An ISO 9001
Company

# Bharat Heavy Electricals Limited

**(**High Pressure Boiler Plant**)**
Tiruchirappalli – 620014, TAMIL NADU, INDIA
MATERIALS MANAGEMENT

| **TITLE**<br><br>**START – UP BURNER ASSEMBLY** | Phone: +91 431 2574087/2574157<br>Fax : +91 431 252 0233 / 0525<br>Email : joe@bheltry.co.in |
|---|---|

| | **Reference Number: MM / PCPS / SB** | **Enquiry Date: 09.01.2012** | **Due date for submission of quotation: 17.02.2012** |
|---|---|---|---|
| You are requested to quote the Enquiry number date and due date in all your correspondences. | | | |

BHEL/Trichy is looking for ..... Supply of **START – UP BURNER ASSEMBLY**

| BHEL commercial terms & conditions with Price Bid formats and all annexure can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units) Bharath Heavy Electricals Limited) under reference "**MM/ PCPS / SB** " | |
|---|---|
| Tenders should reach us before 14:00 hours on the due date<br>Technical bid will be opened at 14:30 hours on the due date<br>Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present. | Yours faithfully,<br>For **Bharath Heavy Electricals Limited**<br><br>A.Josephraj<br><br>SPO / Purchase/ PCPS |

# SPECIFICATION FOR START-UP BURNERS

## BHAVANAGER ENERGY COMPANY Ltd., GUJARAT
## 2 x 250 MW, LIGNITE BASED CFBC BOILERS
## CUSTOMER Nos. 5316, 5317

| | | Stamp |
|---|---|---|
| | | |
| Purchase Order Number: | | |
| Equipment / Item Tag: | | |
| Equipment / Item Description: | **SPECIFICATION FOR STARTUP BURNERS** | |
| | | |
| | | Comment given in this document does not relieve vendor of his/her responsibility for the correct engineering design and fabrication. This equipment or product shall be made as per the codes, requisition, specification, project procedures, and international standards. |

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| Rev | Date DD-MM-YYYY | REVISED | CHECKED | APPROVED | |

| Sl.No. | SPECIFICATION DETAILS | Vendor compliance (YES or NO or NOTED and fill data wherever required) |
|---|---|---|
| 1.0 | **Qualification Criteria**<br>Only those vendors who have supplied Start-up Burners above 30 mkcal/h (capacity) for CFBC applications and if the burners are in successful operation for minimum two years, are qualified to quote for this tender. Vendors to submit a reference list for the same along with the offer itself. | |
| 2.0 | **Scope**<br>This specification covers the general requirements for design, manufacture, inspection, testing and supply of start-up system equipments, its accessories inclusive spares to use in steam generation plants of CFBC (Circulating Fluidized Bed Combustion) boiler.<br>The start-up system equipments with its accessories may include the burners, igniters, scanners, SS Hose with relevant screwed pieces, oil gun maintenance vice rack, refractory hood, quarl forming tool, PTFE cables, spanner for oil gun tip maintenance, etc., which will ensure effective functioning of the Start-up Burner sytem.<br>Supplier to submit a ***Detailed Bill Of Materials List*** citing the scope of supply. | |
| 3.0 | **Application**<br>The heat-up burner consists of Start-up burner for pre-heating the bed material in CFBC boiler during start-up, to enable to switch over from oil to lignite operation and if required the boiler can be fired exclusively with oil up to 30% BMCR for longer period. | |
| 4.0 | **Start–up burner**<br>The Start-up burners are required for heating up the combustor together with the refractory lining when the plant is started from cold conditions. The start-up burner system comprises of four start-up burners.<br><br>The burners shall consist of a central tubular jacket accommodating the adjustable burner gun. The start-up burner gun shall be connected to the oil; atomizing medium (air/steam) and supply systems by flexible hoses with cam lock connections at the cold ends of oil guns. Oil guns must be leak tight and disconnecting of cam locks must seize oil flow through hoses.<br><br>Suitable swirler made of SS310 or superior material to combat erosive conditions inside the combustor of CFBC boilers. Swirler shall be mounted to the oil gun guide pipe in such a way to avoid | |

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| | falling of swirler inside the combustor. Mounting and design of swirler shall be in a way to accommodate adjustment of swirler on the oil gun guide pipe (back and forth) only by sliding and fixing, without affecting the burner performance.<br><br>The start-up burner shall be lighted-up by means of a separate gas igniter (IFM type), equipped with high-voltage electrical ignition. The igniter flame scanner shall monitor the igniter flame. The igniter rod is cooled by igniter air supplied thro' the guide pipe. For lighting up the burners, the start-up burner oil gun is pneumatically moved to its operating position. The operation of the start-up burner shall be monitored by Flame Scanner. Each burner shall have minimum three peepholes with seal air provision enabling the operator to check the igniter and the burner flame locally. Ignitor, Oil gun with retractor, flame scanner and cooling air provisions shall all be mounted on the front panel. It must be possible to rotate the Wind-box independent of Burner Front panel.<br><br>Distribution of the combustion air to start-up burners is accomplished with separate air dampers for each burner. The start-up burners are supplied with combustion air from the secondary air system. During normal lignite operation the start-up burners shall be retracted and cooled by admitting required air. Entry of combustion air shall be from TOP.<br>For burners, atomization air pressure available is 6.0 kg/cm$^2$(g). Burner system shall also be designed for scavenging /flushing with available atomizing air or atomizing steam.<br>Burner shall have man-hole, drain point with valve, lifting lug, and cooling provision, suitable closing provision on removal of oil gun, igniter and scanner during boiler operation, for maintenance. | |
| 5.0 | **PILOT IGNITOR & SCANNER COOLING AIR PROVISION**<br>For ignitor and scanner cooling, provision shall be available for air connection. Connecting Hoses are in Suppliers' scope. | |
| 6.0 | **Design requirement** | |
| 6.1 | The burner shall be designed for data available in this specification and shall be suitable for continuous operation. Components / equipments shall be weatherproof, dust-proof and suitable for outdoor application. | |
| 6.2 | The bed material should not form slag/clinker in the start-up burner mouth. The start-up burner shall be designed to ensure the flame stability against turbulence of bed materials and high-pressure primary air. Supplier to do required modifications as warranted in case of slag/clinker formation in burner throat. | |
| 6.3 | Normal cooling of flame scanner is by Seal / Purge air and during emergency by instrument air. | |

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| 6.4 | Oil guns shall employ spray plates with CONSTANT atomising media pressure. | | |
| 6.5 | A hood made of 3.15mm thick carbon steel sheet resembling the BURNER THROAT REFRACTORY PROFILE is to be provided. This hood provided must be mounted on the seal box of Start-up Burner. | | |
| 6.6 | It must be possible to adjust the working point of Oil gun along with the Swirler by +/- 200mm without affecting the performance of the burner. Burner throat pipe is to be designed accordingly. | | |
| 6.7 | Start-up Burner characteristic curves for the following to be provided.<br>a.) HFO/LSHS Flow Vs Atomising Steam Flow<br>b.) HFO/LSHS Pressure Vs HFO Flow<br>c.) LDO Flow Vs Atomising air Flow<br>d.) LDO Pressure Vs LDO Flow<br>e.) HFO/LSHS Flow Vs Secondary air Flow<br>f.) HFO/LSHS Pressure Vs Furnace to WB DP.<br>g.) LDO Flow Vs Secondary air Flow<br>h.) LDO Pressure Vs Furnace to WB DP. | | |
| 6.8 | If nothing is specified, equipment shall be covered by the scope of this specification and to be designed in accordance with the following requirements. Drawings and standards shall be as stated in this specification. | | |
| 6.9 | All pertinent laws & order, directives, design codes and safety requirements should be considered. | | |
| 6.10 | The burner start up, operation and shutdown shall satisfy applicable latest NFPA 85 (category of Standard on Circulating Fluidized-bed Boiler operation). | | |
| **7.0** | **Required fuel pressure & atomizing media pressure at the burner** | | |
| 7.1 | Fuel pressure max at the burner | kg/sqcm(g) | Supplier to specify |
| 7.2 | Fuel pressure min at the burner | kg/sqcm(g) | Supplier to specify |
| 7.3 | Atomising media pressure max at the burner | kg/sqcm(g) | Supplier to specify |
| 7.4 | Atomising media pressure min at the burner | kg/sqcm(g) | Supplier to specify |
| 7.5 | Flame Length (Min) with calculations | m | Supplier to specify |
| 7.6 | Flame Length (Max) with calculations | m | Supplier to specify |
| **8.0** | **DRAWING ATTACHED FOR REFERENCE** | | |
| 8.1 | Start-up Burner orientation drawing | | |
| 8.2 | PID of Start-up Burner | | |

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|---|---|---|---|---|
| 8.3 | Seal Box for Burner mounting | | | |
| 8.4 | Refractory profile | | | |
| **9.0** | **PROJECT METEOROLOGICAL DATA** | | | |
| 9.1 | Elevation above MSL (Mean Sea Level) | | 42 m | |
| 9.2 | Ambient air temperature | | 43.5 ° C | |
| 9.3 | Relative humidity | | 62% | |
| **10.0** | **TECHNICAL DATA SHEET FOR START-UP BURNER**<br><br>(Left out data shall be furnished by Vendor) | | | |
| | Parameter | Unit | Value | |
| 10.1 | Heat duty | MW | **44** | |
| 10.2 | Fuel | | LDO/ HFO/LSHS | |
| 10.3 | Number of Start-up burner per boiler | Nos. | FOUR | |
| 10.4 | Fuel firing rate maximum | Kg/h | HFO/LSHS : 3940<br>LDO : 3688 | |
| 10.5 | Fuel firing rate minimum | Kg/h | | Vendor to meet > 1:5 Turndown |
| 10.6 | Control range of one burner | | | Supplier to specify |
| 10.7 | Fuel oil pressure at burner max. | Kg/sq.cm(g) | | Supplier to specify |
| 10.8 | Fuel oil pressure at burner min. | Kg/sq.cm(g) | | Supplier to specify |
| 10.9 | Fuel oil pressure at burner Normal | Kg/sq.cm(g) | | Supplier to specify |
| 10.10 | Fuel oil temp at burner | °C | LDO : 40<br>HFO/LSHS : 115 | |
| 10.11 | Atomising Medium | | LDO : Compressed air<br>HFO/LSHS : Steam | |
| 10.12 | Atom. air pressure at burner max. | Kg/sq.cm(g) | | Supplier to specify |
| 10.13 | Atom. air pressure at burner min. | Kg/sq.cm(g) | | Supplier to specify |
| 10.14 | Scavenging media | | Air / Steam | Supplier to specify |
| 10.15 | Scavenging air/steam Flow rate | Air: Ncum/h<br>Steam: Kg/h | | Supplier to specify |
| 10.16 | Duration of scavenging | minutes | | Supplier to specify |
| 10.17 | Type of pilot burner | IFM Type Gas Burner | | |

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| 10.18 | Pilot burner fuel | | LPG | |
| 10.19 | Pilot burner duty | | Intermittent | |
| 10.20 | Pilot burner fuel flow rate | Kg/h | | Supplier to specify |
| 10.21 | Pilot burner fuel pr. at burner max. | $Kg/cm^2(g)$ | | Supplier to specify |
| 10.22 | Pilot burner fuel pr. at burner min. | $Kg/cm^2(g)$ | | Supplier to specify |
| 10.23 | Pilot burner fuel pr. at burner nor. | $Kg/cm^2(g)$ | | Supplier to specify |
| 10.24 | Pilot Flame Length (Min) with calculations | m | | Supplier to specify |
| 10.25 | Pilot Flame Length (Max) with calculations | m | | Supplier to specify |
| 10.26 | Auto Retract mechanism of Oil gun | | | |
| a) | Air Pressure | $Kg/cm^2(g)$ | | Supplier to specify |
| b) | Air Flow | $Nm^3/h$ | | Supplier to specify |
| 10.28 | **Start-up Burner combustion air** | | | |
| a) | Combustion air flow per burner | $Nm^3/h$ (max.) | | Supplier to specify |
| b) | Combustion air temp. (start-up) | °C | 28 - 84 | |
| c) | Combustion air temperature (Lignite operation-SUB not in operation) | °C | 270 | |
| d) | Secondary air pressure | mbar | 40 – 150 | |
| e) | CFB counter pressure - nominal | mbar | 40 – 75 | |
| f) | CFB counter pressure - max | mbar | 125 | |
| 10.29 | Wind-box design pressure | $Kg/cm^2(g)$ | | Supplier to specify |
| 10.30 | Cooling air for oil gun flow & pr. | $Nm^3/h$, $Kg/cm^2(g)$ | | Supplier to specify |
| 10.31 | Cooling air for Igniter flow & pr. | $Nm^3/h$, $Kg/cm^2(g)$ | | Supplier to specify |
| 10.32 | Cooling air for scanner flow & pr. | $Nm^3/h$, $Kg/cm^2(g)$ | | Supplier to specify |
| 10.33 | Cooling air for observation port | $Nm^3/h$, $Kg/cm^2(g)$ | | Supplier to specify |
| 10.34 | Register Draft Loss | $Kg/cm^2(g)$ | | Supplier to specify |
| 10.35 | NOx Emission Level | ppm | | Supplier to specify |

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| 10.36 | **Fuel Parameters at Burner** | | | |
| a) | Viscosity of HFO/LSHS at 115 degC | centistoke | 3.0 – 15.0 | |
| b) | Viscosity of LDO at 40 degC | centistoke | 2.5 – 15.7 | |
| c) | Calorific value of LDO | kJ/kg | 42970 | |
| d) | Calorific value of HFO/LSHS | kJ/kg | 40200 | |
| 10.37 | Viscosity of HFO/LSHS at 50 degC | centistoke | 370 | |
| **11.0** | **SCOPE OF SUPPLY (START-UP SYSTEM)** | | | |
| 11.1 | **START-UP BURNER AND ITS ACCESSORIES each set consists of the following (Ref. attached PID)**<br>a) Wind box with burner mounting plate, provisions to mount actuator, scanner three viewing glasses, igniter, main oil gun, secondary air duct mounting flange with companion flange & fasteners, burner mounting tube with flange & fasteners, neck, lifting lug, drain arrangement with knife edge valve etc., Burner Wind box shall be suitable for mounting on a seal box.<br>b.) Oil gun assy. with guide pipe with provision for connecting power cylinder with iso-kinetic spinner (MOC shall be SS 310), tripod support, knife edge valve<br>c.) Limit switch for providing gun engagement position.<br>d.) Sight glass assy. (3 nos. per burner)<br>e.) Spanner set for gun tip<br>f.) Refractory formation hood.<br>g.) Spare O – ring.<br>h.) Quarl forming tool<br>h.) SS Flexible hoses (each 1.0 metre Long) for fuel oil, Atomising air, Atomising steam, oil gun cooling, Scanner cooling, sight glass cooling, pilot gun cooling and other hoses as applicable.<br>i.) Gasket (asbestos free – oil resistant)<br>j.) Burner throat pipe – Stainless Steel<br>k.) Ceramic paper to wrap on throat pipe.<br>l.) Required Swirlers with various swirl blade angles for establishing clinker free performance.<br>m.) Spray nozzles with spray angles $55^{o}$ and $45^{o}$<br>n.) Oil gun vice and rack assembly for maintenance | | | |

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| 11.2 | **AUTO-RETRACT MECHANISM & ACCESSORIES for Start-up Burners:**<br>a.) Double acting power cylinder for oil gun retraction and insertion with pneumatic tubing and fittings.<br>b.) Solenoid valve<br>c.) Air filter regulator set for solenoid valve with pneumatic tubing and fittings.<br>d) Open/close position limit switches | |
| 11.3 | **IFM GAS IGNITER & ACCESSORIES each set consists following**<br>a.) IFM gas igniter with gauges etc.,<br>b.) Gas igniter integrated transformer & ex-approved Ionic flame monitor with control cable completely fitted<br>c.) Junction box and other items as required.<br>d.) PTFE cables<br>*e.) Other items as required.* | |
| 11.4 | **SCANNER & ACCESSORIES each set consists of following:**<br>a.) Scanner, Slide glass assy., Control unit<br>b.) Swivel device<br>c.) Weather proof enclosure with signal processor duly wired<br>d.) Screened Cable for flame scanner – 60 m<br>e.) Junction box<br>f.) PTFE cables<br>g.) Other items as required. | |
| 11.5 | **Commissioning Spares: (List of items with quantity shall be furnished)**<br>a.) Commissioning spare for Start-up burner<br>b.) Commissioning spare for Gas Igniter<br>c.) Commissioning spare for Scanner | |
| 11.6 | **Inclusive of the above, all the items of supply that form a part of the Start-up Burner system are to be mentioned in the Bill of Material to be submitted by the vendor along with the offer.** | |
| **12.0** | **<u>Erection & Commissioning (E&C) Manuals</u>** | |
| 12.1 | **E&C manuals in English shall be provided.** | |
| 12.2 | E&C manual shall contain full details and drawings of all the equipment furnished, the erection procedures, check list, testing procedures and preliminary operation and maintenance procedures of the equipment. | |
| 12.3 | E&C manuals submission to purchaser Hard copy – 6 nos. & Soft copy – 3 nos. | |
| 12.4 | After commissioning / trial operation, if manual requires any modification / addition / deletion, the same shall be incorporated and updated in the final manual of hard & soft copies. | |

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| **13.0** | **Operation and Maintenance (O&M) Manuals.** | |
| 13.1 | The owner of the plant to get familiarized with equipments and to enable them to operate, maintain, dismantle, reassemble, adjust and repair the equipments in a safe and efficient manner, the O&M manual shall be provided. | |
| 13.2 | O&M manual shall contain relevant pamphlets, catalogues, drawings and list of parts with code number for ordering spares. Maintenance instructions shall include charts showing lubrication, checking, and testing and replacement procedures to be carried out daily, weekly, monthly and at longer intervals to ensure trouble free operation. Where applicable, fault location charts shall be included to facilitate finding the cause of mal-operation or breakdown. The manual shall be specifically compiled for the concerned project / purchase order. | |
| 13.3 | O&M manuals submission to purchaser Hard copies – 6 nos. & Soft copies – 2 nos. | |
| 13.4 | O&M manuals shall be submitted for review and approval prior to the completion. **O & M manuals shall be in English** | |
| **14.0** | **DOCUMENT / DETAILS TO BE SUBMITTED ALONG WITH OFFER:** | |
| 14.1 | Complete scheme, General arrangement drgs., cross-section drawing, technical specification & catalogue for start-up burner, igniter with IFM and flame scanner. Quality plan, Inspection plan, painting & packing procedure for burners. | |
| 14.2 | Previous experience of the vendor for CFBC boiler burner and reference list. | |
| **15.0** | **Characteristic curves & Start-up curves (SUB)** | |
| 15.1 | Major Dimensions, connection details, space required for gun removal, instrument set point and other relevant data. | |
| 15.2 | Elaborate the measures adopted to prevent clinker formation on the refractory throat of start-up burner | |
| 15.3 | Sizing and selection criteria for thermal insulation & cladding and Refractoriness. Details of specifications of insulating materials, procedure for applying insulation, cladding sheet, reinforcement, curing and setting method, calculation for thermal insulation thickness. | |
| **16.0** | **List of all recommended spares for three years normal operation with unit price indicating the validity.** | |
| **17.0** | **INSPECTION & TESTING:**<br>All the equipments / components / assy. etc., shall be inspected by purchaser. Supplier shall furnish quality plan, inspection plan, painting procedure, packing procedure and all drawings for BHEL approval before manufacturing. All drawings shall be submitted in ISO standard size only. Third Party inspection applicable. | |

**18.0 Marking:**

18.1 Stainless steel name plate with BHEL material code, Purchase order No. Operating parameters, etc., to be boldly engraved and firmly fixed to the body.

18.2 Each spare shall be individually tagged with part name, maker's name, spare code & BHEL material code and/or as per the instructions provided along with the Purchase Enquiry.

**19.0 Painting:**

19.1 Painting shall be done in accordance with the painting schedule provided.

**20.0 Packing:**

20.1 Packing shall be to avoid damages during transit, water/dust entrapment and shall be roadworthy.

20.2 Liberal packing material & struts to be used to arrest rolling and to prevent from transit damage.

**21.0 Guarantee:**

21.1 The equipment shall be guaranteed for free replacement of any defective component.

21.2 The performance guarantee shall be for a period of 18 months from the date of commissioning.

21.3 Supplier to provide site support during erection and commissioning till satisfactory performance of the start-up burner is established.

21.4 During the warranty period, whenever required, vendor service engineer is to visit site, free of cost, to settle any issues pertaining to supplies or operation.

**BHARAT HEAVY ELECTRICALS LIMITED**
**TIRUCHIRAPALLI-620014**

**PROCESS & CAPTIVE POWER SYSTEMS / FUEL FIRING**

# SPECIFICATION FOR GAS IGNITOR WITH IFM

PREPARED CHECKED APPROVED

| REV NO | REVISION | PREPARED | CHECKED | APPROVED |
|---|---|---|---|---|
| | | | | |

| | | | |
|---|---|---|---|
| 1 | **Component** | **:** | Gas Ignitor with IFM & accessories complete as per drg no 4-41-450-80354/R01 |
| 2 | **Type** | **:** | Gas ignitor with Electric ignition and Ionic Flame Monitoring. |
| 3 | **Application** | **:** | To light-up main burner firing fuel oil / fuel gas. |
| 4 | **Class of Pilot /Duty Cycle** | **:** | Class-3 / Intermittent (20 sec) |
| 5 | **Working Temperature** | **:** | Spark plug & flame pipe - 600°C |
| 6 | **Heat Release Required** | **:** | 0.25 x $10^6$ kcal / hr |
| 7 | **Pilot Fuel** | **:** | LPG |
| 8 | **Scope of Supply** | **:** | Pilot burner, spark rod, IFM rod, Ignition Transformer with cable to connect ignitor output to spark device, IFM module, control cabinet etc., complete fully wired and assembled. |
| 9 | **Power Supply/Ignitor length** | **:** | *Refer Purchase enquiry.* |
| 10 | **Available Combustion Air Pressure** | **:** | 40 – 150 mbar |
| 11 | **Quantity of Air** | **:** | As required |
| 12 | **Available Pilot Fuel** | **:** | 0.2 to 0.5 kg/$cm^2$(g) |

**Pressure**

| | | | |
|---|---|---|---|
| 13 | **Required Enclosure** | : | Explosion proof (NEMA 4&7) for indoor application |
| 14 | **Cable Entry** | : | 1/2" BSP(F) with flame proof double compression cable gland suitable for 3 core, 6 mm Aluminium cable |
| 15 | **Ignition Transformer** | : | Output rating - Voltage / VA; Size - (width)x (height) x (length); Weight- kg; Mounting dimension- (shall be provided by supplier) |
| 16 | **Inspection / Testing** | : | a) Standard tests shall be conducted to prove a continuous visible strong spark discharge when connected to the transformer for a duty cycle of 20 seconds.<br>b) Material tests and dimension of all critical components<br>c) Standard test shall include establishing proper pilot flame at manufacturer's test facility and / or purchaser's site<br>d) Tip life. |
| 17 | **Certificate** | : | Supplier shall submit testing certificate mentioned at point (16) as above |

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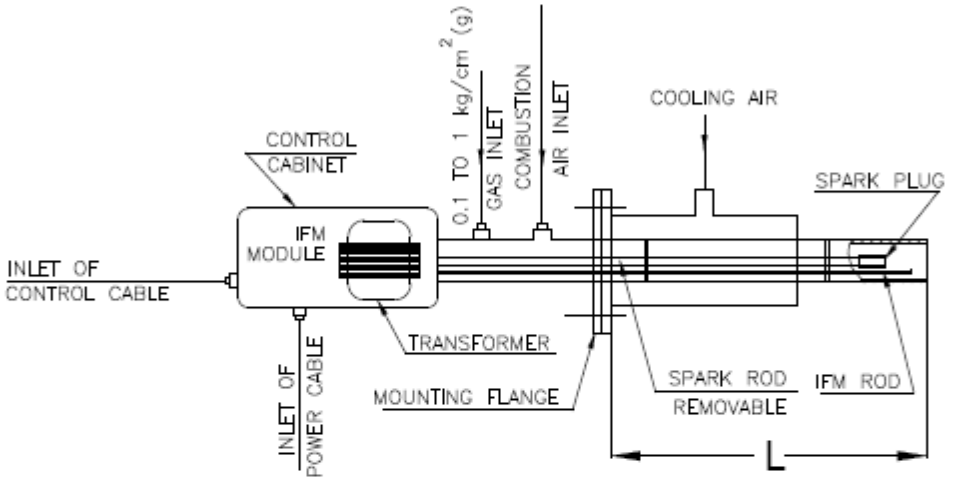
| 18 | **Commissioning** | **:** | As recommended by supplier. |
| | **Spares** | | |
| 19 | **Details to be Furnished with Offer** | **:** | a) Dimensional details.<br>b) Mounting flange details.<br>c) Weight of the assy. in kgs.<br>d) Catalogue with complete spec. and drawings.<br>e) Instruction, Installation, O&M manuals in CD (minimum 2. nos.) and hard copies (minimum 4. nos.) |

| REV | DATE | ALTERED | PGNS |
|---|---|---|---|
| 01 | 22/12/11 | CHD & APPD | NS/TKR |

REVISED AS PER SPEC REQUIREMENT






IFM IGNITOR

Bharat Heavy Electricals Ltd
UNIT: HIGH PRESSURE BOILER PLANT
TIRUCHIRAPALLI – 620014
361–321

| | NAME | SIGNATURE | DATE |
|---|---|---|---|
| DRN | NIKHIL SANKAR | | 01–11–2011 |
| CHD | NIKHIL SANKAR | | 02–11–2011 |
| APPD | T. KALIRAMAKRISHNAN | | 04–11–2011 |

| DEPT | ALL DIMENSIONS ARE IN MM | PROJECTION | SCALE | WEIGHT (Kg) | REF TO ASSY / OLD DWG |
|---|---|---|---|---|---|
| PCPS | | | NTS | | 4–41–450–80260 |
| CODE 1322 | | | | | |

| TITLE | DRAWING NO : | REV |
|---|---|---|
| IFM IGNITOR | 4–41–450–80354 | 01 |

A4 SIZE

**BHARAT HEAVY ELECTRICALS LIMITED**
**TRICHY -14**

**FBC & HRSG**

**ELECTRICALS, CONTROLS & INSTRUMENTATION**



# SPECIFICATION FOR PTFE CABLES

| REV NO | DATE | DESCRIPTION | PREPARED | REVIEWED | APPROVED |
|---|---|---|---|---|---|
| 00 | 30.05.2011 | INITIAL ISSUE | G.JAYABAL | P.VENKATARAMAN | A.SWAMINATHAN |

NOTE:

1. In Vendor Compliance column' - vendor to indicate 'YES', 'NO' or 'NOT APPLICABLE'.

FILENAME: 5305PTFE.DOC

## SPECIFICATION FOR PTFE CABLES

| SL. NO | SPECIFICATION | BHEL REQT. | @VENDOR CONFIRMATION YES/NO |
|---|---|---|---|
| 1.0 | **PTFE CABLES** | | |
| 1.1 | Design Ambient Temperature | 50 DEG C. | |
| 1.2 | Relative humidity | 100 % | |
| 1.3 | Atmosphere | Heavily poluted | |
| 1.4 | Voltage grade | 1100 V AC | |
| 1.5 | Reference standards | IS-8130 for copper conductor JSS-51004 for PTFE insulation.IS 8130, VDE 207 Part(6) & ASTMD 2116. | |
| 1.6 | Conductor material | Strandard, Nickel coated copper.( Min coating as per JSS-51004 | |
| 1.7 | No of Pair | 2 Pair | |
| 1.8 | Size of each core | 0.5 sq mm | |
| 1.9 | Construction | FEP (TEFLON) as per VDE 207 Part(6) & ASTMD 2116 insulation. | |
| 1.10 | Outersheath | FEP (TEFLON) as per VDE 207 Part(6) & ASTMD 2116 insulation. Heat treated, moisture and abrasion resistant. PTFE sheath of insulation grade 1.1 KV | |
| 1.11 | Core identification | By Colour coding as per IEC-189(ii) | |
| 1.12 | Armouring* | required | |
| 1.13 | Packing | Shall be suitable to withstand normal transit condition and tropical condition.. | |
| 2.0 | **INSPECTION &TESTS** | | |
| 2.1 | Conductor resistance | 73.4 Ohm/KM at 20 Deg C (maximim) | |
| 2.2 | Insulation resistance | 100 Meg Ohm/ KM at 20 Deg C as per IS-10810 (minimum) | |
| 2.3 | H V Test | Insulated core shall be as per IS-10810 immersed in water at 25 Deg C for 4 hours before the test and test voltage shall be 3000 V RMS (min) for 1 minute | |
| 2.4 | Spark test | 5000 V RMS (minimum) as per IS-10810 | |

* - Alternate offer without armouring also shall be offered.

## SPECIFICATION FOR PTFE CABLES

| SL. NO | SPECIFICATION | BHEL REQT. | @VENDOR CONFIRMATION YES/NO |
|---|---|---|---|
| 2.5 | Construction & Dimentional check | | |
| 2.6 | Thickness measurement of core insulationand sheath insulation | | |
| 2.7 | Contiuity of coating, cold bend test, resistance to flame propagation, resistance to soldering heat , physical properties for insulation and sheath as per JSS-51004 | | |
| 2.8 | Cable length | Length as per indent requirement | |
| 2.9 | Type and routine Tests | As per BHEL QP QA:CI:STD:QP:49 | |
| 2.2 | Inspection | Cable shall be offered for BHEL/Customer's Inspection | |
| 2.3 | Data sheet approval | Vendor shall send the filled in data sheets in triplicate for BHEL's approval | |
| 2.4 | Guarantee | 24 months from the date of supply. | |

**BHARAT HEAVY ELECTRICALS LIMITED**
**TRICHY - 620 014.**

***FBC & HRSG***

***ELECTRICALS, CONTROLS & INSTRUMENTATION***

| FBC & HRSG:CI:5316:FS | REV 00 | PAGE 01 OF 05 |
|---|---|---|

# SPECIFICATION FOR FLAME SCANNER SYSTEM

| REV NO. | DATE | DESCRIPTION | PREPARED | REVIEWED | APPROVED |
|---|---|---|---|---|---|
| 00 | 16.07.11 | INITIAL ISSUE | Balaji | P.V | A.S |

***SPECIFICATION FOR FLAME SCANNER SYSTEM***

| SLNo | SPECIFICATION | BHEL REQUIREMENTS | VENDOR @ CONFIRMATIONS YES / NO |
|---|---|---|---|
| 5.5 | Operating parameters in combustor: | Pressure: refer burner specification<br>Temperature: 1000 Deg C | |
| 6.0 | FLAME SCANNER AMPLIFIER | | |
| 6.1 | One feeder common by BHEL | 110 V AC UPS | |
| 6.2 | Self checking | Required but flame signal shall not be affected during flame check. | |
| 6.3 | Flame hold Facility | Delay facility required in the amplifier to hold FLAME –ON contact for approx 4 secs (adjustable) during momentary flame failure.<br>Provision for site adjustment of flame strength & frequency required. | |
| 6.4 | Out put contacts | Following output contacts required.<br>1.Flame/No flame change over contacts (SPCO) – 2 Nos<br>2.Scanner fault (self checking ) failed contact (SPCO)- 1 No<br>3.Rating of the above 1 & 2 contacts shall be suitable for 5 Amps.230 V AC or 0.5 Amps 220V DC.<br>4.All contacts wired up to TB.<br>5.20% spare terminals shall be provided in local amplifier box TB.<br>6.Terminal blocks in local Amplifier box shall be screw type and suitable for receiving 2.5mm2 copper cable. | |
| 6.5 | Flame Amplifier card | To be provided with<br>1.LED indication for FLAME ON/NO FLAME<br>2.Provision to adjust sensitivity with facility to block back-ground flame pickup.<br>3.Provision of set 'pick-up to drop off' flame relay, using dual gain adjustment.<br>4.Isolated output of 4-20 mA, 2 wire 24V DC terminated in TB. | |
| 6.6 | Flame scanner local Amplifier box | | |
| 6.6.1 | Flame Intensity meter | Mounted on the FS local amplifier box or on flame amplifier card. | |
| 6.6.2 | Enclosure | Weather proof to IP 65 | |
| 6.6.3 | Mounting | Wall mounting type with necessary nuts, bolts & washers. | |

***SPECIFICATION FOR FLAME SCANNER SYSTEM***

| SLNo | SPECIFICATION | BHEL REQUIREMENTS | VENDOR @ CONFIRMATIONS YES / NO |
|---|---|---|---|
| 6.0 | Packing | Each item shall be packed separately with adequate cushioning material to withstand normal transit risks and shall be sea worthy | |
| 7.0 | Spares | Recommended commissioning spares list and O &M spares list with break - up price shall be furnished with the offer. | |
| 8.0 | Commissioning | Required. Vendor's service Engineer to visit site with suitable tools, spares & commission the system break - up price to be furnished in the offer. | |
| 9.0 | **SPECIFIC REQUIREMENTS.**<br>1. Limitations in the length of the Flame scanner cable between flame scanner head assembly and local amplifier box to be indicated by the vendor in the offer.<br>Unit price for FS head assembly, Amplifier local box flame intensity meter & cable to be indicated in the offer. | | |

**NOTE: @ - Vendor to fillip the column duly signed, stamped all pages and furnish along with offer.**

BHARAT HEAVY ELECTRICALS LIMITED
FBC & HRSG / PURCHASE

Ref: MM/FBC & HRSG/Web Tender

## SPECIAL CONDITIONS

1. This tender is for the supply as per the enclosed Enquiry and specification.

2. The vendor shall have adequate experience in manufacturing of this item.

3. The tender is in TWO parts. One part consisting of Technical Bid with Commercial Terms & Conditions along with Quality Plan for supply in-line with our requirements and another Part containing Price Bid. Techno-Commercial bid and price bids are to be submitted in separate sealed covers. In addition to Technical & Commercial conditions, vendors, who are not registered vendor of BHEL, Trichy have to submit the filled in "Supplier Registration Forms" (available in www.bhel.com website) along with the technical bid. Based on this and other conditions, as well as capacity and capability and approval by customer vendors will be short-listed. Both these covers are to be put in a single cover duly super scribing the Enquiry Number. The technical bid with Commercial Terms & Conditions will be opened on the due date and based on the acceptance of techno-commercial bid and vendor evaluation, the price bid of the qualified vendors will be opened on a suitable date with due intimation.

Following will be the criteria for short-listing the vendors.

- Evaluation of the duly filled Supplier Registration Forms.
- Availability of minimum manufacturing, handling, testing and measuring facilities as detailed in the Supplier Registration Form.
- BHEL will have the right for spot assessment of the facilities.
- Meeting our techno-commercial requirements of the enquiry.
- Customer approval for the vendors before ordering.

4. BHEL reserves the right to negotiate with the L-1 vendor.

5. BHEL reserves the right to re-float the tender opened, if L1 price is not the lowest acceptable price to them inter-alia other reasons.

6. The materials are to be dispatched to site with normal packing in case of indigenous vendors and with sea worthy packing for foreign vendors.

7. For the delayed delivery, LD is applicable at 0.5% per week, subject to a max. of 15% on undelivered portion.

8. Indigenous vendor shall quote for Ex works basis.

9. Foreign vendor shall quote for FOB seaport.

10. Performance Bank Guarantee for 10% value of the order shall be submitted, valid for 24 months from the date of dispatch or 18 months from the date of commissioning.

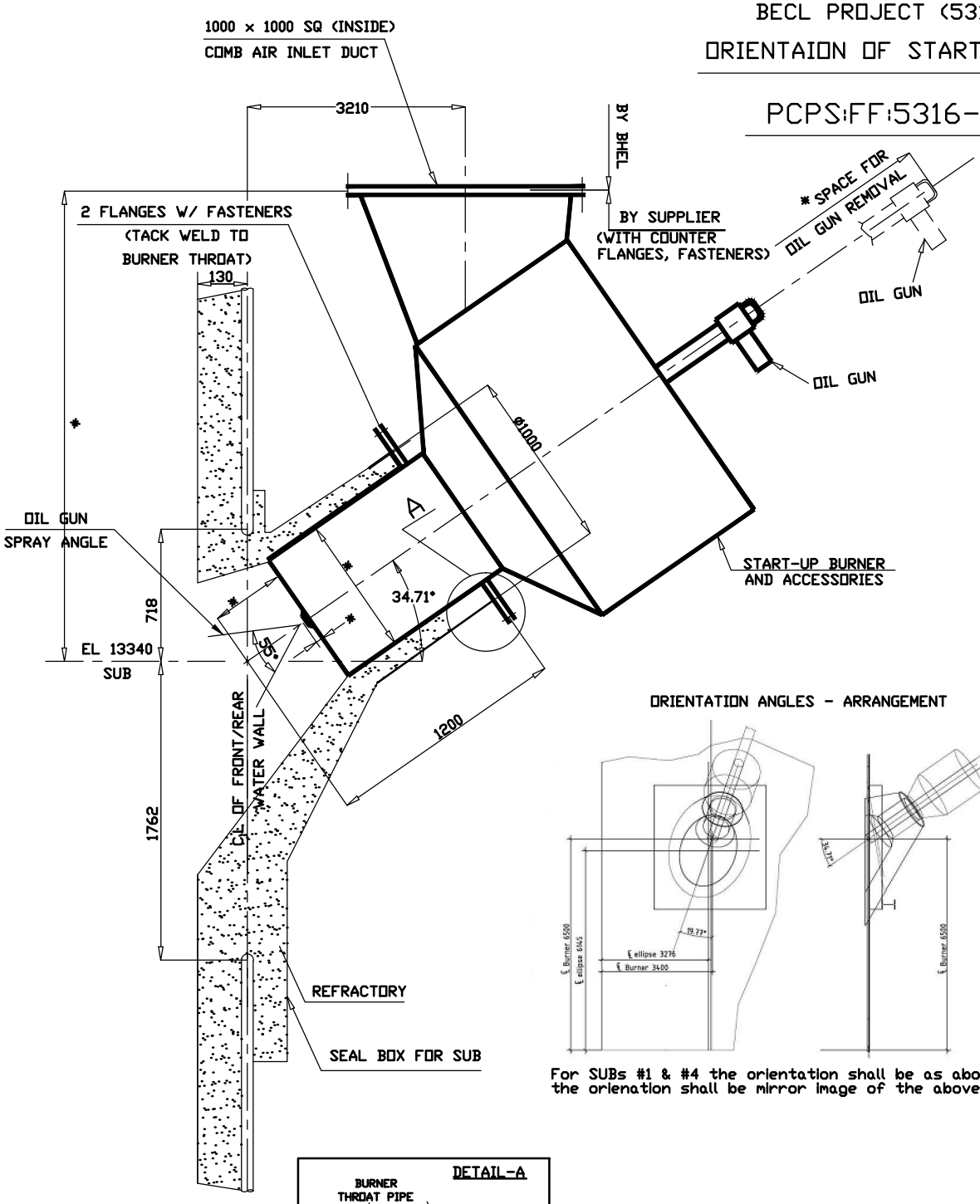
11. Applicable Commercial Terms & Conditions shall be clearly spelt out in the offer.

SPO/PURCHASE/FBC & HRSG

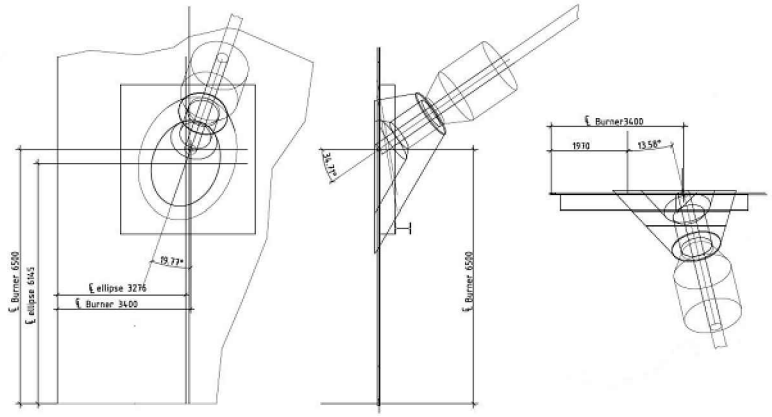
# BECL PROJECT (5316, 5317)

## ORIENTAION OF START-UP BURNER

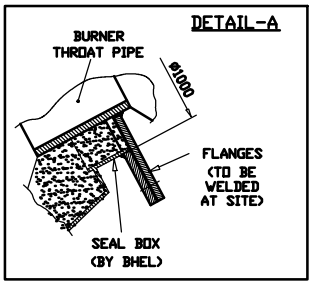
## PCPS:FF:5316-OR/00




ORIENTATION ANGLES - ARRANGEMENT




For SUBs #1 & #4 the orientation shall be as above and for SUBs #2 & #3 the orienation shall be mirror image of the above.




NOTE :

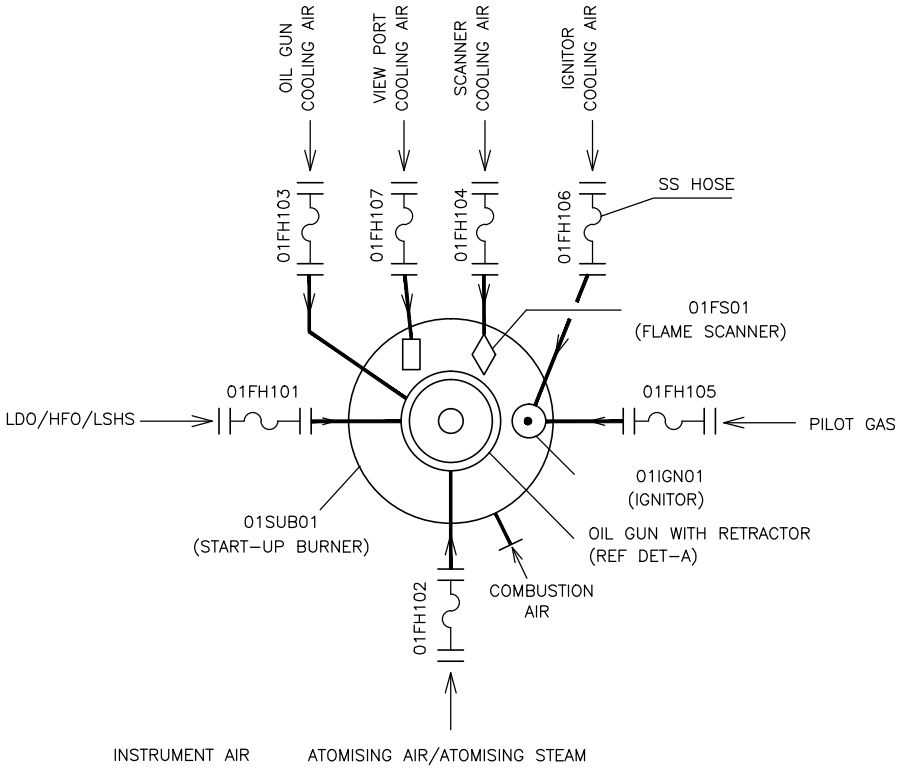
FLAME SHALL NOT INTERFERE WITH THE REFRACTORY WORK.

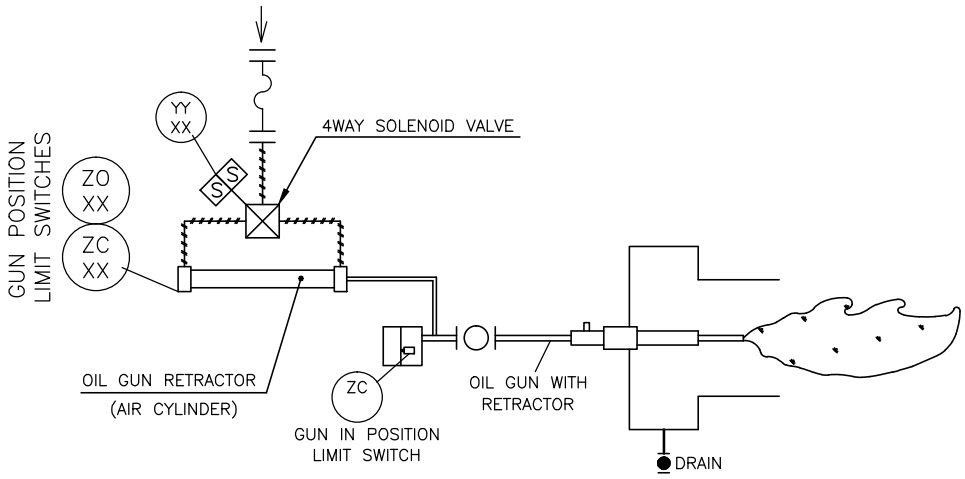
* DATA TO BE FURNISHED BY BURNER SUPPLIER.

DIMENSIONS SHOWN ARE IN MM

# PID OF START-UP BURNER

# PCPS:FF:5316:SUB-PID/00




## DETAIL-A

NOTES :

01. END CONNECTIONS OF HOSES SHOWN ARE INDICATIVE ONLY.

02. PROVISION/HOSES FOR COMBUSTION AIR (IF REQUIRED) FOR GAS IGNITOR SHALL BE FURNISHED BY SUPPLIER.

SS FLEXIBLE HOSES SHALL BE SUPPLIED WITH COMPANIAN SCREWED PIECES FOR BOTH THE ENDS. FIXED MALE END (SUITABLE FOR SOCKET WELDING WITH THE CONNECTING TUBE) AND SWIVELLING FEMALE AT THE OTHER END.

## TAG NO DETAILS

| SUB OF BOILER#1 | Flexible Hose for oil | Flexible Hose for atomising media | Flexible Hose for oil gun cooling air | Flexible Hose for scanner cooling air | Flexible Hose for ignitor gas | Flexible Hose for ignitor cooling air | Flexible Hose for view port cooling air | Start up Burner | Ignitor | Flame Scanner |
|---|---|---|---|---|---|---|---|---|---|---|
| SUB #1 | 01FH101 | 01FH102 | 01FH103 | 01FH104 | 01FH105 | 01FH106 | 01FH107 | 01SUB01 | 01IGN01 | 01FS01 |
| SUB #2 | 01FH201 | 01FH202 | 01FH203 | 01FH204 | 01FH205 | 01FH206 | 01FH207 | 01SUB02 | 01IGN02 | 01FS02 |
| SUB #3 | 01FH301 | 01FH302 | 01FH303 | 01FH304 | 01FH305 | 01FH306 | 01FH307 | 01SUB03 | 01IGN03 | 01FS03 |
| SUB #4 | 01FH401 | 01FH402 | 01FH403 | 01FH404 | 01FH405 | 01FH406 | 01FH407 | 01SUB04 | 01IGN04 | 01FS04 |
| SUB OF BOILER#2 – TAG NUMBERS SHALL BEGIN WITH 02 | | | | | | | | | | |