

**RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:**

**Bid Receiving - PWGSC / Réception des
soumissions - TPSGC**

1550 D'Estimauville Avenue
1550, Avenue d'Estimauville
Québec
Québec
G1J 0C7

FAX pour soumissions: (418) 648-2209

**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

Title - Sujet Electrochemical Systems (2)	
Solicitation No. - N° de l'invitation 31206-140492/A	Date 2014-10-01
Client Reference No. - N° de référence du client 31206-140492	
GETS Reference No. - N° de référence de SEAG PW-\$BAL-001-16122	
File No. - N° de dossier BAP-4-37157 (001)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2014-11-13	Time Zone Fuseau horaire Heure Normale du l'Est HNE
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Tremblay, Marial	Buyer Id - Id de l'acheteur bal001
Telephone No. - N° de téléphone (418) 677-4000 (4159)	FAX No. - N° de FAX () -
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: Conseil national de recherches Canada (CNRC) Site Saguenay National Research Council Canada (NRC) 501, boulevard de l'Université est Saguenay (Québec) G7H 8C3	

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

TPSGC/PWGSC
BFC Bagotville, CP 380
CFB Bagotville, PO Box 380
Bâtiment 62, local 112
Building 62, Room 112
Alouette
Québec
G0V1A0

Delivery Required - Livraison exigée See Herein	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

2 ELECTROCHEMICAL SYSTEMS

NATIONAL RESEARCH COUNCIL CANADA (NRC) SAGUENAY SITE

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PART 1 - GENERAL INFORMATION

1.1 Requirement

The requirement is detailed under Article 6.1 of the resulting contract clauses.

1.2 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.

PART 2 - BIDDER INSTRUCTIONS

2.1 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 (2014-09-25) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

2.2 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.

Your proposal can be transmitted by fax to # 418-648-2209 or by mail to the following address:

→ Bid Receiving Unit
Public Works and Government Services Canada (PWGSC)
1550 D'Estimauville Avenue
Quebec City, Quebec, Canada, G1J 0C7

2.3 Enquiries - Bid Solicitation

All enquiries must be submitted 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.

2.4 Applicable Laws

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in the province of Quebec.

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

3.1 Bid Preparation Instructions

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

Section I: Technical Bid (1 hard copy)

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 corresponding 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 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.

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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.

Exchange Rate Fluctuation

SACC Manual Clause C3010T (2013-11-06) Exchange Rate Fluctuation.

Section III: Certifications

Bidders must submit the certifications required under Part 5.

PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

4.1 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.

4.1.1 Technical Evaluation

4.1.1.1 Mandatory Technical Criteria

The bid must meet the mandatory technical criteria specified below. Bidders must provide the necessary documentation to support compliance with this requirement.

Bids which fail to meet the mandatory technical criteria will be declared non-responsive. Each mandatory technical criterion should be addressed separately.

Mandatory Technical Criteria

Although bidders must propose products meeting all technical specifications outlined in Annex "A"; at the bid closing date, bids will be evaluated on the preselected technical specifications hereafter.

- To demonstrate that your products meet all technical specifications outlined in Annex "A", Bidders must submit with their bid, a copy of complete specifications and descriptive literature (technical documents) of the products offered. The technical documents must be already existing standards documents. The technical documents must not be written specially drafted to this Request For Proposal.

Canada will evaluate only the documentation provided with a bidder's bid. Canada **will not evaluate** information such as references to Web site addresses where additional information can be found, or technical manuals or brochures not submitted with the bid.

Mandatory Technical Criteria		
In the last column of the following table, bidders should indicate where in their technical documents we can find information on the preselected technical specifications:		
Preselected Technical Specifications from Annex A		Pages and/or lines of bidder's technical documents
3.1	Each electrochemical system must:	
	a) be operable in potentiostat, galvanostat, ZRA, and FRA mode;	
	b) have a device that allows for sequential (or simultaneous) measurements on distinct electrochemical cells.	
3.2	The main housing of each of electrochemical system must have the minimum characteristics described in following sub-sections of Annex A:	
	a) sub-section 3.2.1 Amperage, Voltage	
	b) sub-section 3.2.2 Frequency, Exactitude	
	c) sub-section 3.2.3 Input Impedance and current.	
3.3	A system allowing for the taking of sequential (or simultaneous) electrochemical measurements in DC or AC mode on a minimum of eight (8) distinct (separate) electrochemical cells.	
3.5	The software suite provided with each of the electrochemical systems must provide access to the techniques described in following sub-sections of Annex A and allow for the analysis of results obtained using these techniques:	
	a) sub-section 3.5.1 Techniques in DC mode	
	b) sub-section 3.5.2 Techniques in mode AC (impedance)	
	c) sub-section 3.5.3 Voltamperometric and amperometric techniques	
	d) sub-section 3.5.4 Techniques for electrochemical noise	

4.1.2 Financial Evaluation

The total price of each bid will be established using the following criteria:

- (a) Bidders must submit firm prices, Canadian customs duties and excise taxes included, and Applicable Taxes excluded. 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) Bidders must submit their prices DDP destination; Delivered Duty Paid.

4.2 Basis of Selection - Mandatory Technical Criteria

A bid must comply with the requirements of the bid solicitation and meet all mandatory technical evaluation criteria to be declared responsive. The responsive bid with the lowest evaluated price (section B.1.1 of Annex "B" only) will be recommended for award of a contract.

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 the 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.

5.1 Mandatory Certifications Required Precedent to Contract Award

5.1.1 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.

5.1.2 Federal Contractors Program for Employment Equity - Bid Certification

By submitting a bid, the Bidder certifies that the Bidder, and any of the Bidder's members if the Bidder is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "FCP Limited Eligibility to Bid" list available from Human Resources and Skills Development Canada (HRSDC) - Labour's website.

Canada will have the right to declare a bid non-responsive if the Bidder, or any member of the Bidder if the Bidder is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list at the time of contract award.

PART 6 - RESULTING CONTRACT CLAUSES

Notice: Numbering will be revised at contract award

The following clauses and conditions apply to and form part of any contract resulting from the bid solicitation.

6.1 Requirement

The Contractor must supply two (2) electrochemical systems, in accordance with the requirement at Annex "A".

6.2 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.

6.2.1 General Conditions

2010A (2014-09-25), General Conditions - Goods (Medium Complexity), apply to and form part of the Contract.

6.2.2 Supplemental General Conditions

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

4003 (2010-08-16), Supplemental General Conditions - Licensed Software, apply to and form part of the Contract.

4004 (2013-04-25), Supplemental General Conditions - Maintenance and Support Services for Licensed Software, apply to and form part of the Contract.

6.2.2.1 Warranty Period

Section 14 of supplemental general conditions 4001 (2013-01-28) is amended by replacing the period of 12 months by 24 months.

All other provisions of the warranty section remain in effect.

6.3 Term of Contract

6.3.1 Delivery Period

All the deliverables except training must be received within a period ninety (90) calendar days after the contract is awarded.

6.4 Authorities

6.4.1 Contracting Authority

The Contracting Authority for the Contract is Marial Tremblay

Supply Specialist

Telephone: (418) 677-4000, Ext.: 4159

E-mail address: marial.tremblay@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.

6.4.2 Technical Authority

The Technical Authority for NRC is :

(to be completed at contract award by PWGSC)

Name:

Tel.:

Fax:

E-mail:

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 related to 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.

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6.4.3 Contractor's Representatives

Name and telephone number of the person responsible for :

(a) Contract Manager:

Name: _____
Title: _____
Telephone No.: _____
Facsimile No.: _____
E-mail Address: _____

(b) Delivery Follow up:

Name: _____
Title: _____
Telephone No.: _____
Facsimile No.: _____
E-mail Address: _____

6.5 Payment

6.5.1 Basis of Payment - Firm Unit and Lot Prices

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid the firm unit and lot prices, as specified in Annex " B " for a cost of \$_____ (to be completed at contract award by PWGSC). Customs duties are subject to exemption, 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.

6.5.2 SACC Manual Clauses

Number	Date	Title
C2000C	2007-11-30	Taxes - Foreign-based Contractor
C2602C	2008-05-12	Customs Duties Exempt (National Research Council of Canada)
H1001C	2008-05-12	Multiple Payments

6.6 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:

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

6.7 Certifications

6.7.1 Compliance

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 entire contract period. 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.

6.8 Applicable Laws

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in the province of Quebec.

6.9 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) 4001 (2013-01-28), Supplemental General Conditions - Hardware Purchase, Lease and Maintenance;
- (c) 4003 (2010-08-16), Supplemental General Conditions - Licensed Software;
- (d) 4004 (2013-04-25), Supplemental General Conditions - Maintenance and Support Services for Licensed Software;
- (e) 2010A (2014-09-25), General Conditions - Goods (Medium Complexity);
- (f) Annex "A" - Requirement;
- (g) Annex "B" - Basis of Payment; and
- (h) the Contractor's bid dated _____, as amended _____ (to be completed at contract award by PWGSC).

6.10 Electrical Equipment

All electrical equipment supplied under the Contract must be certified or approved for use in accordance with the Canadian Electrical Code, Part 1, before delivery or before the start-up, by a certification organization accredited by the Standards Council of Canada.

6.11 Shipping Instructions - Delivery at Destination

Goods must be consigned to the destination specified in the Contract and delivered Delivered Duty Paid (DDP) NRC-Saguenay, Chicoutimi, Quebec, Canada, Incoterms 2000 for shipments from a commercial contractor.

6.12 Intellectual Property Infringement and Royalties

1. The Contractor represents and warrants that, to the best of its knowledge, neither it nor Canada will infringe any third party's intellectual property rights in performing or using the Work, and that Canada will have no obligation to pay royalties of any kind to anyone in connection with the Work.
2. If anyone makes a claim against Canada or the Contractor concerning intellectual property infringement or royalties related to the Work, that Party agrees to notify the other Party in writing immediately. If anyone brings a claim against Canada, according to Department of Justice Act, R.S. 1985, c. J-2, the Attorney General of Canada must have the regulation and conduct of all litigation for or against Canada, but the Attorney General may request that the Contractor defend Canada against the claim. In either case, the Contractor agrees to participate fully in the defence and any settlement negotiations and to pay all costs, damages and legal costs incurred or payable as a result of the claim, including the amount of any settlement. Both Parties agree not to settle any claim unless the other Party first approves the settlement in writing.
3. The Contractor has no obligation regarding claims that were only made because:
 - (a) Canada modified the Work or part of the Work without the Contractor's consent or used the Work or part of the Work without following a requirement of the Contract; or
 - (b) Canada used the Work or part of the Work with a product that the Contractor did not supply under the Contract (unless that use is described in the Contract or the manufacturer's specifications); or
 - (c) the Contractor used equipment, drawings, specifications or other information supplied to the Contractor by Canada (or by someone authorized by Canada); or
 - (d) the Contractor used a specific item of equipment or software that it obtained because of specific instructions from the Contracting Authority; however, this exception only applies if the Contractor has included the following language in its own contract with the supplier of that equipment or software: "[Supplier name] acknowledges that the purchased items will be used by the Government of Canada. If a third party claims that equipment or software supplied under this contract infringes any intellectual property right, [supplier name], if requested to do so by either [Contractor name] or Canada, will defend both [Contractor name] and Canada against that claim at its own expense and will pay all costs, damages and legal fees payable as a result of that infringement." Obtaining this protection from the supplier is the Contractor's responsibility and, if the Contractor does not do so, it will be responsible to Canada for the claim.

-
4. If anyone claims that, as a result of the Work, the Contractor or Canada is infringing its intellectual property rights, the Contractor must immediately do one of the following:
- (a) take whatever steps are necessary to allow Canada to continue to use the allegedly infringing part of the Work; or
 - (b) modify or replace the Work to avoid intellectual property infringement, while ensuring that the Work continues to meet all the requirements of the Contract; or
 - (c) take back the Work and refund any part of the Contract Price that Canada has already paid.

If the Contractor determines that none of these alternatives can reasonably be achieved, or if the Contractor fails to take any of these steps within a reasonable amount of time, Canada may choose either to require the Contractor to do (c), or to take whatever steps are necessary to acquire the rights to use the allegedly infringing part(s) of the Work itself, in which case the Contractor must reimburse Canada for all the costs it incurs to do so.

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ANNEX " A " - REQUIREMENT

A.1 Annex "A"

Annex " A " attached hereto is to be inserted at this point and forms part of this document.

ANNEX " B " - BASIS OF PAYMENT

B.1 Pricing

Before submitting prices, please refer to clause **6.5 Payment**.

B.1.1 Electrochemical Systems and its Components

Please indicate the brand name and model offered and complete the last two columns of the following table:

Item	Description	Qty	Unit	Firm Price	Total Price
1	Electrochemical System <ul style="list-style-type: none"> • according to Mandatory Technical Specifications of Annex A. ➔ Brand Name Offered: _____ ➔ Model Offered: _____ 	2	Each	\$	\$
2	1.0 - 1.5 m. Cable <ul style="list-style-type: none"> • As per sub-section 3.2.4.A) of Annex A 	2	Each	\$	\$
3	Sequential Electrochemical Measurement Instrument (min. eight (8) / system) <ul style="list-style-type: none"> • As per sub-section 3.3.A) of Annex A 	2	Each	\$	\$
4	Set of 8 Cables for the sequential electrochemical measurements <ul style="list-style-type: none"> • As per sub-section 3.3.B) of Annex A 	2	Set	\$	\$

Item	Description	Qty	Unit	Firm Price	Total Price
5	Software Suite <ul style="list-style-type: none"> As per sub-section 3.5 of Annex A. 	2	Each	\$	\$
6	Documentation <ul style="list-style-type: none"> As per section 5. of Annex A. 	2	Each	\$	\$
7	Warranty Period of 2 Years <ul style="list-style-type: none"> As per clause <u>6.2.2.1 Warranty Period</u> of this document. 	2	Each	\$	\$
8	Electrical Equipment <ul style="list-style-type: none"> certified or approved under clause <u>6.10 Electrical Equipment</u> of this document. 	2	Each	\$	\$
9	Delivery Charges - Delivery at Destination <ul style="list-style-type: none"> goods delivered to NRC-Saguenay, Chicoutimi, Quebec, Canada; according to clause <u>6.11 Shipping Instructions - Delivery at Destination</u> of this document. 	1	lot	\$	\$
Total Value of the Contract:					\$

B.1.2 Optional goods

- (a) It is not mandatory to bid on the following optional goods.
- (b) Please note that we will not consider the prices of optional goods during the evaluation of bids.
- (c) If any optional goods have been tendered, bidders grant to Canada the irrevocable option to acquire these optional goods when issuing the contract.
- (d) Please complete the last two columns of the following table:

Item	Description	Qty	Unit	Firm Unit Price	Total Price
1	<p>A system with a minimum of four (4) additional differential electrometers for simultaneously recording the current distribution in a large cell ("battery" type multi-cells).</p> <ul style="list-style-type: none"> Including delivery charges as per clause 6.11. 	2	Each	\$	\$

ANNEX " C " - PRESENTATION OF YOUR BID

Below is a checklist of the contents of your bid. This list is not an exhaustive list, it remains the Bidder's responsibility to prepare its bid in accordance with the instructions contained in the Request For Proposal (RFP) and provide a comprehensible and sufficiently detailed bid, including all requested pricing details, that will permit a complete evaluation in accordance with the criteria set out in the RFP.

Page 1	Bidders should include with their bid, the first sheet of this RFP properly completed and signed. Refer to 2003 Standard Instructions mentioned in clause 2.1 Standard Instructions, Clauses and Conditions .
Page 5	Bidders must submit their bid only to the address indicated in clause 2.2 Submission of Bids .
Pages 9 and 10	Bids of Bidders must meet the mandatory technical criteria described in clause 4.1.1.1 Mandatory Technical Criteria . <p>➔ As required in clause 4.1.1.1, <u>join with your bid</u>, copy of complete specifications and descriptive literature (technical documents) of the products offered.</p>
Page 12	Bidders who are incorporated, including those bidding as a joint venture, must provide with their bid or promptly thereafter a complete list of names of all individuals who are currently directors of the Bidder. Refer to clause 5.1.1 Code of Conduct and Certifications - Related documentation .
Page 15	Bidders should submit with their bid, clause 6.4.3 Contractor's Representatives properly completed.
Pages 21 to 23	Bidders must include with their bid, Annex "B" - Basis of Payment duly completed.



Conseil national de recherches
Canada

National Research Council
Canada

Site Saguenay

Saguenay Site

Centre des technologies
de l'aluminium

Aluminium Technology
Centre

CNRC · NRC

Annex A

Requirement

Electrochemical Systems

Reference No.: R 710492

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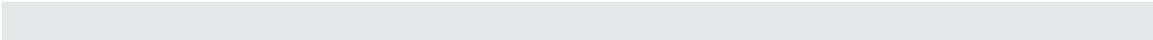
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1. OBJECTIVE

The Saguenay site of the National Research Council's (NRC) Aluminium Technology Centre (ATC) wants to acquire two (2) electrochemical systems that will be used for the following purposes:

- 1.1. Characterizing various materials' resistance to corrosion;
- 1.2. Characterizing the surface protection level obtained by organic coatings;
- 1.3. Studying, in a non-destructive way and through electrochemical channels, the degradation level of Al-Al joints assembled using structural adhesives;
- 1.4. Monitoring the continuous degradation of coatings and adhesive joints installed on vehicles.

2. DELIVRABLES

- 2.1. Two (2) electrochemical systems compliant with the technical specifications requested.

3. MANDATORY TECHNICAL SPECIFICATIONS

All technical specifications described below apply to each of the two (2) electrochemical systems.

Physical characteristics

- 3.1. Two (2) identical electrochemical systems are required. Each of the electrochemical systems must have the following characteristics:
 - 3.1.1. The system must be operable in potentiostat, galvanostat, ZRA, and FRA mode, and must have a device that allows for sequential (or simultaneous) measurements on distinct electrochemical cells.

Systems specification

- 3.2. The main housing of each of the systems must have the following minimum characteristics:
 - 3.2.1. A) system electrically isolated from its AC power source;
B) system that can be operated in potentiostat, galvanostat, ZRA, and FRA control mode;
C) possibility for measurement at 2, 3 or 4 electrodes;

- D) current of ± 3 A;
 - E) measured voltage resolution of $1 \mu\text{V}$ or lower;
 - F) measured current resolution of 100 aA or lower;
 - G) noise $< 10 \mu\text{V rms}$;
 - H) applied voltage of $\pm 15 \text{ V}$ or higher at a current of 3 A .
- 3.2.2. A) frequency analyzer with an analysis interval of $10 \mu\text{Hz}$ at 1 MHz ;
 B) with an exactitude (at high impedance) of $\pm 1\%$ at 10 mHz and of $\pm 10\%$ in the $100 \text{ mHz} - 1 \text{ MHz}$ interval (with V rms of 10 mV).
- 3.2.3. A) High-resolution electrometer with an input impedance of $> 10^{14} \Omega$;
 B) and an input current of $< 10 \text{ pA}$.
- 3.2.4. A) A cable measuring 1.0 to 1.5 m must be provided for the connection between the electrochemical system and the electrochemical cell on which the measurements will be taken.
- 3.3. A) An instrument allowing for the taking of sequential (or simultaneous) electrochemical measurements in DC or AC mode on a minimum of eight (8) distinct (separate) electrochemical cells must be provided with each of the electrochemical systems.
 B) A cable measuring 1.0 to 1.5 m must be provided for the connection to each of the electrochemical cells.

Specifications for the control software

- 3.4. A) It must be possible to control each of the electrochemical systems with a portable computer.
 B) It must be possible to use the same computer to control the two (2) systems. (Note: the control computers are not part of this invitation to tender).
- 3.5. A software suite must be provided with each of the electrochemical systems. The software suite must provide access to the following techniques and allow for the analysis of results obtained using these techniques:
- 3.5.1. Techniques in DC mode:
- A) corrosion potential measurement;
 - B) resistance to polarization;
 - C) Tafel curves;
 - D) potentiodynamic curves;
 - E) cyclic polarization;
 - F) galvanic corrosion;
 - G) potentiostatic measurements;
 - H) galvanostatic measurements;

l) galvanodynamic measurements.

3.5.2. Techniques in AC mode (impedance):

A) electrochemical impedance spectroscopy in potentiostatic, galvanostatic, hybrid, and single frequency mode.

3.5.3. Voltamperometric and amperometric techniques:

A) cyclic voltamperometry;

B) chronoamperometry;

C) chronopotentiometry;

D) chronocoulometry.

3.5.4. Electrochemical noise techniques:

A) acquisition in potentiostat, galvanostat, ZRA, or "biased" ZRA mode;

B) acquisition frequencies ranging from 0.1 to 100 Hz;

C) display of values for mean, RMS, standard deviation, variance, Skewness, Kurtosis, resistance parameters;

D) data analysis modes: PSD, FFT, statistical, analysis using histograms, data normalization, impedance spectra.

4. SECONDARY TECHNICAL SPECIFICATIONS

- 4.1. It must be possible to analyze the files of results obtained with the software suites (Gamry's Global Software) already used at NRC ATC to process electrochemical results.

5. DOCUMENTATION

- 5.1. Must provide the user manual, in print or electronic format, for each of the electrochemical systems, in French or in English, but preferably in the two (2) languages.

6. OTHER REQUIREMENTS

- 6.1. The contractor must provide the technical assistance service via telephone or Internet during the NRC-Saguenay's working hours (from Monday through Friday between 8 a.m. and 4:30 p.m.).

7. DELIVERY AND INSTALLATION

- 7.1. The two (2) electrochemical systems must be delivered to the following address:

National Research Council Canada
Saguenay Site
Aluminium Technology Centre
501 University Boulevard East
Saguenay, Quebec, Canada
G7H 8C3

- 7.2. The NRC's personnel must be able to install the electrochemical systems using the services of a licensed electrician near the NRC's Saguenay site.