

# Content overview

## Touring/Stage 6

MSD Platinum	8
MSD Platinum Flex	10
MSR Platinum 35	12
MSR Gold™ FastFit	14
MSR Gold™ MiniFastFit	16
MSR	18
MSR Short Arc	20

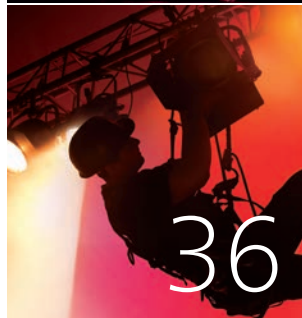


## 22 DJ/Club

24	MSD Platinum
26	MSR Gold™ MiniFastFit
27	MSD Gold™ MiniFastFit

## Theater 30

MSR Platinum	32
MSR Gold MiniFastFit	33
MSR Gold FastFit	34

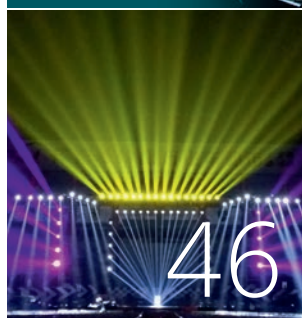


## 36 Film/Studio

39	MSR Platinum
44	MSR Hot Restrike

## Architainment 40

Architectural MSA	41
Architectural MSD	42
CDM-SA/T	44



## 46 Appendix

47	Cross reference list Discharge lamps
50	Design-in overview
52	Fundamentals of light and color
57	Lamp bases
59	Lamp bases names-Filament shapes - Fusing - Lamp life
60	List of manufacturers of ignitors or gear for MSR - MSD
61	Sales organisations
64	Philips type numbers





# General introduction

## Creating an unforgettable experience

Creating unforgettable experiences is the challenge that has inspired us to create the most exciting innovations in light. Our beams have become crisper and sharper. Our spotlights are brighter and whiter. Altogether incredibly compact light sources that ensure every performance has the maximum impact.

From MSR Gold to FastFit, MiniFastFit and Platinum Reflector lamps, our solutions have revolutionized the entertainment industry. And it's not just the major OEMs that use our lamps as the starting point for their fixtures. They're also the inspiration for many of the world's most talented lighting designers, not to mention the artists that live life in the spotlight.

But like all the best performers, we believe there's always room for improvement. It's the reason we work closely with leading fixture manufacturers to create lighting solutions that are more efficient, more powerful, more compact and easier to handle.

We've also established an 'On Stage' marketing platform to ensure that your lighting requirements take center stage in any new product development. Like the Philips P3 pinch protection and gold plated contacts that give our lamps the robust qualities that your industry demands. More than 2000 entertainment professionals have already subscribed to our On Stage Club. If you'd like to be on our VIP list to find out what's happening in the industry first, simply go to [www.philips.com/onstage](http://www.philips.com/onstage).

It's time to put our solutions in the spotlight. On the following pages you'll find our latest range of entertainment lamps. However, we're introducing new talented performers all the time. So to keep up to date with the latest innovations, make sure you contact your local Philips Representative or visit [www.philips.com/onstage](http://www.philips.com/onstage).

We'd like to thank our partners in business for their support and wish them a bright future,

The Philips entertainment lamps team.

# Touring/stage lighting

Lighting designers have a true passion for creating spectacular shows. To help bring out the best in their talents, we have developed the Platinum lamp system. Philips Platinum lamps are extremely compact and intense, allowing OEMs to design really small and flexible fixtures that rotate rapidly and highlight every angle on stage. The fixtures with Platinum inside bring the artists' performances to life, creating an experience that the audience will never forget!

#### \* Platinum technology

Philips MSD/MSR Platinum lamps are the original, brightest, and most compact short arc lamps on the market, enabling the design of small, flexible, and extremely efficient fixtures. The very short arc produces a sparkling, bright light that eliminates shadows and reproduces vivid colors perfectly. The Platinum system is compact and lightweight too, so it can be used anywhere. In short, more light output, more design possibilities, and less energy consumption. The new Platinum Flex lamp provides even more flexible options for your fixture.

#### \* Quality assured

Since Philips Platinum lamps are technologically advanced, close cooperation is required during the design-in to ensure optimum performance of the entertainment fixture. We therefore advise you to always replace end-of-life lamps with the original Philips Platinum types.

Many OEMs have already integrated Platinum lamps into their entertainment fixtures and our lamps have had the honor of lighting up many famous artists worldwide. For more information, please visit our website

[www.philips.com/onstage](http://www.philips.com/onstage)



FastFit lamp replacement

## Platinum lamps – The power to light your creativity

#### FastFit lamp base for easy lamp replacement

Another successful innovation that is well established in the market is the Philips FastFit concept, developed for single ended MSR Gold™ lamps. The rear load lamp base system; enables easy lamp replacement and adjustments in a matter of seconds.

FastFit lamps are also available with a smaller lamp base, called MiniFastFit. These MiniFastFit lamps with a PGJX28 base allow OEMs to make smaller and lighter fixtures compared to the regular FastFit concept, with the PGJX50 lamp base.





MSD Platinum 5 R, 14 R, 12 R LL



MSD Platinum 15 R, 16 R, 18 R LL



MSD Platinum 11 R, 17 RA



MSD Platinum 20 R(B)



MSD Platinum 21 R



MSD Platinum 25 R



MSD Platinum 19 R LL

**MSD Platinum – The power to light your creativity**

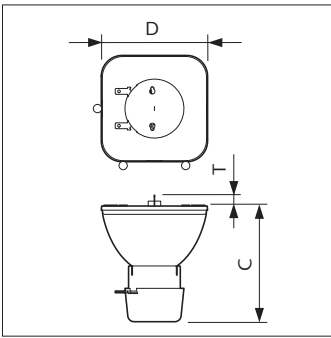
The MSD Platinum lamps open up new levels of creative freedom in entertainment lighting, with powerful, compact and brilliantly intense light. Their compact, lightweight design provides the freedom to create smaller, lighter luminaires – for use at any location on stage. And their short arc, high color temperature and innovative reflector produce a sparkling, high beam intensity for outstanding color reproduction. They also offer long and reliable lifetime, high efficacy and fast replacement times. It all adds up to an intensely exciting creative experience.

**Product Features**

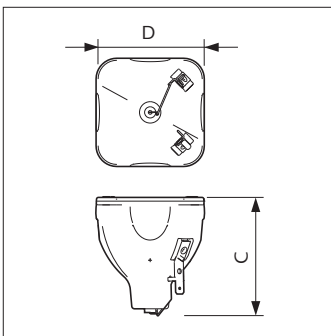
- Very short arc
- Compact system
- High correlated color temperature
- Philips Platinum technology

**Product Benefits**

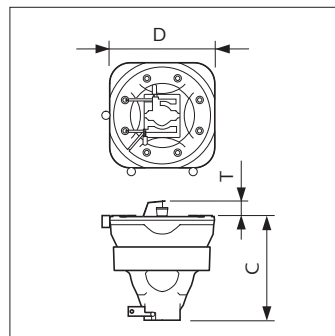
- High beam intensity
- Freedom to create smaller and lighter fixtures
- High perceived brightness
- A long and reliable performance



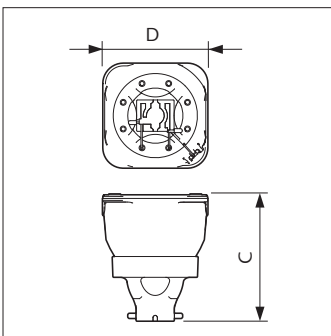
MSD Platinum 5 R, 12 R LL, 14 R



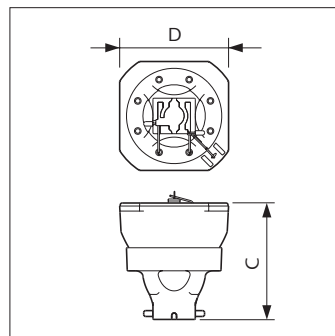
MSD Platinum 15 R, 16 R, 18 R LL



MSD Platinum 11 R, 17 RA



MSD Platinum 19 R LL, 20 R(B)



MSD Platinum 21 R, 25 R

Type	C Max	D Max	T Max
MSD Platinum 5 R	57.1	51.4	6.8
MSD Platinum 12 R LL	57.1	51.4	6.8
MSD Platinum 14 R	57.1	51.4	6.8

Type	C Max	D Max	T Max
MSD Platinum 15 R	66.4	58.5	
MSD Platinum 16 R	66.4	58.5	
MSD Platinum 18 R LL	66.4	58.5	

Type	C Max	D Max	T Max
MSD Platinum 11 R	53	51.5	10.0
MSD Platinum 17 RA	53	51.5	10.0

Type	C Max	D Max	T Max
MSD Platinum 19 R LL	72	58.5	-
MSD Platinum 20 R(B)	72	58.5	-

Type	C Max	D Max	T Max
MSD Platinum 21 R	60	54.5	8.0
MSD Platinum 25 R	60	54.5	8.0

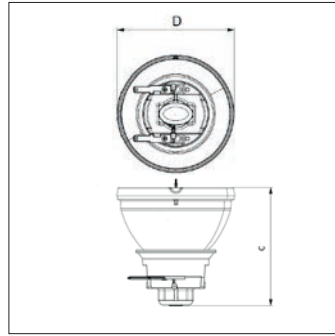
Type	Lamp Wattage (W)	Arc size (mm)	Lumen output (lm)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position	Pinch Temperature (°C)	Ordering number
Philips MSD Platinum 5 R	189	1.0	7950	8000	75	3000	any	350	9281 908 05314
Philips MSD Platinum 11 R	250	1.0	12000	7800	80	2000	any	350	9281 917 05314
Philips MSD Platinum 12 R LL	260	1.0	14000	7800	80	2000 - 6000*	any	350	9284 967 05314
Philips MSD Platinum 14 R	280	1.0	12350	7800	80	2000	any	350	9281 961 05314
Philips MSD Platinum 15 R	300	1.3	14550	8000	75	2000	any	350	9281 916 05314
Philips MSD Platinum 16 R	330	1.3	16000	8000	75	1500	any	350	9281 952 05314
Philips MSD Platinum 17 RA	350	1.0	15250	7000	85	1500	any	350	9281 973 05314
Philips MSD Platinum 18 R LL	370	1.0	22000	8000	80	2000 - 6000*	any	350	9284 966 05314
Philips MSD Platinum 19 R LL	420	1.0	23000	8000	80	2000 - 5000**	any	350	9284 987 05314
Philips MSD Platinum 20 R	470	1.2	22400	8000	80	1500	any	400	9281 972 05314
Philips MSD Platinum 20 RB	470	1.2	22400	8000	80	1500	any	400	9284 952 05314
Philips MSD Platinum 21 R	470	1.2	23000	8000	80	1500	any	350	9281 978 05314
Philips MSD Platinum 25 R	550	1.4	26000	7800	81	1500	any	350	9284 959 05314

\* 2000h at nominal lamp power, 6000h in entertainment cycle

\*\* 2000h at nominal lamp power, 4000h in entertainment cycle



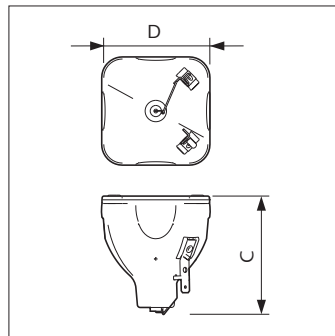
MSD Platinum 200 Flex



MSD Platinum 200 Flex



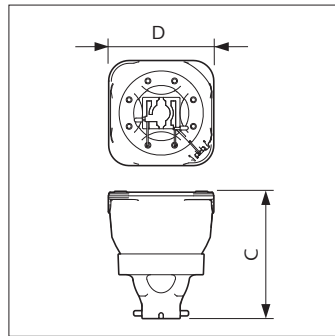
MSD Platinum 300S Flex



MSD Platinum 300S Flex



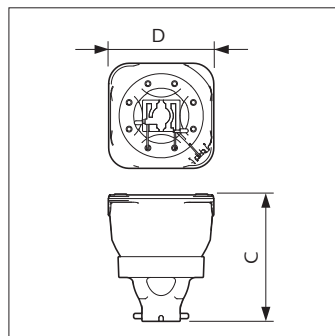
MSD Platinum 400L/500L Flex



MSD Platinum 400L/500L Flex



MSD Platinum 400S/500S Flex



MSD Platinum 400S/500S Flex

**MSD Platinum Flex - The flexible solution for your fixture**

The new Platinum Flex lamp is designed with flexible options, enabling more functionalities for your fixture. The deep dimming option of the lamp –used when the shutter of the fixture is closed– makes it possible to have an extreme long lifetime and energy savings of 30 to 45%. The flexibility of the power levels makes it possible to have a real linear dimming effect from a beam moving head. Next to the excellent lumen output in different colors, the Platinum Flex platform enables the fixture to produce more color combinations and color corrections. Thanks to the intelligent driver scheme, the Platinum Flex platform supports more features, in addition to the renowned Platinum features.

**Product Features**

- Deep dimming when shutter closed
- Wide power range
- Flexible power levels
- Very short arc
- Compact system
- High correlated color temperature
- Philips Platinum technology

**Product Benefits**

- Extremely long lifetime, reduced power consumption by 30-45%
- Enhanced lumen output in different colors, more color combinations and color corrections
- Real linear dimming effect
- High beam intensity
- Freedom to create smaller and lighter fixtures
- High perceived brightness
- A long and reliable performance



Type	C Max	D Max	T Max
MSD Platinum 200 Flex	60	56.5	-
MSD Platinum 300S Flex	66.4	58.5	-
MSD Platinum 400L Flex	60	54.5	8
MSD Platinum 400S Flex	72	58.5	-
MSD Platinum 500L Flex	60	54.5	8
MSD Platinum 500S Flex	72	58.5	-

Type	Lamp Wattage  (W)	Arc size	Lumen output  (lm)	Color Temperature  (K)	Color Rendering Index (Ra)	Max. allowable pinch temp (°C)	Average lamp life (h)	Working distance (mm)	Operating Position	Ordering number
Philips MSD Platinum 200 Flex	190-280 <sup>2</sup>	0.8	14000 <sup>3</sup>	8000 <sup>3</sup>	80 <sup>3</sup>	350	2000-6000 <sup>1</sup>	42.4	any	9284 957 05314
Philips MSD Platinum 300S Flex	330-380	1.0	22000	8000	80	350	2000-6000	31.4	any	9284 963 05314
Philips MSD Platinum 400L Flex	370-480 <sup>5</sup>	1.2	24000 <sup>6</sup>	8000 <sup>6</sup>	80 <sup>6</sup>	350	1500-6000 <sup>4</sup>	59	any	9284 964 05314
Philips MSD Platinum 400S Flex	370-480 <sup>5</sup>	1.2	24000 <sup>6</sup>	8000 <sup>6</sup>	80 <sup>6</sup>	350	1500-6000 <sup>4</sup>	31.4	any	9284 965 05314
Philips MSD Platinum 500L Flex	370-560	1.4	26000	8000	80	350	1500-4500	59.0	any	9284 981 05314
Philips MSD Platinum 500S Flex	370-560	1.4	33000	8000	80	350	1500-4500	31.4	any	9284 982 05314

1 At nominal lamp power: 2000h, In entertainment cycle: 6000h (all moving). Entertainment cycle is the lifetime cycle which is representative for use in the Touring/Stage segment. During 70% of the time the fixture is in idle mode (shutter closed) and during 30% in active mode (all moving, shutter open). In the active mode, a whole range of commonly used conditions in entertainment shows, are tested (color, dim, boost, white...) In the idle mode, the fixture will go into the deep dim level.

2 Nominal level 240W, Minimum dim level (active mode) 190W, Deep dim level (idle mode) 84W, Maximum boost level 280W

3 at 240W

4 At nominal lamp power: 1500h, In entertainment cycle: 4000h (all moving). Entertainment cycle is the lifetime cycle which is representative for use in the Touring/Stage segment.

During 70% of the time the fixture is in idle mode (shutter closed) and during 30% in active mode (all moving, shutter open). In the active mode, a whole range of commonly used conditions in entertainment shows, are tested (color, dim, boost, white...) In the idle mode, the fixture will go into the deep dim level.

5 Nominal level 470W, Minimum dim level (active mode) 370W, Deep dim level (idle mode) 190W, Maximum boost level 480W

6 at 470W



MSR Platinum 35

### MSR Platinum 35 – enhanced stage lighting

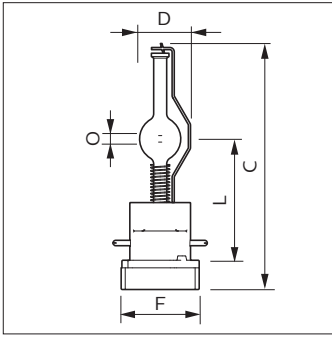
Today's stage designs call for lighting solutions which deliver high brightness and high-contrast beams to avoid shadow creation, as well as more compact luminaire and fixture designs to improve creative choice and design flexibility. Addressing this need, we have developed an incredibly powerful, brilliant and lightweight, compact system for the most amazing light experience – MSR Platinum 35. This lamp system provides a powerful and innovative tool to create intense lighting and delivers the same good light quality as other MSR lamps. The exceptionally short arc generates sparkling, bright light and this ultra-compact design makes the lamp suitable for smaller stage lighting fixtures.

### Product Features

- Very short arc
- Compact system
- High Correlated color temperature
- Philips FastFit technology
- Philips Platinum technology

### Product Benefits

- High beam intensity, high brightness
- Freedom to create smaller and lighter fixtures
- High perceived brightness
- Easy and fast lamp replacement
- A long and reliable lifetime



MSR Platinum 35

Type	C Max	D Max	L Min	L Nom	L Max	O Nom
MSR Platinum 35	116	23.5	55	56	57	3.0

Type	Lamp Wattage (W)	Cap-Base	Lumen output (lm)	Efficacy source (lm/W)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips MSR Platinum 35	800	PGJX36	57800	72	8500	73	1000	any

Type	Lamp current (A)	Ordering number
Philips MSR Platinum 35	12.3	9281 909 05114



MSR Gold™ 700, 700/2, 1200 FastFit



MSR Gold™ 1500, 1500/1, 1500/2, 2000, 2000/1, 2000/2, 2500/2 FastFit

### MSR Gold™ FastFit – easy lamp replacement in seconds

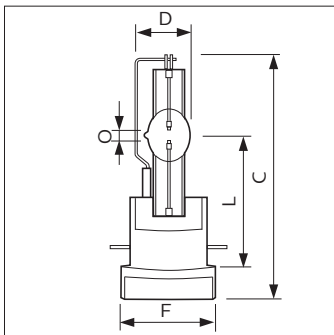
All lamps burn out eventually, but when this happens with single ended MSR Gold™ FastFit, it is replaced in seconds – thanks to the specially designed lamp base and lamp holder. This lamp provides a high beam intensity of pure, white light for a truly illuminating performance, while the gold-plated caps provide superior heat protection and prevent premature failure. P3 technology allows use in any position and at higher temperatures, further extending lamp life and consistency of high-quality light output. Also, because the FastFit design is applied to Philips Halogen lamps, switching between lamp technologies can be done quickly and easily. The Philips MSR Gold™ 1200 FastFit can be operated in a lamp wattage range between 800W and 1400W.

### Product Features

- Philips FastFit
- Very short arc
- Compact design
- Flexible power range
- Philips pinch protection
- Innovative gold plated pins
- MSR filling

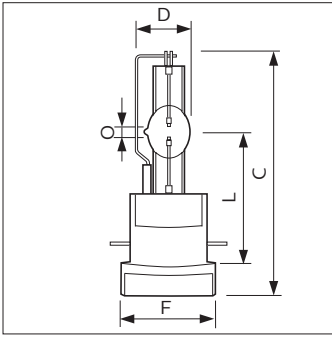
### Product Benefits

- Lamp replacement in just seconds, exchangeable with halogen lamp
- High beam intensity
- Easy handling, smaller and lighter fixtures possible
- Boostable light levels
- Enables use at higher temperatures in any burning position. Longer lifetime, fewer early failures, consistent performance over time
- Reduces early lamp or lamp holder failures. Excellent current transfer
- Pure, white light; color point close to black body line



MSR Gold™ 1500 (/1) (/2), 2000 (/1) (/2), 2500/2 FastFit

Type	C Max	D Max	F Nom	L Min	L Nom	L Max	O Nom
MSR Gold™ 1500 FastFit	128	28	50	64	65	66	6.3
MSR Gold™ 1500/1 FastFit	128	28	50	64	65	66	6.3
MSR Gold™ 1500/2 FastFit	128	28	50	64	65	66	6.3
MSR Gold™ 2000 FastFit	134	34	50	66	67	68	8.0
MSR Gold™ 2000/1 FastFit	133	34	50	66	67	68	7.0
MSR Gold™ 2000/2 FastFit	134	34	50	66	67	68	8.0
MSR Gold™ 2500/2 FastFit	153	35.5	50	73.9	74.9	75.9	9.5

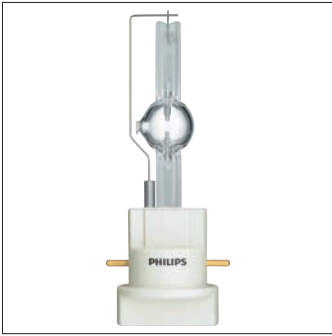


MSR Gold™ 700(/2), 1200 FastFit

Type	C Max	D Max	F Nom	L Min	L Nom	L Max	O Nom
MSR Gold™ 700 FastFit	112	23.2	50	64	65	66	3.8
MSR Gold™ 700/2 FastFit	112	23.2	50	64	65	66	3.8
MSR Gold™ 1200 FastFit	128	26.1	50	64	65	66	5.5

Type	Lamp Wattage (W)	Cap-Base	Lumen output (lm)	Efficacy source (lm/W)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips MSR Gold™ 700 FastFit	700	PGJX50	54000	76	6000	79	750	any
Philips MSR Gold™ 700/2 FastFit	700	PGJX50	48000	68	7300	73	750	any
Philips MSR Gold™ 1200 FastFit	1200	PGJX50	93000	78	6000	80	750	any
Philips MSR Gold™ 1500 FastFit	1500	PGJX50	120000	80	6000	80	750	any
Philips MSR Gold™ 1500/1 FastFit	1500	PGJX50	127500	85	5700	>94	750	any
Philips MSR Gold™ 1500/2 FastFit	1500	PGJX50	116000	77	7200	77	750	any
Philips MSR Gold™ 2000 FastFit	2000	PGJX50	162000	81	6050	91	750	any
Philips MSR Gold™ 2000/1 FastFit	2000	PGJX50	172000	86	5700	90	750	any
Philips MSR Gold™ 2000/2 FastFit	2000	PGJX50	157000	78	7800	88	750	any
Philips MSR Gold™ 2500/2 FastFit	2500	PGJX50	195500	78	7100	88	750	any

Type	Lamp current (A)	Ordering number
Philips MSR Gold™ 700 FastFit	10.2	9281 060 05115
Philips MSR Gold™ 700/2 FastFit	10.2	9281 062 05114
Philips MSR Gold™ 1200 FastFit	15	9281 750 05115
Philips MSR Gold™ 1500 FastFit	15.3	9281 073 05115
Philips MSR Gold™ 1500/1 FastFit	15.3	9281 089 05115
Philips MSR Gold™ 1500/2 FastFit	16.1	9284 103 05115
Philips MSR Gold™ 2000 FastFit	15.2	9281 769 05114
Philips MSR Gold™ 2000/1 FastFit	18.2	9284 101 05114
Philips MSR Gold™ 2000/2 FastFit	19.5	9281 061 05114
Philips MSR Gold™ 2500/2 FastFit	19.5	9281 064 05115



MSR Gold™ 400, 575/2, 700(1/2) MiniFastFit



MSR Gold™ 1000 MiniFastFit

**MSR Gold™ MiniFastFit – lamp replacement in seconds**

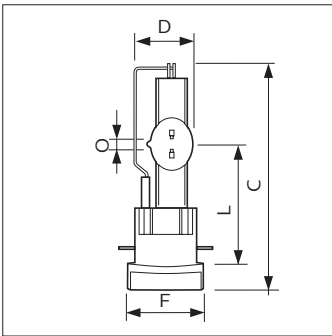
Thanks to the specially designed lamp base, the MSR Gold™ MiniFastFit takes just seconds to replace, to help ensure non-stop clubbing entertainment. In addition, the innovative gold plated pins ensure excellent current transfer to prolong lamp and lamp holder lifetimes and thereby reduce lamp replacement costs. Easy handling and small compact fixture designs are allowed by the lamps compact size, while the very short arc provides a high perceived brightness and high beam intensity.

**Product Features**

- Philips MiniFastFit
- Compact design
- Innovative gold plated pins
- High color temperature
- Very short arc

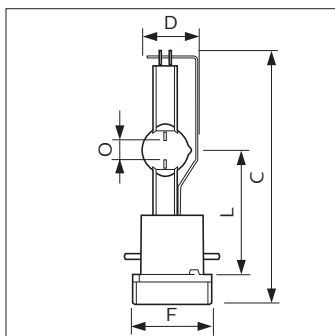
**Product Benefits**

- Lamp replacement in just seconds
- Easy handling, smaller and lighter fixtures
- Reduces early lamp or lamp holder failures.
  - Excellent current transfer
- High perceived brightness
- High beam intensity



MSR Gold™ MiniFastFit

Type	C Max	D Max	F Min	F Nom	F Max	L Min	L Nom	L Max	O Nom
MSR Gold™ 400 MiniFastFit	111	23.2	35.3	36	36.5	55	56	57	3.0
MSR Gold™ 575/2 MiniFastFit	112	23.2	35.3	36	36.5	55	56	57	3.5
MSR Gold™ 700 MiniFastFit	116	23	35.3	36	36.5	55	56	57	3.5
MSR Gold™ 700/1 MiniFastFit	112	23.2	35.3	36	36.5	55	56	57	3.8
MSR Gold™ 700/2 MiniFastFit	112	23.2	35.3	36	36.5	55	56	57	3.8



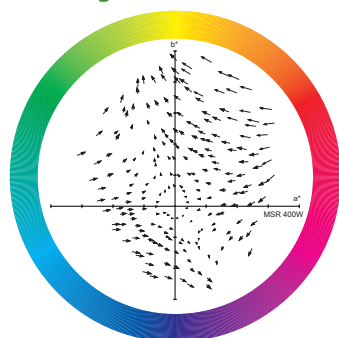
MSR Gold™ 1000 MiniFastFit

Type	C Max	D Max	F Min	F Nom	F Max	L Min	L Nom	L Max	O Nom
MSR Gold™ 1000 MiniFastFit	112	26	35.3	36	36.5	55	56	57	5.5

Type	Lamp Wattage (W)	Cap-Base	Lumen output (lm)	Efficacy source (lm/W)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips MSR Gold™ 400 MiniFastFit	400	PGJX28	28000	65	6400	60	750	any
Philips MSR Gold™ 575/2 MiniFastFit	575	PGJX28	36800	68	7700	70	750	any
Philips MSR Gold™ 700 MiniFastFit	700	PGJX28	49000	70	8850	65	750	any
Philips MSR Gold™ 700/1 MiniFastFit	700	PGJX28	53400	76	5700	73	750	any
Philips MSR Gold™ 700/2 MiniFastFit	700	PGJX28	47000	69	7200	75	750	any
Philips MSR Gold™ 1000 MiniFastFit	1000	PGJX36	82000	82	6000	80	900	any

Type	Lamp current (A)	Ordering number
Philips MSR Gold™ 400 MiniFastFit	7.2	9281 940 05114
Philips MSR Gold™ 575/2 MiniFastFit	10.2	9281 840 05115
Philips MSR Gold™ 700 MiniFastFit	10.8	9281 941 05114
Philips MSR Gold™ 700/1 MiniFastFit	10.2	9281 974 05115
Philips MSR Gold™ 700/2 MiniFastFit	10.2	9281 999 05115
Philips MSR Gold™ 1000 MiniFastFit	11.4	9281 714 05115

CRV diagram



MSR 400W types



MSR 700 (/2), MSR 1200 (/2)



MSR 575/2

**MSR – bright vivid colors, always**

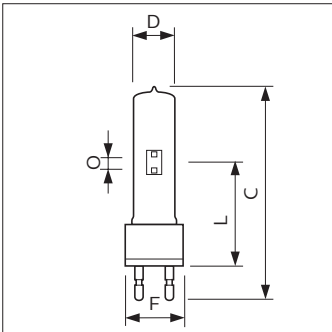
The high color rendering index of the single ended MSR series ensures that everyone in the audience can enjoy the true colors of the scenery, the stage props, the players and their costumes – in fact everything that is on stage can be made bright and vivid in daylight quality light. Also, thanks to the single ended lamp concept, the luminaire has optimal light collection and direction possibilities to help ensure brightness on stage exactly where and when it is needed. In addition, the MSR can be used in any burning position for easy set-up and convenience.

**Product Features**

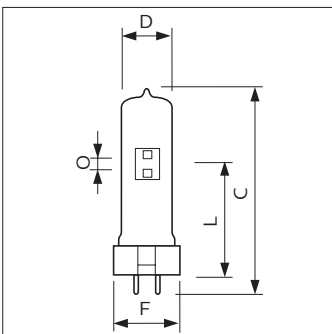
- Single ended lamp concept
- High CRI
- Daylight Color Temperatures

**Product Benefits**

- Optimal light collection
- Excellent color characteristics
- Brightness on stage



G22



GX9.5

Type	C Max	D Max	F Nom	L Min	L Nom	L Max	O Nom
MSR 700	152	30	42	74	75	76	8.0
MSR 700/2	152	30	42	74	75	76	8.0
MSR 1200	175	40	53	84	85	86	10.0
MSR 1200/2	175	40	53	84	85	86	10.0

Type	C Max	D Max	F Min	F Nom	F Max	L Min	L Nom	L Max	O Nom
MSR 575/2 10H	125	30	34	35	36	64	65	66	7.0



Type	Lamp Wattage (W)	Cap-Base	Lumen output (lm)	Efficacy source (lm/W)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips MSR 575/2 10H	575	GX9.5	47000	82	7000	73	1000	any
Philips MSR 700	700	G22	55000	80	5900	75	1000	any
Philips MSR 700/2	700	G22	55000	78	6700	80	1000	any
Philips MSR 1200	1200	G22	103000	88	5900	80	800	any
Philips MSR 1200/2	1200	G22	104000	87	6700	85	800	any

Type	Lamp current (A)	Ordering number
Philips MSR 575/2 10H	7.0	9281 716 05115
Philips MSR 700	12	9280 780 05114
Philips MSR 700/2	11	9281 715 05114
Philips MSR 1200	13.8	9280 781 05114
Philips MSR 1200/2	13.8	9281 718 05114



MSR 1200 SA, MSR 2000 SA



MSR 700 SA

**MSR Short Arc – for longer life**

The lamp’s short arc and compact design helps enable a compact luminaire that provides high beam intensity, while the excellent color rendition characteristics help ensure optimal colors on stage.

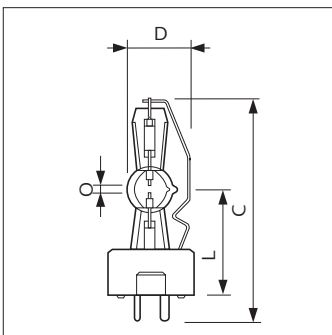
The highly innovative P3 technology, developed by Philips, allows MSR Short Arc lamps to be used at higher temperatures in any burning position. The result? Longer lifetime, fewer early failures and a highly consistent performance throughout the lamp’s lifetime.

**Product Features**

- Philips Pinch Protection
- Short arc
- Compact lamp design
- MSR filling

**Product Benefits**

- Enables use at higher temperatures in any burning position. Longer lifetime, fewer early failures, consistent performance over time
- High beam intensity
- Compact design luminaries
- Excellent color characteristics, optimal colors on stage



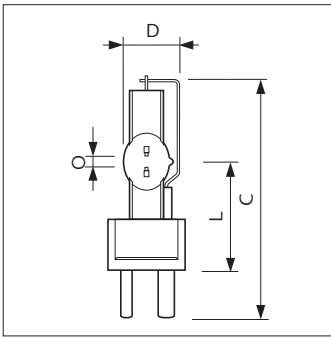
GY9.5

Type	C Max	D Max	L Min	L Nom	L Max	O Nom
MSR 700 SA	83	25	38	39	40	4.0



**Philips Pinch Protection technology**

- **Reliability**, through longer lifetime and fewer early failures.
- **Quality**, through excellent storage characteristics and consistent performance over time.
- **Compactness**, allowing more compact design of fixtures and burning positions.



GY22

Type	C Max	D Max	L Min	L Nom	L Max	O Nom
MSR 1200 SA	135	34	58	59	60	7.0
MSR 2000 SA	135	34	58	59	60	7.0

Type	Lamp Wattage (W)	Cap-Base	Lumen output (lm)	Efficacy source (lm/W)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips MSR 700 SA	700	GY9.5	55000	79	5500	80	750	any
Philips MSR 1200 SA	1200	GY22	96000	80	6100	80	750	any
Philips MSR 2000 SA	1800	GY22	174000	87	6000	85	750	any

Type	Lamp current (A)	Ordering number
Philips MSR 700 SA	11	9281 703 05115
Philips MSR 1200 SA	13.8	9281 709 05115
Philips MSR 2000 SA	21.5	9281 732 05114

# DJ/Club lighting

A blue-tinted photograph of a club interior. In the foreground, a DJ booth is visible with a DJ behind the counter. The background shows a dance floor with people and several spotlights mounted on the ceiling, casting beams of light across the room. The overall atmosphere is vibrant and energetic.

## **MSD Platinum - High end reflector lamps**

In clubs it is vital to create the right mood with impactful and fast moving lighting effects. Philips Platinum lamps do just that. Their very short arc produces a sparkling, bright light that eliminates shadows and perfectly reproduces brilliant and vivid colors. Moreover, the system is so compact that smaller, lightweight fixtures can be developed, that can be used anywhere and can rotate rapidly around the room. More design possibilities, more impact and less energy consumption.

## **A range of lamps for every event**

The Philips DJ/club range also features PAR 56 and PAR 64 lamps. An efficient lighting package with high quality Philips components, all optically aligned and sealed into a robust lamp. In line with the renowned Philips Entertainment Lighting standards, Philips PAR lamps offer the very best quality, reliability and lowest cost of ownership available today.





MSD Platinum 2 R



MSD Platinum 5 R

**MSD Platinum – The power to light your creativity**

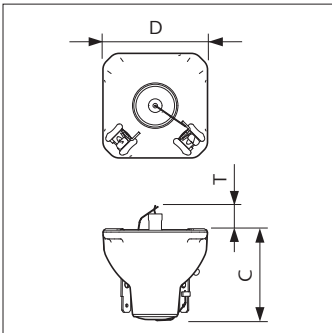
The MSD Platinum lamps open up new levels of creative freedom in entertainment lighting, with powerful, compact and brilliantly intense light. Their compact, lightweight design provides the freedom to create smaller, lighter luminaires – for use at any location on stage. And their short arc, high color temperature and innovative reflector produce a sparkling, high beam intensity for outstanding color reproduction. They also offer long and reliable lifetime, high efficacy and fast replacement times. It all adds up to an intensely exciting creative experience.

**Product Features**

- Very short arc
- Compact system
- High correlated color temperature
- Philips Platinum technology

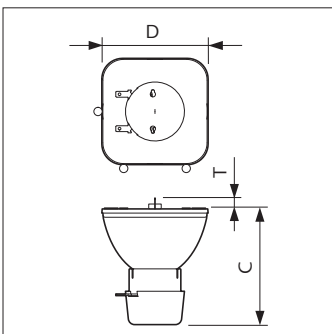
**Product Benefits**

- High beam intensity
- Freedom to create smaller and lighter fixtures
- High perceived brightness
- A long and reliable performance



MSD Platinum 2 R

Type	C Max	D Max	T Max
MSD Platinum 2 R	43.5	46.5	13.5



MSD Platinum 5 R

Type	C Max	D Max	T Max
MSD Platinum 5 R	57.1	51.4	6.8

Type	Lamp Wattage (W)	Arc size (mm)	Lumen output (lm)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position	Pinch Temperature (°C)	Ordering number
Philips MSD Platinum 2 R	132	0.9	5150	8000	75	6000	any	350	9281 976 05314
Philips MSD Platinum 5 R	189	1.0	7950	8000	75	3000	any	350	9281 908 05314

# On Stage with Peter Morse

THE ONE Grand Show - Berlin



For more inspiration check the hall of fame on [www.philips.com/onstage](http://www.philips.com/onstage)

“

THE ONE Grand Show was two years in the making and every lighting state and transition has become an integral part of the story telling process. Each look creates the mood, emotion, atmosphere and physical context of each scene.”

Peter Morse, Lighting Designer  
[www.petermorse.com](http://www.petermorse.com)

Photo credits: Ralph Larmann



MSR Gold™ 300/2 MiniFastFit

**MSR Gold™ MiniFastFit – lamp replacement in seconds**

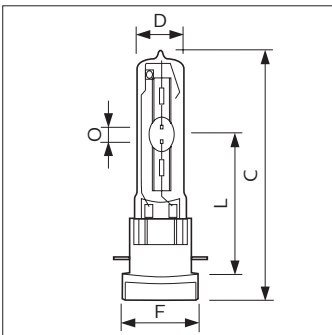
Thanks to the specially designed lamp base and lamp holder, the MSR Gold™ MiniFastFit takes just seconds to replace, to help ensure non-stop clubbing entertainment. In addition, the innovative gold plated pins ensure excellent current transfer to prolong lamp and lamp holder lifetimes and thereby reduce lamp replacement costs. Easy handling and small compact fixture designs are allowed by the lamps compact size, while the very short arc provides a high perceived brightness and high beam intensity.

**Product Features**

- Philips MiniFastFit
- Compact design
- Innovative gold plated pins
- Color temperature >8000K
- Very short arc

**Product Benefits**

- Lamp replacement in just seconds
- Easy handling, smaller and lighter fixtures
- Reduces early lamp or lamp holder failures.
  - Excellent current transfer
- High perceived brightness
- High beam intensity



MSR Gold™ 300/2 MiniFastFit

Type	C Max	D Max	L Min	L Nom	L Max	O Nom
MSR Gold™ 300/2 MiniFastFit	126	23	65.8	66.8	67.8	5.0

Type	Lamp Wattage (W)	Cap-Base	Lumen output (lm)	Efficacy source (lm/W)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips MSR Gold™ 300/2 MiniFastFit	300	PGJX28	22700	75	7750	78	750	any

Type	Lamp current (A)	Ordering number
Philips MSR Gold™ 300/2 MiniFastFit	3.8	9281 771 05115





MSD Gold™ MiniFastFit

### MSD Gold™ MiniFastFit – replacement in seconds + longer life

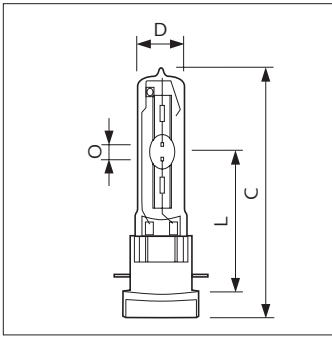
The specially designed lamp base of the MSD Gold™ MiniFastFit means that this lamp can be replaced in just seconds, helping to ensure non-stop entertainment. In addition, the innovative gold plated pins ensure excellent current transfer to prolong lamp and lamp holder lifetimes and thereby reduce lamp replacement costs. The lamp's compact size allows for easy handling and compact fixture designs, while the very short arc provides a high perceived brightness and high beam intensity. What's more, the MSD Gold™ MiniFastFit has an extended lifetime, which further reduces lamp replacement costs.

#### Product Features

- Philips MiniFastFit
- Compact design
- Innovative gold plated pins
- Color temperature >8000K
- Very short arc
- Long lifetime (2000hrs)

#### Product Benefits

- Lamp replacement in just seconds
- Easy handling, smaller and lighter fixtures
- Reduces early lamp or lamp holder failures.
  - Excellent current transfer
- High perceived brightness
- High beam intensity
- Less lamp replacement



MSD Gold™ MiniFastFit

Type	C Max	D Max	L Min	L Nom	L Max	O Nom
MSD Gold™ 300/2 MiniFastFit	126	23	65.8	66.8	67.8	5.0

Type	Lamp Wattage  (W)	Cap-Base	Lumen output  (lm)	Efficacy source  (lm/W)	Color Temperature  (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips MSD Gold™ 300/2 MiniFastFit	300	PGJX28	21000	70	7650	64	2000	any

Type	Lamp current  (A)	Ordering number
Philips MSD Gold™ 300/2 MiniFastFit	3.8	9281 998 05114

# On Stage with Nick Whitehouse

Justin Timberlake's 20/20 Experience tour



For more inspiration check the hall of fame on  
[www.philips.com/onstage](http://www.philips.com/onstage)

“

I love music; seeing how lighting and staging and everything I do enhances an artist's ability to entertain, is priceless. I love being a part of that; it's an unbelievable feeling to hear 20,000 fans scream because of a gig you have helped design and put together!”

Nick Whitehouse, Lighting Designer  
[www.fireplay.com](http://www.fireplay.com)

Photo credits: Ralph Larmann

# Theater lighting

The lighting experiences you create have the power to captivate audiences and turn a performance into something magical. To bring out the best in your talents, you need fixtures that maximise your scene-setting capabilities and recreate them perfectly.

**Exactly the lighting experience you intended**





MSR Platinum 35 ST

**MSR Platinum 35 ST – The best choice for studio/theater lighting**

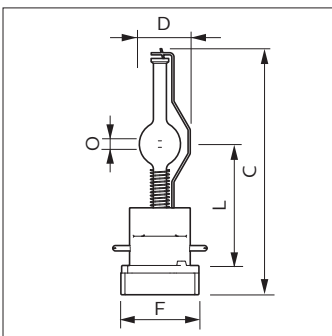
MSR Platinum 35 ST has been specially designed for the studio/theater world, where consistent high-quality light output, high brightness and excellent color rendering are important. This lightweight, compact system delivers intense, cool-white light for the most amazing light experience. It's a powerful and innovative tool, giving lighting designers far greater freedom and delivering the same good light quality as other MSR lamps. The exceptionally short arc generates sparkling, bright light, and the lamp's ultra-compact design makes it suitable for smaller lighting fixtures. The MSR Platinum 35 ST lamp has a balanced spectrum with extra red content for enhanced color rendering.

**Product Features**

- Very short arc
- Compact system
- High Correlated color temperature
- Philips FastFit technology
- Philips Platinum technology

**Product Benefits**

- High beam intensity, high brightness
- Freedom to create smaller and lighter fixtures
- High perceived brightness
- Easy and fast lamp replacement
- A long and reliable lifetime



MSR Platinum 35 ST

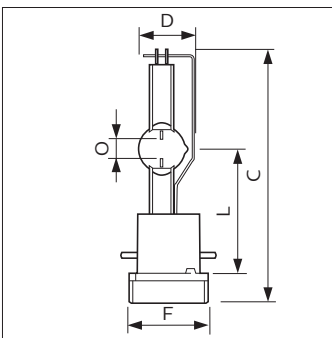
Type	C Max	D Max	F Nom	L Min	L Nom	L Max	O Nom
MSR Platinum 35 ST	116	24	36	55	56	57	3.0

Type	Lamp Wattage (W)	Cap-Base	Lumen output (lm)	Efficacy source (lm/W)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips MSR Platinum 35 ST	800	PGJX36	57800	72	5500	75	750	any

Type	Lamp current (A)	Ordering number
Philips MSR Platinum 35 ST	10.9	9281 945 05114



MSR Gold™ 1000 MiniFastFit



MSR Gold™ 1000 MiniFastFit

**MSR Gold™ MiniFastFit – lamp replacement in seconds**

Thanks to the specially designed lamp base, the MSR Gold™ MiniFastFit takes just seconds to replace, to help ensure non-stop clubbing entertainment. In addition, the innovative gold plated pins ensure excellent current transfer to prolong lamp and lamp holder lifetimes and thereby reduce lamp replacement costs. Easy handling and small compact fixture designs are allowed by the lamps compact size, while the very short arc provides a high perceived brightness and high beam intensity.

**Product Features**

- Philips MiniFastFit
- Compact design
- Innovative gold plated pins
- High color temperature
- Very short arc

**Product Benefits**

- Lamp replacement in just seconds
- Easy handling, smaller and lighter fixtures
- Reduces early lamp or lamp holder failures. Excellent current transfer
- High perceived brightness
- High beam intensity

Type	C Max	D Max	F Min	F Nom	F Max	L Min	L Nom	L Max	O Nom
MSR Gold™ 1000 MiniFastFit	112	26	35.3	36	36.5	55	56	57	5.5

Type	Lamp Wattage (W)	Cap-Base	Lumen output (lm)	Efficacy source (lm/W)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips MSR Gold™ 1000 MiniFastFit	1000	PGJX36	82000	82	6000	80	900	any

Type	Lamp current (A)	Ordering number
Philips MSR Gold™ 1000 MiniFastFit	11.4	9281 714 05115



MSR Gold™ 1200 FastFit



MSR Gold™ 1500/1 FastFit

### MSR Gold™ FastFit – easy lamp replacement in seconds

All lamps burn out eventually, but when this happens with single ended MSR Gold™ FastFit, it is replaced in seconds – thanks to the specially designed lamp base and lamp holder. This lamp provides a high beam intensity of pure, white light for a truly illuminating performance, while the gold-plated caps provide superior heat protection and prevent premature failure. P3 technology allows use in any position and at higher temperatures, further extending lamp life and consistency of high-quality light output. Also, because the FastFit design is applied to Philips Halogen lamps, switching between lamp technologies can be done quickly and easily. The Philips MSR Gold™ 1200 FastFit can be operated in a lamp wattage range between 800W and 1400W.

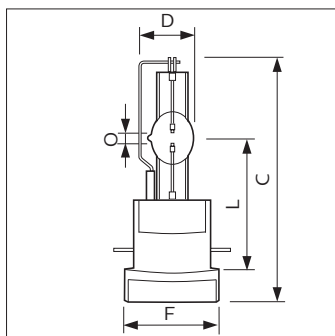
### Product Features

- Philips FastFit
- Very short arc
- Compact design
- Flexible power range
- Philips pinch protection
- Innovative gold plated pins
- MSR filling

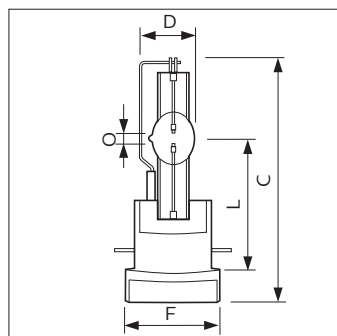
### Product Benefits

- Lamp replacement in just seconds, exchangeable with halogen lamp
- High beam intensity
- Easy handling, smaller and lighter fixtures possible
- Boostable light levels
- Enables use at higher temperatures in any burning position. Longer lifetime, fewer early failures, consistent performance over time
- Reduces early lamp or lamp holder failures. Excellent current transfer
- Pure, white light; color point close to black body line





MSR Gold™ 1200 FastFit



MSR Gold™ 1500/1 FastFit

Type	C Max	D Max	F Nom	L Min	L Nom	L Max	O Nom
MSR Gold™ 1200 FastFit	128	26.1	50	64	65	66	5.5
MSR Gold™ 1500 FastFit	128	28	50	64	65	66	6.3
MSR Gold™ 1500/1 FastFit	128	28	50	64	65	66	6.3
MSR Gold™ 1500/2 FastFit	128	28	50	64	65	66	6.3

Type	Lamp Wattage (W)	Cap-Base	Lumen output (lm)	Efficacy source (lm/W)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips MSR Gold™ 1200 FastFit	1200	PGJX50	100000	83	6000	80	750	any
Philips MSR Gold™ 1500 FastFit	1500	PGJX50	119550	80	6000	80	750	any
Philips MSR Gold™ 1500/1 FastFit	1500	PGJX50	127500	85	5700	95	750	any
Philips MSR Gold™ 1500/2 FastFit	1500	PGJX50	116000	77	7200	77	750	any

Type	Lamp current (A)	Ordering number
Philips MSR Gold™ 1200 FastFit	15	9281 750 05115
Philips MSR Gold™ 1500 FastFit	15.3	9281 073 05115
Philips MSR Gold™ 1500/1 FastFit	15.3	9281 089 05115
Philips MSR Gold™ 1500/2 FastFit	16.1	9284 103 05115



# On Stage Entertainment in the spotlight

## The Philips On Stage Club

Philips On Stage is an integrated loyalty platform for real artists in the entertainment industry; the go-to web page for exclusive access to the latest industry news, interviews and innovations. It also puts talented individuals in the spotlight with the chance to showcase their latest work through inspirational videos, backstage photos and personal insight interviews.

Like the incredible lighting show that Lighting Designer Peter Morse and Programmer Benny Kirkham created for THE ONE Grand Show in Berlin. We followed THE ONE lighting design process from concept to concert, with a guided tour of the venue, exclusive backstage images and a personal photo report from Peter's home in Los Angeles.

The feature culminated in a video of the impressive event at the Friedrichstadt-Palast featuring 500 costumes designed by Jean-Paul Gaultier. A breath-taking production that was brought to life using Philips Platinum and MSR Gold™ lamps. Exceptional solutions with the power to light Peter's creativity – and yours.

But also the work of other lighting designers is put in the spotlight. Like the amazing AC/DC show by Patrick Woodroffe, Justin Timberlake's 20/20 by Nick Whitehouse and the Eurovision Songcontest by Kasper Lange.

If you'd like to be the first to get access to these exclusive interviews, like to stay up to date with the latest in entertainment lighting, and get the chance to feature in our next On Stage exclusive, sign up for free by scanning the QR code below.

## On Stage lighting solutions

Philips develops the most exciting innovations in light so you can create unforgettable experiences.

Our entertainment solutions cover:

- Touring and Stage
- DJ and Club
- Theater
- Film and Studio
- Architainment

Sign up for free -  
Join Philips On Stage  
[www.philips.com/onstage](http://www.philips.com/onstage)





# Film/Studio lighting

As every stage director knows, color purity and evenly distributed light are essential ingredients for any production. This is especially true for accurate reproduction of skin tones.

Philips Platinum 35 ST lamps have been specially developed for Studio/Theater lighting fixtures to ensure consistent high quality light output with the right level of brightness, color rendering and color temperature in any lighting position. The result is attractive and accurately exposed pictures for film and video.

In addition to MSR Platinum 35 ST lamps, the range also includes MSR Hot Restrike lamps. The lamps create perfect daylight under any condition. They give excellent quality and the right amount of light, constantly on tap. Furthermore they are stable and reliable ensuring perfect performance conditions, and their compact Single Ended Lamp technology enables hot re-ignition while maintaining superb color characteristics.

**“In fact it’s early evening... I make it high noon.”**



MSR Platinum 35 ST

**MSR Platinum 35 ST – The best choice for studio/theater lighting**

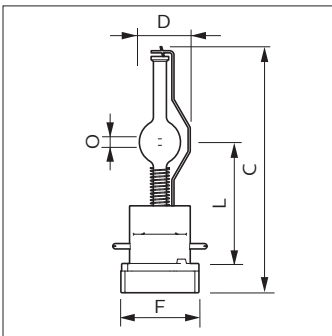
MSR Platinum 35 ST has been specially designed for the studio/theater world, where consistent high-quality light output, high brightness and excellent color rendering are important. This lightweight, compact system delivers intense, cool-white light for the most amazing light experience. It's a powerful and innovative tool, giving lighting designers far greater freedom and delivering the same good light quality as other MSR lamps. The exceptionally short arc generates sparkling, bright light, and the lamp's ultra-compact design makes it suitable for smaller lighting fixtures. The MSR Platinum 35 ST lamp has a balanced spectrum with extra red content for enhanced color rendering.

**Product Features**

- Very short arc
- Compact system
- High Correlated color temperature
- Philips FastFit technology
- Philips Platinum technology

**Product Benefits**

- High beam intensity, high brightness
- Freedom to create smaller and lighter fixtures
- High perceived brightness
- Easy and fast lamp replacement
- A long and reliable lifetime



MSR Platinum 35 ST

Type	C Max	D Max	F Nom	L Min	L Nom	L Max	O Nom
MSR Platinum 35 ST	116	24	36	55	56	57	3.0

Type	Lamp Wattage (W)	Cap-Base	Lumen output (lm)	Efficacy source (lm/W)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips MSR Platinum 35 ST	800	PGJX36	57800	72	5500	75	750	any

Type	Lamp current (A)	Ordering number
Philips MSR Platinum 35 ST	10.9	9281 945 05114

# Architainment lighting

Architainment aims to transform architectural, retail, and themed environments through lighting. Philips Architainment lamps offer excellent colors, a strong beam and long life for amazing creativity and flexibility in architectural lighting. The high color temperature makes them especially suitable for architainment applications. Philips Architainment lamps can bring any object into the limelight and give it the charisma it deserves.

**Giving objects and environments the charisma they deserve.**



MSA 2500 DE

**Architectural MSA – double ended night colors**

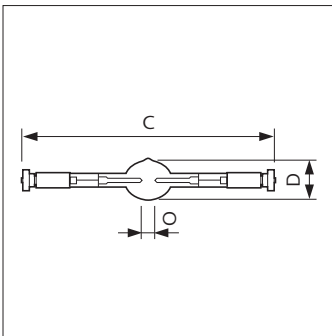
The high luminous efficacy and optimal lamp filling of the double ended Architectural MSA lamps create high beam intensity and excellent color rendering. While the compact arc of the lamp allows efficient beam control and high intensity. Ideal to illuminate architecture of all types at night.

**Product Features**

- High luminous efficacy
- Compact arc
- Optimal lamp filling

**Product Benefits**

- High lumen output
- High beam intensity
- Excellent colors



MSA 2500 DE

Type	C Max	D Max	O Nom
MSA 2500 DE	364	41	25

Type	Lamp Wattage (W)	Cap-Base (P)SFC	Lumen output (lm)	Efficacy source (lm/W)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips MSA 2500 DE	2500	(P)SFC	250000	100	5600	88	2500	p15

Type	Lamp current (A)	Ordering number
Philips MSA 2500 DE	22.5	9280 994 05103



MSD 700, MSD 1200



MSD 575 HR

**Architectural MSD – single ended night colors**

The high luminous efficacy and optimal lamp filling of the single ended Architectural MSD lamps create high beam intensity and excellent color rendering. While the compact arc of the lamp allows efficient beam control and high intensity. Ideal to illuminate architecture of all types at night.

**Product Features**

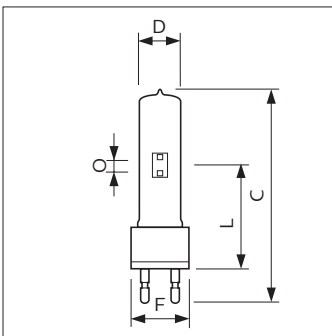
- High luminous efficacy
- Long life
- Optimal lamp filling

**Product Benefits**

- High lumen output
- Low cost of ownership
- Excellent colors

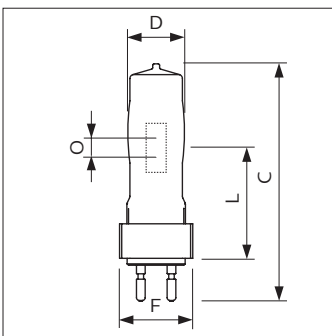


MSD 575



MSD 575 HR, MSD 700

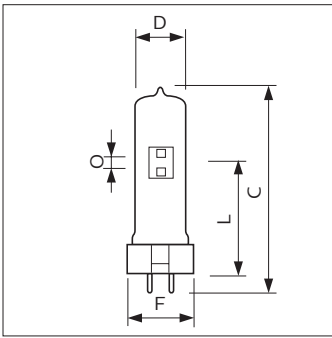
Type	C Max	D Max	F Min	F Nom	F Max	L Min	L Nom	L Max	O Nom
MSD 575 HR	145	30	41	42	43	69	70	71	8.0
MSD 700	175	40	52	53	54	84	85	86	10.0



MSD 1200

Type	C Max	D Max	F Min	F Nom	F Max	L Min	L Nom	L Max	O Nom
MSD 1200	183	42.5	52	53	54	84	85	86	14.0





GX9.5

Type	C Max	D Max	F Min	F Nom	F Max	L Min	L Nom	L Max	O Nom
MSD 575	125	30	34	35	36	64	65	66	8.0

Type	Lamp Wattage  (W)	Cap-Base	Lumen output  (lm)	Efficacy source  (lm/W)	Color Temperature  (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips MSD 575	575	GX9.5	43000	75	6000	72	3000	any
Philips MSD 575 HR	575	G22	47000	81	5700	75	2000	any
Philips MSD 700	700	G22	49000	70	5900	75	3000	any
Philips MSD 1200	1200	G22	92000	79	6300	73	2000	any

Type	Lamp current  (A)	Ordering number
Philips MSD 575	7.0	9280 988 05114
Philips MSD 575 HR	7.0	9280 989 05114
Philips MSD 700	11	9281 704 05114
Philips MSD 1200	13.8	9281 720 05114



CDM-SA/T 150W

**CDM-SA/T – the greener way to light up the night**

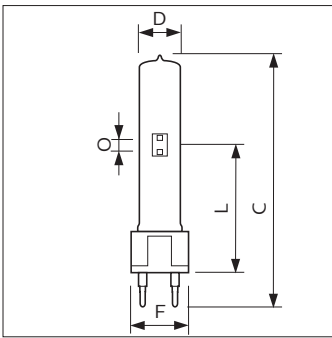
With a high luminous efficacy producing more lumens per watt than standard Architainment lamps, the CDM-SA/T is the greener alternative to light up the night. In addition, the optimal lamp filling and short arc of the lamp create a high beam intensity and excellent color rendering.

**Product Features**

- High luminous efficacy
- Compact arc
- Optimal lamp filling

**Product Benefits**

- High lumen output
- High beam intensity
- Excellent colors



CDM-SA/T G12

Type	C Max	D Max	F Min	F Nom	F Max	L Min	L Nom	L Max	O Nom
Philips CDM-SA/T 150W/942	110	20	29	30	31	55	56	57	6

Type	Lamp Wattage (W)	Cap-Base	Lumen output (lm)	Efficacy source (lm/W)	Color Temperature (K)	Color Rendering Index (Ra)	Average lamp life (h)	Operating Position
Philips CDM-SA/T 150W/942	150	G12	13000	84	4200	95	9000	any

Type	Lamp Current (A)	Ordering number
Philips CDM-SA/T 150W/942	1.8	9280 866 05103

# On Stage with Kasper Lange

Eurovision song contest 2014, Denmark

“

My intention was always clear - the bigger the show, the simpler the design. If a show needs to have an impact on 200 million viewers it needs to be simple. The contest was open to almost 40 different nations and each nation's set needed a different lighting look. The challenge for us was to make each song look unique but also to introduce an organic flow throughout the show and not create a 'mash' of 37 songs.”

Kasper Lange, Lighting Designer



For more inspiration check the hall of fame on [www.philips.com/onstage](http://www.philips.com/onstage)

Photo credits: Ralph Larmann

# Appendix

Cross reference list Discharge lamps

Design-in overview

Fundamentals of light and color

Lamp bases

Lamp bases names-Filament shapes- Fusing, Lamp life

List of manufacturers of ignitors or gear for MSR - MSD

Sales organisations

Philips type numbers

P47

P48

P52

P57

P59

P60

P61

P64

**Special HID lamps** (Non Hot-Restrike lamps)

Philips	Osram	Yodn
MSD Platinum 2 R	SIRIUS HRI 132W	MSD 132R2
MSD Platinum 5 R	SIRIUS HRI 190W	MSD 200R5
MSD Platinum 11 R		
MSD Platinum 12 R LL		
MSD Platinum 14 R	SIRIUS HRI 280W	MSD 280R10
MSD Platinum 15 R		MSD 300R15
MSD Platinum 16 R	SIRIUS HRI 330W	MSD 330S16
MSD Platinum 17 RA		
MSD Platinum 18 R LL		
MSD Platinum 19 R LL		
MSD Platinum 20 R		
MSD Platinum 20 RB		
MSD Platinum 21 R		
MSD Platinum 25 R	SIRIUS HRI 550W	
MSD Platinum 200 Flex		
MSD Platinum 300S Flex		
MSD Platinum 400L Flex		
MSD Platinum 400S Flex		
MSD Platinum 500L Flex		
MSD Platinum 500S Flex		

**Special HID lamps** (Non Hot-Restrike lamps)

Philips	Osram	SLI	Koto	GE	Ushio	Xenpow/Jenbo
<b>Single-ended Metal Halide lamps with outer bulb</b>						
MSR 575/2	HSR 575/72	BA 575 SE NHR 7.2	DIS-7	CSR 575/2/SE CSR 575/2/T/SE (8000 K)	USD 5.75/2 NHR	NSK 575/2
MSR 700		BA 700 SE NHR	DIS-7		USR 700 NHR	NSK 700
MSR 700/2				CSR 700/2/SE		NSK 700/2
MSR 1200	HSR 1200/60	BA 1200 SE NHR	DIS-12		USR 1200 SE	NSK 1200
MSR 1200/2				CSR 1200/2/SE		NSK 1200/2
MSD 575	HSD 575/60	BA 575 SE D			USD-575 NHR	NSD 575
MSD 700						
MSD 1200						NSD 1200

## Cross reference list Discharge lamps

Philips	Osram	SLI	GE	Xenpow/Jenbo
<b>Single-ended Metal Halide lamps without outer bulb</b>				
MSR Gold™ 300/2 MiniFastFit			CSR 300/2/TAL	NSK G 300/2 mini
MSD Gold™ 300/2 MiniFastFit	HSD 300W/80/P28		CSR 300/2/TAL	
MSR Gold™ 400 MiniFastFit	HTI 400W/60/P28			
MSR Gold™ 700/2 MiniFastFit	HTI 700W/75/P28		CSR 700/TAL/60/PGJX28	NSK G 700/2 mini
MSR Gold™ 700 FastFit			CSR 700/TAL/60/PGJX50	NSK G 700
MSR Gold™ 700/2 FastFit	HTI 700W/75/P50		CSR 700/TAL	NSK G 700/2
MSR Gold™ 1000 MiniFastFit	Lok-it! 1000/PS Lok-it! 1000/PS Brilliant			
MSR Gold™ 1200 FastFit				NSK G 1200
MSR Gold™ 1500 FastFit	HTI 1500W/60/P50		CSR 1500/TAL/60	
MSR Gold™ 1500/1 FastFit	HTI 1500W/60/P50		CSR 1500/TAL/60	
MSR Gold™ 1500/2 FastFit				
MSR Gold™ 2000 FastFit	HTI 2000W/60/P50			
MSR Gold™ 2000/1 FastFit				
MSR Gold™ 2000/2 FastFit	HTI 2000W/75/P50			
MSR Gold™ 2500/2 FastFit				
MSR 700 SA	HTI 705 W/SE XS	BA 700 SE SA5.6	CSR 700 SA CSR 700 SA/72	NSK 700SA
MSR 1200 SA	HTI 1200 W/SE XS		CSR 1200 SA CSR 1500 SA	NSK 1200 SA
MSR 2000 SA				

Note: All Philips lamps have pinch protection up to 500degr Celsius

## Design-in overview Platinum

Also check the lamp replacement tool on [www.philips.com/onstage](http://www.philips.com/onstage)

Fixture brand	Fixture model	Philips lamp type
Acme	AE-275B / AE-275R / AE-710Beam	Philips MSD Platinum 2 R
ADJ	Vizi Roller Beam 2R / Vizi Beam Hybrid 2R	Philips MSD Platinum 2 R
Elation	Rayzor Beam 2 R / Sniper 2 R	Philips MSD Platinum 2 R
Jolly	X-SMART BEAM	Philips MSD Platinum 2 R
Terbly	LS-2R / LBM-2R / VDH-2R / PDH-2R / PTB-2R	Philips MSD Platinum 2 R
Triton Blue	2R-BEAM	Philips MSD Platinum 2 R
Acme	XP-5R BEAM / XP-5R BEAM II	Philips MSD Platinum 5 R
ADJ	Vizi Beam 5R / Vizi Spot 5R	Philips MSD Platinum 5 R
Clay Paky	Sharpy	Philips MSD Platinum 5 R
DTS	Jack	Philips MSD Platinum 5 R
Ehrgeiz	Cobalt Plus 5R / Cobalt Plus Beam 5R / Cobalt Plus Spot 5R	Philips MSD Platinum 5 R
Elation	Platinum Beam 5 R / Platinum Beam 5 R Extreme / Platinum Spot 5 R Pro	Philips MSD Platinum 5 R
Futurelight	PLB-5R / PLS-5R	Philips MSD Platinum 5 R
Jolly	X-BEAM 5R / X-SPOT 5R	Philips MSD Platinum 5 R
PR Lighting	XR 200 Beam	Philips MSD Platinum 5 R
Terbly	PT160 Pro / JT160-E / JT160B / PT160B / PT160B Pro / PT 189B	Philips MSD Platinum 5 R
Triton Blue	5R-BEAM / 5R-SPOT / 5R-BEAM-PRO	Philips MSD Platinum 5 R
Martin Professional	RUSH MH7 Hybrid	Philips MSD Platinum 11 R
PR Lighting	PR-2206	Philips MSD Platinum 11 R
Acme	XP-320 BEAM - XP 320 BEAM IP	Philips MSD Platinum 12 R LL
ADJ	VIZI BEAM 12 RX - HYDRO BEAM X12	Philips MSD Platinum 12 R LL

Also check the lamp replacement tool on [www.philips.com/onstage](http://www.philips.com/onstage)

Fixture brand	Fixture model	Philips lamp type
Acme	XP-280 BS	Philips MSD Platinum 14 R
ADJ	VIZI BEAM 14RX	Philips MSD Platinum 14 R
DaGe	AX-2882	Philips MSD Platinum 14 R
Elation	Platinum HFX / Proteus Beam V14B IP / Sniper Pro	Philips MSD Platinum 14 R
PRG	Icon BEAM	Philips MSD Platinum 14 R
Terbly	G14B-IP / G9 Hybrid/ G9B	Philips MSD Platinum 14 R
Acme	XP-15R SPOT	Philips MSD Platinum 15 R
Ehrgeiz	Cobalt X-Beam 15R	Philips MSD Platinum 15 R
Elation	Platinum Spot 15R / Platinum Spot 15R Pro / Platinum Beam 15R	Philips MSD Platinum 15 R
Fine Art	Fine 300 beam / Fine 300 wash	Philips MSD Platinum 15 R
Futurelight	PLB-15R / PLS-15R	Philips MSD Platinum 15 R
GRIVEN	Graphite 2000	Philips MSD Platinum 15 R
Jolly	X-BEAM 15R	Philips MSD Platinum 15 R
PR Lighting	XR 300 Beam	Philips MSD Platinum 15 R
Terbly	Pt 320S spot / PT322S spot basic/ Pt 320B beam / FS300M Follow-Spot	Philips MSD Platinum 15 R
Triton Blue	15R SPOT / 15R BEAM / 15R Follow-Spot	Philips MSD Platinum 15 R
Acme	XP-16R BSW II/ XP-16R BSW PRO / XP-16R Beam II XP-16R BSW / XP-16R Spot / XP-16R Beam	Philips MSD Platinum 16 R
Clay Paky	Sharpy Wash 330	Philips MSD Platinum 16 R
DTS	Max / Max L	Philips MSD Platinum 16 R
Elation	Platinum Wash 16 R Pro	Philips MSD Platinum 16 R
Fine Art	Fine 330 wash / Fine 330 spot	Philips MSD Platinum 16 R
Jolly	X-SUPER BEAM	Philips MSD Platinum 16 R
Terbly	PT330W	Philips MSD Platinum 16 R
Elation	Platinum BX / Platinum SBX	Philips MSD Platinum 17 RA
Fine Art	Fine 350BSW	Philips MSD Platinum 17 RA
Philips Varilite	SL Hydrus 350	Philips MSD Platinum 17 RA
PR Lighting	PR2362 BWS	Philips MSD Platinum 17 RA
Terbly	G10B Beam / G10 Hybrid	Philips MSD Platinum 17 RA
Triton Blue	Mega Beam G10 / HYBRID-G10 Beam-Spot-Wash	Philips MSD Platinum 17 RA
Acme	XP-380 BSW / XP-380 BSW Pro	Philips MSD Platinum 18 R LL
Martin Professional	ERA 500 Hybrid IP	Philips MSD Platinum 18 R LL
Acme	XP 500 BEAM	Philips MSD Platinum 19 R LL
Acme	XP-20R BEAM / XP-20R BSW	Philips MSD Platinum 20 R
Clay Paky	Supersharpy / Mythos	Philips MSD Platinum 20 R(B)
DeSheng	MH-470BWS IP / MH-470B IP	Philips MSD Platinum 20 RB
Elation	Platinum FLX	Philips MSD Platinum 20 R
Fine Art	Fine 470BSW / Fine 470 BEAM	Philips MSD Platinum 20 R
Jolly	X-5 Couple	Philips MSD Platinum 20 RB
Terbly	G12WB Beam & Wash / G12 Hybrid	Philips MSD Platinum 20 R
Elation	Proteus Hybrid	Philips MSD Platinum 21 R
Fine ART	Fine 470BEAM / Fine 470BSW	Philips MSD Platinum 21 R
GTD	GTD-470 BSW / GTD-470 Beam / GTD-480 BSW / GTD-480 Beam	Philips MSD Platinum 21 R
PRG	Icon EDGE	Philips MSD Platinum 21 R
Terbly	G20 Hybrid IP/ G21 Hybrid / G12 WB	Philips MSD Platinum 21 R
Acme	XP 550 BSW II / XP-550 BEAM IP / XP 550 BSW IP	Philips MSD Platinum 25 R
ClayPaky	SHARPY X FRAMA/FD	Philips MSD Platinum 25 R
DLW	DLW 550 BEAM / DLW 550 BSW / DLW 550 Wash	Philips MSD Platinum 25 R
Fine Art	Fine 550 BSW / Fine 550 Wash / Fine 550 BeamWash	Philips MSD Platinum 25 R
GTD	GTD F5 II Beam / GTD F5 II BSW / GTD-550 II BSW / Philips MSD	Philips MSD Platinum 25 R
Philips Varilite	VL10 Beamwash	Philips MSD Platinum 25 R
PR lighting	PR-2569 (Beam)/ PR-2597 (BSW)/ PR-2552 (BSW) / PR-2554 (Beam)	Philips MSD Platinum 25 R
Terbly	G25 Hybrid / G25 Hybrid IP / G25B IP / G25B NOVA IP	Philips MSD Platinum 25 R
Clay Paky	Alpha Profile 800 ST / Alpha Spot QWO ST	Philips MSR Platinum 35 + Philips MSR Platinum 35 ST
Elation	Platinum Profile 35 Pro / Platinum Spot 35 Pro	Philips MSR Platinum 35 + Philips MSR Platinum 35 ST
Fine Art	Fine 8005F	Philips MSR Platinum 35 ST
PR Lighting	XR 800 Spot	Philips MSR Platinum 35 + Philips MSR Platinum 35 ST
Robe	MMX Spot / MMX Wash Beam	Philips MSR Platinum 35 + Philips MSR Platinum 35 ST
Terbly	FS800M Follow Spot	Philips MSR Platinum 35 ST

Also check the lamp replacement tool on [www.philips.com/onstage](http://www.philips.com/onstage)

Fixture brand	Fixture model	Philips lamp type
Terbly	PT800S / PT800P	Philips MSR Platinum 35 + Philips MSR Platinum 35 ST
Triton Blue	35R-SPOT	Philips MSR Platinum 35
Elation	Smarty Hybrid	Philips MSD Platinum 200 Flex
Terbly	G6H NOVA	Philips MSD Platinum 200 Flex
DLW	DLW-380 Beam / DLW-380 BSW	Philips MSD Platinum 300S Flex
Fine Art	Fine 380 LL Beam	Philips MSD Platinum 300S Flex
GTD	GTD-380 N6 BEAM / GTD-380 II BEAM / GTD F3 BEAM / GTD F3 N BEAM / GTD F3 II BSW	Philips MSD Platinum 300S Flex
Jolly	X4-GT / X4 Beam	Philips MSD Platinum 300S Flex
PR Lighting	PR2369 / PR2393 / PR2366 / PR2345	Philips MSD Platinum 300S Flex
Terbly	G7B NOVA / G7H NOVA / G7B NOVA IP / G7H NOVA IP	Philips MSD Platinum 300S Flex
Acme	XP-20R BSW II	Philips MSD Platinum 400 S Flex
DLW	DLW 480 Beam	Philips MSD Platinum 400 L Flex
Elation	Smarty Max	Philips MSD Platinum 400L Flex
Terbly	G22 H Nova / G22 H Nova IP	Philips MSD Platinum 400L Flex
Acme	XP 550 BSW II / XP-550 BEAM IP / XP 550 BSW IP	Philips MSD Platinum 500 L Flex
Elation	PROTEUS EXCALIBUR	Philips MSD Platinum 500 L Flex
GTD	GTD F5 II Beam / GTD F5 II BSW / GTD-550 II BSW	Philips MSD Platinum 500 L Flex
PR	PR-2569 Beam / PR-2597 BSW / PR-2552 BSW / PR-2554 Beam	Philips MSD Platinum 500 L Flex
Terbly	S550H / S550H IP / G550B IP / S550B IP	Philips MSD Platinum 500 L Flex
Desheng	MH-682BP	Philips MSD Platinum 500 S Flex

## Design-in overview MSR Gold FastFit/MiniFastFit

Also check the lamp replacement tool on [www.philips.com/onstage](http://www.philips.com/onstage)

Fixture brand	Fixture model	Philips lamp type
High End Systems	Showbeam 2.5 / Showgun 2.5	MSR Gold 2500/2 FastFit
Coemar	Infinity Multiray	MSR Gold 2000/2 FastFit
High End Systems	Showgun	MSR Gold 2000/2 FastFit
LDR	Canto 2000	MSR Gold 2000/2 FastFit
PR Lighting	PR 6000 Wash/FS / PR 6000 Framing / PR 6000 Spot / Fine 1500E Beam	MSR Gold 2000/1 FastFit
Omarte	Topower 2000	MSR Gold 2000 FastFit
Fine Art	Fine 1500E PERF / Fine 1500E Wash / Fine 1500E Spot	MSR Gold 1510/1 SA/DE
Golden Sea	V2500S Spot / V2000W Wash	MSR Gold 1510 SA/DE and MSR Gold 1510 SA/1 DE
Philips VariLite	VL3015 Spot / VL3015LT Spot / VL3500 Wash / VL3500 Wash FX / VL3515 Spot	MSR Gold 1510 SA/DE
Acme	Xperior 1500 WZ Wash / Xperior 1500SZ Spot	MSR Gold 1500 FastFit
Coemar	Infinity Spot XL	MSR Gold 1500 FastFit
Fine Art	Fine II 1500E Beam / Fine II 1500E Wash / Fine II Performance / Fine III 1500E Spot	MSR Gold 1500 FastFit
Golden Sea	V3000P	MSR Gold 1500 FastFit and MSR Gold 1500/1 FastFit
Jolly Hongcai	Color Beam 1500PF / Color Spot 1500PF / Color Wash 1500PF / Color Wash 1200PF	MSR Gold 1500 FastFit
Martin	MAC III	MSR Gold 1500 FastFit
Philips VariLite	VL6000 Beam	MSR Gold 1500 FastFit and MSR Gold 1500/2 FastFit
PR Lighting	PR-5000 Beam / PR-5000 Spot	MSR Gold 1500 FastFit
Robe	ColorBeam 2500E AT / ColorSpot 2500E AT / ColorWash 2500E AT	MSR Gold 1500 FastFit
SGM Elettronica	Giotto Beam 1500 / Giotto Digital 1500 / Giotto Profile 1500 / Giotto Spot 1500 / Giotto Wash 1500	MSR Gold 1500 FastFit
Acme	Xperior 1200SZ Spot / Xperior 1200SZA Spot / Xperior 1200WZ Wash / Xperior 1200WZA Wash	MSR Gold 1200 FastFit
Chauvet	LEGEND 1200E Spot / LEGEND 1200E Wash	MSR Gold 1200 FastFit
Coef	XP 1200	MSR Gold 1200 FastFit
Coemar	Infinity Wash XL	MSR Gold 1200 FastFit
D.T.S.	XR1200 Wash / XR3000 Beam CMY / XR3000 Spot CMY	MSR Gold 1200 FastFit
Elation	DESIGN Spot 1400 / DESIGN Wash 1400	MSR Gold 1200 FastFit
Futurelight	PHS-1400E	MSR Gold 1200 FastFit
Golden Sea	Terbly V1400S-E / Terbly V1400W-E	MSR Gold 1200 FastFit
iSolution	XP-1200beam / XP-1200SZ / XP-1200WZ	MSR Gold 1200 FastFit
Jolly Hongcai	Color Spot 1200EF	MSR Gold 1200 FastFit
Philips Selecon	Rua	MSR Gold 1200 FastFit



Also check the lamp replacement tool on [www.philips.com/onstage](http://www.philips.com/onstage)

## Fixture brand

## Fixture model

## Philips lamp type

Philips Selecon	Tahi	MSR Gold 1200 FastFit
Philips Selecon	TORU	MSR Gold 1200 FastFit
Philips VariLite	VL4000 BeamWash / VL4000 Spot	MSR Gold 1200 FastFit
PR Lighting	PR3000 / XL1800	MSR Gold 1200 FastFit
PRG	Bad Boy CMY Spot	MSR Gold 1200 FastFit
Robe	ColorSpot 2500E AT / ColorWash 2500E AT	MSR Gold 1200 FastFit
Robert Juliat	Topaze / Manon	MSR Gold 1200 FastFit
SGM Elettronica	Giotto Beam 1500 / Giotto digital 1500 / Giotto Profile 1500 / Giotto Spot 1500 / Giotto Wash 1500	MSR Gold 1200 FastFit
Siluj	Triton Blue V-1201 / Triton blue V-1202	MSR Gold 1200 FastFit
Golden Sea	V1000LT Profile / V1000P Profile	MSR Gold 1000 MiniFastFit
Jolly Hong Cai	X-1000 Spot / X-1000 Spot Profile	MSR Gold 1000 MiniFastFit
Martin	Mac Viper AirFX / Mac Viper Beam / Mac Viper Performance / Mac Viper Profile / Mac Viper Quadray / Mac Viper Wash / Mac Viper Wash DX	MSR Gold 1000 MiniFastFit
Acme	Xperior 700A Beam / Xperior 700SZ Spot	MSR Gold 700/2 MiniFastFit
Chauvet	LEGEND 700E Beam / LEGEND 700E Spot	MSR Gold 700/2 MiniFastFit
Clay Paky	ALPHA BEAM 700 / ALPHA PROFILE 700 / ALPHA SPOT HPE 700 / ALPHA WASH 700 / ALPHA WASH 700 Grand	MSR Gold 700/2 MiniFastFit
Coemar	Infinity ACL SM / Infinity Spot M / Infinity Wash M	MSR Gold 700/2 MiniFastFit
D.T.S.	XR750 Wash	MSR Gold 700/2 MiniFastFit
Fine Art	Fine I 700E Beam / Fine I 700E Performance / Fine I 700E Spot / Fine I 700E Wash	MSR Gold 700/2 MiniFastFit
iSolution	XP-700beam MN / XP-700SZ MN / XP-700WZ MN	MSR Gold 700/2 MiniFastFit
Jolly Hongcai	FL-700 Beam PF / FL-700 Spot PF / MH-700 BEAM / MH-700 SPOT	MSR Gold 700/2 MiniFastFit
PROEL	Arrow Compact 700 Beam / Arrow Compact 700 Spot	MSR Gold 700/2 MiniFastFit
SGM Elettronica	G700 Beam / G700 Spot / G700 Wash / Synthesis 700 Spot / Synthesis 700 Wash	MSR Gold 700/2 MiniFastFit
Acme	Xperior 700SA Spot / Xperior 700WZA Wash	MSR Gold 700/2 FastFit
High End Systems	Technobeam II Extreme / Technobeam II Supreme	MSR Gold 700/2 FastFit
D.T.S.	XR 700 / XR2000 Beam / XR2000 Spot / XR2000 Spot CMY / XR700 Spot / XR700 Wash	MSR Gold 700/2 FastFit
PROEL	Arrow 700 Wash	MSR Gold 700/2 FastFit
Clay Paky	Alpha Profile 700	MSR Gold 700/1 MiniFastFit
Philips VariLite	VL770 Spot	MSR Gold 700 MiniFastFit
Feiying	YW-0805 color 700	MSR Gold 700 FastFit
iSolution	XP-700beam / XP-700SZ / XP-700WZ	MSR Gold 700 FastFit
Jolly Hongcai	Color Spot 700 PF	MSR Gold 700 FastFit
Qmaxz	QME 700P	MSR Gold 700 FastFit
Robe	ColorBeam 700E AT / ColorSpot 700E AT / ColorWash 700E AT	MSR Gold 700 FastFit
SGM Elettronica	Giotto 700 spot	MSR Gold 700 FastFit
Coemar	Infinity ACL SM / Infinity Spot M / Infinity Wash M	MSR Gold 575/2 MiniFastFit
High End Systems	Technospot	MSR Gold 575/2 MiniFastFit
Robe	Robin 600E Beam / Robin 600E Spot / Robin 600E Wash	MSR Gold 575/2 MiniFastFit
Siluj	SCANNER VIVA 575	MSR Gold 575/2 MiniFastFit
Philips VariLite	VL400 / VL440	MSR Gold 400 MiniFastFit
Elation	300 Spot / 300 Wash	MSR Gold 300/2 MiniFastFit
Jolly Hongcai	MH-300 BEAM / MH-300 SPOT	MSR Gold 300/2 MiniFastFit
PROEL	Arrow Compact 300 Beam / Arrow Compact 300 Spot	MSR Gold 300/2 MiniFastFit
Siluj	Triton Blue V300 Beam	MSR Gold 300/2 MiniFastFit
Spotlight	MIDI PR CST CRM	MSR Gold 300/2 MiniFastFit
Acme	Xperior 300A Beam / Xperior 300SZ Spot	MSD Gold 300/2 MiniFastFit
Chauvet	LEGEND 300E Beam / LEGEND 300E Spot	MSD Gold 300/2 MiniFastFit
Clay Paky	ALPHA BEAM 300 / ALPHA SPOT 300 / ALPHA SPOT HPE 300 / ALPHA WASH 300	MSD Gold 300/2 MiniFastFit
Coemar	Infinity ACL S / Infinity Spot S / Infinity Wash S / TECHNOBEAM II	MSD Gold 300/2 MiniFastFit
D.T.S.	TECHNOBEAM II / XR300 BEAM	MSD Gold 300/2 MiniFastFit
Elation	DESIGN Beam 300 / DESIGN Spot 300 E / DESIGN Spot 300 Pro / DESIGN Wash 300E	MSD Gold 300/2 MiniFastFit
Futurelight	PHB-300E / PHS-300E / PHW-300E	MSD Gold 300/2 MiniFastFit
Golden Sea	Terbly V300B-E / Terbly V300S-E / Terbly V300SP-E / Terbly V300W-E	MSD Gold 300/2 MiniFastFit
iSolution	XP-300beam / XP-300SZ	MSD Gold 300/2 MiniFastFit
PR Lighting	XL beam 300 / XS 300	MSD Gold 300/2 MiniFastFit
Robe	Robin 300 Beam Classic / Robin 300 Spot Classic / Robin 300 Wash Classic / Robin 300E Beam / Robin 300E Spot / Robin 300E Wash	MSD Gold 300/2 MiniFastFit
SGM Elettronica	Idea 300 Beam / Idea 300 Spot	MSD Gold 300/2 MiniFastFit

## Fundamentals of Light and color

### Radiation

Radiation is emission or transfer of energy in the form of electromagnetic waves.

These electromagnetic waves travel through a vacuum with a velocity close to 300 000 km/s. Interactions between matter and radiation are explained with the quantum theory of radiation.

It states that energy is emitted and absorbed in discrete quanta (photons). Examples of these interactions are photoelectric, chemical, and biological effects of radiation.

#### *Optical Radiation (UV Light IR)*

Light may be defined as any radiation capable of causing a visual sensation directly.

Light waves occupy only a very small part of the spectrum of electromagnetic waves. The limits of visible radiation are not well defined and vary according to the individual – the lower limit is generally taken as being 380 nm and the upper limit 780 nm (1 nanometre (nm) =  $10^{-9}$  m).

The visible spectrum can be divided into a number of approximate wavelength ranges, each of which makes a certain color impression on the human eye:

380	-	435 nm	violet
435	-	500 nm	blue
500	-	566 nm	green
565	-	600 nm	yellow
600	-	630 nm	orange
630	-	780 nm	red

#### *Ultraviolet and Infrared Radiation*

Electromagnetic radiation with wavelengths just beyond the violet and red ends of the visible spectrum are known as ultraviolet and infrared radiation respectively.

#### *Ultraviolet radiation*

A study of the effects obtained with ultraviolet radiation of different wavelengths has led to the following classification by the CIE into three wavebands:

UV-A	(long-wave)	315-400 nm
UV-B	(medium-wave)	280-315 nm
UV-C	(short-wave)	100-280 nm

This classification is based upon a small number of well-investigated processes - principally the effects on the human skin - and by no means implies that all practical applications of UV are confined to a distinct waveband. Some processes respond to a wide ultraviolet spectrum and others overlap into the visible spectrum as well.

#### *Infrared radiation*

As with ultraviolet radiation, infrared radiation occupies three wavebands:

IR-A	(short-wave)	800 - 1400 nm
IR-B	(medium-wave)	1400 - 3000 nm
IR-C	(long-wave)	3000 - 10000 nm

### Vision

The eye has a lens, which focuses an image on a light-sensitive surface, the retina.

The retina consists of a delicate layer of nerve tissue in which there are two types of nerve fibre endings in the form of light-sensitive cells, called cones and rods. The concentration of cones and rods varies over the retinal area. On the optical axis the centre of the retina (the fovea) only contains cones. Outside the fovea area, the rods and cones are mixed, the proportion of cones decreasing towards the periphery of the retina.

*Central vision*

The cones in the fovea produce a very sharp image showing the greatest detail of which the eye is capable.

*Peripheral vision*

The periphery of the retina, which is composed chiefly of rods, does not produce sharp vision, and objects seen by this area appear as fuzzy silhouettes. The periphery is, however, highly sensitive to movement and flicker.

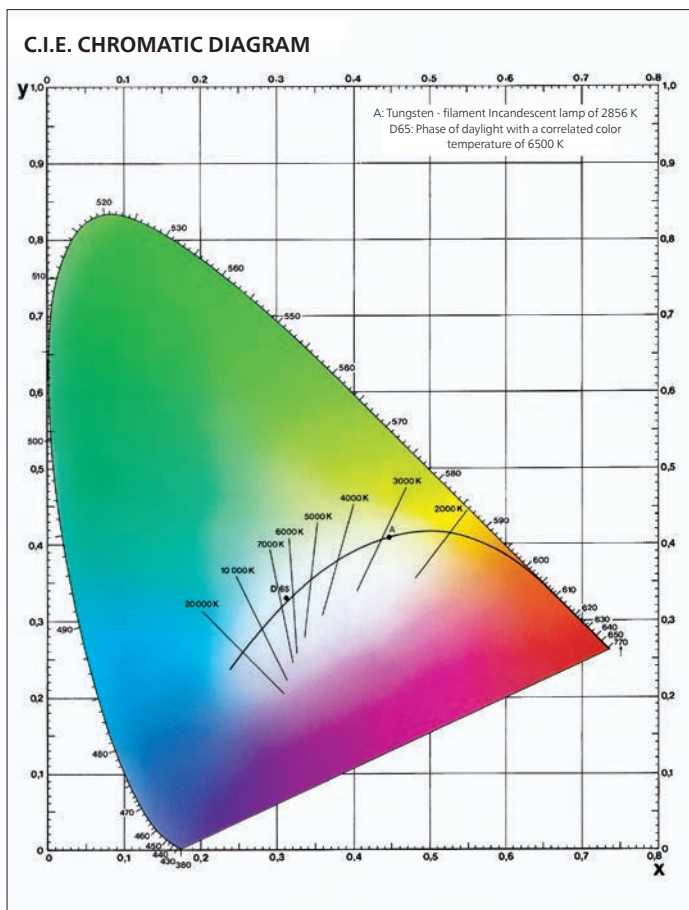
*Adaptation*

Adaptation, the process whereby the eye is able to function over a wide range of illuminance levels, involves (amongst other things) a change in the pupillary opening along with photochemical changes in the retina.

**Color Vision**

The cones enable us to distinguish color. This is possible because there are in fact three types of cones, with pigments sensitive to the red, green and blue parts of the spectrum, respectively.

The brain interprets the relative stimulation of the three color receptors as the color impression. Persons who miss one type of cone are partially color blind.



**Spectral Sensitivity of the Eye**

Within the visible range of the electromagnetic spectrum the eye sensitivity varies strongly with different wavelengths of the same energy content.

For example, under conditions of photopic vision the eye is about twenty times more sensitive to light with a wavelength of 555 nm (yellow-green) than it is to wavelengths of 700 nm (deep red) or 450 nm (violet-blue). The peak sensitivity for scotopic vision lies about 50 nm nearer to the blue end of the spectrum than the maximum sensitivity for photopic vision.

As early as 1924, the Commission Internationale de L'Eclairage (CIE) laid down a standard spectral eye sensitivity curve for photopic vision, The curves give the relative photopic eye sensitivity (V) as a function of the wavelength (l), and are therefore generally called V(l) curve having its maximum at 555 nm.

**Black body radiator**

The black body, or full radiator, is a body that absorbs all radiation falling upon it, transmitting none and reflecting none. The radiation characteristics of such bodies are accurately known and can be very precisely calculated at all wavelengths and temperatures.

The spectral energy distribution of a black body is, according to Planck's law, a function of wavelength and absolute temperature. Not only does the radiant energy increase rapidly with operating temperature, but the wavelength at which the maximum occurs becomes shorter. Radiation of this form is called thermal radiation, or black-body radiation. And because all wavelengths are present in the spectrum of a thermal radiator, such a spectrum is called a continuous spectrum. The black-body radiator is often used as a primary reference standard when describing the light from practical light sources.

**Systems of color Specification**

**CIE System**

*The chromaticity diagram*

The chromaticity diagram, or color triangle, adopted by the CIE in 1931 permits the mathematically exact specification of any color of light in terms of two chromaticity co-ordinates, x and y. These co-ordinates are calculated from a knowledge of the lamp's spectral energy distribution and the response of a CIE standard colorimetric observer related to the three types of light sensitive cones in the human eye. The most saturated light color are found along the sides of the triangle, these gradually diluting into 'white light' toward the centre.

In this diagram the boundaries are formed by the spectral locus which is composed of the color points of monochromatic radiation ranging from blue in the left corner towards green in the top and finally red in the bottom right corner.

### Color Temperature

Color temperature is a term used to describe the color of a light source by comparing it with the color of a black body radiator, or full radiator. The temperature of the black body, in Kelvin, at which a color match is obtained, is said to be the color temperature of the source.

The curve formed on the CIE chromaticity diagram by plotting the chromaticities of a black body radiator at various temperatures, is known as the Planckian locus. Any source that has a chromaticity on this locus may be specified by a color temperature. A source not on the Planckian focus can be described by means of its correlated color temperature, that is, the temperature of the black body at which its color resembles most closely that of the source; provided, that is, that it is not too far from the Planckian focus.

### Color Rendering

#### The CIE General Color Rendering Index $R_a$

In order to be able to compare the color characteristics of various types of light source, the concept of a color rendering index, based on the appearance of a number of test color under different illuminants, was introduced by the CIE.

The average of the chromaticity shifts occurring when the test color are alternately illuminated, first by the lamp under test and then by a reference source of the same color temperature, provides a good measure of the color rendering properties of the test source.

The reference light source used for sources with a correlated color temperature of 5000 K and below is a full (or black-body) radiator of the nearest color temperature. Above 5000 K, the reference source used provides simulated or 'reconstituted' daylight of the appropriate color temperature. In the CIE test color method recommended for international use in 1965, eight Munsell test color of medium saturation were used for measuring and specifying these color rendering properties. Nowadays, fourteen test color are often employed, saturated red, yellow, green and blue, and color approximating the human skin and green foliage having been added.

The general color rendering index, or  $R_a$ , of a source has a maximum value of 100, which occurs when the spectral distributions of the test source and the reference source are identical.

Incandescent lamps have a spectral energy distribution almost identical to that of the standard source, and therefore give excellent color rendering.

The efficacy of these lamps, however, is rather low.

In discharge lamps which have a much higher efficacy a large variety in spectral composition hence color rendition is found, ranging from light sources like Fluorescent super 80 and 90 lamps and CDM metal Halide lamps with good or excellent color rendition while still having a high efficacy on one hand and ultra high efficacy lamps like SOX with a very moderate color rendition.

#### Limitations of the $R_a$ System

Two serious limitations of the  $R_a$  system should be mentioned.

In the first place, it should be remembered that the  $R_a$  of a lamp is an average value based on the examination of only eight test color. Secondly, a low value for a particular color can mean either that the color will be poorly (weakly) - rendered, or that it will be exaggerated, perhaps even with a flattering effect as will be explained in the new CRV system. Thus, a source may be found to have a seemingly acceptable  $R_a$  value, despite the fact that it is incapable of faithfully reproducing a particular test color.

### The New CRV system: precise definition of color quality

#### The right light

Color rendering is an important aspect of artificial lighting. In some situations color should be represented as naturally as possible under daylight conditions yet in other cases lighting should highlight individual color or create a specific atmosphere. However, there are various lighting situations where it is not so much a precise natural color rendering that matters most but where light level and efficiency are of greater importance.

Whether your requirement is for medium quality color rendering, natural color rendering or highlighting of special color, there is the right kind of lamp for each and every application.

In the past, finding the right quality color rendering and tailoring it to your precise requirement was a complex task. It called for special skills acquired through long – and often costly – experience.

Now, however, the new CRV diagram (Color Rendering Vector) means you can get the results you need – without first going through a costly learning curve!

The Color Rendering Vectors (CRV) system provides a completely new and more sophisticated way of defining color quality, making it a valuable tool for lighting professionals involved in the specification of light sources and the design of lighting installations.

### Up to 215 measuring points

Instead of being limited to just the eight color of the Color Rendering Index (CRI) method, CRV uses a much larger number of color as fixed measured points. In fact, 215 color points have been selected from a multitude of practical situations, and include color which are widely used in textiles, paints and many other products, as well as those which are most commonly found in nature. The color rendering ability of the light source under investigation is tested at each point of these 215 color points, and compared with that of a reference light source.

### Separate analysis of deviations

Another important improvement is that the color deviations are analysed separately for each of the 215 color points. There is no averaging, so the rendering of each individual color is assessed and registered separately.

### The CRV diagram

These deviations are represented by a CRV diagram, a circle showing all the color of the spectrum around its circumference, and containing two axes serving as references to show the deviation in the rendering of each color. The deviations are indicated by a vector pointing from the natural color (viewed, under a reference or full-spectrum light source) to the perceived color (viewed under the test light).

### Three aspects of color quality

Each one of the up to 215 vectors is an arrow which shows three aspects of color quality:

- The direction of the vector shows the direction of the color deviation. A shift towards the circumference of the circle indicates an increase in color saturation (more intense), while a shift towards the centre means a decrease in saturation (less intense).
- The start and end points of the vector show the true color (under the reference light source) and the perceived color (under the test light source), respectively.
- The length of the vector shows the magnitude of the color deviation.

### Two main parameters

Thanks to its accurate representation of color quality for up to 215 measuring points the CRV method gives a very precise impression of the color rendering characteristics of a light source. In describing color quality, two parameters are particularly important:

**Hue:** the direction and magnitude of the shift in color.

**Chroma:** the direction and magnitude of the shift in saturation.

A third parameter, the color value or 'lightness', refers to the amount of light reflected from a coloured surface, and can vary for color of the same hue and chroma. In practice, color shifts are almost always a combination of shifts in hue and chroma, and the lightness will not be considered further here.

### Selection of lighting on color quality

Key factors in the selection of lighting for specific application include the type of activity carried out in the area, the general environment, the desired ambience and the products being sold. Three basic levels color quality can be defined: high, good and average.

### High color quality

An incandescent lamp, with its low efficacy of 12 lumen per watt, possesses a well balanced color spectrum. Application of the CRV method therefore shows no deviation at all. The discharge lamps with the best color rendering properties are the fluorescent 'TL' lamps of the /90 series. The diagram for these lamps (see next column) indicates hardly any deviation, thereby demonstrating the excellent color rendering characteristics of this light source. In the home, up-market shops, showrooms and museums, high color quality is essential to ensure that people, products and displayed objects have a natural color appearance.

### Good color quality

Fluorescent 'TL' lamps of the /80 series have good color rendering characteristics. The diagram shows only a limited color shift. These fluorescent lamps are therefore very widely used in many applications where good color rendering is important.

In offices, department stores and light industrial premises, good color quality is a major consideration. In these cases it is not acceptable for color to deviate substantially from their natural appearance.

### Average color quality

Fluorescent lamps of color /33 cause appreciable deviations in color rendering, as the CRV diagram shows. As a result, lamps of this color quality are suitable only for use in situations where color rendering is of little importance. In railway stations and car parks, efficiency takes priority over color rendering. Here, the light source will not be selected primarily for its color quality. However, when people are working in these areas, at least average color quality is recommended.

### Philips, recycling and the environment

We are not just concerned about great product innovation. A great deal of effort has gone into making our products environmentally friendly. The company is committed to the Environmental Management System (ISO 14001) in its European factories – this is annually audited – and has implemented eco-design programmes to make sure that, in the product creation process, environmental issues are dealt with correctly.

For customers, the Philips standard of quality is a clear indication that the products meet or surpass the declared specifications. What is more, the products are delivered as agreed upon and the service meets the customer's expectations.

During the past years we have successfully reduced environmentally unfriendly substances in our lamps. For example Philips took the lead in the reduction of mercury in our TL-D Super 80 Fluorescent lamps and elimination of mercury in SON PIA lamps.

However, Philips has also started to investigate how we can intelligently recycle our products. The first generation of recycling (also called downward recycling) focused on reusing lamp components in whatever application possible (e.g. through reuse in building materials).

Most manufacturers doing so reached 100 % recycling, which although it seemed promising at first, was still based upon the use of highly valuable natural resources (e.g. fluorescent powders) in less valuable applications (e.g. road construction materials).

The second generation of recycling focused upon the re-use of those resources in the same applications as where they were initially used. This 'upward recycling' ensures we (re) use our natural resources to their fullest potential.

However, the most valuable resource consumed by light sources, is however the energy in the form of electricity it consumes. Therefore, the most energy efficient light sources are also the most environmental friendly. Philips has therefore focused its second generation recycling efforts on its Master products. Combining the most efficient use of energy

and the highest possible percentage of reuse, we call this SMART ECOLOGIES. To help our customers, to identify these products easily, we have given these special ranges of Master products an easily recognisable Green Cap. A symbol of the highest quality, combined with the best environmental friendly alternative.

### Philips Quality Standards

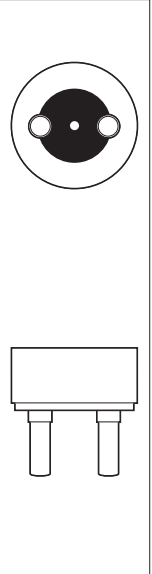
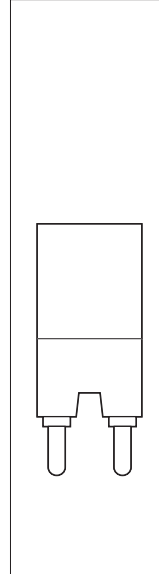
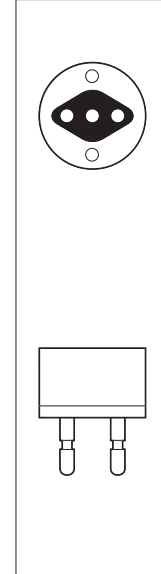
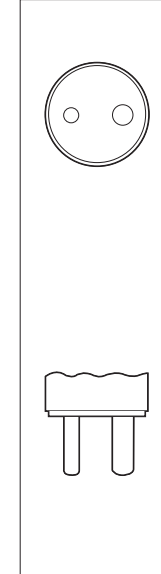
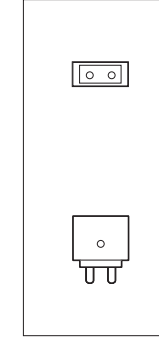
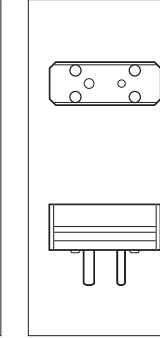
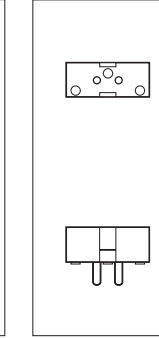
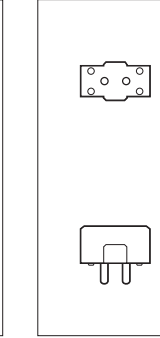
In striving for optimum quality levels, the internationally recognised ISO 9001 system for quality assurance, and the newer QS 9000 standard, have been implemented and rigidly enforced in Philips factories. Almost all phases of development and production are involved in a process of continual improvement within the framework of Total Quality Management (TQM) and achieving so-called 'world class' levels of quality.

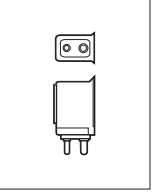
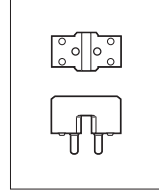
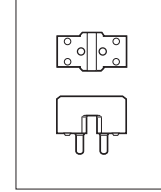
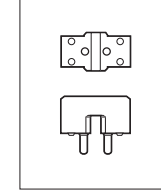
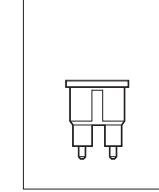
But quality is not just a piece of paper or a set of good intentions. It is about making products with zero defects and good lifetime reliability for ease of mind. It is about supplying our customers with their goods at the right time, and it is about developing the best lighting products in the world and communicating the benefits in the most effective way. It is about handling questions and queries in the most helpful and speedy manner. In short it is about making us easy and rewarding to do business with. And with our company wide quality improvement program BEST (Business Excellence through Speed and Teamwork) we are confident we will also in this new millennium be capable of continuously 'Making things better'.

### International standards and approvals for control gear

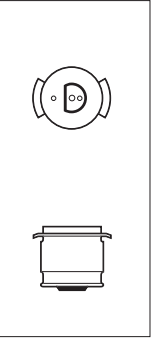
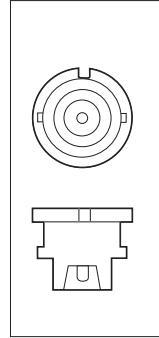
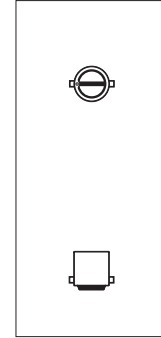
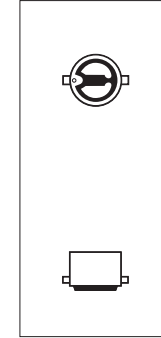
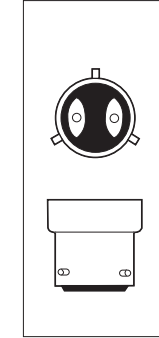
In this publication the specification of Philips control gear satisfies the standards for safety, performance and reliability quoted in the numerous IEC publications for ballasts (electronic and electromagnetic), ignition devices, etc. As for Electro-Magnetic Interference, Philips products conform to the relevant European and/or IEC regulations. On many occasions, formal approval will amount to supervised manufacturing test procedures or testing at the manufacturer's premises (SMT), meaning that these tests are then performed by Philips own engineers, under official supervision. As soon as approval is given, these may be shown on the product labelling (e.g. ENEC).

**Bipost/Bipin**

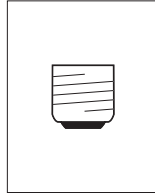
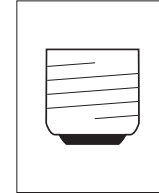
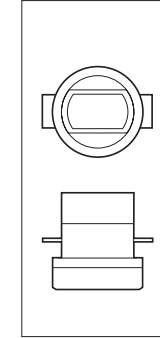
							
G38 IEC: 7004-76 ANSI: Mogul bipost	GY38	G22 IEC: 7004-70-1 ANSI: Medium bipost	GY22	G9.5 IEC: 7004-70-1 ANSI: Medium 2-pin	GY16 IEC: 7004-74	GX9.5 DIN: 49638 IEC: 7004-70A	GY9.5/GZ9.5 IEC: 7004-70B-2 ANSI: Two-pin ceramic

				
GX7.9	GZX9.5 IEC: 7004-70B ANSI: Two-pin ceramic	GZY9.5 IEC: 7004-70B ANSI: Two-pin ceramic	GZZ9.5 IEC: 7004-70B ANSI: Two-pin ceramic	Not standardised

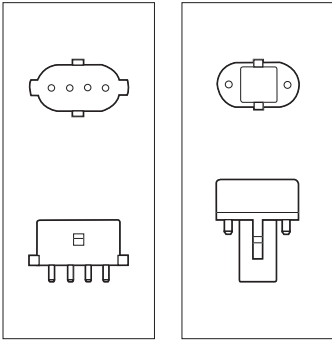
**Prefocus/Bayonet**

				
P28s DIN: 49728 IEC: 7004-42 ANSI: Medium prefocus base C 81-30-1976 sheet 1-5-1	P32d	BA15d DIN:49720 IEC: 7004-11A ANSI: Candelabra bayonet base double contact C 81-30-1976 sheet 1-3-1	B22d/22 IEC: 7004-10	B22d3

**FastFit**

		
E27 DIN: 49620 IEC: 7004-21 Edison screw	E40 DIN: 49625 IEC: 7004-24 ANSI: Mogul screw base C 81-10-1976 sheet 1-17-1	PGJX50

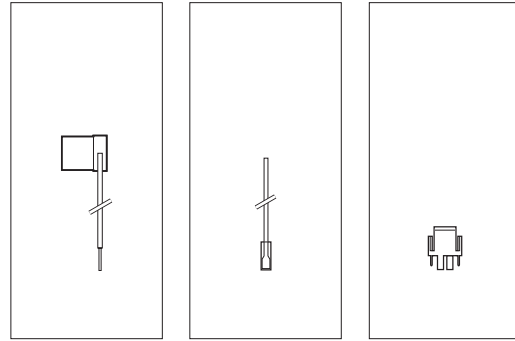
For fluorescent lamps



G27

G23

Cable/Connector

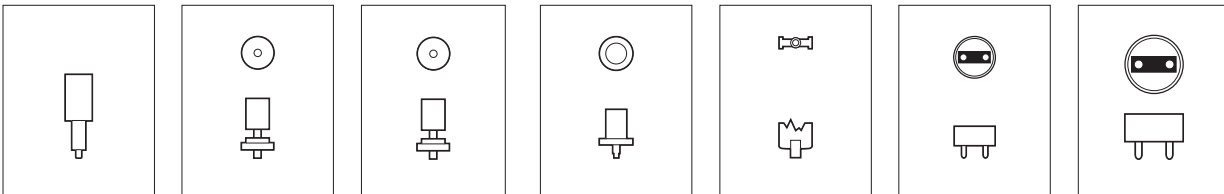


Cap 15.8/14.7  
cable

Cable

AMP connector

For double-ended lamps



SFa21-12  
DIN: 49759

SFc10-4  
DIN: 49759

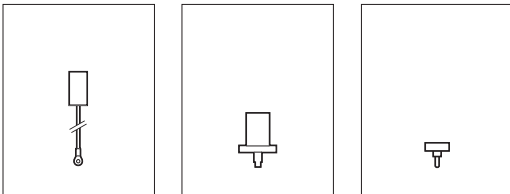
SFc11  
DIN: 49759

SFc15.6-6  
DIN: 49759

R7s, DIN:49750  
IEC: 7004-92  
ANSI: Recessed  
single contact  
base

G5

G13

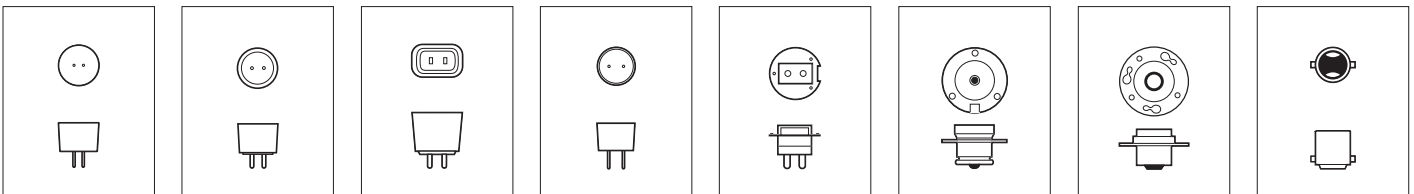


SFa7-5-2  
S30x70

SFc18-5-6  
(P) SFc

Fa4  
IEC: 7004-58-1

For low-voltage lamps



GZ4

GX5.3  
(Round pin)

GY5.3

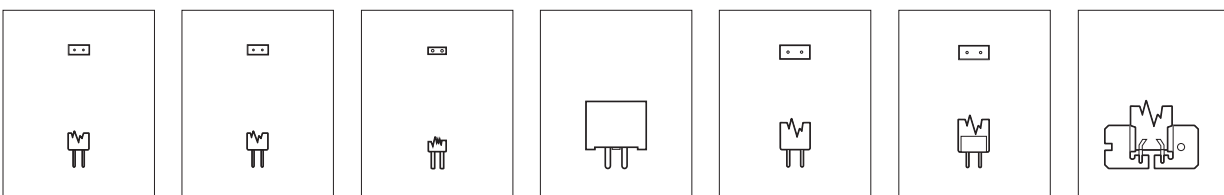
GZ6.35  
DIN: 49754  
IEC: 7004-59A

PG22-6.35  
DIN: 49751  
IEC: 7004-48

PX28s

P30s  
IEC: 7004-44

BA15s,  
DIN: 49720  
IEC: 7004-11A



G3.9

G4  
IEC: 7004-72

GU4  
IEC: 7004-72

G5.3  
IEC: 7004-73-2  
ANSI: Miniature  
2-pin

G6.35, GY6.35  
GX6.35,  
IEC: 7004-59  
ANSI: C 8140-  
1972

B15d  
DIN: 49721  
IEC: 7004-11a

A26/14

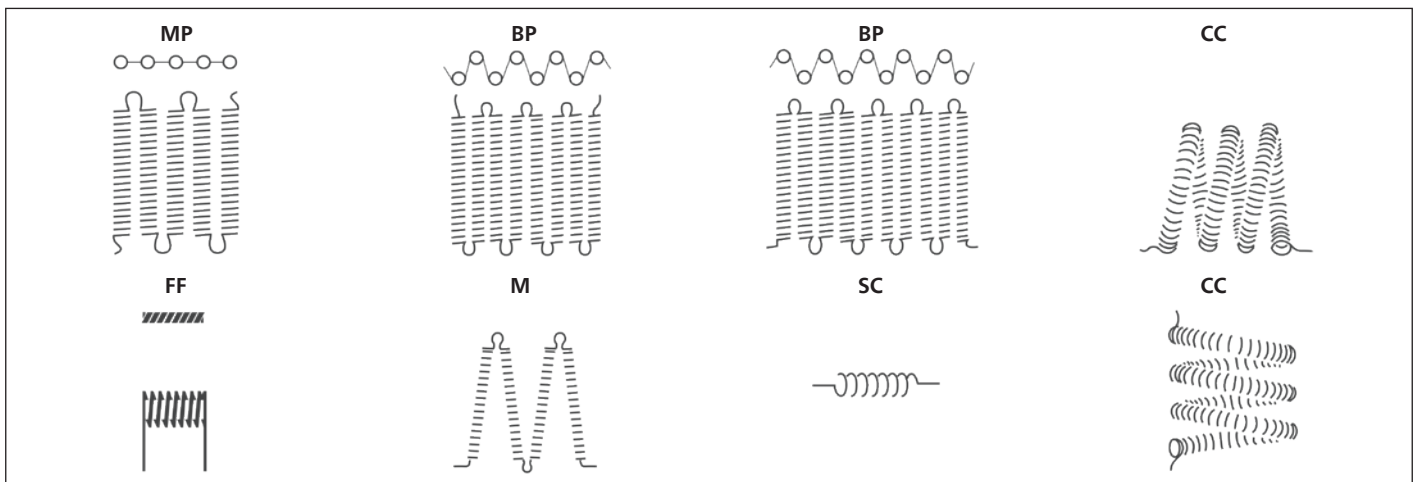
ANSI: Single  
contact  
candelabra  
bayonet base,  
C81-30-1976,  
sheet 1-3-1



**Lamp bases and their names**

Bi-pin cap	G38	Prefocus cap	P28s	Recessed single contact cap and end of lamp	R7s	Prefocus cap	PX28s
	GY38	Bayonet/Prefocus cap	GY38		G5	Prefocus cap	P30s
Bi-pin cap and base	G22	Bayonet cap	P23d	Bi-pin cap	G13	Bayonet cap	BA15s
Bi-pin cap	GY22	Bayonet cap	BA15d	Bi-pin cap	SFA1-5-6	Bi-pin lamp base	G3.9
Bi-pin cap	G9.5	Bayonet cap	B22d3		SFc18-5-6	Bi-pin lamp base	G4
Bi-pin cap	GY16	Screw cap	E27	Single-pin cap and end of tubular lamp	Fa4	Bi-pin cap	GU4
Bi-pin cap	GX9.5	Screw cap	E40	Bi-pin lamp base	GZ4	Bi-pin lamp base for use	G5.3
Bi-pin cap on finished lamp	GY9.5	Cap	2G7	Bi-pin base	GX5.3		G6.35
Bi-pin cap on finished lamp	GZ9.6	Bi-pin cap	G23	Bi-pin base	GY5.3	Bayonet cap	B15d
	GX7.9		Cap 15.8/14.7 cable	Bi-pin lamp base	GZ6.35		A26/14
	GZX9.5		Cable	Bi-pin lamp base	PG22	FastFit cap	GZY
	GZY9.5		AMP connector	Prefocus cap			PGJX50
	GZZ9.5		SFa21-12				
	Special		SFc10-4				
			SFc15.6-6				

**Filament shapes**



- FF = Flat filament
- CC = Coiled coil
- M = M shape
- MP = Monoplane
- BP = Biplane
- SC = Single coil

**Fusing**

All mains voltage filament lamps (halogen and non-halogen) must be fused to reduce the risk of shattering at end-of-life. The table gives the appropriate value.

Wattage W	Voltage V	Fuse A	Wattage W	Voltage V	Fuse A
500	55	16	1200	100-130	16
300	100-130	4	1200	220-250	10
300	220-250	2	2000	100-130	25
500	100-130	6.3	2000	220-250-	10
500	220-250	4	2500	100	35
650	100	10	2500	115-130	25
650	115-130	6.3	2500	220-250	16
650	220-250	4	3250	220-230	16
750/800	115-130	10	3250	240-250	16
750/800	220-230	6.3	5000	115-130	50
900	220-230	6.3	5000	220-250	25
1000	100	16			
1000	115-130	10			
1000	220-250	6.3			

**Lamp Life**

Indication of lamp life can be a confusing matter. The lamps in this catalogue (unless indicated differently) have a lamp life indicated by "Average life" or "Life 50%". This means at least 50% of the population is still working at the indicated number of hours.

In other words:

- average lamp life 1000 hours
  - batch size 100 pieces
- then:
- at reaching 1000 hours
  - at least 50 pieces are still working.

Realise that certain types in special applications have degraded so much that although they still burn they are unfit to fulfill their given task!

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Philips type number	page	Philips type number	page
CDM-SA/T 150W/942	44	MSR Gold™ 1500/1 FastFit	14, 34
MSA 2500 DE	41	MSR Gold™ 1500/2 FastFit	15, 35
MSD 575	42	MSR Gold™ 2000 FastFit	15
MSD 575 HR	42	MSR Gold™ 2000/1 FastFit	15
MSD 700	42	MSR Gold™ 2000/2 FastFit	15
MSD 1200	42	MSR Gold™ 2500/2 FastFit	15
MSD Gold™ 300/2 MiniFastFit	28	MSR Platinum 35	12
MSD Platinum 2 R	24	MSR Platinum 35 ST (Theater)	32
MSD Platinum 5 R	8, 24	MSR Platinum 35 ST (Studio)	39
MSD Platinum 11 R	8		
MSD Platinum 14 R	8		
MSD Platinum 15 R	8		
MSD Platinum 16 R	8		
MSD Platinum 17 RA	8		
MSD Platinum 20 R(B)	8		
MSD Platinum 21 R	8		
MSD Platinum 25 R	8		
MSD Platinum 200 Flex	10		
MSD Platinum 400L Flex	10		
MSD Platinum 400S Flex	10		
MSR 400	18		
MSR 575/2 10H	18		
MSR 700	19		
MSR 700 SA	21		
MSR 700/2	19		
MSR 1200	19		
MSR 1200 SA	21		
MSR 1200/2	19		
MSR 2000 SA	21		
MSR Gold™ 300/2 MiniFastFit	26		
MSR Gold™ 400 MiniFastFit	14		
MSR Gold™ 575/2 MiniFastFit	17		
MSR Gold™ 700 FastFit	15		
MSR Gold™ 700 MiniFastFit	17		
MSR Gold™ 700/1 MiniFastFit	17		
MSR Gold™ 700/2 FastFit	15		
MSR Gold™ 700/2 MiniFastFit	17		
MSR Gold™ 1000 MiniFastFit	17, 33		
MSR Gold™ 1200 FastFit	14, 34		
MSR Gold™ 1500 FastFit	14		



