



**CONTROLS & INSTRUMENTATION (FB)
PRE-QUALIFICATION REQUIREMENT (PQR)**

CI:PE:PQR:FFVCS

Rev. No: 00

Dt. 10.11.2021

Furnace Flame viewing Camera System

Sl.No.	Bid Requirements (Allowed Values)	Bidder Compliance
1.	Bidder should be an Original Equipment Manufacturer (OEM) of high temperature furnace flame viewing camera or authorized system integrator of OEM to quote for this enquiry. If authorized system integrators are quoting on behalf of OEM, authorization letter from OEM in proper letter head format shall be submitted, which should clearly indicate that the particular system integrator is authorized to quote for this enquiry on behalf of OEM and OEM shall extend full support to system integrator throughout the execution of this project.	
2.	The offered flame camera system shall have a record of trouble free performance of minimum one (1) year as on date of enquiry in a coal-fired boiler with corner firing arrangement in a thermal power plant of 500 MW rating or above. Bidder to furnish valid performance certificate for the same.	
3.	Bidder shall submit a list of references of thermal power plants (for coal-fired boilers of 500 MW rating or above) where similar systems are in operation for more than one year.	
4.	Bidder to confirm that commissioning and service support of the offered equipment shall be available in India immediately on request.	

BHARAT HEAVY ELECTRICALS LIMITED

TIRUCHIRAPALLI-620 014

CONTROLS AND INSTRUMENTATION/FB



TECHNICAL SPECIFICATION

FOR

FURNACE AND FLAME VIEWING CAMERA SYSTEM

PROJECT :-

MAHARASHTRA STATE POWER GENERATION CORPORATION LIMITED

BHUSAWAL SUPER THERMAL POWER PROJECT,

1X660MW

CUSTOMER No. 1727

SPECIFICATION REF. CI:1727:CCTV:SPEC / REV. 00

REV.NO	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
00	10/07/20	Initial Release	AA <i>[Signature]</i>	KB <i>[Signature]</i>	<i>[Signature]</i> AKP

SECTION - 1

I. GENERAL

- a. The various aspects covered in this specification are as follows :-
- b. The general points are covered in Section – 1 – General.
- c. The specification requirements are covered in Section – 2 – Specifications.
- d. The documents to be submitted along with the offer / after placement of Order / along with the panel are covered in Section – 3.
- e. The Inspection / Testing and Packing requirements are covered in Section – 4 - Testing, Inspection and Packing.
- f. Commissioning spare list, if any, with price break up shall be furnished along with offer.
- g. Vendor must quote for Mandatory spares separately along with the offer, if applicable.
- h. Recommended spares list for two years operation shall also be furnished separately along with the offer.
- i. If any special or non-standard tools are required for installation, operation or maintenance, the same shall be supplied along with the system.
- j. The entire system and accessories should not contain any asbestos material.
- k. The equipment shall be guaranteed for a period of 12 months from the date of commissioning OR 18 months from the date of dispatch whichever is earlier.
- l. Despatch clearance will be issued along with PGMA with DU Nos. for the ordered items to vendor after the receipt of technically accepted Inspection Report. Vendor shall mark the PGMA with DU Nos. on the casing of the packing and in the packing slip.
- m. Since the vendor's works alone is approved by BHEL, vendor shall manufacture this item in their own works only and shall not off-load the jobs to any other suppliers without the written approval by BHEL.
- n. The system shall be packed as per manufacturers standard. All components of the system should be packed in such a way that it should not get damaged during transportation, storage and handling at site. There shall not be any water entry in the package during storage. The handling instructions shall be clearly mentioned in the package and all panels shall be packed as per packing procedure QA:CI:STD:PR:02/03.

SECTION - 2

I. SPECIFICATION FOR FURNACE AND FLAME VIEWING SYSTEM

Furnace and Flame viewing system with all equipment and accessories shall be supplied for the purpose of monitoring flame (**visible light**) from all the burners and igniters of the fossil fired boiler with balanced draft, tilting tangential and corner firing arrangement. Cameras shall be installed in the furnace wall viewing the flames through suitable lens tubes and resulting images displayed in a monitor located in control room. The cameras shall be of robust design and are expected to withstand the temperature in the furnace of boiler, which will not be less than 1600° C (**with suitable air cooling arrangements** provided to suit this requirement if camera itself cannot withstand to this temperature). The cameras shall also be protected against ingress of dust and moisture, varying temperature and humidity and high vibration levels. The cameras and system shall be suitable for the furnace design as being offered by the main boiler vendor, the firing arrangement (corner, front/ wall fired), the fuel being fired considering the ash content of worst coal. Cameras shall be suitable for viewing of furnace flame at a straight line of view.

Two number of cameras for one boiler complete with all mounting accessories shall be supplied with viewing angle sufficient to view the furnace flame and all the burners fully. The system shall comply to NFPA requirements.

The system should meet the following requirements as a minimum

- a. The system shall be supplied complete with all accessories, auxiliaries, interconnecting cables and termination device including cable required for LVS connection and pneumatic tubing required for the system from the power/air terminal points indicated elsewhere in this specification. Camera shall be equipped with a pneumatic advance & retract system.
- b. Facility for zooming and manual adjustment of iris from the monitor (located in control room) for view of furnace internals
- c. Fully wired Panel/Camera Control box with weather proof IP:65 degree of protection as per IS 60529 shall be provided in the field near camera for mounting all the controls /electronics/accessories necessary for controlling camera operation as well as to take care of interlocks such as:
 - Automatic withdrawal of camera in case of pneumatic air supply failure, temperature exceeding the design set point at camera tip, camera control electronics failure and power supply failure.
 - Camera Local/Remote operation selection along with advance/ retract / reset provisions and indications (Camera IN, Camera OUT, Camera Fault) shall be provided.
- d. Rain canopy shall be provided for field control box.
- e. However, loose components which are designed for IP: 65 or better degree of protection can be neatly mounted in an open top covered rack near the camera.
- f. The resulting images from the camera shall be displayed on a monitor located in the control room. It shall be possible for the operator to select image from either one camera or both the cameras at a time for viewing in the control room.
- g. It shall be possible to advance/retract the camera from control room. Indications shall be made available to inform the operator that the camera is advanced/retracted. All camera fault indications shall be available in control room for information of the operator.
- h. Virtual push buttons and indications from the monitor screen in control room are acceptable. If hard push buttons and indications are provided the same shall be mounted in a compact panel. Miniature push buttons/indication lamps shall be used to make the panel compact.

- i. Panel, if applicable in control room, shall have minimum IP 32 degree of protection as per IS 60529 with a suitable canopy at the top to prevent ingress of dripping water. The panel shall be constructed with CRCA material of minimum thickness 2mm.
- j. The placement of equipment related to camera in control room is at customer's discretion. Hence vendor should be ready to accommodate customer requirement regarding placement of equipment in control room.

II. OTHER SPECIFIC REQUIREMENTS OF THE SYSTEM

- a. The cameras shall be of colour CCD, suitable and proven to monitor the visible light flame from the furnace.
- b. The viewing angle of the camera shall be commensurate with the furnace size, the camera location and the positioning of the burners as indicated in the "Location drawing for furnace CCTV camera" - Drg. No. 3-97-596-24384 / 00 (enclosed in this specification). The camera viewing and mounting angle shall be selected suitably so that all the burners including bottom most burners are visible.
- c. The cameras shall be suitable for direct online continuous viewing of the coal and oil flame and condition of the furnace internals including slagging of the water walls and any other deterioration in the furnace condition in the monitor located in the central control room.
- d. The system shall conform to PAL and number of TV lines shall be adequate for a clear image of the furnace.
- e. The system shall be capable of transmitting images of multiplexed output (video signal) from each camera to customer's large video screen (LVS) system located in Control Room. Necessary video cable (RG-11 or RG-59)/Fibre optic/Ethernet cable to LVS along with connectors (DVI/BNC/VGA etc.) as required by customer shall be supplied by the vendor. Any convertors required for this purpose shall be arranged by the vendor.
- f. It is vendor's responsibility that the offered system is suitable to provide clear picture of the furnace.
- g. Thickness of water wall including insulation thickness and refractory is approximately around 350mm. Vendor to select camera insertion/ retract lengths suitably.
- h. Air cooled lens focusing range shall be selected to have clear view of the closest and farthest point in furnace as per given furnace sizes indicated.
- i. The cameras shall be of a robust design specially designed for the purpose of furnace flame viewing with suitable air cooling to protect the equipment from the extreme local environment. They shall also be protected against ingress of dust and moisture, varying temperature and humidity and high vibration levels. The design shall allow easy access and removal for maintenance.
- j. The lens, viewing tube and the associated equipment shall be designed to ensure settlement of dust and debris on the lens is minimized. Compressed air shall be used for keeping the camera lens clean. Provision shall be available to clean the lens tip to prevent any ash/dust accumulation.
- k. Any cooler unit required for lowering the temperature of cooling air shall be included in vendor's scope. Vendor shall take into account the pressure, temperature and quality of instrument air available for the purpose of cooling and purging. Any air conditioning required shall be in the scope of the vendor.
- l. Multiplexing units (vendor to specify the type offered) to display one / multiple flame viewing camera system inputs in the monitor simultaneously.
- m. Each camera unit shall have the following features:
 - Automatic light compensation : Suitable for furnace flame viewing application.
 - Resolution : 450 or more lines at centre.
 - Power supply : 240V AC, 50 Hz, 1 Phase

- n. Camera housing shall have following features.
 - The camera used shall be housed in stainless steel housing with air-cooled jacket.
 - Suitable ventilation, purging and cooling facilities shall be provided to suit application requirements.
 - Gasket sealing : All edges (Neoprene/Silicone)
- o. Video Monitor offered shall display all camera images in single screen through DVR with recording facility. The DVR shall have spare capacity to connect at least two more cameras online.
- p. Video Monitor offered shall have following features
 - Size : 20 inch (with multiple window viewing feature)
 - Type : Colour LED
 - Minimum Resolution : 1920 X 1200
 - Geometric distortion : Less than 2%
 - Power supply : 240V, 50 Hz AC, 1 Phase.
 - Primary controls : Contrast, brightness
 - High-frequency radiation noise : Minimum
- q. The monitor shall remain dark if no camera is selected or if there is no signal at the video input. The screen shall have a non-reflective surface.
- r. The location shall be finalised at site considering aesthetic view and monitoring for all the operators.
- s. Sufficient memory (minimum 1TB) shall be available in the system for recording videos. If the memory becomes full, a warning shall be issued to operator to shift the files to some other storage.
- t. Applicable drawings for furnace camera openings are “Furnace opening for Camera” (Drg ref. CI: FUR CAM OPNG), “Seal box for TV opening” (Drg ref. CI:SEBOX: OPNG), “Seal box” (drg ref. CI:SEBOX) (enclosed in this specification). Any additional need of inserts pipe/tapping points for installing camera in seal boxes for fixing camera to be studied by vendor based on BHEL seal box drawing and to be included in offer. All necessary erection material for erection of camera and accessories as well as materials required for supporting the camera from boiler shall be in vendor scope.
- u. System will be installed by BHEL, as per the drawings furnished by vendor using the materials supplied by the vendor. On completion of installation, it is the responsibility of vendor to fully commission the system and prove the performance. Also, it is the vendor’s responsibility to get the protocol signed from customer and BHEL site for successful operation and handing over of the system.
- v. Any accessories required for erection and commissioning of the system shall be included in the offer itself even though the same is not called for in the enquiry. This may be highlighted in the offer for future improvements.
- w. All necessary remote/ local programming tools, if required, shall be included in the main offer itself.
- x. All necessary software required for the system shall be considered by the vendor.
- y. Any other accessory to make the system completely operational shall be included in the main offer itself.

III. CLIMATIC CONDITIONS:

- a. Ambient temperature (max) : 50 deg C
- b. Ambient temperature (min) : 17 deg C
- c. Relative humidity (max) : Max 97%
- d. Relative humidity (max) : Min 45%

- e. Equipment shall be suitable for use in tropical climate with high humidity, heavy rainfall and climate conducive to fungus growth and corrosion.
- f. All equipment's / components rating specified are for site conditions. Vendor shall apply suitable de-rating factor for the given site conditions to the rating of the equipment / components offered.

IV. PROTECTION REQUIREMENTS OF THE SYSTEM:

- a. The Camera assembly & housing shall have air cooling arrangement with all accessories.
- b. The camera for furnace flame monitoring shall be mounted on a retract mechanism having automatic retraction facility with fail-safe feature. The automatic retraction unit shall be pneumatic operated. BHEL/Customer will provide instrument air for the camera lens tube and retract mechanism.
- c. Retract mechanism mounts shall have following features.
 - Retract mechanism shall be provided with suitable mounts to fix the camera housing, the lens tube and the wall box.
 - Mounts shall be sturdy and lightweight, capable of being supported from boiler.
- d. Protection shall be given against cooling medium failure (Automatic camera extraction system from the furnace in case of camera cooling arrangement fails).
- e. Automatic shutter/gate mechanism at the camera port to be supplied by vendor, so that port will be closed once camera is withdrawn from the furnace. In case camera retracts due to fault such as loss of air for prolonged duration necessary protections shall be built into the system so that camera does not drift into the furnace due to gravity.
- f. To protect the camera unit from the furnace heat, continuous air purging shall be maintained into the camera housing.
- g. In case of failure of purging air, the camera assembly shall retract automatically to avoid any damage or deterioration due to overheating. Also, shutter/gate located in the furnace opening shall close to prevent radiant heating.
- h. If the camera does not insert or retract in a pre-determined time after command is issued, camera fault indication shall be provided to the operator.
- i. Necessary limit switches shall be supplied along with the camera system by the vendor to detect camera advanced/retracted positions. Vendor shall build necessary interlocks for protection of camera with the same.
- j. Necessary interlocks to be built into the camera system such that once camera gets retracted due to fault, only after the cause of the fault is corrected and acknowledged by operator camera can be inserted again.
- k. For acknowledging and resetting the fault, necessary pushbuttons to be made available in Control Room. The reset pushbuttons provided at the control room shall be mounted at a suitable location at operator's convenience.
- l. An air tank shall be provided near the camera which can store sufficient instrument air for advancing and retracting the camera minimum three times into and out of the furnace in case of instrument air failure. The capacity of the air tank shall be decided by the vendor as per their standard suitable for advance / retract operations.
- m. Cooling air availability to camera lens & camera lens tube until camera is retracted fully in case of instrument air failure is to be ensured by vendor.

V. CABLES

- a. The Scope of Cables is as follows.
 - All Video/Fibre optic/Ethernet cables required for the system shall be supplied by vendor.

- Any other cable required to form a complete functional system shall be supplied by vendor.
 - The termination provision (cable glands, lugs, connectors etc.) for cables supplied by vendor is in vendor scope
 - Control Cables will be provided by BHEL from camera to control room.
- b. Cable run lengths shall be considered as follows for the purpose of cable quantity estimation:
- Cable run length between Camera in field and Control Room shall be considered as 300 Mtr.
 - Cable run length between control room and LVS shall be considered as 100 Mtr.
- c. Vendor to select suitable cable such that there is no transmission loss/quality loss/noise in the signal for the entire length indicated.
- d. Video signal transmission cable shall be of high temperature co-axial type having the following characteristics:
- Type : Armoured (RG-11)
 Temperature range : Up to 80° C.
 Nominal impedance : 75 Ohm.
 Nominal capacitance : Less than 20 pF/ft.
- e. Requirement of video amplifiers, if any, shall be included by vendor based on the length indicated in the offer itself.

VI. FACILITIES PROVIDED BY BHEL/CUSTOMER AT SITE:

- a. Power Supply
- Only one number 240V AC, 50 Hz single phase supply will be made available for each flame viewing camera at Vendor's Field camera control box. Any other voltage required for the operation has to be derived by the vendor from the above supply. Isolation/ protection requirements for the same also shall be in vendor scope.
 - One feeder 240V AC, 50 Hz single phase supply will be made available in Control Room. Electrical power requirements for other accessories shall be derived by the vendor from this supply.
- b. Air Supply
- Instrument air at 4.0 to 5.0 kg / sq.cm (g) will be made available for camera housing cooling and lens tube cooling at one point for each camera, terminated with a valve of connection size Nb25 (F) within three metres from the camera. It shall be in vendor's responsibility to derive any other requirement for air supply from this available source. Vendor to provide all required accessories to receive this air and supply to the various components that requires air supply.
 - As boiler is not a fixed structure, tubes connecting camera with the air source shall consist of flexible, SS braided hoses with quick disconnect facility along with PVC coated copper /SS tubes /GI pipes and shall be supplied by the vendor along with the camera system.
 - Quality of instrument air provided may not be meeting the necessary standards all times and hence, it is vendor's responsibility to include suitable air filter (two stage filter) / air conditioning arrangements for getting good quality instrument air for their CCTV system.

VII. MAKE OF COMPONENTS OFFERED:

- a. Makes of all major bought out components shall be subjected to BHEL/Customer approval.

VIII. VENDOR TO INCLUDE THE FOLLOWING IN THE OFFER:

- Commissioning spares, if any, with bill of materials.
- Commissioning of system is in the scope of vendor. Also, erection assistance (supervision of erection) shall be provided by vendor. Number of man-days to be accounted as 15 with three visits to site for erection/commissioning each boiler. All necessary arrangements for travel and stay shall be taken care by vendor only.
- Erection materials and supporting structures required for the CCTV system shall be estimated and supplied considering the furnace expansion as below. Necessary supporting required for camera system shall be from boiler only and not platforms considering the boiler movements.
 - Furnace expansion in horizontal direction - 39mm sideways
 - Furnace expansion in vertical direction - 150mm downward

SECTION-3

I. DOCUMENTS TO BE FURNISHED BY THE VENDOR

a. Along with the offer

- Complete Bill of material.
- Catalogue on the various equipment.
- Block diagram showing inter-connection among various equipment (from field to control room) showing the components and cabling in-between.
- Dimension of the panels and loose components in control room.
- List of references of plants where similar systems are in operation
- Unit price for various equipment & video cables (in the priced bid)
- Vendor quality plan in BHEL format for camera system.
- Fully Filled up Sub-delivery enquiry deviation format. Any deviation from the enquiry specification shall be explicitly indicated in this format. Only deviations indicated in this format and accepted by BHEL in writing shall be considered in the event of an order.

b. Documents to be given after placement of order

Following documents/drawings shall be sent to BHEL within 15 days from the date of placement of order for approval (in Adobe Acrobat reader - “*.pdf” format). Comments, if any, on the vendor drawings shall be incorporated and revised drawings shall be submitted within 15 days from the receipt of the BHEL commented drawings at vendor’s end.

- Block diagram showing inter-connection among various equipment (from field to control room).
- Functional write up of the system offered including the functional requirements and interlocks provided.
- Logic drawings for camera advance/ retract and hold in retract positions.
- OGA / dimensional details for all the major components.
- Panel mounting / fixing arrangement drawings.
- Power / signal external connection details.
- Power / Air requirement.
- Vendor shall furnish recommended erection/installation drawings for the camera & retract assembly showing mounting and support arrangements for approval from BHEL.
- Catalogues and Complete Bill of material.
- Vendor quality plan in BHEL /Customer format after incorporation of BHEL comments and indicating PO number

c. O & M Manuals

- All O&M manuals shall be in A4 size and shall contain only the contract specific information. Irrelevant information’s shall be scored-out.
- All drawings shall be inserted in an appropriate place in O&M manuals with proper tagging.
- All drawings in the O&M manual shall be in black and white and in A3 or A4 size format only. Bigger size drawings shall be reduced to A4 or A3 size before insertion.
- O&M manuals in CD-ROM shall be sent to BHEL (T). It shall not be sent along with the equipment to site directly. O&M shall contain as built drawings, catalogues for all the components used in the system in addition to the erection, operating, maintenance and trouble-shooting instructions.

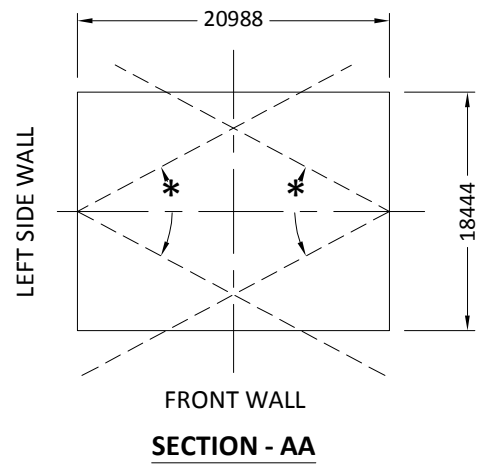
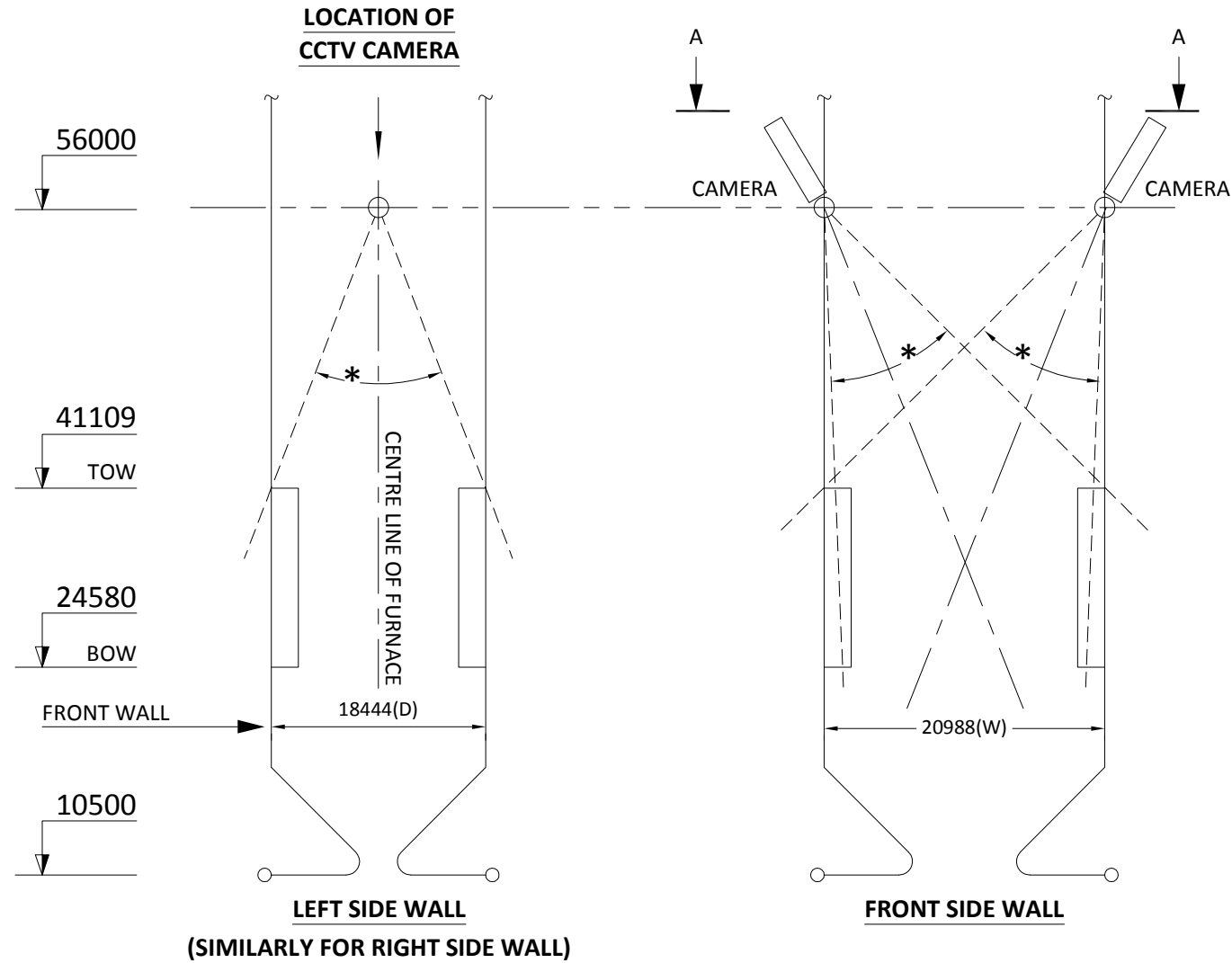
SECTION-4

I. INSPECTION AND TEST REQUIREMENTS

- The vendor shall submit the Vendor Quality Plan (VQP) and the VQP shall be as per the “BHEL format”. The same will be subjected to BHEL/ customer approval after purchase order.

Other Requirements:

- Wherever ‘CHP’ (Customer Hold Point) / ‘W’ (witness) is indicated in the approved VQP, vendor shall offer the material for inspection by Customer and wherever ‘W’ is indicated in the approved VQP, vendor shall offer the material for inspection by BHEL and / or Customer.
- Vendor shall give 21 days’ notice for arranging inspection by BHEL/ Customer.
- Wherever ‘CHP’ / ‘V’ (verification) is indicated against verification of Type test, clearance from Customer, vendor shall ensure the same prior to inspection and submit the same during inspection.
- Material can be despatched only after obtaining M.D.C.C (Material Despatch Clearance Certificate) from Customer. No material shall be despatched without MDCC.
- Vendor shall submit copy of all test certificates / documents as indicated in the approved VQP along with inspection call.
- Testing charges for routine tests, if any, shall be included in the product cost and no separate testing charges for this will be considered.



- NOTES**
1. * ANGLE OF ERECTION & VIEWING SHOULD BE INDICATED BY THE VENDOR.
 2. THIS DRG. IS DRAWN NOT TO SCALE AND HENCE SHOULD NOT BE DIRECTLY USED FOR THE PURPOSE OF ANGLE CALCULATION.
 3. TYPE OF BOILER : CORNER FIRED, BALANCED DRAFT, OTSC.
 4. TOW : TOP OF WINDBOX, BOW : BOTTOM OF WINDBOX
 5. TWO CCTV CAMERAS ARE TO BE FIXED, ONE AT LEFT WALL OF FURNACE, ONE AT RIGHT WALL OF FURNACE.

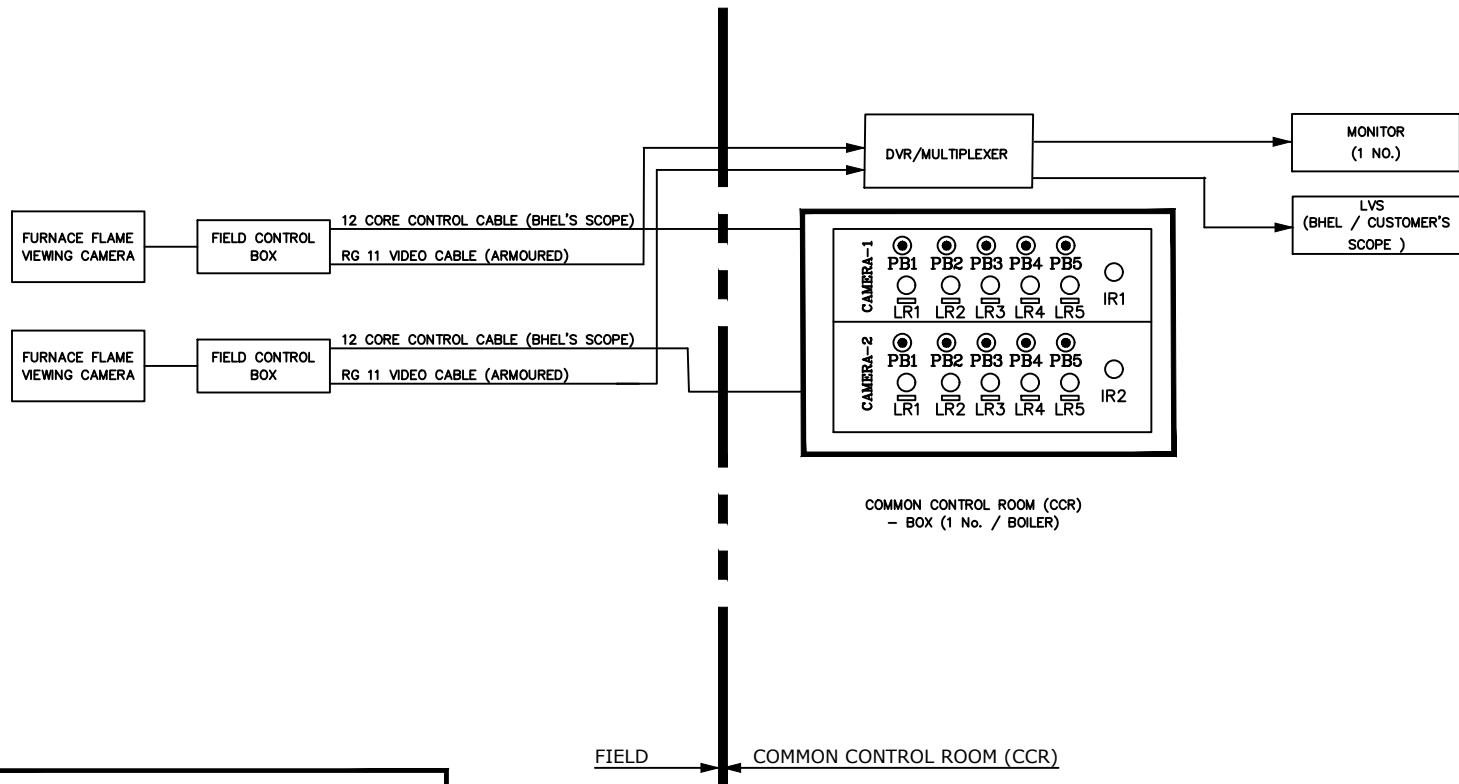
REV	DATE	ALTERED :
		CHD. / APPD. :
ZONE		

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OWNER :		MAHARASHTRA STATE POWER GENERATION COMPANY LIMITED						
PROJECT :		BHUSHAWAL TPS EXPANSION PROJECT 1 X 660 MW, STAGE-IV, UNIT-6, Cust. No. 1727						
CONSULTANT :		DEVELOPMENT CONSULTANTS PRIVATE LIMITED, MUMBAI						
	Bharat Heavy Electricals Ltd		DRN	NAME	SIGNATURE	DATE	NO. OF VAR	
	UNIT: HIGH PRESSURE BOILER PLANT		CHD	AA / KB		09-07-20		—
	TIRUCHIRAPALLI - 620014		APPD	A.K.Panda		09-07-20		—
DEPT. - C&I		SCALE	WEIGHT (Kg)	REF TO ASSY / OLD DWG		ITEM NO	No OF ITEMS	
CODE - 392		NTS						
TITLE			CARD CODE	DRAWING NO :		REV		
LOCATION DRAWING FOR FURNACE CCTV CAMERA			U 01	3-97-596-24384		00		

Sheet 01 Of 01

TYPICAL BLOCK DIAGRAM OF FURNACE FLAME VIEWING CAMERA SYSTEM -A



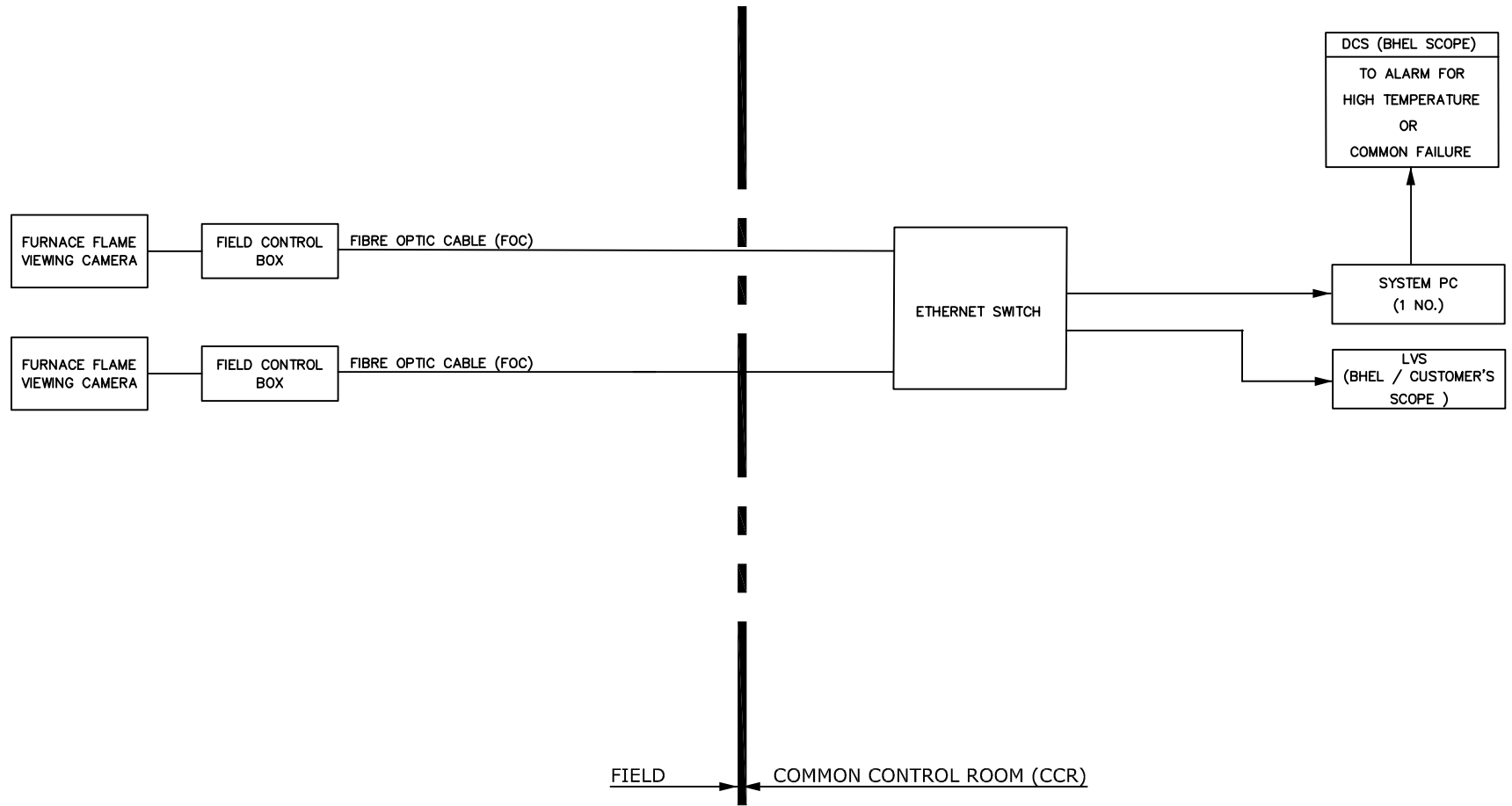
LEGEND

- PB1 – CAMERA ADVANCED PUSH BUTTON
- PB2 – CAMERA RETRACTED PUSH BUTTON
- PB3 – LOCAL MODE SELECTION PUSH BUTTON
- PB4 – REMOTE MODE SELECTION PUSH BUTTON
- PB5 – FAULT RESET PUSH BUTTON
- LR1 – CAMERA ADVANCED INDICATION
- LR2 – CAMERA RETRACTED INDICATION
- LR3 – LOCAL MODE SELECTION INDICATION
- LR4 – REMOTE MODE SELECTION INDICATION
- LR5 – CAMERA FAULT INDICATION
- IR1 – IRIS CONTROL FOR CAMERA-1
- IR2 – IRIS CONTROL FOR CAMERA-2

NOTES

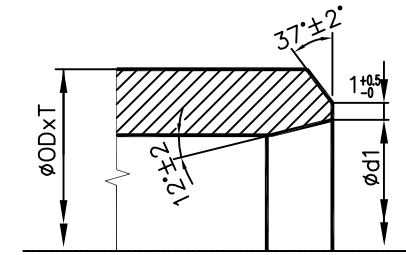
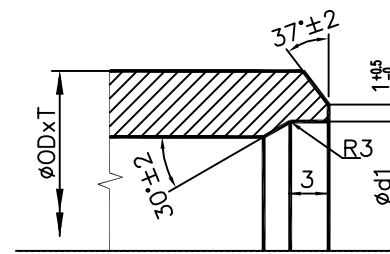
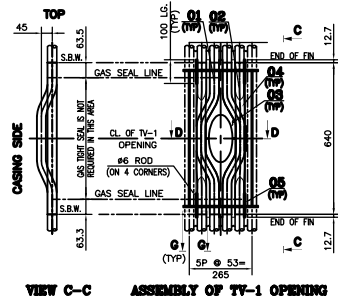
1. ALL CONTROL CABLES WILL BE IN BHEL SCOPE OF SUPPLY

TYPICAL BLOCK DIAGRAM OF FURNACE FLAME VIEWING CAMERA SYSTEM - B (ALTERNATE ARRANGEMENT)



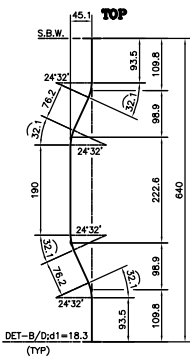
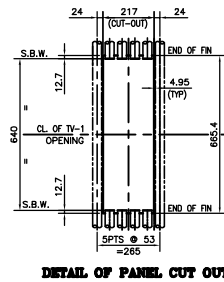
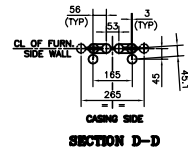
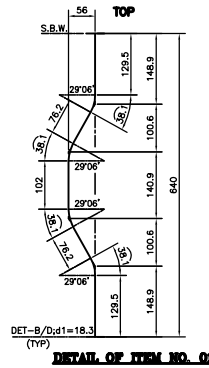
NOTES

1. ALL CONTROL CABLES WILL BE IN BHEL SCOPE OF SUPPLY
2. CAMERA CONTROLS (ADVANCE/RETRACT/FAULT RESET) AND CAMERA INDICATIONS (FAULT) SHALL BE FROM THE SYSTEM PC THROUGH SOFT PUSH BUTTONS/LAMPS.



DETAIL-B

DETAIL-D



DETAIL OF ITEM NO. 02

VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C	UNIT	UNIT WEIGHT	GS	ZONE
					VAR NO	MATERIAL SPECN		D1	QUANTITY		
	05	PLATE; 6X8X100				159422770000 SA387GR12CL2	C		0.040		
									4		
	04	SHAPED PLATE 6X59X281.7	2-06-751-11225		03	159422770000 SA387GR12CL2	C		0.260		
									2		
	03	SHAPED PLATE 6X127X330.7	2-06-751-11225		02	159422770000 SA387GR12CL2	C		0.460		
									4		
	02	TUBE; D38.1X9.65 657.6 LONG				154940210001 SA 213 T12	A		4.650		
									2		
	01	TUBE; D38.1X9.65 665.8 LONG				154940210001 SA 213 T12	A		4.710		
									2		
		TV 1-OPENING							21.240		

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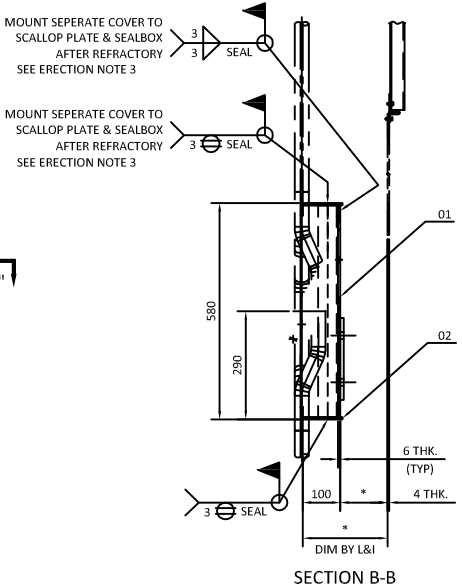
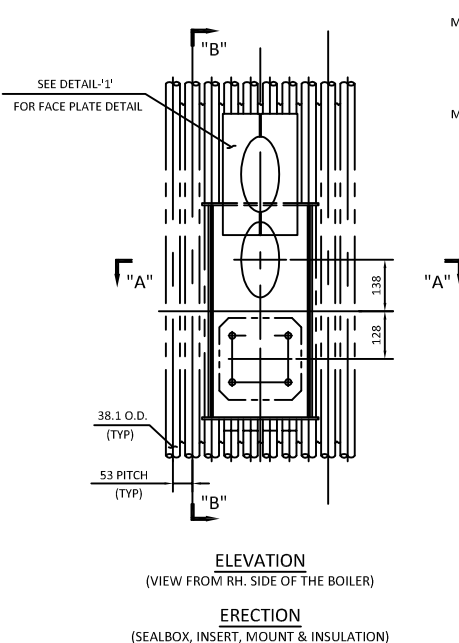
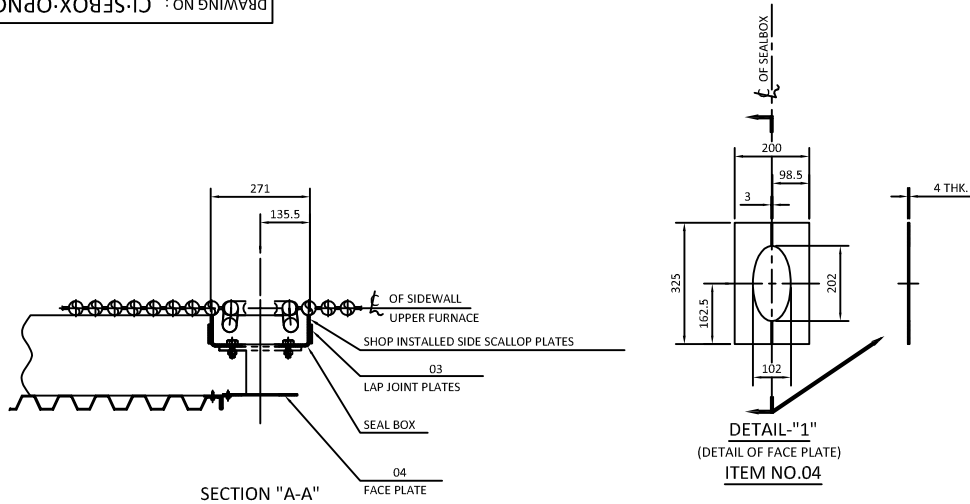
TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

STANDARD

	Bharat Heavy Electricals Ltd		DRN	NAME	SIGNATURE	DATE	NO. OF VAR
	UNIT: HIGH PRESSURE BOILER PLANT		CHD	S. RAJESHWARI		08-03-17	—
	TIRUCHIRAPPALLI - 620014		APPD	K. BALAJI		08-03-17	—
			ASWINI KUMAR PANDA		08-03-17		

REV	DATE	ALTERED :
		CHD./APPD. :
ZONE		

DEPT. : C & I	ALL DIMENSIONS ARE IN MM	SCALE NTS	WEIGHT (Kg)	REF TO ASSY / OLD DWG	ITEM NO	No OF ITEMS
CODE : 392					—	—
TITLE			CARD CODE	DRAWING NO:	REV	
FURNACE OPENING FOR CAMERA			U 01	CI:FUR CAM OPNG	00	



NOTES: -

1. ALL WELDS ARE TO BE SEAL WELDED GAS TIGHT UNLESS OTHERWISE SPECIFIED.
2. ERECTOR TO CUT CORNER OF SCALLOPPED BAR SO AS TO PROVIDE A CLEARANCE BETWEEN ADJACENT TUBE AND A COMPLETE SEAL WELD AROUND THE EDGE OF SEAL BOX.
3. SEAL BOX IS TO BE FILLED WITH CASTABLE REFRACTORY.
4. PAINT THE SURFACE OF ALL TUBES THAT ARE EMBEDDED IN CASTABLE REFRACTORY WITH TWO COATS OF BITUMASTIC PAINT.

VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	UNIT	UNIT WEIGHT	GS	ZONE
					VAR NO	MATERIAL SPECN	DI	QUANTITY			
04	FACE PLATE 4X200X325				15 042 332	SA387GR12CL2	C	L	2.040		
									1		
03	LAP JOINT 6X50X568				15 042 277	SA387GR12CL2	C	L	1.340		
									2		
02	PL 6x40x310				15 042 277	SA387GR12CL2	C	L	0.584		
									2		
01	SEAL BOX		3-09-001-00586		15 042 277	SA387GR12CL2	C	L	8.500		
									1		

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT

STANDARD

<p>Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPPALLI - 620014</p>	DRN	NAME S. RAJESWARI	SIGNATURE	DATE 08-03-17	NO. OF VAR
	CHD	K. BALAJI		08-03-17	—
	APPD	ASWINI KUMAR PANDA		08-03-17	

DEPT. : C & I	ALL DIMENSIONS ARE IN MM	SCALE NTS	WEIGHT (Kg)	REF TO ASSY / OLD DWG	ITEM NO	No OF ITEMS
CODE : 392					—	—

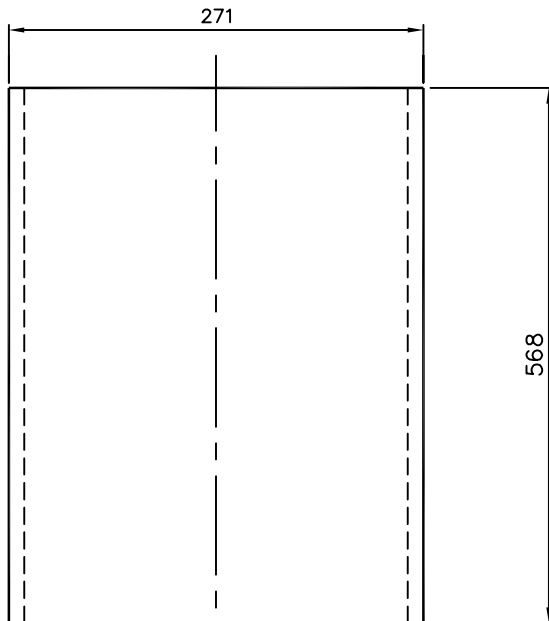
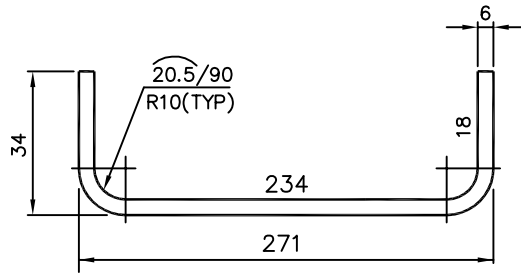
TITLE SEAL BOX FOR TV OPENING	CARD CODE U 01	DRAWING NO: CI:SEBOX:OPNG	REV 00
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REV	DATE	ALTERED :
		CHD./APPD. :

CAUTION : The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

DRAWING NO: CI: SEBOX

FOR TOLERANCES OF UNTOLERANCED
DIMENSIONS DURING MANUFACTURE
REFER PLANT STD.NO TP 023 0299



VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	UNIT	UNIT WEIGHT	CS
		PLATE 6; 316x568				15 942 277			8.500	
						SA 387 GR.12	C			
					VAR NO	MATERIAL SPECN	DI		QUANTITY	



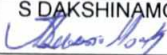
CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.		TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT				STANDARD			
		Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI - 620014 355-055		DRN	S RAJESWARI	SIGNATURE		DATE	08.03.17
				CHD	K. BALAJI			DATE	08.03.17
		APPD	ASWINI KUMAR PANDA			DATE	08.03.17		
DEPT	C&I	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE	WEIGHT (Kg)	REF TO ASSY / OLD DWG			
CODE	392			N.T.S	8.500				
TITLE						DRAWING NO :			
SEAL BOX						CI: SEBOX 00			
						REV			

REV	DATE	ALTERED :
01		CHD & APPD:
ZONE		

**BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI**

**CONTROLS AND INSTRUMENTATION / FB
QUALITY ASSURANCE**

**STANDARD PACKING PROCEDURE
FOR
ELECTRICAL AND ELECTRONIC PANELS
(INCLUDING BOXES, CABINETS, CUBICLES, SYSTEMS AND CHASSIS)**

Rev	Date	Prepared	Checked	Approved	Revision History
00	01.01.96	Sd/-	Sd/-	Sd/-	Initial History
01	28.03.02	A.J.OMPRAKASH Sd/-	R.VARADARAJAN Sd/-	G.MATHIYALAGAN Sd/-	Department name changed
02	26.02.07	RM.VAIRAVAN	N.SRIDHAR	S.SOMASUNDARAM	Revised after discussion with Shipping Dept.
03	07.02.2017	AVINASH V 	RM VAIRAVAN 	S DAKSHINAMOORTHY 	Type of wood for packing changed

1.0 SCOPE

- 1.1 This procedure gives minimum guidelines to be complied with for packing of Electrical, Electronics and Instrumentation panels. This packing shall be suitable for different handling operations and for the adverse conditions during transportation and during indoor / outdoor storage for periods more than one year.

2.0 WOOD SPECIFICATION FOR PACKING

- 2.1 Any seasoned wood or plywood as per relevant international standard
2.2 Sea worthy packing is envisaged for international shipments.

3.0 PACKING

- 3.1 Any seasoned wood or plywood shall be used .It shall be free from knots, etc. and any kind of decay caused by insects and fungus.
- 3.2 The required wood case for the equipment to be packed shall be made out of individual planks of single length and no joint is permissible. Using such planks, the required wood case for the panel shall be made,
- 3.3 Sufficient number horizontal, vertical and diagonal planks (dimension depending upon case size) shall be used for binding and strengthening. Runners have to be provided with metallic sling plates for handling.
- 3.4 Support planks are to be provided such that, no force is acting on the parts of equipment or its parts.
- 3.5 Panels above 1.5 metre shall be bolted at the bottom.
- 3.6 The equipments covered with a polythene sheet shall be kept inside the box, followed by coir, wooden bottoms, thermo coal, etc to prevent vibration effect during loading, transportation, etc.
- 3.7 On all sides of the inner case, black polythene sheet shall be nailed.
- 3.8 Loose items of the equipment, if any, shall be packed separately.
- 3.9 Delicate components likely to be damaged, example PCB – Electronic modules, instrument, etc are to be covered individually in anti-static bags and packed in cartons and filled with fillers like thermo coal, paper cuttings, etc.
- 3.10 Such cartons shall be packed with overall polythene rapping and packed in wooden cases. Mark prominently as "ELECTRONIC COMPONENTS".

4.0 MARKING

- 4.1 After completing the packing, Stencil marking, as per dispatch instructions and symbol marking as per Annexure – I shall be made. Please ensure the box is stenciled with "FRAGILE ITEM", "HANDLE WITH CARE"

5.0 PACKING SLIP

- 5.1 A copy of the packing slip, kept in a polythene cover shall be kept inside the box. Another copy of the packing slip, kept in a polythene cover shall be kept out side the box and covered with a metallic plate to the case.

6.0 CAUTION

Do not pack any other Mechanical items with this case.

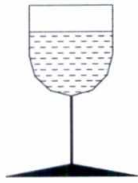
7.0 GENERAL

- 7.1 These packing procedures are the minimum requirements in addition to the standard instructions mentioned in the Purchase Order and Specification.

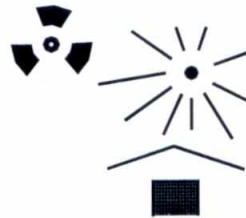
ANNEXURE - 1

TO

PROCEDURE NO:CI:QAC:PR:02/00 ; PR:03/00 ; PR:04/00



FRAGILE, HANDLE WITH CARE



PROTECT FROM HEAT AND RADIOACTIVE SOURCES



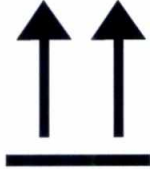
USE NO HOOKS

NOTE: The design of heavy goods packages cannot always resist top lifting by grabhooks.



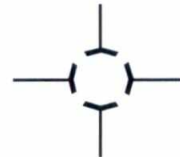
KEEP DRY

NOTE: Not all cases have waterproof internal liners: plywood used in the construction may not have a waterproof glueline.



THIS WAY UP

NOTE: Certain designs of small cases make it difficult to distinguish top from bottom.



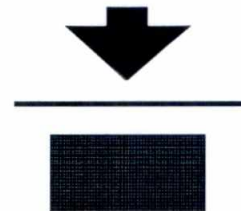
CENTRE OF GRAVITY

NOTE: This should be stencilled as a minimum on the two longest case sides (this information will normally be supplied by the manufacturer of the item(s) packed).



KEEP AWAY FROM HEAT

... kg max



STACKING LIMITATION

NOTE: The maximum load in kilograms should be marked above the arrow.



INTERNATIONAL "SLING HERE" SYMBOL

/ On Bidder's office letter pad /

Self-Declaration

Enquiry No.	GEM/2021/B/1710480
Enquiry Date	29.11.2021

In line with Government public procurement order Number P-45021/2/2017-B.E-II dated 15.06.2017, and further modified order dt.04.06.2020 issued by DPIIT,

I / We hereby declare that I / We are a "Local Supplier" meeting the requirement of minimum local content (.....%) defined in the above government notification for the goods against above mentioned enquiry Number.

Details of location at which local value addition will be made is as follows:

Door No.	
Street / Address 1	
Street / Address 2	
District	
State	
Country	
PIN Code	

We also understand that the false declarations will be considered as breach of Integrity and liable for action.

For Company Name:

Seal:

Signature:

Date:

Place:

(Please fill all the yellow color field)



429-024

MATERIALS MANAGEMENT / BOI**SUB-DELIVERY ENQUIRY DEVIATION FORMAT**

Page : of

Schedule of deviation to
Sub-delivery Enquiry No. : **GEM/2021/B/1710480 dt:29.11.2021**Description : **High Temperature Furnace Flame viewing camera
system and accessories**Documents : **Specification: CI:1727:CCTV:SPEC / Rev 00**

Drawing No. : -

Quality Plan : **Vendor Quality Plan subject to BHEL / Customer
approval**Packing Procedure : **QA:CI:STD:PR:02 / Rev 03**

Document reference	BHEL called for	Firm's alternative offer

Certified that other than the above deviations, we are accepting all the other specifications and requirements in full to your Enquiry.

Station :

Date :

Signature of firm's representative

Firm seal

Note : 1. Deviations should be taken only in the extreme case
2. If necessary, use additional sheets with page control number

GEM/2021/B/1710480 dt:29.11.2021

ANNEXURE

Sl No.	Terms	Conditions	Vendor confirmation
1	Delivery term	Vendor shall quote unit price on FOR / Project site basis inclusive of Packing & Forwarding, Freight & GST . Insurance will be on BHEL scope. Note: Supervision of erection and commissioning of the system at project site is in vendor scope and charges shall be considered along with the accessories for camera system.	Quoted /Not quoted
2	Offer Evaluation	Offer evaluation will be on Single Package .	Accepted
3	Reverse Auction (RA)	RA is applicable & will be conducted as per GeM operating procedure.	Accepted
4	Delivery days	100 days from document approval . Delivery days shall inclusive of all the activities like manufacturing, inspection, Packing & Forwarding and dispatch. Vendor to submit applicable documents within 15 days from GeM PO date.	Accepted
5	Payment term	90% payment within 60 days of issue of consignee receipt-cum-acceptance certificate (CRAC) & balance 10% on commissioning of the system at project site. MSE vendor payment will be made as per MSME act 2006. Any deviation in the above Payment Terms, any other conditions in payment terms or any other payment term will not be accepted and offers are liable to be commercially rejected.	Accepted
6	LD clause	As per present GeM Terms & Conditions	Accepted
7	Guarantee period	12 months from the date of commissioning or 18 months from the date of dispatch whichever is earlier.	Accepted
8	HSN CODE	Indicate HSN code for quoted items	
9	GST	PI Mention in GST % for quoted items	%
Document submission along with bid			
11	Attachments 1	Whether vendor belongs to MSE & Have you submitted Udyam registration certificate (To validate MSE status)	Yes / No
12	Attachments 2	Have you submitted filled ,sign & sealed point wise compliance for PQR with supporting documents . Please mention the corresponding page no also for each PQR point.	Yes / No
13	Attachments 3	Have you submitted Filled, signed & sealed "NIL Deviation Format" .	Yes / No
14	Attachments 4	Have you submitted signed , sealed in the all pages of tender documents like "Technical Specification, Drawing /datasheet , testing procedure, Quality Plan & packing procedure" with respect to this tender along with offer.	Yes / No
15	Attachments 5	Have you Filled local content %, signed , sealed & submitted "Self declaration format for MII clause" as per BHEL format in your company letter head.	Yes / No

Note: vendor consents that the terms & conditions accepted, in GEM alone, shall be binding between BHEL and the Vendor; and no other terms mentioned, elsewhere in the un priced offer / Quotation will be considered / accepted by BHEL.

VENDOR DETAILS

1	Vendor Name	
2	Office Address	
3	Contact Person Name	
4	Mobile No	
5	E mail Id	
6	GSTN	

Vendor to fill & submit this Annexure with sign & seal along with offer .