



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 775-2008

SUPPLY AND DELIVERY OF SPIRAL HEAT EXCHANGERS

TABLE OF CONTENTS

PART A - BID SUBMISSION

Form A: Bid	1
Form B: Prices	3
Form N: Detailed Specifications	4

PART B - BIDDING PROCEDURES

B1. Contract Title	1
B2. Submission Deadline	1
B3. Site Investigation	1
B4. Enquiries	1
B5. Addenda	1
B6. Substitutes	2
B7. Bid Submission	3
B8. Bid	3
B9. Prices	4
B10. Qualification	5
B11. Dimensional Installation Drawings	5
B12. Opening of Bids and Release of Information	5
B13. Irrevocable Bid	6
B14. Withdrawal of Bids	6
B15. Evaluation of Bids	6
B16. Award of Contract	7

PART C - GENERAL CONDITIONS

C0. General Conditions	1
------------------------	---

PART D - SUPPLEMENTAL CONDITIONS

General

D1. General Conditions	1
D2. Scope of Work	1
D3. Contract Administrator	1
D4. Notices	1

Submissions

D5. Authority to Carry on Business	1
D6. Insurance	1

Schedule of Work

D7. Commencement	2
D8. Delivery	2
D9. Liquidated Damages	2

Measurement and Payment

D10. Payment	3
D11. Payment Schedule	3

Warranty

D12. Warranty	3
---------------	---

PART E - SPECIFICATIONS

General

E1. Applicable Specifications and Drawings	1
E2. Goods	1
E3. Spiral Heat Exchangers	1

PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 SUPPLY AND DELIVERY OF SPIRAL HEAT EXCHANGERS

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 4:00 p.m. Winnipeg time, October 31, 2008.

B2.2 Bids determined by the Manager of Materials to have been received later than the Submission Deadline will not be accepted and will be returned upon request.

B2.3 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. SITE INVESTIGATION

B3.1 Further to C3, the Bidder may make an appointment to view the Site by contacting the Contract Administrator.

B3.2 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing.

B4. ENQUIRIES

B4.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.

B4.2 If the Bidder finds errors, discrepancies or omissions in the Bid Opportunity, or is unsure of the meaning or intent of any provision therein, the Bidder shall promptly notify the Contract Administrator of the error, discrepancy or omission at least five (5) Business Days prior to the Submission Deadline.

B4.3 If the Bidder is unsure of the meaning or intent of any provision therein, the Bidder should request clarification as to the meaning or intent prior to the Submission Deadline.

B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B4.5 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.

B4.6 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B3 unless that response or interpretation is provided by the Contract Administrator in writing.

B5. ADDENDA

B5.1 The Contract Administrator may, at any time prior to the Submission deadline, issue addenda correcting errors, discrepancies or omissions in the Bid Opportunity, or clarifying the meaning or intent of any provision therein.

B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.

- B5.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division internet site at <http://www.winnipeg.ca/matmgt>.
- B5.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Division internet site for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B5.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 9 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.
- B6. SUBSTITUTES**
- B6.1 The Work is based on the materials, equipment, methods and products specified in the Bid Opportunity.
- B6.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B6.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least seven (7) Business Days prior to the Submission Deadline.
- B6.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the material, equipment, method or product as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the Contract;
 - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the Contract.
- B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B6.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.
- B6.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.
- B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B15.

- B6.9 No later claim by the Contractor for an addition to the price(s) because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.
- B6.10 Notwithstanding B6.2 to B6.9, and in accordance with B7.8, deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B15.1(a)

B7. BID SUBMISSION

- B7.1 The Bid shall consist of the following components:
- (a) Form A: Bid;
 - (b) Form B: Prices;
- B7.2 The Bid should also consist of the following components:
- (a) Form N: Detailed Specifications;
 - (b) Dimensional Installation Drawings.
- B7.3 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.
- B7.4 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.
- B7.5 The Bid Submission may be submitted by mail, courier or personal delivery, or by facsimile transmission.
- B7.6 If the Bid Submission is submitted by mail, courier or personal delivery, it shall be enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address, and shall be submitted to:
- The City of Winnipeg
Corporate Finance Department
Materials Management Division
185 King Street, Main Floor
Winnipeg MB R3B 1J1
- B7.6.1 Samples or other components of the Bid Submission which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid Submission.
- B7.7 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.
- B7.8 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B15.1(a).
- B7.9 If the Bid Submission is submitted by facsimile transmission, it shall be submitted to (204) 949-1178.
- B7.9.1 The Bidder is advised that the City cannot take responsibility for the availability of the facsimile machine at any time.
- B7.10 Bids submitted by internet electronic mail (e-mail) will not be accepted.

B8. BID

- B8.1 The Bidder shall complete Form A: Bid, making all required entries.

- B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, his name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than his own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.
- B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.
- B8.4 Paragraph 11 of Form A: Bid shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, it shall be signed by the Bidder;
 - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
 - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, should be affixed;
 - (d) if the Bidder is carrying on business under a name other than his own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B8.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.
- B8.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B9. PRICES

- B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B9.1.1 The price on Form B: Prices shall include:
- (a) duty;
 - (b) freight and cartage;
 - (c) Provincial and Federal taxes [except the Goods and Services Tax (GST) and Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable] and all charges governmental or otherwise paid;
 - (d) profit and all compensation which shall be due to the Contractor for the Work and all risks and contingencies connected therewith.
- B9.1.2 The price on Form B: Prices shall not include the Manitoba Association for Resource Recovery Corporation (MARRC) Environmental Handling Charge (EHC) which shall be extra where applicable.
- B9.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.

B9.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

B9.4 Prices from Non-Resident Bidders are subject to a Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B10. QUALIFICATION

B10.1 The Bidder shall:

- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Bidder does not carry on business in Manitoba, in the jurisdiction where the Bidder does carry on business; and
- (b) be financially capable of carrying out the terms of the Contract; and
- (c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.

B10.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) be responsible and not be suspended, debarred or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division internet site at <http://www.winnipeg.ca/matmgt/debar.stm> .

B10.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) have successfully carried out work similar in nature, scope and value to the Work; and
- (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and
- (c) have a written workplace safety and health program, if required, pursuant to The Workplace Safety and Health Act (Manitoba);

B10.4 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B10.5 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B11. DIMENSIONAL INSTALLATION DRAWINGS

B11.1 The Bidder should submit drawings that show the dimensions of the heat exchanger and orientation of the inlet and outlet water nozzles in sufficient detail for the City to evaluate necessary changes to existing installation to accommodate the proposed spiral heat exchanger.

B12. OPENING OF BIDS AND RELEASE OF INFORMATION

B12.1 Bids will not be opened publicly.

B12.2 Following the Submission Deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements or evaluated prices) will be available on the Closed Bid Opportunities (or Public/Posted Opening &

Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division internet site at <http://www.winnipeg.ca/matmgt>

B12.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract Amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division internet site at <http://www.winnipeg.ca/matmgt>

B12.4 The Bidder is advised that any information contained in any Bid may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B13. IRREVOCABLE BID

B13.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 10 of Form A: Bid.

B13.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work for the time period specified in Paragraph 10 of Form A: Bid.

B14. WITHDRAWAL OF BIDS

B14.1 A Bidder may withdraw his Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B14.1.1 Notwithstanding C21, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.

B14.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 11 of Form A: Bid, and only such person, has authority to give notice of withdrawal.

B14.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:

- (a) retain the Bid until after the Submission Deadline has elapsed;
- (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 11 of Form A: Bid; and
- (c) if the notice has been given by any one of the persons specified in B14.1.3(b), declare the Bid withdrawn.

B14.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B13.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law.

B15. EVALUATION OF BIDS

B15.1 Award of the Contract shall be based on the following bid evaluation criteria:

- (a) compliance by the Bidder with the requirements of the Bid Opportunity and degree of compliance with specifications or acceptable deviation there from (pass/fail);
- (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B10 (pass/fail);
- (c) Total Bid Price;
- (d) Dimensional Installation Drawing;
- (e) economic analysis of any approved alternative pursuant to B6.

- B15.2 Further to B15.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid Submission is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities if the interests of the City so require.
- B15.3 Further to B15.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid or in other information required to be submitted, that he is responsible and qualified.
- B15.4 Further to B15.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.
- B15.5 Further to B15.1(d), the Dimensional Installation Drawings will be evaluated based on degree of deviation from existing installation.
- B15.6 This Contract will be awarded as a whole.

B16. AWARD OF CONTRACT

- B16.1 The City will give notice of the award of the Contract or will give notice that no award will be made.
- B16.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.
- B16.2.1 Without limiting the generality of B16.2, the City will have no obligation to award a Contract where:
- (a) the prices exceed the available City funds for the Work;
 - (b) the prices are materially in excess of the prices received for similar work in the past;
 - (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
 - (d) only one Bid is received; or
 - (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.
- B16.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B15.
- B16.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his Bid upon written request to the Contract Administrator.
- B16.4 Notwithstanding C4 and Paragraph 6, the City will issue a purchase order to the successful Bidder in lieu of the execution of a Contract.
- B16.5 The Contract Documents, as defined in C1.1(n) (ii), in their entirety shall be deemed to be incorporated in and to form a part of the purchase order notwithstanding that they are not necessarily attached to or accompany said purchase order.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

- C0.1 The *General Conditions for the Supply and Delivery of Goods* (Revision 2008 05 26) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for the Supply and Delivery of Goods* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division internet site at http://www.winnipeg.ca/matmgt/gen_cond.stm
- C0.2 A reference in the Bid Opportunity to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for Supply of Goods*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

D1.1 In addition to the *General Conditions for the Supply and Delivery of Goods*, these Supplemental Conditions are applicable to the Work of the Contract.

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of the supply and delivery of six (6) spiral heat exchangers.

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is:

Zeljko Bodioga
Project Engineer
Water and Waste Department
110-1199 Pacific Ave.

Telephone No.: (204) 986-2342

Facsimile No.: (204) 224-0032

D4. NOTICES

D4.1 Notwithstanding C21.3, all notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following address or facsimile number:

The City of Winnipeg
Chief Financial Officer
Administration Building, 3rd Floor
510 Main Street
Winnipeg MB R3B 1B9

Facsimile No.: (204) 949-1174

SUBMISSIONS

D5. AUTHORITY TO CARRY ON BUSINESS

D5.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

D6. INSURANCE

D6.1 The Contractor shall provide and maintain the following insurance coverage:

- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured; such liability policy to also contain a cross-liability clause, non-owned automobile liability and products and completed operations cover, to remain in place at all times during the performance of the Work.

- D6.2 Deductibles shall be borne by the Contractor.
- D6.3 The Contractor shall provide the Contract Administrator with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4 for the return of the executed Contract.
- D6.4 The Contractor shall not cancel, materially alter, or cause the policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

SCHEDULE OF WORK

D7. COMMENCEMENT

- D7.1 The Contractor shall not commence any Work until he is in receipt of a notice of award from the City authorizing the commencement of the Work.
- D7.2 The Contractor shall not commence any Work until:
- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence of authority to carry on business specified in D5;
 - (ii) evidence of the workers compensation coverage specified in C6.16;
 - (iii) evidence of the insurance specified in D6.
 - (b) the Contractor has attended a meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a meeting.

D8. DELIVERY

- D8.1 Goods shall be delivered within one hundred and forty (140) Calendar Day(s) of the placing of an order, f.o.b. destination, freight prepaid to:

Wastewater Treatment Plant Supervisor
2230 Main Street
Winnipeg MB

- D8.2 The Contractor shall confirm each delivery with the Contract Administrator or his/her designate, (John Amos / 986-4845) at least two (2) Business Days before delivery.
- D8.3 Goods shall be delivered between 8:30 a.m. and 4:30 p.m. on Business Days.
- D8.4 The Contractor shall off-load goods as directed at the delivery location.

D9. LIQUIDATED DAMAGES

- D9.1 If the Contractor fails to achieve delivery of the goods within the time specified in D8.1 Delivery, the Contractor shall pay the City five hundred dollars (\$ 500.00) per Calendar Day for each and every Calendar Day until the goods have been delivered.
- D9.2 The amount specified for liquidated damages in D9.1 is based on a genuine pre-estimate of the City's damages in the event that the Contractor does not achieve Delivery by the day fixed herein for same.
- D9.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

MEASUREMENT AND PAYMENT

D10. PAYMENT

D10.1 Further to C10, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

D11. PAYMENT SCHEDULE

D11.1 Further to C10, payment shall be in Canadian funds net thirty (30) Calendar Days after receipt and approval of the Contractor's invoice.

WARRANTY

D12. WARRANTY

D12.1 Warranty is as stated in C11.

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

E1.1 These Specifications shall apply to the Work.

E1.2 The following information drawing is applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
1-0101D-M0001	Dimensional Arrangement – Spiral Heat Exchanger

E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B6.

E2. GOODS

E2.1 The Contractor shall supply and deliver spiral heat exchangers in accordance with the requirements hereinafter specified.

E3. SPIRAL HEAT EXCHANGERS

E3.1 Applicable Codes And Standards

- (a) As supplemented by this specification, the following codes, standards and regulations shall apply:
- (i) American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, section VIII, Division 1, latest revision, its addenda, and all other documents referenced therein. (Referred herein after as the Code.) Spiral Heat exchangers shall be designed and stamped in accordance with this Code.
 - (b) In addition, the following codes, standards and regulations in force on the date of the Purchase Order shall apply to the extent specified herein:
 - (i) National Building Code of Canada
 - (ii) Requirements of the Province of Manitoba in which the heat exchanger will be installed

E3.2 Design Conditions

- (a) The equipment shall be designed and constructed to meet the following minimum performance parameters:
- (i) Thermal Capacity: 806 kW
 - (ii) Sludge Flow: 180 m³/hr
 - (iii) Hot Water Flow: 125 m³/hr
 - (iv) Sludge Temperature In: 33°C
 - (v) Sludge Temperature Out: 38°C
 - (vi) Water Temperature In: 68°C
 - (vii) Water Temperature Out: 63°C
 - (viii) Pressure Drop – Sludge Side: 4.9 m
 - (ix) Pressure Drop – Water Side: 3.4 m
 - (x) Max Operating Pressure: 210 kPa

E3.3 Equipment Size and Arrangement

- (a) The spiral heat exchanger shall be generally as shown on the drawing(s). Deviations from the dimensions shown will be considered, but the general arrangement and nozzle orientation must be maintained.

E3.4 Thermal Design

- (a) The Spiral Heat Exchanger shall be guaranteed to deliver the performance called for under E3.2.

E3.5 Design Pressure

- (a) Notwithstanding the design pressure stated in the spiral heat exchanger specification sheet, the minimum design pressure for either side of the exchanger channel shall be not less than 205 kPa.
- (b) The exchanger shall be stamped for the true Maximum Allowable Working Pressure (MAWP) if it is greater than the design pressure.
- (c) The design of exchanger internal pressure parts for a differential pressure less than the shell and/or channel design pressure shall not be allowed unless specifically shown on the spiral heat exchanger specification sheet. When such a differential pressure design is permitted, a special nameplate or warning tag shall be attached to the exchanger so as to make this condition known.

E3.6 Corrosion Allowance

- (a) Corrosion allowances shall be as shown in the specifications.
- (b) No corrosion allowance shall be added to non ferrous materials, stainless steel, or other high alloy parts unless indicated on the spiral heat exchanger specification sheet.

E3.7 Shell

- (a) Shell heads shall be one side fixed, one side removable (hinged and bolted). The removable head shall provide access to the outer (cold side) channel to allow sludge cleaning.

E3.8 Channels

- (a) Spiral heat exchanger construction shall be as given below:
 - (i) Carbon steel 6mm (1/4") thick, 22mm (7/8") inner channel (hot side) width and 25mm (1") outer channel (cold side) width.
 - (ii) The inner (hot side) channel shall be welded to the fixed head.
 - (iii) Spacer studs shall be provided on the inner channel (hot side). The outer (cold side) channel shall be open to the removable head side.

E3.9 Gaskets

- (a) Furnish the gaskets for the removable shell head.
- (b) Provide one extra set of all gaskets.

E3.10 Nozzles and Connections

- (a) Half coupling drain connections with plugs shall be provided on the hot side of the exchanger. Sufficient connections shall be provided to insure complete draining of all spiral compartments.
- (b) Flanged nozzles through 50mm (2") size inclusive shall be raised face 150# American National Standards Institute (ANSI).
- (c) Nozzles over 50mm (2") size may be built up using forged steel raised face 150# ANSI type flanges, with rolled plate (min. 12mm) or pipe necks (minimum SCH. 80). Paragraph UG 37 of the Code shall be used to ascertain the necessity for reinforcement.
- (d) Nozzles shall be long enough to permit the removal of a standard length stud bolt from the back side of the flange to clear the exchanger body and insulation. If not specified

elsewhere, the minimum distance from external surface of shell to nozzle flange face shall be as follows:

- (i) Nozzles up to and including 300mm(12"): 200mm (8")
- (ii) Nozzles over 300mm (12"): 250mm (10")
- (e) A 50mm (2") half coupling backwash nozzles shall be provided on the cold side inlet nozzle and the cold side discharge nozzle.
- (f) A 100mm (4") diameter cleanout shall be provided on the cold side inlet pocket.
- (g) All nozzles shall be ground flush and smooth with the inside of the exchanger. The periphery of any nozzles opening shall be ground to 6mm (1/4") minimum radius.

E3.11 Shell Supports

- (a) Each spiral heat exchanger shall be provided with at least two (2) steel supports with saddles for distributing the dead load.
- (b) The bolt holes in the saddle on one end of each spiral heat exchanger shall be slotted if required for expansion under the operating temperature.

E3.12 Lifting Lugs

- (a) Suitable lifting lugs, rings, or eyebolts shall be provided on the shell in order to facilitate handling.

E3.13 Materials

- (a) Where carbon steel construction is provided, the following materials will be preferred:
 - (i) Plate: SA516 70 (shell, head, channel, reinforcing pad, etc.)
 - (ii) Forgings: SA105N
 - (iii) Pipes: SA106B or SA53B Seamless
 - (iv) Bolting: A193 Gr B7 for bolts and SA 194 Gr 2H for nuts
 - (v) Structural: SA36 - or approved equivalent
- (b) When stainless steel material is provided, L grade materials shall be used.

E3.14 Fabrication

- (a) Forming and Assembly
 - (i) The preparation of plate edges for welding shall be done by shearing, machining, grinding, or thermal cutting. Carbon steel plate thickness greater than 25mm (1") and all ferrous alloy steel plates shall be preheated prior to thermal cutting, and the bevelled edges magnetic particle examined for linear discontinuities. Defects shall not exceed limits outlined in ASME SA 20, Table A1.14.
 - (ii) Plate edge laminations, revealed by visual or magnetic particle examination and which are not acceptable shall be completely removed and area(s) repaired.
 - (iii) The maximum thickness of non bevelled plate shall not exceed 8mm (5/16").
 - (iv) Shearing shall not be used for thickness of 6mm (1/4") and over.
 - (v) Nozzles and their reinforcement pads shall not be located within 50mm (2") of any weld unless welds meet the radiographic requirements in paragraph UW 51 of Division 1.
 - (vi) All internal and external non pressure welded attachments shall be fully seal welded. All seal welded pads shall be vented through a 6mm (1/4") NPT tell tale hole.
- (b) Welding
 - (i) All pressure retaining welds shall be full penetration welds.
 - (ii) Where access does not permit back welding, the root pass shall be made by the Gas Tungsten Arc Welding (GTAW) process.

- (iii) On the shell, welding procedures qualified to SA 516 70 are also acceptable for SA 106 B. The same brands of welding consumables as those used for qualification shall be used for production.
- (iv) Welders and welding procedures shall be qualified in accordance with the ASME Code, Section IX.
- (c) Post Weld Heat Treatment
 - (i) When specified or when required by the ASME Code, post weld heat treatment of the spiral heat exchangers shall be performed in accordance with the requirements of the Code.
 - (ii) Properly identified heat treatment charts are required for all heat treatment operations. The temperature charts shall identify each of the thermocouples used to record the exchanger temperature.

E3.15 Inspection

- (a) The responsibility for inspection rests with the Contractor in accordance with paragraph UG 90 of the Code; however, the Contract Administrator reserves the right for its authorized representative to inspect exchangers at any time during their fabrication to assure that such equipment, materials and workmanship are in accordance with this Specification, and the Code.
- (b) All non destructive examinations shall be performed only by personnel certified in accordance with Canadian General Standards Board (CGSB) Standards.
- (c) All pressure vessels shall be registered by the Contractor with the Government Jurisdiction in which the heat exchanger will be installed. All required certificates shall be obtained by the Contractor and forwarded to the Contract Administrator for record.
- (d) The Contractor shall notify the Contract Administrator, or its authorized representative, when fabrication is started and when the exchanger is completed and ready for final inspection and tests. Intermediate inspections shall be arranged as necessary, between the Contractor and the Contract Administrator or his authorized representative.
- (e) For non magnetic materials, a liquid penetrant examination in accordance with Appendix 8 of the Code, shall be used in place of any required magnetic particle examination.
- (f) Welds utilizing stainless steel or high nickel electrodes shall be liquid penetrant examined upon their completion.
- (g) Radiographic examination of weld joints shall be performed when required by the Code.
- (h) All nozzle to shell and channel attachment welds shall be magnetic particle examined (MT).
- (i) All radiographs taken during fabrication shall be available for examination by the Contract Administrator or his agent.
- (j) All non destructive examinations shall be conducted and results evaluated in accordance with ASME Section V.

E3.16 Testing

- (a) All welded attachments provided with tell tale holes shall be pneumatically and soap tested at 20 psig prior to heat treatment and/or hydrostatic test. Tell tale holes shall not be plugged during the final hydrostatic test of the vessel.
- (b) Spiral heat exchangers shall be subjected to a hydrostatic test pressure which, at every point in the exchanger, is not less than that required by the Code. There shall be no water leakage from nozzle blinds during hydrostatic test.
 - (i) Test shall be performed after completion of all external and internal welding.
 - (ii) Prior to final inspection and hydrostatic test, the inside and outside of the vessel shall be cleaned and shall be free from all slag, scale, dirt, grit, weld spatter and pieces of metal, paint, oil, etc.
- (a) The use of shellac, compounds, lead, etc., on gaskets is not permitted.

- (iii) Service gaskets and bolting that are to be supplied with the exchanger may be used when pressure testing the equipment. A spare set of gaskets for all but American National Standards Institute (ANSI) flanges shall be supplied with the exchanger. All gaskets shall be new.
- (c) All hydrostatic tests shall be held for at least one hour and shall be made in the presence of an authorized inspector and with his approval.
- (d) Following the hydro test, the exchanger shall be completely drained so that no liquid remains.
- (e) The release of an exchanger by an authorized inspector shall not relieve the Contractor of his responsibility and does not alter the conditions of the guarantee.
- (f) No welding (pressure or non pressure) on a pressure envelope is permitted after final hydro testing.

E3.17 Repairs

- (a) Any major repairs resulting from the material defects or manufacturing errors must be reviewed with the Contract Administrator prior to taking any corrective action.
- (b) Welding repairs carried out after heat treatment shall be re heat treated, or after testing shall be re tested, or after radiography shall be re radiographed, or after examination by magnetic particle or liquid penetrant method, shall be re examined in accordance with the requirements of this specification. The Contract Administrator shall be notified of any such repairs.

E3.18 Preparation For Shipment

- (a) All flange faces and other machined surfaces shall be coated with a rust preventative and protected with covers.
- (b) All tell tale and vent holes shall be packed with grease to prevent water infiltration. Plugs are not permitted.
- (c) Bolts and nuts shall be coated with a suitable thread lubricant to prevent galling.
- (d) All bolting and other parts shall be suitably packaged and identified to avoid loss or damage during shipment.
- (e) Spiral heat exchanger shall not be released for shipment without the approval of the Contract Administrator's authorized representative.

E3.19 Documentation

- (a) Provide six (6) sets of the following documents, in English, with the equipment:
 - (i) Operating and maintenance manual.
 - (ii) Dimensioned installation drawings.
 - (iii) Arrangement drawings, incorporating a complete bill of materials.
 - (iv) A complete parts list.
 - (v) A list of recommended spare parts.
- (b) Register the equipment with the Manitoba Department of Labour and provide a CRN number for each spiral heat exchanger.