

Note: Document originally drafted in the English language.

Product Description	
The G-1592 is a 133 mm (5.25 inches) 150 kV, 1.1 MJ (1.5 MHU) maximum anode heat content, rotating anode insert. This metal center section insert is designed for radiography, cineradiography, digital and film screen angiography procedures. The insert features a 12° tungsten-rhenium -molybdenum graphite backed target and is available with the following nominal focal spots:	0.6 - 1.2 IEC 60336
Nominal Anode Input Power Small - 47 kW IEC 60613 Large - 112 kW IEC 60613 For the equivalent anode input power of 250 Watts	Puissance anodique nominale de l'anode Petit foyer - 47 kW CEI 60613 Grand foyer - 112 kW CEI 60613 Pour la puissance anodique d'équilibre thermique de 250 Watts

Description du Produit	
Le tube G-1592, à anode tournante de 133 mm, (5,25 pouces), de 150 kV, et une capacité calorifique maximale de 1,1 MJ (1,5 MUC). Cette section métallique centrale a été conçue pour les procédures radiographiques, cinéradiographiques, angiographiques numérisés et sur film. L'doublement de graphite anode composite en tungstène- rhénium molybdénium avec pente d'anode de 12° est disponible avec les combinaisons focales suivantes:	0,6 - 1,2 CEI 60336
Puissance anodique nominale de l'anode Petit foyer - 47 kW CEI 60613 Grand foyer - 112 kW CEI 60613 Pour la puissance anodique d'équilibre thermique de 250 Watts	

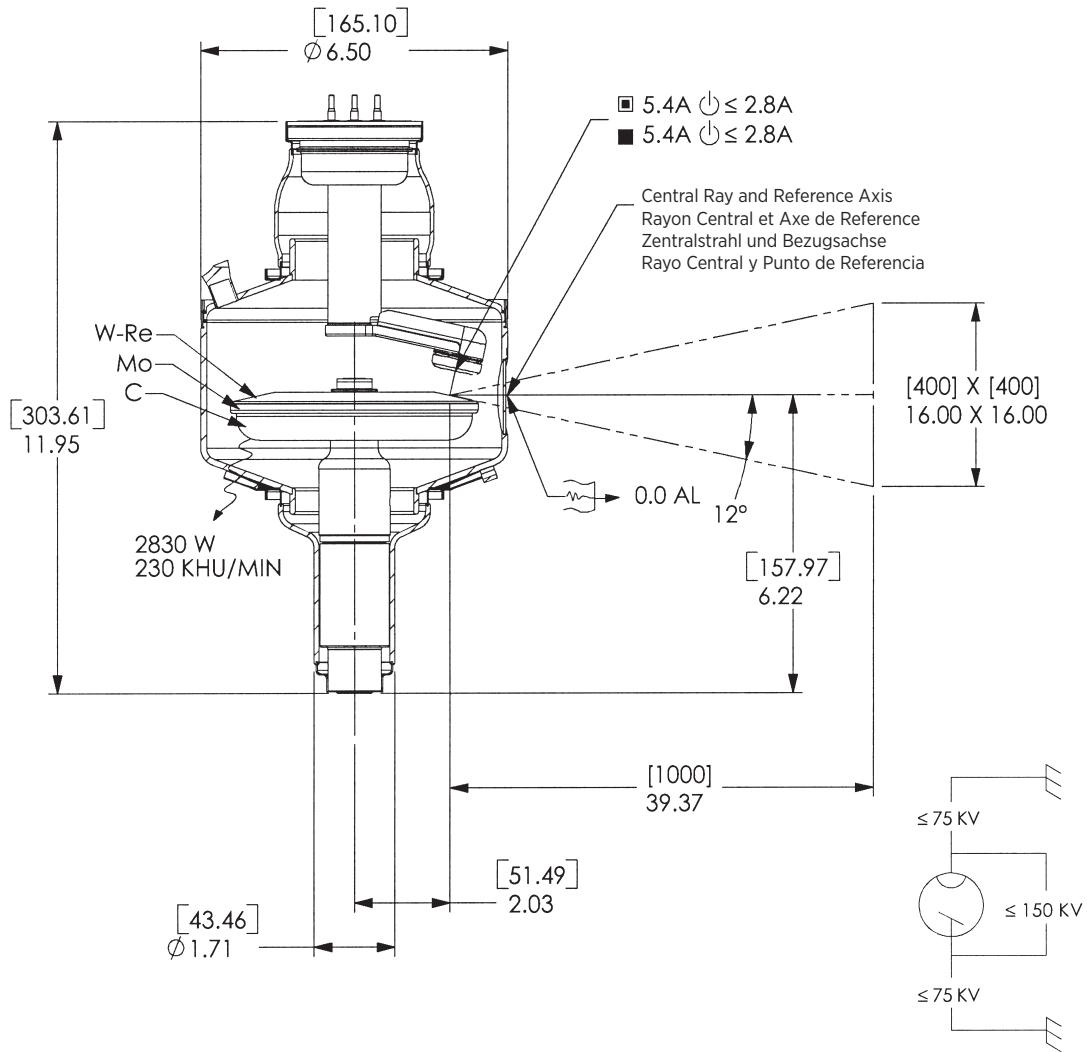
Produktbeschreibung	
Die G-1592 ist eine 133 mm (5.25 zoll) Doppelfokus Drehanoden-Röntgenröhre, mit einer Wärmespeicherkapazität des Anodenstellers von 1,1 MJ (1,5 MHU) und einer max. Spannungsfestigkeit von 150 kV. Diese Röhre ist speziell für den Einsatz mit metallischem Mittelteil wurde für Radiographie-, Röntgenkinematographie-, digitale und Filmangiographieverfahren entwickelt. Der rückseitig graphitbeschichtete Rhenium-Wolfram- und Molybdän Anodensteller besitzt einen Winkel von 12°. Folgende Brennfleck- Kombination ist lieferbar:	0.6 - 1.2 IEC 60336
Nominale Anodenbezugsleistung Klein - 47 kW IEC 60613 Gross - 112 kW IEC 60613 Gilt bei einer Äquivalent - Anodenleistung von 250 Watt	

Descripción del Producto	
El G-1592 es un tubo de ánodo giratorio de 133 mm (5.25 pulgadas), 150 kV, 1.1 MJ (1.5 MHU). Este tubo de metal en la parte central es diseñado para radiografía, cineradiográfica, digital, y procedimientos de angiografía con película de pantalla. Consta se un objetivo de renio, tungsteno y molibdeno con grafito en la parte posterior con un rayo central de 12°. Disponible con las siguientes combinaciones de marcas focales:	0.6 - 1.2 IEC 60336
Potencia nominal de entrada del anodo Foco fino - 47 kW IEC 60613 Foco grueso - 112 kW IEC 60613 Para una potencia equivalente del anodo de 250 Watts	



Dimensions are for Reference only
Les dimensions sont pour la référence seulement
Maße sind als nur Referenz
Las dimensiones están para la referencia solamente

Tube Outline Drawing
Dessin d'Encombrement de la Tube
Maßzeichnungen des Drehanoden-Röntgenröhre
Esquema Detallado del Tubo



Small -White
Petit - Blanc
Klein - Weiss
Pequeño - Blanco

Frame or Chassis
Masse
Chassis
Soporte o Chasis

Large - Black
Grand - Noir
Gross - Schwarz
Largo - Negro

X-Ray Tube
Tube Radiogène
Röntgenröhre
Tubo de Rayos X

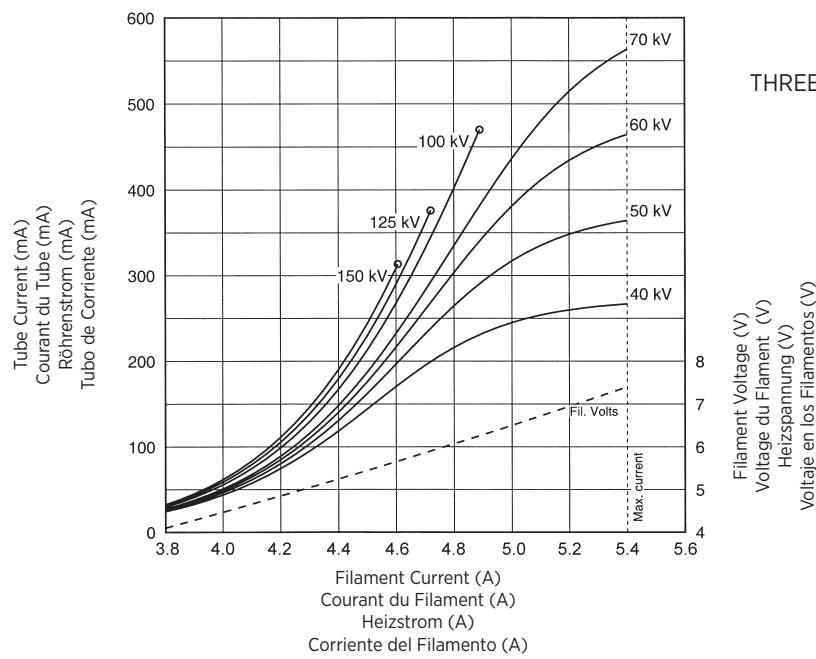
Stand - By
Attente
Bereit Stehen
En Espera

Radiation Filter or Filtration
Filtre de rayonnement
Filterung
Filtración de Radiación

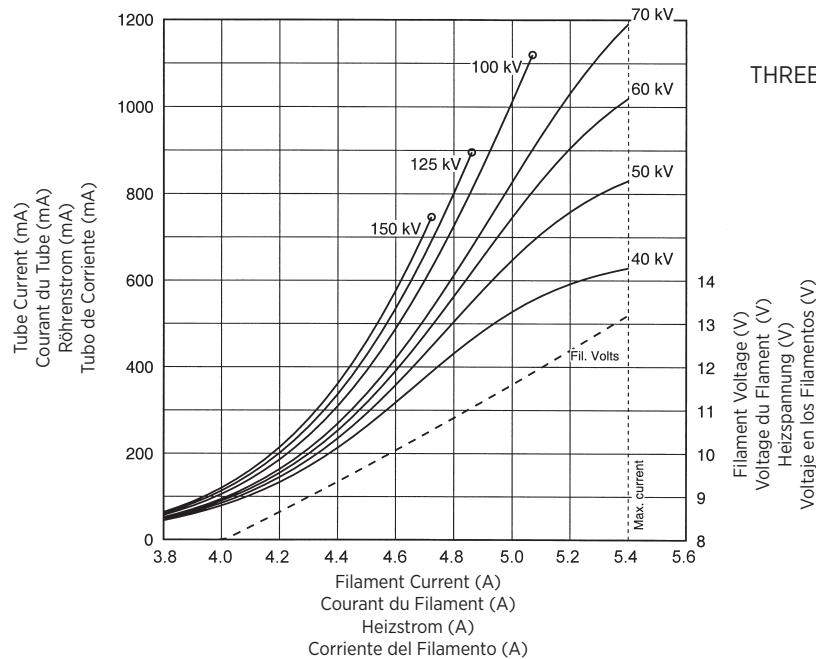


3 Ø Full Wave

Filament Emission Charts IEC 60613
 Abaques d' Émissions des Filaments CEI 60613
 Glühfadenemissionsdiagramm IEC 60613
 Curvas de Emisión de los Filamentos IEC 60613



THREE PHASE EMISSION ($\pm .15$ A)
 0.6



THREE PHASE EMISSION ($\pm .15$ A)
 1.2

Note:
 When using these emission curves for trial exposures, refer to the power rating curves shown for maximum kV, tube emission, filament current, exposure time, and target speed.

Remarque:
 Lors de l'utilisation de ces abaques pour des expositions d'essai, référez-vous aux courbes maximales de kV, d'émission du filament, de temps d'exposition et de vitesse de rotation.

Anmerkung:
 Wenn Sie diese Emissionskurven für Testaufnahmen verwenden, beziehen Sie sich hierbei auf die entsprechenden Nennleistungskurven für max. kV-Werte, Röhrenemission, Heizstrom, und Anodendrehzahl.

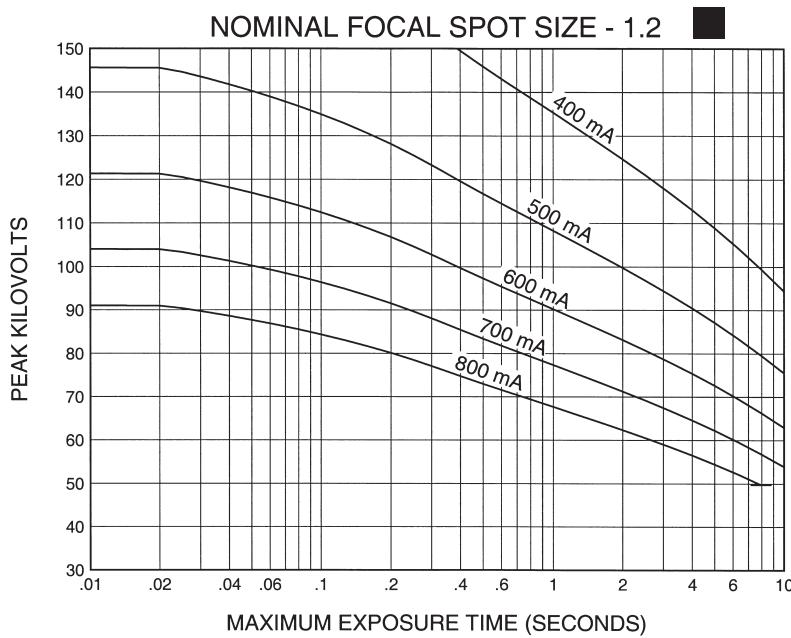
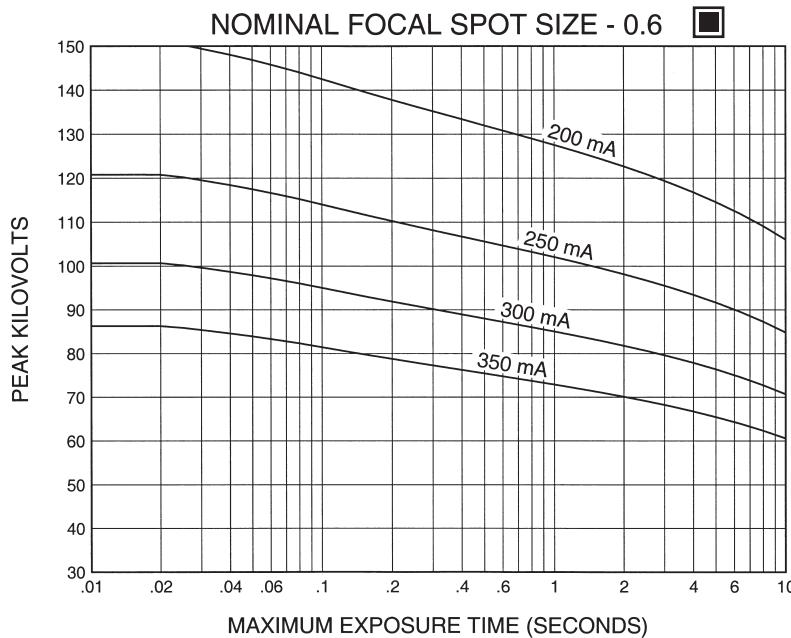
Nota:
 Si utiliza estas curvas de emisión para exposiciones de prueba, refiérase a las curvas de graduación de potencia para el máximo de kV, tubo de emisión, corriente en los filamentos, tiempo de exposición, y a las curvas de velocidad del objetivo.



3 Ø Constant Potential ---

Single Load Ratings IEC 60613
Abaques de Charge pour Pose Unique CEI 60613
Brennfleck - Belastungskurven IEC 60613
Diagramas de Exposición Radiográfica IEC 60613

50 Hz



Nominal anode input power for the anode heat content 40%. IEC 60613

Puissance calorifique nominale de l'anode: 40%, CEI 60613

Thermische Anodenbezugsleistung bei einer Wärmespeicherung von 40%. IEC 60613

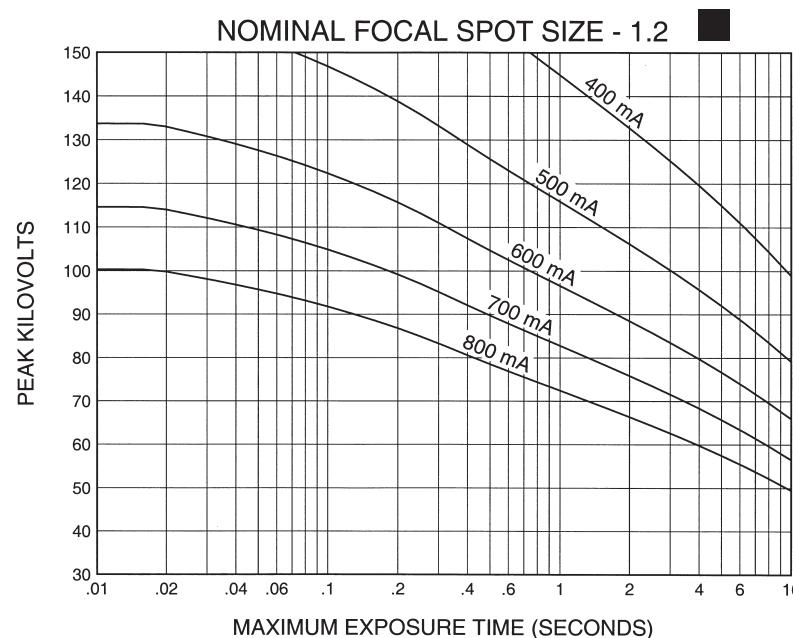
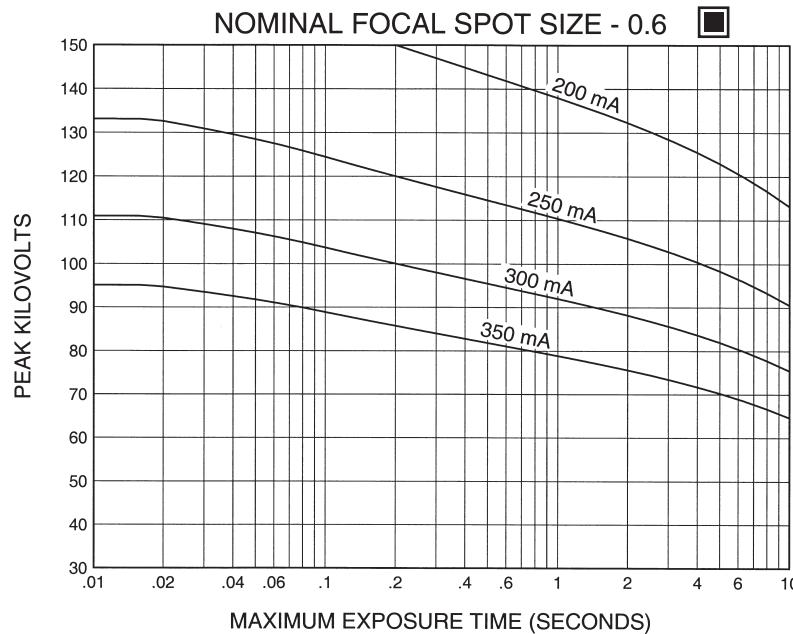
Aproximadamente el poder de penetración para obtener un almacenaje de calor del anodo de 40%. IEC 60613



3 Ø Constant Potential ---

Single Load Ratings IEC 60613
Abaques de Charge pour Pose Unique CEI 60613
Brennfleck - Belastungskurven IEC 60613
Diagramas de Exposición Radiográfica IEC 60613

60 Hz



Nominal anode input power for the anode heat content 40%. IEC 60613

Puissance calorifique nominale de l'anode: 40%, CEI 60613

Thermische Anodenbezugsleistung bei einer Wärmespeicherung von 40%. IEC 60613

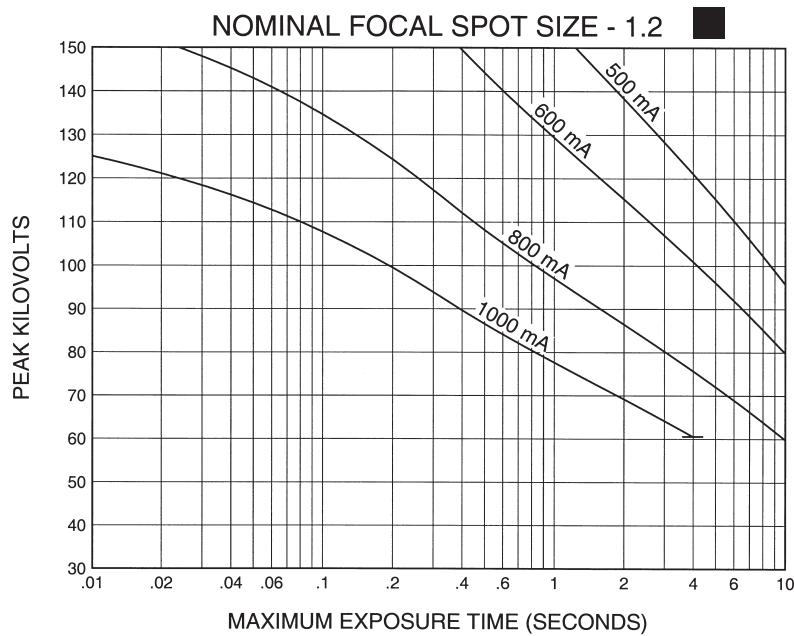
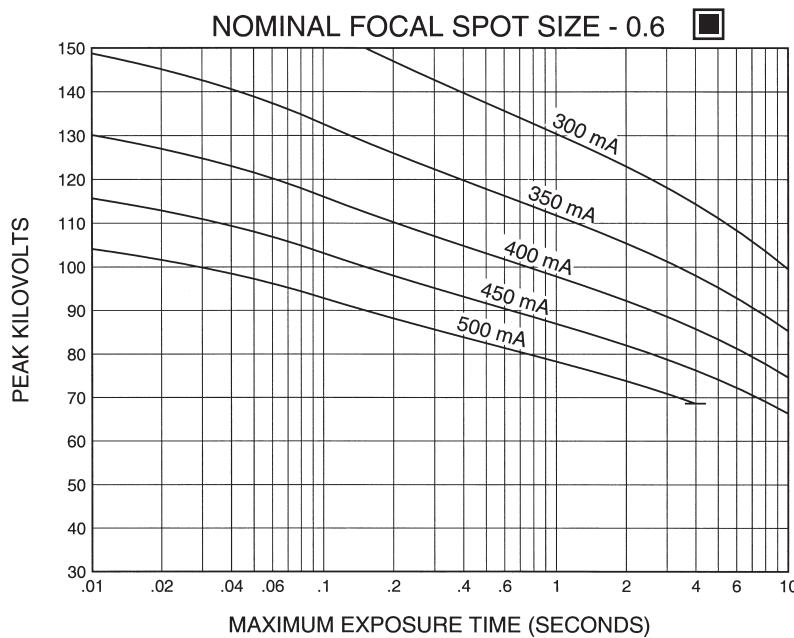
Aproximadamente el poder de penetración para obtener un almacenaje de calor del anodo de 40%. IEC 60613



3 Ø Constant Potential ---

Single Load Ratings IEC 60613
Abaques de Charge pour Pose Unique CEI 60613
Brennfleck - Belastungskurven IEC 60613
Diagramas de Exposición Radiográfica IEC 60613

150 Hz



Nominal anode input power for the anode heat content 40%. IEC 60613

Puissance calorifique nominale de l'anode: 40%, CEI 60613

Thermische Anodenbezugsleistung bei einer Wärmespeicherung von 40%. IEC 60613

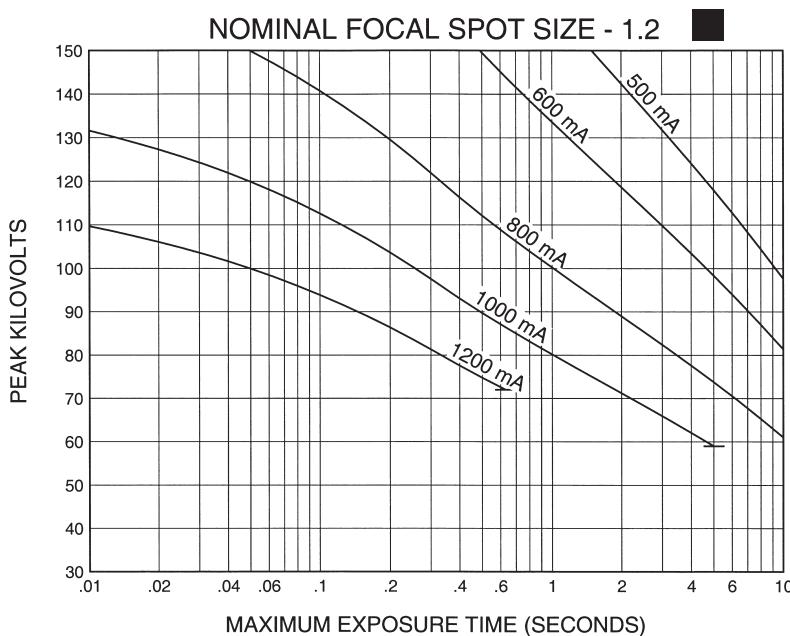
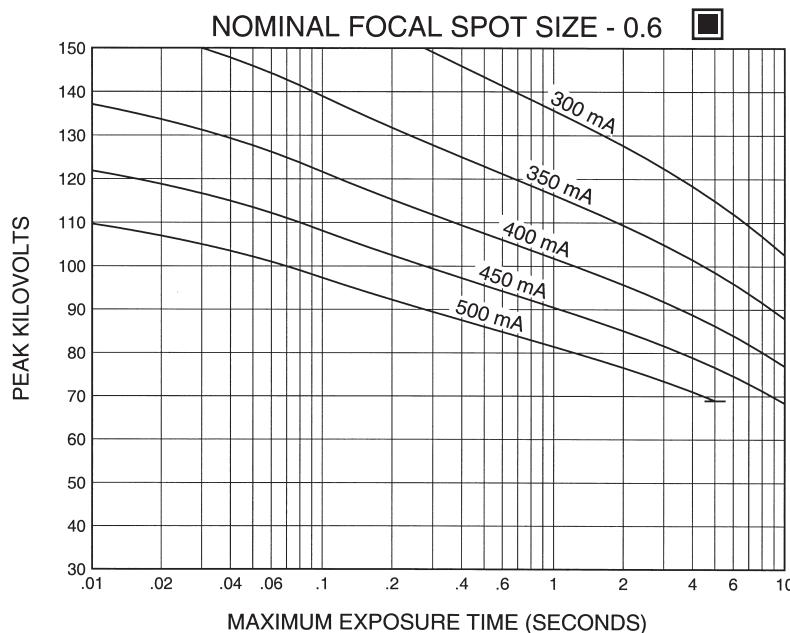
Aproximadamente el poder de penetración para obtener un almacenaje de calor del anodo de 40%. IEC 60613



3 Ø Constant Potential ---

Single Load Ratings IEC 60613
Abaques de Charge pour Pose Unique CEI 60613
Brennfleck - Belastungskurven IEC 60613
Diagramas de Exposición Radiográfica IEC 60613

180 Hz



Nominal anode input power for the anode heat content 40%. IEC 60613

Puissance calorifique nominale de l'anode: 40%, CEI 60613

Thermische Anodenbezugsleistung bei einer Wärmespeicherung von 40%. IEC 60613

Aproximadamente el poder de penetración para obtener un almacenaje de calor del anodo de 40%. IEC 60613

CINERADIOGRAPHIC RATINGS

HOW TO USE CINERADIOGRAPHIC CHARTS

General: With the Cineradiographic rating chart we can determine the maximum allowable kW of the Cine pulse, or with a given kW determine maximum time in seconds the Cine run can progress.

The Most common way of using the charts is to determine maximum time of any expected Cine run and maximum duty factor. With a known duty factor and Cine run time kW can easily be determined.

Definition of Terms

Time in seconds: Total time of one Cine run, usually 5 to 12 seconds.

Duty Factor in Percent (DF%): Actual time during one second the x-ray tube is producing x-rays. If we select a 4 msec pulse width and 60 exposures per second the x-ray tube will be producing x-rays for a total of 240 msec each second or 24% of the time. The higher the DF number, the more load placed on the x-ray tube.

Peak Pulse Power: Peak energy in watts of any one Cine Pulse. Can be any combination of kV and mA allowed by Radiographic and Filament Emission curves.

Example: 80 kV at 400 mA equals

$$80,000 \text{ V} \times 0.4 \text{ A} = 32,000 \text{ W} \text{ or } 32 \text{ kW}$$

USING THE CINE RATING CHARTS:

G-1592 150/180 HZ 3 Phase 1.2 Focal Spot

Example: Determine maximum kW allowed with the following known factors:

Maximum Pulse Width 4 msec
 Exposures per Second 60
 Maximum Cine Run Time10 seconds

Calculate Duty Factor: (DF%)

$$\text{DF\%} = \frac{\text{Pulse Width (mSec)} \times \text{Frames per Second}}{10}$$

$$\text{DF\%} = \frac{4 \text{ msec} \times 60 \text{ exp/sec}}{10} = \frac{240}{10} = 24\%$$

Refer to Rating Chart

G-1592 150/180 HZ 3 Phase 1.2 Focal Spot:

At bottom of chart find 10 second line. Move vertically to intersection with 24% DF curve. Make a horizontal reference to left side of rating chart and note kW rating of 75 kW.

We now know each pulse during the cine run can have a maximum rating of 75 kW under conditions given in example.

kW = kV x mA. The kW of the exposure can be any combination of mA and kV allowed by the Radiographic and Filament Emission Charts.

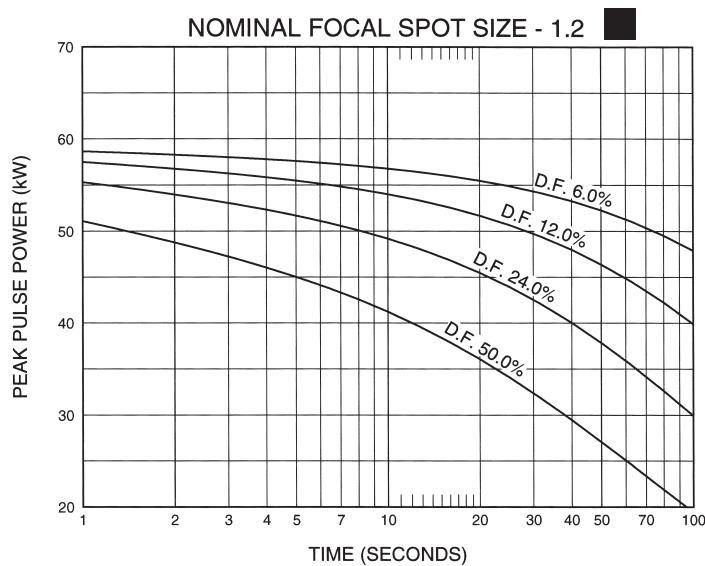
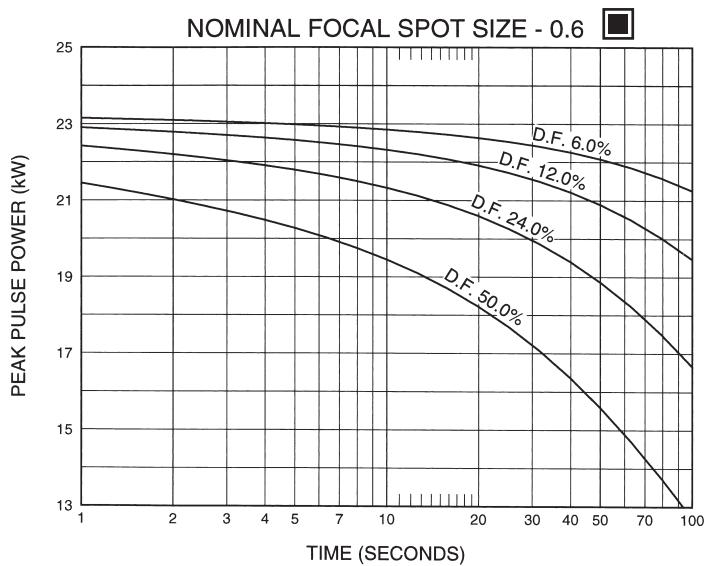
The Cine rating charts are usable to maximum anode heat content and are based on a starting anode heat content of 70% or less.



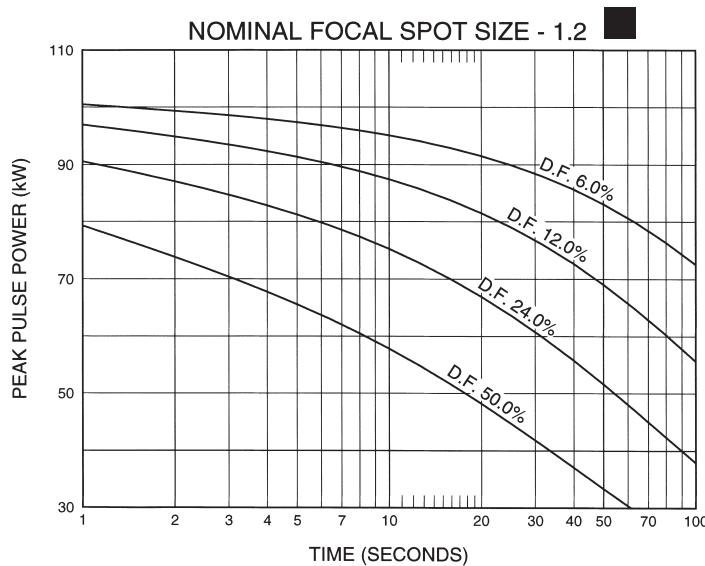
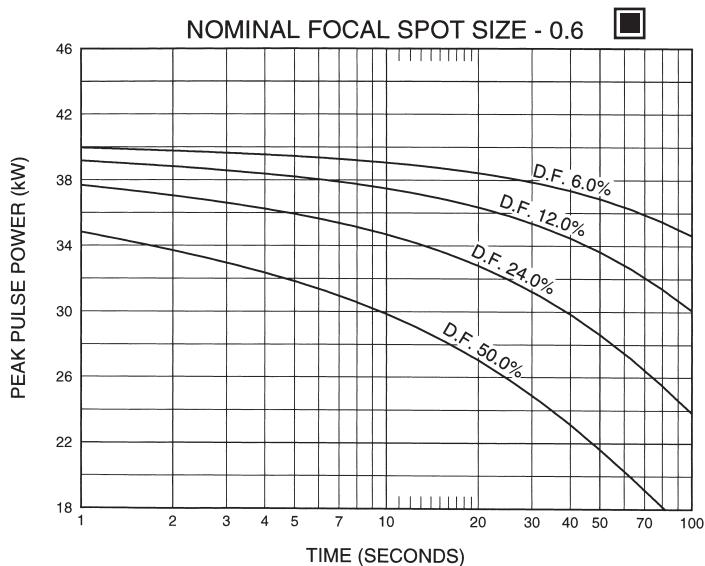
3 Ø Constant Potential ---

Cineradiographic Exposure Charts IEC 60613
Abaques de Cinéradiographie CEI 60613
Belastungskurven für den Kinobetrieb IEC 60613
Diagramas de Exposición Cineradiográfica IEC 60613

50/60 Hz



150/180 Hz



Nominal anode input power for the anode heat content 70%. IEC 60613

Puissance calorifique nominale de l'anode: 70%, CEI 60613

Thermische Anodenbezugsleistung bei einer Wärmespeicherung von 70%. IEC 60613

Aproximadamente el poder de penetración para obtener un almacenaje de calor del anodo de 70%. IEC 60613

ANGIOGRAPHIC RATINGS

HOW TO USE ANGIOGRAPHIC CHARTS

General: Serial Radiography puts a severe demand on the x-ray tube due to the large number of exposures made in rapid succession. Intervals between exposures are fixed and so short that it is not possible for the anode track to cool to any extent during the exposure series. Therefore, the temperature of the anode track increases from exposure to exposure. The kW values used in the angiographic charts have been determined to prevent damage to the anode. The angiographic rating charts are usable to 100% anode heat storage. Exceeding 100% anode heat storage will cause anode track erosion with high risk of tube destruction.

Definition of Terms

Number of Exposures in Series: The number of exposures made in succession or the number of exposures made during one contrast injection.

Exposure Rate: The number of exposures made per second. For a series of exposures where the exposure rate changes, it must be assumed that all exposures will be made at the maximum rate. For example, if during a series 10 exposures will occur at one per second and 30 exposures at 4 per second, use the kW ratings in the 40 exposure column at 4 per second rate.

Exposure Time: Time in seconds of each exposure.

USING THE CHARTS:

Select Correct Chart:

0.6 or 1.2 Focal Spot

Note: 150/180 HZ rotor speed recommended for all angiography.

Determine the number of exposures in Series: With cut film angiography the number of exposures are known, however in Digital Angiography the number of exposures commonly are not known. When determining the number of exposures, assume worst case or past history.

Note: Most angiographic x-ray tubes fail from underestimating the number of exposures made in a series.

Determine kW of each exposure in Series: Referring to chart —find block under “Number of Exposures in Series” that is greater than or equal to expected number of exposures in Series. On left side directly opposite this block under “Exposure Rate per Second” column, select maximum rate per second that will be used for the exposure series. At the intersection of exposure rate and exposure time in seconds, find maximum kW allowed for each exposure.

For Example: 80 pkV and 500 mA = 40 kW

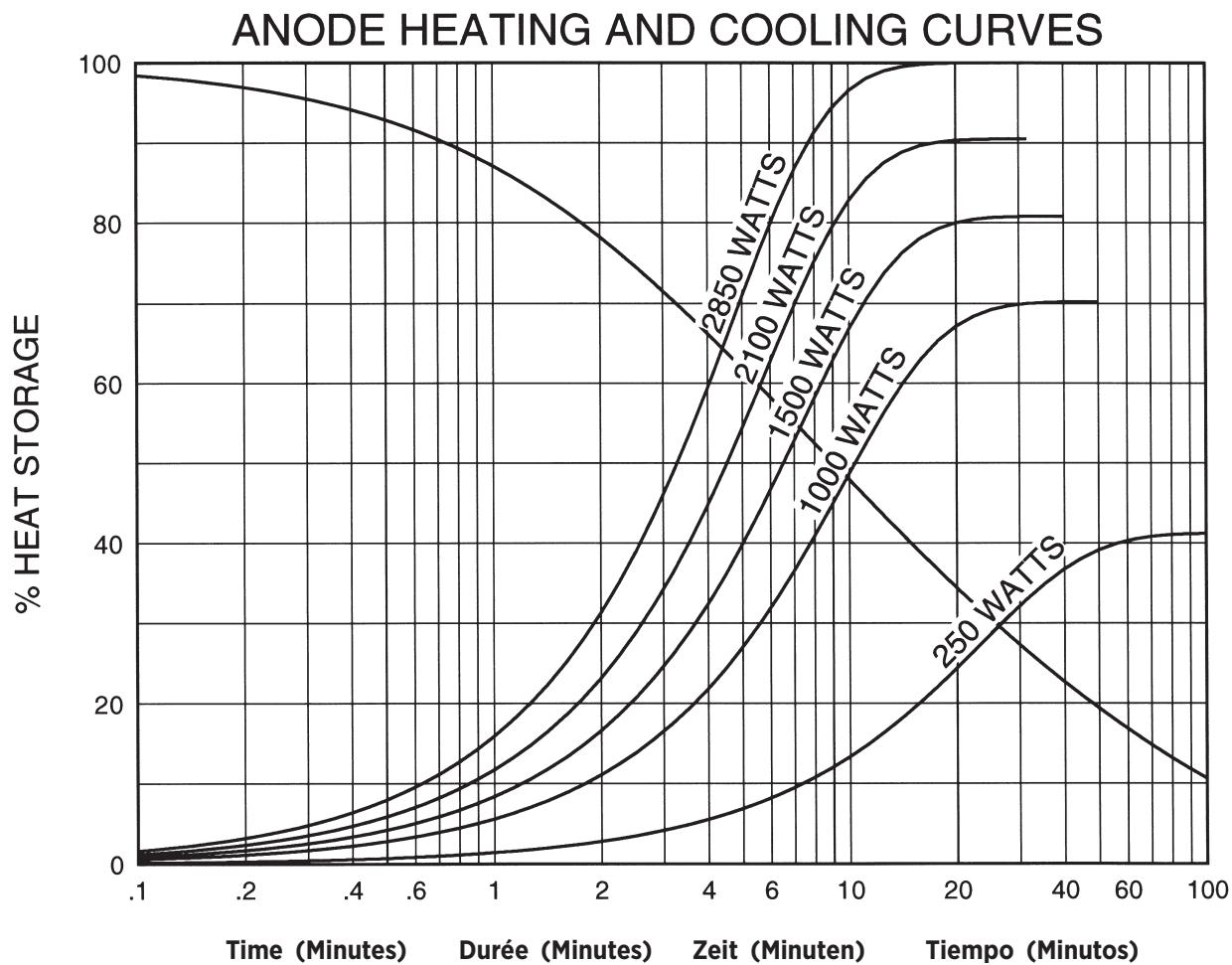
Example: From chart G-1592 150/180 HZ 3 Phase 1.2 Focal Spot, determine kW allowed with following known factors.

Maximum number of exposures40
Exposure time .050 second (50 milliseconds)
Maximum Exposure per second4

From chart find 40 exposure block. On left side directly opposite this block under “Exposure Rate per Second” column, select 4 exposures per second. Find .050 seconds at top of chart. At intersection of exposure rate line and exposure time, find 80.3 kW.



Anode Heating & Cooling Chart
Abaques d' Échauffement et de Refroidissement de L'Anode
Anoden Aufheiz - und Abkühl Kurven
Curvas de Calentamiento y Enfriamiento del Anodo





Salt Lake City, UT

1-801-972-5000

For a complete listing of our global offices,
visit www.vareximaging.com

Manufactured by Varex Imaging Corporation
Fabrique par Varex Imaging Corporation
Hergestellt von Varex Imaging Corporation
Fabricado por Varex Imaging Corporation

Specifications subject to change without notice.
Spécifications susceptibles d'être modifiées sans préavis.
Technische Daten ohne Gewähr.
Especificaciones sujetas a cambio sin previo aviso.