# INFRARED NEGATIVE AS APPLIED TO SPECIAL-EFFECTS PHOTOGRAPHY*

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In the early part of 1935 the Agfa Ansco Corporation, responding to a general demand by the motion picture industry for wider specialization of film products, manufactured and marketed an infrared-sensitive negative material designed principally for the purpose of photographing night effects in the daytime. Dissemination of technical information pertaining to the practical application of this product was undertaken, and the film gave promise of supplying the means of eliminating, to a certain extent, the economic disadvantage of actual night photography.

Production use, however, brought to light emulsion characteristics that, although of decided utility in certain phases of motion picture work, did not lend themselves well to the more intimate details required when photographing close-ups of characters in standard panchromatic make-up.

As a direct result of this experience a new infrared negative, referred to as Type *B*, was brought forth in December, 1936, and has, since that time, fulfilled all film requirements necessary to the successful production of night scenes in the daytime.

The physical properties of this new material, such as base and anti-halo treatment, are similar, of course, to those of all motion picture negative films. It has been designed to meet standard laboratory processing requirements, and the keeping quality, under ordinary storage conditions, has proved to be excellent.

In general speed the film is nearly equal to that of Superpan when both types are exposed without filters. It is necessary, however, in order that infrared-sensitive negative fulfill the function for which it is designed, to expose only with red filters which absorb the blue rays. Practical experience has indicated that the most useful range of filters lies between the Wratten Monobrom *21* and the *29F*. The filter-factor for these blue-absorbing and red-transmitting filters has been found, by sensitometric and practical tests, to be from four to five. The use of deeper red filters adds in no way to the pictorial quality and merely prolongs the time of exposure. In many instances, however, filters as light as the Wratten *15G* have been found suitable, although they transmit some ultraviolet in the region of 3000 Å.

Fig. 1 is a wedge spectrogram comparison of Superpan, the original infrared type, and the new Type *B* infrared, and illustrates the characteristic color-response of each material. Attention is pointed to the red and infrared-sensitivity of the Type *B* material, which reveals a maximum at approximately 7400 Å. The sensitizing pattern of this type permits the use of relatively light red and even heavy yellow filters, due to the lack of response in the green-yellow regions.

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Fig. 2 shows graphs of sensitometric time-gamma curves comparing Superpan and the new Type *B* infrared negative, and reveals the comparable ratio of contrast obtained with these two types at various developing times. This similarity is particularly desirable when photographing close-ups or when it is necessary to match scenes photographed on regular panchromatic negative.

Principles of lighting technic pertaining to booster lights ordinarily employed in producing night effects in the daytime, have been found entirely applicable when using this type of film in conjunction with appropriate filters. Exhaustive tests conducted to observe the effect of panchromatic make-up, reveal that the only alteration necessary is a slightly darker lip rouge produced by the addition of a small amount of blue or brown pigment.

Set practicals such as street lamps, automobile headlights, *etc.*, are rendered

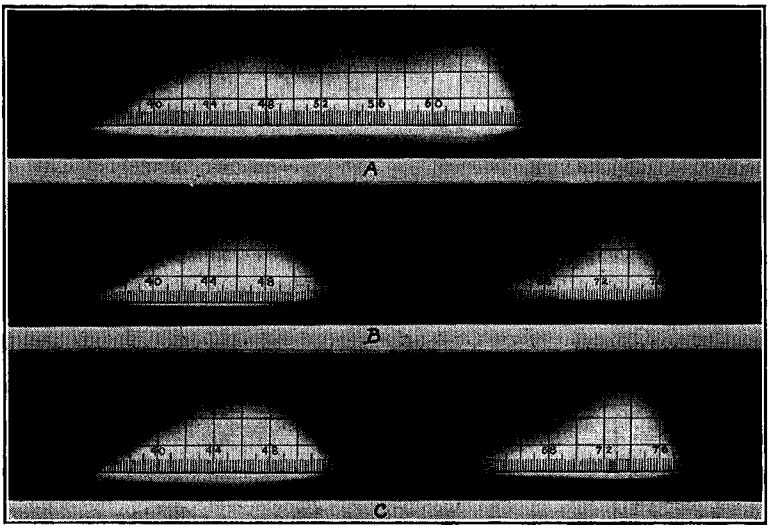


FIG. 1. Spectrogram comparison of (*A*) Superpan negative; (*B*) the original infrared type; and (*C*) the new Agfa Type *B* infrared.

far more realistic than has heretofore been possible with ordinary panchromatic film. Window lighting must be done, of course, with the aid of artificial lights, as in the past, but reveals a far more sturdy effect. The use of either reflectors or booster lights for close-up modelling has been found to be entirely satisfactory, producing soft halftones with the required contrast when applied in the same proportion as for panchromatic negative.

Pictorial long shots in which there is considerable green foliage are recorded with particular charm due to the infrared reflection of chlorophyll, the green coloring matter of plants and leaves. The effect produced by this substance in conjunction with this type of film when viewed upon the screen is very similar to that viewed actually on moonlight nights.

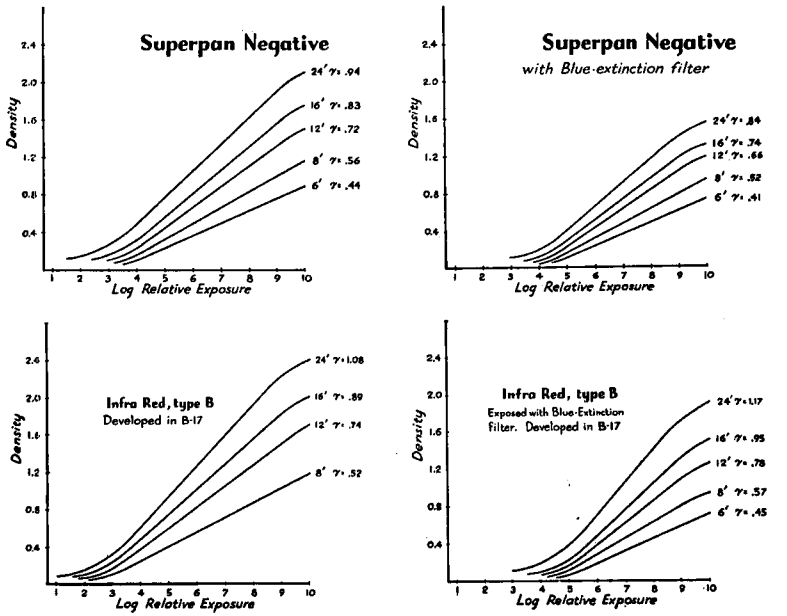


FIG. 2. Sensitometric time-gamma curves comparing Superpan and the new Type *B* Infrared film.

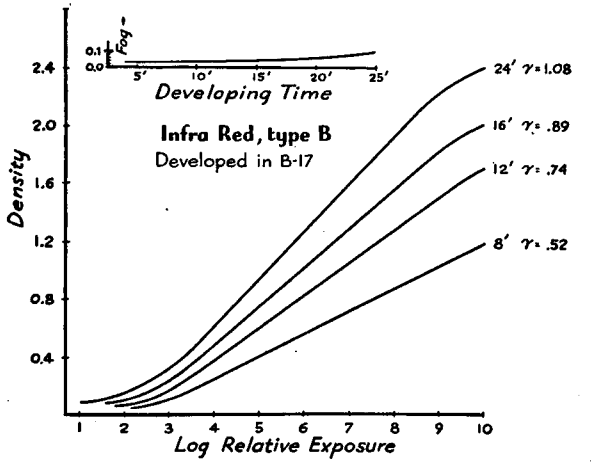


FIG. 3. Exposure and fog curves of Type *B* Infrared film.

Haze penetration properties, due to atmospheric absorption of short-wave length radiation and the recording of the longer rays, make it possible to photograph scenes of extreme beauty under what would ordinarily be regarded as adverse conditions. Many economic possibilities have been exploited by producers, who have long recognized the financial disadvantage and artistic shortcomings of night shooting. In numerous instances the intelligent application of this new medium has not only resulted in a saving of light and labor, but has circumvented, as well, the ever-present danger of illness to important players when heavy night schedules are necessary. This general utilization has included painting permanent street sets a blue-gray color so that a more realistic night effect could be produced with infrared negative which, at the same time, would not hinder the use of panchromatic for the day scenes.

Infrared negative involves no laboratory problem, as processing may be carried out in the usual manner without special treatment or alteration in developing times. The time-fog density curve shown in the upper left-hand corner of Fig. 3 reveals only a slight increase of fog with extended developing times. The ordinary green safelight in general use for processing panchromatic film, although transmitting some infrared rays, has been found by practical experience to be satisfactory with the usual precautions.

In conclusion it is hoped that this addition to motion picture film material will stimulate and encourage the imagination of the practical technician so that in the future he will more readily demand of the manufacturer other special types enabling him not only to enhance the beauty of his productions but also to overcome successfully the technical problems still awaiting solution.