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6097

31 May 1962

MEMORANDUM FOR: Chief, Administrative Staff

THROUGH: Chief, Technical Plans & Development Staff

SUBJECT: Revised Specifications for the Richardson Film Viewer

A contract is currently being negotiated for the procurement of additional Richardson Film Viewers, Model 705V. Due to design limitations of the models previously delivered, TPDS has requested a change of specifications for the new viewers. Attached is a copy of the revised specifications on which the new contract should be based. An additional copy of the specifications is being forwarded to the Richardson Camera Company, Inc. for their information and cost analysis. It is understood that the revised specifications may incur a price increase of the viewers.

[Redacted]

25X1

AC/TDB

MPIC/TPDS/TDB: [Redacted]

25X1

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25X1

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RICHARDSON CAMERA COMPANY
Specification 1401
for a

Film Viewer, Model 705V

1 June 1962

1.0 SCOPE. This specification details requirements of the Model 705 V Film Viewer.

2.0 APPLICABLE STANDARDS. The viewer, auxiliary equipment and support equipment is built to best commercial standards. Due consideration has been given to the requirement for operation and maintenance by semi-skilled personnel.

3.0 REQUIREMENTS.

3.1 DESIGN REQUIREMENTS.

3.1.1 GENERAL CONFIGURATION. The film viewer has the general arrangement and layout shown on drawing 1.

- a. Overall width does not exceed $3\frac{1}{2}$ inches to facilitate movement through 36 inch office doors, elevators, etc.
- b. Projection of the image through a rotatable plate to allow image rotation without using dove prisms, which reduce resolution and introduce distortion.
- c. The film transport handles 35mm thru $9\frac{1}{2}$ " wide film. Specifically 35mm, 70mm, 5", 6.6", 8" and $9\frac{1}{2}$ ". Other sizes optional, as specified.

3.1.2 PROJECTED IMAGE.

3.1.2.1 RESOLUTION. The prime objective of this design was to produce a practical film viewer having the ability to resolve 200 lines per millimeter or more. Minimum resolutions achieved are 40 lines per millimeter at 5X, 90 lines per millimeter at 12X and 150 lines per millimeter at 30X.

3.1.2.2 DISTORTION. Distortion of images will not exceed 1/10th of one percent when projecting a calibrated grid and measuring at the screen.

3.1.2.3 IMAGE POSITIONING. Image positioning controls are provided which allow the operator to bring any portion of the film frame into view on the screen at 50X magnification. The lateral movement of the film stage shall be accomplished by a motor driven ball screw and nut or similar high reliability mechanical device. It is also possible for the operator to rotate the film stage through a full 360 degrees. A handle or grasp point shall be provided for the operator to accomplish the rotation.

3.1.3 PROJECTION SYSTEM

3.1.3.1 LIGHT SOURCE. The light source should be of an intensity to provide 100 ft. lamberts, the requirement for best viewing conditions, measured at the viewer's side of the screen under the following conditions:

- (1) maximum image magnification, 50X in this case; and
- (2) 1.0 density filter filling the film gate. The 100 ft lamberts is the ultimate objective at maximum magnification but if not attainable the absolute lower limit will be two (2) ft lamberts.

3.1.3.2 CONDENSER SYSTEM. The condenser lens system will consist of sufficient glass elements to insure that the beam of light shall be free from spreading due to spherical aberration which will in turn allow for maximum amount of light being taken up by the system consistent with the dimensions of the light source. The condenser lens shall be adjustable in order to concentrate more light into the film plane commensurate with change of magnification.

3.1.3.3 COOLING SYSTEM. A system of cooling (fan, if adequate) will be provided to remove heat generated by the light source. It is required that the filtered air be exhausted after having passed by the light source, which is last in the channel of air passage. An absolute minimum of vibration will be affected by mounting the cooling device in a separate cabinet if it is vibration producing. Film gate temperature will be no more than 140° F at the film plane with a piece of film with a fogged density of 1.0 completely filling the entire film gate. Ambient room temperature to be 80° F, or below.

3.1.3.4 FILM GATE. The film aperture measures 5 x 5 inches and has a glass platen to hold the film flat while viewing. The platen is designed to accommodate 35mm up to 9 1/2" film in standard thicknesses.

3.1.3.5 FOOTAGE COUNTER. A footage counter is provided. Footage indication is displayed in lower left hand corner of screen. Counter may be reset by button on control panel.

3.1.3.6 PROJECTION LENSES.

3.1.3.6.1 LENS. Lenses used meet the requirements for resolution and distortion called out in 3.1.2.1 and 3.1.2.2.

3.1.3.6.2 LENS MOUNT. An operator control is provided for interchanging lenses to provide variable magnification. Lens selection is performed electrically. Three magnifications, 5X, 12X and 30X are provided. One spare lens position on the turret is provided, making a total of four positions. Extreme care was used in design of the turret to minimize the effect of vibration.

3.1.3.6.3 FOCUS CONTROL. The lenses are par-focussed so that when they are interchanged, the image is in focus. In addition, an operator control is provided for vernier adjustment of focus.

3.1.3.7 RELAY MIRRORS. The mirrors used for reflecting the projected image are a high quality aluminized front surface mirror protected by silicon monoxide coating. The mirrors are of sufficient flatness and thickness to meet the resolution and distortion requirements of paragraph 3.1.3; but in no case are mirrors to be less than 1/2 inch thick. Mirrors are mounted on a three point suspension system for ease in alignment. Care was taken to prevent a loss of image resolution due to vibration in the mirror system.

3.1.3.8 SCREEN. The screen material is LGP-60 (LS 60-GPL) Polacoat. Minimum screen size shall be 28 inches x 28 inches. The screen is not cemented into a frame and may be easily removed from the front of the machine.

3.1.4 FILM TRANSPORT SYSTEM.

3.1.4.1 FILM SPOOLS. The viewer will handle rolls of 9 1/2" width film up to 250 ft. long, (6 inch maximum reel diameter) and 5" wide film up to 500 ft. long (7 3/4" maximum reel diameter) and of 70mm and 35mm film up to 1000 feet in length. (10 1/2" maximum reel diameter). The film transport system allows for spools of any standard size.

3.1.4.2 FILM SCAN SPEED. Normal film movement in forward and reverse is by capstan drive of the film with variable control of the capstan drive motor. Film speed with capstan drive is variable from .1 to 5 inches per second. Sufficient control of the film movement will be provided to insure smooth film movement at all scan speeds.

3.1.4.3 REWIND SPEEDS: Rewind and fast forward drive is provided by the film spool torque motors and a variable control. A maximum rewind speed of 200 ft/min is provided. Sufficient control of the braking system is maintained to insure there will be smooth stop motion when the variable control is returned to the stop position.

3.1.4.4 FILM TRANSPORT CONTROLS. Film transport control logic shall interlock the film transport operations so that it is virtually impossible for an operator to damage film by improper sequencing of film transport controls.

3.1.4.5 PERMANENT CIRCUIT DIAGRAMS. To minimize the effect of lost instruction books, a circuit diagram of the transport control and lens shift control circuit is permanently glued to the inside of one of the cabinet covers.

3.1.5 OPERATING ENVIRONMENT.

3.1.5.1 ATMOSPHERE. The machine is designed for operation in normal air conditioned office environment.

3.1.5.2 ELECTRICAL. The viewer operates from a nominal 117 volts, 15 ampere, 60 cps, single phase circuit. Sufficient voltage regulation is to be incorporated in the equipment to insure maximum performance of the film torque control system with a line voltage continuously varying from 100 volts to 125 volts. All electrical and electronic parts are to be of the heavy duty, maximum reliability type. Indicator lamps are provided for each fuse holder and relay, and the fuse holders are marked to indicate correct amperage. A chassis and cabinet grounding wire is included in the AC line cord and terminated in standard three pin connectors.

3.1.5.3 RELOCATION FEATURES. The viewer is equipped with casters for easy relocation within an office building. The viewer is capable of passing thru a standard 36 inch office door by swinging the hinged control panel down.

3.1.5.4 VIBRATION. The viewer is equipped with vibration isolators to provide reasonable protection from vibration.

3.1.6 HUMAN ENGINEERING.

3.1.6.1 RELIABILITY. The viewer will be required to operate on a "production line" basis. Therefore, it features good reliability and maintainability even though operated and maintained by semi-skilled personnel. Relays in the control circuitry are protected with dust covers. All circuits are designed to be failsafe and are properly fused.

3.1.6.2 MAINTAINABILITY. Special consideration has been given to design for ease of maintenance. Access doors, panels or covers are provided for easy access to parts requiring periodic cleaning and/or most subject to failure.

3.1.6.3 FUNCTIONAL LAYOUT. All operating controls are conveniently within the reach of a comfortably seated operator. Controls are grouped by function and suitably identified. Operation of controls follows established conventions such as up for on, clockwise for increase, etc.

3.1.6.4 SAFETY. Projection and overhanging edges which could injure operator or maintenance personnel have been reduced. All edges and corners of the cabinet are rounded. Chassis and cabinet have a positive connection to ground thru the AC line cord.

3.2 MATERIALS, PARTS AND PROCESSES.

3.2.1 HARDWARE. Screws, nuts, bolts, etc., are of American standard sizes, threads, etc. The minimum practicable variety of sizes and lengths have been used. Use of self-tapping sheetmetal screws have been avoided except for mounting light weight labels and similar non-critical applications. Assembly hardware is replaceable by AN standard assembly hardware. The viewer is designed, insofar as practical, for maintenance with standard hand tools of a minimum type and variety. If special tools are required, one each shall be included in the initial spares kit or shall be mounted securely within the equipment.

3.2.2 FINISHES. All surfaces are of a corrosion resistant type or are suitably treated to protect against corrosion. Painted surfaces have been protected with suitable undercoating before application of finish coats. Interior surfaces near the projection light path are finished in dull black to minimize stray light reflection.

3.2.3 LUBRICATION. Parts requiring lubrication are easily accessible and oil holes and grease fittings are provided. Wherever possible, sealed bearings of the pre-lubricated type have been used.

3.2.4 WORKMANSHIP. The equipment has been constructed and careful attention given to detail in both design and fabrication.

3.3 INITIAL SPARES KIT. A kit of initial spare parts and maintenance materials is supplied with each viewer. This kit will include the spare parts and working material that the contract deems necessary to keep the machine in operation for a period of six months. Suggested items include:

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| a. Projection lamps | e. Lens & Mirror cleaner |
| b. Platen glasses | f. Fuses |
| c. Heat glasses | g. Lubrication material & dispensers |
| d. Calibration test grid | h. Touch up paint |
| | i. Instruction & maintenance books |

3.4 INSTRUCTION BOOKS. An operator's instruction book and a maintenance technician's instruction book is delivered in the initial spares kit with each film viewer. Instruction books have been written to good commercial practice and contain a minimum of cross references.

4.1 QUALITY ASSURANCE. Testing has been progressive throughout the development program. Final inspection and acceptance testing to prove compliance with specification requirements will be at the Contractor's plant. The technical representative of the Contracting Officer shall be informed of the date of this test at least fifteen days prior to the test.

5.0 PREPARATION FOR DELIVERY. After acceptance testing, the equipment will be packaged and packed and marked for delivery in accordance with the terms of the contract.

6.0 NOTES. None.