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

RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:

Réception des soumissions - TPSGC / Bid Receiving - PWGSC
1550, Avenue d'Estimauville
1550, D'Estimauville Avenue
Québec
Québec
G1J 0C7
FAX pour soumissions: (418) 648-2209

REQUEST FOR PROPOSAL
DEMANDE DE PROPOSITION

Proposal To: Public Works and Government Services Canada

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

Proposition aux: Travaux Publics et Services Gouvernementaux Canada

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

Comments - Commentaires

Issuing Office - Bureau de distribution
TPSGC/PWGSC
601-1550, Avenue d'Estimauville
Québec
Québec
G1J 0C7

Title - Sujet Variable Extrusion Production Syst	
Solicitation No. - N° de l'invitation 31206-185284/A	**Date** 2017-10-26
Client Reference No. - N° de référence du client 31206-185284	
GETS Reference No. - N° de référence de SEAG PW-$QCN-016-17244	
File No. - N° de dossier QCN-7-40170 (016)	**CCC No./N° CCC - FMS No./N° VME**
Solicitation Closes - L'invitation prend fin **at - à 02:00 PM** **on - le 2017-12-06**	**Time Zone** **Fuseau horaire** Heure Normale du l'Est HNE
F.O.B. - F.A.B. **Plant-Usine:** ☐ **Destination:** ☑ **Other-Autre:** ☐	
Address Enquiries to: - Adresser toutes questions à: Carrier, Bertrand	**Buyer Id - Id de l'acheteur** qcn016
Telephone No. - N° de téléphone (418) 649-2708 ( )	**FAX No. - N° de FAX** (418) 648-2209
Destination - of Goods, Services, and Construction: **Destination - des biens, services et construction:** CONSEIL NATIONAL DE RECHERCHES DU CANADA SITE SAGUENAY, via NEWTON - PORTE 6 501 BOUL. DE L'UNIVERSITÉ EST SAGUENAY Québec G7H8C3 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 Voir doc	**Delivery Offered - Livraison proposée**
Vendor/Firm Name and Address **Raison sociale et adresse du fournisseur/de l'entrepreneur** **Telephone No. - N° de téléphone** **Facsimile No. - N° de télécopieur**	
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) **Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)** **Signature** **Date**	

Canada

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PART 1 - GENERAL INFORMATION

1.1 Requirement

The requirement is detailed at section 6.2 of the Resulting Contract Clauses.

1.2 Debriefings

Bidders may request a debriefing on the results of the bid solicitation process. Bidders should make the request to the Contracting Authority within 15 working days from receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.

1.3 Trade Agreements

The requirement is not subject to the provisions of the North American Free Trade Agreement (NAFTA), and the Canadian Free Trade Agreement (CFTA).

PART 2 - BIDDER INSTRUCTIONS

2.1 Standard Instructions, Clauses and Conditions

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

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

The 2003 (2017-04-27) 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: 60 days
Insert: 90 days

2.1.1 *SACC Manual* Clauses

The following terms and conditions are incorporated herein:

SACC Reference	Section	Date
B1000T	Condition of Material - Bid	2014-06-26
C9000T	Price	2010-08-16

2.2 Submission of Bids

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

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

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

2.3 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than seven (7) 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 question(s) or may request that the Bidder do so, so that the proprietary nature of the question(s) is eliminated, and the enquiry can be answered to all Bidders. Enquiries not submitted in a form that can be distributed to all Bidders may not be answered by Canada.

2.4 Applicable Laws

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

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

2.5 Improvement of Requirement during Solicitation Period

Should bidders consider that the specifications or Statement of Requirements contained in the bid solicitation could be improved technically or technologically, bidders are invited to make suggestions, in writing, to the Contracting Authority named in the bid solicitation. Bidders must clearly outline the suggested improvement as well as the reasons for the suggestion. Suggestions that do not restrict the level of competition nor favour a particular bidder will be given consideration provided they are submitted to the Contracting Authority at least ten (10) working days before the bid closing date. Canada will have the right to accept or reject any or all suggestions.

PART 3 - BID PREPARATION INSTRUCTIONS

3.1 Bid Preparation Instructions

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

Section I: Technical Bid (2 hard copies)
Section II: Financial Bid (1 hard copy)
Section III: Certifications (1 hard copy)

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

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

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

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

1) use 8.5 x 11 inch (216 mm x 279 mm) paper containing fibre certified as originating from a sustainably-managed forest and containing minimum 30% recycled content; and

2) use an environmentally-preferable format including black and white printing instead of colour printing, printing double sided/duplex, using staples or clips instead of cerlox, duotangs or binders.

Section I: Technical Bid

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

Section II: Financial Bid

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

3.1.1 Exchange Rate Fluctuation

C3011T (2013-11-06), Exchange Rate Fluctuation

Section III: Certifications

Bidders must submit the certifications and additional information required under Part 5.

3.2 Optional site visit

It is recommended that the Bidder or a representative of the Bidder visit the work site. Arrangements have been made for the site visit to be held at the Arvida Research & Development Centre (ARDC), Rio Tinto, 1955 Mellon Blvd., Jonquière, Quebec G7S 4K8, on 14 November 2017. The site visit will begin at 10:00 EST.

Bidders are requested to communicate with the Contracting Authority no later than November 10, 2017; 10:00 EST to confirm attendance and provide the name(s) of the person(s) who will attend. Bidders may be requested to sign an attendance sheet. Bidders who do not attend or do not send a representative will not be given an alternative appointment but they will not be precluded from submitting a bid. Any clarifications or changes to the bid solicitation resulting from the site visit will be included as an amendment to the bid solicitation.

PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

4.1 Evaluation Procedures

(a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.

(b) An evaluation team composed of representatives of Canada will evaluate the bids.

4.1.1 Technical Evaluation

4.1.1.1 Mandatory Technical Criteria

The mandatory technical criteria are detailed at Annex C.

4.1.2 Financial Evaluation

The price of the bid will be evaluated in Canadian dollars, Applicable Taxes excluded, FOB destination, Canadian customs duties and excise taxes included.

Unless the bid solicitation specifically requires bids to be submitted in Canadian currency, bids submitted in foreign currency will be converted to Canadian currency for evaluation purposes. The rate given by the Bank of Canada in effect on the bid solicitation closing date, or on another date specified in the bid solicitation, will be applied as a conversion factor to the bids submitted in foreign currency.

4.2 Basis of Selection

A bid must comply with the requirements of the bid solicitation and all the mandatory technical criteria to be declared responsive. The responsive bid with the lowest Total Bid Price (TBP) (Annex B) 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. Unless specified otherwise, 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 Integrity Provisions of the Standard Instructions, all bidders must provide with their bid, **if applicable**, the declaration form available on the Forms for the Integrity Regime website (http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html), 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 section titled Information to be provided when bidding, contracting or entering into a real procurement agreement of 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 Federal Contractors Program for Employment Equity - Bid Certification

By submitting a bid, the Bidder certifies that the Bidder, and any of the Bidder's members if the Bidder is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "FCP Limited Eligibility to Bid" list available at the bottom of the page of the Employment and Social Development Canada (ESDC) - Labour's website (https://www.canada.ca/en/employment-social-development/programs/employment-equity/federal-contractor-program.html#).

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.

5.2.3 Bidder Certifies that All Equipment is "Off-the-Shelf"

Any equipment bid to meet this requirement must be "off-the-shelf" (unless otherwise stated in this bid solicitation), meaning that each item of equipment is commercially available and requires no further research or development and is part of an existing product line with a field-proven operational history (that is, it has not simply been tested in a laboratory or experimental environment). If any of the equipment bid is a fully compatible extension of a field-proven product line, it must have been publicly announced on or before the bid closing date. By submitting a bid, the Bidder is certifying that the entire equipment bid is off-the-shelf.

5.2.4 OEM Certification

(a) Any Bidder that is not the Original Equipment Manufacturer (OEM) for every item of hardware proposed as part of its bid is required to submit the OEM's certification (Annex D) regarding the Bidder's authority to provide and maintain the OEM's hardware, which must be signed by the OEM (not the Bidder). No Contract will be awarded to a Bidder who is not the OEM of the hardware it proposes to supply to Canada, unless the OEM certification has been provided to Canada. Bidders are requested to use the OEM Certification Form (Annex D) included with the bid solicitation. Although all the contents of the OEM Certification Form are required, using the form itself to provide this information is not mandatory. For Bidders/OEMs who use an alternate form, it is in Canada's sole discretion to determine whether all the required information has been provided. Alterations to the statements in the form may result in the bid being declared non-responsive.

(b) If the hardware proposed by the Bidder originates with multiple OEMs, a separate OEM certification is required from each OEM.

(c) For the purposes of this bid solicitation, OEM means the manufacturer of the hardware, as evidenced by the name appearing on the hardware and on all accompanying documentation.

PART 6 - RESULTING CONTRACT CLAUSES

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

6.1 Security Requirements for Canadian suppliers

6.1.1 There is no security requirement applicable to this Contract.

6.2 Requirement

6.2.1 The Contractor must supply, deliver and install one (1) electric dual-actuator system enabling the rotational control of two rods inserted into an aluminium extrusion die, including the delivery, the installation, the accessories, the commissioning, the documentation and the training, all in accordance with the Requirement described at Annex "A".

6.2.2 Condition of Material – Contract

The Contractor must provide material that is new production of current manufacture supplied by the principal manufacturer or its accredited agent. The material must conform to the latest issue of the applicable drawing, specification and part number, as applicable, that was in effect on the bid closing date.

6.3 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.

6.3.1 General Conditions

2010A (2016-04-04), General Conditions - Goods (Medium Complexity), apply to and form part of the Contract.

6.3.2 Supplemental General Conditions

4001 (2015-04-01), Hardware purchase, lease and maintenance,

apply to and form part of the Contract.

6.4 Term of Contract

6.4.1 Period of the Contract

The contract period is from the date of contract award until the end of the warranty period inclusively.

6.4.2 Delivery Date

All the deliverables must be received within twelve (12) calendar weeks from contract date.

6.4.3 Installation and Training Period

On-site installation and training, as detailed in Annex A, must be provided within two (2) days following the exercise of the option.

6.5 Authorities

6.5.1 Contracting Authority

The Contracting Authority for the Contract is:

Name:	Bertrand Carrier
Title:	Supply Specialist
	Public Works and Government Services Canada Acquisitions Branch
Address	1550 D'Estimauville Ave., Quebec, Qc. G1J 0C7
Telephone:	418-649-2708

Facsimile: 418-648-2209
E-mail address: Bertrand.Carrier@pwgsc.gc.ca

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

6.5.2 Project Authority

The Project Authority for the Contract is:

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

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

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

6.5.3 Contractor's Representative

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

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

6.6 Payment

6.6.1 Basis of Payment

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a firm price**,** as specified in Annex *B* for a cost of $ _____ *insert the amount at contract award*). 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.

6.6.2 Terms of payment

SACC Manual Clause H1001C, (2008-05-12) Multiple Payments

6.7 Invoicing Instructions

1. The Contractor must submit invoices in accordance with the section entitled "Invoice Submission" of the general conditions. Invoices cannot be submitted until all work identified in the invoice is completed.
2. Invoices must be distributed as follows:
   a) The original and one (1) copy must be forwarded to the address shown on page 1 of the Contract for certification and payment.

6.8 Certifications

6.8.1 Compliance

Unless specified otherwise, the continuous compliance with the certifications provided by the Contractor in its bid or precedent to contract award, and the ongoing cooperation in providing additional information are conditions of the Contract and failure to comply will constitute the Contractor in default. Certifications are subject to verification by Canada during the entire period of the Contract.

6.9 Applicable Laws

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

6.10 Priority of Documents

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

(a) the Articles of Agreement;
(b) the General Conditions 2010A (2016-04-04) Goods (Medium Complexity);
(c) the supplemental general conditions 4001 (2015-04-01) Hardware Purchase, Lease and maintenance;
(d) Annex A, Requirement;
(e) Annex B, Basis of payment;
(f) Annex C, Mandatory Technical Criteria;
(g) Annex D, OEM Certification Form ;
(h) the Contractor's bid dated _____ (*insert date of bid*)

6.11 *SACC Manual* Clauses

G1005C	2016-01-28	Insurance
B7500C	2006-06-16	Excess Goods
D9002C	2007-11-30	Incomplete Assemblies
B1501C	2006-06-16	Electric Equipment

6.12 Inspection and Acceptance

The Project Authority is the Inspection Authority. All reports, deliverable items, documents, goods and all services rendered under the Contract are subject to inspection by the Inspection Authority or representative. Should any report, document, good or service not be in accordance with the requirements of the Statement of Work and to the satisfaction of the Inspection Authority, as submitted, the Inspection Authority will have the right to reject it or require its correction at the sole expense of the Contractor before recommending payment.

6.13 Shipping Instructions - Delivery at Destination

Goods must be consigned to the destination specified delivered DDP Delivered Duty Paid; National Research Centre Canada, Arvida Research & Development Centre (ARDC), Rio Tinto,1955 Mellon Blvd. Jonquière, Quebec G7S 4K8, as per Incoterms 2000 for shipments from commercial contractor.

ANNEX A - REQUIREMENT

Variable Extrusion Production System

Acronyms

ATC	Aluminium Technology Centre
CNRC	Conseil national de recherche Canada
CTA	Centre des technologies de l'aluminium
Km	Kilomètre
Kn	Kilo Newton
m/s2	Mètre / seconde (carré)
mm	Millimètre / Millimetre
Mm/s	Millimètre / seconde
Mpa	Méga Pascal
Nm	Newton mètre / Newton meter
NRC	National Research Council Canada

1 OBJECTIVE: To design and manufacture a variable section aluminum extrusion system.

The National Research Council of Canada's (NRC) Aluminium Technology Centre (ATC), at the Saguenay site, wishes to acquire an electric dual-actuator system enabling the rotational control of two rods inserted into an aluminium extrusion die.

The system will be an addition to the experimental extrusion press at Rio Tinto's Arvida Research & Development Centre (see Figure 1 in Appendix A).

The scope of the work includes the design of the frame to accommodate the two actuators, the purchase of two actuators, as well as the mechanical system to allow the rotation and the load transfer to the rods inserted into the die. The system must be fully independent of the experimental extrusion press in order to be able to remove it when necessary. Only the mechanics of the system (frame, mountings, and actuators) is requested, and the NRC will be responsible for integrating the system. The system must be installed in the extrusion press laboratory at the designated site.

2 DELIVERABLES

Design and manufacture on approval of concepts, including:

2.1. Two (2) electrical linear actuators
2.2. A frame permitting the installation of two electrical linear actuators
2.3. A rotation system adapted to the frame to transmit the loads
2.4. A quick-connect system to join the two die rods to the actuators
2.5. Documentation, drawings, and technical data sheets of the equipment
2.6. Installation of the equipment at the designated site
2.7. Training

3 CONSTRAINTS

The system will need to be installed next to an existing and operational extrusion press.

A safety mat is in place to prevent anyone from approaching it when the press is in operation. The frame and its floor mounting must be designed to maintain the safety mat in place (see figures 4 and 5, Appendix A).

The approximate dimensions of the space available are available in Appendix A.

The frame mounting must also allow for the system's removal and for the extrusion press's return to its original state.

4 EQUIPMENT MINIMUM PERFORMANCE CHARACTERISTICS

4.1. Specifications of the frame:

4.1.1. The frame must be able to accommodate the two (2) actuators and withstand the maximum loads.

4.1.2. The frame must be very rigid so as to avoid large deformations during operation of the actuators. The dimensions of the frame must respect the available space around the press (see figures 7 and 8 in Appendix A).

4.1.3. Ideally, the safety mats on the ground should remain in place.

4.1.4. The floor-mounted frame must allow for the system to be easily removed.

4.1.4.1. Anchors with bolts are recommended.

4.1.4.2. The anchors will need to be flush with the floor level to avoid accidents when the system is not in place.

4.1.5. For positioning of the actuators, when the lever arm is in the vertical position, the actuator must be horizontal so as to exercise the maximum moment load in this position (see Figure 4 in Appendix A).

4.1.6. The actuators must be fixed on pivots to the two (2) ends for their proper functioning, as illustrated in Figure 4 (Appendix A).

4.1.7. The vertical and horizontal positions of the rods that connect to the die must be adjustable, with a minimum suggested range of 20 mm for the vertical position, and a minimum range of 100 mm for the horizontal position. A precision of ±0.2 mm on positioning or less is requested in order to position the equipment so as to facilitate the connection with the rods of the die.

4.1.7.1. The vertical distance between the two (2) rods inserted into the die is 120 mm, as shown in Figure 2 (Appendix A).

4.2. Specifications of the actuators:

4.2.1. The two (2) linear actuators must be only electrical and 4.2.1.1 have a position sensor to detect displacement,

4.2.1.2. as well as a force sensor.

4.2.2. Displacement precision must be a minimum of ±0.05 mm.

4.2.3. The precision of the force sensor must be equal to or less than ±2% of the maximum capacity of the chosen actuator.

4.2.4. Please note that the wiring for the connection of the force and displacement sensors in the controller at the NRC must be provided.

4.2.5. A moment (torque) load between values of 12 000 and 14 000Nm per rod is required.

The rods inserted in the extrusion die have a diameter of 65 mm and will be machined from H13 steel.

During the extrusion, the rods undergo both an axial force evaluated at 500 kN and a moment load equivalent to the maximum capacity of the actuator multiplied by its lever arm. With an axial force of

500 kN and a moment load of 13 000 Nm (see Figure 3 in Appendix A), a constraint equivalent to 550 MPa is developed in the rod.

With the operating temperature of the rods fixed at 530°C, and the elastic limit of the H13 material associated with this temperature being 845 MPa, a safety factor of approximately 1.5 is maintained.

The objective is to maintain the rotational capacity at its highest, since the friction and the deformation efforts may be relatively high, depending on the design of the die.

4.2.6. With a lever arm of 250 mm, an actuator with an approximate capacity of 50 kN is necessary.

Such as with a Parker electrical actuator, the ETH125M20 with parallel engine, allows you to develop a force of 50 kN with a useful life of 2500 km or equivalent.

See the Appendix “B” for information.

An electrical actuator with a similar capacity and useful life will be accepted.

4.2.7. The useful life of the actuators must be greater or equal than 2500 km under normal load conditions.

Since the maximum capacity of the aforementioned Parker actuator is 81.4 kN, providing an equivalent constraint of about 785 MPa with the same 250 mm lever arm, and that this equivalent constraint is near the elastic limit of the H13, it may be necessary to have a force-restricting mechanism.

4.2.8. A transmitted moment load limiter may be necessary. Check that the moment load limiter does not influence the measurement of the angle of rotation from the actuator's displacement as long as the maximum moment, i.e. 13 000 Nm, is not reached.

4.2.9. The maximum force will also be restricted by the NRC's programming of a controller.

4.2.10. As mentioned previously, a force sensor must be integrated into the rod of each of the cylinders. The capacity of the force sensors to be integrated will be dependent on the maximum force developed.

Such as The Parker company also offers force sensors as a function of the ETH actuator chosen.

4.2.11. The angle of rotation of the rods in the die must vary between 0° and 90°.

4.2.11.1. At 45°, at mid-stroke of the actuator, it must be horizontal.

4.2.11.2. With a lever arm of 250 mm, a 0-400 mm displacement of the actuator is necessary.

4.2.12. The speed of rotation of the rods must be greater than or equal to 60°/s.

With a lever arm of 250 mm, as previously suggested, this then requires the upper actuator's speed to be 250 mm/s.

This maximum speed must be reached in less than 0.2 s. For the Parker ETH125M20 actuator, with a displacement of 0-400 mm, the maximum speed is 800 mm/s, with a maximum acceleration of 4 m/s^2.

4.3. Specifications of the connection system with the die rods:

4.3.1. The system must allow a quick connection and disconnection with the die rods while maintaining a slight clearance.

4.3.1.1. A backlash of less than 0.5° is requested. This backlash will influence the actual angle of rotation since the angle will be calculated on the basis of the displacement of the actuators.

4.3.2. Since the die must be heated before being inserted into the press, the system must allow for a clearance so that the die can be inserted into the press. The minimum clearance must be 800 mm, in addition to the clearance required for the connection mode selected between the die's rods and the actuator system.

Since the clearance is significant, i.e. greater than 800 mm (Figure 6, Appendix A), and the available space is restricted, a telescopic system is an option. Since the die is inserted into the press using a hydraulic cylinder, a telescopic system could retract and extend during die changes.

4.3.3. The system must be able to maintain the full capacity of the load to the connection of the H13 die rods, with a diameter of 65 mm.

A male/female system with a slide may be feasible.

The NRC will be responsible for adapting the die rods to the connection system. It is necessary to determine the required length of connection of the rods before knowing the actual clearance to remove the die. Given that the die rods will be hot (~500°C), cooling channels with NPT inputs and

outputs can be machined in the connections. Cooling water is available in close proximity to the press.

5 DOCUMENTATION

The following documents must accompany the system:

5.1. Technical drawings of the frame and its components.

5.2. Technical drawings of the mode of connection with the die.

5.3. Technical data sheets for the actuators with maintenance (connections, lubrication, etc.).

5.4. Technical data sheet for the force sensor (connections and calibration).

5.5. The documentation must be:

5.5.1. In paper format;

5.5.2. Available on electronic media (CD if possible);

5.5.3. Available in French and/or English.

6 OTHER REQUIREMENTS

6.1. Maintenance and Technical Support

The Contractor must provide technical assistance by telephone or Internet during the NRC-Saguenay's working hours (from Monday through Friday, between 8:00 a.m. and 4:30 p.m.).

7 DELIVERY, INSTALLATION AND COMMISSIONING

7.1. The system must be delivered and installed at:

Arvida Research & Development Centre (ARDC)
Rio Tinto 1
955 Mellon Blvd.
Jonquière, Quebec G7S 4K8.

7.2. Although the control system is supported by the NRC, the company will be responsible for checking:

7.2.1. the proper functioning of the actuators;

7.2.2. the positioning system, and

7.2.3. that the connection system [is properly connected to] the extrusion die's rods.

8 CLIENT'S RESPONSIBILITIES

The NRC is responsible for ensuring that the supply of water, air and electricity are adequate for the proper functioning of the system.

9 TRAINING

Training must be provided to two (2) users, i.e. a user from the NRC and a user from Rio Tinto.

The training must cover the following elements:

- Operation and use of the system (~2-4 hrs).

ANNEX B – BASIS OF PAYMENT

Item	Description	Qty	Firm Unit Price	Calculated Price
1	**ELECTRIC DUAL-ACTUATOR SYSTEM** Enabling the rotational control of two rods inserted into an aluminium extrusion die, including the accessories, installation, commissioning and documentation, as per the requirement described in Annex A. **Brand : _____** **Model #: _____** (In accordance with the technical requirements and including all equipment and accessories, specified in Annex A)	1	$	$
2	**Training** (as detailed in Section 9 of Annex A)	1	$	$
3	**DDP (Saguenay, Quebec, Canada)** Including customs duties, handling and delivery.	1	$	$
	TOTAL BID PRICE (TBD) ($CAD) =			

ANNEX C – MANDATORY CRITERIA

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

Bids which fail to meet the mandatory criteria. Each mandatory criterion should be addressed separately.

C.1 Mandatory Criterion # 1 – Equipment Minimum Performance Characteristics Selected from Annex A

Bidders must proposed a product, which is not a prototype or test unit but a standard proven product of the manufacturer and contain reliable state-of-the-art technology

Although Bidders must propose products meeting all "minimum performance characteristics of equipment" required in Annex A; at the bid closing date, bids will be evaluated on the "minimum performance characteristics of equipment selected" listed in the table of "Minimum performance characteristics of equipment selected of Annex A".

Simply stating that the proposed product complies or that it meets the "minimum performance characteristics of equipment selected" is not enough. To demonstrate that their products meet all the "minimum performance characteristics of equipment selected", Bidders must submit bid, proofs of compliance, as well as details of calculations and proposed items.

Bidders should complete the last column of the "Table of minimum performance characteristics of equipment selected of Annex A" hereafter using cross-referenced to the proofs of compliance; Bidders should indicate where in the bid the reference material can be found, including the title of the document, and the page and paragraph numbers. The proofs of compliance must provide sufficient detail and explanation to allow evaluation and demonstrate that each the "minimum performance characteristics of equipment selected" is met.

Proof of compliance is defined as a document, such as a brochure and/or technical literature and/or a third party test report provided by a nationally and/or internationally recognized testing facility and/or a report generated by a nationally and/or internationally recognized third party software.

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

	C.1 Mandatory Criterion no 1 – Equipment Minimum performance Characteristics, selected from Annex A **ELECTRIC DUAL-ACTUATOR SYSTEM**	**Bidder's Substantiation** (should indicate the reference to the technical documentation included in Bid or indicate the exact information)
1	The two (2) linear actuators must only be electrical.	
2	The displacement tolerance must be a minimum of ±0.05 mm.	
3	The tolerance of the force sensor must be equal to or less than ±2% of the maximum capacity of the chosen actuator.	
4	A moment (torque) load between values of 12 000 and 14 000 Nm per rod is required.	
5	The useful life of the actuators must be greater or equal to 2 500 km under normal load conditions	

ANNEX D – OEM Certification Form

OEM Certification Form

This confirms that the original equipment manufacturer (OEM) identified below has authorized the Bidder named below to provide and maintain its products under any contract resulting from the bid solicitation identified below.

Name of OEM _____

Signature of authorized signatory of OEM _____

Print Name of authorized signatory of OEM _____

Print Title of authorized signatory of OEM _____

Address for authorized signatory of OEM _____

Telephone no. for authorized signatory of OEM _____

Fax no. for authorized signatory of OEM _____

Date signed _____

Solicitation Number _____

Name of Bidder _____

Appendix A

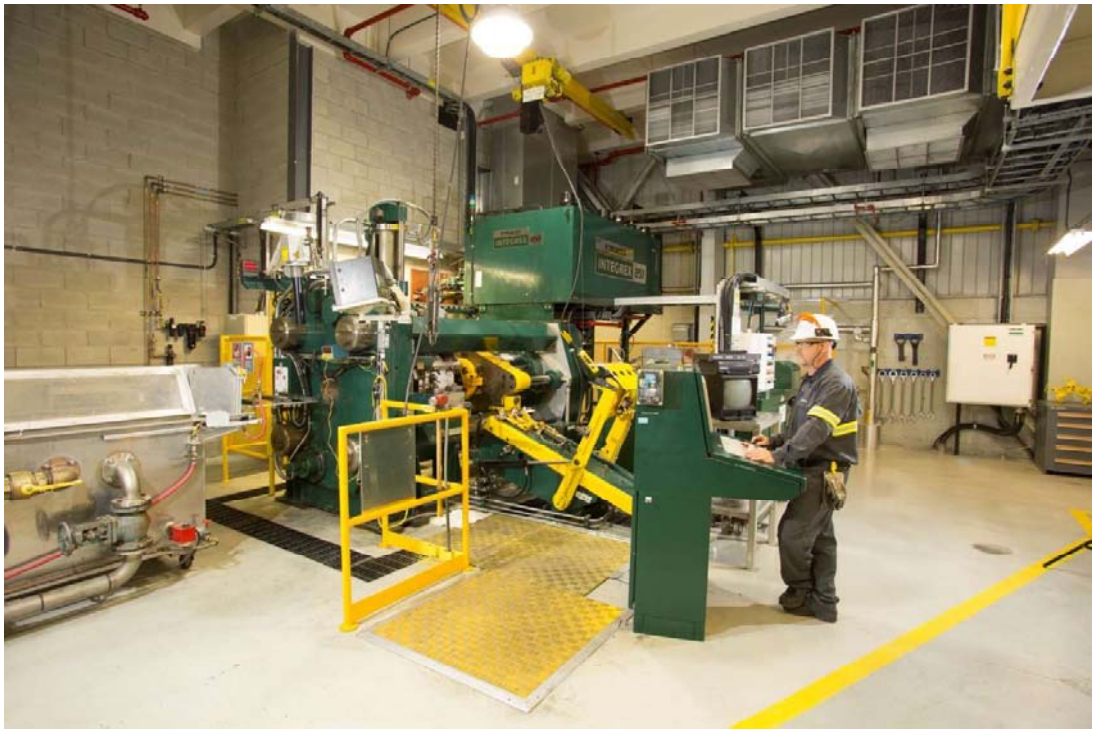


Figure 1. Experimental extrusion press, Rio Tinto, Saguenay, Arvida Borough

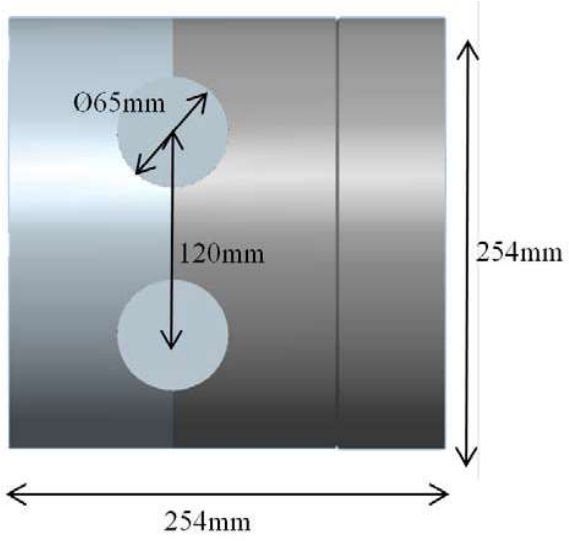


Figure 2. Dimensions of the die

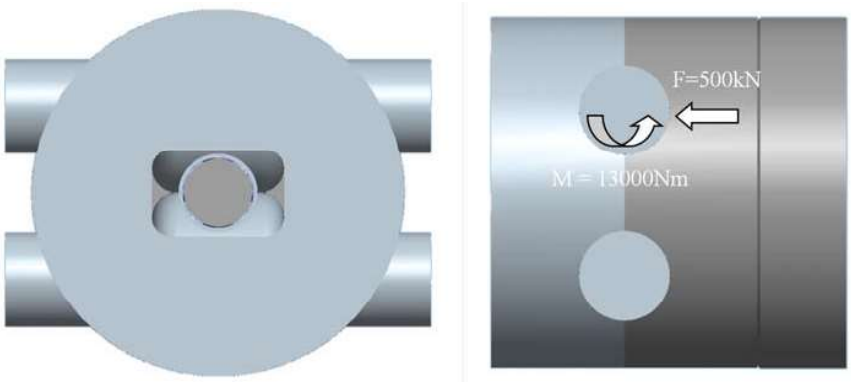


Figure 3. Forces on the rods of the die

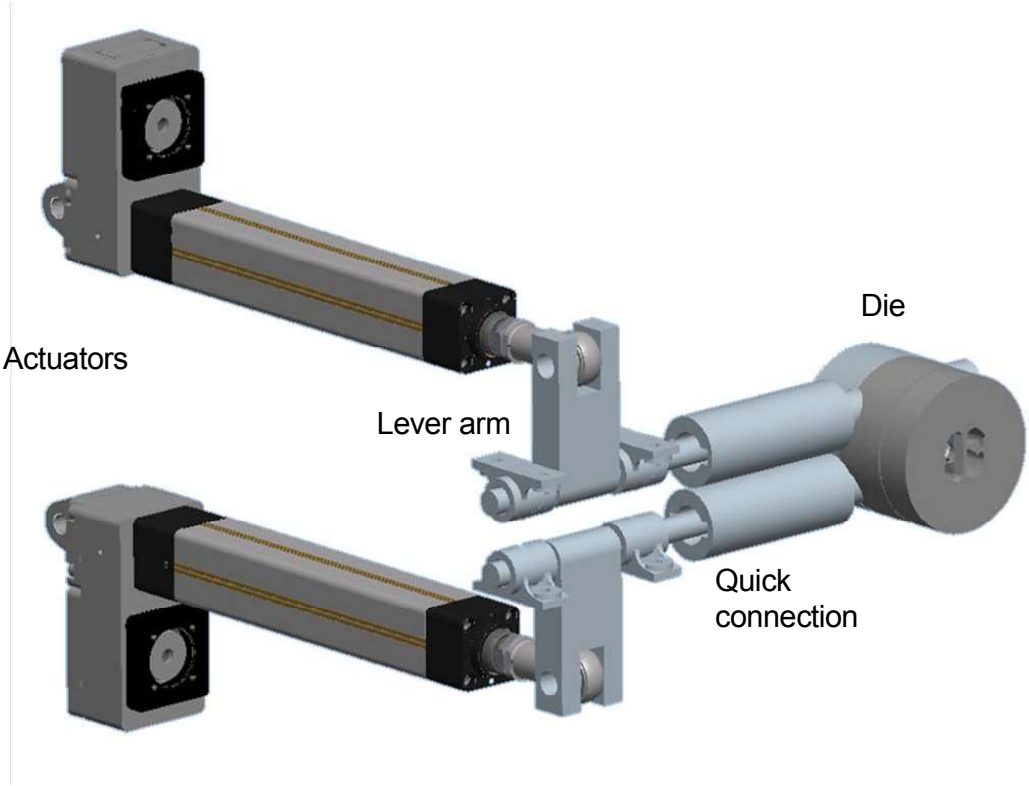


Figure 4. Sketch of the system

AVAILABLE SPACE AND DIMENSIONS
**DIMENSIONS SHOWN ARE FOR INFORMATION ONLY*

Figure 5. Available space and safety mat

Figure 6. Stroke length of the die insertion system.

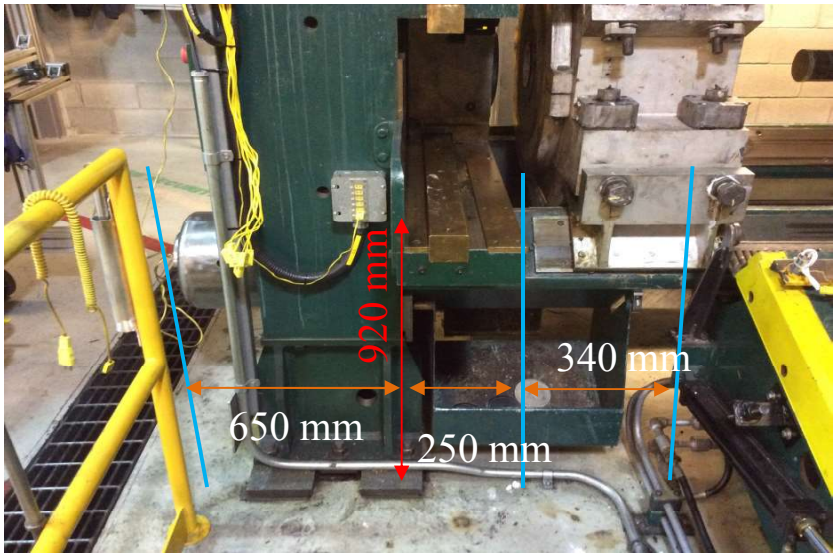


Figure 7. Height, clearance on each side of the insertion system

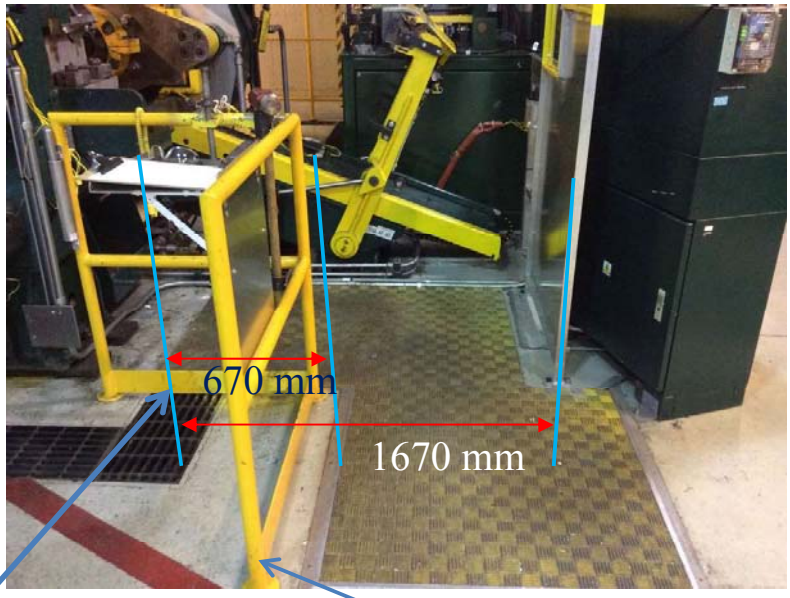


Figure 8. Front clearance of the insertion system

Beginning of the insertion system of the die

Removable guard for the installation

Appendice "B"

Cylinder size type	Unit	ETH100 M10	ETH100 M20	ETH125 M10	ETH125 M20
Screw lead	[mm]	10	20	10	20
Screw diameter	[mm]	50		63	
Travels, speeds and accelerations					
Available strokes [1) 2)]	[mm]	continuous from 100-2000 & standard strokes		continuous from 100-2000 & standard strokes	
Max. permissible speed at stroke =					
100-400 mm	[mm/s]	400	800	417	833
500 mm	[mm/s]	400	747	417	807
600 mm	[mm/s]	333	622	395	684
800 mm	[mm/s]	241	457	290	514
1000 mm	[mm/s]	185	354	224	405
1200 mm	[mm/s]	148	284	180	329
1400 mm	[mm/s]	122	235	148	275
1600 mm	[mm/s]	102	198	125	234
2000 mm	[mm/s]	76	148	94	170
Max. Acceleration	[m/s²]	8	10	8	10
Forces					
Max. axial traction/thrust force motor inline	[N]	54800	56000	88700	114000
Max. axial traction/thrust. [3)] Motor parallel	[N]		50800	76300	81400
Equivalent dynamic axial force at a lifetime of 2500 km	[N]	18410	27100	27140	49600
Max. transmissible torque / force constant					
Max. transmissible torque inline motor	[Nm]	100	200	150	400
Max. transmissible torque. [3)] Motor parallel	[Nm]	108	200	150	320
Force constant motor inline [5)]	[N/Nm]	565	283	565	283
Force constant motor parallel [5)]	[N/Nm]	509	254	509	254
Weight [6)]					
Weight of base unit with zero stroke (incl. piston rod)	[kg]	21	24	56	64
Additional weight of inline unit	[kg]	12		27	
Additional weight of parallel unit	[kg]	21		51	
Mass of additional stroke (incl. piston rod)	[kg/m]	38		62	
Weight of piston rod with zero stroke	[kg]	1.2		2.9	
Weight of piston rod - additional length	[kg/m]	7.7		14.4	
Mass moments of inertia					
Motor parallel without stroke	[kgmm²]	5860	6240	17050	17990
Motor inline without stroke	[kgmm²]	2240	2620	12960	13400
Parallel/inline motor per meter	[kgmm²/m]	4270	4710	10070	10490
Accuracy: Bidirectional Repeatability (ISO230-2)					
Motor inline	[mm]	±0.03			
Motor parallel	[mm]	±0.05			
Efficiency					
Motor inline (the efficiency includes all friction torques)	[%]	90			
Motor parallel	[%]	81			
Ambient conditions					
Operating Temperature	[°C]	-10...+70			
Ambient temperature	[°C]	-10...+40			
Storage temperature	[°C]	-20...+40			
Humidity	[%]	0...95 % (non-condensing)			
Location height range	[m]	max. 3000			

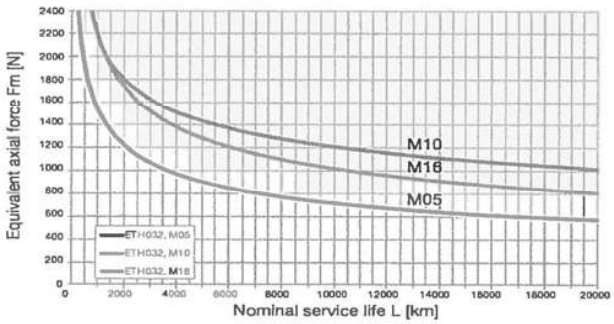
[1)] "Order Code" (page 54), [2)] Intermediate stroke lengths may be interpolated.
[3)] Applies only for motor speed < 100 min⁻¹. Transmissible torque depending on the motor speed n Motor parallel see page 15,
[5)] The efficiency factors are included in the force constants, [6)] Weight without rod-end and mounting option..

Technical Data apply under normal conditions and only for the individual operating and load modes. In the case of compound loads, it is necessary to verify in accordance with normal physical laws and technical standards whether individual ratings should be reduced. In case of doubt please contact Parker.

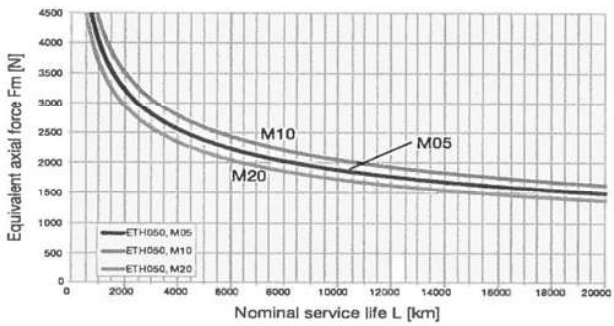
Diagrams [2]

The given values apply when adhering to the recommended lubrication intervals (see relubrication). The diagrams were established in accordance with DIN ISO 3408-5

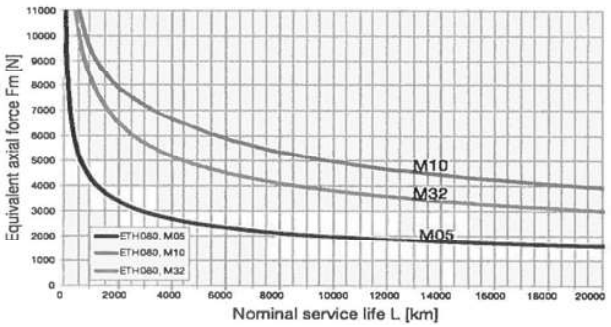
ETH032



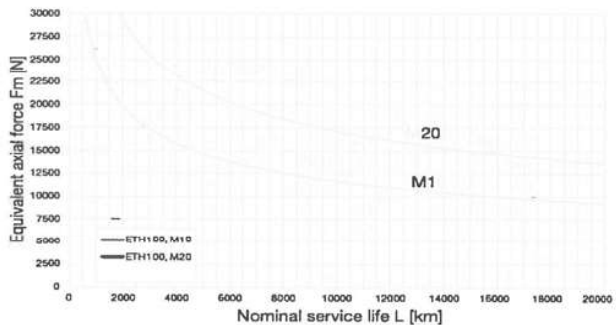
ETH050



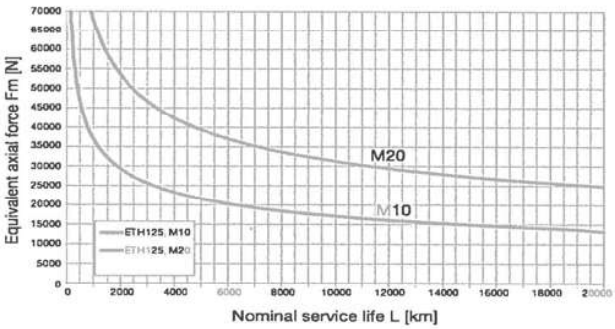
ETH080



ETH100



ETH125



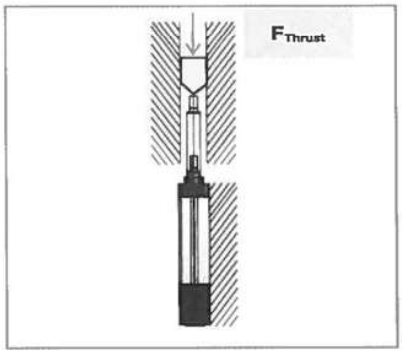
Prerequisites for nominal service life

- Bearing and screw temperature between 20 °C and 40 °C.
- No impairment of the lubrication, for example by external particles.
- Relubrication in accordance with the specifications.
- The given values for thrust force, speed and acceleration must be adhered to at any rate.
- No approaching the mechanical end stops (external or internal), no other abrupt loads, as the given maximum force of the cylinder may never be exceeded.
- No external side loads
- Application factor fw = 1. In order to calculate the real service life and the corresponding application factor, please refer to chapter "Service Life" see page 13
- No high exploitation of several power features at a time (for example maximum speed or thrust force).
- No regulating oscillation at standstill.

[2] ATEX cylinders feature a reduced the service life. Please note the brochure on "intended use" (192-550004).

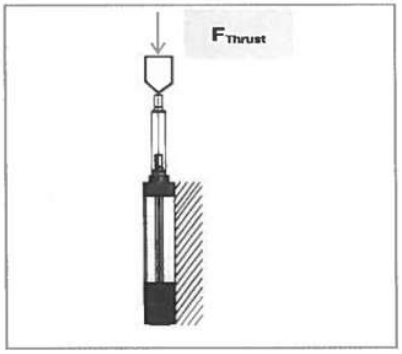
Case 1

Cylinders fixed with mounting flanges, foot mounting or mounting plates.
Cylinder always fixed at the front end as well.
Thrust rod with axial guiding.



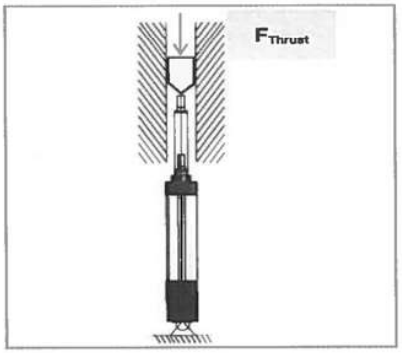
Case 2

Cylinders fixed with mounting flanges, foot mounting or mounting plates.
Cylinder always fixed at the front end as well.
Thrust rod without axial guiding. External force applied axially with respect to cylinder axis.

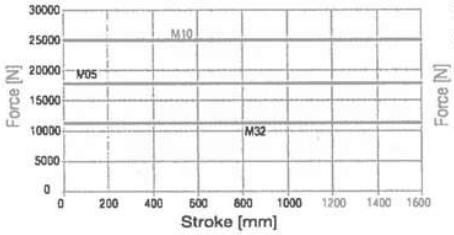


Case 3

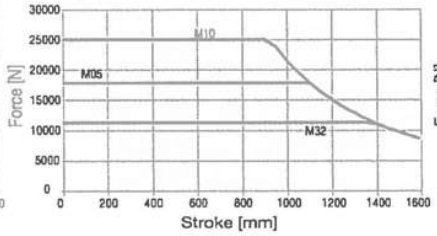
Cylinder mounted with center trunnion, rear clevis or any other rear fixing material (e.g. rear mounting plate).
Thrust rod with axial guiding.



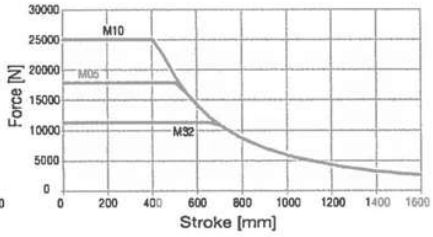
ETH080 - Case 1



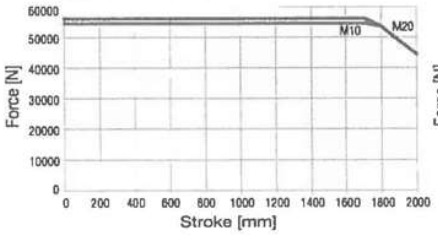
ETH080 - Case 2



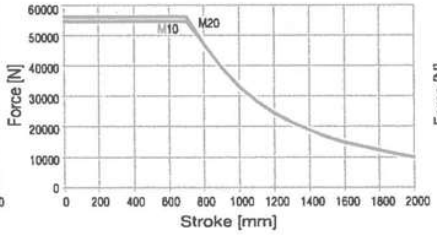
ETH080 - Case 3



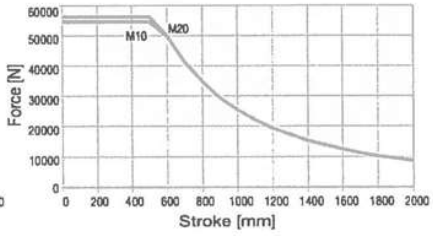
ETH100 - Case 1



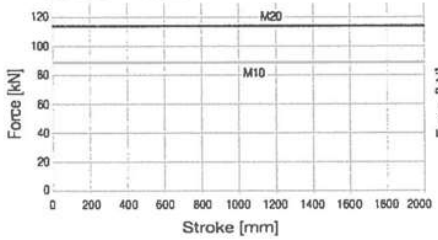
ETH100 - Case 2



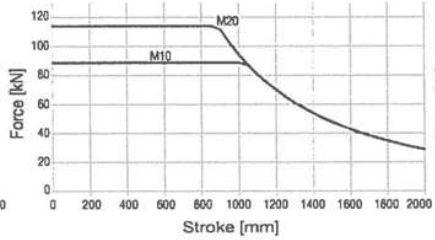
ETH100 - Case 3



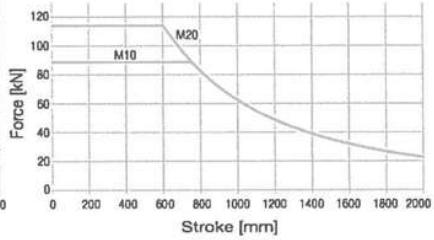
ETH125 - Case 1



ETH125 - Case 2



ETH125 - Case 3



Accessories

Force sensors - Spherical rod eye with integrated force sensor

Swivel heads are important construction components with respect to rotary, pivoting and tilting movements. Force measurements are more and more frequently required in applications.
The force transducers are suitable for direct mounting on the cylinder rod. They can, for example, be used to measure contact forces or overloads. Thanks to the thin film technology, the swivel head force transducers are very robust and reliable. An integrated amplifier emits an output signal of 4...20 mA.
The sensors correspond to the EN 61326 standard for electromagnetic compatibility (EMC) and are sized to pick up traction/ thrust forces.

Features

- Measuring range: Traction/thrust forces up to ±114 kN
- Thin film implants (instead of conventional bonded foil strain gauges)
- Corrosion resistant stainless steel version
- Integrated amplifier
- Small temperature drift
- Long term stability
- High shock and vibration resistance
- For dynamic or static measurements
- Good repeatability
- Simple mounting
- Also available in ATEX design [1) 2)]. Authorized for gas atmospheres zone 1 and zone 2.

Ex II 2G Ex ib IIC T4

Connection of the force sensors to Compax3 with Option M21 is possible.

Technical Features

		Spherical rod eye with integrated force sensor									With External Thread		
	Unit	ETH032			ETH050			ETH080			ETH100	ETH125	
		M05	M10	M16	M05	M10	M20	M05	M10	M32	M10/M20	M10	M20
Accuracy	[%]	0.2										1	
Material	-	Stainless steel											
Protection class	-	IP67											
Ambient temperature	[°C]	-20 to +80											
Measuring range	[kN]	±3.7	±3.7	±2.4	±9.3	±7.0	±4.4	±17.8	±25.1	±10.6	±56.0	±88.7	±114.0
Accuracy	[N]	14.8	14.8	9.6	37.2	28.0	17.6	71.2	100.4	42.4	1120	1774	2280
Part N° (standard option).	-		0111.916	0111.917	0121.916	0121.917	0121.918	0131.916	0131.917	0131.918	0141.916	0141.917	0141.918
Part N° (ATEX option [1)3)] Ex)	-		0111.946		0121.946	0121.947		0131.946	0131.947		0141.946	0151.947	0151.948

For ETH032-ETH080: Only possible with cylinder rod end "M" (external thread).
For ETH100, ETH125: Only possible with cylinder rod end "K".
A subsequent conversion from another rod end to M or K is generally **NOT** possible.

[1)] The ATEX approval of the force sensors is only met, if the sensor is operating with an ATEX authorized isolated switch amplifiers and an ATEX authorized cable.
[2)] Please refer to the installation and operating instructions in the supplied operating manual.