VARIAN
medical systems

X-RAY PRODUCTS

G-2090TRI
Rotating Anode X-Ray Tube

Tubes Radiogénes à Anode Tournante
Röntgenröehre mit rotierender Anode
Tubos de Rayos - X con Ánodo Giratorio

G-2090TRI/B-240H

Note: Document originally drafted in the English language.

Product Description

The G-2090TRI is a 5.0" (127 mm) 125 kV, 1,428 kJ (2.0 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° rhenium-tungsten facing on molybdenum with a graphite backed target and is available with the following nominal focal spots:

0.3 - 0.6 - 1.0
IEC 60336

Nominal Anode Input Power
Small - 14 kW IEC 60613
Intermediate - 45 kW IEC 60613
Large - 82 kW IEC 60613
For the equivalent anode input power of 450 Watts

Maximum Anode Cooling Rate:
3,700 W (5,170 HU/sec)

Maximum continuous anode heat dissipation:
3,700 W (5,170 HU/sec)

Reference Axis:
Perpendicular to port face.

This insert is intended for use in Varian B-240H housings.

Description du Produit

Le tube G-2090TRI, à anode tournante de 127 mm, (5,0 pouces), 125 kV, avec une capacité calorifique maximale de 1,428 kJ (2,0 MUC). Cette section métallique centrale a été conçue pour les procédures radiographiques, cinéradiographiques, angiographiques numérisés et sur film. L'tube est pourvu d'une anode avec pente de 12° en rhènium - tungsténe sur une base de molybdéne et avec un doublage de graphite. Il est disponible avec les combinaisons foyers suivantes:

0,3 - 0,6 - 1,0
CEI 60336

Puissance anodique nominale de l'anode
Petit foyer - 14 kW CEI 60613
Moyen foyer - 45 kW CEI 60613
Grand foyer - 82 kW CEI 60613
Pour la puissance anodique d'equilibre thermique de 450 Watts

Toux maximum de refroidissement de l'anode:
3,700 W (5,170 UC/sec)

Description calorifique maximim de l'anode (en continu):
3,700 W (5,170 UC/sec)

Référence axe:
Perpendiculaire à la face de sortie.

Ce tube est essentiellement destiné à être employé dans les gaines Varian des séries B-240H.

Produktbeschreibung

Die G-2090TRI ist eine 5.0" (127 mm) Doppelfokus Drehanoden-Röntgenröhre, mit einer Anoden Wärmespeicherkapazität von 1,428 kJ (2.0 MHU) und einer max. Spannungsfestigkeit von 125 kV. Diese Einsatz mit metallischem Mittielteil wurde für Radiographie-Röntgenkinematographie-, digitale und Filmangiographieverfahren entwickelt. Der rückseitig graphitbeschichtete Rhenium-Wolfram- und Molybdän Anodenteller besitzt einen Winkel von 12°. Folgende Brennfleckkombination ist lieferbar:

0.3 - 0.6 - 1.0
IEC 60336

Nominale Anodenbezugsleistung
Klein - 14 kW IEC 60613
Mitte - 45 kW IEC 60613
Gross - 82 kW IEC 60613
Gilt bei einer Aquivalent - Anodenleistung von 450 Watt

Nennliestung der Anode:
3,700 W (5,170 HU/sek)

Maximale kontinuierliche Wärmeableitung des Anodentellers:
3,700 W (5,170 HU/sek)

Referenz Achsen:
Senkrecht zum Strahlenaustrittsfenster.

Die Röntgenröhre ist für den Einbau in die Varian Strahlerhaube B-240H vorgesehen.

Descripcion del Producto

El G-2090TRI es un tubo de ánodo giratorio de 127 mm (5.0"), 125 kV, 1,428 kJ (2.0 MUC). Este tubo de metal en la parte central es diseñado especificamente para radiografía, cineradiográphica, digital, y procedimientos de angiografía con pelicula de pantalla. El blanco emisor es una combinación de renio, tungsteno y molibdeno con grafito en la parte posterior con un rayo central de 12 grados. Disponible con las siguientes combinaciones de marcas focales:

0.3 - 0.6 - 1.0
IEC 60336

Potencia nominal de entrada del anodo
Foco fine - 14 kW IEC 60613
Foco intermedio - 45 kW IEC 60613
Foco grueso - 82 kW IEC 60613
Para una potencia equivalente del anodo de 450 Watts

Medida Maxima del Enfriamiento del Anodo:
3,700 W (5,170 HU/seg)

Maxima disipación termal continuo del Anodo:
3,700 W (5,170 HU/seg)

Referencia de axes:
Perpendicular a la abertura facial.

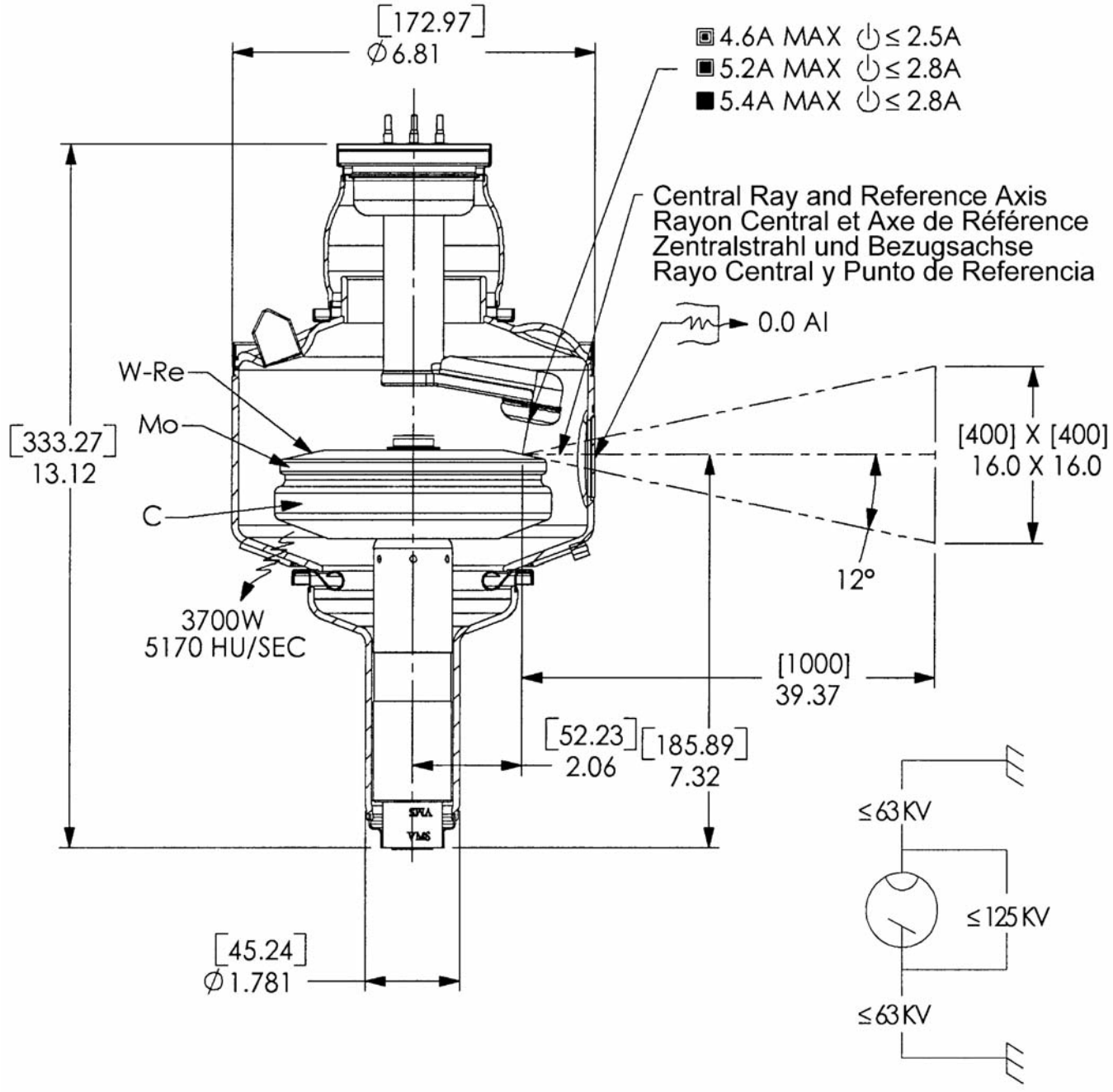
Este tubo es diseñado, para uso en los encajes Varian de la serie B-240H.

9047-000 Rev G 04/12

Manufactured by Varian Medical Systems
Fabrique par Varian Medical Systems
Hergestellt von Varian Medical Systems
Fabricado por Varian Medical Systems

G-2090TRI
Tube Outline Drawing

Dessin d'Encombrement de la Tube
Maßzeichnungen des Drehanoden-Röntgenröhre
Esquema Detallado del Tubos



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

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

Stand - By
Attente
Bereitschaft
En Espera

X-Ray Tube
Tube Radiogène
Röntgenröhre
Tubo de Rayos X

Intermediate
Moyen
Mitte
Intermedio

Common - Red
Neutre - Rouge
Neutral - Rot
Común - Rojo

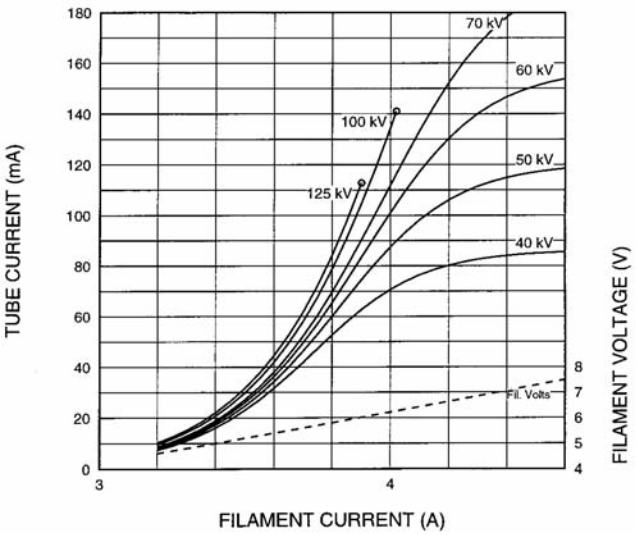
Frame or Chasis
Masse
Chassis
Soporte o Chasis

Radiation Filter or Filtration
Filtre de rayonnement
Filterung
Filtración de Radiación

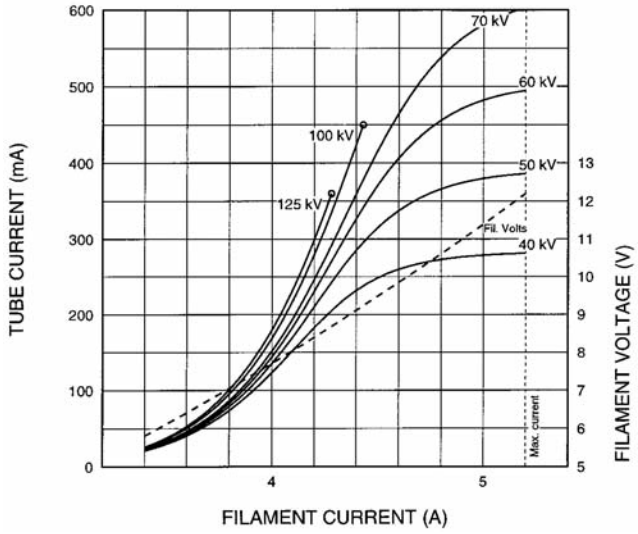
Abaques d' Émissions des Filaments CEI 60613 Heizfadenemissionsdiagramm IEC 60613 Curvas de Emisión de los Filamentos IEC 60613

3 Ø FULL WAVE

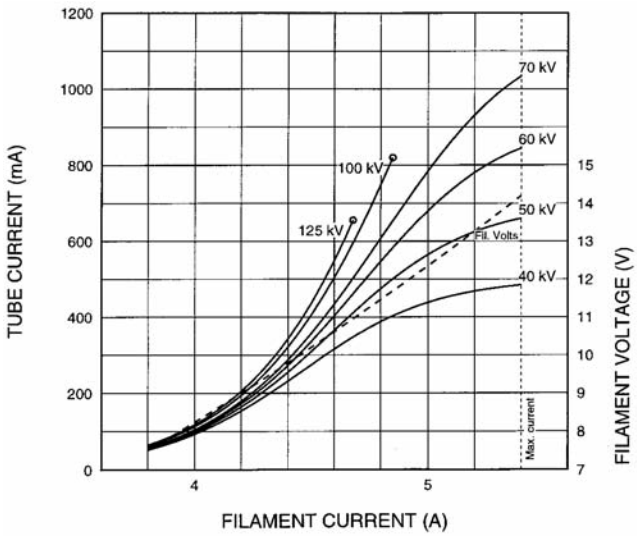
THREE PHASE EMISSION (± .15 A)
G-2090TRI 0.3 ▣



THREE PHASE EMISSION (± .15 A)
G-2090TRI 0.6 ■



THREE PHASE EMISSION (± .15 A)
G-2090TRI 1.0 ■

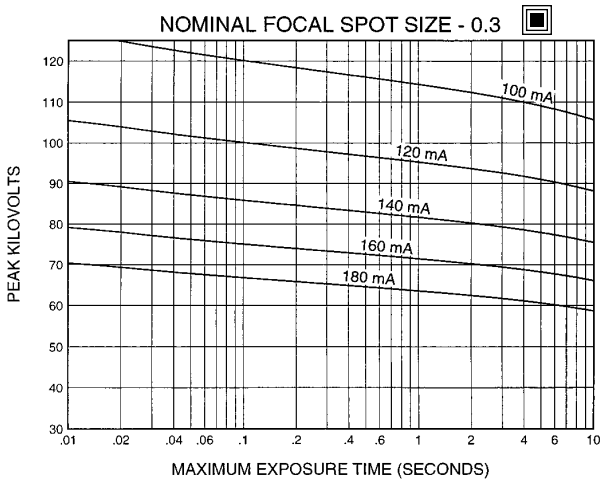


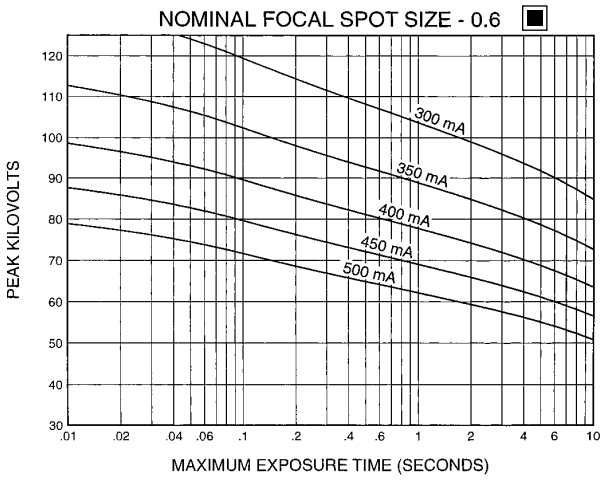
Note:	When using these emission curves for trial exposures, refer to the power rating curves shown for maximum kV, tube emission, filament current, exposure time, and target speed.
Remarque:	Lors de l'utilisation de ces abaques pour des expositions d'essai, référez-vous aux courbes maximales de kV, d'émission 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 gradación de potencia para el máximo de kV, tubo de emisión, corriente en los filamentos, tiempo de exposión, y a las curvas de velocidad del objetivo.

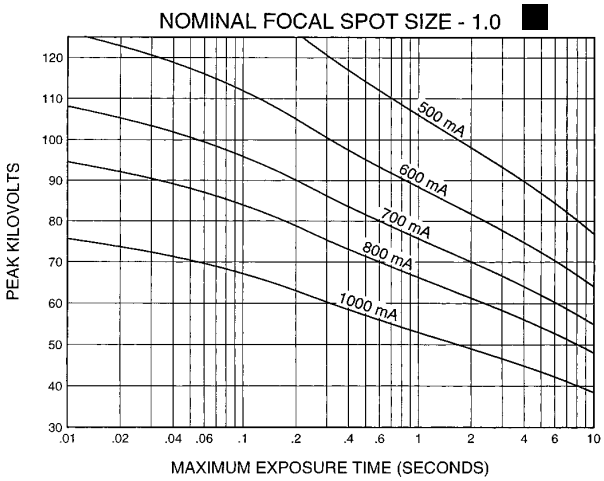
Abaques de Chargepour Pose Unique CEI 60613 613Brennfleck Belastungskurven IEC 60613 Diagramas de Exposición Radiográfica IEC 60613

3 Ø Constant Potential

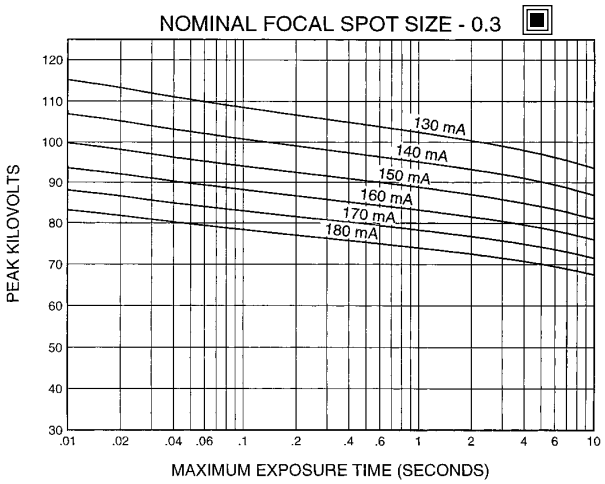
100 HZ

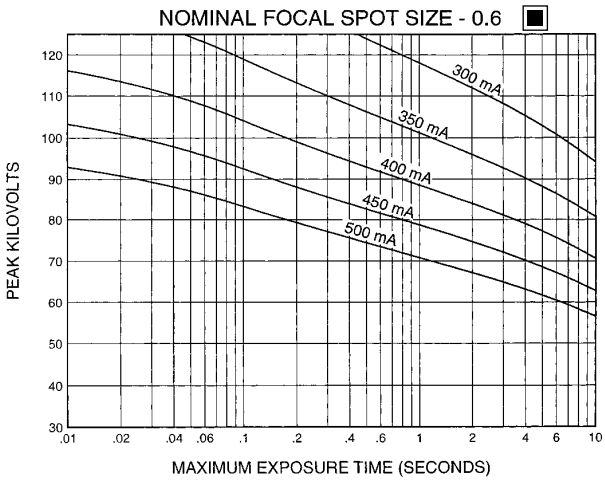


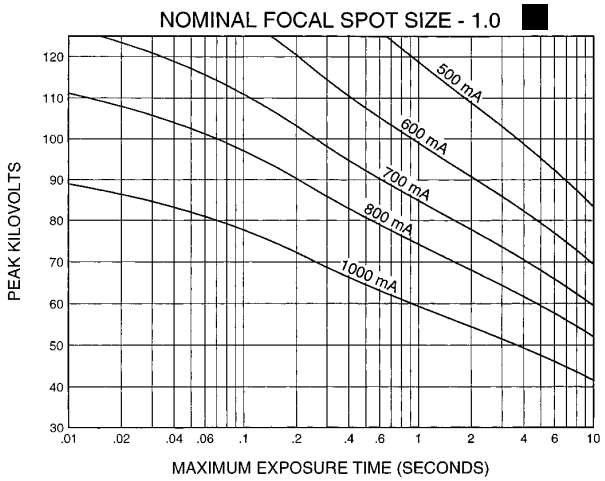




150 HZ





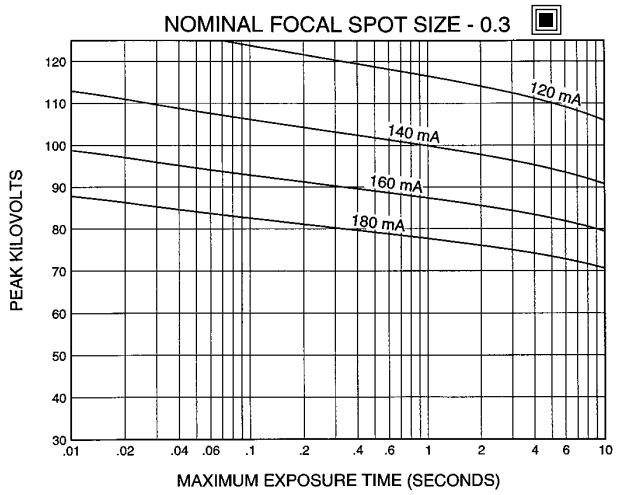


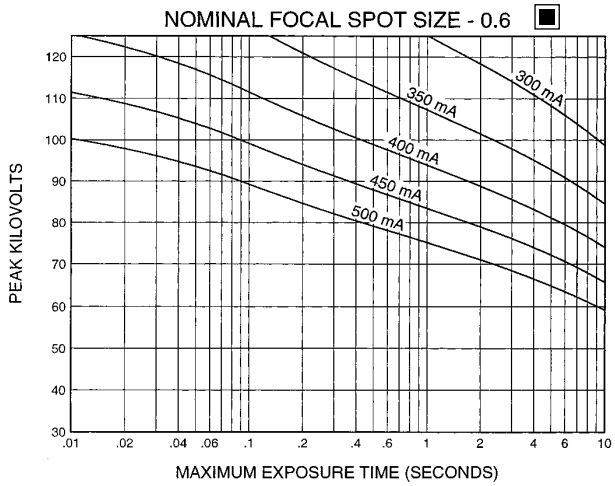
Nominal anode input power for the anode heat content 40%. IEC 60613	Puissance calorifique nominale de l'anode: 40%, CEI 60613	Thermische Anoden bezugsleistung für eine speicherung von 40%. IEC 60613	Aproximadamente el poder de penetracion para obtener un almacenaje de calor del anodo de 40%. IEC 60613

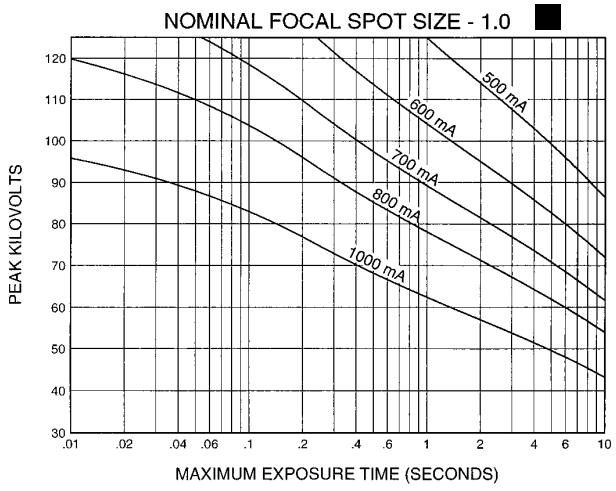
Abaques de Chargepour Pose Unique CEI 60613 Brennfleck Belastungskurven IEC 60613 Diagramas de Exposición Radiográfica IEC 60613

3 Ø Constant Potential ⎓

180 HZ







Nominal anode input power for the anode heat content 40%. IEC 60613	Puissance calorifique nominale de l'anode: 40%, CEI 60613	Thermische Anoden bezugsleistung für eine speicherung von 40%. IEC 60613	Aproximadamente el poder de penetracion 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 or 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

$$\frac{80{,}000\ V \times 400\ mA}{1000} = 32{,}000\ W \text{ or } 32\ kW$$

USING THE CINE RATING CHARTS:

G-2090 150 HZ 3 Phase 1.0 Focal Spot

Example: Determine maximum kW allowed with the following known factors:
Maximum Pulse Width ..... 4 msec
Exposures per Second 60
Maximum Cine Run Time ... 10 seconds

Calculate Duty Factor: (DF%)

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

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

Refer to Rating Chart
G-2090 150 HZ 3 Phase 1.0 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 60 kW.

We now know each pulse during the cine run can have a maximum rating of 60 kW under conditions given in example.

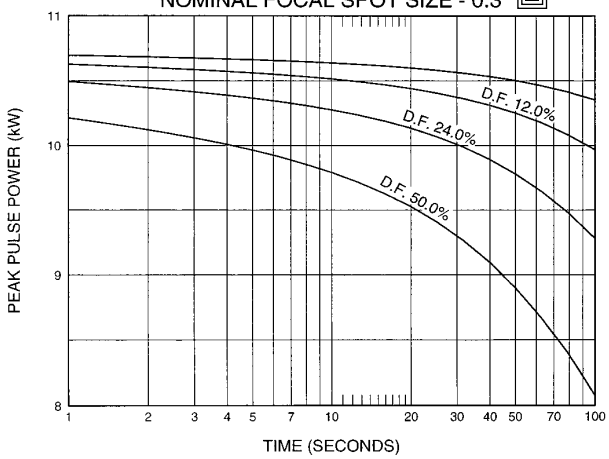
kW = kV x mA. The kW of the exposure can be any combination of mA and kW allowed by the Radiographic and Filament Emission Charts.

The Cine rating charts are usable to maximum anode heat content.

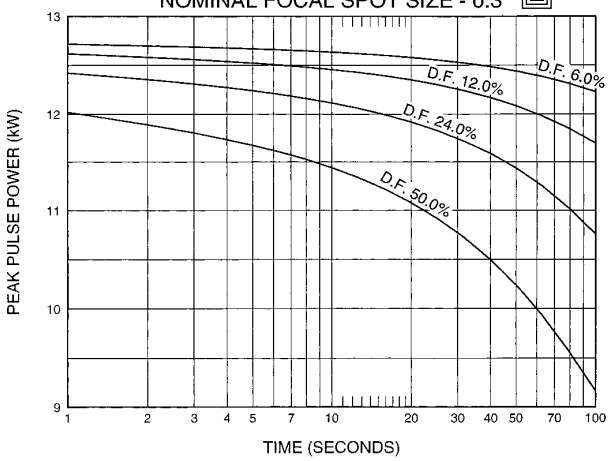
Abaques d'Cinéradiographie CEI 60613 Belastungskurven für den Kinobetrieb IEC 60613 Diagramas de Exposición Cineradiográfica IEC 60613

100 HZ — 3 Ø Constant Potential ⎓ — 150/180 HZ

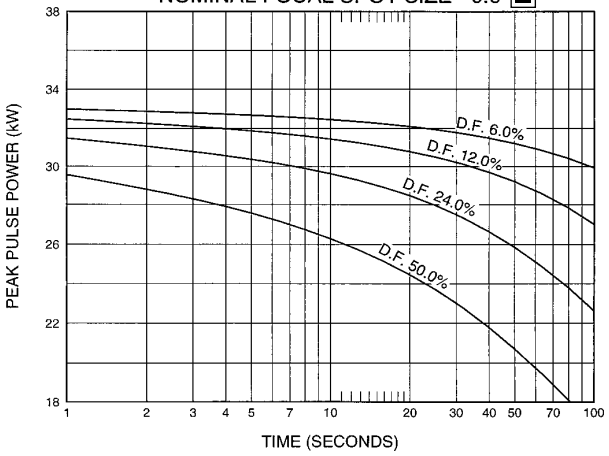
NOMINAL FOCAL SPOT SIZE - 0.3 ■



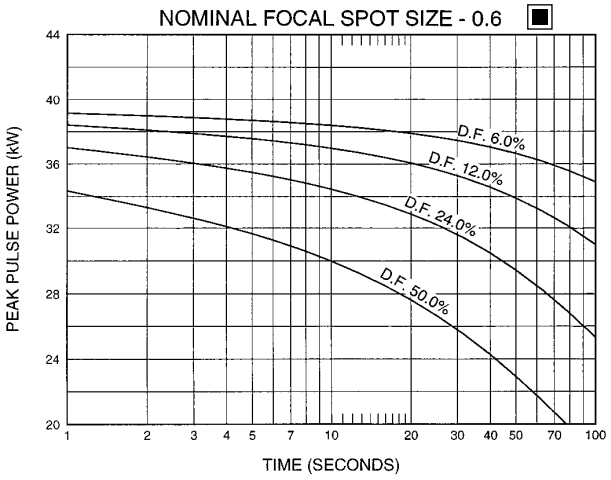
NOMINAL FOCAL SPOT SIZE - 0.3 ■



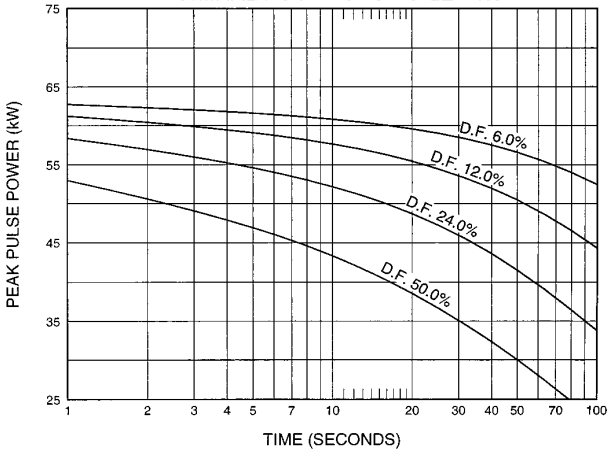
NOMINAL FOCAL SPOT SIZE - 0.6 ■



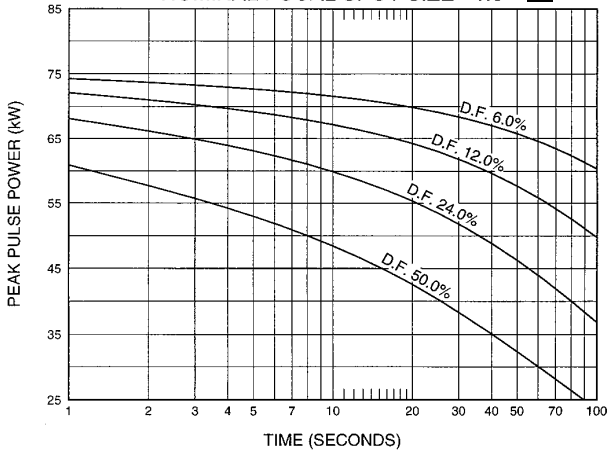
NOMINAL FOCAL SPOT SIZE - 0.6 ■



NOMINAL FOCAL SPOT SIZE - 1.0 ■



NOMINAL FOCAL SPOT SIZE - 1.0 ■



Nominal anode input power for the anode heat content 70%. IEC 60613	Puissance calorifique nominale de l'anode: 70%, CEI 60613	Thermische Anoden bezugsleistung für eine speicherung von 70%. IEC 60613	Aproximadamente el poder de penetracion 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 maximum anode heat content.

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:

0.3, 0.6 or 1.0 Focal Spot

Note: 150 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-2090 150 HZ 3 Phase
1.0 Focal Spot, determine kW allowed with following known factors.
Maximum number of exposures 40
Exposure time .050 second (50 milliseconds)
Maximum Exposure per second 4

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 59.5 kW.

0.3 Focal Spot 3Ø 12 Degrees 100 Hz
0,3 Dimension Focale 3Ø 12 Degrés 100 Hz
0.3 Brennpunkt 3Ø 12 Grad 100 Hz
0.3 De Marcas Focales 3Ø 12 Grados 100 Hz

Caractéristoques Pour L'Angiographie CEI 60613
Angiographische Nennleistungen IEC 60613
Gradaciones Angiografica IEC 60613

Exposure rate per second	Tube load (kW) as a function of the exposure time (seconds) of the individual radiographs of the series															Number of exposures in series
	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.100	0.120	0.140	0.160	0.180	0.200	0.225	0.250	
1	10.8	10.6	10.5	10.4	10.3	10.3	10.2	10.1	10.1	10.0	10.0	9.9	9.9	9.8	9.8	10
2	10.7	10.6	10.4	10.4	10.3	10.2	10.1	10.1	10.0	9.9	9.9	9.8	9.8	9.7	9.7	
3	10.7	10.6	10.4	10.3	10.3	10.2	10.1	10.0	9.9	9.9	9.8	9.8	—	—	—	
4	10.7	10.6	10.4	10.3	10.2	10.2	10.1	10.0	9.9	9.8	—	—	—	—	—	
8	10.7	10.5	10.3	10.2	10.1	10.1	—	—	—	—	—	—	—	—	—	
15	10.7	10.4	10.2	10.1	—	—	—	—	—	—	—	—	—	—	—	
30	10.6	10.3	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	10.7	10.6	10.4	10.4	10.3	10.2	10.1	10.1	10.0	9.9	9.9	9.8	9.8	9.7	9.7	20
2	10.7	10.6	10.4	10.3	10.3	10.2	10.1	10.0	9.9	9.8	9.8	9.7	9.7	9.6	9.5	
3	10.7	10.5	10.4	10.3	10.2	10.2	10.0	9.9	9.8	9.8	9.7	9.6	—	—	—	
4	10.7	10.5	10.4	10.3	10.2	10.1	10.0	9.9	9.8	9.7	—	—	—	—	—	
8	10.7	10.5	10.3	10.2	10.1	10.0	—	—	—	—	—	—	—	—	—	
15	10.6	10.4	10.2	10.0	—	—	—	—	—	—	—	—	—	—	—	
30	10.5	10.2	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	10.7	10.6	10.4	10.3	10.2	10.2	10.1	10.0	9.9	9.8	9.7	9.6	9.6	9.5	9.4	40
2	10.7	10.5	10.4	10.3	10.2	10.1	10.0	9.9	9.8	9.7	9.6	9.5	9.4	9.4	9.3	
3	10.7	10.5	10.4	10.2	10.2	10.1	9.9	9.8	9.7	9.6	9.5	9.4	—	—	—	
4	10.7	10.5	10.3	10.2	10.1	10.0	9.9	9.7	9.6	9.5	—	—	—	—	—	
8	10.7	10.4	10.2	10.1	10.0	9.8	—	—	—	—	—	—	—	—	—	
15	10.6	10.3	10.1	9.9	—	—	—	—	—	—	—	—	—	—	—	
30	10.5	10.1	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	10.7	10.5	10.4	10.3	10.2	10.1	10.0	9.9	9.8	9.7	9.6	9.5	9.4	9.3	9.2	60
2	10.7	10.5	10.4	10.2	10.1	10.1	9.9	9.8	9.7	9.6	9.5	9.4	9.3	9.2	9.1	
3	10.7	10.5	10.3	10.2	10.1	10.0	9.8	9.7	9.6	9.5	9.3	9.2	—	—	—	
4	10.7	10.5	10.3	10.2	10.1	10.0	9.8	9.6	9.5	9.4	—	—	—	—	—	
8	10.7	10.4	10.2	10.0	9.9	9.8	—	—	—	—	—	—	—	—	—	
15	10.6	10.3	10.0	9.8	—	—	—	—	—	—	—	—	—	—	—	
30	10.4	10.0	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	10.7	10.5	10.4	10.2	10.1	10.1	9.9	9.8	9.7	9.5	9.4	9.3	9.3	9.1	9.0	80
2	10.7	10.5	10.3	10.2	10.1	10.0	9.8	9.7	9.6	9.4	9.3	9.2	9.1	9.0	8.9	
3	10.7	10.5	10.3	10.2	10.0	9.9	9.8	9.6	9.5	9.3	9.2	9.1	—	—	—	
4	10.7	10.4	10.3	10.1	10.0	9.9	9.7	9.5	9.4	9.2	—	—	—	—	—	
8	10.6	10.4	10.1	10.0	9.8	9.7	—	—	—	—	—	—	—	—	—	
15	10.6	10.2	10.0	9.7	—	—	—	—	—	—	—	—	—	—	—	
30	10.4	10.0	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	10.7	10.5	10.3	10.2	10.1	10.0	9.8	9.7	9.6	9.4	9.3	9.2	9.1	9.0	8.8	100
2	10.7	10.5	10.3	10.2	10.0	9.9	9.8	9.6	9.5	9.3	9.2	9.1	8.9	8.8	8.7	
3	10.7	10.4	10.3	10.1	10.0	9.9	9.7	9.5	9.4	9.2	9.1	8.9	—	—	—	
4	10.7	10.4	10.2	10.1	9.9	9.8	9.6	9.4	9.3	9.1	—	—	—	—	—	
8	10.6	10.3	10.1	9.9	9.8	9.6	—	—	—	—	—	—	—	—	—	
15	10.5	10.2	9.9	9.7	—	—	—	—	—	—	—	—	—	—	—	
30	10.4	9.9	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	10.7	10.4	10.3	10.1	10.0	9.9	9.7	9.5	9.3	9.2	9.0	8.9	8.7	8.6	8.4	150
2	10.7	10.4	10.2	10.1	9.9	9.8	9.6	9.4	9.2	9.0	8.9	8.7	8.6	8.4	8.3	
3	10.7	10.4	10.2	10.0	9.9	9.7	9.5	9.3	9.1	8.9	8.8	8.6	—	—	—	
4	10.6	10.4	10.2	10.0	9.8	9.7	9.4	9.2	9.0	8.8	—	—	—	—	—	
8	10.6	10.3	10.0	9.8	9.6	9.5	—	—	—	—	—	—	—	—	—	
15	10.5	10.1	9.8	9.6	—	—	—	—	—	—	—	—	—	—	—	
30	10.3	9.8	—	—	—	—	—	—	—	—	—	—	—	—	—	

Note:
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0.3 Focal Spot 3Ø 12 Degrees 150 Hz
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Caractéristoques Pour L'Angiographie CEI 60613
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Gradaciones Angiografica IEC 60613

Exposure rate per second	Tube load (kW) as a function of the exposure time (seconds) of the individual radiographs of the series															Number of exposures in series
	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.100	0.120	0.140	0.160	0.180	0.200	0.225	0.250	
1	12.7	12.5	12.3	12.2	12.1	12.1	12.0	11.9	11.8	11.7	11.7	11.6	11.5	11.5	11.4	10
2	12.7	12.5	12.3	12.2	12.1	12.0	11.9	11.8	11.7	11.6	11.5	11.5	11.4	11.3	11.3	
3	12.7	12.5	12.3	12.2	12.1	12.0	11.8	11.7	11.6	11.5	11.4	11.4	—	—	—	
4	12.7	12.4	12.3	12.1	12.0	11.9	11.8	11.7	11.5	11.4	—	—	—	—	—	
8	12.6	12.4	12.2	12.0	11.9	11.8	—	—	—	—	—	—	—	—	—	
15	12.6	12.3	12.0	11.8	—	—	—	—	—	—	—	—	—	—	—	
30	12.5	12.1	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	12.7	12.5	12.3	12.2	12.1	12.0	11.9	11.8	11.7	11.6	11.5	11.5	11.4	11.3	11.2	20
2	12.7	12.4	12.3	12.1	12.0	12.0	11.8	11.7	11.6	11.5	11.4	11.3	11.2	11.1	11.0	
3	12.7	12.4	12.2	12.1	12.0	11.9	11.7	11.6	11.5	11.4	11.3	11.2	—	—	—	
4	12.7	12.4	12.2	12.1	12.0	11.8	11.7	11.5	11.4	11.3	—	—	—	—	—	
8	12.6	12.3	12.1	11.9	11.8	11.6	—	—	—	—	—	—	—	—	—	
15	12.5	12.2	11.9	11.7	—	—	—	—	—	—	—	—	—	—	—	
30	12.4	11.9	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	12.7	12.4	12.3	12.1	12.0	11.9	11.8	11.6	11.5	11.4	11.3	11.2	11.1	11.0	10.9	40
2	12.7	12.4	12.2	12.1	12.0	11.9	11.7	11.5	11.4	11.3	11.2	11.1	11.0	10.8	10.7	
3	12.7	12.4	12.2	12.0	11.9	11.8	11.6	11.4	11.3	11.1	11.0	10.9	—	—	—	
4	12.6	12.4	12.2	12.0	11.9	11.7	11.5	11.3	11.2	11.0	—	—	—	—	—	
8	12.6	12.3	12.0	11.8	11.6	11.5	—	—	—	—	—	—	—	—	—	
15	12.5	12.1	11.8	11.5	—	—	—	—	—	—	—	—	—	—	—	
30	12.3	11.8	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	12.7	12.4	12.2	12.1	12.0	11.8	11.7	11.5	11.4	11.2	11.1	11.0	10.9	10.8	10.7	60
2	12.7	12.4	12.2	12.0	11.9	11.8	11.6	11.4	11.2	11.1	11.0	10.8	10.7	10.6	10.4	
3	12.6	12.4	12.1	12.0	11.8	11.7	11.5	11.3	11.1	11.0	10.8	10.7	—	—	—	
4	12.6	12.3	12.1	11.9	11.8	11.6	11.4	11.2	11.0	10.8	—	—	—	—	—	
8	12.6	12.2	11.9	11.7	11.5	11.4	—	—	—	—	—	—	—	—	—	
15	12.5	12.0	11.7	11.4	—	—	—	—	—	—	—	—	—	—	—	
30	12.3	11.7	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	12.7	12.4	12.2	12.0	11.9	11.8	11.6	11.4	11.2	11.1	10.9	10.8	10.7	10.5	10.4	80
2	12.6	12.4	12.1	12.0	11.8	11.7	11.5	11.3	11.1	10.9	10.8	10.6	10.5	10.3	10.2	
3	12.6	12.3	12.1	11.9	11.8	11.6	11.4	11.2	11.0	10.8	10.6	10.5	—	—	—	
4	12.6	12.3	12.1	11.9	11.7	11.5	11.3	11.1	10.8	10.6	—	—	—	—	—	
8	12.5	12.2	11.9	11.7	11.5	11.3	—	—	—	—	—	—	—	—	—	
15	12.4	12.0	11.6	11.3	—	—	—	—	—	—	—	—	—	—	—	
30	12.2	11.6	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	12.6	12.4	12.1	12.0	11.8	11.7	11.5	11.3	11.1	10.9	10.8	10.6	10.5	10.3	10.2	100
2	12.6	12.3	12.1	11.9	11.8	11.6	11.4	11.2	11.0	10.8	10.6	10.4	10.3	10.1	9.9	
3	12.6	12.3	12.0	11.9	11.7	11.5	11.3	11.0	10.8	10.6	10.4	10.3	—	—	—	
4	12.6	12.3	12.0	11.8	11.6	11.5	11.2	10.9	10.7	10.5	—	—	—	—	—	
8	12.5	12.1	11.8	11.6	11.4	11.2	—	—	—	—	—	—	—	—	—	
15	12.4	12.0	11.6	11.3	—	—	—	—	—	—	—	—	—	—	—	
30	12.2	11.6	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	12.6	12.3	12.0	11.8	11.7	11.5	11.2	11.0	10.8	10.6	10.4	10.2	10.0	9.8	9.6	150
2	12.6	12.3	12.0	11.8	11.6	11.4	11.1	10.9	10.6	10.4	10.2	10.0	9.8	9.6	9.4	
3	12.6	12.2	11.9	11.7	11.5	11.3	11.0	10.8	10.5	10.3	10.0	9.8	—	—	—	
4	12.6	12.2	11.9	11.7	11.5	11.3	10.9	10.6	10.4	10.1	—	—	—	—	—	
8	12.5	12.1	11.7	11.4	11.2	11.0	—	—	—	—	—	—	—	—	—	
15	12.4	11.9	11.4	11.1	—	—	—	—	—	—	—	—	—	—	—	
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Exposure rate per second	Tube load (kW) as a function of the exposure time (seconds) of the individual radiographs of the series															Number of exposures in series
	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.100	0.120	0.140	0.160	0.180	0.200	0.225	0.250	
1	33.4	32.6	32.1	31.6	31.2	30.8	30.2	29.6	29.1	28.7	28.3	28.0	27.7	27.3	27.0	10
2	33.4	32.5	31.9	31.4	30.9	30.5	29.8	29.2	28.6	28.1	27.7	27.3	27.0	26.6	26.2	
3	33.3	32.4	31.7	31.2	30.7	30.2	29.4	28.8	28.2	27.6	27.2	26.7	—	—	—	
4	33.2	32.3	31.6	31.0	30.4	30.0	29.1	28.4	27.7	27.2	—	—	—	—	—	
8	33.0	31.9	31.0	30.2	29.6	29.0	—	—	—	—	—	—	—	—	—	
15	32.6	31.2	30.1	29.1	—	—	—	—	—	—	—	—	—	—	—	
30	32.0	30.1	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	33.4	32.5	31.9	31.4	30.9	30.5	29.8	29.1	28.6	28.1	27.6	27.2	26.8	26.4	26.0	20
2	33.3	32.4	31.7	31.1	30.6	30.1	29.3	28.6	27.9	27.4	26.9	26.4	26.0	25.5	25.0	
3	33.2	32.2	31.5	30.8	30.3	29.8	28.9	28.1	27.4	26.7	26.2	25.7	—	—	—	
4	33.1	32.1	31.3	30.6	30.0	29.4	28.5	27.6	26.8	26.2	—	—	—	—	—	
8	32.8	31.5	30.5	29.7	28.9	28.2	—	—	—	—	—	—	—	—	—	
15	32.4	30.7	29.4	28.3	—	—	—	—	—	—	—	—	—	—	—	
30	31.6	29.3	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	33.2	32.3	31.6	31.0	30.4	29.9	29.1	28.3	27.6	27.0	26.4	25.9	25.5	24.9	24.4	40
2	33.2	32.1	31.3	30.7	30.1	29.5	28.5	27.7	26.9	26.2	25.6	25.0	24.5	23.9	23.3	
3	33.1	32.0	31.1	30.4	29.7	29.1	28.0	27.1	26.3	25.5	24.9	24.2	—	—	—	
4	33.0	31.8	30.9	30.1	29.4	28.7	27.6	26.6	25.7	24.9	—	—	—	—	—	
8	32.6	31.2	30.0	29.0	28.1	27.3	—	—	—	—	—	—	—	—	—	
15	32.1	30.2	28.6	27.4	—	—	—	—	—	—	—	—	—	—	—	
30	31.1	28.5	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	33.1	32.1	31.3	30.6	30.0	29.4	28.4	27.6	26.8	26.1	25.4	24.8	24.3	23.7	23.1	60
2	33.0	31.9	31.0	30.3	29.6	29.0	27.9	26.9	26.0	25.3	24.6	23.9	23.3	22.7	22.0	
3	32.9	31.7	30.8	30.0	29.2	28.6	27.4	26.3	25.4	24.6	23.8	23.1	—	—	—	
4	32.8	31.5	30.5	29.6	28.9	28.1	26.9	25.7	24.8	23.9	—	—	—	—	—	
8	32.5	30.9	29.6	28.5	27.5	26.7	—	—	—	—	—	—	—	—	—	
15	31.9	29.8	28.1	26.8	—	—	—	—	—	—	—	—	—	—	—	
30	30.8	28.0	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	33.0	31.9	31.0	30.3	29.6	29.0	27.9	26.9	26.0	25.2	24.5	23.8	23.2	22.5	21.9	80
2	32.9	31.7	30.8	29.9	29.2	28.5	27.3	26.2	25.3	24.4	23.7	23.0	22.3	21.6	20.9	
3	32.8	31.5	30.5	29.6	28.8	28.1	26.8	25.6	24.6	23.7	22.9	22.2	—	—	—	
4	32.7	31.3	30.2	29.3	28.4	27.6	26.2	25.0	24.0	23.1	—	—	—	—	—	
8	32.3	30.6	29.2	28.1	27.0	26.1	—	—	—	—	—	—	—	—	—	
15	31.7	29.5	27.7	26.3	—	—	—	—	—	—	—	—	—	—	—	
30	30.5	27.6	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	32.9	31.7	30.8	29.9	29.2	28.5	27.3	26.2	25.3	24.4	23.7	23.0	22.3	21.6	20.9	100
2	32.8	31.5	30.5	29.6	28.8	28.0	26.7	25.6	24.6	23.7	22.8	22.1	21.4	20.6	19.9	
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30	30.3	27.2	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	32.7	31.3	30.1	29.2	28.3	27.5	26.0	24.8	23.7	22.7	21.8	21.0	20.3	19.4	18.7	150
2	32.6	31.1	29.8	28.8	27.8	27.0	25.5	24.1	23.0	22.0	21.0	20.2	19.5	18.6	17.8	
3	32.5	30.9	29.6	28.4	27.4	26.5	24.9	23.6	22.4	21.3	20.4	19.5	—	—	—	
4	32.4	30.7	29.3	28.1	27.1	26.1	24.4	23.0	21.8	20.7	—	—	—	—	—	
8	31.9	29.9	28.3	26.9	25.6	24.6	—	—	—	—	—	—	—	—	—	
15	31.2	28.7	26.7	25.0	—	—	—	—	—	—	—	—	—	—	—	
30	29.9	26.6	—	—	—	—	—	—	—	—	—	—	—	—	—	

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	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.100	0.120	0.140	0.160	0.180	0.200	0.225	0.250	
1	39.4	38.3	37.6	36.9	36.4	35.9	35.0	34.3	33.6	33.1	32.6	32.1	31.7	31.3	30.8	10
2	39.3	38.2	37.3	36.6	36.0	35.5	34.5	33.7	33.0	32.3	31.8	31.2	30.8	30.3	29.8	
3	39.2	38.0	37.1	36.3	35.7	35.1	34.0	33.1	32.3	31.6	31.0	30.5	—	—	—	
4	39.1	37.8	36.9	36.1	35.4	34.7	33.6	32.6	31.8	31.0	—	—	—	—	—	
8	38.8	37.3	36.1	35.1	34.2	33.4	—	—	—	—	—	—	—	—	—	
15	38.3	36.3	34.8	33.6	—	—	—	—	—	—	—	—	—	—	—	
30	37.5	34.9	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	39.3	38.1	37.3	36.6	36.0	35.4	34.5	33.6	32.9	32.2	31.6	31.1	30.6	30.0	29.5	20
2	39.2	37.9	37.0	36.3	35.6	34.9	33.8	32.9	32.0	31.3	30.6	30.0	29.5	28.9	28.3	
3	39.1	37.7	36.8	35.9	35.2	34.5	33.3	32.2	31.3	30.5	29.8	29.1	—	—	—	
4	39.0	37.6	36.5	35.6	34.8	34.0	32.7	31.6	30.6	29.8	—	—	—	—	—	
8	38.5	36.8	35.5	34.3	33.3	32.4	—	—	—	—	—	—	—	—	—	
15	37.9	35.7	33.9	32.5	—	—	—	—	—	—	—	—	—	—	—	
30	36.8	33.8	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	39.1	37.9	36.9	36.1	35.4	34.7	33.5	32.5	31.6	30.8	30.1	29.4	28.8	28.1	27.5	40
2	39.0	37.6	36.6	35.7	34.9	34.1	32.8	31.7	30.7	29.8	29.0	28.3	27.6	26.9	26.2	
3	38.9	37.4	36.2	35.3	34.4	33.6	32.2	30.9	29.9	28.9	28.1	27.3	—	—	—	
4	38.7	37.2	35.9	34.9	33.9	33.1	31.6	30.2	29.1	28.1	—	—	—	—	—	
8	38.3	36.3	34.8	33.4	32.3	31.2	—	—	—	—	—	—	—	—	—	
15	37.5	35.0	33.0	31.3	—	—	—	—	—	—	—	—	—	—	—	
30	36.1	32.7	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	39.0	37.6	36.5	35.6	34.8	34.0	32.7	31.5	30.5	29.6	28.8	28.0	27.3	26.5	25.8	60
2	38.8	37.3	36.2	35.1	34.2	33.4	32.0	30.7	29.6	28.6	27.7	26.9	26.1	25.3	24.5	
3	38.7	37.1	35.8	34.7	33.7	32.9	31.3	29.9	28.7	27.7	26.7	25.9	—	—	—	
4	38.6	36.8	35.5	34.3	33.3	32.3	30.6	29.2	27.9	26.8	—	—	—	—	—	
8	38.0	35.9	34.2	32.8	31.5	30.4	—	—	—	—	—	—	—	—	—	
15	37.2	34.5	32.3	30.5	—	—	—	—	—	—	—	—	—	—	—	
30	35.7	32.0	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	38.8	37.3	36.1	35.1	34.2	33.4	31.9	30.6	29.5	28.5	27.6	26.8	26.0	25.2	24.4	80
2	38.7	37.1	35.8	34.7	33.7	32.8	31.2	29.8	28.6	27.5	26.5	25.7	24.9	24.0	23.1	
3	38.5	36.8	35.4	34.2	33.2	32.2	30.5	29.0	27.7	26.6	25.6	24.7	—	—	—	
4	38.4	36.5	35.1	33.8	32.7	31.6	29.8	28.3	27.0	25.8	—	—	—	—	—	
8	37.8	35.6	33.8	32.2	30.9	29.7	—	—	—	—	—	—	—	—	—	
15	37.0	34.1	31.8	29.9	—	—	—	—	—	—	—	—	—	—	—	
30	35.4	31.5	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	38.7	37.1	35.8	34.7	33.7	32.8	31.2	29.8	28.6	27.5	26.5	25.7	24.9	23.9	23.1	100
2	38.5	36.8	35.4	34.2	33.1	32.2	30.5	29.0	27.7	26.5	25.5	24.6	23.7	22.8	21.9	
3	38.4	36.5	35.0	33.8	32.6	31.6	29.8	28.2	26.8	25.7	24.6	23.6	—	—	—	
4	38.2	36.3	34.7	33.3	32.1	31.0	29.1	27.5	26.1	24.9	—	—	—	—	—	
8	37.7	35.3	33.3	31.7	30.3	29.0	—	—	—	—	—	—	—	—	—	
15	36.8	33.7	31.3	29.4	—	—	—	—	—	—	—	—	—	—	—	
30	35.1	31.1	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	38.4	36.5	34.9	33.6	32.5	31.4	29.6	27.9	26.5	25.3	24.2	23.2	22.4	21.2	19.1	150
2	38.2	36.2	34.6	33.2	31.9	30.8	28.8	27.1	25.7	24.4	23.3	22.3	21.4	20.4	19.1	
3	38.0	35.9	34.2	32.7	31.4	30.2	28.2	26.4	24.9	23.6	22.5	21.4	—	—	—	
4	37.9	35.6	33.8	32.3	30.9	29.7	27.5	25.7	24.2	22.9	—	—	—	—	—	
8	37.3	34.6	32.4	30.6	29.1	27.7	—	—	—	—	—	—	—	—	—	
15	36.3	33.0	30.4	28.2	—	—	—	—	—	—	—	—	—	—	—	
30	34.6	30.2	—	—	—	—	—	—	—	—	—	—	—	—	—	

Note:
1. (kW) of Exposure Equals mA x kV. For Example: 70 kV x 300 mA = 21 kW.
2. Exposures less than .010 seconds will have a kW rating same as .010 seconds.

Remarque:
1. (kW) en exposition égale kV x mA. Par exemple: 70 kV x 300 mA = 21 kW.
2. Les expositions inférieures à 0.010 sec. ent les mémes valuers en kW que celles de 0.010 sec.

Anmerkungen:
1. (kW) der Belichtung is gleich mA x kV Zum Beispiel: 70 kV x 300 mA = 21 kW.
2. Belichtungen von weniger als .010 Sekunden haben die gleichen kW Werte wie die von .010 Sekunden.

Nota:
1. (kW) De exposición se calcula multiplicando mA x kV-por ejemplo: 70 kV x 300 mA = 21 kW.
2. Para exposición de menos de .010 segundos, el resultado en (kW) seria lo mismo que el de .010 segundos.

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

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

Thermische Anoden bezugsleistung für eine speicherung von 70%. IEC 60613

Aproximadamente el poder de penetracion para obtener un almacenaje de calor del anode de 70%. IEC 60613

1.0 Focal Spot 3Ø 12 Degrees 100 Hz
1,0 Dimension Focale 3Ø 12 Degrés 100 Hz
1.0 Brennpunkt 3Ø 12 Grad 100 Hz
1.0 De Marcas Focales 3Ø 12 Grados 100 Hz

Caractéristoques Pour L'Angiographie CEI 60613
Angiographische Nennleistungen IEC 60613
Gradaciones Angiografica IEC 60613

Exposure rate per second	Tube load (kW) as a function of the exposure time (seconds) of the individual radiographs of the series														Number of exposures in series
	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.100	0.120	0.140	0.160	0.180	0.200	0.225	0.250	
1	63.9	61.9	60.5	59.3	58.2	57.3	55.6	54.2	52.9	51.8	50.7	49.7	48.8	47.7	46.7	
2	63.7	61.5	59.9	58.5	57.3	56.3	54.4	52.7	51.3	50.0	48.8	47.6	46.6	45.4	44.3	
3	63.5	61.1	59.3	57.8	56.5	55.3	53.2	51.4	49.8	48.4	47.1	45.9	—	—	—	
4	63.3	60.7	58.8	57.1	55.7	54.4	52.1	50.2	48.5	46.9	—	—	—	—	—	10
8	62.6	59.4	57.0	54.9	53.1	51.4	—	—	—	—	—	—	—	—	—	
15	61.6	57.7	54.6	52.1	—	—	—	—	—	—	—	—	—	—	—	
30	60.2	55.2	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	63.7	61.5	59.8	58.5	57.3	56.2	54.3	52.6	51.1	49.7	48.5	47.3	46.2	45.0	43.8	
2	63.4	61.0	59.1	57.6	56.2	54.9	52.7	50.8	49.1	47.6	46.2	44.9	43.7	42.3	41.1	
3	63.1	60.5	58.4	56.7	55.2	53.8	51.4	49.3	47.4	45.7	44.2	42.9	—	—	—	
4	62.9	60.0	57.7	55.9	54.2	52.7	50.1	47.8	45.8	44.1	—	—	—	—	—	20
8	62.0	58.3	55.5	53.1	51.0	49.1	—	—	—	—	—	—	—	—	—	
15	60.6	56.0	52.5	49.5	—	—	—	—	—	—	—	—	—	—	—	
30	58.5	52.6	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	63.3	60.7	58.8	57.1	55.7	54.3	52.0	49.9	48.1	46.5	45.0	43.6	42.3	40.8	39.5	
2	63.0	60.1	57.9	56.1	54.4	52.9	50.3	48.0	46.0	44.2	42.6	41.1	39.7	38.2	36.8	
3	62.6	59.5	57.1	55.1	53.3	51.6	48.8	46.3	44.2	42.3	40.6	39.0	—	—	—	
4	62.3	59.0	56.4	54.1	52.2	50.4	47.4	44.8	42.5	40.5	—	—	—	—	—	40
8	61.2	57.0	53.7	51.0	48.6	46.4	—	—	—	—	—	—	—	—	—	
15	59.6	54.3	50.2	46.8	—	—	—	—	—	—	—	—	—	—	—	
30	56.9	50.0	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	62.9	60.0	57.8	55.9	54.2	52.7	50.0	47.7	45.6	43.8	42.1	40.6	39.2	37.6	36.1	
2	62.6	59.4	56.9	54.8	53.0	51.3	48.3	45.8	43.6	41.6	39.8	38.2	36.7	35.1	33.6	
3	62.2	58.8	56.1	53.8	51.8	49.9	46.8	44.1	41.7	39.7	37.8	36.2	—	—	—	
4	61.9	58.2	55.3	52.8	50.6	48.7	45.3	42.5	40.1	38.0	—	—	—	—	—	60
8	60.6	56.0	52.5	49.4	46.8	44.5	—	—	—	—	—	—	—	—	—	
15	58.9	53.1	48.6	45.0	—	—	—	—	—	—	—	—	—	—	—	
30	55.8	48.4	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	62.6	59.4	56.9	54.8	52.9	51.2	48.2	45.7	43.4	41.4	39.6	38.0	36.5	34.8	33.3	
2	62.2	58.7	56.0	53.7	51.6	49.8	46.6	43.8	41.4	39.3	37.5	35.8	34.3	32.6	31.1	
3	61.8	58.1	55.1	52.6	50.4	48.4	45.0	42.1	39.7	37.5	35.6	33.9	—	—	—	
4	61.4	57.4	54.3	51.6	49.3	47.2	43.6	40.6	38.1	35.9	—	—	—	—	—	80
8	60.2	55.2	51.4	48.2	45.4	43.0	—	—	—	—	—	—	—	—	—	
15	58.3	52.1	47.5	43.7	—	—	—	—	—	—	—	—	—	—	—	
30	55.0	47.2	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	62.2	58.7	56.0	53.7	51.7	49.8	46.6	43.8	41.5	39.3	37.5	35.8	34.2	31.8	28.6	
2	61.8	58.1	55.1	52.6	50.4	48.4	45.0	42.1	39.6	37.4	35.4	33.7	32.2	30.4	28.6	
3	61.4	57.4	54.2	51.5	49.2	47.1	43.5	40.4	37.9	35.6	33.7	32.0	—	—	—	
4	61.1	56.7	53.4	50.5	48.0	45.8	42.1	39.0	36.4	34.1	—	—	—	—	—	100
8	59.7	54.5	50.4	47.1	44.2	41.7	—	—	—	—	—	—	—	—	—	
15	57.8	51.3	46.4	42.6	—	—	—	—	—	—	—	—	—	—	—	
30	54.4	46.3	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	61.3	57.2	54.0	51.2	48.8	46.7	43.0	39.9	37.3	34.0	29.8	26.5	23.8	21.2	19.1	
2	60.9	56.5	53.1	50.1	47.6	45.3	41.5	38.3	35.6	33.3	29.8	26.5	23.8	21.2	19.1	
3	60.5	55.8	52.2	49.1	46.4	44.1	40.1	36.9	34.1	31.8	29.8	26.5	—	—	—	
4	60.1	55.2	51.3	48.1	45.3	42.9	38.8	35.5	32.8	30.5	—	—	—	—	—	150
8	58.7	52.9	48.4	44.7	41.6	39.0	—	—	—	—	—	—	—	—	—	
15	56.6	49.6	44.4	40.2	—	—	—	—	—	—	—	—	—	—	—	
30	53.1	44.4	—	—	—	—	—	—	—	—	—	—	—	—	—	

Note:
1. (kW) of Exposure Equals mA x kV. For Example: 70 kV x 300 mA = 21 kW.
2. Exposures less than .010 seconds will have a kW rating same as .010 seconds.

Remarque:
1. (kW) en exposition égale kV x mA. Par exemple: 70 kV x 300 mA = 21 kW.
2. Les expositions inférieures à 0.010 sec. ent les mémes valuers en kW que celles de 0.010 sec.

Anmerkungen:
1. (kW) der Belichtung is gleich mA x kV Zum Beispiel: 70 kV x 300 mA = 21 kW.
2. Belichtungen von weniger als .010 Sekunden haben die gleichen kW Werte wie die von .010 Sekunden.

Nota:
1. (kW) De exposición se calcula multiplicando mA x kV-por ejemplo: 70 kV x 300 mA = 21 kW.
2. Para exposición de menos de .010 segundos, el resultado en (kW) seria lo mismo que el de .010 segundos.

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

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

Thermische Anoden bezugsleistung für eine speicherung von 70%. IEC 60613

Aproximadamente el poder de penetracion para obtener un almacenaje de calor del anode de 70%. IEC 60613

1.0 Focal Spot 3Ø 12 Degrees 150 Hz
1,0 Dimension Focale 3Ø 12 Degrés 150 Hz
1.0 Brennpunkt 3Ø 12 Grad 150 Hz
1.0 De Marcas Focales 3Ø 12 Grados 150 Hz

Caractéristoques Pour L'Angiographie CEI 60613
Angiographische Nennleistungen IEC 60613
Gradaciones Angiografica IEC 60613

Exposure rate per second	Tube load (kW) as a function of the exposure time (seconds) of the individual radiographs of the series															Number of exposures in series
	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.100	0.120	0.140	0.160	0.180	0.200	0.225	0.250	
1	75.1	72.4	70.5	68.9	67.5	66.3	64.1	62.2	60.5	59.0	57.6	56.4	55.2	53.8	52.6	
2	74.8	71.9	69.7	67.9	66.3	64.9	62.4	60.3	58.4	56.7	55.1	53.7	52.4	50.9	49.5	
3	74.5	71.3	68.9	66.9	65.2	63.6	60.9	58.5	56.5	54.6	53.0	51.5	—	—	—	
4	74.1	70.8	68.2	66.0	64.1	62.4	59.5	57.0	54.8	52.8	—	—	—	—	—	10
8	73.2	69.0	65.8	63.1	60.7	58.6	—	—	—	—	—	—	—	—	—	
15	71.8	66.7	62.7	59.3	—	—	—	—	—	—	—	—	—	—	—	
30	69.9	63.4	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	74.7	71.8	69.6	67.8	66.2	64.8	62.2	60.1	58.1	56.3	54.7	53.3	51.9	50.3	48.9	
2	74.4	71.1	68.7	66.6	64.8	63.1	60.3	57.8	55.6	53.6	51.9	50.3	48.8	47.1	45.5	
3	74.0	70.4	67.7	65.4	63.4	61.6	58.5	55.8	53.4	51.3	49.4	47.7	—	—	—	
4	73.6	69.8	66.8	64.3	62.1	60.2	56.8	53.9	51.4	49.2	—	—	—	—	—	20
8	72.3	67.6	63.8	60.7	58.0	55.6	—	—	—	—	—	—	—	—	—	
15	70.6	64.5	59.8	56.0	—	—	—	—	—	—	—	—	—	—	—	
30	67.7	60.0	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	74.2	70.8	68.2	66.0	64.1	62.3	59.3	56.6	54.3	52.2	50.3	48.6	47.0	45.2	43.6	
2	73.7	70.0	67.1	64.6	62.5	60.5	57.1	54.2	51.7	49.4	47.4	45.6	43.9	42.0	40.3	
3	73.3	69.2	66.0	63.3	60.9	58.8	55.2	52.0	49.3	47.0	44.9	43.0	—	—	—	
4	72.8	68.4	65.0	62.1	59.5	57.3	53.4	50.1	47.3	44.9	—	—	—	—	—	40
8	71.3	65.8	61.5	57.9	54.8	52.1	—	—	—	—	—	—	—	—	—	
15	69.1	62.2	56.9	52.6	—	—	—	—	—	—	—	—	—	—	—	
30	65.5	56.6	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	73.7	69.9	66.9	64.4	62.2	60.2	56.7	53.8	51.1	48.8	46.8	44.9	43.2	41.2	39.5	
2	73.2	69.0	65.7	63.0	60.5	58.3	54.6	51.3	48.6	46.1	44.0	42.0	40.3	38.3	36.5	
3	72.7	68.2	64.6	61.6	59.0	56.6	52.6	49.2	46.3	43.8	41.6	39.6	—	—	—	
4	72.2	67.3	63.5	60.3	57.5	55.0	50.8	47.3	44.3	41.8	—	—	—	—	—	60
8	70.6	64.5	59.8	56.0	52.7	49.8	—	—	—	—	—	—	—	—	—	
15	68.2	60.6	54.9	50.4	—	—	—	—	—	—	—	—	—	—	—	
30	64.1	54.6	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	73.2	69.0	65.7	62.9	60.5	58.3	54.5	51.2	48.4	45.9	43.7	41.8	40.0	38.0	35.7	
2	72.7	68.1	64.5	61.4	58.8	56.4	52.3	48.9	45.9	43.4	41.1	39.1	37.3	35.3	33.5	
3	72.1	67.2	63.3	60.1	57.2	54.7	50.4	46.8	43.8	41.2	38.9	36.9	—	—	—	
4	71.7	66.4	62.2	58.7	55.7	53.1	48.6	45.0	41.9	39.2	—	—	—	—	—	80
8	69.9	63.4	58.5	54.4	50.9	47.9	—	—	—	—	—	—	—	—	—	
15	67.4	59.4	53.4	48.7	—	—	—	—	—	—	—	—	—	—	—	
30	63.1	53.1	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	72.7	68.1	64.5	61.5	58.8	56.5	52.4	48.9	46.0	43.4	41.1	39.1	35.7	31.8	28.6	
2	72.2	67.2	63.3	60.0	57.2	54.6	50.3	46.7	43.6	41.0	38.7	36.7	34.8	31.8	28.6	
3	71.6	66.3	62.1	58.6	55.6	53.0	48.4	44.7	41.6	38.9	36.6	34.6	—	—	—	
4	71.1	65.4	61.0	57.3	54.2	51.4	46.7	42.9	39.8	37.1	—	—	—	—	—	100
8	69.3	62.5	57.2	53.0	49.4	46.3	—	—	—	—	—	—	—	—	—	
15	66.7	58.3	52.1	47.3	—	—	—	—	—	—	—	—	—	—	—	
30	62.2	51.9	—	—	—	—	—	—	—	—	—	—	—	—	—	
1	71.5	66.1	61.9	58.3	55.2	52.5	47.9	44.1	39.7	34.0	29.8	26.5	23.8	21.2	19.1	
2	71.0	65.2	60.6	56.9	53.6	50.8	46.0	42.1	38.9	34.0	29.8	26.5	23.8	21.2	19.1	
3	70.4	64.3	59.5	55.5	52.1	49.2	44.3	40.4	37.1	34.0	29.8	26.5	—	—	—	
4	69.9	63.4	58.4	54.2	50.7	47.7	42.8	38.8	35.6	32.9	—	—	—	—	—	150
8	68.0	60.4	54.6	50.0	46.2	42.9	—	—	—	—	—	—	—	—	—	
15	65.2	56.1	49.5	44.5	—	—	—	—	—	—	—	—	—	—	—	
30	60.5	49.5	—	—	—	—	—	—	—	—	—	—	—	—	—	

Note:
1. (kW) of Exposure Equals mA x kV. For Example: 70 kV x 300 mA = 21 kW.
2. Exposures less than .010 seconds will have a kW rating same as .010 seconds.

Remarque:
1. (kW) en exposition égale kV x mA. Par exemple: 70 kV x 300 mA = 21 kW.
2. Les expositions inférieures à 0.010 sec. ent les mémes valuers en kW que celles de 0.010 sec.

Anmerkungen:
1. (kW) der Belichtung is gleich mA x kV Zum Beispiel: 70 kV x 300 mA = 21 kW.
2. Belichtungen von weniger als .010 Sekunden haben die gleichen kW Werte wie die von .010 Sekunden.

Nota:
1. (kW) De exposición se calcula multiplicando mA x kV-por ejemplo: 70 kV x 300 mA = 21 kW.
2. Para exposición de menos de .010 segundos, el resultado en (kW) seria lo mismo que el de .010 segundos.

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

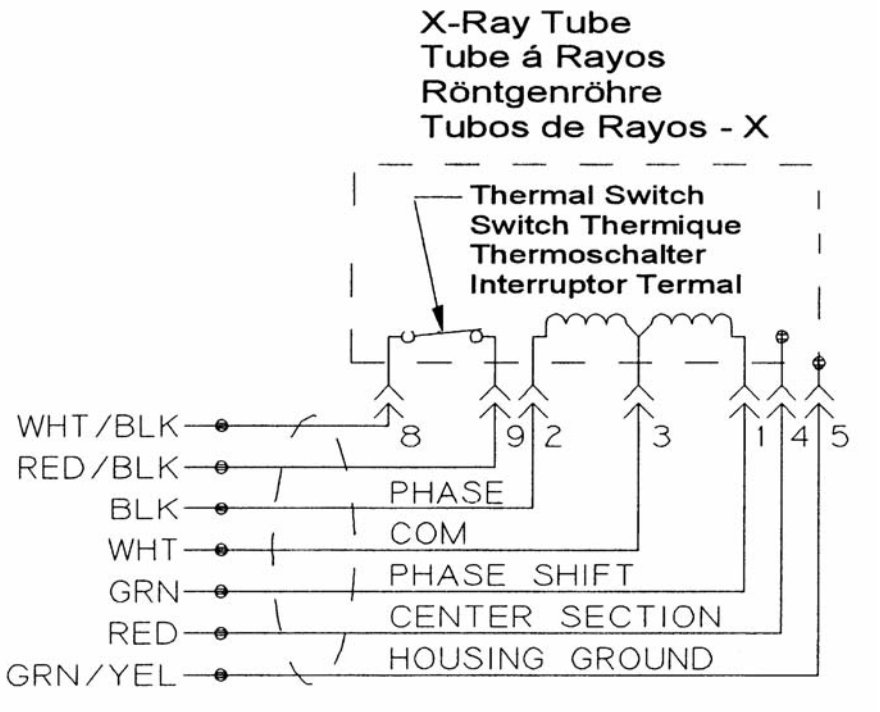
Puissance calorifique nominale de l'anode: 70%, CEI 60613

Thermische Anoden bezugsleistung für eine speicherung von 70%. IEC 60613

Aproximadamente el poder de penetracion para obtener un almacenaje de calor del anode de 70%. IEC 60613

Stator - Wiring Diagram
Stator - Schéma de Câblage
Stator - Drahtfarbentabelle
Bovina - Diagramas

Spécificités et Caractéristiques du Stator
Statornennleistungen und Merkmale
Caracteristicas y Clarificacion de la Bovina



Wire Color / Couluers des Branchements / Kabekfarben / Cable de Color	Description / Description / Beschreibung / Descripcion
1 Green	Phase Shift
Vert	Stator de Changement de Phase
Grün	Veränderliche Statorphase
Verde	Cambio de Fase del Estator
2 Black	Phase
Noir	Phase
Schwarz	Phase
Negro	Fase
3 White	Common
Blanc	Neutre
Weiss	Neutral
Blanco	Común
4 Red	Center Section
Rouge	Section Centrale
Rot	Mittelteil
Rojo	Sección Central
5 Green/Yellow	Housing Ground
Vert/Jaune	Masse de la Gaine
Grün/Gelb	Masse des Gehäuses
Verde/Amarillo	Encaje a Tierra
8 White/Black	Thermal Switch
Blanc/Noir	Switch Thermique
Weiss/Schwarz	Thermoschalter
Blanco/Negro	Interruptor Termal
9 Red/Black	Thermal Switch
Rouge/Noir	Switch Thermique
Rot/Schwarz	Thermoschalter
Rojo/Negro	Interruptor Termal

"R" Stators	Stator "R"	"R" Stator	"R" Bovina	
Black - White	Noir - Blanc	Schwarz - Weiss	Negro - Blanco	14 Ω
Green - White	Vert - Blanc	Grün - Weiss	Verde - Blanco	43 Ω
180 Hz Cap	180 Hz Cap	180 Hz Cap	180 Hz Cap	6 µF
60 Hz Cap	60 Hz Cap	60 Hz Cap	60 Hz Cap	30 µF

Stator Power:
Time to full speed of the anode is a function of the power rating of the "starter" and the weight / diameter of the anode. All Varian stator types are rated for regular speed and high speed starters.

Immediately following high speed anode rotation, the rotor speed must be reduced to 4000 r/min or less within 10 seconds using a suitable dynamic braking device.

No more than two high speed starts per minute are permissible. The starting voltage must never exceed 600 volts rms.

Puissance du stator:
Le temps nécessaire à la montée en pleine vitesse est fonction de la puissance du démarreur et du poids/ diamétre del'anode. Tous les stators Varian sont prévus pour une vitesse normale et pour une vitesse rapide.

Immédiatement aprés la rotation à 4000 t/min ou moins en 10 secondes en utilisant un système de freinage dynamique approprié.

Pas plus de deux demarrages rapides par minute sont autorisés. La tension de démarrage ne doit jamais excéder 600 volts rms.

Statorleistung:
Die Zeitspanne bis zur vollen Geschwindigkeit des Anodentellers ist eine funktion aus der Nennleistung des Anlaufgerätes und Gewichtes bzw. Durchmessers des Tellers.
Alle Varian stator sind für hoch- und normaltourigen Betrieb ausgelegt.

Unter Verwendung einer geeigneten Anogenbremse muß die Drehzahl nach hochtourigem Betrieb unmittelbar auf weniger als 4,000 U/min verreduziert werden.
Es sind nicht mehr als zwei Hochleistungsstarts pro minute zulässig. Die Anlaufspannung darf hiebei 600 volt nicht überschreiten.

Poder de la Bovina:
La velocidad maxima del anodo giratorio es obtenida por el poder del arrancador y es relacionado con el peso y diametro del anodo. Todos las bovinas de Varian son usadas con velocidad regular y velocidad alta al principio.

Immediatamente despues de obtener la velocidad alta del anodo giratario, la velocidad del rotador debe der reducida a 4000 r/min ó menos en 10 segundos usado un sistema dunamico y apropiado para reducir la velocidad.

El rotador no debe ser expuesto a velocidades altas no mas de dos (2) veces por minuto. El voltaje inicial no debe excedir 600 voltios rms.

Le Gaine B-240H

Maximum Peak Voltage ..... 125 kV
Anode to Ground ..... 63 kV
Cathode to Ground ..... 63 kV

Maximum X-ray Tube Assembly Heat Content ..... 1,500 kJ (2.0 MHU)

Maximum Continuous Heat Dissipation
(Includes stator heat) ..... Refer to Heat Exchanger Brochure

Focal Point Position (Central Ray) Within 1mm
(X,Y Direction from the center of radiation port.)

X-Ray Tube Assembly
Permanent Filtration ..... 1.0 mm Al IEC 60522

Loading Factors for Leakage Radiation ..... 125 kV, 30 mA

High Voltage Cable Receptacles ..... Per IEC 60526

Ambient Air Temperature Limits for Operation ..... 5°C to 40°C

Temperature Limits for Storage and Transport ..... -20°C to +75°C
Humidity ..... +10% to +90%
Atmospheric Pressure Range ..... 70 kPa to 106 kPa

Weight: Housing ..... 34 kg (74.9 lbs)

IEC Classification ..... Class I

Safety Devices: Thermal Switch
Normally Closed Contact ..... Opening at 85°C
Closes at 74°C

Filament Frequency Limits ..... 50 HZ - 25 kHZ

Das B-240H Gehäuse

Maximale Spannungsfestigkeit ..... 125 kV
Anode gegen Erde ..... 63 kV
Kathode gegen Erde ..... 63 kV

Maximale Wärmespeicherkapazität des Strahlergehäuses ... 1,500 kJ (2.0 MHU)

Maximale kontinuierliche Wärmeableitung des Strahler gehäuses
(einschleisslich Statorerwärmung) ..... Siehe Wärmeaustauscherbroschüre

Brennfleckposition (Zentralstrahl) innerhalb von 1mm
(X-,Y-Achse von der Mitte des Strahlenaustrittsfensters)

Röntgenstrahlers
Eigenfilterwert ..... 1.0 mm Al IEC 60522

Ladefaktoren für Leckstrahlmessung ..... 125 kV, 30 mA

Hochspannungskabelbehälter ..... Pro IEC 60526

Umgebundstemperaturgrenzen für den Betrieb ..... 5°C bis 40°C

Temperaturgrenzen für Aufbewahrung und Transport ..... -20°C bis +75°C
Feuchtigkeit ..... +10% bis +90%
Luftdruck ..... 70 kPa bis 106 kPa

Gewicht - Gehäuse ..... 34 kg (74.9 lbs)

IEC Klassifizierung ..... Klasse I

Sicherheitseinrichtungen - Thermoschalter
normalerweise geschlossen Verbindung ..... Offen bei 85°C
Geschlossen bei 74°C

Heizfaden - Frequenzgrenze ..... 50 HZ - 25 kHZ

Encaje de B-240H

Voltage Maximo Elevado ..... 125 kV
Anodo a Tierra ..... 63 kV
Catodo a Tierra ..... 63 kV

Maximo Calor Contenido de Ensamblaje del Tubo de Rayos X
..... 1,500 kJ (2.0 MHU)

Difusion del calor continuo del encaje
(Incluye el calor de la bovina) ..... Refierase al folleto del radiador

Posición de la marca focal (Rayo Central) Dentro de 1mm.
(La dirección axial X,Y se refiere del centro de la radiación Portal.)

Ensamblaje de Tubo de Rayos X
Filtracion Permanente ..... 1.0 mm Al IEC 60522

Especificaciones de Encaje para la fuga de Radiación ..... 125 kV, 30 mA

Receptáculo del cable de tensión ..... Por IEC 60526

Temperatura Limitada de Operación ..... 5°C a 40°C

Temperatura Limitada de Almacen y Transporte ..... 20°C a +75°C
Humedad ..... +10% a +90%
Límites de la presión atmosférica ..... 70 kPa a 106 kPa

Peso: Encaje ..... 34 kg (74.9 lbs)

IEC Clasificación ..... Clase I

Aparatos de Seguridad: Interruptor Termal
Normalmente Cerrado ..... Abierto a 85°C
Cerrado a 74°C

Limites de la frecuencia del filamento ..... 50 HZ - 25 kHZ

Le Gaine B-240H

Maximum Peak Voltage ..... 125 kV
Anode to Ground ..... 63 kV
Cathode to Ground ..... 63 kV

Maximum X-ray Tube Assembly Heat Content ..... 1,500 kJ (2.0 MHU)

Maximum Continuous Heat Dissipation
(Includes stator heat) ..... Refer to Heat Exchanger Brochure

Focal Point Position (Central Ray) Within 1mm
(X,Y Direction from the center of radiation port.)

X-Ray Tube Assembly
Permanent Filtration ..... 1.0 mm Al IEC 60522

Loading Factors for Leakage Radiation ..... 125 kV, 30 mA

High Voltage Cable Receptacles ..... Per IEC 60526

Ambient Air Temperature Limits for Operation ..... 5°C to 40°C

Temperature Limits for Storage and Transport ..... -20°C to +75°C
Humidity ..... +10% to +90%
Atmospheric Pressure Range ..... 70 kPa to 106 kPa

Weight: Housing ..... 34 kg (74.9 lbs)

IEC Classification ..... Class I

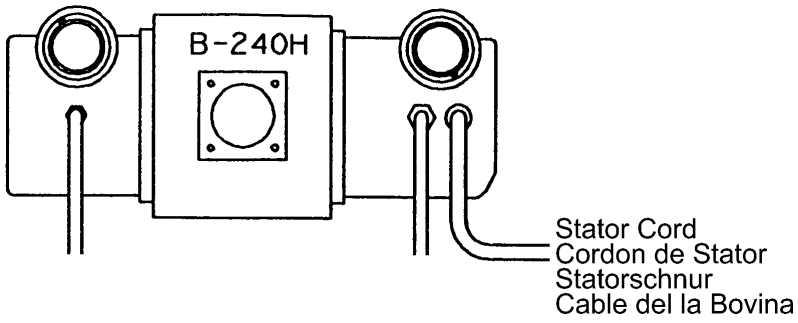
Safety Devices: Thermal Switch
Normally Closed Contact ..... Opening at 85°C
Closes at 74°C

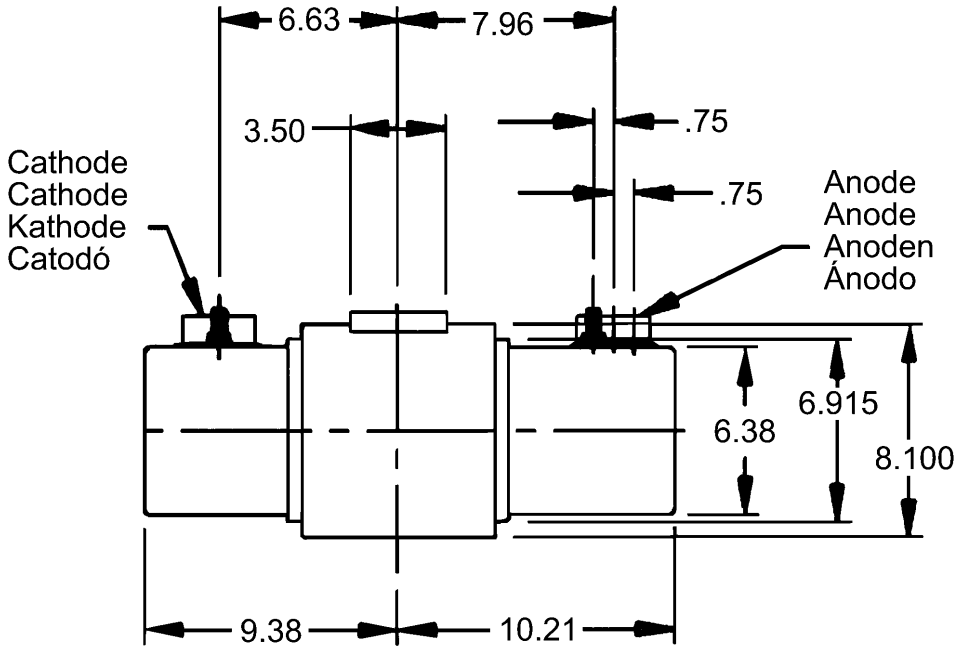
Filament Frequency Limits ..... 50 HZ - 25 kHZ

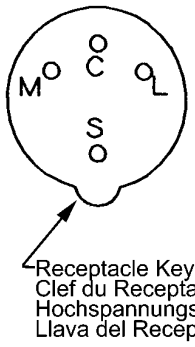
Le Gaine B-240H **Das B-240H Gehäuse** **Encaje de B-240H**

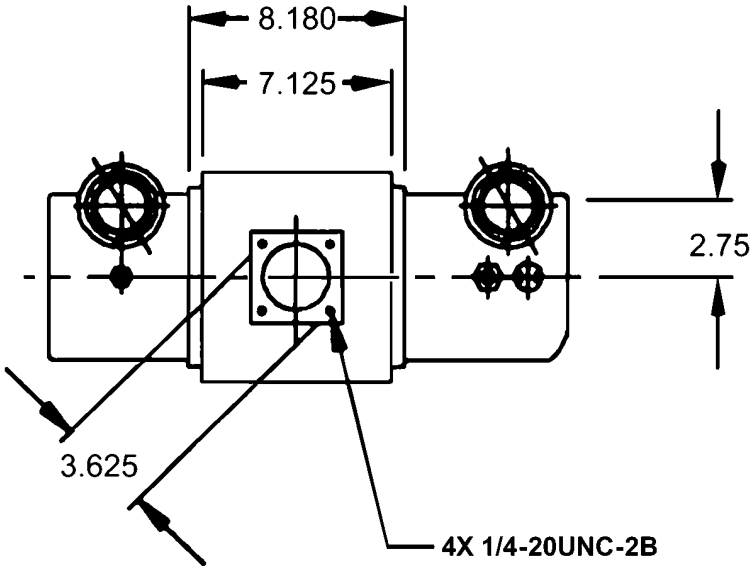
Note: Dimensions in Inches
Remarque: Dimensions en Pouces
Hinweis: Abmessungen in Zoll
Nota: Dimensiones en Pulgadas

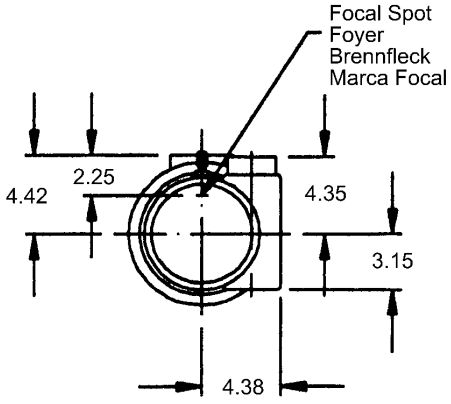
Dimensions are for reference only
Les dimensions sont pour la référence seulement
Maße sind als nur Referenz
Las dimensiones están para la referencia solamente





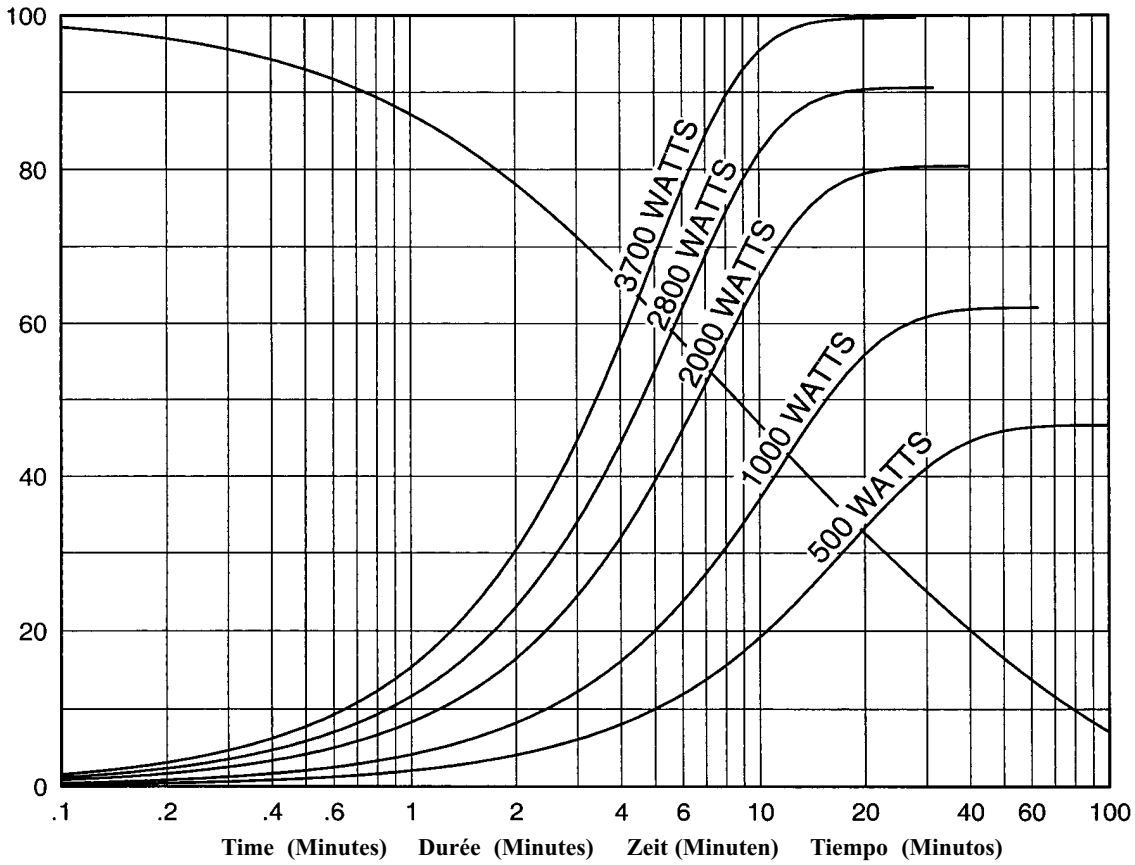






Abaques d' Échauffement et de Refroidissement de L'Anode
Anode Aufheiz - und AkKühlkurven
Curvas de Calentamiento y Enfriamiento del Anodo

ANODE HEATING AND COOLING CURVES



Note:
1. Heating and cooling curves reflect maximum tube performance. Tube operation is ultimately limited by system software control.

Remarque:
1. Les abaques d'échauffement et de refroidissement représentent des valeurs maximales. L'utilisation du tube est finalement limitée par le logiciel du système.

Anmerkungen:
1. Die Angaben stellen die höchstzulassigen Betriebswerte dar. Der technische Betrieb muß im Rahmen der Belastungs- und Abkühlkennlinien durchgefuhrt werden.

Nota:
1. El máximo poder del tubo es reflectada en el diagrama de enfriamiento y calentamiento del encaje asamblado. La operación del tubo es ultimamente limitada por el control del sistema programado.

VARIAN medical systems
X-RAY PRODUCTS

Salt Lake City, UT 1-801-972-5000
Charleston, SC 1-843-767-3005

www.varian.com