GOSSEN

GOSSEN GMBH · D-8520 ERLANGEN

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GOSSEN

SIXTICOLOR

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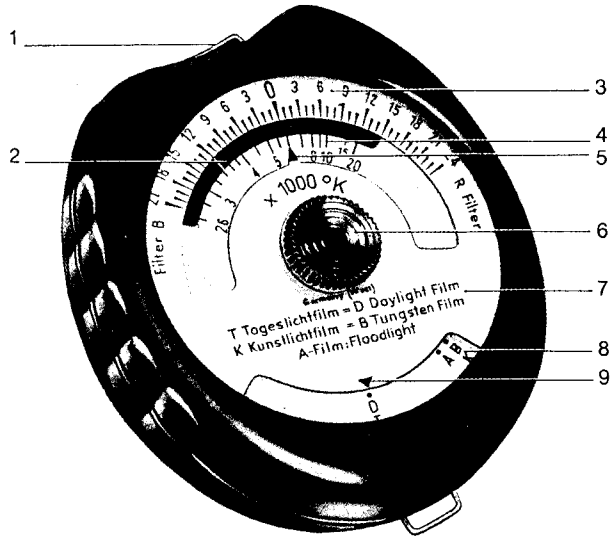


1. Push Button.
   When depressed, the indicator needle (2) is freed to give reading. When button is released, needle and reading are both locked. Reading can then be taken either from Filter Scale (3) or from Colour Temperature Scale (4).
2. White indicator needle.
3. Filter scale showing colour correction filters required, from B (blue) 21 to 1 and R (red) 1 to 24.
4. Colour Temperature Scale. This scale is rated in degrees Kelvin(K) (the three noughts indicating thousands have been omitted to save space, therefore the reading must be multiplied by 1,000).
5. Index mark for K values which is set by rotating knob (6).
6. Rotating knob for setting index arrows to type of film or Kelvin degree measurement of film.
7. Table showing colour temperature for which most films are balanced.
8. Index letters of film types.
9. Arrow which is set to index letters (8) by means of rotating knob (6).

Your Colour films will be enhanced when the colour balance of your film and the light conditions both match.

All colour films are balanced for a certain type or quality of light, e. g. for daylight or for tungsten light. If the light source does not correspond to the colour temperature for which the film is balanced, a blue or red colour cast will result, especially with reversal colour film. Shots taken in the shade, for instance, will have a blue cast due to the blue light of the sky.

These defects can be overcome, however, by using the appropriate colour correction filter. These filters change the „wrong" light to that for which the colour film in use has been balanced.

The type of light – that is its quality of colour – is termed Colour Temperature and is designated in degree Kelvin (K). (A detailed explanation is given on page 14.)

The SIXTICOLOR is not designed to measure fluorescent or similar light sources.

The SIXTICOLOR

* **records automatically the correction filters necessary,**
* **gives a fully automatic reading of the colour temperature of the light.**

How to use the SIXTICOLOR

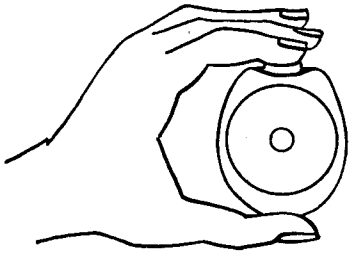
Set it for the film type

Turn the central knob (6) until the arrow (9) points to the colour film to be used, e. g. on D (T) for daylight colour film.

When this arrow (9) is, for instance, on D, then the corresponding arrow (5) on the upper half of the dial will automatically be set on the Kelvin degree measurement of Daylight colour film which is 5,800 K. You can, of course, reverse the procedure and set the upper arrow to the required degree-Kelvin value when the lower arrow will correspond to the type film being used.
(More about film types will be found on page 10.)

Measurement

In general, the light measured is that which falls on the most important part of the scene or subject to be photographed, measurement being made from the subject position towards the light source.
Note: The opal disc must be evenly illuminated. Be sure that the disc is not shaded by a finger or other object, otherwise the measured colour temperature may be incorrect. (Examples of methods of measurement will be found on pages 5–9.)



The white indicator needle (2) shows on the upper scale (3) of the SIXTICOLOR the filters to be used – to the left of the zero mark the 'B' (blue) filters and to the right of the zero mark the 'R' (red) filters. (An explanation of the figures on the filter scale is given on page 15. Details of filters on the market are given on pages 12/13.)

At the same time, the K value of the light measured is given on the colour temperature scale (4).

The filters indicated should be placed in the normal way in front of the camera lens.

Example: The SIXTICOLOR shows that Filter R 9 is required – in the case of, say, Lifa filters it would be CR 9 – in order to correct existing light to suit your film. Should you not have the filter indicated, i. e. R 9, the next weaker filter – R 6 – should be used. Alternatively two or more filters may be added together to make the filter required, e. g. R 6 + R 3 = R 9.

Filter Factors

The use of filters increases the exposure time.
Before taking the photograph you must, of course, determine the light value or time/aperture combination – as against Colour temperature – with, for instance, one of the Gossen range of Exposure Meters.

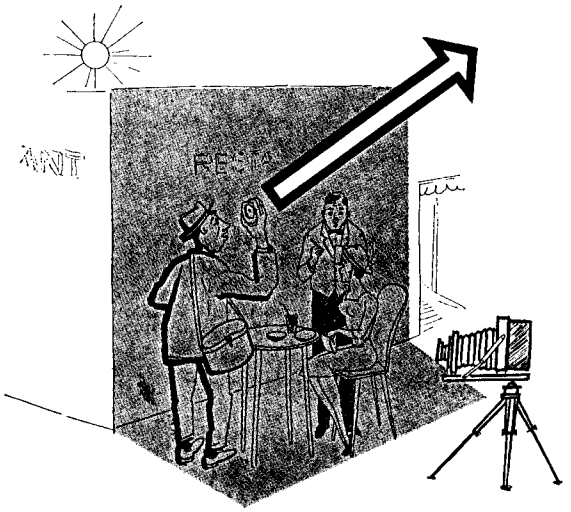
The exposure result obtained must be adjusted to take into account the factor of the Colour Correction Filter(s) used and the corresponding increase in time and/or aperture be taken into account as with ordinary filters. (The filter factors for Colour Correction Filters are given by the filter manufacturers.)

Examples of measuring methods

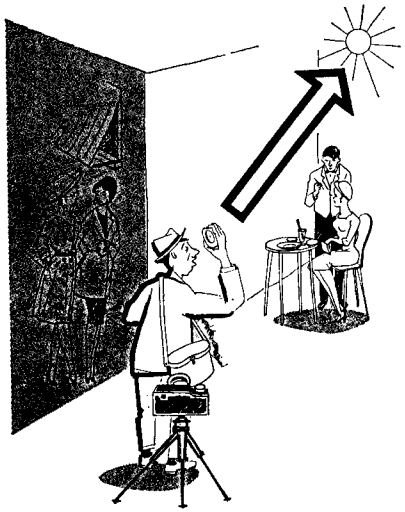
Subject in sunlight: Measure by pointing the cell towards the sun.

Overcast sky (no sun):
Measure by pointing the cell towards the sky.

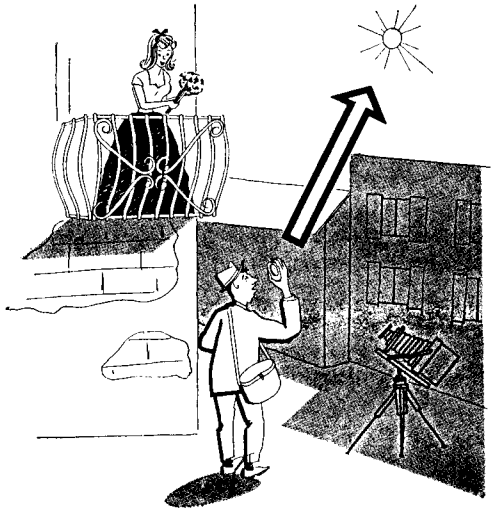
Note: with drifting clouds (also with overcast sky), the colour temperature often changes quickly.



Subject in the shade:
Take the reading by pointing the cell towards the sky, but do not allow the sunlight to fall directly on to the opal disc.



Subject with sun and shade:
Direct the opal disc towards the sun, as the part illuminated by the sun is more important than that which is in the shade.



If the subject is inaccessible:
measure from a substitute position where the lighting conditions are similar to those falling on the subject.

Film Types

The most popular type of colour film is **Daylight Colour Film** (SIXTICOLOR symbol T, English D) and the best colour reproduction is obtained under conditions where the colour temperature is approximately 5,800 K.

This type of film can also be used with electronic flash and blue flash bulbs.

Daylight Colour Films are available from all colour film manufacturers.

There are, however, two types of artificial – or tungsten – light colour films.

These are: SIXTICOLOR Symbols.

K – English B for pictures with photolamps with a colour temperature of 3,200 K.

A for pictures with photolamps with a colour temperature of 3,400 K (floodlight). Yellow flashbulbs are also suitable.

Use your filters correctly

Colour filters indicated by the SIXTICOLOR convert the colour temperature of the measured light to that for which the colour film is balanced. When projected, the colours of the transparency will appear on the screen as natural and lifelike as the original.

The colour correction filters indicated by the SIXTICOLOR correct colour casts which would otherwise have occured if the film were used under colour temperature conditions for which it was not balanced. It naturally does not compensate for errors arising out of incorrect exposure or excessively long storage of film etc. In order to create particular tone effects sunset scenes for instance – use a filter one step down from that indicated on the SIXTICOLOR, or use no filter at all. Obviously the choice would depend on your own experience and the precise effect required.

In case of doubt use the next weaker filter.

Please note: Red and Blue filters of different manufacturers, although bearing the same number, that is to say R 9 or B 9, may vary both in the density of their colours and may also **have a different exposure factor.** The instructions supplied by each filter manufacturer with their Colour Correction Filters should be carefully studied.

Designation of filters of various filter manufacturers

The filters of the firms detailed below are indexed in the same way as the filter scale on the SIXTICOLOR:

Lifa
Göttinger Farbfilter
Rollei-Werke
Summer ("Heliopan")
Agfa-Gevaert
Cenei
Biermann & Weber

For the amateur a filter set of two weak R-Filters and one weak B-Filter will generally suffice.

Example:
R 3, R 6 und B 3
R 2, R 5 and B 2

Two or more filters can be added to make other combinations, e. g. R 3 + R 6 = R 9.

Some filter manufacturers code their filters with numbers and/or markings which do not correspond with the SIXTICOLOR. For these filters the following corresponding codes would apply:

SIXTICOLOR Reading	Agfa-Filter	Ilford-Filter	Ansco-Filter
B 12	K 69	351	10
R 12	K 19	161	11

SIXTICOLOR Reading	Kodak-Wratten-Filter
B 3	82 B
6	82 + 82 C
9	82 C + 82 C
12	80 B
15	80 B + 82 A
18	80 B + 82 C
21	80 B + 82 B + 82 C

SIXTICOLOR Reading	Kodak-Wratten-Filter
R 3	81 B
6	81 EF + 81
9	85 C
12	85
15	85 B
18	85 B + 81 B
21	85 B + 81 EF
24	85 B + 81 EF + 81 D

About Colour Temperature (a little theory for curious minded)

Light consists of rays with different wave-lengths. The different wave-lengths have their characteristic colours in the spectrum. From the shorter to the longer wave-lengths the colours appear as follows: blue, green, yellow, orange and red. The proportion of rays (and therefore the amount of any particular colour) in the various spectral regions differs in accordance with the type of light. For instance, the light from incandescent lamps contains more red than blue. In daylight the blue rays are predominant.
This "spectral composition" of light has a great influence on the colour rendering of the colour film. For instance, a photograph taken in the shade under a blue sky will result in a blue tinge on the picture.

Our eyes are not able to judge critically the colour of light (that is to say its spectral composition) because our subjective vision constantly accommodates itself to the prevailing colour of light. For this reason we need an "objective" measuring instrument which measures the respective colours. This "quality" of light which is so important in colour photography is known as COLOUR TEMPERATURE.

The connection between "colour" and "temperature" is defined by the characteristics of light of glowing bodies. With these the spectral composition of light, that is the light "colour", is defined plainly by the glowing temperature.

This temperature is called the "colour temperature" and is given in K (degree Kelvin) $K = °C + 273$

The expression colour temperature is also used for light not emitted by glowing bodies. For instance, if you had a colour temperature of 10,000 K for a blue sky you could then assess that a glowing body at 10,000 K would emit the same light as the blue sky.

With the SIXTICOLOR you can measure the colour temperature of all the types of light which are important in photography.
Care should be taken, however, with fluorescent light, sodium vapor and mercury vapor lamps and similar coloured light sources, as these have a different spectral composition from the normal light emitted by a glowing body. The SIXTICOLOR therefore is not designed to measure these light sources.

The Filter Scale

Colour temperature is measured not only in "degrees Kelvin" but also in "mired" values:

$$\text{mired value} = \frac{1{,}000{,}000}{\text{K value}}$$

MIRED = MIcro REciprocal Degree.
In practice smaller values are used, and this smaller value is known as the decamired value.

To obtain the decamired value: divide the mired value by 10, i. e. 10 mired = 1 decamired. Example: 5,000 K = 200 mired = 20 decamired.
These mired and decamired values allow for the precise selection of the colour correction filter.
Though the value of the light expressed in K may differ, provided the value of the conversion required is the same, the one filter can be used in both cases. For instance, a filter R 6 converts the colour temperature by the value of 6 decamireds that is to say:

e. g. 8,900 K (11.2 decamired) into 5,800 K (17.2 decamired)
or 3,960 K (25.3 decamired) into 3,200 K (31.3 decamired).

In both cases the decamired value difference is the same – that is 6 – though the degree-Kelvin value is different (3,100 K and 760 K).
The numbers on the filter scale of the SIXTICOLOR are the decamired values. The white pointer indicates the decamired difference between the colour temperature measured and that for which the colour film in use has been balanced. The illustration on page 1 indicates a filter B 12 and a colour temperature of approximately 3,400 K. The arrow on the lower part points to D and T, and the corresponding arrow on the upper part of the scale to 5,800 K (this Kelvin-degree value being that for which daylight colour film is balanced). The decamired difference therefore is:

29.3 decamired (3,400 K) minus 17.2 decamired (5,800 K)
= 12 decamired, that corresponds to filter B 12.

The bluish filter B raises the K value of the colour temperature, and the reddish R filters lower it.

Data about the SIXTICOLOR

Under normal measuring conditions the measuring error is smaller than ±1 decamired.

To assure the above mentioned accuracy of measurement, the following minimum value of brightness is necessary:

	Brightness	Indication of the exposure meter when set to 15/10 DIN (25 ASA)
with incandescent lamps and photolamps	approx. 100 Lux (10 foot candle)	approx. light value 3.5 (aperture 5.6 – 3 sec.)
with daylight	approx 1000 Lux (100 foot candle)	approx. light value 7 (aperture 5.6 – 1/4 sec.)

The values obtained with the SIXTICOLOR are independent of light intensity up to about 100,000 Lux (9,300 foot candles).

The pointer indicator at the rest position (that is with the opal disc completely covered) has no bearing on the indication of the instrument.

The pointer rests, with completely covered opal disc, at 3,000 K. Differences up to ± 4 decamired from this value no not effect the accuracy of the instrument.