

Appendix **B** **EQUIPMENT** **SPECIFICATION FORMS**

These equipment specification forms have been developed in order to simplify both the request for specifications and the comparison of different vendors' specifications. Copies of the General Information (see following page) and all pertinent forms are sent to each vendor under consideration when new equipment is to be purchased. Forms are included for the following equipment:

CONTENTS

- Generators (3 pages)
- X-ray Tubes
- X-ray Tube Housings
- Heat Integrators
- Image Intensifiers (2 pages)
- Video Systems
- Disc or Tape Recorders
- Cameras
- Exposure Control Systems
- Grids
- Video Systems Performance
- Camera Systems or Changer Performance

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GENERAL INFORMATION

The attached forms are provided so that we may more fairly evaluate your specifications compared to those of your competitors. It is hoped that the majority of the specification data are readily available and that it will not be necessary to specially test the equipment that is under consideration. If for any reason you feel that you cannot supply certain data, please let us know, stating the reasons that such information is not available. If you feel that your product is not properly represented by the data requested in these forms, please let us know and provide us with what you believe is the appropriate data.

The following guidelines should assist you in preparing the necessary information for our evaluation:

1. All blanks on the attached forms must be filled in for the equipment upon which you are bidding.
2. All data must be provided in the units noted.
3. We have not specified the methods of evaluation; therefore it will be necessary for you to provide the appropriate conditions for the tests you have carried out (e.g., kVp, mA, exposure time, focal spot size, scattering material (if any), geometry, test target used, etc.).
4. The specification data provided on these forms will become part of the purchase order and, hence, the specifications for acceptance.
5. If alternate (optional) equipment is to be considered a complete evaluation form will be re-

quired for each alternate item. For example, if two generators are being considered, one bid and the other as an option, two sets of the generator specification forms must be provided, one for each generator.

6. After completion of the forms please number all pages (e.g., page 1 of 10) to assure that none of your material is overlooked.
7. Please provide all other available data and specifications for equipment quoted (e.g., single exposure rating, anode thermal characteristic, housing cooling, angiographic rating, cine-radiographic rating, and fluoroscopic rating charts for x-ray tubes and housings).
8. On your quote, please provide list and net price for all units of equipment comprising a component of the system (e.g., spot film camera system).
9. Price quotes for components should include the cost of necessary additional fixtures. For example, the quote price for a spot film camera system should include the cost of all mounting, support, and interfacing components.
10. These forms along with your detailed quotation and other supporting information should be supplied to _____
_____. A total of three copies would be appreciated.

If you have any questions concerning the forms, the information requested, or any other matters, please contact _____
_____.

Vendor

Date

GENERATORS (page 1)

Manufacturer

Model Number

Power Requirements

Preferred Mains Voltage

_____ V

Single or Three Phase

_____ Ø

kVA

_____ kVA

kVp

Push-button or Dial

Minimum kVp

Maximum kVp

Steps

Specified Accuracy

mA

Push-button or Dial

Minimum mA

_____ mA

Maximum mA

_____ mA

mA Stations—Small Focus

Large Focus

Specified Accuracy

Timing

Type (e.g., forced extinction)

Manual—Minimum

_____ msec ± _____ msec at _____ kVp _____ mA

10 msec

10 msec ± _____ msec at _____ kVp _____ mA

100 msec

100 msec ± _____ msec at _____ kVp _____ mA

Automatic—Minimum

_____ msec ± _____ msec at _____ kVp _____ mA

10 msec

10 msec ± _____ msec at _____ kVp _____ mA

100 msec

100 msec ± _____ msec at _____ kVp _____ mA

Vendor

Date

GENERATORS (page 2)

Timing (cont.)

Maximum Exposure Time _____ sec
Is maximum exposure time adjustable? _____ yes _____ no
Exposure Time Settings _____
Phase-In Interrogation Time _____ msec at _____ kVp and _____ mA
Maximum Exposures per Second _____ exposures/second
Exposure Time Display (Type) _____
Falling Load _____ yes _____ no

kW Ratings

at 70 kVp _____ kW
80 kVp _____ kW
90 kVp _____ kW
100 kVp _____ kW
110 kVp _____ kW
125 kVp _____ kW
150 kVp _____ kW

Premagnetization Time

_____ msec

Time Sharing Capability

_____ yes _____ no

Fluoroscopy

kVp Range _____ kVp to _____ kVp
Steps _____

mA Range _____ mA to _____ mA
Steps _____

Timer Range _____ min to _____ min
Steps _____

Automatic Exposure Control _____ kVp only _____ mA only _____ mA-kVp
combined

Vendor

Date

GENERATORS (page 3)

Focal Spot Size Selection

Available Independent of mA? _____ yes _____ no

Rotor Speeds

Available _____ rpm

_____ rpm

Percentage Ripple

(Measured as x-ray output)

_____ % at 80 kVp, 100 mA

_____ % at 80 kVp, 200 mA

_____ % at 80 kVp, 400 mA

_____ % at 80 kVp, 600 mA

_____ % at 80 kVp, 800 mA

_____ % at 80 kVp, 1000 mA

Vendor

Date

X-RAY TUBES

Manufacturer

Tube Model #

Focal Spot Size

Unbiased

Biased

Small

_____ mm

_____ mm

Large

_____ mm

_____ mm

Will you accept star measurements
for testing purposes?

_____ yes

_____ no

kW Rating

Small Focal Spot

_____ kW

_____ kW

Large Focal Spot

_____ kW

_____ kW

Maximum kVp

_____ kVp

Anode Characteristics

Angle—Small Focal Spot

_____ °

Large Focal Spot

_____ °

Heat Capacity

_____ HU

Cooling Rate

_____ HU/min (maximum)

Rotor Speed Requirements

Fluoroscopic—Small Focal Spot

_____ rpm

Large Focal Spot

_____ rpm

Radiographic—Small Focal Spot

_____ rpm

Large Focal Spot

_____ rpm

Bias Power Supply

Bias Voltage

_____ V

Number of Tubes per Supply

Vendor

Date

X-RAY TUBE HOUSINGS

Manufacturer

Housing Model #

Housing Characteristics

Heat Capacity

_____ HU

Cooling Rate—Without Fan

_____ HU/min (maximum)

With Fan

_____ HU/min (maximum)

With Liquid Circulation System

_____ HU/min (maximum)

Vendor

Date

HEAT INTEGRATORS

Manufacturer

Model #

Number of Tubes

Display and Warning

Digital or Analog Display

All Tubes Simultaneously?

_____ yes _____ no

% of Maximum or % Remaining

Audible Overload Indicator

_____ yes _____ no

System Lock at Overload?

_____ yes _____ no

Manual Lock Override?

_____ yes _____ no

Vendor

Date

IMAGE INTENSIFIERS (page 1)

Manufacturer

Model #

Input Field Size

Small

_____ in ± _____ in

Medium

_____ in ± _____ in

Large

_____ in ± _____ in

Output Phosphor Size

_____ in ± _____ in

Phosphor Types

Input

Output

X-ray Absorption at 60 keV

_____ %

Resolution*

Small Field—Center

_____ cycles/mm

50%

_____ cycles/mm

Edge

_____ cycles/mm

Medium Field—Center

_____ cycles/mm

50%

_____ cycles/mm

Edge

_____ cycles/mm

Large Field—Center

_____ cycles/mm

50%

_____ cycles/mm

Edge

_____ cycles/mm

*Please state measurement technique (e.g., kVp, target type, scatter).

Vendor

Date

IMAGE INTENSIFIERS (page 2)

Brightness Falloff*

Small Field _____ %

Medium Field _____ %

Large Field _____ %

Contrast Sensitivity*

Small Field _____ %

Medium Field _____ %

Large Field _____ %

Contrast Ratio*

Small Field _____ %

Medium Field _____ %

Large Field _____ %

Conversion Factor*

$$\left(\frac{\text{cd}}{\text{m}^2 \text{ mR/sec}} \right)$$

Minimum

Maximum

Small Field _____

Medium Field _____

Large Field _____

Flare or Veiling Glare*

Small Field _____ %

Medium Field _____ %

Large Field _____ %

*Please state measurement technique.

Vendor

Date

VIDEO SYSTEMS

Video Tube (Please provide manufacturer's data sheet)

Manufacturer _____
Type (e.g., vidicon, lead-oxide vidicon, or plumbicon) _____
Model # _____
Target Voltage _____ V

Camera-Video Tube-Amplifier Chain

Manufacturer _____
Model # _____
Bandwidth _____ MHz at - 3dB
Signal-to-Noise Ratio _____ dB
Scan Lines Per Frame _____
Shading Correction? _____ yes _____ no
Gamma Correction? _____ yes _____ no
Other Signal Processing (e.g., white clip or crush)?
Describe _____
Composite Video Signal _____ mV
Sync Pulse _____ mV
RS/170 Standard Signal? _____ yes _____ no
Does video signal contain serrations and equalizing
pulses? _____ yes _____ no
AGC or ATC? _____
Aspect Ratio (4:3, 1:1, etc.) _____

Monitor

Manufacturer _____
Model # _____
Size (diagonal) _____ in
Bandwidth _____ MHz at - 3dB
Signal-to-Noise Ratio _____ dB
Black Level Clamping _____ yes _____ no

Vendor

Date

DISC OR TAPE RECORDERS

Manufacturer _____

Model # _____

Type (U-matic, hard disc, floppy disc, etc.) _____

Bandwidth _____

MHz at - 3 dB

Signal-to-Noise Ratio

Inner track _____

dB

Outer track _____

dB

Maximum Number of Images

_____ fields _____ frames

Real-Time Recording

Frames/sec—Record _____

fps

Playback _____

fps

Is (single frame) playback field or frame? _____

yes

_____ no

Last Image Hold? _____

yes

_____ no

Composite Video Signal _____

mV

Sync Pulse _____

mV

RS-170 Standard Signal? _____

yes

_____ no

Does video signal contain serrations and equalizing pulses? _____

yes

_____ no

Automatic Video Level Control _____

yes

_____ no

Vendor

Date

CAMERAS

Manufacturer

Model #

Film Size

_____ mm

Image Size

_____ mm

Film Holders

Maximum Input Capacity

_____ sheets or feet

Maximum Output Capacity

_____ sheets or feet

Frame Rates

_____ fps

Lens

Focal Length

_____ mm

Widest Aperture

_____ f/#

f/# Stops Available

Continuous or Waterhouse

Resolution* (Camera only—i.e., lens plus film during
maximum speed run)

_____ cycles/mm

*Please state measurement technique.

Vendor

Date

EXPOSURE CONTROL SYSTEMS

Fluoroscopic

Manufacturer _____

Model # _____

Type (ionization, PMT, peak video, average video) _____

% of Image Area View for Exposure Control _____ %

Technique (mA-kVp variable, mA variable, kVp variable, etc.) _____

Manual Overrides (Types and Techniques) _____

Spot Film and/or Spot Film Cameras (Specify)

Manufacturer _____

Model # _____

Type (ionization, screen-PMT, etc.)
If screen, what type? _____

Technique (Fixed mA and kVp with variable time, floating mA and/or kVp with fluoro, etc.) _____

Maximum Exposure Time _____ msec

Minimum Exposure Time _____ msec

Manual Technique (mA and/or kVp and/or Time) _____

Density Selector

Type _____

Number of Steps _____

% Exposure (not density) Change per Step _____ %

Vendor

Date

GRIDS

Application

(Bucky, fluoro, image intensifier, film changer, etc.)

Manufacturer

Model #

Ratio

Lines/cm

_____ lines/cm

Lead Content

_____ g/cm²

Focus Range

_____ in to _____ in

Removable?

_____ yes _____ no

Vendor _____

Date _____

VIDEO SYSTEMS PERFORMANCE

Total Video Chain Including Image Intensifier
but Excluding Image Storage Devices

Bandwidth	_____ MHz at - 3 dB		
Signal-to-Noise Ratio	_____ dB		
	<u>Small Field</u>	<u>Medium Field</u>	<u>Large Field</u>
Brightness Fall-Off*	_____ %	_____ %	_____ %
Contrast Sensitivity*	_____	_____	_____
Contrast Ratios*	_____	_____	_____
Flare or Veiling Glare*	_____	_____	_____
Resolution* —Center	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm
50%	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm
Edge	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm

Total Video Chain Including Image Intensifier
and Image Storage Devices

Bandwidth	_____ MHz at - 3 dB		
Signal-to-Noise Ratio	_____ dB		
Inner Track	_____ dB		
Outer Track	_____ dB		
	<u>Small Field</u>	<u>Medium Field</u>	<u>Large Field</u>
Resolution—Center	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm
50%	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm
Edge	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm

*Please state measurement technique.

Vendor

Date

CAMERA SYSTEMS OR CHANGER PERFORMANCE

Image Intensifier-Camera, Spot Film
System, or Film Changer

Resolution*	<u>Small Field</u>	<u>Medium Field</u>	<u>Large Field</u>
Single Frame—Center	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm
50%	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm
Edge	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm
Nominal Frame Rate (____ fps)			
Center	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm
50%	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm
Edge	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm
Maximum Frame Rate (____ fps)			
Center	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm
50%	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm
Edge	_____ cycles/mm	_____ cycles/mm	_____ cycles/mm
Brightness Falloff*	_____ %	_____ %	_____ %
Contrast Sensitivity*	_____	_____	_____
Contrast Ratio*	_____	_____	_____
Flare or Veiling Glare*	_____	_____	_____

*Please state measurement technique.

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