

***Phosphors***

**TUNGSRAM**

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## TYPE F-3

**USE:** Fluorescent lamp, 3500 °K (IEC Standard: "White")

**Chemical composition:** Calcium-halophosphate: Antimony, Manganese

**Chemical symbol:**  $\text{Ca}_5(\text{PO}_4)_3(\text{F}, \text{Cl})$ : Sb, Mn

### PHYSICAL PROPERTIES

Body Color: White

Material Density (g/cc): 3,15

Particle Size Distribution by Photo-sedimentograph (Ultrasonic Dispersion):

< 5 $\mu\text{m}$	5 – 15 $\mu\text{m}$	> 15 $\mu\text{m}$
max. 5%	min. 80%	max. 15%

$d_{50}$  ( $\mu\text{m}$ ):  $11 \pm 1$

### OPTICAL PROPERTIES

Wavelength at Peak: 583/480 nm

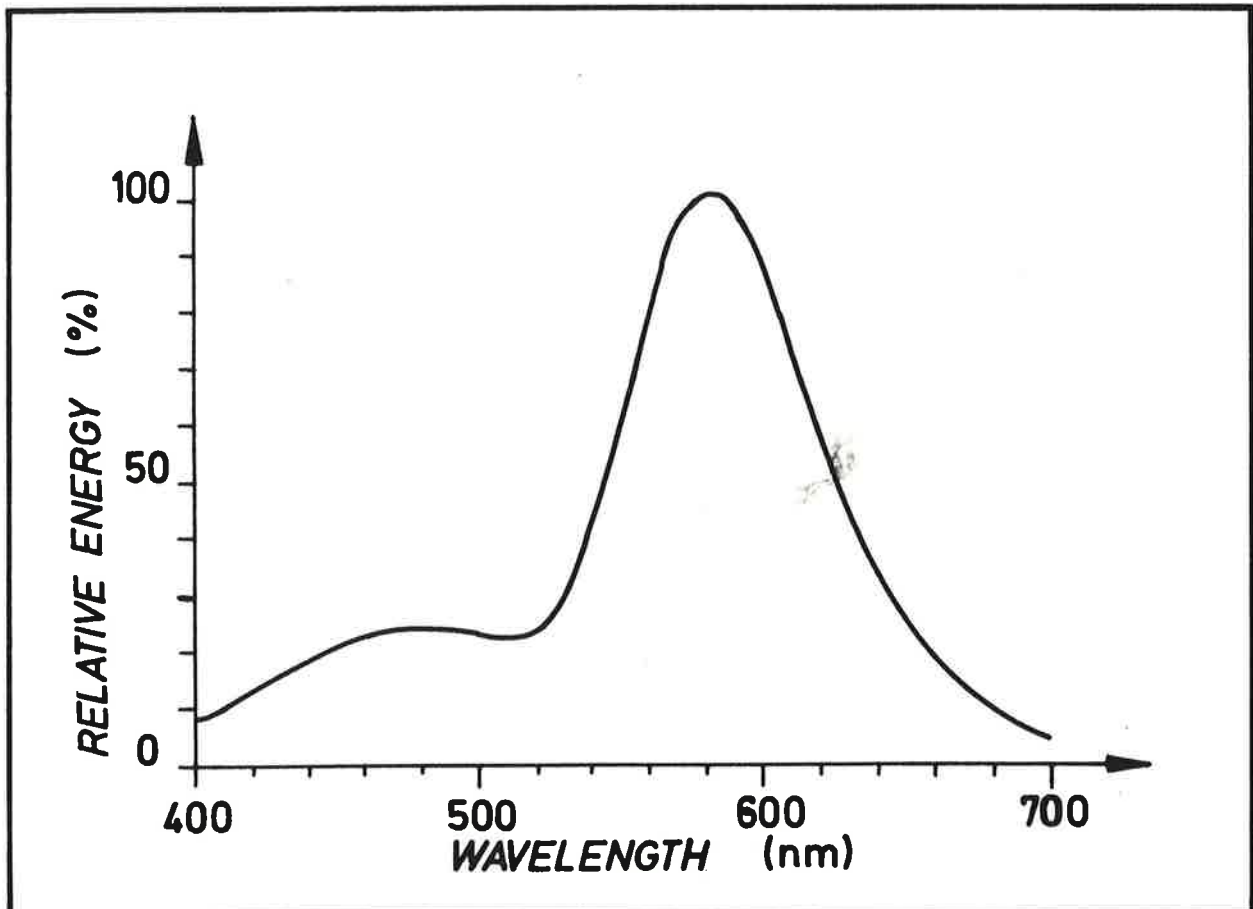
Band Width: Not applicable

Luminescent Color (ICI Color Coordinates):

Powder (Existed by 253.7 nm U.V.)

$x = 0.451 \pm 0.010$

$y = 0.418 \pm 0.010$



## TYPE F-7

**USE:** Fluorescent lamp, 6000 °K (Asian daylight)

**Chemical composition:** Calcium-halophosphate: Antimony, Manganese

**Chemical symbol:**  $\text{Ca}_5(\text{PO}_4)_3$  (F, Cl): Sb, Mn

### PHYSICAL PROPERTIES

Body Color: White

Material Density (g/cc): 3.14

Particle Size Distribution by Photo-sedimentograph (Ultrasonic Dispersion):

< 5 $\mu\text{m}$	5 – 15 $\mu\text{m}$	> 15 $\mu\text{m}$
max. 5%	min. 80%	max. 15%

$d_{50}$  ( $\mu\text{m}$ ):  $11 \pm 1$

### OPTICAL PROPERTIES

Wavelength at Peak: 579/480 nm

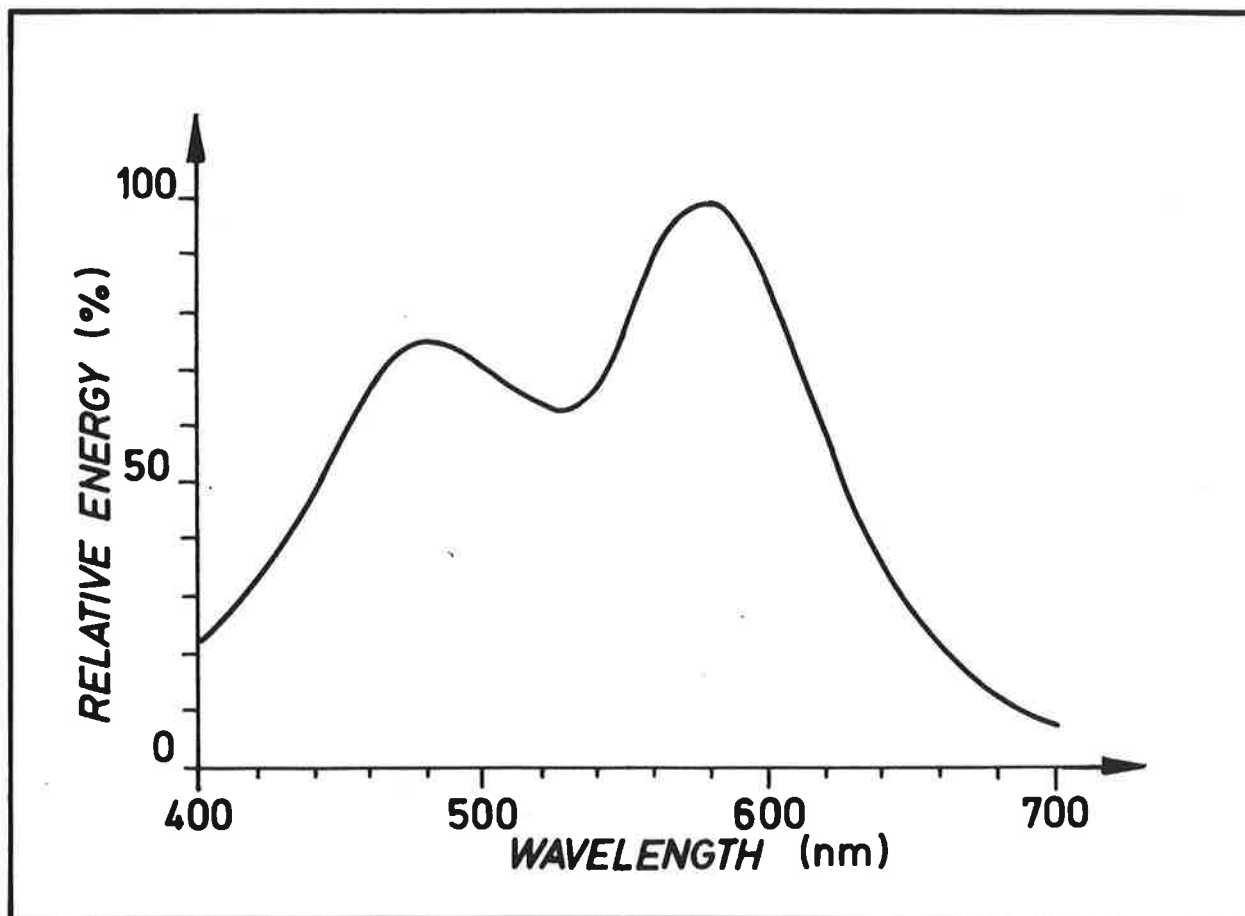
Band Width: Not applicable

Luminescent Color (ICI Color Coordinates):

Powder (Exited by 253.7 nm U.V.)

$x = 0.349 \pm 0.010$

$y = 0.370 \pm 0.010$



## TYPE F-12

**USE:** Fluorescent lamp, Red component for three band lamps

**Chemical composition:** Yttrium-oxide: Europium

**Chemical symbol:**  $Y_2O_3: Eu$

### PHYSICAL PROPERTIES

Body Color: White

Material Density (g/cc): 5.0

Particle Size Distribution by Photo-sedimentograph (Ultrasonic Dispersion):

$< 3 \mu m$	$3 - 10 \mu m$	$> 10 \mu m$
max. 10%	min. 80%	max. 10%

$d_{50} (\mu m): 5 \pm 1$

### OPTICAL PROPERTIES

Wavelength at Peak: 611 nm

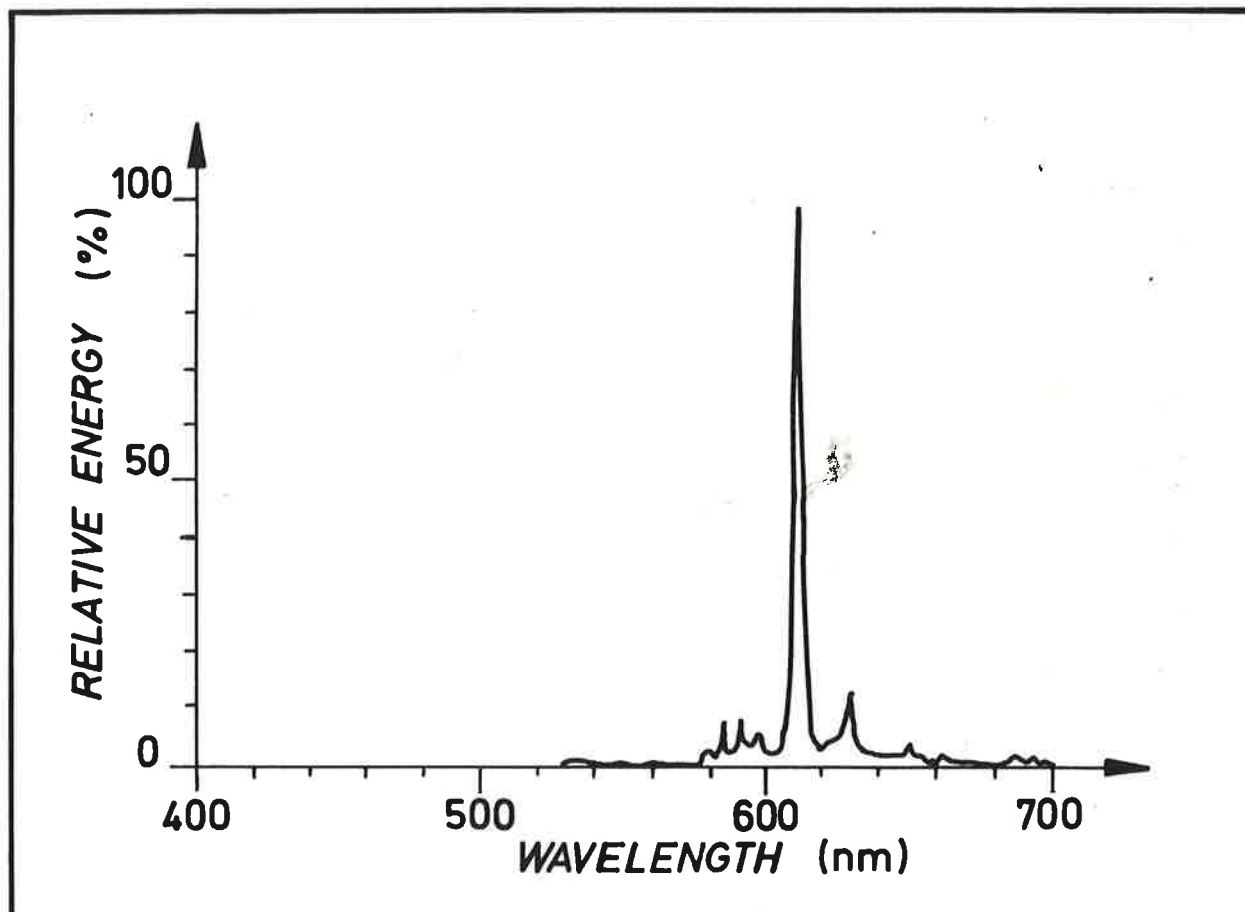
Band Width: Line

Luminescent Color (ICI Color Coordinates):

Powder (Exited by 253.7 nm U.V.)

$x = 0.652 \pm 0.010$

$y = 0.350 \pm 0.010$



## TYPE F-25/UW

**USE:** Fluorescent lamp, Universal White

**Chemical composition:** Blend phosphor

Pink and bluish Calcium-halophosphate:

Antimony, Manganese

Zinc-silicate: Manganese

**Chemical symbol:**  $\text{Ca}_5(\text{PO}_4)_3(\text{F}, \text{Cl})$ : Sb, Mn and  $\text{Zn}_2\text{SiO}_4$ : Mn

### PHYSICAL PROPERTIES

Body Color: White

Particle Size Distribution by Photo-sedimentograph (Ultrasonic Dispersion):

< 5 $\mu\text{m}$	5 – 15 $\mu\text{m}$	> 15 $\mu\text{m}$
max. 5%	min. 80%	max. 15%

$d_{50}$  ( $\mu\text{m}$ ):  $11 \pm 1$

### OPTICAL PROPERTIES

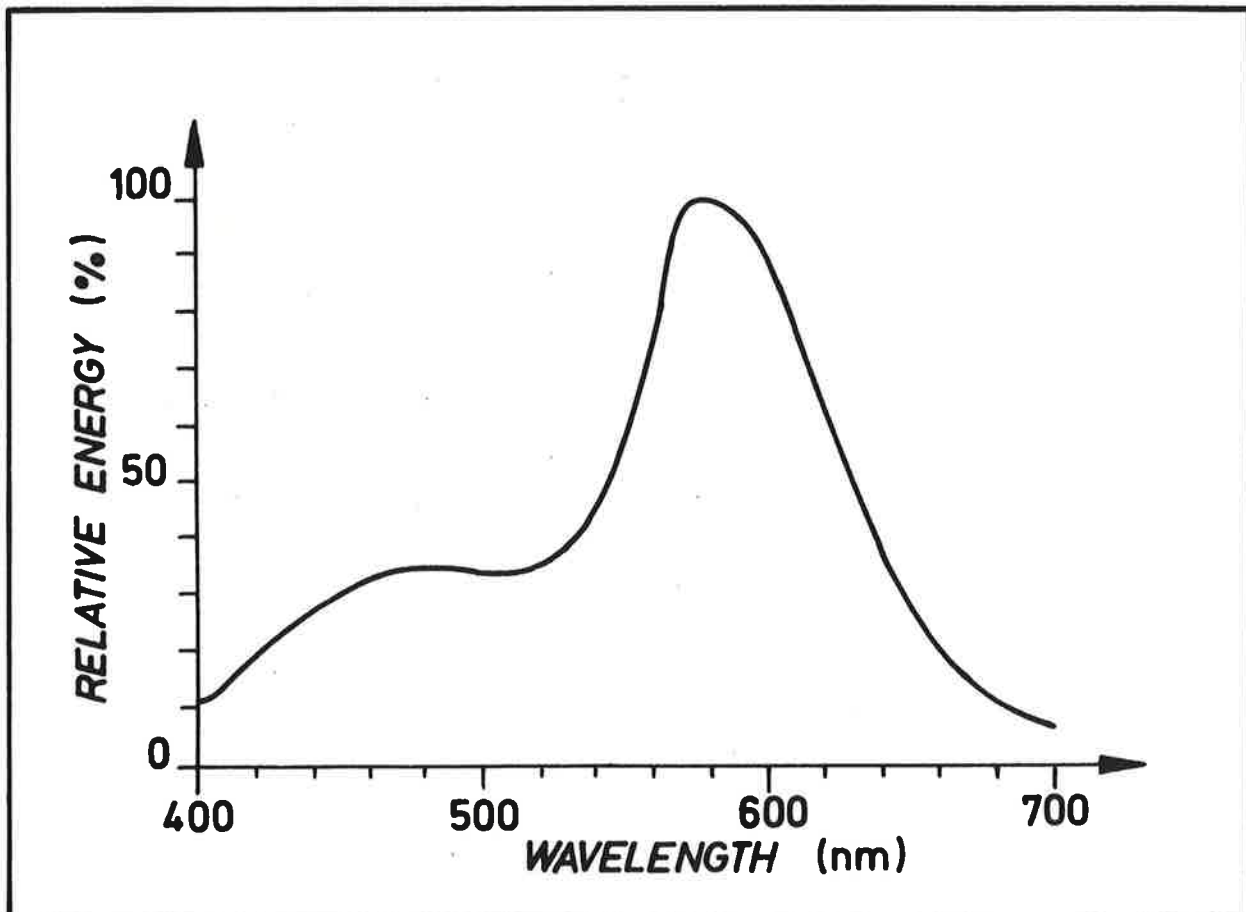
Wavelength at Peak: Not applicable

Luminescent Color (ICI Color Coordinates):

Powder (Excited by 253.7 nm U.V.)

$x = 0.421 \pm 0.010$

$y = 0.390 \pm 0.010$



## TYPE F-29

**USE:** Fluorescent lamp, 2900 °K (IEC Standard: "Warm White")

**Chemical composition:** Calcium-halophosphate: Antimony, Manganese

**Chemical symbol:**  $\text{Ca}_5(\text{PO}_4)_3$  (F, Cl): Sb, Mn

### PHYSICAL PROPERTIES

Body Color: White

Material Density (g/cc): 3.15

Particle Size Distribution by Photo-sedimentograph (Ultrasonic Dispersion):

< 5 $\mu\text{m}$	5 – 15 $\mu\text{m}$	> 15 $\mu\text{m}$
max. 5%	min. 80%	max. 15%

$d_{50}$  ( $\mu\text{m}$ ):  $11 \pm 1$

### OPTICAL PROPERTIES

Wavelength at Peak: 585/480 nm

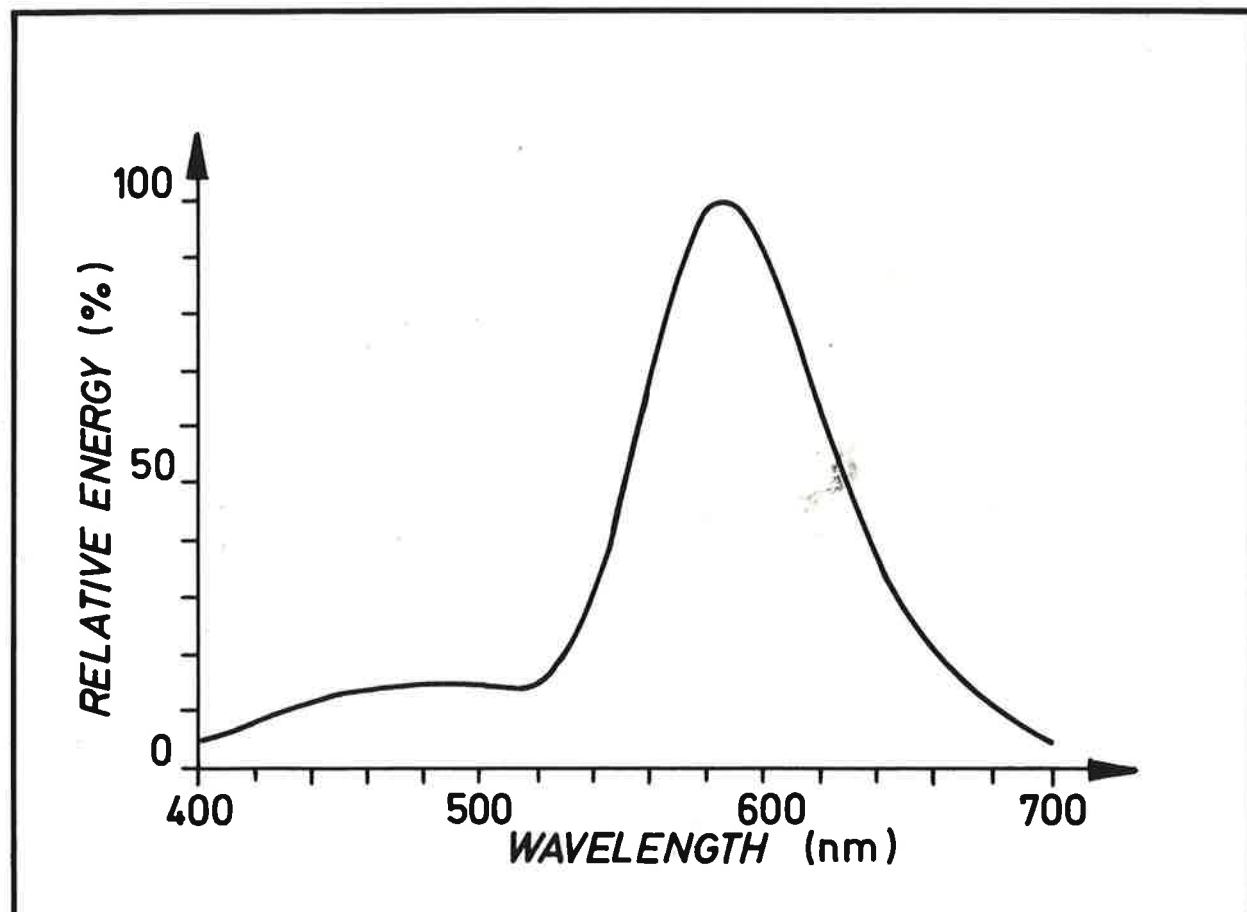
Band Width: Not applicable

Luminescent Color (ICI Color Coordinates):

Powder (Excited by 253.7 nm U.V.)

$x = 0.489 \pm 0.010$

$y = 0.424 \pm 0.010$



## TYPE F-33

**USE:** Fluorescent lamp, 4200 °K (IEC Standard: "Cool White")

**Chemical composition:** Calcium-halophosphate: Antimony, Manganese

**Chemical symbol:**  $\text{Ca}_5(\text{PO}_4)_3(\text{F}, \text{Cl})$ : Sb, Mn

### PHYSICAL PROPERTIES

Body Color: White

Material Density (g/cc): 3.14

Particle Size Distribution by Photo-sedimentograph (Ultrasonic Dispersion):

$< 5 \mu\text{m}$	$5 - 15 \mu\text{m}$	$> 15 \mu\text{m}$
max. 5%	min. 80%	max. 15%

$d_{50} (\mu\text{m})$ :  $11 \pm 1$

### OPTICAL PROPERTIES

Wavelength at Peak: 580/480 nm

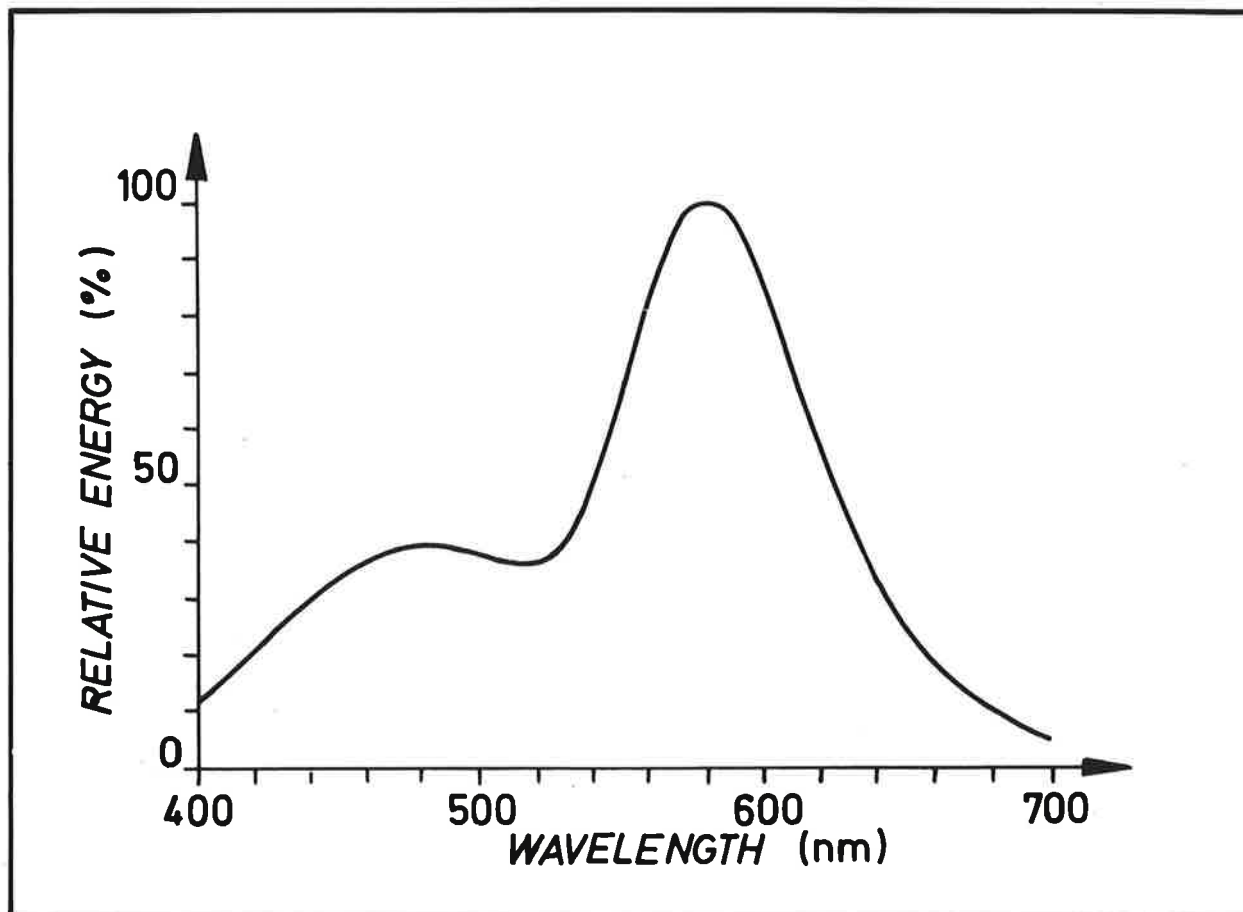
Band Width: Not applicable

Luminescent Color (ICI Color Coordinates):

Powder (Excited by 253.7 nm U.V.)

$x = 0.414 \pm 0.010$

$y = 0.401 \pm 0.010$





## TYPE F-72

**USE:** Fluorescent lamp, Tropical daylight

**Chemical composition:** Blend phosphor

Calcium-halophosphate: Antimony, Manganese

Strontium, Magnesium-orthophosphate: Tin

**Chemical symbol:**  $\text{Ca}_5(\text{PO}_4)_3(\text{F}, \text{Cl})$ : Sb, Mn and  $(\text{Sr}, \text{Mg})_3(\text{PO}_4)_2$ : Sn

### PHYSICAL PROPERTIES

Body Color: White

Particle Size Distribution by Photo-sedimentograph (Ultrasonic Dispersion):

< 5 $\mu\text{m}$	5 – 15 $\mu\text{m}$	> 15 $\mu\text{m}$
max. 6%	min. 77%	max. 17%

$d_{50}$  ( $\mu\text{m}$ ):  $12 \pm 1$

### OPTICAL PROPERTIES

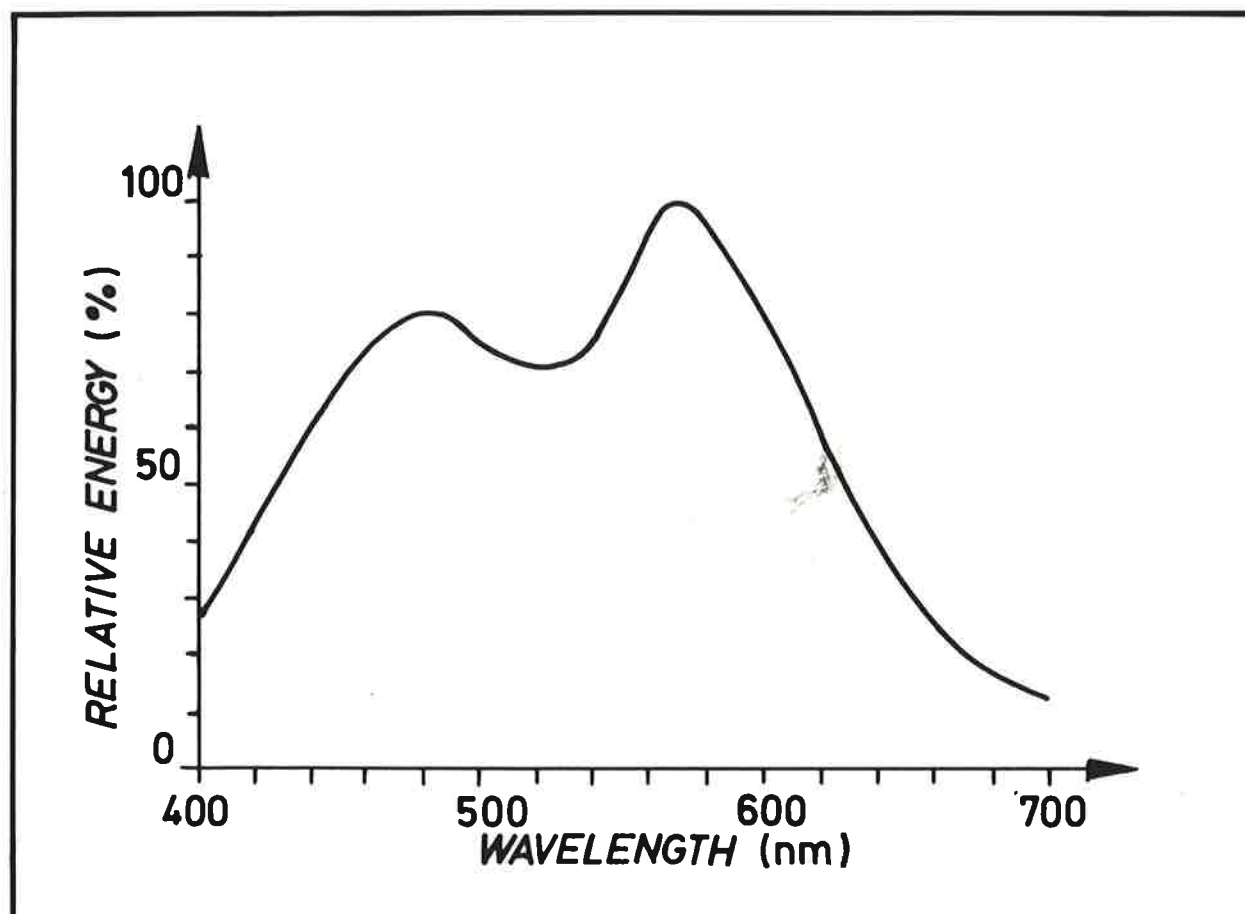
Wavelength at Peak: Not applicable

Luminescent Color (ICI Color Coordinates):

Powder (Exited by 253.7 nm U.V.)

$x = 0.337 \pm 0.010$

$y = 0.358 \pm 0.010$



## TYPE F-73

**USE:** Fluorescent lamp, 6500 °K (IEC Standard: "Daylight")

**Chemical composition:** Calcium-halophosphate: Antimony, Manganese

**Chemical symbol:**  $\text{Ca}_5(\text{PO}_4)_3(\text{F}, \text{Cl})$ : Sb, Mn

### PHYSICAL PROPERTIES

Body Color: White

Material Density (g/cc): 3.14

Particle Size Distribution by Photo-sedimentograph (Ultrasonic Dispersion):

$< 5 \mu\text{m}$	$5 - 15 \mu\text{m}$	$> 15 \mu\text{m}$
max. 5%	min. 80%	max. 15%

$d_{50} (\mu\text{m})$ :  $11 \pm 1$

### OPTICAL PROPERTIES

Wavelength at Peak: 578/480 nm

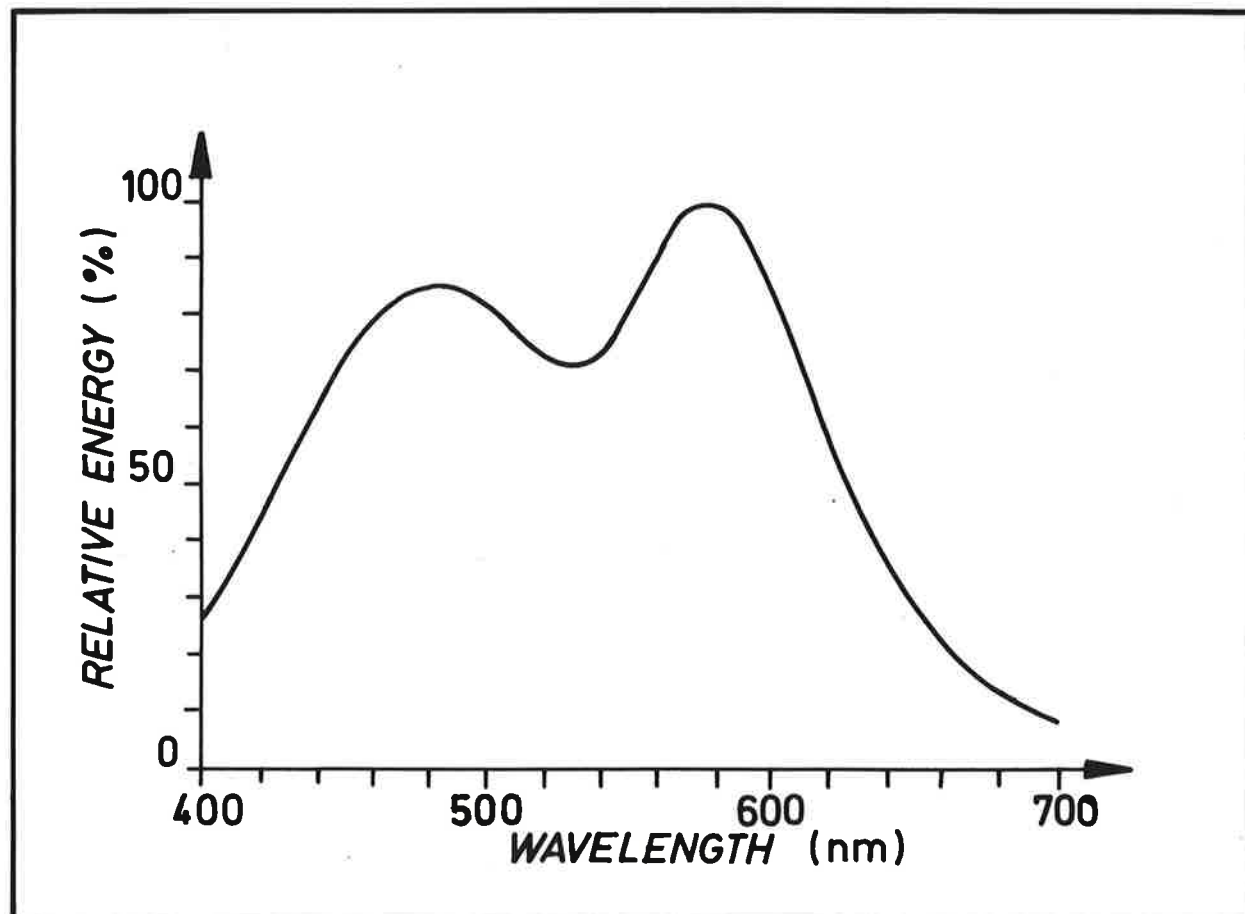
Band Width: Not applicable

Luminescent Color (ICI Color Coordinates):

Powder (Exited by 253.7 nm U.V.)

$x = 0.344 \pm 0.010$

$y = 0.366 \pm 0.010$



## TYPE F-80

**USE:** Fluorescent lamp, Whitish Blue

**Chemical composition:** Calcium-halophosphate: Antimony

**Chemical symbol:**  $\text{Ca}_5(\text{PO}_4)_3\text{F} \cdot \text{Sb}$

### PHYSICAL PROPERTIES

Body Color: White

Material Density (g/cc): 3.14

Particle Size Distribution by Photo-sedimentograph (Ultrasonic Dispersion):

< 5 $\mu\text{m}$	5 – 15 $\mu\text{m}$	> 15 $\mu\text{m}$
max. 5%	min. 80%	max. 15%

$d_{50}$  ( $\mu\text{m}$ ):  $11 \pm 1$

### OPTICAL PROPERTIES

Wavelength at Peak: 480 nm

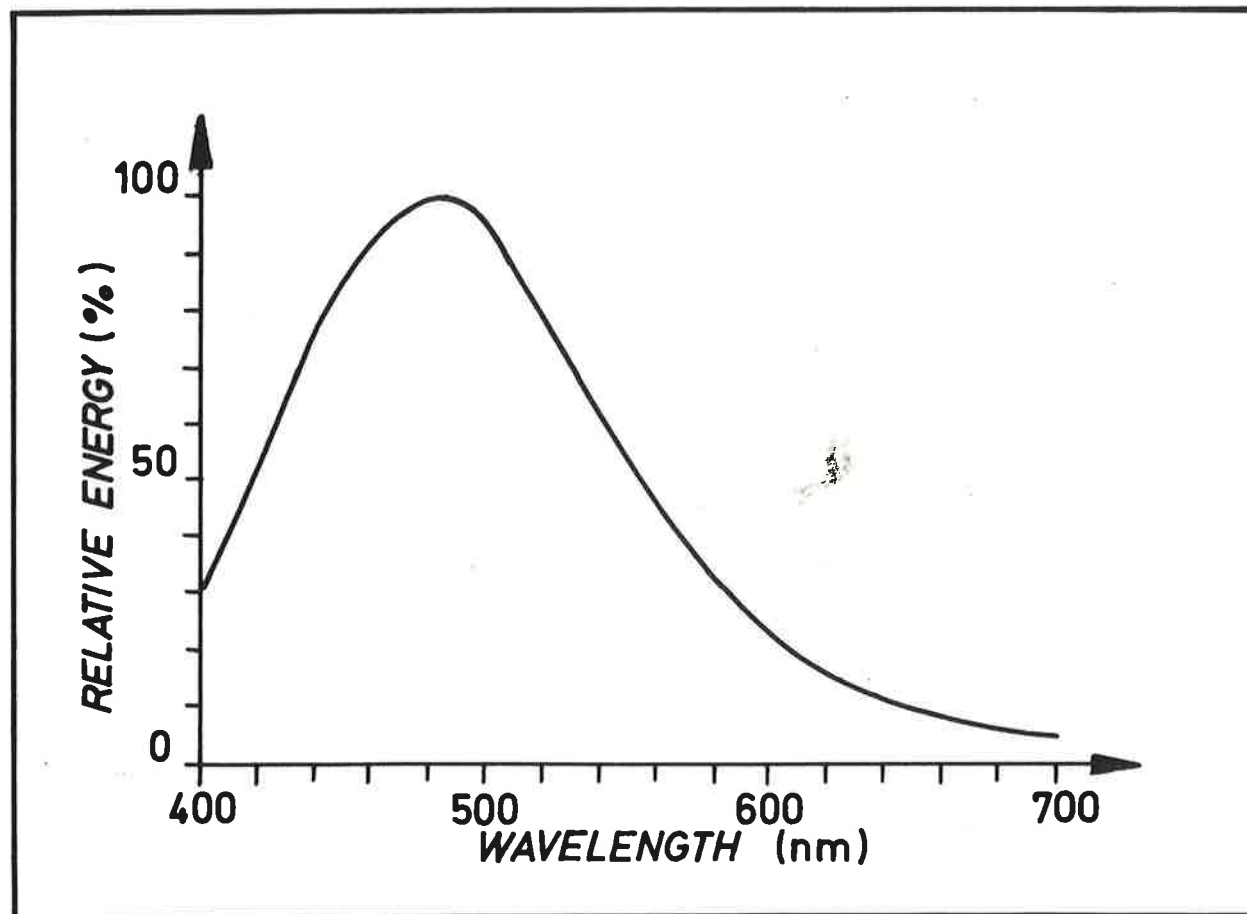
Band Width: 135 nm

Luminescent Color (ICI Color Coordinates):

Powder (Exited by 253.7 nm U.V.)

$x = 0.224 \pm 0.010$

$y = 0.290 \pm 0.010$



## TYPE F-85

**USE:** Fluorescent lamp, Blue

**Chemical composition:** Calcium-tungstate: lead

**Chemical symbol:**  $\text{CaWO}_4$ : Pb

### PHYSICAL PROPERTIES

Body Color: White

Material Density (g/cc): 6.05

Particle Size Distribution by Photo-sedimentograph (Ultrasonic Dispersion):

< 5 $\mu\text{m}$	5 – 15 $\mu\text{m}$	> 15 $\mu\text{m}$
max. 10%	min. 80%	max. 10%

$d_{50}$  ( $\mu\text{m}$ ):  $10 \pm 1$

### OPTICAL PROPERTIES

Wavelength at Peak: 450 nm

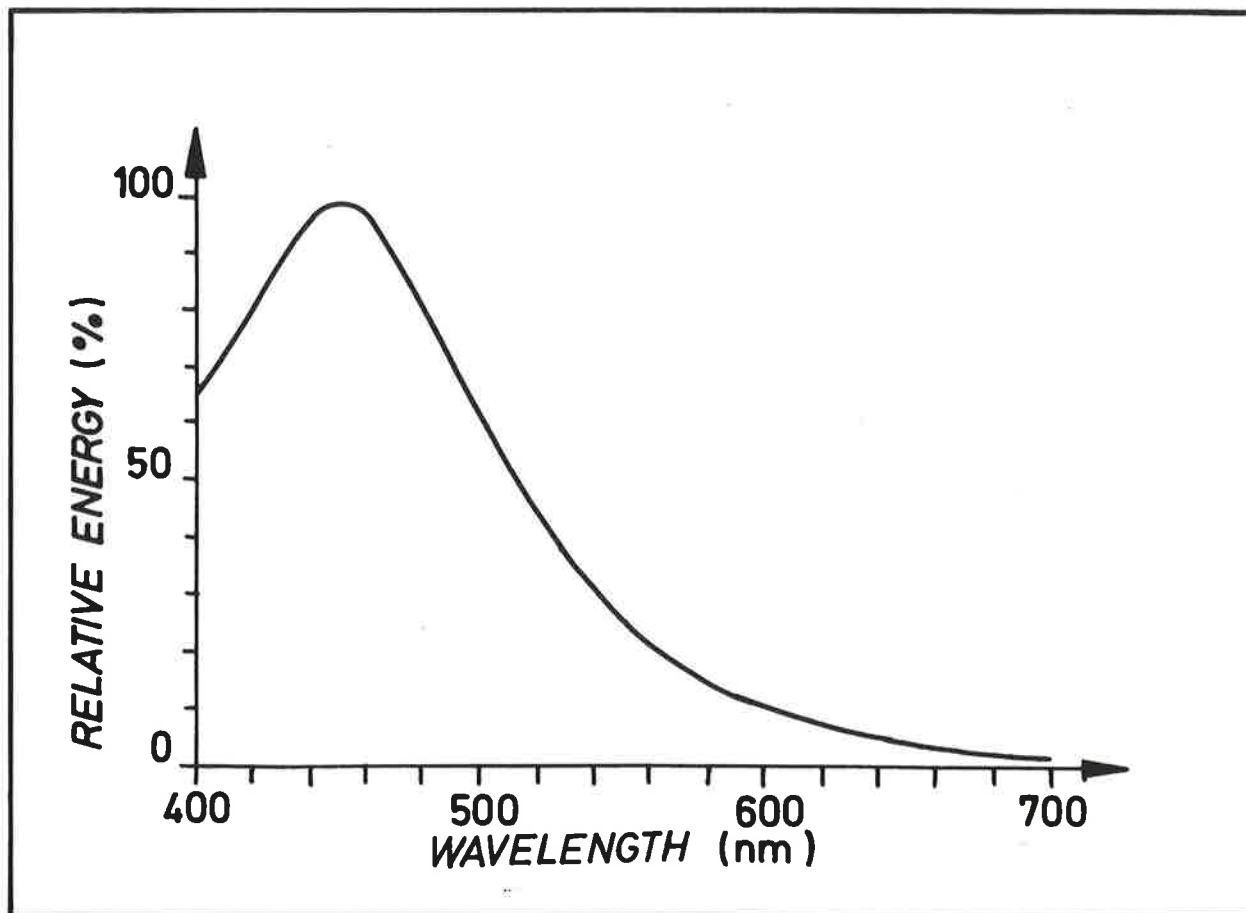
Band Width: 120 nm

Luminescent Color (ICI Color Coordinates):

Powder (Exited by 253.7 nm U.V.)

$x = 0.186 \pm 0.010$

$y = 0.174 \pm 0.010$



## TYPE F-89

**USE:** Fluorescent lamp, Blue

**Chemical composition:** Strontium-pyrophosphate: Tin

**Chemical symbol:**  $\text{Sr}_2\text{P}_2\text{O}_7$ : Sn

### PHYSICAL PROPERTIES

Body Color: White

Material Density (g/cc): 3.50

Particle Size Distribution by Photo-sedimentograph (Ultrasonic Dispersion):

< 2 $\mu\text{m}$	2 – 20 $\mu\text{m}$	> 20 $\mu\text{m}$
max. 10%	min. 80%	max. 10%

$d_{50}$  ( $\mu\text{m}$ ):  $5 \pm 1 \mu\text{m}$

### OPTICAL PROPERTIES

Wavelength at Peak: 460 nm

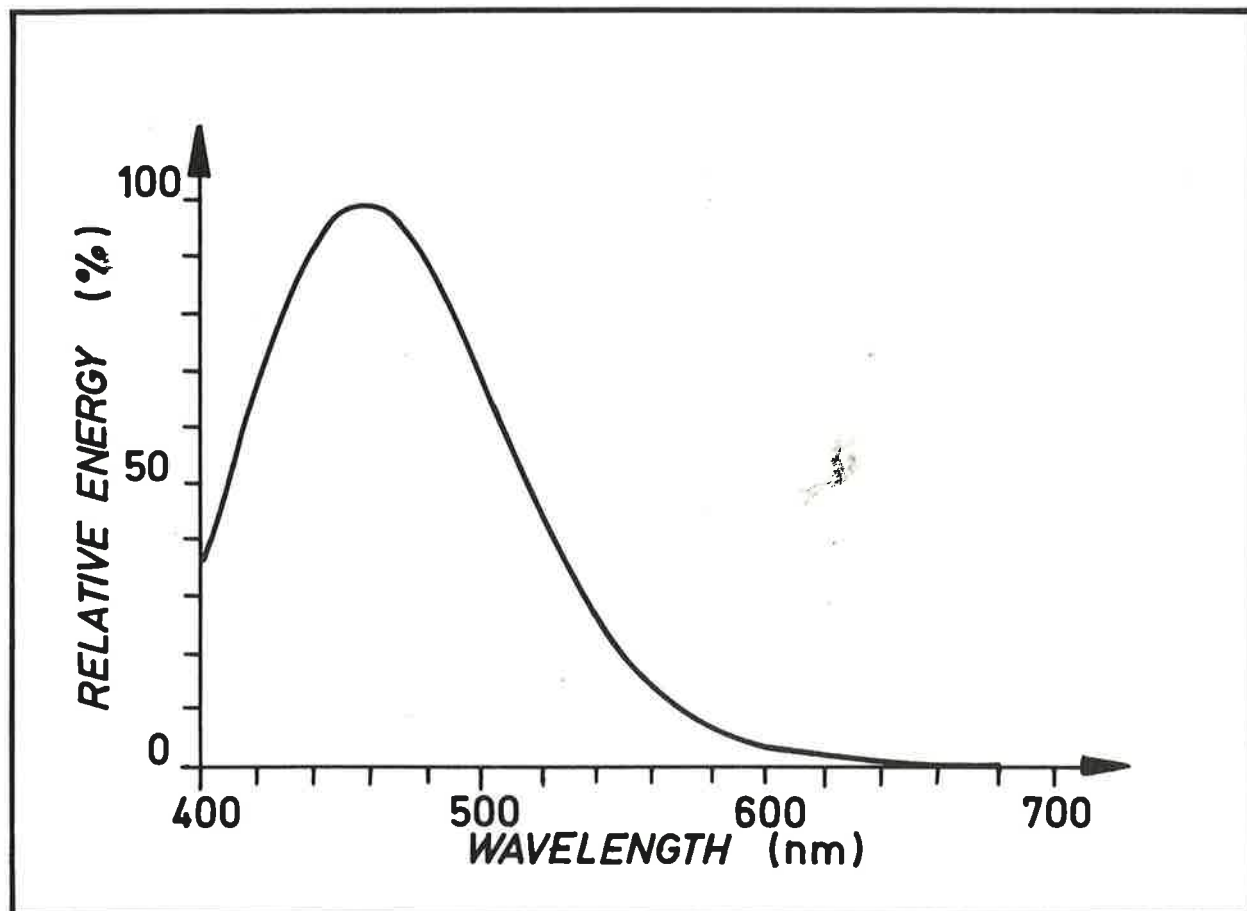
Band Width: 105 nm

Luminescent Color (ICI Color Coordinates):

Powder (Excited by 253.7 nm U.V.)

$x = 0.166 \pm 0.010$

$y = 0.177 \pm 0.010$



## TYPE F-093

**USE:** Fluorescent lamp, Photocopy Blue

**Chemical composition:** Strontium-pyrophosphate: Europium

**Chemical symbol:**  $\text{Sr}_2\text{P}_2\text{O}_7$ : Eu

### PHYSICAL PROPERTIES

Body Color: White

Material Density (g/cc): 3.52

Particle Size Distribution by Photo-sedimentograph (Ultrasonic Dispersion):

< 2 $\mu\text{m}$	2 – 20 $\mu\text{m}$	> 20 $\mu\text{m}$
max. 10%	min. 80%	max. 10%

$d_{50}$  ( $\mu\text{m}$ ):  $5 \pm 1$

### OPTICAL PROPERTIES

Wavelength at Peak: 420 nm

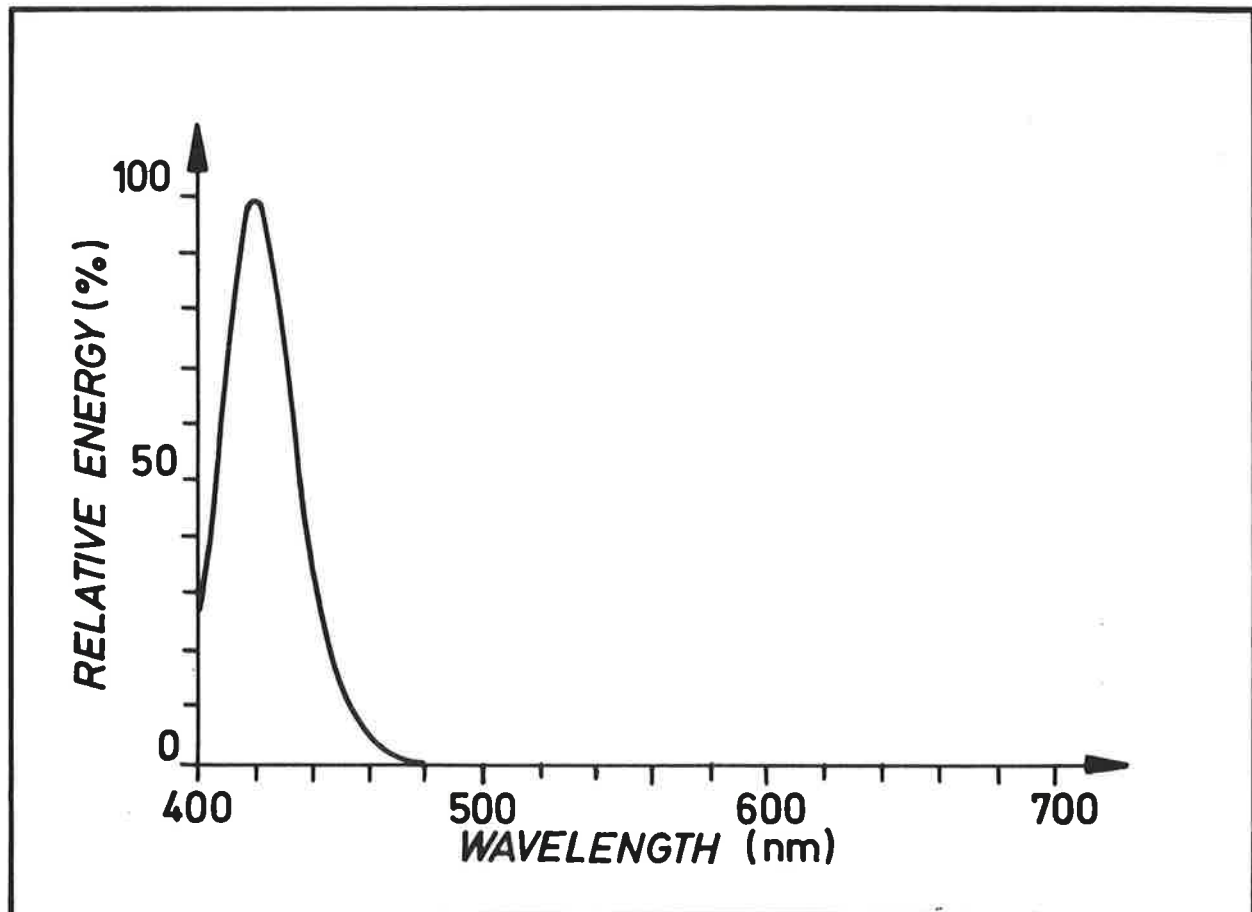
Band Width: 30 nm

Luminescent Color (ICI Color Coordinates):

Powder (Exited by 253.7 nm U.V.)

$x = 0.177 \pm 0.010$

$y = 0.010 \pm 0.010$



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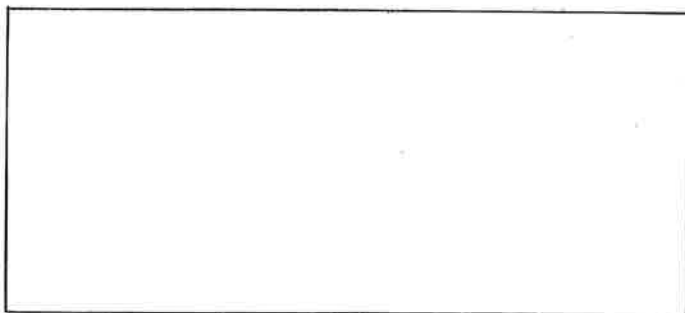
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