



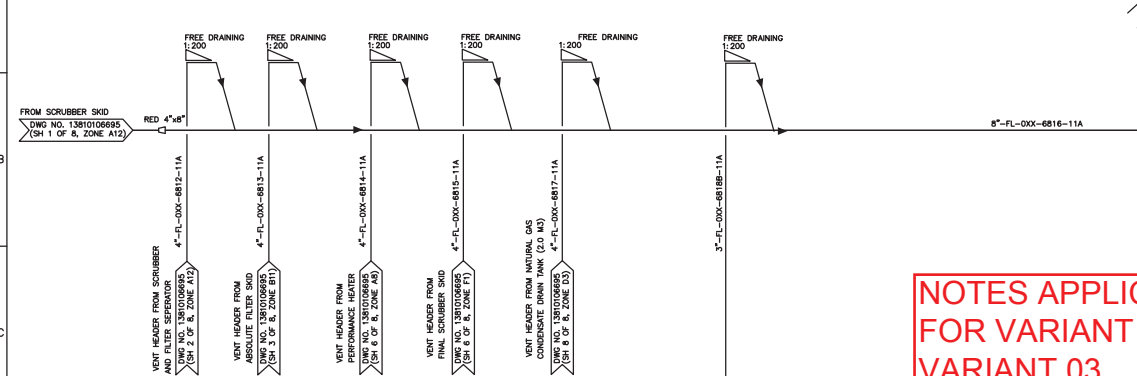
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GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

96990-10-18C-1  
DRG. NO. 13810106695  
SHT. 9 OF 8, ZONE A12



NOTES APPLICABLE  
FOR VARIANT 02 &  
VARIANT 03.

#### NOTES:- MECHANICAL

- 1.1 VENTS/DRAINS ARE SHOWN ONLY TO MEET SYSTEM REQUIREMENTS. ADDITIONAL HIGH POINT VENT AND LOW POINT DRAINS SHALL BE PROVIDED ACCORDING TO FINAL LAYOUT.
- 1.2 INSTRUMENT ISOLATION VALVES, VENT & DRAIN VALVES ARE OF GATE TYPE AS PER BHEL PIPING MATERIAL SPECIFICATION.
- 1.3 OPERATOR SHALL ENSURE INSTRUMENT AIR SUPPLY BEFORE COMMISSIONING OF THE INSTRUMENTS (LEVEL CONTROL VALVES, SHUT/DOWN/BLOW/DOWN/SOLIDID VALVES).
- 1.4 VENT-STRAINER OF 500 MICRON ARE PROVIDED UPSTREAM OF SCRUBBER FOR ARRESTING PIPE RUST, SCALES ETC., DURING COMMISSIONING.
- 1.5 VALVE (U-8812) SHALL BE LOCATED 15 M AWAY FROM FUEL GAS SCRUBBER SKID.
- 1.6 SCRUBBER, FILTER SEPARATOR, ABSOLUTE SEPARATOR, PERFORMANCE HEATER & GAS CONDENSATE DRAIN TANKS SCRUBBER SHALL BE DESIGNED AS ASME SEC. VIII, DIV. 1.
- 1.7 OUTLET ISOLATION VALVE OF SAFETY VALVE SHALL BE ALWAYS KEPT OPEN.
- 1.8 (a) OUTLET ISOLATION VALVE OF SAFETY VALVE SHALL BE CLOSED ONLY WHEN THE INLET ISOLATION VALVE AND SAFETY VALVE AND INLET ISOLATION VALVE IS ADEQUATELY DEPRESSURIZED THROUGH BLEED VALVE.
- 1.9 (b) SAFETY VALVE SHALL BE TAKEN FOR MAINTENANCE ONLY AFTER THE SPACE BETWEEN THE INLET VALVE AND SAFETY VALVE AND SPACE BETWEEN SAFETY VALVE AND INLET ISOLATION VALVE ARE SAFELY DEPRESSURIZED THROUGH RESPECTIVE BLEED VALVES.
- 1.10 (c) VALVES IN ALL FLARE/VENT LINES SHALL BE INSTALLED IN HORIZONTAL DIRECTION WITH STEM DOWNWARDS TO AVOID BLOCKAGE OF GATE VALVE.
- 1.11 (d) ALL VALVES ARE OF FIRE SAFE CONDITION VALVES AS PER API-600.
- 1.12 (e) FUEL GAS LINE DOWNSTREAM OF FINAL SCRUBBER SKID SHALL BE OF STAINLESS STEEL MATERIAL.
- 1.13 (f) ALL VENTS AND DRAINS UP TO FIRST ISOLATION VALVE (NON L.O. TYPE) SHALL BE OF STAINLESS STEEL MATERIAL FOR SS LINES.
- 1.14 (g) FOR MATERIAL SPECIFICATION OF PIPES, FITTINGS ETC., REFER PIPING MATERIAL SPECIFICATION.
- 1.15 (h) THIS BALL VALVE ALONG WITH SPECTACLE BLIND SHALL BE OPENED AFTER ENSURING THAT THE NRV IN THE NZ SYSTEM ARE NOT PASSING ANY READING IN THE PRESSURE GAUGE IS RESULT OF PASSING THROUGH NRVs.
- 1.16 (i) ALL BALL VALVES IN FUEL GAS SYSTEM ARE OF FULL BORE FIRE SAFE DESIGN ONLY.
- 1.17 (j) FUEL GAS SCRUBBER SKID, FILTER SEPARATOR SKID, GAS BOOSTER COMPRESSORS, ABSOLUTE FILTER, PERFORMANCE HEATER AND FINAL SCRUBBER ARE LOCATED NEAR GAS TURBINE AS (A).
- 1.18 (k) PERFORMANCE HEATER NEEDS P REED WATER FROM HRSO & (B) TO MINIMIZE HEAT LOSS FROM FUEL GAS THROUGH PIPING BEYOND HEATER.
- 1.19 (l) MINIMUM MAXIMUM PARAMETERS INDICATED AT THE OUTLET OF HEATERS OCCURS INDEPENDENT OF CORRESPONDING MIN-MAX PARAMETERS AT INLET OF EQUIPMENT. HOWEVER, THE EQUIPMENT NEED TO BE DESIGNED FOR THE WORST CONDITION. ALSO, MIN-MAX PARAMETERS FOR FLOW, PRESSURE AND TEMPERATURE FOR VARIOUS EQUIPMENT CAN OCCUR INDEPENDENT OF EACH OTHER AND THE SYSTEM SHALL BE DESIGNED FOR THE WORST CONDITION.
- 1.20 (m) THE SCRUBBER, FILTER SEPARATOR AND ABSOLUTE FILTER SHALL BE OF VERTICAL TYPE, EVEN THOUGH IN P&ID, FILTER SEPARATOR IS SHOWN HORIZONTAL TYPE.
- 1.21 (n) NECESSARY ROOT VALVES, ISOLATION VALVES, VENT/DRAIN VALVES WILL BE PROVIDED FOR PA, DP, FLOW, & LEVEL MEASURING INST. AS PER APPROVED INSTRUMENT HOOK UP DRAWING.
- 1.22 (o) FOR MATERIAL SPECIFICATION OF PIPES, FITTINGS ETC., PLEASE REFER TO BHEL PIPING MATERIAL SPECIFICATION.
- 1.23 (p) STANDARD P&ID LEGEND SHALL BE FOLLOWED.
- 1.24 (q) THESE VALVES SHALL BE LOCATED AT LEAST 15M AWAY FROM THE RESPECTIVE OT TO ENSURE ITS CLOSURE IN CASE OF FIRE.
- 1.25 (r) ALL VENTS & DRAINS SHALL BE MINIMUM 1" (25MM) SIZE.
- 1.26 (s) END CONNECTIONS OF VALVES SHALL BE AS PER P&ID. END CONNECTIONS OF CONTROL VALVES SHALL BE AS PER MANUFACTURER'S STANDARD.
- 1.27 (t) THIS HEADER SHALL BE LOCATED NEAR TO THE PERFORMANCE HEATER CONDENSATE DRAIN TANK (20 CU.M).
- 1.28 (u) PSV 6834, UH-6842A, UH-6842B SHALL BE LOCATED CLOSER TO THE PERFORMANCE HEATER CONDENSATE DRAIN TANK (20 CU.M).
- 1.29 (v) COPPER JUMPS SHALL BE PROVIDED BY PIPING (DRIPPING AND UNDRIPS) ACROSS ALL THE FLANGES FOR ELECTRICAL CONDUCTIVITY.
- 1.30 (w) ALL CONTROL, SHUT OFF VALVES/INSTRUMENTS SHALL BE MINIMUM OF 30MM BORE.
- 1.31 (x) THIS PRESSURE TRANSDUCER (PT-6840) SHALL BE LOCATED CLOSER TO THE MASS FLOW METER (F-6840).

#### NOTES:- ELECTRICAL AND C&I

- 2.1 VOLTAGE RATING SOLINOID VALVE = 24 V DC, TYPE OF SOLINOID VALVE = UNIVERSAL TYPE.
- 2.2 LEVEL TRANSMITTERS ON SCRUBBER, FILTER SEPARATOR, HEATER, GAS BOOSTER COMPRESSOR AND THESE TRANSMITTERS ARE MOUNTED AT SAME ELEVATION.
- 2.3 ALL ELECTRICAL EQUIPMENT AND RELAY INSTRUMENTATION IN FUEL GAS SYSTEM ARE DESIGNED TO EXPLOSION PROOF TO CL 1, DIV. 1, EX. C & D AS PER NEC.
- 2.4 SET POINTS FOR SCRUBBER ARE AS FOLLOWS:  
(A) LAL = 75 MM, (B) LAH = 125 MM, (C) LAH = 225 MM, (D) LAH = 275 MM, (E) RANGE = 350 MM
- 2.5 SET POINTS FOR FILTER SEPARATOR ARE AS FOLLOWS:  
(A) LAH = 125 MM, (B) LAH = 175 MM, (C) LAH = 225 MM, (D) RANGE = 350 MM
- 2.6 THE PSV INDICATION  
REPRESENTS 1" (25.4) VALVE WITH "Y" TYPE OFFICE AND SET PRESSURE OF 28 KG/CM<sup>2</sup>(G).
- 2.7 PSV-4501/4502/4503/4504/4505/4506/4507/4508/4509 ARE FIRE SAFE CONDITION VALVES AS PER API-600.
- 2.8 IT DRIVES, ALL TYPES OF MOV'S & SOV'S etc. FEEDBACK AND COMMAND SIGNALS INTERFACE TO DIFFERENT CONTROL SYSTEM SHALL BE IN LINE WITH DRIVE CONTROL PHILOSOPHY. DCS.
- 2.9 NO. PE-04-409-145-1002
- 2.10 THE ELECTRICAL/ELECTRONIC INSTRUMENTS IN THIS PROJECT SHALL BE INTRINSICALLY SAFE AND CERTIFIED TO IEC ZONE-1 GAS GROUP IIA/IB, TEMPERATURE CLASS T3 MINIMUM.
- 2.11 END CONNECTIONS FOR TAP OFF TAPS TO BE PROVIDED ON PIPING FOR INSTRUMENTS SHALL BE AS FOLLOWS:  
(a) ROOT VALVE ENDING WITH 1/2" SW FOR PRESSURE < 60kg(g) AND 1" SW FOR PRESSURE > 60 kg(g).
- (b) 11/2" FLANGED CONNECTION FOR TEMPERATURE
- 2.12 NECESSARY ROOT VALVES, ISOLATION VALVES, VENT/DRAIN VALVES WILL BE PROVIDED FOR PR, DP, FLOW, & LEVEL MEASURING INSTRUMENTS AS PER APPROVED INSTRUMENT HOOK UP DRAWING.
- 2.13 FIRE IN OT SYSTEM MAY OCCUR IN THE FOLLOWING AREAS:  
(A) OT COMPARTMENT  
(B) GENERATOR COMPARTMENT  
(C) OT ACCESSORY BASE  
FIRE IN ANY OF THE ABOVE DEFINED AREAS BEING COMMUNICATED BY CO2 OTG FIRE FIGHTING PANEL TO MARK-VI AND ACCORDINGLY, CLOSURE/OPENING OF ON/OFF VALVE AT OT INLET IS BEING IMPLEMENTED BY MARK-VI.
- 2.14 SET POINTS FOR 2.0 M3 NATURAL GAS CONDENSATE DRAIN TANK ARE AS FOLLOWS:  
(a) LAL = 200 MM, (b) LAH = 300 MM, (c) LAH = 700 MM, (d) LAH = 800 MM  
(e) 2.15 SET POINTS FOR 20.0 M3 PERFORMANCE HEATER CONDENSATE DRAIN TANK ARE AS FOLLOWS:  
(a) LAL = 200 MM, (b) LAH = 300 MM, (c) LAH = 2200 MM, (d) LAH = 2200 MM
- 2.16 THE FLOW INSTRUMENT MINIMUM STRAIGHT PIPE DISTANCE (UPSTREAM AND DOWNSTREAM) TO BE FOLLOWED AS PER MANUFACTURER STANDARD.
- 2.17 ALL ELECTRICAL MOTORS INSTALLED SHALL BE FLAME PROOF TYPE.

GAS TURBINE  
(FR-9FB)  
(REFER DRAWING: 2-3663-89201)

Pressure kg/cm <sup>2</sup>	Temp °C	Flow kg/hr
NO. 210	210	10300
MIN. 26.7	210	13867
MAX. 34.3	210	85491
MIN. 43.89	288	70101

WHEN PERFORMANCE HEATER IN OPERATION

PROJECT: 1x370 MW YELAHANKA COMBINED CYCLE POWER PLANT

OWNER: KARNATAKA POWER CORPORATION LIMITED

OWNER CONSULTANT: FICHTNER Consulting Engineers (India) Private Limited,

APPROVED BY: BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

DEPT. UNITS, DIMS. SCALE WEIGHT (KG) REF. TO ASSY. DRG. ITEM NO. NO. OF ITEMS

NO.	DATE	ALTERED	CHD/APPD	NO.	DATE	ALTERED	CHD/APPD	NO.	DATE	ALTERED	CHD/APPD	NO.	DATE	ALTERED	CHD/APPD	NO.	DATE	ALTERED	CHD/APPD
01	15.04.16	CHD/APPD	MSPB	02	06.03.16	CHD/APPD	MSPB	03	06.03.16	CHD/APPD	MSPB	04	06.03.16	CHD/APPD	MSPB	05	06.03.16	CHD/APPD	MSPB

REVISIONS IN-LINE WITH KPLC/FI COMMENTS RECEIVED VIDE LETTER REF. NO. 3115161-KPLC-ME-VOT-167 DTD: 21.03.16

REVISIONS IN-LINE WITH KPLC/FI COMMENTS RECEIVED VIDE LETTER REF. NO. 3115161-KPLC-ME-VOT-107 DTD: 28.02.16

TITLE P&ID FOR FUEL GAS CONDITIONING SYSTEM FOR GAS TURBINE (FR-9FB)

DRG. NO. 1-381-01-06695

ISS. NO. XXXX-XX-XXXX

SHT. No. 08

NO. OF SHT. 08