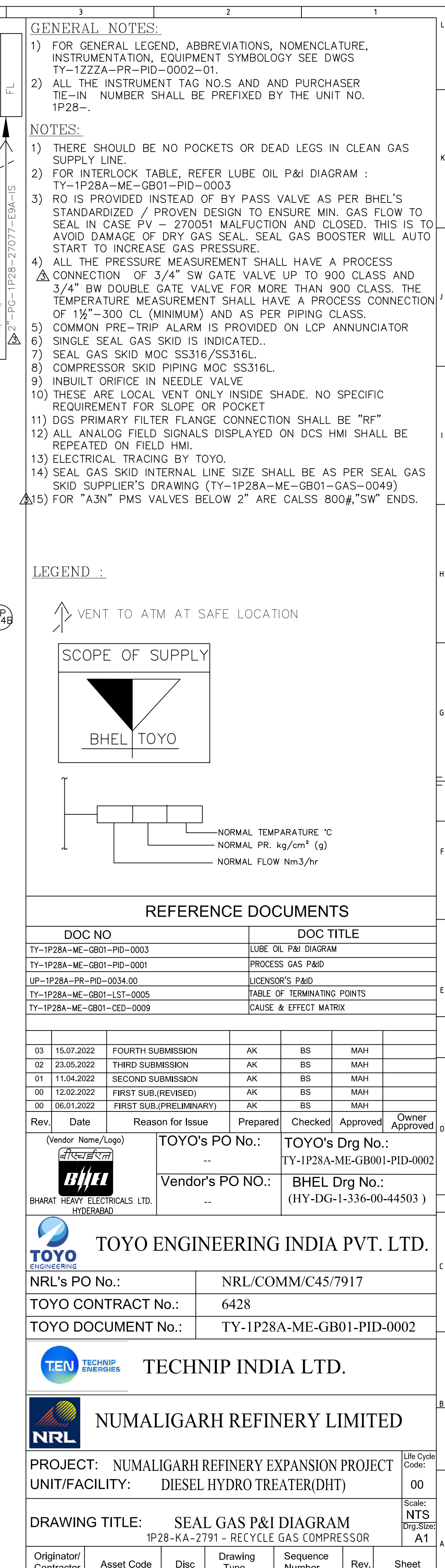
Life Cycle Code:

00

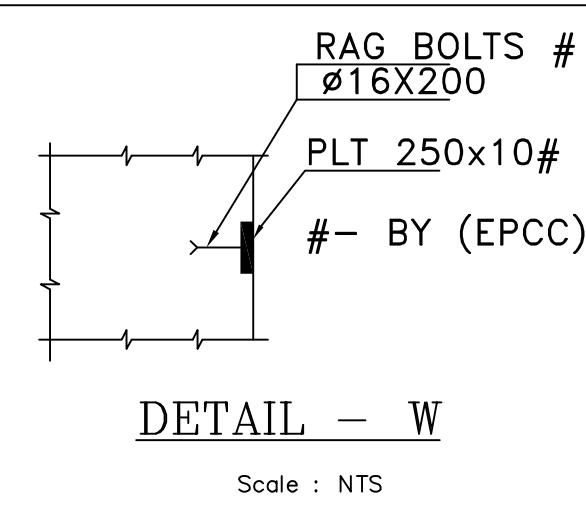
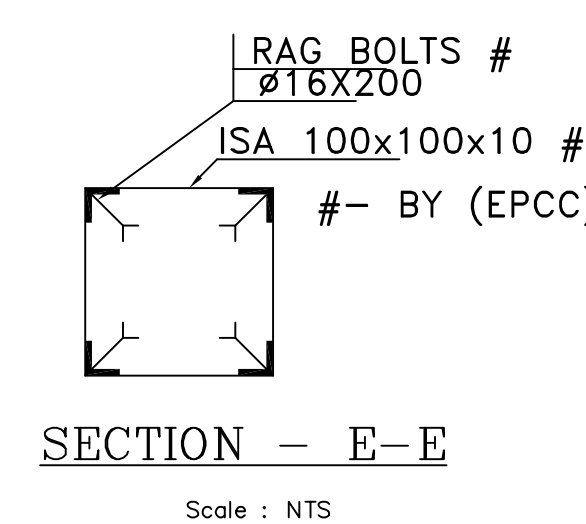
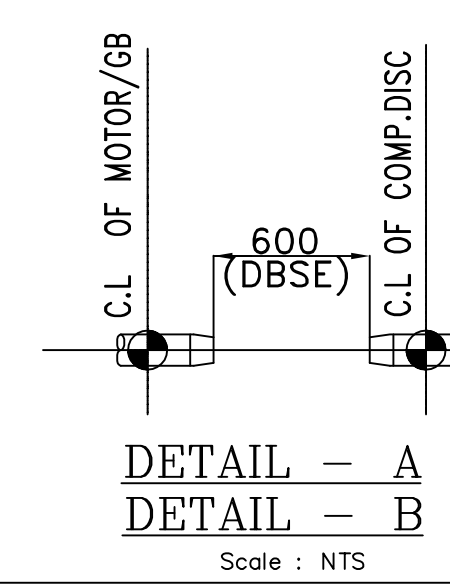
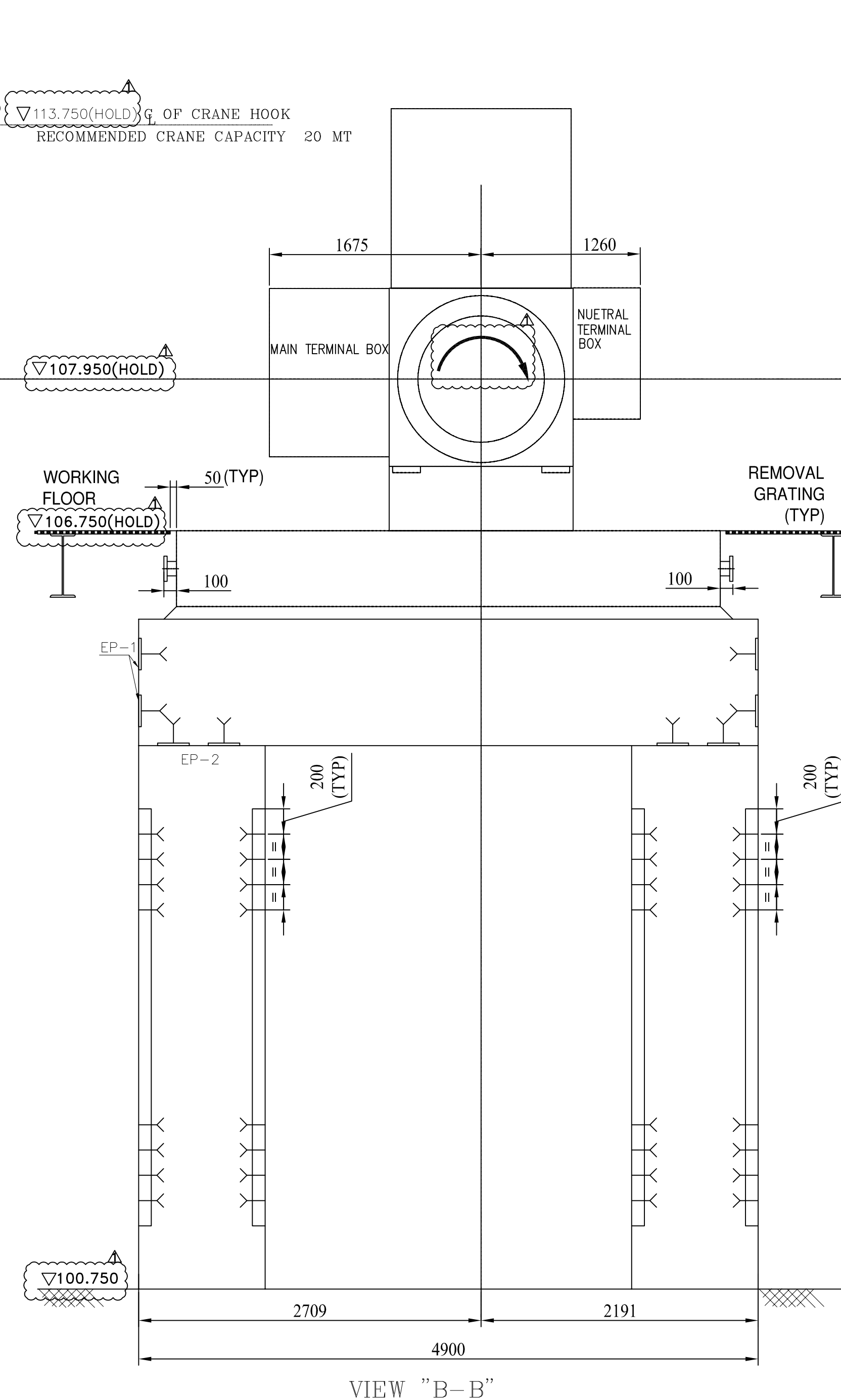
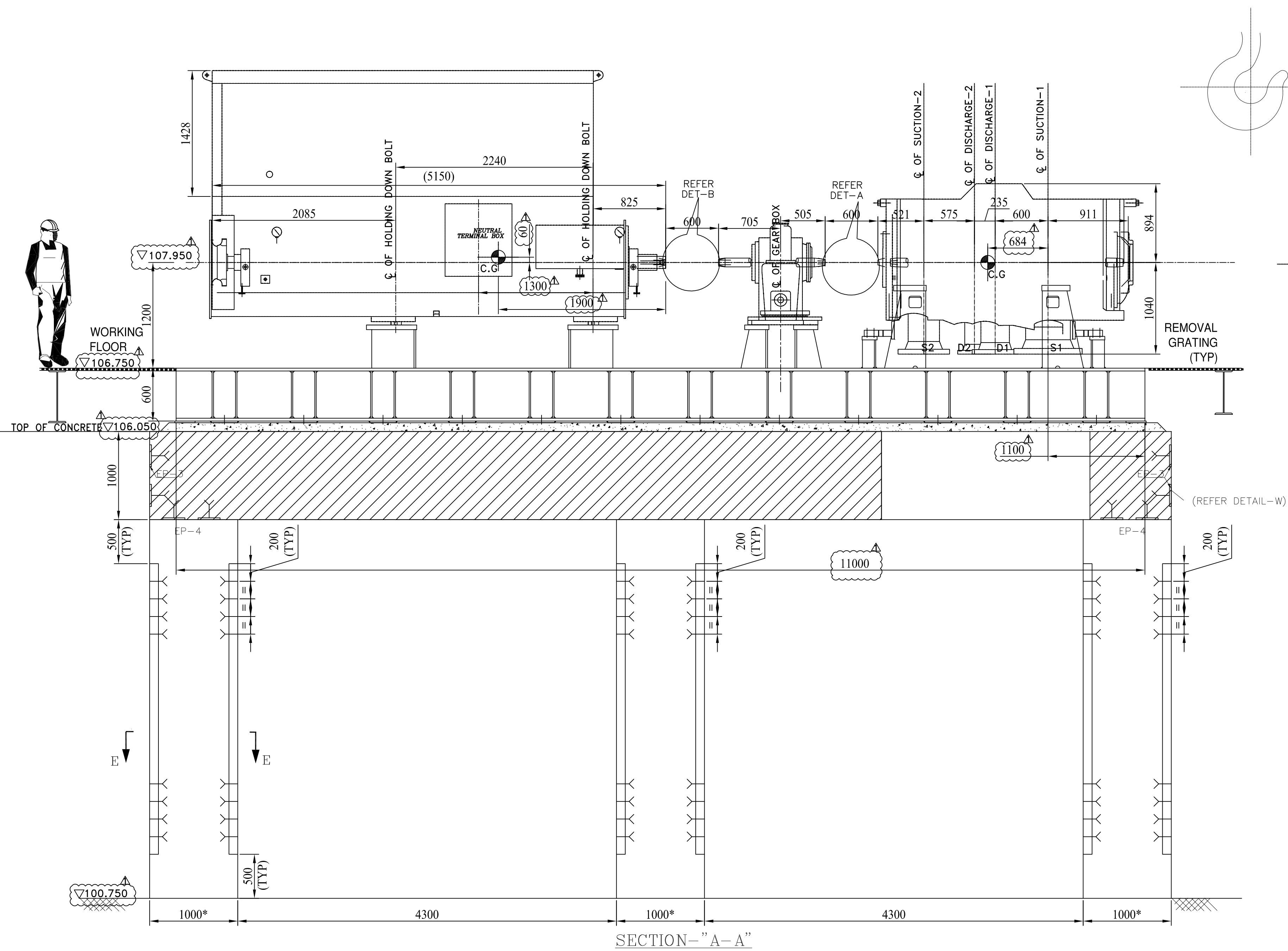
Scale: NTS

Dwg. Size: A1

Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TY	1P28A	ME	GB01-PID	0001	03	01 OF 01



PROJECT: NUMALIGARH REFINERY EXPANSION PROJECT					Life Cycle Code:	
UNIT/FACILITY: DIESEL HYDRO TREATER(DHT)					00	
DRAWING TITLE: SEAL GAS P&I DIAGRAM					Scale: NTS	
1P28-KA-2791 - RECYCLE GAS COMPRESSOR					Dwg.Size: A1	
Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
1P28A		15	DP24-DP	2000	00	04 OF 04



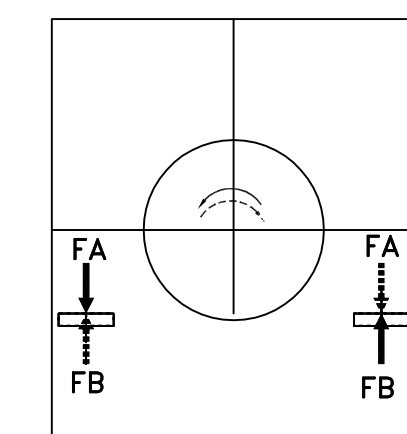
DOUBLE AMPLITUDE OF VIBRATION (PEAK TO PEAK)25 MICRONS LOADS TABLE (IN KGS.)			
	MOTOR	GEAR BOX	COMPRESSOR
			2MCL 528
MACHINE WEIGHT	15300	1500	22000
ROTOR WEIGHT	3600	--	1146
WT.OF HEAVIST PART	3600	280	5500
MAXIMUM CONT. SPEED	2973		10034
1ST CRIT.SPEED			3485
2ND CRIT. SPEED			12785

MAX. WEIGHT FOR MAINTENANCE \simeq 15300(MOTOR.)FOUNDATION LOAD DATA COMPRESSOR

LOAD POINTS	STATIC WT. WITHOUT ROTOR WT. KG	ROTOR WT. KG	LOAD DUE TO OP. TORQUE KG	UN BAL. KG	FAILURE LOAD* KG	SEISMIC VERTICAL LOAD KG	SEISMIC LOAD HORIZONTAL
A	6889	261.5	+101	±183	±2615	1716	2574
B	6889	261.5	+101	±183	±2615	1716	2574
C	6889	261.5	-101	±183	±2615	1716	2574
D	6889	261.5	-101	±183	±2615	1716	2574

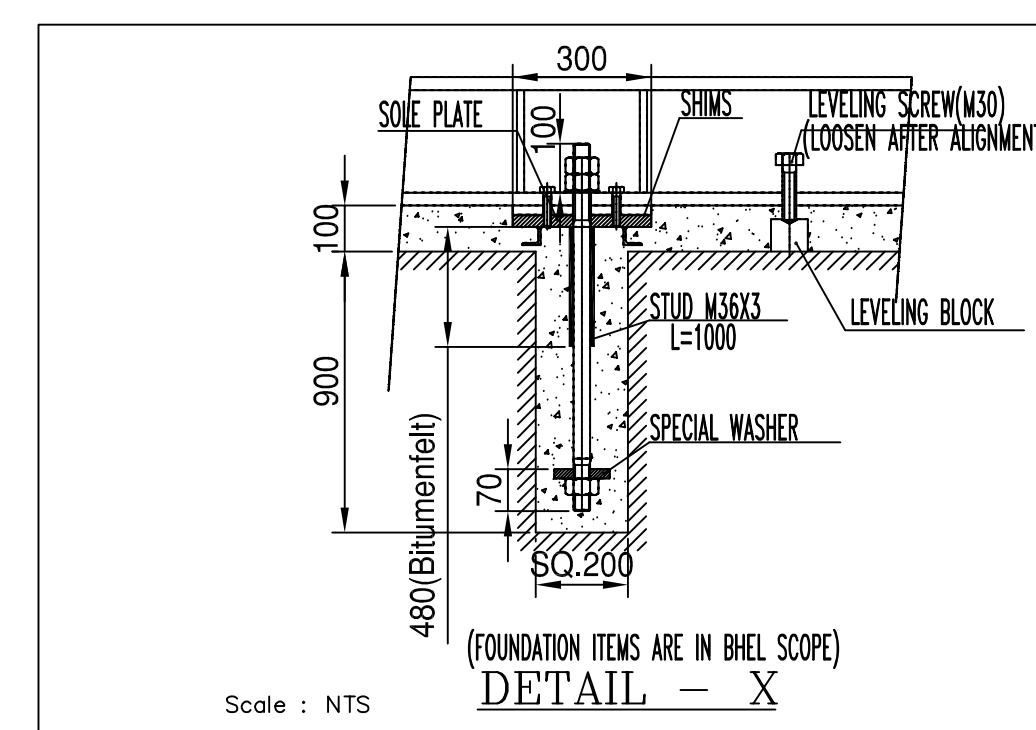
MOTOR FOUNDATION LOAD DATA

- MOTOR RATING = 3270KW
 - MAX. FORCE CALCULATED FROM MAX. IMPULSE TORQUE
(SHORT CIRCUIT MOMENT) = F_M
 - FORCE EXERTED BY WEIGHT ON EACH SIDE = F_G
 - FOUNDATION LOAD ON EACH SIDE COMPRESSION = $F_A = F_M + F_G$
 - TENSILE FORCE = $F_B = F_M - F_G$
- THE FORCE OCCUR ALTERNATIVELY INDEPENDENT OF THE DIRECTION OF ROTATION



FOUNDATION LOAD GEAR BOX

	LOAD POINT (N)					
	G1	G2	G3	G4	G5	G6
STATIC LOAD	7358		7358		7358	
DYNAMIC LOAD	-9935				9935	








GENERAL NOTES:

- [illegible]

NOTES:

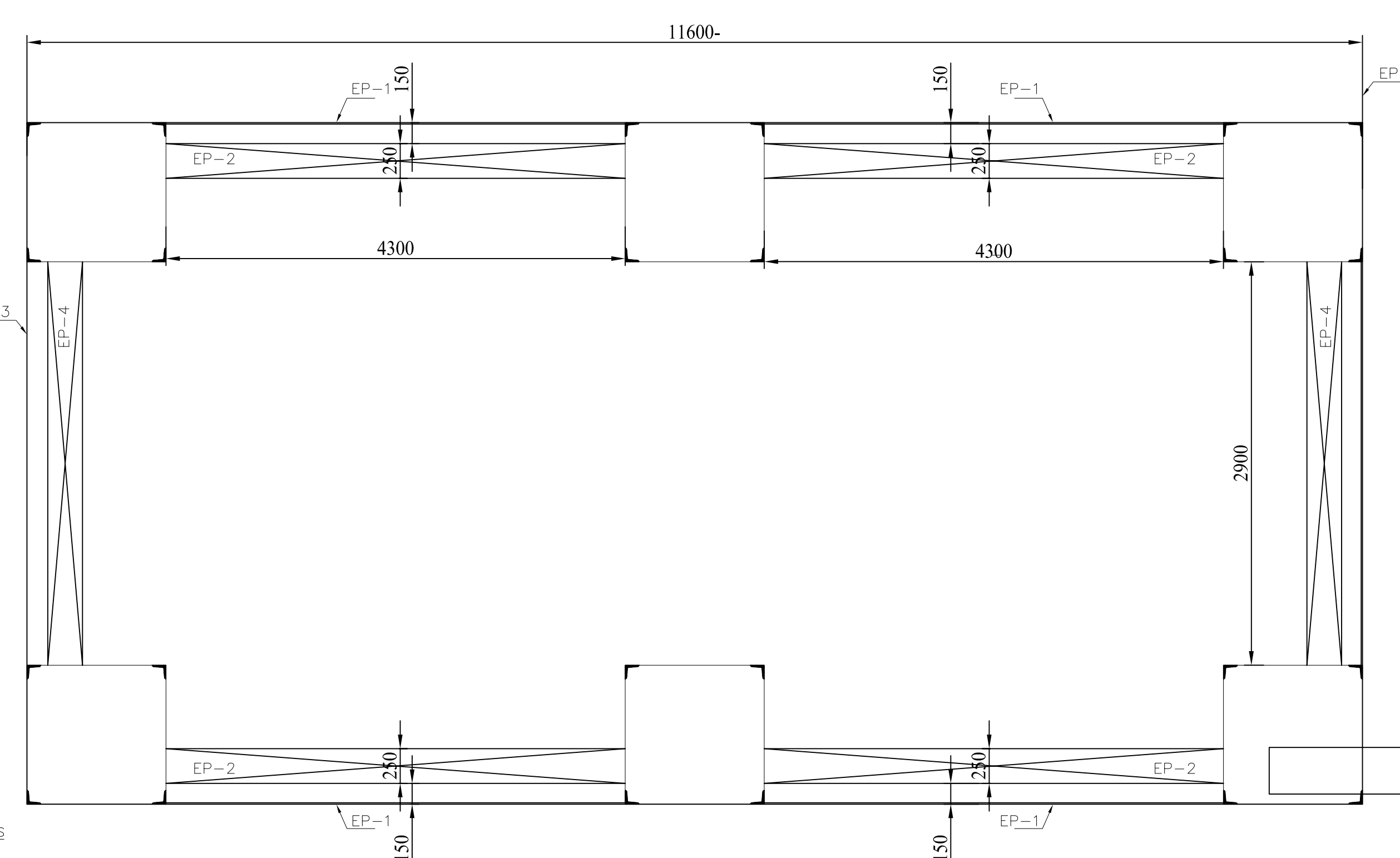
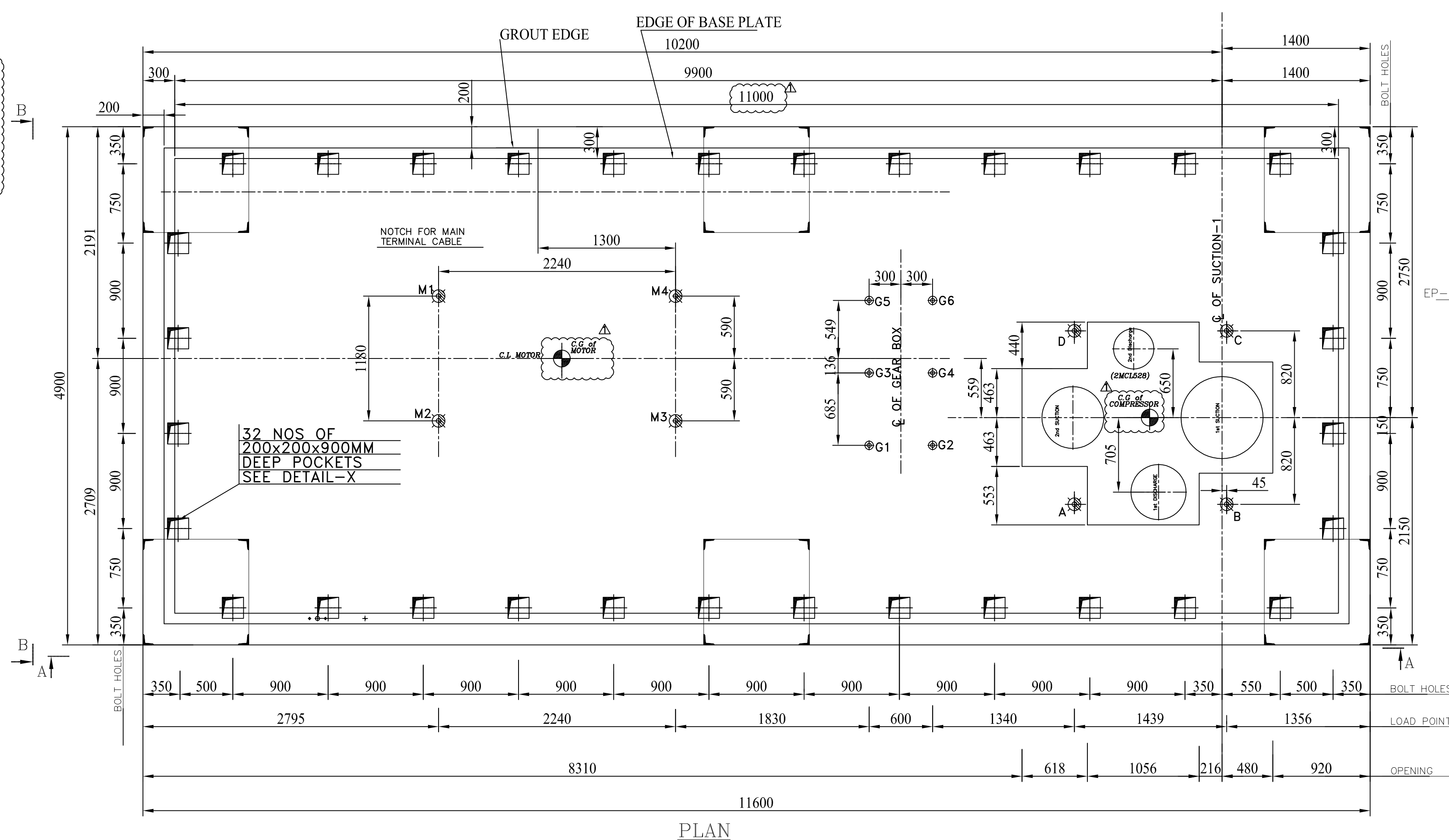
1. ALL DIMENSIONS ARE IN 'MM' & ELEVATIONS ARE IN 'MTS'
2. ALL LEVELS ARE REFERED TO FINISH FLOOR LEVEL (100.750)
3. THIS DRAWING INDICATES DIMENSIONS OUTLINES OVERALL DIMENSIONS & ERECTION LOAD OF EQUIPMENT ALSO
4. BOTTOM OF HOOK OF MAINTENANCE CRANE = (113.750(HOLD))

LEGEND :

- | | |
|---|---------------------------|
|  | ELEVATION |
|  | CENTRE LINE ELEVATION |
|  | CENTRE OF REFERENCE |
|  | ELEVATION OF FLOOR LEVELS |
|  | GRATING |

REFERENCE DOCUMENTS



DOC NO	DOC TITLE
TP-1P30A-ME-0033-GAS-0002.00	OVERALL DIMENSIONAL SKETCH FOR SOUR GAS COMPRESSOR (1P30-KA-1781)
TP-1P30A-ME-0033-GAS-0008.00	GEAR BOB GA DRAWING (1P30-KA-1781)
TP-1P30A-ME-0033-GAS-0017	Main Motor GR drawing
TP-1P30A-ME-0033-GAS-0010.00	SEAL GAS FILTER SKID & CONTROL SKID GA DRG
TP-1P30A-ME-0033-DTL-0002	GA BOM & WIRING OF LOCAL CONTROL PANEL (1P30-KA-1781)
TP-1P30A-ME-0033-GAS-0011.00	LUBE OIL OVERHEAD TANK GA DRAWING
TP-1P30A-ME-0033-GAS-0005.00	LUBE OIL CONSOLE GA DRG.
TP-1P30A-ME-0033-GAS-0023.00	SEAL GAS BOOSTER SKID GA DRAWING



DETAILS OF EMBEDDED PLATES

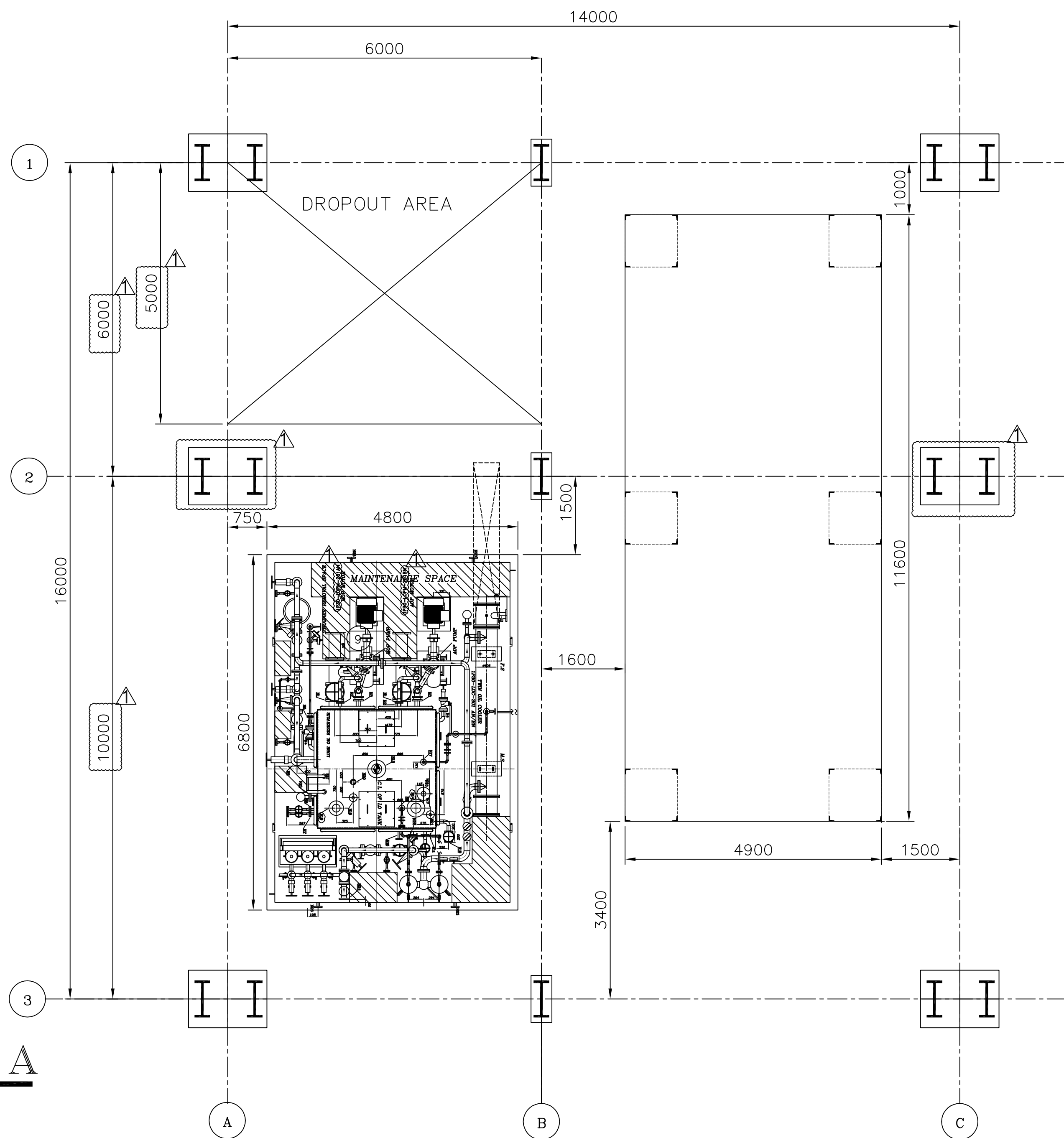
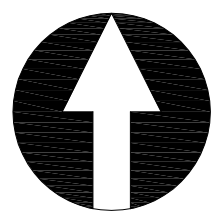
PRELIMINARY

01	02/06/2022	ISSUED FOR APPROVAL	PDM	BKK	CHANDU		
00	03/02/2022	ISSUED FOR APPROVAL	PDM	BKK	CHANDU		
Rev.	Date	Reason for Issue	Prepared	Checked	Approved		Owner Approved

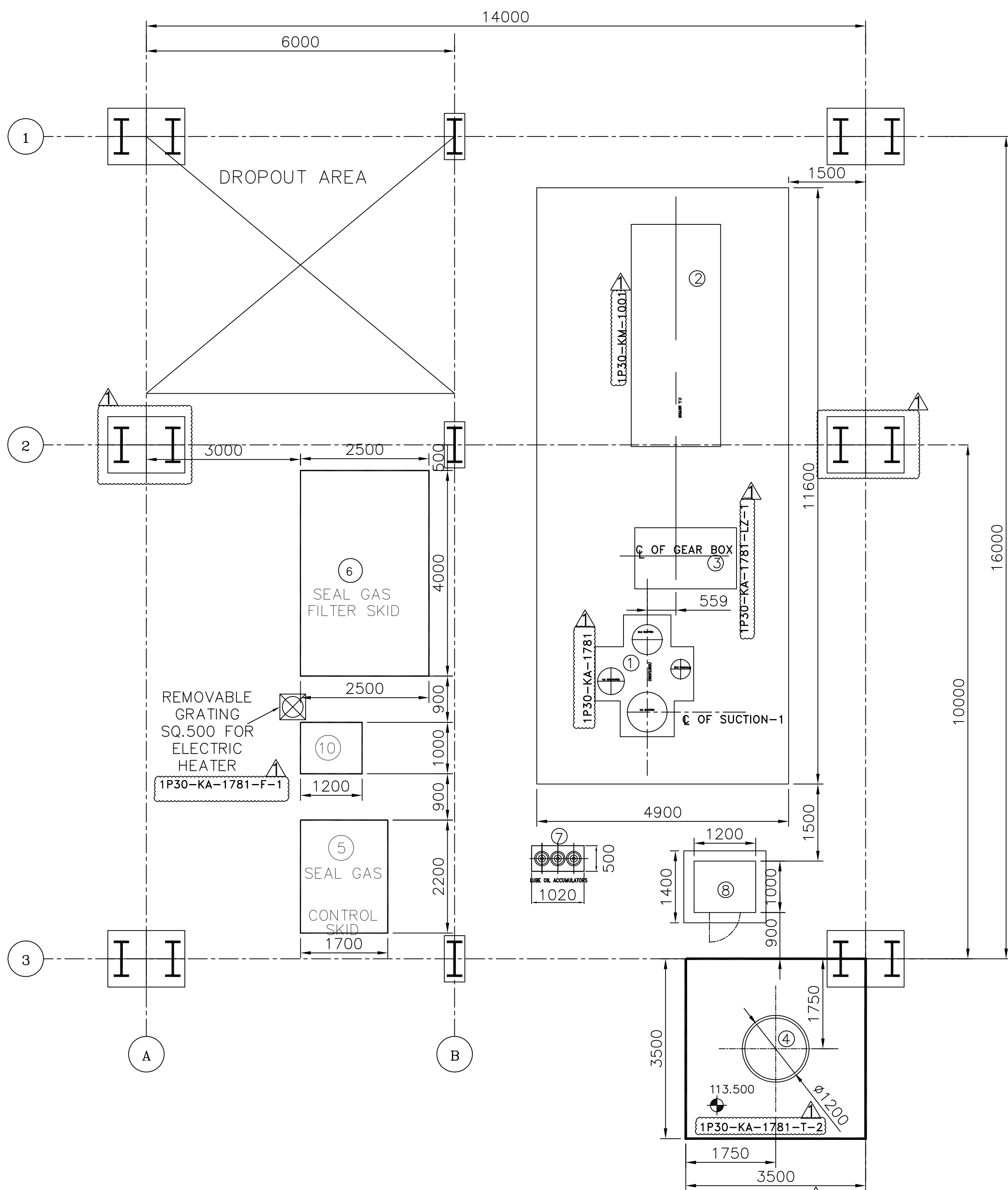
VENDOR LOGO		NUMALIGARH REFINERY LIMITED	
PURCHASE ORDER NUMBER:	4500020401-TEC/24.01.2022		SUBMISSION STATUS (VENDOR MUST SELECT ONE STATUS)
SUPPLY REQUIREMENT (SR)NUMBER:	200683C-000-MR-1011-0002		INFORMATION
VENDORS NAME:	NUMALIGARH BHARAT HEAVY ELECTRICALS LIMITED		X REVIEW
NRL DOCUMENT NUMBER (MANDATORY)	TP-IP30A-ME-0033-GAS-0001.00		CERTIFIED FINAL
REV. NO.	00		AS BUILT
REV. DATE	02.03.2022		CANCELLED
VENDORS REFERENCE NUMBER(IF ANY)	HY-DG-0-33600-44920		SUPERSEDED

DOCUMENT TITLE: MACHINERY ARRANGEMENT & FOUNDATION						
EQUIPMENT / TAG NUMBER(S): 1P30-KA-1781						
DOCUMENT ITEM:						
PURCHASER REVIEW AND COMMENTS SHALL NOT BE ASSIGNED TO INDICATE EITHER RESPONSIBILITY OR LIABILITY FOR ACCURACY AND COMPLETED OF THIS DOCUMENT OR TO ALTER ANY CONTRACTUAL TERMS AND CONDITIONS.						
CONTRACTOR REVIEW CODE						
Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TP	1P30A	ME	GAS	0001	01	1 OF 1

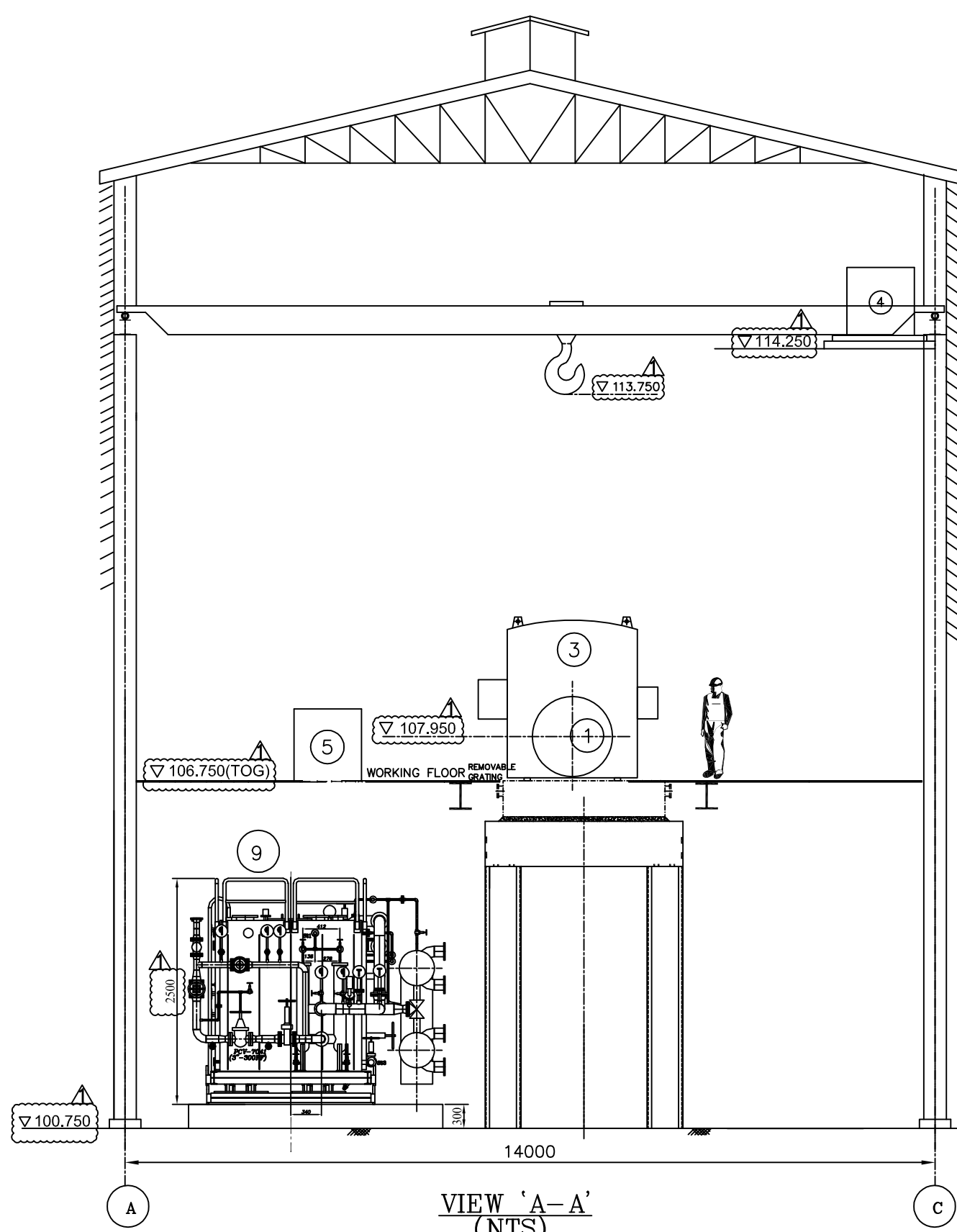
NORTH SYMBOL



PLAN BELOW 106.750M



PLAN ABOVE 106.750M



NOTE: SOME SKIDS ARE NOT SHOWN FOR BETTER CLARITY

COMPRESSOR DATA

MACHINE MAKE	BHEL
MODEL	2MCL 528
MACHINE WEIGHT	22000 KG
MAXIMUM CONT.	10034
IST. CRIT. SPEED	3485
IIND. CRIT. SPEED	12785
SHAFT POWER REQUIRED FOR RATED CONDITION	2651 KW

EQUIPMENT TABLE

S. NO.	TAG NO	DESCRIPTION	EMPTY WEIGHTS(Kgs)	FLOODED WEIGHTS(Kgs)
1.	1P30-KA-1781	COMPRESSOR	22000	---
2.	1P30-KM-1001	MOTOR	15300	---
3.	1P30-KA-1781-LZ-1	GEAR BOX	4500*	---
4.	1P30-KA-1781-T-2	O.H.LUBE OIL TANK	660*	2050*
5.	---	SEAL GAS CONTROL SKID	2200*	2200*
6.	---	SEAL GAS FILTER SKID	2500*	2500*
7.	1P30-KA-1781-V-1 A/B/C	L.O. ACCUMULATORS	600*	1000*
8.	---	LOCAL CONTROL PANEL	1000*	1000*
9.	---	LUBE OIL CONSOLE	20000*	35000*
10.	1P30-KA-1781-Y01 A/B	SEAL GAS BOOSTER SKID	1000*	1000*
11.	---	MAX. WEIGHT FOR MAINTENANCE	15300 (MOTOR)	---

* SIZES AND WEIGHTS ARE PRELIMINARY

GENERAL NOTES:

NOTES:

- ALL DIMENSIONS ARE IN 'MM' & ELEVATIONS ARE IN 'MTS'
- ALL LEVELS ARE REFERED TO FINISH FLOOR LEVEL 100.000.
- THIS DRAWING INDICATES DIMENSIONS OUTLINES OVERALL DIMENSIONS & ERECTION LOAD OF EQUIPMENT ALSO.
- BOTTOM OF HOOK OF MAINTENANCE CRANE = 113.000

HOLD:

LEGEND :

- ELEVATION
- CENTRE LINE ELEVATION
- CENTRE OF REFERENCE
- ELEVATION OF FLOOR LEVELS
- GRATING

REFERENCE DOCUMENTS

DOC NO	DOC TITLE
TP-1P30A-ME-0033-GAS-0002.00	OEVRALL DIMESIONAL SKETCH FOR SOUR GAS COMPRESSOR (1P30-KA-1781)
TP-1P30A-ME-0033-GAS-0008.00	GEAR BOX GA DRAWING (1P30-KA-1781)
TP-1P30A-ME-0033-GAS-0017	MAIN MOTOR GA DRAWING
TP-1P30A-ME-0033-GAS-0010.00	SEAL GAS FILTER SKID & CONTROL SKID GA DRG
TP-1P30A-ME-0033-DTL-0002	GA BOM & WIRING OF LOCAL CONTROL PANEL (1P30-KA-1781)
TP-1P30A-ME-0033-GAS-0011.00	LUBE OIL OVERHEAD TANK GA DRAWING
TP-1P30A-ME-0033-GAS-0005.00	LUBE OIL CONSOLE GA DRG.
TP-1P30A-ME-0033-GAS-0023.00	SEAL GAS BOOSTER SKID GA DRAWING
TP-1P30A-ME-0033-GAS-0001.00	MACHINERY ARRANGEMENT AND FOUNDATION FOR SOUR GAS COMPRESSOR (1P30-KA-1781)

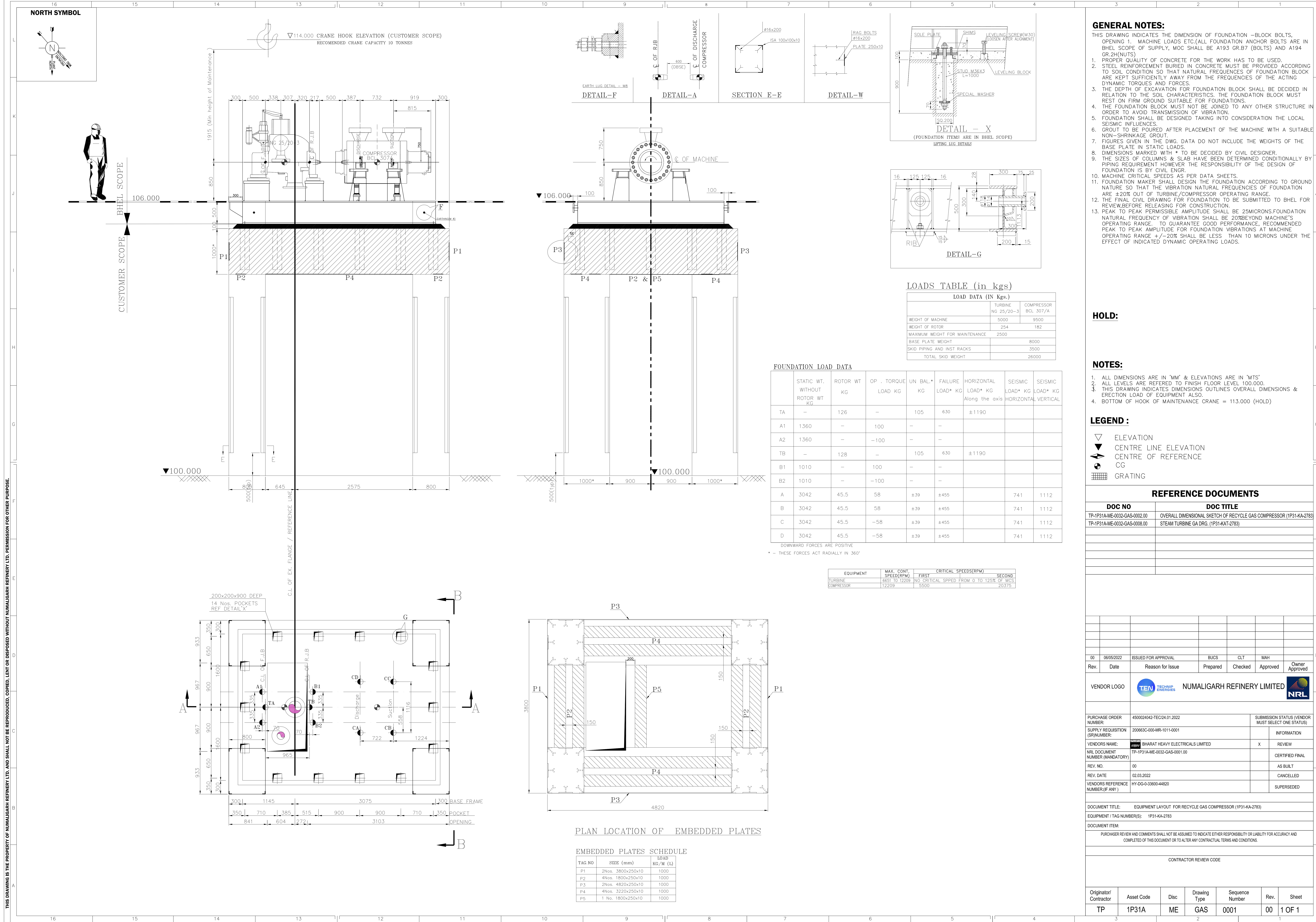
01	04/06/2022	ISSUED FOR APPROVAL	PDM	BKK	CHANDU	
00	02/03/2022	ISSUED FOR APPROVAL	PDM	BKK	CHANDU	
Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner Approved
VENDOR LOGO		TEN TECHNIP ENERGIES		NUMALIGARH REFINERY LIMITED		NRL

PURCHASE ORDER NUMBER:	4500024041-TEC24.01.2022	SUBMISSION STATUS (VENDOR MUST SELECT ONE STATUS)
SUPPLY REQUISITION (SR)NUMBER:	200663C-000-MR-1011-0002	INFORMATION
VENDORS NAME:	■■■■■ BHARAT HEAVY ELECTRICALS LIMITED	X REVIEW
NRL DOCUMENT NUMBER (MANDATORY)	TP-1P30A-ME-0033-EQL-0001.00	CERTIFIED FINAL
REV. NO.	01	AS BUILT
REV. DATE	04.06.2022	CANCELLED
VENDORS REFERENCE NUMBER (IF ANY)	HY-DG-0-33600-44921	SUPERSEDED

DOCUMENT TITLE:	EQUIPMENT LAYOUT FOR SOUR GAS COMPRESSOR (1P30-KA-1781)
EQUIPMENT / TAG NUMBER(S):	1P30-KA-1781
DOCUMENT ITEM:	
PURCHASER REVIEW AND COMMENTS SHALL NOT BE ASSUMED TO INDICATE EITHER RESPONSIBILITY OR LIABILITY FOR ACCURACY AND COMPLETED OF THIS DOCUMENT OR TO ALTER ANY CONTRACTUAL TERMS AND CONDITIONS.	

CONTRACTOR REVIEW CODE

Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TP	1P30A	ME	EQL	0001	01	1 OF 1



THIS DRAWING IS THE PROPERTY OF NIAMI GARG REFINERY LTD AND SHALL NOT BE REPRODUCED COPIED, LENT OR DISPOSED WITHOUT NIAMI GARG REFINERY LTD PERMISSION FOR OTHER PURPOSE

GENERAL NOTES:






- THIS DRAWING INDICATES THE DIMENSION OF FOUNDATION -BLOCK BOLTS, OPENING 1. MACHINE LOADS ETC.(ALL FOUNDATION ANCHOR BOLTS ARE BHEL SCOPE OF SUPPLY, MOC SHALL BE A193 GR.B7 (BOLTS) AND A194 GR.28(NUTS)
1. PROPER QUALITY OF CONCRETE FOR THE WORK HAS TO BE USED.
2. THE REINFORCEMENT BURIED IN CONCRETE MUST BE PROVIDED ACCORDING TO SOIL CONDITION SO THAT NATURAL FREQUENCIES OF FOUNDATION BLOCK ARE KEPT SUFFICIENTLY AWAY FROM THE FREQUENCIES OF THE ACTING DYNAMIC TORQUES AND FORCES.
3. THE DEPTH OF EXCAVATION FOR FOUNDATION BLOCK SHALL BE DECIDED IN REFERENCE TO THE SOIL CHARACTERISTICAL. THE FOUNDATION BLOCK MUST REST ON FIRM GROUND SUITABLE FOR FOUNDATIONS.
4. THE FOUNDATION BLOCK MUST NOT BE JOINED TO ANY OTHER STRUCTURE IN ORDER TO AVOID TRANSMISSION OF VIBRATION.
5. FOUNDATION SHALL BE DESIGNED TAKING INTO CONSIDERATION THE LOCAL SEISMIC INFLUENCES.
6. GROUT TO BE POURED AFTER PLACEMENT OF THE MACHINE WITH A SUITABLE NON-SHRINKAGE GROUT.
7. FIGURES GIVEN IN THE DWG. DATA DO NOT INCLUDE THE WEIGHTS OF THE BASE PLATE IN STATIC LOADS.
8. DIMENSIONS MARKED WITH * TO BE DECIDED BY CIVIL DESIGNER.
9. THE SIZES OF COLUMN & SLAB HAVE BEEN DETERMINED CONDITIONALLY BY PIPING REQUIREMENT HOWEVER THE RESPONSIBILITY OF THE DESIGN OF FOUNDATION IS BY CIVIL ENGR.
10. MACHINE CRITICAL SPEEDS AS PER DATA SHEETS.
11. FOUNDATION MAKER SHALL DESIGN THE FOUNDATION ACCORDING TO GROUND NATURAL FREQUENCY AND THE VIBRATION NATURAL FREQUENCIES OF FOUNDATION ARE $\pm 20\%$ OUT OF TURBINE/COMPRESSOR OPERATING RANGE.
12. THE FINAL CIVIL DRAWING FOR FOUNDATION TO BE SUBMITTED TO BHEL FOR REVIEW,BEFORE RELEASING FOR CONSTRUCTION.
13. PEAK TO PEAK PERMISSIBLE AMPLITUDE SHALL BE 25MICRONS.FOUNDATION NATURAL FREQUENCY OF VIBRATION SHALL BE 20%BEYOND MACHINE'S OPERATING RANGE TO GUARANTEE GOOD PERFORMANCE. RECOMMENDED PEAK TO PEAK AMPLITUDE FOR FOUNDATION VIBRATIONS AT MACHINE OPERATING RANGE $+/-20\%$ SHALL BE LESS THAN 10 MICRONS UNDER THE EFFECT OF INDICATED DYNAMIC OPERATING LOADS.

HOLD:

NOTES:

1. ALL DIMENSIONS ARE IN 'MM' & ELEVATIONS ARE IN 'M'S'
2. ALL LEVELS ARE REFERED TO FINISH FLOOR LEVEL 100.000.
3. THIS DRAWING INDICATES DIMENSIONS OUTLINES OVERALL DIMENSIONS & ERECTION LOAD OF EQUIPMENT ALSO.
4. BOTTOM OF HOOK OF MAINTENANCE CRANE = 113.000 (HOLD)

LEGEND :



- | | |
|---|-----------------------|
|  | ELEVATION |
|  | CENTRE LINE ELEVATION |
|  | CENTRE OF REFERENCE |
|  | CG |
|  | GRATING |

REFERENCE DOCUMENTS

DOC NO	DOC TITLE
TP-1P31A-ME-0032-GAS-0002.00	OVERALL DIMENSIONAL SKETCH OF RECYCLE GAS COMPRESSOR (1P31-KA-2783)
TP-1P31A-ME-0032-GAS-0008.00	STEAM TURBINE GA DRG. (1P31-KAT-2783)

[illegible]

00	06/05/2022	ISSUED FOR APPROVAL	BUCS	CLT	MAH	
Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner Approved

VENDOR LOGO	 
-------------	---

PURCHASE ORDER NUMBER	4500024042-TEC/24.01.2022	SUBMISSION STATUS (VENDOR MUST SELECT ONE STATUS)
SUPPLY REQUESTION (SR) NUMBER:	200663C00-MR-1011-0001	INFORMATION
VENDORS NAME:	SHU BHARAT HEAVY ELECTRICALS LIMITED	X REVIEW
NRL DOCUMENT NUMBER (MANDATORY)	TP-IP31A-ME-0032-GAS-0001.00	CERTIFIED FINAL
REV. NO.	00	AS BUILT
REV. DATE	02.03.2022	CANCELLED
VENDORS REFERENCE NUMBER (IF ANY)	HY-DG-0-33600-44820	SUPERSEDED

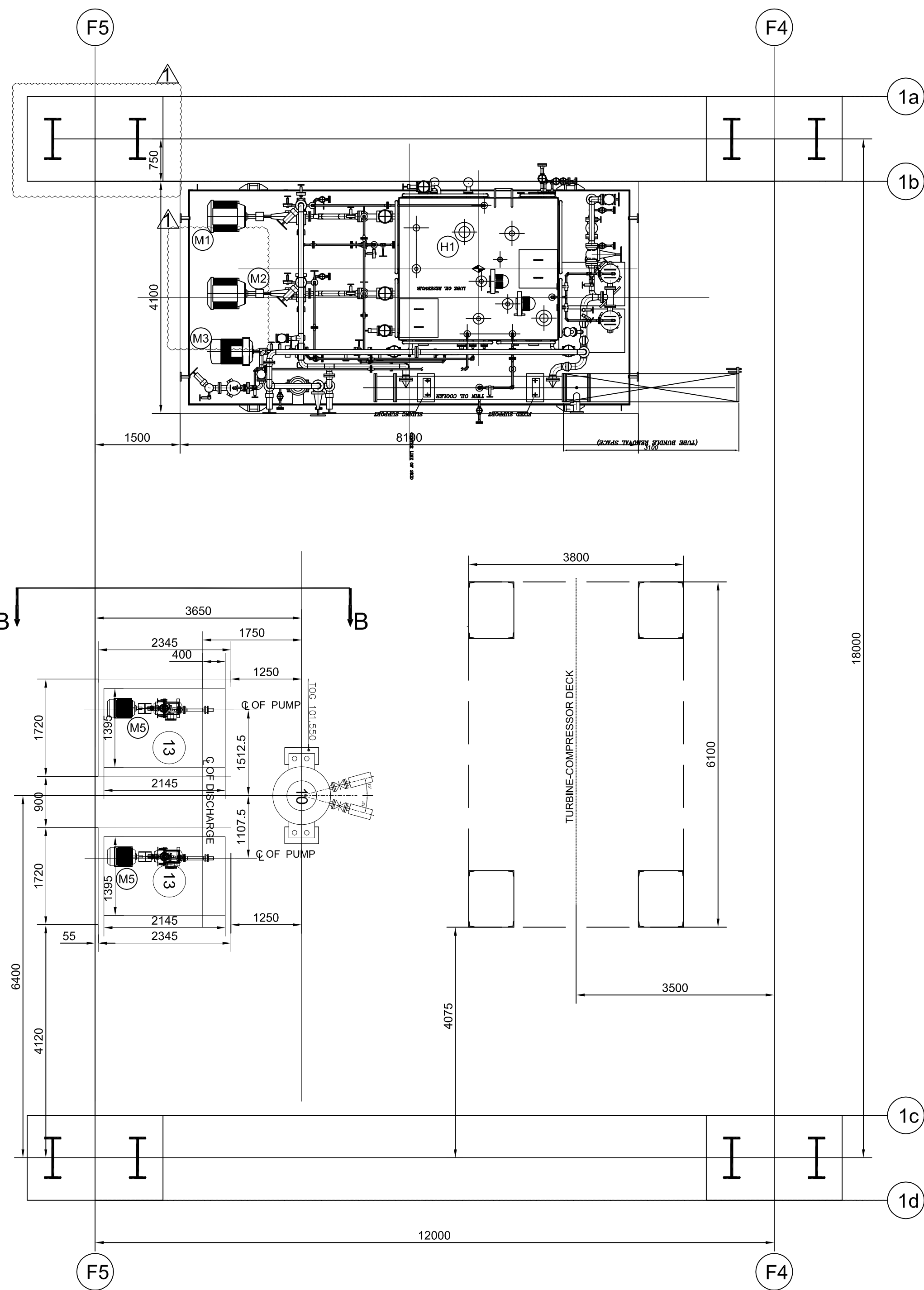
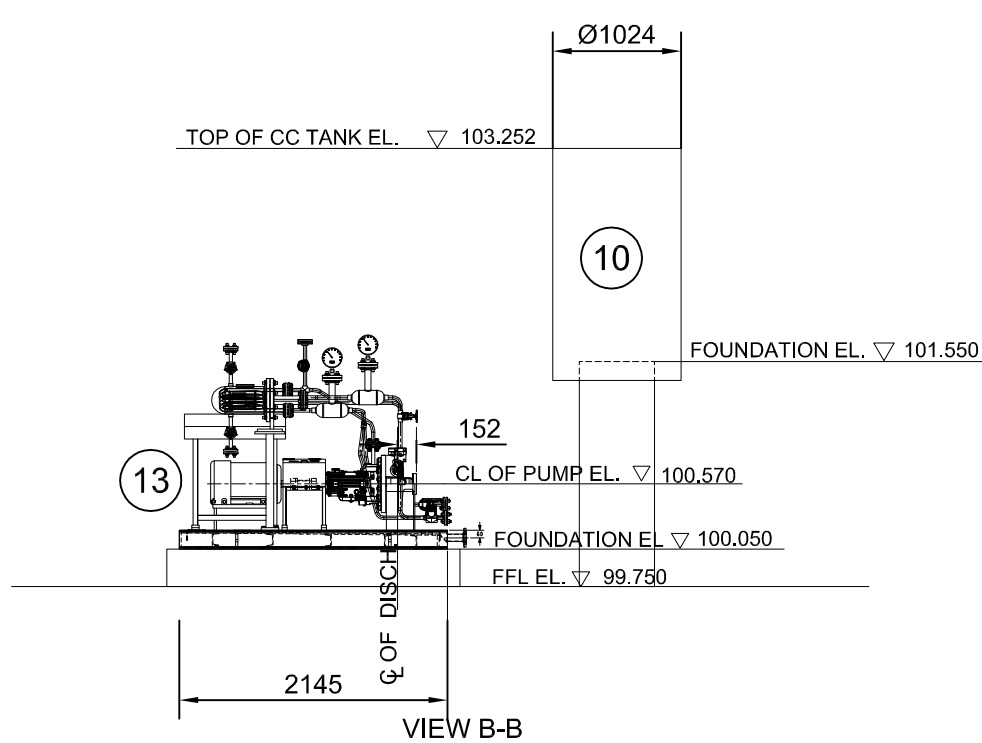
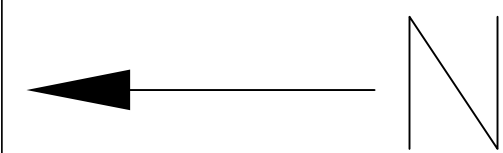
DOCUMENT TITLE:	EQUIPMENT LAYOUT FOR RECYCLE GAS COMPRESSOR (1P31-KA-2783)
EQUIPMENT / TAG NUMBER(S):	1P31-KA-2783

DOCUMENT ITEM:
PURCHASER REVIEW AND COMMENTS SHALL NOT BE ASSUMED TO INDICATE EITHER RESPONSIBILITY OR LIABILITY FOR ACCURACY AND COMPLETED OF THIS DOCUMENT OR TO ALTER ANY CONTRACTUAL TERMS AND CONDITIONS.

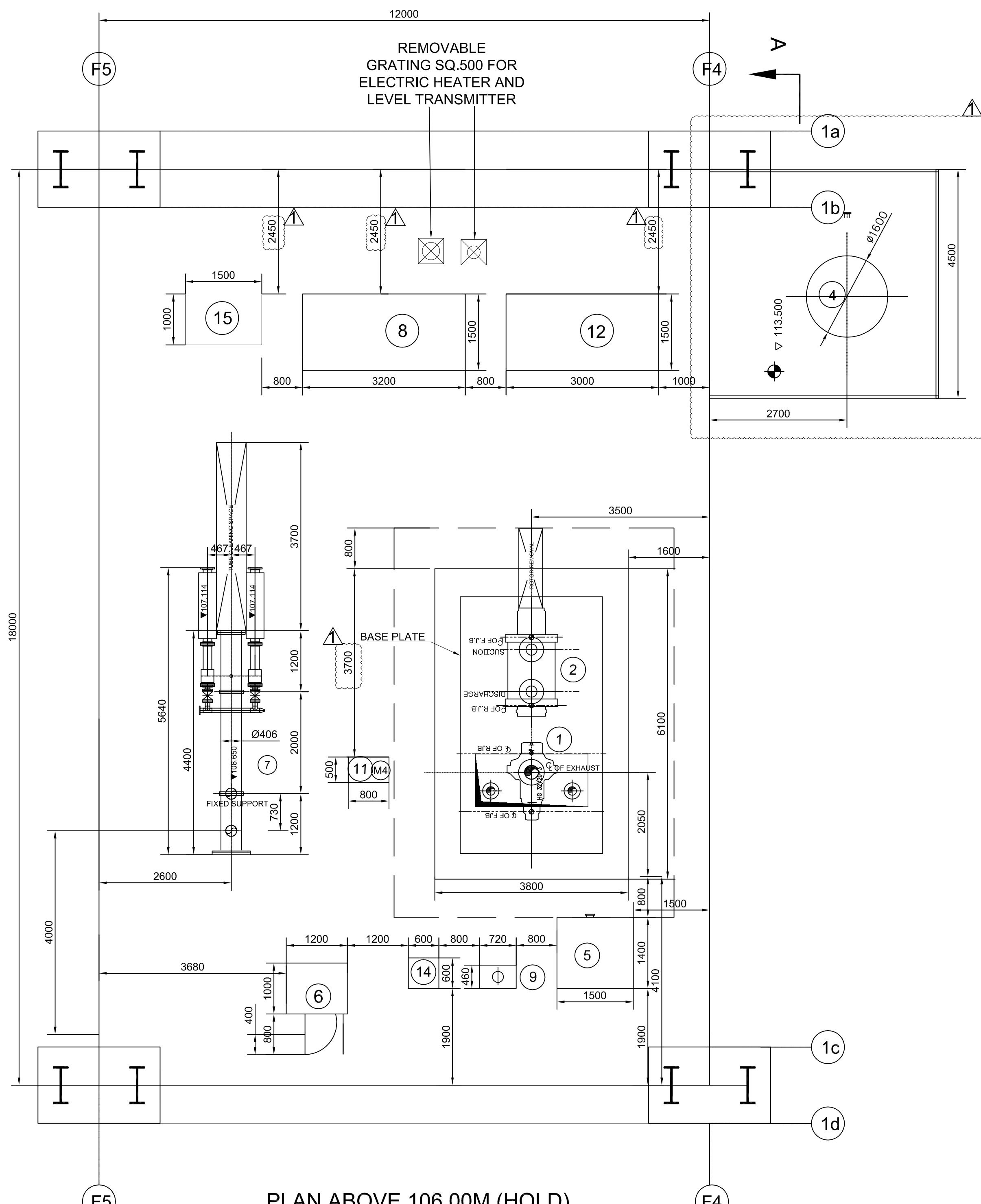
CONTRACTOR REVIEW CODE

Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TP	1P31A	ME	GAS	0001	00	1 OF 1

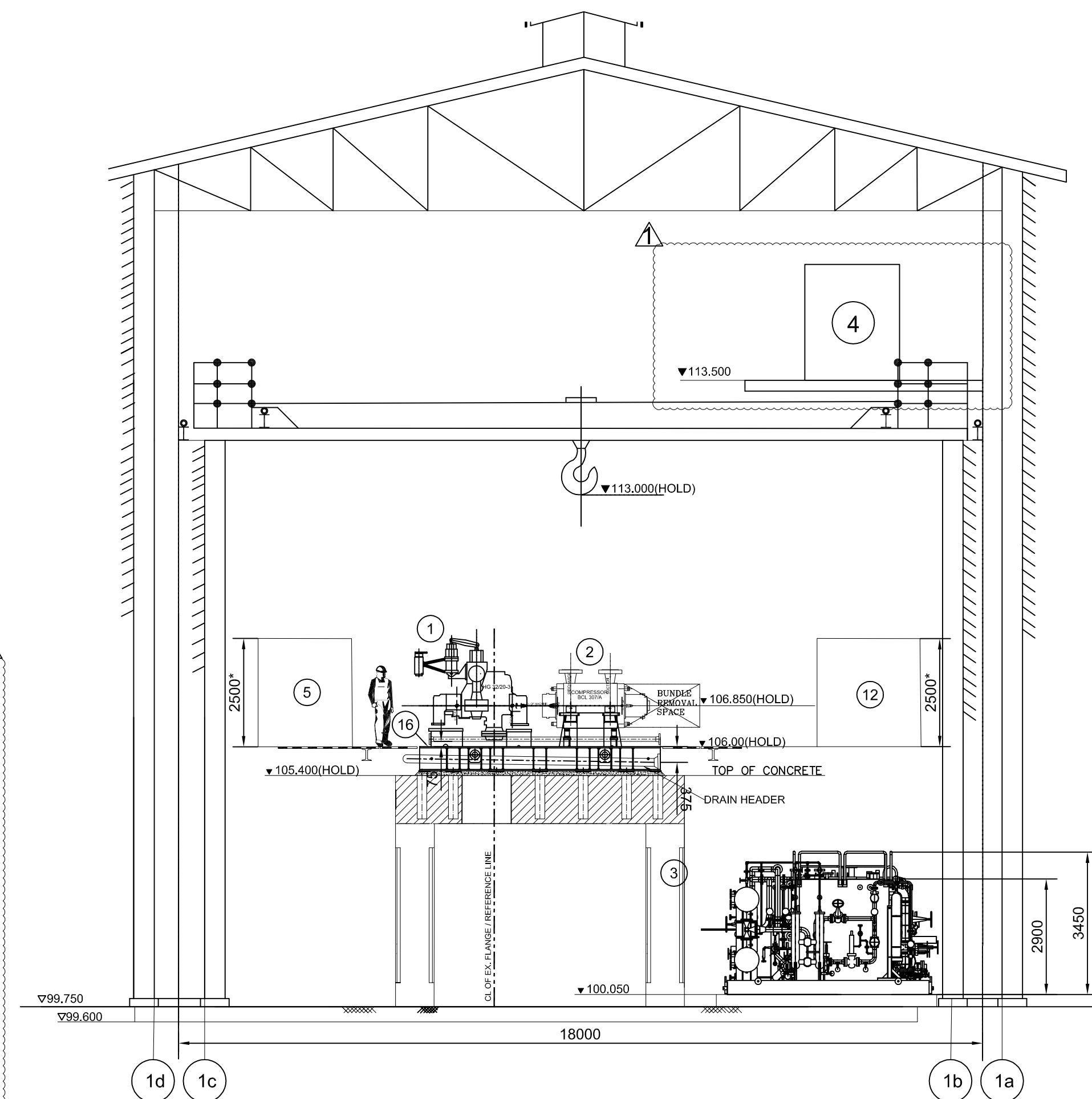
NORTH SYMBOL



PLAN BELOW 106.00M (HOLD)



PLAN ABOVE 106.00M (HOLD)



VIEW 'A-A'

(NTS)

NOTE: SOME SKIDS ARE NOT SHOWN FOR BETTER CLARITY
* marked dimensions are tentative

LOAD TABLE

S.NO.	EQUIPMENT TAG NO	DESCRIPTION OF EQUIPMENT	EMPTY Wt. (Kgr.)	FLOODED Wt. (Kgr.)
1	1P31-KT-2783	STEAM TURBINE	8500	-
2	1P31-KA-2783	COMPRESSOR	9050	-
3	-	LUBE OIL CONSOLE	20000*	35000*
4	1P31-KA-2783-T-51	LUBE OIL OVERHEAD TANK	1500*	3500*
5	-	GOVERNING OIL CONSOLE	1000*	1300*
6	-	LOCAL CONTROL PANEL	2500*	-
7	1P31-KA-2783-E-52	GLAND STEAM CONDENSER	1600*	2100*
8	-	DRY GAS SEAL FILTER SKID	2500*	2500*
9	1P31-KA-2783-V-51A/B	GOVERNING OIL ACCUMULATOR	350*	420*
10	1P31-KA-2783-T-53	CONDENSATE COLLECTING TANK	1400*	2750*
11	-	BARRING GEAR CONSOLE	150*	150*
12	-	DRY GAS SEAL CONTROL SKID	2000*	2000*
13	1P31-KA-2783-P-56 A/B	CONDENSATE TRANSFER PUMPS	1300 EACH*	1300 EACH*
14	1P31-KA-2783-G-53 A/B	GOVERNING OIL FILTER	500*	500*
15	1P31-KA-2783-Y01 A/B	SEAL GAS BOOSTER SKID	1000*	1000*
16	-	BASEPLATE WEIGHT OF COMP. & TURBINE	11000*	-

* SIZES AND WEIGHTS ARE PRELIMINARY

ELECTRICAL EQUIPMENT TABLE

S.NO.	EQUIPMENT TAG NO	DESCRIPTION OF EQUIPMENT
M1	1P31-LOPM-201AN	L.O. CONSOLE MAIN PUMP MOTOR
M2	1P31-LOPM-201BN	L.O. CONSOLE STAND BY PUMP MOTOR
M3	1P31-LOPM-201AN	EMERGENCY OIL PUMP MOTOR
M4	1P31-KA-2783-PM-53	MOTOR FOR BARRING GEAR CONSOLE
M5	1P31-KA-2783-PM-56 A/B	MOTOR FOR CONDENSATE TRANSFER PUMPS
-	1P31-KA-2783-PM-55	OIL TRANSFER PUMP MOTOR (PORTABLE)
-	1P31-KA-2783-PM-52	OIL PURIFIER PUMP MOTOR (PORTABLE)
H1	411-K-101-EE-01	MAIN L.O. TANK ELECTRIC HEATER

COMPRESSOR DATA

MACHINE MAKE	BHEL
MODEL	BCL 307/A
MACHINE WEIGHT	9500 KG
MAXIMUM CONT. SPEED	12209 RPM
IST CRIT. SPEED	5500 RPM
IIND CRIT. SPEED	20375 RPM
RATED POWER	1227kW

TURBINE DATA

MACHINE MAKE	BHEL
TURBINE MODEL	NG 25/20-3
TOTAL TURBINE WEIGHT	5000 KG
RATED/MCS (RPM)	10412/12209
RATED OUTPUT	1220 kW

GENERAL NOTES:

NOTES:

- ALL DIMENSIONS ARE IN 'MM' & ELEVATIONS ARE IN 'M'S'
- ALL LEVELS ARE REFERRED TO FINISH FLOOR LEVEL 100.000.
- THIS DRAWING INDICATES DIMENSIONS OUTLINES OVERALL DIMENSIONS & ERECTION LOAD OF EQUIPMENT ALSO.
- BOTTOM OF HOOK OF MAINTENANCE CRANE = 113.000 (HOLD)

HOLD:

LEGEND :

- ELEVATION
- CENTRE LINE ELEVATION
- CENTRE OF REFERENCE
- ELEVATION OF FLOOR LEVELS
- GRATING

REFERENCE DOCUMENTS

DOC NO	DOC TITLE
TP-1P31A-ME-0032-GAS-0002.00	OVERALL DIMENSIONAL SKETCH OF RECYCLE GAS COMPRESSOR (1P31-KA-2783)
TP-1P31A-ME-0032-GAS-0009.01	STEAM TURBINE GA DRG. (1P31-KAT-2783)
TP-1P31A-ME-0032-GAS-0009.02	
TP-1P31A-ME-0032-GAS-0014.00	GA OF GLAND STEAM CONDENSER + CC TANK
TP-1P31A-ME-0032-GAS-0010.00	SEAL GAS FILTER SKID & CONTROL SKID GA DRG
TP-1P31A-ME-0032-DTL-0002	GA BOM & WIRING OF LOCAL CONTROL PANEL (1P31-KA-2783)
TP-1P31A-ME-0032-GAS-0011.00	LUBE OIL OVERHEAD TANK GA DRAWING
TP-1P31A-ME-0032-GAS-0006.00	LUBE OIL CONSOLE GA DRG.
TP-1P31A-ME-0032-GAS-0017.00	SEAL GAS BOOSTER SKID GA DRAWING
TP-1P31A-ME-0032-GAS-0011.00	MACHINERY ARRANGEMENT AND FOUNDATION

Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner Approved
01	08/06/2022	ISSUED FOR APPROVAL	PDM	BKK	BUCS	
00	02/03/2022	ISSUED FOR APPROVAL	PK	CLT	MAH	MAH

VENDOR LOGO		TECHNIP ENERGIES	NUMALIGARH REFINERY LIMITED	
-------------	--	------------------	-----------------------------	--

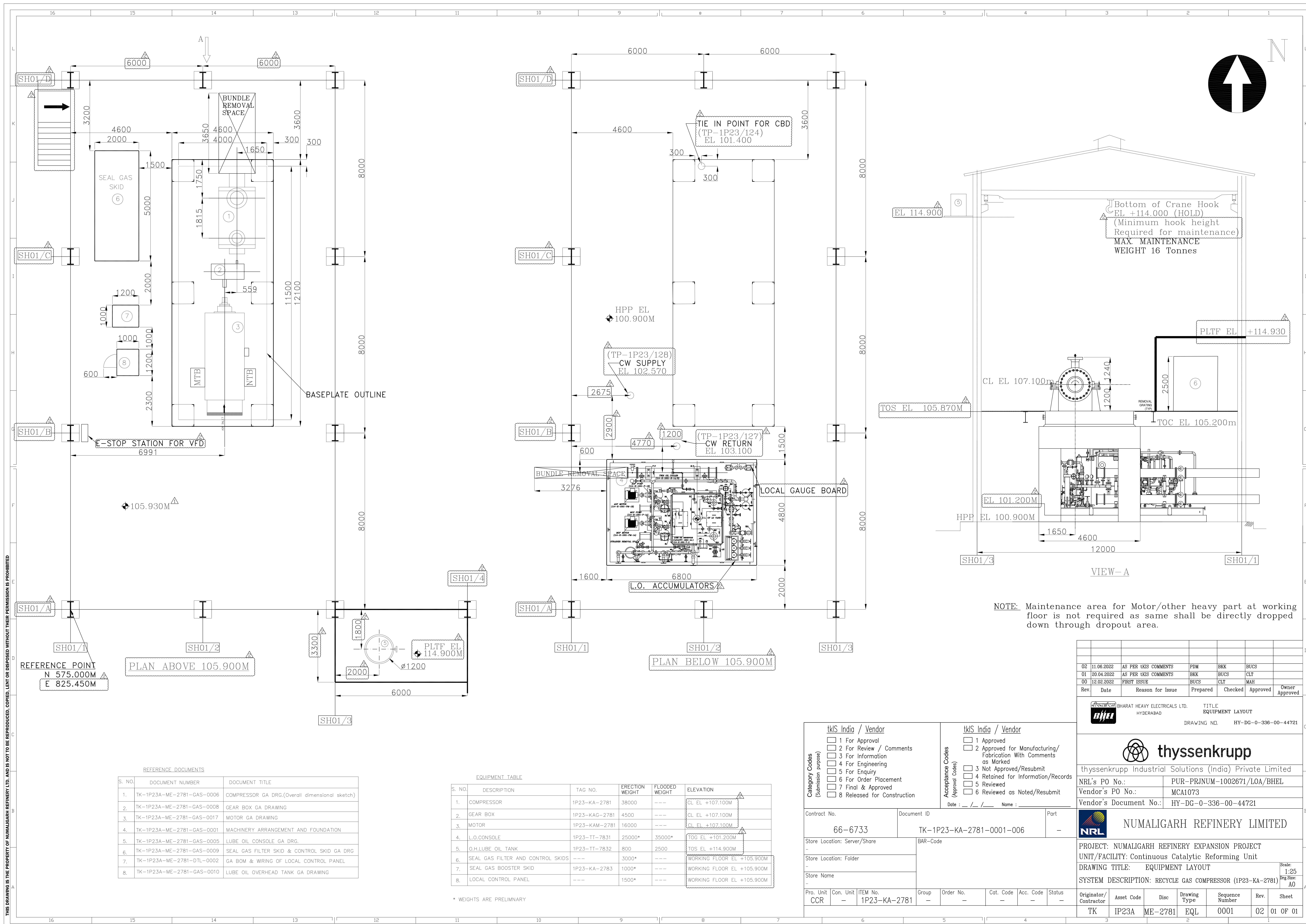
PURCHASE ORDER NUMBER:	4500024042-TEC/24.01.2022	SUBMISSION STATUS (VENDOR MUST SELECT ONE STATUS)
SUPPLY REQUISITION (SR)NUMBER:	200663C-000-MR-1011-0001	INFORMATION
VENDORS NAME:	BHARAT HEAVY ELECTRICALS LIMITED	X REVIEW
NRL DOCUMENT NUMBER (MANDATORY)	TP-1P31A-ME-0032-EQL-0001.00	CERTIFIED FINAL
REV. NO.	00	AS BUILT
REV. DATE	02.02.2022	CANCELLED
VENDORS REFERENCE NUMBER (IF ANY)	HY-DG-0-33600-44821	SUPERSEDED

DOCUMENT TITLE:	EQUIPMENT LAYOUT FOR RECYCLE GAS COMPRESSOR (1P31-KA-2783)
EQUIPMENT / TAG NUMBER(S):	1P31-KA-2783
DOCUMENT ITEM:	
PURCHASER REVIEW AND COMMENTS SHALL NOT BE ASSUMED TO INDICATE EITHER RESPONSIBILITY OR LIABILITY FOR ACCURACY AND COMPLETED OF THIS DOCUMENT OR TO ALTER ANY CONTRACTUAL TERMS AND CONDITIONS.	

CONTRACTOR REVIEW CODE

Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet
TP	1P31A	ME	EQL	0001	01	1 OF 1

THIS DRAWING IS THE PROPERTY OF NUMALIGARH REFINERY LTD. AND IS NOT TO BE REPRODUCED, COPIED, LENT OR DISPOSED WITHOUT THEIR PERMISSION IS PROHIBITED



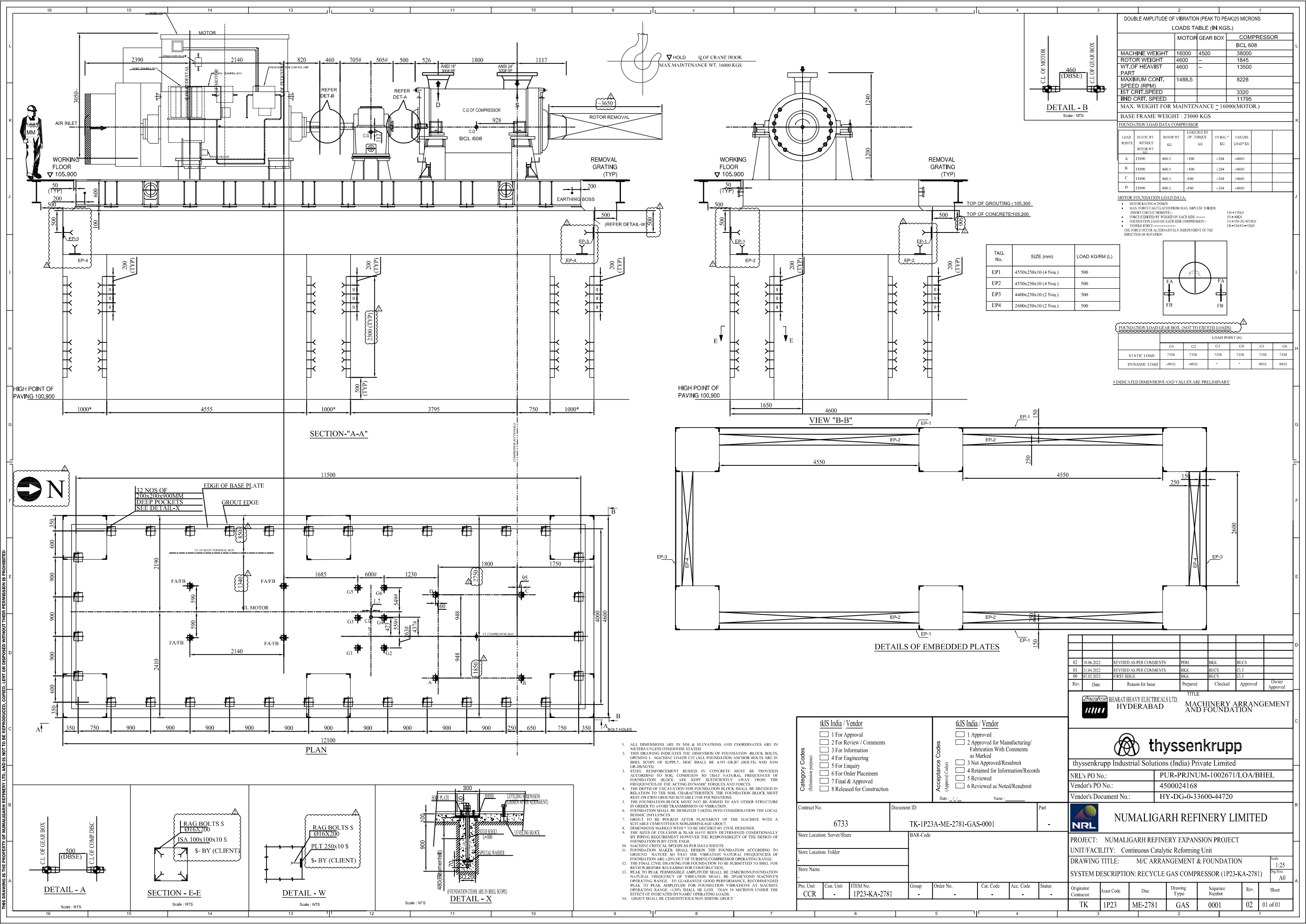
REFERENCE DOCUMENTS		
S. NO.	DOCUMENT NUMBER	DOCUMENT TITLE
1.	TK-1P23A-ME-2781-GAS-0006	COMPRESSOR GA DRG.(Overall dimensional sketch)
2.	TK-1P23A-ME-2781-GAS-0008	GEAR BOX GA DRAWING
3.	TK-1P23A-ME-2781-GAS-0017	MOTOR GA DRAWING
4.	TK-1P23A-ME-2781-GAS-0001	MACHINERY ARRANGEMENT AND FOUNDATION
5.	TK-1P23A-ME-2781-GAS-0005	LUBE OIL CONSOLE GA DRG.
6.	TK-1P23A-ME-2781-GAS-0009	SEAL GAS FILTER SKID & CONTROL SKID GA DRG
7.	TK-1P23A-ME-2781-DTL-0002	GA BOM & WIRING OF LOCAL CONTROL PANEL
8.	TK-1P23A-ME-2781-GAS-0010	LUBE OIL OVERHEAD TANK GA DRAWING

EQUIPMENT TABLE					
S. NO.	DESCRIPTION	TAG NO.	ERECTION WEIGHT	FLOODED WEIGHT	ELEVATION
1.	COMPRESSOR	1P23-KA-2781	38000	---	CL EL +107.100M
2.	GEAR BOX	1P23-KAG-2781	4500	---	CL EL +107.100M
3.	MOTOR	1P23-KAM-2781	16000	---	CL EL +107.100M
4.	L.O.CONSOLE	1P23-TT-7831	25000*	35000*	TOG EL +101.200M
5.	O.H.LUBE OIL TANK	1P23-TT-7832	800	2500	TOS EL +114.900M
6.	SEAL GAS FILTER AND CONTROL SKIDS	---	3000*	---	WORKING FLOOR EL +105.900M
7.	SEAL GAS BOOSTER SKID	1P23-KA-2783	1000*	---	WORKING FLOOR EL +105.900M
8.	LOCAL CONTROL PANEL	---	1500*	---	WORKING FLOOR EL +105.900M

* WEIGHTS ARE PRELIMINARY

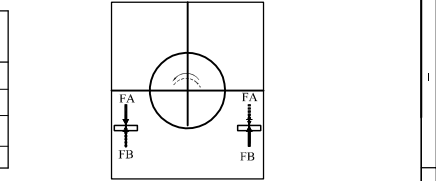
tkIS India / Vendor		tkIS India / Vendor	
<input type="checkbox"/> 1 For Approval		<input type="checkbox"/> 1 Approved	
<input type="checkbox"/> 2 For Review / Comments		<input type="checkbox"/> 2 Approved for Manufacturing/ Fabrication With Comments as Marked	
<input type="checkbox"/> 3 For Information		<input type="checkbox"/> 3 Not Approved/Resubmit	
<input type="checkbox"/> 4 For Engineering		<input type="checkbox"/> 4 Retained for Information/Records	
<input type="checkbox"/> 5 For Enquiry		<input type="checkbox"/> 5 Reviewed	
<input type="checkbox"/> 6 For Order Placement		<input type="checkbox"/> 6 Reviewed as Noted/Resubmit	
<input type="checkbox"/> 7 Final & Approved		Date : _ / _ / _ Name : _	
<input type="checkbox"/> 8 Released for Construction			
Category Codes (Submission purpose)		Acceptance Codes (Approval Codes)	
Contract No. 66-6733		Document ID TK-1P23-KA-2781-0001-006	
Store Location: Server/Share -		Part -	
Store Location: Folder -		BAR-Code -	
Store Name -			
Pro. Unit CCR	Con. Unit -	Item No. 1P23-KA-2781	Group -
Order No. -	Cat. Code -	Acc. Code -	Status -

02	11.06.2022	AS PER IKIS COMMENTS	PDM	BKK	BUCS				
01	20.04.2022	AS PER IKIS COMMENTS	BKK	BUCS	CLT				
00	12.02.2022	FIRST ISSUE	BUCS	CLT	MAH				
Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner Approved			
BHARAT HEAVY ELECTRICALS LTD. HYDERABAD			TITLE EQUIPMENT LAYOUT						
DRAWING NO.			HY-DG-0-336-00-44721						
thyssenkrupp									
thyssenkrupp Industrial Solutions (India) Private Limited									
NRL's PO No.:			PUR-PRJNUM-1002671/LOA/BHEL						
Vendor's PO No.:			MCA1073						
Vendor's Document No.:			HY-DG-0-336-00-44721						
NRL			NUMALIGARH REFINERY LIMITED						
PROJECT: NUMALIGARH REFINERY EXPANSION PROJECT									
UNIT/FACILITY: Continuous Catalytic Reforming Unit									
DRAWING TITLE: EQUIPMENT LAYOUT									
SYSTEM DESCRIPTION: RECYCLE GAS COMPRESSOR (1P23-KA-2781)									
Originator/ Contractor	Asset Code	Disc	Drawing Type	Sequence Number	Rev.	Sheet			
TK	IP23A	ME-2781	EQL	0001	02	01 OF 01			



DOUBLE AMPLITUDE OF VIBRATION (PEAK TO PEAK) 25 MICRONS					
LOADS TABLE (IN KGS.)					
	MOTOR	GEAR BOX	COMPRESSOR		
			BCL 608		
MACHINE WEIGHT	16000	4500	38000		
ROTOR WEIGHT	4600	—	1845		
WT. OF HEAVIST PART	4600	—	13500		
MAXIMUM CONT. SPEED (RPM)	1488.5		8228		
1ST CRIT. SPEED			3320		
IND CRIT. SPEED			11795		
MAX. WEIGHT FOR MAINTENANCE = 16000(MOTOR.)					
BASE FRAME WEIGHT : 23000 KGS					
FOUNDATION LOAD DATA COMPRESSOR					
LOAD POINTS	STATIC WT. WITHOUT ROTOR WT. KG	ROTOR WT. KG	LOAD DUE TO OP. TORQUE KG	UN BAL. * KG	FAILURE LOAD* KG
A	11890	460.5	-100	±264	±4605
B	11890	460.5	-100	±264	±4605
C	11890	460.5	-100	±264	±4605
D	11890	460.5	-100	±264	±4605

MOTOR FOUNDATION LOAD DATA:
• MOTOR RATING = 200KW
• MAX. FORCE CALCULATED FROM MAX. IMPULSE TORQUE (SHORT CIRCUIT MOMENT) - FM = 135KN
• FORCE EXERTED BY WEIGHT ON EACH SIDE - FG = 80KN
• FOUNDATION LOAD ON EACH SIDE COMPRESSION - FA = FM + FG = 215KN
• TENSILE FORCE - FB = FM - FG = 55KN
THE FORCE OCCUR ALTERNATIVELY INDEPENDENT OF THE DIRECTION OF ROTATION



FOUNDATION LOAD GEAR BOX (NOT TO EXCEED LOADS)						
LOAD POINT (N)						
	G1	G2	G3	G4	G5	G6
STATIC LOAD	7358	7358	7358	7358	7358	7358
DYNAMIC LOAD	-9935	-9935	-	-	9935	9935

INDICATED DIMENSIONS AND VALUES ARE PRELIMINARY

Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner Approved
02	10.06.2022	REVISED AS PER COMMENTS	PDM	BKK	BUCS	
01	21.04.2022	REVISED AS PER COMMENTS	BKK	BUCS	CLT	
00	07.02.2022	FIRST ISSUE	BKK	BUCS	CLT	

BHARAT HEAVY ELECTRICALS LTD. HYDERABAD
MACHINERY ARRANGEMENT AND FOUNDATION

thyssenkrupp Industrial Solutions (India) Private Limited

NRL's PO No.:

PUR-PRJNUM-1002671/LOA/BHEL

Vendor's PO No.:

4500024168

Vendor's Document No.:

HY-DG-0-33600-44720

NUMALIGARH REFINERY LIMITED

PROJECT: NUMALIGARH REFINERY EXPANSION PROJECT

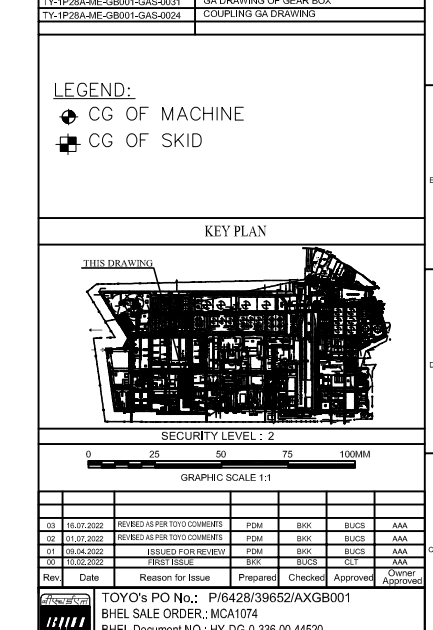
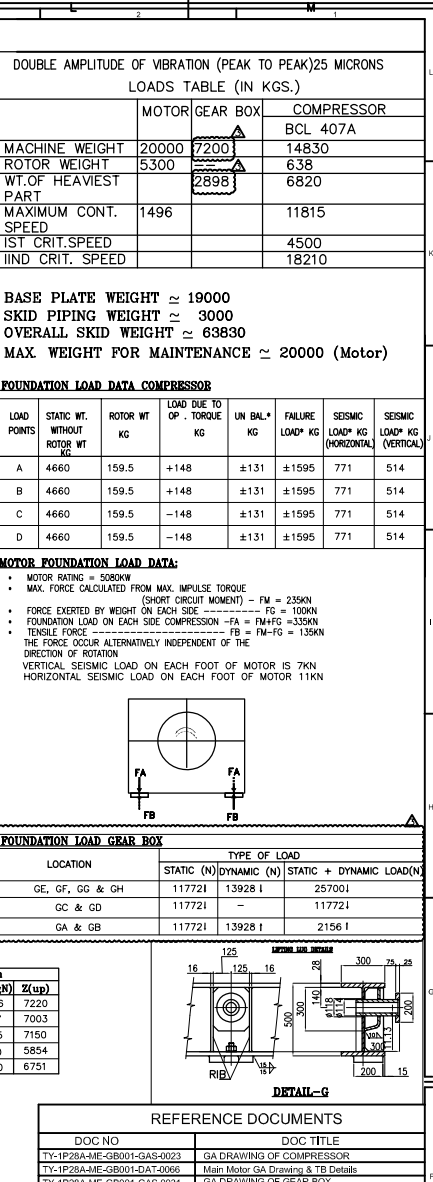
UNIT/FACILITY: Continuous Catalytic Reforming Unit

DRAWING TITLE: M/C ARRANGEMENT & FOUNDATION





SHEET NO: 01 of 01

Contract No. 6733		Document ID TK-IP23A-ME-2781-GAS-0001		Part -	
Store Location: Server/Share -		BAR-Code			
Store Location: Folder -					
Store Name -					
Pro. Unit CCR	Con. Unit -	ITEM No. IP23-KA-2781	Group -	Order No. -	Cat. Code -
		Acc. Code -	Status -		

- ALL DIMENSIONS ARE IN MM & ELEVATIONS AND COORDINATES ARE IN METERS UNLESS OTHERWISE STATED.
- THIS DRAWING INDICATES THE DIMENSION OF FOUNDATION, BLOCK BOLTS, OPENING I, MACHINE LOADS ETC.(ALL FOUNDATION ANCHOR BOLTS ARE IN BHEL SCOPE OF SUPPLY, MOC SHALL BE A193 GR.B7 (BOLTS) AND A194 GR.2H(NUTS).
- STEEL REINFORCEMENT BURIED IN CONCRETE MUST BE PROVIDED ACCORDING TO SOIL CONDITION SO THAT NATURAL FREQUENCIES OF FOUNDATION BLOCK ARE KEPT SUFFICIENTLY AWAY FROM THE FREQUENCIES OF THE ACTING DYNAMIC TORQUES AND FORCES.
- THE DEPTH OF EXCAVATION FOR FOUNDATION BLOCK SHALL BE DECIDED IN RELATION TO THE SOIL CHARACTERISTICS. THE FOUNDATION BLOCK MUST REST ON FIRM GROUND SUITABLE FOR FOUNDATIONS.
- THE FOUNDATION BLOCK MUST NOT BE JOINED TO ANY OTHER STRUCTURE IN ORDER TO AVOID TRANSMISSION OF VIBRATION.
- FOUNDATION SHALL BE DESIGNED TAKING INTO CONSIDERATION THE LOCAL SEISMIC INFLUENCES.
- GROUT TO BE POURED AFTER PLACEMENT OF THE MACHINE WITH A SUITABLE CEMENTITIOUS NON-SHRINKAGE GROUT.
- DIMENSIONS MARKED WITH * TO BE DECIDED BY CIVIL DESIGNER.
- THE SIZES OF COLLARS & SLAB HAVE BEEN DETERMINED CONDITIONALLY BY PIPING REQUIREMENT HOWEVER THE RESPONSIBILITY OF THE DESIGN OF FOUNDATION IS BY CIVIL ENGINEER.
- MACHINE CRITICAL SPEEDS AS PER DATA SHEETS.
- FOUNDATION MAKER SHALL DESIGN THE FOUNDATION ACCORDING TO GROUND NATURE SO THAT THE VIBRATION NATURAL FREQUENCIES OF FOUNDATION ARE 120% OUT OF TURBINE/COMPRESSOR OPERATING RANGE.
- THE FINAL CIVIL DRAWING FOR FOUNDATION TO BE SUBMITTED TO BHEL FOR REVIEW BEFORE RELEASING FOR CONSTRUCTION.
- PEAK TO PEAK PERMISSIBLE AMPLITUDE SHALL BE 25MICRONS FOUNDATION NATURAL FREQUENCY OF VIBRATION SHALL BE 20%BEYOND MACHINE'S OPERATING RANGE. TO GUARANTEE GOOD PERFORMANCE, RECOMMENDED PEAK TO PEAK AMPLITUDE FOR FOUNDATION VIBRATIONS AT MACHINE OPERATING RANGE <20% SHALL BE LESS THAN 10 MICRONS UNDER THE EFFECT OF INDICATED DYNAMIC OPERATING LOADS.
- GROUT SHALL BE CEMENTITIOUS NON SHRINK GROUT



Technical drawing of a detail of a window frame assembly, labeled "DETAIL - X". The drawing shows a cross-section of a window frame installed in a wall. Key components labeled include: SHE PLATE (30x22x2), SHIMS, LEVELING SCREW (L60) (LOOSEN AFTER ALIGNMENT), STUD JESSES (1-1000), LEVELING BLOCK, and SPECIAL WASHER. Dimensions are given in millimeters (mm) and centimeters (cm). The total height of the wall section is 480 mm (16 inches). The height of the window frame is 300 mm (12 inches). The height of the sill is 70 mm (2 7/8 inches). The width of the sill is 80 mm (3 1/8 inches). The drawing is titled "DETAIL - X" and includes a note: "(FOUNDATION ITEMS ARE IN OTHER SCOPE)".

 TOYO ENGINEERING INDIA PVT. LTD.								
TOYO'S PO No.:	NRL/COMM/C457917							
TOYO CONTRACT No.:	6428							
TOYO DOCUMENT No.:	TY-IP28A-ME-GB01-GAS-0012							
 TECHNIP ENERGIES INDIA LTD.								
 NUMALIGARH REFINERY LIMITED								
PROJECT: NUMALIGARH REFINERY EXPANSION PROJECT UNIT/FACILITY: DIESEL HYDRO TREATER(DHT)								
MACHINERY ARRANGEMENT & FDN. (IP28-KA-2791)								
 RECYCLE GAS COMPRESSOR								
Originator/ Contractor	Asset Code	Class	Purchase No	Drawing Title	Sequence Number	Rev	Drawn By	Sheet
TY	IP28A	ME	GB01	GAS	0012	03	01 OF 02	

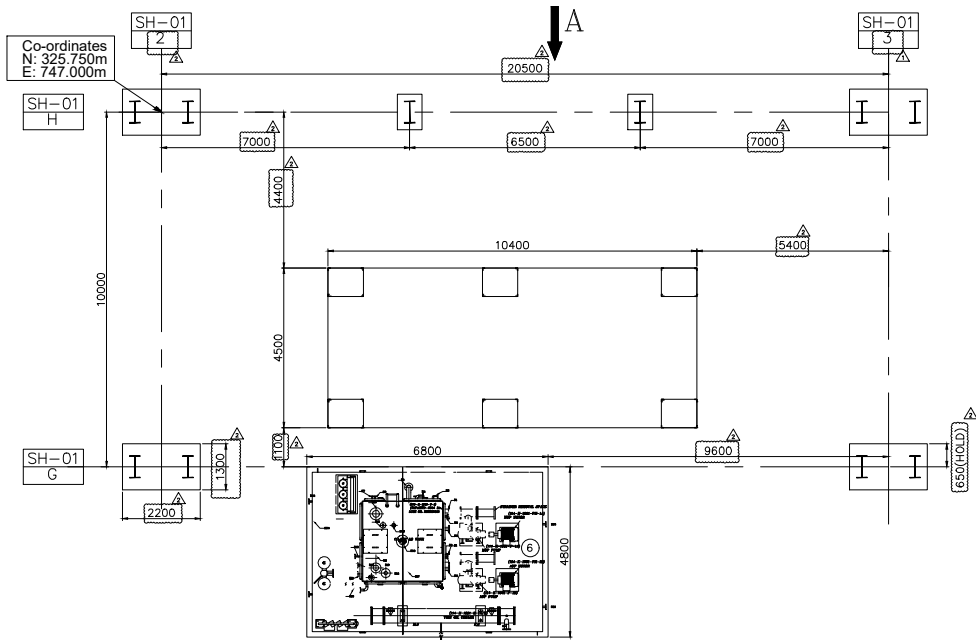
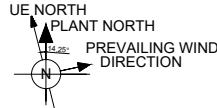
WIND ROSE (FROM)

8:30 AM IST

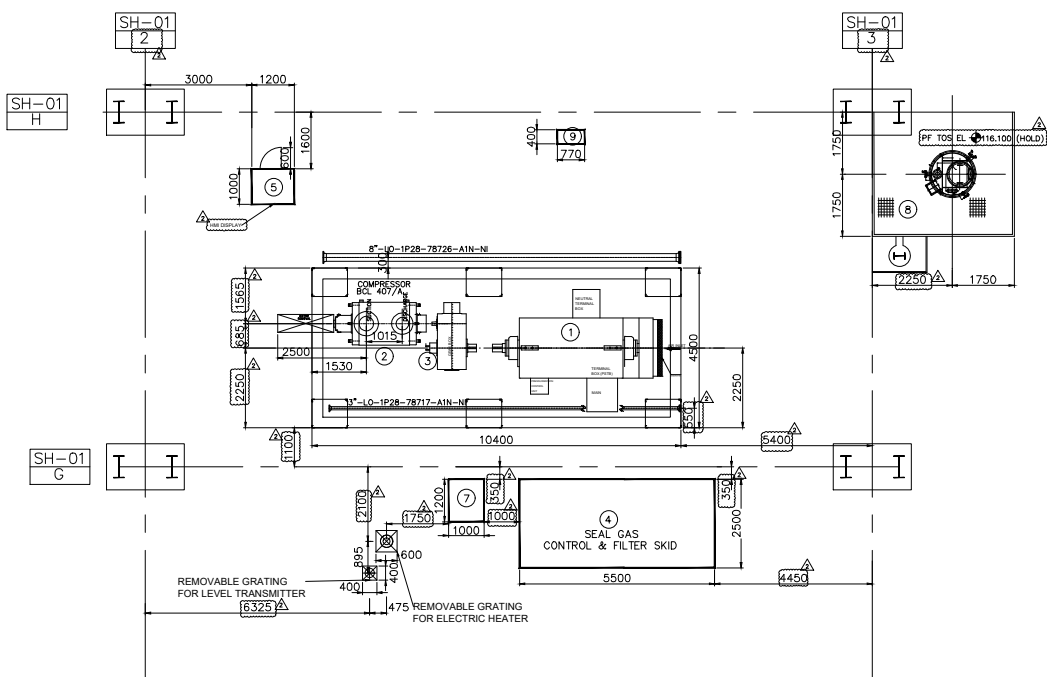
17:30 PM IST

SEISMIC LOAD " ±Kg "		
AXIAL	LATERAL	VERTICAL
308.4	249.7	112.5
259.7	384.8	207.5
303.9	396.9	202.4
314.2	422.4	226.5
276.6	477.7	274.4
302.0	465.3	221.5
275.4	486.5	210.6
249.7	496.9	186.4
228.6	488.0	155.7
219.9	337.1	121.4
253.1	344.9	96.0
354.8	209.0	148.8
422.1	107.9	207.7
429.3	79.0	219.4
337.4	206.9	227.9
259.6	299.5	340.7
259.9	342.7	350.0
323.3	356.5	301.6
358.1	370.1	275.8
375.1	375.8	246.8
331.4	413.5	282.2
308.6	375.9	226.2
331.3	365.5	204.2
279.8	362.2	208.4
323.3	233.4	113.2
431.4	111.0	157.2
449.3	112.9	178.6
424.5	118.9	156.9

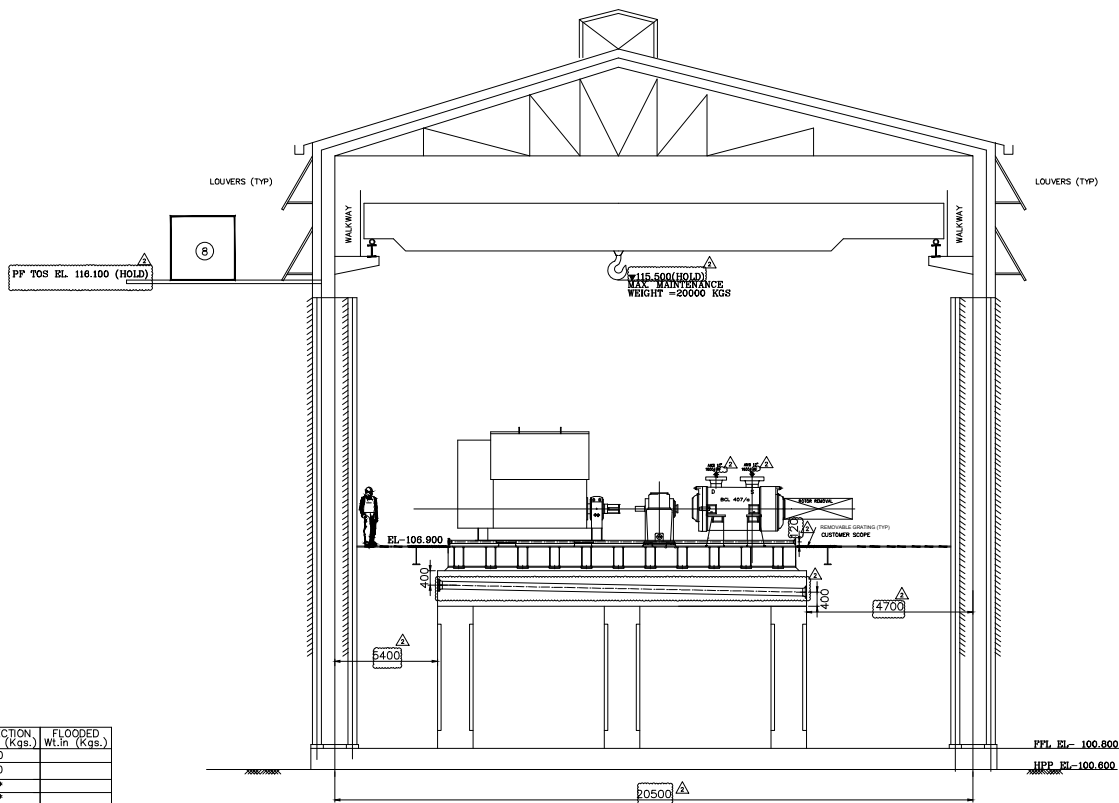
REFERENCE DOCUMENTS									
DOC NO				DOC TITLE				REV.	
TY-1P28A-ME-GB001-GAS-0023				GA DRAWING OF COMPRESSOR				00	
TY-1P28A-ME-GB001-DAT-0068				Main Motor GA Drawing & TB Details				00	
TY-1P28A-ME-GB001-GAS-0031				GA DRAWING OF GEAR BOX					
KEY PLAN									
SECURITY LEVEL : 2									
GRAPHIC SCALE 1:1									
03	16.07.2022	REMOVED AS PER TOYO COMMENTS	PGM	BHK	BUCS	AAA			
02	01.07.2022	REMOVED AS PER TOYO COMMENTS	PGM	BHK	BUCS	AAA			
01	09.04.2022	ISSUED FOR REVIEW	PGM	BHK	BUCS	AAA			
00	10.02.2022	FIRST ISSUE	BHK	BUCS	CLT	AAA			
Rev.	Date	Reason for Issue	Prepared	Checked	Approved	Owner Approved			
TOYO O's PO No.: P16428/39652/AXGB001 BHEL SALE ORDER: MCA1074 BHEL Document No.: HY-DG-0-336-00-44520									
TOYO ENGINEERING INDIA PVT. LTD.									
NRL's PO No.:				NRL/COMM/C45/7917					
TOYO CONTRACT No.:				6428					
TOYO DOCUMENT No.:				TY-1P28A-ME-GB01-GAS-0012					
TECHNIP ENERGIES INDIA LTD.									
NUMALIGARH REFINERY LIMITED									
PROJECT: NUMALIGARH REFINERY EXPANSION PROJECT UNIT/FACILITY: DIESEL HYDRO TREATER(DHT) MACHINERY ARRANGEMENT & FDN. (1P28-KA-2791)									
RECYCLE GAS COMPRESSOR						Unit Code XX			
Originator/ Contractor Asset Code Disc ME						Drawing Type GAS		Sequence Number 0012	
Rev. 03						Sheet 02 OF 02			



PLAN BELOW WORKING FLOOR (PF TOS 106.900M)



PLAN ABOVE WORKING FLOOR (PF TOS 106.900M)



NOTE: SOME SKIDS ARE NOT SHOWN FOR BETTER VISIBILITY

LOAD TABLE

S.NO.	DESCRIPTION OF EQUIPMENT	ERECTION Wt.in (Kgs.)	FLOODED Wt.in (Kgs.)
1	MOTOR	20000	
2	COMPRESSOR	14830	
3	GEAR BOX	7000*	
4	SEAL GAS CONTROL SKID & FILTER SKID	3500*	
5	LOCAL CONTROL PANEL	750*	
6	LUBE OIL CONSOLE	18700*	28200*
7	BOOSTER SKID	1000*	
8	OVERHEAD TANK	800*	2500*
9	LCS FOR MAIN MOTOR	150*	
10	BASE PLATE WEIGHT	19000*	
11	COMPRESSOR SKID PIPING WEIGHT	3000*	
12	OVERALL COMPRESSOR SKID WEIGHT	63830*	

* WEIGHTS ARE PRELIMINARY

GENERAL NOTES:

- ALL DIMENSIONS ARE IN MM AND CO-ORDINATES ARE IN METERS.
- THE MAXIMUM MAINTENANCE WEIGHT IN THE COMPLETE PACKAGE IS 20000 KGS i.e WEIGHT OF THE MAIN MOTOR.
- THE COMPLETE MAIN MOTOR MUST ALWAYS BE LIFTED AS A SINGLE UNIT.
- THE MAIN MOTOR WILL BE SUPPLIED AS A SINGLE UNIT.

HOLD:

DESCRIPTION OF EQUIPMENT	ERECTION Wt.in (Kgs.)	FLOODED Wt.in (Kgs.)
GEAR BOX	7000*	
SEAL GAS CONTROL SKID & FILTER SKID	3500*	
LOCAL CONTROL PANEL	750*	
LUBE OIL CONSOLE	18700*	28200*
BOOSTER SKID	1000*	
OVERHEAD TANK	800*	2500*
LCS FOR MAIN MOTOR	150*	
BASE PLATE WEIGHT	19000*	
COMPRESSOR SKID PIPING WEIGHT	3000*	
OVERALL COMPRESSOR SKID WEIGHT	63830*	

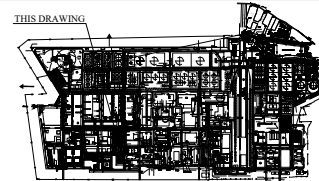
* WEIGHTS ARE PRELIMINARY

REFERENCE DOCUMENTS

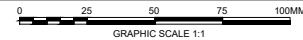
DOC NO	DOC TITLE	REV.
TY-IP28A-ME-GB01-GAS-0012	MACHINERY ARRANGEMENT AND FOUNDATION	
TY-IP28A-ME-GB01-GAS-0014	AUXILIARY EQUIPMENT FOUNDATION	
TY-IP28A-ME-GB01-GAS-0023	GA DRAWING OF COMPRESSOR	
TY-IP28A-ME-GB01-GAS-0031	GEAR BOX GA DRAWING	
TY-IP28A-ME-GB01-GAS-0031	Main Motor GA Drawing & TB Details	
TY-IP28A-ME-GB01-GAS-0018	LUBE OIL CONSOLE GA DRAWING	
TY-IP28A-ME-GB01-GAS-0019	SEAL GAS BOOSTER DRAWING	
TY-IP28A-ME-GB01-GAS-0049	SEAL GAS FILTER SKID & CONTROL SKID GA DRG	
TY-IP28A-ME-GB01-GAS-0051	GA BOM & WIRING OF LOCAL CONTROL PANEL	
TY-IP28A-ME-GB01-GAS-0060	LUBE OIL OVERHEAD TANK GA DRAWING	

STATUS: PRELIMINARY

KEY PLAN



SECURITY LEVEL - 2



Rev	Date	Reason for Issue	Prepared	Checked	Approved	Owner Approved
2	04-05-2022	Issued for approval	PDM	BHK	BUCS	-
1	08-04-2022	Issued for approval	PDM	BHK	BUCS	-
0	10-02-2022	Issued for approval	BHK	BUCS	CLT	-
P	11-01-2022	Issued for approval	BHK	BUCS	CLT	-

TOYO's PO No.: P/6428/39652/AXGB001
(BHEL's Sale Order NO.): MCA 1074 (Work Order:1044404300)
(BHEL's Document NO.): HY-DG-0-336-00-44521

TOYO ENGINEERING INDIA PVT. LTD.

NRL's PO No.: NRL/COMM/C45/7917
TOYO CONTRACT No.: 6428
TOYO DOCUMENT No.: TY-IP28A-ME-GB01-EQL-0013

TECHNIP ENERGIES INDIA LTD.

NUMALIGARH REFINERY LIMITED

PROJECT: NUMALIGARH REFINERY EXPANSION PROJECT
UNIT/FACILITY: DIESEL HYDRO TREATER(DHT)

DRAWING TITLE: EQUIPMENT LAYOUT
(1P28-KA-2791)

Originator/ Contractor	Asset Code	Dist	Purchase No.	Drawing Type	Sequence Number	Rev.	Sheet
TY	1P28A	ME	GB01	EQL	0013	02	01 OF 01