



MANDATORY SPARES (GAS TURBINE DRIVEN CENTRIFUGAL COMPRESSOR PACKAGE)

PROJECT : Installation of New GTC Compressor at Gandhar,
Gujarat,
OWNER : Gas Authority of India Limited
PMC : Engineers India Limited
JOB NO. : B240

A	16.04.19	ISSUED FOR COMMENTS	AS	NK	NK
Rev. No	Date	Purpose	Prepared by	Checked by	Approved by

The vendor shall note the following and furnish the quotation for Mandatory Spares accordingly:

1. Mandatory spares shall consist of Spares as listed below.
2. The word 'Set' means the quantity required for full replacement of that part in one machine.
3. The bidder shall quote for all the mandatory spares as defined below & as applicable to the proposed design of the equipment. In case, any spare which is listed in the checklist but not applicable due to specific construction/design of the equipment, the same shall be highlighted as 'Not Applicable' against that spare supported with proper technical explanation.'
4. Spare part shall be identical in all respects to the parts fitted on the main equipment, including dimensions, material of construction, and heat treatment.

SECTION-A: ROTATING EQUIPMENT

Sl. No.	Part Description	Unit	Quantity	Remarks
	ROTATING EQUIPMENT			
1.0	CENTRIFUGAL COMPRESSOR			
1.1	Spare Rotor (Dynamically Balanced)	Set	1	(See Note 1)
1.3	Dry Gas Seal (Drive end and Non-Drive end)	Set	1	
2.0	GAS TURBINE (Special Purpose)			
2.1	Heavy Industrial Type Gas Turbine			
2.1.1	Spare Rotor	Set	1	(See Note-1)
2.1.2	Hot Gas Path Components			
	– Combustion liners	Set	1	
	– Combustion end covers	Set	1	
	– End caps	Set	1	
	– Transition pieces	Set	1	
	– Cross fire tubes	Set	1	
	– Flow Sleeves	Set	1	
	– Spark Plugs	Set	1	
	– Turbine nozzles	Set	1	
	– Buckets	Set	1	
	– Stator Shrouds	Set	1	
2.2	Light-Industrial/Aero-Derivative Type Gas Turbine			
2.2.1	Gas Generator	Set	1	(See Note-2)
2.2.2	Hot Gas Path Components			
	– Combustion liners	Set	1	
	– Combustion end covers	Set	1	
	– End caps	Set	1	
	– Transition pieces	Set	1	
	– Cross fire tubes	Set	1	
	– Flow Sleeves	Set	1	
	– Spark Plugs	Set	1	
	– Turbine nozzles	Set	1	
	– Buckets	Set	1	
	– Stator Shrouds	Set	1	
3.0	LUBE OIL PUMPS			(See Note-3)
3.1	Centrifugal Pump			

Sl. No.	Part Description	Unit	Quantity	Remarks
3.1.1	Mechanical seals (Complete Cartridge assembly)	Set	1	
3.2	Positive Displacement Pump Rotary			
3.2.1	Mechanical seals (Complete Cartridge assembly)	Set	1	
Remarks: 1. Spare Rotor shall be supplied duly dynamically balanced and Mechanical Run Tested. 2. Spare Gas Generator shall be supplied duly dynamically balanced, Mechanical Run Tested and containerized with Container to be left at site. 3. Spares shall be quoted depending on the type of pump proposed for lube oil system. Incase of a between bearing pump, both Drive-end side and Non-drive end seals shall be considered.				

SECTION-B: ELECTRICAL

1.1.	MV induction motors 37 kW & above (one set of spare for each rating & type)		
a)	Set of bearings (NDE+DE	Set	1
b)	Terminal/ bushing	Set	1
1.2.	VFD (one set of spare for each VFD)		
a)	Transistors/IGBT	Set of each rating & type	1
b)	Control cards	No. of each type	1
c)	Power supply cards	No of each rating & type	1
d)	Power fuses	Each rating & type, whichever is more	20 % or one no (min)
e)	control fuses/MCB	Each rating & type, whichever is more	10 no of each type and rating (min)
f)	Contactors	Each rating & type, whichever is more	10 % or one no (min)
g)	Indicating lamps	Each rating & type, whichever is more	20 % or one no (min)
h)	Indicating lamps covers	No. of each color	2 nos
i)	Blocker Diode	Each rating & type,	2 nos
1.3.	MV Switchboard (MCC)		one set of spare for each switchboard
a)	Closing Coil	Each rating & type,	1
b)	Trip Coil	Each rating & type,	1
c)	Control Fuses/MCB	Each rating & type,	10
d)	Indicating lamps covers	Each rating & type, whichever is more	5
e)	Indicating lamps	Each rating & type, whichever is more	20% or 3 Nos. (min.), whichever is more

1.4.	DC System		one set of spare for each DC System
a)	Power Thyristors / Transistors / IGBT /IGCT	Set of each rating & type	1
b)	Control cards	No. of each type	1
c)	Power supply cards	No of each rating & type	1
d)	Power fuses	Each rating &type, whichever is more	20 % or one no (min)
e)	Control fuses / MCB	Each rating &type, whichever is more	10 no of each type and rating (min)
f)	Indicating lamps	No. of each color	10 % or one no (min)
g)	Indicating lamps covers	No. of each color	20 % or one no (min)
h)	Blocker Diode	Each rating &type	2 nos

SECTION-C: INSTRUMENTATION

Mandatory spares shall be quoted and included in base price as per the following table:

Sl. No.	Part Description	Quantity Required
	Mandatory spares shall be quoted and included in base price as follows:	
1	Field Instruments	
	This includes all types of the following instruments excluding line-mounted instruments.	
I	Pressure gauges Temperature gauges	10%subject to minimum1No. of each type and size, range, rating and material wise whichever is higher.
II	Field transmitters for Pressure, Level, DP, Flow and Temperature etc.	10%subject to minimum1No. of each type and size, range, rating and material wise whichever is higher.
III	RTD/Thermocouple (with Thermowell), Thermowell etc.	10%subject to minimum1No. of each type and size, range, rating and material wise whichever is higher.
V	Gas detector, fire detector UV/IR Thermal/heat detectors with transmitter	10% subject to minimum 1 no of each type of sensor & transmitter, whichever is higher.
VI	Level gauge glasses	10% subject to minimum 1 no of glass of each size along with gasket set, whichever is higher.
VII	Instrument valve / 3-Way valve manifold / Tube fittings etc.	10% subject to minimum 1 no for each type/size, whichever is higher.
VIII	Speed transmitter probe	10% subject to minimum 1 no of each, which ever is higher.
IX	Beacons / Horns for gas detector	10% or minimum one number, whichever is higher.
2	Line mounted instruments	
I	Control valve, shutdown valve	a) 01No. seat plug assembly for each valve under cavitation and / or flashing and noise (for globe and angle valves).

Sl. No.	Part Description	Quantity Required
		b) Grouping of balance valves with respect to size, rating, material & trim type and 10% subject to minimum 1 no. of plug & seat assembly of each group, whichever is higher (for globe & angle valves) c) Grouping of valves with respect to size, rating & material and 10% subject to min 1 no. ball & seat, for each group whichever is higher (for ball valves). d) Grouping of valves with respect to size, rating & material and 10% subject to min 1 no. of disk/rotary plug and seat of each group, whichever is higher (for rotary plug & butterfly valves).
		e) Grouping of all valves with respect to size, rating, material & trim type and 10% subject to minimum 1 no. whichever is higher of the following items group wise: - I. Gland packing II. Actuator Diaphragm. III. Valve positioner IV. Bonnet gaskets (for all type of valves) V. Quick exhaust Valve (if any) VI. Solenoid valves VII. Limit switches. VIII. Smart Positioner. IX. Air filter regulators
II	Pressure Relief valve and pilot valve of pilot operated PRV	
	a) Spring, Nozzle, Seat	5% of total quantity of identical pressure relief valves or minimum one number which ever is higher.
	b) Gasket set, O-Ring set	20% of total quantity of identical pressure relief valves or minimum one number whichever is higher.
	c) Complete Pilot of Pilot operated pressure safety valves	5% of total quantity of identical pilot operated pressure relief valves or minimum one number whichever is higher
III	Self actuated regulators	a) Grouping of valves with respect to size, rating, material & trim type and 10% subject to minimum 1 no. of the following items of each group, whichever is higher : - I. Plug & Seat Assembly II. Gland packing III. Actuator Diaphragm. IV. Bonnet gaskets (for all type of valves)
3	PLC	
I	Each type of modules used in PLC like I/O cards, processor cards, power supply cards, communication cards, interface cards, etc. as	5% of the total installed quantity subject to minimum one number, whichever is higher of each type.

Sl. No.	Part Description	Quantity Required
	being offered by the system	
II	IS isolator barriers	
	a) Analog input	5 % of total quantity
	b) Analog output	5 % of total quantity
	c) Digital input	5 % of total quantity
	d) Thermocouple / RTD	5 % of total quantity
III	Isolator/signal multiplier	5% of total installed quantity subject to minimum one number, whichever is higher of each type.
IV	IS mV/I converter	5% of total installed quantity subject to minimum one number, whichever is higher of each type.
V	IS RTD/I converter	5% of total installed quantity subject to minimum one number, whichever is higher of each type.
VI	Prefabricated cable	4 set with connecting plug for each type of peripheral and I/O hardware
VII	Keyboard	1 no of each type
VIII	Interposing relay	5% of total installed quantity subject to minimum one number, whichever is higher of each type.
IX	Push button	5% of total installed quantity subject to minimum one number, whichever is higher of each type.
X	Lamps	5% of total installed quantity subject to minimum one number, whichever is higher of each type.
XI	Selector switch	5% of total installed quantity subject to minimum one number, whichever is higher of each type.
XII	Switches	5% of total installed quantity subject to minimum one number, whichever is higher of each type.
XIII	Alarm cards (receiver switches)	5% of total installed quantity subject to minimum one number, whichever is higher of each type.
XIV	MCBs	5% of total installed quantity subject to minimum one number, whichever is higher of each type.
XV	System cabinet air filter	100%
XVI	Annunciator	
	- Power supply module	4 nos
	- Flasher module	4 nos
	- Tone generator card	2 nos
	- Lamps	5 dozen
	- Fuses	2 dozens
XVII	Termination panel/patch card, series resistor, isolator (for safe area signal)	5 % of total quantity
XX	Fuses (of each type)	100 %
4	Vibration and Temperature monitoring system	
I	Each type of module used in machine monitoring system like I/O cards, processor cards, power supply cards, communication card, interface card etc as being offered for system	5% of total installed quantity subject to minimum one number, whichever is higher of each type.
II	Probe of each type (vibration, temp, axial	10% or minimum 1 number, whichever

Sl. No.	Part Description	Quantity Required
	displacement keyphasor, etc)	is higher
III	Fuses of each type	100%
VIII	Selector switches	5% of total installed quantity subject to minimum one number, whichever is higher of each type.
5	Compressor control system	
I	Anti-Surge Controller(If applicable)	01 No.
II	Master /Performance Controller(If applicable)	01 No.
III	Load Sharing Controller (If applicable)	01 No.

Notes:

1. The word 'Type' means the make, model no., type, range, size/length, rating, material as applicable.
2. Whenever % is identified, contractor shall supply next rounded figure.
3. Mandatory spares shall include sub-package items also.
4. Mandatory spares shall be supplied loose for use by client in future.