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Bid Fax: (819) 997-9776

**LETTER OF INTEREST  
LETTRE D'INTÉRÊT**

Comments - Commentaires

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

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

<b>Title - Sujet</b> Accumulation Stands (1 - 4)	
<b>Solicitation No. - N° de l'invitation</b> K2A10-180936/A	<b>Date</b> 2018-01-25
<b>Client Reference No. - N° de référence du client</b> K2A10-180936	<b>GETS Ref. No. - N° de réf. de SEAG</b> PW-\$\$HN-468-74214
<b>File No. - N° de dossier</b> hn468.K2A10-180936	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2018-02-12</b>	
<b>Time Zone</b> Fuseau horaire Eastern Standard Time EST	
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Haroutounian, Rosanna	<b>Buyer Id - Id de l'acheteur</b> hn468
<b>Telephone No. - N° de téléphone</b> (819) 420-2076 ( )	<b>FAX No. - N° de FAX</b> ( ) -
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b> DEPARTMENT OF THE ENVIRONMENT 335 RIVER RD Marie-France Nguyen ETD-TD-VEDEV 613-998-9131 OTTAWA Ontario K1A0H3 Canada	

Instructions: See Herein

Instructions: Voir aux présentes

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

# **Request for Information (RFI)**

**for**

**Small Engine and Equipment Accumulation Stands**

**for**

**Environment and Climate Change Canada (ECCC)**

## **NOTE:**

This is not a bid solicitation.

Canada is seeking feedback from Industry with respect to ECCC's request for four accumulation stands for small engines and equipment.

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## 1. Purpose and Nature of the Request for Information (RFI)

Public Services and Procurement Canada (PSPC), on behalf of Environment and Climate Change Canada (ECCC) is requesting Industry feedback regarding the design and supply of four accumulation stands for the Vehicles and Engines Testing and Emissions Verification section of ECCC's Transportation Division.

This RFI is neither a call for tender nor a Request for Proposal (RFP). No agreement or contract will be entered into based on this RFI. The issuance of this RFI is not to be considered in any way a commitment by the Government of Canada (Canada), nor as authority to potential respondents to undertake any work that could be charged to Canada. This RFI is not to be considered as a commitment to issue a subsequent solicitation or award contract(s) for the work described herein.

Although the information collected may be provided as commercial-in-confidence (and, if identified as such, will be treated accordingly by Canada), Canada may use the information to assist in drafting performance specifications (which are subject to change) and for budgetary purposes.

Respondents are encouraged to identify, in the information they share with Canada, any information that they feel is proprietary, third party or personal information. Please note that Canada may be obligated by law (e.g. in response to a request under the Access of Information and Privacy Act) to disclose proprietary or commercially-sensitive information concerning a respondent (for more information: <http://laws-lois.justice.gc.ca/eng/acts/a-1/>).

Participation in this RFI is encouraged, but is not mandatory. There will be no short-listing of potential suppliers for the purposes of undertaking any future work as a result of this RFI. Similarly, participation in this RFI is not a condition or prerequisite for the participation in any potential subsequent solicitation.

Respondents will not be reimbursed for any cost incurred by participating in this RFI.

The RFI closing date published herein is not the deadline for comments or input. Comments and input will be accepted any time up to the time when/if a follow-on solicitation is published.

## 2. Objectives of the RFI

The purpose of this RFI process is to inform Industry of the impending RFP for ECCC accumulation stands by Canada, and to request that interested parties provide feedback on the breadth and depth of the project.

The intent of the consultation process will be to share working draft documents with Industry for input and/or for information purposes. PSPC will inform and consult with Industry regarding the following:

- level of interest in providing ECCC accumulation stands.
- ability to meet the design requirements identified herein.
- ability to meet the operational requirements identified herein.

A list of questions is provided in Annex C, for Industry's response. Note that the response requested is for information purposes only and will allow PSPC to clearly define the requirement for the required goods.

### 3. Background Information

Environment and Climate Change Canada's (ECCC) mandate is to preserve and enhance the quality of the natural environment; conserve Canada's renewable resources; conserve and protect Canada's water resources; forecast weather and environmental change; enforce rules relating to boundary waters; and coordinate environmental policies and programs for the federal government.

Paragraph 158(c) of the Canadian Environmental Protection Act, 1999 (CEPA) gives authority to ECCC to “establish and operate facilities for the testing of vehicles, engines or equipment and components, and acquire test equipment for that purpose”. The Vehicles and Engines Testing and Emissions Verification section of ECCC’s Transportation Division administers various programs to verify compliance with emission standards prescribed in the engine emission regulations made under the CEPA.

In order to prepare test specimens (engines) for testing, test specimens must undergo a service accumulation where the test specimens are “run-in” following various loadings. The service accumulation period allows the test specimen’s exhaust emissions to be stabilized prior to testing for exhaust emissions measurement.

The following links are provided for reference and relate to the standards prescribed under the Canadian Environmental Protection Act.

**Off-Road Small Spark-Ignition Engine Emission Regulations:**

<https://ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=81>

<http://laws-lois.justice.gc.ca/eng/regulations/SOR-2003-355/index.html>

**Off-Road Compression-Ignition Engine Emission Regulations:**

<https://ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=88>

<http://laws-lois.justice.gc.ca/eng/regulations/SOR-2005-32/index.html>

## 4. Security Requirement

There is no security requirement associated with this requirement.

## 5. Legislation, Trade Agreements, and Government Policies

The following is indicative of some of the legislation, trade agreements and government policies that could impact any follow-on solicitation(s):

- a) Canadian Free Trade Agreement (CFTA);
- b) North American Free Trade Agreement (NAFTA);
- c) World Trade Organization – Agreements on Government Procurement (WTO-AGP);
- d) Canada-European Union Comprehensive Economic and Trade Agreement (CETA);
- e) Canada-Chile Free Trade Agreement (CCFTA);
- f) Canada-Colombia Free Trade Agreement;
- g) Canada-Panama Free Trade Agreement;
- h) Canada-Peru Free Trade Agreement (CPFTA);
- i) Federal Contractors Program for Employment Equity (FCP-EE);

## 6. Schedule

In providing responses, the following schedule should be utilized as a baseline:

- Request for Information (RFI)
- One-on-One sessions (if necessary)
- RFP issued
- Evaluation of Bids
- Contract(s) Award

## 7. Important Notes to Respondents and Submission Requirements

### 7.1 Enquiries

Interested respondents must submit their responses and enquiries **electronically** to the PSPC Contracting Authority, identified below:

Name: **Rosanna Haroutounian**

Title: **Supply Officer**

Public Services and Procurement Canada (PSPC)

Acquisitions Branch

Logistics, Electrical, Fuel and Transportation Directorate (LEFTD)

Telephone: **819-420-2076**

Facsimile: **819-953-4944**

E-mail: [rosanna.haroutounian@tpsgc-pwgsc.gc.ca](mailto:rosanna.haroutounian@tpsgc-pwgsc.gc.ca)

## 7.2 Response Format

- a) **Cover Page:** If the response includes multiple volumes, respondents are requested to indicate on the front cover page of each volume the title of the response, the solicitation number, the volume number and the full legal name of the respondent. A point of contact for the Respondent should be included in the package.
- b) **Title Page:** The first page of each volume of the response, after the cover page, should be the title page, which should contain:
  - i. the title of the respondent's response and the volume number;
  - ii. the name and address of the respondent;
  - iii. the name, address and telephone number of the respondent's contact;
  - iv. the date; and
  - v. the RFI number.
- c) **Numbering System:** Respondents are requested to prepare their response using a numbering system corresponding to the one in this RFI. All references to descriptive material, technical manuals and brochures included as part of the response should be referenced accordingly.
- d) **Language of Response:** Responses may be provided in English or French, at the preference of the respondent.
- e) **Response Parameters:** Respondents are reminded that this is an RFI and not an RFP and, in that regard, respondents should feel free to provide their comments and/or concerns in addition to their responses, where applicable, alternative recommendations regarding how the requirements or objectives described in this RFI could be satisfied. Respondents are also invited to provide comments regarding the content, format and/or organization of any draft documents included in this RFI. Respondents should explain any assumptions they make in their responses.
- f) PSPC reserves the right to seek clarifications from a respondent for any information provided in response to this RFI, either by telephone, in writing or in person.
- g) **Response Confidentiality:** Respondents are requested to clearly identify those portions of their response that are proprietary. The confidentiality of each respondent's response will be maintained. Items that are identified as proprietary will be treated as such except where PSPC determines that the enquiry is not of a proprietary nature. PSPC may edit the questions or may request that the respondent do so, so that the proprietary nature of the question is eliminated, and the enquiry can be answered with copies to all interested parties.

There is no page limit on the response to be provided. Respondents are requested to respond to all questions posted in Annex C.

## 7.3 Submission of Responses

- a) **Time and Place for Submission of Responses:** Responses are to be submitted electronically to the Contracting Authority in Section 7.1.
- b) **Responsibility for Timely Delivery:** Each respondent is solely responsible for ensuring its response is delivered on time to the Contracting Authority in Section 7.1.

## 7.4 Nature of Responses Requested

Respondents are requested to provide their comments, concerns and, where applicable, alternative recommendations regarding how the requirements or objectives described in this RFI could be satisfied. Respondents are also invited to provide comments regarding the content, format and/or organization of any draft documents included in this RFI. Respondents should explain any assumptions they make in their responses.

## 8. Treatment of Responses and upcoming One-on-One Meetings (if applicable)

- a) **Use of Responses:** Responses will not be formally evaluated. However, the responses received may be used by Canada to develop or modify procurement strategies or any draft documents contained in this RFI. Canada will review all responses received by the RFI closing date. Canada may, in its discretion, review responses received after the RFI closing date.
- b) **Review Team:** A review team composed of representatives of the client (where applicable) and PSPC will review the responses. Canada reserves the right to hire any independent consultant, or use any Government resources that it considers necessary to review any response. Not all members of the review team will necessarily review all responses.
- c) **Follow-up Activity:** Canada may, in its discretion, contact any respondents to follow up with additional questions or for clarification of any aspect of a response. Also PSPC reserves the right to request a one-on-one meeting with any respondents. During this meeting respondents will be requested to provide an overall presentation, which will be followed by questions from PSPC. PSPC reserves the right to set the agenda, the number of attendees and the date, time and length of these one-on-one meetings. Please note that these meetings are not to include marketing-type presentations. Respondent participation in any one-on-one meeting is **not mandatory** for this RFI, nor will non-participation preclude any supplier from participating in any potential final RFP resulting from this process. All meetings will be treated as confidential. Canada will not reimburse any respondent for expenses incurred for any follow-up activities

## 9. Closing date for the RFI

Responses to this RFI are to be submitted to the PSPC Contracting Authority identified above, on or before **February 12, 2018.**

Changes to this RFI may occur and will be advertised on the Government Electronic Tendering System (GETS). Canada asks respondents to visit BuyandSell at <https://buyandsell.gc.ca/> regularly to check for changes, if any.

## **ANNEX A - Draft Statement of Work**

### **1.0 INTRODUCTION**

Environment and Climate Change Canada's (ECCC) mandate is to preserve and enhance the quality of the natural environment; conserve Canada's renewable resources; conserve and protect Canada's water resources; forecast weather and environmental change; enforce rules relating to boundary waters; and coordinate environmental policies and programs for the federal government.

Paragraph 158(c) of the Canadian Environmental Protection Act, 1999 (CEPA) gives authority to ECCC to “establish and operate facilities for the testing of vehicles, engines or equipment and components, and acquire test equipment for that purpose”. The Vehicles and Engines Testing and Emissions Verification section of ECCC's Transportation Division administers various programs to verify compliance with emission standards prescribed in the engine emission regulations made under the CEPA.

### **2.0 APPLICABLE DOCUMENTS**

The following links are provided for reference and relate to the standards prescribed under the Canadian Environmental Protection Act.

#### **2.1 Off-Road Small Spark-Ignition Engine Emission Regulations:**

<https://ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=81>  
<http://laws-lois.justice.gc.ca/eng/regulations/SOR-2003-355/index.html>

#### **2.2 Off-Road Compression-Ignition Engine Emission Regulations:**

<https://ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=88>  
<http://laws-lois.justice.gc.ca/eng/regulations/SOR-2005-32/index.html>

**This RFP contains four Statements of Work for four parts of test equipment.**

**Bidders may submit a bid for one or more parts.**

**Bidders must indicate clearly in their submission the part(s) for which they are submitting a bid.**

## **PART 1 – ACCUMULATION STAND FOR TYPE I ENGINES: HANDHELD EQUIPMENT**

This Statement of Work covers the design and supply of an accumulation stand for the service accumulation of off-road small spark-ignition engines of handheld equipment, where the engines will be loaded using various loading equipment.

### **1.0 Definitions**

#### **1.1. Type I - Handheld equipment specimens**

Examples of the Type I equipment specimens to be used on the accumulation stand include, but are not limited to, the following: grass trimmers, hedge trimmers, brush cutters, chainsaws, blowers, drills/augers, cut-off saws, etc.

### **2.0 Scope of Work**

#### **2.1 Accumulation Stand**

The contractor must design and build or supply a stand for service accumulation of handheld equipment specimens. The handheld equipment specimens will be loaded using different equipment such as, but not limited to, a water brake dynamometer or line loads. The loading equipment is not part of this SOW. The handheld equipment specimens will be mounted in a variety of configurations which may use the handle(s) on the equipment meant for the operator. For example, a chainsaw specimen may be held in place using the front and back handles with a water break dynamometer directly attached to the chainsaw's drive shaft.

#### **2.2 The Type I accumulation stand must meet the following functional and performance requirements:**

- 2.2.1 The accumulation stand must consist of a moveable platform, which can pass through standard double doors with an opening of 72 inches (182.9 centimeters) width by 85 inches (215.9 centimeters) height. If casters are used, they must be lockable or the accumulation stand must be stabilized with retractable/adjustable jacks. The use of fork tunnels to be used with a pallet jack is also acceptable.
- 2.2.2 The footprint of the stand must not exceed 75 x 200 centimeters (cm), and the platform height must be between 70 and 90 cm.
- 2.2.3 The platform must be isolated from the frame, to minimize vibrations transmitted by the specimen.
- 2.2.4 The platform must feature an array of t-slots running the length of the platform. There must be between 5 and 7 equally-spaced t-slots on the platform. These t-slots must accommodate 3/8"-16 threaded studs, as per the ANSI/ASME B5.1M-1985 standard.
- 2.2.5 The thickness of the platform must be between 25.4 and 50.8 millimeters (1.0 to 2.0 inches).
- 2.2.6 The accumulation stand must include any permanent fixtures used in the mounting of the equipment specimen, such as, but not limited to, clamping arms, permanent positioning arms, strut channel framing and t-slotted framing. A permanent fixture is understood to be one that will always be attached to the accumulation stand and can be used for any equipment specimen type (some of which are defined in 1.1).

- 2.2.7 The supply of non-permanent clamping equipment, including but not limited to, clamps, brackets and temporary positioning arms, is not part of this SOW. However, the Contractor must demonstrate with technical drawings how a chainsaw, grass trimmer, hedge trimmer, drill/auger and leaf blower would be mounted onto the accumulation stand. Specifications of the non-permanent clamping equipment must also be supplied. The non-permanent clamping equipment must be available off-the-shelf and cannot require a custom design requiring special fabrication.
- 2.2.8 A guard must be provided to protect from moving parts and to contain any components that could become free while the equipment specimen is under any type of operation, such as but not limited to wide-open throttle, partial-load and idle.
- 2.2.8.1 The guard must include a window allowing for complete view of the equipment specimen when it is mounted to the accumulation stand. The window must protect from moving parts and from any component that could become free with the equipment specimen under any type of operation, as defined in 2.2.8.
- 2.2.8.2 The guard must accommodate all types of equipment specimens, as defined in 1.1. It is acceptable that more than one guard be provided.
- 2.2.9 The stand must include a separate spill pan to contain any fuel or other fluid that may leak from the equipment specimen.
- 2.2.9.1 The spill pan must have a draining mechanism that does not require the removal of the accumulation stand.
- 2.2.9.2 The spill pan must encompass the footprint of the accumulation stand.
- 2.2.9.3 The spill pan must be dedicated to the Type I Accumulation Stand.
- 2.2.10 Throttle actuator
- 2.2.10.1 A throttle actuator must be included with mounting hardware, accommodating all equipment specimen configurations, as defined in 1.1. It is acceptable to provide more than one type of mounting hardware in order to accommodate all types of equipment specimens.
- 2.2.10.2 The throttle actuator must be an electromechanical type actuator. It must be capable of interfacing with National Instruments LabVIEW, which will be used as the computer control and data acquisition (DAQ) system. The DAQ system is not part of this SOW, however the contractor must demonstrate functionality and compatibility with DAQ system.
- 2.2.10.3 The throttle actuator must allow for variable throttle positions, from idle to full throttle.
- 2.2.10.4 The throttle actuator must be spring returned to 0 when no power is applied.
- 2.2.10.5 All electrical equipment must be UL or CSA approved.

### 2.3 Design Life

All hardware systems must have a 20 year life without failure when operated and maintained as per the original equipment manufacturer's instructions.

## 3.0 Deliverables

### 3.1 Deliverable 1:

The contractor must submit the design of the accumulation stand, including technical drawings listing dimensions, weight, and components. The functionality and compatibility of the throttle actuator with a DAQ system must be demonstrated. The contractor must demonstrate with technical drawings how the non-permanent mounting fixtures are used to mount the equipment specimen listed in 2.2.7 to the accumulation stand. The project authority must approve design before construction of the accumulation stand begins.

### 3.2 Deliverable 2:

- 3.2.1 The accumulation stand, as defined in the functional and performance requirements in section 2.0 Scope of Work.
- 3.2.2 Installation, service and operation manuals covering all of the components must be included.
- 3.2.3 Electronic copies of technical drawings and 3D files of the accumulation stand and the permanent mounting fixtures. Technical drawing files must be supplied in either dwg or pdf format. 3D files must be supplied in vendor-neutral format, such as STEP or IGS.
- 3.2.4 Delivery, assembly, installation and commissioning of the accumulation stand at 335 River Rd. S, Ottawa, ON K1V 1C7.

## 4.0 Schedule

- 4.1 The contractor must submit deliverable 3.1 within 30 days after the contract is awarded.
- 4.2 The contractor must submit deliverable 3.2 within 120 days after the contract is awarded.

## **PART 2 – ACCUMULATION STAND FOR TYPE II ENGINE: 3 KW OR LESS**

This Statement of Work covers the design and supply of one accumulation stand for the service accumulation of off-road small spark-ignition (SSI) engines.

### **1.0 Definitions**

#### 1.1 Type II - Small engine specimens

Examples of the Type II engine specimens to be used on the accumulation stand include, but are not limited to, engines of equipment such as: grass trimmers, hedge trimmers, brush cutters, chainsaws, blowers, drills/augers, cut-off saws, etc. The Type II engine specimens are SSI engines with a horizontal output shaft and a rated power of 3 kW or less (i.e. Class III-V engines of Title 40, Section 1054.801, of the *Code of Federal Regulations* of the United States).

### **2.0 Scope of Work**

#### 2.1 Accumulation Stand

The contractor must design and build or supply a stand for the service accumulation of off-road SSI engines. The engine specimens will be loaded using a dynamometer. The dynamometer and the engine specimen will be mounted onto one accumulation stand. The dynamometer's shaft and the engine specimen's drive shaft will be connected using a coupling.

#### 2.2 The accumulation stand for Type II Specimens must meet the following functional and performance requirements:

2.2.1 The accumulation stand must be moveable and must pass through standard double doors with an opening of 72 inches (182.9 centimeters) width by 85 inches (215.9 centimeters) height. If casters are used, they must be lockable or the accumulation stand must be stabilized with retractable/adjustable jacks. The use of fork tunnels to be used with a pallet jack is also acceptable.

2.2.2 The footprint of the stand must not exceed 75 x 200 centimeters (cm), and the platform height must be between 70 and 90 cm.

2.2.3 The mounting platform of the accumulation stand must be divided in two sections: a fixed platform for the dynamometer and an adjustable height platform for the specimen engine.

2.2.3.1 The adjustable section must have a minimum height adjustment of 10 cm above and 10 cm below the fixed dynamometer platform. The adjustment of the height adjustment must be performed by a mechanism that is operated by one person. The height adjustment must be infinitely adjustable, or in 5 millimeters (mm) increments maximum.

2.2.3.2 The adjustable section must have a vibration resistant locking mechanism to prevent movement once desired height is achieved.

2.2.3.3 The mounting platform should be isolated from the accumulation stand to minimize vibrations transmitted by the engine specimen.

- 2.2.3.4 The adjustable section of the platform must feature an array of t-slots running the length of the platform. There must be between 5 and 7 equally-spaced t-slots on the platform. These t-slots must accommodate 3/8"-16 threaded studs, as per the ANSI/ASME B5.1M-1985 standard.
- 2.2.3.5 The thickness of the adjustable section of the platform must be 38.1 to 50.8 millimeters (1.5 to 2.0 inches).
- 2.2.3.6 The thickness of the fixed section of the platform must be 25.4 to 38.1 millimeters to (1.0 to 1.5 inches).
- 2.2.4 The accumulation stand must include a separate spill pan to contain any fuel or other fluid that may leak from the specimen.
  - 2.2.4.1 The spill pan must have a draining mechanism that does not require the removal of the accumulation stand.
  - 2.2.4.2 The spill pan must encompass the footprint of the accumulation stand.
  - 2.2.4.3 The spill pan must be dedicated to the Type II Accumulation Stand.
- 2.2.5 Dynamometer
  - 2.2.5.1 A dynamometer must be installed on the fixed section of the platform and must meet the minimum specifications in Table 1.

Table 1: Dynamometer Specification for Type II Accumulation Stand

Parameter	Value
Maximum power rating (continuous)	up to 3 kiloWatts (kW)
Maximum torque range	up to 6 Newton-meter (N·m)
Maximum speed	up to 20,000 revolutions per minute (rpm)
Dynamometer inertia	less than 0.002 kilogram-square meter (kg·m <sup>2</sup> )

- 2.2.5.2 If the dynamometer requires an external cooling system, it must be included with the dynamometer and must be a forced air cooling system. The external cooling system must be dedicated to the Type II Accumulation Stand, and cannot be shared with any other accumulation stand(s).
- 2.2.5.3 A dynamometer controller must be included.
  - 2.2.5.3.1 The dynamometer controller must be a closed-loop design.
  - 2.2.5.3.2 A load cell to measure torque and a speed transducer must be included. These must be appropriately sized for the specifications of the dynamometer.
  - 2.2.5.3.3 It must be capable of interfacing with National Instruments LabVIEW, which will be used as the computer control and data acquisition (DAQ) system.

- 2.2.5.4 All electrical equipment must be UL or CSA approved.
- 2.2.5.5 A calibration arm and calibration weights must be included. The calibration arm and calibration weights must be appropriately sized for the specifications of the dynamometer.
- 2.2.5.6 The dynamometer must be equipped with an electric starter motor, to allow remote starting of the specimen engine. It must be possible to disengage the starter motor without having to remove the starter remover from the dynamometer.
- 2.2.6 A drive shaft and torsional coupling must be included to connect the dynamometer to the specimen output shaft. The drive shaft must allow for a parallel misalignment of up to 1 millimeter and an angular misalignment of up to 7.5° (e.g. Guardian 56SF or equivalent).
- 2.2.7 A drive shaft guard must be supplied to encapsulate the drive shaft and coupling. More than one drive shaft guard can be supplied to accommodate all centerline heights and drive shaft and coupling configurations.
  - 2.2.7.1 The drive shaft guard must accommodate all centerline heights as defined in 2.2.3, and all engine equipment types as defined in 1.1.
  - 2.2.7.2 The drive shaft guard must be able to open and close without having to remove the drive shaft guard from the accumulation stand. If a hinged mechanism is chosen to open and close the drive shaft guard, the hinges must be able to be locked.
  - 2.2.7.3 The drive shaft guard must be built to contain any drive line components in the event of a drive line break with the specimen under all type of operation, including but not limited to wide-open throttle, partial-load and idle.
- 2.2.8 Throttle actuator
  - 2.2.8.1 A throttle actuator must be included with mounting hardware, accommodating all engine specimen configurations, as defined in 1.1. It is acceptable to provide more than one type of mounting hardware in order to accommodate all types of engine specimens.
  - 2.2.8.2 The throttle actuator must be an electromechanical type actuator. It must be capable of interfacing with National Instruments LabVIEW, which will be used as the computer control and DAQ.
  - 2.2.8.3 The throttle actuator must allow for variable throttle positions, from idle to full throttle.
  - 2.2.8.4 The throttle actuator must be spring returned to 0 when no power is applied.
- 2.2.9 The DAQ system is not part of this SOW; however, the contractor must demonstrate functionality and compatibility of the dynamometer controller and throttle actuator with a DAQ system. The contractor must supply hardware interfaces (if required),

communication requirements and specifications (i.e. programming commands, control signals) to integrate with a DAQ system.

### 2.3 Design Life

All hardware systems must have a 20 year life without failure when operated and maintained as per the original equipment manufacturer's instructions.

## 3.0 Deliverables

### 3.1 Deliverable 1:

The contractor must submit the design of the accumulation stand, including technical drawings listing dimensions, weight, and components. The functionality and compatibility of the dynamometer controllers and throttle actuators with a DAQ system must be demonstrated. The project authority must approve design before construction of the accumulation stands begins.

### 3.2 Deliverable 2:

3.2.1 The accumulation stand, as defined in the functional and performance requirements in section 2.0 Scope of Work.

3.2.2 The contractor must supply hardware interfaces (if required), communication requirements and specifications (i.e. programming commands, control signals) to integrate with a DAQ system.

3.2.3 Installation, service and operation manuals covering all of the components must be included.

3.2.4 Electronic copies of technical drawings and 3D files of the accumulation stands. Technical drawing files must be supplied in either dwg or pdf format. 3D files must be supplied in vendor-neutral format, such as STEP or IGS.

3.2.5 Delivery, assembly, installation and commissioning of the accumulation stands and systems at 335 River Rd. S, Ottawa, ON K1V 1C7.

## 4.0 Schedule

4.1 The contractor must submit deliverable 3.1 within 30 days after the contract is awarded.

4.2 The contractor must submit deliverable 3.2 within 120 days after the contract is awarded.

## **PART 3 – ACCUMULATION STAND FOR TYPE III ENGINES: 20 KW OR LESS**

This Statement of Work covers the design and supply of one accumulation stand for the service accumulation of off-road small spark-ignition (SSI) and small compression-ignition (CI) engines, where an external load is applied by a dynamometer.

### **1.0 Definitions**

#### **1.1 Type III – Engine Specimens**

Examples of the Type III engine specimens to be used on the accumulation stand include, but are not limited to, engines of equipment such as: lawn mowers, snow blowers, cultivators, pressure washers, vibrating plate compactors, etc. The Type III engine specimens are SSI or CI engines with a horizontal or vertical output shaft and a rated power of 20 kW or less (i.e. Class I and II engines of Title 40, Section 1054.801, of the *Code of Federal Regulations of the United States*).

### **2.0 Scope of Work**

#### **2.1 Accumulation Stand**

The Contractor must design and build or supply a stand for the service accumulation of off-road SSI and small CI engines. The engine specimens will be loaded using a dynamometer. The dynamometer and the engine specimen will be mounted onto one accumulation stand. The dynamometer's shaft and the engine specimen's drive shaft will be connected using a coupling.

#### **2.2 The accumulation stand for Type III Specimens must meet the following functional and performance requirements:**

2.2.1 The accumulation stand must be moveable and must pass through standard double doors with an opening of 72 inches (182.9 centimeters) width by 85 inches (215.9 centimeters) height. If casters are used, they must be lockable or the stand must be stabilized with retractable/adjustable jacks. The use of fork tunnels to be used with a pallet jack is also acceptable.

2.2.2 The footprint of the stand must not exceed 75 x 200 cm, and the platform height must be between 70 and 90 cm.

2.2.3 The platform must consist of two sections: one for the dynamometer and the other for the specimen engine.

2.2.3.1 The dynamometer must be mounted on a platform, which can pivot to allow coupling to specimens in both vertical and horizontal output shaft configuration. The platform for the dynamometer must be able to be locked in place once positioned in either the vertical or horizontal position.

2.2.3.2 The platform for the specimen engine must feature an array of t-slots running the length of the platform. There must be between 5 and 7 equally-spaced t-slots on the platform for the specimen engine. These t-slots must accommodate ½"-13 threaded studs, as per the ANSI/ASME B5.1-M-1985 standard.

2.2.3.3 The thickness of the platform must be 50.8 to 63.5 millimeters (2.0 to 2.5 inches).

- 2.2.3.4 The platform must be isolated from the accumulation stand to minimize vibrations transmitted by the specimen engine.
- 2.2.4 The accumulation stand must include a separate spill pan to contain any fuel or other fluid that may leak from the specimen.
  - 2.2.4.1 The spill pan must have a draining mechanism that does not require the removal of the accumulation stand.
  - 2.2.4.2 The spill pan must encompass the footprint of the accumulation stand.
  - 2.2.4.3 The spill pan must be dedicated to the Type III Accumulation Stand.
- 2.2.5 Dynamometer

2.2.5.1 The dynamometer must meet the minimum specifications in Table 1.

Table 1: Dynamometer Specification for Type III Accumulation Stand.

Parameter	Value
Maximum power rating (continuous)	up to 20 kiloWatts (kW)
Maximum torque range	up to 80 Newton-meter (N·m)
Maximum speed	up to 10,000 revolutions per minute (rpm)
Dynamometer inertia	less than 0.017 kilograms square-meter (kg·m <sup>2</sup> )
Dynamometer rotation	Bi-directional

- 2.2.5.2 If the proposed dynamometer is eddy-current type, it must be a dry-gap dynamometer. If the proposed dynamometer is an electric dynamometer (AC or DC), it must include the drive appropriately sized for the electric dynamometer. The installation and commissioning of the drive must be included. Notwithstanding the type of dynamometer proposed, the dynamometer must be able to operate in a horizontal and in a vertical position.
- 2.2.5.3 If the dynamometer requires an external cooling system, it must be included with the dynamometer. If an eddy-current dynamometer is proposed, the cooling system must be a liquid cooling system. All components of the cooling system loop must be included, including but not limited to the pump, chiller, etc. Installation and commissioning costs of the cooling system must be included. The external cooling system must be dedicated to the Type III accumulation stand, and cannot be shared with any other accumulation stand(s).
- 2.2.5.4 The dynamometer must be equipped with an electric starter motor, to allow remote starting of the specimen engine. It must be possible to disengage the starter motor without having to remove the starter remover from the dynamometer.
- 2.2.5.5 A dynamometer controller must be included.
  - 2.2.5.5.1 The dynamometer controller must be a closed-loop design.

- 2.2.5.5.2 A load cell to measure torque and a speed transducer must be included. These must be appropriately sized for the specifications of the dynamometer.
- 2.2.5.5.3 The dynamometer controller must be capable of interfacing with National Instruments LabVIEW, which will be used as the computer control and data acquisition (DAQ) system.
- 2.2.5.6 All electrical equipment must be UL or CSA approved.
- 2.2.5.7 Calibration arm and calibration weights must be included. The calibration arm and calibration weights must be appropriately sized for the specifications of the dynamometer.
- 2.2.6 A drive shaft and torsional coupling must be included to connect the dynamometer to the specimen engine output shaft. The drive shaft must allow for a parallel misalignment of up to 0.51 millimeter and an angular misalignment of up to 2.4° (e.g. Sure-Flex Plus 8S, or equivalent).
- 2.2.7 A drive shaft guard must be supplied to encapsulate the drive shaft and coupling. More than one drive shaft guard can be supplied to accommodate all centerline heights and drive shaft and coupling configurations.
  - 2.2.7.1 The drive shaft guard must accommodate all centerline heights for any engine specimen, as defined in 1.1.
  - 2.2.7.2 The drive shaft guard must be able to open and close without having to remove the drive shaft guard from the accumulation stand. If a hinged mechanism is chosen to open and close the drive shaft guard, the hinges must be able to be locked.
  - 2.2.7.3 The drive shaft guard must accommodate specimen engines with horizontal and vertical drive shafts.
  - 2.2.7.4 The drive shaft guard must be built to contain any drive line components in the event of a drive line break with the specimen under all type of operation, including but not limited to wide-open throttle, partial-load and idle.
- 2.2.8 Throttle actuator
  - 2.2.8.1 A throttle actuator must be included with mounting hardware, accommodating all engine specimen configurations, as defined in 1.1. It is acceptable to provide more than one type of mounting hardware in order to accommodate all types of engine specimens.
  - 2.2.8.2 The throttle actuator must be an electromechanical type actuator. It must be capable of interfacing with National Instruments LabVIEW, which will be used as the computer control and DAQ system.
  - 2.2.8.3 The throttle actuator must allow for variable throttle positions, from idle to full throttle.

2.2.8.4 The throttle actuator must be spring returned to 0 when no power is applied.

2.2.9 The DAQ system is not part of this SOW; however, the contractor must demonstrate functionality and compatibility of the dynamometer controller and throttle actuator with a DAQ system. The contractor must supply hardware interfaces (if required), communication requirements and specifications (i.e. programming commands, control signals) to integrate with a DAQ system.

### 2.3 Design Life

All hardware systems must have a 20 year life without failure when operated and maintained as per the original equipment manufacturer's instructions.

## 3.0 Deliverables

### 3.1 Deliverable 1:

The contractor must submit the design of the accumulation stand, including technical drawings listing dimensions, weight, and components. The functionality and compatibility of the dynamometer controllers and throttle actuators with a DAQ system must be demonstrated. The project authority must approve design before construction of the accumulation stands begins.

### 3.2 Deliverable 2:

3.2.1 The accumulation stand, as defined in the functional and performance requirements in section 2.0 Scope of Work.

3.2.2 The contractor must supply hardware interfaces (if required), communication requirements and specifications (i.e. programming commands, control signals) to integrate with a DAQ system.

3.2.3 Installation, service and operation manuals covering all of the components must be included.

3.2.4 Electronic copies of technical drawings and 3D files of the accumulation stands. Technical drawing files must be supplied in either dwg or pdf format. 3D files must be supplied in vendor-neutral format, such as STEP or IGS.

3.2.5 Delivery, assembly, installation and commissioning of the accumulation stands and systems at 335 River Rd. S, Ottawa, ON K1V 1C7.

## 4.0 Schedule

4.1 The contractor must submit deliverable 3.1 within 30 days after the contract is awarded.

4.2 The contractor must submit deliverable 3.2 within 120 days after the contract is awarded.

## **PART 4 – LOAD BANK FOR TYPE IV ENGINES: ELECTRIC GENERATORS**

This Statement of Work covers the design and supply of a programmable alternating current (AC) load bank for the service accumulation of off-road small spark-ignition and off-road compression-ignition engines in electric generators.

### **1.0 Definitions**

#### 1.1. Type IV - Electrical generator specimens

The electrical generators to be accumulated are portable type generators with spark-ignition or compression-ignition engines, with a maximum electric power output of 20 kilowatts. The electrical generators will be single-phase.

### **2.0 Scope of Work**

#### 2.1 Load Bank

The contractor must design and build or supply a load bank for service accumulation of electric generators.

#### 2.2 The programmable load bank must meet the following functional and performance requirements:

- 2.2.1 The electrical loading of the generator must be achieved through a programmable load bank, capable of applying a resistive load of up to 20 kilowatts (kW) in 250 watt increments or less for 120 volts and 240 volts 60 hertz single phase AC. Two or more load banks can be connected to attain the total resistive load.
- 2.2.2 The load bank must be programmable. The load bank must be capable of interfacing with National Instruments LabVIEW, which will be used as the computer control and data acquisition system (DAQ), to apply the various electrical loads.
- 2.2.3 The programmable load bank must be capable of measuring actual load voltage and current and provide an output for each value to the National Instruments LabVIEW DAQ system. The accuracy must be 1 % of the full scale or better for both voltage and current.
- 2.2.4 The DAQ system is not part of this SOW, however the contractor must demonstrate the programmable load bank's functionality with a DAQ system.
- 2.2.5 Cables to connect electric generators to the programmable load bank must be included, for both 120V and 240V configurations. The cable length must be determined at design approval, see 3.1 Deliverable 1.

#### 2.3 Design Life

All hardware systems must have a 20 year life without failure when operated and maintained as per the original equipment manufacturer's instructions.

### **3.0 Deliverables**

#### **3.1 Deliverable 1:**

The contractor must submit the design of the load bank, including technical drawings listing dimensions, weight, components and its specifications. The project authority must approve design before construction.

#### **3.2 Deliverable 2:**

3.2.1 The delivery of the programmable load bank and all associated equipment as defined in the functional and performance requirements in section 2.0 Scope of Work.

3.2.2 Installation, service and operation manuals covering all of the components must be included.

3.2.3 Delivery, assembly, installation and commissioning of the accumulation stand at 335 River Rd. S, Ottawa, ON K1V 1C7.

### **4.0 Schedule**

4.1 The contractor must submit deliverable 3.1 within 30 days after the contract is awarded.

4.2 The contractor must submit deliverable 3.2 within 120 days after the contract is awarded.

## ANNEX B – Draft Evaluation Criteria

### PART 1 - ACCUMULATION STAND FOR TYPE I ENGINES: HANDHELD EQUIPMENT

#### 1.0 MANDATORY TECHNICAL CRITERIA (MT)

The Bid must meet the mandatory technical criteria specified below. Bidders must provide the necessary documentation to support compliance with the requirements, including technical data sheets, specifications, brochures and/or other relevant technical documentation describing the equipment offered and demonstrating compliancy. Each mandatory technical criterion must be addressed separately and in the order presented below.

Bids which fail to meet the mandatory technical criteria will be declared non-responsive.

The Bidder is requested to identify in the tables below the section(s) or page(s) of its proposal in which evidence is provided to clearly demonstrate that each of the Mandatory Technical Criterion has been met.

#	SOW Part 1	MANDATORY TECHNICAL CRITERION (MT)	MET / NOT MET	SECTION / PAGE #
MT1	2.2.1	The accumulation stand must consist of a moveable platform, which can pass through standard double doors opening of 72 inches (182.9 centimeters) width by 85 inches (215.9 centimeters) height. If casters are used, they must be lockable or the accumulation stand must be stabilized with retractable/adjustable jacks. The use of fork tunnels to be used with a pallet jack is also acceptable.		
MT2	2.2.2	The footprint of the stand must not exceed 75 x 200 centimeters (cm), and the platform height must be between 70 and 90 cm.		
MT3	2.2.3	The platform must be isolated from the frame, to minimize vibrations transmitted by the specimen.		
MT4	2.2.4	The platform must feature an array of t-slots running the length of the platform. There must be between 5 and 7 equally-spaced t-slots on the platform. These t-slots must accommodate 3/8"-16 threaded studs, as per the ANSI/ASME B5.1M-1985 standard.		
MT5	2.2.5	The thickness of the platform must be between 25.4 and 50.8 millimeters (1.0 to 2.0 inches).		
MT6	2.2.6	The accumulation stand must include any permanent fixtures used in the mounting of the equipment specimen, such as, but not limited to, clamping arms, permanent positioning arms, strut channel framing and t-slotted framing. A permanent fixture is understood to be one that will always be attached to the accumulation stand and can be used for any equipment specimen type (some of which are defined in 1.1).		

MT7	2.2.7	The Bidder must demonstrate with technical drawings how a chainsaw, a grass trimmer, a hedge trimmer, a drill/auger and a leaf blower would be mounted onto the accumulation stand. Specifications of the non-permanent clamping equipment must also be supplied. The non-permanent clamping equipment must be available off-the-shelf and cannot require a custom design requiring special fabrication.		
MT8	2.2.8	A guard must be provided to protect from moving parts and to contain any components that could become free while the equipment specimen is under any type of operation, such as but not limited to wide-open throttle, partial-load and idle.		
MT9	2.2.8.1	The guard must include a window allowing for complete view of the equipment specimen when it is mounted to the accumulation stand. The window must protect from moving parts and from any component that could become free with the equipment specimen under any type of operation, as defined in 2.2.8.		
MT10	2.2.8.2	The guard must accommodate all types of equipment specimens, as defined in 1.1. It is acceptable that more than one guard be provided.		
MT11	2.2.9	The stand must include a separate spill pan to contain any fuel or other fluid that may leak from the equipment specimen.		
MT12	2.2.9.1	The spill pan must have a draining mechanism that does not require the removal of the accumulation stand.		
MT13	2.2.9.2	The spill pan must encompass the footprint of the accumulation stand.		
MT14	2.2.9.3	The spill pan must be dedicated to the Type I Accumulation Stand.		
MT15	2.2.10.1	A throttle actuator must be included with mounting hardware, accommodating all equipment specimen configurations, as defined in 1.1. It is acceptable to provide more than one type of mounting hardware in order to accommodate all types of equipment specimens.		
MT16	2.2.10.2	The throttle actuator must be an electromechanical type actuator. It must be capable of interfacing with National Instruments LabVIEW, which will be used as the computer control and data acquisition (DAQ) system. The DAQ system is not part of this SOW, however the contractor must demonstrate functionality and compatibility with DAQ system.		
MT17	2.2.10.3	The throttle actuator must allow for variable throttle positions, from idle to full throttle.		

MT18	2.2.10.4	The throttle actuator must be spring returned to 0 when no power is applied.		
MT19	2.2.10.5	All electrical equipment must be UL or CSA approved.		

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## 2.0 POINT-RATED TECHNICAL CRITERIA (PRT)

- Bids which meet all the mandatory technical criteria will be evaluated and scored as specified in the table below.
- In order to qualify for the rating process, proposals must respond to the following point-rated technical criteria.
- Bids must receive a minimum technical pass mark of **12.5 out of 25** on the point-rated technical criteria in order to be evaluated on the basis of their Financial Proposal.
- Bids which fail to achieve the technical pass mark will be declared non-responsive and given no further consideration.
- All project references may be checked for accuracy and applicability.
- The Bidder may use cross-referencing where applicable.

ITEM #	POINT-RATED TECHNICAL CRITERION (PRT)	POINTS / SCORE	SECTION / PAGE #
PRT 1.0	<p>Bidders must propose equipment that must not be a prototype or test unit, but standard proven equipment of the manufacturer and contains reliable state-of-the-art technology.</p> <p>In order to demonstrate this requirement, Bidders must provide with their bid at least two (2) technical drawings and/or pictures of previous similar designs and identify customers who have recently purchased the equipment. For a design to be considered valid, it is necessary that the equipment specified in the project:</p> <ul style="list-style-type: none"> <li>• be a similar product; and</li> <li>• was sold within the 24 months period prior to the closing date of this bid solicitation.</li> </ul> <p>(10 points per design)</p>	/20	
PRT 2.0	<p>Bidders must submit with their bid the following information for each customer identified in PRT 1.0:</p> <ul style="list-style-type: none"> <li>• the brand name and model of the equipment sold;</li> <li>• the date of sale;</li> <li>• technical details of the equipment sold;</li> <li>• a description of how the equipment sold meets the requirements of Criterion PRT 1.0; and</li> <li>• customer contact information, which should include organization name, organization address, contact name, contact telephone number, and contact e-mail address.</li> </ul> <p>The provided information may be verified with the Bidder's customer to confirm its accuracy. If the information verification does not match the requirements, then the Bid may be declared non-responsive.</p> <p>(2.5 points per reference)</p>	/5	
<b>TOTAL</b>		/25	

<b>PART 1 - ACCUMULATION STAND FOR TYPE I ENGINES: HANDHELD EQUIPMENT SUMMARY AND FINAL POINT-RATED SCORE</b>	
<b>POINT-RATED TECHNICAL CRITERIA</b>	<b>SCORE</b>
PART 1 – PRT 1.0	/ 20
PART 1 – PRT 2.0	/ 5
<b>TOTAL</b>	<b>/ 25</b>
<b>PASS MARK:</b>	12.5 / 25
<b>PASS / FAIL:</b>	

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## PART 2 - ACCUMULATION STAND FOR TYPE II ENGINES: 3 KW OR LESS

### 1.0 MANDATORY TECHNICAL CRITERIA (MT)

The Bid must meet the mandatory technical criteria specified below. Bidders must provide the necessary documentation to support compliance with the requirements, including technical data sheets, specifications, brochures and/or other relevant technical documentation describing the equipment offered and demonstrating compliancy. Each mandatory technical criterion must be addressed separately and in the order presented below.

Bids which fail to meet the mandatory technical criteria will be declared non-responsive.

The Bidder is requested to identify in the tables below the section(s) or page(s) of its proposal in which evidence is provided to clearly demonstrate that each of the Mandatory Technical Criterion has been met.

#	SOW Part 2	MANDATORY TECHNICAL CRITERION (MT)	MET / NOT MET	SECTION / PAGE #
MT1	2.2.1	The accumulation stand must be moveable and must pass through standard double doors with an opening of 72 inches (182.9 centimeters) width by 85 inches (215.9 centimeters) height. If casters are used, they must be lockable or the accumulation stand must be stabilized with retractable/adjustable jacks. The use of fork tunnels to be used with a pallet jack is also acceptable.		
MT2	2.2.2	The footprint of the stand must not exceed 75 x 200 centimeters (cm), and the platform height must be between 70 and 90 cm.		
MT3	2.2.3	The mounting platform must be divided in two sections: a fixed platform for the dynamometer and an adjustable height platform for the specimen engine.		
MT4	2.2.3.1	The adjustable section must have a minimum height adjustment of 10 cm above and 10 cm below the fixed dynamometer platform. The adjustment of the height adjustment must be performed by a mechanism that is operated by one person. The height adjustment must be infinitely adjustable, or in 5 millimeters (mm) increments maximum.		
MT5	2.2.3.2	The adjustable section must have a vibration resistant locking mechanism to prevent movement once desired height is achieved.		
MT6	2.2.3.3	The mounting platform should be isolated from the accumulation stand, to minimize vibrations transmitted by the engine specimen.		
MT7	2.2.3.4	The adjustable section of the platform must feature an array of t-slots running the length of the platform. There must be between 5 and 7 equally-spaced t-slots on the platform. These t-slots must		

		accommodate 3/8"-16 threaded studs, as per the ANSI/ASME B5.1M-1985 standard.		
MT8	2.2.3.5	The thickness of the adjustable section of the platform must be 38.1 to 50.8 millimeters (1.5 to 2.0 inches).		
MT9	2.2.3.6	The thickness of the fixed section of the platform must be 25.4 to 38.1 millimeters to (1.0 to 1.5 inches).		
MT10	2.2.4	The accumulation stand must include a separate spill pan to contain any fuel or other fluid that may leak from the specimen.		
MT11	2.2.4.1	The spill pan must have a draining mechanism that does not require the removal of the accumulation stand.		
MT12	2.2.4.2	The spill pan must encompass the footprint of the accumulation stand.		
MT13	2.2.4.3	The spill pan must be dedicated to the Type II Accumulation Stand.		
MT14	2.2.5.1	A dynamometer must be installed on the fixed section of the platform and must meet the minimum specifications: <ul style="list-style-type: none"> <li>• Maximum power rating (continuous): up to 3 kiloWatts (kW)</li> <li>• Maximum torque range: up to 6 Newton-meter (N·m)</li> <li>• Maximum speed: up to 20,000 revolutions per minute (rpm)</li> <li>• Dynamometer inertia: less than 0.002 kilogram-square meter (kg·m<sup>2</sup>)</li> </ul>		
MT15	2.2.5.2	If the dynamometer requires an external cooling system, it must be included with the dynamometer and must be a forced air cooling system. The external cooling system must be dedicated to the Type II Accumulation Stand, and cannot be shared with any other accumulation stand(s).		
MT16	2.2.5.3	A dynamometer controller must be included.		
MT17	2.2.5.3.1	The dynamometer controller must be a closed-loop design.		
MT18	2.2.5.3.2	A load cell to measure torque and a speed transducer must be included. These must be appropriately sized for the specifications of the dynamometer.		
MT19	2.2.5.3.3	It must be capable of interfacing with National Instruments LabVIEW, which will be used as the computer control and data acquisition (DAQ) system.		
MT20	2.2.5.4	All electrical equipment must be UL or CSA approved.		

MT21	2.2.5.5	A calibration arm and calibration weights must be included. The calibration arm and calibration weights must be appropriately sized for the specifications of the dynamometer.		
MT22	2.2.5.6	The dynamometer must be equipped with an electric starter motor, to allow remote starting of the specimen engine. It must be possible to disengage the starter motor without having to remove the starter remover from the dynamometer.		
MT23	2.2.6	A drive shaft and torsional coupling must be included to connect the dynamometer to the specimen output shaft. The drive shaft must allow for a parallel misalignment of up to 1 millimeter and an angular misalignment of up to 7.5° (e.g. Guardian 56SF or equivalent).		
MT24	2.2.7	A drive shaft guard must be supplied to encapsulate the drive shaft and coupling. More than one drive shaft guard can be supplied to accommodate all centerline heights and drive shaft and coupling configurations.		
MT25	2.2.7.1	The drive shaft guard must accommodate all centerline heights as defined from 2.2.3.1 to 2.2.3.6, and all engine equipment types as defined in 1.1.		
MT26	2.2.7.2	The drive shaft guard must be able to open and close without having to remove the drive shaft guard from the accumulation stand. If a hinged mechanism is chosen to open and close the drive shaft guard, the hinges must be able to be locked.		
MT27	2.2.7.3	The drive shaft guard must be built to contain any drive line components in the event of a drive line break with the specimen under all type of operation, including but not limited to wide-open throttle, partial-load and idle.		
MT28	2.2.8.1	A throttle actuator must be included with mounting hardware, accommodating all engine specimen configurations, as defined in 1.1. It is acceptable to provide more than one type of mounting hardware in order to accommodate all types of engine specimens.		
MT29	2.2.8.2	The throttle actuator must be an electromechanical type actuator. It must be capable of interfacing with National Instruments LabVIEW, which will be used as the computer control and DAQ.		
MT30	2.2.8.3	The throttle actuator must allow for variable throttle positions, from idle to full throttle.		
MT31	2.2.8.4	The throttle actuator must be spring returned to 0 when no power is applied.		
MT32	2.2.9	The DAQ system is not part of this SOW; however, the contractor must demonstrate functionality and		

		compatibility of the dynamometer controller and throttle actuator with a DAQ system. The Bidder must supply hardware interfaces (if required), communication requirements and specifications (i.e. programming commands, control signals) to integrate with a DAQ system.		
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## 2.0 POINT-RATED TECHNICAL CRITERIA (PRT)

- Bids which meet all the mandatory technical criteria will be evaluated and scored as specified in the table below.
- In order to qualify for the rating process, proposals must respond to the following point-rated technical criteria.
- Bids must receive a minimum technical pass mark of **12.5 out of 25** on the point-rated technical criteria in order to be evaluated on the basis of their Financial Proposal.
- Bids which fail to achieve the technical pass mark will be declared non-responsive and given no further consideration.
- All project references may be checked for accuracy and applicability.
- The Bidder may use cross-referencing where applicable.

ITEM #	POINT-RATED TECHNICAL CRITERION (PRT)	POINTS / SCORE	SECTION / PAGE #
PRT 1.0	<p>Bidders must propose equipment that must not be a prototype or test unit, but standard proven equipment of the manufacturer and contains reliable state-of-the-art technology.</p> <p>In order to demonstrate this requirement, Bidders must provide with their bid, at least two (2) technical drawings and/or pictures of previous similar designs and identifying customers who have recently purchased the equipment. For a design to be considered valid, it is necessary that the equipment specified in the project:</p> <ul style="list-style-type: none"> <li>• be a similar product; and</li> <li>• was sold within the 24 months period prior to the closing date of this bid solicitation.</li> </ul> <p>(10 points per design)</p>	/20	
PRT 2.0	<p>Bidders must submit with their bid, the following information for each customer identified in PRT 1.0:</p> <ul style="list-style-type: none"> <li>• the brand name and model of the equipment sold;</li> <li>• the date of sale;</li> <li>• technical details of the equipment sold;</li> <li>• a description of how the equipment sold meets the requirements of Criterion PRT 1.0; and</li> <li>• customer contact information, which should include organization name, organization address, contact name, contact telephone number, and contact e-mail address.</li> </ul> <p>The provided information may be verified with the Bidder's customer to confirm its accuracy. If the information verification does not match the requirements, then the Bid may be declared non responsive.</p> <p>(2.5 points per reference)</p>	/5	
<b>TOTAL</b>		/25	

PART 2 - ACCUMULATION STAND FOR TYPE II ENGINES: 3kW OR LESS SUMMARY AND FINAL POINT-RATED SCORE	
POINT-RATED TECHNICAL CRITERIA	SCORE
PART 2 – PRT 1.0	/ 20
PART 2 – PRT 2.0	/ 5
<b>TOTAL</b>	<b>/ 25</b>
<b>PASS MARK:</b>	12.5 / 25
<b>PASS / FAIL:</b>	

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## PART 3 - ACCUMULATION STAND FOR TYPE III ENGINES: 20 KW OR LESS

### 1.0 MANDATORY TECHNICAL CRITERIA (MT)

The Bid must meet the mandatory technical criteria specified below. Bidders must provide the necessary documentation to support compliance with the requirements, including technical data sheets, specifications, brochures and/or other relevant technical documentation describing the equipment offered and demonstrating compliancy. Each mandatory technical criterion must be addressed separately and in the order presented below.

Bids which fail to meet the mandatory technical criteria will be declared non-responsive.

The Bidder is requested to identify in the tables below the section(s) or page(s) of its proposal in which evidence is provided to clearly demonstrate that each of the Mandatory Technical Criterion has been met.

ITEM #	SOW Part 3	MANDATORY TECHNICAL CRITERION (MT)	MET / NOT MET	SECTION / PAGE #
MT1	2.2.1	The accumulation stand must be moveable and must pass through standard double doors with an opening of 72 inches (182.9 centimeters) width by 85 inches (215.9 centimeters) height. If casters are used, they must be lockable or the stand must be stabilized with retractable/adjustable jacks. The use of fork tunnels to be used with a pallet jack is also acceptable.		
MT2	2.2.2	The footprint of the stand must not exceed 75 x 200 cm, and the platform height must be between 70 and 90 cm.		
MT3	2.2.3	The platform must consist of two sections: one for the dynamometer and the other for the specimen engine.		
MT4	2.2.3.1	The dynamometer must be mounted on a platform, which can pivot to allow coupling to specimens in both vertical and horizontal output shaft configuration. The platform for the dynamometer must be able to be locked in place once positioned in either the vertical or horizontal position.		
MT5	2.2.3.2	The platform for the specimen engine must feature an array of t-slots running the length of the platform. There must be between 5 and 7 equally-spaced t-slots on the platform for the specimen engine. These t-slots must accommodate ½"-13 threaded studs, as per the ANSI/ASME B5.1-M-1985 standard.		
MT6	2.2.3.3	The thickness of the platform must be 50.8 to 63.5 millimeters (2.0 to 2.5 inches).		
MT7	2.2.3.4	The platform must be isolated from the accumulation stand to minimize vibrations transmitted by the specimen engine.		

MT8	2.2.4	The accumulation stand must include a separate spill pan to contain any fuel or other fluid that may leak from the specimen.		
MT9	2.2.4.1	The spill pan must have a draining mechanism that does not require the removal of the accumulation stand.		
MT10	2.2.4.2	The spill pan must encompass the footprint of the accumulation stand.		
MT11	2.2.4.3	The spill pan must be dedicated to the Type III Accumulation Stand.		
MT12	2.2.5.1	The dynamometer must meet the following minimum specifications: <ul style="list-style-type: none"> <li>• Maximum power rating (continuous): up to 20 kiloWatts (kW)</li> <li>• Maximum torque range: up to 80 Newton-meter (N·m)</li> <li>• Maximum speed: up to 10,000 revolutions per minute (rpm)</li> <li>• Dynamometer inertia: less than 0.017 kilograms square-meter (kg·m<sup>2</sup>)</li> <li>• Dynamometer rotation: Bi-directional</li> </ul>		
MT13	2.2.5.2	If the proposed dynamometer is eddy-current type, it must be a dry-gap dynamometer. If the proposed dynamometer is an electric dynamometer (AC or DC), it must include the drive appropriately sized for the electric dynamometer. The installation and commissioning of the drive must be included. Notwithstanding the type of dynamometer proposed, the dynamometer must be able to operate in a horizontal and in a vertical position.		
MT14	2.2.5.3	If the dynamometer requires an external cooling system, it must be included with the dynamometer. If an eddy-current dynamometer is proposed, the cooling system must be a liquid cooling system. All components of the cooling system loop must be included, including but not limited to the pump, chiller, etc. Installation and commissioning costs of the cooling system must be included. The external cooling system must be dedicated to the Type III accumulation stand, and cannot be shared with any other accumulation stand(s).		
MT15	2.2.5.4	The dynamometer must be equipped with an electric starter motor, to allow remote starting of the specimen engine. It must be possible to disengage the starter motor without having to remove the starter remover from the dynamometer.		
MT16	2.2.5.5	A dynamometer controller must be included.		
MT17	2.2.5.5.1	The dynamometer controller must be a closed-loop design.		

MT18	2.2.5.5.2	A load cell to measure torque and a speed transducer must be included. These must be appropriately sized for the specifications of the dynamometer.		
MT19	2.2.5.5.3	The dynamometer controller must be capable of interfacing with National Instruments LabVIEW, which will be used as the computer control and data acquisition (DAQ) system		
MT20	2.2.5.6	All electrical equipment must be UL or CSA approved.		
MT21	2.2.5.7	Calibration arm and calibration weights must be included. The calibration arm and calibration weights must be appropriately sized for the specifications of the dynamometer.		
MT22	2.2.6	A drive shaft and torsional coupling must be included to connect the dynamometer to the specimen engine output shaft. The drive shaft must allow for a parallel misalignment of up to 0.51 millimeter and an angular misalignment of up to 2.4° (e.g. Sure-Flex Plus 8S, or equivalent).		
MT23	2.2.7	A drive shaft guard must be supplied to encapsulate the drive shaft and coupling. More than one drive shaft guard can be supplied to accommodate all centerline heights and drive shaft and coupling configurations.		
MT24	2.2.7.1	The drive shaft guard must accommodate all centerline heights for any engine specimen, as defined in 1.1.		
MT25	2.2.7.2	The drive shaft guard must be able to open and close without having to remove the drive shaft guard from the accumulation stand. If a hinged mechanism is chosen to open and close the drive shaft guard, the hinges must be able to be locked.		
MT26	2.2.7.3	The drive shaft guard must accommodate specimen engines with horizontal and vertical drive shafts.		
MT27	2.2.7.4	The drive shaft guard must be built to contain any drive line components in the event of a drive line break with the specimen under all type of operation, including but not limited to wide-open throttle, partial-load and idle.		
MT28	2.2.8.1	A throttle actuator must be included with mounting hardware, accommodating all engine specimen configurations, as defined in 1.1. It is acceptable to provide more than one type of mounting hardware in order to accommodate all types of engine specimens.		
MT29	2.2.8.2	The throttle actuator must be an electromechanical type actuator. It must be capable of interfacing with		

		National Instruments LabVIEW, which will be used as the computer control and DAQ system.		
MT30	2.2.8.3	The throttle actuator must allow for variable throttle positions, from idle to full throttle.		
MT31	2.2.8.4	The throttle actuator must be spring returned to 0 when no power is applied.		
MT32	2.2.9	The DAQ system is not part of this SOW; however, the Bidder must demonstrate functionality and compatibility of the dynamometer controller and throttle actuator with a DAQ system. The Bidder must supply hardware interfaces (if required), communication requirements and specifications (i.e. programming commands, control signals) to integrate with a DAQ system.		

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## 2.0 POINT-RATED TECHNICAL CRITERIA (PRT)

- Bids which meet all the mandatory technical criteria will be evaluated and scored as specified in the table below.
- In order to qualify for the rating process, proposals must respond to the following point-rated technical criteria.
- Bids must receive a minimum technical pass mark of **20 out of 35** on the point-rated technical criteria in order to be evaluated on the basis of their Financial Proposal.
- Bids who fail to achieve the technical pass mark will be declared non-responsive and given no further consideration.
- All project references may be checked for accuracy and applicability.
- The Bidder may use cross-referencing where applicable.

ITEM #	POINT-RATED TECHNICAL CRITERION (PRT)	POINTS / SCORE	SECTION / PAGE #
PRT 1.0	<p>Bidders must propose equipment that must not be a prototype or test unit, but standard proven equipment of the manufacturer and contains reliable state-of-the-art technology.</p> <p>In order to demonstrate this requirement, Bidders must provide with their bid, at least two (2) technical drawings and/or pictures of previous similar designs and identifying customers who have recently purchased the equipment. For a design to be considered valid, it is necessary that the equipment specified in the project:</p> <ul style="list-style-type: none"> <li>• be a similar product; and</li> <li>• was sold within the 24 months period prior to the closing date of this bid solicitation.</li> </ul> <p>(10 points per design)</p>	/20	
PRT 2.0	<p>Bidders must submit with their bid, the following information for each customer identify in PRT 1.0:</p> <ul style="list-style-type: none"> <li>• the brand name and model of the equipment sold;</li> <li>• the date of sale;</li> <li>• technical details of the equipment sold;</li> <li>• a description of how the equipment sold meets the requirements of Criterion PRT 1.0; and</li> <li>• customer contact information, which should include organization name, organization address, contact name, contact telephone number, and contact e-mail address.</li> </ul> <p>The provided information may be verified with the Bidder's customer to confirm its accuracy. If the information verification does not match the requirements, then the Bid may be declared non responsive.</p> <p>(2.5 points per reference)</p>	/5	

PRT 3.0	Dynamometer cooling system: <ul style="list-style-type: none"> <li>• Separate liquid cooling system (e.g. chiller) (0 points)</li> <li>• On-board or integrated cooling system (5 points)</li> <li>• Liquid cooled cooling system (10 points)</li> </ul>	/10	
<b>TOTAL</b>		<b>/35</b>	

<b>PART 3 – ACCUMULATION STAND FOR TYPE III ENGINES: 20 kW DYNAMOMETERS SUMMARY AND FINAL RATED SCORE</b>	
POINT-RATED TECHNICAL CRITERIA	SCORE
PART 3 – PRT 1.0	/ 20
PART 3 – PRT 2.0	/ 5
PART 3 – PRT 3.0	/ 10
<b>TOTAL</b>	<b>/ 35</b>
<b>PASS MARK:</b>	<b>20 / 35</b>
<b>PASS / FAIL:</b>	

**PART 4 - LOAD BANK FOR TYPE IV ENGINES: ELECTRIC GENERATORS**

**1.0 MANDATORY TECHNICAL CRITERIA (MT)**

The bid must meet the mandatory technical criteria specified below. Bidders must provide the necessary documentation to support compliance with the requirements, including technical data sheets, specifications, brochures and/or other relevant technical documentation describing the equipment offered and demonstrating compliancy. Each mandatory technical criterion must be addressed separately and in the order presented below.

Bids which fail to meet the mandatory technical criteria will be declared non-responsive.

The Bidder is requested to identify in the tables below the section(s) or page(s) of its proposal in which evidence is provided to clearly demonstrate that each of the Mandatory Technical Criterion has been met.

<b>ITEM #</b>	<b>SOW Part 4</b>	<b>MANDATORY TECHNICAL CRITERION (MT)</b>	<b>MET / NOT MET</b>	<b>SECTION / PAGE #</b>
MT1	2.2.1	The electrical loading of the generator must be achieved through a programmable load bank, capable of applying a resistive load of up to 20 kilowatts (kW) in 250 watt increments or less for 120 volts and 240 volts 60 hertz single phase AC. Two or more load banks can be connected to attain the total resistive load.		
MT2	2.2.2	The load bank must be programmable. The load bank must be capable of interfacing with National Instruments LabVIEW, which will be used as the computer control and data acquisition system (DAQ), to apply the various electrical loads		
MT3	2.2.3	The programmable load bank must be capable of measuring actual load voltage and current and provide an output for each value to the National Instruments LabVIEW DAQ system. The accuracy must be 1 % of the full scale or better for both voltage and current.		
MT4	2.2.4	The DAQ system is not part of this SOW, however the Bidder must demonstrate the programmable load bank's functionality with a DAQ system.		
MT5	2.2.5	Cables to connect electric generators to the programmable load bank must be included, for both 120V and 240V configurations.		

## 2.0 POINT-RATED TECHNICAL CRITERIA (PRT)

- Bids which meet all the mandatory technical criteria will be evaluated and scored as specified in the table below.
- In order to qualify for the rating process, proposals must respond to the following point-rated technical criteria.
- Bids must receive a minimum technical pass mark of **30 out of 50** on the point-rated technical criteria in order to be evaluated on the basis of their Financial Proposal.
- Bids which fail to achieve the technical pass mark will be declared non-responsive and given no further consideration.
- All project references may be checked for accuracy and applicability.
- The Bidder may use cross-referencing where applicable.

ITEM #	POINT-RATED TECHNICAL CRITERION (PRT)	POINTS / SCORE	SECTION / PAGE #
PRT 1.0	<p>Bidders must propose equipment that must not be a prototype or test unit, but standard proven equipment of the manufacturer and contains reliable state-of-the-art technology.</p> <p>In order to demonstrate this requirement, Bidders must provide with their bid at least two (2) technical drawings and/or pictures of previous similar designs and identify customers who have recently purchased the equipment. For a design to be considered valid, it is necessary that the equipment specified in the project:</p> <ul style="list-style-type: none"> <li>• be a similar product; and</li> <li>• was sold within the 24 months period prior to the closing date of this bid solicitation.</li> </ul> <p>(10 points per design)</p>	/20	
PRT 2.0	<p>Bidders must submit with their bid the following information for each customer identified in PRT 1.0:</p> <ul style="list-style-type: none"> <li>• the brand name and model of the equipment sold;</li> <li>• the date of sale;</li> <li>• technical details of the equipment sold;</li> <li>• a description of how the equipment sold meets the requirements of Criterion PRT 1.0; and</li> <li>• customer contact information, which should include organization name, organization address, contact name, contact telephone number, and contact e-mail address.</li> </ul> <p>The provided information may be verified with the Bidder`s customer to confirm its accuracy. If the information verification does not match the requirements, then the Bid may be declared non responsive.</p> <p>(2.5 points per reference)</p>	/5	

PRT 3.0	Load increment values: <ul style="list-style-type: none"> <li>• 250 W (0 points)</li> <li>• 100 W to 250 W (5 points)</li> <li>• 10 W to 99 W (10 points)</li> <li>• Less than 10 W (20 points)</li> </ul>	/20	
PRT 4.0	Energy recovery: <ul style="list-style-type: none"> <li>• None (0 points)</li> <li>• Regenerative (5 points)</li> </ul>	/5	
<b>TOTAL</b>		<b>/50</b>	

<b>PART 4 - LOAD BANK FOR TYPE IV ENGINES: ELECTRIC GENERATORS SUMMARY AND FINAL POINT-RATED SCORE</b>	
<b>POINT-RATED TECHNICAL CRITERIA</b>	<b>SCORE</b>
PART 4 – PRT 1.0	/ 20
PART 4 – PRT 2.0	/ 5
PART 4 – PRT 3.0	/ 20
PART 4 – PRT 4.0	/ 5
<b>TOTAL</b>	<b>/ 50</b>
<b>PASS MARK:</b>	<b>30 / 50</b>
<b>PASS / FAIL:</b>	

## **ANNEX C – Questions to Industry**

1. Are the requirements and definitions as stated in the draft the Statement of Work and Evaluation Criteria, clear?
2. Are there missing elements/components to the work, tasks and/or deliverables? If yes, specify.
3. Please identify any issues that would limit your ability to perform the work outlined in the Statement of Work for any or all accumulation stands (Part 1-4).
4. Is there anything in the Mandatory Technical Criteria and the Point-Rated Technical Criteria that would preclude you from submitting an offer? If so, can you tell us what it is and explain why?
5. Would you submit an offer on this requirement if it was tendered as described herein? If not, please explain why.
6. Are there any technical evaluation criterion that you think should be added? If yes, please explain what they are and why they should be added?
7. Do you have any other concerns that you would like to address?