

Phosphor and Emitter

Chemical
composition

Optical
properties

Physical
properties

Application

OSRAM

Phosphor



Phosphor and Emitter

Phosphor

Phosphors belong to a class of chemical substances that will emit visible light without radiation of heat („cold light“) under the action of electrical energy, X-rays, or UV-radiation.

In the electric lamp industry phosphors are mainly used to transform into light the invisible UV-radiation, which is generated with high efficiency in mercury discharge lamps. The phosphors are applied in thin layers on the inside wall of the lamp bulb. Due to the high chemical and electrical attack in discharge lamps only very stable inorganic phosphors, so called crystal-phosphors, can be used. Depending on the type and production method, it is possible to generate different spectral distributions of the emitted light. Thus by choosing appropriate phosphors or mixtures thereof resp., lamps with almost any desired light colour can be manufactured.

In a period of more than 30 years OSRAM has gained a wide experience in manufacturing phosphors. On account of the know-how resulting from the basic research carried out with respect to phosphors, careful selection of the best possible raw materials, and the application of the most modern manufacturing methods, OSRAM has become one of the leading manufacturers in this field.

Since approx. 20 years for fluorescent lamps mainly halophosphate-phosphors have been used. They have the advantage that by varying the activator or sensitizer in the basic crystals the desired emission spectrum and consequently the light colour of the lamp can be obtained. These halophosphates which are used today in all fluorescent lamps of the standard colour range and which are produced by OSRAM in great quantities have reached a high standard of quality due to never ceasing further development.

It should be pointed out, however, that outside influences can have detrimental effects in the processing of the phosphors. Mechanical processes, e.g. grinding, should be avoided. Manufacturing processes at higher temperatures (e.g. baking of the phosphor above 600° C) can esp. in the presence of impurities deteriorate the phosphor or at least change the luminescence colour.

Phosphor and Emitter

Emitter

The gas discharge by which light is generated in fluorescent lamps is initiated and maintained by electrons which are emitted from the surface of the electrodes. The emission of electrons from metals can be activated for instance by using sufficiently high temperatures. Chemical substances like emitters, which are applied on metal components e.g. coiled tungsten electrodes however, make possible the emission of electrons at relatively low temperatures. These emitters are preferably combinations of oxides of various alkaline earth metals which are used as dispersions in the manufacture of electric lamps and are activated by various processes. The types of emitters and their processing method influence various properties of the lamps, especially their most important property: the lifetime of the lamps.

During the many years of its existence OSRAM has gained great experience in the techniques of application and processing of emitters in the manufacture of gas discharge lamps which is reflected in the high standard of quality of these lamps.

Phosphor and Emitter

Survey of available phosphors and emitters

Phosphors

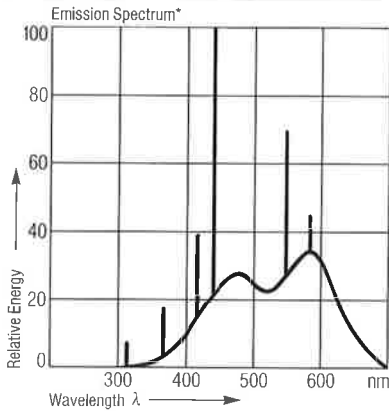
F 10 Type Internationale Name	Daylight Daylight	SV 067 Type International Name	SV 067 —
F 15 Type International Name	Daylight de Luxe Daylight de Luxe	L 78 Type International Name	L 78 —
F 19 Type International Name	Daylight 5000 de Luxe Daylight 5000 de Luxe	L 104 Type International Name	L 104 White
F 20 Type International Name	Cool White Cool White	L 120 Type International Name	L 120 —
F 22 Type International Name	Cool White de Luxe Cool White de Luxe	L 129 Type International Name	L129 —
F 23 Type International Name	White White	SV 137 Type International Name	SV 137 —
F 25 Type International Name	Universal-White Universal-White	L 236 Type International Name	L 236 Cool White
F 30 Type International Name	Warm White Warm White	L 238 Type International Name	L 238 Warm White
F 32 Type International Name	Warm White de Luxe Warm White de Luxe	SV 250 Type International Name	SV 250 —
F 36 Type International Name	OSRAM-L-NATURA —	SV 253 Type International Name	SV 253 —
F 39 Type International Name	OSRAM-L-INTERNA® —	L 372 Type International Name	L 372 —
S 15 Type International Name	S 15 —	L 522 Type International Name	L 522 —
S 22 Type International Name	S 22 —	L 580 Type International Name	L 580 —
S 18 H Type International Name	S 18 H —		

Emitters

P 11/E 400 Type International Name	P 11/E 400 —
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Phosphor and Emitter

Phosphor F10, F15



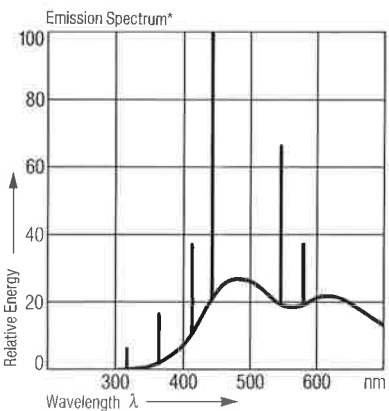
Phosphor Type F 10
International Name Daylight
Chemical Composition Calciumhalophosphate-Sb, Mn
 Calciumhalophosphate-Sb

Optical Properties
 Fluorescence colour* white
 CIE-colour-coordinates x = 0,323
 y = 0,344
 Nearest colour temperature* 5900 K
 (* incl. Hg-radiation)

Physical Properties
 Body colour white
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	25 %	50 %	75 %
Fisher SSS-value	7,1 μm	9,8 μm	13,0 μm
	7,2		

Application
 in fluorescent lamps (mercury low-pressure-discharge)



Phosphor Type F 15
International Name Daylight de Luxe
Chemical Composition Calciumhalophosphate-Sb
 Strontium-Magnesium-Ortho-Phosphate-Sn

Optical Properties
 Fluorescence colour* white
 CIE-colour-coordinates x = 0,318
 y = 0,330
 Nearest colour temperature* 6250 K
 (* incl. Hg-radiation)

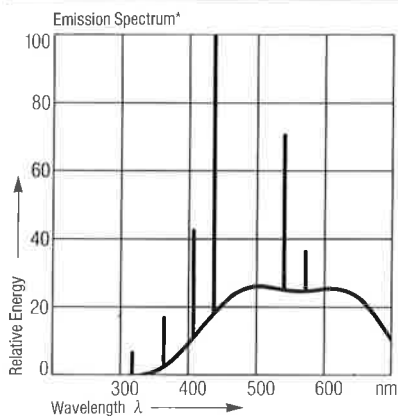
Physical Properties
 Body colour white
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	25 %	50 %	75 %
Fisher SSS-value	5,3 μm	8,3 μm	11,4 μm
	5,9		

Application
 in fluorescent lamps (mercury low-pressure-discharge)

Phosphor and Emitter

Phosphor F19, F20



Phosphor Type
International Name
Chemical Composition

F 19
 Daylight 5000 de Luxe
 Daylight 5000 de Luxe
 Calciumhalophosphate-Sb
 Strontium-Magnesium-ortho-Phosphate-Sn
 Strontiumhalophosphate-Sb
 Zinc Silicate-Mn
 Magnesium-Fluorogermanate-Mn

Optical Properties

Fluorescence colour*
 CIE-colour-coordinates*
 Nearest colour temperature*
 (* incl. Hg-radiation)

white
 $x = 0,344$
 $y = 0,354$
 5000 K

Physical Properties

Body colour
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

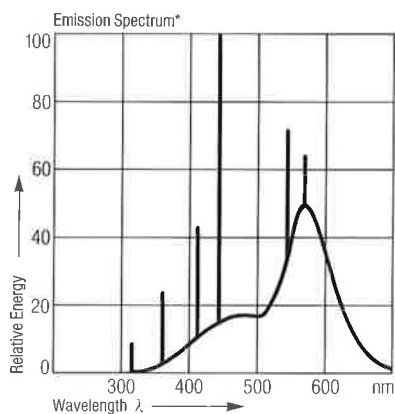
	25 %	50 %	75 %
Particle size distribution (Coulter Counter)	6,4 μm	10,1 μm	13,3 μm

Fisher SSS-value

6,1

Application

in fluorescent lamps (mercury low-pressure-discharge)



Phosphor Type
International Name
Chemical Composition

F 20
 Cool White
 Cool White
 Calciumhalophosphate-Sb, Mn

Optical Properties

Fluorescence colour*
 CIE-colour-coordinates*
 Nearest colour temperature*
 (* incl. Hg-radiation)

white
 $x = 0,370$
 $y = 0,375$
 4100 K

Physical Properties

Body colour
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	25 %	50 %	75 %
Particle size distribution (Coulter Counter)	8 μm	11 μm	15 μm

Fisher SSS-value

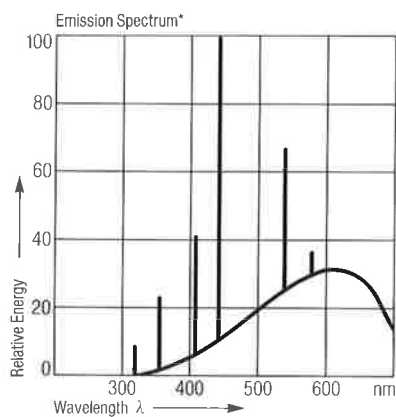
7,4

Application

in fluorescent lamps (mercury low-pressure-discharge)

Phosphor and Emitter

Phosphor F 22, F 23



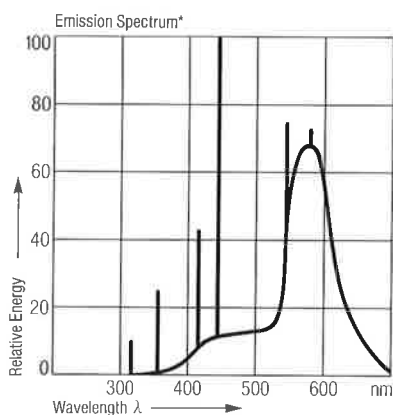
Phosphor Type F 22
International Name Cool White de Luxe
Chemical Composition Calciumhalophosphate-Sb
 Strontium-Magnesium-ortho-Phosphate-Sn
 Zinc silicate-Mn

Optical Properties
 Fluorescence colour* white
 CIE-colour-coordinates* $x = 0,391$
 $y = 0,372$
 Nearest colour Temperature* 3700 K
 (* incl. Hg-Radiation)

Physical Properties
 Body colour white
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	25 %	50 %	75 %
Fisher SSS-value	5,6 μm	9,1 μm	15,1 μm

Application
 in fluorescent lamps (mercury low pressure-discharge)



Phosphor Type F 23
International Name White
Chemical Composition Calciumhalophosphate-Sb, Mn

Optical Properties
 Fluorescence colour* white
 CIE-colour-coordinates* $x = 0,414$
 $y = 0,394$
 Nearest colour temperature* 3500 K
 (* incl. Hg-radiation)

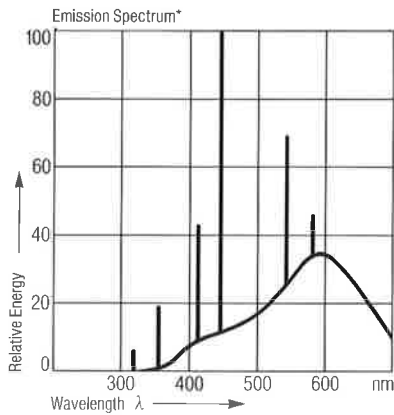
Physical Properties
 Body colour white
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	25 %	50 %	75 %
Fisher-SSS-value	8 μm	11 μm	15 μm

Application
 in fluorescent lamps (mercury low-pressure-discharge)

Phosphor and Emitter

Phosphor F 25, F 30



Phosphor Type
International Name
Chemical Composition

F 25
 Universal-White
 Universal-White
 Calciumhalophosphate-Sb, Mn
 Calciumhalophosphate-Sb
 Strontium-Magnesium-ortho-Phosphate-Sn
 Zinc silicate-Mn

Optical Properties

Fluorescence colour*
 CIE-colour-coordinates*
 Nearest colour temperature*
 (* incl. Hg-radiation)

white
 x = 0,380
 y = 0,372
 4000 K

Physical Properties

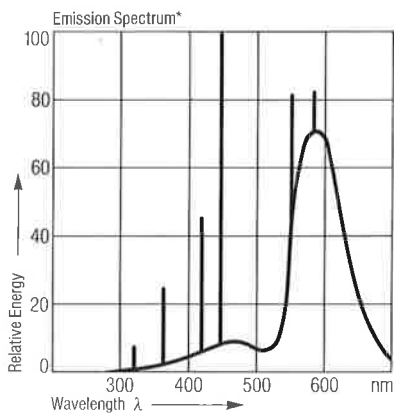
Body colour
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	25%	50%	75%
	6,8 μm	9,8 μm	12,8 μm

Fisher SSS-value 6,6

Application

in fluorescent lamps (mercury low-pressure-discharge)



Phosphor Type
International Name
Chemical Composition

F 30
 Warm White
 Warm White
 Calciumhalophosphate-Sb, Mn

Optical Properties

Fluorescence colour*
 CIE-colour-coordinates*
 Nearest colour temperature*
 (* incl. Hg-radiation)

yellowish-white
 x = 0,439
 y = 0,402
 299 K

Physical Properties

Body colour
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	25%	50%	75%
	8 μm	12 μm	16 μm

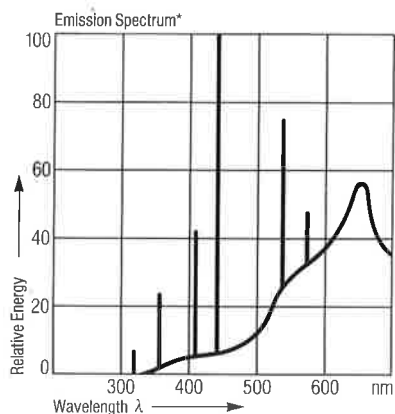
Fisher SSS-value 8,4

Application

in fluorescent lamps (mercury low-pressure-discharge)

Phosphor and Emitter

Phosphor F 32, F 36



Phosphor Type
International Name
Chemical Composition

F 32
 Warm White de Luxe
 Warm White de Luxe
 Strontium-Magnesium-ortho-Phosphate-Sn
 Strontiumhalophosphate-Sb
 Zinc Silicate-Mn

Optical Properties

Fluorescence colour*
 CIE-colour-coordinates*
 Nearest colour temperature*
 (* incl. Hg-radiation)

white
 $x = 0,440$
 $y = 0,402$
 2900 K

Physical Properties

Body colour
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

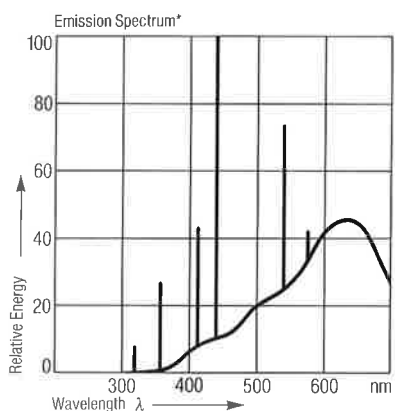
25 %	50 %	75 %
4,5 μm	7,3 μm	11,6 μm

Fisher SSS-value

6,2

Application

in fluorescent lamps (mercury low-pressure-discharge)



Phosphor Type
International Name
Chemical Composition

F 36
 OSRAM-L-NATURA
 —
 Calciumhalophosphate-Sb
 Strontium-Magnesium-ortho-Phosphate-Sn
 Zinc silicate-Mn
 Magnesium-Fluorogermanate-Mn

Optical Properties

Fluorescence colour*
 CIE-colour-coordinates*
 Nearest colour temperature*
 (* incl. Hg-radiation)

white
 $x = 0,388$
 $y = 0,362$
 3700 K

Physical Properties

Body colour
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

25 %	50 %	75 %
4,7 μm	7,7 μm	11,2 μm

Fisher SSS-value

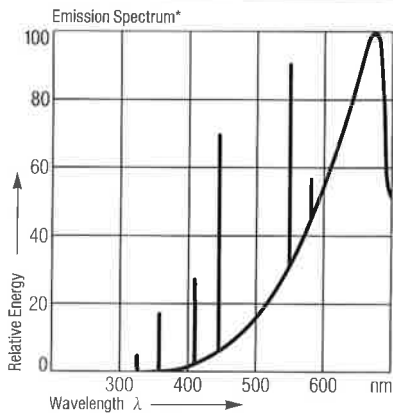
5,6

Application

in fluorescent lamps (mercury low-pressure-discharge)

Phosphor and Emitter

Phosphor F 39



Phosphor Type
International Name
Chemical Composition

F 39
OSRAM-L-INTERNA®
—
Strontium-Magnesium-ortho-Phosphate-Sn
Strontiumhalophosphate-Sb
Zinc silicate-Mn
Magnesium-Fluorogermanate-Mn

with 0,7 weight % of Ni-titanate added for exact adjustment of the colour coordinates

Optical Properties

Fluorescence colour* white
CIE-colour-coordinates*
 $x = 0,471$
 $y = 0,411$
Nearest colour temperature* 2550 K
(* incl. Hg-radiation)

Physical Properties

Body colour yellowish-white
Particle size distribution (Coulter Counter)
(Size at listed percentiles)

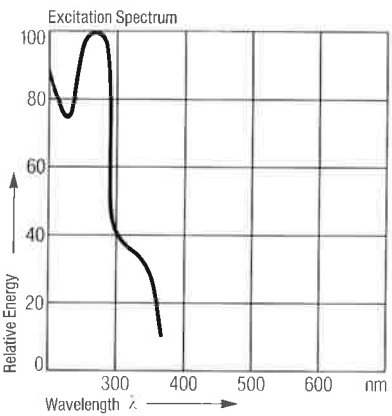
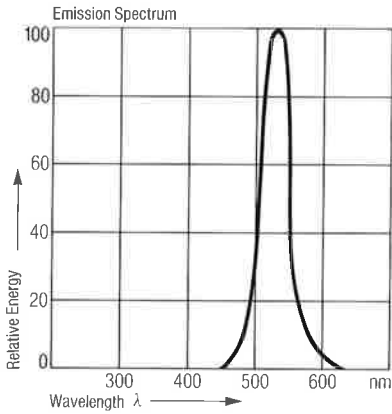
	25 %	50 %	75 %
Fisher SSS-value	5,0 μm	8,2 μm	12,3 μm
	5,8		

Application

in fluorescent lamps (mercury low-pressure-discharge)

Phosphor and Emitter

Phosphor S 15, S 22



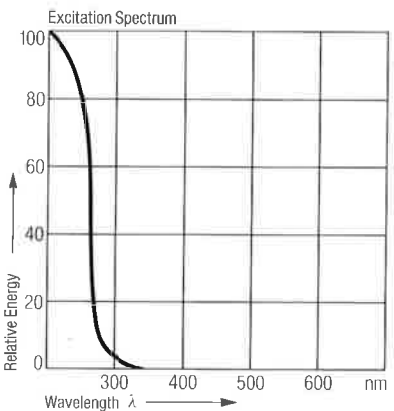
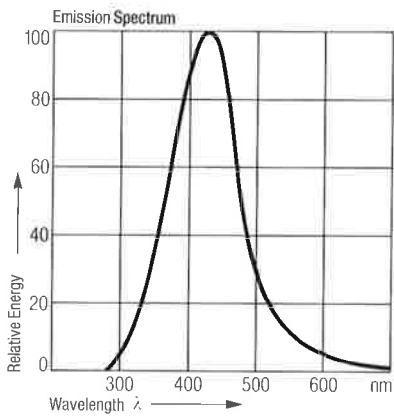
Phosphor Type S 15
International Name S 15
Chemical Composition —
 Zincsilicate-Mn

Optical Properties
 Fluorescence colour* green
 Maximum of emission 526 nm
 CIE-colour-coordinates*
 x = 0,241
 y = 0,626
 Nearest colour temperature —
 (* incl. Hg-radiation)

Physical Properties
 Density 3,96
 Body colour white
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	10 %	50 %	90 %
Fisher SSS-value	2 μm	6 μm	12 μm

Excitation
 Uv-radiation, x-rays, cathode-rays



Phosphor Type S 22
International Name S 22
Chemical Composition —
 Calciumtungstate

Optical Properties
 Fluorescence colour* blue
 Maximum of emission 416 nm
 CIE-colour-coordinates*
 x = 0,175
 y = 0,145
 Nearest colour temperature —
 (* incl. Hg-radiation)

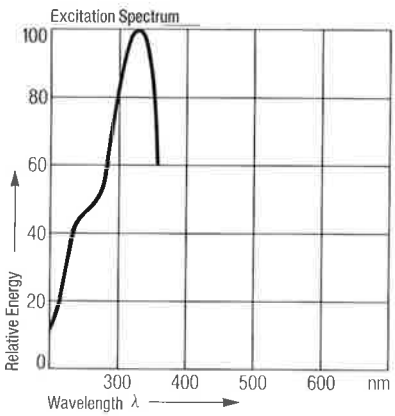
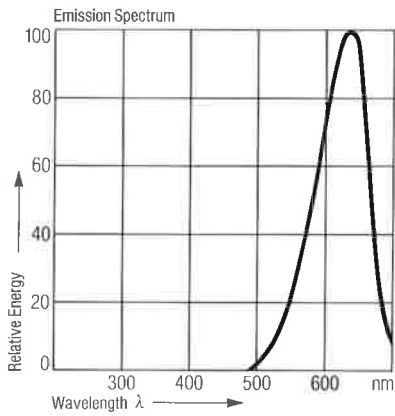
Physical Properties
 Density 6,08
 Body colour white
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	10 %	50 %	90 %
Fisher SSS-value	3 μm	5 μm	10 μm

Excitation
 UV-radiation, x-rays, cathode-rays

Phosphor and Emitter

Phosphor S 18 H



Phosphor Type S 18 H
International Name S 18 H
Chemical Composition —
 Calciumsilicate-Mn, Pb

Optical Properties
 Fluorescence colour* orange-red
 Maximum of emission 616 nm
 CIE-colour-coordinates*
 x = 0,517
 y = 0,365
 Nearest colour temperature —
 (* incl. Hg-radiation)

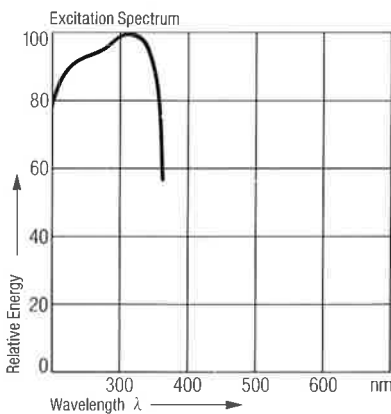
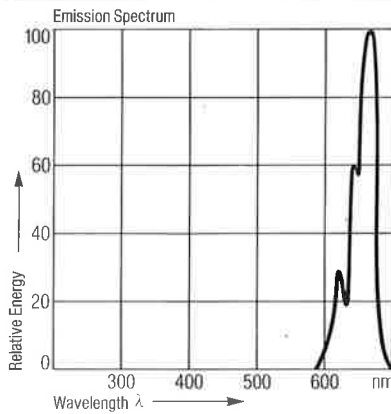
Physical Properties
 Density 2,90
 Body colour white
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	10 %	50 %	90 %
Fisher SSS-value	4 μm	5 μm	15 μm
	6,2		

Excitation
 UV-radiation, x-rays, cathode-rays

Phosphor and Emitter

Phosphor SV 067, L 78



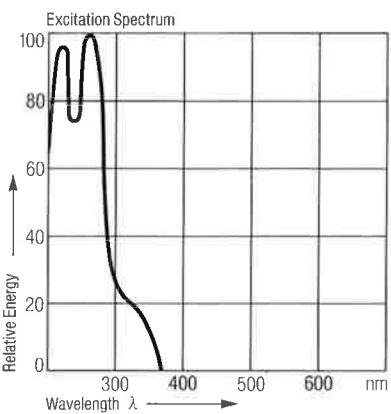
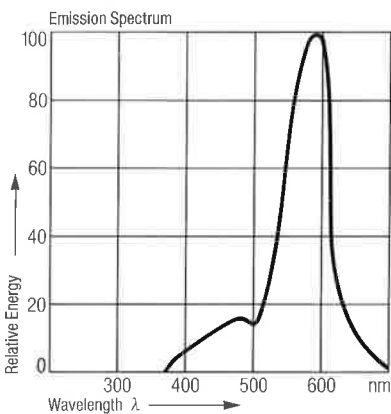
Phosphor Type SV 067
International Name SV 067
Chemical Composition —
 Magnesium-Fluorogermanate-Mn

Optical Properties
 Fluorescence colour* deep red, crimson
 Maximum of emission 660 nm
 CIE-colour-coordinates*
 x = 0,551
 y = 0,287
 Nearest colour temperature —
 (* incl. Hg-radiation)

Physical Properties
 Density 4,03
 Body colour yellowish-white
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	10 %	50 %	90 %
Fisher SSS-value	2,8 μm	7,2 μm	16,1 μm
	6,9		

Excitation
 UV-radiation, x-rays, cathode-rays



Phosphor Type L 78
International Name L 78
Chemical Composition —
 Calciumhalophosphate-Sb, Mn

Optical Properties
 Fluorescence colour* yellow
 Maximum of emission 587 nm
 CIE-colour-coordinates*
 x = 0,431
 y = 0,430
 Nearest colour temperature —
 (* incl. Hg-radiation)

Physical Properties
 Density 3,22
 Body colour white
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	10 %	50 %	90 %
Fisher SSS-value	4 μm	9 μm	16 μm
	8,2		

Excitation
 UV-radiation, x-rays, cathode-rays

Phosphor and Emitter

Phosphor L 104, L 120

Emission Spectrum

Phosphor Type L 104
International Name White
Chemical Composition Calciumhalophosphate-Sb, Mn

Optical Properties
 Fluorescence colour* white
 Maximum of emission 585 nm
 CIE-colour-coordinates* x = 0,414
 y = 0,394
 Nearest colour temperature 3500 K
 (* incl. Hg-radiation)

Physical Properties
 Density 3,20
 Body colour white
 Particle size distribution (Coulter Counter) (Size at listed percentiles)

	10%	50%	90%
Fisher SSS-value	6 μm	11 μm	19 μm
	7,5		

Excitation
 UV-radiation, x-rays, cathode-rays

Excitation Spectrum

Emission Spectrum

Phosphor Type L 120
International Name —
Chemical Composition Calciumhalophosphate-Sb, Mn

Optical Properties
 Fluorescence colour* yellowish-white
 Maximum of emission 585 nm
 CIE-colour-coordinates* x = 0,460
 y = 0,421
 Nearest colour temperature —
 (* incl. Hg-radiation)

Physical Properties
 Density 3,15
 Body colour white
 Particle size distribution (Coulter Counter) (Size at listed percentiles)

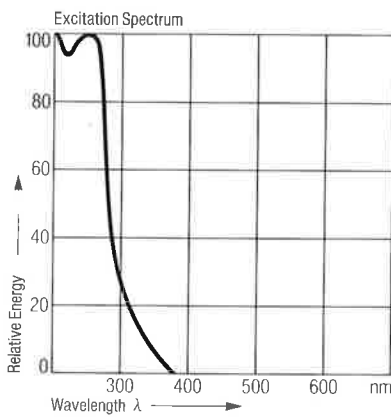
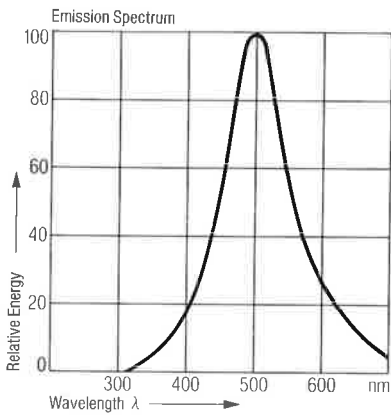
	10%	50%	90%
Fisher SSS-value	6 μm	10 μm	18 μm
	7,4		

Excitation
 UV-radiation, x-rays, cathode-rays

Excitation Spectrum

Phosphor and Emitter

Phosphor L 129, SV 137



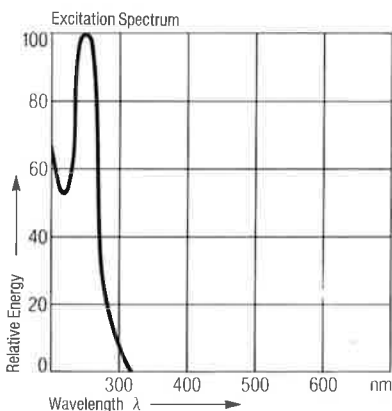
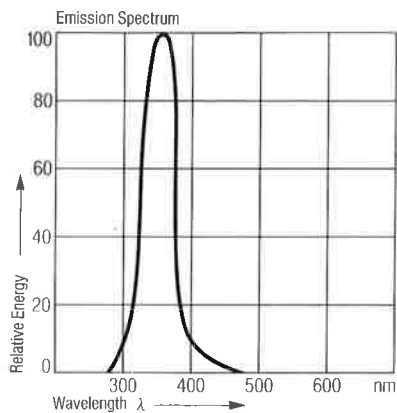
Phosphor Type L 129
International Name L 129
Chemical Composition —
 Calciumhalophosphate-Sb

Optical Properties
 Fluorescence colour* bluish-white
 Maximum of emission 480 nm
 CIE-colour-coordinates*
 x = 0,214
 y = 0,283
 Nearest colour temperature —
 (* incl. Hg-radiation)

Physical Properties
 Density 3,13
 Body colour white
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	10 %	50 %	90 %
Fisher SSS-value	5 μm	10 μm	20 μm
	7,0		

Excitation
 UV-radiation



Phosphor Type SV 137
International Name SV 137
Chemical Composition —
 Bariumdisilicate-Pb

Optical Properties
 Fluorescence colour UV-A
 Maximum of emission 345 nm
 CIE-colour-coordinates —
 Nearest colour temperature —

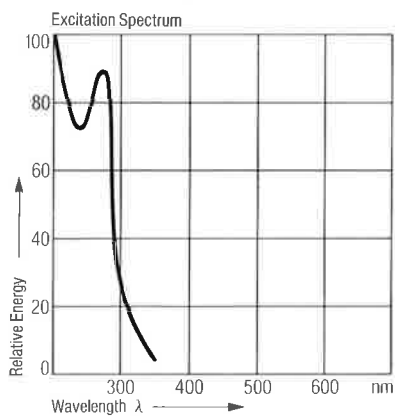
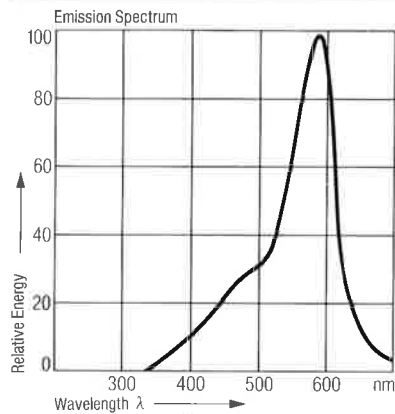
Physical Properties
 Density 3,74
 Body colour white
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	10 %	50 %	90 %
Fisher SSS-value	4,3 μm	8,9 μm	16,5 μm
	5,6		

Excitation
 UV-radiation

Phosphor and Emitter

Phosphor L 236, L 238



Phosphor Type
International Name
Chemical Composition

L 236
 L 236
 Cool White
 Calciumhalophosphate-Sb, Mn

Optical Properties

Fluorescence colour* white
 Maximum of emission 580 nm
 CIE-colour-coordinates* x = 0,370
 y = 0,375
 Nearest colour temperature* 4100 K
 (* incl. Hg-radiation)

Physical Properties

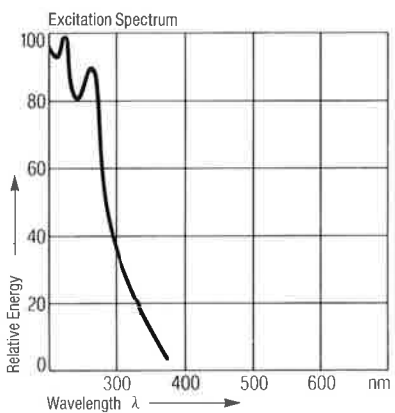
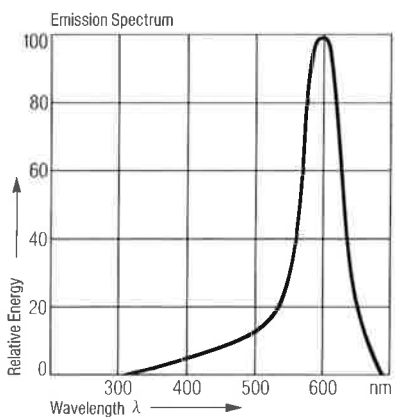
Density 3,20
 Body colour white
 Particle size distribution (Coulter Counter) (Size at listed percentiles)

	10 %	50 %	90 %
	6 μm	11 μm	20 μm

Fisher SSS-value 7,4

Excitation

UV-radiation, x-rays, cathode-rays



Phosphor Type
International Name
Chemical Composition

L 238
 L 238
 Warm White
 Calciumhalophosphate-Sb, Mn

Optical Properties

Fluorescence colour* yellowish-white
 Maximum of emission 584 nm
 CIE-colour-coordinates* x = 0,439
 y = 0,402
 Nearest colour temperature* 2900 K
 (* incl. Hg-radiation)

Physical Properties

Density 3,20
 Body colour white
 Particle size distribution (Coulter Counter) (Size at listed percentiles)

	10 %	50 %	90 %
	6 μm	12 μm	22 μm

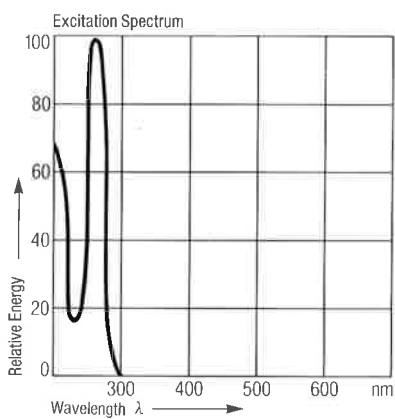
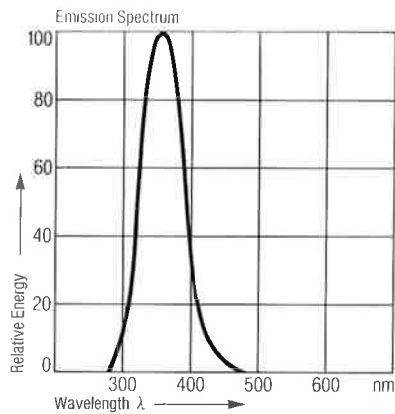
Fisher SSS-value 8,4

Excitation

UV-radiation, x-rays, cathode-rays

Phosphor and Emitter

Phosphor SV 250, SV 253



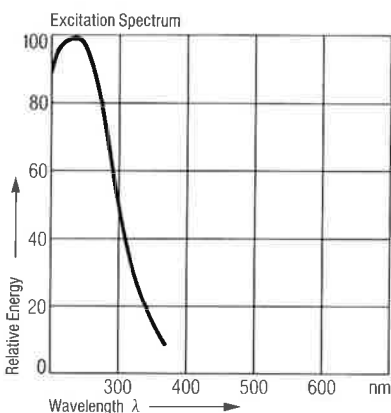
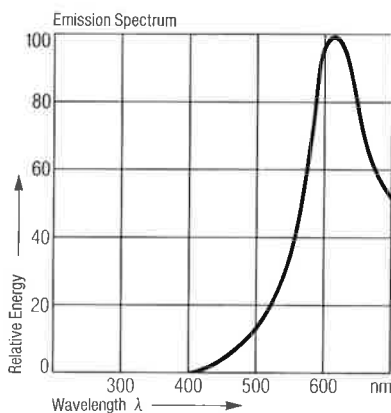
Phosphor Type SV 250
SV 250
International Name —
Chemical Composition Barium-Strontium-Magnesiumsilicate-Pb

Optical Properties
 Fluorescence colour UV-A
 Maximum of emission 366 nm
 CIE-colour-coordinates —
 Nearest colour temperature —

Physical Properties
 Density 4,12
 Body colour white
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	10%	50%	90%
Fisher SSS-value	1 μm	3 μm	10 μm
	3,8		

Excitation
 UV-radiation, x-rays, cathode-rays



Phosphor Type SV 253
SV 253
International Name —
Chemical Composition Strontium-Magnesium-ortho-Phosphate-Sn

Optical Properties
 Fluorescence colour* red-orange
 Maximum of emission 626 nm
 CIE-colour-coordinates*
 x = 0,471
 y = 0,388
 Nearest colour temperature —
 (* incl. Hg-radiation)

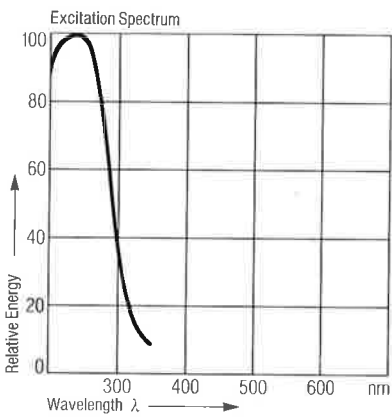
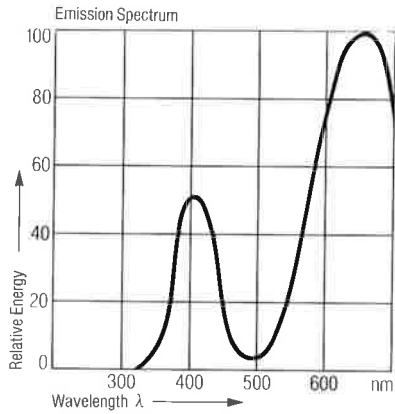
Physical Properties
 Density 3,90
 Body colour white
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

	10%	50%	90%
Fisher SSS-value	5 μm	11 μm	20 μm
	6,2		

Excitation
 UV-radiation

Phosphor and Emitter

Phosphor L 372, L 522



Phosphor Type
International Name
Chemical Composition

L 372
 L 372
 —
 Calcium-Strontium-ortho-Phosphate-Sn

Optical Properties

Fluorescence colour*
 Maximum of emission
 CIE-colour-coordinates*

pink
 645 nm
 $x = 0,442$
 $y = 0,325$

Nearest colour temperature
 (* incl. Hg-radiation)

—

Physical Properties

Density
 Body colour
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

4,0

white

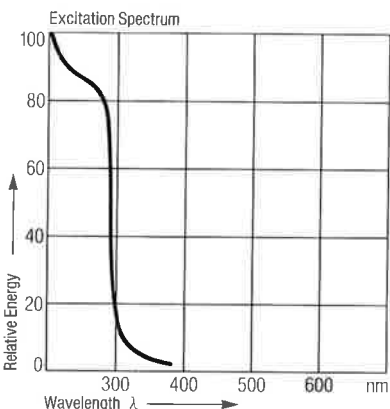
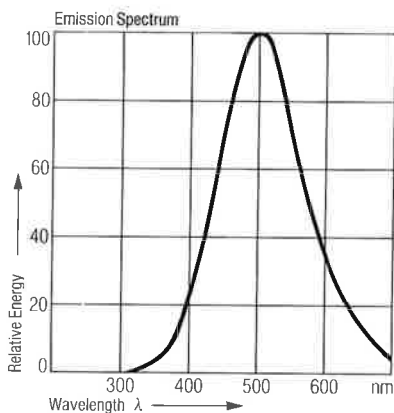
	10 %	50 %	90 %
Fisher SSS-value	3,2 μm	7,3 μm	15,7 μm

Fisher SSS-value

5,2

Excitation

UV-radiation



Phosphor Type
International Name
Chemical Composition

L 522
 L 522
 —
 Strontiumhalophosphate-Sb, Mn

Optical Properties

Fluorescence colour*
 Maximum of emission
 CIE-colour-coordinates*

blue-green
 506 nm
 $x = 0,252$
 $y = 0,344$

Nearest colour temperature
 (* incl. Hg-radiation)

—

Physical Properties

Density
 Body colour
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

4,11

white

	10 %	50 %	90 %
Fisher SSS-value	4 μm	9 μm	15 μm

Fisher SSS-value

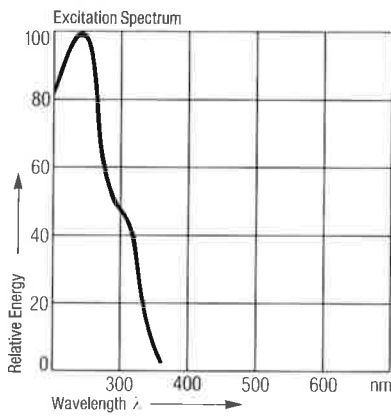
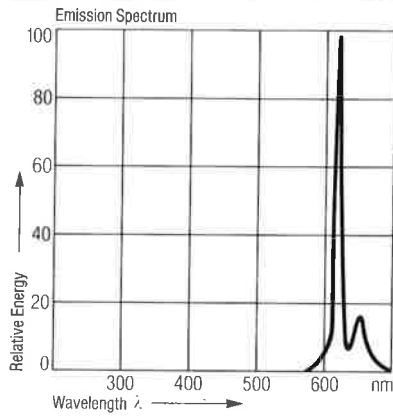
6,8

Excitation

UV-radiation, x-rays, cathode-rays

Phosphor and Emitter

Phosphor L 580



Phosphor Type
International Name
Chemical Composition

L 580
 L 580
 —
 Yttriumoxide-Eu

Optical Properties

Fluorescence colour*
 Maximum of emission
 CIE-colour-coordinates*
 Nearest colour temperature
 (* incl. Hg-radiation)

red
 610 nm
 x = 0,597
 y = 0,331

Physical Composition

Density
 Body colour
 Particle size distribution (Coulter Counter)
 (Size at listed percentiles)

5,3			
white			
	10 %	50 %	90 %
	3 μm	5,8 μm	13,6 μm

Fisher SSS-value

3,3

Excitation

UV-radiation, x-rays, cathode-rays

Phosphor and Emitter

Emitter P11/E 400

Emitter Type	P 11/E 400
International Name	P 11/E 400
Chemical Composition	—
	Ba-Sr-Ca-Carbonate + Zr-Oxide

Optical Properties

Carbonate-content	81,7% by weight
NC-content	0,8% by weight
Solvent-content	17,5% by weight

Physical Properties

Viscosity	Runningtime 38s* (DIN 53211 with 4 mm ø jet)						
Paste weight	2,38 g/ml*						
Electrical resistivity	> 10 ⁷ Ω cm						
Particle size distribution (Coulter Counter)							
	<table><tr><td>25 %</td><td>50 %</td><td>75 %</td></tr><tr><td>1,7 μm</td><td>2,8 μm</td><td>4,9 μm</td></tr></table>	25 %	50 %	75 %	1,7 μm	2,8 μm	4,9 μm
25 %	50 %	75 %					
1,7 μm	2,8 μm	4,9 μm					

* Average value, may be adjusted as required

Functional data

Lifetime - intermittent operation	1200 h (inductive operation, one switch period/min)
Lifetime - continuous operation	5500 h (capacitive operation in fluorescent lamps 40 W with coil EW 176)
Emitterconsumption after 2000 h (capacitive operated):	12 %

Use

Emitter for low-pressure-discharge-lamps