



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

Contract No. S16/7076

MINISTRY OF EDUCATION,
YOUTH AND SPORTS

Purchase Contract

entered into 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 registered office at Na Slovance 2

PSČ 182 21 Praha 8

represented by: prof. Jan Řídký, DrSc., the Director

Registered in the register of public research institutions of the Ministry of Education, Youth and Sports of the
Czech Republic

Bank: UniCredit Bank Czech Republic, a.s.

Account number: 2106551053/2700

Id. No.: 68378271

Tax Id. No.: CZ68378271

(hereinafter the "Buyer")

and

2. Seller:

MIT, spol. s r. o.

with its registered office at Praha 4, Klánova 71/56, PSČ 14700

registered in commercial register kept by the Municipal court of Prague, item C 10259

represented by Martin Moser, the statutory representative

Bank: ČSOB, a.s.

Account number: (USD) 576978693/0300

Id. No.: 46348395

Tax Id. No.: CZ46348395

(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 the beneficiary of a subsidy from the Ministry of Education, Youth and Sports of the Czech Republic for the project "ELI: EXTREME LIGHT INFRASTRUCTURE – phase 2", reg. No. CZ.02.1.01/0.0/0.0/15_008/0000162, within the Operational Programme "Research, Development and Education (hereinafter the "ELI-Beamlines Project").
- 2.2 The objective of the ELI-Beamlines Project is to build and operate an international research laboratory (research facility) utilising the latest generation of laser technology with subsequent implementation of a series of projects in basic and applied research.
- 2.3 With a view to successful implementation of the ELI-Beamlines Project, it is also necessary to provide for the subject of performance of this Contract. The subject of performance of this Contract will become part



of the infrastructure for research, development and innovations, ELI-Beamlines (hereinafter the "ELI-Beamlines Infrastructure"), and will further be used for implementation of research projects.

- 2.4 The Seller has been awarded a public contract entitled "Beam transport mirrors for the L3 laser beam lines"
(hereinafter the "Tender Procedure").

III. Subject of the Contract

- 3.1 This Contract stipulates the obligation of the Seller to supply to the Buyer and transfer to the Buyer the ownership title to a set of 1 Petawatt, 30 J, 30 fs, 10 Hz, 820 nm beam transport mirrors for the ELI L3 laser as specified in the proposal of the Seller (prepared together with Newport Corporation's Spectra-Physics Lasers Group ("Coating Provider"), the company polishing and coating the mirrors), attached as Annex No. 1 to this Contract (hereinafter the "Proposal") in the quantity and quality specified therein (the above-specified mirrors are hereinafter referred to also as the "Mirror" or „Mirrors“).
- 3.2 The Seller's performance shall also include:
- transport of the Mirrors to the place of delivery as specified in art. VII. hereof including sufficient transport insurance and clearing the Mirrors for export (all export customs duties, costs and formalities);
 - delivery of each Mirror set with description of proper handling, storage, cleaning and transport procedures in electronic form;
- (The Mirrors and the performances pursuant to par. 1 and 2 of this Article hereof are hereinafter also referred to as the "Supply")
- 3.3 The Buyer agrees to take over the Mirrors with all the required documents delivered properly and in due time and pay the Purchase Price for them to the Seller as specified in Art. V. hereof.
- 3.4 The Seller undertakes to duly deliver, under the terms agreed herein and within the time frame agreed herein, at his own cost and risk the Mirrors to the place of delivery as specified in art. VII. hereof. The Seller shall be responsible for delivery of the Mirrors fully in accordance with this Contract and all its Annexes, his bid submitted within the Tender Procedure and valid legal, technical and quality regulations.
- 3.5 Notwithstanding anything to the contrary stated in the Proposal the following rules governing some features related to nature and the course of delivery of the Mirrors and pricing shall apply: transport of the Mirrors to the place of delivery by the Seller including insurance and export duties (par. 3.2 and 3.4 hereof), time of title and risk of damage transfer (art. IV. hereof), VAT, export and import obligations distribution between the Parties (par. 5.2 hereof).

IV. Ownership Title

The ownership title to the Mirrors shall pass to the Buyer upon execution of the handover protocol attesting to the handover and takeover of the Mirrors at the place of delivery, at which time the Buyer also assumes the risk of damage to the Mirrors.

V. Purchase Price and Payment Terms

- 5.1 The purchase price for the subject-matter of this Contract as set out in Art. III was set on the basis of the Seller's bid submitted within the Tender Procedure as the maximum price that cannot be exceeded, in the amount of \$US 770 880 excl. VAT (in words: seven hundred and seventy thousand eight hundred and eighty USD), (hereinafter the "Purchase Price").
- The prices of individual Mirrors are given in Annex No. 1 hereto.
- 5.2 All the prices set out in this Contract are exclusive of VAT paid in the Czech Republic which will be paid by the Buyer. The Seller is responsible for clearing the Mirrors for export (export customs formalities and financial duty if any). The Buyer is responsible for clearing the Mirrors for import (import customs formalities and financial duty if any).
- 5.3 The Purchase Price includes all the costs related to the performance of the subject of this Contract. 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 changes in the foreign exchange rates.

- 5.4 The Buyer agrees to pay the Purchase Price to the Seller in accordance with the Terms and Conditions of Sale included in Annex No. 1 hereto.
- 5.5 Invoices shall be payable within thirty (30) days of the invoice date (hereinafter the "Maturity Period"). Payment of the invoiced amount means 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 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 charged supply is provided for the purposes of the "ELI: EXTREME LIGHT INFRASTRUCTURE – phase 2" project, reg. No. CZ.02.1.01/0.0/0.0/15_008/0000162.

and must also be in conformity with any double taxation treaties applicable to the given case.

- 5.6 The last invoice in each calendar year must be delivered by the Seller to the Buyer's filing department not later than by 15 December of the given calendar year. If a tax document – invoice is not issued in conformity with the payment terms stipulated by the Contract or if it does not comply with the requirements stipulated by law or if it is not delivered to the Buyer by the aforementioned date, the Buyer is entitled to return the tax document – invoice to the Seller as incomplete, or incorrectly issued, for supplementation or issue of a new invoice, as appropriate, within five (5) business days of the date of its delivery to the Buyer. In that case, the Buyer is not in delay in payment of the purchase price or part thereof and the Seller shall issue a corrected invoice with a new identical Maturity Period, which shall commence on the date of delivery of the corrected or newly issued tax document – invoice to the Buyer.

The Buyer's invoicing details are set out in Art. I hereof.

VI. Times of Performance of the Subject of the Contract

- 6.1 The Seller undertakes to duly deliver the Mirrors specified in Art. III paragraph 3.1 hereof by not later than 12 months from signature of this Contract by the Parties and the Buyer undertakes to take delivery of such duly delivered Mirrors; the handover of the mirrors shall be subject to a handover protocol to be drawn up and executed by the parties as defined below.
- 6.2 The Seller shall be entitled to deliver the Mirrors to the Buyer prior to the agreed deadline for their handover as defined in Section 6.1 under the conditions stipulated in par. 8.3 of this Contract.

VII. Place of delivery

The place of delivery shall be ELI Beamlines facility, Dolní Břežany, district Prague-west.

VIII. Acceptance of the Mirrors

- 8.1 Acceptance of the Mirrors shall occur prior to shipment of the Mirrors from the Coating Provider based on a review of the Final Data Package submitted electronically and on CD. The Final Data Package consists of the information stated in the Proposal.

Should the Seller fail to provide the Buyer with the complete Final Data Package, the subject of the Contract /

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Supply shall be not considered complete and fit for delivery / acceptance by the Buyer.

- 8.2 In case the Mirrors will not be delivered personally by the Seller acceptance will be carried out with the Coating Provider. The Seller is obligated to empower such person to take part in acceptance of the Mirrors.
- 8.3 Partial deliveries of the Mirrors prior to final delivery deadline (par. 6.1 hereof) shall be accepted by the Buyer without any further conditions. However, not more than one acceptance procedure per month regarding partial deliveries of the Mirrors shall take place.

IX. Warranty and Claims Based on Defects of the Supply

- 9.1 The warranty provided for the Mirrors is stated in Annex No. 1 hereto (hereinafter the "Warranty"). The Buyer shall raise a warranty claim against the Seller without undue delay after ascertaining the non-conformance, but not later than on the last day of the Warranty Period (as defined in Annex No. 1 hereto), by means of a written notice sent to the Seller's authorised representative for technical matters set out herein. A claim sent by the Buyer on the last day of the Warranty Period shall be deemed to be made in time.

In the written warranty claim, the Buyer shall describe the non-conformance.

- 9.2 The Seller agrees to remove the claimed non-conformance of the Supply free of charge, provided it is covered under the Warranty.
- 9.3 The Seller undertakes to remove any non-conformance covered under the Warranty in a manner and within a commercially reasonable time.
- 9.4 In the event of removal of the claimed non-conformance, the Parties shall execute a record on removal of the claimed non-conformance, in which they shall confirm that the non-conformance has been removed.
- 9.5 In addition to the exceptions listed in the Proposal, the Warranty shall not apply to defects caused by unprofessional handling, incorrect or unsuitable maintenance, non-compliance with the Coating Providers' rules of operation and maintenance of equipment accepted by the Buyer from the Seller or the Coating Provider upon acceptance, or those of which the Seller or the Coating Provider advised the Buyer in writing. The Warranty shall also not apply to defects caused by gross negligence or intentional conduct.

X. Intentionally omitted

XI. Termination of the Contract

- 11.1 This Contract may be terminated by its performance, agreement of the Parties or 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 events:
- i) the Seller has materially breached the obligations imposed thereon by the Contract;
 - ii) insolvency proceedings are initiated against the Seller's assets;
 - iii) any costs paid by the Buyer in accordance with the Contract will be considered ineligible (i.e. paid in breach of rules of the respective Operational Program) for the reasons caused solely by the Seller.
- 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.

XII. Representatives, Notices

- 12.1 The Seller has appointed the following authorised representatives for communication with the Buyer in relation to the subject of performance hereunder:

In technical matters:

Thomas Meier

E-mail: meier@mit-laser.cz, tel.:+420 777 708 931



- 12.2 The Buyer has appointed the following authorised representatives for communication with the Seller in relation to the subject of performance hereunder:

In technical matters:

Dr. Stefan Borneis

E-mail: stefan.borneis@eli-beams.eu, tel.:(+420) 266 051 424

- 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

- 13.1 This Contract and all the legal relationships arising out of it shall be governed by the laws of the Czech Republic, notwithstanding anything to the contrary stated in the Proposal.
- 13.2 The Parties acknowledge and note that the provisions of the Civil Code shall apply in matters that are not explicitly regulated by this Contract and the Proposal, including the Terms and Conditions included in the Proposal. Except as expressly stated in the provisions contained in the main body of this Contract, in the event of any conflict between the provisions contained in the main body of this Contract and the Proposal, the provisions contained in the Proposal shall control and take precedence.
- 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, notwithstanding anything to the contrary stated in the Proposal, the dispute shall be resolved by the competent court in the Czech Republic based on application of any of the Parties.

XIV. 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, together with the Proposal, represents the entire and comprehensive agreement between the Buyer and the Seller.
- 14.3 The Seller undertakes, under the terms and conditions hereof, in accordance with instructions issued by the Buyer and using all necessary professional care, to:
- i) duly archive all written material prepared in connection with the execution of this Contract and to provide access to the Buyer to these archived documents until 2028;
 - ii) cooperate during financial inspections carried out in accordance with Act 320/2001 Coll., on Financial Inspections, as amended, i.e. to allow the Managing Authority of the Operational Program Research and Development for Innovation (hereinafter the "Sponsor" and the "RDIOP") to access also those portions of the tender (bid) submitted within the Procurement Procedure, the Contract, Orders and related documents which may be protected by special legal regulation, given that all requirements set forth by legal regulation with respect to the manner of executing such inspections will have been observed; the Seller shall bind any of its sub-contractors to comply with this obligation accordingly.
- 14.4 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.
- 14.5 This Contract becomes valid and effective as of the day of its execution by the authorised persons of both Parties.
- 14.6 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.

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14.7 This Contract is drawn up in four (4) counterparts, each of which is deemed to be the original. Each Party to the Contract shall receive two (2) counterparts. The following Annexes are an integral part of the Contract:

Annex No. 1: Proposal

(Where the Proposal stipulates any rules for relations between the Coating provider (or Newport Corporation) and its clients such rules are deemed as rules of the Seller for the purposes of this Contract).

14.8 The Parties, manifesting their assent with its entire contents, affirm the Contract with their signature.

In Prague, on 21. 6. 2016

In Prague, on 21. 6. 2016

For: Fyzik

Name: prof. Jan Řídký, DrSc.

Title: Director

For: MŠMT

Name: Martin Moser

Title: Statutory body

Fyzikální ústav AV ČR
veřejná výzkumná instituce
182 21 Praha 8, Na Slovance 2

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Lasery, fotonika
a jemná mechanika

MIT spol. s r.o., Klánova 56, 147 00 Praha 4



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MINISTRY OF EDUCATION,
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Annex No. 1 to the Purchase contract: Proposal

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Lasery, fotonika a jemná mechanika



TECHNICAL & PRICING PROPOSAL
For L3 Petawatt High- Intensity Laser Beam
Transport Mirrors – HR and Leak Mirror
@820nm, 30J, 30fs

May 26th, 2016

Commercial in Confidence: Limit distribution to parties referenced herein.

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PROPOSAL CONTENTS

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1. Relevant Experience

In summary, Newport Corporation's Spectra-Physics Laser business' ("Spectra-Physics, or SP") capabilities in Custom Optical Coatings include:

- Multiple coating-production techniques: Ion-beam sputtering, Ion-assisted deposition & Electron-beam deposition.
- Precision, large-area electron-beam-evaporated optical coatings deposited on substrates up to 0.9-Meter aperture with high uniformity.
- High laser-damage-threshold coatings including NIR reflectors exceeding 60 J/cm² at 1064nm over 0.7M aperture with 10 ns pulses, and UV dichroics that withstand 7 J/cm² of 3 ns pulses.
- Low coating stress and proprietary stress compensation techniques enable us to consistently meet stringent reflected wavefront specifications such as:
 - $\lambda/8$ peak-to-valley plus RMS slope errors below $\lambda/100$ /cm on filtered data of 60cm BK7 NIR mirrors for the NIF program at LLNL.
 - $\lambda/10$ -wave level on VIS and NIR-coated components for laser projects such as NIF Small Optics and SP internal laser mirrors.
- Low absorption coatings, reflectors as low as 10ppM at 1 micron wavelength as measured by laser calorimetry.
- Film thickness is directly monitored and controlled to 1% rms level of accuracy to achieve challenging spectral targets such as SBS suppression on NIF transport mirrors and above 98% transmission passbands on polarizers.
- Custom optics for Spectra-Physics CW & Pulsed SP lasers, including:
 - Low loss, environmentally stable reflectors and outcouplers for ion lasers
 - Broadband dispersion-compensated mirrors for tunable ultrafast lasers
 - High-fluence mirrors and polarizers for Q-switched GCR, high-peak & high-average power lasers
- The coating facility has a complete array of metrology, cleaning, mechanical and software support tools, with all manufacturing sub-systems managed under Spectra-Physics Master Quality Plan.

For nearly 25 years, Spectra-Physics has participated in large-optics programs, providing precision laser optics to a variety of programs, some examples include:

- High-fluence Mirrors and Polarizers for the Inertial Confinement Fusion Program at Lawrence Livermore National Laboratory, US, such as:
 - Nova Laser: Produced 1053nm mirrors to 92cm aperture.
 - Beamlet Laser: Produced 1053nm mirrors and polarizers to 70cm aperture.



- National Ignition Facility: Presently in production of about 760 large optics, various 1053nm/351nm mirrors and 1053nm polarizers to 80cm apertures.
- HAPLS High energy fluence mirrors for Petawatt laser through LLNL
- Orion program at AWE -> 80 High- fluence UV dichroics – HR 351nm, HT @ 527nm/ 1053nm
- LBNL – High fluence Mirrors for the BELLA laser program HR @ 750-850nm
- PHELIX Laser @ GSI Darmstadt, Germany – High fluence Mirrors and Dichroics @ 1053nm
- Meter-class, High-fluence UV, Fluorine-resistant Mirrors and Windows for excimer lasers at the Los Alamos National Laboratory and the Naval Research Laboratory, US.
- High-fluence Mirrors and Polarizers for the international ICF community in Japan and the UK.

Currently, Spectra-Physics has excess, large-optics manufacturing capacity available to support the production of optics for the L3 Petawatt high energy transport mirrors.

2. Mirror Substrates – Specifications

a. TM-45S, TM-45P, LM-45S – Dimensions

REQ ID	TM- 45S, TM45P, LM- 45S	Specification	Tolerance
REQ-015795/A	Shape	Rectangular	
REQ-015796/A	Length (L) mm	440	+0/-1
REQ-015797/A	Height (H) mm	290	+0/-1
REQ-015798/A	Thickness	75	+/-1
REQ-015799/A	90% of the clear aperture (CA) mm	396 x 261	+4/-0
REQ-015800/A	Wedge of rear surface S2 vs. front surface S1 along the long side L in ARC minutes.	10	+/-3
REQ-015801/A	Chamfer, 45 °	3mm	+/-1mm

b. Dimension for TM-30P

REQ ID	TM- 30P	Specification	Tolerance
REQ-015891/A	Shape	Rectangular	
REQ-015892/A	Length (L) mm	360	+0/-1
REQ-015893/A	Height (H) mm	290	+0/-1
REQ-015894/A	Thickness	65	+/-1
REQ-015895/A	90% of the clear aperture (CA) mm	324 x 261	+4/-0
REQ-015896/A	Wedge of rear surface S2 vs. front surface S1 along the long side L in ARC minutes.	10	+/-3
REQ-015897/A	Chamfer, 45 °	3mm	+/-1mm

c. Dimension for TM-17.5S, TM15S, LM-15S, LM-15P, TM-13P

REQ ID	TM- 17.5S, TM-15S, LM-15S, TM-13S	Specification	Tolerance
REQ-015898/A	Shape	Rectangular	
REQ-015899/A	Length (L) mm	320	+0/-1
REQ-015900/A	Height (H) mm	290	+0/-1
REQ-015901/A	Thickness	60	+/-1
REQ-015902/A	90% of the clear aperture (CA) mm	288 x 261	+4/-0
REQ-015903/A	Wedge of rear surface S2 vs. front surface S1 along the long side L in ARC minutes.	10	+/-3
REQ-015904/A	Chamfer, 45 °	3mm	+/-1mm

d. Substrate Material: for Turn Mirrors (TM) (REQ-015802/A)

- Turn Mirrors (REQ-015802/A) Corning HPFS 7980 mirror grade fused silica without open bubbles on the front reflecting surface S1.

- Leak Mirrors (REQ-015804/A) Coming HPFS 7980, class 0 and grade A
- e. **Quality Polish: Conforming to print documentation TC ID/ Revision - 00218494 / C section 3.3.**

With exception on S2, the substrates will be biased (wavefront prefigured) to meet wavefront, gradient distortion specification after coating.

- f. **Substrate Marking (REQ-015805 /A)**
 - Mirror substrates shall have the following information engraved into top of the substrates barrel. P/N complying to print documentation TC ID/ Revision - 00218494 / C – section 3.4
- g. **Witness Samples (REQ-015820 /A):** Each coating will have 2 – 1” diameter witness samples for damage testing and metrology purpose.
 - **Witness Specification-** surface quality < 20-10 scratch / dig, same material and polish as the substrate.

3. Coating Specification

- a. High energy multi dielectric (MLD) coating is resistant to solvents like alcohol and acetone and DI water.
- b. Coating will work in vacuum and dry N2 atmosphere (1%RH)
- c. The mirrors acceptance test – wavefront and spectral will be performed in vacuum / dry environment
- d. No crazing in vacuum environment within 1 year. SP will only guarantee if the mirror environment stay stable doesn't oscillate between Vacuum and Atmosphere. – See Warranty section

e. Coating specification for Turn Mirror Coatings

REQ ID	Turn Mirror Coating	Specification	Tolerance
REQ-015824/A	coated	Length - 6mm Height - 6mm	+6/-1
REQ-015825/A	Centering error	1mm	

REQ-015826/A	Environment	Vacuum (1E-5 mbar)	
REQ-015827/A	Hardness and adherence	Coating to apply to Mil-M-13508	
REQ-015828/A	Repetition Rate	≤10	
REQ-015829/A	Pulse duration	<30fs	
REQ-015830/A	Damage Threshold @ 30fs in vacuum The acceptance of the LDT will be based on testing of a 2" coated witness sample	0.8J/cm ² , 1000-on-1 @ > 10Hz @30fs	
REQ-015831/A	Centering Wavelength	820nm	
REQ-015832/A	Bandwidth	770-870nm	
REQ-015833/A	Reflectivity Rs	>99.8%	
REQ-015834/A	Reflectivity Rp	> 99.5	
REQ-015835/A	GDD	< 40fs	
REQ-015836/A	Front surface S1 single pass reflected wavefront at use angle over 90% of CA	< 95nm (0.15 waves @ 633nm) P-V	
REQ-015837/A	Gradient surface distortion of the mirror front surface S1 over 90% of the CA	11nm/cm (0.0167 waves/cm at 633nm) best effort to meet 6nm/cm RMS after coating	
REQ-015838/A	Reflectivity of rear surface AR coating for S-Polarization.	< 0.7 % over Bandwidth	
REQ-015858/A	Scratch / Dig.	Front Surface S1: ≤ 20-10 Rear Surface S2: Inspection polish.	

f. Specification for Leak Mirror coatings, S- and P-polarization.

REQ ID	Turn Mirror Coating	Specification	Tolerance
REQ-015840/A	Coated Area	Length - 6mm Height - 6mm	+6/-1
REQ-015841/A	Centering error	1mm	
REQ-015842/A	Environment	Vacuum (1E-5 mbar)	
REQ-015843/A	Hardness and adherence	Coating to apply to Mil-M-13508	

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A Division of Newport Corporation

3635 Peterson Way
Santa Clara, CA 95054

Laser Optics
Tel: (480) 980-4343

REQ-015844/A	Repetition Rate	≤10 Hz	
REQ-015845/A	Pulse duration	<30fs	
REQ-015846/A	Damage Threshold @ 30fs in vacuum The acceptance of the LDT will be based on testing of a 2" coated witness sample	0.8J/cm ² , 1000-on-1 @ > 10Hz @30fs	
REQ-015847/A	Centering Wavelength	820nm	
REQ-015848/A	Bandwidth	770-870nm	
REQ-015849/A	Reflectivity Rs and Rp	>99.5% over bandwidth absolute transmission uniformity shall be better than 0.1% PV of usable aperture at use angle with goal of 0.05% PV. Transmission uniformity will be measured by using 1.0" witness located on separate tooling along the radius of the tooling	
REQ-0158350/A	GDD	< 40fs peak to valley over entire bandwidth and CA	
REQ-015851/A	Front surface S1 single pass reflected wavefront at use angle over 90% of CA	< 95nm (0.15 waves @ 633nm) P-V	
REQ-015852/A	Gradient surface distortion of the mirror front surface S1 over 90% of the CA	11nm/cm (0.0167 waves/cm at 633nm) best effort to meet 6nm /cm RMS after coating	
REQ-015853/A	Rear surface S2 single pass reflected wavefront at use angle over 90% CA	To meet wavefront spec of transmitted wave	
REQ-015854/A	Rear surface S2 wavefront gradient	≤ λ/25/cm @633nm over 90% CA at use angle	
REQ-015855/A	Transmitted wavefront over 90% CA	λ/4 PV @ 633nm over 90% CA at angle of use.	
REQ-015856/A	Reflectivity of rear surface AR coating for S-Polarization.	< 0.7 % over Bandwidth	
REQ-015857/A	Scratch / Dig.	Front Surface S1: ≤ 20-10 Rear Surface S2: Inspection polish	

g. Exception

- Damage threshold- commercially reasonable efforts to meet $> 0.8\text{J}/\text{cm}^2$ @ 800nm, 30fs, SP will meet $> 0.4\text{J}/\text{cm}^2$ @ 800nm, 30fs. This is based on current designed test at LLNL and it met $>> 0.4\text{J}/\text{cm}^2$.

4. Pricing:

Substrate			Coating				Pricing	
Item Substrate	Size mm (L x H x T)	Quantity	Coating Type	AOI (deg.)	Polarization	AR on Surface S2	Price per Part	Total Price
TM-45S	440 X 290 X 75	15	turn mirror coating	45	S	Y	\$ [REDACTED]	\$ [REDACTED]
TM-45P	440 X 290 X 75	12	turn mirror coating	45	P	N	\$ [REDACTED]	\$ [REDACTED]
LM-45S	440 X 290 X 75	2	leak mirror coating	45	S	Y	\$ [REDACTED]	\$ [REDACTED]
TM-30P	360 X 290 X 65	2	turn mirror coating	30	P	N	\$ [REDACTED]	\$ [REDACTED]
TM-17.5S	320 X 290 X 60	2	turn mirror coating	17.5	S	Y	\$ [REDACTED]	\$ [REDACTED]
TM-15S	320 X 290 X 60	2	turn mirror coating	15	S	Y	\$ [REDACTED]	\$ [REDACTED]
LM-15S	320 X 290 X 60	2	leak mirror coating	15	S	Y	\$ [REDACTED]	\$ [REDACTED]
LM-15P	320 X 290 X 60	2	leak mirror coating	15	P	N	\$ [REDACTED]	\$ [REDACTED]
TM-13P	320 X 290 X 60	2	turn mirror coating	13	P	N	\$ [REDACTED]	\$ [REDACTED]
TM uncoated substrate	440 X 290 X 75	2	turn mirror Substrate - To verify WF in Mount	N/A	N/A	N/A	\$ [REDACTED]	\$ [REDACTED]
Transport costs (including insurance, containers, etc.) DDU Dolní Břežany							\$ [REDACTED]	\$ [REDACTED]
Total		43						\$770,880.00

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5. Test Procedures

Handling: Coated optics are transferred between work centers in clean containers to minimize contamination. Two HEPA-filtered carts are available for transport and storage, in addition to the cleanroom-compatible optic containers provided by the substrate supplier. Optics to be tested are mounted into universal frames that interface with all mounts on the large-optic metrology stations. SP maintains detailed procedures of each process operation.

Interferometry: 18" Zygo - SP to provide RWF data before and after coating of each mirror in dry environment and provide Transmitted measurement of all of the leak mirrors in dry environment. Provide Interferograms data file on a CD which will include the data package.

Spectral Response: 1" diameter fused silica witnesses measured by Cary5000 Spectrophotometer in Transmission and Reflection in wet and dry environment.

Surface Maps: SP will provide surface inspection map of each parts referencing the Part number and the serial number.

Uniformity: SP will provide uniformity data across the part using string witness samples .

White Light Interferometer: SP will provide Group Delay Dispersion curves for every coating run.

Damage Threshold Testing format: SP doesn't have the capability to measure Laser damage threshold at 30 fs pulse width, SP will provide 2- 2" diameter fused silica witnesses to qualify the coating design. SP will also provide 2 - 1" diameter witness samples with every coating run for damage testing and metrology purpose.

Packaging: SP will provide PETG containers to preserve optic safety and cleanliness during commercial shipment. SP will label each package with P/N. SP will clean the optic containers prior to inserting the coated optics into their containers in a cleanroom environment. SP uses an electric lift to extract and insert optics into the containers. SP will label FRAGILE GLASS sticker on the container.

6. Product Acceptance

Acceptance of Turn mirrors and the Leak mirror: Acceptance of the coating performance by customer shall occur prior to shipment of the Mirrors from SP based on a review of the Final Data Package submitted electronically and on CD.

This Data Package contains:

- o Documents that prove the conformity of the substrate material.
- o Before and after coating: measurement of single-pass reflected wave front of side S1 in 18" interferometer: Peak-to-valley and gradient, at use angle and under N2 purge or dry clean room air <1% RH. For uncoated optic, AOI=0° is acceptable if fringe contrast is too low at 1064 nm and measurement without dry environment.
Additional measurements for leak (diagnostic) mirrors: single-pass transmitted wave front peak-to-valley and gradient at use angle.

Supplier to provide print out of interferograms and data files on CD and via email.

Supplier to document orientation of the mirror with respect to interferograms – part number on top.

- Map of scratch-dig before and after coating
- LDT test report will be provided by ELI
- Measurement of reflectivity, transmission vs. wavelength for witness samples in dry environment 2% RH
- Results of homogeneity of reflectivity of coated leak mirror: array of witness samples
- GDD of witness samples and of an array of witness samples that is representative for the entire mirror surface of the leak mirror coating run. Documentation of internal coating run number for referencing.

a. Proposed Material Review Board (MRB) Procedure

As part of Spectra-Physics ISO 9001:2001 compliance, we have a Material Review Board procedure. Its purpose is to ensure that non-conforming product is clearly identified and to prevent inadvertent use or installation. The MRB procedure defines the requirements for the control of non-conforming product within SP and is under the preview of the Quality Assurance / Service Support Manager. The MRB is addressed by the following SP Quality Procedures:

- Control of Non-Conforming Product in Incoming Inspection Flowchart, SSL4.13.001
- Control of Non-Conforming Product in Production Flowchart, SSL4.13.002
- Customer Supplied Product Procedure, SSL4.07.000
- Incoming Inspection MRBN Form Work Instruction, SSL4.13.004
- Material Review Board Notice, SSL-F-0005
- Part Deviation Authorization Work Instruction, SSL4.10.004
- Product Deviation Authorization Work Instruction, SSL4.10.005
- Quality Records List, SSL4.16.000
- SP SSL Return Authorization Request Form, SSL-F-0025
- SSL Failure Analysis Report Form, SSL-F-0043
- Supplier Corrective/Preventive Action Report, SSL-F-0021
- WIP MRBN Form Work Instructions, SSL4.13.003

The MRB Procedure is as follows:

- SSL will maintain a system for controlling non-conforming product that does not comply with specifications
- All non-conforming products will be identified with approved forms, including: MRBN (F-0005), and/or reject tag, RA tag, FA tag.

- There are designated areas (06MRB, 15MRB, 15M, 18M, 19M) to process and disposition non-conforming products. Non-conforming material in each area will be controlled, evaluated, dispositioned and segregated.
- The responsibility for reviewing the non-conforming product on the areas of Incoming MRB and Work-In-Progress (WIP) MRB will be with a Quality Assurance Representative and the responsible Manufacturing Engineer.
- Quality Assurance personnel review the results with the customer to verify the disposition and approve corrective/preventative action, when such is warranted.
- The Quality Assurance Representative will maintain the records and report on current trends of non-conforming products.

b. Warranty:

Spectra-Physics warrants that, for a period of up to one year from the date of shipment, but prior to installation (the "Warranty Period"), the coated and polished optics that are the subject of this proposal will conform to the "scratch/dig" specifications stated in Sections 3.e and 3.f of this proposal. In the event the coated and polished optics that are the subject of this proposal do not conform to the "scratch/dig" specifications stated in Sections 3.e and 3.f of this proposal, Spectra-Physics will re-polish and re-coat the nonconforming optics one time, as the sole remedy for breach of warranty and/or nonconformance of the optics. The foregoing warranty is subject to the limitations stated in the "Warranty" paragraph of the attached Newport Corporation Terms and Conditions of Sale, and, in addition, is only valid if parts are stored and tested per Spectra-Physics storage requirements below.

- i. SP shall mark the inner PETG containers with a "Void if Broken" seal. If there is a potential warranty claim, SP must be notified by customer when the Mirrors are removed from the warehouse prior to Evaluation and Installation. SP shall package with each Mirror - 1 each of the 1" diameter Spectral Witnesses.
- ii. Storage of Turn and Leak Mirrors: Mirrors and witnesses (packaged with each Mirror) are to be stored in dry environment and contamination-controlled environment.
- iii. Handling upon removal: Component optical surfaces should be kept free of organic contaminants, dust, dirt, fingerprints, oils, or any material inconsistent with a class 100 cleanroom.



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TITLE AND RISK OF LOSS; ACCEPTANCE. All Products will be delivered FOB (for domestic shipments) or EXW (Ex Works) (for international shipments), Newport's designated factory (INCOTERMS 2010). Delivery shall occur, title to the Products (except for title to any Software which shall at all times remain with Newport) shall pass from Newport to Buyer, and Buyer shall assume all risk of loss or damage, upon delivery of the Products to the carrier, unless otherwise agreed by both parties in writing. In no event shall Newport be liable for any delay in delivery (provided that Newport timely delivers the Products to the carrier as provided above), or assume any liability in connection with shipment, nor shall the carrier be deemed an agent of Newport. Buyer shall inspect all Products promptly upon receipt. The furnishing by Newport of a Product to Buyer shall constitute acceptance of that Product unless Newport receives a written notice of defect or nonconformity within five (5) business days after receipt by Buyer, provided, that such acceptance shall not relieve Newport of its warranty obligations hereunder.

CHANGES. Any changes to any order for custom or option configured Products, or any order or series of similar orders for standard Products which exceeds \$5,000, including but not limited to any changes to the specifications for the Products, must be approved in advance in writing by Newport. In the event of changes to any order or the specifications for the Products, Newport reserves the right to adjust the prices and delivery dates for the Products, and to invoice Buyer for any unearned discounts based upon the actual quantities of Products delivered. In addition, Buyer shall be responsible for all costs associated with such change including, but not limited to, the burdened costs of all raw materials, work in progress and finished goods inventory on-hand or ordered which are impacted by such change.

CANCELLATION. Any order for standard Products which does not exceed \$5,000 (it being agreed that any series of similar orders for standard Products shall be aggregated and deemed one order for the purpose of determining such amount) may be cancelled by Buyer by providing written notice to Newport at least thirty (30) days prior to the scheduled shipment date. Any order for custom or option configured Products, or any order or series of similar orders for standard Products which exceeds \$5,000, may be cancelled only upon Newport's prior written approval, which approval may be granted or withheld in Newport's sole discretion. Any order cancellation will be subject to the following cancellation charges with respect to all cancelled units of Products: (a) the contract price of all Products completed prior to such cancellation; (b) the burdened cost of all raw materials (including long lead time items) in Newport's possession or on order; (c) the burdened cost of all raw materials incorporated into and all labor applied to work in progress, plus profit thereon in accordance with Newport's published margins; and (d) other reasonable cancellation charges including, but not limited to, non-recurring engineering expenses, cancellation costs payable by Newport to its suppliers, and any other costs incurred by Newport relating to such cancellation. Newport will use commercially reasonable efforts to reduce such cancellation costs by reallocating materials to other projects and/or returning surplus material to, or canceling orders with, its suppliers. In no event shall the Buyer be liable for more than the contract price of the cancelled Products.

RETURNS. Custom or option configured Products, film, optics, or any order or series of similar orders for standard Products which exceeds \$5,000 in the aggregate, are non-returnable. Any order for standard Products which does not exceed \$5,000 (it being agreed that any series of similar orders for standard Products shall be aggregated and deemed one order for the purpose of determining such amount) may be returned to Newport for credit within thirty (30) days of the initial invoice date (60 days outside of the U.S.) and are subject to a 25% restocking charge. Prior to returning a Product, Buyer must contact Newport's Return Department for shipping instructions and a return material authorization number ("RMA#"). Buyer must ship the Product back in its original condition and in the original or equivalent packaging, with the RMA# clearly marked on the outside of the box, freight prepaid. Newport shall not be responsible for any damage occurring in transit or obligated to accept Products returned without a RMA#. Buyer bears all risk of loss or damage to the returned Products until delivery at Newport's designated facility. Any return shipment received by Newport without an RMA# and/or whose contents are not received in their original condition, may be reshipped by Newport freight collect to Buyer.

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EXPORT. Newport's sale and delivery of the Products and/or Software are subject to compliance with all applicable global export laws and regulations, including but not limited to the Wassenaar Arrangement and any regulations implemented thereunder, the U.S. Export Administration Regulations (EAR), and the U.S. International Traffic in Arms Regulations (ITAR) (collectively, "Export Regulations"), including any requirement for Newport to apply for an export license, which may result in a delay in delivery and/or additional costs or, if denied by the applicable government authority, may prevent the sale and delivery of the Products. The quoted lead time for delivery of the Products may be impacted by the length of time required to obtain an export license, if applicable. Newport will not have any liability to Buyer for any failure or delay in delivery resulting from Newport's compliance with licensing or other requirements under the applicable Export Regulations. Buyer acknowledges and agrees that if the Products, Software and/or associated technical data delivered by Newport hereunder are to be exported, re-exported or transferred, Buyer shall comply with all applicable Export Regulations. Without limiting the foregoing, Buyer acknowledges and agrees that, unless there is prior written authorization from the applicable government agency, Buyer will not (1) use such Products for any of the end use activities restricted under Part 744 of the EAR or any equivalent end-use based restrictions (if such restrictions are applicable to the country of destination and/or end user); or (2) directly or indirectly sell, distribute, export, re-export or transfer any Products to any person, entity and/or country, in each case without first obtaining written authorization from the applicable government agency, if required. In cases of a routed export transaction, Buyer, acting as the Foreign Principal Party in Interest (FPPPI), shall assume all export responsibilities, including but not limited to determining license requirements, obtaining licenses, and providing power of attorney to and overseeing any forwarder or agent acting on its behalf. Buyer shall ensure that its forwarder or agent complies with all applicable Export Regulations. Buyer agrees to defend, indemnify, and hold harmless Newport from and against any claim, loss, liability, expense, or damage (including liens or legal fees) incurred by Newport with respect to any export or re-export activities of Buyer and/or Buyer's forwarder or agent which are contrary to the provisions in this section.

REMEDIES. Newport shall have the right to terminate any order, or to delay the shipment thereof, by reason of (a) Buyer's bankruptcy or insolvency, or the pendency of any proceedings against Buyer under any statute for the relief of debtors; (b) Buyer's breach of these Terms and Conditions; (c) Newport's learning that the ultimate destination of the Products is other than that set forth in the Newport quote; or (d) failure of Buyer to meet any other reasonable requirements established by Newport or to provide timely responses to requests from Newport (including acts or omissions of Buyer which may delay production).

GENERAL. Newport's performance of its obligations will be excused or the timeframe for performance will be extended as is reasonably necessary under the circumstances, in the event that Newport is prevented from performing its obligations in whole or in part by riots, fire, flood, earthquake, explosion, epidemics, war, strike or labor disputes, embargo, civil or military authority, act of God, changes in law, regulation or governmental policy, acts or omissions of vendors or suppliers, transportation difficulties or delays, or other causes beyond its reasonable control. In such event, such performance shall take place as soon thereafter as is reasonably practicable. Failure of the Buyer to provide timely response to requests from the Newport may also result in delivery delays which shall be excused hereunder. If any provision of these Terms and Conditions is held to be invalid by a court of competent jurisdiction, then the remaining provisions shall remain, nevertheless, in full force and effect. The parties agree to renegotiate in good faith any term held invalid and to be bound by the mutually agreed substitute provision in order to give the most approximate effect intended by the parties. No waiver of any provision of these Terms and Conditions shall be valid or binding on any party unless agreed to in writing by the party to be charged. The failure of either party to enforce at any time any of the provisions of these Terms and Conditions, or the failure to require at any time performance by the other party of any of the provisions of these Terms and Conditions, shall in no way be construed to be a present or future waiver of such provisions, nor in any way affect the validity of either party to enforce each and every such provision thereafter. These Terms and Conditions shall be construed under and according to the laws of the State of California without regard to its conflict of law provisions. The parties agree that jurisdiction and venue for any actions relating to these Terms and Conditions will be in the state or federal courts located in the County of Orange, State of California. Each party hereby irrevocably submits to the exclusive jurisdiction of the state and federal courts sitting in County of Orange, State of California, for the adjudication of any dispute hereunder or in connection herewith and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding, any claim that it is not personally subject to the jurisdiction of any such court, or that such suit, action or proceeding is improper. In the event of any action, suit or proceeding relating to the subject matter hereof, the prevailing party shall be entitled, in addition to any other rights and remedies it may have, to recover its reasonable attorneys' fees and related costs from the non-prevailing party.

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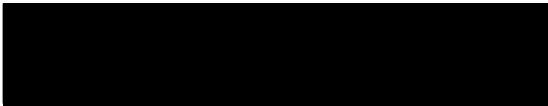
SIGNATURES & AUTHORIZATIONS

Newport Corporation

Jasbir Rajasani - Director of Thin Film Engineering.

Spectra-Physics Lasers A Division of Newport Corporation

MIT, spol. s r.o.



Martin Moser – Managing Director