Cleaning Requirements

XRVS 120 NG can be cleaned by washing with a solution of mild soap or detergent and lukewarm water. Use a clean soft cloth, applying only light pressure. Rinse with clean water and dry by blotting with a damp cloth or chamois.

DO NOT USE Window cleaning sprays, kitchen scouring compounds or solvents such as acetone, gasoline, benzene, alcohol, carbon tetrachloride or lacquer thinner. These can scratch/deteriorate the screen surface.

The Anti-Reflection coating of XRVS 120 AR can be cleaned using a standard window cleaning spray such as Windex Glass Cleaner with Vinegar or Windex Glass and Surface Cleaner using a soft, clean cloth. (window cleaning sprays should not be used to clean the beaded side of the projection screen, only mild soap and water)

Throw Distance/Screen Diagonal Recommendations

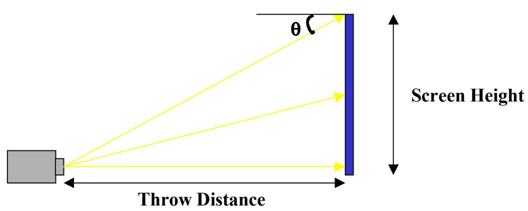


Figure 1

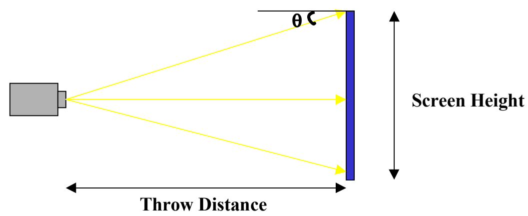


Figure 2

Figure #	Throw Distance/Screen Diagonal
1	1.80 – 2.00
2	1.20 – 1.35

For projection systems such as that shown in Figure 1, with the projector placed off-axis to the screen, a throw distance/screen diagonal ratio of at least 1.80 is recommended. For ratios less than 1.80 a fresnel lens is recommended.

For projection systems such as that shown in Figure 2, with the projector placed on-axis (centered) to the screen, a throw distance/screen diagonal ratio of at least 1.10 is recommended. For ratios less than 1.10 a fresnel lens is recommended.

TABLE 1 – RECOMMENDED THROW DISTANCE TO SCREEN DIAGONAL FOR 4:3 ASPECT RATIO SCREENS

			Off-Axis Projector	Centered Projector
Diagonal (inches)	Height (in)	Width (in)	Throw Distance (in)	Throw Distance (in)
40.00	24.00	32.00	77.0	44.0
50.00	30.00	40.00	93.5	55.0
60.00	36.00	48.00	110.0	66.0
67.00	40.20	53.60	121.0	73.5
72.00	43.20	57.60	129.0	79.0
80.00	48.00	64.00	143.0	88.0

TABLE 2 – RECOMMENDED THROW DISTANCE TO SCREEN DIAGONAL FOR 9:16 ASPECT RATIO SCREENS

			Off-Axis Projector	Centered Projector
Diagonal (inches)	**Height (in)**	**Width (in)**	**Throw Distance (in)**	**Throw Distance (in)**
40.00	19.61	34.86	65.0	48.0
50.00	24.51	43.58	78.5	60.0
60.00	29.42	52.29	92.0	72.0
70.00	34.32	61.01	105.5	84.0
80.00	39.22	69.73	119.0	96.0
90.00	44.12	78.44	132.5	108.0
100.00	49.03	87.16	146.0	120.0

Cutting Recommendations

XRVS 120 screens can be cut using circular saws (table or radial) or by routing. Because the screen material softens quickly it is necessary to keep the cutting tool and the machined edge of the screen as cool as possible. Tool sharpness is essential to prevent gumming, heat build-up, stresses, and de-lamination of the screen.

ROUTING

Most commercially available routers are acceptable for cutting XRVS screens. The router should have a minimum of one horsepower and a no-load speed of approximately 20,000 rpm.

The XRVS screen to be cut should be placed on the vacuum table with the film side up.

Router bits may be of high-speed steel, carbide-tipped, solid carbide, or diamond-tipped. They may be one piece, multiple part, piloted, non-piloted, straight cutting, forming or specialty bits. Router bits may consist of one to four flutes, single and double fluted bits are the most commonly used. The length of the cutting edge should not exceed three times the diameter of the tool. If possible, the shank diameter should be equal to or larger than the cutting tool diameter. The length of the shank should be long enough so that the entire cutting edge is usable.

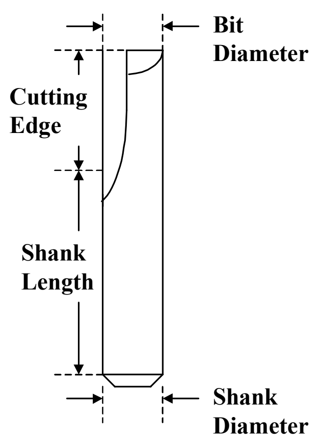


Figure 3

Proper feed direction is essential for a smooth cut. Routers rotate clockwise and have a tendency to pull the bit into the work. The feed direction for external cuts should be counterclockwise. When routing inside edges the router should be fed clockwise.

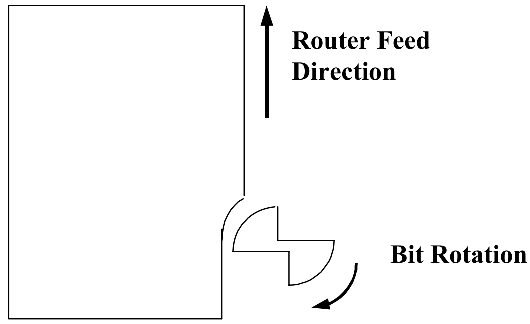


Figure 4

The tools designed for routers are of small diameter and operate at high speeds. Therefore is of utmost importance that vibration be avoided. Even small vibrations can cause crazing and fractures in the screen material during routing. A larger diameter cutter will provide a better surface with less tendency to chip. Use a ½ inch or larger diameter cutter whenever possible. Recommended speeds are 18,000 to 28,000 rpm. The higher rpm rate will allow faster feed rates and a smoother finish. Do not overload the motor. Operate the feed rate just below the chipping speed for maximum production.

CIRCULAR SAW

The XRVS screen to be cut should be placed on the cutting surface with the film side up. Circular saws used for cutting XRVS screen should have minimal vibration. The run-out of the saw arbor and blade collar should be no greater than 0.002 inches.

Several blade types work well for cutting XRVS screens. Carbide tipped blades are recommended for the longer life of the cutting edge. A 10 inch, 80 tooth blade is recommended for general cutting. The blades teeth should be the triple-chip design (see Figure 5), where every other tooth has a beveled cutting edge to help clear away saw chips.

Best results are achieved when the teeth have a clearance angle of 10 – 15°. To prevent chipping the saw blade teeth must have a constant height and must all be in the same plane, i.e. one tooth cannot extend to one side more than the others. Installing a stiffener ½ to ⅔ the saw blade diameter and mounting it against the outside of the blade greatly reduces vibration and unwanted runout.

The blade should protrude approximately ⅛ to ½ inch above the screen to be cut. Feed the screen through evenly, a relatively fast rate of cutting (40 ft/min) minimizes heat build up between the screen and the blade.

Storage

XRVS 120 screens should be stored vertically or in special racks where the sheets can lean at an angle of approximately 10°. If XRVS 120 screens are stored horizontally, they must not be allowed to sag. Care must be taken to prevent chips or dirt from becoming lodged between the screens as they may damage the screen's surface.

XRVS Test Methods

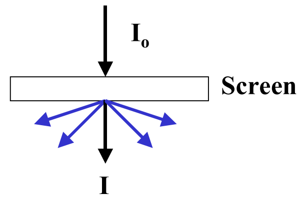
The following methods are used to characterize the optical performance of 3M's eXtended Resolution Video Screens (XRVS).

Diffuse Transmission

Ratio of diffusively transmitted light to incident light.

$$T_D = \frac{\text{Total Transmitted Light} - I}{I_o}$$

Where I is the specular component of the total transmitted light

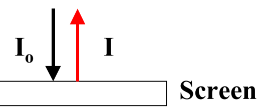


Measured using a spectrophotometer calibrated for both zero and full transmission using the D65 illuminant option. The screen under test is placed against the measurement aperture of the spectrophotometer and a measurement is recorded of the transmission spectrum over the (400nm - 700nm) wavelength range. The average Diffuse Transmission (T_D) value is calculated from this range using photopic weighting.

Specular Reflectance

Defined as the ratio of specularly reflected light to incident light.

$$R_S = \frac{I}{I_o}$$



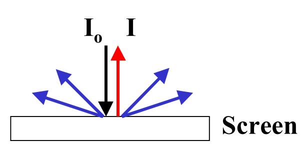
Measured using a spectrophotometer calibrated for both zero and full white reflectance at 5 degrees incidence using the D65 illuminant option. The screen under test is placed against the measurement aperture of the spectrophotometer and a measurement is recorded of the reflected spectrum over the (400nm - 700nm) wavelength range. The average specular reflectance (R_S)can be calculated from this range using photopic weighting.

Diffuse Reflectance

Defined as the ratio of diffusively reflected light to the incident light.

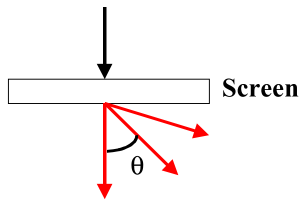
$$R_D = \frac{\text{Total Reflected Light} - I}{I_o}$$

Where I is the specular component of the total transmitted light



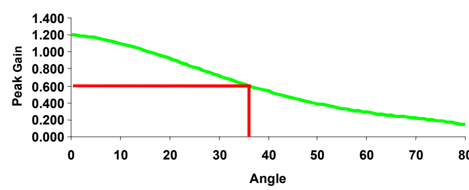
Measured using a spectrophotometer calibrated for both zero and full white reflectance using the D65 illuminant option. The screen under test is placed against the measurement aperture of the spectrophotometer and a measurement is recorded of the total reflected spectrum over the (400nm - 700nm) wavelength range. The average total reflectance (R_T) is calculated from this range using photopic weighting. The average diffuse reflectance (R_D) is calculated by subtracting the average specular reflectance (R_S) from the average total reflectance (R_T).

PEAK GAIN
A measure of screen brightness and a function of viewing angle. It is normalized with respect to a Lambertian diffuser.



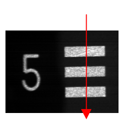
A white light source illuminates a white reflectance standard. It's luminance is measured with a luminance meter at near normal incidence (L_R). A screen is placed in front of the light source and the luminance is measured (on the opposite side of the sample from the source) at near normal incidence (L_S). The peak gain is defined as the ratio of L_S/L_R.

VIEWING ANGLE
Defined as the angle at which the peak gain is reduced by 50%.

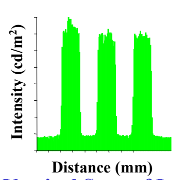


After the on-axis gain measurement, the screen is stepped through a range of angles, a luminance reading taken at each position. $L_{S\text{-}\theta}/ L_R$ (Gain) is then plotted as a function of angle. The view angle is defined as the angle at which the gain falls to one-half its peak value.

MODULATION DEPTH
Defined as the ability of a screen to resolve a given spatial frequency.



Projected Image



Vertical Scan of Image

$$\textbf{Inter Character Contrast} = \frac{I_{MAX}}{I_{MIN}}$$

$$\textbf{Modulation Depth} = \frac{ICC - 1}{ICC + 1}$$

A simple resolution test apparatus consists of a collimated white light source, an opal glass diffuser, a chrome USAF 1951 resolution test target, a screen sample holder, a CCD Camera and a computer system equipped with a frame-grabber and software to acquire and manipulate the image. The screen under test is placed on the sample holder. The chrome USAF 1951 resolution test target is then placed against the screen under test (against the light source side). The CCD camera is focused on the appropriate spatial frequency (nominally 1.12 lp/mm) and the brightness level on the viewer side is set to the desired level. The projected image is captured and the intensity is scanned vertically. The Inter Character Contrast Ratio (ICC) is calculated from the ratio of the average intensity maximums and minimums. The modulation depth (MD) is then calculated by normalizing the ICC for a given spatial frequency.

Note to User
Each customer must determine whether this product meets the specific needs of their particular application. The following recommendations are for general guidance purposes and each customer must validate them in its particular process.

3M makes no additional warranties, express or implied, including but not limited to any implied warranties of merchantability or fitness for a particular purpose. In particular, but without limitation, 3M makes no representations or warranties concerning the effective life of the products or their ability to survive user's environmental testing. Purchaser is responsible for determining whether the 3M products are fit for the purchaser's particular purpose and suitable for the purchaser's method of production. 3M shall not be liable in any action against 3M in any way related to the products for any loss or damages, whether non-specified direct, indirect, special, incidental or consequential (including downtime, loss or profits or goodwill) regardless of the legal theory asserted.

3M
Projection Display Components
Optical Systems Division
3M Center, Building 260-5N-10
St. Paul, MN 55144