THIN BBO CRYSTALS FOR SHG AND THG OF Ti:Sapphire LASER WAVELENGTH

Free Standing BBO Crystals

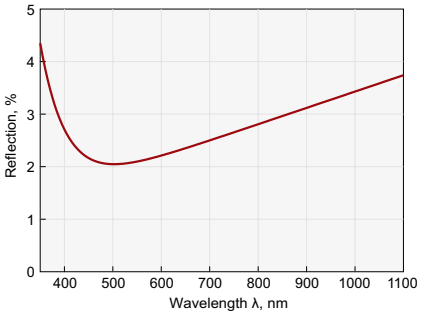
The crystals down to 100 µm can be supplied as free standing crystals not attached to the support. However, ring mounts are highly recommended for safe handling of these thin crystals. Minimum aperture of free standing BBO is 5×5 mm, maximum aperture is 22×22 mm. The tolerance is ±50 µm for crystals of thickness down to 300 µm and ±20 µm for crystals of thickness down to 100 µm.

Optically contacted crystals

BBO crystals less than 100 µm thickness can be supplied optically contacted on UV Fused Silica substrate sizes 10×10×1 mm or 12×12×2 mm. Other sizes of substrates are also available on request. Minimum aperture of optically contacted BBO is 5×5 mm, maximum aperture is 10×10 mm. The tolerance of crystal thickness is +10/-5 microns.

Protective Coatings for BBO crystals

P-protective coating – is a single or two layer antireflection coating made at specified wavelength range. Typical reflection values are R<2% in the mid range, R<4% at the edges. P coating is highly recommended for ultrashort pulse applications and features low dispersion and very high laser damage threshold.



Typical P-coating for BBO SHG@800 nm application

Standard specifications of ultrathin BBO crystals

Flatness	λ/8 @ 633 nm
Parallelism	< 20 arcsec
Perpendicularity	< 5 arcmin
Angle tolerance	< 30 arcmin
Aperture tolerance	± 0.1 mm
Surface quality	10 – 5 scratch & dig (MIL-PRF-13830B)
Clear aperture	>90% of full aperture
Laser damage threshold	>200 GW/cm^2, 133 fsec pulse, 800 nm typical, 50 Hz

EKSMA OPTICS recommends the following thickness BBO crystals depending on application and fundamental wavelength pulse duration, assuming it is spectrum limited Gausian pulse.

Application	Pulse duration, fs	Thickness, mm
Type 1, SHG @ 800 nm, Θ=29.2°, φ=90°	10	0.05
	20	0.1
	50	0.2
	100	0.5
	200	1
Type 1, THG @ 800 nm, Θ=44,3°, φ=90°	10	0.01
	20	0.02
	50	0.05
	100	0.1
	200	0.2

BBO FOR SHG @ 800 nm

BBO crystal. Thickness = 0.05 mm*

Aperture, mm	UV FS support size, mm	θ, deg	φ, deg	Coating	Catalogue number	Price, EUR
6×6	10×10×2	29.2	90	P/P @ 400-800 nm	BBO-600H	948
8×8	10×10×2	29.2	90	P/P @ 400-800 nm	BBO-800H	990
10×10	12×12×2	29.2	90	P/P @ 400-800 nm	BBO-1000H	1110

* All BBO crystals of thickness less than 100 µm are optically contacted onto UV FS support.
All crystals are mounted into open ring holders.

SHG BBO crystals. Thickness = 0.1 mm

Aperture, mm	θ, deg	φ, deg	Coating	Catalogue number	Price, EUR
6×6	29.2	90	P/P @ 400-800 nm	BBO-601H	505
8×8	29.2	90	P/P @ 400-800 nm	BBO-801H	710
10×10	29.2	90	P/P @ 400-800 nm	BBO-1001H	800
12×12	29.2	90	P/P @ 400-800 nm	BBO-1201H	1295
15×15	29.2	90	P/P @ 400-800 nm	BBO-1501H	2040
20×20	29.2	90	P/P @ 400-800 nm	BBO-2001H	3785
22×22	29.2	90	P/P @ 400-800 nm	BBO-2201H	5155

SHG BBO crystal. Thickness = 0.2 mm

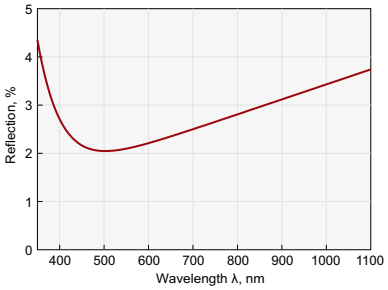
Aperture, mm	θ, deg	φ, deg	Coating	Catalogue number	Price, EUR
6×6	29.2	90	P/P @ 400-800 nm	BBO-602H	505
8×8	29.2	90	P/P @ 400-800 nm	BBO-802H	710
10×10	29.2	90	P/P @ 400-800 nm	BBO-1002H	790
12×12	29.2	90	P/P @ 400-800 nm	BBO-1202H	1285
15×15	29.2	90	P/P @ 400-800 nm	BBO-1502H	2020
20×20	29.2	90	P/P @ 400-800 nm	BBO-2002H	3725
22×22	29.2	90	P/P @ 400-800 nm	BBO-2202H	5150

SHG BBO crystal. Thickness = 0.5 mm

Aperture, mm	θ, deg	φ, deg	Coating	Catalogue number	Price, EUR
6×6	29.2	90	P/P @ 400-800 nm	BBO-603H	440
8×8	29.2	90	P/P @ 400-800 nm	BBO-803H	665
10×10	29.2	90	P/P @ 400-800 nm	BBO-1003H	760
12×12	29.2	90	P/P @ 400-800 nm	BBO-1203H	1265
15×15	29.2	90	P/P @ 400-800 nm	BBO-1503H	1980
20×20	29.2	90	P/P @ 400-800 nm	BBO-2003H	3720
22×22	29.2	90	P/P @ 400-800 nm	BBO-2203H	5150

SHG BBO crystal. Thickness = 1 mm

Aperture, mm	θ, deg	φ, deg	Coating	Catalogue number	Price, EUR
6×6	29.2	90	P/P @ 400-800 nm	BBO-604H	390
8×8	29.2	90	P/P @ 400-800 nm	BBO-804H	615
10×10	29.2	90	P/P @ 400-800 nm	BBO-1004H	765
12×12	29.2	90	P/P @ 400-800 nm	BBO-1204H	1150
15×15	29.2	90	P/P @ 400-800 nm	BBO-1504H	1860
20×20	29.2	90	P/P @ 400-800 nm	BBO-2004H	3575
22×22	29.2	90	P/P @ 400-800 nm	BBO-2204H	4580



P-protective coating curve of Type 1
(θ=29.2°, φ=90°) BBO crystal used for SHG@800 nm

SHG BBO crystal. Thickness = 2 mm

Aperture, mm	θ, deg	φ, deg	Coating	Catalogue number	Price, EUR
6×6	29.2	90	P/P @ 400-800 nm	BBO-605H	360
8×8	29.2	90	P/P @ 400-800 nm	BBO-805H	620
10×10	29.2	90	P/P @ 400-800 nm	BBO-1005H	830
12×12	29.2	90	P/P @ 400-800 nm	BBO-1205H	1200
15×15	29.2	90	P/P @ 400-800 nm	BBO-1505H	1910
20×20	29.2	90	P/P @ 400-800 nm	BBO-2005H	3625
22×22	29.2	90	P/P @ 400-800 nm	BBO-2205H	4630

Housing Accessories

Ring Holders
for Nonlinear Crystals
See page 2.26

Positioning Mount
840-0199 for
Nonlinear Crystal
Housing
See page 2.27

BBO FOR THG @ 800 nm

BBO crystal. Thickness = 0.01 mm, optically contacted

Aperture, mm	UV FS support size, mm	θ, deg	φ, deg	Coating	Catalogue number	Price, EUR
6×6	10×10×2	44.3	90	P/P @ 400-800/266	BBO-606H	1020
8×8	10×10×2	44.3	90	P/P @ 400-800/266	BBO-806H	1060
10×10	12×12×2	44.3	90	P/P @ 400-800/266	BBO-1006H	1175

BBO crystal. Thickness = 0.02 mm, optically contacted

Aperture, mm	UV FS support size, mm	θ, deg	φ, deg	Coating	Catalogue number	Price, EUR
6×6	10×10×2	44.3	90	P/P @ 400-800/266	BBO-607H	1020
8×8	10×10×2	44.3	90	P/P @ 400-800/266	BBO-807H	1060
10×10	12×12×2	44.3	90	P/P @ 400-800/266	BBO-1007H	1175

BBO crystal. Thickness = 0.05 mm, optically contacted

Aperture, mm	UV FS support size, mm	θ, deg	φ, deg	Coating	Catalogue number	Price, EUR
6×6	10×10×2	44.3	90	P/P @ 400-800/266	BBO-608H	948
8×8	10×10×2	44.3	90	P/P @ 400-800/266	BBO-808H	990
10×10	12×12×2	44.3	90	P/P @ 400-800/266	BBO-1008H	1110

THG BBO crystal. Thickness = 0.1 mm

Aperture, mm	θ, deg	φ, deg	Coating	Catalogue number	Price, EUR
6×6	44.3	90	P/P @ 400-800/266	BBO-609H	505
8×8	44.3	90	P/P @ 400-800/266	BBO-809H	710
10×10	44.3	90	P/P @ 400-800/266	BBO-1009H	800
12×12	44.3	90	P/P @ 400-800/266	BBO-1209H	1330
15×15	44.3	90	P/P @ 400-800/266	BBO-1509H	2140
20×20	44.3	90	P/P @ 400-800/266	BBO-2009H	3925
22×22	44.3	90	P/P @ 400-800/266	BBO-2209H	5355

THG BBO crystal. Thickness = 0.2 mm

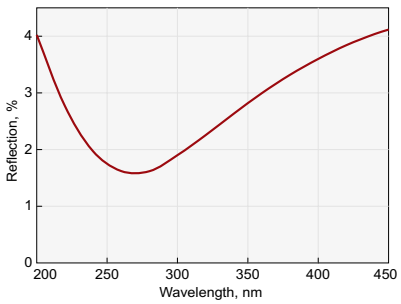
Aperture, mm	θ, deg	φ, deg	Coating	Catalogue number	Price, EUR
6×6	44.3	90	P/P @ 400-800/266	BBO-610H	505
8×8	44.3	90	P/P @ 400-800/266	BBO-810H	710
10×10	44.3	90	P/P @ 400-800/266	BBO-1010H	790
12×12	44.3	90	P/P @ 400-800/266	BBO-1210H	1285
15×15	44.3	90	P/P @ 400-800/266	BBO-1510H	2020
20×20	44.3	90	P/P @ 400-800/266	BBO-2010H	3915
22×22	44.3	90	P/P @ 400-800/266	BBO-2210H	5310

THG BBO crystal. Thickness = 0.5 mm

Aperture, mm	θ, deg	φ, deg	Coating	Catalogue number	Price, EUR
6×6	44.3	90	P/P@400-800/266	BBO-611H	440
8×8	44.3	90	P/P@400-800/266	BBO-811H	665
10×10	44.3	90	P/P@400-800/266	BBO-1011H	760
12×12	44.3	90	P/P@400-800/266	BBO-1211H	1265
15×15	44.3	90	P/P@400-800/266	BBO-1511H	1980
20×20	44.3	90	P/P@400-800/266	BBO-2011H	3900
22×22	44.3	90	P/P@400-800/266	BBO-2211H	5300

THG BBO crystal. Thickness = 1 mm

Aperture, mm	θ, deg	φ, deg	Coating	Catalogue number	Price, EUR
6×6	44.3	90	P/P @ 400-800/266	BBO-612H	390
8×8	44.3	90	P/P @ 400-800/266	BBO-812H	625
10×10	44.3	90	P/P @ 400-800/266	BBO-1012H	785
12×12	44.3	90	P/P @ 400-800/266	BBO-1212H	1210
15×15	44.3	90	P/P @ 400-800/266	BBO-1512H	1920
20×20	44.3	90	P/P @ 400-800/266	BBO-2012H	3860
22×22	44.3	90	P/P @ 400-800/266	BBO-2212H	4960



P-protective coating curve of Type 1 (θ=44.3°, φ=90°)
BBO crystal's exit face used for THG@800 nm

Related Products

Zero Order Dual Wavelength Plates
See page 4.26

Ring Holders
for Nonlinear Crystals
See page 2.26

Positioning
Mount 840-0199
for Nonlinear
Crystal Housing
See page 2.27