

PHOTOLAB CHEAT SHEET

Fotolabor · aDUBta
1 Light & exposure · 2 Lenses & sharpness

Stops

One stop more = twice the light, one stop less = half.

$f/1.4 \cdot 2 \cdot 2.8 \cdot 4 \cdot 5.6 \cdot 8 \cdot 11 \cdot 16 \cdot 22$

$1/1000 \cdot 1/500 \cdot 1/250 \cdot 1/125 \cdot 1/60 \cdot 1/30$
s

ISO 100 · 200 · 400 · 800 · 1600 · 3200

f-number = focal length ÷ entrance pupil. Big number = small opening. Each step in the rows = one stop.

Same light, different look

$1/500 \text{ s } f/16 = 1/1000 \text{ s } f/11 = 1/250 \text{ s } f/22$

Time: freeze or blur movement · aperture: depth of field · ISO: grain (film) / noise (digital).

Daylight table (Kodak TRI-X 400, ISO 400, 1/500 s)

LIGHT	APERTURE	LV
bright sun, light sand / snow	f/22	16
bright sun, distinct shadows	f/16	15
weak, hazy sun	f/11	14
cloudy bright, no shadows	f/8	13
heavy overcast, open shade	f/5.6	12

Average front-lit subjects, 2 h after sunrise to 2 h before sunset.

Light value

$LV = 2 \cdot \log_2(N) - \log_2(t) - \log_2(ISO/100)$

Same LV = same exposure, LV + 1 = one stop less light. $f/16 \cdot 1/500 \text{ s} \cdot ISO 400 \rightarrow LV \approx 15$.

Metering

- Reflected (camera): assumes an average, neutral grey subject → snow turns grey: to keep it white give more; dark subjects: give less.
- Incident (hand-held, at the subject): measures the light falling on the subject – independent of its brightness.
- Histogram: spike at the left edge = clipped shadows, at the right edge = clipped highlights.

Long exposures (film)

METERED	HP5 PLUS	TRI-X 400
1 s	1 s	+1 stop or 2 s, dev. –10 %
10 s	≈ 20 s	+2 stops or 50 s, dev. –20 %
100 s	≈ 420 s	+3 stops or 1200 s, dev. –30 %

Ilford: from ½ s, T = $T_m^{1.31}$. Always use the data sheet of your film.

Angle of view (full frame, diagonal)

15 mm	110°	50 mm	46°
21 mm	90°	85 mm	29°
35 mm	65° / 62°	135 mm	19°

ZEISS Milvus data. Full frame 36 × 24 mm; APS-C/DX approx. 24 × 16 mm, crop factor ≈ 1.5 (50 mm on DX ≈ 75 mm cut-out).

Depth of field

- Two stops down ($f/5.6 \rightarrow f/11$) ≈ usually double.
- Grows with the square of the distance; inversely with the square of the focal length.
- “⅓ in front, ⅓ behind” is not a general rule – close up it is almost symmetrical.

Hyperfocal distance

$H \approx f^2 / (k \cdot z)$

z = diagonal ÷ 1500: full frame ≈ 0.029 mm, APS-C ≈ 0.019 mm. Focus on H → sharp from H/2 to ∞.

FULL FRAME	f/8	f/11	f/16
21 mm	1.9 m	1.4 m	1.0 m
28 mm	3.4 m	2.5 m	1.7 m
35 mm	5.3 m	3.9 m	2.7 m
50 mm	10.8 m	7.9 m	5.4 m

Depth of field is a loosely defined quantity – a guide, not to the centimetre.

Diffraction & lens errors

- Airy disc ≈ f-number in μm (ZEISS rule of thumb; $f/16 \approx 16 \mu\text{m}$). Stopping down far costs detail; at f/22 ZEISS measured resolution limited solely by diffraction.
- Barrel: lines bow outward · pincushion: inward · vignetting: dark corners · chromatic aberration: colour fringes → lens profiles.

Sources: Kodak F-4017 (2021) · Ilford HP5 PLUS (2018) · Sekonic · ISO 517, 2720, 12232 · ExifTool (LightValue) · Adobe Camera Raw help · H. H. Nasse, ZEISS 2009/2010 · ZEISS Milvus data · Nikon (crop factor). Details: adubta-music.de/fotolabor.html