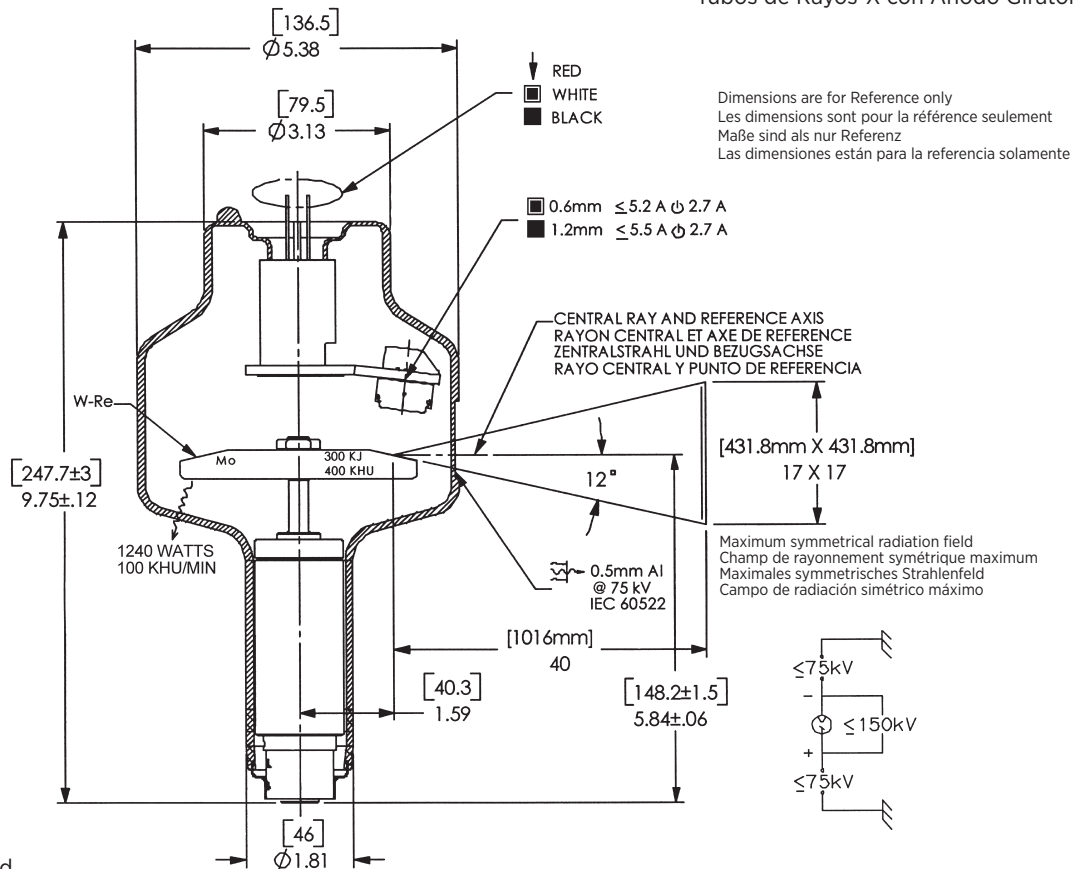


Rotating Anode X-Ray Tube
 Tubes Radiogènes à Anode Tournante
 Röntgenröhre mit rotierender Anode
 Tubos de Rayos-X con Ánodo Giratorio

- Large - Black
 Grand - Noir
 Gross - Schwarz
 Largo - Negro
- Small - White
 Petit - Blanc
 Klein - Weiss
 Pequeño - Blanco
- Stand - By
 Attente
 Bereit Stehen
 En Espera
- Frame or Chasis
 Masse
 Chassis
 Soporte o Chasis
- X-Ray Tube
 Tube Radiogène
 Röntgenröhre
 Tubo de Rayos X
- Radiation Filter or Filtration
 Filtre de rayonnement
 Filterung
 Filtración de Radiación



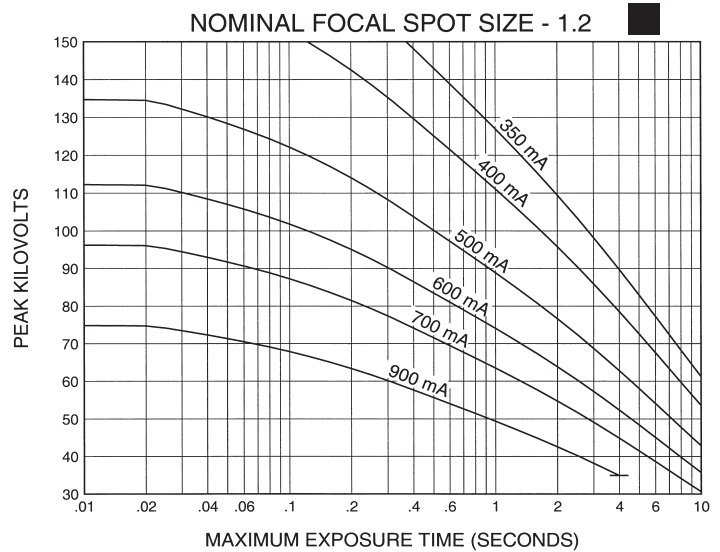
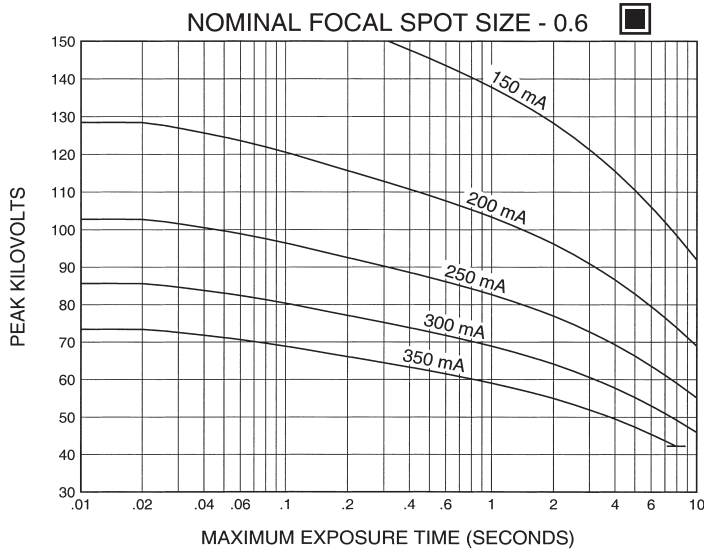
Note: Document originally drafted in the English language.

| Product Description | Description du Produit | Produktbeschreibung | Descripcion del Producto |
|---|--|--|---|
| <p>The RAD-60 is a 4" (100 mm) 150 kV, 300 kJ (400 KHU) maximum anode heat content, rotating anode insert. This insert is specifically designed for general radiographic and fluoro/spotfilm procedures. The insert features a 12° rhenium-tungsten molybdenum target and is available with the following nominal focal spots:</p> <p style="text-align: center;">0.6 - 1.2 IEC 60336</p> <p>Nominal Anode Input Power Small - 40 kW IEC 60613 Large - 100 kW IEC 60613 For the equivalent anode input power of 120 Watts</p> | <p>Le tube RAD-60, à anode tournante de 100 mm, (4 pouces), 150 kV, avec une capacité calorifique maximale de 300 kJ (400 kUC) est à usage spécifique pour la radiographie de générale et pour la radio-fluorographie. L' anode composite en Rhénium - Tungstène Molybdène avec pente d'anode de 12° est disponible avec les combinaisons focales suivantes:</p> <p style="text-align: center;">0,6 - 1,2 CEI 60336</p> <p>Puissance anodique nominale de l'anode Petit foyer - 40 kW CEI 60613 Grand foyer - 100 kW CEI 60613 Pour la puissance anodique d'équilibre thermique de 120 Watts</p> | <p>Die RAD-60 ist eine 4" (100 mm) Doppelfokus Drehanoden-Röntgenröhre, mit einer Wärmespeicherkapazität des Anodentellers von 300 kJ (400 KHU) und einer max. Spannungsfestigkeit von 150 kV. Sie ist besonders geeignet für die allgemeine Röntgenaufnahme-technik, sowie auch für den Durchleuchtungs- und Zielgerätebetrieb (1mm FFA) Verfahren. Der Rhenium, Wolfram, und Molybdän Anodenteller besitzt einen Winkel von 12°. Folgende Brennfleckkombinationen ist lieferbar:</p> <p style="text-align: center;">0.6 - 1.2 IEC 60336</p> <p>Nominale Anodenbezugsleistung Klein - 40 kW IEC 60613 Gross - 100 kW IEC 60613 Gilt bei einer Aequivalent - Anodenleistung von 120 Watt</p> | <p>El RAD-60 es un tubo de ánodo giratorio de 100 mm, (4"), 150 kV, 300 kJ (400 kUC) diseñado específicamente para procedimientos generales en radiografía y fluoroscopia. Consta de un objetivo de renio, tungsteno y molibdeno con pendiente de 12 grados. Disponible con las siguientes combinaciones de marcas focales:</p> <p style="text-align: center;">0.6 - 1.2 IEC 60336</p> <p>Potencia nominal de entrada del anodo Foco fine - 40 kW IEC 60613 Foco grueso - 100 kW IEC 60613 Para una potencia equivalente del anodo de 120 W</p> |

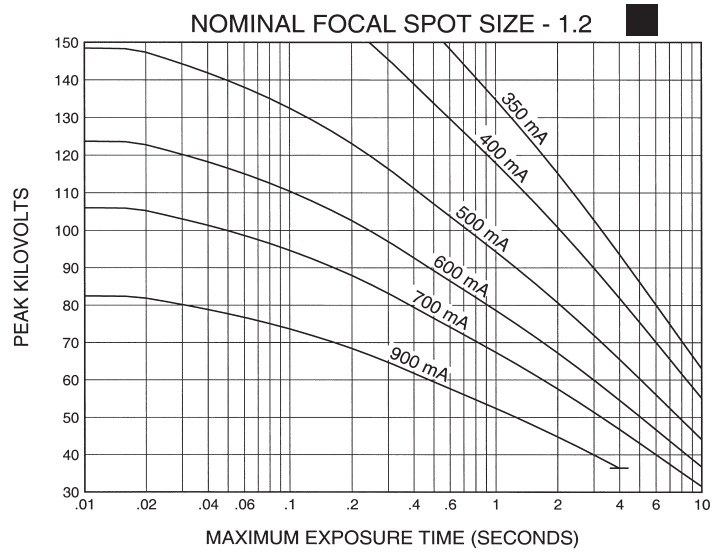
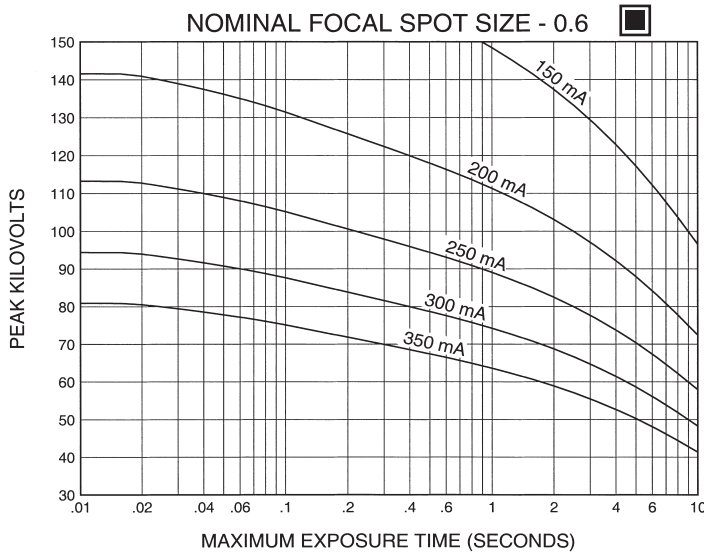
3 Ø Constant Potential

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

50 HZ - 2,850 RPM



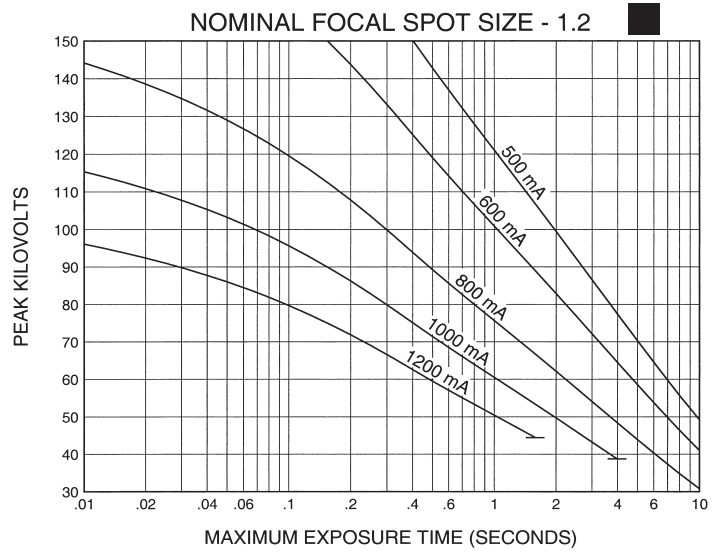
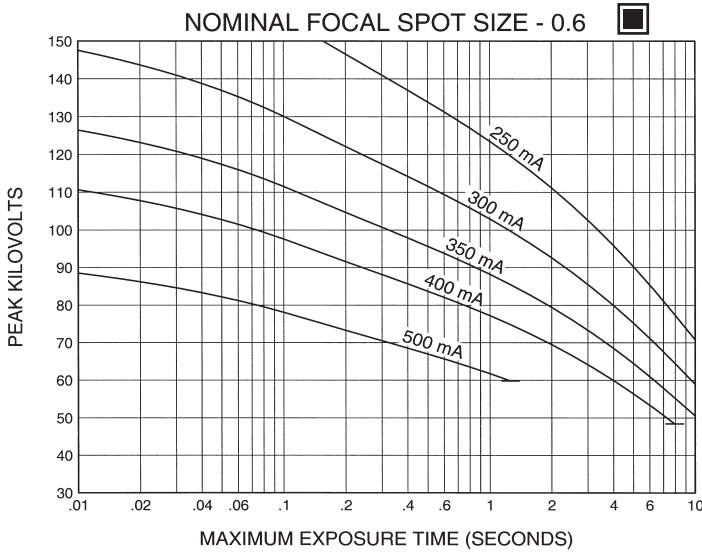
60 HZ - 3,450 RPM



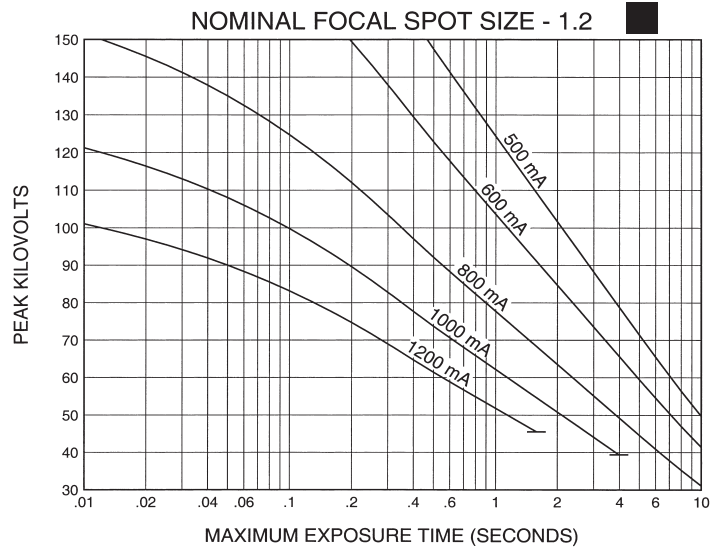
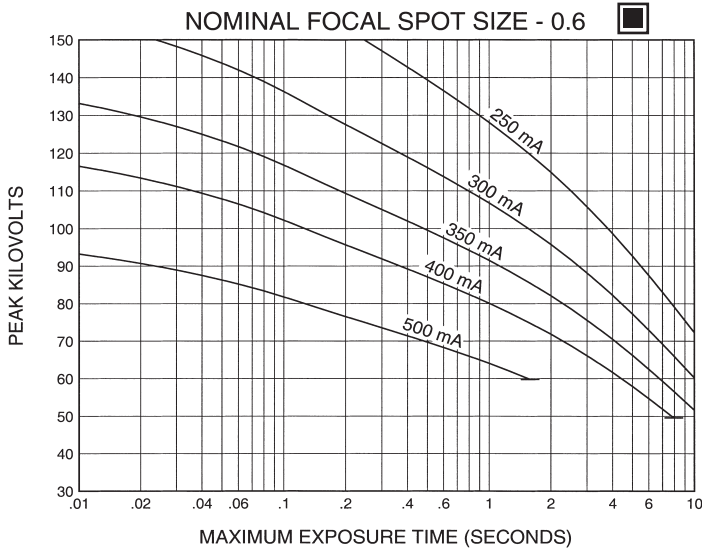
| | | | |
|--|--|--|--|
| <p>Nominal anode input power for the anode heat content 40%. IEC 60613</p> | <p>Puissance calorifique nominale de l'anode: 40%, CEI 60613</p> | <p>Thermische Anodenbezugsleistung bei einer Wärmespeicherung von 40%. IEC 60613</p> | <p>Aproximadamente el poder de penetración para obtener un almacenaje de calor del anodo de 40%. IEC 60613</p> |
|--|--|--|--|

3 Ø Constant Potential

150 HZ - 8,500 RPM



180 HZ - 10,000 RPM



| | | | |
|--|--|--|--|
| <p>Nominal anode input power for the anode heat content 40%. IEC 60613</p> | <p>Puissance calorifique nominale de l'anode: 40%, CEI 60613</p> | <p>Thermische Anodenbezugsleistung bei einer Wärmespeicherung von 40%. IEC 60613</p> | <p>Aproximadamente el poder de penetración para obtener un almacenaje de calor del anodo de 40%. IEC 60613</p> |
|--|--|--|--|

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 5 msec pulse width and 50 exposures per second the x-ray tube will be producing x-rays for a total of 250 msec each second or 25% 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 V x 0.4 A = 32,000 W or 32 kW

USING THE CINE RATING CHARTS:

RAD-60 150/180 Hz 3 Phase 1.2 Focal Spot

Example: Determine maximum kW allowed with the following known factors:
Maximum Pulse Width 2 msec
Exposures per Second 60
Maximum Cine Run Time4.5 seconds

Calculate Duty Factor: (DF%)

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

$$DF\% = \frac{2 \text{ msec} \times 60 \text{ exp/sec}}{10} = \frac{120}{10} = 12\%$$

Refer to Rating Chart RAD-60 150/180 Hz 3 Phase 1.2 Focal Spot:

At bottom of chart find 2 second line. Move vertically to intersection with 12% DF curve. Make a horizontal reference to left side of rating chart and note kW rating of 80 kW.

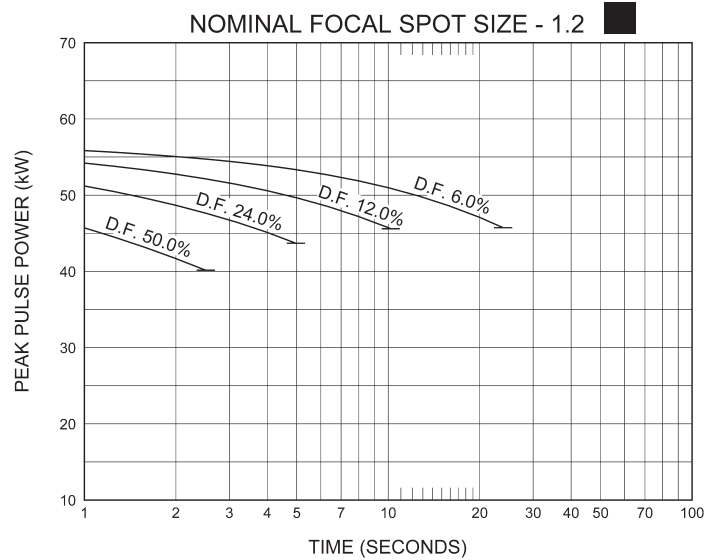
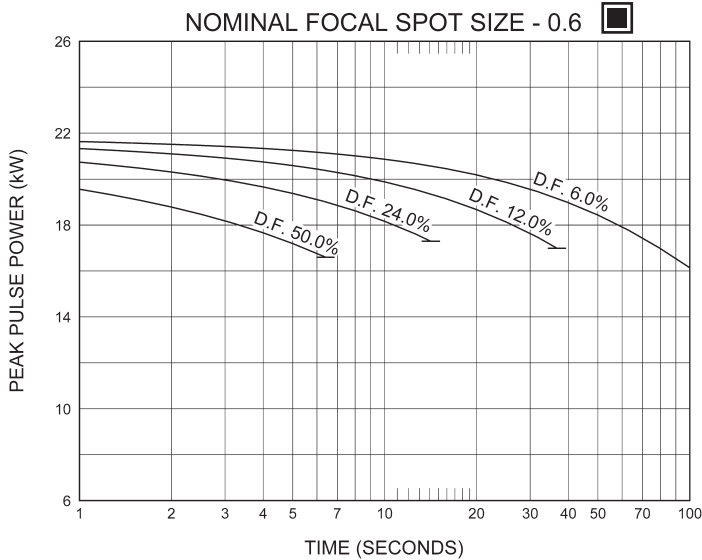
We now know each pulse during the cine run can have a maximum rating of 80 kW under conditions given in example.

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.

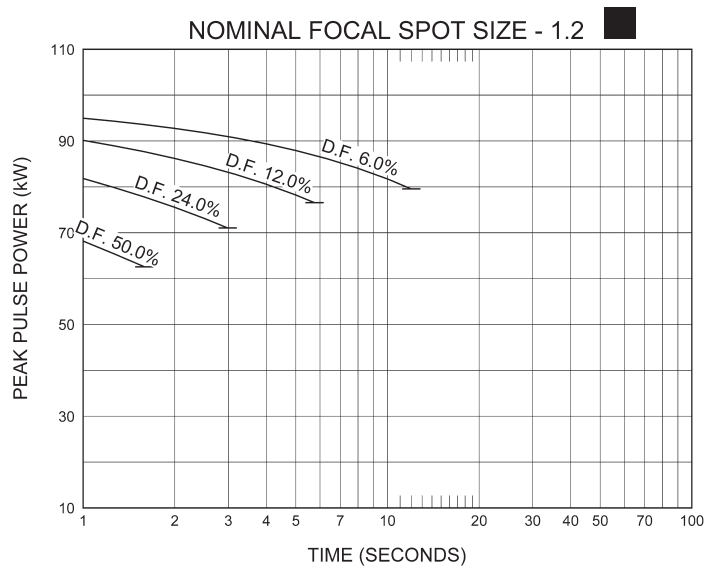
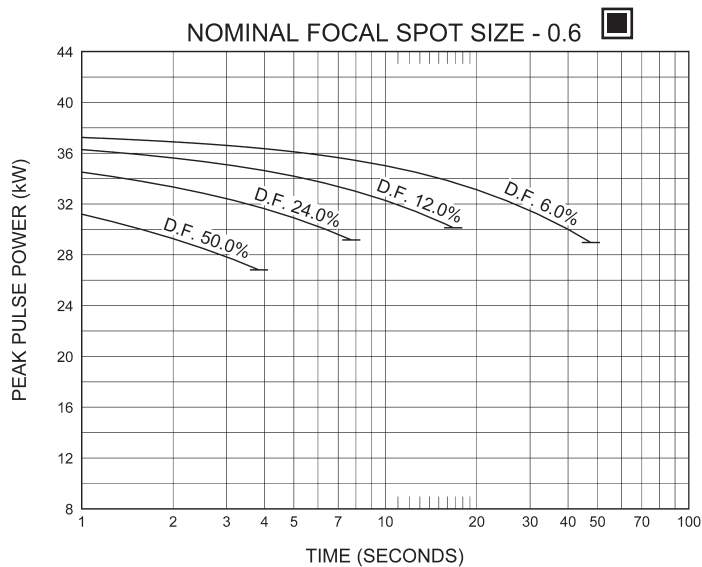
The Cine rating charts are usable to 100% anode heat storage. The start of Cine run should be below 70% anode heat storage. Exceeding 100% anode heat storage will cause anode track erosion with high risk of tube destruction.

3 Ø Constant Potential \equiv

50/60 Hz



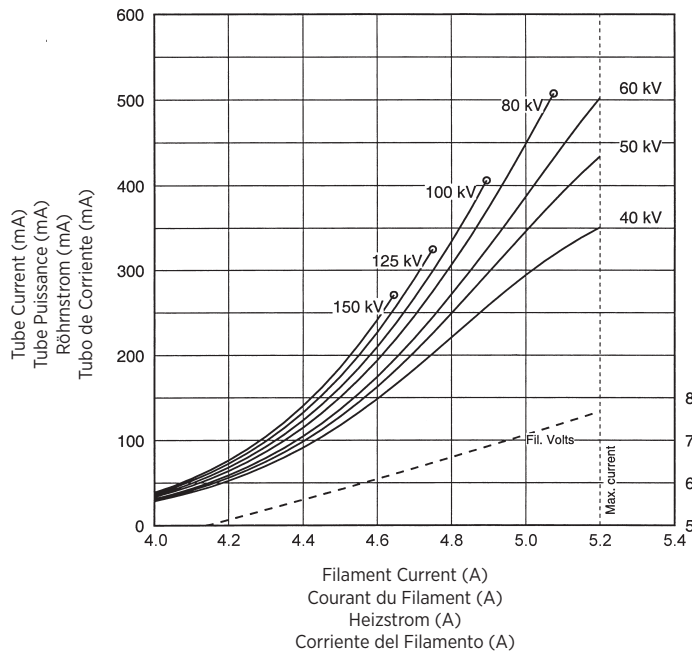
150/180 Hz



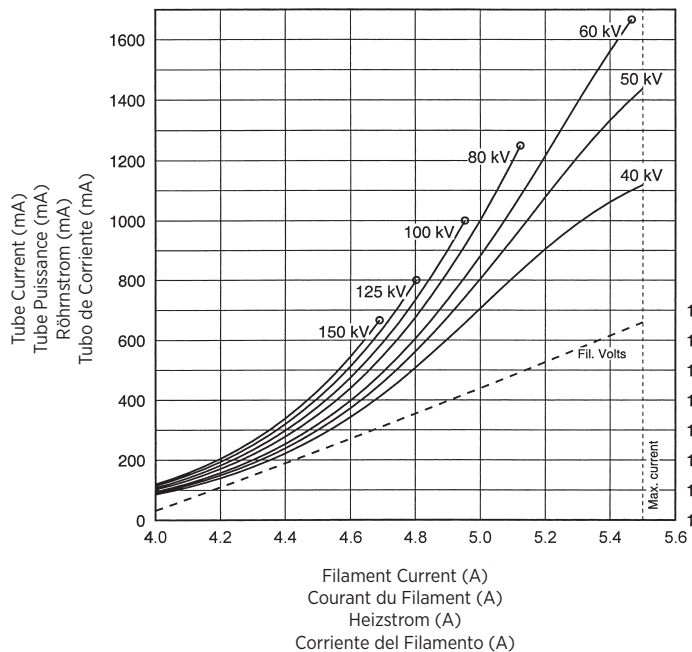
| | | | |
|---|---|---|---|
| Nominal anode input power for the anode heat content 70%. IEC 60613 | Puissance calorifique nominale de l'anode: 70%, CEI 60613 | Thermische Anodenbezugsleistung bei einer Wärmespeicherung von 70%. IEC 60613 | Aproximadamente el poder de penetración para obtener un almacenaje de calor del anodo de 70%. IEC 60613 |
|---|---|---|---|

3 Ø Constant Potential

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

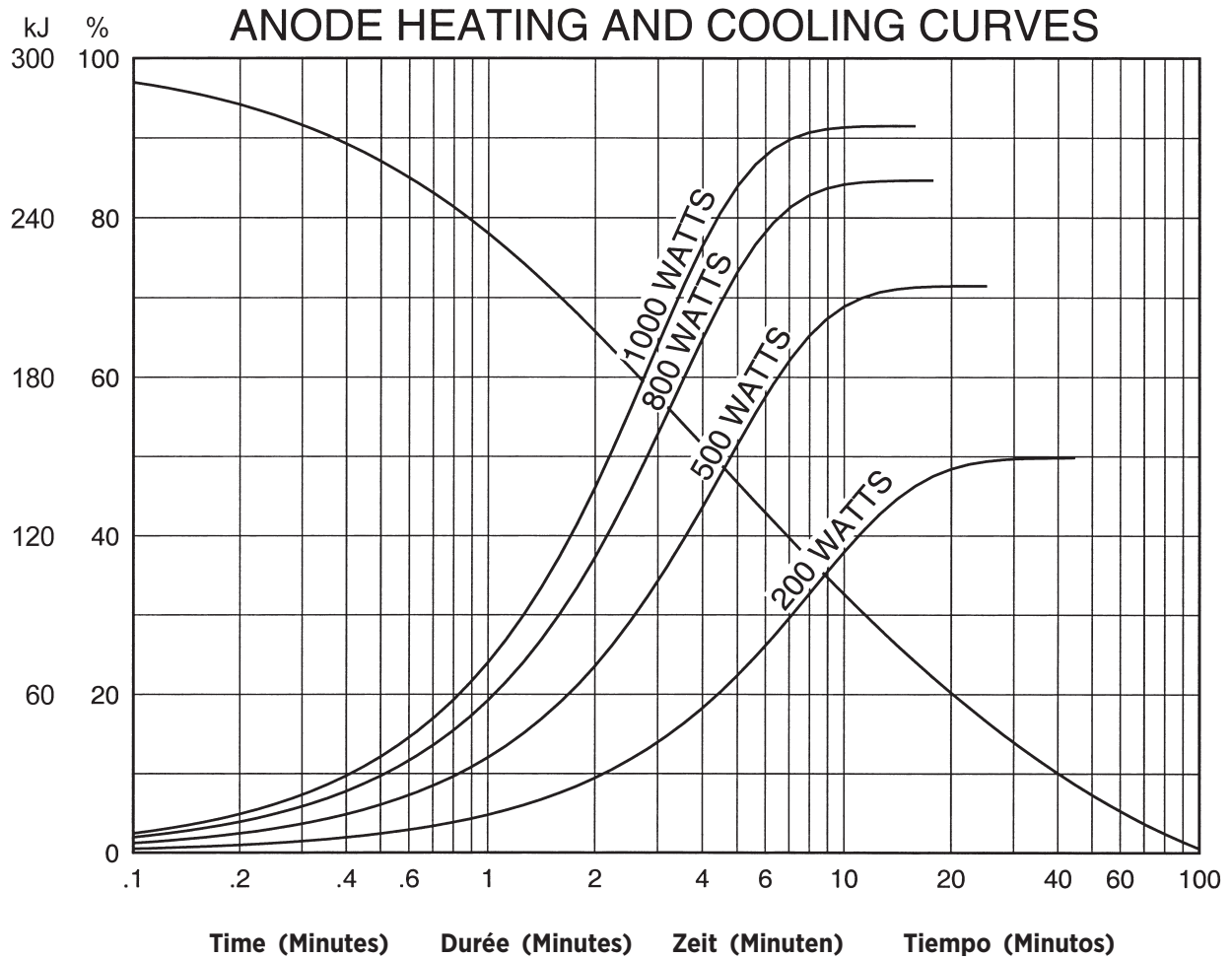


THREE PHASE EMISSION (± .15 A)
 0.6



THREE PHASE EMISSION (± .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 gradación 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.





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