Public Works and Government Services Canada

Travaux publics et Services gouvernementaux Canada

RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:

Bid Receiving
PWGSC
33 City Centre Drive
Suite 480
Mississauga
Ontario
L5B 2N5
Bid Fax: (905) 615-2095

SOLICITATION AMENDMENT
MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

Vendor/Firm Name and Address
Raison sociale et adresse du fournisseur/de l'entrepreneur

Issuing Office - Bureau de distribution

Public Works and Government Services Canada
Ontario Region
33 City Centre Drive
Suite 480
Mississauga
Ontario
L5B 2N5

Title - Sujet Laser Measurement Instrument	
Solicitation No. - N° de l'invitation 23584-130711/A	**Amendment No. - N° modif.** 001
Client Reference No. - N° de référence du client 23584-130711	**Date** 2013-06-18
GETS Reference No. - N° de référence de SEAG PW-$TOR-031-6280	
File No. - N° de dossier TOR-3-36022 (031)	**CCC No./N° CCC - FMS No./N° VME**
Solicitation Closes - L'invitation prend fin **at - à 02:00 PM** **on - le 2013-07-08**	**Time Zone** **Fuseau horaire** Eastern Daylight Saving Time EDT
F.O.B. - F.A.B. **Plant-Usine:** ☐ **Destination:** ☑ **Other-Autre:** ☐	
Address Enquiries to: - Adresser toutes questions à: Schmidt, Jeff	**Buyer Id - Id de l'acheteur** tor031
Telephone No. - N° de téléphone (905) 615-2058 ( )	**FAX No. - N° de FAX** (905) 615-2060
Destination - of Goods, Services, and Construction: **Destination - des biens, services et construction:** See Herein	

Instructions: See Herein

Instructions: Voir aux présentes

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

Canada

AMENDMENT 001 HAS BEEN ISSUED TO ATTACH THE SOLICITATION DOCUMENTS.

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PART 1 - GENERAL INFORMATION

1. Security Requirement

There is no security requirement associated with this bid solicitation.

2. Requirement

The requirement is detailed under Article 2 of the resulting contract clauses.

3. Optional Site Visit

It is recommended that the Bidder or a representative of the Bidder visit the work site. Arrangements have been made for a tour of the work site. The site visit will be held on June 12, 2013, at 10:00 AM,Natural Resources Canada, CANMETMaterials, 183 Longwood Road South Hamilton, ON L8P 0A5. Bidders are requested to communicate with the Contracting Authority 5 days before the scheduled visit to confirm attendance and provide the name(s) of the person(s) who will attend. Bidders may be requested to sign an attendance form. Bidders who do not attend or send a representative will not be given an alternative appointment but they will not be precluded from submitting a bid. Any clarifications or changes to the bid solicitation resulting from the site visit will be included as an amendment to the bid solicitation.

4. Debriefings

Bidders may request a debriefing on the results of the bid solicitation process. Bidders should make the request to the Contracting Authority within 15 working days of receipt of the results of the bid solicitation process. The debriefing may be 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) 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 (2012-11-19) 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

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 (3 hard copies)

Section II: Financial Bid (1 hard copy)

Section III: Certifications (1 hard 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 should:

1) use 8.5 x 11 inch (216 mm x 279 mm) paper containing fibre certified as originating from a sustainably-managed forest and 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

Bidders must submit their financial bid in accordance with the Basis of Payment. The total amount of Applicable Taxes must be shown separately.

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

1.1.1 Mandatory Technical Criteria

1. The Bidder must meet all the mandatory criteria located at Section 12, Mandatory Equipment Requirements and Section 13, Mandatory Heat Exchanger and Chiller Requirements at Annex A, Requirement.

2. The Bidder must provide within their bid the make and model of the proposed instrument and clearly address each specification in detail demonstrating compliance to the requirement.

3. The Offeror must complete and submit Annex E, Table and Notice of Designated and/or Hazardous Substances on Project with their bid.

1.2 Financial Evaluation

1. Bidders must submit pricing in accordance with Annex B, Basis of Payment, with their bids at bid closing.

2. *SACC Manual* Clause A0220T (2013-04-25) Evaluation of Price

2. Basis of Selection

2.1 *SACC Manual* Clause A0031T (2010-05-16) Basis of Selection - Mandatory Technical Criteria

PART 5 - CERTIFICATIONS

Bidders must provide the required certifications and related documentation to be awarded a contract. Canada will declare a bid non-responsive if the required certifications and related documentation 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, to provide the related documentation or to comply with the request of the Contracting Authority for additional information will also render the bid non-responsive.

1. Mandatory Certifications Required Precedent to Contract Award

1.1 Code of Conduct and Certifications - Related documentation

By submitting a bid, the Bidder certifies that the Bidder and its affiliates are in compliance with the provisions as stated in Section 01 Code of Conduct and Certifications - Bid of Standard Instructions 2003. The related documentation therein required will assist Canada in confirming that the certifications are true.

2. Additional 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 - Certification over $25,000 and below $200,000

Suppliers who are subject to the Federal Contractors Program (FCP) and have been declared ineligible contractors by Human Resources and Skills Development Canada (HRSDC) are no longer eligible to receive federal 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.

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, and/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, and/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;

d. ( ) has not been declared an ineligible contractor by HRSDC, and has a valid certificate number as follows: _____ .

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 applicable to this Contract.

2. Requirement

The Contractor must provide the items detailed under the "Requirement" at Annex A.

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) issued by Public Works and Government Services Canada.

3.1 General Conditions

2010A (2013-04-25), General Conditions - Goods (Medium Complexity), apply to and form part of the Contract.

3.2 Supplemental General Conditions

4001 (2013-01-28) Hardware Purchase, Lease and Maintenance, apply to and form part of the Contract.

4. Term of Contract

4.1 Period of the Contract

The period of the Contract is from date of Contract to two years from Site Acceptance Test approval (*to be completed at Contract award)*.

4.1 Delivery Date

All the deliverables must be received within 12 weeks from Contract award.

5. Authorities

5.1 Contracting Authority

The Contracting Authority for the Contract is:

Name: Jeff Schmidt
Title: Supply Officer
Organization: Public Works and Government Services Canada
Acquisitions Branch
Address: 33 City Centre Dr., Mississauga, ON L5B 2N5

Telephone : 905-615-2058
Facsimile: 905-615-2060
E-mail address: jeff.schmidt@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:

Name: _____
Title: _____
Organization: _____
Address: _____

Telephone: ___ ___ _____
Facsimile: ___ ___ _____
E-mail address: _____

The Technical Authority 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

Name: _____
Title: _____
Organization: _____
Address: _____

Telephone: ___ ___ _____
Facsimile: ___ ___ _____
E-mail address: _____

6. Payment

6.1 Basis of Payment - Firm Price, Firm Unit Price(s) or Firm Lot Price(s)

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid firm a unit price(s), as specified in Annex B, Basis of Payment for a cost of $ _____. Customs duties are included and Applicable Taxes are extra.

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 Single Payment

SACC Manual claause H1000C (2008-05-12) Single Payment

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.

2. Invoices must be distributed as follows:

a. The original and one (1) copy must be forwarded to the address shown on page 1 of the Contract for certification and payment.

b. One (1) copy must be forwarded to the Contracting Authority identified under the section entitled "Authorities" of the Contract.

8. Certifications

8.1 Compliance

Compliance with the certifications and related documentation 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, provide the related documentation or if 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 _____.

10. Priority of Documents

If there is a discrepancy between the wording 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) the supplemental general conditions 4001 (2013-01-28) Hardware Purchase, Lease and Maintenance;
(c) the general conditions 2010A (2013-04-25) Goods (Medium Complexity);
(d) Annex A, Requirement;
(e) Annex B, Basis of Payment;
(f) the Contractor's bid dated _____.

11. Insurance

SACC Manual clause G1005C (2008-05-12) Insurance

ANNEX A
REQUIREMENT

Laser Flash Thermal Diffusivity Measurement Instrument

1. Background

Natural Resources Canada (NRCan), CanmetMATERIALS (CANMET-MTL), Hamilton, ON, requires a laser flash thermal diffusivity measurement instrument including: installation, commissioning, training, manuals and drawings and service to support the research and development of a variety of projects. This instrument determines the thermal diffusivity of a material by measuring the temperature of the sample in response to a laser pulse. The projects supported by this instrument include novel materials for heat exchanger to thermoelectric materials. The object of this equipment is to provide researchers with an essential tool to support the research and development of heat exchanger and thermoelectric materials in determining the thermal diffusivity and specific heat of these materials from room temperature to 1100 degrees Celsius (ºC).

2. Requirement

The system must have the following main sub-systems, with the specific requirements listed in Sections 12 and 13:

2.1 One or more vacuum chamber with at least one access;
2.2 Heating elements;
2.3 Vacuum pumping system and gas system;
2.4 Heating and cooling system to provide accurate temperature control of the sample;
2.4 Computerized data recording system with supervisory visualization system and control system;
2.5 A laser system to apply pulsed heating to the sample under test;
2.6 A detector system consisted of infrared detectors and its cooling, pre-amplifiers and amplifiers to record the temperature of the sample as a function of time.

3. Installation

3.1 The Contractor must provide on-site installation of the laser flash thermal diffusivity measurement system upon arrival at the CANMET-MTL Facility in Hamilton, ON. Installation must be carried out by a supplier qualified service technician.

3.2 NRCan will provide the required service drops (electrical, compressed air, industrial gases, reverse osmosis (RO) water, tap water, and cooling circuit of 20ºC or 30ºC, with lockable disconnects) to support the final hook-up of the system.

3.3 If connection with the building water loop is required, the Contractor must provide a strainer, 40 mesh size screen or finer on return water line.

3.4 If connection with the building water loop is required, the coolant and construction materials must be compatible with sodium nitrite and sodium metaborate inhibitors containing process water loop.

3.5 Plumbing requirements: Plumbing accessories including but not limited to piping, fittings (elbows, unions, connectors), hoses, clamps, hardware, insulation materials and labelling must be provided by the Contractor. CANMET-MTL to provide facility piping and water drops.

3.6 The Contractor must deliver, assemble and install equipment in the second floor of CANMET-MTL, Eco Materials Laboratory, Room 236.

4. Installation Certification

4.1 The Contractor must arrange and provide installation certification by the Ontario Electrical Safety Authority (ESA) for any electrical installation work.

4.2 Plumbing must adhere to the National Plumbing Code.

4.3 Individuals working on this project must have the following Ontario certifications, licenses or proof of training:

- Certified Plumbers
- Certified Industrial Millwrights, Riggers, Ironworkers and Welders
- Certified electricians
- WHMIS training and certification

4.4 The Contractor must obtain permits required for installation.

5. Calibration Certification

5.1 The contractor must provide calibration and certification of calibration of the equipment installed at the CANMETMaterials Hamilton Facility. When required by CanmetMATERIALS, calibrations must be provided by an accredited ISO/IEC 17025-2005 calibration service provider.

5.2 The Contractor must include a calibration plan iupon delivery dentifying and listing each measuring device that must be calibrated, calibration range, recommended points and frequency of calibration.

5.3 The laser flash thermal diffusivity measurement system design must include calibration ports and scheduled site visits to facilitate the calibration operation. See Article 10.2.

5.4 The calibration service, along with the calibration report, must include the evidence of Accreditation by a recognized Accrediting Body and the Scope of Accreditation for all artefacts and standards used in the calibration.

6. Occupational Health & Safety and Environment

6.1 The contractor must comply with the Province of Ontario's requirements and CANMET-MTL Federal OHS&E (Occupational Health, Safety and Environment) policy and procedures;

6.2 CANMET-MTL will orient the contractor for CANMET-MTL Federal OHS&E policy and procedures, prior to the start of the work;

6.3 The contractor must put in place its own qualified compliance monitoring process and team;

6.4 Prior to Contractor Orientation at CANMET-MTL, all onsite contractors must provide proof of WHMIS training;

6.5 All non-Canadian citizens coming on site must forward copies of their passport a minimum of 2 weeks prior to Orientation.

7. Commissioning

The Contractor must provide on-site commissioning at the CANMET-MTL facility in Hamilton, ON. The on-site commissioning of the system must be carried out by a Contractor qualified service technician.

7.1 Cold Commissioning Acceptance

Cold commissioning must be carried out and completed prior to Energizing Equipment by the Contractor or NRCan approved third party service provider. The items to be completed must include the following:

7.1.1 Obtain Electrical Certification (Ontario Electrical Safety Authority - ESA);
7.1.2 Provide a set of Standard Operating Procedures;
7.1.3 Provide a Lock-Out Tag-Out (LOTO) Procedure;
7.1.4 Provide Equipment Documentation Updates (as a result of equipment modification & installation).
7.1.5 Rework to Obtain Compliance;
7.1.6 Conduct Final Prestart Engineering Review Complete to Ensure all Guarding and Safety Features have been adhered to;
7.1.7 Equipment Energizing Procedure Commences;
7.1.8 Staged Removal of Lock-Out Tag-Out (LOTO) of Equipment.

7.2 Warm Commissioning

The Contractor must conduct warm commissioning which must meet the following:

7.2.1 Verify software communication between the instrument and controlling computer;
7.2.2 Verify accurate temperature control from room temperature to 1100 ºC (±1.0 K);
7.2.3 Alignment of the laser, associated optics and detectors;
7.2.4 Correct any deviations of the performance specifications;
7.2.5 Ensure Limit Switches are Properly Set;
7.2.6 Verify laser and temperature Controls;
7.2.7 Verify that an ultimate vacuum 0.01 mBar or better can be reached within 30 minutes;
7.2.8 Vent the chamber and inspect interior of chamber;
7.2.9 Close the chamber and heat up of hot zone from room temperature to 1100°C in vacuum or inert gas;
7.2.10 Demonstrate instrumentations and check equipment safety, alarms and interlocks.
7.2.11 Rework if necessary for compliance;
7.2.12 Contractor sign off on Commissioning of new equipment.

7.3 Hot Commissioning

The Contractor must conduct and complete hot commissioning which must meet the following:

7.3.1 Demonstrate controlled temperature ramp to the high limit (1100 ºC) in vacuum and in inert gas environment. Demonstrate temperature stability (±1.0 K) and control anywhere between room temperature and 1100 ºC.

7.3.2 Demonstrate stable and repeatable discharge of laser energy at all sample temperatures from room temperature to 1100 ºC (±1.0 K) in vacuum or inert gas environment, as appropriate. Demonstrate focus and alignment of the laser beam, optics, and detector.

7.3.3 Demonstrate stable and repeatable measurement of a NIST-certified standard reference material, at any pre-set sample temperatures from room to 1100 ºC (±1.0 K) in vacuum or inert gas environment, as appropriate.

7.3.4 Rework if necessary for compliance.

8. On-Site Training

8.1 On-site (CANMET-MTL Facility, Hamilton, ON) training must include system operation, hardware maintenance procedures, software usage, safety training, procedure for maintenance, system calibration and trouble shooting of the system for up to a maximum of three (3) users in English. The contractor must make available and arrange for training in French, if requested.

8.2 The laser flash thermal diffusivity measurement system must be provided with basic training by an expert in thermal transport properties measurements.

9. Manuals & Equipment Drawings

9.1 The Contractor must provide NRCan one (1) hard copy and one (1) electronic copy in MS Word and PDF format of the manuals which must include, but not limited to:

- Installation and startup manuals
- Calibration Procedure and certifications
- User Manuals including electrical, hydraulic and pneumatic schematics
- OEM certifications
- Maintenance, Troubleshooting & Parts manual
- Procedure to place the system into a safe and reliable shutdown state
- Emergency procedures

9.2 Manuals must be provided to NRCan in English language.

9.3 The Contractor must provide NRCan electronic copies in PDF format of the system schematics, layouts, and equipment detail drawings.

10. Warranty, Service, Support & Updates

10.1 The Contractor must provide a second year parts and labour warranty on the entire equipment. Warranty will begin one year after the equipment is accepted as fully tested and operational to the satisfaction of NRCan at CANMET-MTL.

10.2 The Contractor must provide a 2-year service warranty on the equipment. Warranty will begin on the day that the site acceptance testing has been approved at CANMET-MTL. The service warranty requires the contractor to provide calibration services at 6 month intervals over the first 2 years following installation acceptance.

10.3 The Contractor must include technical support as either: regional technical support; technical phone support; or support via the Internet. Communication must begin within 72 hours of the initial request for support.

10.4 The laser flash thermal diffusivity measurement system must have spare parts and service support available for a minimum of five (5) years after purchase.

10.5 The Contractor must provide all software updates and new releases to Canada for a period of at least one (1) year following 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. Acceptance Test Requirements

The equipment as supplied and installed must pass all tests and checks as specified in Annex C, Acceptance Test Plan.

12. Mandatory Equipment Requirements

Note: *Text in italics is for evaluation purposes only and will not be included in Annex A the Contract*.

Item No.	Requirement	*Page no. in Bidder's proposal*
A1 - Equipment Certifications		
A1-1	The equipment must be CSA, ESA, or ULC approved with visible markings upon delivery.	
A1-2	The design of equipment must comply with the guidelines for Control of Hazardous Energy - Lockout and Other Methods CSA Z460.	
A1-3	The design of equipment must comply with the guidelines for "Safeguarding of Machinery", CSA Z432.	
A1-4	The design of equipment must follow the "American National Standard for Safe Use of Lasers": ANSI Z136.1-2007.	
A1-5	The equipment must meet the requirements of the Province of Ontario Occupational Health and Safety Regulations for Industrial Establishments, section 7: Pre-Start Health and Safety Review. It will be the responsibility of the Contractor to make any modifications necessary to meet the section 7 requirements.	
A1-6	The equipment's electromagnetic interference must comply with Industry Canada EMI verification requirements, ICES-001: Industrial, Scientific and Medical (ISM) Radio Frequency Generators.	
A2 - General Design Requirements (age, size, weight, safety)		
A2-1	The laster flash thermal diffusivity system's footprint must be less than 3 m (width) x 1 m (depth).	
A2-2	Each piece, as delivered, must conform to the building constraints, Annex D, CANMET-MTL Building Information.	
A2-3	Laser Flash Thermal Diffusivity Measurement Instrument must measure the thermal diffusivity of a solid material in vacuum or inert atmosphere, from room temperature up to 1100 ^{o}C maximum temperature, with a tolerance up to ±1.0 K.	
A2-4	The volume enclosed by the furnace must be no less than 2 litres.	
A2-5	The laser beam path must be enclosed and interlocked, following ANSI Z136.1-2007.	
A2-6	The operator must be able to operate the instrument without any special laser safety training.	

A2-7	The Contractor must supply a vacuum pump system to achieve a base pressure of 0.01 mbar or better and evacuation of the vacuum container. The vacuum pump package must include dust separator, oil mist eliminator and suitable traps for the protection of the vacuum pump and the vacuum chamber.	
A2-8	The Contractor must supply a refrigerated bath circulator with a cooling capacity of 680W or greater, and a heating capacity of 2000W or greater. This unit must be able to maintain a temperature stability to better than ±0.02 K. This unit, either by itself or through a transformer, must be able to operate under an electrical supply of 110V/60Hz or 208V/60Hz.	
A2-9	Equipment must have a safety interlock flow switch to prevent the system operation without cooling present.	
A3 - Facility Integration (Environment, Connection to services)		
A3-1	The equipment must be able to operate indoors, within a research facility, where the ambient humidity may vary from 10% to 80% (non-condensing) and where the ambient temperature may vary from 10 °C to 35 °C.	
A3-2	Electrical requirements: 600 V, 3 phases, 60 Hz; 208 V; 110V or combinations of these voltages. Uninterruptable Power Supply (UPS) and power line noise filters (line conditioners) must be present for all computers and electronic equipment.	
A3-3	Cooling water service available: Should any components require cooling, the Contractor must provide an adequately sized heat exchanger to ensure that the equipment cannot contaminate the building cooling system. See Section 13, Mandatory Heat Exchanger and Chiller requirements.	
A3-4	The laser flash thermal diffusivity measurement equipment must include a filter, regulator and lubricator capable to handle dry compressed air at 0.76 MPa (110 psi).	
A3-5	Plumbing requirements: The plumbing accessories must be provided by the Contractor. CANMET-MTL will provide piping and water drops. Compressed air piping: must be compatible with ASTM B-88, type "K", hard drawn, seamless copper tubing and locally mounted flexible tubing. Cooling piping: must be compatible with ASTM B-88 type "L" hard copper and locally mounted flexible tubing.	
A3-6	The electric motors and transformers included in the system design must meet NEMA Premium efficiency standards.	
A4 - Equipment Functional & Technical Requirements		
A4-1	The measurement method must conform to ASTM E-1461, DIN EN 821, DIN 30905	
A4-2	The laser flash thermal diffusivity measurement instrument must be able to measure thermal diffusivity from room temperature to 1100°C within one instrument.	
A4-3	Furnace requirements: 1. A high-temperature furnace for measurements between room temperature and 1100°C must be available. 2. The furnace must be moved by a motorized hoist to allow unobstructed access to the sample holder.	

	3. The furnace must be user-exchangeable to accommodate future application or modification. The furnace swap must be easily carried out, within a short time (less than one day by a trained operator). Any special tools or accessories necessary for this exchange must be provided.	
A4-4	The instrument must have the capability to measure thermal diffusivities over the range of 0.01 mm2/s to 1000 mm2/s with accuracy better than 3% between room temperature and 1100°C.	
A4-5	The instrument must have the capability to measure the specific heat of solids with an accuracy of better than ±6%. The system must be equipped with special detector units to obtain reliable results (accuracy of better than ±6%) for specific heat determination above 500°C. The detector system must have an orifice system with defined orifice positions. The orifice diameters must be considered at Cp calculation (ratio method).	
A4-6	The instrument must have a vertical set up with a laser system arranged on the bottom, the sample in the centre and the detector on top.	
A4-7	The furnace must be capable of maintaining the sample temperature to better than 1.0 K at any given pre-set temperature between room temperature and 1100°C.	
A4-8	The sample temperature must be measured using a platinum-rhodium (type-S) or nickel-chrome/ nickel (type-K) thermocouple depending on the sample temperature and atmosphere.	
A4-9	The temperature equilibrium must be determined not only from the sample temperature signal but also from the stability of the detector signal.	
A4-10	A temperature calibration routine for the sample temperature measurement must be available for at least one of the following NIST (National Institute of Standards and Technology) certified reference materials: Sn, Pb, Zn, Al, Cu, Alumel, pure nickel, electrolytic iron. The operator must have the option to perform the calibration at any time. The Contractor must provide the necessary NIST certified sample material for the calibration routine.	
A4-11	The inside of the furnace (test chamber) must be made of fused silica.	
A4-12	The furnace (test chamber) must not include any exposed insulation material that will crumble and release powder material.	
A4-13	The system must be vacuum-tight by design, with a leak rate no more than 10-7 mbar l/s.	
A4-14	The instrument must be able to measure samples under oxidizing, reducing and inert atmospheres as well as under vacuum.	
A4-15	The instrument must be prepared for connection with pump system to carry out measurements under a vacuum of 0.01 mbar or better.	
A4-16	The instrument must ensure that no compressed air will be required for actuator control (no pneumatic control) of filters and apertures.	
A4-17	The alignment of laser beam path, optics, and sample must be software-controlled.	
A4-18	The equipment must employ a separate "pilot" laser for alignment of the optical path.	
A4-19	The system must be equipped with liquid nitrogen cooled MCT- and InSb-detectors with a dewar capable of supplying liquid nitrogen for 8h or 24h.	
A4-20	Iris must not be used for reducing energy towards the detector.	
A4-21	Mirrors must not be used on the detector side.	

A4-22	The detectors (and the furnaces) of the system must be user-exchangeable to accommodate future application.	
A4-23	The laser must be a neodymium: glass system.	
A4-24	The laser system must conform to class 1.	
A4-25	The laser head must be mounted in the measurement part and completely shielded.	
A4-26	The laser system, in combination with filter(s), must be able to deliver a pulse with an integrated energy that can be varied between 0.6 to 18 J/pulse.	
A4-27	The laser must be built into the instrument. An external optical fiber delivery will not be accepted.	
A4-28	Additional laser energy reduction by filter (for e.g., thin films) must be implemented. The filter must be motorized and software controlled.	
A4-29	The instrument must have an automated and motorized enlargement optics for laser spot adjustment.	
A4-30	The energy of the laser pulse illuminating the sample must be software-controlled.	
A4-31	The difference in integrated energy between two laser pulses must be less than 10%.	
A4-32	The system must be equipped with a pulse mapping device to measure the actual pulse shape for each individual laser pulse.	
A4-33	The detectors must be accompanied with a preamplifier and main amplifier.	
A4-34	The sample thermocouple must include a protection disk or sleeve.	
A4-35	The distance between sample and thermocouple must be no more than 7 mm from the sample.	
A4-36	The system must be equipped with an automatic sample changer (ASC) for loading of up to three samples, each up to 12.7 mm in diameter (±0.3mm), into the vacuum chamber at the same time. The system must be able to rotate each sample into place and make the desired measurements for each sample automatically, as programmed.	
A4-37	The system must allow measurement on disc samples with diameters between 6 mm and 25.4 mm (±0.3mm), or square samples whose side is between 6 mm and 25.4 mm (±0.3mm). Sample holders for samples with other dimensions must be available on request.	
A4-38	One aluminum titanate or silicon carbide sample holders for the measurement of round and square samples must be included in the system.	
A4-39	The laser pulse must be capable of illuminating both a disc-shaped and a square area.	
A4-40	The system must allow measurements on samples with thickness between 0.1 mm and 6 mm (±1%).	
A4-41	The sample holders must be made of optically dense materials, e.g. SiC and Al2TiO5. The optical transmission at 1054 nm through these materials must converge to zero. The sample holders must not be made of alumina.	
A4-42	These special sample holders must be available for purchase separately: sample holders designed for molten polymers, liquids with viscosity from 0.2 to 1010 mPa-s, pastes, powders, laminates and fibers as well as for	

	measurements in-plate direction (in-plane), and for tests under mechanical pressure.	
A4-43	Liquid sample holder: When filled, no parts of the sample holder must be able to move. The above must be true over the entire temperature range (room temperature to 1100 ºC).	
A4-44	An in-plane sample holder and a corresponding calculation model for measurement of thin samples without limitations regarding thickness must be available.	
A4-45	A sample holder for samples which shrink or crumble upon heating must be available for measurements up to 900°C.	
A4-46	The data acquisition system must allow a minimum 10,000 measurement points for the detector signal.	
A4-47	An independent beam mapping system for beam characterization must be included. At least 1000 data points sampling the pulse shape must be recorded.	
A4-48	For the detector channel the data acquisition system must allow acquisition rates of 500 kHz (0.002 ms) or better.	
A4-49	Two independent data acquisition systems must be built-in for both detector and beam mapping channels.	
A4-50	The minimum measurement time must be shorter than 100 ms. The maximum measurement time must be greater than 10 s.	
A4-51	The system must have these safety features: • Furnace power failure interlock; • Over temperature interlock; • Activation of laser interlock; • Full encapsulation of the laser beam connected with an interlock system; • Confirmation that the system is laser class I, with no special training requirements or precautions for the laboratory or the operator • Safety switch for detector and furnace position; • Recognition of low liquid nitrogen level in detector.	
	A5 - Software and Computer Requirements	
A5-1	The Contractor must supply software that is able to record the following faults: • furnace power failure; • over temperature signals; • activation of laser interlock(s). • control set point errors. The software must not require a license or annual renewal.	
A5-2	The software must allow manual or fully automatic adjustment of measurement times and amplification.	
A5-3	The software must allow operation of the instrument in a fully automatic or manual mode.	
A5-4	All software features must be available for use without requiring additional software options or add-ons.	
A5-5	• The measurement software must operate in an IBM compatible PC operating under Windows 7;	

	• The software must provide the user the ability to plot, analyze and process data; • The computer used for data acquisition must have a USB connection for retrieval of data.	
A5-6	The software drivers must be available in 32-bit and 64-bit versions.	
A5-7	The software must be compatible to any standard data transfer protocols such as Ethernet or a USB connection.	
A5-8	The software must include at least three (3) baseline corrections. It must be possible to modify and change the baseline correction in subsequent analysis.	
A5-9	The analysis software must include a minimum of 15 different models for evaluation of the measured signals. Each model must have the ability to be combined with three different baseline corrections and with or without pulse correction.	
A5-10	The software must contain mathematical models for heat loss correction of the sample in both the rise portion of the experimental data and the trailing readings.	
A5-11	The software must have a model wizard for recommendation of the ideal model.	
A5-12	The software must have the capability of correcting the experimental data for the finite pulse width of the laser and radial and facial heat loss simultaneously, based on a non-linear regression routine and a heat diffusion model.	
A5-13	The software must have the Cape-Lehman model to correct the experimental data for finite pulse width and heat loss.	
A5-14	The software must contain mathematical models for two- and three-layer samples as well as contact resistance calculation on the basis of a non-linear regression routine including heat loss and finite pulse correction.	
A5-15	The software must contain mathematical models for measurements the in-plane direction.	
A5-16	The software must have the ability to calculate the thermal conductivity using measured thermal diffusivity data along with user inputs of specific heat, linear thermal expansion and bulk density.	
A5-17	The software must allow determination of the specific heat on the basis of a comparative method. For calculation of the heat capacity (Cp), the pulse must be integrated over the time period to measure the real pulse energy input.	
A5-18	The software must allow data to be exported in ASCII format and graphical formats including at least one of the following: tif, jpg or bmp.	
A5-19	All information (data files for individual samples at various temperatures) pertaining to a test must be kept in a database of the computer controlling the laser flash, in such a way to allow simultaneous loading of multiple measurements from that database in a single step.	
	A6 - Accessories	
A6-1	The Contractor must supply a kit of reference samples consisting of at least the following material: Pyroceram 9606, Inconel 600, Stainless Steel 310, Pure Iron.	

13. Mandatory Heat Exchanger and Chiller Requirements

Item No.	Requirement	*Page no. in Bidder's proposal*
	A1 - Equipment Certifications	
A1-1	The heat exchanger and chiller must be CSA, ESA or ULC approved with visible markings.	
A1-2	The design of heat exchanger and chiller must follow the guidelines for Control of Hazardous Energy - Lockout and Other Methods CSA Z460.	
A1-3	The Heat Exchanger and Chiller Performance Standards for Rating Packaged Water Chillers must meet CSA C743.	
A1-4	The Heat Exchanger and Chiller must be in compliance with Heating and Cooling Equipment, CSA-C22.2 # 236-05.	
A1-5	All plumbing works must follow the National Plumbing Code of Canada.	
	A2 - Facility Integration (Environment, Connection to services)	
A2-1	The heat exchanger and chiller must be able to operate indoors, within a research facility, where humidity may vary from 0 to 80% (non-condensing).	
A2-2	The heat exchanger and chiller must be able to operate under the following electrical requirements: 600 V, 3 phase, 60 Hz; 208 V; 110V or combinations of these voltages.	
A2-3	Electrical Connections: NEMA plug or hard-wired	
A2-4	Acoustic noise level must be no more than 87dba at 1.0m (3.3') from the instrument, or acoustical barrier will be required.	
	A3 - Equipment Functional & Technical Requirements	
A3-1	The heat exchanger and chiller must meet the following data output requirements: Temperature and flow display, min/max. alarms switches;	
A3-2	The heat exchanger and chiller supply and return process pressure gauges must be included and functional.	
A3-3	The heat exchanger and chiller low supply water pressure switch must be included and functional.	
A3-4	The heat exchanger and chiller pressure relief valve must be included and functional.	

14. Regulations, Guidelines, and Standards

The Contractor must comply with the following Regulations, Guidelines and Standards throughout the term of the Contract:

Government of Canada

- Canada Labour Code Part II: Occupational Health and Safety
- Canada Occupational Health and Safety Regulations
- National Building Code
- National Fire Code
- National Plumbing Code

- Treasury Board of Canada Directives, Guidelines, Policies and Procedures
- Canadian Environmental Protection Act
- Controlled Goods Act (may be applicable)

Province of Ontario

- Occupational Health and Safety Act
- Ontario's 2012 OH&S Act and Regulations
- Guidelines for Pre-start Health and Safety Reviews, Annex II (Recognized Standards) (Ontario Ministry of Labour, April 2001)
- Ontario Building Code (current edition)
- Technical Standards and Safety Act (including applicable standards referenced within)
- Ontario Fire Code (current edition)
- Ontario Plumbing Code
- Environmental Protection Act
- Ontario Electrical Safety Code 25th edition

Industry Canada

ICES-001: Industrial, Scientific and Medical (ISM) Radio Frequency Generators

Safety Standards

ANSI

- ANSI/ASSE Z244.1-2003: Control of Hazardous Energy - Lockout/Tagout and Alternative Methods (Note: CSA Z460-05 prevails)
- ANSI Z136.1-2007: Safe Use of Lasers

ASTM
ASTM E1461-11: Standard Test Method for Thermal Diffusivity by the Flash Method;

DIN

- DIN EN 821: Advanced Technical Ceramics - Monolithic Ceramics;
- DIN 30905: NanoFlash test method

CSA

- Z432: Safeguarding of Machinery
- Z107.58: Noise Emission Declarations for Machinery
- CAN/CSA-Z431: Basic and Safety Principles for Man-Machine Interface, Marking, and Identification
- Z460: Control of Hazardous Energy - Lockout and Other Methods
- CSA C743: Performace Standards for Rating Packaged Water Chillers
- CSA C22.2 #236-05: Heating and Cooling Equipment

NFPA

79: Electrical Standard for Industrial Equipment

15. Location

Natural Resources Canada
CANMETMaterials
183 Longwood Road South
Hamilton, ON L8P 0A5

ANNEX B
BASIS OF PAYMENT

Prices are firm, all inclusive in Canadian dollars, FOB destination. Transportation charges, customs duties and Excise taxes are included, and Goods and Services Tax or Harmonized Sales Tax is extra, if applicable.

Item	Requirement	Firm Lot Price
1.	Supply, delivery, installation of: - Laser Flash Thermal Diffusivity Measurement Instrument - Manuals and equipment drawings - Second year parts and labour warranty - 2-year service warranty - Commissioning - Calibration - On-Site Training in accordance with all the Specifications in Annex A, Requirement.	$ _____
	Make and model number: _____	

ANNEX C
ACCEPTANCE TEST PLAN

See attached document

ANNEX D
CANMET-MTL BUILDING INFORMATION

1. Loading Dock Limits:

The pinch point for truck unloading directly from their box or flat bed is the inner door and dock leveller: Overhead door 2.3m wide x 3.0m high

- Dock floor is 1.2m below finish floor of the ground floor level
- Dock leveller 20 Ton capacity with platform 2.1m wide x 2.1m long + drop down lip 2.14m wide x 2.22m Deep. Hydraulic leveller range is +/- 0.3m

The door at the top of the ramp is 2.3m wide x 3m high.

2. Elevator Limits:

Passenger Elevator:

- Load Limit: 1590 kg (3500 lb)
- Door Opening: width of 1070 mm (42") and a height of 2134 mm (84")
- Interior Dimensions: 2030 mm (6'8") wide by 1650 mm (5'5") deep by height to suspended ceiling of 2290 mm (7'6").

Freight Elevator:

- Load Limit: 4545 kg (10000 lb)
- Door Opening: width of 2440 mm (8'0") and a height of 2440 mm (8'0")
- Interior Dimensions: 2440 mm (8'0") wide X 4290 mm (14'1") deep X height of 3050 mm (10'0").

3. Pallet Truck

Pallet truck Limit: 2492 kg (5500 lb)

ANNEX E
TABLE AND NOTICE OF DESIGNATED AND/OR HAZARDOUS SUBSTANCES ON PROJECT

See attached document

ANNEX C
ACCEPTANCE TEST PLAN
LASER FLASH THERMAL DIFFUSIVITY MEASUREMENT INSTRUMENT

Note: *The Acceptance test Plan will be completed during the testing procedures on location at CANMET-MTL. It has been included for information purposes only.*

1. Introduction

This document outlines the methods and testing procedures for all acceptance testing for the Laser Flash Thermal Diffusivity Measurement Tool. In order for acceptance testing to be completed successfully, the Contractor must perform all tests to successful completion in the presence of a CANMET-MTL Technical representative. Each test has two possible outcomes: pass or fail.

The equipment must perform measurements of thermal diffusivity and heat capacity samples between room temperature and 1100 °C.

2. Test Team Personnel

The test team consists of one Contractor tester and one primary CANMET-MTL witness who have the authority to sign off tests and two CANMET-MTL Secondary Witness who can observe the tests and input their observations to the primary witness.

Name	Role	Organization
	Primary Operator	
	Secondary Operator	
	Primary Witness	CANMET-MTL
	Secondary Witness	CANMET-MTL
	Secondary Witness	CANMET-MTL

2.1 CANMET-MTL Representatives

Name	Organization/Branch	Role
	Relocation Program Logistics	Manager
	HEALTH & SAFETY	Manager

2.2 Contractor Representatives

Name	Organization	Role

2.3 Sign-off

By signing this document, each party agrees to the terms and protocols in the Acceptance Test Plan.

	Contractor	Organization
Signature		
Name		CANMET-MTL
Title		Technical Authority
Date		

3. Deliverables

3.1 Hardware

The following hardware items must be delivered to CANMET MATERIALS fully inspected and functional.

Quantity	Deliverable	Pass / Fail	Model/Part #
1	Laser flash thermal diffusivity measurement instrument		

3.2 Software

The following software items must be delivered to CANMET MATERIALS fully inspected and functional.

Quantity	Deliverable	Pass / Fail	Product/Part #
1	Software for data recording system with supervisory visualization system and control system		

4. Site acceptance Test Plan

4.1 Site Acceptance Test (SAT)

The SAT will be conducted at the CANMET-MTL site in Hamilton, ON after installation and commissioning has been completed.

4.2 Equipment Certifications

Mandatory Equipment Requirements	Test Description	Details	SAT
1.1	CSA/electrical approval		
1.2	CSA Z460 LOTO compliance		
1.3	Laser Safety ANSI Z136.1-2007 compliance		
1.4	Industry Canada EMI ICES-001 compliance		
1.5	Compliance to ASTM E-1461, DIN EN 821, DIN 30905		
1.6	PreStart up Health and Safety Review (PSHSR)		

4.3 System Testing – General Requirements

Mandatory Specifications	Test Description	Details	SAT
2.1	Verify that the motorized hoist works		
2.2	Verify that the vent and refill steps work and are completed within 30 minutes.		
2.3	Verify that the base pressure of 0.01 mBar or better can be achieved.		
2.4	Confirm Laser is class 1	Visible label	

4.4 Facilities integration

Mandatory Specifications	Test Description	Details	SAT
3.1	Equipment must be able to operate within these electrical requirements: 600V, 3 phase, 60Hz, 208V, 110V or combination of these voltages.		
3.2	If there are utility failures, the product must shutdown without any hazard to the operators, facilities, or itself.		

3.3	The equipment must include a filter, regulator and lubricator capable of handling dry compressed air at 0.76 MPa.		
3.4	There must not be any leaks in the plumbing and fittings supplied by the Contractor.		

4.5 Functional Testing

Mandatory Specifications	Test Description	Details	SAT
4.1	Equipment must be able to achieve a base pressure of 0.01 mBar or better.		
4.2	Equipment must be able to achieve sample temperature anywhere between room temperature and 1100 °C.	Each sample temperature must be stabilized to within ±1.0K , within 15 minutes.	
4.3	Instrument must be able to measure samples under inert gas or vacuum	Must demonstrate temperature stabilization under both environments.	
4.4	Software-controlled laser alignment procedure must achieve desired alignment such that the focused laser beam spot is within 3mm of the centre of the sample.		
4.5	Software must control the integrated energy of the laser pulse.		
4.6	MCT and InSb detectors must conform to calibration		
4.7	Laser beam mapping of both round and square beam must be achieved.		
4.8	Perform a test using the automatic sample changer for measurement of one NIST-certified sample that must have thermal diffusivity between 0.01 and 0.1 mm^2/s	Measure both thermal diffusivity and heat capacity. Measured data must match NIST data of the same material within 10%	
4.9	Perform a test using the automatic sample changer for measurement	Measure both thermal diffusivity and heat	

	of one NIST-certified sample that must have thermal diffusivity between 3 and 30 mm^2/s	capacity. Measured data must match NIST data of the same material within 10%	
4.10	Perform a test using the automatic sample changer for measurement of one NIST-certified sample that must have thermal diffusivity between 100 and 1000 mm^2/s	Measure both thermal diffusivity and heat capacity. Measured data must match NIST data of the same material within 10%	
4.11	Demonstrate that mathematical models for pulse width/shape correction on the three previous samples.	Software must return model results within a reasonable time and not crash.	
4.12	Must demonstrate ability to export data into ASCII format.	Software export option and working USB port.	

4.6 Calibration

The Contractor must provide calibration and certification of calibration of the equipment as installed at CANMET-MTL's lab. All calibrations must be provided by an accredited calibration service provider, which is accredited to ISO/IEC 17025-2005.

The measurements must be traceable to the International System of Units (SI).

As a result of the calibration, the Contractor must include with the calibration report, the evidence of Accreditation by a recognized Accrediting Body, and the Scope of Accreditation for all artefacts and standards used in the calibration.

#	Test Description	Details	SAT
1	Calibration plan		
2	Calibration report		
3	Evidence of Accreditation		

4.7 Safety Testing

All instrumentation installed in the lab must conform to the Province of Ontario Occupational Health and Safety Regulations for Industrial Establishments, section 7: Pre-Start Health and Safety Review. The CANMET MATERIALS Health & Safety department requires all automation, and instrumentation to be certified with the CSA standard at time of delivery. This section will ensure that the system conforms to these standards. All safety tests must be passed without exception by the Primary Operator indentified in Section 2, Test Team Personnel. No deficiencies will be accepted for this section.

#	Test Description	Details	SAT
1	CSA/electrical approval		

2	PreStart up Health and Safety Review (PSHSR)		
3	Must demonstrate functioning interlocks: 3.1 Furnace power failure interlock; 3.2 Over temperature interlock; 3.3 Activation of laser interlock; 3.4 Full encapsulation of the laser beam connected with a sophisticated interlock system. Guarantee that the system is laser class 1, with no special requirements or precautions are required for the laboratory or the operator; 3.5 Safety switch for detector and furnace position; 3.6 Recognition of low liquid nitrogen level in detector.		

4.9 Deficiencies

#	Test # / Sequence	Description	Comments

4.10 Action Plan

Deficiency	Action Plan

4.11 Final Sign-off

SAT

The SAT for CANMET-MTL system LASER FLASH was

OUTCOME

Tested by:	Date:	Witnessed by:	Date:
Contractor Representative		Staff	
Contractor		**CANMET-MTL**	

ANNEX D
CANMET-MTL BUILDING INFORMATION

1. Loading Dock Limits:

The pinch point for truck unloading directly from their box or flat bed is the inner door and dock leveller:
Overhead door 2.3m wide x 3.0m high

- Dock floor is 1.2m below finish floor of the ground floor level
- Dock leveller 20 Ton capacity with platform 2.1m wide x 2.1m long + drop down lip 2.14m wide x 2.22m Deep. Hydraulic leveller range is +/- 0.3m

The door at the top of the ramp is 2.3m wide x 3m high.

2. Elevator Limits:

Passenger Elevator:

- Load Limit: 1590 kg (3500 lb)
- Door Opening: width of 1070 mm (42") and a height of 2134 mm (84")
- Interior Dimensions: 2030 mm (6'8") wide by 1650 mm (5'5") deep by height to suspended ceiling of 2290 mm (7'6").

Freight Elevator:

- Load Limit: 4545 kg (10000 lb)
- Door Opening: width of 2440 mm (8'0") and a height of 2440 mm (8'0")
- Interior Dimensions: 2440 mm (8'0") wide X 4290 mm (14'1") deep X height of 3050 mm (10'0").

3. Pallet Truck

Pallet truck Limit: 2492 kg (5500 lb

ANNEX E
TABLE AND NOTICE OF DESIGNATED AND/OR HAZARDOUS SUBSTANCES ON PROJECT

Instructions to Contractors/Bidders: Please complete the following sections of this form, and return a signed and dated copy with your bid. Failure to do so will result in your bid being deemed non-responsive.

Notice of Designated and/or Hazardous Substances on Project
Project
Project Address
Project No.
Contract Authority
Project Manager

Notice to Contractors / Bidders: In accordance with applicable occupational health and safety, and/or environmental protection statutes, be advised that **no designated substances are present in the work area**.

We, _____ (name of Contractor/Bidder) hereby acknowledge having received this "Notice of Designated or Hazardous Substances on Project."	
Signed for the Contractor / Bid Date:	
Name (Please Print):	**Title:**
Contractors/Bidders Certification: In accordance with applicable occupational health and safety, and/or environmental protection statutes, the bidder below certifies that no designated substances will be brought onto the CanmetMATERIALS facility.	
We, _____ (name of Contractor/Bidder) hereby acknowledge having received this "Notice of Designated or Hazardous Substances on Project."	
Signed for the Contractor / Bid Date:	
Name (Please Print):	**Title:**