

Ref No : PUR/IMP/ADITYA/ISRO/PUK/16/2014-15.

March 23, 2015.

M/s.

Dear Sir/s,

The Director, Indian Institute of Astrophysics, Bangalore, invites Sealed Tenders Two bid system (Technical bid & Price bid ) for the Supply of **“Titanium Alloy Ti6A14V, ASTM Grade 5, forged Blank size 1650mm x 1100mm x 85mm” for VELC Optical Bench - 2 Nos” as per the attached Technical Specifications and the Drawing .** The terms and conditions may be noted from IIA Website and if you are in a position to quote for the supply in accordance with the requirements, please submit your quotation. The Tender documents and other details are available on IIA web site [www.iiap.res.in/tenders.htm](http://www.iiap.res.in/tenders.htm)

**Eligibility Criteria of Vendor:** The vendor must have understanding, experience and the infrastructure. The technical bid shall include the profile of the company and its past experience, heritage of the supplier in supplying forged Titanium blanks of similar or near similar dimensions and purpose with the details of those clients details.

**The Tender bid can be in foreign currency & in Indian Rupees.** Your completed Tender bids (both Technical bid & Price bid) must reach our office on or before 17/04/2015 by 15 00 hrs. The bids must be in a separate Sealed envelopes duly superscribed with the Name of the Supply & Due Date, both the envelopes kept in a big envelopes mentioning Quotation for “Titanium Alloy Ti6A14V, ASTM Grade 5, forged Blank for VELC Optical Bench” must reach this office within the Due Date and time. The Technical bid will be opened in the presence of the bidders or their authorized representative of the Company by 15.30 hrs on 17/04/2015. The Price bid will be opened only those vendors quotes qualify in Technical Evaluation. The opening of Price bid, date and time will be intimated later. Incomplete Bids are liable for rejection.

For any Technical clarification you may contact during Office hours Sri.P.Umesh Kamath (Phone No.2254 1215) and Commercial clarifications can be had from Shri Y.K.Raja Iyengar, Stores & Purchase Officer (Phone No.2254 1244).

Thanking you,

Yours faithfully,

Y.K.Raja Iyengar  
Stores & Purchase Officer

**GLOBAL TENDER DOCUMENT No : PUR/IMP//ADITYA/ISRO/PUK/16/2014-15.**  
**Dt. March 23, 2015.**

**TENDER FORM**

FROM:

TO  
THE DIRECTOR  
Indian Institute of Astrophysics,  
Bangalore - 560 034.

Sir,

I/We hereby offer to supply the Items/Equipment indicated below at the price hereunder quoted and agree to hold this office open till . I/We shall be bound to supply the items/Equipment hereby offered upon the issue of the Purchase Order communicating to the acceptance thereof on or before the expiry of the last mentioned date. You are at liberty to accept any one or more of the items such Items/Equipment. I/We not withstanding that the offer in this tender has not been accepted in whole, shall be bound to supply such items and such portion or portions of one or more of the items as may be specified in the said Purchase order communicating the acceptance.

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S No. Description of the item(s) Qty. Unit Rate Dely. Period  
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1. Titanium Alloy Ti6A14V, ASTM Grade 5, forged Blank - 2 Numbers  
of size 1650 (-0.0, + 5.0) mm x 1100 (-0.0, + 5.0) mm x 85  
(-0.0, + 1.0) mm OR 65"x 45.3"x 3.4" for VELC Optical  
Bench as per attached Technical Specifications and the Drawing .

Fabrication drawings shall be given to IIA, for approval; these drawings should be  
editable and not just images.  
(Tender bids can be in Foreign currency & in Indian Rupees )

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Place at which the Delivery is required : Indian Institute of Astrophysics  
Bangalore - 560 034.

Date by which the supplies are required : 16 weeks from the date of order.

2 I/We have understood the items of the tender annexed to the invitation to the Tender and have thoroughly examined the specifications/drawing and / or pattern quoted or referred to herein and / are fully aware of the nature of the items/ Equipment required and my / our offer is to supply the items/ Equipment strictly in accordance with the requirements subject to the terms and conditions contained in the Purchase order communicating the acceptance of this tender either in whole or in part.

Date :

Signature and Seal of Supplier

## Annexure - A

### INSTRUCTIONS TO SUPPLIERS

1. Tenders should be sent in a sealed and superscribed envelopes with mention of Tender No. date and date of opening. Only one Tender should be sent in each envelope.
2. Late and Delayed tender will not considered at all.
3. Duties, Taxes where legally leviable and intended to be claimed should distinctly shown separately in the Tender.
4. a) Your quotation should be valid for 90-120 days from the date of opening of Tender.  
b) Prices are required to be quoted according to the units indicated in the annexed tender form. When quotations are given in terms of units other than those specified in the Tender form, relationship between the two sets of units must be furnished.
5. a) All available Technical Literature(s), Catalogue(s) and other data in support of the specifications and details of the item(s) should be furnished along with the offer.  
b) Approximate net and gross weight of the items offered shall be indicated in your offer. If dimensional details are available the same should indicated in your offer.  
c) Air freight/sea freight charges up to Bangalore Airport may be sent along with the offer.

#### d) Specifications:

Items / Equipment offered should strictly conform to our specifications. Deviation, if any should be clearly indicated by the Supplier in their quotation. The supplier should also indicate the Make / type No. of the stores offered and provide catalogue(s), Technical literature(s) and sample(s), wherever necessary along with the quotations. Test certificates wherever necessary should be forwarded along with the supplies. Whenever options are called for in our specifications, the Supplier should address all such options. Wherever specifically mentioned by us, the Supplier could suggest changes to specifications with appropriate response for the same.

1. Corrections, if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amounts quoted in words and figures, amount quoted in words shall prevail.
2. The supplier should supply along with the tender, the Banking information for payment or any other purpose.
3. A complete set of instruction and operation manual should be supplied.
4. Final performance should be guaranteed.

## **TERMS AND CONDITONS OF CONTRACT**

### **1. DEFINITIONS:**

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- a) The terms 'Purchaser' shall mean the Director, Indian Institute of Astrophysics, Bangalore - 560 034.
- b) The term 'Supplier' shall mean, the person, firm or company with whom or with which the order for the supply of Items / Equipment is placed.
- c) The terms 'Purchase Order' shall mean the communication signed on behalf of the Purchaser by an officer duly authorized intimating the acceptance on behalf the Purchaser on the terms and conditions mentioned or referred to in the said communications accepting the tender or offer of the supplier for supply of Items/Equipment.

### **2. PRICES:**

The price may please be indicated on unit basis only.

#### **Duty Exemption:**

Please note that we may issue Excise duty exemption / Customs duty Exemption Certificate", if acceptable under the Govt. of India notification No.10/97- Central Excise & No.51/96 - Customs valid till 2016.

### **3. GUARANTEE AND REPLACEMENT:**

The Supplier shall guarantee that the Items/Equipment supplied shall comply fully with the specifications laid down, for material workmanship and performance. The Guarantee should be for a period of one year minimum from the date of supply.

### **4. PACKING, FORWARDING AND INSURANCE:**

The Contractor will be held responsible for the stores being sufficiently and properly packed for transport by air / Sea to withstand transit hazards ensure safe arrival at the destination. The packing and marking of packing shall be done by and at the expenses of the contractor. The Purchaser will not pay separately for transit insurance, all risks in transit being exclusively of the supplier and the Purchase shall pay only for such Items/Equipment as are actually received in good condition, in accordance with contract.

5. **TEST CERTIFICATE:**

Wherever required Test Certificate should be sent before dispatch of the items.

6. **ACCEPTANCE OF ITEMS / EQUIPMENT:**

a)It is expressly agreed that the acceptance of Items/Equipment, is subject to final approval by the Purchase, whose decision shall be final.

7. **DELIVERY PERIOD:**

Delivery is the essence of the contract. The supplier should adhered to delivery schedule as indicated in the Purchase order.

8. **EXTENTION OF DELIVERY TIME:**

As soon as it is apparent that Supplier dates cannot be adhered to, an application shall be sent by the Supplier to the Purchaser. If failure, on the part of the Supplier to deliver the Items/Equipment in proper time shall have arisen from any cause which the Purchaser may admit as reasonable ground for an extension of the time ( and his decision shall be final he may allow such additional time as he considers it to the justified by the circumstances of the case). In case of Letter of Credit the banking charge for the LOC amendment will be on suppliers account.

9. **PAYMENT:**

Preference will be given to the supplier whose payment terms is on Site Draft.

10. **SECURITY FOR PAYMENT:**

Successful Supplier will have to furnish in the form of a Bank Guarantee or any other form as called for by the Purchase towards any payments before supply of items/equipment. In case of payment through Letter of Credit the Banking charges outside India and inside India will be on suppliers account.

11. IIA reserves the right to reject any or all the Tenders without assigning any reason.

Stores & Purchase Officer  
For Director

**Technical specifications of the items:**

**Deliverables:**

**Titanium alloy, Ti6Al4V, ASTM Grade 5, forged blank of Size:**

**1650 (-0.0, +5.0) mm x 1100 (-0.0, +5.0) mm x 85 (-0.0, +1.0) mm OR 65" x 45.3" x 3.4"**  
for VELC Optical Bench - Qty 2 nos.

The above item shall be conforming to the technical specifications mentioned below along with all the relevant test certificates and documentation. Material shall be in flat condition without any deformation, cracks, pitting, dents etc. The blank shall be Proof/ Pre-machined having flatness not more than  $\pm 0.5\text{mm}$ .

**Technical Specifications:**

Material: Ti6Al4V, annealed condition.

Material shall be in a stress free condition and shall comply with ASTM Grade 5/ ASTM B381-6a standard specifications with respect to mechanical properties, chemical compositions and co-efficient of thermal expansion.

**Chemical Composition:**

Sampling plan for chemical analysis: Samples shall be taken on ingot level for each heat from both top and bottom of the ingot.

Chemical composition shall confirm to the specified range given below. Analysis shall be carried out as per ASTM E120, by spectroscopic method in accordance with federal test method No.151 or 112.

<b>Component</b>	<b>Wt. %</b>
Aluminium	6
Vanadium	4
Iron	0.25 max
Oxygen	0.2 max
Titanium	Remaining

### **Mechanical Properties: (Minimum Values)**

Tensile strength, Ultimate	950 MPa.
Tensile strength, Yield	880 MPa.
Modulus of Elasticity	113.8 GPa
Compressive Yield Strength	970 MPa
Notched Tensile Strength	1450 MPa
Poisson's ratio	0.342
Fatigue Strength	510 MPa

### **Coefficient of Thermal Expansion (CTE):**

In the order of  $8.6 \times 10^{-6}$  m/m per °C in the temperature range 20°C to 100°C (as per ASTM Grade 5 as a base line). (If the value is higher than this, the material will not be accepted.)

### **Testing / Inspection / Documentation:**

1. The cast ingots after adequate removal of metal to eliminate piping and segregation representing Top and Bottom locations shall be forged to slabs by sufficiently working to achieve complete breakdown of ingot structure.
2. **Macro etch test**
  - Macro etch test shall be done on each slab to represent the entire cross section in accordance with AMS 2642/2643.
  - Macro structure shall be free from Pipe, Cracks, Porosities, Laps, folds, pitting, segregation and inclusions. Acceptance shall be as per the section 3.3.3.1 of AMS 2380 D.
3. The forged blank shall be 100 percent screened by ultrasonic testing as per AMS 2631 class A1/ AM2632 Class A-1. The forged blank shall be X-ray tested to rule out any internal defects. The vendor shall provide the cost involved for these tests separately.
4. The vendor shall test for the ultimate tensile/breaking strength of the material using test coupons made from the same forged blank. And the test certificate shall be provided for acceptance prior to the shipment of the material.

5. Dye Penetrant testing: Dye penetrant test shall be carried out on all the slabs on both the faces (100% of the area) and they shall be free from surface defects.
6. Test coupons made from the same forged blank shall be used for carrying out all the required tests. Additional coupons of size 50mmx100mmx10mm, 6 numbers from each blank shall be supplied to IIA along with the blank for repeat checks, if required, as a contingency.
7. The above tests shall be conducted by a third party inspection firm like Lloyds/BVI for material properties, ultrasonic tests and X-ray tests.
8. Test certificates for all the above mentioned tests shall be submitted to IIA for acceptance of material prior to the shipment. The vendor should ensure that the materials shall comply with all the above mentioned requirements.
9. Waivers if any, of all major non-conformances and deviations noted during manufacturing and testing shall be recorded and reported to IIA immediately on their occurrence along with the corrective plan / disposition. Only after a clearance from IIA, the vendor shall proceed with further processes.
10. The vendor shall send the materials along with an additional set of complete documentation pertaining to all the test results as follows:
  - a. Dimensions and tolerances to be achieved as per specification given in drawing.
  - b. The vendor shall provide the details of the overall process steps / plans proposed to realize the forged blank in their proposal. The overall manufacturing drawings shall be given to IIA for approval before proceeding with manufacture if necessary.
  - c. IIA reserves accessibility to vendor site as and when required. Information like, sub-contractor information, material test reports, product test reports need to be provided to IIA, during all stages of the contract.
11. Any changes to the above shall be made by mutual agreement between IIA and vendor.

Stores & Purchase Officer

Drawing of Titanium Blank Optical Bench.

