List of documents	Proposed by Vendor (Vendors check mark)	Remarks	R2R Treatment (IN-76101, ME-76107, FA-76101A/B) CO INCINERATOR, De Nox, De Sox, Air Fan Draft, Flue Gas cooler, Flue gas skid, Steam Drum)
Instrument Index (Ship loose items to be marked, if any)	X		X
I/O List	X		X
Alarm Trip Set Points List	X		X
Serial Interface Exchange Table (Modbus IO Allocation Table)	X		X
Control system philosophy and Operation Principle	X		X
Control System Configuration	X		X
Cause and Effect Diagram	X		X
Control block diagram shown detail scope of supply and interface of electrical and instrumentation	X		X
Functional Safety Data Sheet (For Safety Loops If any)	X		X
Functional Safety Manual (For Safety Loops If any)	X		X
Certificates of IEC61508 Compliance (for safety loops if any)	X		X
Electrical and Instrumentation Schematics, Wiring Diagrams and BOM	X		X
Terminal Block/ Junction Box Wiring Diagrams	X		X
PLC Controller Data Sheet and Drawings	X		X
Controller Modules (MMS, Steam Turbine, Anti Surge system and etc.) Data Sheet and Drawings if applicable	X		X
Local Junction Box Dimensional Layout and Drawing	X		X
Terminal Block Arrangement Drawing	X		X
Remote/ Local Control Panel Inspection and Test Procedure	X		X
Control Valves Data Sheets & Drawings	X		X
Safety Valve Data Sheet & Drawing	X		X
Anti Surge Valve Datasheet & Drawing if applicable	X		X
CEMS Datasheet if applicable	X		X
Logic Diagrams and Sequences for Burners, main control loop, purging, start-up and shut down.	X		X
Protection/Control Logic Diagrams and Sequences for:	X		X
• Start-up	X		X
• Shut down	X		X
• Emergency shut down	X		X
• etc.	X		X
Control Narrative for control loops	X		X
Programming and Parameter Setting of PLC	X		X
Instrumentation Loop Diagram	X		X
Instrument / electrical installation drawings and hook up	X		X
Instrument Calculation Sizing Notes (for Control Valve ,Safety Valve , Flow Element) (Including Noise And Velocity Calculation)	X		X
Instrument and Control System Catalogue and Specification sheets	X		X
Instrument data sheet	X		X
Level calculation and sketches for LT (if any)	X		X
Instrument Calibration and Material Certifications	X		X
Instrument Cable list	X		X
Instrument and Junction Box Location Layout	X		X
Instrument Cable And Tray Layout	X		X
Air Supply Distribution Drawing if applicable	X		X
Instrument Earthing Layout	X		X
Material Take Off for Instrument Bulk Items	X		X
Local/Remote Control Panels (UCP, MMS, etc.) Drawing and Layouts	X		X
Local/Remote Control Panels (UCP, MMS, etc.) Wiring Diagram	X		X
Local Control/ Gauge Board/ Station Specification Layout And Outline Drawing if applicable	X		X
Power Consumption and UCP Heat Dissipation	X		X
Cabinets Arrangement Drawings (Front, Rear, Internal View, with Racks and Card Location), Inclusive of Bill of Material	X		X
Cabinet Interface Wiring Diagram	X		X
Graphic Display (HMI) Pages Print out	X		X
FAT/SAT Procedure for Control System	X		X
FAT/SAT Report for Control System	X		X
Vibration Switch Data Sheet and Drawing (If Applicable)	X		X
Manufacturer Dossier for Instrument	X		X
Pneumatic/Wiring/ Hydraulic Schematic for Instruments	X		X
Miscellaneous	X		X

No.	Items	Required by Purchaser (sample)	Proposed by Vendor (Vendors check mark)	Remarks	R2R Treatment (IN-76101, ME-76107, FA-76101A/B) CO INCINERATOR, De Nox, De Sox, Air Fan Draft, Flue Gas cooler, Flue gas skid, Steam Drum)
1	Supply of all instrumentation, control valves, safety valves and etc. inside the package and loose items if any.	X	X		X
2	Dedicated Remote Control Panels for each package and common area	X	X		As per required
2	Dedicated Local Control Panels(ATEX certificate, IP 65) with control system and with MODBUS and HardWired connection	X	X		As per required
3	Redundant PLC based UCPs	X	X		X
4	Remote Control Systems (BMS, UCP, Steam turbine, Anti surge, MMS and etc.)	X	X		X
5	Interposing relays and panel if specified.	X	X		X
6	Machine monitoring system (MMS)	X	X		X
7	Vibration/ temperature monitoring system	X	X		X
8	Operation workstation with local network requirements (all in one IPC on cabinet wall mounted, 19")	X	X		X
9	One rugged engineering laptop for package controlling purpose, Original software with unlimited license required for all purpose.	X	X		X
10	HMI Screen mounted (Min 19") on Panel doors + rack mounted IPC	X	X		X
11	Industrial Ethernet or serial link communication for UCP to interface connection with plant DCS (RTU)	X	X		X
12	Instrument earth bus bar (Field)	X	X		X
13	Instrument Air Manifold if required	X	X		X
14	All instruments installation materials including fittings, isolation and drain valves, manifolds, junction boxes, single cable, cable trays, glands, instrument support, instrument Hook up , etc.	X	X		X
15	Cable glands and segregated trays (IS/ NIS/ Power)	X	X		X
16	316L SS Local Control Panel (Ex de IIC T5/T6 and IP 65)	X	X		X
17	Local gauge boards (if applicable.)	X	X		X
18	Power Distribution Panel	X	X		X
19	Inspection, test and certificate for instruments	X	X		X
20	Sun shield for instruments if required	X	X		X
21	Instruments Anti-surge system	X	X		

Note * : Will be finalized later.

Note ** : Vendor to advise using panel door mounted IPC or rack mounted IPC + HMI wall mounted.

Note *** : Vendor to advise the necessity of having local HMI.

No.	Items	Required by Purchaser (sample)	Proposed by Vendor (Vendors check mark)	Remarks	R2R Treatement (IN-76101, ME-76107, FA-76101A/B) CO INCINERATOR, De Nox, De Sox, Air Fan Draft, Flue Gas cooler, Flue gas skid, Steam Drum)
1	All protective and safety instrument systems and quantities (if any) refer to the field devices shall comply with the relevant API (RP) and IEC standards.	X	X		X
2	Logic and control narratives.	X	X		X
3	All instrument wiring between junction box(es)/local panels/ power distribution panel (PDP) and local Instruments, cable glands and segregrated trays (IS/ NIS/ Power) on skid and earth bus bar with relevant wiring.	X	X		X
4	Instrument sizing and calculation report.	X	X		X
5	All tubings (min SS 316) between instruments and relevant accessories inside the package and up to dedicated tie-in point for loos items.	X	X		X
6	SIL-3 PLC system for shutdown safety loops (series 400FH siemens or equal)	X	X		X
7	SIL Certified (SIL2) instruments for shutdown safety loops.	X	X		X
8	Faile safe design control system for safeguarding loops.	X	X		X
9	NACE, SSC and HIC requirements for instruments if applicable (PMS).	X	X		X
10	Redundancy level for CPU, Power Supply, Communication Cards & IO Redundancy for emergency safety and closed loops and ciritical IO as min.	X	X		X

No.	Instrument Notes	Proposed by Vendor (Vendors check mark)	R2R FLUE GAS TREATMENT PACKAGE RFCC (IN-76101, ME-76107, FA-76101A/B) CO INCINERATOR, De Nox, De Sox, Air Fan Draft, Flue Gas cooler, Flue gas skid, Steam Drum)
1	All document and drawing shall be readable/searchable and in reproducible format. Drawings shall show dimension, size, taggings and labels	X	X
2	VENDOR shall follow the labeling and identification of equipment and instruments using the PURCHASER equipment instruments tag numbering system.	X	X
3	All control and instrumentation provisions shall be included in the scope of The VENDOR supply.	X	X
4	All signals to be intrinsically safe for all instruments.	X	X
5	Fieldbus shall not be used. All the requirement and guide line for fieldbus application stated in engineering documents shall be considered void.	X	X
6	Smart instruments with LCD display, Exia IIC T6, 4-20 mA signal and HART protocol shall be used. All instruments shall be preferably loop powered. In the case of the unavailability of loop-powered instruments, 4-wire instruments could be used. In all cases, instruments shall be selected for 24 Vdc.	X	X
7	IP degree for Instrumentation shall be complied with below requirements - Outdoors : IP65 - In control room : IP42 as minimum	X	X
8	JOB SPECIFICATION FOR INSTRUMENTATION & CONTROL OF PACKAGED UNITS Doc No.:2001-00-ED-IN-SP-7028 shall be thoroughly reviewed and rigorously followed.	X	X
9	Instrument inspection and test procedure and corresponding test report shall be included in FAT report. (Instrument inspection includes Leak test, Function test, Cable continuity and Cable IR test) and it shall be submitted to Purchaser as official VP for approval and submission schedule will be discussed during technical clarification period.	X	X
10	Vendor shall perform Site Acceptance Test for control system provided by vendor. Integration to Main Control System shall be included as part of site support. (if applied)	X	
11	For any loose-part instrument, installation procedure and installation inspection/testing procedure as well as hook-up drawing shall be provided.	X	X
12	Vendor shall very clearly specify safety instrumented function that shall be implemented in safety system. Required information and documents will specified through clarification meeting based on proposed configuration of the functions.	X	X
13	When the manufactured item is installed and provided in a form skid, junction boxes for instruments and cabling between instrument and the junction box including tray, conduit, gland, etc. shall be provided and installed by vendor. And manufacturer & detailed model information for installed bulk material (tray, conduit, cable gland, JB and etc.) shall be specified by Package Vendor before installation at shop.	X	X
14	Instrument junction boxes shall be made of SS 316L and shall be IEC certified and IP65 as a minimum.	X	X
15	Instrumentation loose parts shall be clearly specified in instrument list/index and P&ID. And it shall be packed in the paper boxes and clearly mention in the packing list as number wise.	X	X
16	Vendor shall fill in tick marks in provided "Instrument and Control Block Diagram" to describe instrument and system configuration. It shall be submitted together with technical proposal. It is subject to Purchaser's review and comment until mutual agreement between Vendor and Purchaser is made.	X	X
17	Spare philosophy for control systems shall be complied with para. 8.5 of 2001-00-ED-IN-SP-7021 (Job Specification for Programmable Logic Controllers(PLC)).	X	X
18	Following shows requirement for cabinets. 1) Rittal cabinets shall be applied for all cabinets 2) The proposed indoor-installed cabinets size is: 800mm(W) x 800mm(D) x 2100mm(H) - Front and Rear Access with Double doors - Fan (redundant), Cabinet Lighting, Utility Socket - Cabinet : Rittal type - Drawing Pocket - IP 42 grade Electrical Power Supply (UPS) is 230VAC, 50Hz, 1ph with dedicated circuit breaker. For the cabinet lighting and utility socket power are Non- UPS power (230VAC, 50Hz, 1ph).	X	X
19	All instruments which to be provided by vendor, it shall be complied with project requirements ...r process connection size and minimum rating.	X	X
20	Control Logic Review, Logic Internal Test and Logic Final Acceptance Test shall be executed. V... the test is proceeding without additional charge.	X	X
21	Vendor shall perform Site Acceptance Test for control system provided by vendor. Integration to ...ort.	X	X
22	PLC hardware/software license certificates, capacity, lifecycle and work station for PLC and an ...cation.	X	X
23	VENDOR is responsible for complete package design, supply, installation, and testing of instru... safe and efficient operation of the package. The instrumentation, control /safety devices, all control logic required for the operation of the packa... shall be provided by the VENDOR.	X	X
24	All supplied instruments shall be localized based on "Specification for Site Information and Uti...	X (where is possible)	X
25	Instrumentation of the package shall employ common components made by the same manufacturer and model numbers, to maximiz...	X	X
26	All protection devices including temperature, vibration, etc. measurement shall be provided by the VENDOR for safe and proper op...	X	X
27	All instrumentation, control equipment shall have ingress protection to IP 65 and shall be suitable for outdoor installation.	X	X
28	Segregated JBs and Trays for Analogue, Digital, and power based on control and safeguarding systems as per Job Specification for I...	X	X
29	VENDOR shall consider the minimum interface signals as indicated in relevant P&ID with plant PCS / SGS / FGS system. Critical ...s shall be hardwired.	X	X
30	VENDOR shall be responsible for preparation of all instruments installation / hook-up drawings and shall submit the same drawing...	X	X
31	Vibration switches shall be explosion Proof, EEXd, with M20 X 1.5 cable entry, case material cast Aluminum or cast iron, IP-65, surface mounted, external set point adjustment, change over type and with local manual reset button and shall have DPDT contacts. Vibration switch shall be loop power -24 VDC and work without external power requirement.	Generally confirmed. But, it will be finalized based on sub-vendor data.	X
32	Vibration switch construction shall have start-up trip delay with adjustable delay.	X	X
33	Exd Vibration Switch, Exia Positioner, Air Filter & Regulator, I/P Converter with Name plate & its bracket for instrument (if any) shall be considered by vendor.	X	X
34	All shutdown valves for safety application in fire zone shall be fire proofed according clause 8 of project spec Doc No.: 2001-00-ED-IN-SP-7001.	X	X
35	Vendor is responsible to review job specifications and instrument design criteria attached to MR and any deviation list shall be submitted at the bid stage for client approval.	X	X
36	Vendor should strictly follow project symbol and legend and numbering procedure requested for instruments.	X	X
37	Purchaser will provide dual redundant Un-Interruptible Power Supplies (UPS) 230 VAC, 50 Hz. All System modules and instrument devices shall be capable of operating during voltage variations up to ± 10% and frequency variations up to ± 5%.	X	X
38	All instrument wetted parts in connection with the process shall be min AISI 316/ 316L, unless higher grades are required by the process conditions or higher grades required based on project PMS.	X	X
39	In case of any safety loop came up, and SIL is required for any of instrument, SIL verification and following documents as part of SIS, comprising sensors, logic solver and final elements, shall be prepared by vendor: "Certificates of IEC61508 compliance" & "Functional safety data sheet" & "Functional Safety Manual". Vendor to Confirm.	X	X
40	Pressure and temperature gauge hosing material shall be min SS 304.	X	X
41	Solenoid valves (if any) shall be intrinsically safe and low power type and the selected model shall be proper for the solenoid driver (barrier) selected by system supplier and shall be approved by client before purchase.	X	X
42	Minimum instrument air shall be consider as 4 barg for instrument valve actuator sizing .	X	X
43	Vendor shall consider Time Synchronization with GPS Master Clock System (NTP (Network Time Protocol) Server). NTP server	X	X
44	All original licenses including OS software shall be provided and supplied to End User(EORC) without any limitation.	X (if possible)	X
45	PLC hardware/software license certificates, capacity, lifecycle shall be provided.	X (if possible)	X
46	In case of power failure or high temperature (w/ thermostat), cabinet alarm shall be configured.	X	X
47	MMS Panel shall be considered and communicated with UCP as slave. Redundant Modbus connections and required hardwire connections shall be considered with PCS	X	X

Specification for site conditions of project shall be considered and confirmed by bideder

Please confirm and clarify sub-vendor data

Not acceptable Original software shall be supplied