

TENDER FUNCTIONAL SPECIFICATIONS

Case no. 2026-0019-26-MES-RUE

Purchasing and associated services: High speed Dual head
532nm PIV laser

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1 General overview

1.1 Purpose and scope

This request addresses the need for IFP Energies Nouvelles, within the framework of energy transition and sustainable mobility, to acquire a high-speed dual head PIV laser operating at 532nm wavelength. The objective is to study velocity field in wide variety of applications to sustain research and development effort.

Associated services :

- Commissioning
- Training for the use of the Equipment
- Warranty
- Spare parts delivery
- Preventive and Corrective Maintenance

1.2 Aims

The purpose of the purchase is to equip IFP Energies Nouvelles Team with a new high-speed laser for PIV applications, operating at 532nm. The laser should be robust and stable, with easy maintenance and handling.

The Contractor is responsible, during the performance of its service, for providing IFPEN with an Equipment that:

- fully meets the expected specifications, functionalities, and performance,
- is capable of withstanding all site constraints related to normal operating conditions,
- is free from any design and manufacturing defects.

1.3 Appendices to the specifications

Documents	Reference	Date	Rev.	attached version ¹	
				Electronic	Paper
1. Booklet on deviations from the Golden Rules	“fren-EN”			☒	☐
2. Memo on safety in Rueil outside companies	“01_en”			☒	☐
3. Minute document					

¹ Check if the document is appended to the specifications.

2 Definitions

Equipment	High speed Dual head 532nm PIV laser
Bidder	A natural or legal person who is submitting a proposal in response to this request for tenders.
FAT – Factory Acceptance Test	Shop / Factory acceptance
SAT – Site Acceptance Test	In situ acceptance at the IFPEN site
Contract holder	Contract holder on completion of this tendering process
Unavailability	It refers to the state of the Equipment subject to Critical or Semi-critical failures. The period of Unavailability of the Equipment begins upon the written intervention request from IFPEN and ends with the signing of the report certifying the restoration of the Equipment's functionality, signed by the Parties.
Semi-critical failure	Refers to any malfunction allowing the Equipment to operate only for part of its functionalities.
Critical failure	Refers to any malfunction making it impossible to use all functionalities of the Equipment or those deemed essential by IFPEN.

3 Requirements

3.1 Functional expression of requirements

In the following table, the priority level of the expected functions is as follows:

- **A – Essential function**

This function is directly related to the needs and must be imperatively ensured (as well as any associated minimum/maximum thresholds)

- **B – Important**

Desired function but not at any cost (not imperative, but it may impact the score; see the evaluation grid in the tender specifications).

- **C – Desirable/Optional**

The function will only be retained if it is technically and commercially suitable for IFPEN:

- The "PAS" (Potential additional service) is to be selected by IFPEN during the awarding phase.
- The "optional tranche" is to be activated during the execution of the contract, if necessary, at IFPEN's initiative, with a reasonable notice period to be specified by the Bidder.

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High Speed Dual head 532nm PIV laser				
P	Functions expected	Expected performance		Acceptance
			min	max
A	Pulse energy/power	To ensure high-quality lighting in IFPEN experimental conditions, laser pulse should provide at least 11mJ/110W at 10kHz (accounting both heads).	Min: 11mJ/110W @ 10kHz.	More energy/power doesn't provide additional points in final evaluation
A	Pulse width	Pulse width must be shorter than 160ns, to ensure high diagnostics quality.	<160ns	
A	Repetition rate	To meet the needs of various experimental configurations at IFPEN, laser frequency must be adjustable, at least between 10kHz and 30kHz.	Minimum range: 10 kHz - 30kHz.	Higher frequency doesn't provide additional points in the final evaluation
A	Pulse to pulse stability	To maintain a stable operation during, pulse to pulse stability must be lower than 1% of the Root Mean Square (RMS), in ambient temperature conditions.	<1% RMS	
A	Laser interface	Laser must be equipped with RS232 or RS484, and TTL external trig		

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Technical documentation			
P	Functions expected	Expected performance	Acceptance
			min max
A	Supply of user and maintenance manuals on delivery	• Written in French • English version to be also provided preferably • Archived in electronic format.	

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Associated assistance, support, or training services			
P	Functions expected	Expected performance	Acceptance min max
A	Commissioning	The Contract holder shall be responsible for implementing all the means and resources necessary to put into service with the Equipment until definitive acceptance is confirmed.	
A	Training of IFPEN operators	The training sur site must include hands-on sessions using IFPEN's test benches The purpose of this training stage is to: • train users to use the Equipment, • train users to perform level 1 maintenance operations. Content and duration to be detailed by the Bidder Planning to be proposed by the Tenderer	Duration : 1 day minimum Participants : 4 IFPEN employees Training : two weeks maximum after commissioning

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Maintenance and after-sales services			
P	Functions expected	Expected performance	Acceptance min max
A	Warranty	Under the warranty, the Contract holder shall: • ensure that the Equipment remains available, • replace all equipment and spare parts supplied which are deemed faulty, • carry out all the necessary operations so as to repair any damage and / or re-establish normal usage conditions. Coverage: diagnosis, dismantling, replacement and reassembly of the parts found to be faulty, and all costs relating to the movement of personnel and the packaging and transport of equipment in order to refurbish the Equipment. For the warranty period, the Bidder is invited to set out its commitments on the following items: • Warranty period duration: • Remote assistance response time: • On-site intervention response time: • Lead-time for spare parts delivery: • Maximum number of days of Unavailability per year: • Specify if inclusion free of charge or paid of preventive maintenance: • Compensation in case the commitments have not been fulfilled:	Minimum warranty duration: 1 year from the date of the Equipment's qualitative acceptance, without reservations Maximum remote assistance response time: 24 hours Maximum on-site response time: 72 hours (business days only) after pre-diagnosis done during the remote assistance
A	After-Sales service	The Bidder indicates in its offer: • Organization, technical/human resources and experience on After-Sales service	

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		- the Bidder indicates how remote assistance requests outside the warranty period or maintenance contract are dealt with, and sets out its commitments in this topic. - List of spare parts, including their current price. - The Bidder sets out its commitments on prices and lead time post-warranty - Supply chain organization for spare parts - Preventive maintenance protocol also detailing the replaced parts, replacement conditions (systematic or based on wear), and the lifespan of these parts (ideally in terms of the number of laser firing if applicable, or other if more relevant) - Identification in this list of level 1 maintenance parts Level 1 maintenance must be able to be performed by IFPEN personnel trained for this purpose.	
C	Maintenance contract to be offered as an option	The Bidder can provide a quote for the following contracts (see the grid on excel file): Option 1: annual preventive maintenance completed with: - All costs applicable outside the lumpsum Option 2: all-included maintenance contracts (preventive and corrective maintenance, parts and labor) For option 1 and 2 : For the maintenance contract period, the Bidder is invited to set out its commitments on the following items: - Remote assistance lead time: - Quote proposal lead time after remote or onsite diagnosis: - On-site intervention lead time: - Lead-time for spare parts delivery:	For Option 2: Maximum remote assistance response time: 24 hours Maximum on-site response time: 72 hours (business days only) after pre-diagnosis done during the remote assistance

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		- Maximum number of days of Unavailability² per year: - Compensation in case the commitments have not been fulfilled	
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Corporate Social Responsibility			
P	Fonctions attendues	Performances attendues	Acceptabilité min max
A	Equipment lifespan and position in its obsolescence cycle.	The Bidder must indicate the Equipment's position in its lifecycle (start date of commercialization/estimated or known end date of commercialization).	Availability of spare parts: Minimum of 10 years from the expiration date of the offer. Human and technical capacity to ensure equipment full maintenance: Minimum of 10 years from the expiration date of the offer.
B	Proposal for environmentally friendly materials	Rate and detail of bio-sourced/recycled materials/second hand spare parts used in the manufacturing of the supply. Rate and detail of materials recyclable at the end of the supply's lifecycle.	
B	Water consumption and ease of maintenance	For easy maintenance and reduced water consumption, internal water cooling system is preferable.	

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B	Societal commitments	Indicate the number and rate the current workforce involved in the production line, or the aftersales service of the Equipment, corresponding to the profiles eligible for professional integration actions, listed in Article 16 of the link below: https://www.legifrance.gouv.fr/loda/id/JORFTEXT000043310341 Provide the job titles involved.	
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3.2 Type of samples/fluids and operating conditions

None.

4 Expression of constraints

4.1 Legislation, regulations, standards in force

The Equipment supplied and the services provided by the contract holder shall comply with the regulations in force.

4.2 CE Marking

In accordance with regulations, the Equipment supplied must bear CE marking and be delivered with a CE certificate of compliance.

4.3 Safety

Safety is a priority concern for IFP Energies nouvelles' Directorate General. Personnel working at IFP Energies nouvelles sites will be required to comply with the following guidelines:

- Memo on Safety for external companies
- Deviations from the Gold Rules

4.4 Usage environment

The Equipment must be installed in an environment with the following external parameters:

No specification.

The bidder can (optional) conduct a visit of IFPEN's premises, **only to check the site and its potential constraints in relation to the installation and use of the Equipment**. All questions related to the Equipment's specifications must be submitted in writing on the PLACE platform. See details on the Tender specifications.

The Bidder is responsible for informing IFPEN of the environmental and usage constraints to which the Equipment is subject under normal conditions of use and maintenance. In particular:

- the utilities needed for the Equipment to operate:
 - voltage and electrical power requirements,
 - the required fluid types and network pressures,
- precautions for use,
- the necessary safeguards.

5 Arrangements for acceptance of the Equipment and associated services

5.1 Workshop/factory acceptance (Factory Acceptance Test)

Non required.

5.2 In situ acceptance (SAT)

This milestone must allow IFPEN to verify the compliance of the Equipment with the functionalities and performances described in the Functional Specifications.

The acceptance tests for this step must be carried out at IFPEN's site, in accordance with the procedures described below:

Tests	Tested functions	Expected performance	Acceptance conditions
Energy	Energy Max @ 10kHz	Higher than 11mJ/110W at 10kHz	>11mJ/110W at 10kHz
Power stability	Long duration operation	On a 1hours operation, Power stability < 0.5% RMS	<0.5% RMS
Head 1 / Head 2 power	Power level identical on both head of the laser	Identical power on both head at 10kHz	Power difference <5% in average over 5 min measurement duration.
Head 1/head 2 laser alignment	Superposition of laser beam and adjustment procedure. The supplier must provide and implement the alignment verification method, to be validated by IFPEN	Perfect laser beam alignment	Perfect laser beam alignment @2m from output.
Beam roundness	Visualization of Laser beam on each head	Circular shape, roundness >90%	roundness >90%

IFPEN undertakes to conduct the SAT tests within 1 month after training.

Final acceptance shall be pronounced once IFP Energies nouvelles has signed the Acceptance Report.

Acceptance, as defined above, triggers the start of the warranty period.

6 Logistical Requirements

6.1 Expected implementation calendar

Requested delivery date, including commissioning

16 weeks maximum from the date of contract's signature. An offer proposing a longer period will be deemed as irregular.

6.2 Delivery address

IFP Energies nouvelles, 1 - 4 Avenue de Bois Préau, 92500 Rueil-Malmaison, France

6.3 Packaging - Transport - Delivery

6.3.1 Packaging - Transport

The Contract holder shall assume responsibility for:

- the proper packaging of the Equipment and its accessories, required for its transport, The Contract holder shall be held liable for poor or insufficient packaging used to transport the Equipment.
- the transport of the Equipment and its accessories, from its workshops to the place of delivery indicated on the order.
- Incoterm DDP

6.3.2 Unloading – Handling – IFPEN Intra-Site transfer

When the Contract holder is in charge of installing the Equipment, as well as when there are special cases for loading, unloading or handling the Equipment, the Contract holder must:

- deliver the Equipment to its place of use; the person responsible for the delivery must first come to the Reception desk and hand over the delivery slip,
- unpack the Equipment.