



EUROPEAN UNION
European Structural and Investing Funds
Operational Programme Research,
Development and Education



Purchase Contract

pursuant to Section 2079 et seq. of Act No. 89/2012 Coll., the Civil Code, as amended (hereinafter the “**Civil Code**”)

I. THE PARTIES:

1. Buyer:

Fyzikální ústav AV ČR, v. v. i.

(Institute of Physics of the Czech Academy of Sciences, public research institution)

with its principal office at Praha 8, Na Slovance 2, PSČ 182 00

represented by: RNDr. Michal Prouza, Ph.D., the Director

Registered in the Registry of public research institutions kept by the Ministry of Education, Youth and Sports of the Czech Republic

Id. No.: 68378271

Tax Id. No.: CZ68378271

(hereinafter the “**Buyer**”)

and

2. Seller:

Safran Reosc

with its principal office at Avenue de la Tour Maury 91280, Saint Pierre du Perray - France

represented by: Philippe Rioufreyt, Chief Executive Officer

Registered in Registre du Commerce et des Sociétés d’Evry under number 492 019 419

Id. No.: D0068009

Tax Id. No.: FR4492019419

(Hereinafter the “**Seller**”; the Buyer and the Seller are hereinafter jointly referred to as the “**Parties**” and each of them individually as a “**Party**”).

enter, on the present day, month and year, into this Purchase Contract (hereinafter the “**Contract**”)

II. Fundamental Provisions:

- 2.1 The Buyer is a beneficiary of a subsidy granted by the Ministry of Education, Youth and Sports of the Czech Republic within the Operational Programme “Research, Development and Education”.
- 2.2 The Seller has been awarded the public contract entitled “OAP mirrors substrates for L4f beam focusing TP20_031” (hereinafter the “**Public Contract**”).

III. Subject of the Contract

- 3.1 Under this Contract the Seller shall design, manufacture and deliver to the Buyer three OAP mirror substrates as specified herein and under the conditions stipulated herein including Annexes to this Contract, especially Annex No 1 Requirements Specification Document (hereinafter the “**RSD**”).



The above-specified final mirror substrates are hereinafter referred to also each as the “**Substrate**” and together as the “**Substrates**”. The fused silica blanks (to be purchased from a subsupplier) which will be further processed by the Seller into the final Substrates are in this contract called the “**Blanks**”.

- 3.2 The Buyer shall take over the Substrates with all the required documentation and pay the Purchase Price for them to the Seller as specified in Art. V. hereof.

IV. Risk of Loss and Ownership Title

The risk of loss or damage to the Substrates shall pass to the Buyer upon their delivery to the Place of Delivery (upon offloading from the means of transport designated by the Seller).

The ownership title to each individual Substrate shall pass to the Buyer upon provision of the final instalment of the Purchase Price related to the individual Substrate to the Seller.

V. Purchase Price and Payment Terms

- 5.1 The purchase price for the Substrates is set forth below under the Item “C Total price for 3 Substrates” (hereinafter the “**Purchase Price**”). The table below furthermore sets out the composition of the Purchase Price.

Item	Description of the Item	Price in EUR excl. VAT
A	Fixed costs + Manufacturing costs for 2 Substrates	[vypuštěno]
A1	Fixed costs only	[vypuštěno]
B	Manufacturing costs for the 3rd Substrate	[vypuštěno]
C	Total price for 3 Substrates	970 000

- 5.2 All prices stipulated in this Contract are exclusive of VAT payable in the EU that will be paid by the Buyer in the Czech Republic.
- 5.3 The Seller, if applicable, is responsible for clearing the Substrates both for export from the country of origin and for import to the EU (export and import customs formalities and financial duties). The Buyer shall provide all needed assistance and carry out activities needed for completion of import procedures. The Buyer shall formally apply that the Substrates are admitted to the EU free of import financial duties (customs) if the law of the European Union provides for such admission.
- 5.4 The Purchase Price includes all costs related to the performance of the subject-matter of this Contract of which the Seller knew or should have known including all manufacturing costs, costs of transport, packaging, proper level of insurance and any other direct or indirect costs needed to perform this Contract duly and in time (but excluding VAT payable in the EU). The Purchase Price for the subject of performance set out in Art. III. hereof is the maximum permissible price. The Purchase Price is independent of the development of prices and currency exchange rates.
- 5.5 The Purchase Price for the Substrates shall be paid based on tax documents – invoices, to the account of the Seller designated in the invoice.

The Seller is entitled to invoice the Purchase Price as follows:

- 10% of the Purchase Price upon Blanks order;
- 20 % of the Purchase Price upon Qualified Design approval;
- 20 % of the Purchase Price upon documented take over and acceptance of the Blanks from a subsupplier; one third of this amount might be invoiced after take over and acceptance of each Blank if different in time;
- 20% of the Purchase Price upon metrology readiness (the wavefront metrology path is designed, mounts are fabricated and major interferometric components are available (i.e. Computer Generated Hologram);
- 20% of the Purchase Price upon execution of the acceptance protocol by the Parties (Art. 8.2 hereof);



- 10 % of the Purchase Price upon the issuance of a delivery note confirming delivery of the Substrates to the Place of Delivery free of damage caused in transport; one third of this amount might be invoiced after confirmed due delivery of each Substrate if different in time.

5.6 Invoices shall be payable within thirty (30) days from their delivery to the Buyer (hereinafter the "**Maturity Period**"). If the Seller indicates any shorter maturity period in an invoice, such other period is deemed irrelevant and the period set out herein applies. Payment of the invoiced amount is considered executed on the date of its remitting to the Seller's account. In conformity with the applicable tax regulations of the Czech Republic, the tax documents – invoices issued by the Seller hereunder shall include particularly the following details:

- a) the business name/designation and registered office of the Buyer
- b) the tax identification number of the Buyer
- c) the business name/designation and registered office of the Seller
- d) the tax identification number of the Seller
- e) the registration number of the tax document
- f) the scope and object of the taxable supply
- g) the date of issue of the tax document
- h) the date of the supply or the date of acceptance of the consideration, whichever is earlier, if it differs from the date of issue of the tax document
- i) the price of the supply
- j) a declaration that the invoiced performance is provided for the purposes of the "Advanced Research Using High Intensity Laser Produced Photons and Particles" project, reg. No. CZ.02.1.01/0.0/0.0/16_019/0000789 or any other project in accordance with instructions provided by the Buyer in advance

and must also be in conformity with any double taxation treaties applicable to this Contract.

5.7 Invoices shall be submitted to the Buyer only in the electronic form to the email address: efactory@fzu.cz

VI. Manufacturing Deadlines

6.1. The Seller shall design and manufacture the Substrates so that:

- a) **one Substrate** is ready (including all documentation needed for verification) for acceptance at the Seller's site within **22 months from the signature of this Contract** and
- b) **two Substrates** are ready (including all documentation needed for verification) for acceptance at the Seller's site within **26 months from the signature of this Contract**.

6.2. The preliminary fabrication time schedule presented by the Seller as the selected bidder in its bid for the Public Contract forms Annex No 2 hereto. The preliminary schedule is not binding for the Seller. But if any delay longer than 3 months occurs, the Seller shall inform the Buyer within 30 calendar days from awareness by the Seller of the risks of delay and present to it measures to be taken in order the delay is remedied or further delay minimized. Failing to comply with this obligation shall constitute a material breach of the Contract (Art. XI).

VII. Place of Delivery

The place of delivery shall be the ELI Beamlines facility, Za Radnicí 836, ZIP 252 41, Dolní Břežany, district Prague-west, the Czech Republic (hereinafter the "**Place of Delivery**").

If the Buyer contracts a coating provider (contracted to coat the uncoated Substrates) before commencement of transport of Substrates or of an individual Substrate to the Place of Delivery, the Seller commits to negotiate with the Buyer on terms and conditions under which the Substrate or Substrates will be delivered directly to the coating provider. The new terms and conditions (including adequate Purchase Price adjustment), if agreed to by the Parties, shall take form of an amendment to this Contract. The new place of delivery agreed in the amendment shall be regarded as the Place of Delivery under this Contract.



VIII. Production Phasing, Acceptance and Transport of the Substrates

8.1 Qualification of Design

The Seller shall submit to the Buyer basic manufacturing drawings and other documentation and information in line with art. 5.4.1 of Annex No 1 hereto (RSD) for approval before manufacture of the Substrates.

The Buyer shall provide a statement (approval or any comments) on the manufacturing drawings and related documentation and information submitted by the Seller within 10 business days from receiving them. Potential necessity of implementation of any comments of the Buyer does not postpone the manufacturing deadlines stipulated hereby if the Buyer meets the 10-business-day deadline. Should the deadline for provision of the statement not be met by the Buyer, the manufacturing deadlines extend accordingly.

8.2 Manufacture and Acceptance

The Buyer shall accept the Substrates (or any Substrate separately) at the Seller's site if the Substrates comply with all requirements stipulated herein and the results of the verification process are documented through documentation requested under this Contract. In such a case, the Buyer shall provide the Seller with an acceptance protocol and the Seller shall without undue delay start the transport of the Substrates to the Place of Delivery. The acceptance protocol might be also drafted by the Seller and submitted to the Buyer for approval.

The Seller shall employ best effort practices to minimize subsurface damage of the final parabolic surfaces.

8.3 Delivery of the Substrates

The inspection of the Substrates in terms of potential damage incurred during transport shall be carried out by the Buyer immediately after delivery of the Substrates to the Place of Delivery. The Buyer shall confirm due delivery of the Substrates to the Place of Delivery to the Seller within 5 days or to a carrier designated by the Seller, if delivered free of transport damage, by issuing a delivery note.

IX. Defects of the Substrates and Warranty Claims

9.1 A Substrate shall be deemed defective if it does not conform to the requirements stipulated herein. The Seller shall be liable for (i) any defects in the Substrates at the time of their acceptance, (ii) defects in the Substrates caused during transport to the Place of Delivery and (iii) for defects that occur in the Substrates during the entire warranty period (quality guarantee).

Defects Detected during Acceptance Procedure

9.2 The Buyer is not obliged to accept the Substrates if there are any defects in them. However, the Buyer is entitled based on its discretion to accept the Substrates despite there are defects in them if (i) the removal of the defects does not require acquisition of a new Blank and (ii) the Buyer presents a defect removal schedule under which the defects are to be removed with all reasonable expedition and promptly. The deadline for removing the defects shall be agreed in the acceptance protocol. If the Seller removes the defects within the agreed deadline, the respective Substrate is deemed to be manufactured in time in accordance with art. 6.1 hereof. If the Seller fails to remove the defects within the agreed deadline, the acceptance becomes invalid and the Seller is deemed to be in breach of art. 6.1 hereof from the day the respective manufacturing deadline has expired.

9.3 The Buyer is also entitled based on its discretion to accept the Substrates despite there are defects in them without removing the defects if the Parties agree on an adequate price discount.

9.4 Acceptance of the Substrates does not prevent the Buyer from making a later claim for removal of a hidden defect (that was present in a Substrate at the time of acceptance but could not have been detected during the acceptance procedure due to the nature of the verification methods). In such a case, Art. 9.9 – 9.11. hereof apply.

Radial PSD Curve and surface slope error

9.5 If at the time of verification of a Substrate



- a) further surface processing of the Substrate is needed under REQ-028405/A of the RSD (the radial PSD curve or the RMS wavefront gradient of the polished parabolic surface exceeds the limit),
- b) it is the main material defect of the Substrate, and
- c) the Seller promises execution of further processing within reasonable deadline,

the Buyer shall agree with the Seller adequate additional time for the processing. If the Substrate (i) meets after the further processing the respective requirement and the processing is carried out within the agreed deadline or (ii) the Seller after the further processing decides to accept the Substrate defective as is with an adequate discount agreed with the Seller, the Substrate shall be accepted by the Seller as manufactured in time according to the Art. 6.1 hereof.

Defects Caused during Transport

- 9.6 If a defect is detected by inspection of the Substrates in the Place of Delivery, the defect shall be documented and immediately reported to the Seller. Articles 9.9 – 9.11. hereof apply on the defect removal. The Buyer is also entitled based on its discretion to accept the defective Substrate as is in line with Art. 9.3 hereof.
- 9.7 Issuance of a delivery note confirming delivery of a Substrate free of damage caused in transport does not prevent the Buyer from making a later claim for removal of a hidden defect (that was present in a Substrate at the time of the inspection but could not have been detected during the inspection due to the nature of the available inspection methods). In such a case, Art. 9.9 – 9.11. hereof apply.

Warranty (Quality Guarantee)

- 9.8 The Seller provides the warranty of quality for each Substrate for a period of 1 year from the date of due delivery of the Substrate to the Place of Delivery (the day of issuance of the delivery note is the first day of the warranty period). The Buyer shall raise a warranty claim against the Seller without undue delay after detecting a defect, but not later than on the last day of the warranty period, by means of a written notice sent to the Seller's authorised representative for technical matters set out herein.
- 9.9 The Seller shall remove the defect for which it is responsible free of charge.
- 9.10 The Seller undertakes to remove any defect within a deadline agreed with the Buyer. If the Parties do not reach an agreement, the Seller shall remove the defect (i) within six months and (ii) in case the removal requires acquisition of a new Blank, the defect shall be removed within 1 year from raising the warranty claim.
- 9.11 The Parties shall execute a record on removal of the defect, in which they shall confirm that the defect has been removed.
- 9.12 The warranty shall not apply to defects caused by non-compliance with written rules of operation and maintenance of the Substrates provided by the Seller, manipulation errors or by normal wear and tear.

X. Penalties, vis major circumstances and liability limitation

Penalties

- 10.1 If the Seller is in delay with due finalization of manufacturing of any Substrate within the manufacturing deadlines stipulated in Art. 6.1 hereof, the Seller shall pay to the Buyer a contractual penalty for delay in the amount of 0,02% of the Purchase Price (without VAT) for every (even commenced) day of delay.
- 10.2 The total contractual penalty for delay with due finalization of manufacturing of one Substrate shall not exceed 3% of the Purchase Price (without VAT). Thus, the total contractual penalty for delay with due finalization of manufacturing of the Substrates shall not exceed 9% of the Purchase Price (without VAT)
- 10.3 If the Seller is in delay with the removal of a defect in case of hidden defects (Art. 9.4 or 9.7) or a warranty claim (Art. 9.8), the Seller shall pay to the Buyer a contractual penalty for delay in the amount of 0,0015 % of the Purchase Price (without VAT) for every (even commenced) day of delay.



- 10.4 The total contractual penalties for delay with removal of defects under this Contract shall not exceed 2% of the Purchase Price (without VAT).
- 10.5 The Seller shall pay contractual penalties within fifteen (15) days from the day, on which the Buyer enumerated their claim. The payment by the Seller of contractual penalties for delay to which the Buyer is entitled under this Art. X hereof shall be the sole indemnification due by the Seller to the Buyer because of such delay. The Buyer has the right to terminate the present Contract for default of the Seller in application of the Art. 11.2 iii) hereof.
- 10.6 The Buyer is entitled to unilaterally set off claims arising from the contractual penalties against the claim of the Seller for the payment of the Purchase Price (or any part of it) after agreement by the Parties on the amount of penalties due by the Seller. The Buyer is not obliged to take into account objections of the Seller raised against the enumeration of the contractual penalties should the Seller fail to document, within 30 days from receipt of the notice of penalties, that the application of penalties is groundless or that it is not liable for the delays.

Vis major circumstances

- 10.7 Circumstances constituting vis major shall be deemed to have been constituted by such circumstances / obstacles which arose independently of the will of the obliged Party, and which prevent fulfilment of that Party's obligation, provided that it could not be reasonably expected that the obliged Party could overcome or avert this obstacle or its consequences, and furthermore that such Party could foresee such obstacle when it entered into the respective covenants. Vis major shall not be constituted by obstacles that arose only after the obliged Party was in default with fulfilment of its obligations, or which arose in connection with its economic situation.

In addition and for the sake of clarity, the Parties agree that any particular effects or impacts on the Seller or his performance under this Contract of the Covid-19 epidemic that meet the conditions set out above in this Art. 10.7 will be considered as vis major cases despite the fact of the existence of the epidemic outbreak on the date of the signature of this Contract.

- 10.8 Should a situation occur, which a Party could reasonably consider to constitute vis major, and which could affect fulfilment of its obligations hereunder, such Party shall as soon as possible notify the other Party and attempt to continue in its performance hereunder in a reasonable degree. Simultaneously, such Party shall inform the other of any and all its proposals, including alternative modes of performance, however, without consent of the other Party, it shall not proceed to effect such alternative performance.
- 10.9 If a situation constituting vis major occurs, the deadlines imposed hereunder shall be extended by the period of the documented duration of the said vis major. The obliged Party shall properly document to the other Party the start and the finish of the vis major period.

Liability limitation

- 10.10 Except in case of corporal or property damages, gross negligence, or wilful misconduct shall the Seller's liability be limited to the aggregate amount of this Contract. The Seller shall not be liable for indirect damages such as loss of business and loss of profit.

XI. Termination of the Contract

- 11.1 This Contract may be terminated by withdrawal from the Contract on the grounds stipulated by law or in the Contract.
- 11.2 The Buyer is entitled to withdraw from the Contract without any penalty from Seller in any of the following cases:
- i) material breach of the Contract is committed by the Seller and the Seller has not remedied such breach within 3 months (or another longer period agreed to by the Buyer if to remedy the breach in 3 months is impossible for reasons documented by the Seller) following the sending of a written notice by the Buyer;
 - ii) insolvency proceedings are initiated against the Seller's assets;



iii) the Seller is in delay with the delivery of any Substrate by more than 6 months.

11.3 The Seller is entitled to withdraw from the Contract without any penalty from Buyer in the event of material breach of the Contract by the Buyer.

11.4 Either Party is entitled to withdraw from the Contract without any penalty in case of a vis major event (Art. 10.7 hereof) that lasts more than six months. The right to withdraw under this Art. 11.4 for a persisting vis major event can be executed by either Party only until documented take over and acceptance of the first Blank from a subsupplier by the Seller.

Partial termination of the Contract

11.5 The Buyer is entitled to partially withdraw from this Contract without any penalty from the Seller in relation to the manufacturing and delivery of one of the three Substrates (hereinafter the "**Terminated Substrate**"). In case of the written partial termination of this Contract (withdrawal) by the Buyer, the following rules apply:

- a) the obligation of the Seller to manufacture and deliver the remaining two Substrates under the terms of this Contract remain unaffected by the partial termination; the first of the two remaining Substrates shall be ready for acceptance at the Seller's site within the deadline stipulated in Art. 6.1.a) hereof and the second one within the deadline stipulated in Art. 6.1.b) hereof;
- b) the Seller shall stop further works on the Terminated Substrate and shall exercise all reasonable efforts on prevention of further costs related to the manufacture of the Terminated Substrate;
- c) the Parties shall agree on terms for packing and shipping of the unfinished Terminated Substrate to the Buyer;
- d) the financial settlement shall be carried out according to the following rules:
 - i) regarding the remaining two Substrates, the Buyer shall pay to the Seller the Fixed costs (needed to manufacture the Substrates regardless final number of the Substrates) and the Manufacturing costs for the remaining two Substrates (as set out in the price table in Art. 5.1 hereof, Item A);
 - ii) regarding the Terminated Substrate, the Seller shall have the right to payment of reasonably accrued costs in connection with the fulfilment of his obligations hereunder in relation to the Terminated Substrate prior to the partial Contract termination, under the condition that these could demonstrably not be cancelled in time provided that the Seller provides any and all reasonable assistance to the Buyer with respect to ideal liquidation of these costs for the Seller, following the Seller's instructions.

The sum of the accrued costs in connection with the fulfilment of his obligations hereunder in relation to the Terminated Substrate by the Seller together with the price for the remaining two Substrates (the Fixed costs and the Manufacturing costs for 2 Substrates, Item A of the price table) must not exceed the Purchase Price which is the total price for all three Substrates as set out in the price table in Art. 5.1 hereof, Item C). No indirect costs (e.g. loss of contracts, loss of profit etc.) shall be eligible.

- e) if, following the partial termination of this Contract and taking into account the actual status of manufacture of the remaining two Substrates and the time of termination, the schedule of payments (Art. 5.5 hereof) does not any more well correspond to the manufacturing process, the Parties shall with good faith negotiate on modification of the schedule of payments.

XII. Representatives, Notices

12.1 The Seller has appointed the following authorised representative for communication with the Buyer in technical matters:

Abdelhamid GHRIB

E-mail: abdelhamid.ghrib@safrangroup.com, tel.: +33 1 69 89 76 32

12.2 The Buyer has appointed the following authorised representative for communication with the Seller in technical matters:

Dr. Daniel Kramer, e-mail: Daniel.Kramer@eli-beams.eu, tel.: +420 266 051 423.



- 12.3 Unless this Contract stipulates otherwise, any and all notices that are to be or may be made between the Parties under this Contract must be made in writing and delivered to the other Party by an internationally renowned courier service (Federal Express, DHL, etc.), in person (with written confirmation of acceptance) or by registered post.

XIII. Choice of Law and disputes resolution

- 13.1 This Contract and all the legal relationships arising out of it shall be governed by the laws of the Czech Republic.
- 13.2 The Parties acknowledge and note that the provisions of the Czech Civil Code shall apply in matters that are not explicitly regulated by this Contract.
- 13.3 Any and all disputes arising out of this Contract or the legal relationships connected with the Contract shall be resolved by the Parties by mutual negotiations. In the event that any dispute cannot be resolved by negotiations within sixty (60) days, the dispute shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one arbitrator appointed in accordance with the said Rules. The Emergency Arbitrator Provisions shall not apply.

Arbitration proceedings place: Berlin (Germany)

Language: English

Constitution of the arbitral tribunal: sole arbitrator

Proceedings costs: each Party shall bear its own proceedings and legal representation costs, no success based reimbursements.

XIV. Export Control

In the event that the supply of the Substrates is under an applicable law subject to an end-user statement regarding use, an export license or any other similar administrative measure, the Buyer shall provide needed cooperation to meet the legal requirements and comply with the applicable rules. However, the Buyer must always remain entitled to use the Substrates for the operation of the ELI Beamlines research centre in the Czech Republic. Any resale of Substrates is subject to written approval of the Seller.

XV. Final provisions

- 14.1 The Buyer hereby declares that it is not with respect to the subject hereof an entrepreneur and that the subject of the Contract doesn't fall within the scope of any of its entrepreneurial activities.
- 14.2 The Contract represents the entire and comprehensive agreement between the Buyer and the Seller.
- 14.3 In the event that any of the provisions of this contract shall later be shown or determined to be invalid, ineffective or unenforceable, then such invalidity, ineffectiveness or unenforceability shall not cause invalidity, ineffectiveness or unenforceability of the Contract as a whole. In such event the Parties undertake without undue delay to replace after mutual agreement such invalid, ineffective or unenforceable provision of the Contract by a new provision, that in the extent permitted by the laws and regulations of the Czech Republic, relates as closely as possible to the intentions of the Parties to the Contract at the time of creation hereof.
- 14.4 This Contract shall be valid on the date of the signature of both Parties and effective on the day, on which it was published in the register of contracts within the meaning of the Act no. 340/2015 Coll., on the Register of Contracts.
- 14.5 This Contract may be changed or supplemented solely by means of numbered supplements in writing, furnished with the details of time and place and signed by duly authorised representatives of the Parties.
- 14.6 The following Annexes form an integral part of the Contract:
- Annex No. 1: Requirements Specification Document
 - Annex No. 2: Preliminary Fabrication Time Schedule
- 14.7 The Parties, manifesting their consent with its entire contents, affirm the Contract with their signature.



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MINISTRY OF EDUCATION,
YOUTH AND SPORTS

For: Fyzikální ústav AV ČR, v. v. i.

For: Safran Reosc

Name: RNDr. Michal Prouza, Ph.D.
Title: Director

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MINISTRY OF EDUCATION,
YOUTH AND SPORTS

Annex No. 1 Requirements Specification Document

Confidentiality Level	<i>RP - Restricted by policies</i>	TC ID / Revision	00252462/E
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Document Type	<i>Specification (SP)</i>		

[RSD Product Category C]

OAP mirrors substrates for L4f beam focusing
TP20_031



Keywords

n/a

	Position	Name
Responsible person	Chief Optical Designer	Daniel Kramer
Prepared by	Chief Optical Designer	Daniel Kramer

RSS History

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Viktor Fedosov	SE & Planning Group Leader; Quality Manager		

Approved by

<i>Name (approver)</i>	<i>Position (approver)</i>	<i>Date</i>	<i>Signature (approver)</i>
Georg Korn	Science and Technology Manager, Scientific coordinator of RP2-6		

Revision History

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1	D. Kramer	14.01.2020	RSD draft creation	A
2	A. Kuzmenko	24.01.2020	RSD update, version for internal review	B
3	A. Kuzmenko	30.01.2020	RSD update, version for 2 nd review	C
4	D.Kramer	20.04.2020	Metrology in design step and slope error in nonconformity article	D
5	D.Kramer	28.04.2020	Sub-aperture wavefront allowed below 6 mm, final version	E

Table of Content

1. Introduction	4
1.1. Purpose	4
1.2. Scope	4
1.3. Terms, Definitions and Abbreviations	4
1.4. Reference documents	4
1.5. References to standards	5
2. Functional, Performance and Design requirements.....	5
2.1. General requirements.....	5
3. Environmental requirements	5
4. Packaging requirements	6
4.1. General requirements.....	6
5. Quality control	6
5.1. Quality Reports (QRs)	6
5.2. Documentation and data control	7
5.3. Nonconformity Control System	7
5.4. Phasing of the delivery	8
5.4.1. Qualification of Design	8
5.4.2. Manufacturing.....	9
5.4.3. Acceptance.....	9

1. Introduction

1.1. Purpose

This Requirements Specification Document (RSD) lists the technical requirements and constraints on products applying in RA1 program of ELI project. This leads to the identification of interfaces with the ELI science-based technology. This RSD also acts as the parent document for the technical requirements that need to be addressed in lower-level design description documents.

1.2. Scope

This RSD contains all of the technical requirements: functional, performance and design, delivery, safety and quality requirements for the following product (tender number - TP20_031): **OAP mirrors substrates for L4f beam focusing** (further "**OAP mirrors substrates**").

The products will be located in the E4 and E3 experimental halls after coating and are registered in the PBS software under the following PBS codes:

RA1.L4BT.E34F.O.OAP.1 (1 pc for E3-P3), RA1.L4BT.E34F.O.OAP.2 (1 pc of spare part for E3-P3) and RA1.L4BT.E44F.O.OAP.1 (1 pc for E4).

1.3. Terms, Definitions and Abbreviations

For the purpose of this document, the following abbreviated terms are applied:

Abbreviation	Meaning
CA	Contracting Authority (Institute of Physics AV CR, v. v. i.)
ELI	Extreme Light Infrastructure
L4f	Compressed beam from ATON L4 laser
NCR	Nonconformity Report
OAP	Off Axis Parabola
PSD	Power Spectral Density
QR	Quality Report
RA1	Research activity 1
RMS	Root Mean Square
RSD	Requirements Specification Document

1.4. Reference documents

Number of doc.	Title of Document/File
RD-01	00251763-02_3.4_ES_DW_OAPL4f_30deg_uncoated_C rev3.pdf

1.5. References to standards

If this document includes references to standards or standardized/ standardizing technical documents the CA allows/permits also another equal solution to be offered.

2. Functional, Performance and Design requirements

Functional, performance and design requirements for the **OAP mirrors substrates** are summarized within reference drawing **RD-01** (see chapter 1.4).

2.1. General requirements

REQ-028392/A

The Supplier shall provide basic manufacturing drawings for the **OAP mirror substrates** in conformity with the reference drawing **RD-01** (see chapter 1.4) and overall layout of the wavefront metrology concept. Documents shall demonstrate to the CA that the requirements from RD-01 were properly taken into account by the Seller and the metrology concept is consistent.

REQ-028393/A

The parameters of each **OAP mirror substrate** shall correspond to the requirements given in the reference drawing **RD-01** (see chapter 1.4).

Specific Quality Report: I, II, III, IV, V (see REQ-028399/A)

REQ-028394/A

The material used for the **OAP mirror substrates** shall correspond to the requirement 9 from the reference drawing **RD-01** (see chapter 1.4) so that no bubbles are present on the final parabolic surface. Any other material shall be approved in advance by the CA.

Specific Quality Report: VI (see REQ-028399/A)

3. Environmental requirements

REQ-028395/A

The Supplier and the CA shall agree on the cleaning method to clean mirrors substrates without decreasing the substrates' properties and to avoid contamination of clean space.

NOTE: The cleaning methods may use high gas flow (dry air) and specialized chemical cleaning liquids (i.e. methanol, isopropyl alcohol, deionized water).

4. Packaging requirements

4.1. General requirements

REQ-028396/A

All the substrates shall be cleaned and packaged in the clean environment of class 6 according to ČSN EN ISO 14644 (equivalent to EN ISO 14644) or cleaner.

NOTE: Regarding the referred to standard/s or technical documents the CA allows/permits also another equal solution to be offered.

REQ-028397/A

Each substrate shall be placed in a separate PET-G container preventing damage, degradation and contamination. The PET-G containers shall be packed in a minimum of two plies separate clean packaging and placed in a sufficiently padded box for transport.

REQ-028398/A

The orientation of the substrate in the PET-G container shall be such that the concave S1 side faces upward.

5. Quality control

5.1. Quality Reports (QRs)

REQ-028399/A

For each uncoated substrates, the Supplier shall perform the following tests of product quality and provide corresponding **specific quality reports (I - VI)**:

- I. An interferometric report of the full clear aperture. Sub-aperture measurement is acceptable for spatial periods below 6 mm. At least 3 measurement locations are required for the sub-aperture measurement;
 - II. Focal length and off axis distance measurement report;
 - III. S-D report listing the main defects and their locations;
 - IV. Microroughness report from center and 3 corners of Clear Aperture;
 - V. Dimensional report listing the main dimensions;
 - VI. Material report showing at least the Fused Silica class, batch number and producer.
-

5.2. Documentation and data control

REQ-028400/A

For each uncoated substrate, the Supplier shall provide a Declaration of Conformity (or the equivalent document) with technical requirements defined by the product RSD and ensure completeness of the products.

REQ-028401/A

For each uncoated substrate, the Supplier shall provide the interferometric data from the quality report I (see REQ-028399/A) in a digital form readable by Zygo MX software. Data format shall be agreed with the CA.

REQ-028402/A

The Supplier shall use the following data formats:

- *.dat (Zygo binary file format for interferograms)
 - *.JPG, *.PDF/A, *.HTML
 - CAD 2D: *.dwg
 - CAD 3D: *.stp; *.ste; *.step or other 3D CAD formats agreed with the CA
 - *.doc, *.docx, *.xls, *.xlsx, *.ppt, *.pptx (for MS Office or OpenDocument Format)
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REQ-028403/A

The Supplier shall provide the following type of documents:

- 2D baseline manufacturing drawings;
 - Printable format for text documents.
-

5.3. Nonconformity Control System

REQ-028404/A

The Supplier shall establish and maintain a nonconformity control system compatible with ČSN EN ISO 9001 (equivalent to EN ISO 9001).

REQ-028405/A

Namely, in case the radial PSD curve of the polished parabolic surface or the RMS wavefront gradient exceeds the limit defined in parameter 8 or 7 of the RD-01, the Supplier shall provide the interferometric data to the CA. The focal spot shape will be then calculated and the CA will decide if further surface processing is needed.

5.4. Phasing of the delivery

This chapter is intended to briefly summarize basic milestones of the Contract delivery. These milestones represent gates (checkpoints) where the quality of the delivery is to be evaluated.

Delivery shall not proceed past these gates unless their satisfactory accomplishment is approved by the CA.

Delivery lifecycle shall contain at least the following phases (**quality gates**):

- **Qualification of Design**
- **Manufacturing**
- **Acceptance**

5.4.1. Qualification of Design

Summary of what has to be provided by Supplier in terms of documentation (QRs and manufacturing drawings) before starting the manufacturing. The goal is to verify the **manufacturing drawings**.

The output of this phase is **Qualified Design**.

REQ-028406/A

Before the ending of Qualified Design phase, the Supplier shall provide the baseline manufacturing drawings and metrology layout (see REQ-028392/A) for approval.

REQ-028407/A

Before the ending of Qualified Design phase the Supplier shall provide the following information that shall be agreed by the CA:

- structure and content of quality reports (see REQ-028399/A);
 - **HOW** and **WHEN** each of the technical requirements related to the final product will be verified (through QR, see REQ-028399/A).
-

REQ-028408/A

Before the ending of Qualified Design phase the Supplier and the CA shall agree on:

- detailed procedures related to the testing during Manufacturing phase;
 - common nonconformity control system (see REQ-028404/A and REQ-028405/A).
-

5.4.2. Manufacturing

The goal is to demonstrate that the manufactured products meet the specified technical requirements (RSD) of the CA.

This quality gate concerns primarily:

- **Testing at Supplier's site** (factory testing);
- **Packaging**

The output of this phase is the **Final Product**.

REQ-028409/A

The results of the Manufacturing phase of verification shall be recorded by the Supplier in corresponding QRs (see REQ-028399/A) and provided to the CA for approval (see chapter 5.4.3).

5.4.3. Acceptance

The Acceptance phase shall demonstrate the following:

- Final products have been successfully verified and this process has been documented in an appropriate way through QRs (see REQ-028399/A);
- All detected nonconformities have been solved in accordance with REQ-028404/A;
- Final products are free of fabrication errors.

The output of this phase is a **Verified Product**.

In case of successful acceptance phase, the CA shall provide to the Supplier signed acceptance protocol. In case of unsuccessful acceptance stage, the CA shall provide to the Supplier Nonconformity Report (NCR) and process in accordance with REQ-028404/A shall be applied.

REQ-028410/A

Verification process shall be carried out by the Supplier and it is successfully completed when the final products comply with all specifications and the results of this process are documented in an appropriate way through QRs (see REQ-028399/A).

NOTE: Acceptance will be carried out by the CA (or if required, representatives/contractors appointed by the CA) on the final products at the Supplier's site.



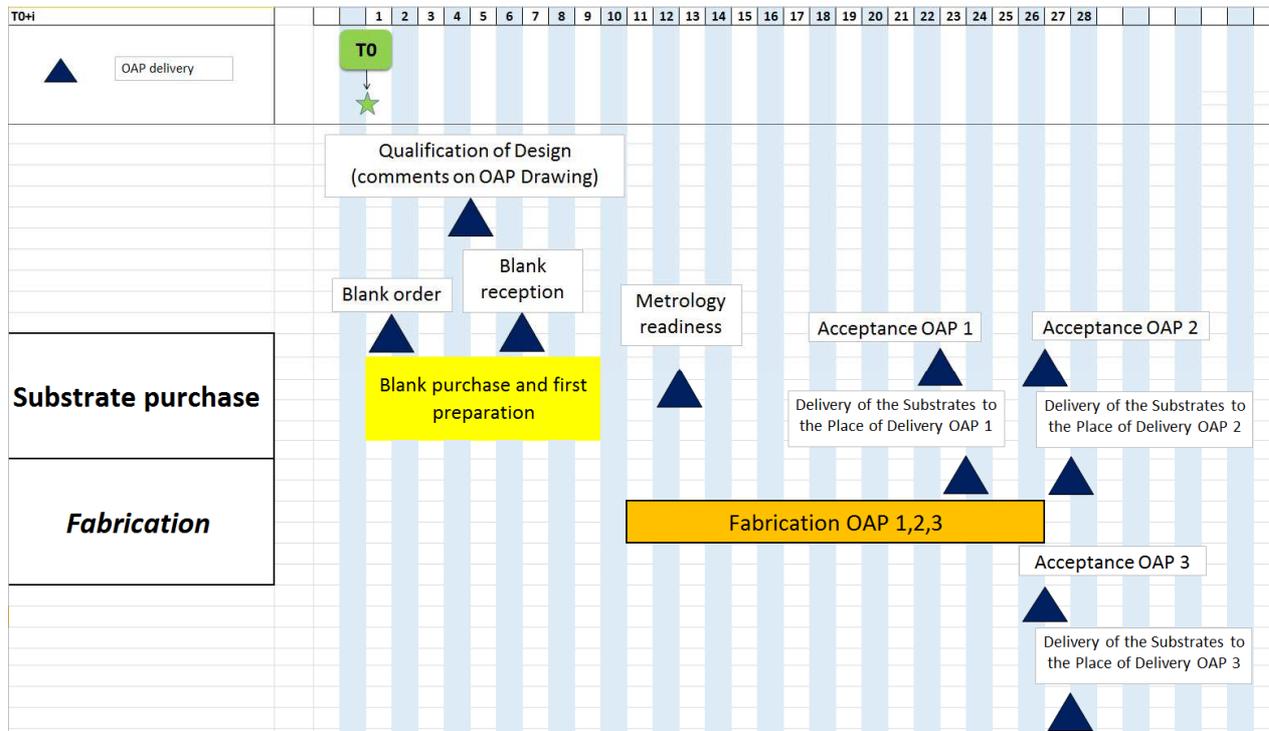
EUROPEAN UNION
European Structural and Investing Funds
Operational Programme Research,
Development and Education



MINISTRY OF EDUCATION,
YOUTH AND SPORTS

Annex No. 2 Preliminary Fabrication Time Schedule

Preliminary Fabrication Time Schedule



Steps	Schedule (Months)
Blank order	TO + 1
Qualified design submission for approval	TO + 4
Delivery of the blanks by a subsupplier	TO + 6
Metrology readiness	TO + 12
Acceptance OAP 1	TO + 22
Acceptance OAP 2	TO + 26
Acceptance OAP 3	TO + 26
Delivery of the substrates to the place of Delivery OAP 1	TO + 23
Delivery of the substrates to the place of Delivery OAP 2 and 3	TO + 27