

LIST OF MANDATORY SPARES (Bidder to fill 'Unit Price' column & Break Up of LOT in 'Remarks' column)

I	Item	Item Description	QTY	UNIT	Currency	Unit Price	Total Price	Remarks (Indicate the Details / Break up of LOT)
		MECHANICAL						
		GAS ENGINE AND AUXILIARIES						
		I Engine Block, Bearings, Oil Sump & Covers						
		1. Camshaft Bearing Bush	1 sets				0	
		2. Cylinder head screw	1 sets				0	
		3. Cylinder liner	1 sets				0	
		4. Antipolishing Ring	2 sets				0	
		5. Sealing Set	2 sets				0	
		6. Thrust Bearing Kit	2 sets				0	
		7. Main Bearing Kit	4 sets				0	
		8. Sealing kit for Covers & End Covers	2 sets				0	
		II. Connecting Rod & Piston						
		9. Big End Bearing kit	2 sets				0	
		10. Piston	1 sets				0	
		11. Piston Ring set	1 sets				0	
		12. Small End Bearings	1 sets				0	
		13. Connecting Rod Screws	1 sets				0	
		14. Shims	2 sets				0	
		15. Connecting Rod (Lower part)	1 nos.				0	
		16. Connecting Rod (Upper part)	1 sets				0	
		17. Securing Ring	2 sets				0	
		18. Gudgeon Pin	2 sets				0	
		III Cylinder Head with Valves						
		19. Cylinder Head	1 sets				0	
		20. Starting valve	4 nos.				0	
		21. Inlet valve (complete)	4 nos.				0	
		22. Sealing set for Cylinder head replacement	4 nos.				0	
		23. Seat ring for inlet valve	4 nos.				0	
		24. Seat ring for outlet valve	8 nos.				0	
		25. Sealing set for cylinder head overhaul	4 nos.				0	
		26. Exhaust Valve (complete)	8 nos.				0	
		IV Valve Mechanism & Camshaft						
		27. Intermediate Gear	1 sets				0	
		28. Intermediate Gear Bearing	2 sets				0	
		29. Camshaft piece	2 nos.				0	
		30. Push Rod	2 sets				0	
		31. Protecting pipes	2 sets				0	
		32. Valve tappet	2 sets				0	
		33. Gear	2 sets				0	
		34. Guide pin	2 sets				0	
		35. Screw	2 sets				0	
		V Turbocharger, charge Air Cooler & Waste Gates						
		36. Charge Air Cooler	2 sets				0	
		37. Turbocharger Bearings	4 sets				0	
		38. Turbocharger Thrust collar	2 nos.				0	
		39. Turbine Inlet casings	2 nos.				0	
		40. Turbocharger Nozzle Ring	2 nos.				0	
		41. Turbocharger Shroud Ring	2 nos.				0	
		42. Turbine outlet Casings	2 nos.				0	
		43. Turbocharger Rotor & Rotating parts	2 nos.				0	
		VI Ignition Equipment & Gas Manifold						
		44. Spark Plug	20 nos.				0	
		45. Pre Combustion Chamber Valve	10 nos.				0	
		46. Ignition Module	5 nos.				0	
		47. Connection piece/pipes (All types)	1 2 nos. each type (LOT)				0	
		48. Ignition Cable	10 nos.				0	
		49. Not Used						
		50. Main Gas admission valves	2 nos.				0	
		VII Lubricating oil system						
		51. Pump Sealing Set	4 sets				0	
		52. Fuel Feed pipes	4 nos.				0	
		53. Lube oil pump Bearings	1 1 set each type (LOT)				0	
		54. Lube Oil service Kit	2 nos.				0	
		55. Lube Oil Thermostat element	2 nos.				0	
		56. Lube Oil Thermostatic element set	10 nos.				0	
		57. Lube Oil filter Candles	5 sets				0	
		58. Lube oil pump Driving Gear	2 nos.				0	
		59. Pre Lube Oil pump gear	2 nos.				0	
		VIII Governor						
		60. Governor Drive Bearing	2 sets				0	
		IX Cooling water System						
		61. LT water pump	2 nos				0	
		62. HT water pump	2 nos				0	
		63. Driving gear (All types)	1 LOT : 1 no each type				0	
		64. NRV for circulating pump	2 nos				0	
		X Exhaust System						
		65. Positioner	2 nos				0	
		66. Bellows (All types)	1 LOT: 2 nos each type				0	
		67. Multiduct service Kit	2 nos				0	
		XI Automation & Engine Control						
		68. Knock Sensor	4 nos				0	
		69. Temperature Sensor (All types)	1 2 nos each type (LOT)				0	
		70. Control Unit CCM	2 nos				0	
		71. Electronic Unit IOM	4 nos				0	
		72. Control Unit	2 nos				0	
		73. Engine Safety module	2 nos				0	
		74. Pressure Transducer	4 nos				0	
		75. Pressure Sensor (All types)	1 2 nos each type (LOT)				0	
		76. I/P Convertor	2 nos				0	
		77. Speed Pick-Up (All types)	1 2 nos each type (LOT)				0	
		78. Speed sensor	1 2 nos each type (LOT)				0	
		79. Limit Switch (All types)	1 2 nos each type (LOT)				0	
		XII Starting Air System						
		80. Starting Air Master Valves of each drive type	1 2 nos each type (LOT)				0	
		81. Start Blocking Valve	2 nos				0	
		82. Flame Arrestor	2 sets				0	
		Other spares						
		83. O ring (All types)	1 1 no. of each type (LOT)				0	
		84. Sealing sets (All other types not mentioned above)	1 2 nos each type (LOT)				0	
		85. Butterfly valves (All types)	1 2 nos each type (LOT)				0	
		86. Filter cartridge (All types other than Lube Oil filter)	1 1 no.of a particular type and size of filter (LOT)				0	

87.	Bel lows (All types)	2	sets			0
	WATER SYSTEM:					
	A). Horizontal Centrifugal Pumps (Each type / model)					
1.	Impeller with nuts & other accessories	1	Set			0
2.	Wearing rings (Impeller & Casing ; as applicable)	2	Set			0
3.	Shaft	1	Set			0
4.	Shaft Sleeves	2	Set			0
5.	Pump & Drive Coupling, bushes, pins with all fasteners	1	Set			0
6.	Pump bearings	1	Set			0
7.	Mechanical Seal	1	Set			0
	Note : One set consists of quantity required for complete replacement for one pump					
	B). Vertical Pumps (Each type /model) - If applicable					
1.	Suction Bell / Impeller guide piece	1	1 Number each (LOT)			0
2.	Bowl assembly	1	set			0
3.	Impeller with nuts and other accessories	1	no			0
4.	Impeller Shaft with fasteners	1	set			0
5.	Shaft Sleeves	2	set			0
6.	Line Shafts & Head Shafts	1	set			0
7.	All Gaskets , O-rings	2	set			0
8.	Wearing rings – Impeller (If applicable)	1	set			0
9.	Wearing Rings – Casing (if applicable)	1	set			0
10.	Line, Head and Impeller Shaft bearings	2	set			0
11.	Thrust bearings (of pump & drive assembly)	1	set			0
12.	Shaft couplings with all fasteners	1	set			0
13.	Pump & Drive Coupling with all fasteners & coupling Guards	1	set			0
14.	Gland Assembly / Mechanical seal as applicable	2	set			0
15.	Gland packing as applicable	3	set			0
16.	Thrust brg. collar if applicable	1	set			0
17.	Bearing housing	1	set			0
	C). SWRO (Membranes)					
1.	RO Membranes	1	20% of total installed membranes in all the two streams / trains or 2 Nos whichever is higher (LOT)			0
	D). High Pressure Pumps (RO Plant)					
1.	Impeller with nuts & other accessories	1	Set			0
2.	Wearing rings (Impeller & Casing ; as applicable)	2	Set			0
3.	Shaft	1	Set			0
4.	Shaft Sleeves	2	Set			0
5.	Pump & Drive Coupling, bushes, pins with all fasteners	1	Set			0
6.	Pump bearings	1	Set			0
7.	Mechanical Seal	1	Set			0
	Note : One set consists of quantity required for complete replacement for one Pump					
	E). Energy Recovery (ERU) Units – If applicable					
1.	PX Exchangers	1	100 % of PX units installed for one SWRO train/stream (LOT)			0
2.	Upstream & Downstream isolation valves	1	10% of Valves installed for one SWRO train/stream (LOT)			0
3.	PX Booster Pumps					
i	Impeller with nuts & other accessories	2	Set			0
ii	Wearing rings (Impeller & Casing ; as applicable)	4	Set			0
iii	Shaft	2	Set			0
iv	Shaft Sleeves	4	Set			0
v	Pump & Drive Coupling, bushes, pins with all fasteners	1	Set			0
vi	Pump bearings	1	Set			0
vii	Mechanical Seal	1	Set			0
	Note : One set consists of quantity required for complete replacement for one Turbo Charger / PX pump as the case may be					
	F). Chemical Cleaning System (SWRO Plant)					
1.	Mixer (Agitator) of Chemical Tanks	1	NO			0
2.	Chemical Cleaning Pump & Motor	1	NO			0
3.	Cartridge Filter Elements	1	Set			0
	G). Flushing Cleaning System (SWRO Plant)					
1.	Flushing Pump & motor	1	NO			0
	H). Pre- Filtration					
	(i) Cartridge Filtration Units (For SWRO Plant) (If applicable)					
1.	Cartridge Filters Elements	1	30% of total installed membranes in all the three streams/trains (LOT)			0
	(ii) Pressure Sand (PSF) Filters (If applicable)					
1.	Inlet Water Distributor Assembly	2	Set			0
2.	Strainers / Nozzles of Under drain Collector OR Header Lateral Collector (whichever is applicable)	1	Set			0
3.	Filter Media	1	One full charge for one filter + 10% (LOT)			0
	Note : One set consists of quantity required for complete replacement for one filter					
	(iii) Dual Media (DMF) Filters-If applicable					
1.	Inlet Water Distributor Assembly	2	Set			0
2.	Strainers / Nozzles of Under drain Collector OR Header Lateral Collector (whichever is applicable)	1	Set			0
3.	Filter Media	1	One full charge for one filter + 10% (LOT)			0
	Note : One set consists of quantity required for complete replacement for one filter					
	(iv) Filter Backwash Water Pumps- If applicable					
1.	Impeller with nuts & other accessories	1	Set			0
2.	Wearing rings (Impeller & Casing ; as applicable)	2	Set			0
3.	Shaft	1	Set			0
4.	Shaft Sleeves	2	Set			0
5.	Pump & Drive Coupling, bushes, pins with all fasteners	1	Set			0
6.	Pump bearings	1	Set			0
7.	Mechanical Seal	1	Set			0
	Note : One set consists of quantity required for complete replacement for one pump					
	(v) Filter Air Blowers (Air scouring of PSF & DMF)- If applicable					
1.	Impeller with nuts & other accessories	1	Set			0
2.	Shaft	1	Set			0
3.	Bearings of Blowers	1	Set			0
4.	Suction filter Assembly	1	Set			0
5.	V Belts(if applicable)	1	Set			0
	Note : One set consists of quantity required for complete replacement for one blower of each type / rating/ size					
	(vi) Filter Feed Pumps-If applicable					
1.	Impeller with nuts & other accessories	1	Set			0
2.	Wearing rings (Impeller & Casing ; as applicable)	2	Set			0
3.	Shaft	1	Set			0

	4.	Shaft Sleeves	2	Set			0
	5.	Pump & Drive Coupling, bushes, pins with all fasteners	1	Set			0
	6.	Pump bearings	1	Set			0
	7.	Mechanical Seal	1	Set			0
		Note : One set consists of quantity required for complete replacement for one Pump					
		I) UF SYSTEM					
		I-1) Ultra-filtration (UF) Plant – Membranes					
	1)	UF Membranes	1	10% of total installed membranes in proposed streams/trains (LOT)			0
		I-2) UF Feed Pumps (UF Plant)					
	1)	UF feed pump	1	Set			0
		I-3) UF Feed Pumps (SWRO Plant)					
	1)	Impeller with nuts & other accessories	2	Set			0
	2)	Wearing rings (Impeller & Casing ; as applicable)	4	Set			0
	3)	Shaft	2	Set			0
	4)	Shaft Sleeves	4	Set			0
	5)	Pump & Drive Coupling, bushes, pins with all fasteners	1	Set			0
	6)	Pump bearings	1	Set			0
	7)	Mechanical Seal	1	Set			0
		Note : One set consists of quantity required for complete replacement for one Pump					
		I-4) UF Permeate Transfer Pumps (UF Plant)					
	1)	Impeller with nuts & other accessories	2	Set			0
	2)	Wearing rings (Impeller & Casing ; as applicable)	4	Set			0
	3)	Shaft	2	Set			0
	4)	Shaft Sleeves	4	Set			0
	5)	Pump & Drive Coupling, bushes, pins with all fasteners	1	Set			0
	6)	Pump bearings	1	Set			0
	7)	Mechanical Seal	1	Set			0
		Note : One set consists of quantity required for complete replacement for one Pump					
		J). Valves (except Control Valves) – For Sizes 80 mm NB and less					
	1.	Valves of all types	1.	2 numbers of each type / size /material of construction (LOT)			0
		K). Valves (except Control Valves) – For Sizes above 80 mm NB					
	1.	Sluice Valves / Gate Valves					
	a)	Seats, Rings, Gaskets, Gland, Packing & Nuts	1	1 number of each type / size /material of construction (LOT)			0
	b)	Complete Valve (including gear operator as applicable)	1	1 number of each type / size /material of construction (LOT)			0
	2.	Butterfly Valves					
	a)	Seats, Rings, Gaskets, Gland, Packing & Nuts, Disc, &Bearings	1	1 number of each type / size /material of construction (LOT)			0
	b)	Complete Valve (including gear operator as applicable)	1	1 number of each type / size /material of construction (LOT)			0
	3.	Diaphragm Valves					
	a)	Diaphragms	1	2 nos. of each type / size /material of construction (LOT)			0
	b)	Seats, Rings, Gaskets, Gland, Packing & Nuts & Bush	1	1 set of each type / size /material of construction (LOT)			0
	c)	Complete Valve (including gear operator as applicable)	1	1 number of each type / size /material of construction (LOT)			0
	4.	Globe Valves					
	a)	Seats, Rings, Gaskets, Gland, Packing & Nuts, Disc, & Bearings	1	1 set of each type / size /material of construction (LOT)			0
	b)	Complete Valve (including gear operator as applicable)	1	1 number of each type / size /material of construction (LOT)			0
	5.	Plug Valves					
	a)	Seats, Rings, Gaskets, Gland, Packing & Nuts, Plug	1	1 set of each type / size /material of construction (LOT)			0
	b)	Complete Valve (including gear operator as applicable)	1	1 number of each type / size /material of construction (LOT)			0
	6.	Check Valves of all types					
	a)	Seats, Rings, Disc/ Door/ Flap, Hinge& Door pins, Gland, Packing & Nuts, Gaskets, Ball (for lift type)	1	1 set of each type / size /material of construction (LOT)			0
	b)	Complete Valve	1	1 number of each type / size /material of construction (LOT)			0
	7.	Air Release Valves					
	a)	Seats, Rings, Gaskets	1	1 set of each type / size /material of construction (LOT)			0
	b)	Complete Valve	1	1 number of each type / size /material of construction (LOT)			0
		Note : One set consists of quantity required for complete replacement for one valve					
		L). ELECTRICALLY OPERATED HOISTS					
	1.	Bearings	1	Set			0
	2.	Rope guide	1	Set			0
	3.	Brake lining	1	Set			0
	4.	Wire rope	1	Set			0
		Note : One set consists of quantity required for complete replacement for one hoist of each type & capacity					
		PLANT UTILITIES:					
		1.00.00 Compressed Air System:					
	1.01.00	Oil free Screw Air Compressor (As applicable)					
	1.01.01	H. P. Stage Complete HP Stage assembly consisting of high pressure element, Bearing for male and female rotors (drive end), Bearing for male and female rotors (non-drive end), Timing gears, Graphite ring shaft for compressor chambe	1	1 Set of each type/rating (LOT)			0
	1.01.02	L. P. Stage Complete LP Stage assembly consisting of high pressure element, Bearing for male and female rotors (drive end),Bearing for male and female rotors (non-drive end), Timing gears, Graphite ring shaft for compressor cha	1	1 Set of each type/rating (LOT)			0
	1.01.03	Motor Bearings	2	set			0
	1.01.04	LP stage Gear and Pinion	1	set			0
	1.01.05	HP stage Gear and Pinion	1	set			0
	1.01.06	Air Intake Filter Element With Gaskets	4	set			0
	1.01.07	Oil Filter Element With Gaskets & Seals	4	set			0
	1.01.08	Safety Valve Springs and Gaskets for HP stage	1	set			0
	1.01.09	Safety Valve Springs and Gaskets for LP stage	1	set			0
	1.01.10	Valves (within the compressor house with actuators	12	nos of each type/ratings/ size (LOT)			0
	1.01.11	Oil Pump/Motor					
	1.01.11.1	Oil Pump and Motor complete assembly	1	set			0

	1.01.11.2	Pump impeller/rotor with shaft		1	set				0		
	1.01.11.3	Set of bearings		2	set				0		
	1.01.11.4	Set of Seals		2	set				0		
	1.01.12	Drain / Moisture Trap		1	2 Set of each type/size (LOT)				0		
	1.01.13	Oil Cooler Gaskets & Seals		2	set				0		
	2.00.00	AIR DRYING PLANT (Twin tower type) FOR IA SYSTEM (As applicable)									
	2.01.01	Pre filter element(Ceramic candle or as applicable)		2	set				0		
	2.01.02	After filter element(Ceramic candle or as applicable)		2	set				0		
	2.01.03	Valves & Valve Actuators (pneumatic/hydraulic)		2	set				0		
	2.01.04	Heater coil for temperature stabilization (for HOC type)(as applicable)		2	set				0		
	2.02.00	MEASURING INSTRUMENTS									
	1	Electronic Transmitters									
	(i)	Transmitters of all types, ranges and model no. (for the measurement of Pressure, differential pressure flow, level, etc.)		1	10% or 1 No. of each type and model, whichever is more (LOT)				0		
	2	Temperature elements									
	(i)	RTD's* of each type and length		1	10% or 2 Nos. of each type and length Whichever is more (LOT)				0		
	ii)	Thermocouples of each type like K-type, R- type, metal etc. and length *		1	10% or 2 Nos. of each type and length Whichever is more (LOT)				0		
	(iii)	Thermowell for application like mill outlet temperature and SH/RH/Eco/ true gas temp. in furnace		1	10% or 2 Nos. of each type and length Whichever is more (LOT)				0		
	(iv)	Temperature transmitters		1	10% of each type and length whichever is more (LOT)				0		
	3	Local Indicators like temperature gauges, pressure gauges, differential pressure gauges, flow gauges flow meters etc.,		1	5% or 1 No. of each make, model and type whichever is more (to be divided to various ranges in proportion to main of all make (LOT)				0		
	4	Process Actuated Switch Devices Includes all types of Pressure, differential pressure, flow, temperature, differential temperature, level switch Devices		1	5% or 1 No. of each type and model whichever is more (LOT)				0		
	5	Dew Point meters		1	5% or 1 No. of each type and model whichever is more (LOT)				0		
	2.03.00	MICROPROCESSOR BASED/PLC BASED CONTROL/ELECTRONIC BASED CONTRAL PANEL (IF APPLICABLE)									
	1	Fully programmed controller of electronic modules of each type (as applicable)		1	10% or 1 no. whichever is more (LOT)				0		
	2	Power supply module (if applicable)		1	10% or 1 no. whichever is more (LOT)				0		
	2.04.00	Rotary drum type Air drying plant for Instrument Air system (As applicable)									
		Drive assembly consisting of motor, gear boxes, drive shaft & coupling		1	Set				0		
	2.05.00	Air compressor motor		1	No.				0		
	3.00.00	FIRE DETECTION AND PROTECTION SYSTEM						Unit Price	Total Price	Remarks	
	Item	Description		Qty	Unit	Currency	Ex Works			(Indicate	
	1.0	PUMPS	Hydrant	Jockey							
	1.1	Impeller		1	set	INR			0		
	1.2	Pump bearing (Incl. thrust brg., journal brg., line shaft brg.)		1	set	INR			0		
	1.3	Pump shaft		1	set	INR			0		
	1.4	Wearing rings		2	set	INR			0		
	1.5	Shaft Sleeve		1	set	INR			0		
	1.6	Bushings		2	set	INR			0		
	1.7	Bearing housing (if provided)		1	set	INR			0		
	1.8	Coupling bolts & nuts (with bushes)		1	set	INR			0		
		Above quantity/items are required for each type and rating of pumps being supplied under the contract									
	2.0	DIESEL ENGINE (1 set means item required for 1 diesel engine)									
	Item	Qty	Hydrant			Unit Price	Total	Remarks (Indicate			
						Ex Works	Price	the Details / Break			
	2.1	Sprayers/Injector		1	set			0			
	2.2	Piston rings & sealing rings		1	set			0			
	2.3	Exhaust valve assembly		1	set			0			
	2.4	Springs		1	set			0			
	2.5	Packings and gaskets		1	set			0			
	2.6	Fuel oil filter elements with seals		2	set			0			
	2.7	Fuel oil filter assembly		1	set			0			
	2.8	Lub. oil filter elements with seals		2	set			0			
	2.9	Scrapper rings		1	set			0			
	2.10	Solenoid coil for fuel valve		1	set			0			
	2.11	Corrosion inhibitor (if provided)		1	set			0			
	2.12	Big end & small end bearing of connecting rod		1	set			0			
	2.13	Speedometer		1	set			0			
	2.14	Speedometer wire		1	set			0			
	2.15	Rubber hoses of water line with mounting clamps		1	set			0			
	2.16	Cranking starter assembly complete		1	set			0			
	2.17	Lub. oil and fuel oil hoses with end connectors		1	set			0			
	2.18	Water pump bells		2	set			0			
		Above quantity/items are required for each type and rating of diesel engine being supplied under the contract									
	3.0	FIRE HOSES WITH COUPLINGS									
	3.1	7.5m long fire hoses (internal) with end connectors		1	10% of population (LOT)			0			
	3.2	15m long fire hoses (internal) with end connectors		1	10% of population (LOT)			0			
	3.3	15m long fire hoses (external) with end connectors		1	10% of population (LOT)			0			
	4.0	BRANCH PIPES WITH NOZZLES									
	4.1	Nozzles with branch pipes & quick coupling ends (internal)		1	10% of population (LOT)			0			
	4.2	Nozzles with branch pipes & quick coupling ends (external)		1	10% of population (LOT)			0			
	5.0	DELUGE VALVE ASSEMBLIES									
	5.1	Complete deluge valve assembly along with internals and accessories									
	5.1.1	150 NB		1	10% of population (Min 1 Set) : (LOT)			0			
	5.1.2	100 NB		1	10% of population (Min 1 Set) : (LOT)			0			
	5.1.3	80 NB		1	10% of population (Min 1 Set) : (LOT)			0			
	5.1.4	50 NB		1	10% of population (Min 1 Set) : (LOT)			0			
	5.2	Clapper assembly complete (consisting of clapper seat rubber, screws, etc.)									
	5.2.1	150 NB		1	10% of population (Min 1 Set) : (LOT)			0			
	5.2.2	100 NB		1	10% of population (Min 1 Set) : (LOT)			0			
	5.2.3	80 NB		1	10% of population (Min 1 Set) : (LOT)			0			
	5.2.4	50 NB		1	10% of population (Min 1 Set) : (LOT)			0			
	5.3	Solenoid coils									
	5.3.1	150 NB		1	10% of population (Min 1 Set) : (LOT)			0			
	5.3.2	100 NB		1	10% of population (Min 1 Set) : (LOT)			0			
	5.3.3	80 NB		1	10% of population (Min 1 Set) : (LOT)			0			
	5.3.4	50 NB		1	10% of population (Min 1 Set) : (LOT)			0			
	6.0	VALVES (GATE/GLOBE/BUTTERFLY/NRV)									
	6.1	Complete valves		1	5% of population of each type & size (LOT)			0			

6.2	Reduction gear operator(Gate/Globe/Butterfly)	1	10% of population of each type & size (LOT)			0
6.3	Flap/door with pin(NRV)	1	10% of population of the each type & size (LOT)			0
6.4	Disc(butterfly/globe)	1	5% of population of each type & size (LOT)			0
6.5	Gate(Gate valve)	1	5% of population of each type & size (LOT)			0
6.6	Stem(all types)	1	5% of population of each type & size (LOT)			0
6.7	Seal rings(all types)	1	10% of population of each type & size (LOT)			0
6.8	Flap rings(NRV)	1	10% of population of each type & size (LOT)			0
6.9	Gaskets	1	10% of population of each type & size (LOT)			0
6.10	Bearing(Butterfly valve)	1	10% of population of each type & size (LOT)			0
6.11	Motorized actuator of butterfly valve 300 NB	1	No.			0
7.0	BASKET STRAINERS / Y-TYPE STRAINERS for HVW/MVW SYSTEM					
7.1	Strainer elements with O-rings and stiffeners.					
7.1.1	Basket strainer	1	20% of population of each type & size (LOT)			0
7.1.2	Y- Type strainer	1	20% of population of each type & size (LOT)			0
8.0	MVW SPRAY SYSTEM					
8.1	Spray Nozzles	1	5% of population (LOT)			0
8.2	QB Detectors	1	5% of population (LOT)			0
9.0	HVW SPRAY SYSTEM					
9.1	Spray nozzles	1	5% of population (LOT)			0
9.2	QB Detectors	1	5% of population (LOT)			0
10.0	HYDRANT VALVE					
10.1	Hydrant valve complete (internal) single headed with instantaneous female coupling	1	20% of population (LOT)			0
10.2	Hydrant valve complete (external) single headed with instantaneous female coupling	1	20% of population (LOT)			0
10.3	Water monitor sets with nozzle branch pipe etc.	1	5% of population (LOT)			0
10.4	Spindle with nuts of Hydrant valve	1	10% of population (LOT)			0
10.5	Bonnet, gland nut, rubber assembly of hydrant valve	1	10% of population (LOT)			0
10.6	Seat, check nut, washer assembly of hydrant valve	1	10% of population (LOT)			0
10.7	Rubber washer for female coupling	1	10% of population (LOT)			0
10.8	Instantaneous female coupling assembly complete for hydrant valve	1	10% of population (LOT)			0
10.9	Lock pin assembly for hydrant valve	1	10% of population (LOT)			0
11.0	FIRE DETECTORS					
11.1	Multisensor detectors (Addressable)	1	5% of population (LOT)			0
11.2	In indicators assembly for smoke detectors provided in false ceiling (Response indicator)	1	5% of population (LOT)			0
12.0	PORTABLE EXTINGUISHERS					
12.1	Water type	1	10% of each type (LOT)			0
12.2	Foam Type	1	10% of each type (LOT)			0
12.3	CO ₂ Type	1	10% of each type (LOT)			0
12.4	Dry Chemical Type	1	10% of each type (LOT)			0
13.0	MOBILE EXTINGUISHERS					
13.1	Foam type	1	10% of each type (LOT)			0
13.2	CO ₂ Type	1	10% of each type (LOT)			0
13.3	Dry Chemical Type	1	10% of each type (LOT)			0
14.0	INERT GAS EXTINGUISHING SYSTEM					
14.1	Nozzles	1	2 Nos. of each size/type (LOT)			0
14.2	Automatic & Manual release system	1	1 No. of each size/type (LOT)			0
14.3	Cylinder valve with safety pressure relief device	1	1 No. of each size/type (LOT)			0
14.4	Flexible hoses(if applicable)	1	5 Nos. of each size/type (LOT)			0
14.5	Solenoid coils	1	2 Nos. of each size/type (LOT)			0
15.0	FIRE ALARM PANEL & REPEATER FIRE ALARM PANEL					
15.1	Fuses	1	100% of population (LOT)			0
15.2	Indicating lamps	1	100% of population (LOT)			0
15.3	Push Button	1	10 Nos. of each type and rating (LOT)			0
15.4	Power supply modules	1	10% or 1 No. of each type & rating whichever is more (LOT)			0
15.5	Control modules, loop cards modules, isolator cards	1	10% or 1 No. whichever is more (LOT)			0
15.6	LCD display of each type unit of panel	1	Nos.			0
15.7	Cartridges for printers	2	Nos.			0
15.8	Interface unit / modules for non- addressable devices, auxiliary / output relay modules, control modules, supervisory control modules and any other electronic modules	1	10% or 1 No.of each type whichever is more (LOT)			0
15.9	LED's of each type	1	100% of population (LOT).			0
15.9.1	Power supervision relay	1	4 Nos. of each type (LOT)			0
15.10	Fire screen / alarm buzzer	1	1 No. of each type (LOT)			0
16.0	ELECTRICAL					
16.1	Electrical Actuator	1	10% or 1 No. of each type, model and rating whichever is more (LOT)			0
17.0	CONTROL AND INSTRUMENTATION					
17.1	MEASURING INSTRUMENTS					
17.1.1	All types of Local indicators	1	2 Nos. of each make, model and type (LOT)			0
17.1.2	Process Actuated Switch Devices : (All types of Pressure, diff. pressure, flow, temperature, level switch devices).	1	2 Nos. of each type and model (LOT)			0
17.1.3	All type of Electronic Transmitters and Ultrasonic Transmitters including sensors.	1	10% or 1 No. of each type and model whichever is more (LOT)			0
17.1.4	Limit switches for isolation valves	1	2 Nos. of each type (LOT)			0
18.0	PROCESS CONNECTION PIPING (For Impulse Piping / Tubing and Air Supply Piping as Applicable)					
18.1.1	Valves	1	1 No. of each type, class, size and model (LOT)			0
18.1.2	2 way, 3 way, 5 way valve manifolds	1	1 No. of each type, class, size and model (LOT)			0
18.1.3	Fittings	1	5% or 1 No. of each type, class, size and model whichever is more (LOT)			0
19.0	CABLES					
19.1.1	Pre fabricated cable of each type.	1	1 No. of each type, size and model (LOT)			0
19.1.2	Pre fabricated cable connector	1	1 No. of each type, size and model (LOT)			0
19.1.3	Other cables (including core cable, short-term fire proof cable, fiber optic cables, etc.)	1	5% of each type, pair/ core and size of actual installed quantity (LOT)			0
20.0	PLC CONTROL SYSTEM					
20.1.1	Power Supply Unit	1	1 No. of each type and model (LOT)			0
20.1.2	Electronic modules(I/O modules, communication modules and any other module used in the system)	1	10% or 1 No. of each type and model, whichever is more (LOT)			0
20.1.3	Central Processor Unit	1	1 No. of each type and model (LOT)			0
20.1.4	Interconnecting Cables	1	10% of each type & size (LOT)			0
20.1.5	Cooling Fan in PLC system / cabinet	2	Nos.			0
20.1.6	Indication lamps of all types	1	100% (LOT)			0
20.1.7	Graphical Interface Unit	1	No.			0

21.0	24V – DC POWER SUPPLY SYSTEM						
21.1.1	CTs, CVTs, VTs, chokes, AC/DC isolators, contactors, timers, relays	1	5% or 2 Nos. of each type and rating whichever is more (LOT)			0	
21.1.2	Fuses of each type and rating	1	200% (LOT)			0	
21.1.3	Fuse free Circuit breakers	1	5% or 5 Nos. of each type and rating whichever is more (LOT)			0	
21.1.4	Electronic modules of all types	1	One No. of each type (LOT)			0	
21.1.5	Indication lamps	1	100%			0	
21.1.6	Cooling Fans	1	1 No. of each type (LOT)			0	
21.1.7	Indicators	1	1 No of each type and rating (LOT)			0	
21.1.8	Relays of all types including overload relays	1	2 Nos. of each type and rating (LOT)			0	
21.1.9	Batteries	1	5% or 2 nos. of each type & rating whichever is more (LOT)			0	
4.00.00	VENTILATION SYSTEM						
1.0	MOTOR for supply air fan/Exhaust Air fan/ Roof Extractor	1	1 no. each type and rating (LOT)			0	
	ELECTRICAL:						
	Mandatory spares for Dry Type Transformers						
1	HV Bushing (if applicable)	1	No.			0	
2	LV Bushing (if applicable)	1	No.			0	
3	LV Neutral Bushing (if applicable)	1	No.			0	
4	Complete Winding Limb (HV and LV)	1	1 No. Each (LOT)			0	
5	WTI (if applicable)	1	No.			0	
6	Set of Thermister /RTD with associated leads complete for one transformer	1	Set			0	

complete transformer.

		QTY	Currency in	Unit Price [Ex Works]	Total Price	Remarks (Indicate the Details / Break	
	MANDATORY SPARES for oil filled transformers and SUT:	UOM					
1.	HV Bushing with metal parts and gaskets (See Note 1) (SUT)	3			0		
	HV Bushing with metal parts and gaskets (See Note 1) (AUX TR)	3			0		
2.	HV Neutral bushing with metal parts and gaskets (if applicable) (SUT)	2			0		
	HV Neutral bushing with metal parts and gaskets (if applicable) (AUX TR)	1			0		
3.	LV bushing with metal parts and gaskets (See Note 1) (SUT)	3			0		
	LV bushing with metal parts and gaskets (See Note 1) (AUX TR)	3			0		
4.	LV Neutral bushing with metal parts and gaskets (if applicable) (SUT)	0			0		
	LV Neutral bushing with metal parts and gaskets (if applicable) (AUX TR)	1			0		
5.	WTI with contacts (SUT)	1			0		
	WTI with contacts (AUX TR)	1			0		
6.	OTI with contacts (SUT)	1			0		
	OTI with contacts (AUX TR)	1			0		
7.	Pressure relief device (if applicable) (SUT)	1			0		
	Pressure relief device (if applicable) (AUX TR)	1			0		
8.	MOG (SUT)	1			0		
	MOG (AUX TR)	1			0		
9.	Buchholz relay complete (SUT)	1			0		
	Buchholz relay complete (AUX TR)	1			0		
10.	Oil surge relay (SUT)	1			0		
	Oil surge relay (AUX TR)	0			0		
11.	Set of gaskets (See Note 2) (SUT)	1			0		
	Set of gaskets (See Note 2) (AUX TR)	1			0		
12.	Set of valves (2 nos. of each type/size), LOT (SUT)	1			0		
	Set of valves (2 nos. of each type/size), LOT (AUX TR)	1			0		
13.	Cooler fan with motor (SUT)	2			0		
	Cooler fan with motor (AUX TR)	0			0		
14.	Air cell for conservator (If applicable) (SUT)	1			0		
	Air cell for conservator (If applicable) (AUX TR)	1			0		
	Note 1: Each mandatory spare OIP bushing shall be provided with suitable "stand ".						
	Note 2: 1 set consists of gaskets required for 1 (one) No. transformer for the following						
	(a) Protection and monitoring devices						
	(b) Cooler circuit						
	(c) Largest inspection cover, if applicable						
	(d) HV/LV turret, if applicable						
		Qty	Unit	Currency in	Unit Price [Ex Works]	Total Price	Remarks (Indicate the Details / Break
	MANDATORY SPARES for LT SWITCHGEAR:						
Part A:							
1	Complete breaker	1	10% of each type & rating(min 1 No) (LOT)		0		
2	Ammeter	1	2 Nos of each type, size & range (LOT)		0		
3	Voltmeter	1	2 Nos of each type, size & range (LOT)		0		
4	Relays	1	10 % of each type (min 2 Nos) (LOT)		0		
5	Bus bar support insulators	10	Nos.		0		
Part B:							
1	Spring charging motors	1	3 Nos of each type & rating (LOT)		0		
2	Aux. Contact set	1	6 sets of each type & rating (LOT)		0		
3	Limit switches	1	10 Nos of each type (LOT)		0		
4	Arc chutes	1	10% of each type & rating (LOT)		0		
5	Fixed contact set	1	3 Nos sets of each type & rating (LOT)		0		
6	Moving contact set	1	3 Nos sets of each type & rating (LOT)		0		
7	Arcing contact	1	3 Nos sets of each type (LOT)		0		
8	Charging spring	1	2 Nos of each type & rating (LOT)		0		
9	Current transformer	1	3 Nos of each type & ratio (LOT)		0		
10	Closing coil	1	6 Nos of each type & rating (LOT)		0		
11	Trip coil	1	6 Nos of each type & rating (LOT)		0		
12	CT for Bimetal O/L relays	1	3 Nos of each type & rating (LOT)		0		
13	Voltage transformer	1	3 Nos of each type and ratio (LOT)		0		
14	Control supply transformer	1	3 Nos of each type and rating (LOT)		0		
15	(a) Power contactor	1	2 Nos of each type & rating (LOT)		0		
	(b) Coil of above contactor	1	2 Nos of each type & rating (LOT)		0		
16	Air break switches/ MCCBs	1	3 Nos of each type & rating (LOT)		0		
17	DP air break switches(DC)	1	3 Nos of each type & rating (LOT)		0		
18	Control & selector switches	1	3 Nos of each type & rating (LOT)		0		
19	Control fuses & neutral links	1	Total 50 Nos (Fuses) & 10 Nos (Neutral links), to cover all the ratings (LOT)		0		
20	Indicating lamps	1	Total 30 Nos to cover all the types & ratings (LOT)		0		
21	Vertical bus bar dropper support insulators	25	Nos.		0		
22	Bus duct flexible connectors (both transformer and switchgear end)	1	1 set for thee phases of each type & size (LOT)		0		
23	(a) Primary disconnect in MCC (Bus bar end)(Male/female contact)	1	Total 15 Nos. proportionately divide for all ratings (LOT)		0		
	(b) Secondary disconnect in MCC (Cable end)	1	Total 15 Nos. proportionately divide for all ratings (LOT)		0		
24	Push buttons	1	10 Nos of each type (LOT)		0		

25	Power fuses	1	Total 20% proportionately divide for all ratings (min 3 Nos) (LOT)			0
26	Thermal Bimetal relays	1	Total 5% proportionately divide for all ratings (min 1 No) (LOT)			0
27	Current transducers	1	2 Nos of each type & rating (LOT)			0
28	Voltage transducers	1	2 Nos of each type & rating (LOT)			0
29	Busbar aluminium flat pieces	1	12 meters of each type & rating (LOT)			0
30	Busbar angles/formed pieces for breaker	1	2 Nos. of each type (LOT)			0
31	Terminal blocks	1	12 Nos of each type & rating (LOT)			0
	LIST OF MANDATORY SPARES FOR MV SWITCHGEAR:					
	MV Switchgear (33kV/11kV)					
1	Breaker of each rating	1	10% of each type & rating (Min 1 No.) (LOT)			0
2	Numerical relays	1	10% of each type (Min 2 Nos) (LOT)			0
3	Aux. Relays/ Lock out relays/ Timers(if applicable)	1	10% of each type (Min 2 Nos) (LOT)			0
4	Bus bar support insulators	12	Nos.			0
5	Energy meter of each type & range	1	1 Nos. of each type (LOT)			0
6	Spring charging motor complete	1	2 Nos. of each type (LOT)			0
7	Current transformer of each type & ratio	1	3 Nos. of each type (LOT)			0
8	Potential transformer of each type & ratio	1	3 Nos. of each type (LOT)			0
9	Shunt trip coil	1	5 Nos. of each type & rating (LOT)			0
10	Closing coils	1	5 Nos. of each type & rating (LOT)			0
11	Moving contact assembly of each rating (One set means complete replacement for one breaker)	2	sets			0
12	Stationary (fixed) contact of each rating (One set means complete replacement for one breaker)	2	sets			0
13	Bus seal off bushings	1	3 nos. of each type & size (LOT)			0
14	Limit switches	1	10 Nos. of each type (LOT)			0
15	Control switches	1	2 Nos. of each type (LOT)			0
16	Selector switches	1	2 Nos. of each type (LOT)			0
17	Isolation switch for the control supply	2	Nos.			0
18	Circuit breaker auxiliary contact assembly	1	6 Nos. of each type & rating (LOT)			0
19	indicating lamps with holders	20	sets			0
20	(a) Fuse base and holder	12	Nos.			0
	(b) Fuse link	12	Nos.			0
21	isolating contact (fixed & moving)(one set means male & female contacts of one complete breaker)	1	4 sets of each rating (LOT)			0
22	Terminal blocks	6	Nos.			0
23	Multiple pin plug contact assy. with cables (male & female)	6	Nos.			0
24	inter-phase barrier	1	2 Nos. of each type (LOT)			0
25	Vacuum Contactors with HRC fuses (if applicable)	1	2 Sets (One set= Three fuses) (LOT)			0
26	Surge arresters (if applicable)	1	3 Nos. of each rating (LOT)			0
	LIST OF MANDATORY SPARES FOR GENERATOR & AUXILIARIES:					
	Generator & Auxiliaries					
1	Complete Generator bearings	1	Set			0
2	Exciter bearings (if applicable)	1	Set			0
3	Brush- holder assembly with housing for exciter for rotor winding E/F sensing (if applicable)	1	Set			0
4	Brush Gear assembly complete with brushes for slip ring (if applicable)	1	Set			0
5	Gaskets of all types for Generator	1	Set			0
6	Brush- holder assembly for shaft earthing (if applicable)	1	Set			0
7	Complete Generator phase and neutral bushings with terminal connectors for one machine	1	Set			0
	B Excitation system					
a	Relays	1	2 Nos. of each type (LOT)			0
b	Electronic modules	1	1 Nos. of each type (LOT)			0
c	Rectifier element with heat sinks, RC network and fuses	1	1x100% of one bridge (LOT)			0
d	AC/DC field breaker	1	Nos			0
e	Over voltage suppressor	1	Sets			0
f	Control transformers of each type/rating	1	Sets			0
g	Excitation Transformer	1	Nos			0
h	Field flashing breaker	1	Nos			0
i	Over voltage suppressor	1	Set			0
j	Initial excitation diode	2	Set			0
k	Compatible HMI / Laptops for excitation system	1	1 no. of each type (LOT)			0
l	Software & Programmes / programmed EPROMs with necessary hardware/software keys for multiple use.	1	1 set of each type for one unit (LOT)			0
m	Network switches / ethernet switches with connectors, cables and all accessories complete for one unit.	1	1 no. of each type (LOT)			0
	C VFD drive					
	D Motors					
		1	01 no of each type & rating (LOT)			0
		1	1no of each type and rating (LOT)			0
	LIST OF MANDATORY SPARES FOR GENERATOR & AUXILIARIES:					
	I MV Busduct					
	1 11 KV Busduct					
i	Support insulators	25	Nos.			0
ii	Three phase set of flexible terminal connectors for switchgear end of each type & rating	1	Set			0
iii	Three phase set of flexible terminal connector for transformer end of each type & rating	1	Set			0
iv	Three phase set of flexible terminal connector for Generator end of each type & rating	1	Set			0
v	Three phase set of flexible terminal connector for PTSP and NG Cubicle end of each type & rating	1	Set			0
vi	Seal off bushings of each type & rating	3	Nos.			0
	2 NG Transformer for Generator	1	No.			0
	3 Current trans formers					
a	Generator CTs of each type & rating	3	Nos.			0
	4 VT & SP Cubicles					
a	Lightning arrestor	3	Nos.			0
b	VT for Generator each type and rating	3	Nos.			0
c	Surge capacitor	3	Nos.			0
	ONE SET MEANS COMPLETE REQUIREMENT OF ONE PHASE, WHEREVER NOT SPECIFIED					
NOTE:						
	LIST OF MANDATORY SPARES FOR DG SET:					
1	Ammeter 96x96mm, (0-200 amp) Accuracy class:1.0	1	No.			0
2	A.C. Voltmeter 96x96 mm, (0-15 kV) Accuracy class:1.0	1	No.			0
3	Coil assembly 24 Volts	2	Set			0
4	Solenoid coil for fuel oil system	2	No.			0
5	Complete rotating rectifier assembly for alternator	1	Set			0
6	Voltage regulator complete	1	Set			0
7	Switches	1	1 No. of each type & rating (LOT)			0

8	Power contactors	1	2 No. of each type & rating (LOT)			0
9	Auxiliary contactors	1	1 No. of each type & rating (LOT)			0
10	DC starter assembly with clutch engaging and disengaging arrangements complete with motor	1	No.			0
11	Coil for contactor(for both power and Auxiliary contactors)	1	2 No. of each type & rating (LOT)			0
12	Timer	1	1 No. of each type & rating (LOT)			0
13	Auxiliary relays	1	1 No. of each type & rating (LOT)			0
14	Current transformers	1	1 No. of each type (LOT)			0
15	Voltage transformers	1	1 No. of each type (LOT)			0
16	Battery charging rectifier diodes	4	Nos.			0
17	Fuses	1	6 No. of each type & rating (LOT)			0
18	Start/Stop push buttons	1	2 No. of each type & rating (LOT)			0
19	Indication lamps	1	20% (LOT)			0
20	Indication lamp holders	1	10% (LOT)			0
21	On/Off Isolator	1	No.			0
MANDATORY SPARES LIST FOR CONTROL AND INSTRUMENTATIONS						
CONTROL SYSTEM:						
1.	HMI Devices					
A)	Work station					
(i)	OWS with licensed software	1	1 no. of each type and model (LOT)			0
B)	Network Components					
(i)	Switch/repeaters/hubs/firewalls for PLC/ DDCMIS including Station LAN etc.	1	2 nos. of each type and model (LOT)			0
2.	Cables and Connectors.					
(i)	Prefab interconnecting cables with connectors	1	2 no. of each type and length (LOT)			0
(ii)	System bus cable with connectors	1	2 no. of each type and length (LOT)			0
(iii)	I/O bus cable with connectors for remote I/O units	1	2 no. of each type and length (LOT)			0
(iv)	Loose Connectors	1	5 nos. (sets) of each type (LOT)			0
3.	Power Supply Modules & Power Packs for control system	1	20% or 2 nos. of each type model and rating, whichever is more (LOT)			0
4.	Electronic modules of each type and model for control system, Data communication system, Master and Slave Clock etc. (This shall include all type of cards like I/O cards, Remote I/O cards, communication/Interface cards, con	1	20% or 2 nos. of each type model and rating, whichever is more (LOT)			0
5.	Bus coupler/interface hardware / other communication devices.	1	20% of each type and model or minimum 2 nos. whichever is more (LOT)	2		0
6.	Relays	1	10% of each type and model or minimum 2 nos. whichever is more (LOT)	2		0
7.	Batteries used for battery backup of RAMs(if applicable)	1	10% of each type and model or minimum 2 nos. whichever is more (LOT)	2		0
8.	Fuses	1	200 % of each type and rating (LOT)			0
9.	Cooling fans for Power supply and cabinets.	1	10 % of each type and model (LOT)			0
10	Intelligent mini UPS for workstation server, PCs, LVS, L3 switch.(if applicable)	1	1 no. of each size and rating (LOT)			0
MEASURING INSTRUMENTS:						
1	AAQMS (SO ₂ , NO _x , CO, Mercury, Ozone, Dust monitoring)					0
(i)	Analyzer for SO ₂ , NO _x , CO, Dust monitoring	1	1 no. complete instrument of each type and model (LOT)			0
(ii)	Electronic Card Assemblies/PCBs, power supply modules	1	10% of each type and model (LOT)			0
(iii)	Set of Gaskets/"O" rings/ seals	1	200% of each type, model, rating and size (LOT)			0
(iv)	Heater Assembly.	1	20% of each type and model (LOT)			0
(v)	Temp. Sensor	1	20% of each type and model (LOT)			0
(vi)	Solenoids	1	2 nos. of each type, model and rating (LOT)			0
(vii)	Filters, light source, etc.	1	100% of each type, model and rating (LOT)			0
(viii)	Calibration gases, calibration cell and other consumables for calibration: - of all types and ranges.	1	One year supply (LOT)			0
(ix)	Pump repair kit (if applicable)	1	Set			0
2	(i) CEMS (SO _x , NO _x , CO, CO ₂ , PM, NMHC):-					
(a)	Analyzer for SO _x , NO _x , CO ₂ , CO.	1	1 no complete instrument of each type and model (LOT)			0
(b)	Flue gas flow measurement	1	1 no. complete instrument alongwith sender/receiver unit (LOT)			0
(c)	Stack Opacity measurement	1	1 no. complete instrument alongwith sender/receiver unit (LOT)			0
(d)	Electronic card assembly/ PCBs, moisture/condensate monitor, power supply modules	1	10% of each type, model and rating (LOT)			0
(e)	Set of gaskets/O-rings/ seals	1	200% of each type, model, rating and size (LOT)			0
(f)	Temp. Sensor	1	20% of each type and model (LOT)			0
(g)	Heater assembly, Cooler assembly	1	20% of each type and model (LOT)			0
(h)	Complete Probe with shield assembly (Not applicable for Insitu-path)	1	1 no. of each type and model (LOT)			0
(i)	Solenoids	1	2 nos. of each type, model and rating (LOT)			0
(j)	Filters, light source, sensor, detector, etc.	1	200% of each type, model and rating (LOT)			0
(k)	Calibration gases, Calibration cell and other consumables for calibration: - of all types and ranges.	1	One year supply (LOT)			0
(l)	Heavy duty blower assembly	1	1 no. of each type, size and rating (LOT)			0
(m)	Rotameter/Air flow meter	1	2 nos. of each type, model and rating (LOT)			0
2 (ii)	Oxygen Analyzer (Low & High Temp.)					
(a)	Oxygen measurement instrument	1	1 no complete instrument (along with probe assembly) of each type and model (LOT)			0
(b)	Electronic card assembly/ PCBs, power supply modules	1	10% of each type, model and rating (LOT)			0
(c)	Set of gaskets/O-rings/ seals	1	200% of each type, model, rating and size (LOT)			0
(d)	Temp. Sensor	1	20% of each type and model (LOT)			0

(e) Heater assembly	1	20% of each type and model (LOT)			0
(f) Solenoids	1	2 nos. of each type, model and rating (LOT)			0
(g) Filters	1	100% of each type, model and rating (LOT)			0
(h) Calibration gases of all types and ranges.	1	one year supply (LOT)			0
(I) Rotameter/Air flow meter	1	2 nos. of each type, model and rating (LOT)			0
3 Measuring Instruments					
a) Transmitters					
(i) Transmitters of all type, range and model no. (For the measurement of Pressure, differential pressure flow, level, temperature etc.)	1	10% of each type and model (LOT)			0
(ii) Interface modules at field(between field transmitter & DDCMIS)like Zener barrier, power supply isolator, isolater(as applicable)etc.	1	10% of each type (LOT)			0
b) Temperature elements					
(i) RTD's	1	10% of each type and length (LOT)			0
(ii) Thermocouples	1	10% of each type and length (LOT)			0
POWER SUPPLY SYSTEM:					
Uninterrupted Power supply (UPS) System including Static Switches for Sub Distribution					
(i) Silicon controlled thyristors, diodes and power transistors.	1	100% (LOT)			0
(ii) Capacitors	1	Set			0
(iii) CT's, CVT's VT's chokes, AC/DC isolators, contactors, timers, relays.	1	10% of each type and rating (LOT)			0
(iv) Fuses of each types and rating	2	200%(LOT)			0
(v) Fuse free Circuit breakers	1	5% of each type and rating (LOT)			0
(vi) Electronic modules	1	10% of each type (LOT)			0
(vii) Indication lamps	1	100% of each type (LOT)			0
(viii) Lamp holders with series resistor, if any	1	10% of each type (LOT)			0
(ix) Cooling Fans	1	2 nos. of each type (LOT)			0
(x) Digital/analog panel meters/ indicators	1	1 no. of each type (LOT)			0
(xi) Relays of all types including overload relays.	1	10%(LOT)			0
(xii) Static Switch	1	10% or minimum 1 no (whichever is higher) of each type and rating (LOT)			0
INSTRUMENTATION CABLE, INTERNAL WIRING:					
(i) Pre fabricated cable of each type (other than DDCMIS application) (if applicable)	1	10% of installed quantity (LOT)			0
(ii) Pre fabricated cable connector (other than DDCMIS application) (if applicable)	1	10% of each type and model (LOT)			0
(iii) Other cables (Instrumentation and Control cable)	1	5% or 500 mtrs whichever is more for each type, pair and size of actual supplied quantity (LOT)			0
CCTV:					
(i) Camera	1	10% of each type or 2 nos. which ever is more (LOT)			0
(ii) Full function keyboard & Joystick	1	No.			0
(iii) Client Work Stations with monitor	1	No.			0
(iv) Network Switches	1	10% of each type ,make ,model etc. (LOT)			0
(v) Camera/Database Server	1	No.			0
(vi) Mechanism motors	1	10% (LOT)			0
(vii) Media Converters	1	10% (LOT)			0
(viii) Camera mounting arrangement.	1	10% of each type or 2 nos. whichever is more (LOT)			0
PROCESS CONNECTION PIPING (FOR IMPULSE PIPING/TUBING, SAMPLING PIPING/TUBING AND AIR SUPPLY PIPING AS APPLICABLE):					
(i) Valves of all types	1	10% (LOT)			0
(ii) 2 way, 3 way, 5 way valve manifolds	1	10% of each type, class, size and model (LOT)			0
(iii) Fittings	1	10% (LOT)			0
(iv) Purge meters	1	5% of each model (LOT)			0
(v) Filter regulators	1	20% of each model (LOT)			0
ELECTRIC ACTUATORS:					
(i) Actuator	1	1 no. of each type & rating (LOT)			0
(ii) Electronic PCB of all types	1	10% of each type & model (LOT)			0
(iii) Absolute Encoder (replaceable part)	1	5% of each type & model (LOT)			0
(iv) Electronic Torque sensor	1	5% of each type & model (LOT)			0
CONTROL VALVES, ACTUATORS AND ACCESSORIES:					
(i) Pneumatic Control Valve actuator assembly	1	10% or 1 Nos. of each type, model and rating, whichever is more (LOT)			0
(ii) Diaphragms, O' rings, seals etc.	1	100% of all types, make etc. (LOT)			0
(iii) Pressure Gauges of all types, make, rating etc.(if applicable)	1	10% or 2 nos. of each type whichever is more (LOT)			0
(iv) Solenoid valves (if applicable)	1	10% or 2 nos. of each type whichever is more (LOT)			0
(v) Control valve positioners/smart positioners and its accessories	1	10% or 2 nos. of each type, model and rating, whichever is more (LOT)			0
(vi) E/P converters(if applicable)	1	10% or 2 nos. of each type, model and rating, whichever is more (LOT)			0
PUBLIC ADDRESS SYSTEM					
(A) Call Stations & Amplifiers					
(i) Call station for outdoor area with amplifier	1	10 % of each type, make, model etc. (LOT)			0
(ii) Call station for indoor area desktop mounting type with amplifier	1	10 % of each type, make, model etc. (LOT)			0
(iii) Master Control Unit (MCU)	1	10 % of each type, make, model etc. (LOT)			0
(iv) Portable Call station with minimum 2 mtrs connecting cable.	1	10 % of each type, make, model etc. (LOT)			0
(v) Standalone amplifier	1	10 % of each type, make, model etc. (LOT)			0
(B) Loudspeakers					
(i) Outdoor Industrial horn type loudspeaker	1	10 % of each type, make, model etc. (LOT)			0
(ii) Indoor wall mounted cone type loudspeaker	1	10 % of each type, make, model etc. (LOT)			0
(C) Network devices and accessories					
(i) Network Switches	1	10 % of each type, make, model etc. (LOT)			0
(ii) Media Converters	1	10 % of each type, make, model etc. (LOT)			0
(iii) Complete Server with software & its applicable license	1	10 % of each type, make, model etc. (LOT)			0
(iv) PC Station with software & its applicable license	1	10 % of each type, make, model etc. (LOT)			0

Note:

- 1 In case the main population of any item is only one no., then the spare quantity shall also be one no., overriding requirements indicated in
- 2 Wherever the quantity is given only in percentage, the spare quantity shall be distributed into various ranges/size/rating/type (as the case may

II. MANDATORY SPARES FOR ROOFTOP SOLAR PV					
1 Solar PV module	1	1% of total population (LOT)			0
2 Inverter -	1	1 (One) No. of string inverter of highest size of supplied capacity (LOT)			0
3 Solar DC cable	500	m			0
4 DC side Surge Arrestor, if applicable	1	No.			0
Wherever quantity has been specified as percentage (%) and the quantity of mandatory spares works out to be a fraction, the same Spares of PCU and / or String Inverter is to be supplied only if the equipment(s) is (are) available in the Solar PV project as per detailed					