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## Technical Data

### Effects

Any Spotlight can be used as a Projector. Its efficiency, however, is dependent upon three things: 1, the lens and lens system; 2, the reflector system and 3, the type of lamp and wattage.

There are two types of projectors which fall under the general heading (A), those whose image is projected by use of a condenser lens system and (B) those whose image is produced with the help of a reflector system, through a gate.

#### System A

The condenser system produces an exact reproduction of the slide in the same way as a normal film projector but employs special slides or discs.

#### Condenser System Source Requirements

**First Lens:** Must be of the plano convex type for height definition work but for simple projections a fresnell lens can be used.

**Reflector:** A large well balanced correctly aligned reflector.

**Lamp:** The best type of lamps for this work are ones with a flat filament, the wattage being dependent upon the amount of illumination required.

**Adjustment of housing:** Depending upon the size of the first and condenser lens, the nearer the lamp is to the first lens the better the light output. Adjustment of the lamp is necessary to prevent an image of the filament being projected.

**Heat Filter:** This is not necessary if the slides to be projected are made of heat resistant glass.

#### SLIDES

The standard size slide for most projectors is  $6\frac{1}{2}$ " (165 mm) x 8" (203 mm) made from heat resistant glass. Ordinary glass is apt to shatter due to the heat at the focal point (over 300 degrees for a 1kw unit).

Image size should not exceed 3' and is usually smaller for most applications, dependent upon the size of picture required and the lens employed. The correct size can be calculated using the following formula:—

$$\frac{P}{P} = \frac{q}{2Q}$$

$$\frac{1}{p} \times \frac{1}{P} = \frac{1}{f}$$

$\frac{P}{P}$  = Multiplication factor  
 $\frac{P}{P}$  = Size of image on slide  
 $q$  = Distance from wall

$Q$  = Size of picture  
 $f$  = Focal length of lens

Image should be mounted upside down as it is reversed when projected. Outlining can best be obtained by using matt model paint and colouring by using glass stain, both are easily removed with a razor blade. Before application of the paint, the glass should be cleaned with methylated spirits to remove any grease. All marking should be kept to one side only, as due to the thickness of the glass, any image on the other side will be out of focus. Cathedral or rolled glasses of the type used for bathroom windows can be used for producing patterned backgrounds particularly useful in revues etc., but a heat filter must also be used.

#### MOVING EFFECTS

These are supplied in the form of a heat-resistant glass disc in a sheet metal housing driven by a variable speed motor. Effects such as clouds, rain, snow, fish, ships etc., can be obtained in this form.

#### LENSES (OPTICAL)

Three standard lenses are available, 2 $\frac{1}{2}$ ", 3" and 4" focal length, for use with either slides or moving effects. For determining the type of lens required, the previous mentioned Formula should be used.

#### System B

This consists of a spotlight with a specially manufactured plate or 'GOBO' in place of the usual masking plate, to project a silhouette. Simple effects such as prison bars, crosses etc. can thus be produced. The main advantage of this system is that it requires no extra equipment, the unit also being used for ordinary spot lighting work. The image produced is also brighter compared with the condenser lens type as little light is absorbed by the lens. The main drawback being in that only silhouettes can be produced.

#### ULTRA VIOLET LIGHT

This light is near the end of the visible spectrum and is actually invisible to the human eye. It can only be seen when reflected from surfaces treated with a special fluorescent base. This light source is mainly restricted to revue and pantomime work. One method for producing the ultra violet light involves a 125 wat Mercury Vapour Discharge Lamp fitted with black glass filter combined with any of the standard theatre type floodlight luminaires. The source being of the discharge type needs the addition of a choke to build up the initial strike voltage which is fitted on to the luminaire batten. The effectiveness of this lighting is always dependent upon the degree of black-out available as any stray light allowed to illuminate the stage will reduce the contrast. Fluorescent tubes are available. These provide a much flatter light

output wave band and while effective for dance hall club type areas tend to spread too far over the stage, hence the need to use an alternative source with a standard luminaire fitting.

#### LINNEBACH EFFECT

This effect is simply the creation of shadows, the principle being the projection of a shadow on to a cloth or cyclorama by using a large wattage light source of the tungsten type in a simple box or housing without lens or reflector. The slide or object to be projected being placed in front of the beam produced such that its shadow can be seen on the cloth. The slide and light source can be mounted separately and in fact this is often necessary to ensure clear outlines. Slides can be made up with a combination of colour filters and silhouettes to produce an outline against sky on the cloth. This type of effect can prove to be an interesting experiment within its own right, but it must be remembered the light spill from the Acting Area will destroy the illusion, and therefore plenty of free stage space may be necessary.

#### FIRE AND FIRELIGHT

For normal domestic type sets it is difficult to create a real moving fire effect that can be seen in competition with the stage lighting. Practical properties are available on hire, but it is far better to use a small spot or flood hidden in the fire opening which, when lit will light up the back of the fireplace and project light across the stage. A filter, using a mixture of red amber should be fitted to give the correct tint.

For large scale effects, optical discs can be hired which project a flickering flame on to a backing and these can be used in conjunction with general stage lighting to represent a main conflagration.

#### SMOKE OR FOG

The most effective way of producing smoke or fog is to use dry ice which can usually be obtained from a local manufacturer. The material vaporises on contact with water and the resultant fumes create a fog or mist effect. Special machines can be hired or purchased which receive the dry ice in bulk and then control the rate of immersion in water which in turn controls the amount of smoke produced. Such devices are fitted with nozzles so the direction is available for spreading the vapour over the right part of the acting area. Alternatively, it can be dispersed by merely breaking the blocks of dry ice into small particles, spreading them on a tin tray and then adding water. The material will not keep for long and should be purchased in quantities to allow for required, kept wrapped in newspaper in a damp barrel. Where the effect of smoke or fog is to appear outside a doorway window backing then the use