Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:

Bid Receiving - PWGSC / Réception des soumissions - TPSGC
11 Laurier St. / 11, rue Laurier
Place du Portage, Phase III
Core 0B2 / Noyau 0B2
Gatineau, Québec K1A 0S5
Bid Fax: (819) 997-9776

REQUEST FOR PROPOSAL
DEMANDE DE PROPOSITION

Proposal To: Public Works and Government Services Canada

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

Proposition aux: Travaux Publics et Services Gouvernementaux Canada

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

Comments - Commentaires

Title - Sujet
Battery Manufacturing Line

Solicitation No. - N° de l'invitation	**Date**
31026-171557/A	2017-02-11

Client Reference No. - N° de référence du client
31026-171557

GETS Reference No. - N° de référence de SEAG
PW-$$HN-458-72439

File No. - N° de dossier	**CCC No./N° CCC - FMS No./N° VME**
hn458.31026-171557	

Solicitation Closes - L'invitation prend fin
at - à 02:00 PM
on - le 2017-03-27

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:	**Buyer Id - Id de l'acheteur**
Lee, Carlos	hn458

Telephone No. - N° de téléphone	**FAX No. - N° de FAX**
(819) 420-0336 ( )	(819) 953-4944

Destination - of Goods, Services, and Construction:
Destination - des biens, services et construction:
NATIONAL RESEARCH COUNCIL CANADA
75 BOUL.DE MORTAGNE
ÉDIFICE BOUCHERVILLE
BOUCHERVILLE
Quebec
J4B6Y4
Canada

Instructions: See Herein

Instructions: Voir aux présentes

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

Delivery Required - Livraison exigée	**Delivery Offered - Livraison proposée**
See Herein	

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**

Issuing Office - Bureau de distribution
Electrical & Electronics Products Division
11 Laurier St./11, rue Laurier
7B3, Place du Portage, Phase III
Gatineau, Québec K1A 0S5

Canada

Item Article	Description	Dest. Code Dest.	Inv. Code Fact.	Qty Qté	U. of I. U. de D.	Unit Price/Prix unitaire FOB/FAM Destination	Plant/Usine	Delivery Req. Livraison Req.	Del. Offered Liv. offerte
1	ELETRODE CELL CUTTING UNIT As detailed in Appendix A • • Part Number Offered:_____ • Name of Manufacturer:_____ • Delivery Date Offered:_____	31026	31026	1	EACH	$	XXXXXXXXXX	See Herein	
2	POUCH CELL ELECTROLYTE FILLING/DEG ASSING MACHINE As detailed in Appendix B • • Part Number Offered:_____ • Name of Manufacturer:_____ • Delivery Date Offered:_____	31026	31026	1	Each	$	XXXXXXXXXX	See Herein	
3	DOUBLE PLANETARY MIXER As detailed in Appendix C • • Part Number Offered:_____ • Name of Manufacturer:_____ • Delivery Date Offered:_____	31026	31026	1	Each	$	XXXXXXXXXX	See Herein	

Item Article	Description	Dest. Code Dest.	Inv. Code Fact.	Qty Qté	U. of I. U. de D.	Unit Price/Prix unitaire FOB/FAM Destination	Plant/Usine	Delivery Req. Livraison Req.	Del. Offered Liv. offerte
4	POUCH CELL SIDE SEALER / FORMING E QUIPMENT As detailed in Appendix D • Pouch Side Sealer Equipment Unit Price: $_____ • Part Number Offered:_____ • Name of Manufacturer:_____ • Pouch Forming Equipment Unit Price: $_____ • Part Number Offered:_____ • Name of Manufacturer:_____ • Total cost of Pouch Side Sealer and Pouch Forming Equipment: • $_____ • Optional Item (Not Factored in the Evaluation) Integrated device to the pouch forming machine to allow the cutting of the pouch sheet from roll, either before, during or after cup forming, to separate blank from continuous web. • Unit Price for Optional Item: $_____ •	31026	31026	1	Each	$	XXXXXXXXXX	See Herein	

Item Article	Description	Dest. Code Dest.	Inv. Code Fact.	Qty Qté	U. of I. U. de D.	Unit Price/Prix unitaire FOB/FAM Destination	Plant/Usine	Delivery Req. Livraison Req.	Del. Offered Liv. offerte
4	Part Number Offered:_____ • Name of Manufacturer:_____ • • Delivery Date Offered:_____								

Item Article	Description	Dest. Code Dest.	Inv. Code Fact.	Qty Qté	U. of I. U. de D.	Unit Price/Prix unitaire FOB/FAM Destination	Plant/Usine	Delivery Req. Livraison Req.	Del. Offered Liv. offerte
5	WEB CALENDERING MACHINE As detailed in Appendix E • • Part Number Offered:_____ • Name of Manufacturer:_____ • Delivery Date Offered:_____	31026	31026	1	Each	$	XXXXXXXXXX	See Herein	
6	BATTERY STACK ASSEMBLY MACHINE As detailed in Appendix F • • Part Number Offered:_____ • Name of Manufacturer:_____ • Delivery Date Offered:_____	31026	31026	1	Each	$	XXXXXXXXXX	See Herein	

Item Article	Description	Dest. Code Dest.	Inv. Code Fact.	Qty Qté	U. of I. U. de D.	Unit Price/Prix unitaire FOB/FAM Destination	Plant/Usine	Delivery Req. Livraison Req.	Del. Offered Liv. offerte
7	SLOT DIE SLURRY COATING/DRYING MAC HINE As detailed in Appendix G • • Part Number Offered:_____ • Name of Manufacturer:_____ • Delivery Date Offered:_____	31026	31026	1	Each	$	XXXXXXXXXX	See Herein	

TABLE OF CONTENTS

PART 1 - GENERAL INFORMATION

1. Security Requirement

There is no security requirement associated with the requirement.

2. Requirement

The contractor must provide the goods in accordance with the technical requirements and in the quantities as stated herein.

2.1 Delivery Requirement

Delivery is requested to be completed by July 31, 2017.

3. 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.

4. Trade Agreements

The requirement is subject to the provisions of the World Trade Organization Agreement on Government Procurement (WTO-AGP), the North American Free Trade Agreement (NAFTA), and the Agreement on Internal Trade (AIT).

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 (2016-04-04) 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) calendar days

1.1 SACC Manual Clauses

SACC Reference	Section	Date
A9033T	Financial Capability	2012-07-16
B1000T	Condition of Material	2014-06-26

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 five (5) 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 (2 hard copies)

Section II: Financial Bid (1 hard copy)

Section III: Certifications (1 hard copy)

Section IV: Additional Information (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 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.

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.

1.1 Pricing - Multi-Item Bid Solicitation

Bidders do not have to quote a price for every item in the bid solicitation in order to be evaluated. Bidders may withdraw one or more items after bid closing but prior to contract award by advising in writing the Contracting Authority.

1.2 Exchange Rate Fluctuation

The requirement does not offer exchange rate fluctuation risk mitigation. Requests for exchange rate fluctuation risk mitigation will not be considered. All bids including such provision will render the bid non-responsive.

Section III: Certifications

1.3 Certifications

Bidders must submit the certifications required under Part 5.

Section IV: Additional Information

1.4 Additional Information

1.4.1 Delivery Offered

While delivery is requested as indicated above, the best delivery that could be offered is_____.

1.4.2 Contractor Representatives

Name and telephone number of the person responsible for :

General enquiries
Name:
Telephone:
Facsimile:
E-mail:

Delivery follow-up

Name:
Telephone:
Facsimile:
E-mail:

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.

Evaluation Criteria

All bids must be completed in full and provide all of the information requested in the bid solicitation to enable full and complete evaluation.

1.1 Technical Evaluation

1.1.1 Mandatory Technical Criteria

The following Mandatory requirements must be submitted with the bid for evaluation

Technical compliance (description of items and appendices as stated herein);
Completion of Appendix A1, B1, C1, D1, E1, F1, and G1 – Evaluation Criteria;

1.2 Financial Evaluation

1.2.1 Pricing Basis

The bidder must quote firm unit prices in Canadian dollars, DDP Delivered Duty Paid (destination), Applicable Taxes extra, as applicable. Freight charges to destination and all applicable Custom duties and Excise taxes must be included.

2. Basis of Selection

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 on an item by item basis will be recommended for award of a contract.

PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION

Bidders must provide the required certifications and additional information to be awarded a contract.

The certifications provided by Bidders to Canada are subject to verification by Canada at all times. Canada will declare a bid non-responsive, or will declare a contractor in default if any certification made by the Bidder is found to be untrue whether made knowingly or unknowingly, during the bid evaluation period or during the contract period.

The Contracting Authority will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply and to cooperate with any request or requirement imposed by the Contracting Authority will render the bid non-responsive or constitute a default under the Contract.

5.1 Certifications Required with the Bid

Bidders must submit the following duly completed certifications as part of their bid.

5.1.1 Integrity Provisions - Declaration of Convicted Offences

In accordance with the *Ineligibility and Suspension Policy* (http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html), the Bidder must provide with its bid the required documentation, as applicable, to be given further consideration in the procurement process.

5.2 Certifications Precedent to Contract Award and Additional Information

The certifications and additional information listed below should be submitted with the bid, but may be submitted afterwards. If any of these required certifications or additional information is not completed and submitted as requested, the Contracting Authority will inform the Bidder of a time frame within which to provide the information. Failure to provide the certifications or the additional information listed below within the time frame provided will render the bid non-responsive.

5.2.1 Integrity Provisions – Required Documentation

In accordance with the *Ineligibility and Suspension Policy* (http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html), the Bidder must provide the required documentation, as applicable, to be given further consideration in the procurement process.

5.2.2 General Environmental Criteria Certification

The Bidder must select and complete one of the following two certification statements.

A) The Bidder certifies that the Bidder is registered or meets ISO 14001.

_____ _____

Bidders' Authorized Representative Signature Date

or

B) The Bidder certifies that the Bidder meets and will continue to meet throughout the duration of the contract, a minimum of four (4) out of six (6) criteria identified in the table below.

The Bidder must indicate which four (4) criteria, as a minimum, are met.

Green Practices within the Bidders' organization	**Insert a checkmark for each criterion that is met**
Promotes a paperless environment through directives, procedures and/or programs	
All documents are printed double sided and in black and white for day to day business activity unless otherwise specified by your client	
Paper used for day to day business activity has a minimum of 30% recycled content and has a sustainable forestry management certification	
Utilizes environmentally preferable inks and purchase remanufactured ink cartridges or ink cartridges that can be returned to the manufacturer for reuse and recycling for day to day business activity.	
Recycling bins for paper, newsprint, plastic and aluminum containers available and emptied regularly in accordance with local recycling program.	
A minimum of 50% of office equipment has an energy efficient certification.	

_____ _____

Bidders' Authorized Representative Signature Date

5.2.3 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 (http://www.labour.gc.ca/eng/standards_equity/eq/emp/fcp/list/inelig.shtml) available from Employment and Social Development Canada (ESDC) - 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

1. Security Requirement

There is no security requirement associated with the requirement.

2. Requirement

The contractor must provide the goods in accordance with the technical requirements and in the quantities as stated herein.

2.1 SACC Manual Clauses

SACC Reference	Section	Date
B1501C	Electrical Equipment	2006-06-16
B7500C	Excess Goods	2006-06-16

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 (2016-04-04), General Conditions - Goods (Medium Complexity), apply to and form part of the Contract.

4. Term of Contract

4.1 Delivery Date

All the deliverables must be received on or before _____ (Delivery as offered and as accepted will be inserted at contract award).

5. Authorities

5.1 Contracting Authority

The Contracting Authority for the Contract is:
Carlos Lee
Public Works and Government Services Canada
Acquisitions Branch
Logistics, Electrical, Fuel and Transportation Directorate
"HN" Division
7B3, Place du Portage, Phase III
11 Laurier Street
Gatineau, QC, K1A 0S5

Telephone: (819) 420-0336
Facsimile: (819) 953-4944
E-mail address: Carlos.lee@pwgsc-tpsgc.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 Contractor's Representative

Name and telephone number of the person responsible for:

General Enquiries

Name: will be inserted at contract
Telephone: will be inserted at contract
Facsimile: will be inserted at contract
E-mail: will be inserted at contract

Delivery Follow-up

Name: will be inserted at contract
Telephone: will be inserted at contract
Facsimile: will be inserted at contract
E-mail: will be inserted at contract

6. Payment

6.1 Basis of Payment

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a firm unit prices, as specified in the contract. 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 Limitation of Price

SACC Manual clause C6000C (2011-05-16) Limitation of Price

6.3 Single Payment

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

6.4 SACC Manual Clauses

SACC Reference	Section	Date
G1005C	Insurance - No Specific Requirement	2016-01-28

7. Invoicing Instructions

(a) The original and one (1) copy must be forwarded to the consignee for certification and payment.

(b) One (1) copy must be forwarded to the following address

Conseil National de Recherches Canada
Edifice Boucherville
75 Boulevard de Mortagne
Boucherville, QC
J4B 6Y4
Attention: Simon Riendeau

(c) One (1) copy must be forwarded to the Contracting Authority identified under the section entitled "Authorities" of the Contract.
Department of Public Works and Government Services
"HN" Division
7B3 Place du Portage, Phase III
11 Laurier Street
Gatineau, QC
K1A 0S5
Attention: Carlos Lee

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 Ontario.

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) 2010A (2016-04-04) General Conditions – Goods (Medium Complexity);
(c) Requirement;
(d) Appendix A – Electrode Cell Cutting Unit
(e) Appendix B – Pouch Cell Electrolyte Filling and Degassing Machine
(f) Appendix C – Double Planetary Mixer
(g) Appendix D – Pouch Cell Side Sealer and Pouch Forming Equipment
(h) Appendix E – Web Calendering Machine
(i) Appendix F – Battery Stack Assembly Machine
(j) Appendix G – Slot Die Slurry Coating and Drying Machine
(k) the Contractor's bid dated _____

11. SACC Manual Clauses (Delivery)

SACC Reference	Section	Date
D2000C	Marking	2007-11-30
D2001C	Labelling	2007-11-30
D6010C	Palletization	2007-11-30
D3010C	Delivery of Dangerous Goods/Hazardous Products	2016-01-28
D9002C	Incomplete Assemblies	2007-11-30

11.1 Shipping Instructions - Delivery at Destination

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

Delivered Duty Paid (DDP) (Boucherville, QC) Incoterms 2000 for shipments from a commercial contractor.

APPENDIX A - Electrode Cutting Unit

REQUIREMENTS

1.0 Purpose

The National Research Council of Canada (NRC) wishes to acquire a semi-automated Li-ion battery prototype manufacturing line, in order to serve the Canadian battery manufacturing industry value chain. This manufacturing line must be able to produce industrial-quality pouch-type battery cells of different sizes, and shall include a number of different modules, starting from the mixing of active materials up to the final sealing and trimming of the pouch-cell.

Within this scope, NRC wishes to acquire an electrode cutting unit. The equipment shall be a stand-alone piece of equipment designed and built for accuracy and robustness to operate in a safe manner in a laboratory environment. The equipment must be delivered to the NRC's Boucherville site. All of the specifications indicated herein must be met.

The delivered equipment must have the following specifications:

2.0 Constraints

2.1 Overall dimensions

2.1.1 The overall width of the machine must not exceed 1.5 meters.

2.1.2 The overall depth of the machine must not exceed 1.1 meters.

2.1.3 The overall height of the machine must not exceed 2.1 meters.

3.0 Mandatory Technical Specifications

3.1 Equipment frame

3.1.1 The equipment must be supplied on a self-standing frame with safety enclosures.

3.1.2 The frame must be provided with wheels for easy occasional displacement and positioning, as well as blocking and leveling systems.

3.1.3 All outside metallic surfaces, if not of stainless steel or aluminium, must be painted for rust prevention.

3.2 Machine specifications

3.2.1 The equipment must allow the precise cutting of battery electrodes, typically comprising inorganic active material layers coated on metal foils (copper, aluminum or nickel).

3.2.2 The machine must punch electrode sheets using the steel rule die technique.

3.2.3 The machine must nonetheless be capable of supporting a punch and die set in the future.

3.2.4 A lateral electrode roll support must be provided with the machine, not surpassing the overall machine dimensions as specified in 2.1.

3.2.5 The electrode roll support must have capacity for a roll having a width of up to 300 mm, a nominal inside diameter (ID) of 76.2 mm (3”) and an outside diameter (OD) up to 300 mm, and weighting a maximum of 30 Kg.

3.2.6 The machine must allow the electrode roll to be manually unwound and placed in the die, for electrode rolls having widths up to 250 mm.

3.2.7 The roll lateral position must be adjustable to allow for a precise positioning of the electrode foil in the die (in order to ensure alignment of the cutting of the electrode tab on the uncoated part of the electrode foil).

3.2.8 The die set must contain an adjustable electrode sheet alignment device (raised edge) for a precise positioning of the electrode foil in the die.

3.2.9 The machine must be equipped with a clamping device to hold the electrode foil in place while being punched.

3.2.10 The machine must be able to punch the electrodes automatically.

3.2.11 The machine must use a pneumatic actuated press.

3.2.12 The machine must have an adjustable end of stroke positioning means.

3.2.13 The machine must be equipped with an adjustable cylinder speed means.

3.2.14 The machine must have a punch force of at least 15 kN.

3.3 Operator controls and emergency features

3.3.1 The equipment must be operated via double-push buttons for operator safety purposes.

3.3.2 The machine must be equipped with a light curtain system for operator safety purposes.

3.3.3 The machine must be equipped with an electronic controller to allow the adjustment of the pressing time.

3.3.4 Emergency stop button(s) must be placed on the frame of the machine.

3.4 Die set

3.4.1 The steel rule die set must not contain materials that can generate particles during punching, such as wood.

3.4.2 The counterplate must be made of ground hardened steel or other materials resistant to marking from the steel rule.

3.4.3 Two pairs of die sets must be included (anode + cathode) to allow for the preparation of electrodes for two different battery sizes.

3.4.4 First pair (for big battery size) must be comprised of two individual die sets. First die set must allow the cutting of one anode of dimensions 150x200 mm, excluding tab. Second die set must allow the cutting of one cathode of dimensions 148x198 mm, excluding tab (tab location and dimensions to be determined).

3.4.5 Second pair (for small battery size) must be comprised of two individual die sets. First die set must allow the cutting of anodes with dimensions 34x50 mm, excluding tabs. Second die set must allow the cutting of cathodes of dimensions 32x48 mm, excluding tabs (tab locations and dimensions to be determined).

3.4.6 For the small battery size, four anodes (or cathodes) must be cut in line at once, with a minimal space in between (however at least 2 mm).

3.4.7 The electrodes must be cut with corner radii of 1.5 mm.

3.4.8 The die sets must allow the precise cutting of battery electrodes made from either copper or aluminum foils with thicknesses from 8 to 50 µm single- or double-side coated with inorganic layers having thicknesses between 20 and 200 µm per side.

4.0 Spare Parts

4.1 The contractor is asked to include a recommended spare parts list (RSPL) with their bid. The spares list may be included in the contract to be purchased optionally on an "as and when" required basis. This list shall include as a minimum:

4.1.1 Name and Description of item;
4.1.2 Price;
4.1.3 OEM Item Part Number;
4.1.4 Detailed Assembly Drawing or Specification Data Sheet.

4.2 Spare parts shall be available for a period of no less than 10 years, and should be readily available.

4.3 Suppliers must ensure that manuals and other related documents are updated when a spare part become obsolete and is replaced by a new model.

5.0 Deliverables

The following list of deliverables is to be included with the final equipment price, with the exception of the spare parts, which is to be listed as optional.

5.1 A set of tools specific to the equipment must be provided.

5.2 Two (2) copies of the technical documentation on the operation and maintenance of the equipment, written in English must be provided in both hard copy and electronic format.

5.3 Installation support and equipment commissioning. Those activities will take place at AST Boucherville location: 75 Boulevard de Mortagne, Boucherville, QC by qualified personnel of the manufacturing company.

5.4 System training to take place at AST Boucherville location: 75 Boulevard de Mortagne, Boucherville, QC. A complete one-day (7.5 hours) basic hands-on training must be given to at least 3 users, within 15 calendar days after commissioning.

5.5 A Spare parts list (offered as an optional item in the cost sheet).

6.0 System warranty and support

6.1 One (1) year warranty from start-up (commissioning) must be included. Comprising support by email, phone or Internet. The technical support within 24 hours during regular working hours between 8:30 A.M. and 4:30 P.M. (Canada Eastern Time Zones) during the warranty period.

7.0 General Information and services provided by NRC

7.1 The equipment must be CSA or ULC-approved or certified by a recognized organization in Quebec.

7.2 All safety or emergency labels must be in English or illustrated by symbols.

7.3 Electrical voltage available: 600 volts, 3 phases, 60 Hz; 208 volts, 3 phases, 60 Hz; and 120 / 208 volts, 1 phase, 60 Hz. Any other voltage, if needed, must be obtained using a transformer supplied by the supplier.

7.4 All measuring, monitoring, display and record must be in SI (System international) units.

7.5 Compressed air: 90 PSI. The diameter of the pipe and the required flow rate shall be communicated by the supplier before or upon delivery.

7.6 Cooling water: 15 to 20 °C; the diameter of the pipe and the required flow rate shall be communicated by the supplier 30 days after contract award, of when final design drawings are submitted.

APPENDIX A1 - EVALUATION CRITERIA

1.0 Mandatory evaluation criteria

1.1 The equipment required must comply with the descriptions and specifications set out in Appendix A – Section 2.0 and 3.0 – Mandatory Technical Specifications. The descriptions and specifications are indicated hereafter by numbers ranging from 2.1.1 to 3.4.8.

Mandatory specifications	**Specify the location in the bid documentation or data sheets where the mandatory specifications are met**	**Meet/not meet**
2.1.1		
2.1.2		
2.1.3		
3.1.1		
3.1.2		
3.1.3		
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3.4.4		
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3.4.6		
3.4.7		
3.4.8		

APPENDIX B - Pouch-Cell Electrolyte Filling and Degassing Machine

REQUIREMENTS

1.0 Purpose

The National Research Council of Canada (NRC) wishes to acquire a semi-automated Li-ion battery prototype manufacturing line, in order to serve the Canadian battery manufacturing industry value chain. This manufacturing line must be able to produce industrial-quality pouch-type battery cells of different sizes, and must include a number of different modules, starting from the mixing of active materials up to the final sealing and trimming of the pouch-cell.

Within this scope, NRC wishes to acquire a pouch-cell electrolyte filling and degassing machine. The equipment must be a stand-alone piece of equipment designed and built for accuracy and robustness to operate in a safe manner in an anhydrous laboratory environment. This document must serve to outline the requirements for a Lab/Pilot machine to be utilized to Fill and Seal battery and/or ultracapacitor pouch cells. Flexibility in cell size and process parameters such as vacuum level, electrolyte dispensing quantity and rate, soak time, and sealing method must be incorporated in this design so that the operator can optimize overall cycle time and product quality.

The equipment must be delivered to the NRC's Boucherville site. All of the specifications indicated herein must be met.

The delivered equipment must have the following specifications:

2.0 Equipment Constraints

2.1 Over all dimensions

2.1.1 The overall width of the machine must not exceed 1.1 meters.

2.1.2 The overall depth of the machine must not exceed 1.0 meters.

2.1.3 The overall height of the machine must not exceed 2.4 meters.

2.1.4 All machine setups and operator adjustments must be accessible via the front of the machine.

3.0 Mandatory Technical Specifications

3.1 Equipment

3.1.1 The machine must be supplied on self-standing frame with safety enclosures.

3.1.2 The frame must be provided with wheels for easy occasional displacement and positioning, as well as blocking and leveling systems.

3.1.3 All outside metallic surfaces, if not of stainless steel or aluminium, must be painted for rust prevention.

3.1.4 The machine must be able to operate in an anhydrous environment (≤ -40 ºC dewpoint).

3.1.5 The machine must be able to perform two different operations: 1) the electrolyte filling of the pouch-cell and first sealing, and 2) the degassing of the pouch-cell after formation and final sealing.

3.1.6 All parts coming in contact with the electrolyte (in liquid or gaseous form) must be compatible with electrolytes, such as stainless steel 316 or polypropylene. Compatible material to be informed by supplier.

3.1.7 At least one (1) emergency stop button must be placed on the frame of the machine.

3.2 Operation description: electrolyte filling and temporary sealing.

3.2.1 The equipment must be designed to dose and dispense a certain amount of liquid electrolyte in the pouch-cells and then seal them using a thermo-sealing process.

3.2.2 The machine must be equipped with a pouch-cell support system to hold and accurately locate it for the operation. The pouch-cell must be oriented with the unsealed edge pointing upwards.

3.2.3 Cell holding fixture must be adjustable for different cell sizes.

3.2.4 The machine must be equipped with a suction device that pulls apart both halves of the pouch, in order to ensure a sufficient opening of the unsealed side for electrolyte filling.

3.2.5 The pouch opening operation must be adjustable to the cell size.

3.2.6 The machine must be capable of flushing the cell with inert gas and/or dry room air, by successive vacuuming and pressurizing cycles.

3.2.7 The number and time of flushing cycles must be operator adjustable.

3.2.8 The machine must be capable of dispensing the electrolyte in the pouch-cell at various levels of vacuum or even atmospheric pressure.

3.2.9 The electrolyte dispensing nozzle must lower deep enough into the pouch-cell between the spread halves to avoid the presence of electrolyte in the seal area.

3.2.10 A shut-off mechanism must be located at the tip of the nozzle, to avoid any leakage after electrolyte dispensing.

3.2.11 The machine must allow a soaking cycle after electrolyte dispensing, prior to and/or after pouch sealing.

3.2.12 Electrolyte soak time(s) must be operator adjustable.

3.2.13 During soaking cycle, the machine must be capable of cycling between pressures of 1 atm. to -29.5 inch Hg vacuum level.

3.2.14 Pressure cycling parameters (number of cycles, pressure levels and times) must be operator adjustable.

3.2.15 The sealing must be performed under vacuum without vacuum interruption from the filling and soaking cycle.

3.3 Operation description: degassing and final sealing

3.3.1 The same machine must be capable of performing the degassing and final thermo-sealing of pouch-cells after their formation cycle.

3.3.2 The pouch-cell support system must allow to accurately locate the cell for the degassing and final sealing operation.

3.3.3 The machine must be equipped with an automated pouch piercing device, activated once the chamber has been placed under active vacuum.

3.3.4 The pouch must be pierced above the cell stack location in order to draw out any gases accumulated during cell formation.

3.3.5 After degassing, the pouch-cell must be sealed at the final seal location (close to the stack).

3.4 Operator panel

3.4.1 A touch screen control panel (HMI: human machine interface) must be installed on the frame of the machine and easily accessible by the operator.

3.4.2 Operation language must be in English.

3.4.3 The HMI must enable the operator to adjust the following parameters (including but not limited to): electrolyte dosing, vacuuming, cell-opening, electrolyte filling, soaking cycles, sealing temperature and time, degassing.

3.4.4 The HMI must enable the entire control of the process.

3.4.5 The HMI must be able to program and store different operational recipes.

3.4.6 The HMI must allow for immediate viewing of alarms.

3.4.7 The HMI must store an alarm history.

3.5 Pouch Cell dimension

3.5.1 The equipment must be capable of operating with pouch sizes from :

- Cell width including extra space for gas accumulation (W): 60 to 280 mm,
- Cell height (H): 50 to 230 mm, excluding tabs.

3.5.2 The equipment must be capable of operating with pouch-cell thicknesses from 1 mm to 12 mm.

3.6 Electrolyte pump

3.6.1 Pump must be servo motor actuated.

3.6.2 The pump must be able to work with typical electrolytes used in lithium-ion batteries or supercapacitors.

3.6.3 The pump must be able to precisely dose and deliver a minimal range of electrolyte volumes from 0.1 to 600 mL.

3.6.4 The pump must have a dosing precision of at least ±0.5 vol%.

4.0 Spare Parts

4.1 The contractor is asked to include a recommended spare parts list (RSPL) with their bid. The spares list may be included in the contract to be purchased optionally on an "as and when" required basis.. This list must include as a minimum:

4.1.1 Name and Description of item;
4.1.2 Price;
4.1.3 OEM Item Part Number;
4.1.4 Detailed Assembly Drawing or Specification Data Sheet.

4.2 Spare parts must be available for a period of no less than 10 years, and should be readily available.

4.3 Suppliers must ensure that manuals and other related documents are updated when a spare part become obsolete and is replaced by a new model.

5.0 Deliverables

The following list of deliverables is to be included with the final equipment price, with the exception of the spare parts, which is to be listed as optional.

5.1 A set of tools specific to the equipment must be provided.

5.2 Two (2) copies of the technical documentation on the operation and maintenance of the equipment, written in English must be provided in both hard copy and electronic format.

5.3 Installation support and equipment commissioning. Those activities will take place at AST Boucherville location: 75 Boulevard de Mortagne, Boucherville, QC by qualified personnel of the manufacturing company.

5.4 System training to take place at AST Boucherville location: 75 Boulevard de Mortagne, Boucherville, QC. A complete one-day (7.5 hours) basic hands-on training must be given to at least 3 users, within 15 calendar days after commissioning.

5.5 A Spare parts list (offered as an optional item in the cost sheet).

6.0 System warranty and support

6.1 One (1) year warranty from start-up (commissioning) must be included. Comprising support by email, phone or Internet. The technical support within 24 hours during regular working hours between 8:30 A.M. and 4:30 P.M. (Canada Eastern Time Zones) during the warranty period.

7.0 General Information and services provided by NRC

7.1 The equipment must be CSA or ULC-approved or certified by a recognized organization in Quebec.

7.2 All safety or emergency labels must be in English or illustrated by symbols.

7.3 Electrical voltage available: 600 volts, 3 phases, 60 Hz; 208 volts, 3 phases, 60 Hz; and 120 / 208 volts, 1 phase, 60 Hz. Any other voltage, if needed, must be obtained using a transformer supplied by the supplier.

7.4 All measuring, monitoring, display and record must be in SI (System international) units.

7.5 Compressed air: 90 PSI, the diameter of the pipe and the required flow rate must be communicated by the supplier before or upon delivery.

APPENDIX B1 - EVALUATION CRITERIA

1.0 Mandatory evaluation criteria

1.1 The equipment required must comply with the descriptions and specifications set out in Appendix B – Section 2.0 and 3.0 – Mandatory Technical Specifications. The descriptions and specifications are indicated hereafter by numbers ranging from 2.1.1 to 3.6.4.

Mandatory specifications	Specify the location in the bid documentation or data sheets where the mandatory specifications are met	Meet/not meet
2.1.1		
2.1.2		
2.1.3		
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3.5.2		
3.6.1		
3.6.2		
3.6.3		
3.6.4		

APPENDIX C - Double Planetary Mixer

REQUIREMENTS

1.0 Purpose

The National Research Council of Canada (NRC) wishes to acquire a semi-automated Li-ion battery prototype manufacturing line, in order to serve the Canadian battery manufacturing industrial value chain. This manufacturing line must be able to produce industrial-quality pouch-type battery cells of different sizes, and shall include a number of different modules, starting from the mixing of active materials and up to the final sealing and trimming of the pouch-cell.

Within this scope, NRC wishes to acquire a double planetary mixer for the preparation of active materials formulations. The equipment must be delivered to the NRC's Boucherville site. All of the specifications indicated herein must be met.

The delivered equipment must have the following specifications:

2.0 Constraints

2.1 Double planetary mixer

2.1.1 Equipment must be table-top.

3.0 Mandatory Technical Specifications

3.1 Mixer

3.1.1 Equipment must be comprised of a double planetary mixer having 2 or 3 blades and a high shear mixer.

3.1.2 Each set of planetary blades must rotate on their axis while orbiting the vessel, resulting in uniform mixing.

3.1.3 The high shear blade must rotate on its own axis in a stationary position with an individual speed adjustment.

3.1.4 Control of all mixer parameters must be done via an operator interface panel.

3.1.5 Must permit to mix slurries with viscosities ranging between at least 5 000 and 10 000cPs.

3.1.6 The mixer must be equipped with a lifting system to open the vessel, automatic or using a crank handle.

3.1.7 The cover must have at least 1 view port, 1 lighting window, 1 port allowing the addition of material and 1 port for vacuum connection. Each of the ports must have the capability to be sealed.

3.1.8 The mixer must be capable of indicating the temperature inside the mixing chamber during operation.

3.2 Blades

3.2.1 Double planetary mixer must have an adjustable orbital speed ranging from 10 to 70rpm and the blades an adjustable axial speed of 15-100 rpm (minimum range).

3.2.2 Hi-speed disperser must have an adjustable axial speed ranging from 1000-7500rpm.

3.3 Vessel

3.3.1 The vessel must be removable from the mixer and freestanding (example: flat bottom).

3.3.2 Processing capacity ranging between 1 to 2L maximum

3.3.3 Wetted and non-wetted parts must be made of stainless steel type 304 or 316.

3.3.4 The wetted parts must be polished to obtain a mirror finish (minimum #320 grit polish). Non-wetted parts must be finished with a minimum of #200 grit polish.

3.3.5 The vessel must be airtight, allowing for mixing under vacuum conditions.

3.3.6 The enclosure must be capable to sustain a vacuum of 29.5mmHg during mixing.

3.3.7 The vessel must be of jacketed construction with liquid heating/cooling capability.

3.3.8 A total of 2 identical vessels must be provided with the equipment.

4.0 Spare Parts

4.1 The contractor is asked to include a recommended spare parts list (RSPL) with their bid. The spares list may be included in the contract to be purchased optionally on an “as and when” required basis.. This list shall include as a minimum:

4.1.1 Name and Description of item;
4.1.2 Price;
4.1.3 OEM Item Part Number;
4.1.4 Detailed Assembly Drawing or Specification Data Sheet.

4.2 Spare parts shall be available for a period of no less than 10 years, and should be readily available.

4.3 Suppliers must ensure that manuals and other related documents are updated when a spare part become obsolete and is replaced by a new model.

5.0 Deliverables

5.1 A set of tools specific to the equipment must be provided

5.2 Two (2) copies of the technical documentation on the operation and maintenance of the equipment, written in English must be provided in both hard copy and electronic format.

5.3 A Spare parts list (offered as an optional item in the cost sheet).

6.0 System warranty and support

6.1 One (1) year warranty from start-up (commissioning) must be included. Comprising support by email, phone or Internet. The technical support within 24 hours during regular working hours between 8:30 A.M. and 4:30 P.M. (Canada Eastern Time Zones) during the warranty period.

7.0 General Information and services provided by NRC

7.1 The equipment must be CSA or ULC-approved or certified by a recognized organization in Quebec

7.2 All safety or emergency labels must be in English or illustrated by symbols

7.3 Electrical voltage available: 600-volt, 3-phase; 208-volt, 3-phase; and 120-volt, 1-phase. Any other voltage, if needed, must be obtained using a transformer supplied by the supplier

7.4 Compressed gas: the diameter of the pipe and the required flow rate shall be communicated by the supplier before or upon delivery

7.5 Cooling water: 15 to 20 °C; the diameter of the pipe and the required flow rate shall be communicated by the supplier before or upon delivery

APPENDIX C1 - EVALUATION CRITERIA

1.0 Mandatory evaluation criteria

1.1 The equipment required shall comply with the descriptions and specifications set out in Appendix C – Section 2.0 and 3.0 – Mandatory Technical Specifications. The descriptions and specifications are indicated hereafter by numbers ranging from 2.1.1 to 3.3.8.

Mandatory specifications	**Specify the location in the bid documentation or data sheets where the mandatory specifications are met**	**Meet/not meet**
2.1.1		
3.1.1		
3.1.2		
3.1.3		
3.1.4		
3.1.5		
3.1.6		
3.1.7		
3.1.8		
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3.3.8		

APPENDIX D - Pouch-Cell Side Sealer and Pouch Forming Equipment

REQUIREMENTS

1.0 Purpose

The National Research Council of Canada (NRC) wishes to acquire a semi-automated Li-ion battery prototype manufacturing line, in order to serve the Canadian battery manufacturing industry value chain. This manufacturing line must be able to produce industrial-quality pouch-type battery cells of different sizes, and must include a number of different modules, starting from the mixing of active materials up to the final sealing and trimming of the pouch-cell.

Within this scope, NRC wishes to acquire a pouch-cell side sealer equipment along with a pouch forming equipment. The Pouch cell side sealer must be a stand-alone piece of equipment designed and built for accuracy and robustness to operate in a safe manner in an anhydrous laboratory environment. The Pouch forming is designed to cold-form a multilayer laminate film which is used as a soft shell packaging for the battery stack.

The equipment must be delivered to the NRC's Boucherville site. All of the specifications indicated herein must be met.

2.0 Pouch Cell Side Sealer

2.1 Overall dimensions constrains

2.1.1 The overall width of the machine must not exceed 1.4 meters

2.1.2 The overall depth of the machine must not exceed 1.3 meters.

2.1.3 The overall height of the machine must not exceed 2.4 meters

2.2 Mandatory Technical Specifications

2.2.1 General specifications

2.2.1.1 The equipment can be either table-top or supplied on a self-standing frame.

2.2.1.2 The equipment must be mounted with adjustable feet or any other leveling system.

2.2.1.3 If the equipment is supplied on a self-standing frame, it must be provided with wheels for easy occasional displacement, positioning and blocking systems.

2.2.1.4 Equipment must be supplied with safety enclosures.

2.2.1.5 The machine must be able to operate in an anhydrous environment (≤ -40 ^{o}C dewpoint).

2.2.2 Machine specification

2.2.2.1 The equipment must be designed to thermally seal together two sheets of a laminate multilayer film (named “pouch”) that serves as the battery soft packaging. The pouch is usually made of an internal layer of a polyolefin (the thermo-sealable material), an intermediate layer of aluminum and an external layer of polyamide or another wear-resistant polymer. In one or both sheets of the pouch, a cup of specific dimensions has been previously formed to precisely match the battery stack dimensions.

2.2.2.2 The machine must use locating means to allow a precise positioning of both half-pouches to be sealed as well as the battery stack. This can be achieved via locating holes (at least two) previously punched in the pouch on the outer perimeter of the sheets, in order to locate and align the two half-pouches during sealing. Alternative methods to achieve the same positioning purposes will be considered.

2.2.2.3 The machine must be able to seal the half-pouches one side at a time (including the side having protruding metallic tabs from the stack), or three sides at a time (including the side having protruding metallic tabs from the stack), one side being left unsealed for subsequent electrolyte filling.

2.2.2.4 The machine must be equipped with means allowing the precise positioning of the battery stack and half-pouches relative to the sealing bar(s), in order to seal the pouch at precise and repeatable locations.

2.2.2.5 The machine must be able to seal the pouch automatically.

2.2.2.6 The machine must use a pneumatic actuated press.

2.2.2.7 The press cylinder speed must be adjustable.

2.2.2.8 The applied pressure on the seal bars must be precisely adjustable.

2.2.2.9 The machine must have a sealing force of at least 4 kN.

2.2.2.10 The machine must have adjustable sealing temperatures up to at least 200 ˚C.

2.2.2.11 The sealing time must be precisely adjustable.

2.2.2.12 The machine must have a sealing bar length of at least 300 mm.

2.2.2.13 The machine must have a sealing bar width between 4 mm and 8 mm (exact dimension to be determined).

2.2.2.14 The sealing bars must be made of rigid thermo-conductive material, not containing any pliable material coming in contact with the sealing surface.

2.2.2.15 The sealing bar for the tab-side must have cut-outs to compensate for the tabs thickness and positioning (dimensions and positioning of the tabs to be determined).

2.2.2.16 The machine must have a fine adjustment device to ensure the parallelism between upper and lower seal bars.

2.2.2.17 The machine must be provided with tooling for two different battery sizes (exact dimensions to be determined).

2.2.3 Operator controls and emergency features

2.2.3.1 The equipment must be operated via double-push buttons for operator safety purposes.

2.2.3.2 The machine must enable the operator to adjust the following parameters (including but not limited to): sealing bar(s) opening and closing, sealing temperature, sealing time, sealing pressure.

2.2.3.3 At least 1 emergency stop button must be placed on the frame of the machine.

3.0 Pouch Forming Equipment

3.1 Overall dimensions Constraints

3.1.1 The overall width of the machine must not exceed 1.5 meters.

3.1.2 The overall depth of the machine must not exceed 1.4 meters.

3.1.3 The overall height of the machine must not exceed 2.1 meters

3.2 Mandatory Technical Specifications

3.2.1 Equipment frame

3.2.1.1 The equipment can be either table-top or supplied on a self-standing frame.

3.2.1.2 The equipment must be mounted with adjustable feet or any other leveling system.

3.2.1.3 If the equipment is supplied on a self-standing frame, it must be provided with wheels for easy occasional displacement and positioning, as well as blocking and leveling systems.

3.2.1.4 Equipment must be supplied with safety enclosures.

3.2.1.5 All outside metallic surfaces, if not of stainless steel or aluminium, must be painted for rust prevention.

3.2.2 Machine specification

3.2.2.1 The equipment must be designed to form a prismatic shape into a multilayer laminate film (named “pouch”) that will serve as battery soft packaging.

3.2.2.2 The machine must be equipped with an integrated support for the pouch roll having a width of up to 300 mm, a nominal inside diameter (ID) of 76.2 mm (3”) and an outside diameter (OD) up to 300 mm, and weighting a maximum of 30 Kg.

3.2.2.3 The machine must allow the pouch roll to be manually unwound and placed in the die.

3.2.2.4 The roll lateral position must be adjustable to allow for a precise positioning of the pouch sheet in the die.

3.2.2.5 The machine must contain a locating device that allows a precise positioning of the pouch sheet in the die.

3.2.2.6 The machine must be equipped with a clamping device to hold the pouch sheet in place while being formed.

3.2.2.7 The machine must be able to form the pouch sheet automatically.

3.2.2.8 The machine must use a pneumatic actuated press.

3.2.2.9 The machine must have a means for adjusting the forming depth.

3.2.2.10 The machine must be equipped with an adjustable cylinder speed means.

3.2.2.11 The machine must have a punch force of at least 15 kN.

3.2.2.12 The machine must be equipped with at least two guiding posts for alignment precision.

3.2.3 Operator controls and emergency features

3.2.3.1 The equipment must be operated via double-push buttons for operator safety purposes.

3.2.3.2 The machine must be equipped with a light curtain system for operator safety purposes.

3.2.3.3 The machine must be equipped with an electronic controller to allow the adjustment of the pressing time.

3.2.3.4 A minimum of one (1) emergency stop button(s) must be placed on the frame of the machine.

3.2.4 Forming die characteristics

3.2.4.1 The forming die must form a cup into the pouch, plus a gas cup if required.

3.2.4.2 The die working area must be at least 250x300 mm.

3.2.4.3 The die must permit the formation of a depth ranging from 3 to 6 mm and must be adjustable allowing incremental changes of 1 mm in order to reach depths of 3, 4, 5 and 6 mm.

3.2.4.4 The die edges must be rounded in order to avoid damaging the pouch material during forming.

3.2.4.5 Two die sets must be included, with different cup dimensions.

3.2.4.6 First die must allow for the forming of a single cup measuring 35x51 mm (exact dimensions to be confirmed).

3.2.4.7 Second die must allow for the forming of a cup measuring 151x201 mm (exact dimensions to be confirmed), plus a gas cup measuring 25x180 mm (location and exact dimensions to be confirmed).

3.2.4.8 Forming die must punch at least 2 locating holes in the pouch in the outer perimeter of the sheet (exact diameter and locations to be determined) in order to locate and align the two half-pouches during the subsequent assembly step (pouch thermo-sealing). Alternative methods to achieve the same positioning purposes will be considered.

3.3 Optional Technical Specifications

3.3.1 A device integrated to the machine which allows the cutting of the pouch sheet from roll, either before, during or after cup forming, to separate blank from continuous web, should be quoted as an option.

4.0 Spare Parts

4.1 The contractor is asked to include a recommended spare parts list (RSPL) with their bid. The spares list may be included in the contract to be purchased optionally on an "as and when" required basis.. This list must include as a minimum:

4.1.1 Name and Description of item;
4.1.2 Price;
4.1.3 OEM Item Part Number;
4.1.4 Detailed Assembly Drawing or Specification Data Sheet.

4.2 Spare parts must be available for a period of no less than 10 years, and should be readily available.

4.3 Suppliers must ensure that manuals and other related documents are updated when a spare part become obsolete and is replaced by a new model.

5.0 Deliverables

The following list of deliverables is to be included with the final equipment price, with the exception of the spare parts, which is to be listed as optional.

5.1 A set of tools specific to the equipment must be provided.

5.2 Two (2) copies of the technical documentation on the operation and maintenance of the equipment, written in English must be provided in both hard copy and electronic format.

5.3 Installation support and equipment commissioning. Those activities will take place at AST Boucherville location: 75 Boulevard de Mortagne, Boucherville, QC by qualified personnel of the manufacturing company.

5.4 System training to take place at AST Boucherville location: 75 Boulevard de Mortagne, Boucherville, QC. A complete one-day (7.5 hours) basic hands-on training must be given to at least 3 users, within 15 calendar days after commissioning.

5.5 A Spare parts list (offered as an optional item in the cost sheet).

6.0 System warranty and support

6.1 One (1) year warranty from start-up (commissioning) must be included. Comprising support by email, phone or Internet. The technical support within 24 hours during regular working hours between 8:30 A.M. and 4:30 P.M. (Canada Eastern Time Zones) during the warranty period.

7.0 General Information and services provided by NRC

7.1 The equipment must be CSA or ULC-approved or certified by a recognized organization in Quebec.

7.2 All safety or emergency labels must be in English or illustrated by symbols.

7.3 Electrical voltage available: 600 volts, 3 phases, 60 Hz; 208 volts, 3 phases, 60 Hz; and 120 / 208 volts, 1 phase, 60 Hz. Any other voltage, if needed, must be obtained using a transformer supplied by the supplier.

7.4 All measuring, monitoring, display and record must be in SI (System international) units.

7.5 Compressed air: 90 PSI, the diameter of the pipe and the required flow rate must be communicated by the supplier before or upon delivery.

APPENDIX D1 - EVALUATION CRITERIA

1.0 Technical criteria evaluation

1.1 The equipment required must comply with the descriptions and specifications set out in Appendix D – Section 2.0 and 3.0 – Mandatory Technical Specifications. The descriptions and specifications are indicated hereafter by numbers ranging from 2.1.1 to 3.2.4.8

POUCH SIDE SEALER		
Mandatory specifications	**Specify the location in the bid documentation or data sheets where the mandatory specifications are met**	**Meet/not meet**
2.1.1		
2.1.2		
2.1.3		
2.2.1.1		
2.2.1.2		
2.2.1.3		
2.2.1.4		
2.2.1.5		
2.2.2.1		
2.2.2.2		
2.2.2.3		
2.2.2.4		
2.2.2.5		
2.2.2.6		
2.2.2.7		
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2.2.3.1		
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POUCH FORMING		
Mandatory specifications	**Specify the location in the bid documentation or data sheets where the mandatory specifications are met**	**Meet/not meet**
3.1.1		
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APPENDIX E – Web Calendering Machine

REQUIREMENTS

1.0 Purpose

The National Research Council of Canada (NRC) wishes to acquire a semi-automated Li-ion battery prototype manufacturing line, in order to serve the Canadian battery manufacturing industry value chain. This manufacturing line must be able to produce industrial-quality pouch-type battery cells of different sizes, and shall include a number of different modules, starting from the mixing of active materials up to the final sealing and trimming of the pouch-cell.

Within this scope, NRC wishes to acquire a web calendering machine for the roll-to-roll preparation of battery electrodes. The equipment must be delivered to the NRC's Boucherville site. All of the specifications indicated herein must be met.

The delivered equipment must have the following specifications:

2.0 Equipment Constraints

2.1 Over all dimensions

2.1.1 The overall width of the machine must not exceed 1.4 meters.

2.1.2 The overall depth of the machine must not exceed 1.2 meters.

2.1.3 The overall height of the machine must not exceed 2.1 meters.

3.0 Mandatory Technical Specifications

3.1 Equipment

3.1.1 Equipment can be either table-top or supplied on a self-standing frame.

3.1.2 The machine must be mounted with adjustable feet or any other leveling system.

3.1.3 If the equipment is supplied on a self-standing frame, it must be provided with wheels for easy occasional displacement, positioning and blocking systems.

3.1.4 The calender mechanical speed must be adjustable with a minimal range between 0.5 and 5mpm.

3.1.5 The machine must be capable of applying a hydraulic calendering force up to at least 40 metric tons, with an accuracy of ± 5% and continuous active feedback and control.

3.1.6 The hydraulic calendering force must be adjustable and allow incremental changes down to at most 0.1 metric ton.

3.1.7 The hydraulic system must be electrically powered.

3.1.8 The hydraulic system must be controlled through the HMI.

3.1.9 The machine must allow both rolls to be synchronously driven.

3.1.10 Enclosure for drive and controls must be made of aluminium or other metals, for robustness purpose.

3.1.11 The frame must be of heavy steel construction and designed for maximum load capacity.

3.1.12 All components must be painted with industrial paint enamel or plated for corrosion protection.

3.1.13 The machine must be equipped with safety guarding, particularly around the calender rolls.

3.1.14 The calender rolls dimensions must be at least 200mmOD x 300mm face.

3.1.15 The calender rolls must be constructed from high quality D2 tool steel and through hardened to 58-62Rc and stress relieved for maximum compressive strength and thermal stability.

3.1.16 The calender rolls must be hard chrome plated with hardness of at least 70Rc and precision ground to at least ±1.5µm TIR (total indicator run out) with a 1-2Ra finish.

3.1.17 The calender rolls must be assembled with precision bearing and housing assemblies to insure smooth and constant rolling.

3.1.18 The center deflection of the rolls must not exceed 1µm at maximum force.

3.1.19 The gap opening between rolls must be controlled with a precision assembly and must have independent left and right manual adjustment with accuracy down to 1µm.

3.1.20 The calender rolls must be heated and at least one of the rolls must be equipped with a temperature sensor.

3.1.21 The heated rolls must have an adjustable temperature up to 150°C, with accuracy of at most ± 3°C and maximum temperature variation of 3°C across the roll face.

3.1.22 The machine must be equipped with an HMI (Human Machine Interface) allowing to control at least the clamping force and line speed, as well as to indicate the clamping force, speed, tension on both unwind and rewind, and calendered web length.

3.1.23 The machine must include a hardwired emergency stop that will open the rolls when activated.

3.1.24 The machine must be able to process incoming materials comprised of various supports (foils, foams, or others) single or double-side coated continuously or intermittently with various typical battery active materials.

3.1.25 The machine must be able to process incoming materials (as described in 3.1.24) with thicknesses from 9 µm, and up to 1mm, and with widths from 50mm up to 250mm.

3.1.26 Both calender rolls must be equipped with a cleaning apparatus typically referred to as doctor blades, to scrape off any particulates that can stick to the rolls and damage them. The apparatus must also ensure that the detached particulates don't contaminate the web.

3.2 Unwind and Rewind

3.2.1 Both unwind and rewind shafts must be able to accept rolls with cores having internal diameter (ID) of 76mm (3 inches).

3.2.2 Both unwind and rewind shafts must be equipped with a core locking device to secure the rolls in position.

3.2.3 Both unwind and rewind must be capable of receiving a material roll of up to 300mm OD.

3.2.4 Both unwind and rewind must be equipped with tension control systems.

3.2.5 The machine must have idler rolls to support the web at the entry and exit of the calender rolls.

4.0 Spare Parts

4.1 The contractor is asked to include a recommended spare parts list (RSPL) with their bid. The spares list may be included in the contract to be purchased optionally on an "as and when" required basis. This list shall include as a minimum:

4.1.1 Name and Description of item;
4.1.2 Price;
4.1.3 OEM Item Part Number;
4.1.4 Detailed Assembly Drawing or Specification Data Sheet.

4.2 Spare parts shall be available for a period of no less than 10 years, and should be readily available.

4.3 Suppliers must ensure that manuals and other related documents are updated when a spare part become obsolete and is replaced by a new model.

5.0 Deliverables

The following list of deliverables is to be included with the final equipment price, with the exception of the spare parts, which is to be listed as optional.

5.1 A set of tools specific to the equipment must be provided.

5.2 Two (2) copies of the technical documentation on the operation and maintenance of the equipment, written in English must be provided in both hard copy and electronic format.

5.3 Installation support and equipment commissioning. Those activities will take place at AST Boucherville location: 75 Boulevard de Mortagne, Boucherville, QC by qualified personnel of the manufacturing company.

5.4 System training to take place at AST Boucherville location: 75 Boulevard de Mortagne, Boucherville, QC. A complete one-day (7.5 hours) basic hands-on training must be given to at least 3 users, within 15 calendar days after commissioning.

5.5 A Spare parts list (offered as an optional item in the cost sheet).

6.0 System warranty and support

6.1 One (1) year warranty from start-up (commissioning) must be included. Comprising support by email, phone or Internet. The technical support within 24 hours during regular working hours between 8:30 A.M. and 4:30 P.M. (Canada Eastern Time Zones) during the warranty period.

7.0 General Information and services provided by NRC

7.1 The equipment must be CSA or ULC-approved or certified by a recognized organization in Quebec.

7.2 All safety or emergency labels must be in English or illustrated by symbols.

7.3 Electrical voltage available: 600 volts, 3 phases, 60 Hz; 208 volts, 3 phases, 60 Hz; and 120 / 208 volts, 1 phase, 60 Hz. Any other voltage, if needed, must be obtained using a transformer supplied by the supplier.

7.4 All measuring, monitoring, display and record must be in SI (System international) units.

7.5 Compressed air: 90 PSI. The diameter of the pipe and the required flow rate shall be communicated by the supplier before or upon delivery.

7.6 Cooling water: 15 to 20 °C; the diameter of the pipe and the required flow rate shall be communicated by the supplier 30 days after contract award, of when final design drawings are submitted.

APPENDIX E1 - EVALUATION CRITERIA

1.0 Financial evaluation

1.1 The equipment required shall comply with the descriptions and specifications set out in Appendix E – Section 2.0 and 3.0 – Mandatory Technical Specifications. The descriptions and specifications are indicated hereafter by numbers ranging from 2.1.1 to 3.2.5.

Mandatory specifications	Specify the location in the bid documentation or data sheets where the mandatory specifications are met	Meet/not meet
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3.2.5		

APPENDIX F - Battery Stack Assembly Machine

REQUIREMENTS

1.0 Purpose

The National Research Council of Canada (NRC) wishes to acquire a semi-automated Li-ion battery prototype manufacturing line, in order to serve the Canadian battery manufacturing industry value chain. This manufacturing line must be able to produce industrial-quality pouch-type battery cells of different sizes, and shall include a number of different modules, starting from the mixing of active materials up to the final sealing and trimming of the pouch-cell.

Within this scope, NRC wishes to acquire an automated battery stack assembly machine. The equipment shall be a stand-alone piece of equipment designed and built for accuracy and robustness to operate in a safe manner in an anhydrous laboratory environment.The equipment must be delivered to the NRC's Boucherville site. All of the specifications indicated herein must be met.

The delivered equipment must have the following specifications:

2.0 Constraints

2.1 Overall dimensions

2.1.1 The overall width of the machine must not exceed 1.9 meters.

2.1.2 The overall depth of the machine must not exceed 1.5 meters.

2.1.3 The overall height of the machine must not exceed 2.4 meters.

3.0 Mandatory Technical Specifications

3.1 Equipment frame

3.1.1 Equipment must be supplied on self-standing frame with safety enclosures.

3.1.2 Frame must be provided with wheels for easy occasional displacement and positioning.

3.1.3 All outside metallic surfaces, if not of stainless steel or aluminium, must be painted for rust prevention.

3.2 Operation description

3.2.1 The equipment must be designed to stack separate elements (electrode sheets) and place a continuous separator sheet in-between using a separator Z-folding method.

3.2.2 The anode, cathode and separator stacking process must be performed automatically.

3.2.3 The equipment must be able to operate in a step-by-step mode.

3.2.4 Anode & cathode precise positioning must be performed with the pick-and-place method. In this method, the electrodes are automatically picked from magazines (one for the anodes, one for the cathodes) and placed on the stacking platform.

3.2.5 Anodes & cathodes must be positioned with a maximum error of +/- 0.5 mm associated with a Cpk index of 1 or higher.

3.2.6 The stacking platform must be equipped with automated grippers that hold electrodes and folded separator during stacking and separator Z-folding operations.

3.2.7 Anodes & cathodes stacking and gripper pressures must be adjustable and must remain constant during the entire cell-stacking process, in order to avoid any electrode displacement or damage during the operation.

3.2.8 The machine must be equipped with an adjustable web-tensioning system for the separator.

3.2.9 The machine must be equipped with an active web guiding system (EPC : Edge Position Controller) for the separator.

3.2.10 The separator must be guided with a maximum lateral error of +/- 0.5 mm associated with a Cpk index of 1 or higher.

3.2.11 After completing the cell-stacking, the separator must be automatically wound for an adjustable number of outer wraps, to hold the stack together.

3.2.12 After wrapping, the separator must be cut by the machine without losing the stack alignment nor the tension on the separator unwind path.

3.2.13 The separator tail must be taped to the stack manually or automatically.

3.3 Operator panel and emergency features

3.3.1 A touch screen control panel (HMI: human machine interface) must be installed on the frame of the machine and easily accessible by the operator.

3.3.2 Operation language must be in English.

3.3.3 The HMI must enable the operator to adjust the following parameters: separator lateral web positioning, separator web tension, anodes and cathodes pick-and-place system parameters, Z-fold stacking platform positioning.

3.3.4 The HMI must enable the entire control of the automatic stacking process.

3.3.5 The HMI must allow for immediate viewing of alarms.

3.3.6 The HMI must store an alarm history.

3.3.7 A minimum of one (1) Emergency stop button(s) must be placed on the frame of the machine.

3.3.8 The machine must be equipped with a network connection for remote connection by supplier and support.

3.4 Machine specification

3.4.1 Separator unwinding and cell stacking operations must be performed in a safety enclosure to minimize dust contamination and operator risk.

3.4.2 Machine's doors must be equipped with interlocked systems were required for the operator safety.

3.4.3 Pick-and-place process speed range must be adjustable up to at least 12 pick-and-places per minute.

3.4.4 Number of stacking electrodes (anode/cathode) must be operator adjustable via the HMI.

3.4.5 The machine must be capable of stacking equal or unequal numbers of cathodes and anodes (example: one more anode than the number of cathodes), controllable via the HMI.

3.4.6 The machine must be able to stack from 2 electrodes (1 anode and 1 cathode) up to 50 electrodes (or a stack thickness of 10 mm, whichever is less).

3.4.7 Unwind tension range to suit separator material (the separator characteristics are defined in section 3.6).

3.4.8 The machine must be able to operate in anhydrous environment (≤ -40 ºC dewpoint).

3.5 Magazines and Electrodes dimensions

3.5.1 Electrode magazines must be easily removable and replaceable via positive locating features.

3.5.2 Electrode magazines must have the capability to pile up to 70 mm of electrodes in height.

3.5.3 The equipment must be capable of operating with electrode sizes from :

- Width (W): 30 to 230 mm,

- Height (H): 40 to 230 mm, excluding electrode tabs.

3.5.4 Magazines to be included for 2 sizes of cathode: 1) 32x48 mm (WxH) and 148x198 mm (WxH), excluding tabs.

3.5.5 Magazines to be included for 2 sizes of anode: 1) 34x50 mm (WxH) and 150x200 mm (WxH), excluding tabs.

3.6 Separator dimensions

3.6.1 Separator material: typical examples are microporous membranes made of polyolefin, polyvinylidene fluoride, cellulose or polytetrafluoroethylene.

3.6.2 Separator width : from 30 to 230 mm

3.6.3 Separator thickness : from 10 to 40 microns

3.6.4 Separator form: continuous sheet provided in reel format.

3.6.5 Reel core ID: 76.2 mm (3''); OD up to 400 mm.

3.6.6 Reel weight : maximum 30 kg

4.0 Spare Parts

4.1 The contractor is asked to include a recommended spare parts list (RSPL) with their bid. The spares list may be included in the contract to be purchased optionally on an "as and when" required basis. This list shall include as a minimum:

4.1.1 Name and Description of item;
4.1.2 Price;
4.1.3 OEM Item Part Number;
4.1.4 Detailed Assembly Drawing or Specification Data Sheet.

4.2 Spare parts shall be available for a period of no less than 10 years, and should be readily available.

4.3 Suppliers must ensure that manuals and other related documents are updated when a spare part become obsolete and is replaced by a new model.

5.0 Deliverables

The following list of deliverables is to be included with the final equipment price, with the exception of the spare parts, which is to be listed as optional.

5.1 A set of tools specific to the equipment must be provided.

5.2 Two (2) copies of the technical documentation on the operation and maintenance of the equipment, written in English must be provided in both hard copy and electronic format.

5.3 Installation support and equipment commissioning. Those activities will take place at AST Boucherville location: 75 Boulevard de Mortagne, Boucherville, QC by qualified personnel of the manufacturing company.

5.4 System training to take place at AST Boucherville location: 75 Boulevard de Mortagne, Boucherville, QC. A complete one-day (7.5 hours) basic hands-on training must be given to at least 3 users, within 15 calendar days after commissioning.

5.5 A Spare parts list (offered as an optional item in the cost sheet).

6.0 System warranty and support

6.1 One (1) year warranty from start-up (commissioning) must be included. Comprising support by email, phone or Internet. The technical support within 24 hours during regular working hours between 8:30 A.M. and 4:30 P.M. (Canada Eastern Time Zones) during the warranty period.

7.0 General Information and services provided by NRC

7.1 The equipment must be CSA or ULC-approved or certified by a recognized organization in Quebec.

7.2 All safety or emergency labels must be in English or illustrated by symbols.

7.3 Electrical voltage available: 600 volts, 3 phases, 60 Hz; 208 volts, 3 phases, 60 Hz; and 120 / 208 volts, 1 phase, 60 Hz. Any other voltage, if needed, must be obtained using a transformer supplied by the supplier.

7.4 All measuring, monitoring, display and record must be in SI (System international) units.

7.5 Compressed air: 90 PSI, the diameter of the pipe and the required flow rate shall be communicated by the supplier before or upon delivery.

APPENDIX F1 - EVALUATION CRITERIA

1.0 Mandatory evaluation criteria

1.1 The equipment required shall comply with the descriptions and specifications set out in Appendix F –Section 2.0 and 3.0 – Mandatory Technical Specifications. The descriptions and specifications are indicated hereafter by numbers ranging from 2.1.1 to 3.6.6.

Mandatory specifications	**Specify the location in the bid documentation or data sheets where the mandatory specifications are met**	**Meet/not meet**
2.1.1		
2.1.2		
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3.2.1		
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3.6.6		

APPENDIX G - Slot-Die Slurry Coating and Drying Machine

REQUIREMENTS

1.0 Purpose

The National Research Council of Canada (NRC) wishes to acquire a semi-automated Li-ion battery prototype manufacturing line, in order to serve the Canadian battery manufacturing industry value chain. This manufacturing line must be able to produce industrial-quality pouch-type battery cells of different sizes, and shall include a number of different modules, starting from the mixing of active materials up to the final sealing and trimming of the pouch-cell.

Within this scope, NRC wishes to acquire a slot-die slurry coating and drying machine for the production of battery electrodes. The equipment must be delivered to the NRC's Boucherville site. All of the specifications indicated herein must be met.

The delivered equipment must have the following specifications:

2.0 Equipment Constraints

2.1 Overall dimensions

2.1.1 The overall length of the machine must not exceed 4 meters.

2.1.2 The overall width of the machine, once installed and ready to use, must not exceed 2.2 meters.

2.1.3 The overall width of the machine must not exceed 1.75m in order to fit through the building's interior doors when delivering to the laboratory.

2.1.4 The overall height of the machine must not exceed 2.1 meters.

3.0 Mandatory Technical Specifications

3.1 Coating machine

3.1.1 The machine must include the following sections: unwind roll, splice table, ink feeding station, die coater, drying oven, chill/pull roll and rewind roll.

3.1.2 The coating must be applied by a precision slot-die against a backing roll.

3.1.3 The machine must allow the use of aluminum, copper or nickel foil substrates with thicknesses ranging between 9 and 50 µm.

3.1.4 The width range for foil must be from 50 to 250mm.

3.1.5 The width range for the coating must be from 30 to 210mm.

3.1.6 The machine must mechanically permit to adjust and reach a speed ranging between 0.3 to 3mpm.

3.1.7 Equipment must be supplied on self-standing frame with safety enclosures.

3.1.8 The frame(s) and components must be painted or plated for corrosion protection.

3.1.9 Any supporting steel plates must meet the level of flatness of a maximum total indicator run out (TIR) of 0.25 µm.

3.1.10 Idler rolls must be of thin shell aluminum construction with hard anodized surface and balanced to ensure an optimal web tension control.

3.1.11 All rolls of the machine must have an outside diameter (OD) of at least 100 mm.

3.1.12 The machine must be equipped with a two zones LEL (lower explosive limit) monitoring system interlocked with the machine controls (zones to be determined).

3.2 Control system

3.2.1 A touch screen control panel (HMI: human machine interface) must be installed on the frame of the machine and easily accessible by the operator.

3.2.2 Operation language must be in English.

3.2.3 The HMI must enable the operator to adjust the following parameters: line speed, start/stop of stall tension, start/stop of line run, jog of individual motors, material tension set points, coating length, mass-free zone length (in case of intermittent coating), open/close of coating nip, open/close of material nip, start/stop of dryer fan(s), dryer temperature set point, rewind taper tension, feed pump rate set point, start/stop of feed pump.

3.2.4 The HMI main screen must indicate the actual line speed, the coated web length, the dryer actual temperatures, interlocks and alarms.

3.3 Roll-to-roll system

3.3.1 Both unwind and rewind shafts must have a width of at least 300mm.

3.3.2 Both unwind and rewind shafts must be able to accept rolls with cores having internal diameter (ID) of 76mm (3 inches).

3.3.3 Both unwind and rewind shafts must be equipped with a core locking device to secure the rolls in position.

3.3.4 Both unwind and rewind must have an OD capacity of at least 300mm.

3.3.5 Both unwind and rewind roll supports must be cantilevered.

3.3.6 Both unwind and rewind shafts must support rolls of up to a weight of at least 50kg.

3.3.7 The machine must have the capability of working with a web tension ranging between at least 0.2 to 1 PLI (pounds per lineal inch).

3.3.8 The machine must have at least three independent zones of automatic tension control strategically placed in the web course: between unwind and die (unwinding zone), between die and chill-roll (drying zone) and between chill-roll and rewind (rewinding zone).

3.3.9 The unwind station must have an adjustable constant tension control system.

3.3.10 The splice table must include clamps and knife guide slots.

3.3.11 The rewind station must have a tension control system with adjustable taper tension using roll diameter feedback.

3.3.12 The roll-to-roll system must include a chill/pull roll downstream of the drying oven, to cool the web and pull it prior to windup.

3.3.13 The chill roll must have a minimum external diameter of at least 150 mm with a wrap angle of at least 180 degrees to maximize heat transfer.

3.3.14 The chill/pull roll must have an internal cooling system ensuring the passage of tap or chilled water.

3.3.15 Both unwind and rewind zones must include active web guiding systems (EPC : Edge Position Controller).

3.3.16 The web guiding systems must ensure a maximum lateral error of +/- 0.5 mm.

3.4 Dryer

3.4.1 The dryer must comprise two thermally independent sections.

3.4.2 Dryers must be positioned in a linear and horizontal configuration.

3.4.3 Each drying section must be at least 1m.

3.4.4 Temperature must be independently controlled and monitored in each heating zone.

3.4.5 Each drying section must maintain a controlled temperature between ambient and 150 °C.

3.4.6 Each drying section must maintain a temperature of ± 2°C from the setpoint.

3.4.7 The inside of the dryer must be made of stainless steel.

3.4.8 The air supply must be heated with electric coils.

3.4.9 The heat skid must contain supply fans and heaters.

3.4.10 The heated air must be delivered to both sides of the web with a control of top/bottom flow ratio.

3.4.11 The web must be supported by idler rolls.

3.5 Slurry feeding system/station

3.5.1 The slurry feeding station must be mounted on a cart with wheels for mobility.

3.5.2 The slurry feeding station must operate using a pressurized system.

3.5.3 The holding tank volume must be between 5 and 10 L.

3.5.4 The slurry feeding station must be able to operate with slurry volumes as low as 1 L.

3.5.5 The holding tank and all wetted parts must be made of either 304 or 316 stainless steel.

3.5.6 The interior of the tank must be easily cleanable: equipped with tank liners chemically compatible with typical battery slurries or have an internal finish of 1-3 Ra.

3.5.7 The slurry must be delivered to the die using a precision progressive cavity pump (to be included).

3.5.8 The tank must have two ports, one to apply gas pressure and one for slurry delivery to the progressive cavity pump.

3.5.9 The tank must include a pressure gauge for internal pressure monitoring.

3.5.10 The tank must include a pressure relieve valve.

3.5.11 The tank must be equipped with an agitator driven by an inherently safe motor, to maintain the homogeneity of the slurry.

3.5.12 The rotational speed of the progressive cavity pump must be adjustable.

3.6 Coating head

3.6.1 The coating must be achieved using a precision slot-die (to be included).

3.6.2 The coating head must be equipped with a vacuum box that will allow a better control and stabilization of the slurry flow during application onto the moving web. The vacuum flow must be adjustable via a vacuum gage.

3.6.3 Die construction must be made of type 15-5 stainless steel hardened to at least 38-40Rc.

3.6.4 The slot die must have been treated to relieve the stress from the building process to insure an optimum stability of the parts.

3.6.5 The die must have a flat flow surface precision micro ground and diamond lapped to 1-3 Ra finish for all wetted surfaces, except for contoured flow surfaces that must be polished to at least 4-6 Ra finish.

3.6.6 The flow surfaces and lips must have a flatness/straightness of a maximum deviation of 0.001" (2.54µm) over their entire lengths.

3.6.7 The equipment must be able to perform all the following coating modes: continuous, stripe, and intermittent.

3.6.8 The intermittent coating option must be adjustable to create various mass-free zone lengths and frequencies.

3.6.9 The machine must be equipped with a sensor system to register the coated zones on first side and ensure the coating on the same zones on the other side of the web when employing the intermittent mode.

3.6.10 The backing roll must have a minimum OD of 150mm and a minimum of 300mm face.

3.6.11 The backing roll must be hard chrome-plated for corrosion protection, and polished to at least 2-4 Ra finish.

3.6.12 The backing roll must have a total indicator run out (TIR) of at most 1.25µm and a straightness deviation of at most 2.54µm.

3.6.13 The backing roll must be assembled with precision bearing and housing assemblies to insure a smooth and constant rolling.

3.6.14 The backing roll assembly (as assembled on the machine) must have a total indicator run out (TIR) of at most 1.25µm and a straightness deviation of at most 2.54 µm.

3.6.15 The die must be capable of operating with multiple types of slurries, with viscosities ranging from 5,000 to 10,000cPs.

3.6.16 A set of 4 stainless steel precision die-shims pre-punched to a perfect fit with the die must be included : 2 shims allowing a coating width of 60 mm and having thicknesses of 50 and 100 µm ; 2 shims allowing a coating width of 210 mm and having thicknesses of 50 and 100 µm ;

3.6.17 All components of the die mounting must be of 304 or 316 stainless steel or nickel plated steel.

3.6.18 The die must have two positions: operating and maintenance.

3.6.19 Transition from one position to the other must be pneumatically or automatically actuated.

3.6.20 The left/right gap adjustment in the operating position must allow a fine adjustment via precision slide assemblies, with a precision of ± 1µm.

3.6.21 The gap adjustments must be lockable and repeatable, in order to go from one position to the other without losing the settings in the operating mode.

3.6.22 The die mounting must allow an angular adjustment of the lips in order to apply the slurry at different angles from the centerline of the backing roll.

3.6.23 The die mounting must comprise safety stops to prevent the die lip from contacting with the backing roll.

3.6.24 The coating head must be enclosed for safety reasons.

3.6.25 The coating head enclosure must be made of aluminium with safety glass panels all around and at least 2 access doors.

3.6.26 The coating head enclosure must have an exhaust port connected to the dryer entry, for operator safety.

3.6.27 The web must be enclosed between the coating head and the dryer entry for thermal and security reasons.

4.0 Spare Parts

4.1 The contractor is asked to include a recommended spare parts list (RSPL) with their bid. The spares list may be included in the contract to be purchased optionally on an “as and when” required basis. This list shall include as a minimum:

4.1.1 Name and Description of item;
4.1.2 Price;
4.1.3 OEM Item Part Number;
4.1.4 Detailed Assembly Drawing or Specification Data Sheet.

4.2 Spare parts shall be available for a period of no less than 10 years, and should be readily available.

4.3 Suppliers must ensure that manuals and other related documents are updated when a spare part become obsolete and is replaced by a new model.

5.0 Deliverables

The following list of deliverables is to be included with the final equipment price, with the exception of the spare parts, which is to be listed as optional.

5.1 A set of tools specific to the equipment must be provided.

5.2 Two (2) copies of the technical documentation on the operation and maintenance of the equipment, written in English must be provided in both hard copy and electronic format.

5.3 Installation support and equipment commissioning. Those activities will take place at AST Boucherville location: 75 Boulevard de Mortagne, Boucherville, QC by qualified personnel of the manufacturing company.

5.4 System training to take place at AST Boucherville location: 75 Boulevard de Mortagne, Boucherville, QC. A complete one-day (7.5 hours) basic hands-on training must be given to at least 3 users, within 15 calendar days after commissioning.

5.5 A Spare parts list (offered as an optional item in the cost sheet).

6.0 System warranty and support

6.1 One (1) year warranty from start-up (commissioning) must be included. Comprising support by email, phone or Internet. The technical support within 24 hours during regular working hours between 8:30 A.M. and 4:30 P.M. (Canada Eastern Time Zones) during the warranty period.

7.0 General Information and services provided by NRC

7.1 The equipment must be CSA or ULC-approved or certified by a recognized organization in Quebec.

7.2 All safety or emergency labels must be in English or illustrated by symbols.

7.3 Electrical voltage available: 600 volts, 3 phases, 60 Hz; 208 volts, 3 phases, 60 Hz; and 120 / 208 volts, 1 phase, 60 Hz. Any other voltage, if needed, must be obtained using a transformer supplied by the supplier.

7.4 All measuring, monitoring, display and record must be in SI (System international) units.

7.5 Compressed air: 90 PSI. The diameter of the pipe and the required flow rate shall be communicated by the supplier before or upon delivery.

7.6 Cooling water: 15 to 20 °C; the diameter of the pipe and the required flow rate shall be communicated by the supplier 30 days after contract award, of when final design drawings are submitted.

APPENDIX G1 - EVALUATION CRITERIA

1.0 Mandatory evaluation criteria

The equipment required shall comply with the descriptions and specifications set out in Appendix G – Section 2.0 and 3.0 – Mandatory Technical Specifications. The descriptions and specifications are indicated hereafter by numbers ranging from 2.1.1 to 3.6.27.

Mandatory specifications	**Specify the location in the bid documentation or data sheets where the mandatory specifications are met**	**Meet/not meet**
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2.1.3		
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3.6.27		