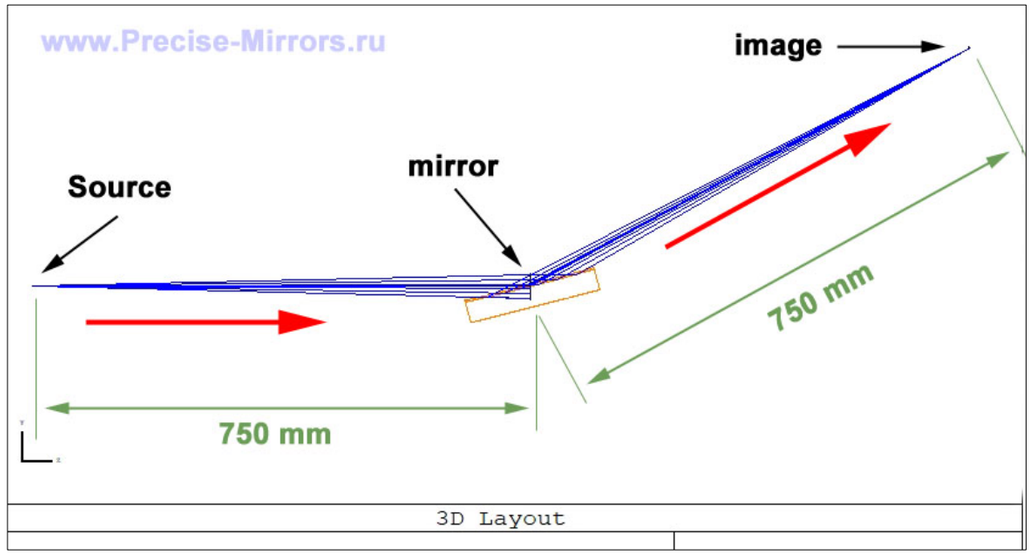
Typical request (for free form):

… we need one toroidal mirror, task: to focus light from a point *source. Distance to source 750 mm, distance to image 750 mm, angle of incidence 76 degrees. Source diameter about 30 µm, mirror clear aperture size 200x60 mm. Work spectral range 20-80 nm. Desired image diameter (focal point) about 30-40 µm.*

Illustrative explanatory drawing (not from customer)



Typical "world" answer (quote) from typical sales manager:

…one toroidal mirror will cost YYYY Euro (USD...) and delivery terms will be FFFF weeks (days, monthes...). ***As for the image diameter You specified,*** *a specialist is needed to determine it, who can simulate Your optical scheme design using specialized professional software. We do not have such a specialist in the sales department, but when You place* ***and pay for Your order*** *, such a specialist will definitely study Your wish...*

What will know this speciallist AFTER the order is paid? See below.

Our typical quotation (below, next pages)

Identification Code: 303236311 in the Register of Legal Entities Identification
i-Fax/Tel: +3707 000 4444 <zilta@lasertechn.com> zilta.eu Rygos ave.13-32, 05257 Vilnius, Lithuania, EU
SEB Bankas, SWIFT CBVILT2X, Acc. № LT92 7044 0600 0794 8853

ii «Z I L T A»
Precision Optics Measuremnts

To: **"Name Surname"** <e-mail@-email.com> *dated:* 31 Feb 2023 Re: toroidal mirrors inquiry

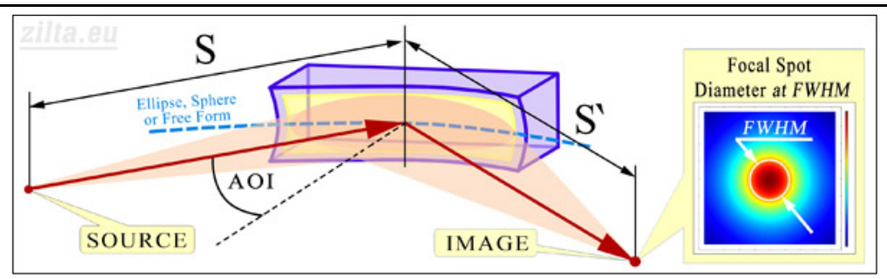
Offer No. 2023-0305-c01 (3 pages, with AQD and appendixes in file appendixes-fam-2023.pdf) **Base offer valid till 5 May 2023** **Special offer valid till 5 April 2023**

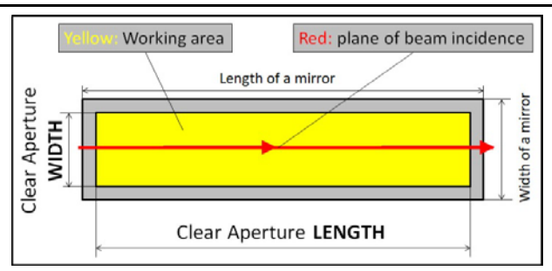
Specification (one concave mirror)	MIRROR#1 (ultra precise toroid)	MIRROR#2 (precise aspherized toroid)	MIRROR#3 (ultra precise ellipse)
Mirror sizes (LxWxH) // **Clear Aperture**, [mm], (**right** drawing **below**) tolerances: clear aperture +0.5 mm, L&W -0.5 mm, H ±0.5 mm	**240 X 70** x 30 // **200 x 60**	**240 X 70** x 30 // **200 x 60**	**240 X 70** x 30 // **200 x 60**
Minimal focal point diameter at work λ_{WORK}** (FWHM), test measure in certificate at λ=633 nm – see below **AQD#1** and app.3	**Ø 170 µm***	**Ø 50 µm***	**Ø 26 µm***
Max. power density (W/cm2) in focal plane, λ_{WORK}*, [%] see **AQD#1**	**14%** from reference	**51%** from reference	**REFERENCE**
Surface figure tolerance at AOI_{WORK}**, λ=633 nm, at size [mm] see.app.2	**λ/100 RMS** at 200 x 60	**λ/75 RMS** at 200 x 60	**λ/110 RMS** at 200 x 60
Substrate roughness [nm], see app. 4	**0.3 nm, RMS**	**0.2 nm, RMS**	**0.2 nm, RMS**
Distances: to source *S* // to image *S'*, [mm], (**left** drawing **below**)	**750** ± 3.8 // **750** ±3.8	**750** ± 1.5 // **750** ±1.5	**750** ± 0.8 // **750** ±0.8
Angle **O**f **I**ncidence (**AOI**), [degrees], (**left** drawing **below**)	**76** ± 0.4	**76** ± 0.2	**76** ± 0.1
Mirror substrate material	By deafult: **AstroSitall®** (Zerodur analog, more details see in app. 6)		
Spectral range @ coating	Metall HR **20 - 80 nm** **Standard Au** // **Special EUV** - see below **AQD#2** and in app. 7		
Oper. conditions: vacuum up to ~10^{-5} mbar.			
Individual certificate : Dimensions. Optical Distances & AOI. Shape tolerance: 3D topography map, focal spot and surface micro-roughness analyzes. Individually packed in membrane box.			

Uncoated mirror price (Lithuania, Vilnius, EXW) and production time [CMU]	3'486 @ 10 weeks	3'879 @ 11 weeks	4'507 @ 12 weeks
Coating: Standard Au // (Special XUV), one RUN (1 pcs) [CMU]	'320 // '440 + 1 week		
Base offer price (Lithuania, Vilnius, EXW) and production time [EUR]	3'806 // 3'926 @ 11 weeks	4'199 // 4'319 @ 12 weeks	4'827 // 4'947 **@ 13 weeks**
Special offer dealer price (discounted and faster) [CMU]	**3'425 // 3'533 @ 9 weeks**	**3'779 // 3'887 @ 10 weeks**	**4'344 // 4'452 @ 11 weeks**
Packing, insurance (0.2%), delivery (1 pc) to Your Country, City [CMU]	207 + 1 week	208 + 1 week	209 + 1 week

* - theoretical simulation for ideal adjustment and work condition; due to diffraction limits specified focal spot size may be available not for whole customer spectral work range.

** - λ_{WORK} = 50 nm AOI_{WORK}= 76.0 degrees





Standard: **CA** </=90% of mirror sizes
(yellow zone on left pictures) plus bevels 0.5x45°
CA >90% => add cost: Start price for best finish polishing on **bigger** substrate with CA<90%, only then add price of
the "***delicate* Cut** +final Certification" procedure

Payments: 80% advance, as for unique optic. Final payments: 30 days after delivery. Warranty: one Year (quoted); other –on request.

This offer valid as contract. References at Precise-Mirrors.ru Other at Zilta.eu

"SIGNED"

Синявский Максим Николаевич

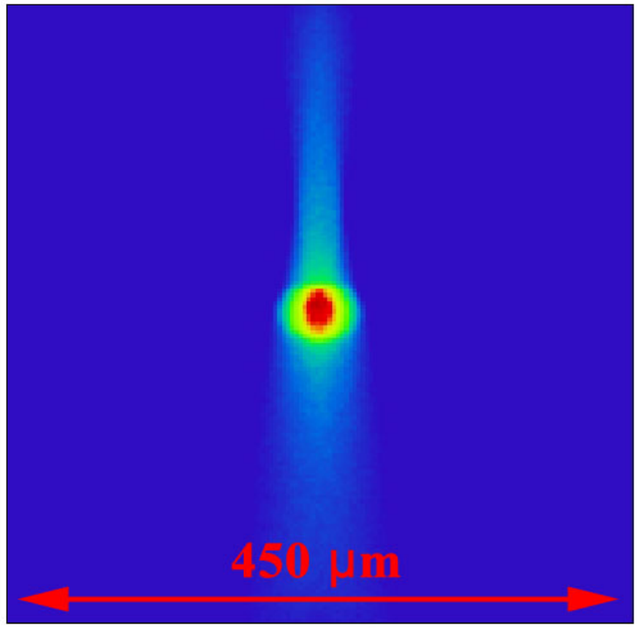
Sinyavsky Maxim

CMU in prices - **C**onditional **M**onetary **U**nits only for EXAMPLE OF THIS TYPICAL quotation

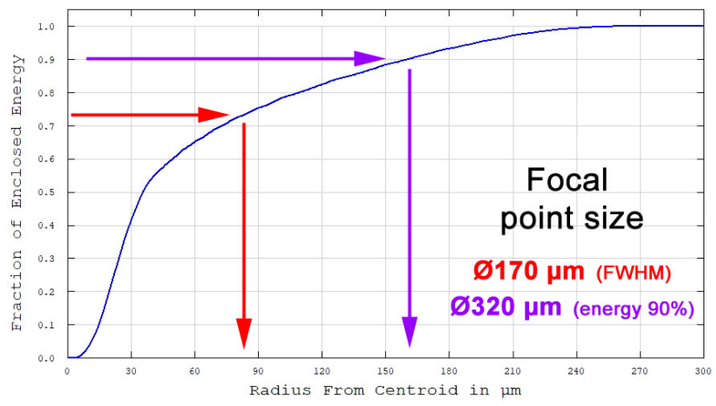
Identification Code: 303236311 in the Register of Legal Entities Identification
i-Fax/Tel: +3707 000 4444 <zilta@lasertechn.com> zilta.eu Rygos ave.13-32, 05257 Vilnius, Lithuania, EU
SEB Bankas, SWIFT CBVILT2X, Acc. № LT92 7044 0600 0794 8853

Add **Q**uotation **D**ata (**AQD**) **#1**. Analysis for **LIGTH SOURCE Ø30 µm .**
ZEMAX theoretical image size analyze, beam size on the mirror – Ø60 mm, source homogeneous isotropic, simulation wavelength **50 nm**

MIRROR#1 (ultra precise toroid)

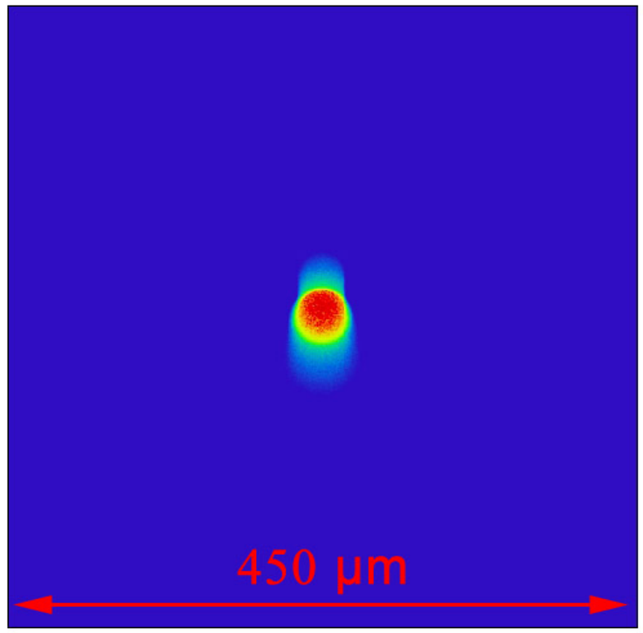


Max. power density [W/cm2] ~14% from reference

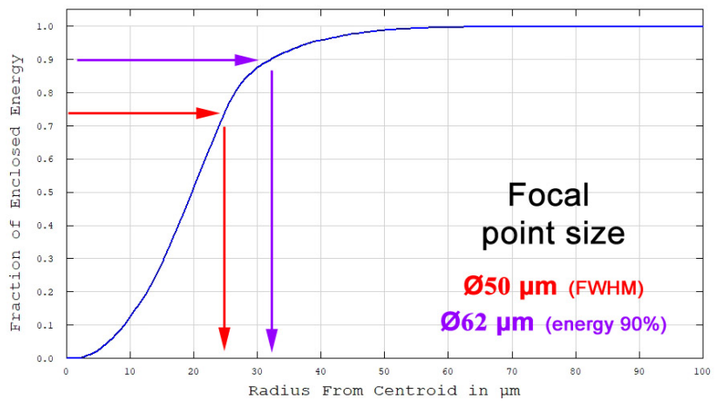


Encircled energy (with diffraction limitations)
(NOT meets customer requirements)

MIRROR#2 (precise aspherized toroid)

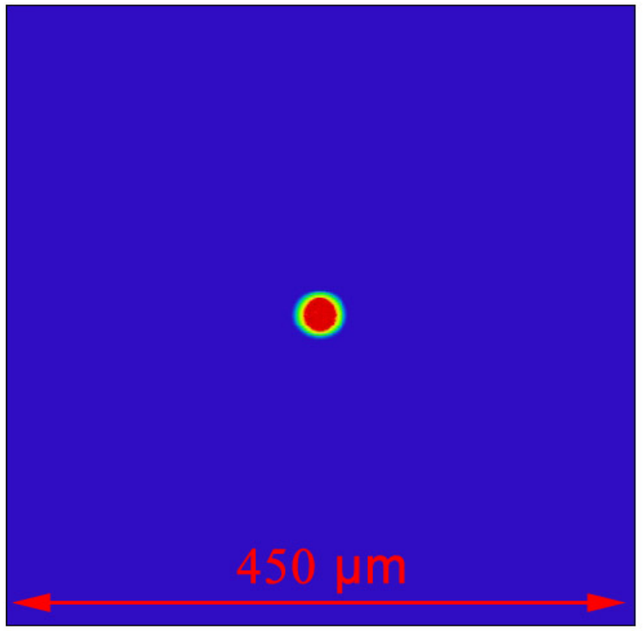


Max. power density [W/cm2] ~51% from reference

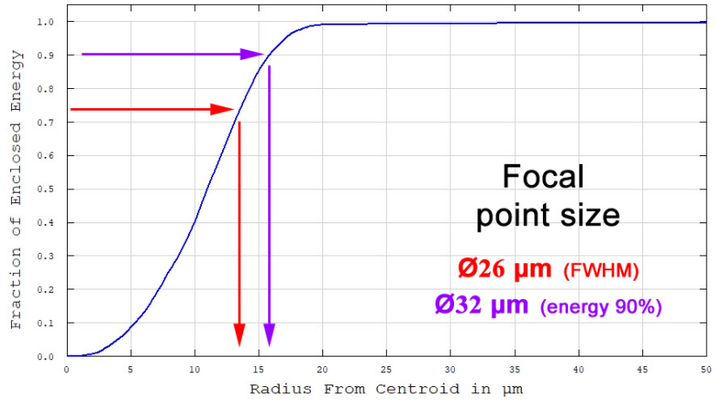


Encircled energy (with diffraction limitations)
(nearly meets customer requirements)

MIRROR#3 (ultra precise ellipse)



REFERENCE

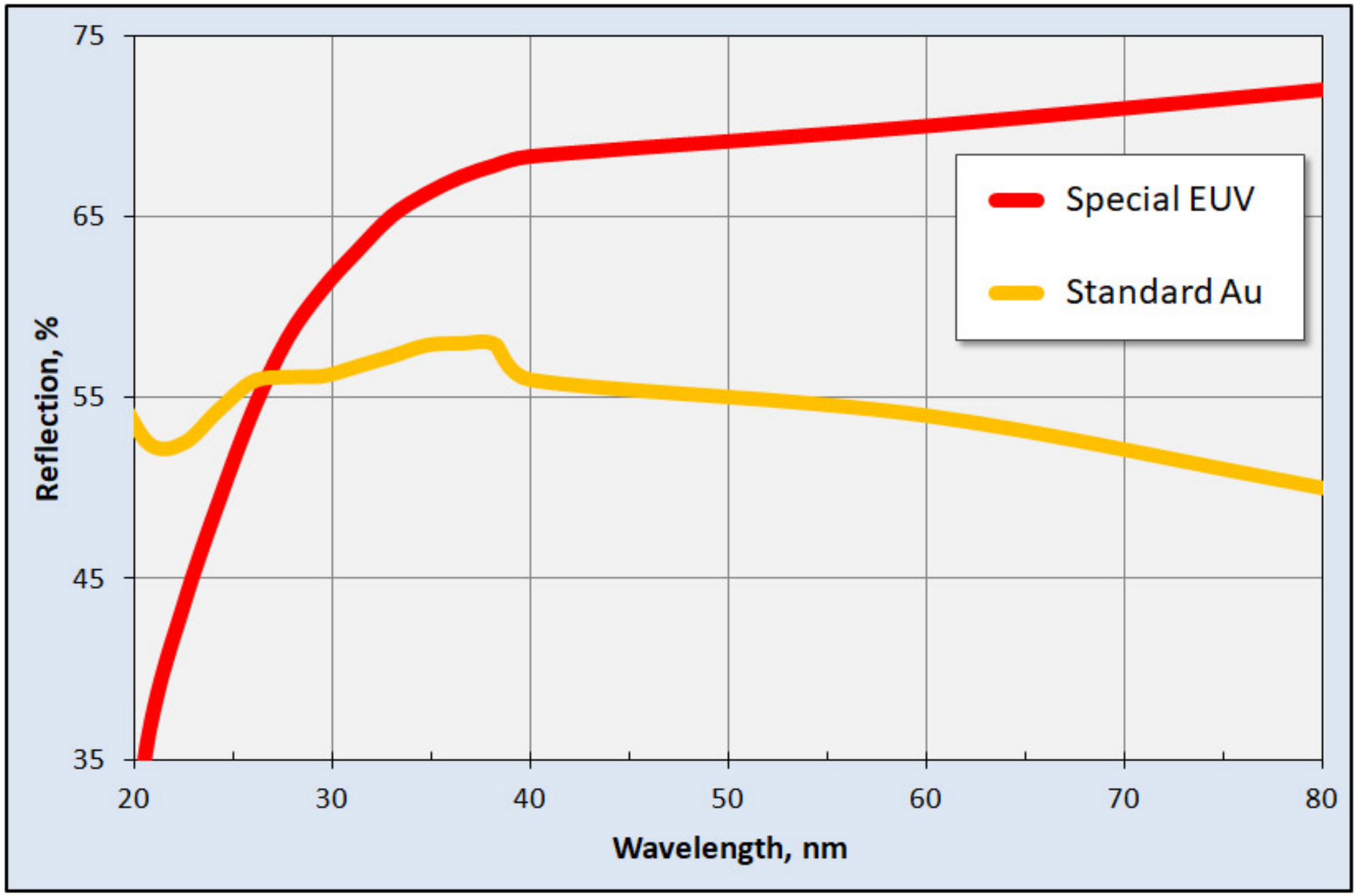


Encircled energy (with diffraction limitations)
(meets customer requirements)

www.Precise-Mirrors.ru

Identification Code: 303236311 in the Register of Legal Entities Identification
i-Fax/Tel: +3707 000 4444 <zilta@lasertechn.com> zilta.eu Rygos ave.13-32, 05257 Vilnius, Lithuania, EU
SEB Bankas, SWIFT CBVILT2X, Acc. № LT92 7044 0600 0794 8853

Add **Q**uotation **D**ata (**AQD**) **#2**. Typical reflectance (unpolarized radiation) for **Standard Au** and **Special EUV** **at 20 - 80 nm** spectral range **at AOI=76.0 deg**



www.Precise-Mirrors.ru