

**RETURN BIDS TO:**  
**RETOURNER LES SOUMISSIONS À:**  
**Bid Receiving - PWGSC / Réception des  
soumissions - TPSGC**  
**11 Laurier St./ 11 rue, Laurier**  
**Place du Portage, Phase III**  
**Core 0A1 / Noyau 0A1**  
**Gatineau, Québec K1A 0S5**  
**Bid Fax: (819) 997-9776**

**REQUEST FOR PROPOSAL**  
**DEMANDE DE PROPOSITION**

**Proposal To: Public Works and Government  
Services Canada**

We hereby offer to sell to Her Majesty the Queen in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods, services, and construction listed herein and on any attached sheets at the price(s) set out therefor.

**Proposition aux: Travaux Publics et Services  
Gouvernementaux Canada**

Nous offrons par la présente de vendre à Sa Majesté la Reine du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux annexes ci-jointes, les biens, services et construction énumérés ici sur toute feuille ci-annexée, au(x) prix indiqué(s).

**Comments - Commentaires**

<b>Title - Sujet</b> RESEARCH AUTOCLAVE	
<b>Solicitation No. - N° de l'invitation</b> 31184-118054/C	<b>Date</b> 2012-07-18
<b>Client Reference No. - N° de référence du client</b> 31184-118054	
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$\$PV-924-60853	
<b>File No. - N° de dossier</b> pv924.31184-118054	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2012-08-15</b>	<b>Time Zone</b> <b>Fuseau horaire</b> Eastern Daylight Saving Time EDT
<b>F.O.B. - F.A.B.</b> Specified Herein - Précisé dans les présentes <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input type="checkbox"/> <b>Other-Autre:</b> <input checked="" type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Caron, Anne	<b>Buyer Id - Id de l'acheteur</b> pv924
<b>Telephone No. - N° de téléphone</b> (819) 956-3874 ( )	<b>FAX No. - N° de FAX</b> (819) 956-3814
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b>  Specified Herein Précisé dans les présentes	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

**Vendor/Firm Name and Address**

**Raison sociale et adresse du  
fournisseur/de l'entrepreneur**

**Issuing Office - Bureau de distribution**

Scientific, Medical and Photographic Division / Division de  
l'équipement scientifique, des produits photographiques et  
pharmaceutiques  
11 Laurier St./ 11 rue, Laurier  
6B1, Place du Portage  
Gatineau, Québec K1A 0S5

<b>Delivery Required - Livraison exigée</b> See Herein	<b>Delivery Offered - Livraison proposée</b>
<b>Vendor/Firm Name and Address</b> <b>Raison sociale et adresse du fournisseur/de l'entrepreneur</b>     <b>Telephone No. - N° de téléphone</b> <b>Facsimile No. - N° de télécopieur</b>	
<b>Name and title of person authorized to sign on behalf of Vendor/Firm</b> <b>(type or print)</b> <b>Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>     <b>Signature</b>     <b>Date</b>	

Solicitation No. - N° de l'invitation

31184-118054/C

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

pv924

Client Ref. No. - N° de réf. du client

31184-118054

File No. - N° du dossier

pv92431184-118054

CCC No./N° CCC - FMS No/ N° VME

---

This bid solicitation cancels and supersedes previous bid solicitation number 31184-118054/A dated 2012-01-13 with a closing of 2012-02-27 at 02:00 pm and bid solicitation number 31184-118054/B dated 2012-05-15 with a closing of 2012-06-27 at 02:00 pm.

## TABLE OF CONTENTS

### PART 1 - GENERAL INFORMATION

1. Security Requirement
2. Requirement
3. Debriefings

### PART 2 - BIDDER INSTRUCTIONS

1. Standard Instructions, Clauses and Conditions
2. Submission of Bids
3. Enquiries - Bid Solicitation
4. Applicable Laws

### PART 3 - BID PREPARATION INSTRUCTIONS

1. Bid Preparation Instructions

### PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

1. Evaluation Procedures
2. Basis of Selection

### PART 5 - CERTIFICATIONS

1. Code of Conduct Certifications - Consent to a Criminal Record Verification
2. Certifications Precedent to Contract Award

### PART 6 - RESULTING CONTRACT CLAUSES

1. Security Requirement
2. Requirement
3. Standard Clauses and Conditions
4. Term of Contract
5. Authorities
6. Payment
7. Invoicing Instructions
8. Certifications
9. Applicable Laws
10. Priority of Documents
11. SACC Manual Clauses
12. Shipping Instructions

#### List of Annexes:

Annex A	Requirement
Annex B	Mandatory Specifications
Annex C	Consent to a Criminal Record Verification
Appendix A	Autoclave floor, rails and mounting structure
Appendix B	Autoclave external floor mounting structure

## PART 1 - GENERAL INFORMATION

### 1. Security Requirement

There is no security requirement associated with the requirement.

### 2. Requirement

The Structures and Materials Performance Laboratory of the National Research Council (NRC) Institute for Aerospace Research of has a requirement for a new autoclave for research related to manufacturing processes for fibre-reinforced polymer composite materials.

The new autoclave is to have similar dimensions to the existing research autoclave that NRC will be removing. The new autoclave **must** fit in the same location as the old autoclave with a minimum of changes to existing infrastructure (building or utilities). See Appendix A and B for details.

The requirement is detailed in Annex "A" and the Mandatory Specifications are detailed in Annex "B"

### 3. Debriefings

After contract award, bidders may request a debriefing on the results of the bid solicitation. Bidders should make the request to the Contracting Authority within 15 working days of receipt of notification that their bid was unsuccessful. The debriefing may be provided in writing, by telephone or in person.

## PART 2 - BIDDER INSTRUCTIONS

### 1. Standard Instructions, Clauses and Conditions

All instructions, clauses and conditions identified in the bid solicitation by number, date and title are set out in the Standard Acquisition Clauses and Conditions Manual (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) Manual issued by Public Works and Government Services Canada.

Bidders who submit a bid agree to be bound by the instructions, clauses and conditions of the bid solicitation and accept the clauses and conditions of the resulting contract.

The 2003 (2012-07-11) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

Subsection 5.4 of 2003, Standard Instructions - Goods or Services - Competitive Requirements, is amended as follows:

Delete: sixty (60) days

Insert: ninety (90) days

#### 1.1 SACC Manual Clauses

B1000T (2007-11-30) Condition of Material

### 2. Submission of Bids

Bids **must** be submitted only to Public Works and Government Services Canada (PWGSC) Bid Receiving Unit by the date, time and place indicated on page 1 of the bid solicitation.

### 3. Enquiries - Bid Solicitation

All enquiries **must** be submitted in writing to the Contracting Authority no later than ten (10) calendar days before the bid closing date. Enquiries received after that time may not be answered.

Bidders should reference as accurately as possible the numbered item of the bid solicitation to which the enquiry relates. Care should be taken by bidders to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature **must** be clearly marked "proprietary" at each relevant item. Items identified as "proprietary" will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the questions or may request that the Bidder do so, so that the proprietary nature of the question is eliminated, and the enquiry can be answered with copies to all bidders. Enquiries not submitted in a form that can be distributed to all bidders may not be answered by Canada.

### 4. Applicable Laws

Any resulting contract **must** be interpreted and governed, and the relations between the parties determined, by the laws in force in Ontario.

Bidders may, at their discretion, substitute the applicable laws of a Canadian province or territory of their choice without affecting the validity of their bid, by deleting the name of the Canadian province or territory specified and inserting the name of the Canadian province or territory of their choice. If no change is made, it acknowledges that the applicable laws specified are acceptable to the bidders.

## PART 3 - BID PREPARATION INSTRUCTIONS

### 1. Bid Preparation Instructions

Canada requests that bidders provide their bid in separately bound sections as follows:

- Section I:** Technical Bid (three (3) copies)
- Section II:** Financial Bid (one (1) copy)
- Section III:** Certifications (one (1) copy)

Prices **must** appear in the financial bid only. No prices **must** be indicated in any other section of the bid.

Canada requests that bidders follow the format instructions described below in the preparation of their bid:

- (a) use 8.5 x 11 inch (216 mm x 279 mm) paper;
- (b) use a numbering system that corresponds to the bid solicitation.

In April 2006, Canada issued a policy directing federal departments and agencies to take the necessary steps to incorporate environmental considerations into the procurement process Policy on Green Procurement. (<http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html>). To assist Canada in reaching its objectives, bidders are encouraged to:

- 1) use 8.5 x 11 inch (216 mm x 279 mm) paper containing fibre certified as originating from a sustainably-managed forest and/or containing minimum 30% recycled content; and
- 2) use an environmentally-preferable format including black and white printing instead of colour printing, printing double sided/duplex, using staples or clips instead of cerlox, duotangs or binders.

## Section I: Technical Bid

In their technical bid, bidders should explain and demonstrate how they propose to meet the requirements and how they will carry out the Work.

## Section II: Financial Bid

The bidder **must** quote a firm lot price all inclusive of supply, commissioning, training and manuals, DAP (Ottawa, Ontario), the Goods and Services Tax (GST) and/or the Harmonized Sales Tax (HST) extra, as applicable. Freight charges to destination **must** be included.

### 1.1 Submission of Price Lists

WITH THEIR PROPOSAL, THE BIDDER IS REQUESTED TO SUBMIT A COPY OF:

- a) Recommended spare parts list of common spare parts required to support on-going equipment operation for a period of 5 years from commissioning and associated pricing.
- b) Spare parts pricing list.
- c) Recommended consumable parts list and associated pricing.
- d) List of all available and recommended options for make and model of the control PC and associated pricing.
- e) List of all available and recommended options for the control software and associated pricing.
- f) Internal Lighting option if available. Lighting to illuminate the autoclave interior, with controls accessible from outside the vessel and associated pricing.

The submitted price lists are provided for price support purposes only. The Bidder hereby acknowledges that, terms and conditions submitted as part of price lists do not form part of the Contract and are superceded by PWGSC terms and conditions.

Note: Prices provided for the above are for information purposes only and will not be part of the financial evaluation.

### 1.2 Exchange Rate Fluctuation

C3011T (2010-01-11) Exchange Rate Fluctuation

## Section III: Certifications

Bidders **must** submit the certifications required under Part 5.

## PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

### 1. Evaluation Procedures

- (a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.

## 1.1 Technical Evaluation

All proposals submitted **must** be completed in full and provide all of the information requested in the Request for Proposal (RFP) package to enable a full and complete evaluation. If the requirement is not addressed in the bidder's proposal, the proposal will be considered incomplete or non-responsive and will be rejected. The onus is on the bidder to provide all the information necessary to ensure a complete and accurate assessment.

### 1.1.1 Mandatory Technical Criteria

See Annex "A" - Requirement and Annex "B" - Mandatory Specifications

#### 1. ABILITY TO MEET THE TECHNICAL REQUIREMENT (**MANDATORY**):

- a) For Items Defined by Specifications:  
The bidder is requested to cross reference the mandatory technical criteria contained herein to their supporting technical documentation.
- b) Provision of Supporting Technical Documentation:  
Supporting technical documentation for the goods offered **must** be provided with the bid at time of bid closing. Technical brochures or technical data **MUST** be provided to verify compliancy to the technical mandatory specifications.
- c) NRC will validate compliance during the Commissioning of the autoclave.

## 1.2 Financial Evaluation

The lowest evaluated price will be established using the following criteria:

- a) prices will be evaluated in Canadian Funds excluding the Goods and Services Tax (GST) or Harmonized Sales Tax (HST).

For evaluation purposes, bids received in a foreign currency will be converted to Canadian funds using the appropriate rate of exchange using the rate quoted by the Bank of Canada as being in effect on date of bid closing.

- b) prices will be evaluated on a DAP Ottawa.

## 2. Basis of Selection

A0031T (2010-08-16) Basis of Selection - Mandatory Technical Criteria Only

## PART 5 - CERTIFICATIONS

Bidders **must** provide the required certifications to be awarded a contract. Canada will declare a bid non-responsive if the required certifications are not completed and submitted as requested.

Compliance with the certifications bidders provide to Canada is subject to verification by Canada during the bid evaluation period (before award of a contract) and after award of a contract. The Contracting Authority will have the right to ask for additional information to verify bidders' compliance with the certifications before award of a contract. The bid will be declared non-responsive if any certification made by the Bidder is untrue, whether made knowingly or unknowingly. Failure to comply with the certifications or to comply with the request of the Contracting Authority for additional information will also render the bid non-responsive.

### 1. **Code of Conduct Certifications - Consent to a Criminal Record Verification (*Bidder to complete*)**

#### 1.1 **Bidders must submit with their bid, by the bid solicitation closing date:**

- (a) a complete list of names of all individuals who are currently directors of the Bidder;
- (b) a properly completed and signed form Consent to a Criminal Record Verification, Annex C (PWGSC-TPSGC 229), for each individual named in the list.

### 2. **Certifications Precedent to Contract Award**

The certifications listed below should be completed and submitted with the bid, but may be submitted afterwards. If any of these required certifications is not completed and submitted as requested, the Contracting Authority will so inform the Bidder and provide the Bidder with a time frame within which to meet the requirement. Failure to comply with the request of the Contracting Authority and meet the requirement within that time period will render the bid non-responsive.

#### 2.1 **Federal Contractors Program for Employment Equity - Certification**

##### 2.1.1 **Federal Contractors Program - \$200,000 or more (*Bidder to complete*)**

- 1. The Federal Contractors Program (FCP) requires that some suppliers, including a supplier who is a member of a joint venture, bidding for federal government contracts, valued at \$200,000 or more (including all applicable taxes), make a formal commitment to implement employment equity. This is a condition precedent to contract award. If the Bidder, or, if the Bidder is a joint venture and if any member of the joint venture, is subject to the FCP, evidence of its commitment **must** be provided before the award of the Contract.

Suppliers who have been declared ineligible contractors by Human Resources and Skills Development Canada (HRSDC) are no longer eligible to receive government contracts over the threshold for solicitation of bids as set out in the Government Contracts Regulations. Suppliers may be declared ineligible contractors either as a result of a finding of non-compliance by HRSDC, or following their voluntary withdrawal from the FCP for a reason other than the reduction of their workforce to less than 100 employees. Any bids from ineligible contractors, including a bid from a joint venture that has a member who is an ineligible contractor, will be declared non-responsive.



2. If the Bidder does not fall within the exceptions enumerated in 3. (a) or (b) below, or does not have a valid certificate number confirming its adherence to the FCP, the Bidder **must** fax (819-953-8768) a copy of the signed form LAB 1168, Certificate of Commitment to Implement Employment Equity, to the Labour Branch of HRSDC.
3. The Bidder, or, if the Bidder is a joint venture the member of the joint venture, certifies its status with the FCP, as follows:

The Bidder or the member of the joint venture

- (a) ( ) is not subject to the FCP, having a workforce of less than 100 full-time or part-time permanent employees, or temporary employees having worked 12 weeks or more in Canada;
- (b) ( ) is not subject to the FCP, being a regulated employer under the Employment Equity Act, S.C. 1995, c. 44;
- (c) ( ) is subject to the requirements of the FCP, having a workforce of 100 or more full-time or part-time permanent employees, or temporary employees having worked 12 weeks or more in Canada, but has not previously obtained a certificate number from HRSDC (having not bid on requirements of \$200,000 or more), in which case a duly signed certificate of commitment is attached;
- (d) ( ) is subject to the FCP, and has a valid certificate number as follows: \_\_\_\_\_  
(e.g. has not been declared an ineligible contractor by HRSDC.)

Further information on the FCP is available on the HRSDC Web site:

## PART 6 - RESULTING CONTRACT CLAUSES

### 1. Security Requirement

There is no security requirement associated with the requirement.

### 2. Requirement

The Structures and Materials Performance Laboratory of the National Research Council (NRC) Institute for Aerospace Research of has a requirement for a new autoclave for research related to manufacturing processes for fibre-reinforced polymer composite materials.

The Contractor **must** provide autoclave in accordance with the Requirement detailed in Annex "A" and as per the Mandatory Specifications are detailed in Annex "B".

### 3. Standard Clauses and Conditions

All clauses and conditions identified in the Contract by number, date and title are set out in the Standard Acquisition Clauses and Conditions Manual (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) manual issued by Public Works and Government Services Canada.

#### 3.1 General Conditions

2010A (2012-07-16) General Conditions - Goods (Medium Complexity), apply to and form part of the Contract.

#### 4. Term of Contract

##### 4.1 Delivery Date

All the deliverables **must** be received on or before *(to be filled in only at contract award)*.

#### 5. Authorities

##### 5.1 Contracting Authority

The Contracting Authority for the Contract is:

**Anne Caron**

Public Works and Government Services Canada

Acquisitions Branch

Commercial Consumer Products Directorate

11 Laurier Street, 6A2, Phase III

Place du Portage, Hull, Quebec, K1A 0S5

Telephone: (819) 956-3874

Facsimile: (819) 956-3814

E-mail address: anne.caron@tpsgc-pwgsc.gc.ca

The Contracting Authority is responsible for the management of the Contract and any changes to the Contract **must** be authorized in writing by the Contracting Authority. The Contractor **must** not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

##### 5.2 Technical Authority

The Technical Authority for the Contract is: *(to be filled in only at contract award)*

The Technical Authority named above is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Technical Authority, however the Technical Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

##### 5.3 Contractor's Representative *(Bidder to complete)*

The telephone number of the person responsible for:

**General enquiries**

Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Facsimile No. \_\_\_\_\_

E-mail address: \_\_\_\_\_

**Delivery Follow-up**

Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Facsimile No. \_\_\_\_\_

E-mail address: \_\_\_\_\_

## 6. Payment

### 6.1 Basis of Payment - Firm Price

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a firm lot price, as specified in the contract for a cost of \$(*to be filled in only at contract award*). Customs duties and excise tax are excluded and Goods and Services Tax or Harmonized Sales Tax is extra, if applicable.

Canada will not pay the Contractor for any design changes, modifications or interpretations of the Work, unless they have been approved, in writing, by the Contracting Authority before their incorporation into the Work.

### 6.2 Progress Payments

1. Canada will make progress payments in accordance with the payment provisions of the Contract, no more than once a month, for cost incurred in the performance of the Work, up to 80 percent of the amount claimed and approved by Canada if:
  - (a) an accurate and complete claim for payment using form PWGSC-TPSGC 1111, Claim for Progress Payment, and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
  - (b) the amount claimed is in accordance with the basis of payment;
  - (c) the total amount for all progress payments paid by Canada does not exceed 80 percent of the total amount to be paid under the Contract;
  - (d) all certificates appearing on form PWGSC-TPSGC 1111 have been signed by the respective authorized representatives.

Milestone	Payment	Estimated Schedule
Final Installation and Commissioning Plan and proof of purchase of steel	25%	4 to 8 weeks after Contract Award
In-factory pressure vessel certification test	25%	
Delivery	40%	March 2013
Final Acceptance - Commissioning Report	10%	June 2013

2. The balance of the amount payable will be paid in accordance with the payment provisions of the Contract upon completion and delivery of all work required under the Contract if the Work has been accepted by Canada and a final claim for the payment is submitted.
3. Progress payments are interim payments only. Canada may conduct a government audit and interim time and cost verifications and reserves the rights to make adjustments to the Contract

from time to time during the performance of the Work. Any overpayment resulting from progress payments or otherwise **must** be refunded promptly to Canada.

### 6.3 SACC Manual Clauses

C2605C (2008-05-12) Canadian Customs Duty and Sales Tax

## 7. Invoicing Instructions

1. The Contractor **must** submit invoices in accordance with the section entitled "Invoice Submission" of the general conditions. Invoices cannot be submitted until all work identified in the invoice is completed.

Each invoice **must** be supported by:

- (a) claim for Progress Payment form, PWGSC-TPSGC 1111;
- (b) a copy of the release document and any other documents as specified in the Contract;
- (c) a copy of the Milestone document identified in table 6.2.

2. Invoices **must** be distributed as follows:

- (a) The original and one (1) copy **must** be forwarded to the following address for certification and payment. *(to be filled in only at contract award)*
- (b) One (1) copy **must** be forwarded to the Contracting Authority identified under the section entitled "Authorities" of the Contract.

## 8. Certifications

Compliance with the certifications provided by the Contractor in its bid is a condition of the Contract and subject to verification by Canada during the term of the Contract. If the Contractor does not comply with any certification or it is determined that any certification made by the Contractor in its bid is untrue, whether made knowingly or unknowingly, Canada has the right, pursuant to the default provision of the Contract, to terminate the Contract for default.

## 9. Applicable Laws

The Contract **must** be interpreted and governed, and the relations between the parties determined, by the laws in force in Ontario.

## 10. Priority of Documents

If there is a discrepancy between the wordings of any documents that appear on the list, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list.

- (a) the Articles of Agreement;
- (b) 2010A (2012-07-16) General Conditions - Goods (Medium Complexity);
- (c) Annex A, Requirement;
- (d) Annex B, Mandatory Specifications;
- (e) Annex C, Consent to a Criminal Record Verification
- (f) Appendix A, Autoclave floor, rails and mounting structure
- (g) Appendix B, Autoclave external floor mounting structure
- (h) the Contractor's bid dated *(to be filled in only at contract award)*.

## 11. SACC Manual clause

B1501C (2006-06-16) Electrical Equipment  
 A9068C (2010-01-11) Site Regulations  
 B7500C (2006-06-16) Excess Goods  
 A2000C (2006-06-16) Foreign Nationals (Canadian Contractor)  
 A2001C (2006-06-16) Foreign Nationals (Foreign Contractor)

## 12. Shipping Instructions

1. Goods **must** be consigned to the destination specified in the Contract and delivered:

Delivered at Place (DAP) Ottawa, Ontario Incoterms 2000 for shipments from a commercial contractor.

NRC Customs is responsible for paying all applicable customs duties and excise taxes.

The NRC Customs contact is:

Mike Emard, 613-993-9113 or Dan Frampton 613-993-2259

2. The Contractor will be responsible for all delivery charges, administration, costs and risk of transport.

## ANNEX "A"

### REQUIREMENT

The Structures and Materials Performance Laboratory of the National Research Council (NRC) Institute for Aerospace Research of has a requirement for a new autoclave for research related to manufacturing processes for fibre-reinforced polymer composite materials.

The new autoclave is to have similar dimensions to the existing research autoclave that NRC will be removing. The new autoclave **must** fit in the same location as the old autoclave with a minimum of changes to existing infrastructure (building or utilities). See Appendix A and B for details.

The autoclave **must** comply with the following Requirements. The Contractor **must** provide the items detailed in Annex "A" and in accordance with the Mandatory Specifications detailed in Annex "B".

The following applies to the requirement and **must** be provided by the Contractor:

#### 1. Installation and Commissioning (*Bidder to complete*)

A preliminary Installation and Commissioning Plan with timeline **must** be prepared by the contractor, including all installation activities, detailed facility requirements, and all service connection requirements, to allow the NRC to install the autoclave.

The preliminary Plan **must** be provided to NRC not later than 4 weeks after contract award. Following review of the preliminary plan with NRC, a final Installation and Commissioning Plan **must** be provided for NRC approval not later than 8 weeks after contract award.

NRC will be responsible for the foundation for seating the autoclave, as well as connections to electrical power, cooling water, and pressurized nitrogen gas per the supplier's specifications. NRC will install the autoclave in accordance with installation instructions and timeline defined in the final Installation and Commissioning Plan.

The contractor will be responsible for delivery, initial calibration, check out, and commissioning of the autoclave, including the provision of all required tools and personnel to complete these activities. Commissioning **must** include tests/demonstrations to verify that the autoclave meets the requirements.

The contractor **must** complete commissioning of the autoclave no later than 8 months after contract award. The contractor **must** provide NRC with a commissioning report including all test results and data supporting the commissioning, not later than 4 weeks after the completion of commissioning.

Commissioning **must** be provided and **must** be carried out by a qualified service technician. State your best installation and commissioning schedule. Commissioning will be carried out within \_\_\_\_\_ calendar days of delivery and be completed within \_\_\_\_\_ calendar days.

## 2. Manuals

### 2.1 Operation Manual

A fully detailed English version of the Operation Manual **must** be provided at the time of equipment delivery and **must** cover not only the overall system but also the major detailed components.

The contractor **must** also provide either as part of the Operation Manual or as a separate document:

- The Programming Manual **must** be supplied at the time of programmer training and **must** include detailed explanations of the programming requirements for the controller.

### 2.2 Maintenance Manual

A fully detailed English version of the Maintenance Manual **must** be provided at the time of equipment delivery and **must** cover all preventative and corrective maintenance activities that might reasonably occur during the life of the equipment. The Maintenance Manual **must** also include an Illustrated Parts List that includes a detailed list of the available spare parts.

### 2.3 Drawings

The contractor **must** provide as-built drawings reflecting the final delivered and commissioned state of the autoclave, including all detailed systems, not later than 4 weeks after completion of commissioning.

## 3. Training

### 3.1 Programmer Training (*Bidder to complete*)

Training **must** be provided in English for 3 programmers not later than 1 week after completion of autoclave commissioning. The training **must** encompass both classroom and hands-on training including detailed orientation on the equipment features and control software. Training may be provided on or off site but will be at the contractor 's expense. All costs associated with the training **must** be included in the price.

Programmer Training will be completed within \_\_\_\_\_ calendar days after completion of commissioning.

Provide complete details of training e.g. duration, scope, etc.,

---



---

---

### 3.2 Operator Training (*Bidder to complete*)

Training **must** be provided on site in English for a minimum of 3 operators not later than 1 week after completion of autoclave commissioning. The training **must** include hands-on operation of the installed equipment running a test component such that the real environment is experienced. An element of classroom training may be included to supplement this requirement. All costs associated with the training **must** be included in the price.

Operator Training will be completed within \_\_\_\_\_ calendar days of commissioning.

Provide complete details of training e.g. duration, scope, etc.,

---

---

### 3.3 Maintenance Training (*Bidder to complete*)

Training **must** be provided on site in English for a minimum of 2 persons on all mechanical, electrical, and plumbing maintenance issues not later than 4 weeks after completion of autoclave commissioning. The training **must** include a detailed review of operation of all systems as well as preventative and corrective maintenance procedures. All costs associated with the training **must** be included in the price.

Maintenance Training will be completed within \_\_\_\_\_ calendar days of commissioning.

Provide complete details of training e.g. duration, scope, etc.,

---

---



---

#### 4. Service (*Bidder to complete*)

Purchase of the system **must** include: technical phone support; support via the Internet; and support via a fax-back document system for a period of 1 year minimum from the date of commissioning on a normal work-week basis.

Service support **must** be available by phone or e-mail on a normal work-week basis for troubleshooting and for control software programming questions, for example for inclusion of complex control schemes such as real-time material models, at no extra charge for a period of 1 year minimum from the date of commissioning.

Response for service **must** be within 24 hours or less. On-site support, if required, **must** be available within 3 days from the time of notification.

Also, provide the following with your bid:

a) Location of available service facilities (after sales service and repair). List the service facilities closest to the destination.

---

---

---

b) Locations of available replacement parts from consumables to major components.

---

---

---

c) Response time re: service calls, and escalation schedule, i.e. (how many days with no resolution to a problem until a more experienced person is called in, and from which location).

---

---

---

d) List the frequency of routine maintenance visits provided by a qualified service technician during the warranty period, if applicable and included in the price.

---

---

## 5. Parts Availability

Standard spare parts **must** be available at the contractor 's facility within 3 days from the time of notification. Receipt of an individual part at the NRC facility may differ based on the size and weight of the replacement article, but receipt of the replacement part **must** not exceed 7 days from the time of notification. The supplier **must** include in their proposal a list of all spare parts, if any, which cannot be supplied within this timeline.

## 6. Preventive Maintenance Plan

The contractor **must** provide a recommended preventive maintenance plan for the equipment as part of the proposal. The preventive maintenance plan **must** define the activities, parts, and schedule necessary to ensure the equipment meets all of the requirements of this specification for a period of 5 years from commissioning.

## 7. Product(s) Offered (*Bidder to complete*)

The Bidder **must** indicate the make and model number of the products offered (identify specific components which make up the system):

Name of Manufacturer: \_\_\_\_\_

Model/Part Number: \_\_\_\_\_

## 8. Point of Manufacture/Shipping (*Bidder to complete*)

The Bidder **must** state the point of manufacture/shipping of goods or where service is to be performed:

Location: \_\_\_\_\_

Postal Code: \_\_\_\_\_

## 9. Delivery (*Bidder to complete*)

While delivery is requested by December 21, 2012, the best delivery that could be offered by the Bidder is \_\_\_\_\_.

## 10. Software Upgrades

The contractor **must** provide all software updates and new releases to the purchaser for a period of one (1) year following the acceptance, at no additional cost.

Note: The word "updates" means all enhancements, extensions or other modifications to the software. The word "releases" means enhancements or modifications to the software or new modules or supplementary modules that function in conjunction with the software, that represent the next generation of software, and which the Contractor has decided to make available to its customers usually for an additional charge.

## 11. Client References

The Bidder **MUST** provide with their bid three (3) company/organisation/organization names, addresses and contact person(s) (with both telephone numbers and e-mail addresses) where the Bidder has supplied same/similar equipment as the one proposed in this bid in the last ten (10) years. All such referenced systems **must** be fully operational and demonstrate that the bidder has a proven track record of supplying and maintaining similar equipment. Canada may contact these references. The Bidder agrees that failure to comply with such a request, will lead to disqualification of the Bidders' proposal from further consideration.

## 12. Additional Documentation References

With their proposal, the bidder **MUST** submit:

- a) Ambient environment requirements
- b) Nitrogen source requirements
- c) Any changes required to existing facilities or utilities
- d) Graphic images (e.g. drawings) of the equipment proposed. Please include dimensions on graphic images.

**ANNEX "B"****MANDATORY SPECIFICATIONS**

The supplied equipment and services **must** meet or better all of the requirements defined below. The supplied equipment is to be new, not used or refurbished. Systems not meeting all the following Mandatory Requirements will be considered non-compliant.

References are to be specific to supporting technical documentation (ex. Document title, page and paragraph number). Final validation of specifications will be done during the commissioning demonstrations.

**Compliance Acknowledgement: (*Bidder to complete*)**

I, the bidder, certify that proposed system will be in compliance with entire requirement and all of below listed mandatory specifications.

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

**1. TECHNICAL****1.1 Configuration****1.1.1 Working (Interior) Envelope**

The minimum internal working envelope **must** be 4 ft diameter x 8 ft long.

Reference (*Bidder to complete*) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**1.1.2 Internal Floor**

The autoclave floor **must** be configured as shown in Appendix A with two integral rails. The autoclave floor and rails **must** be sized to accommodate loads of carts, tools, and parts with a combined mass of up to 1000 lbs.

Reference (*Bidder to complete*) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**1.1.3 Internal Cart**

The autoclave **must** include a cart with wheels suitable for running on the rails in 1.1.2, with a length sized for the working envelope. The cart **must** be no more than 8 inches tall (including wheels), have a low thermal mass, and be capable of supporting up to 1000 lbs in its own weight, tools, and parts.

Reference **(Bidder to complete)** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**1.1.4 External Mounting Structure**

The autoclave external mounting structure **must** meet the dimension shown in Appendix A and be configured such that the autoclave can be mounted on the floor beams shown in Appendix B.

Reference **(Bidder to complete)** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**1.1.5 Exterior Envelope**

The exterior dimensions of the autoclave **must** be no larger than:

Width: 8 ft 6 in. (door closed); 9 ft 6 in. (door open) - Overall Height: 9 ft - Above top of existing floor I-beams (see Appendix B)

Length: 23 ft (door open) - Overall

Reference **(Bidder to complete)** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**1.1.6 Door Configuration**

The door **must** be sealed shut by a hydraulically operated breech-lock ring. The door **must** be mounted on a hinge on the right side when facing into the autoclave, and swing open far enough to fully clear the entire internal working diameter. Door swing **must** be hydraulically operated.

Reference **(Bidder to complete)** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

---

**1.1.7 Connection Panel**

There **must** be one or more connection panels on the autoclave interior wall where all thermocouples and vacuum lines from parts will be connected. The connection panel(s) **must** use the following connector types:

- Thermocouples: Omega K-type flat pin, product number SHXJP1-06-K
- Vacuum (source and sense lines): Swagelok QC-Series, brass or stainless steel, size QC6

**1.1.8 Standard Parts**

Wherever possible, standard parts **must** be used, including transducers and control system parts.

**1.1.9 Weight**

As delivered, the weight of any single item of assembled equipment **must** be no more than 18,000 pounds, in order to remain within the lift capacity of the existing overhead crane in the building where the autoclave is to be installed.

**1.1.10 Pass-Throughs**

The autoclave **must** include a minimum of four 1-inch diameter pass-throughs that provide access through the pressure vessel shell. As delivered, openings through the insulation and inner wall of the working envelope are not required. The pass-throughs **must** be capped with easily removable and replaceable caps on the autoclave exterior, and **must** pass all necessary certification tests.

Reference **(Bidder to complete)** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**1.1.11 Blank Electrical Pairs**

The autoclave **must** include a minimum of 20 pairs of blank (un-terminated) electrical wires built into the autoclave which pass through the autoclave shell from exterior to interior.

Reference **(Bidder to complete)** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**1.2 Functional Capabilities**

The equipment **must** be capable of simultaneously connecting to, monitoring, and controlling from the following minimum number of thermocouple and vacuum lines:

- 16 thermocouples of K-type
- 6 separate vacuum source lines
- 6 separate vacuum sense lines

Reference **(Bidder to complete)** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

---

Vacuum source lines **must** be individually controlled to deliver the commanded level of vacuum to a part and **must** include the function to vent part vacuum. Vacuum sense lines **must** each connect to a separate transducer capable of sensing both vacuum and positive pressure up to autoclave maximum pressure.

#### 1.2.1 Pressurization

The autoclave **must** be pressurized with NRC-supplied gaseous nitrogen, and the pressure vessel **must** be certified to an operating pressure of not less than 200 psig. The NRC-supplied gaseous nitrogen will be regulated to a pressure of not greater than 300 psig. The inlet control valve on the in-coming nitrogen line is the responsibility of the autoclave supplier and **must** be rated for not less than 300 psig. The equipment **must** be capable of applying pressure within the working envelope at a programmable rate of up to 10 psi per minute, and **must** hold any commanded pressure level to  $\pm 1$  psi.

Reference (***Bidder to complete***)\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

#### 1.2.2 Vacuum

Vacuum **must** be provided by a dedicated electric pump and reservoir system supplied with the autoclave, with the pump rated at not less than 10 CFM. The maximum noise level from the vacuum pump while operating **must** not exceed 75 dBA when measured at a distance of 10 feet.

Reference (***Bidder to complete***)\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

The vacuum system **must** be controlled by solenoid valves (as opposed to pilot pressure valves) with a separate valve on each vacuum source line. Each vacuum source line **must** be independently controllable and able to deliver a different level of vacuum from the other vacuum source lines. All vacuum source lines **must** include resin traps exterior to the autoclave shell that can be easily opened and cleaned. The resin traps **must** include cooling that is selectable on or off (may be manual control).

Reference (***Bidder to complete***)\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

---

This system **must** be capable of providing vacuum of at least 28.5 inches of Hg, and **must** hold any commanded level of vacuum to  $\pm 0.5$  inches of Hg. The vacuum source lines **must** also provide for vacuum venting. The system **must** provide the capability to vent vacuum from each source line independently from the other source lines, at a program controlled rate that can be commanded at levels from 1 to 30 inches of Hg per minute for bagged parts ranging from 0.02 – 1.5 cu.ft. of vent volume.

Reference **(Bidder to complete)** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Vacuum system integrity **must** be tested by connecting each vacuum source line to a separate vacuum sense line, drawing at least 28.5 inches of Hg, closing the vacuum source line valve, and monitoring the vacuum sense line; vacuum **must** not drop by more than 2 inches of Hg in 5 minutes. This test **must** be passed both at room ambient conditions (temperature and pressure) and with the autoclave pressurized to 100 psig (ambient temperature).

### 1.2.3 Heating

Heating **must** be provided by an electric heater and fan system to distribute the hot nitrogen evenly over all parts in the autoclave.

Reference **(Bidder to complete)** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

The heating system **must** meet the requirements below while operating at a pressure of 90 to 100 psi, for autoclave loads of tools and simulated parts with a combined thermal mass equivalent to 500 lbs of steel. For capability demonstration purposes, the thermal mass is to be considered as a 0.50 inch thick steel plate, 3.25 ft wide x 7.5 ft long, positioned in the autoclave to permit free air flow both above and below it. Capability demonstration may be performed with a different configuration of metal plate provided that thermal analysis shows system performance would have met the requirements herein had the plate been configured as described above.

The ability of the heating system to meet the ramp and soak requirements below **must** be based on part thermocouples taped to the simulated part surface.

The heating system **must** be capable of meeting the requirements below with a "free-air" temperature uniformity of  $\pm 5$  °F with respect to the controller set point, for any point in the working envelope, at any point in time.

Reference **(Bidder to complete)** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Note: The temperature requirements listed below are exclusive of measurement device accuracy.



Heating ramp control capability:

Ramp control accuracy will be determined once the simulated part's temperature rate has converged and stabilized. The simulated part's temperature rate is to be determined based on the average of readings taken over 10 minute intervals.

## Temperature ramp rate :

0.5 to 10 °F / minute up to 400 °F;

0.5 to 5 °F / minute above 400 °F

## Temperature ramp rate accuracy :

± 0.5 °F / minute up to 400 °F;

± 0.2 °F / minute above 400 °F

Reference **(Bidder to complete)**\_\_\_\_\_

Soak control capability:

Maximum soak temperature : 800 °F minimum

Temperature control accuracy: ± 5 °F

Reference **(Bidder to complete)**\_\_\_\_\_

**1.2.4 Cooling**

Cooling will be provided by cooling tower water to be supplied by NRC, with a selectable city water bypass. The cooling water **must** run through a heat exchanger with a suitable fan system to distribute the cooled nitrogen evenly over all parts in the autoclave.

The cooling controls **must** be modulating type (not step control).

The cooling system **must** be capable of meeting the requirements below while operating at a pressure of 90 to 100 psi, for autoclave loads of tools and parts with a thermal mass configuration and conditions as stated in 1.2.3.

The ability of the cooling system to meet the temperature ramp requirements below **must** be based on part thermocouples taped to the simulated part surface. The cooling system **must** be capable of meeting the requirements below with a "free-air" temperature uniformity of ± 5 °F with respect to the controller set point, for any point in the working envelope, at any point in time.

Reference **(Bidder to complete)**\_\_\_\_\_

Note: The temperature requirements listed below are exclusive of measurement device accuracy.

---

**Cooling ramp control capability:**

Ramp control accuracy will be determined once the simulated part's temperature rate has converged and stabilized. The simulated part's temperature rate is to be determined based on the average of readings taken over 10 minute intervals

Temperature ramp rate: 0.5 to 10 °F / minute from 800°F to 400 °F;  
0.5 to 5 °F / minute from 400 °F to 200 °F

Temperature ramp rate accuracy: ± 0.5 °F / minute

Reference **(Bidder to complete)** \_\_\_\_\_

---

**1.3 Instrumentation**

The following requirements apply to the installed system of transducers in combination with the recording equipment. Unless otherwise stated, these requirements apply over the full operating range of the autoclave for pressure, vacuum, and temperature.

**1.3.1 Pressure Monitoring**

Overall calibration accuracy: ± 0.5 % of maximum operating pressure

Resolution: ± 0.5 psi or less

Reference **(Bidder to complete)** \_\_\_\_\_

---

**1.3.2 Vacuum Monitoring**

Overall calibration accuracy: ± 0.25 inches of Hg

Resolution: ± 0.1 inches Hg or less

Reference **(Bidder to complete)** \_\_\_\_\_

---

**1.3.3 Temperature Monitoring**

Overall calibration accuracy: ± 2 °F

Resolution: ± 0.1 °F or less

Reference **(Bidder to complete)** \_\_\_\_\_

**1.4 Existing Utilities**

The autoclave **must** be capable of meeting the requirements herein when connected to the utilities available at the location of the existing autoclave, with a minimum of changes to the existing utilities. The existing utilities and their capacities are as follows.

**1.4.1 Electrical Power**

Available power:

- 3-Phase, 60 Hertz, 250 Amps, 600 Volts (typical variance: 575-600V)
- 1-Phase, 60 Hertz, 20 Amps, 208 Volts
- 1-Phase, 60 Hertz, 15 Amps, 115 Volts

Reference (unit requirement) **(Bidder to complete)**\_\_\_\_\_

**1.4.2 Cooling Water**

Available water: 1.25 inch diameter pipe from existing cooling tower, 70 psi, max. 90°F (hot summer day)

Reference (unit requirement) **(Bidder to complete)**\_\_\_\_\_

**2. CONTROLS****2.1 Control System****2.1.1 Hardware**

The control system **must** use programmable logic controllers (PLC' with modulating control (no step control)). The control system **must** include an uninterruptible power supply sufficient for saving of all process data and for controlled shutdown of the system in the event of a power failure.

Reference **(Bidder to complete)**\_\_\_\_\_

The autoclave **must** be controlled by a single PC-based system. The PC and its peripherals (keyboard, monitor, etc.) **must** be supplied separate from the autoclave and will be located on a desk near the autoclave, connected by a suitable cable (desk to be supplied by NRC).

Reference **(Bidder to complete)**\_\_\_\_\_

### 2.1.2 Software

The control software **must** operate under Microsoft Windows, and **must** provide options for both direct cycle control based on "free-air" temperature and lead/lag control based on part thermocouples.

The control software **must** permit the NRC to define his/her own control schemes based on any combination of process or part temperatures, time, vacuum levels, and pressures, and permit the NRC to select the control point (e.g. select specific thermocouple ("free-air" or part), average over several sensors, etc.). The control software **must** permit operation of the autoclave as an oven, i.e. with normal atmospheric pressure levels.

The control software **must** permit the operator to change control scheme parameters on-the-fly (i.e. while a cure cycle is underway).

The control software **must** include functionality for the NRC to incorporate real-time material models (e.g. viscosity based on cure history, degree-of-cure based on cure history, etc.) that are actively used by the software to control process parameters.

Reference (***Bidder to complete***) \_\_\_\_\_

The control software **must** provide all necessary functionality for:

1. The operator to program new cure schedules, with full control over ramp up, holds, and ramp down of pressure, vacuum, and temperature.
2. The operator to set upper and lower alarm levels, independent of programmed levels, for ramp up, holds, and ramp down of pressure, vacuum, and temperature.
3. The operator to acknowledge alarms and isolate individual parts for out-of-tolerance readings for vacuum and/or temperature so that the cure cycle may continue with the out-of-tolerance sensor disregarded by the controller.
4. Creation of a Load File with facility for the operator to enter all important details about the autoclave load (e.g. identifier and description for each part, thermocouple and vacuum connections for each part, etc), and with automatic recording of all process parameters (pressure, vacuum, temperature, etc.) at the following intervals:
  - a. During ramp up or down of any parameter: selectable from 0.1 to 30 minutes
  - b. During holds: selectable from 1 to 30 minutes
5. Acquisition and display of data from all of the instrumentation channels identified in paragraph 1.2 as well as all other standard installed instrumentation (e.g. "free-air" thermocouple, working envelope pressure transducer).
6. Access to all process and part data during a cure cycle, including the ability to export data for separate analysis, without disruption to the cycle or on-going data acquisition.
7. Exporting of Load File data to Microsoft Excel for further analysis.
8. Creation of a Load Report with ability for the operator to select which parameters and their frequency to include in the Report, and with ability for the operator to select whether data for any parameter is presented graphically or in table format.

Reference (***Bidder to complete***) \_\_\_\_\_

The contractor **must** provide backup copies of all control software that is loaded on the system, as well as the PLC ladder logic program including label files in soft and hard copy.

## 2.2 Ethernet Connection

An Ethernet connection **must** be provided to allow connection of the control PC to the host network in the installation facility so that Programming and Load Files can be transferred as necessary. This connection **must** also allow other network-connected computers to view operating status of the autoclave at any point in time.

Reference **(Bidder to complete)** \_\_\_\_\_

## 2.3 Operator Intervention

A valve **must** be provided on each vacuum source line to allow the operator to isolate any part from the vacuum source (close vacuum source line) and to reconnect the part to the vacuum source (reopen vacuum source line).

As well, a valve **must** be provided on each vacuum source line to allow the operator to vent any part to atmosphere. The operator **must** be able to actuate these valves independent of any cure schedule program that is running.

Reference **(Bidder to complete)** \_\_\_\_\_

In the event of a computer failure, the operator **must** have the ability for manual override and control of vacuum, pressure, and temperature.

Reference **(Bidder to complete)** \_\_\_\_\_

## 3. CERTIFICATION

The supplier will be responsible for certifying the autoclave as a pressure vessel according to all applicable local regulations. The supplier will be responsible for certifying all equipment associated with the autoclave according to all applicable local regulations, including electrical certification to CSA or ESA standards, as applicable.

The supplier **must** provide an Installation and Commissioning Plan that outlines the nature and timeline of certification activities in accordance with the requirements of paragraph 1 of Annex "A" herein.

---

#### 4. ENVIRONMENTAL

The autoclave will be located inside an environmentally controlled building. However, the supplier **must** identify any necessary requirements for environment quality, temperature, humidity, etc in order to achieve the specified performance levels.

#### 5. HEALTH & SAFETY

The supplier **must** detail all safety features of the equipment including not only the features on and in the autoclave but also the safety lockouts and safeguards built into the controller to prevent hazardous operation. Safeguards **must** be designed, constructed, installed, used, and maintained in accordance with all local Workplace Health and Safety Regulations.

##### 5.1 General Requirements

All equipment installed at the NRC' facility **must** be provided with safeguards on it that will prevent anyone from coming into contact with the following:

- hazardous moving parts on the machine;
- surfaces with temperatures that may cause skin to freeze, burn, or blister;
- energized components;
- any other hazard that may pose a risk to the safety or health of anyone in the area.

All mechanical and electrical devices **must** be designed to "fail to safety". The operating controls of the equipment **must** be readily and clearly identifiable, located within reach of the operator, and unable to be activated by inadvertent contact. The equipment **must** be provided with an emergency stopping device that is readily and clearly identifiable, and located in the direct view and within reach of the operator at all times.

The supplier **must** furnish MSDS sheets for all hazardous materials present in the equipment at the time of arrival at the installation facility.

##### 5.2 Autoclave Specific Requirements

In addition to the requirements above, the safety features of the autoclave **must**:

- ensure the autoclave cannot be pressurized without the door being fully locked;
- ensure the autoclave door cannot be opened until the pressure has been safely vented;
- provide a system to warn the operator of any residual pressure, prior to opening the door;
- prevent the door from opening violently due to residual low pressure;
- provide interlocking of the door and prevent opening until the internal atmosphere and temperature are at a safe level;
- allow operators to initiate an emergency stop and accompanying alarm at any time while working inside the pressure vessel.

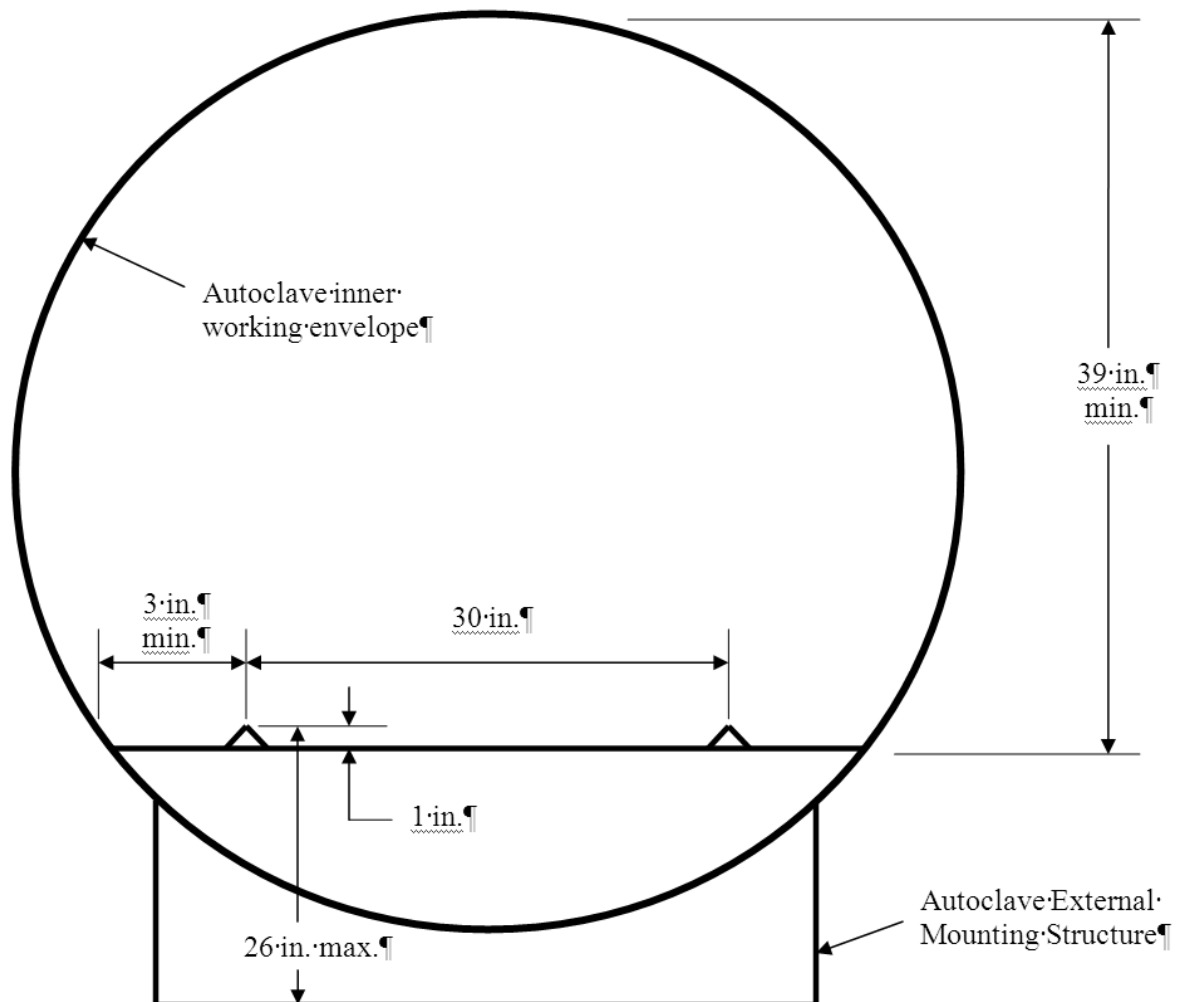
The safety of the pressure vessel **must** be ensured by a pressure relief valve. A spare certified pressure relief valve **must** be provided along with the autoclave, so that it can be installed in place of the original pressure relief valve should the original valve fail. The autoclave **must** be equipped with over-pressure and over-temperature alarms and controls which prevent hazardous operation of the equipment. These **must** operate independent of all other programmed or manual controls.

Reference (*Bidder to complete*) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

## **APPENDIX A**

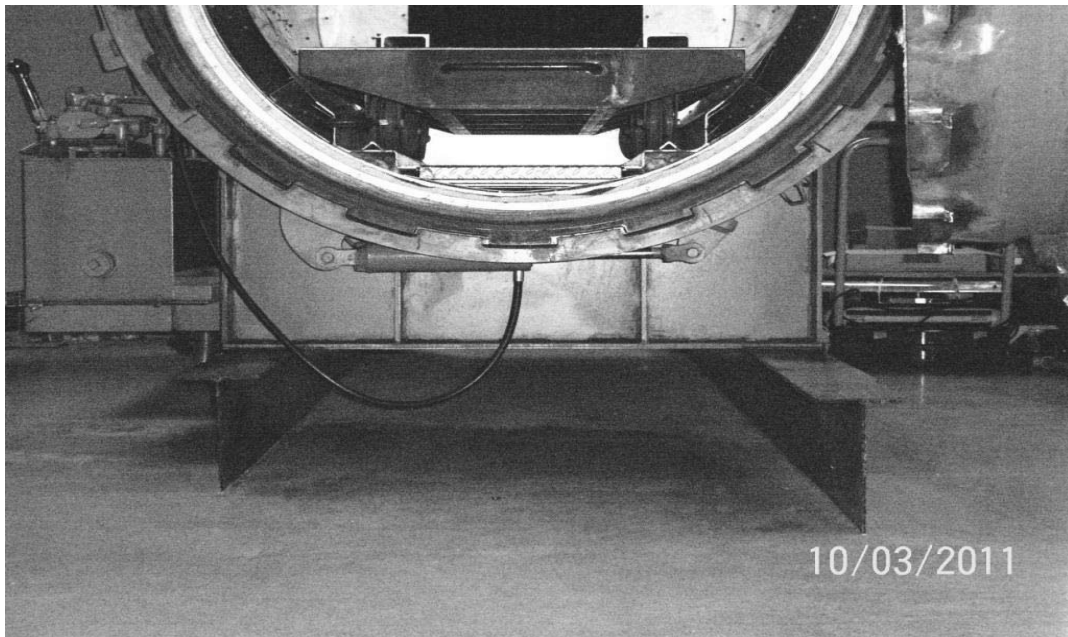
### **Autoclave Floor, Rails, and Mounting Structure Configuration**



## **APPENDIX B**

### Autoclave External Floor Mounting Structure

External mounting structure used with existing autoclave :

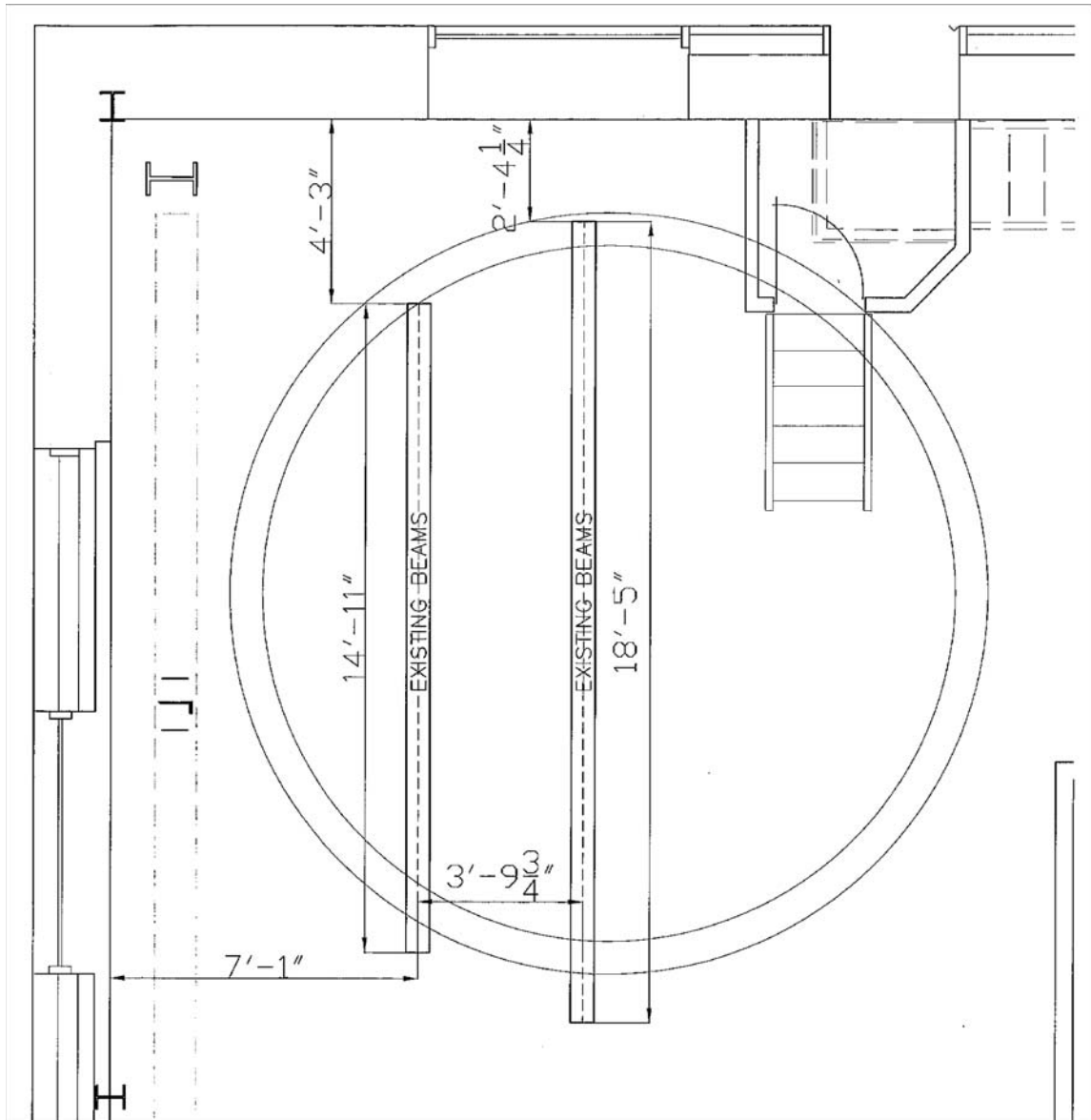


Front view showing I-beams beneath existing autoclave mounting structure.



Side view showing existing autoclave mounting structure welded to I-beams.





Layout of existing autoclave installation area showing I-beam supports for autoclave.