



VIALOX NAV

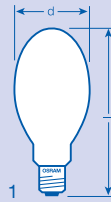
High-pressure sodium lamps
Technical Information

SEE THE WORLD IN A NEW LIGHT

OSRAM



VIALOX® NAV® (SON) 4Y®



**4 YEARS
LONGLIFE**

Type		NAV-E 4Y				
		Elliptical, coated				
		50 W	70 W	150 W	250 W	400 W
Lamp wattage	W	50	70	150	250	400
System wattage ¹⁾	W	62	83	170	275	440
Lamp voltage	V	85	90	100	100	105
Starting voltage min./max.	kV _s	1.8/2.3	1.8/2.3	3/4.5	3/4.5	3/4.5
Lamp current	A	0.77	0.98	1.8	3.0	4.45
Mains current comp. ²⁾	A	0.5	0.6	1.0	1.5	2.5
Luminous flux	lm	3500	5600	14000	25000	47000
Lamp luminous efficacy	lm/W	70	80	93	100	118
Average luminance	cd/cm ²	6	9	13	23	25
Colour rendering index		≤25	≤25	≤25	≤25	≤25
Light colour ³⁾		ww	ww	ww	ww	ww
Colour temperature	K	2000	2000	2000	2000	2000
Diameter d	mm	70	70	90	90	120
Length max. l	mm	156	156	226	226	290
Base		E27	E27	E40	E40	E40
Burning position		universal	universal	universal	universal	universal
Max. perm. outer bulb temp.	°C	310	310	310	400	400
Max. perm. base edge temp.	°C	210	210	210	250	250
Comp. cap. at 50 Hz ²⁾	µF	10	12	20	32	45
Circuits (see page 15)	Fig. no.	1	1	1	1	1
Average life ⁴⁾	h	28000	28000	32000	32000	32000
Failure rate at 16,000 h	%	8	8	5	5	5
Order reference		NAV-E 50 4Y	NAV-E 70 4Y	NAV-E 150 4Y	NAV-E 250 4Y	NAV-E 400 4Y
EAN 4050300 ...		577678	577692	577555	577579	577593
Standard pack	pcs	24	24	12	12	12
Figure	No.	1	1	1	1	1

Potential savings with NAV® 4Y®

• Longer relamping intervals

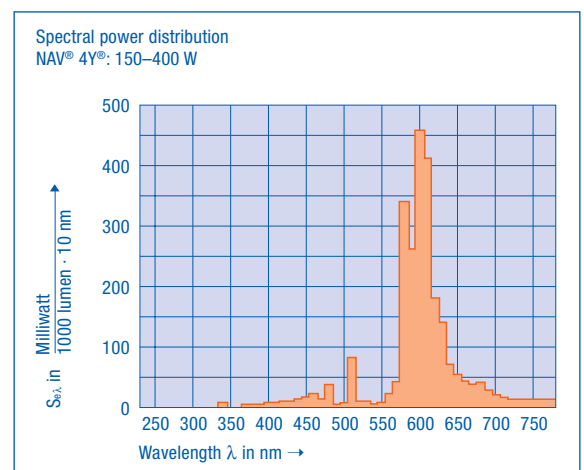
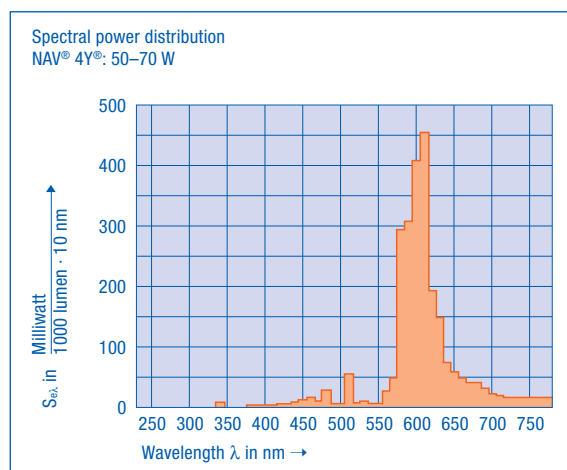
With NAV® 4Y® lamps, group replacement can be extended to four years. Extending the relamping interval to four years instead of the traditional three-year cycle for NAV® lamps alone produces savings of 25% in annual lamp replacement costs.

• Effective reduction in early failures

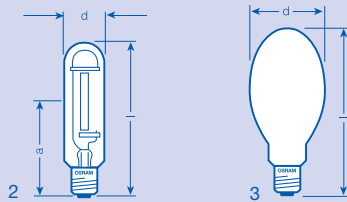
After 16,000 hours, 95% of NAV® 4Y® 150, 250 and 400 W lamps will still be operational, along with an impressive 92% of 50 and 70 W lamps. This brings considerable additional savings in replacement costs.

1) Lamp and control gear.
Depending on the control gear used
2) Values at rated voltage and $\cos \phi \geq 0.9$
3) ww = warm white
4) See explanation on page 13

NAV®-E 100 W and NAV®-T 100 W are available as NAV® SUPER 4Y lamps. See pages 8 and 9



VIALOX® NAV® (SON) 4Y®

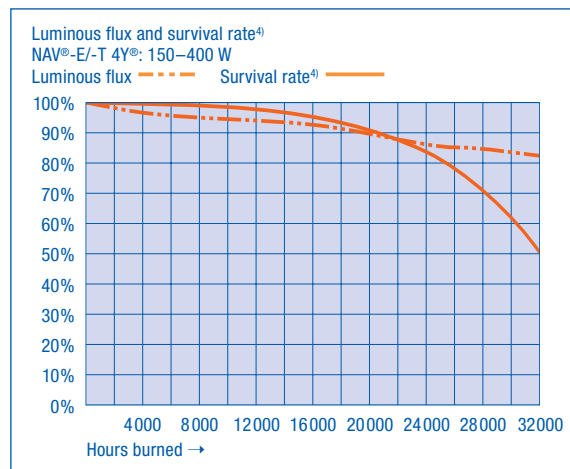
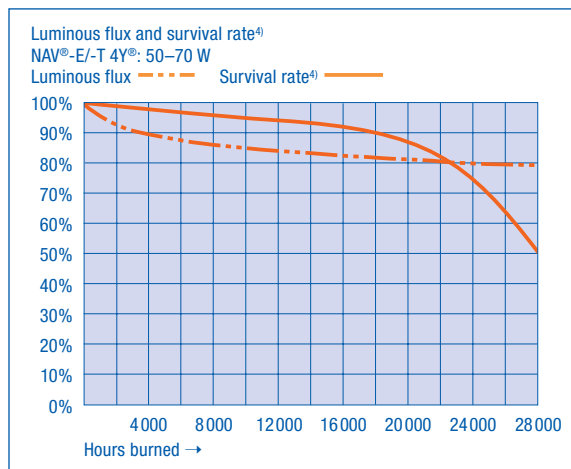


**4 YEARS
LONGLIFE**

Type	NAV-T 4Y Tubular, clear				NAV-E 4Y with integrated igniter		
		70 W	150 W	250 W	400 W	50 W/l ⁶⁾	70 W/l ⁶⁾
Lamp wattage	W	70	150	250	400	50	70
System wattage ¹⁾	W	83	170	275	440	62	83
Lamp voltage	V	90	100	100	105	85	90
Starting voltage min./max.	kVs	1.8/2.3	3/4.5	3/4.5	3/4.5	Starts at mains voltage ⁷⁾	Starts at mains voltage ⁷⁾
Lamp current	A	0.98	1.8	3.0	4.4	0.77	0.98
Mains current comp. ²⁾	A	0.6	1.0	1.5	2.5	0.5	0.6
Luminous flux	lm	5900	14500	27000	48000	3500	5600
Lamp luminous efficacy	lm/W	84	97	108	120	70	80
Average luminance	cd/cm ²	340	420	560	580	6	9
Colour rendering index		≤25	≤25	≤25	≤25	≤25	≤25
Light colour ³⁾	ww	ww	ww	ww	ww	ww	ww
Colour temperature	K	2000	2000	2000	2000	2000	2000
Light centre length ⁵⁾ a	mm	104	132	158	175	–	–
Diameter d	mm	37	46	46	46	70	70
Length max. l	mm	156	211	257	285	156	156
Base		E27	E40	E40	E40	E27	E27
Burning position		universal	universal	universal	universal	universal	universal
Max. perm. outer bulb temp.	°C	310	310	400	400	310	310
Max. perm. base edge temp.	°C	210	210	250	250	210	210
Comp. cap. at 50 Hz ²⁾	µF	12	20	32	45	10	12
Circuits (see page 15)	Fig. no.	1	1	1	1	3	3
Average life ⁴⁾	h	28000	32000	32000	32000	24000	24000
Failure rate at 16,000 h	%	8	5	5	5	12	12
Order reference		NAV-T 70 4Y	NAV-T 150 4Y	NAV-T 250 4Y	NAV-T 400 4Y	NAV-E 50/l 4Y	NAV-E 70/l 4Y
EAN 4050300 ...		579061	577616	577630	577654	606033	606019
Standard pack	pcs	12	12	12	12	24	24
Figure	No.	2	2	2	2	3	3

NAV® 4Y® lamps are setting new standards in reliability and economy:

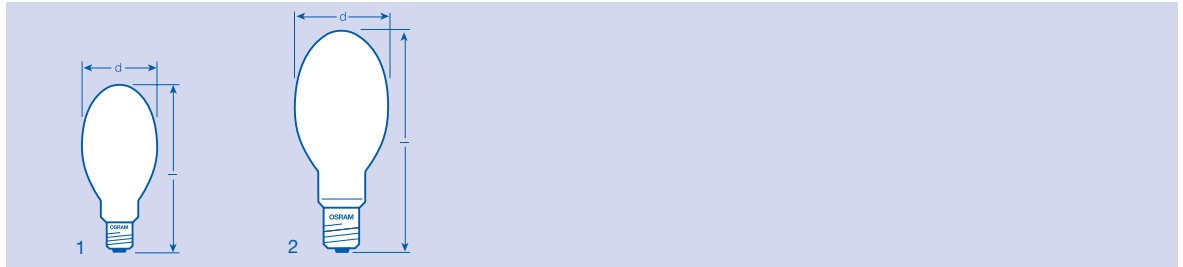
- Optimised support structure with patented shock absorber ensures the arc-tube is securely supported and reduces failures due to shock or violent vibrations.
- Improved high-performance ceramics reduce sodium diffusion.
- Laser welding guarantees precise positioning of the electrodes.



- 1) Lamp and control gear. Depending on the control gear used
- 2) Values at rated voltage and $\cos \phi \geq 0.9$
- 3) ww = warm white
- 4) See explanation on page 13
- 5) Light centre length = distance from base to centre of discharge tube
- 6) These lamps have been released only for operation with control gear designed for high-pressure sodium lamps – external igniters are not permitted
- 7) Minimum mains voltage required: 198 V

NAV®-E 100 W and NAV®-T 100 W are available as NAV® SUPER lamps. See pages 8 and 9

VIALOX® NAV® (SON)



	Type	NAV-E					
		Elliptical					
		50 W/E	70 W/E	150 W ⁵⁾	250 W ⁵⁾	400 W ⁵⁾	1000 W
Lamp wattage	W	50	70	150	250	400	1000
System wattage ¹⁾	W	62	83	170	275	440	1075
Lamp voltage	V	85	90	100	100	105	115
Starting voltage min./max.	kV _s	1.8/2.3	1.8/2.3	3/4.5	3/4.5	3/4.5	3.5/5
Lamp current	A	0.77	0.98	1.8	3.0	4.45	10.3
Mains current comp. ²⁾	A	0.5	0.6	1.0	1.5	2.5	6.0
Luminous flux	lm	3500	5600	14000	25000	47000	120000
Lamp luminous efficacy	lm/W	70	80	93	100	118	128
Average luminance	cd/cm ²	6	9	14	24	27	38
Colour rendering index		≤25	≤25	≤25	≤25	≤25	≤25
Light colour ³⁾	ww	ww	ww	ww	ww	ww	ww
Colour temperature	K	2000	2000	2000	2000	2000	2000
Diameter d	mm	70	70	90	90	120	165
Length max. l	mm	156	156	226	226	290	370
Base		E27	E27	E40	E40	E40	E40
Burning position		universal	universal	universal	universal	universal	universal
Max. perm. outer bulb temp.	°C	310	310	310	400	400	400
Max. perm. base edge temp.	°C	210	210	210	250	250	250
Comp. cap. at 50 Hz ²⁾	µF	10	12	20	32	45	100
Circuits (see page 15)	Fig. no.	1	1	1	1	1	1
Average life ⁴⁾	h	18000	18000	24000	24000	24000	20000
Order reference		NAV-E 50/E	NAV-E 70/E	NAV-E 150	NAV-E 250	NAV-E 400	NAV-E 1000
EAN 4050300 ...		015750	015767	015613	015620	015637	015644
Standard pack	pcs	24	24	12	12	12	6
Figure	No.	1	1	2	2	2	2

VIALOX® NAV®

The all-round range from 50 W to 1000 W

- Luminous efficacy of up to 130 lm/W.
- Colour rendering index (CRI) ≤25.
- Applications: Outdoor systems for street lighting, industrial premises and floodlighting.
Indoor systems for heavy industry (for new installations we recommend NAV® SUPER 4Y).

1) Lamp and control gear.
Depending on the control gear used

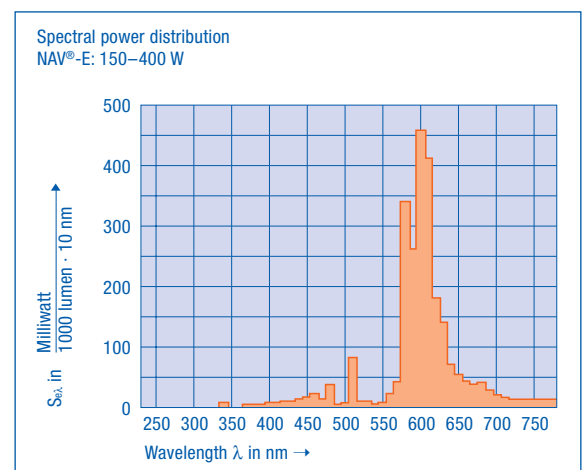
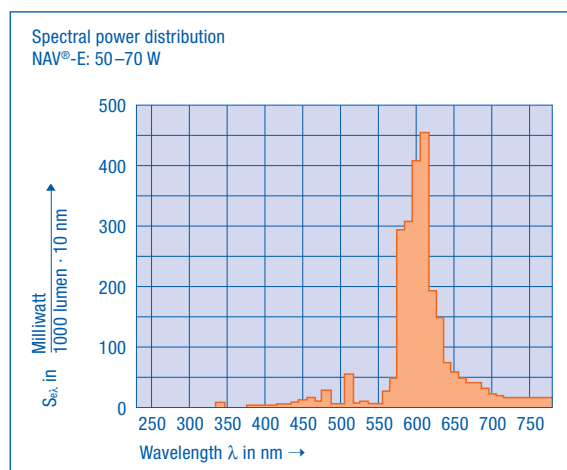
2) Values at rated voltage and $\cos \phi \geq 0.9$

3) ww = warm white

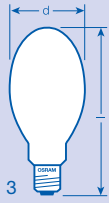
4) See explanation on page 13

5) NAV®-E 150 W, 250 W, 400 W and NAV®-T 150 W, 250 W, 400 W are also available with built-in igniters.

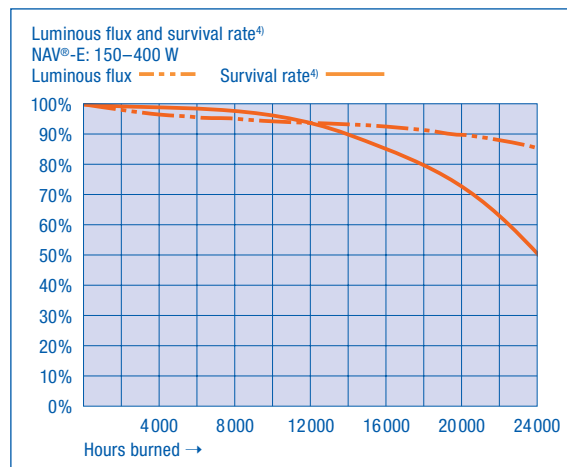
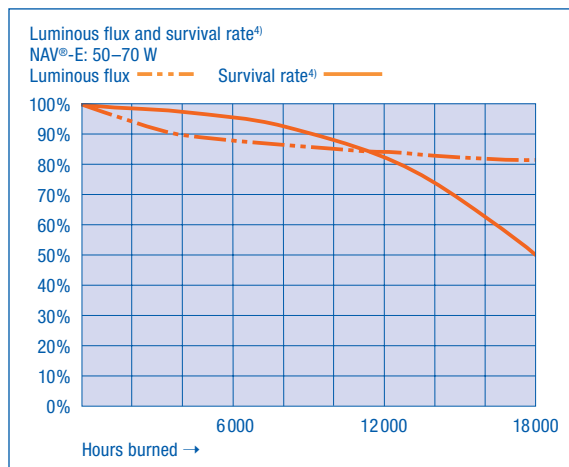
Details on request



VIALOX® NAV® (SON)

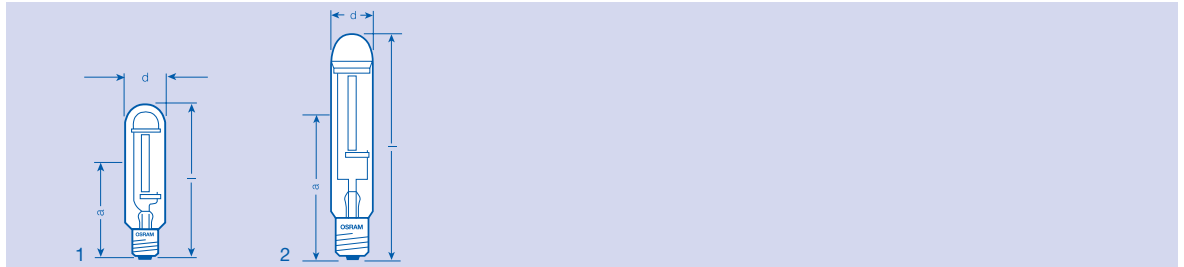


Type	NAV-E with integrated igniter		
		50 W/l ⁵⁾	70 W/l ⁵⁾
Lamp wattage	W	50	70
System wattage ¹⁾	W	62	83
Lamp voltage	V	85	90
Starting voltage min./max.	kVs	Starts at mains voltage	Starts at mains voltage
Lamp current	A	0.77	0.98
Mains current comp. ²⁾	A	0.5	0.6
Luminous flux	lm	3500	5600
Lamp luminous efficacy	lm/W	70	80
Average luminance	cd/cm ²	6	9
Colour rendering index		≤25	≤25
Light colour ³⁾		ww	ww
Colour temperature	K	2000	2000
Diameter d	mm	70	70
Length max. l	mm	156	156
Base		E27	E27
Burning position		universal	universal
Max. perm. outer bulb temp.	°C	310	310
Max. perm. base edge temp.	°C	210	210
Comp. cap. at 50 Hz ²⁾	µF	10	12
Circuits (see page 15)	Fig. no.	3	3
Average life ⁴⁾	h	16000	16000
Order reference		NAV-E 50/l	NAV-E 70/l
EAN 4050300 ...		015583	015590
Standard pack	pcs	24	24
Figure	No.	3	3



- 1) Lamp and control gear. Depending on the control gear used
- 2) Values at rated voltage and $\cos \phi \geq 0.9$
- 3) ww = warm white
- 4) See explanation on page 13
- 5) These lamps have been released only for operation with control gear designed for high-pressure sodium lamps – external igniters are not permitted

VIALOX® NAV® (SON)



Type	NAV-T					
	Tubular, clear					
		70 W	150 W ⁶⁾	250 W ⁶⁾	400 W ⁶⁾	1000 W
Lamp wattage	W	70	150	250	400	1000
System wattage ¹⁾	W	83	170	275	440	1075
Lamp voltage	V	90	100	100	105	110
Starting voltage min./max.	kV _s	1.8/2.3	3/4.5	3/4.5	3/4.5	3/5.5
Lamp current	A	0.98	1.8	3.0	4.4	10.6
Mains current comp. ²⁾	A	0.6	1.0	1.5	2.5	6.0
Luminous flux	lm	5900	14500	27000	48000	130000
Lamp luminous efficacy	lm/W	84	97	108	120	130
Average luminance	cd/cm ²	210	280	330	440	660
Colour rendering index		≤25	≤25	≤25	≤25	≤25
Light colour ³⁾		ww	ww	ww	ww	ww
Colour temperature	K	2000	2000	2000	2000	2000
Electrode spacing	mm	36	58	65	82	160
Light centre length ⁵⁾ a	mm	104	132	158	175	240
Diameter d	mm	37	46	46	46	65
Length max. l	mm	156	211	257	285	355 ⁷⁾
Base		E27	E40	E40	E40	E40
Burning position		universal	universal	universal	universal	universal
Max. perm. outer bulb temp.	°C	310	310	400	400	400
Max. perm. base edge temp.	°C	210	210	250	250	250
Comp. cap. at 50 Hz ²⁾	µF	12	20	32	45	100
Circuits (see page 15)	Fig. no.	1	1	1	1	1
Average life ⁴⁾	h	18000	24000	24000	24000	20000
Order reference		NAV-T 70	NAV-T 150	NAV-T 250	NAV-T 400	NAV-T 1000
EAN 4050300 ...		255590	015668	015675	015682	251417
Standard pack	pcs	12	12	12	12	12
Figure	No.	1	2	2	2	2

1) Lamp and control gear.

Depending on the control gear used

2) Values at rated voltage and $\cos \varphi \geq 0.9$

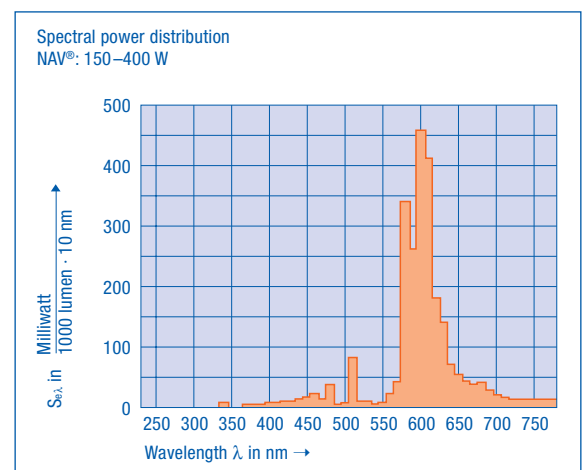
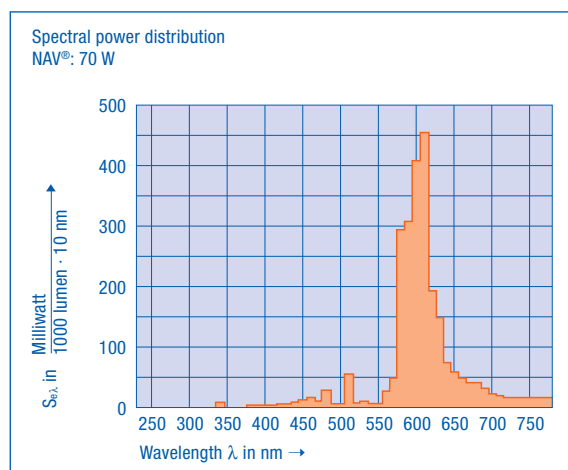
3) ww = warm white

4) See explanation on page 13

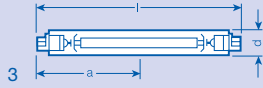
5) Light centre length = distance from base to centre of discharge tube

6) NAV®-E 150 W, 250 W, 400 W and NAV®-T 150 W, 250 W, 400 W are also available with built-in igniters. Details on request

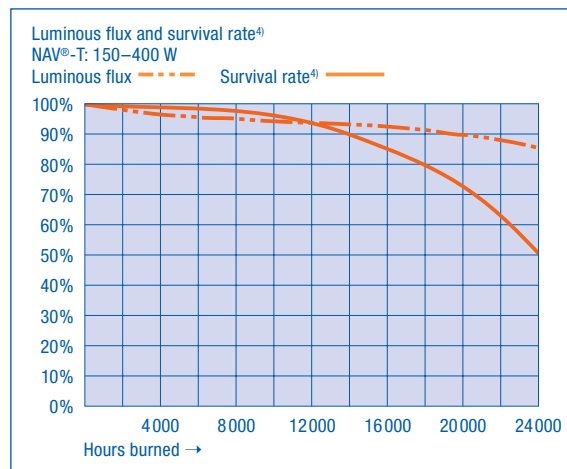
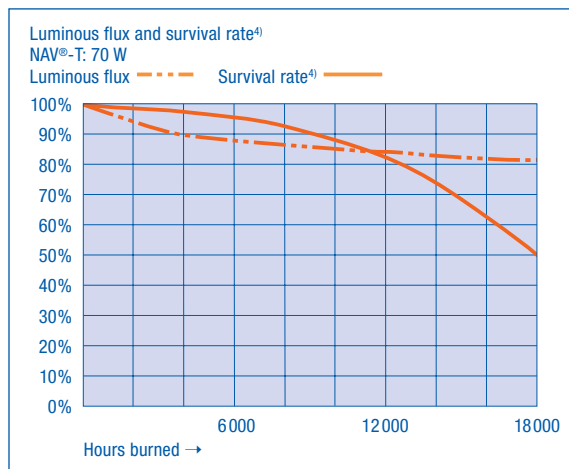
7) On request also available with a special length of 390 mm



VIALOX® NAV® (SON)

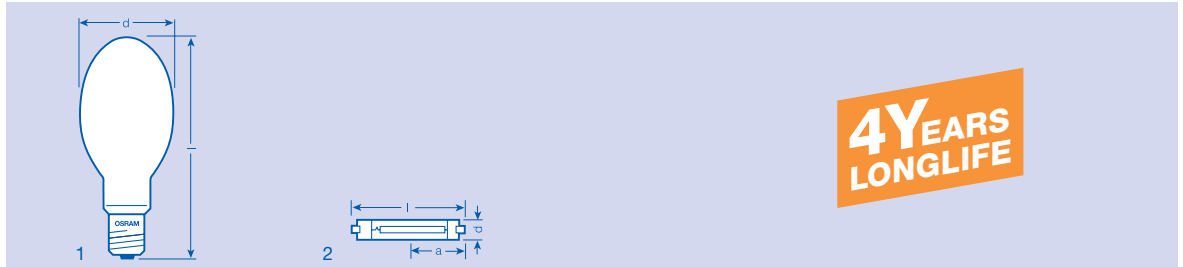


Type		NAV-TS	
		250 W ⁽⁶⁾⁷⁾	400 W ⁽⁶⁾⁷⁾
Lamp wattage	W	250	400
System wattage ¹⁾	W	275	440
Lamp voltage	V	100	105
Starting voltage min./max.	kV _S	3/5,5	3/4,5
Instant restart min.	kV _S	25	25
Lamp current	A	3,0	4,4
Mains current comp. ²⁾	A	1,5	2,5
Luminous flux	lm	25500	48000
Lamp luminous efficacy	lm/W	102	120
Average luminance	cd/cm ²	330	440
Colour rendering index		≤25	≤25
Light colour ³⁾		ww	ww
Colour temperature	K	2000	2000
Electrode spacing	mm	65	82
Light centre length ⁵⁾ a	mm	103	103
Diameter d	mm	23	23
Length max. l	mm	206	206
Base		Fc2	Fc2
Burning position		p45	p45
Max. perm. outer bulb temp.	°C	650	650
Max. perm. base edge temp.	°C	250	250
Comp. cap. at 50 Hz ²⁾	µF	36	45
Circuits (see page 15)	Fig. no.	1/2	1/2
Average life ⁴⁾	h	24000	24000
Order reference		NAV-TS 250	NAV-TS 400
EAN 4050300 ...		015705	015712
Standard pack	pcs	12	12
Figure	No.	3	3



- 1) Lamp and control gear. Depending on the control gear used
- 2) Values at rated voltage and $\cos \varphi \geq 0.9$
- 3) ww = warm white
- 4) See explanation on page 13
- 5) Light centre length = distance from base to centre of discharge tube
- 6) Lamps can be instantly restarted from hot with special igniters with ignition voltages greater than 25 kV_S
- 7) NAV®-TS lamps achieve their rated data at a relatively high ambient temperature, as occurs in typical HQ®-TS luminaires or in a luminaire simulator (heat tube)

VIALOX® NAV® (SON) SUPER 4Y



Type	NAV-E SUPER 4Y, Elliptical, coated				NAV-TS SUPER 4Y, Double ended		
	100 W	150 W	250 W	400 W	70 W	150 W	
Lamp wattage	W	100	150	250	400	70	150
System wattage ¹⁾	W	115	176	285	450	83	170
Lamp voltage	V	100	100	100	105	85	100
Starting voltage min./max.	kV _S	4/5	4/5	4/5	4/5	4/5	3.5/4.5
Instant restart min.	kV _s	–	–	–	–	25	25
Lamp current	A	1.2	1.8	3.0	4.4	0.98	0.8
Mains current comp. ²⁾	A	0.7	1.0	1.5	2.5	0.6	1.0
Luminous flux	lm	9500	16700	31000	54000	6800	15000
Lamp luminous efficacy	lm/W	95	111	124	132	97	100
Average luminance	cd/cm ²	13	16	30	30	410	450
Colour rendering index		≤25	≤25	≤25	≤25	≤25	≤25
Light colour ³⁾		ww	ww	ww	ww	ww	ww
Colour temperature	K	2000	2000	2000	2000	2000	2000
Electrode spacing	mm	–	–	–	–	36	40
Light centre length ⁵⁾ a	mm	–	–	–	–	57	66
Diameter d	mm	75	90	90	120	20	23
Length max. l	mm	186	226	226	290	114.2 ⁶⁾	132 ⁶⁾
Base		E40	E40	E40	E40	RX7s	RX7s-24
Burning position		universal	universal	universal	universal	p45	p45
Max. perm. outer bulb temp.	°C	310	310	400	400	650	650
Max. perm. base edge temp.	°C	210	210	250	250	250	250
Comp. cap. at 50 Hz ²⁾	µF	12	20	32	45	12	20
Circuits (see page 15)	Fig. no.	1	1	1	1	2	2
Average life ⁴⁾	h	28000	32000	32000	32000	24000	24000
Failure rate at 16,000 h	%	8	5	5	5	12	12
Order reference		NAV-E 100 SUPER 4Y	NAV-E 150 SUPER 4Y	NAV-E 250 SUPER 4Y	NAV-E 400 SUPER 4Y	NAV-TS 70 SUPER 4Y	NAV-TS 150 SUPER 4Y
EAN 4050300 ...		015774	024370	024387	024394	024301	281667
Standard pack	pcs	12	12	12	12	12	12
Figure	No.	1	1	1	1	2	2

VIALOX® NAV® SUPER 4Y

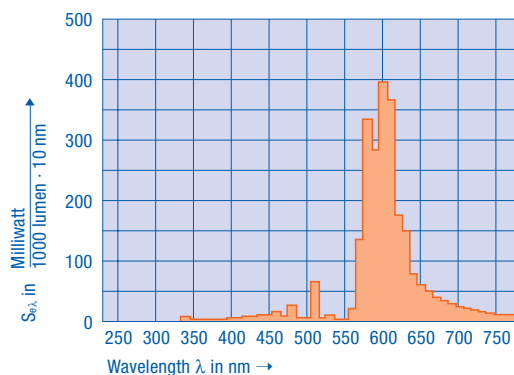
NAV® SUPER 4Y lamps are the brightest and most economical high-pressure sodium lamps.

- Up to 20% higher luminous efficacy than normal NAV® lamps (up to 150 lm/W).
- The same colour properties and applications as normal NAV® lamps.
- Improved luminous flux maintenance.

Application benefits compared with NAV®:

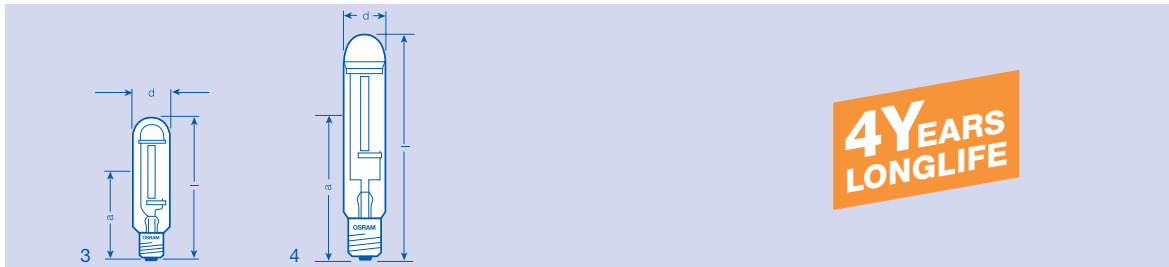
- **Existing installations:**
Higher lighting levels for the same energy costs.
- **New installations:**
Lower investment and operating costs thanks to smaller number of luminaires and lamps.

Spectral power distribution
NAV® SUPER 4Y: 50–600 W

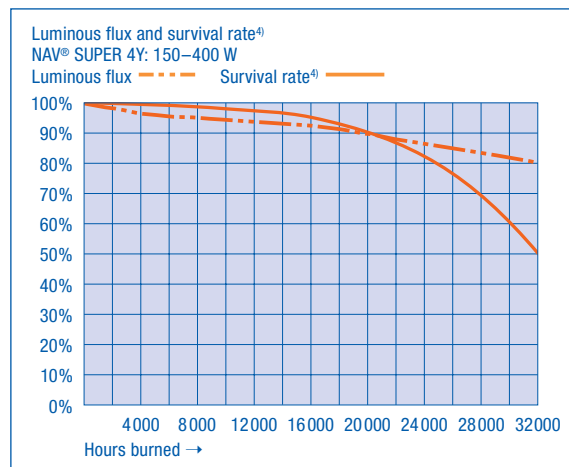
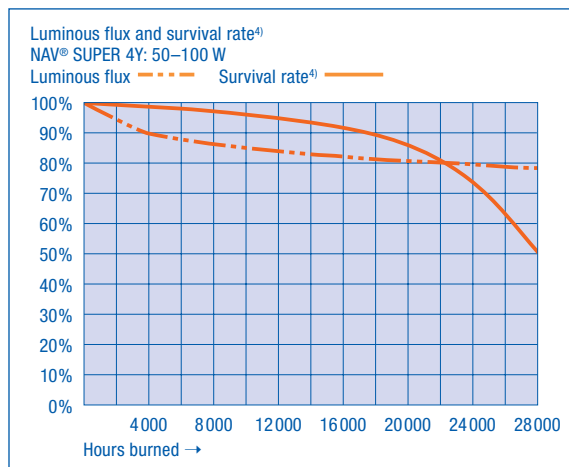


- 1) Lamp and control gear.
Depending on the control gear used
- 2) Values at rated voltage and $\cos \varphi \geq 0.9$
- 3) ww = warm white
- 4) See explanation on page 13
- 5) Light centre length = distance from base to centre of discharge tube
- 6) Contact spacing

VIALOX® NAV® (SON) SUPER 4Y

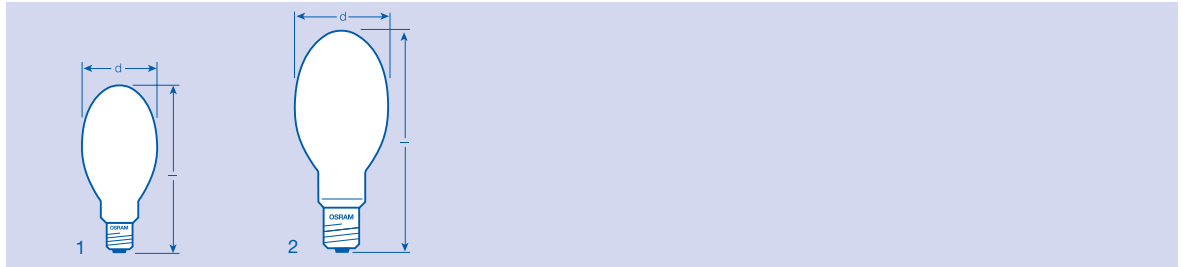


Type	NAV-T, SUPER 4Y, Tubular, clear							
		50 W	70 W	100 W	150 W	250 W	400 W	600 W
Lamp wattage	W	50	70	100	150	250	400	600
System wattage ¹⁾	W	66	83	115	176	285	445	650
Lamp voltage	V	90	85	100	100	100	102	112
Starting voltage min./max.	kVs	1.8/2.3	1.8/2.3	4/5	4/5	4/5	4/5	4/5
Instant restart min.	kVs	—	—	—	—	—	—	—
Lamp current	A	0.8	0.98	1.2	1.8	3.0	4.4	6.2
Mains current comp. ²⁾	A	0.5	0.6	0.7	1.0	1.5	2.4	3.4
Luminous flux	lm	4400	6500	10000	17200	33000	54500	89000
Lamp luminous efficacy	lm/W	81	93	100	112	127	136	148
Average luminance	cd/cm ²	250	360	470	520	730	750	770
Colour rendering index		≤25	≤25	≤25	≤25	≤25	≤25	≤25
Light colour ³⁾	ww	ww	ww	ww	ww	ww	ww	ww
Colour temperature	K	2000	2000	2000	2000	2000	2000	2000
Electrode spacing	mm	36	36	41	58	65	82	120
Light centre length ⁵⁾ a	mm	104	104	132	132	158	175	175
Diameter d	mm	37	37	46	46	46	46	46
Length max. l	mm	156	156	211	211	257	285	285
Base		E27	E27	E40	E40	E40	E40	E40
Burning position		universal	universal	universal	universal	universal	universal	universal
Max. perm. outer bulb temp.	°C	310	310	310	310	400	400	450
Max. perm. base edge temp.	°C	210	210	210	210	250	250	250
Comp. cap. at 50 Hz ²⁾	µF	10	12	12	20	32	45	65
Circuits (see page 15)	Fig. no.	1	1	1	1	1	1	1
Average life ⁴⁾	h	28000	28000	28000	32000	32000	32000	32000
Failure rate at 16000 h	%	8	8	8	5	5	5	—
Order reference		NAV-T 50 SUPER 4Y	NAV-T 70 SUPER 4Y	NAV-T 100 SUPER 4Y	NAV-T 150 SUPER 4Y	NAV-T 250 SUPER 4Y	NAV-T 400 SUPER 4Y	NAV-T 600 SUPER 4Y
EAN 4050300 ...		024325	015736	015743	024400	024417	281179	275772
Standard pack	pcs	12	12	12	12	12	12	12
Figure	No.	3	3	4	4	4	4	4



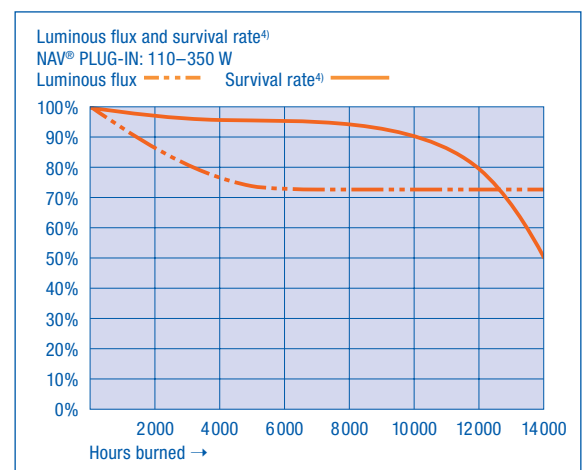
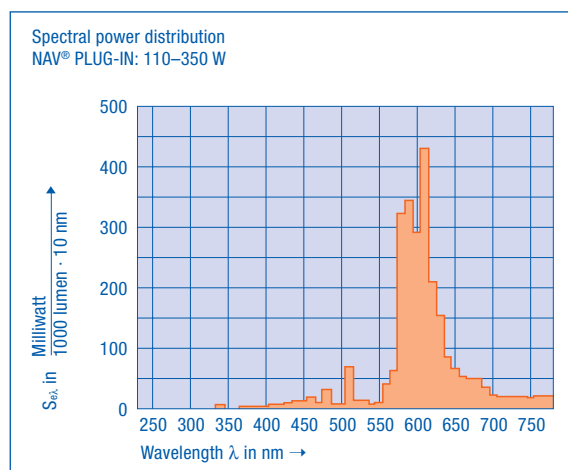
- 1) Lamp and control gear. Depending on the control gear used
- 2) Values at rated voltage and $\cos \phi \geq 0.9$
- 3) ww = warm white
- 4) See explanation on page 13
- 5) Light centre length = distance from base to centre of discharge tube

VIALOX® NAV® (SON) PLUG-IN



Type	NAV-E Plug-In			
		110 W ⁶⁾	210 W ⁶⁾	350 W ⁶⁾
Lamp wattage	W	110	210	350
System wattage ¹⁾	W	125	232	385
Lamp voltage	V	110	104	117
Starting voltage min./max.	kV _s	Starts at mains voltage	Starts at mains voltage	Starts at mains voltage
Instant restart min.	kV _s	–	25	25
Lamp current	A	1.3	2.5	3.6
Mains current comp. ²⁾	A	–	–	–
Luminous flux	lm	8000	18000	34000
Lamp luminous efficacy	lm/W	73	86	97
Average luminance	cd/cm ²	11	17	19
Colour rendering index		≤25	≤25	≤25
Light colour ³⁾		ww	ww	ww
Colour temperature	K	2000	2000	2000
Electrode spacing	mm	–	–	–
Light centre length ⁵⁾ a	mm	–	–	–
Diameter d	mm	75	90	120
Length max. l	mm	170	226	290
Base		E27	E40	E40
Burning position		universal	universal	universal
Max. perm. outer bulb temp.	°C	310	400	400
Max. perm. base edge temp.	°C	210	250	250
Comp. cap. at 50 Hz ²⁾	µF	10	18	25
Circuits (see page 15)	Fig. no.	3	3	3
Average life ⁴⁾	h	14000	14000	14000
Order reference		NAV-E 110	NAV-E 210	NAV-E 350
EAN 4050300 ...		024318	015576	015651
Standard pack	pcs	10	12	6
Figure	No.	1	2	2

- 1) Lamp and control gear.
Depending on the control gear used
- 2) Values at rated voltage and $\cos \varphi \geq 0.9$
- 3) ww = warm white
- 4) See explanation on page 13
- 5) Light centre length = distance from base to centre of discharge tube
- 6) The plug-In lamps should only be used in luminaires for HQL®125 W, 250 W and 400 W mercury lamps if the control gear is suitable for the higher operating current of the NAV® lamps. Check that the maximum permissible values for the winding temperature defined in VDE and IEC specifications are not exceeded. In cases of doubt, consult the manufacturer of the luminaire or control gear before replacing the lamp



Operating instructions

Safety

OSRAM VIALOX® NAV® meet the safety requirements defined in IEC 62035. It is impermissible to operate the lamp if its outer bulb is damaged or missing.

Supply voltage

The lamps must be connected via suitable control gear. An ac voltage of 230 V/50 Hz is generally required. If a differing supply voltage is used, appropriate control gear or units with suitable taps must be used.

Permissible mains voltage fluctuations: $\pm 3\%$

Sudden fluctuations in the mains voltage of more than $\pm 10\%$ may cause the lamps to go out. If the actual voltage fluctuates permanently from the rated voltage (230 V) changes in the light colour and luminous flux of high-pressure discharge lamps may occur. The life of the lamp may also be reduced as a result.

Control gear

Conventional control gear: ballast, igniter and compensating capacitor.

For reliable and trouble-free ignition it is essential to use an igniter which is suitable for the particular type of lamp. This is particularly important for NAV® SUPER 4Y lamps as these require relatively high ignition energy. The igniter should always be installed close to the lamp. There are no restrictions on the distance between the ballast and the lamp as long as the permissible voltage losses are taken into account. In circuits with a neutral conductor the choke should be connected to live. If luminaires in which lamps are not installed are connected to the electrical supply the ignition equipment (igniter, ignition pulser) must be disconnected otherwise it may cause radio interference.

Under certain conditions the ballasts and compensating capacitors needed to operate discharge lamps may form oscillating circuits in which excessive currents and voltages may damage the lamps, control gear and capacitors. Such resonance effects should be countered by suitable circuitry and fuses.

At the end of their lives, high-pressure sodium lamps may exhibit what is known as a rectifier effect (see IEC 62035). This effect is not specific to the lamps from any particular manufacturer. As a result of the excessive dc components, the control gear and igniters may overheat, which is why high-pressure sodium lamps should only ever be operated with control gear that has adequate thermal protection. This also applies to control gear with power reduction circuitry.

The following lamps with integrated igniters will start when connected to the mains:

NAV®-E 50 W/I

NAV®-E 70 W/I

permitted only with NAV® gear 50 resp. 70 W.

NAV®-E 110, 210 and 350 W (PLUG-IN)

permitted only with HQL® gear 125, 250, resp. 400 W.

The following lamps are available with integrated igniters on request:

NAV®-E 150 W, 250 W, 400 W

NAV®-T 150 W, 250 W, 400 W

Lamps with integrated igniters must not be operated in luminaires equipped with igniters.

Suitable igniters and control gears for VIALOX® NAV® lamps can be obtained from electrical wholesalers or retailers.

Some (old) igniters are equipped with STE 501 (built-in glow starter) or SE 600 (built-in spark gap). STE 501 and SE 600 should be replaced each time the lamp is replaced. STE 501 and SE 600 are two different starter elements and must not be interchanged.

Operating temperatures

High-pressure sodium lamps are ideal for use outdoors in the cold because their luminous flux is virtually unaffected by temperature. NAV® lamps with internal ignition mechanisms can be reliably started with rated mains voltage at temperatures as low as -25°C . This also applies to the NAV®-E 110, 210 and 350 W plug-in lamps.

Only NAV® lamps designed to operate with external igniters are suitable for extremely low ambient temperatures down to -50°C . Special (heatable) igniters are needed in these cases, such as MZN 400 SU-LT from BAG Turgi (for NAV lamps from 100 to 400 W).

Power factor

CCG: Because the ballast is connected in series the power factor is 0.5 to 0.7, depending on the type of lamp. Using the recommended comp. capacitor the power factor is ≥ 0.9 .

ECG: With POWERTRONIC® the power factor is greater than 0.96 c.

Starting

Full luminous flux is reached a few minutes after power-on. The starting current may be up to twice the operating current depending on the control gear.

Fuses

VIALOX® NAV® lamps must be protected by slow-acting fuses. Fuse wire rated at twice the nominal lamp current should be sufficient. If automatic cutouts are used they should have “C” type trip characteristics. If the system is adjusted to the upper limit value of 10x the rated current of the circuit breaker the cutout will not trip at twice the nominal lamp current.

Restart

VIALOX® NAV® lamps with separate igniters will restart about one minute after they go out. VIALOX® NAV® lamps with integrated igniters have to cool down for between 4 and 15 minutes before they will restart.

NAV®-TS lamps can be restarted immediately with suitable igniters. They need a surge voltage of 25 kVs.

Luminaire design

Luminaire design should be based on EN 60598. Also in lamp standard EN 60662 the “information for luminaire design” should be observed. The permissibility value for the maximum “voltage increase at lamp terminals” can be found in the data sheets of EN 60662 section 2.

The lampholders must be designed to withstand the high voltages involved in starting these lamps. High-voltage lampholders are available from the manufacturers.

Deviating from data tables OSRAM VIALOX® NAV® 50-70 W can also be operated with 4.5 kV igniters.

Reduced-load circuit

All VIALOX® NAV® lamps can be operated at 50% of their rated wattage. This can be achieved by:

- step switching¹⁾ by changing to control gear with the next lower rating
- step switching¹⁾ with additional inductance.

The lamps must be started at rated wattage and must operate at rated wattage for about 10 minutes before being stepped down. Luminous efficacy will also be reduced.

There is no guarantee that lamps operated with leading-edge phase control will function correctly.

Output must not be reduced by reducing the mains voltage.

Luminous flux

To all intents and purposes, the luminous flux is not affected by the ambient temperature (outside the lamp). The specified luminous flux values relate to a horizontal burning position and operation with reference control gear at rated supply voltage. All NAV®-TS lamps reach their rated data at a relatively high ambient temperature, as occurs in typical luminaires or in a luminaire simulator (heat tube).

Insects and sodium light

The light from NAV® lamps attracts up to 85% fewer insects than the light from mercury lamps. The luminaires therefore stay cleaner for longer and the insect population is afforded a certain amount of protection.

End of life

To protect the control gear and avoid radio interference, NAV® lamps must be replaced as soon as they come to the end of their lives. These lamps have reached the end of their lives if

- the light colour of the lamp changes dramatically or
- there is an appreciable loss of brightness or
- the lamp no longer starts or
- the lamp keeps going out and coming on again (cycling).

Notes on disposal

- High pressure discharge lamps (e.g. NAV®) must not be placed in domestic waste or in containers for recycled glass.
- Domestic users should take these lamps to local recycling centres.
- Commercial users should use the services of a recycling company.

VIALOX® NAV® lamps contain small quantities of mercury. Poisonous mercury vapour may escape if sodium lamps are broken. These lamps should be handled by a recycling company as mercury waste under code EWC 200121 or as mercury containing residue.

Guarantee

A guarantee can only be given for these lamps if they are operated under the specified operating conditions with suitable control gears.

¹⁾ Use electrical power switches

Lamp life

There are a confusing number of definitions for lamp life, and these differ from one region to the next and from one application to the next. The basic definitions for the most common types are given below.

This document refers explicitly only to the **average life**.

Average life

Average number of hours burned over several groups in which in the group in question half the lamps have failed as the result of a defect (50% failure).

Survival rate

Indicates percentage of lamps still functioning after a certain time of operation. Average values for various wattages and reduction batches.

Minimum life

Minimum period of time in which a lamp remains in operation under laboratory conditions.

Economical life

Period of time between group relamping of an installation under the condition that operating costs are minimised and the installation luminous flux does not fall below a particular value. This will vary according to the application.

Service life

Simplified practical view of the economical life. This is the operating time after which the installation luminous flux (the product of the relative luminous flux and the lamps still in operation) is still around 70% (sometimes 80%).

Not applicable to street lighting or emergency lighting and similar installations where the light beams do not cross each other and where any fail of a single light source will crucial lower the quality of lighting installation (e. g. uniformity of street surface luminance).

Operating high-pressure lamps for short periods in combination with frequent on/off switching will shorten their life. This applies to both cold starting and hot restarts.

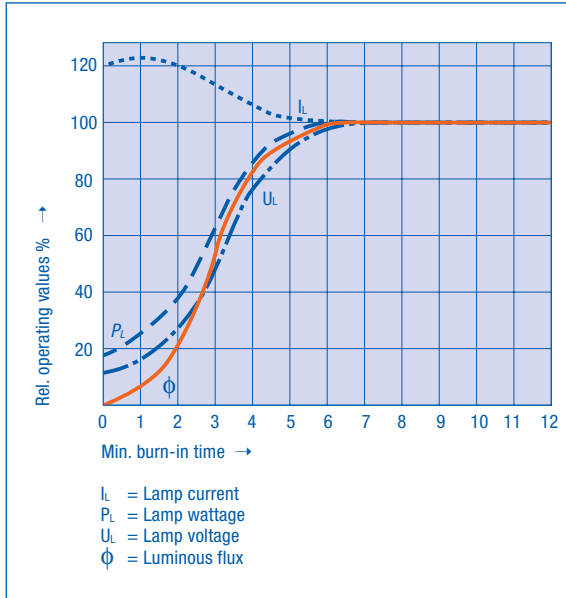
Notes on luminous flux behaviour, lamp life and survival rates

The graphs and values are for guidance only. They show an average for various wattages and production batches. The data was recorded under controlled laboratory conditions for a switching cycle of 11 hours on/1 hour off. In practice, there may be considerable discrepancies.

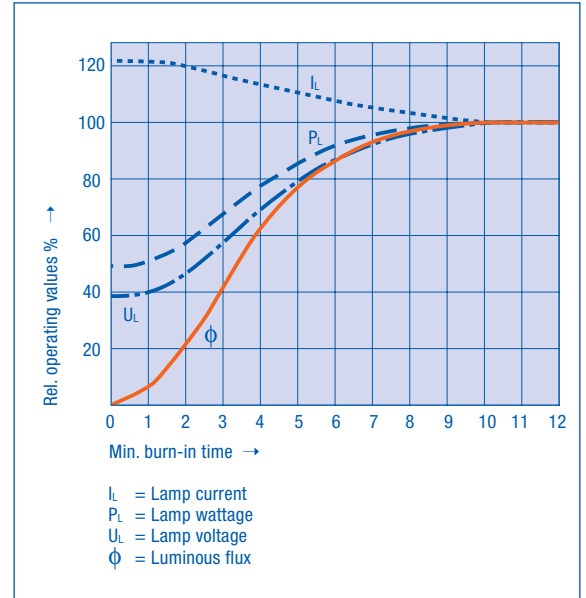
The various factors include the following:

- type of lamp/lamp wattage
- type of phosphor/coating method
- type of starter
- type of control gear (CCG, ECG)
- power supply
- switching cycle

Start-up behaviour

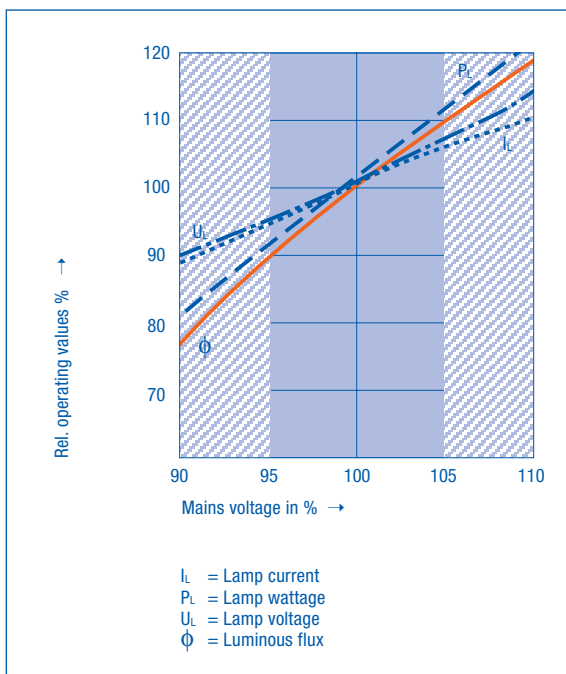


NAV® (4Y®), NAV® SUPER 4Y®:
 up to 600 W (average value)
 NAV® SUPER 4Y lamps tend to have a faster start-up profile and standard NAV® lamps a slower start-up profile.

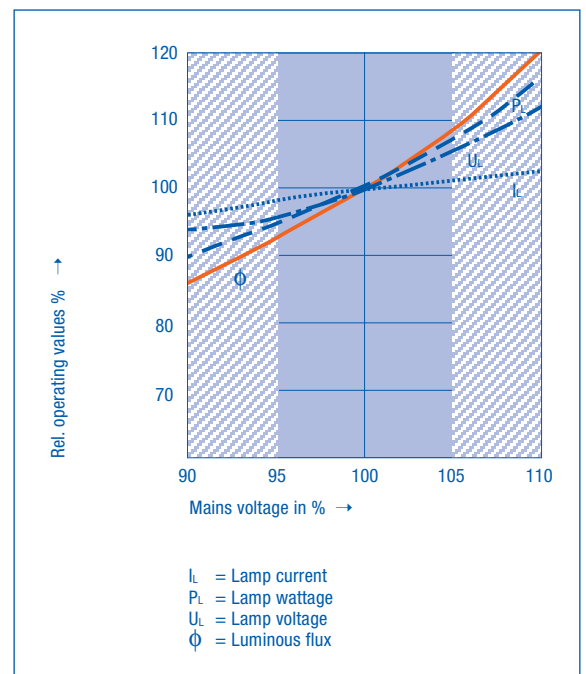


NAV®: 1000 W

Operating characteristics as a function of supply voltage

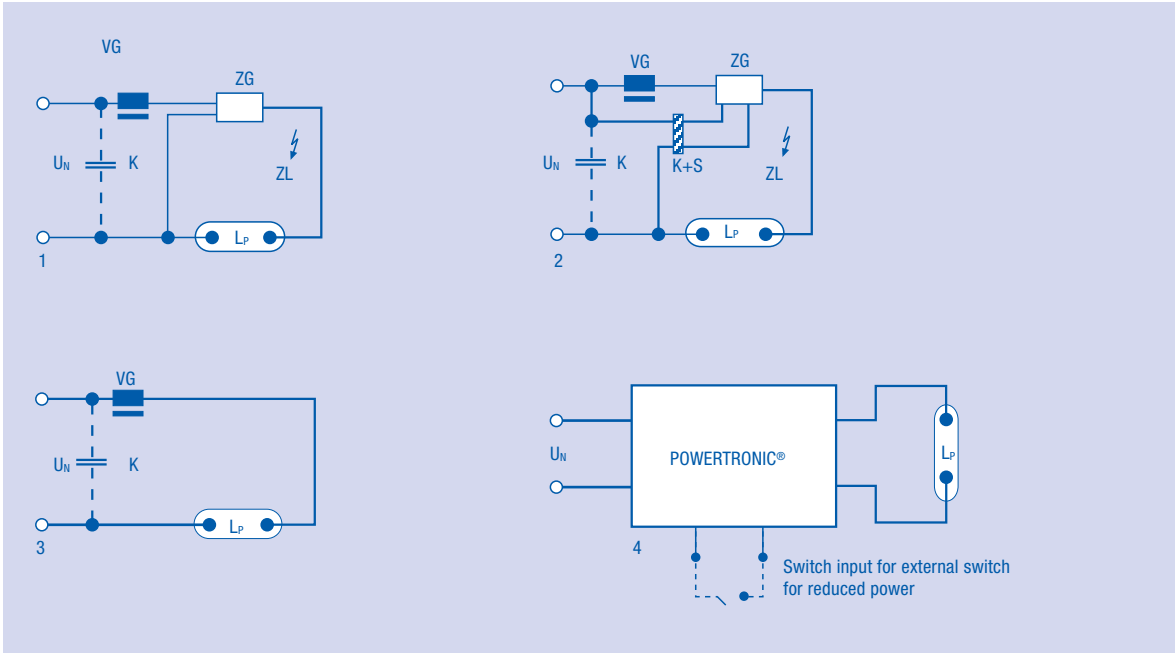


NAV® 4Y®: 50–70 W
 NAV®: 50–70 W
 NAV® SUPER 4Y®: 50–70 W



NAV® 4Y®: 150– 400 W
 NAV®: 150–1000 W
 NAV® SUPER 4Y®: 100– 600 W

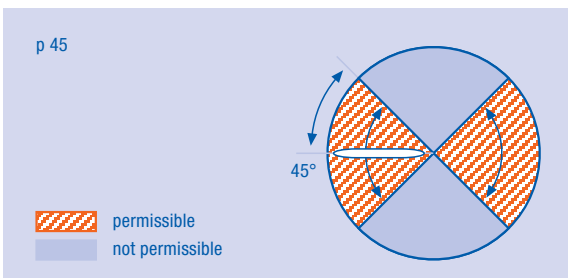
Circuits



U_N = Rated voltage 230 V ac
 VG = Control gear
 K = Compensation capacitor
 K+S = Time-limiting switch and contactor
 LP = Lamp
 ZG = Igniter
 ZL = HF ignition line

To ensure safe and reliable ignition the igniter appropriate to the type of lamp must be used.

Burning position



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