

OPTOSHOP

YOUR GATEWAY TO ADVANCED
LASER OPTICS



CATALOG 2025



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OPTOSHOP is powered by **OPTOMAN**



OPTOMAN is a **Super-Optics Hero**, that designs, develops and manufactures advanced high-power and longevity Ion Beam Sputtered (IBS) laser optics.

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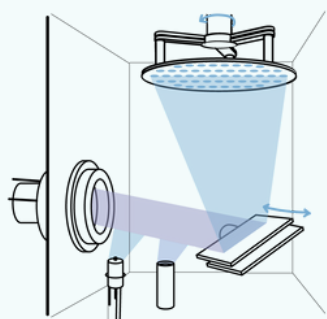
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ION BEAM SPUTTERING



OPTOMAN uses only **the most advanced thin film deposition technology - Ion Beam Sputtering (IBS)**, which allows us to make the highest possible accuracy, repeatability and quality optics.

IBS has the same meaning to OPTOMAN as Mjólnir hammer has to Thor. So yes, it's pretty important and OPTOMAN does not shy investments to have the best IBS machines in order to provide the best optics.

Ion Beam Sputtering (IBS)

is a Physical Vapour Deposition (PVD) technique when the layer of a desired material is formed by molecules extracted from the target material by a highly energetic and precisely controlled ion beam.

The key principle lies in the mechanism of extracting molecules from the target material. The possibility of material sputtering is enabled by ion grid optics that can precisely control ion energy and beam focus. When the proper energy of ions is chosen to minimize ion implantation (typically 1000-2000eV), they are precisely directed to the target material, and desired atoms or molecules are knocked out from their stable positions by multiple collisions and can leave the target. Such **interaction between the ion beam and the target is called sputtering**.

Utilizing this, an optical interference coating is created by stacking layers of different materials and precisely controlling the thickness of each layer. Coatings produced by the Ion Beam Sputtering method are proven to **meet the most demanding industry and scientific requirements** and provide numerous benefits for laser and laser systems manufacturers.

QUALITY CONTROL

As with great laser power comes great responsibility for coaters, OPTOMAN acts responsibly during the whole supply chain process, including post-coating quality checks.

OPTOMAN is carefully inspecting the quality of the optics produced, so the customers could enjoy seamless usage of optical components, without investing their time and effort to ensure that optics are compliant to the specifications.

HERE'S WHAT OUR CLIENTS SAY

“Our high-repetition-rate laser plasma accelerator requires very high pump energies in the amplification stages of the laser. Therefore, the optics used must not exhibit any degradation over long periods, including billions of shots.

Thanks to OPTOMAN, this problem has been totally overcome. After months and even years of use, there is no sign of coating degradation, which is a sign of their good work.”

Dr. Juan B. Gonzalez-Diaz,
Laser Engineer at DESY



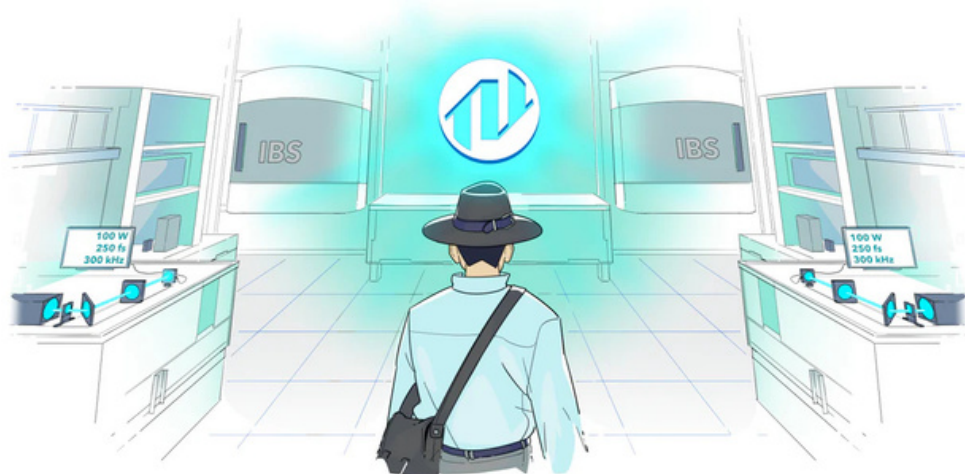
“OPTOMAN’s O-45° mirrors ULLM19 and dual-wavelength ultrafast mirrors (1030+515 nm) have been extremely useful to our work. Both products deliver exceptional performance and quality!”

Anne-Lise Viotti, Assistant Professor
at Lund University



LUND
UNIVERSITY

CONGRATULATIONS! YOU'VE FOUND SUPERHERO TIER – LASER OPTICS



Explore the **best capabilities of OPTOMAN translated into in-stock optics**. We have put our hearts and souls into developing these products and we're proud to say they are among the very best on the market. Though they might appear as ordinary optics, their performance is truly exceptional, far surpassing market standards.



SuperHero Tier products are marked with the symbol of OPTOMAN

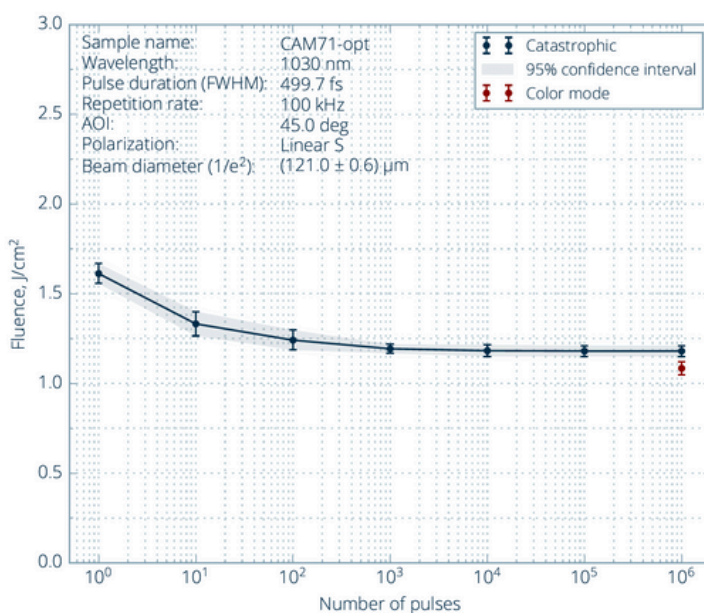
SUPERHERO POWER LASER OPTICS



OPTOMAN's SuperHero Power Laser Optics are **built for the most demanding ultrafast laser applications**. They deliver very high LIDT ($> 1 \text{ J/cm}^2$ @ 1030 nm, 500 fs, s-pol) to withstand the highest peak intensities and feature low, spectrally uniform Group Delay Dispersion (GDD) to **preserve pulse duration in femtosecond and picosecond laser systems**.

Whether used in pulse compression setups or high-power ultrafast laser systems, these optics **ensure precise, reliable performance under extreme laser power**, featuring no color-change effect and significantly extended lifetime. Thriving even in TW and PW peak laser power environments, SuperHero Power optics embody the best of OPTOMAN's capabilities – exceptional in performance, and ready to take on the extremes.

LIDT MEASUREMENT



Characteristic damage curve

IN-STOCK PRODUCTS

Product code	Ø, mm	t, mm	Coating	AOI, °	Unit price, EUR
PP-UVFS-12.7-6.35-ULLM5SHL	12.7	6.35	HRs>99.95% & HRp>99.9%@1010 - 1050 nm	45	140
PP-UVFS-25.4-6.35-ULLM5SHL	25.4	6.35	HRs>99.95% & HRp>99.9%@1010 - 1050 nm	45	195
PP-UVFS-50.8-9.52-ULLM5SHL (no SCC)	50.8	9.52	HRs>99.95% & HRp>99.9%@1010 - 1050 nm	45	445
PP-UVFS-50.8-9.52-ULLM5SHL (SCC)	50.8	9.52	HRs>99.95% & HRp>99.9%@1010 - 1050 nm	45	505
PP-UVFS-12.7-6.35-ULLM8SHL	12.7	6.35	HR>99.9% @ 1030 nm	0	90
PP-UVFS-25.4-6.35-ULLM8SHL	25.4	6.35	HR>99.9% @ 1030 nm	0	140
PP-UVFS-12.7-6.35-LLM186	12.7	6.35	HRsp>99.9% @ 515 nm	45	140
PP-UVFS-25.4-6.35-LLM186	25.4	6.35	HRsp>99.9% @ 515 nm	45	195
PP-UVFS-50.8-9.52-LLM186	50.8	9.52	HRsp>99.9% @ 515 nm	45	350
PP-UVFS-25.4-6.35-LLM188	25.4	6.35	HR>99.9% @ 515 nm	0	195

*Quantity discounts: 5pcs – 5% off, 10 pcs - 15% off, 20 pcs - 25% off

NON-DEGRADING UV OPTICS

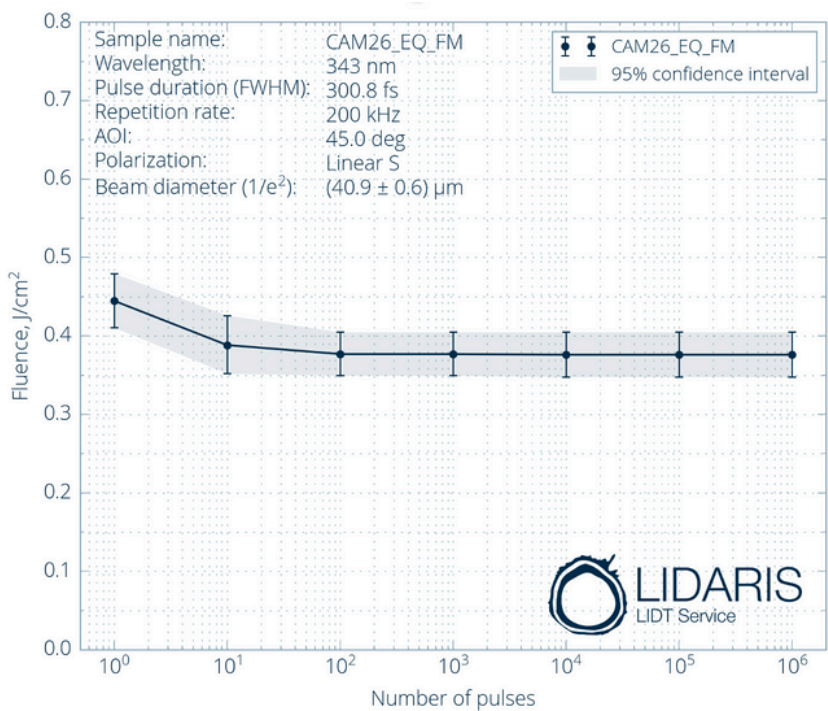


OPTOMAN's Non-degrading Optics are built to **resist the fatigue and color-change effects** that often plague UV laser systems. Featuring IBS coatings optimized for UV spectral range, these mirrors **maintain stable spectral performance, high LIDT (>0.35 J/cm² @ 343nm, 300fs), and show no color-change effect**, even after 10,000 hours of continuous high-intensity UV exposure.

They deliver reliable, long-term performance in UV laser systems, **lowering maintenance costs, reducing downtime and cutting total cost of ownership**. Engineered to defy degradation under extreme UV exposure, these optics embody OPTOMAN's best capabilities.

DESIGN EXAMPLE

HRs>99.6% @337-349 nm, AOI 45°



IN-STOCK PRODUCTS

Product code	Ø, mm	t, mm	Coating	AOI, °	Unit price, EUR
PP-UVFS-25.4-6.35-LLM267EL	25.4	6.35	HRs>99.6%@337-349 nm	45	145
PP-UVFS-25.4-6.35-LLM417	25.4	6.35	HRs>99.7%+HRp>99.6% @ 355 nm	45	120
PP-UVFS-12.7-6.35-LLM267EL	12.7	6.35	HRs>99.6%@337-349 nm	45	95
PP-UVFS-50.8-9.52-LLM267EL	50.8	9.52	HRs>99.6%@337-349 nm	45	450
PP-UVFS-38.1-6.35-LLM270	38.1	6.35	HRa>99.5% @ 355 nm	45	200
PP-UVFS-25.4-6.35-LLM334	25.4	6.35	HRs>99.8% + HRp>99.5% @ 257 nm	45	145
PP-UVFS-12.7-3.0-DM438-AR804EL	12.7	3	HRs>99.6%@337-349 nm + HTp>98%@505-525 +HTs>98%+1015-1045nm	45	235
PP-UVFS-25.4-3.0-DM438-AR804EL	25.4	3	HRs>99.6%@337-349 nm + HTp>98%@505-525 +HTs>98%+1015-1045nm	45	380
PP-UVFS-25.4-6.35-DM520-AR943	25.4	6.35	HRs>99.8% + HRp>99.5% @ 257 nm + HTsp>98% @ 515 + 1030 nm	45	380

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

NO AGING DUV LASER OPTICS

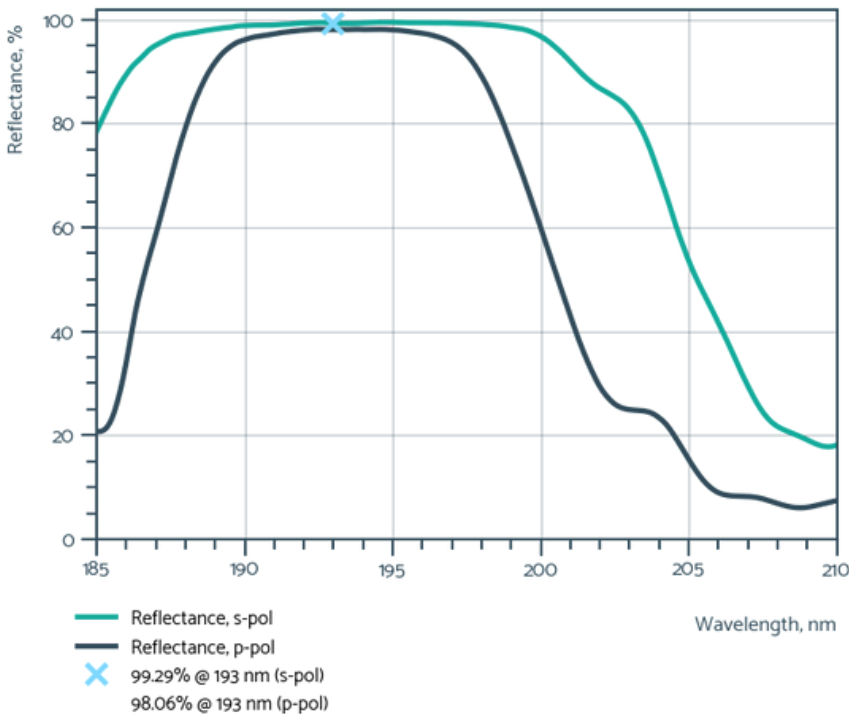


OPTOMAN's DUV Laser Optics are engineered for long-term stability in the most demanding deep ultraviolet environments. Optimized for Deep UV spectral range, these IBS-coated mirrors provide **high reflectivity (HR >98%)** and **deliver consistent optical performance over time**.

Built on high-purity fused silica substrates, they resist color-center formation, optical fatigue, and spectral drift – failure modes that limit standard DUV optics. With no aging effect and extended operational lifetime, these optics are **ideal for excimer laser systems in semiconductor, medical, and scientific applications** where performance and reliability are critical.

COATING EXAMPLE

HRa>98% @ 193 nm, AOI=45°

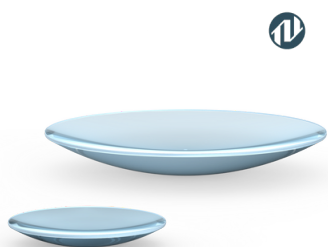


IN-STOCK PRODUCTS

Product code	Ø, mm	t, mm	Coating	AOI, °	Unit price, EUR
PP-UVFS-25.4-6.35-LLM316	25.4	6.35	HRa>99% @ 213 nm	45	110
PP-UVFS-25.4-6.35-LLM290	25.4	6.35	HRa>98% @ 193 nm	45	180
PP-UVFS-25.4-6.35-LLM323	25.4	6.35	HRa>98.5% @ 206 nm	45	180
PP-UVFS-25.4-6.35-MW97	25.4	6.35	HR(R>97.0%) @ 193 nm + (R>95.0%) @ 635 nm	45	210

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

EXTREME LOW-LOSS LASER OPTICS



OPTOMAN's Low-Loss Laser Optics are engineered to **achieve the lowest possible optical losses** without compromising reflectivity or stability. Featuring IBS coatings delivering near-total reflection ($R > 99.995\%$) with very low absorption and scattering levels down to <2 ppm, these mirrors are **ideal for the most efficient ultrafast femtosecond and picosecond laser systems**.

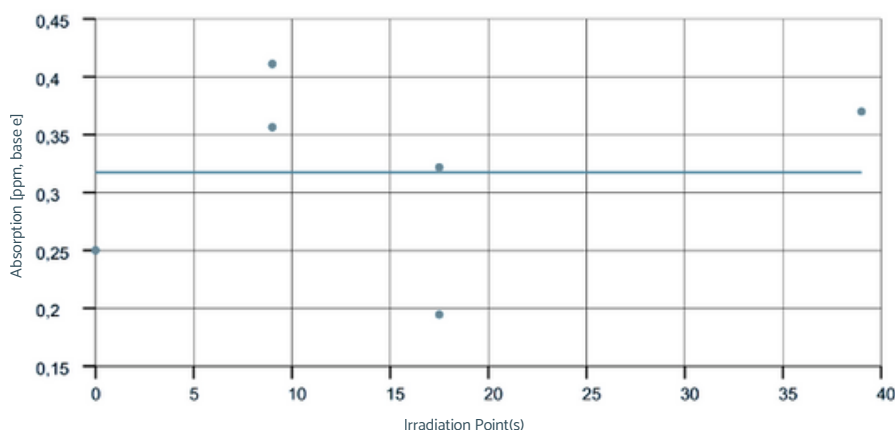
Whether used in nonlinear setups, or as cavity mirrors in low-gain lasers like HeNe or HeCd, they **preserve pulse energy** and **temporal characteristics with minimal loss**. Built with extremely low roughness, they represent OPTOMAN's best-in-class capability for near-total reflection and uncompromised efficiency.

COATING EXAMPLE

HR $>99.995\%$ @ 1030 + R $>50\%$ + R $_{\text{average}}>62\%$ (best effort)

@ 630-660 nm, AOI= 0°

Absorption: <1.5 ppm (<1 ppm best effort)



Calibration Coefficient:
 $1,3820 \text{ mW}^{-1}$

Absorption:
 $0.3 \pm 0.2 \text{ ppm}$
(method of calculation: Mean value)

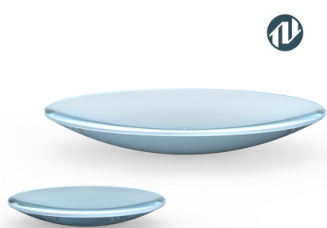
IN-STOCK PRODUCTS

Standard supply

Product code	Ø, mm	t, mm	Coating	Wavelength (nm)	AOI, °	Flatness	Unit price, EUR
PP-UVFS-25.4- 6.35-LLM134	25.4	6.35	HR>99.995% @ 1030 nm	1030	0	λ/4 over 15mm area	125
PP-UVFS-25.4- 9.5-LLM134	25.4	9.5	HR>99.995% @ 1030 nm + HR>50% @ 630-660 nm	1030	0	λ/8 over 16mm area	140
PP-UVFS-38.1- 12.7-LLM134	38.1	12.7	HR>99.995% @ 1030 nm	1030	0	λ/4	350

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

MIRRORS FOR MULTIPASS CELLS

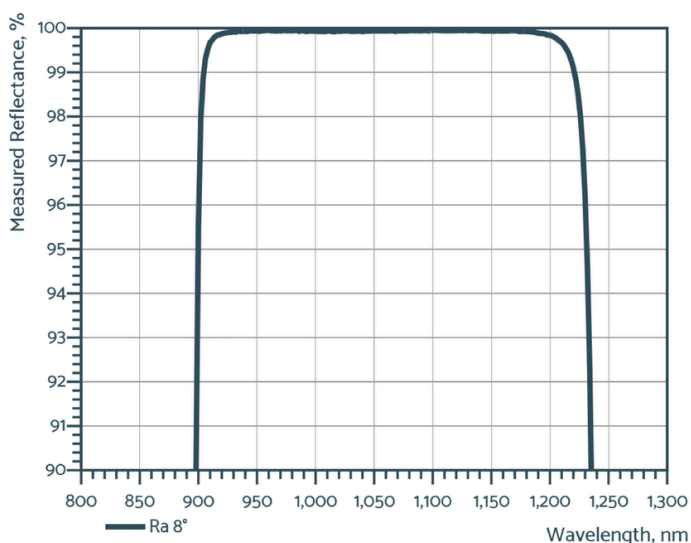


OPTOMAN's Mirrors for Multipass Cells are designed to **maximize performance** in systems where every reflection counts. In ultrafast MPC setups, where light reflects dozens or even hundreds of times, the efficiency of the cell scales exponentially with the quality of its mirrors.

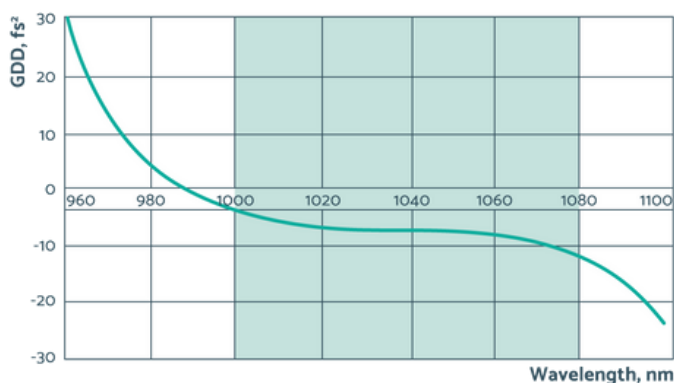
These IBS-coated MPC mirrors deliver **broadband high reflectivity (>99.99%)**, low and spectrally uniform Group Delay Dispersion (GDD), and high **LIDT (>0.69 J/cm² @ 1030 nm, 180 fs)**. Built with non-degrading coating technology, MPCs are now more reliable and durable than ever before, ensuring your ultrafast laser systems perform at their highest potential even after many pulses.

COATING EXAMPLE

HR>99.9% @ 925-1170 nm, AOI = 0°



GDD, S1: <50 fs² @ 950-1150 nm, AOI = 0° (GDD = 0 fs² @ 1030 nm)



IN-STOCK PRODUCTS

Standard supply

Product code	Ø, mm	t, mm	Coating	AOI, °	Unit price, EUR
PCV-R300-UVFS- 50.8-ET952- UBBHR38	50.8	9.52	HR>99.9% @ 925-1170 nm	0	800
PCV-R300-UVFS- 76.2-ET127- UBBHR38	76.2	12.7	HR>99.9% @ 925-1170 nm	0	1,600
PCV-R500- UVFS-50.8- ET9.52- UBBHR38	50.8	9.52	HR>99.9% @ 925-1170 nm	0	900
PCV-R600- UVFS-76.2- ET127-UBBHR38	76.2	12.7	HR>99.9% @ 925-1170 nm	0	1,600
PCV-R1000- UVFS-50.8- ET952-UBBHR38	50.8	9.52	HR>99.9% @ 925-1170 nm	0	550

*Quantity discounts: 5pcs – 5% off, 10 pcs - 15% off, 20 pcs - 25% off

OPTICS FOR LASERCOM

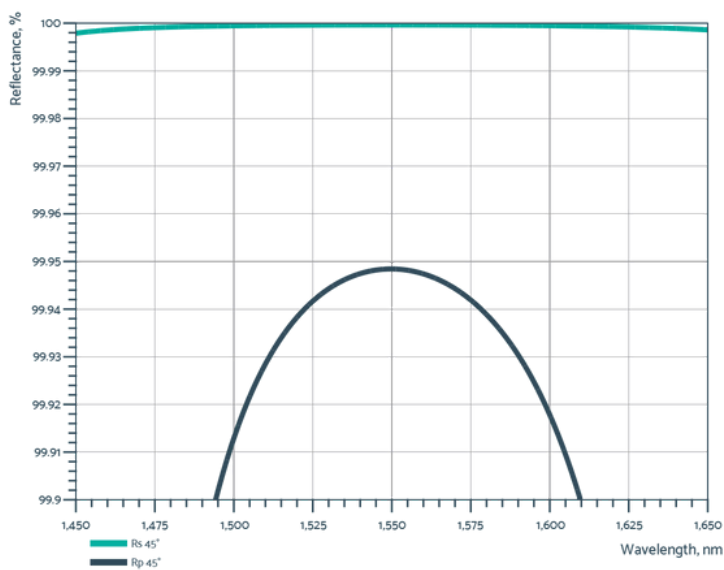


Extreme conditions in space demand laser systems and optical components that deliver **exceptional environmental stability, spectral precision, and long-term reliability.** OPTOMAN's Laser Communication Optics are engineered to meet these challenges with high precision, repeatability, and minimal absorption.

Featuring IBS coatings with **high reflectivity at 1550 nm (HR >99.95%)** and **increased LIDT**, these optics **ensure low degradation and stable performance under environmental extremes.** Designed to reduce downtime and eliminate costly replacements, OPTOMAN's space-optimized optics ensure consistent signal integrity, where failure is not an option, and performance is mission-critical.

COATING EXAMPLE

HRs>99.95% & HRp>99.9% @ 1550 nm, AOI=45°



IN-STOCK PRODUCTS

Product code	Ø, mm	t, mm	Coating	Wavelength (nm)	AOI, °	Flatness	Unit price, EUR
PP-UVFS-25.4-6.35-LLM285	25.4	6.35	HRs>99.95% & HRp>99.9% @ 1550 nm	1550	45	λ/10 over 13 mm area	185

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

CHIRPED MIRROR PAIRS

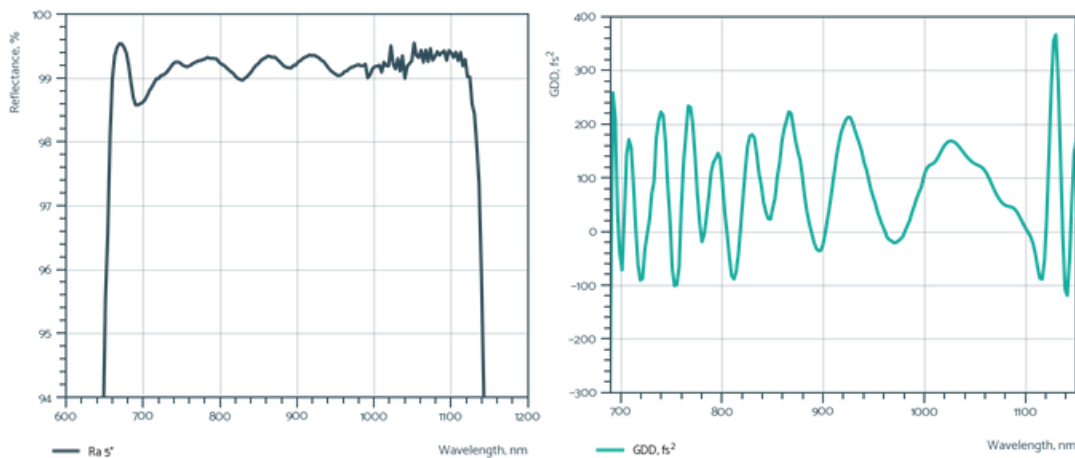


OPTOMAN's Chirped Mirror Pairs are designed **to tackle** one of the most critical challenges in high-power ultrafast laser systems: **excessive absorption in pulse compression optics** – the primary driver of coating degradation.

Engineered for **precise control of GDD** through variation in dielectric layer thickness, these IBS-coated mirrors enable **efficient, stable pulse compression**. Extensive R&D has achieved ~5x lower absorption compared to standard chirped mirrors, with measured values as low as 7.5 ± 0.37 ppm. This **minimizes heat generation, eliminates thermal lensing**, and **extends operational lifetime**. With excellent spectral performance and reliable dispersion compensation, these mirrors make thermal lensing a non-issue, even in demanding high-power applications.

COATING EXAMPLE

HRavg>99.0% @ 700 nm - 1100 nm, AOI=5°
GDD R = +100 fs² +/-250 fs² @ 700 nm - 1100 nm, AOI=5°



IN-STOCK PRODUCTS

Product code	Ø, mm	t, mm	Coating	Wavelength (nm)	AOI, °	Flatness	Unit price, EUR**
PP-UVFS-50.8-9.52-LLM159	50.8	9.52	HRavg>99.0% @ 700 nm - 1100 nm	700-1100	5	<λ/8 over 20 mm area	1,200

**The listed price is for the set of two chirped mirrors

***Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off**

OPTICS FOR ER:YAG LASERS

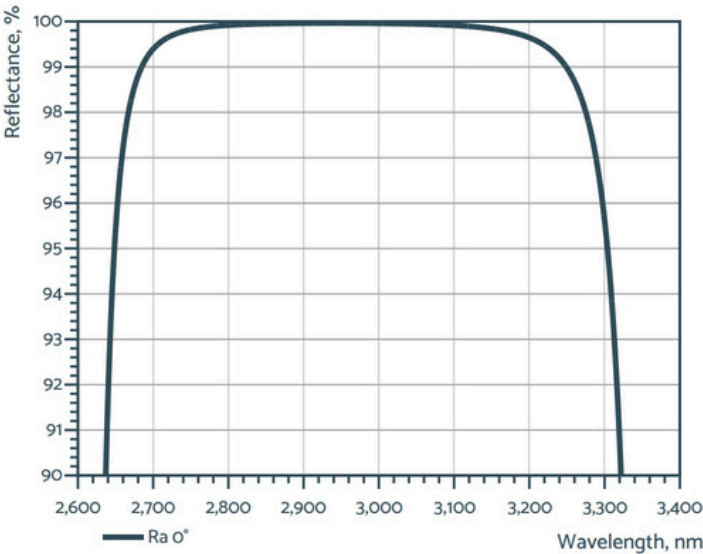


 OPTOMAN's Optics for Er:YAG Lasers are designed for **precision** and **reliability** in the most demanding medical and mid-IR applications. Optimized for 2940nm, matching the strong absorption band of water, these IBS-coated optics are **ideal for laser-tissue ablation use**.

Advanced manufacturing processes effectively **reduce hydroxyl** and **oxygen-related absorption** in the coating, enabling **high reflectivity (HR >99.8%)**, **minimal losses**, and **a long operational lifetime**. With LIDT values exceeding 1 J/cm² (10 Hz, 2 mm), these mirrors ensure stable, consistent performance where it matters most. When precision at 2940 nm is critical, OPTOMAN delivers optics you can trust.

COATING EXAMPLE

HR>99.8% @ 2940 nm, AOI=0°



IN-STOCK PRODUCTS

Product code	Ø, mm	t, mm	Coating	Wavelength (nm)	AOI, °	Unit price, EUR
PP-UVFS-127-3O-LLM226	12.7	3	HR>99.8% @ 2940 nm	2940	0	140
PCV-R1000-IRFS-12.7-ET6.35-LLM178	12.7	6.35	HR>99.8% @2940 nm	2940	0	110
PCV-R1000-IRFS-12.7-ET6.35-LLM178+	12.7	6.35	HR>99.8%@ 2940 nm	2940	0	140

***Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off**

OPTICAL MIRRORS

From Laser Mirrors optimized for CW, Q-switched, and nanosecond systems, including Nd:YAG and Er:YAG, to Ultrafast Laser Mirrors that preserve temporal pulse characteristics and withstand the high peak intensities of femtosecond and picosecond systems, our mirrors are built to meet the demands of advanced laser applications. For dispersion control, our Dispersive Mirrors, including GTI, Chirped, and Chirped Mirror Pairs, offer precise GDD control and compact alternatives to bulky prism or grating compressors. Meanwhile, our Spherical Mirrors deliver reliable beam steering and focusing capabilities with minimal optical loss and no chromatic aberration.

Whether you're building a high-power industrial laser, compressing ultrashort pulses, or shaping beams with precision – OPTOSHOP has the mirror you need.



ULTRAFAST LASER MIRRORS



OPTOMAN’s Ultrafast Laser Mirrors are designed to provide **high reflectivity** and **high LIDT** for ultrashort laser pulses, while **preserving** their **temporal characteristics**. By minimizing Group Delay Dispersion (GDD) across the specified wavelength range, these mirrors combat the effects of dispersive temporal broadening and compression.

The combination of low GDD and high reflectivity is achieved using **precisely engineered Ion Beam Sputtered (IBS) coatings** that are fully resistant to mechanical wear, humidity, and temperature fluctuations, ensuring reliable laser performance under any operating conditions. Ultrafast Laser Mirrors are ideal for systems based on Yb:YAG, Yb:KGW, Yb:KYW, Yb-doped fiber, and Ti:Sapphire lasers, including their second, third, and fourth harmonics. Applications include materials processing, spectroscopy, nonlinear optics, and biomedical technologies.

CAPABILITIES

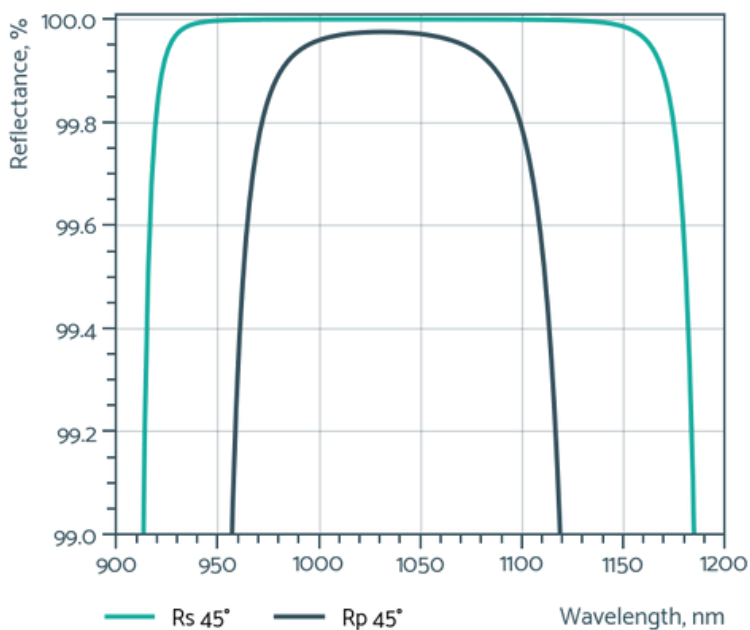
Coating technology	Ion Beam Sputtering (IBS)
Spectral range	193-5000 nm
Reflectivity	>99.9%
Size	3-420 mm
Flatness	up to $\lambda/20$
Surface quality	up to 10 ⁻⁵ S-D over CA (MIL-PRF-13830B)
LIDT	> 0.7 J/cm ² , 800 nm, 47 fs, 100 Hz, p-pol > 1.35 J/cm ² , 800 nm, 47 fs, 100 Hz, s-pol
GDD	<20 fs ²

IN-STOCK OPTIONS

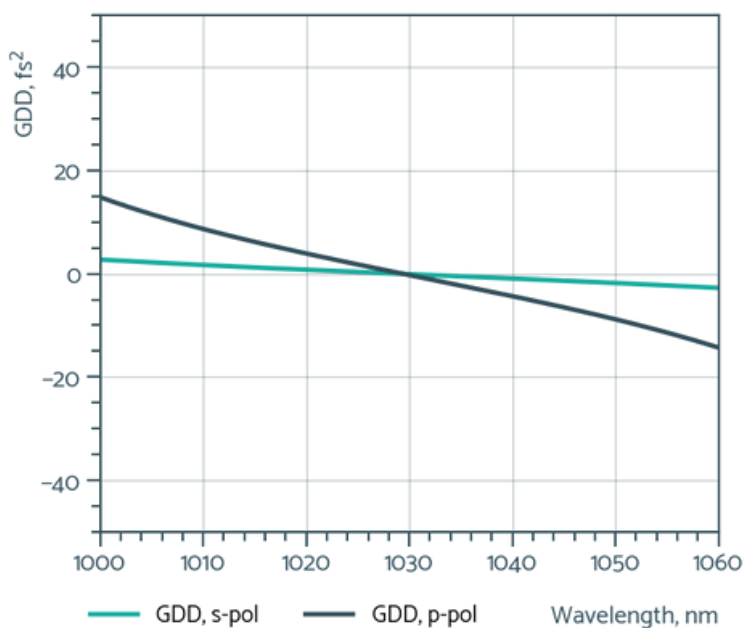
PRODUCT TYPE: STANDARD

COATING EXAMPLE

HRs>99.95% & HRp>99.9% @1010 - 1050 nm, AOI=45°



IGDD Rsl<10 fs², IGDD Rpl<20 fs²



IN-STOCK PRODUCTS

Standard supply

Product code	Ø, mm	t, mm	Coating	Wavelength (nm)	AOI, °	Flatness	Unit price, EUR
PP-UVFS-12.7-6.35-ULLM3	12.7	6.35	HRs>99.95% & HRp>99.9% @ 500-530 nm	515	45	<λ/8 over CA	85
PP-UVFS-25.4-6.35-ULLM5 (SCQ)	25.4	6.35	HRs>99.95% & HRp>99.9% @ 1010-1050 nm	1030	45	<λ/8 over CA	125
PP-UVFS-25.4-6.35-ULLM3	25.4	6.35	HRs>99.95% & HRp>99.9% @ 500-530 nm	515	45	<λ/8 over CA	110
PP-UVFS-50.8-9.52-ULLM5 (no SCQ)	50.8	9.52	HRs>99.95% & HRp>99.9% @ 1010-1050 nm	1030	45	<λ/8 over 19mm area	365
PP-UVFS-25.4-6.35-ULLM9	25.4	6.35	HR>99.9% @ 500-530 nm	515	0	<λ/8 over 17mm area	130
PP-UVFS-12.7-6.35-ULLM5	12.7	6.35	HRs>99.95% & HRp>99.9% @ 1010-1050 nm	1030	45	<λ/8 over 10mm area	85
PP-UVFS-50.8-9.52-ULLM3 (SCC)	50.8	9.52	HRs>99.95% & HRp>99.9% @ 500-530 nm	515	45	<λ/8 over CA	340
PP-UVFS-12.7-3.0-ULLM5	12.7	3	HRs>99.95% & HRp>99.9% @ 1010 - 1050 nm	1030	45	<λ/8 over 4mm area	70
PP-UVFS-12.7-6.35-ULLM8	12.7	6.35	HR>99.9% @ 1010-1050 nm	1030	0	<λ/8 over 10mm area	90
PP-UVFS-50.8-9.52-ULLM8 (SCC)	50.8	9.52	HR>99.9% @ 1010-1050 nm	1030	0	<λ/8 over CA	380
PP-UVFS-25.4-6.35-ULLM8	25.4	6.35	HR>99.9% @ 1010-1050 nm	1030	0	<λ/8 over CA	110
PP-UVFS-50.8-9.52-ULLM5 (SCC)	50.8	9.52	HRs>99.95% & HRp>99.9% @ 1010-1050 nm	1030	45	<λ/8 over CA	460
PP-UVFS-12.7-6.35-LLM121	12.7	6.35	HRsp>99.9% @ 1030 nm & HRsp>99.9% @ 515 nm	1030+515	45	<λ/8 over 10mm area	100

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

IN-STOCK PRODUCTS

Standard supply

Product code	Ø, mm	t, mm	Coating	Wavelength (nm)	AOI, °	Flatness	Unit price, EUR
PP-UVFS-25.4-635-UULLM5SHL	25.4	6.35	HRs>99.95% & HRp>99.9% @ 1010-1050 nm	1030	45	λ/10 over CA	195
PP-UVFS-12.7-6.35-LLM186	12.7	6.35	HRsp>99.9% @ 515 nm	515	45	λ/10 over 8mm area	140
PP-UVFS-50.8-9.52-UULLM5SHL (no SCC)	50.8	9.52	HRs>99.95% & HRp>99.9% @ 1010-1050 nm	1030	45	λ/8 over 35mm area	445
PP-UVFS-12.7-6.35-UULLM8SHL	12.7	6.35	HR>99.9% @ 1030 nm	1030	0	λ/10 over CA	90
PP-UVFS-25.4-6.35-LLM186	25.4	6.35	HRsp>99.9% @ 515 nm	515	45	λ/10 over 10mm area	195
PP-UVFS-25.4-6.35-UULLM8SHL	25.4	6.35	HR>99.9% @ 1030 nm	1030	0	λ/6 over CA	140
PP-UVFS-50.8-9.52-UULLM5SHL (SCC)	50.8	9.52	HRs>99.95% & HRp>99.9% @ 1010-1050 nm	1030	45	λ/8 over CA	505
PP-UVFS-12.7-6.35-UULLM5SHL	12.7	6.35	HRs>99.95% & HRp>99.9% @ 1010-1050 nm	1030	45	λ/8 over CA	140
PP-UVFS-25.4-6.35-UBBHR18 (no SCC)	25.4	6.35	HRs>99.9% @ 700-900 nm, HRp >99.5% @ 730 - 870 nm	700-900	45	λ/6 over 15mm	155
PP-UVFS-12.7-6.35-UBBHR7	12.7	6.35	HRs>99.95% & HRp>99.9% @ 980 - 1080 nm	980-1080	45	λ/10 over CA	110
PP-UVFS-25.4-6.35-UBBHR7	25.4	6.35	HRs>99.95% & HRp>99.9% @ 980 - 1080 nm	980-1080	45	λ/6 over CA	160

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

IN-STOCK PRODUCTS

Standard supply

Product code	Ø, mm	t, mm	Coating	Wavelength (nm)	AOI, °	Flatness	Unit price, EUR
PP-UVFS-25.4-6.35-UULLM13	25.4	6.35	HRp>99.5%@ 327-363nm + HRs>99.75%@320 - 370 nm	343	45	λ/10 over CA	175
PP-UVFS-25.4-6.35-UULLM11	25.4	6.35	HRs>98.5%@235 - 280 nm & HRp>97.5%@241 - 271 nm	257	45	λ/10 over 15 mm area	200
PP-UVFS-50.8-9.52-UULLM11	50.8	9.52	HRs>98.5%@235 - 280 nm & HRp>97.5%@241 - 271 nm	257	45	λ/8 over CA	360
PP-UVFS-12.7-6.35-LLM198	12.7	6.35	Rs > 99.9% @500-540nm + 1000-1070 nm, Rp > 99.8% @507-527nm Rp > 99.9% @1005-1070nm	1030+515	45	λ/6 over 9mm area	140
PP-UVFS-25.4-6.35-LLM198	25.4	6.35	Rs > 99.9% @500-540nm + 1000-1070 nm, Rp > 99.8% @507-527nm Rp > 99.9% @1005-1070nm	1030+515	45	λ/6 over 20mm area	140
PP-UVFS-50.8-9.52-LLM198	50.8	9.52	Rs > 99.9% @500-540nm + 1000-1070 nm, Rp > 99.8% @507-527nm Rp > 99.9% @1005-1070nm	1030+515	45	λ/6 over 40mm area	380
PP-UVFS-50.8-9.52-LLM121	50.8	9.52	HRsp>99.9% @ 1030 nm + HRsp>99.9% @ 515 nm	1030+515	45	λ/8 over CA	400
PP-UVFS-25.4-6.35-LLM121	25.4	6.35	HRsp>99.9% @ 1030 nm & HRsp>99.9% @ 515 nm	1030+515	45	λ/8 over CA	160
PP-UVFS-50.8-9.52-MW98	50.8	9.52	HRA>99.3% @ 343 nm + HRA>99.5% @ 515 nm + HRA>99.8% @ 1030 nm	343+515+1030	45	λ/10 over 30 mm area	540
PP-UVFS-25.4-6.35-MW98	25.4	6.35	HRA>99.3% @ 343 nm + HRA>99.5% @ 515 nm + HRA>99.8% @ 1030 nm	343+515+1030	45	45 λ/8 over 20 mm area	290

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

IN-STOCK PRODUCTS

Standard supply

Product code	Ø, mm	t, mm	Coating	Wavelength (nm)	AOI, °	Flatness	Unit price, EUR
PP-UVFS-25.4-6.35-ULLM19	25.4	6.35	HRa>99.9% @ 1030 nm	1030	0-45	λ/10 over 10mm area	145
PP-UVFS-25.4-6.35-ULLM31	25.4	6.35	HRa>99.9% @ 515 nm	515	0-45	λ/8 over 15mm area	145
PP-UVFS-50.8-9.52-ULLM19 (no SCC)	50.8	9.52	HRa>99.9% @ 1030 nm	1030	0-45	λ/8 over 20.5mm area	390
PP-UVFS-12.7-6.35-ULLM19	12.7	6.35	HRa>99.9% @ 1030 nm	1030	0-45	λ/8 over 9mm area	110

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

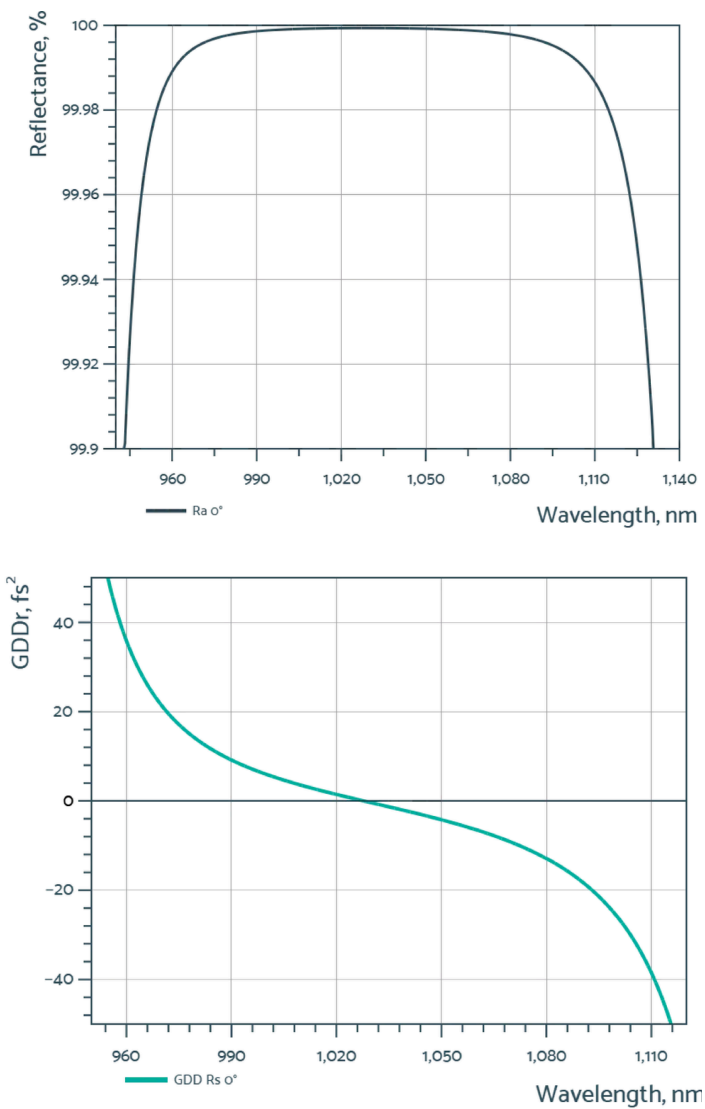
IN-STOCK OPTIONS

PRODUCT TYPE: LOW LOSS

OPTOMAN's Low-Loss IBS-coated Ultrafast Laser Mirrors are engineered to deliver minimal optical losses and extremely **high reflectivity ($R > 99.995\%$)** making them ideal for the most efficient femtosecond and picosecond laser systems. Designed to preserve pulse energy and temporal characteristics, low-loss mirrors ensure near total reflection with exceptionally low scatter and absorption.

COATING EXAMPLE

HR>99.995% @ 1030 nm



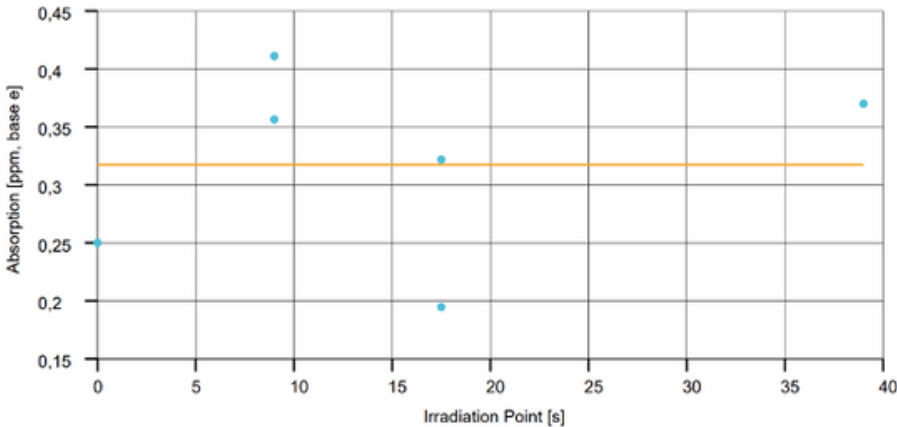
IN-STOCK PRODUCTS

Standard supply

Product code	Ø, mm	t, mm	Coating	Wavelength (nm)	AOI, °	Flatness	Unit price, EUR
PP-UVFS-25.4-6.35-LLM134	25.4	6.35	HR>99.995% @ 1030 nm	1030	0	<λ/4 over 15mm area	125
PP-UVFS-25.4-9.5-LLM134	25.4	9.5	HR>99.995% @ 1030 nm + HR>50% @ 630-660 nm	1030	0	<λ/8 over 16mm area	140
PP-UVFS-38.1-12.7-LLM134	38.1	12.7	HR>99.995% @ 1030 nm	1030	0	<λ/4	350

COATING EXAMPLE

HR>99.995% @ 1030 + R>50% +R_average>62% (best effort)
@ 630-660 nm, AOI=0°
Absorption:<1.5 ppm (<1 ppm best effort)



Calibration Coefficient:

1,3820 mW⁻¹

Absorption:

0,3 ±0,2 ppm

(Method of calculation: Meanvalue)

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

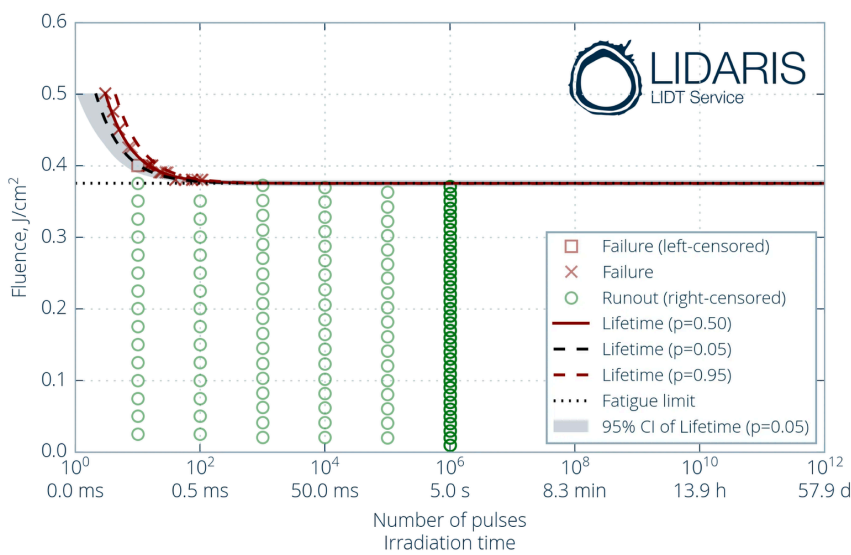
IN-STOCK OPTIONS

PRODUCT TYPE: ENHANCED LIFETIME

OPTOMAN's Enhanced Lifetime IBS-coated Ultrafast Laser Mirrors with Non-Degrading Technology are engineered to deliver long-term reliability and high LIDT in femtosecond and picosecond laser systems. Enhanced Lifetime mirrors feature an extended operational lifetime exceeding 10,000 hours and exhibit no color-change effect, even under continuous high-intensity operation, which directly translates into lower maintenance costs and reduced downtime.

COATING EXAMPLE

HRs>99.6% @ 337-349 nm, AOI 45°



IN-STOCK PRODUCTS

Standard supply

Product code	Ø, mm	t, mm	Coating	Wavelength h (nm)	AOI, °	Flatness	Unit price, EUR
PP-UVFS-25.4-6.35-LLM417	25.4	6.35	HRs>99.7%+HRp>99.6% @ 355 nm	355	45	λ/8 over 20 mm area	120
PP-UVFS-50.8-9.52-LLM267EL	50.8	9.52	HRs>99.6% @ 337-349 nm	343	45	λ/10 over CA	450
PP-UVFS-12.7-6.35-LLM267EL	12.7	6.35	HRs>99.6% @ 337-349 nm	343	45	λ/10 over CA	95

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

LASER MIRRORS



OPTOMAN’s Laser Mirrors are used to deliver exceptionally **high reflectivity** and **minimal absorption losses across a wide range of laser applications**. Coated using Ion Beam Sputtering (IBS) technology, these mirrors are optimized for a specific wavelength or spectral range, from **Deep-UV** to **Mid-IR**, and are ideal for CW, Q-switched, and nanosecond laser systems.

Built to **withstand high average** and **peak powers**, they maintain stable optical performance over time. The dense, durable IBS coatings ensure outstanding thermal and environmental stability, resisting mechanical wear, humidity, and temperature fluctuations, making them a reliable choice for demanding scientific and industrial environments. OPTOMAN’s Laser Mirrors are widely used in scientific, industrial, medical, space, and laser communication systems. Compatible with Nd:YAG, Er:YAG, dye, diode, and other solid-state or fiber lasers operating across the visible, near-IR, and mid-IR regions.

CAPABILITIES

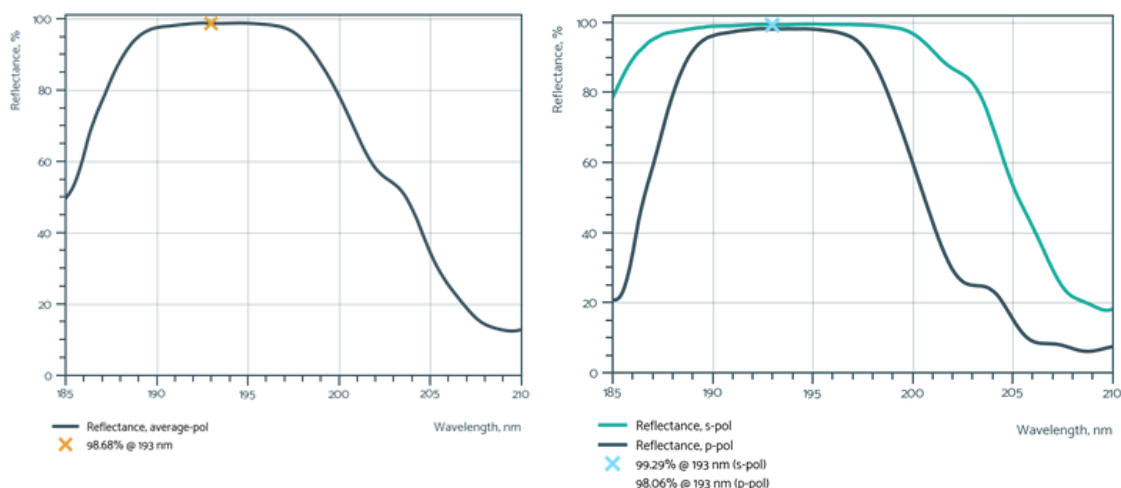
Coating technology	Ion Beam Sputtering (IBS)
Spectral range	193-5000 nm
Reflectivity	>99.9%
Size	3-420 mm
Flatness	up to $\lambda/20$
Surface quality	up to 10-5 S-D over CA (MIL-PRF-13830B)

IN-STOCK OPTIONS

PRODUCT TYPE: DEEP UV-MIRRORS

COATING EXAMPLE

HRa>98% @ 193 nm, AOI=45°



IN-STOCK PRODUCTS

Standard supply

Product code	Ø, mm	t, mm	Coating	Wavelength (nm)	AOI, °	Flatness	Unit price, EUR
PP-UVFS-25.4-6.35-LLM316	25.4	6.35	HRa > 99 % @ 213 nm	213	45	< λ/10 over 15 mm area	110
PP-UVFS-25.4-6.35-LLM290	25.4	6.35	HRa>98% @ 193 nm	193	45	<λ/10 over 15 mm area	180
PP-UVFS-25.4-6.35-LLM323	25.4	6.35	HR>98%@ 206 nm	206	45	<λ/8 over CA	180

*Quantity discounts: 5pcs – 5% off, 10 pcs - 15% off, 20 pcs - 25% off

DISPERSIVE MIRRORS



OPTOMAN’s IBS-coated Dispersive Mirrors are engineered to precisely manage dispersion in ultrafast laser systems, **enabling tight control over temporal characteristics of the pulse**. By introducing carefully controlled chromatic dispersion, these mirrors **compensate for dispersive effects caused by other optical components**, offering a compact, alignment-insensitive alternative to bulky prism or grating compressors.

Dispersive mirrors can operate as Gires–Tournois Interferometer (GTI) mirrors, where dispersion arises from interference effects within an off-resonant optical resonator, or as Chirped Mirrors, which utilize wavelength-dependent penetration depth to tailor the delay. Compared to gratings or prisms, highly dispersive mirrors **offer reduced higher-order dispersion**. For broader bandwidths (>100 nm), Chirped Mirror Pairs with out-of-phase GDD oscillations enable smoother, oscillation-free compression.

CAPABILITIES

Coating technology	Ion Beam Sputtering (IBS)
Spectral range	193-5000 nm
Reflectivity	>99.99%
Size	3-420 mm
Flatness	up to $\lambda/20$
Surface quality	up to 10-5 S-D over CA (MIL-PRF-13830B)
LIDT	>0.13 J/cm ² , 1030 nm, 182 fs, 1000 Hz, 148 μ m
GDD	up to ± 100000 fs ²

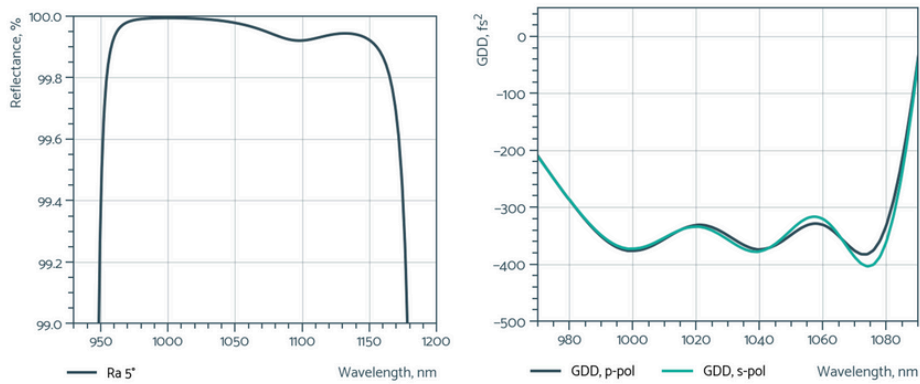
IN-STOCK OPTIONS

PRODUCT TYPE: GTI MIRRORS

COATING EXAMPLE

HR>99.9% @ 980 – 1080nm, AOI = 5°

GDD: -350fs² ± 120fs² @ 980 – 1080nm, AOI = 5°



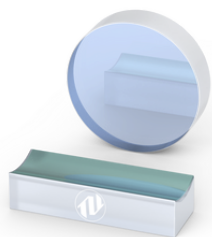
IN-STOCK PRODUCTS

Standard supply

Product code	Ø, mm	t, mm	Coating	Wavelength (nm)	GDD	AOI, °	Unit price, EUR
PP-UVFS-25.4-6.35-LLM214	25.4	6.35	HR>99.9% @ 980 – 1080nm	1030	350fs ² ± 120fs ² @ 980 – 1080nm	5	220
PP-UVFS-12.7-6.35-LLM214	12.7	6.35	HR>99.9% @ 980 – 1080nm	1030	350fs ² ± 120fs ² @ 980 – 1080nm	5	180
PP-UVFS-25.4-6.35-LLM302	25.4	6.35	HRs>99.9% @ 505-525 nm	515	-200fs ² +/- 100fs ² @ 505 – 525 nm	45	510
PP-UVFS-25.4-6.35-GTI7+	25.4	6.35	Rp & Rs >99.8% @ 1010 - 1050 nm	1030	-400 fs ² +/-100 fs ² @ 1025 - 1055 nm	0-10	200
PP-UVFS-25.4-6.35-BBHR77	25.4	6.35	HRs > 99.5% @ 1320 nm	1320	-2500 +/-1000fs ² @ 1315-1325 nm	45	980
PLW-DEG0.5-UVFS-12.7-5.0-GTI7	12.7	5	HRp & HRs >99.8% @ 1010 - 1050 nm	1030	-600 fs ² +/-150 fs ² @ 1025 - 1055 nm	0-10	70
PLW-DEG0.5-UVFS-12.7-5.0-GTI7+	12.7	5	Rp & Rs >99.8% @ 1010 - 1050 nm	1030	-400 fs ² +/-100 fs ² @ 1025 - 1055 nm	0-10	95

*Quantity discounts: 5pcs – 5% off, 10 pcs - 15% off, 20 pcs - 25% off

SPHERICAL MIRRORS



OPTOMAN's Spherical Mirrors are precision optics designed to focus, collimate, or redirect laser beams using curved reflective surfaces. Coated with high-density Ion Beam Sputtered (IBS) coatings, they offer **exceptional reflectivity, high LIDT, minimal scattering, and absorption** – ideal for high average and peak power laser systems.

Available in a range of radii of curvature (ROC), our spherical mirrors come in both **concave** and **convex form**. Concave mirrors (negative ROC) focus light without introducing chromatic aberration – **perfect for beam shaping, precision imaging, and illumination setups**. Convex mirrors (positive ROC) expand field of view and produce virtual, upright images in diagnostic and optical systems.

Disclaimer: where radius of curvature (ROC) values are not explicitly stated, they are calculated at the coating's design wavelength and provided for reference only.

Will these mirrors maintain my laser system's beam quality? Will they be able to handle high power laser pulses and long-term exposure? These are the questions OPTOMAN takes care of with the Spherical Mirrors you'll find below.

AVAILABLE SPHERICAL SUBSTRATES

OPTOMAN has a number of 1/2", 1" and 2" spherical mirror substrates in stock, ready to be coated. Choosing the in-stock substrate option allows, on average, saving 6 weeks of lead time and reducing end-product cost 3 times.

Choose the suitable spherical mirror substrates and OPTOMAN will make custom coatings on them. OPTOMAN is a coatings superhero, so uncoated substrates are not for sale.



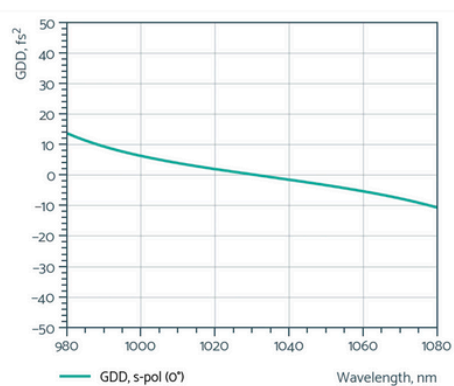
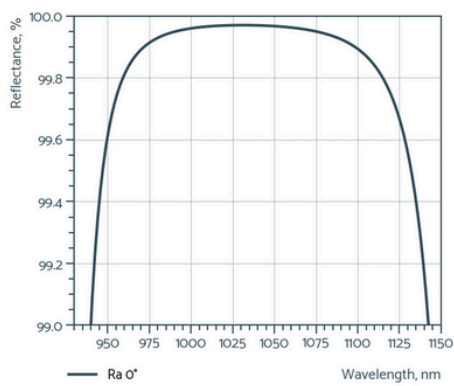
CAPABILITIES

Coating technology	Ion Beam Sputtering (IBS)
Spectral range	193-5000 nm
Reflectivity	HR>99.9%
Size	3-420 mm
Flatness	Up to $\lambda/20$
Surface quality	up to 10-5 S-D over CA (MIL-PRF-13830B)
ROC	up to -10000

IN-STOCK OPTIONS

PRODUCT TYPE: SPHERICAL MIRRORS COATING EXAMPLE

HR>99.9%@1010 - 1050 nm, AOI=0°
IGDD R<15 fs²



IN-STOCK PRODUCTS

Standard supply

Product Code	Curvature	Ø, mm	Coating	Wavelength, nm	AOI, °	ROC, mm	Irregularity	Unit price, EUR
PCV-R2500-UVFS-25.4-ET6.35-ULLM8	Plano - Concave	25.4	HR>99.9%@ 1010 - 1050 nm	1030	0	-2500	λ/10 over CA	190
PCV-R200-UVFS-25.4-ET6.35-ULLM8	Plano - Concave	25.4	HR>99.9%@ 1010 - 1050 nm	1030	0	-200	λ/10 over CA	190
PCV-R600-UVFS-25.4-ET6.35-ULLM8	Plano - Concave	25.4	HR>99.9% @ 1010 - 1050 nm	1030	0	-600	λ/10 over CA	190
PCV-R800-UVFS-25.4-ET6.35-ULLM8	Plano - Concave	25.4	HR>99.9%@ 1010 - 1050 nm	1030	0	-800	λ/10 over CA	190
PCV-R1500-UVFS-25.4-ET6.35-ULLM8	Plano - Concave	25.4	HR>99.9%@ 1010 - 1050 nm	1030	0	-1500	λ/10 over CA	190
PCX-R500-UVFS-25.4-CT6.35-ULLM8	Plano - Convex	25.4	HR>99.9%@ 1010 - 1050 nm	1030	0	500	λ/10 over CA	190
PCX-R1000-UVFS-25.4-CT6.35-ULLM8	Plano - Convex	25.4	HR>99.9%@ 1010 - 1050 nm	1030	0	1000	λ/10 over CA	190
PCX-R600-UVFS-25.4-CT6.35-ULLM8	Plano - Convex	25.4	HR>99.9%@ 1010 - 1050 nm	1030	0	600	λ/10 over CA	190

*Quantity discounts: 5pcs – 5% off, 10 pcs - 15% off, 20 pcs - 25% off

IN-STOCK PRODUCTS

Standard supply

Product Code	Curvature	Ø, mm	Coating	Wavelength, nm	AOI, °	ROC, mm	Irregularity	Unit price, EUR
PCV-R100-UVFS-25.4-ET6.35-ULLM8	Plano - Concave	25.4	HR>99.9%@ 1010 - 1050 nm	1030	0	-2500	λ/10 over CA	150
PCV-R400-UVFS-25.4-ET6.35-ULLM8	Plano - Concave	25.4	HR>99.9%@ 1010 - 1050 nm	1030	0	-400	λ/10 over CA	190
PCV-R1000-UVFS-25.4-ET6.35-ULLM8	Plano - Concave	25.4	HR>99.9%@ 1010 - 1050 nm	1030	0	-1000	λ/10 over CA	190
PCV-R1250-UVFS-12.7-ET6.0-ULLM8	Plano - Concave	25.4	HR>99.9%@ 1010 - 1050 nm	1030	0	-1250	λ/10 over CA	190
PCX-R600-UVFS-25.4-CT6.35-ULLM8	Plano - Convex	25.4	HR>99.9%@ 1010 - 1050 nm	1030	0	600	λ/10 over CA	190
PCV-R100-UVFS-25.4-ET6.35-ULLM9	Plano - Concave	25.4	HR>99.9%@ 500 - 530 nm	515	0	-100	λ/10 over CA	190
PCV-R200-UVFS-25.4-ET6.35-ULLM9	Plano - Concave	25.4	HR>99.9%@ 500 - 530 nm	515	0	-200	λ/10 over CA	190
PCV-R400-UVFS-25.4-ET6.35-ULLM9	Plano - Concave	25.4	HR>99.9%@ 500 - 530 nm	515	0	-400	λ/10 over CA	190
PCV-R600-UVFS-25.4-ET6.35-ULLM9	Plano - Concave	25.4	HR>99.9%@ 500 - 530 nm	515	0	-600	λ/10 over CA	190
PCV-R1250-UVFS-12.7-ET6.0-ULLM9	Plano - Concave	12.7	HR>99.9%@ 500 - 530 nm	515	0	-1250	λ/10 over CA	190

*Quantity discounts: 5pcs – 5% off, 10 pcs - 15% off, 20 pcs - 25% off

IN-STOCK PRODUCTS

Standard supply

Product Code	Curvature	Ø, mm	Coating	Wavelength, nm	AOI, °	ROC, mm	Irregularity	Unit price, EUR
PCX-R500-UVFS-25.4-CT6.35-ULLM9	Plano - Convex	25.4	HR>99.9%@ 500 - 530 nm	515	0	500	λ/10 over CA	190
PCX-R600-UVFS-25.4-CT6.35-ULLM9	Plano - Convex	25.4	HR>99.9%@ 500 - 530 nm	515	0	600	λ/10 over CA	190
PCV-R800-UVFS-25.4-ET6.35-ULLM9	Plano - Concave	25.4	HR>99.9%@ 500 - 530 nm	515	0	-800	λ/10 over CA	190
PCV-R1000-UVFS-25.4-ET6.35-ULLM9	Plano - Concave	25.4	HR>99.9%@ 500 - 530 nm	515	0	-1000	λ/10 over CA	190
PCX-R1000-UVFS-25.4-CT6.35-ULLM9	Plano - Convex	25.4	HR>99.9%@ 500 - 530 nm	515	0	1000	λ/10 over CA	190
PCV-R1250-UVFS-12.7-ET6.0-ULLM9	Plano - Concave	12.7	HR>99.9%@ 500 - 530 nm	515	0	-1250	λ/10 over CA	190
PCV-R1500-UVFS-25.4-ET6.35-ULLM9	Plano - Concave	25.4	HR>99.9%@ 500 - 530 nm	515	0	-1500	λ/10 over CA	190
PCV-R2500-UVFS-25.4-ET6.35-ULLM9	Plano - Concave	25.4	HR>99.9%@ 500 - 530 nm	515	0	-2500	λ/10 over CA	190
PCV-R300-UVFS-50.8-ET9.52-UBBHR38	Plano - Concave	50.8	HR>99.9%@ 925-1170 nm	1030	0	-300	λ/10 over CA	800

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

IN-STOCK PRODUCTS

Standard supply

Product Code	Curvature	Ø, mm	Coating	Wavelength, nm	AOI, °	ROC, mm	Irregularity	Unit price, EUR
Product Code	Plano - Concave	50.8	HR>99.9% @ 925-1170 nm	1030	0	-500	λ/10 over CA	900
Product Code	Plano - Concave	50.8	HR>99.9% @ 925-1170 nm	1030	0	-1000	λ/10 over CA	900
Product Code	Plano - Concave	25.4	HR>99.9% @ 1010 - 1050 nm	1030	0	-100	λ/10 @ 633 nm over CA	150
Product Code	Plano - Concave	25.4	HR>99.9% @ 1010 - 1050 nm	1030	0	-1000	λ/10 @ 633 nm per CA	190
Product Code	Plano - Concave	25.4	HR>99.9% @ 1010 - 1050 nm	1010-1050	0	-400	λ/10 @ 633 nm per CA	190
Product Code	Plano - Concave	12.7	HR>99.9% @ 1010 - 1050 nm	1030	0	1250	λ/4 over CA	110
Product Code	Plano - Convex	25.4	HR>99.9% @ 1010 - 1050 nm	1030	0	600	λ/10 over CA	190
Product Code	Plano - Concave	25.4	HR>99.9% @ 1010 - 1050 nm	1030	0	-800	λ/10 over CA	190
Product Code	Plano - Concave	50.8	HR>99.9% @ 925-1170 nm	1030	0	-500	λ/10 @ 633 nm per CA	900

*Quantity discounts: 5pcs – 5% off, 10 pcs - 15% off, 20 pcs - 25% off

LASER FILTERS

Whether you need to split, reflect, transmit, or extract light within a laser system, OPTOMAN's laser filters are built to perform under the most demanding conditions.

From Dichroic Mirrors that sharply separate different harmonics or other specific wavelengths without absorption or spectral drift, to Non-Polarizing Beam Splitters that split beams without altering polarization of the light, to Output Couplers that precisely balance reflectance and transmittance inside laser cavities - each filter type serves a vital role in beam control and laser efficiency. All filters feature dense, stable IBS coatings for maximum optical performance and minimal losses, with anti-reflective coatings on secondary surfaces where needed.

Whether you're building a laser system, separating or combining laser beams, or directing light in a microscopy, biomedical, or industrial laser setup - OPTOSHOP has the high-performance laser filter you need. Explore the full selection of Dichroic Mirrors, Beam Splitters, and Output Couplers below.



DICHROIC MIRRORS



OPTOMAN’s Dichroic Mirrors, also known as Dichroic Filters or Dichromatic Mirrors, are designed to transmit a specific wavelength band while reflecting others with minimal absorption. Coated using Ion Beam Sputtered (IBS) thin-film dielectric coatings, they **deliver spectral drift-free performance** that allows very sharp edge configurations.

Dichroic filters are commonly used as pump light injectors in laser resonators, end mirrors for intracavity frequency doubling, fluorescence microscopy, or harmonic separators in high-performance laser systems. Whether you’re integrating a dichroic mirror into a laser system or a complex imaging setup, OPTOMAN offers **reliable, high-performance solutions** – explore the Dichroic Mirrors collection below.

CAPABILITIES

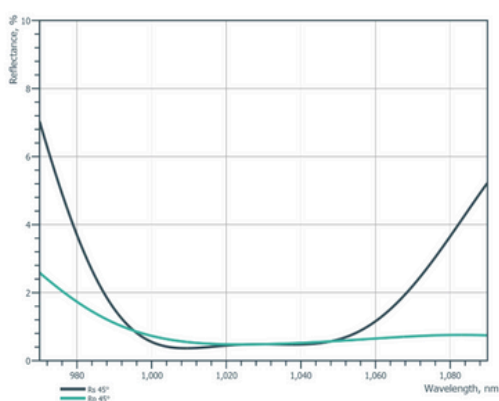
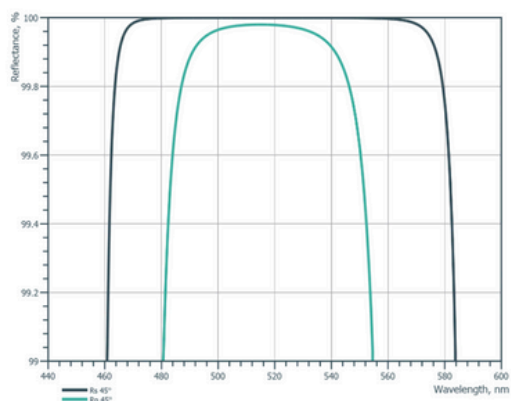
Material	UVFS
Reflectivity	>99.95 %
Dimensions	12.7-50.8 mm
Thickness	2.0 – 8.0 mm
HR Wavelength	195 -1030 nm
HT Wavelength	261 -1400 nm
Surface quality	10-5 S-D or 20-10 S-D
Flatness	Up to $\lambda/10$
LIDT	>2 J/cm ² , s-pol, 100 ps, 1030 nm (as per ISO S-on-1, 200 um beam dia) >100 GW/cm ² , 60 fs, 200 nm (15 mm dia)

IN-STOCK OPTIONS

PRODUCT TYPE: STANDARD

COATING EXAMPLE

HRsp>99.9% @ 515 nm + HRsp>99.3% @ 500-530 nm
Rsp<2% @ 1030 nm, AOI=45°



IN-STOCK PRODUCTS

Standard supply

Product Code	Ø, mm	t, mm	Coating	AOI, °	HR wavelength, nm	HT wavelength, nm	Unit price, EUR
PP-UVFS-25.4-6.35-DM389-AR753	25.4	6.35	HRs>99.5% @ 343 nm + HTp>98% @ 515 nm + HTs>98% @ 1030 nm	45	343	515+1030	110
PP-UVFS-25.4-6.35-DM77-AR120	25.4	6.35	HRsp>99.5% @ 515 nm + Rs<5% @ 1030 nm	45	515	1030	195
PP-UVFS-25.4-3.0-DM131-AR260	25.4	3	HRs>99.95% + HRp>99.5% @ 976 nm + HTp>98% @ 1030nm	45	976	1030	400

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

IN-STOCK PRODUCTS

Standard supply

Product Code	Ø, mm	t, mm	Coating	AOI, °	HR wavelength, nm	HT wavelength, nm	Unit price, EUR
PP-UVFS-12.7-3.0-DM77-AR120+	12.7	3	HRsp > 99.9% @ 515 nm + HRsp > 99.3% @ 500-530 nm + Rsp < 2% @ 1030 nm	45	515	1030	95
PP-UVFS-25.4-6.35-DM77-AR120	25.4	6.35	HRsp > 99.5% @ 515 nm + Rs < 5% @ 1030 nm	45	515	1030	195
PP-UVFS-25.4-3.0-DM438-AR804EL	25.4	3	HRs>99.6%@337-349 nm + HTP>98%@505-525 + HTs>98%+1015-1045nm	45	343	515+1030	380
PP-UVFS-25.4-6.35-DM389-AR753	25.4	6.35	HRs>99.5% @ 343 nm + HTP>98% @ 515 nm + HTs>98% @ 1030 nm	45	343	515+1030	110

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

POLARIZATION OPTICS

Explore High Power Thin-Film Polarizers that efficiently separate s- and p- polarized light with high extinction ratios and minimal absorption, Zero-Order Air-Spaced Waveplates that ensure precise polarization control with excellent stability over temperature and wavelength, and Polarizing Cube Beamsplitters that offer robust, alignment-friendly integration for splitting or combining laser beams.

Every component features an exceptional Laser-Induced Damage Threshold (LIDT) and consistent optical performance over time. Whether you're combining beams in a femtosecond laser system, attenuating Q-switched laser energy, or optimizing polarization in scientific measurement setups - OPTOSHOP's Polarization Optics are up for the task. Explore the available options below.



THIN FILM POLARIZERS



OPTOMAN’s High Power Thin-Film Polarizers are designed specifically for high-power laser applications where traditional polarizer types fall short. These components use Ion Beam Sputtered (IBS) dielectric multilayer coatings to **efficiently separate s- and p- polarized light with high extinction ratio and minimal absorption.**

The multilayer coatings design enables strongly polarization-dependent reflectivity: s- polarized light is reflected, while p- polarized light is transmitted, with excellent efficiency and negligible optical loss. These polarizers are commonly optimized for operation at a 45° angle of incidence, providing a clean 90° separation between reflected and transmitted beams, however, custom solutions at other angles are also possible. With **high transmittance, high reflectance, and outstanding Laser-Induced Damage Threshold (LIDT)**, OPTOMAN’s thin-film polarizers ensure stable, extended-lifetime operation under extreme power conditions.

CAPABILITIES

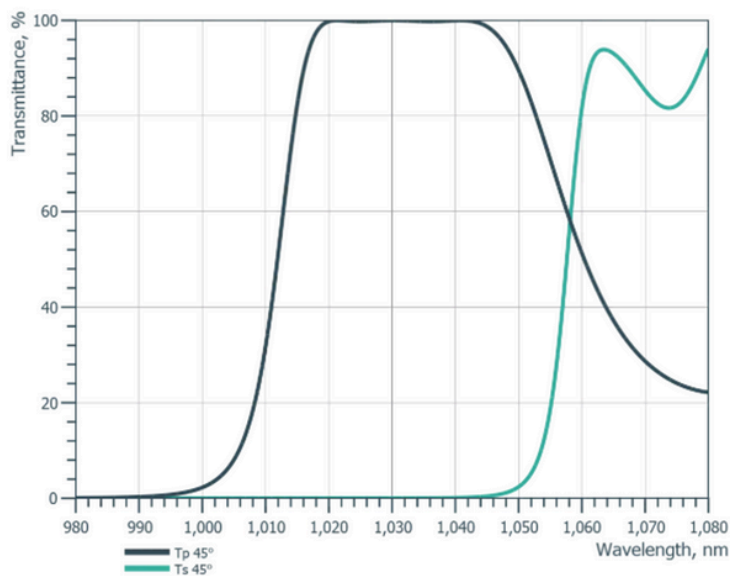
Coating technology	Ion Beam Sputtering (IBS)
Spectral range	193-5000 nm
Extinction ratio	up to 10000:1
Size	3-420 mm
Flatness	up to $\lambda/20$
Surface quality	up to 10-5 S-D over CA (MIL-PRF-13830B)
LIDT	$>0.77 \text{ J/cm}^2$, 1030 nm, 190 fs, 300 kHz, 175 μm
GDD	$< 20 \text{ fs}^2$

IN-STOCK OPTIONS

PRODUCT TYPE: HIGH POWER THIN-FILM POLARIZERS

COATING EXAMPLE

IRs>99.9% @ 1030 nm + Tp>98% (>99% best efforts) @ 1030 nm



IN-STOCK PRODUCTS

Standard supply

Product Code	Ø, mm	t, mm	Coating	Wavelength, nm	AOI, °	Flatness	Unit price, EUR
PP-UVFS-25.4-3.0-BTFP28	25.4	3	Rs > 99.9% & Tp > 98% @ 515 nm	515	55.4	λ/8 over 15 mm area	175
PP-UVFS-25.4-3.0-BTFP17	25.4	3	Rs > 99.8% @ 1030 nm + Tp > 99% @ 1030 nm	1030	55.4	λ/8 over 6 mm area	255

*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

IN-STOCK PRODUCTS

Standard supply

Product Code	Ø, mm	t, mm	Coating	Wavelength, nm	AOI, °	Flatness	Unit price, EUR
PP-UVFS-25.4-6.35-TFP86	25.4	6.35	Rs > 99.9% @ 1064 nm + HTp > 98% @ 1064 nm (Tp/Ts > 1000:1)	1064	45	λ/10 over 9 mm area	230
PP-UVFS-25.4-3.0-TFP4527	25.4	3	Rs>99.9% & Tp>98% @ 515 nm	515	45	λ/8 over 15mm area	205
PP-UVFS-25.4-3.0-TFP4526	25.4	3	Rs>99.9% & Tp>98% @ 1030 nm	1030	45	λ/8 over 15mm area	335
PP-UVFS-50.8-8.0-TFP4526	50.8	8	Rs>99.9% & Tp>98% @ 1030 nm	1030	45	λ/8 over 15mm area	580
PP-UVFS-12.7-3.0-TFP67	12.7	3	Rs>99.9% @ 1030 nm + Tp>98% (>99% best efforts) @ 1030 nm	1030	45	λ/3 over CA	160
PP-UVFS-25.4-6.35-TFP67	25.4	6.35	Rs>99.9% @ 1030 nm + Tp>98% (>99% best efforts) @ 1030 nm	1030	45	λ/4 over CA	250
PP-UVFS-25.4-6.35-TFP95	25.4	6.35	HRs > 99.6% + HTp > 95% @ 343 nm	343	45	λ/10 over 15mm area	240

*Quantity discounts: 5pcs – 5% off, 10 pcs - 15% off, 20 pcs - 25% off

ZERO-ORDER AIR-SPACED WAVEPLATES



OPTOMAN's Waveplates, also known as Retarders, are optical components that modify the polarization state of transmitted light without attenuating, deviating, or displacing the beam. By leveraging birefringent materials, waveplates introduce a controlled phase shift between orthogonal polarization components, **allowing precise polarization control.**

Waveplates are commonly used to rotate linear polarization or convert linear into circular polarization, making them essential elements in applications like optical isolators, polarization-sensitive laser setups, and beam combining systems. Among all types, Zero-Order Air-Spaced Waveplates provide **the most consistent performance, offering minimal sensitivity to wavelength or temperature variations and ensuring long-term stability and precision.** Constructed from crystalline birefringent materials and separated by an air gap, these waveplates are optimized for high power laser applications and deliver superior LIDT and spectral reliability.

CAPABILITIES

Coating technology	Ion Beam Sputtering (IBS)
Clear aperture	>18 mm
Surface quality	20-10 S-D
Transmitted WFD	$<\lambda/10$ @ 633 nm
Design wavelength	1030 nm
Retardation order	Zero Order
Retardation and tolerance	$\lambda/2 \pm \lambda/300$ @ 20° C
Beam deviation	<10 arcsec
LIDT	>20 J/cm ² , 1064nm, 10ns, 100 Hz

IN-STOCK PRODUCTS

Standard supply

Product Code	Ret.	Ø, mm	Mounting thickness, mm	Clear Aperture, mm	Reflectance	Design Wavelength, nm	Unit price, EUR
HWP-AS-ZO-1030-25.4-SHP	$\lambda/2$	25.4	7	>17	R < 0.1% @ 1030 nm	1030	380
HWP-AS-ZO-515-25.4-SHP	$\lambda/2$	25.4	7	>17	R < 0.1% @ 515 nm	515	380
QWP-AS-ZO-1030-25.4-SHP	$\lambda/4$	25.4	7	>17	R < 0.1% @ 1030 nm	1030	380
QWP-AS-ZO-515-25.4-SHP	$\lambda/4$	25.4	7	>17	R < 0.1% @ 515 nm	515	380
HWP-AS-ZO-1030-25.4	$\lambda/2$	25.4	6	>18	R<0.2% @ 1030 nm	1030	240
HWP-AS-ZO-515-25.4	$\lambda/2$	25.4	6	>18	R<0.2% @ 515 nm	515	240
QWP-AS-ZO-1030-25.4	$\lambda/4$	25.4	6	>18	R<0.2% @ 1030 nm	1030	240
QWP-AS-ZO-515-25.4	$\lambda/4$	25.4	6	>18	R<0.2% @ 515 nm	515	240

*Quantity discounts: 5pcs – 5% off, 10 pcs - 15% off, 20 pcs - 25% off

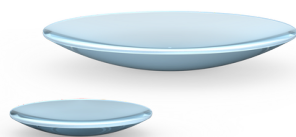
ANTI-REFLECTIVE OPTICS

OPTOMAN's Anti-Reflective Optics are built for high-performance laser applications where low reflection losses, high transmission, and long-term reliability are essential. All AR-coated lenses and windows available in OPTOSHOP are coated using Ion Beam Sputtering (IBS) – the most advanced thin-film deposition technology.

Thanks to the near-bulk density of IBS coatings, these optics feature extremely low absorption, excellent environmental stability, and outstanding laser-induced damage thresholds (LIDT). The dense coating structure ensures thermal lensing elimination, resistance to humidity, and mechanical stress, making them suitable for demanding industrial and scientific environments. From beam focusing to optical isolation, OPTOMAN's AR Coated Lenses and AR Coated Windows deliver maximum throughput and minimal losses. Explore both categories below.



LENSES



OPTOMAN’s AR Coated Laser Lenses are designed to efficiently focus collimated laser beams in a variety of laser applications. Coated using Ion Beam Sputtering (IBS) technology, these lenses deliver **high transmittance**, and **low absorption**, minimizing reflection losses and **thermal effects**.

Available in Plano-Convex (PCX) lenses for focusing beams to a spot, and Plano-Concave (PCV) lenses for beam expansion or divergence control, each lens type provides specific optical characteristics for different use cases. Whether you’re directing a laser beam in industrial processing or a scientific measurement setup, these lenses **ensure precision and power efficiency at your target wavelength**.

Disclaimer: where radius of curvature (ROC) values are not explicitly stated, they are calculated at the coating’s design wavelength and provided for reference only.

CAPABILITIES

Coating technology	Ion Beam Sputtering (IBS)
Dimensions	25.4 mm (+0/0.1 mm)
Edge Thickness	2.0 mm (+/-0.1 mm)
Central thickness	3.179 mm (+/-0.1 mm)
Clear aperture	>80%
Surface quality	S1/S2: 20-10 S-D
Surface irregularity	S1/S2: $\lambda/6@633\text{ nm}$ per CA
Protective chamfers	0.2-0.4 x 45°
LIDT	>0.25 J/cm ² , 515 nm, 500 fs, 10kHz

IN-STOCK PRODUCTS

Standard supply

Product Code	Curvature	Ø, mm	Coating	Wavelength, nm	Focal length, mm	ROC, mm	Irregularity	Unit price, EUR
CV-F50-UVFS-25.4-CT2.0-AR636-AR636	Plano - Concave	25.4	AR < 0.1% @ 515 nm + 1030 nm	1030 + 515	-50	-23	λ/6 over CA	140
CV-F100-UVFS-25.4-CT2.0-AR636-AR636	Plano - Concave	25.4	AR < 0.1% @ 515 nm + 1030 nm	1030 + 515	-100	-46	λ/6 over CA	140
CX-F100-UVFS-25.4-ET2.0-AR636-AR636	Plano - Convex	25.4	AR < 0.1% @ 515 nm + 1030 nm	1030 + 515	100	46	λ/6 over CA	140
PCX-F150-UVFS-25.4-ET2.0-AR636-AR636	Plano - Convex	25.4	AR < 0.1% @ 515 nm + 1030 nm	1030 + 515	150	69	λ/6 over CA	140
PCX-F200-UVFS-25.4-	Plano - Convex	25.4	AR < 0.1% @ 515 nm + 1030 nm	1030 + 515	200	92	λ/6 over CA	140
PCX-F250-UVFS-25.4-ET2.0-AR636-AR636	Plano - Convex	25.4	AR < 0.1% @ 515 nm + 1030 nm	1030 + 515	250	115	λ/6 over CA	140
CX-F300-UVFS-25.4-ET2.0-AR636-AR636	Plano - Convex	25.4	AR < 0.1% @ 515 nm + 1030 nm	1030 + 515	300	138	λ/6 over CA	140
PCX-F400-UVFS-25.4-ET2.0-AR636-AR636	Plano - Convex	25.4	AR < 0.1% @ 515 nm + 1030 nm	1030 + 515	400	184	λ/6 over CA	140

*Quantity discounts: 5pcs – 5% off, 10 pcs - 15% off, 20 pcs - 25% off

IN-STOCK PRODUCTS

Standard supply

Product Code	Curvature	Ø, mm	Coating	Wavelength, nm	Focal length, mm	ROC, mm	Irregularity	Unit price, EUR
PCX-F250-UVFS-25.4-ET2.0-AR548-AR548	Plano-Convex	25.4	AR<0.1% @ 1030 nm	1030	250	115	λ/6 over CA	115
PCX-F200-UVFS-25.4-ET2.0-AR548-AR548	Plano-Convex	25.4	AR<0.1% @ 1030 nm	1030	200	92	λ/6 over CA	115
PCX-F150-UVFS-25.4-ET2.0-AR548-AR548	Plano-Convex	25.4	AR<0.1% @ 1030 nm	1030	150	69	λ/6 over CA	115
PCX-F100-UVFS-25.4-ET2.0-AR548-AR548	Plano-Convex	25.4	AR<0.1% @ 1030 nm	1030	100	46	λ/6 over CA	115
PCV-F100-UVFS-25.4-CT2.0-AR548-AR548	Plano-Concave	25.4	AR<0.1% @ 1030 nm	1030	-100	-46	λ/6 over CA	115
PCV-F75-UVFS-25.4-CT2.0-AR548-AR548	Plano-Concave	25.4	AR<0.1% @ 1030 nm	1030	-75	-34.5	λ/6 over CA	115
PCX-F500-UVFS-25.4-ET2.0-AR548-AR548	Plano-Convex	25.4	AR<0.1% @ 1030 nm	1030	500	230	λ/6 over CA	140
PCX-F300-UVFS-25.4-ET2.0-AR548-AR548	Plano-Convex	25.4	AR<0.1% @ 1030 nm	1030	300	138	λ/6 over CA	115

*Quantity discounts: 5pcs – 5% off, 10 pcs - 15% off, 20 pcs - 25% off

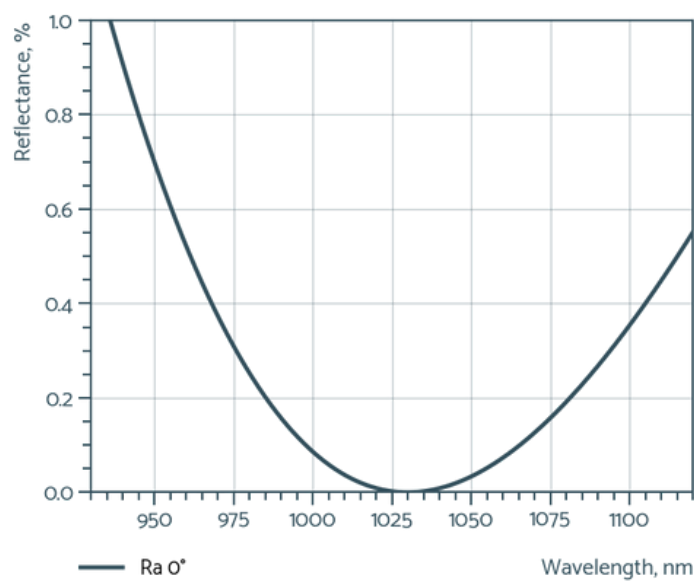
IN-STOCK PRODUCTS

Standard supply

Product Code	Curvature	Ø, mm	Coating	Wavelength, nm	Focal length, mm	ROC, mm	Unit price, EUR
PCX-F400-UVFS-25.4-ET2.0-AR548-AR548	Plano-Convex	25.4	AR<0.1% @ 1030 nm	1030	400	184	115
PCX-F700-UVFS-25.4-ET2.0-AR548-AR548	Plano-Convex	25.4	AR<0.1% @ 1030 nm	1030	700	322.1	115
PCV-F50-UVFS-25.4-CT2.0-AR548-AR548	Plano-Concave	25.4	AR<0.1% @ 1030 nm	1030	-50	-23	115
PCX-F500-UVFS-25.4-ET2.0-AR636-AR636	Plano – Convex	25.4	AR < 0.1% @ 515 nm + 1030 nm	1030 + 515	500	230	140
PCX-F700-UVFS-25.4-ET2.0-AR636-AR636	Plano – Convex	25.4	AR < 0.1% @ 515 nm + 1030 nm	1030 + 515	700	322.1	140

COATING EXAMPLE

AR<0.1% @ 1030 nm, AOI=0°



*Quantity discounts: 5pcs - 5% off, 10 pcs - 15% off, 20 pcs - 25% off

WINDOWS



OPTOMAN's AR Coated Windows are designed to **maximize transmission** and **protect laser systems by minimizing reflection losses and backscatter**. While they may appear simple, laser windows play a critical role in maintaining system efficiency, stability, and safety - especially in high-power or sensitive optical setups.

Coated using advanced Ion Beam Sputtering (IBS) technology, these windows **deliver high transmittance, excellent spectral performance, and a high laser-induced damage threshold (LIDT)**. Anti-Reflection (AR) coatings are applied to increase system throughput and reduce the risk of ghost images caused by back reflections. They are engineered to withstand temperature fluctuations, humidity, and long-term optical fatigue, ensuring reliable performance in demanding environments.

CAPABILITIES

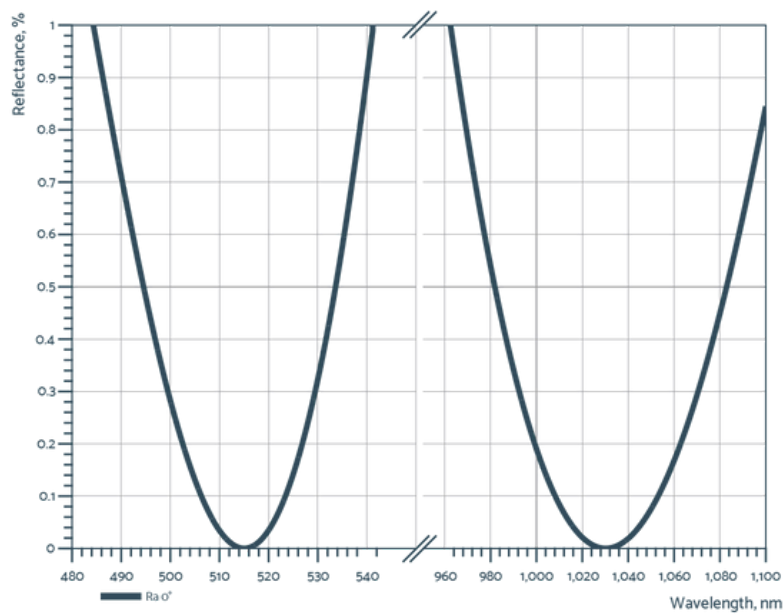
Coating technology	Ion Beam Sputtering
Dimensions	25.4 mm (+0/-0.1 mm)
Thickness	6.35 mm +/-0.1 mm
Clear aperture	min 20 mm
Surface quality	S1/S2: 20-10 S-D
Parallelism	10 arcsec
Protective chamfers	0.1-0.4 mm x 45°
Chips	0.2 mm
Substrate Shape	Plano S1/Plano S2

IN-STOCK OPTIONS

PRODUCT TYPE: AR COATED WINDOWS

COATING EXAMPLE

AR < 0.1% @ 515 nm + 1030 nm, AOI 0°



IN-STOCK PRODUCTS

Standard supply

Product Code	Ø, mm	t, mm	Coating	Wavelength, nm	TWD	Unit price, EUR
PP-UVFS-25.4-6.35-AR548-AR548	25.4	6.35	AR<0.1% @ 1030 nm	1030	λ/10 over CA	80
PP-UVFS-12.7-2.0-AR636-AR636	12.7	2	AR < 0.1% @ 515 nm + 1030 nm	515+1030	λ/8 over CA	45
PP-UVFS-25.4-6.35-AR636-AR636	25.4	6.35	AR < 0.1% @ 515 nm + 1030 nm	515+1030	λ/8 over CA	90

*Quantity discounts: 5pcs – 5% off, 10 pcs - 15% off, 20 pcs - 25% off

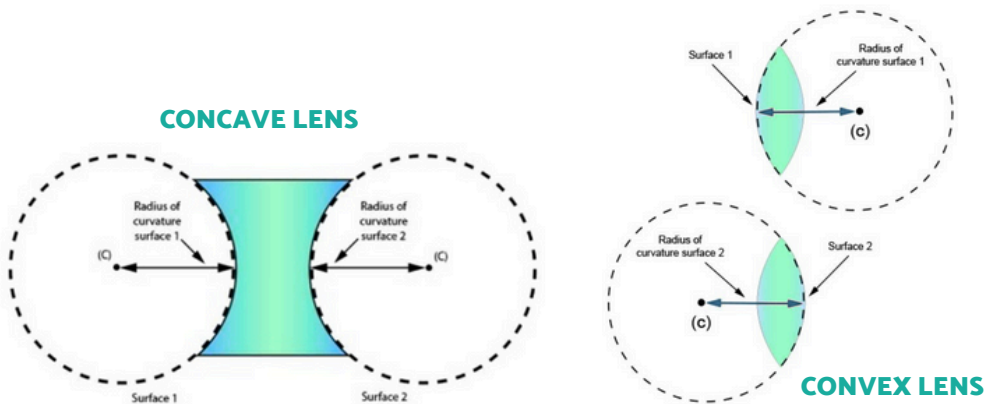
GLOSSARY

Group Delay Dispersion (GDD) is the frequency dependency of the group delay, or (quantitatively) the corresponding derivative with respect to angular frequency. It refers to how different wavelengths of light are delayed by different amounts as they pass through an optical element. It is the second derivative of the optical phase shift with respect to angular frequency, typically measured in fs^2 (femtoseconds squared).

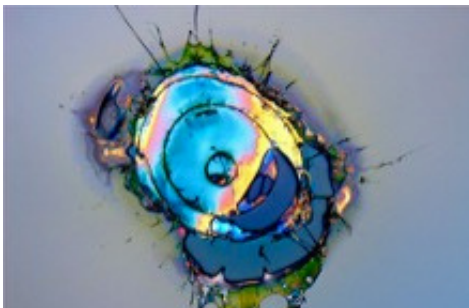
Why it matters

In ultrafast laser systems, pulses are often just a few femtoseconds long. If GDD isn't properly managed, these pulses become distorted—reducing peak intensity, damaging precision, and lowering system performance.

ROC, radius of curvature, defined as the radius of the sphere from which a curved optical surface (like a lens or mirror) is a segment. It can be positive, zero, or negative depending on whether the surface is convex, plano, or concave, respectfully.



LIDT (Laser-Induced Damage Threshold) is the maximum amount of laser energy or power an optical component can withstand without being damaged. The purpose of LIDT is to specify the maximum laser fluence (for pulsed lasers, typically in J/cm^2) or the maximum laser intensity (for continuous wave lasers, typically in W/cm^2) that a laser optic can withstand before damage occurs.



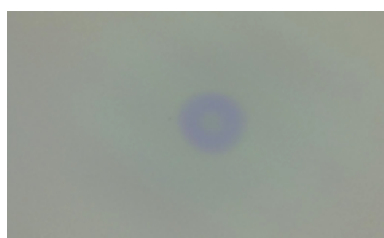
Example of laser-induced damage on a dielectric mirror operated in a vacuum

Why it matters

If the laser fluence (energy per area) exceeds the LIDT, the optic can melt, crack, or degrade—leading to failure of the laser system. High LIDT means the optic can handle higher power and longer lifetime

Color-change effect refers to a subtle but damaging form of degradation that occurs under prolonged exposure to ultrafast UV laser radiation.

Unlike catastrophic damage – which typically results in visible cracks, scattering, or coating failure – the color-change effect alters the optical properties of the coating without visibly damaging the component. It manifests as a shift in spectral performance, often causing a change in reflectance or transmittance that disrupts the pulse shape and temporal characteristics of femtosecond or picosecond laser systems.



An example of colour change damage after prolonged exposure to laser irradiation

Chirped mirrors are specialized dispersive mirrors designed to control the Group Delay Dispersion (GDD) of ultrashort laser pulses.

Gires-Tournois Interferometer (GTI) mirrors are a type of dispersive mirror used to introduce controlled Group Delay Dispersion (GDD), typically positive GDD between 100 and 5000 fs², but only over a narrow spectral range (5–300 nm).

These mirrors are mainly used for pulse compression in Yb:YAG and Yb:KGW femtosecond lasers, but can also be optimized for other wavelengths, such as Ti:Sapphire laser systems.

Surface quality defines the level of surface imperfections, such as scratches, digs, sleeks, chips, and coating defects on an optical component. It is specified using a scratch-dig rating (e.g., 10-5), where lower numbers indicate higher quality. Better surface quality ensures lower scatter, higher reliability, and a longer operational lifetime.

Typical specs:

- 40-20 – Standard optics
- 20-10 – Precision laser optics
- 10-5 – High-power or intra-cavity lasers

Surface flatness measures how much an optical surface deviates from an ideal flat plane. It is usually expressed in wavelengths (λ) or nanometers (nm), using a PV (Peak-to-Valley) value.

Flatness is referenced to the test wavelength—for example, $\lambda/10$ @ 633 nm corresponds to about 63 nm flatness. Poor flatness introduces aberrations, causing the beam to defocus, reshape, or shift.

Flatness can also be expressed as:

- $\lambda/10$ @ 633 nm = 63.3 nm
- $\lambda/10$ @ 546 nm = 54.6 nm

Interferograms are used to reveal the actual surface shape beyond just the flatness number.

Parallelism describes how parallel two surfaces are with respect to each other. It's typically measured in arcminutes (') or arcseconds.

It is useful for specifying components such as windows and polarizers, where parallel surfaces are ideal for system performance, as they minimize distortion that would otherwise degrade image or beam quality.

When the specification is given in arcseconds or arcminutes, it refers to the maximum wedge angle between the two surfaces.

Protective chamfer is a small, beveled edge, usually cut at 45° along the outer edges of an optical component. Measured along the flat, it serves both functional and aesthetic purposes.

Reasons for using chamfers on optical components:

- **Preventing chipping:** Reduces the risk of edge damage during handling or mounting.
- **Reducing reflections:** Alters edge geometry to help minimize stray light.
- **Alignment:** Can serve as a reference surface for aligning optical elements.
- **Ease of handling:** Chamfered edges reduce the risk of damage and facilitate handling, mounting, and installation.
- **Aesthetics:** Provide a clean, polished, and finished appearance.

Clear aperture is the diameter or area of an optical component that must meet the specified optical performance. Due to manufacturing constraints, it is virtually impossible for the clear aperture to be exactly equal to the full diameter (or length and width) of the optics.

Irregularity, a type of surface accuracy specification, describes how the shape of a surface deviates from the shape of a reference surface. Regularity refers to the sphericity of the circular fringes that are formed from the comparison of the test surface to the reference surface.

Chips are areas where material has been removed from the periphery or edges of an optical element. Optics without chamfers—or with very small or sharp chamfers—tend to chip easily when in contact with coating holders or even plastic packaging. Chip specification defines the maximum allowable chip size, typically given in millimeters (mm).

Transmitted Wavefront Distortion (TWD), also referred to as Transmitted Wavefront Error (TWE), arises from deviations of a transmitting glass component from an ideal plane-parallel plate. These deviations include both thickness variations and inhomogeneities in the refractive index of the material.

TWE is defined as the residual deviation after removing tilt (from wedge) and spherical error (from lens-like geometry). It must be measured interferometrically, since surface flatness or Reflected Wavefront Error (RWE) alone do not account for transmission effects.

Extinction ratio measures how well an optical component—such as a polarizer or modulator—separates or blocks one polarization state of light relative to the other.

It is defined as the ratio of transmitted power in the desired polarization to that in the unwanted (orthogonal) polarization. A high extinction ratio (e.g., $T_p/T_s > 1000:1$) indicates excellent polarization purity.

Surface roughness is one component of describing how the shape of a surface deviates from its ideal form, where higher values correspond to rougher surfaces, while lower values indicate the surface is smooth.

Substrate material (UVFS): Fused silica is an ultra-pure glass made from almost 100% SiO_2 . It is highly transparent from deep-UV to near-IR wavelengths and remains optically stable.

Why we choose it over BK7 (standard optical glass):

- **Handles heat better:** Expands ~10–15× less than BK7, so the optic maintains its shape when temperatures change.
- **Higher Laser-Induced Damage Threshold (LIDT):** Tolerates more laser energy before damage – ideal for high-power lasers.
- **Stronger UV performance:** Transmits UV light efficiently with very little fluorescence or UV darkening.
- **Cleaner material:** Fewer impurities and lower absorption ensure stable performance, longer operational lifetime, and reduced total cost of ownership.

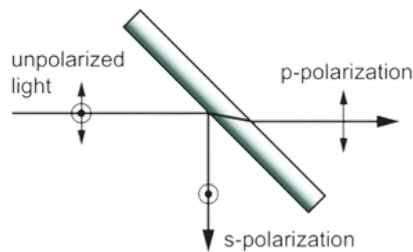
Anti-reflection (AR) coating - thin-film layers on a surface that cancel reflections at a chosen wavelength (and angle), so more light goes through. It gives higher transmission, less ghosting/flare, better power throughput and signal.

Stress-compensating coating (SCC) is a non-optical balancing layer, commonly SiO_2 , deposited on the rear surface of a substrate to counteract thin-film stress induced by the functional front-side coating. Its purpose is to maintain substrate flatness and mechanical stability.

Polarization refers to the orientation of the electric field of a light wave. It is crucial in optics because it determines how light interacts with materials, surfaces, and optical components.

When light interacts with a surface, its polarization can be described using two orthogonal states:

- **p-polarized:** the electric field oscillates in the plane of incidence, defined by the incoming ray and the surface normal.
- **s-polarized:** the electric field oscillates perpendicular to the plane of incidence (i.e., out of the plane).



Polarizers are optical elements that transmit one polarization state of light while blocking or reflecting the orthogonal state. They control the orientation of the electric field.

How they operate: Light components along two perpendicular directions are treated differently: one is transmitted, and the other is reflected. For unpolarized light, an ideal linear polarizer transmits about ~50%.

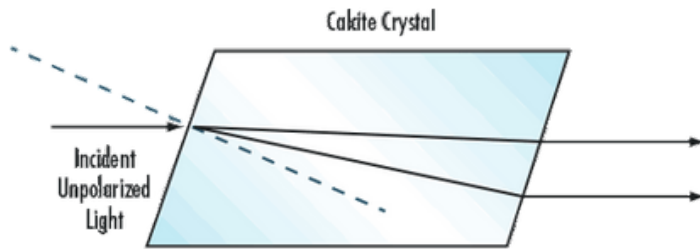
Types of polarizers

- **Thin-film polarizer:** A flat, coated glass plate with a multilayer coating tuned so that one polarization is transmitted (passes through like a window) while the orthogonal polarization is reflected (like a mirror).
- **Polarizing cube beamsplitter:** Built from two prisms forming a cube, with a coated diagonal interface. One polarization passes straight through, while the orthogonal polarization is reflected at 90° , splitting the input into two clean beams.

When to use which

- **Polarizing cube beamsplitter:** Use when two clean, separated output beams are needed in a compact form.
- **Thin-film polarizer:** Use when a plate optic is preferred to transmit one polarization state and reflect the other—for beam steering, polarization cleanup, or handling high-power beams.

A **waveplate** is a thin crystal plate (often quartz or MgF_2) that has a fast axis and a slow axis. Light polarized along these two axes travels at slightly different speeds. This tiny delay (phase shift) changes the polarization of the beam without bending it or changing its color.



Separation of unpolarized light by a birefringent calcite crystal (waveplate).

Waveplate types

- Quarter-wave ($\lambda/4$): Converts linear $\leftrightarrow$ circular polarization when the input polarization is $\sim 45^\circ$ to the fast axis.
- Half-wave ($\lambda/2$): Rotates linear polarization, the rotation equals twice the angle between the input polarization and the fast axis.

Zero-order waveplates provide only the target delay ($\lambda/4$ or $\lambda/2$) without additional full-wave retardance.

Why we choose zero-order

- Stability: Least sensitive to wavelength, temperature, and angle of incidence, since there are no extra full-wave “laps.”
- Error sensitivity: zero-order $\ll$ low-order $\ll$ multi-order.
- Accuracy: Tighter retardance tolerance at the labeled value ($1/4$ or $1/2$), without additional full-wave delays.
- Build & power options: Available as true or compound zero-order. Air-spaced designs offer the highest Laser-Induced Damage Threshold (LIDT) and the widest temperature range, while cemented or polymer versions are smaller, less expensive, but have lower LIDT.

OPTOSHOP



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