

1	GENERAL					
2	Project:	INSTALLATION OF NEW GTC AT GANDHAR			Job No.:	B240
3	Owner:	GAIL (INDIA) LTD			Site:	GPU GANDHAR
4	Purchaser:				Unit:	NEW COMPRESSOR AREA
5	Item No. :	910-KT-901			Duty :	☒ Continuous ☐ Intermittent
6	No. of Units :	Working : ONE		Standby : NONE	Driven Equipment: Centrifugal Compressor	
7	Applicable to:	☒ Proposal ☐ Purchase ☐ As Built				
8	☒ : Scope, Option & Information specified by Purchaser. ☐ : Information required from and options left to vendor. Vendor to cross (:) the selected option.					
9	Cycle:	☐ Regen ☒ Simple		☐ Exhaust Heat recovery (Future)		
10	Type:	☒ Aero-Derivative or ☒ Industrial		☒ Single Shaft or ☒ Two Shaft		
11	Driven Equipment : Normal Shaft Power (kW)			@	RPM	Rated Shaft Power (kW) @ RPM
12	Output Shaft Speed Range (RPM)	☐ Min.		☐ Max.		
13	Desired Minimum Site Power (kW)			@	RPM	(See Note 1 & 2)
14	Manufacturer:			☐ Model	☐ ISO Rating	
15	Operation:	☐ Attended ☒ Unattended		☐ Potential Max. Power (kW)		
16	PERFORMANCE(Note-1,2,3)					
17	Gas Turbine Including All Losses		Site Rated	ISO Rated	Site Max. Temp.	Site Min. Temp.
18						
19	☐ Dry Bulb Temp.	°C				
20	☐ Relative Humidity	(%)				
21	☐ Barometer	kg/cm ² a				
22	☐ Output @ Turbine Shaft	kW	(♠)			
23	☐ Heat Rate, LHV	Kcal/kW-Hr	(♣♣)			
24	☐ Output Shaft Speed	RPM				
25	☐ Exhaust Flow	Kg/Sec				
26	☐ Firing Temp.	°C				
27	☐ Gas Generator Exhaust Temp.	°C				
28	☐ Power Turbine Exhaust Temp.	°C				
29	☐ Certified Point					
30	(1) Incl. ☐ Steam ☐ Water Effects For					
31	☐ Emission Control	☐ Augmentation				
32	☐ Steam Flow	Kg/Sec				
33	☐ Water Flow	Kg/Sec				
34						
35	(♠) - Out Put KW guarantee;		(♣♣) - Heat rate guarantee;			
36	Location :			Noise specifications :		
37	☒ Indoor	☐ Outdoor	☒ Grade	☒ Applicable to Machine: Max. 88 dBA @ 1m.		
38	☐ Heated	☒ Under-roof	☐ Mezzanine	See Job Spec B240-910-80-42-SP-5010		
39	☒ Un-heated	☒ Partial Sides	☐	☐ Applicable to Neighbourhood: Max. dBA @ m.		
40	☒ Elect. Area Classification: (Ref. Elect. spec.)			See Specification		
41		Non-Hazardous	Zone/ Gr./ Temp.	☒ Acoustic Housing ☒ Yes ☐ No		
42	Gas Turbine Area	☐				
43	Gas Turbine Enclosure	☐		Applicable specifications :		
44	Control Panel	☐		☒ Job Specification No.:B240-910-80-42-SP-5010		
45	☐ Winterization Req'd (2.1.8)	☐	☒ Tropicalization Req'd	☒ API Standard 616, 5 th edn. ☐ Others		
46	☐ Third Party Certification Req'd			☒ Vendor having Unit Responsibility : Compressor Vendor		
47	Site data : (Refer Site & utility data B240-910-80-42-SU-5010)			Painting :		
48	☐ Elevation (m):	☐ Barometer (kg/cm ² A):		☒ Manufacturer's Standard		
49	☐ Range of Ambient Temps. TempDry Bulb	Wet Bulb	Dry Bulb	☐ Other : Ref.Spec.:		
50	Normal (°C) :			Shipment :		
51	Max. (°C) :			☐ Domestic ☒ Export ☐ Export Boxing		
52	Min. (°C) :			☒ Outdoor Storage More than 12 Months		
53	Site Rated(°C) :			☐ Spare Rotor assembly packaged for :		
54	Unusual conditions :			☐ Domestic ☒ Export Shipment		
55	☒ Dust	☐ Fumes		☒ Lift Slings & Spreaders by Vendor/ Packager		
56	☐ Corrosive Agents					
57	☒ Other : Insulation for Heat conservation and Personnel protection.					
58	REMARKS :					
59						

60	FUEL SYSTEM										
61	Type	☒ Gas	☐ Liquid	☐ Dual:	☐	☐ Gas/ Liquid	☐ Liquid/ Liquid				
62	Turbine Starting on:		☒ Gas	☐ Liquid	☐ Either of the Fuel						
63	Complete Fuel Receiving System			☐ Max. Time Allowed for Complete Transfer			Seconds				
64	GAS FUELS Fuel Analysis - Mol%			LIQUID FUELS			Not Applicable				
65											
66											
67	Composition	MW	Normal (Mole %)		Fuel Type:						
68			Please refer ANNEXURE-A to this datasheet for details of fuel gas for GT		Liquid Fuel	☐ Yes	☐ No				
69	Air	28.96			Treatment	☐ Vendor	☐ Others				
70	Oxygen	32.000			Fuel Transfer	☐ Yes	☐ No				
71	Nitrogen	28.016			Heater Required	☐ Yes	☐ No				
72	Water Vap.	18.016			☐ Liquid Fuel Press. Req'd. Max. / Min. (kg/cm ² a):			/			
73	CO	28.010			Fuel Storage	☐ Vendor	☐				
74	CO ₂	44.010			Fuel Unloading	☐ Vendor	☐				
75	Hydrogen	2.016			Fuel forwarding	☐ Vendor	☐				
76	Methane	16.042			FUEL ANALYSIS DATA						
77	Ethylene	28.052					PROPERTY	ASTM Method	Measured Value		
78	Ethane	30.068			Viscosity @ 38°C SSU	D-445					
79	Propylene	42.078			Sulphur Content (%wt), Max.						
80	Propane	44.094			Bomb Method	D-129					
81	i-Butane	58.120			Lamp Method	D-1266					
82	N-Butane	58.120			High Temp. Method	D-1552					
83	i-Pentane	72.146			Specific Gravity	D-1298					
84	N-Pentane	72.146			Flash Point °C	D-56					
85	Hexane Plus				Pour Point °C	D-97					
86	Total				Water	D-95					
87	Avg.Mol. Wt.				Filterable Dirt MG/100ml	D-2276					
88	HC Dew point °C @ 30kg/cm ² g				Lower Heating Value, Kcal/Kg:						
89	Cors.Agts-PPM										
90	Contamints-PPM										
91	LHV, Kcal/Kg Kcal/Sm ³										
92	Supply Pressure . kg/cm ² g										
93	Supply Temp. °C										
94	☒ Fuel Press.										
95	Req. Mx/Mn. kg/cm ² g										
96	Compression System Req'd.		☐ Yes	☐ No							
97	Compression System by (if req'd)		☐ Vendor	☐ Purchaser							
98	Heater Req'd.(Refer elect spec)		☒ Yes	☐ No							
99	Rate of Change of LHV										
100	Water / Steam Injection:										
101	☐ Water Pressure Req'd.:		kg/cm ² g								
102	☐ Steam Pressure Req'd.:		kg/cm ² g								
103	☐ Steam Temp. Req'd.:		°C								
104	☐ Water/ Steam Quantity		kg/hr								
105	☐ Water/ Steam Quality										
106											
107	FUEL SYSTEM PIPING (Also refer Job specification no: B240-910-80-42-SP-5010)										
108	☒ Bypass and Vent Valve			☒ Isolation Block valves			☒ ANSI Flange Rating				
109	☐ Twin Y-Type Strainer with cont. Flow Transfer Valve			☐ NACE Material Standards							
110	☒ Stainless steel fuel piping manifold.										
111											
112											
113	REMARKS :										
114											
115											
116											
117											
118											
119											

120 CONSTRUCTION FEATURES (♣♣♣)							
121 ■ Speeds				Materials of Construction:			
122 Max. Continuous : RPM ; Trip : RPM				Compressor Rotor Blades			
123 ■ Lateral Critical Speeds (Damped): [As per API 616]				Compressor Stator Vanes			
124	First Critical	RPM	Mode	Turbine Stage	Nozzles	Blades	Wheels or Discs
125	Second Critical	RPM	Mode	1			
126	Third Critical	RPM	Mode	2			
127	Fourth Critical	RPM	Mode	3			
128	☐ Above Critical Speed Test Proven Yes/ No			4			
129 ■ Train Lateral Analysis Req'd. ■ Undamped stiffness map req'd.							
130 ■ Train Torsional Analysis Required							
131 ☐ Torsional Critical Speeds							
132	First Critical	RPM		Combustors			
133	Second Critical	RPM		Compressor Casing			
134	Third Critical	RPM		Combustor Casing			
135	Fourth Critical	RPM		Turbine Casing			
136 ■ Vibration :							
137	Allowable Test Level : Shaft	Microns P/P					
138	Allowable Test Level : Case	mm/ Sec					
139 ☐ Rotation, Viewed From Drive End : ☐ CW ☐ CCW				Gauge Boards And Control Panels			
140 Air Compressor :				Gauge Boards			
141	Stages	Max. Tip Speed	m/Sec	■ Location: GT Compressor skid			
142	Type	Pressure Ratio		Control Consoles	☐ On Skid	☐ Off Skid Local	
143	Casing Split	☐ Axial ☐ Radial		☐ Off Skid Remote (Central Control Room)			
144	Rotor	☐ Solid ☐ Built-up		Weather Protection Required		☒ Yes	☐
145 Turbine : GG/ PT				☐ Specification			
146	Stages	Max. Tip Speed	m/Sec	☐ Annunciation Required			
147	Casing Split	■ Axial ☐ Radial		☐ Visual Display Unit (VDU)		☐ Key Board	
148	Rotor	☐ Solid ☐ Built-up					
149 Combustors :				Control Systems			
150	☐ Single ☐ Multiple, Number			Type	Method of Control: Speed variation(Ref.Job. Spec.)		
151	■ Gas ☐ Liquid ☐ Dual Fuel			Controlled Process variable : Compressor suction pressure			
152	Max. Allowable Temp. Variation (°C)			☐ Mech.	☐ Pneu.	☐ Hydraulic	☐ Electric ☐ Electronic
153	Applicable Plane			■ Microprocessor Based		☐ Combined	
154	Fuel Nozzles per Combustor			☐ Signal Source: Compressor dis. pressure(Refer Job Spec)			
155	☐ Wobbe Index No. Req'd.	☐ Max. ☐ Min.		☐ Sensitivity		☐ Range To	
156				☐ Time of AC Outage Protection		Min.	
157 Maintenance Intervals, Hours :				☐ Shut Off Valves for Shutdown Sensors			
158	■ Hot Gas Path Inspections			Starting System			
159	■ Major Overhauls			☐ Manual	■ Semi Automatic	■ Automatic	
160	☐ Other			☐ Purge		Minutes	
161 Governor :				☐ Provision for Shutdown Valve Test During Operation			
162	■ Mfr's Std. ☐ Other ☐ Make: ☐ Model						
163	☐ Constant Speed	■ Variable Speed					
164	☐ Isochronous	☐ Droop					
165	Remote Shutdown Signal	■ Electric					
166	☐ Pneumatic ☐ Hydraulic ☐ None						
167	■ Manual Speed Changer, RPM	Max. Min.					
168	☐ Maintain Turbine Speed Upon Failure of Control Signal or Actuator						
169	■ Regulation, NEMA Class : 'D'						
170							
171							
172 REMARKS:							
173							
174	(♣♣♣) For Multiple-Shaft Turbine Vendor shall furnish all the information for each shaft.						
175							
176							
177							
178							
179							

CONSTRUCTION FEATURES (Continued) (♣♣♣)									
181 Bearings & Bearing Housings (♣♣♣♣)									
182 Radial	Inlet	Exhaust	Thrust	Active	In-active				
183 ☐ Type			☐ Type						
184 ☐ Manufacturer			☐ Manufacturer						
185 ☐ Length (mm)			☐ Unit Load (Ult.) (Kg/cm ²)						
186 ☐ Shaft Dia (mm)			☐ Unit Load (Site Rtd) (Kg/cm ²)						
187 ☐ Unit Load (Actual/Allowable)	/	/	☐ Unit Load (Max. Poten.)						
188 ☐ Base Material			☐ No. Of Pads/ Area, m ²	/	/				
189 ☐ Babbit Thickness (mm)			☐ Base Material						
190 ☐ No. Of Pads			☐ Babbit Thickness, mm						
191 ☐ Load Between / On Pads			☐ Pivot: Centre/ Offset, %						
192 ☐ Pivot Centre / Offset, %			Lubrication : ☐ Flooded ☐ Directed						
193 ☐ Damper Bearing			Thrust Collar : ☐ Integral ☐ Replaceable						
194			Material :						
195 Bearing temperature devices : ☒ As per API 670 (Note-5&6)			195 Vibration detectors : ☒ As per API 670 (Note-5&6)						
196 ☐ Thermocouples			196 ☒ Type: Proximity ☐ Model:						
197 ☐ Sel. Switch & Indicator By: Purchaser: Manuf.:			197 ☐ Manufacturer:						
198 ☒ Resistance Temp. Detectors			198 ☒ No. at EA Shaft Brq.: Two Total No.:						
199 ☐ Resistance Material : ☐ Ohms			199 ☒ Oscillator-Demodulators supplied By: Vendor						
200 ☐ Sel. Switch & Indicator By: Purchaser: Manuf.:			200 ☐ Mfr.: ☐ Model:						
201 ☒ Location - Journal Bearing : (Φ)			201 ☒ Monitor Supplied By : (Note-5&6)						
202 No.: EA Pad: One Every Other Pad: Per Brq.			202 ☐ Location: Enclosure:						
203 Other:			203 ☐ Mfr.: ☐ Model:						
204 ☒ Location - Thrust Bearing : (Ω)			204 ☐ Scale Range: Alarm; ☐ Set @ :m.						
205 No.: EA Pad: One Every Other Pad: Per Brq.			205 ☐ Shutdown ☐ Set @ :m. ☐ Time Delay Sec.						
206 Other:			206 Axial position detectors : ☒ As per API 670 (Note-5&6)						
207 No.(Inact): EA Pad: Every Other Pad: Two Per Brq.			207 ☒ Type: Proximity ☐ Model:						
208 Other:			208 ☐ Manufacturer: ☒ No.Regd.: 2						
209 ☒ Monitor Supplied By : (Note-5&6)			209 ☒ Oscillator-Demodulators supplied By: Vendor						
210 ☐ Location: Enclosure:			210 ☐ Mfr.: ☐ Model:						
211 ☐ Mfr.: ☐ Model:			211 ☒ Monitor Supplied By : (Note-5&6)						
212 ☐ Scale Range: Alarm; ☐ Set @ °C.			212 ☐ Location: Enclosure:						
213 ☐ Shutdown ☐ Set @ °C.; ☐ Time Delay Sec.			213 ☐ Mfr.: ☐ Model:						
214			214 ☐ Scale Range: ☐ Alarm ; ☐ Set @ :m.						
215 (Φ) Each journal bearing (tilting pad) shall have			215 ☐ Shutdown ☐ Set @ :m. ☐ Time Delay Sec.						
216 RTD's in no less than 50% of the shoes.			216 Acceleration Transducers : ☐ As per API 670						
217			217 ☐ Mfr.: ☐ Model:						
218 (Ω) Each Thrust bearing (tilting pad) shall have RTD's in			218 ☐ Location: Number:						
219 No less than 50% of the active shoes and two in the inactive			219 ☐ Monitor Supplied By :						
220 Side shoes			220 ☐ Location: Enclosure:						
221			221 ☐ Mfr.: ☐ Model:						
222			222 ☐ Scale Range: ☐ Alarm ; ☐ Set @ :m.						
223			223 ☐ Shutdown ☐ Set @ :m. ☐ Time Delay Sec.						
224 Purchaser's Connections :									
225 ☒ Design Approval Req'd. ☐ ASME ☐ API605 ☐ Other									
226	Connection	Rating	Size	Facing	Position	Flanged Or Studded	Mating flange & Gasket by Vendor	Gas Velocity (m/s)	Remark
227									
228									
229									
230	Inlet								
231	Exhaust								
232	Fuel Supply								
233	Steam								
234	Water								
235									
236									
237 REMARKS :									
238									
239 (♣♣♣) For Multiple-Shaft Turbine Vendor shall furnish all the information for each shaft.									
240 (♣♣♣♣) For rolling element bearings if proposed please modify entry as required. Show L-10 Bearing life.									

241	ACCESSORIES SUPPLIED BY GAS TURBINE MANUFACTURER			
242	Starting And Helper Drivers (Note-7)		☐ Gears See API 613 Data Sheet	
243	☒ Starter Only	☐ Starter / Helper	☐ Driven Equipment See API Data Shts.	
244	Type ☒ Motor/ Electrohydraulic	☐ Steam Turbine	☒ Fire Protection Equipment	
245	☐ Gas Expander	☐ IC Engine	☐ Hydraulic	Type ☐ Clean Agent ☒ CO ₂ ☐ Others
246	☐ Gas Turbine	☒ Starter is Clutched		☐ Type of Sensor ☐ Number of Detectors
247	☐ Helper Rating, kW			☐ Ultra Violet Number
248	☐ Starter Rating, kW			☐ Infra Red Number
249	☐ Shaft Turning Device Required			☐ Additional Levels
250	☒ Motor		Mounting Plates	
251	Type	Rating	kW	Type ☐ Soleplate ☒ Baseplate
252	Mfr.	Model		☐ Shimpack Thickness, mm
253	☐ Steam Turbine (See attached API DS)		Base Plate	
254	Mfr.	Model		☒ Furnished By Vendor
255	kW	Max. Steam Flow, kg/hr		☐ Gas Turbine Only ☒ Extended for Compr., Gear Unit
256	Total / Start, Kg		☐ Soleplates Required ☐ Drip Rim	
257	☐ Gas Expander	See Appl. Spec. No.:		☐ Column Mounting ☐ Levelling Pads
258	Mfr.	Model		☒ Decking : Non skid decking
259	kW	Max. Gas Flow, kg/hr		Remark:
260	Total / Start, Kg			
261	☐ Gas for Expansion Turbine			
262		Min.	Max.	Normal
263	Inlet Pressure, kPa			
264	Exhaust Press., kPa			
265	Gas Temp. Inlet, EC			
266	Gas temp. Exh., EC			
267	Molecular Wt.			
268	Speed Control	☐ Governor	☐ Pressure Regulator	
269		Yes	No	
270	Inlet Control Valve furnished	☐	☐	☒ Ventilation Fan 100% standby Reqd.
271	Stainless Steel Piping Manifold	☐	☐	☒ Positive Pressure Ventilation:
272	Carbon Steel Flanges	☐	☐	☒ Gas Turbine ☐ Gear ☐ Elec. Generator
273	Y-Strainer w/breakout Flanges	☐	☐	☐ Negative Pressure Ventilation: ☐ Gas Turbine
274	Low Speed Capability (for compr. cleaning)	☐	☐	☒ Ventilation Filter
275	Relief Valve Pressure Set Point, kg/cm ² g			☐ Type: ☐ No. of stages
276	Casing Material			☐ D.C. Fan Reqd.
277	Seal Type			☐ Others
278	☐ Internal Combustion Engine See Appl. Spec. No.:		Couplings And Guards See API-671 data sheet.	
279	Type	☐ Spark Ignited	☐ Diesel	☐ Mfr. ☒ Type: Flexi metallic.
280	Mfr.	Model		☐ Model
281	Speed, RPM	Power, kW		☐ Max. Outside Diameter, mm
282	☐ Combustion Gas Turbine See Appl. Spec. No.:		☐ Hub Weight, kg	
283	Mfr.	Model		☒ Spacer Length, mm ☐ Spacer Wt., kg
284	Speed, RPM	Power, kW		☐ Idling Adapter Reqd. ☐ Solo Plate Reqd.
285	☒ Guard supplied by Vendor			
286	☐ Black Start Capability Required		Type ☒ Fully Enclosed ☐ Semi Open ☐ Other	
287	☐ Black Start Type:		☐ Lubricating Requirements	
288	☐ A.C. Power not Available		☒ Non Lube ☐ Grease ☐ Cont. Oil lube	
289	☐ C.W. not Available		Quantity per Hub, kg/m ³ /hr	
290	☐ Instrument Air not Available		Remarks:	
291	☐ D.G. Set reqd. to provide complete starting			
292	Elec. power requirements			
293	☐ Black Start on Gas/ Liquid/ Both fuel reqd.			
294				
295	Remarks:			
296				
297				
298				
299				
300				

301	ACCESSORIES SUPPLIED BY GAS TURBINE MANUFACTURER (Contd..)			
302	Air Inlet System(Refer Job spec: B240-910-80-42-SP-5010)		Exhaust System (Refer Job spec: B240-910-80-42-SP-5010)	
303	☐ Air Filter (Refer Job Specifications)		☐ Complete Exhaust System with stack/Chimney@min30 m ht	
304	☐ Complete Air Path Component Material : SS 304		☐ Extent of furnished Insulation	
305	☐ Internal Type Separator	☐ Media Filters	☐ (Relief) (Diversion) Valve	
306	☐ Pad Type Pre-filters	☐ Combination	☐ Exhaust Heat Recovery System: Provision for Future	
307	☐ Self Cleaning Pulse (Pulse Type)		☐ Emission Control System	
308	☐ Single Stage with provision for		☐ Exhaust Silencer Plate Element Matl.	
309	future Extra Stages	☐ Yes ☐ No	☐ Emissions Sampling System	
310	☐ Normal Dust Loading, kg/Nm ³ /hr		☐ Expn. Joint Mfr. Turbine Vendor Type	
311	☐ Wind Design Velocity, km/hr		☐ Ducting Gauge / Material: /	
312	☐ Snow Load, kg/m ³		☐ Silencer Mfr. Diff. Pr, mm H ₂ O	
313	☐ Seismic Zone		☐ Heat Recovery Device	
314	Location ☐ Ground level ☒ Elevated (Minimum 5 m)		Mfr. Type Diff.Pr, mm H ₂ O	
315	☐ Filtration Efficiency		Steam Gen. Pr..kPag Temp., °C	
316	☐ Maintenance Interval, months		Rate, kg/hr	
317	☐ Cleaning Frequency, months/days		☐ Manometer Mfr. ☐ Model	
318	☐ Implosion Door		Range, mm H ₂ O	
319	☐ Evaporative Cooler ☐ Anti-Icing		☐ Atmospheric Relief Device	
320	☐ Liquid to Air Exchanger		Type Mfr. Location	
321	☐ Walkway, Ladders, Handrails Req'd.		☐ External diff. Pr. by Others, mm H ₂ O :	
322	☐ Compr. Cleaning System, Type		☐ System Site Rated Pressure Drop, 100 mm H₂O	
323	☐ Silencer Plate Element Material: SS		☐ Disch. Flange Orientation:	
324	☐ Filter Mfr. ☐ Model		☐ Vertical ☐ Side Hzl. ☐ Side at an Angle ☐ Axial	
325	100% Rated Air flow diff. Pr.		Atmospheric Emissions (Note-8)	
326	Clean, mm H ₂ O	Alarm, mm H ₂ O Changeover	☐ Emission Suppression System Req'd.	
327	☐ Cooler Mfr. ☐ Model	Diff.Pr, mm H ₂ O	☒ NO _x Requirements: 100ppm(v/v) @ 15%excess oxygen(max)	
328	☐ Exchgr. Mfr. ☐ Model	Diff.Pr, mm H ₂ O	☐ NO _x Emitted	
329	☐ Ducting Gauge / Material: SS		Emissions Reduction Method (if req'd.)	
330	☐ Expn. Joint Mfr. ☐ Type		☐ Water Injection ☐ SCR	
331	☐ Silencer Mfr. ☐ Model		☐ Steam ☐ Dry Combustor	
332	Diff. Pr, mm H ₂ O :		☐ Other ☐ SO _x Requirements	
333	☐ Manometer Mfr. ☐ Model		☐ Sulphur Content of Fuel	
334	Range, mm H ₂ O :		☐ SO _x Emitted (Based on stated sulphur content)	
335	☐ System Site Rated Pressure Drop, 100mm H ₂ O		☐ CO Requirements ☐ CO Emitted	
336	100% Rated Air Flow :		☐ Particulate Requirements: 150mg/Nm ³	
337	REMARKS :		☐ Unburned HC Requirements ☐ Unburned HC Emitted	
338			Applicable Emission Codes or Regulations	
339			☐ EPA-Title 40 CFR ☒ Others MPPNM	
340	UTILITIES			
341	☒ Utility conditions : Refer spec no: B240-910-80-42-SU-5010		☐ Total utility consumption :	
342	Steam	Aux. Drivers	Heating	Cooling Water : m ³ /hr
343	Inlet: Min. /cm ² G °C.		kg/cm ² G °C.	Steam Normal : Kg/hr
344	Nor. kg/cm ² G °C.		kg/cm ² G °C.	Steam Maximum : Kg/hr
345	Max. kg/cm ² G °C.		kg/cm ² G °C.	Instrument Air : Nm ³ /hr
346	Exhaust :Min. kg/cm ² G °C.		kg/cm ² G °C.	HP (Aux.Driver) : kW
347	Nor. kg/cm ² G °C.		kg/cm ² G °C.	HP (Auxiliaries) : kW
348	Max. kg/cm ² G °C.		kg/cm ² G °C.	Battery Chargers/ Heaters : kW/ kW
349	Electricity : ☐ Pilot Light Indication	Purge (Air or N ₂) Nm ³ /hr		
350	Motors	Heating	Control	Shutdown
351	Voltage		Miscellaneous :	
352	Hertz		☒ Vendor's Review&Comments on Purch. Piping&Foundation	
353	Phase		☐ Final assembly clearance ☐ Welding hardness testing	
354	Cooling Water :		☐ Speed –Torque curve ☐ Increase power for Steam / Water	
355	Temp. Inlet: °C. Max. Return: °C., Design °C	☐ Effect of Amb. Cond. On exhaust flow		
356	Press. Norm.: kg/cm ² G. Design: kg/cm ² G.	☐ Special Test procedure		
357	Min. Return: kg/cm ² G. Max. Allow. ΔP: kg/cm ² .	☐ Purchaser's review of Comp. / Goodman Diagram		
358	Water Source: Fouling Factor :	☐ Vendor witness alignment		
359	Instrument air :		☐ Technical Data manual	
360	Pr.: Max. kg/cm ² G, Min. kg/cm ² G, Nor. kg/cm ² G	☒ Recommended straight run of Pipe diameters before suction:		
		☐ Run down curves		

INSPECTION AND TESTING				LUBRICATION & WEIGHTS			
361							
362	SHOP INSPECTION & TESTS :			Lubrication Systems: ■ See LOS datasht. (B240-910-80-42-DS-1005/1006)			
363		Reqd.	Witn.	Obs.	☐ Lube oil Viscosity ISO Grade:		
364	Shop Inspection	■	☐	☐	Common to ☐ Gas Generator/ Single Shaft Turbine		
365	Cleanliness	■	☐	☐	■ Free Power Turbine ☐ Load Gear		
366	Hydrostatic (Casing / Filter)	■	■	☐	■ Driven Eqpt. ☐ Auxiliaries		
367	Mechanical Run (Main/Spare Rotor) (Note-10)	■	■	☐	☐ Combined/ Separate Lube/Seal System		
368	■ Contract Coupling ☐ Idling Adaptor(s)			☐ System Designed for Synthetic Lubricant			
369	■ Contract Probe ☐ Shop Probes			Lube Specification			
370	Vibration Plots	■	☐	☐	Common to ☐ Gas Generator ☐ Power Turbine		
371	Tape record Vib. Data	■	☐	☐	☐ Load Gear ☐ Driven Eqpt.		
372	Performance Test (GG/GT)	■	■	☐	☐ Auxiliaries		
373	Complete Unit Test	■	■	☐	■ Oil Requirements	Flow m ³ /hr	Pr. kg/cm ² g
374					GG or SS Turbine		
375	Load Gear Test				Driven Equipment		
376	Sound Level test (during Comp. Unit Test)	■	■	☐	Gear		
377	Aux. Equipment Test	■	■	☐	Couplings		
378	Post Test Inspection	■	■	☐	Power Turbine		
379	Hydraulic Coupling Inspection	☐	☐	☐	Total		
380	Governor Response Test	■	■	☐	☐ Mounting Arrangement		
381	Spare Parts	■	■	☐	☐ Console ☐ Column ■ Baseplate		
382	Fire Protection	■	■	☐			
383	Other : Rotor Balance test	■	☐	■			
384	Material Inspection Requirements (Refer Job Specification)			■ Weights & Dimensions			
385	☐ Special Charpy Testing				Dry Inst.Wt kg	Shipp. wt.kg	L x W x
386	☐ Radiography Req'd. for:			GG or SS Turbine			
387	☐ Magnetic Particle Req'd. for:			SS Turbine Rotor			
388	☐ Liquid Penetrant Req'd. for:			Power Turbine			
389	☐ Ultrasonic Req'd. for:			P.T. Rotor			
390	☐ Weld Inspection			Lube System			
391	☐ Welding Hardness Testing			Driven Equipment			
392	Miscellaneous			Filter			
393	■ Vendor's review & Comments on Purch. Piping & Foundation			Inlet Silencer			
394	☐ Final Assembly Clearances			Exhaust Silencer			
395	☐ Coordination Meeting Site			Ducting			
396	■ Speed-Torque Curve						
397	☐ Increase Power for Steam/Water						
398	■ Effects of Ambient Cond. On Exh. Flow			Max. Erection wt.	Item No.		
399	☐ Run Down Curves			Max. Maintenance wt.	Item No.		
400	☐ Purch. review of Campbell/ Goodman Diag.						
401	■ Vendor Witness Alignment						
402	■ Technical Data Manual						
403	☐ No. of Proposal Copies						
404							
405	REMARKS :						
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420	NOTES:-
421	1. Both intake & exhaust losses shall be considered as 100mm WC for GT rating.
422	2. The continuous base rating of Gas turbine at the specified site conditions of altitude, intake & exhaust losses, site rated temperature, humidity shall not be less than: (a). 110% of maximum compressor power required for Case-1 including all transmission losses. (b). 105% of maximum compressor power required for Case-2 including all transmission losses.
423	3. Performance data as per Page nos. _____ shall be filled-in for each of the specified operating cases of the Compressor.
424	4. In order to justify the site rating of the proposed Gas Turbine, bidder shall furnish all supporting data, deration curves/charts & calculations.
425	5. The make and model of bearing temperature monitoring system, vibration and axial displacement monitoring system shall be as per Instrumentation specification forming part of inquiry document.
426	6. The location of bearing temperature monitoring system, vibration and axial displacement monitoring system shall be as per Instrumentation specification forming part of inquiry document.
427	7. Gas turbine shall be provided with Gas starting system. Please refer Job Spec. Doc. No. B240-910-80-42-SP-5010 for more details.
428	8. No water/steam injection is permissible for emission reduction.
429	9. Vendor shall provide Insulation for heat conservation & personal protection.
430	10. Vendor shall include in his scope of supply a Spare Rotor in case Industrial type Turbine is proposed or a Spare Gas Generator in case Aero-Derivative type Gas Turbine is Proposed.
431	11. Vendor shall supply suitable Fuel Gas conditioning skid based on the specified Fuel Supply conditions.
432	

25.03.19	A	AS	NK
Date	Rev	Job Engineer	Rev. & Approved By

ANNEXURE-A

To be updated as per latest Process Datasheets

PERFORMANCE DATASHEET:

OPERATING CASE-_____

BIDDER SHALL SUBMIT THIS PERFORMANCE DATASHEET DULY FILLED-IN FOR EACH OPERATING CASE AS PER COMPRESSOR DATASHEET

SL. NO.	DESCRIPTION	UNITS	PERFORMANCE DATA
1.0	<u>COMPRESSOR</u>		
1.1	BKW required at compressor input shaft including all losses (excl. Gear box losses) (with 0% positive tolerance).	kW	
1.2	Rated Speed	RPM	
2.0	<u>GEAR UNIT</u>		
2.1	Gear Unit efficiency	%	
2.2	Gear Unit Rating	kW	
2.3	Input Speed/Output Speed	RPM	
3.0	<u>GAS TURBINE</u>		
3.1	Gas Turbine ISO Rating	kW	
3.2	GT Site Rating (See 3.9 Below).	kW	
3.3	Heat Rate at Site Conditions <i>[While generating rated BKW at 1.0 above]</i>		
	GT Heat rate @ Site rated temp. _____ °C	kJ/kWh kcal/kWh	
3.4	GG Rated Speed	rpm	
3.5	PT Rated Speed	rpm	
3.6	GGT Inlet Temperature <i>[While generating site rated power]</i>	°C	
3.7	Expected TBO (Hot Section)	Hrs	
3.8	Expected TBO (Power Turbine)	Hrs	
3.9	<u>SITE CONDITIONS (Please refer Doc. No. B240-910-80-42-SU-5010)</u>		
i.	Site Altitude	m	_____ above MSL
ii.	Max. Inlet Loss (At Site)	mm H ₂ O	100
iii.	Max. Exhaust Loss (At site)	mm H ₂ O	100
iv.	Site Rated/peak Temperature	°C	_____ °C
v.	Relative Humidity	%	_____ @ _____ °C
vi.	LHV of fuel gas	kcal/kg kcal/Sm ³	_____ _____ (HC Dew point @ _____ kg/cm ² g is (-) _____ °C)
4.0	<u>NOISE LEVEL</u>		
4.1	Overall Compressor package Noise level @ 1 meter from the equipment Train (including compressor, turbine and other aux. Equipment & piping)	dBA	

PERFORMANCE TABLE: OPERATING CASE: _____

BIDDER SHALL SUBMIT THIS PERFORMANCE TABLE DULY FILLED-IN FOR EACH OPERATING CASE AS PER COMPRESSOR DATASHEET

Sr No	DESCRIPTION	UNITS					
							Remarks
			CASE –1				
			ISO	Rated	Max	Min	
1	Ambient temperature	°C					
2	Relative humidity	%					
3	LHV of Fuel gas	kcal/kg kcal/Sm ³					
4	Compressor BkW (including seal losses, transmission losses)	kW					
5	Rated Speed of the Compressor	rpm					
7	Mech. Losses of Gas Turbine (Power to all auxiliaries)	kW					
8	Power Turbine Shaft speed	rpm					
9	Power required on Power Turbine Shaft [= (4) + (7)]	kW					
10	Site efficiency	%					
11	H _R : Heat Rate corresponding to (9)	kJ/kWh kcal/kWh					
12	W _{max.} : Max. Power on PT Shaft at corresponding shaft speed Site Elevation = _____ m above MSL Max. Inlet pressure Losses = 100 mm H ₂ O Max. Exhaust Pressure Losses = 100 mm H ₂ O & Including all other losses	kW					
13	η _S corresponding to W _{max.}	%					
14	H _R corresponding to W _{max.}	kJ/kWh kcal/kWh					
15	T _S : PT Exhaust Temperature	°C					
16	GG Exhaust Temp	°C					
17	Firing Temp	°C					
18	Exhaust Flow	kg/sec					
19	Actual Margin available with offered GT [= {(12) – (9)}/{(9)} * 100]	%					

GAS TURBINE EXHAUST GAS EMISSION DATASHEET

BIDDER SHALL SUBMIT THIS GAS TURBINE EMISSION DATASHEET DULY FILLED-IN FOR EACH OPERATING CASE AS PER COMPRESSOR DATASHEET

GUARANTEED GASEOUS EMISSION DATA FOR GLC PREDICTION STUDIES						
S.No.	DESCRIPTION	Units	OPERATING CASE: _____			
			ISO	Rated	Peak	Remarks
	Reference Temperature for Gas Turbine	°C				
1	Fuel Gas, Calorific Value	kcal/kg kcal/Sm ³				
2	Fuel Flow Rate	kg/hr				
3	Physical Height of exhaust chimney from ground level	meters		30.0		
4	Diameter of exhaust chimney at tip	meters				
5	Exit Velocity (Min. / Nor. / Max.)	m/sec				
6	Exit Temperature (Min. / Nor. / Max.)	°C				
7	Volumetric Flow of Exhaust Gas (at _____ kg/cm ² G & _____ °C)	m ³ /hr				
8	Mass flow rate of Exhaust Gas	kg/hr				
9	Avg. Molecular Weight of exhaust gas					
10	Composition of Exhaust Gas					
10.1	-CO ₂	Vol.% (dry/wet)				
10.2	-N ₂	Vol.% (dry/wet)				
10.3	-O ₂	Vol.% (dry/wet)				

GUARANTEED GASEOUS EMISSION DATA FOR GLC PREDICTION STUDIES						
S.No.	DESCRIPTION	Units	OPERATING CASE: _____			
			ISO	Rated	Peak	Remarks
10.4	-Moisture	Vol. %				
10.5	-SO ₂	Wt.% mg/Nm ³				
10.6	-NO _x	Wt.% mg/Nm ³				
10.7	-CO	Wt.% mg/Nm ³				
10.8	-HC	Wt.% mg/Nm ³				
10.9	-Any other composition from GT exhaust ** Component A ☐ ☐ Component B ** Component C	Wt.% mg/Nm ³				
11	Particulate matter : Size Distribution - < 10 : - > 10 :	mg/Nm ³				