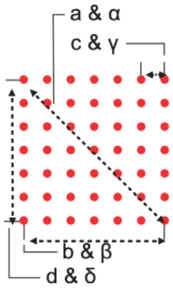
Power Technology incorporated

DEOs

Diffractive Optics

Off-the-shelf Glass DOEs

These stock elements are made of Fused Silica glass by etching, or are replicated using Acrylate polymers on Soda Lime glass substrates. The versions for the visible range feature an anti-reflective (AR) coating on the plain side of the glass substrate and the versions for 800 nm on both sides of the substrate. The Fused Silica DOEs have a size of 5 x 5.75 x 0.67 mm (VIS versions) or 9.95 x 9.35 x 0.67 mm (NIR versions). The Arylate-on-Soda-Lime DOEs have a size of 5.2 x 4.7 x 1 mm. The range of available glass DOE will soon be extended to cover additional common laser wavelengths, like 532 nm and 1064 nm.
In sample quantities, all versions are available in a circular adapter frame for use with standard laboratory mounts.

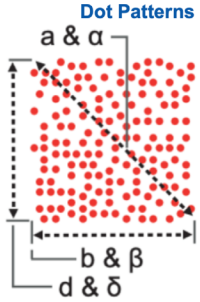


Description	Design Wavelength	Pattern Size @ 100 mm Distance, Values: mm				Pattern Angles (@ Design Wavelength)				Optimum Wavelength Range(s)
		a	b	c	d	α	β	γ	δ	
Cross – 38 @ 635	635 nm	69.6	--	--	--	38.4°	--	--	--	560-670 nm
1 : 2 Beam Splitter	660 nm	45.1	--	--	--	25.4°	--	--	--	630-700 nm
1 : 7 Dot Line	640 nm	12.8	--	--	2.1	7.3°	--	--	1.22°	630-760 nm
1 : 25 Dot LineCircle	640/650 nm	15.4	--	--	0.64	8.8°	--	--	0.37°	635-645 nm
Matrix 5 x 5 Dots	650 nm	79.1	55.9	53.9	13.1	43.1°	31.2°	30.1°	7.5°	630-700 nm
1 : 2 Beam Splitter	800 nm	0.44	--	--	--	0.25°	--	--	--	~ 800 nm
1 : 2 Beam Splitter	800 nm	1.75	--	--	--	1.0°	--	--	--	~ 800 nm
1 : 2 Beam Splitter	800 nm	17.5	--	--	--	10.0°	--	--	--	~ 800 nm
1 : 6 Beam Splitter	800 nm	4.4	0.9	--	--	2.5°	0.5°	--	--	~ 800 nm
4 x 2 Dot Matrix	800 nm	4.1	3.4	1.14	2.3	2.4°	2.0°	0.65°	1.3°	~ 800 nm
3 x 4 Dot Matrix	800 nm	5.8	3.2	1.6	4.8	3.3°	1.8°	0.9°	2.8°	~ 800 nm
3 x 5 Dot Matrix	800 nm	5.8	2.6	1.3	5.2	3.3°	1.5°	0.7°	3.0°	~ 800 nm
8 x 8 Dot Matrix	800 nm	6.9	4.9	0.7	4.9	4.0°	2.8°	0.4°	2.8°	~ 800 nm
15 x 15 Dot Matrix	800 nm	10.4	7.3	0.52	7.3	5.9°	4.2°	0.3°	4.2°	~ 800 nm

Off-the-shelf Polymer DOEs

These standard elements are replicated using polymer materials like Polycarbonate (PC) or Polymethyl Methacrylate (PMMA). They have a standard size of 8.0 mm diameter and 0.6 mm, 1.0 mm or 1.2 mm thickness. For simplified handling, e.g. for tests on the optical bench, we offer versions mounted in a 12.7 mm stainless steel adapter ring, fitting into standard optics mounts.

Random Dot Patterns



Description	Design Wavelength	Pattern Size @ 100 mm Distance, Values: mm				Pattern Angles (@ Design Wavelength)				Optimum Wavelength Range(s)
		a	b	c	d	α	β	γ	δ	
33000-Dot Pseudo-Random	645nm*	101.3	84.8	56.4		53.7	45.9	31.5		630-660 nm
40100-Dot Pseudo-Random	850nm*	135.6	114.9	72.0		68.3	59.7	39.6		825-870 nm
31806-Dot Truely-Random	830nm*	146.9	118.5	86.9		72.6	61.3	47.0		800-890 nm
47708-Dot Truely-Random	830nm*	146.9	118.5	86.9		72.6	61.3	47.0		800-890 nm
29594-Dot Pseudo-Random	830nm*	146.7	118.5	86.5		72.5	61.3	46.8		810-850 nm
51978-Dot Truely-Random	640nm*	162.8	97.5	130.4		78.3	52.0	66.2		610-660 nm
101050-Dot Truely-Random	640nm*	167.4	100.4	133.9		79.9	53.3	67.6		610-660 nm

* Large-angle pattern that due to its symmetry properties is subject to geometrical distortion, if the DOE is used at laser wavelengths significantly different ($\Delta\lambda$ > 50nm) from the design wavelength.

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	Description	Design Wavelength	Pattern Size @ 100 mm Distance, Values: mm				Pattern Angles (@ Design Wavelength)				Optimum Wavelength Range(s)
			a	b	c	d	α	β	γ	δ	
Dot Matrix	17 x 17 Dots	660nm	38.0	26.6	1.7	26.6	21.5	15.2	0.9	15.2	590-730 nm
	2 x 2 + 1 Dots	635nm	28.3	19.9	19.9	19.9	16.1	11.4	11.4	11.4	635&405 nm
	101 x 101 Dots	660nm	12.8	9.1	0.1	9.1	7.4	5.2	0.05	5.2	635-680 nm
	51 x 51 Dots	660nm*	56.9	40.3	0.8	40.3	31.8	22.8	0.5	22.8	560-720 nm
	11 x 11 Dots	635nm*	71.2	50.3	5.0	50.3	39.2	28.2	2.8	28.2	590-690 nm
	6 x 6 Dots	635nm	11.7	8.3	1.7	8.3	6.7	4.7	0.9	4.7	590-690 nm
	10 x 10 Dots	532nm	21.1	14.9	3.3	14.9	23.8	17.0	1.9	17.0	510-600 nm
	4 x 6 Dots	532nm	26.6	13.7	4.6	22.8	15.1	7.8	2.6	13.6	500-580 nm
	5 x 5 Dots	690nm	1.1	0.75	0.19	0.75	0.61	0.43	0.11	0.43	630-750 nm
	51 x 51 Dots	532nm*	46.8	33.1	0.66	33.1	26.4	18.8	0.38	18.8	480-600 nm
	21 x 21 Dots	520nm*	46.8	33.1	1.66	33.1	26.4	18.8	0.95	18.8	480-600 nm
Multi Lines	11 Lines (Square)	635nm*	76.7	54.4	5.4	54.4	42.0°	30.4°	3.0°	30.4°	530-670 nm
	7 Lines (Square)	635nm*	54.0	38.2	6.4	38.2	30.2°	21.6°	3.6°	21.6°	530-670 nm
	5 Lines (Rectangular)	660nm*	55.0	10.9	2.7	53.9	30.8°	6.2°	1.6°	30.2°	590-670 nm
	25 Lines (Square)	660nm*	68.4	48.3	2.0	48.3	37.7°	27.2°	1.1°	27.2°	530-670 nm
	65 Lines (Square, Central Line Thicker)	660nm*	45.6	32.2	0.5	32.2	25.7°	18.3°	0.3°	18.3°	530-670 nm
	10 Lines (Rectangular)	650nm*	125.5	90.0	10.0	87.5	64.2°	48.5°	5.4°	47.3°	600-700 nm
	15 Lines (Rectangular)	520nm*	65.5	42.1	3.0	50.2	36.3°	23.8°	1.7°	28.2°	480-550 nm
	11 Lines (Rectangular)	850nm*	155.6	41.5	4.15	150	75.8°	23.5°	2.3°	74°	830-880 nm
	3 Lines (Rectangular)	520nm*	50.7	8.0	4.0	50.0	28.4°	4.6°	2.3°	28.1°	490-550 nm
	5 Lines (Rectangular)	520nm*	50.7	8.0	2.0	50.0	28.4°	4.6°	1.15°	28.1°	480-560 nm
	81 Lines (Rectangular)	650nm*	156.0	124.8	1.6	93.6	75.9°	63.9°	0.8°	50.2°	600-700 nm
	3 Lines (Rectangular)	660nm*	54.7	10.8	5.4	53.6	30.6°	6.2°	3.1°	30.0°	600-700 nm
Crosshair	Cross – 25@532	532nm	45.1				25.4°				500-640 nm
	Cross – 2@645	645nm	3.4				2.0°				600-645 nm
	Cross – 5@520	520nm	8.7				5.0°				488-600 nm
	Cross – 10@633	633nm	17.5				10.0°				570-690 nm
	Cross (high contrast area)	633nm	17.5				10.0°				530-670 nm
	Cross – 45@633	633nm	83.0				45.0°				620-700 nm
	Cross – 30@640	640nm	53.6				30.0°				590-660 nm
	Cross – 60@635	635nm	115.5				60.0°				580-690 nm
	Cross – 15@520	520nm	26.4				15.0°				480-550 nm
	Cross – 75@650	650nm	153.5				75.0°				600-700 nm
	Cross – 60@450	450nm	116.1				60.3°				420-520 nm
	Cross – 52@515	515nm	97.6				52.0°				440-540 nm
	Cross - 30@450	450nm	53.6				30.0°				440-480 nm
Dot Lines & Quasi-Continous Lines	1 : 5 Dot Line	635nm	10.5	2.6			6.0	1.5			450-700 nm
	1 : 19 Dot Line	650nm	24.0	1.3			13.7	0.8			500-540 & 630-690 nm
	QC- Line – 5@633	633nm	8.7	--			5.0	--			630-690 nm
	QC -Line – 30@532	532nm	53.8	--			30.1	--			470-560 nm
	1 : 11 Dot Line	650nm	28.9	2.9			16.5	1.6			600-730 nm
	QC - Line – 20@633	633nm	35.2	--			20.0	--			630-670 nm
	QC - Line – 45@660	660nm	83.9	--			45.5	--			600-700 nm
	1 : 99 Dot Line	635nm	49.3	0.5			27.7	0.3			600-700 nm
	QC - Line – 45@940	940nm	83.0	--			45.0	--			890-980 nm
	QC - Line – 51@840	840nm	95.0	--			50.6	--			790-880 nm
Circles & Dot Circles	Solid Line Circle	592nm	55.8	--			31.2	--			480-600 nm
	1 : 16 Dot Circle	515nm	81.9	16.1			44.5	9.2			480-532 nm
	1 : 72 Dot Circle	532nm	36.9	1.6			20.9	0.9			400-570 nm
	1 : 36 Dot Circle	532nm	6.1	0.5			3.5	0.3			480-560 nm
	Solid Line Circle	520nm	6.0	--			3.4	--			520-532 nm
	1 : 16 Dot Circle	635nm	18.9	3.7			10.8	2.1			530-700 nm
	Solid Line Circle	488nm	77.0	--			42.1	--			488-532 nm

* Large-angle pattern that due to its symmetry properties is subject to geometrical distortion, if the DOE is used at laser wavelengths significantly different ($\Delta\lambda$ > 50nm) from the design wavelength.

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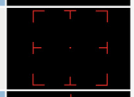
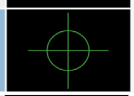
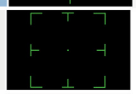
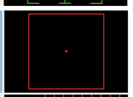
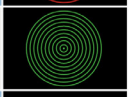
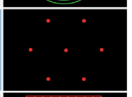
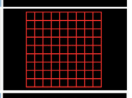
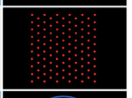
Viewfinder & Special Patterns Description	Design Wavelength	Pattern Size @ 100 mm Distance, Values: mm	Pattern Angles (@ Design Wavelength)	Optimum Wavelength Range(s)	Image
Viewfinder	645nm	Width: 26.9 mm Height: 18.0 mm Diagonal: 32.6 mm	Width: 15.3° Height: 10.3° Diagonal: 18.5°	570-750 nm	
Viewfinder (Lines Square)	633nm*	Width: 60.6 mm Height: 60.6 mm Diagonal: 85.6 mm	Width: 33.7° Height: 33.7° Diagonal: 46.4°	590-730 nm	
Viewfinder (Circle + Cross)	645nm	Width Cross: 37.0 mm Circle Ø: 18.5 mm	Width Cross: 21.0° Circle Ø: 10.6°	570-750 nm	
Viewfinder (Dot Circle + Cross)	635nm	Width Cross: 11.0 mm Circle Ø : 8.8 mm Dot Spacing: 1.1 mm	Width Cross: 6.3° Circle Ø: 5.0° Angle betw. Dots: 0.63°	570-750 nm	
Viewfinder (Dot Square)	532nm	Width: 12.3 mm Height: 12.3 mm Diagonal: 17.4 mm Dot Spacing: 0.5 mm	Width: 7.0° Height: 7.0° Diagonal: 10.0° Angle betw. Dots: 0.3°	480-670 nm	
Viewfinder	650nm	Width: 83.0 mm Height: 53.7 mm Diagonal: 98.9 mm	Width: 43.7° Height: 27.9° Diagonal: 52.6°	590-730 nm	
Viewfinder (Circle + Cross)	520nm	Width Cross: 49.9 mm Circle Ø: 24.6 mm	Width Cross: 28.0° Circle Ø: 14.0°	500-540 nm	
Viewfinder	520nm	Width: 65.9 mm Height: 65.9 mm Diagonal: 93.2 mm	Width: 36.5° Height: 36.5° Diagonal: 50°	500-540 nm	
Solid Line Square	633nm*	Width: 63.1 mm Height: 63.1 mm Diagonal: 89.5 mm	Width: 35.0° Height: 35.0° Diagonal: 48.2°	530-650 nm	
Square Grid 51 x 51 Lines	660nm	Width: 40.3 mm Height: 40.3 mm Diagonal: 56.9 mm Line Spacing: 0.8 mm	Width: 22.8° Height: 22.8° Diagonal: 31.8° Angle betw. Lines: 0.45°	530-660 nm	
5 Rings	645nm	Width: 51.3 mm Line Spacing: 5.1 mm	Width: 28.8° Line Spacing: 2.9°	530-700 nm	
10 Rings	515nm	Width: 96.2 mm Line Spacing: 4.8 mm	Width: 51.4° Line Spacing: 2.6°	488-532 nm	
Hexagon	780nm	Width: 13.1 mm	Width: 7.5°	520-800 nm	
Square Grid 10 x 10 Lines	658nm	Width: 72.8 mm Height: 72.8 mm Diagonal: 102.9 mm Line Spacing: 8.1 mm	Width: 40.0° Height: 40.0° Diagonal: 51.4° Angle betw. Lines: 4°	620-680 nm	
21x11 Hexagonal Array	660nm*	Width: 61.1 mm Height: 35.3 mm Diagonal: 70.5 mm Dot Spacing: 3.5 mm	Width: 34.0° Height: 20.0° Diagonal: 38.8° Angle betw. Dots: 2.0°	580-730 nm	
11x10 Hexagonal Array	660nm*	Width: 44.4 mm Height: 46.2 mm Diagonal: 64.1 mm Dot Spacing: 5.1 mm	Width: 25.1° Height: 26.0° Diagonal: 35.5° Angle betw. Dots: 2.9°	580-730 nm	
5 Rings	450 nm	Width: 73 mm Line Spacing: 7.3 mm	Width: 40° Line Spacing: 4.0°	400-500 nm