

Company Seven

ASTRO-OPTICS DIVISION



Nikon UV-Nikkor 105mm Lens Brochure **Len is similar to current production PF10545MF-UV /** **UV-105 distributed by Company Seven**

From our article about these lenses at: <http://company7.com/nikon/lens/0105f4.5uv.html>

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Nikon

UV-Nikkor 105mm f/4.5



Nikon

We take pleasure in announcing a newly developed lens for ultraviolet photography. . . the UV-Nikkor 105mm f/4.5. To date, no lens has completely met the demanding conditions of ultraviolet photography in terms of image quality and operational ease. In fact, only through very complicated techniques have a handful of researchers successfully used ultraviolet photography. The new UV-Nikkor 105mm f/4.5 will ensure researchers and specialists performance, image quality and operational ease. This new lens will serve as an integral and effective tool in the various fields where UV photography is essential as well as an invaluable aid to all types of research.

Nikon

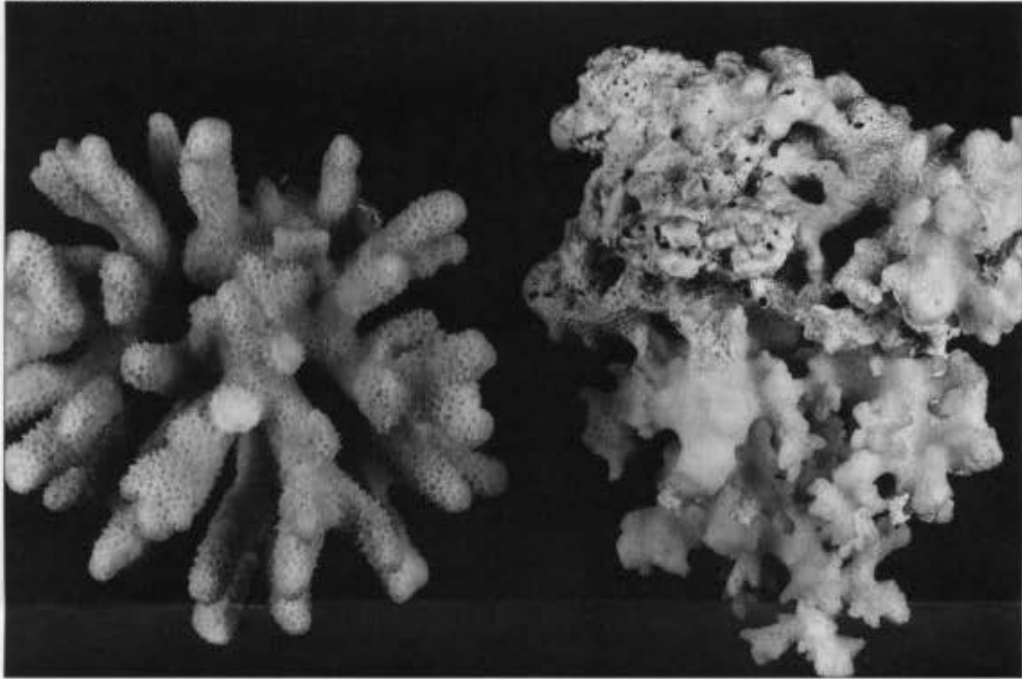
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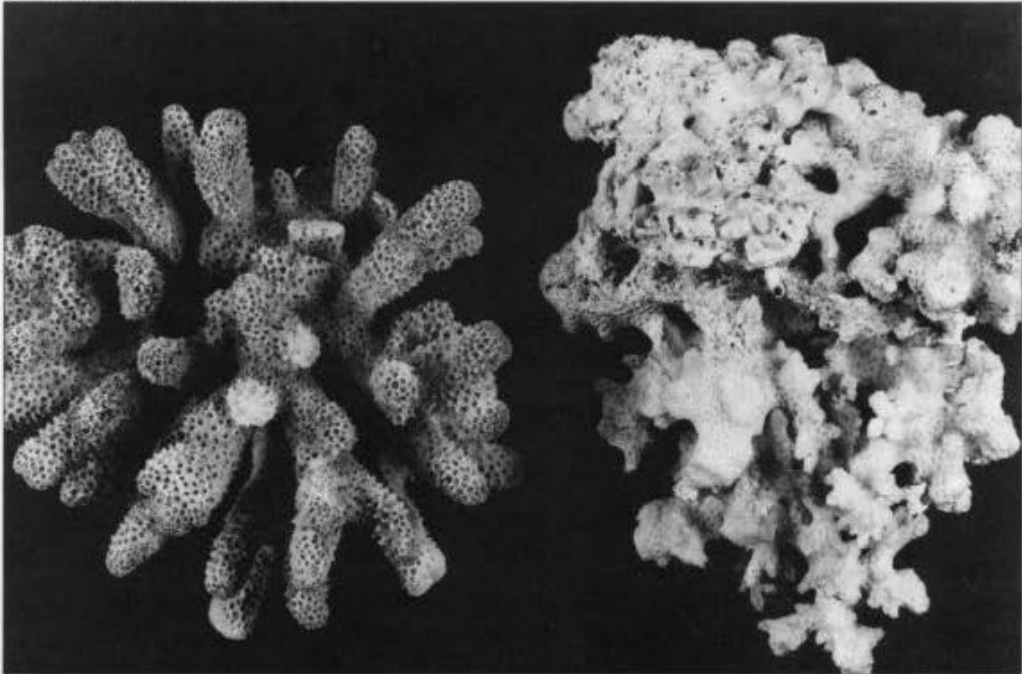
Coral

The fine details of the coral's star shape patterns are sharply defined. Although these patterns appear in visible light photography, UV photography renders clearer definition.

Visible Light Photograph f/22



UV Photograph (300-400nm) f/22



At last, ultraviolet photography made

Ultraviolet Photography

Reflected ultraviolet photography requires UV radiations falling on the subject, and only UV radiations entering the camera. Fluorescence photography needs UV radiations only (and no visible light) falling on the subject, and visible light (but no UV) entering the camera. With this type of photography, virtually any type of lens can be used since most are generally capable of recording fluorescence. However, with ultraviolet photography, since all UV wavelengths shorter than about 350nm are absorbed by conventional optical glass, a special type of lens is necessary. UV rays are electromagnetic waves around 200–400nm. Though the human eye is sensitive only within a range of 380–780nm, it is possible to get valuable information from UV photography which the human eye cannot catch particularly in such fields as medical and forensic science, criminal lab work, examination of fine art and industrial works as well as for factory inspections. The UV-Nikkor 105 mm f/4.5 is made of a fluorite and quartz glass. Offering excellent correction of aberrations, this lens renders outstanding performance. Furthermore, this new UV lens eliminates the need of clumsy ultraviolet focus adjustment once you get pinpoint focus with the naked eye because our UV-Nikkor produces no variation in focus position between visible wavelength and UV. The elimination of refocusing to obtain pinpoint focus in UV photography allows the user to perform ultraviolet photography with remarkable ease. In infrared photography, however, focus adjustment is necessary.



UV-Nikkor 105 mm f/4.5

- Spectral transmittance is as high as 70%, ranging from 220nm to 900nm. The transmittance curve is flat.
- From ∞ to 1:2, variation of aberrations is brought down to minimal level over the full range of wavelengths, assuring excellent image quality.
- Like ordinary Micro-Nikkor lenses, UV-Nikkor is virtually distortion-free.
- There is no need of focus adjustment in UV photography once you set the lens at focus position with visible light due to superior compensation of chromatic aberration. (Focus adjustment is essential for infrared photography.)

e practical.

How to Take Ultraviolet Pictures

Ultraviolet photographs can be taken with ease as long as the proper lenses, light sources, filters and photosensitive materials are selected. The following is a brief outline of light sources, filters, photosensitive materials and exposure methods:

Light Sources

It is essential that the light source contain a sufficient amount of UV rays. However, since UV rays can be harmful to humans, the user should avoid long use of UV light sources and looking directly at them. Protective glasses should always be worn. The following are the light sources for UV photography:

● Sunlight

Sunlight is rich in UV rays of around 300nm. However light intensity of shorter wavelengths than 300nm decreases and is inconvenient for UV photography because of the long exposures required.

● Blacklight Fluorescent Lamps

A fluorescent light source is commonly used for show-window displays and theater lighting. The wavelengths range from 300nm to 400nm, with the peak wavelength at 360nm. Sufficient light can be obtained with two to four 20-watt lamps.

● Mercury Vapor Arc Lamps

Mercury vapor arc lamps are available in several types—low pressure, normal pressure, high pressure and ultra-high pressure. Luminous spectrum strength varies according to mercury lamp type. You may choose an appropriate lamp fit for wavelengths of interest.

Filters

For UV photography, the light source or camera should be equipped with a UV transmitting filter to block out visible or infrared light. However, since this filter blocks out visible light, it should be removed when focusing. A dedicated adaptor is available to allow the UV-Nikkor 105mm f/4.5 to accommodate the ultraviolet transmitting filters (50 × 50mm) now on the market. You may use ordinary filters since the filter attachment size of this UV lens is 52mm.

Photosensitive Materials

Silver salt film's photosensitive layer is made up of silver halide grains dispersed throughout the gelatin of the emulsion layer. The silver halide has a sensitizing

capacity of up to 200nm, and the gelatin that surrounds it absorbs UV rays of less than 300nm. The standard film, therefore, is not suited for UV photography below 300nm.

The films below are suitable for ultraviolet photography:

- (1) Long-wave ultraviolet photo films (300–400nm)
Panchromatic films and regular photosensitive materials are competent, e.g. Tri-X, Technical Pan 2415, Neopan SS, Mini Copy films, etc.
- (2) Short-wave ultraviolet photo films (less than 300nm)
Special films are required, e.g. Kodak Spectroscopic Type 103-O, Type 103-F, Infrared films, etc.
- (3) Infrared films
In using infrared film for UV photography, it is essential to carefully check the spectral characteristics of the filter in use. Some UV films transmit red-infrared wavelengths above 650nm, which may cause overlapping images made of unwanted wavelengths on the film in addition to ultraviolet images.
- (4) Color films
Ordinary color films may be used for near UV photography. Images will appear in a blue monochrome color.

Focusing

The UV-Nikkor 105mm f/4.5 needs no focus adjustment for UV photography once the correct focus position is set by the naked eye (visible emission of light).

Exposure

As a rule in UV photography exposure meters built in cameras cannot be used. Instead, test shots are a must, taking into account the film's sensitivity to UV rays, its spectral energy distribution of the light source, the spectral transmittance of the filter, and the ultraviolet reflection ratio of the subject to be photographed.

The following is an example of an actual photography situation:

Light source: Black light (BCL) 40W × 4

Filter: U330

Film: Tri-X (D-76, 20°C, 7 min.)

Exposure: f/5.6 at approx. 1/125 sec.

At last, ultraviolet photography

Plants ①⑤

On the right are pressed flowers, and on the left withered autumn leaves. Various differences are distinguished in flowers, leaves, stalks, etc. depending upon wavelengths.

Lacquer Ware ②

This is a piece of "Wajima" lacquer ware. The thin gold film and white paint appear black in the UV photo compared to the photo taken by visible light. This is due to a difference in the paints' spectral reflection ratio. This is particularly useful for examination of archives, documents, paintings, notes and bank checks as well as for the protection of historical treasures.

"Monshiro" Butterflies ③

UV rays are reflected differently from wings of male and female "Monshiro" or cabbage butterflies. The female's wings reflect more of UV rays in the 300-400nm range, while the male's wing reflection is significantly lower which is believed to be due primarily to the structure and coats of their scale. This is a particularly valuable aid in identifying the gender of such butterflies.

In this rare photo of butterfly wings taken at 253nm, male and female wings shine with almost equal brightness, supporting the hypothesis that distinctions are possible only in the 300-400nm range.

Sliced Cuttlefish ④

The cuttlefish's skin which could not be recorded in a visible light photo, shows up incredibly clear in the UV photo. The fibers of the newspaper underneath are even clearly depicted.

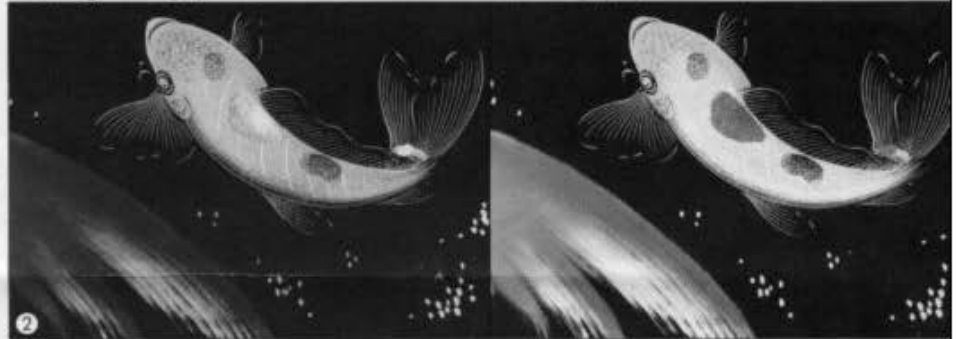
Visible Light Photograph f/11

UV Photograph (300-400nm) f/11



Visible Light Photograph f/5.6

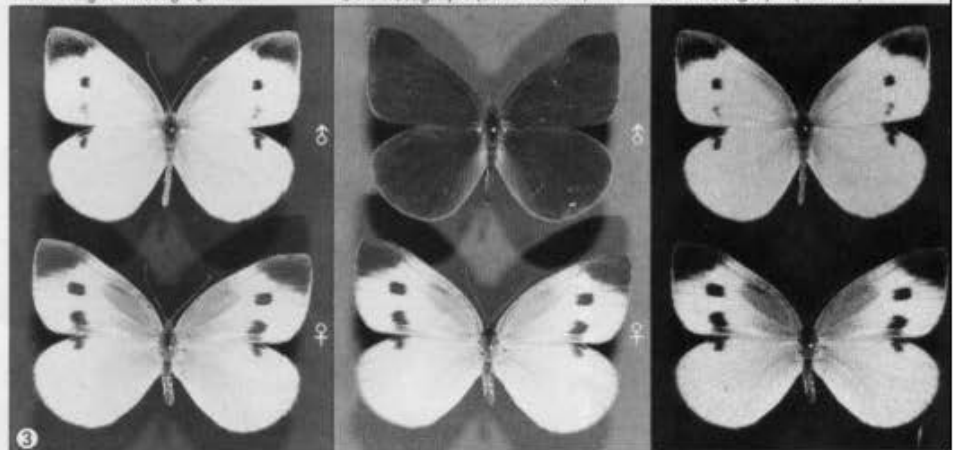
UV Photograph (300-400nm) f/5.6



Visible Light Photograph f/11

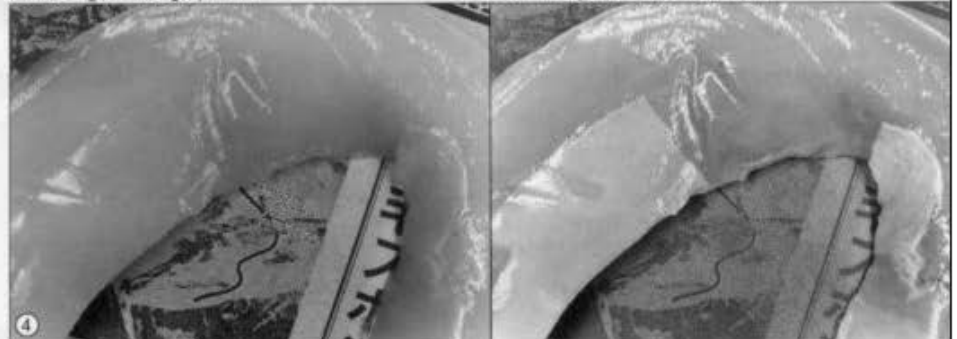
UV Photograph (300-400nm) f/11

UV Photograph (253nm) f/11



Visible Light Photograph f/11

UV Photograph (300-400nm) f/11



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Visible Light Photograph f/5.6

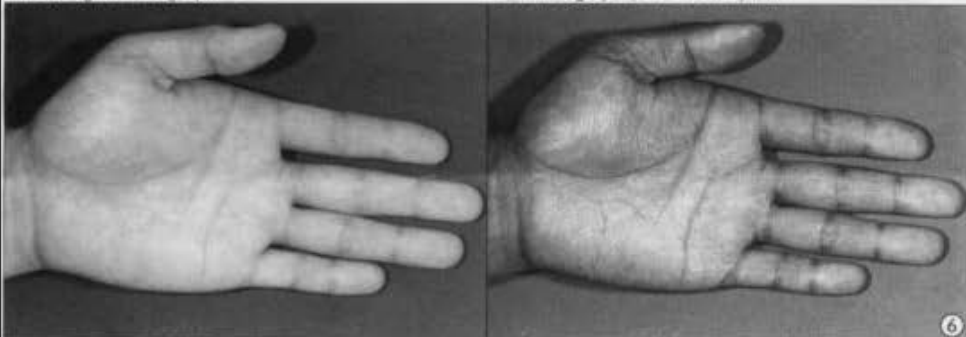
UV Photograph (300-400nm) f/5.6

UV Photograph (253nm) f/5.6



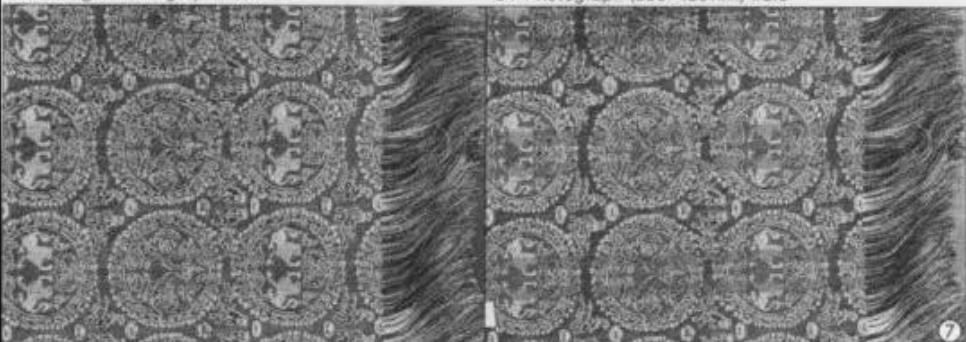
Visible Light Photograph f/11

UV Photograph (300-400nm) f/11



Visible Light Photograph f/5.6

UV Photograph (300-400nm) f/5.6



Visible Light Photograph f/11

UV Photograph (300-400nm) f/11



Human Hand ⑥

The surface of the skin (where there is no blood circulation) and the underlying layers of skin (where there is circulation) are clearly distinguished in the UV photo. The changes in the surface of the skin are accentuated by the UV light reflecting off it. The degree of reflection and absorption is dependent on the quantity of melanin within the skin. This allows viewing of aspects that cannot be obtained under visible light. The UV-Nikkor 105mm f/4.5 provides a wide range of practical applications in the areas of dermatology and other anatomical sciences.

Textiles ⑦

This is a photo of a piece of traditionally woven cotton fabric, which has been handed down from generation to generation. As you can see, the UV photo clearly shows the horizontal flow of the cotton's texture.

Senior Citizens ⑧

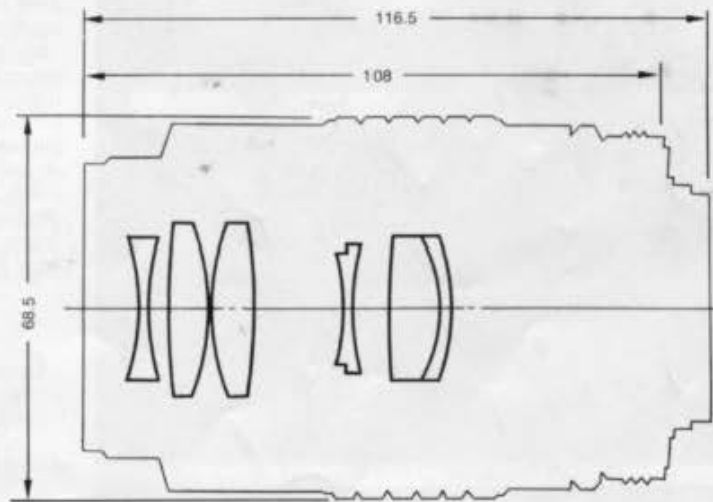
Here you see senior citizens enjoying a Japanese game called "gate ball," which is similar to croquet. Even with sunlight as a light source, the players' complexions can be shown darkened with UV photography. As you can see, the UV photo clearly depicts this without blur. High-speed UV photography is no longer a dream, if high speed films are used.

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Specifications

Focal length	105 mm
Maximum aperture	f/4.5
Lens construction	6 elements 6 groups (employing fluorite and quartz glass)
Picture angle	23° 20'
Aperture scale	f/4.5-f/32 on both standard and aperture-direct-readout (ADR) scales
Diaphragm	Fully automatic
Metering	Full-aperture exposure measurement
Distance scales	Graduated both in meters and feet from 0.48 m (1.57 ft.) to infinity (∞)
Dimensions	68.5 mm dia. \times 116.5 mm long (overall) 108 mm extension from flange
Weight	Approx. 515g (18.1 oz)
Filter	52 mm
Compatible teleconverter	TC-14A or TC-201 (Not for use in UV photography.)

Specifications and design shown herein are subject to change without notice.



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