

1030 NM MIRRORS FOR BIG AND SCARY FS/PS LASERS

LEADING ULTRAFAST TO EVEN HIGHER POWERS

High laser power levels call for high-power measures. OPTOMAN is here to save the day with high reflectivity IBS mirror coatings designed for big & scary ultrafast Yb:YAG, Yb:KYW/KGW, Yb doped fiber lasers.

It may look like standard mirror design, but it is not - it may bring big changes to overall system performance. Choose wisely.

OPTOMAN LAB NOTEBOOK

CHALLENGE:

While high laser-induced damage threshold is a buzzword when talking femtosecond & picosecond optics, it is not (only) the nominal LIDT value that matters. The separation of laser damage modes - catastrophic and color-change - is evident when measuring standard optics. The fatigue effect of color-change damage becomes even more significant for high-power mirrors after prolonged radiation ($>10^3$ pulses).

TASK:

Color-change effect is an arch-enemy and LIDT-limiting factor for ultrafast applications. It must be eliminated in order to increase the lifetime of the optics.

STATUS:

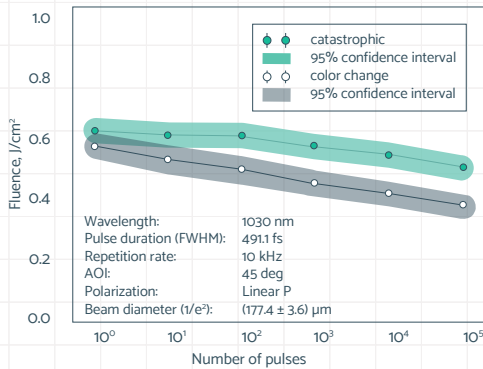
Completed.

CONCLUSIONS:

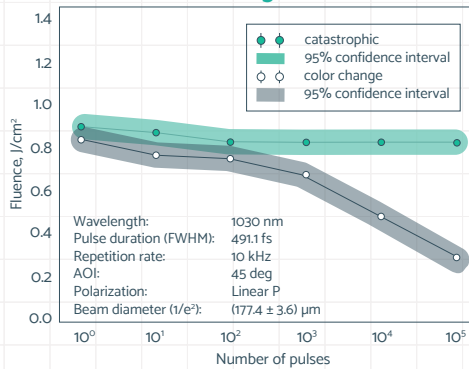
Standard mirrors (ULLM5) do a good job in most ultrafast applications, however the most demanding applications require special solutions, i.e. SuperHero League (ULLM5SHL) mirrors.



Market-Standard Mirrors



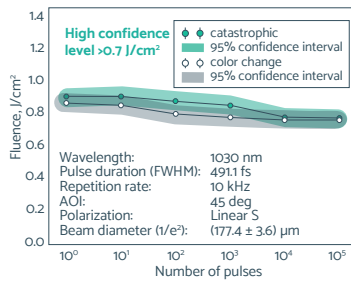
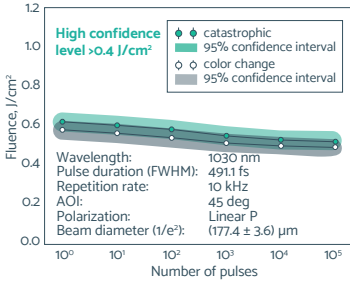
Market-Standard High Power Mirrors



STANDARD MIRRORS (ULLM5)

- Perfect price-to-performance ratio
- Industry standard specifications
- Fully characterized

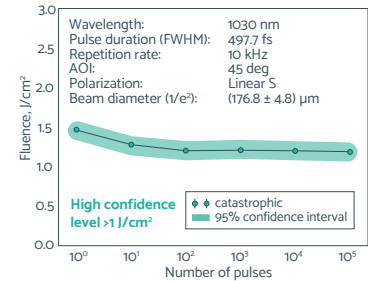
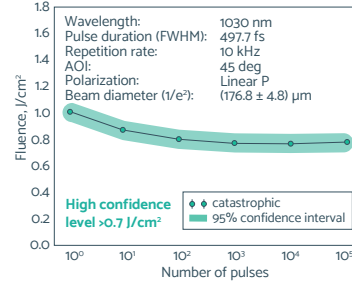
LIDT Lifetime Price
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SUPERHERO LEAGUE MIRRORS (ULLM5SHL)

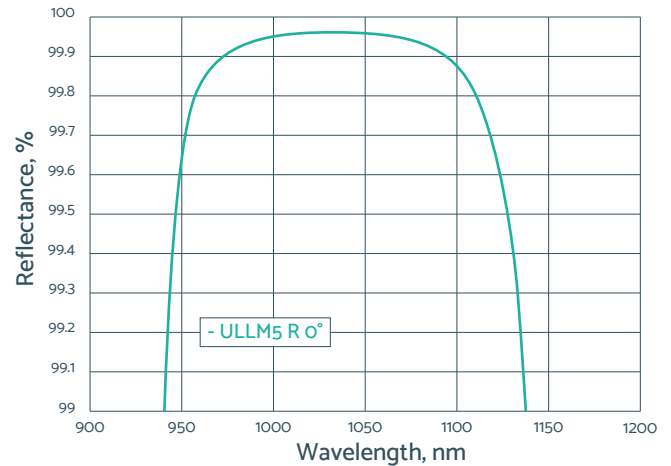
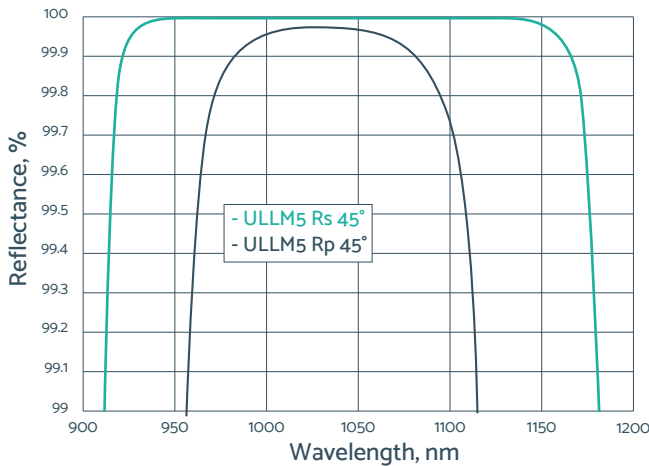
- Very high LIDT
- No color-change damage
- Fully characterized

LIDT Lifetime Price
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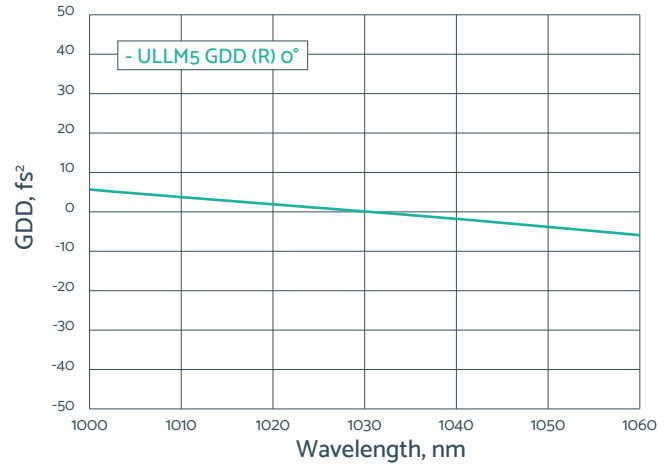
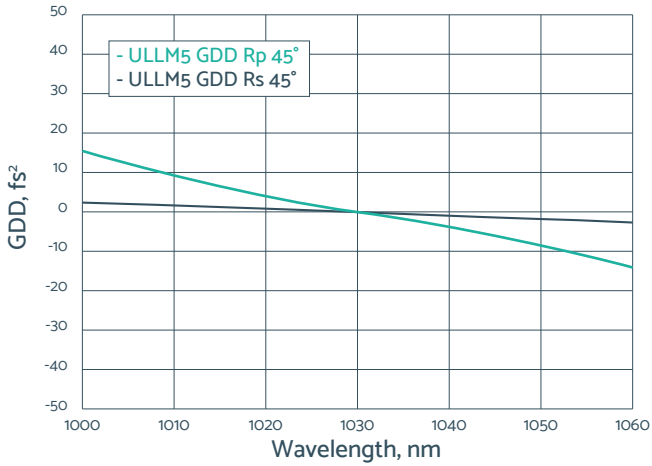
	Standart (ULLM5)	SuperHero League (ULLM5SHL)
Substrate	UVFS	
Surface Quality, S1	10-5 S-D (MIL-PRF-13830B)	
Surface Flatness, S1	<λ/10 @ 633 nm over CA	
AOI	0° or 45° or which ever °	
Coating (IBS)	HRs>99.95% & HRp>99.9% @ 1010 - 1050 nm (Yes, custom bandwidths available)	
Laser Induced Damage Treshold	<p>Femtosecond:</p> <p>> 0.4 J/cm², 1030 nm, 500 fs, 10 kHz, p-pol > 0.7 J/cm², 1030 nm, 500 fs, 10 kHz, s-pol</p> <p>Picosecond:</p> <p>> 2 J/cm², 1030 nm, 10 ps, 10 kHz, p-pol > 3 J/cm², 1030 nm, 10 ps, 10 kHz, s-pol</p>	<p>Femtosecond:</p> <p>> 0.7 J/cm², 1030 nm, 500 fs, 10 kHz, p-pol > 1 J/cm², 1030 nm, 500 fs, 10 kHz, s-pol</p> <p>Picosecond:</p> <p>> 3 J/cm², 1030 nm, 10ps, 10 kHz, p-pol > 5 J/cm², 1030 nm, 10ps, 10 kHz, s-pol</p>

Rs > 99.95% & Rp > 99.9% @ 1010-1050 nm

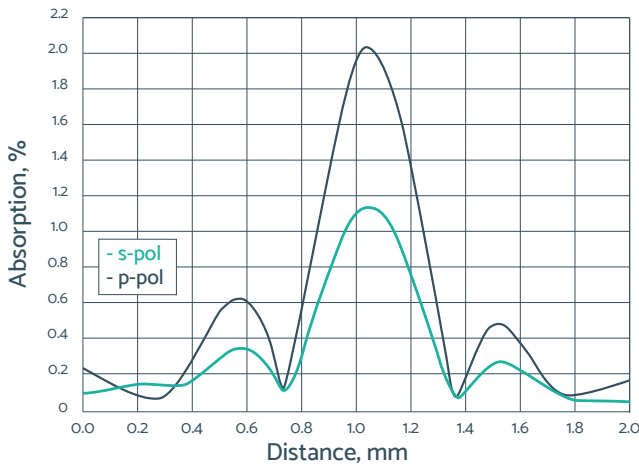


Reflected Group Delay Dispersion

IGDD $R_{s1} < 20 \text{ fs}^2$, IGDD $R_{p1} < 50 \text{ fs}^2$

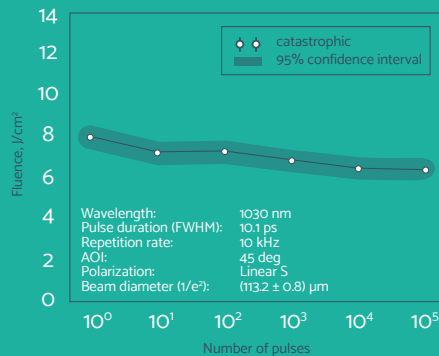
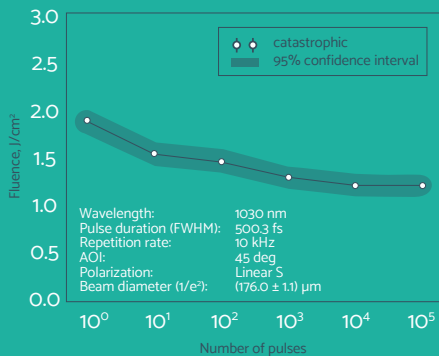


Absorption @ 1064 nm ~1 ppm for s-pol component and ~2 ppm for p-pol component.
 Measured by PCI technology.



OPTOMAN doesn't stop here...

Keep an eye out for our technological developments that are still in progress. Coatings featuring super high LIDT with no color-change degradation are under development. Preliminary R&D figures:



LIDT > 1.2 J/cm^2 , 1030 nm, 500 fs, 10kHz, s-pol

LIDT > 6 J/cm^2 , 1030 nm, 10 ps, 10kHz, s-pol