

SCHEDULE B – FORM OF QUOTATION

**RFQ Title: West Village Energy Centre - Hot Water Boilers**

**RFQ No: 1220-040-2023-014**

**CONTRACTOR**

**Legal Name:**

**Contact Person and Title:**

**Business Address:**

**Business Telephone:**

**Business Fax:**

**Business E-Mail Address:**

**CITY OF SURREY**

City Representative: Sunny Kaila, Manager, Procurement Services

E-mail for PDF Files: [purchasing@surrey.ca](mailto:purchasing@surrey.ca)

1.If this Quotation is accepted by the City, a contract will be created as described in:

(a) the Agreement;

(b) the RFQ; and

(c) other terms, if any, that are agreed to by the parties in writing.

2.Capitalized terms used and not defined in this Quotation will have the meanings given to them in the RFQ. Except as specifically modified by this Quotation, all terms, conditions, representations, warranties and covenants as set out in the RFQ will remain in full force and effect.

3. I/We have reviewed the RFQ Attachment 1 – Draft Quotation Agreement – Goods and Services. If requested by the City, I/we would be prepared to enter into that Agreement, amended by the following departures (list, if any):

**Section Requested Departure(s)**

4. The City requires that the successful Contractor have the following in place **before providing the Goods and Services**:

1. Workers’ Compensation Board coverage in good standing and further, if an “Owner Operator” is involved, personal operator protection (P.O.P.) will be provided,

Workers' Compensation Registration Number \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;

1. Prime Contractor qualified coordinator is Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

and Contact Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;

1. Insurance coverage for the amounts required in the proposed Agreement as a minimum, naming the City as additional insured and generally in compliance with the City’s sample insurance certificate form available on the City’s Website at [www.surrey.ca](http://www.surrey.ca) search [Standard Certificate of Insurance](http://www.surrey.ca/files/DCT_Standard_Certificate_of_Insurance_2014.docx);

(d) City of Surrey or Intermunicipal Business License: Number \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;

(e) If the Contractor’s Goods and Services are subject to GST, the Contractor’s GST Number is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; and

(f) If the Contractor is a company, the company name indicated above is registered with the Registrar of Companies in the Province of British Columbia, Canada, Incorporation Number \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

As of the date of this Quotation, we advise that we have the ability to meet all of the above requirements **except as follows** (list, if any):

**Requested Departure(s):**

5.The Contractor acknowledges that the departures it has requested in Sections 3 and 4 of this Quotation will not form part of the Agreement unless and until the City agrees to them in writing by initialing or otherwise specifically consenting in writing to be bound by any of them.

**Changes and Additions to Specifications:**

6. In addition to the warranties provided in the Agreement, this Quotation includes the following warranties:

7. I/We have reviewed the RFQ Attachment 1, Schedule A – Specifications of Goods and Scope of Services. If requested by the City, I/we would be prepared to meet those requirements, amended by the following departures and additions (list, if any):

**Requested Departure(s)**

**Technical Proposal Form**

8**.** Contractor should include in its technical submission information and documentation proposed for this project. Specifications and general information for the Goods listed above should be recorded on this form. Add rows as needed to include additional information.

**Engineering Data:** Contractors should complete, West Village Energy Centre, Phase 2 Hot Water Boiler, Specifications 42 11 13 Submittal Response Form attached to this Schedule B – Form of Quotation as Schedule B-1.

The Schedule B1 West Village Energy Centre, Phase 2 Hot Water Boiler, Specifications 42 11 13 Submittal Response Form is included to provide an example of information that is typically requested from Contractors.

**Performance Data:** Contractors should complete, Performance Data Sheet Response Form attached to this Schedule B – Form of Quotation as Schedule B-2.

The Schedule B-2 Performance Data Sheet Response Form is included to provide an example of information that is typically requested from Contractors.

**Fees and Payments**

10.The Contractor offers to supply to the City of Surrey the Goods and Services for the prices plus applicable taxes as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **F.O.B.** Destination Freight Prepaid | | **Payment Terms**:  A cash discount of \_\_\_\_% will be allowed if invoices are paid within \_\_\_ days, or the \_\_\_ day of the month following, or net 30 days, on a best effort basis. | | | **Ship Via:** |
| **Item** | **Specifications / Description** | | **Qty** | **Unit Price** | **Total Amount** |
| **A** | 1500 BHP Hot Water Boiler Package | | 2 | $ | $ |
| **B** | Engineering Submittals | | 1 Lot | $ | $ |
| **C** | Site Services, Training and Final Documentation | | 1 Lot | $ | $ |
| **D** | Delivery FOB Site | | 1 Lot | $ | $ |
| **E** | Spares (per Boiler)   * Two (2) PSV * One (1) Low Water Cut Off * Two (2) High Temp Cut Off | | 2 Lot | $ | $ |
| **G** | Sub-Total: | | | | $ |
| **H** | Goods and Services Tax (5%): | | | | $ |
| **I** | B.C Provincial Sales Tax (7%), as applicable: | | | | $ |
| **J** | **Total Quotation Price:** | | | | $ |
| CURRENCY: Canadian Dollar  Note: Overheads, General Conditions and Profit are to be included in the above amounts. | | | | | |

**Optional Pricing:**

11. The following is a list of option prices to the Goods and forms part of this RFQ, upon the acceptance of any of the optional prices. The optional prices are an addition to the Total Quotation Price and do not include GST and PST. DO NOT state a revised Total Quotation Price.

|  |  |  |
| --- | --- | --- |
| **Item** | **Description** | **Total Price** |
| (a) | Optional reduced emission (NOx) boiler for both units. | $ |
| (b) | Optional load side reactor for VFD’s for both units. | $ |
| (c) | Optional Boiler Storage for both units. | $ |
| (d) | Optional Site Visit for Boiler Full Load Test. | $ |
| (e) | One (1) year scheduled maintenance contract. | $ |
| (f) | Two (2) year scheduled maintenance contract. | $ |
| (g) | Five (5) year scheduled maintenance contract. | $ |
| (h) | Recommended Spare Parts | $ |
| CURRENCY: Canadian Dollar  Note: Overheads, General Conditions and Profit are to be included in the above amounts. | | |

**Delivery and Submittals:**

12. Documentation Submittals will be provided \_\_\_\_\_\_\_\_\_\_\_\_\_ weeks after notice to proceed or purchase order.

13. Delivery of Equipment, FOB Site, will occur \_\_\_\_\_\_\_\_ weeks after receipt of submittal drawings with comments.

14. Delivery Delays due to rejected or unacceptable submittals will not be cause for the extension of delivery period indicated above.

**Variations from Quotation:**

15. We submit herein a list of alternatives (that will increase or reduce the base cost) including price revisions to our Quotation Price for the alternative and variations we propose to the Specification. The deduction may be applied singly or collectively to the Quotation Price. We understand that should an alternative or variation be accepted by the City, it will be included in the contract documents as an addendum to the drawings and specification, and not issued as a change order.

None of the following variation sums have been included in the base Quotation Price. (Attach additional pages(s) as required).

|  |  |
| --- | --- |
| **Substitution/Alternates/Variations** | **Add/Deduct** |
|  | $ |
|  | $ |
|  | $ |
|  | $ |

**Time Schedule:**

16. Contractors should provide an estimated schedule, with major item descriptions and times indicating a commitment to provide the Goods and perform the Services within the time specified (use the spaces provided and/or attach additional pages, if necessary).

MILESTONE DATES \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ACTIVITY | SCHEDULE IN \_\_\_\_\_\_\_\_\_\_\_ | | | | | | | | | |
|  | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
|  |  |  |  |  |  |  |  |  |  |  |
| SAMPLE |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

**Experience, Reputation and Resources:**

17. Contractor's relevant experience and qualifications in delivering Goods and Services similar to those required by the Agreement (use the spaces provided and/or attach additional pages, if necessary):

18. Contractor's references (name and telephone number) (use the spaces provided and/or attach additional pages, if necessary). The City's preference is to have a minimum of three references. Previous clients of the Contractor may be contacted at the City’s discretion.

19. Contractors should identify and provide the background and experience of all key personnel proposed to provide the Goods and Services (use the spaces provided and/or attach additional pages, if necessary):

**Key Personnel**

|  |  |
| --- | --- |
| Name: |  |
| Experience: |  |
| Dates: |  |
| Project Name: |  |
| Responsibility: |  |

20. Contractors should identify and provide the background and experience of all sub‑contractors and material suppliers proposed to undertake a portion of the Goods and Services (use the spaces provided and/or attach additional pages, if necessary):

|  |  |  |  |
| --- | --- | --- | --- |
| *Description of Goods & Services* | *Sub-Contractors & Material Suppliers Names* | *Years of Working with Contractor* | *Telephone Number and Email* |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

21. I/We the undersigned duly authorized representatives of the Contractor, having received and carefully reviewed the RFQ and the Agreement, submit this Quotation in response to the RFQ.

**This Quotation** is offered by the Contractor this \_\_\_\_\_\_\_ day of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, 2023.

**CONTRACTOR**

**I/We have the authority to bind the Contractor.**

|  |  |
| --- | --- |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (Legal Name of Contractor)  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (Signature of Authorized Signatory)  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (Print Name and Position of Authorized Signatory) | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (Signature of Authorized Signatory)  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (Print Name and Position of Authorized Signatory) |

# SCHEDULE B-1 – WEST VILLAGE ENERGY CENTRE, PHASE 2 HOT WATER BOILER, SPECIFICATIONS 42 22 13. SUBMITTAL RESPONSE FORM

It shall be the Contractor's responsibility to carefully examine each item of the specification. All variances, exceptions and/or deviations from the preferred specification should be fully described.

*Note: Contractors are directed to list complete manufacturers’ details of model proposed in the right-most column.*

|  |  |  |
| --- | --- | --- |
| **Specifications** | **Provided? (y/n)** | **Specifications of Goods Offered. (Contractor should complete all spaces in this column).** |
| 1. Manufacturer or Contractor to provide unit performance data at full load and part load for summer and winter, in their standard format. |  |  |
| 1. Submit data in the format of the data sheets found in the appendices for base and optional boiler selections |  |  |
| 1. Performance is based on constant flow through each boiler, with the following winter and summer normal operating conditions. |  |  |
| * 1. Summer Operation, 45C Plant Return Temperature with blended Boiler Inlet Temperature of 60.0C & Outlet / Supply Temperature of 80C. |  |  |
| * 1. Shoulder Operation, 50C Plant Return Temperature with blended Boiler Inlet Temperature of 68.0C & Outlet / Supply Temperature of 88C. |  |  |
| * 1. Winter Operation, 55C Plant Return Temperature with blended Boiler Inlet Temperature of 75.0C, & Outlet/Supply Temperature of 95C |  |  |
| 1. Descriptions of complete boiler system proposed, including controls and communication interfaces |  |  |
| 1. Flowsheet describing the process and utility connections for each boiler skid along with controls and instrumentation supplied. |  |  |
| 1. Package general arrangement drawings with maintenance space requirements, including access platform support points. General arrangement drawings must represent the total unit on a single drawing and will include the boiler vessel, burner, FD fan, and relief valves. |  |  |
| 1. Sizes, type of, locations, and details of process and utility connections will be provided on drawings. |  |  |
| 1. Maximum allowable differential water temperature across boiler at minimum inlet temperature. |  |  |
| 1. Minimum allowable differential water temperature across boiler. |  |  |
| 1. Minimum water flow and inlet temperature allowed through boiler for continuous operation. |  |  |
| 1. Maximum rate of heat up (degrees C per hour) |  |  |
| 1. Guaranteed Minimum continuous output; i.e., turndown capability, assuming the gas pressure delivered to the inlet of the gas train is between 55 kPag to 90 kPag. Vendor shall provide additional on skid pressure regulator(s) as needed to reduce natural gas pressure to an acceptable level for the proposed boiler package fuel gas train, if applicable. |  |  |
| 1. Required boiler gas train, flow, connection location, type and size. |  |  |
| 1. Amount of combustion air for the boilers, including any air preheating which may be required. |  |  |
| 1. The maximum electric power requirements for the skid package. Include a complete list of all electric motors, complete with sizing in connected kWe, motor type, drive type and type of service (continual while firing, intermittent, etc.) include the total connected and an estimate of peak electrical demand impact of aggregate system. |  |  |
| 1. Contractor shall provide sound level data in octave bands for both the boiler (all exposed surfaces) and the boiler exhaust stack. The sound level data should be presented as either sound power levels, or sound pressure levels measured in free field at a distance of minimum 1 metre from the boiler surfaces and boiler exhaust outlet. Sound measurements shall follow either standard ISO 3744 or Standard ISO 3746. |  |  |
| 1. Guaranteed NOx and CO emission data in mg/m3 (milligram per cubic meter) units corrected to 3% O2, dry basis at 20° Celsius and a pressure of 101.325 kilopascals. |  |  |
| 1. List of communicated control and operational parameters that are available for monitoring by the plant control system |  |  |
| 1. Factory recommended planned maintenance schedule and description of maintenance tasks and frequency, based on 30 year life. |  |  |
| 1. Provide guaranteed maximum time to respond to an emergency service request. |  |  |
| 1. Identify nearest service centre / technician to project site that can provide boiler repairs/troubleshooting; burner repairs/trouble shooting; burner controls repairs/troubleshooting. |  |  |
| 1. Provide a recommended list of spare parts for the first 2 years of operation with pricing. |  |  |
| 1. Provide list of installation references with contact information, for boilers in hot water service of the same size(s) being proposed. |  |  |
| 1. Provide an estimate of reliability or availability of the type/model of boiler proposed. |  |  |
| 1. Provide an outline of course topics to be covered during each training session |  |  |
| 1. Provide a list of items or assemblies that are expected to be shipped loose in order to prevent damage or to facilitate shipping. |  |  |
| 1. OPTIONAL – Service Contract The proponents are requested to provide with the RFQ response a separate proposal for three scheduled service contracts based on the following durations: |  |  |
| * 1. One (1) Year |  |  |
| * 1. Two (2) Years |  |  |
| * 1. Five (5) Years |  |  |
| 1. Provide list of scheduled service tasks to be performed based on a unit operating 6000 hrs. per year. |  |  |
| 1. Provide a list of scheduled service tasks in addition to the annual scheduled maintenance that would be required to be performed at 3, 5 and 10 year intervals. |  |  |
| 1. Operator Training: Training described in item 1.8.2 of Schedule A-1 |  |  |
| 1. Post Start-up Visit: The post startup site visits described in item 1.9.4 of Schedule A-1. |  |  |

# SCHEDULE B-2 – PErFORMANCE DATA SHEET RESPONSE FORM

**SEASON: WINTER**

Boiler Model: ; Output: 1500 BHP thermal

Fuel: Natural gas; 38.2 MJ/M3 (HHV)

Ambient Air for Combustion: 10°C at 40% Relative Humidity

Site Elevation: 90 meters Above Sea Level

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| FIRING RATE | % | 12.5 | 25 | 50 | 75 | 100 |
| BOILER OUTPUT MWt |  | 1.875 | 3.75 | 7.5 | 11.25 | 15 |
| OUTLET OPERATING PRESSURE | kPag | 275 | 275 | 275 | 275 | 275 |
| FLOWRATE | L/s | 180 | 180 | 180 | 180 | 180 |
| ENTERING WATER TEMPERATURE | °C |  |  |  |  | 75 |
| LEAVING WATER TEMPERATURE | °C | 95 | 95 | 95 | 95 | 95 |
| WATER SIDE PRESSURE DROP | kPa |  |  |  |  |  |
| FLUE GAS TEMP. LVG. BOILER | °C |  |  |  |  |  |
| STACK TEMPERATURE | °C |  |  |  |  |  |
| NOx @ 3% O2 dry | mg/M3 |  |  |  |  |  |
| CO | ppm |  |  |  |  |  |
| FUEL RATE | Kg/Hr |  |  |  |  |  |
| EXCESS AIR | % |  |  |  |  |  |
| COMBUSTION AIR RATE | Kg/Hr |  |  |  |  |  |
| COMBUSTION AIR TEMPERATURE | °C |  |  |  |  |  |
| FLUE GAS RATE | Kg/Hr |  |  |  |  |  |
| RELEASE RATE | kW / M2 |  |  |  |  |  |
| LIBERATION RATE | kW / M3 |  |  |  |  |  |
| LOSSES |  |  |  |  |  |  |
| Dry gas loss | % |  |  |  |  |  |
| H2O+H2 in fuel | % |  |  |  |  |  |
| H2O in air | % |  |  |  |  |  |
| Radiation | % |  |  |  |  |  |
| Manufacturer's margin | % |  |  |  |  |  |
| Unaccounted for losses | % |  |  |  |  |  |
| TOTAL LOSSES | % |  |  |  |  |  |
| BOILER EFFICIENCY; Fuel to Water (HHV) | % |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

|  |  |
| --- | --- |
| FD Fan Motor Horsepower; HP |  |
| ASME Boiler Heating Surface area (total), M2 |  |
| Furnace Volume; M3 |  |
| Minimum Flowrate (L/s) |  |

**SEASON: SUMMER**

Boiler Model: ; Output: 1500 BHP thermal

Fuel: Natural gas; 38.2 MJ/M3 (HHV)

Ambient Air for Combustion: 20°C at 40% Relative Humidity Site Elevation: 90 meters Above Sea Level

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| FIRING RATE | % | 12.5 | 25 | 50 | 75 | 100 |
| BOILER OUTPUT MWt |  | 1.875 | 3.75 | 7.5 | 11.25 | 15 |
| OUTLET OPERATING PRESSURE | kPag | 275 | 275 | 275 | 275 | 275 |
| FLOWRATE | L/s | 180 | 180 | 180 | 180 | 180 |
| ENTERING WATER TEMPERATURE | °C |  |  |  |  | 60 |
| LEAVING WATER TEMPERATURE | °C | 80 | 80 | 80 | 80 | 80 |
| WATER SIDE PRESSURE DROP | kPa |  |  |  |  |  |
| FLUE GAS TEMP. LVG. BOILER | °C |  |  |  |  |  |
| STACK TEMPERATURE | °C |  |  |  |  |  |
| NOx @ 3% O2 dry | mg/M3 |  |  |  |  |  |
| CO | ppm |  |  |  |  |  |
| FUEL RATE | Kg/Hr |  |  |  |  |  |
| EXCESS AIR | % |  |  |  |  |  |
| COMBUSTION AIR RATE | Kg/Hr |  |  |  |  |  |
| COMBUSTION AIR TEMPERATURE | °C |  |  |  |  |  |
| FLUE GAS RATE | Kg/Hr |  |  |  |  |  |
| RELEASE RATE | kW / M2 |  |  |  |  |  |
| LIBERATION RATE | kW / M3 |  |  |  |  |  |
| LOSSES |  |  |  |  |  |  |
| Dry gas loss | % |  |  |  |  |  |
| H2O+H2 in fuel | % |  |  |  |  |  |
| H2O in air | % |  |  |  |  |  |
| Radiation | % |  |  |  |  |  |
| Manufacturer's margin | % |  |  |  |  |  |
| Unaccounted for losses | % |  |  |  |  |  |
| TOTAL LOSSES | % |  |  |  |  |  |
| BOILER EFFICIENCY; Fuel to Water (HHV) | % |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

**SEASON: WINTER**

Boiler Model: ; Output: 1500 BHP thermal

20 mg/m3 MAXIMUM NOx BURNER OPTION

Fuel: Natural gas; 38.2 MJ/M3 (HHV)

Ambient Air for Combustion: 10°C at 40%

Relative Humidity Site Elevation: 90 meters Above Sea Level

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| FIRING RATE | % | 12.5 | 25 | 50 | 75 | 100 |
| BOILER OUTPUT MWt |  | 1.875 | 3.75 | 7.5 | 11.25 | 15 |
| OUTLET OPERATING PRESSURE | kPag | 275 | 275 | 275 | 275 | 275 |
| FLOWRATE | L/s | 180 | 180 | 180 | 180 | 180 |
| ENTERING WATER TEMPERATURE | °C |  |  |  |  | 75 |
| LEAVING WATER TEMPERATURE | °C | 95 | 95 | 95 | 95 | 95 |
| WATER SIDE PRESSURE DROP | kPa |  |  |  |  |  |
| FLUE GAS TEMP. LVG. BOILER | °C |  |  |  |  |  |
| STACK TEMPERATURE | °C |  |  |  |  |  |
| NOx @ 3% O2 dry | mg/M3 |  |  |  |  |  |
| CO | ppm |  |  |  |  |  |
| FUEL RATE | Kg/Hr |  |  |  |  |  |
| EXCESS AIR | % |  |  |  |  |  |
| COMBUSTION AIR RATE | Kg/Hr |  |  |  |  |  |
| COMBUSTION AIR TEMPERATURE | °C |  |  |  |  |  |
| FLUE GAS RATE | Kg/Hr |  |  |  |  |  |
| RELEASE RATE | kW / M2 |  |  |  |  |  |
| LIBERATION RATE | kW / M3 |  |  |  |  |  |
| LOSSES |  |  |  |  |  |  |
| Dry gas loss | % |  |  |  |  |  |
| H2O+H2 in fuel | % |  |  |  |  |  |
| H2O in air | % |  |  |  |  |  |
| Radiation | % |  |  |  |  |  |
| Manufacturer's margin | % |  |  |  |  |  |
| Unaccounted for losses | % |  |  |  |  |  |
| TOTAL LOSSES | % |  |  |  |  |  |
| BOILER EFFICIENCY; Fuel to Water (HHV) | % |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

|  |  |
| --- | --- |
| FD Fan Motor Horsepower; HP |  |
| ASME Boiler Heating Surface area (total), M2 |  |
| Furnace Volume; M3 |  |
| Minimum Flowrate (L/s) |  |

**SEASON: SUMMER**

Boiler Model: ; Output: 1500 BHP thermal

20 mg/m3 MAXIMUM NOx BURNER OPTION

Fuel: Natural gas; 38.2 MJ/M3 (HHV)

Ambient Air for Combustion: 20°C at 40%

Relative Humidity Site Elevation: 90 meters Above Sea Level

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| FIRING RATE | % | 12.5 | 25 | 50 | 75 | 100 |
| BOILER OUTPUT MWt |  | 1.875 | 3.75 | 7.5 | 11.25 | 15 |
| OUTLET OPERATING PRESSURE | kPag | 275 | 275 | 275 | 275 | 275 |
| FLOWRATE | L/s | 180 | 180 | 180 | 180 | 180 |
| ENTERING WATER TEMPERATURE | °C |  |  |  |  | 60 |
| LEAVING WATER TEMPERATURE | °C | 80 | 80 | 80 | 80 | 80 |
| WATER SIDE PRESSURE DROP | kPa |  |  |  |  |  |
| FLUE GAS TEMP. LVG. BOILER | °C |  |  |  |  |  |
| STACK TEMPERATURE | °C |  |  |  |  |  |
| NOx @ 3% O2 dry | mg/M3 |  |  |  |  |  |
| CO | ppm |  |  |  |  |  |
| FUEL RATE | Kg/Hr |  |  |  |  |  |
| EXCESS AIR | % |  |  |  |  |  |
| COMBUSTION AIR RATE | Kg/Hr |  |  |  |  |  |
| COMBUSTION AIR TEMPERATURE | °C |  |  |  |  |  |
| FLUE GAS RATE | Kg/Hr |  |  |  |  |  |
| RELEASE RATE | kW / M2 |  |  |  |  |  |
| LIBERATION RATE | kW / M3 |  |  |  |  |  |
| LOSSES |  |  |  |  |  |  |
| Dry gas loss | % |  |  |  |  |  |
| H2O+H2 in fuel | % |  |  |  |  |  |
| H2O in air | % |  |  |  |  |  |
| Radiation | % |  |  |  |  |  |
| Manufacturer's margin | % |  |  |  |  |  |
| Unaccounted for losses | % |  |  |  |  |  |
| TOTAL LOSSES | % |  |  |  |  |  |
| BOILER EFFICIENCY; Fuel to Water (HHV) | % |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |