ND filter table

Every doubling of the filter factor costs one stop and doubles the exposure time. The table gives the stops, the filter factor, the optical density and what 1/125 s turns into for each common ND filter.

Filter	Stops	Filter factor	Optical density	1/125 s becomes
ND2	1	2×	0.3	0.016 s
ND4	2	4×	0.6	0.032 s
ND8	3	8×	0.9	0.064 s
ND16	4	16×	1.2	0.128 s
ND32	5	32×	1.5	0.256 s
ND64	6	64×	1.8	0.512 s
ND128	7	128×	2.1	1.0 s
ND256	8	256×	2.4	2.0 s
ND512	9	512×	2.7	4.1 s
ND1024	10	1024×	3.0	8.2 s
ND2048	11	2048×	3.3	16.4 s
ND4096	12	4096×	3.6	32.8 s
ND8192	13	8192×	3.9	1 min 6 s

Reading off exposure times

The row is the shutter speed your camera suggests without a filter, the column is the filter you screw on. Past roughly 30 seconds you need bulb mode – and with it a timer.

No filter	ND8	ND64	ND256	ND1024	ND4096
1/500	0.016 s	0.128 s	0.512 s	2.0 s	8.2 s
1/250	0.032 s	0.256 s	1.0 s	4.1 s	16.4 s
1/125	0.064 s	0.512 s	2.0 s	8.2 s	32.8 s
1/60	0.133 s	1.1 s	4.3 s	17.1 s	1 min 8 s
1/30	0.267 s	2.1 s	8.5 s	34.1 s	2 min 17 s
1/15	0.533 s	4.3 s	17.1 s	1 min 8 s	4 min 33 s
1/8	1.0 s	8.0 s	32.0 s	2 min 8 s	8 min 32 s
1/4	2.0 s	16.0 s	1 min 4 s	4 min 16 s	17 min 4 s
1/2	4.0 s	32.0 s	2 min 8 s	8 min 32 s	34 min 8 s
1 s	8.0 s	1 min 4 s	4 min 16 s	17 min 4 s	68 min 16 s

The formula behind it

New exposure time = original time × filter factor. An ND64 stretches 1/125 s to 1/125 × 64 = 0.512 s. In stops: each stop doubles the time, and six stops are a factor of 64.
Optical density is the same value written logarithmically. A filter with a density of 3.0 swallows ten stops – that is the familiar ND1024, which many makers label ND1000.

Which filter for what?

- **ND8 to ND64:** moving water in a creek, a touch of motion blur, video on the 180-degree rule under an overcast sky.
- **ND256 to ND1024:** glassy water at the coast, drifting clouds, making people vanish from a busy square.
- **ND4096 and stronger:** long exposures in full sun, architecture without passers-by.

Stacking filters

Screw-in filters of the same diameter stack on top of each other, and most holders take several square filters at once. Stops add up, factors do not: ND8 plus ND64 is 3 + 6 = 9 stops, a factor of 512. The FAQ covers the rest.