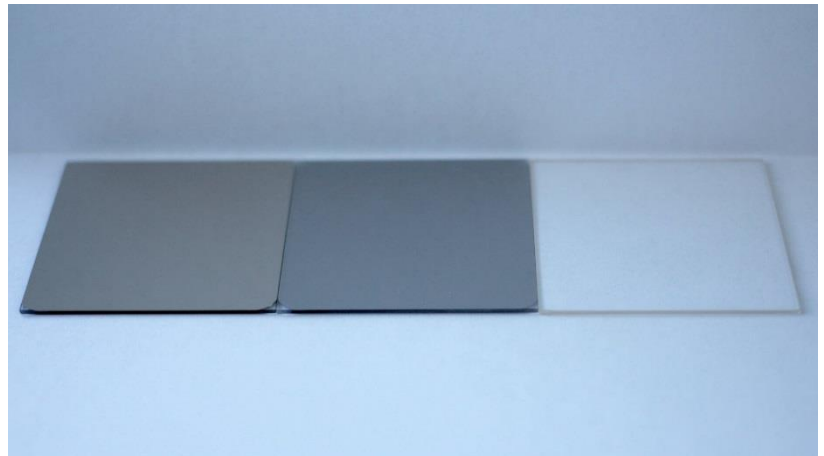


Standard Neutral Density Filters

A thin metal layer (usually Cr-Ni) is deposited under high vacuum on a substrate of optically polished glass or fused silica in such a way that part of the incident light is transmitted, part is reflected, but the rest is absorbed by the metal layer. By specific modification of the evaporation parameters, neutral density filters with different transmission values are created.

In contrast to mass-colored gray glass, vapor-deposited neutral density filters can be produced on substrates of the same thickness. They are colour neutral, do not bleach out and can be used over a very wide spectral range.



Neutral Density Filter Type T, N and A

Properties

- Combination of several neutral density filters possible
- High thermal load capacity
- Dense layers, tropicalized
- Extremely long service life

Combination of neutral density filters

It is possible to use several grey filters in the beam path at the same time. This allows further fine gradations. To avoid possible multiple reflections, it is recommended to install the grey filters at a slight angle. The total transmission (T_T) of two or more gray filters connected in series corresponds to the multiplication of the individual filters:

$$T_T = T_1 \cdot T_2 \text{ (e. g. } T_{50\%} \cdot T_{40\%} = T_{T20\%})$$

The total density (D_T) of all filters corresponds to the sum of the individual filters:

$$D_T = D_1 + D_2 \text{ (z. B. } D_{0,1} + D_{0,3} = D_{T0,4})$$

Applications

- Photometer
- Detectors
- Cameras

Specifications

Criteria	Glass	Fused silica
Application	VIS to NIR	UV to NIR
Wavelength range [nm]	400 – 2800	220 - 2800
Material	B-270	Fused silica Infrasil-I
Size [mm]	50x50±0,2	50x50±0,2
Thickness [mm]	2,0±0,2	1,0±0,1
Clear aperture	48x48mm	48x48mm
Facets	0,2-0,4 mm / 45°	0,2-0,4 mm / 45°
Parallelism	<2'	<2'
Flatness	3/10(10)	3/10(10)
Cleanness	60/40 acc. to MIL-0- 12830B	60/40 acc. to MIL-0- 12830B
Hardness, adhesion, humidity	acc. to MIL- M-13508	acc. to MIL- M-13508

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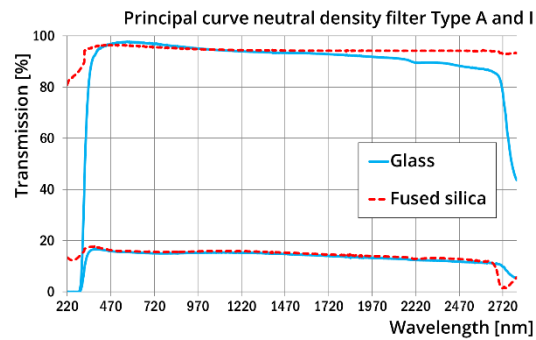
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Specifications

No.	Type	OD	T[%]	Deviation from nominal value [%]
1	A	0,01	97,72	
2	B	0,10	79,43	
3	C	0,20	63,10	
4	D	0,30	50,12	
5	E	0,40	39,81	
6	F	0,50	31,62	±5
7	G	0,60	25,12	
8	H	0,70	19,95	
9	I	0,80	15,85	
10	J	0,90	12,59	
11	K	1,00	10,00	
12	L	1,10	7,943	
13	M	1,20	6,310	
14	N	1,30	5,012	±10
15	O	1,60	2,512	
16	P	1,70	1,995	
17	Q	2,00	1,000	
18	R	2,30	0,5012	
19	S	2,70	0,1995	±20
20	T	3,00	0,1000	

The transmission data refer to $\lambda = 550 \text{ nm}$, measured at an angle of incidence of 15° . Depending on filter type and wavelength, certain deviations from the transmission measured at 550 nm must be taken into account.

On request, we can provide an individually measured transmission curve for each neutral density filter.



Filter Boxes

Filter boxes for 12 or 24 filters for shatterproof, dust-free storage of neutral density filters and other optical parts of the size 50 x 50 mm or for $\varnothing 50 \text{ mm}$.

Neutral density filter sets

FILTRÖP supplies single filters as well as complete neutral density filter sets including filter box:

Set A: 12 neutral density filters: Type A, B, C, D, G, H, I, K, M, N, O + Q

Set B: 20 neutral density filters: A-T

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