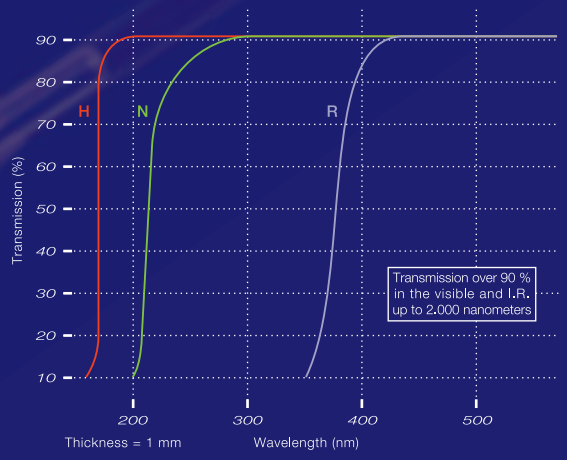
Standard Linear Arc Lamps

DC SERIES

EXAMPLE : ORDERING INFORMATION

Arc lamp	VQ
Krypton	K
Quartz envelope	N
Ref N°	7P4
(DC Serie)	DC
Pressure in Kg/cm2	4
Tube end	M

DIFFERENT TYPES OF SILICA TUBING

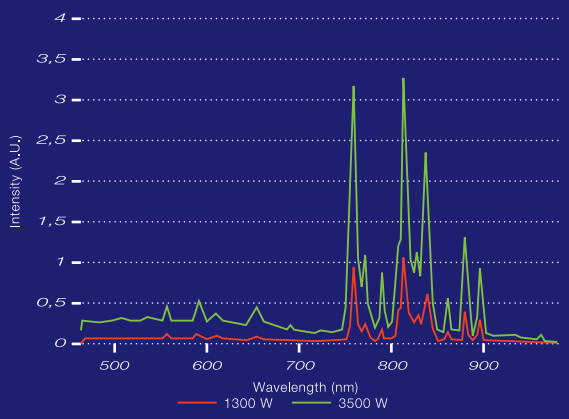


R : Cerium doped silica. Even after extensive use there is pratically no violet coloured absorbtion center near 540 nanometers.
This silica filters pratically all the UV, no deterioration of doped glass rods or reflectors, no ozone formation, and has no damaging effect on the eyes.
Considerable conversion of UV into fluorescence centered at 435 nanometers : particularly recommended for pumping Yag crystals.

N : Natural fused silica with little fluorescence (selection of quartz crystals). After long use, coloured centers appear near 540 nanometers. Robust material.

H : Pure synthetic non-fluorescent silica. No appearance of absorption at 540 nanometers. This silica is mainly used for optical pumping of rubies and for distant UV flash sources.

TYPICAL KRYPTON OUTPUT SPECTRUM CW ARC LAMP

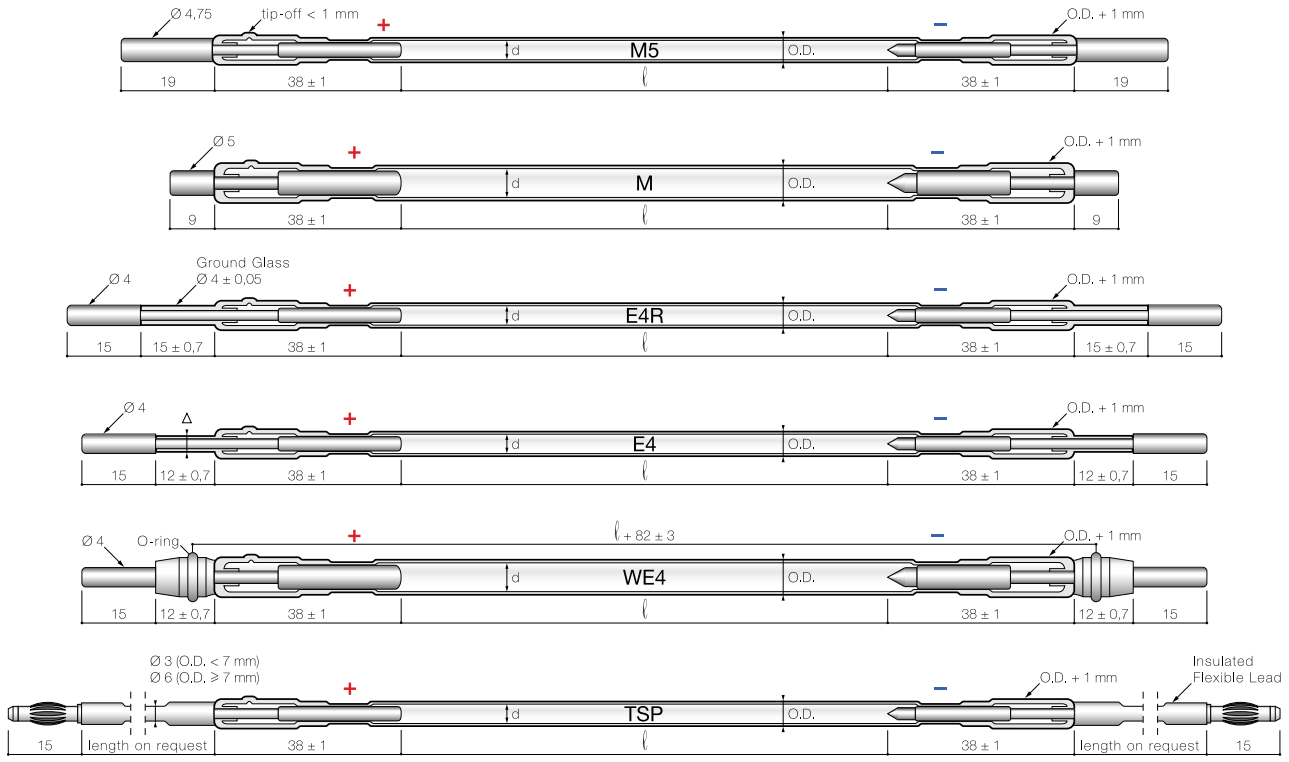


The krypton spectral structure is composed of strong line radiation between 750 and 900 nanometers for optimal spectral coupling of Nd : YAG or Nd : glass crystal.

Figure shows emission of a 150 mm arc length, 4 mm bore diameter CW krypton arc lamp for 2 different powers :
1300 W and 3500 W.

Standard Linear Tube ends

DC SERIES



Note 1

KRYPTON ARC LAMP (VQK…DC4)

Continuous operation in water for CW laser pumping.
Standard pressure fill : 4 kg/cm² (1 to 8 kg/cm² on request).
DC operation (preferably filtered current).
Standard silica : N (H, R available on request).
Standard tube ends : M5 (M, E4, E4R, WE4, available on request).
High voltage insulation flexible leads with specific length available : TS…

- Ø 3 mm ext : temperatures -70°C +250°C, insulation 22 kV.
- Ø 6 mm ext : temperatures -70°C +250°C, insulation 37 kV.

The last figure in our reference indicates cold filling pressure in kg/cm² for DC tube series.

N.B. The DC tubes filled with Krypton have an output twice as high as that of the same tubes filled with Xenon when used for YAG crystal pumping. When these lamps are to be used as a very powerful light source with spectral characteristics similar to those of the sun, a Xenon fill is recommended.

Ignition Characteristics for all DC series (with pressure 4 kg/cm²)

Minimum anode voltage : 1 - 2 KVDC.
Minimum trigger voltage : 15 - 20 KV.

Approximate calculation of voltage U and current I for a desired power W,

based on values indicated in the table.

$$U \simeq \frac{U'}{\sqrt[4]{\frac{W'}{W}}} \qquad I \simeq \frac{W}{U}$$

Where : W = desired power (watts) at pressure of «x» kg/cm².
W' = maximum power (watts) at pressure of «x» kg/cm² given in table.
U' = voltage given in table for «x» kg/cm².
U = voltage to be used to obtain desired power W at «x» kg/cm².
I = current to be used to obtain desired power W at «x» kg/cm².

N.B. I) This formula can also be used for other types of continuous operation lamps to calculate the voltage U and current I corresponding to the disired power W, from the values of U' and W' measured on the lamps.
II) The values indicated are understood for filtered DC voltage. In the case of pulsed repetitive operation (with constant mean power) the above formula remains applicable when values are measured on the lamp used in this way.

Approximate calculation of voltage/current values for different desired pressures,

From voltage and current values measured on a lamp operated at «y» watts (pressure from 1 to 8 kg/cm²).

$$I \simeq \frac{I'}{\sqrt[4]{\frac{P}{P'}}} \qquad U \simeq U' \cdot \sqrt[4]{\frac{P}{P'}}$$

Where : P' = pressure in kg/cm² of gas fill in lamp on which voltage and current have been measured for «y» watts.
P = desired pressure in kg/cm².
U' = measured voltage for «y» watts and with pressure P' in the lamp.
I' = measured current in amperes for «y» watts and with pressure P' in the lamp.
I = current in amperes with pressure P in the lamp.
U = voltage for the lamp with pressure P.

Note 2

The standard wall thickness of our DC tube series is 0,5 mm, favorable to heat exchange and the avoidance of cristobalite formation. However we can make tubes on request with a constant wall thickness of 1 mm, where mechanical strength is particularly important. In this case, 1 is added to the first figure of the reference in the table and J is added before DC.
Example : VQK N 6P2 DC2 E2 becomes
VQK N 7P2 JAC2 E2.
(The first figure of the VQ reference always indicates tube O.D.).
The other characteristics given in the table remain unchanged.

Note 3

F is Ø of hole in plate supporting flashtubes fitted with WE2 ends. Maximum operating temperature for continuous use in oxiding atmosphere (dry air) for lamps fitted with WE4, WDE2 ends : 200°C.

Note 4

Cooling requirements : Fluid cooled only. Use deionised water with average flow of 8 liters/min.
Exchangers must be made of non-metallic material, except stainless (no copper or derivatives).
Lifetime : depends on the number of lamp firings, type of HV booster used and direct lamp confinement. 1000 hours can be reached at maximum power given in the table, 2000 hours when the lamp is used at 50% of maximum power, lifetime being defined as ending when output drops below 80% of initial output power. Minimum power given in the table shows wattage below which lamps should not be operated with continuous rating. This value should be used for standby power when lamps reach maximum power from time to time and not be switched off in between.

Note 5

Voltages are given with a fluctuation of ± 5 volts.
Mean values measured under filtered DC, lamp power being adjusted to the current.
Mean values may vary with inside tolerances of the tubes and with the precision of Krypton filling pressure (pressure precision is highly reproducible in our fabrication).

N.B. It is strongly recommended **not to exceed 55A** on DC arc lamps (standard dimensions as per pictures above), for bore diameters d = 7mm, whatever the conditions. For other dimensions, please consult us. Adjust DC series lamp power to current rather than to voltage.

DC tubes with a filling pressure of 4 kg/cm² have a greater light yield than tubes with standard pressure of 2 kg/cm². These lamps can be furnished with filling pressures of up to 8 kg/cm². For example, a light yield increase of 20 to 50% (according to the type of utilisation) can be obtained by changing pressure from 2 to 8 kg/cm². The greater the pressure, the higher the continuous operating voltage and ignition voltage should be, and the greater is the light yield.

Note 6

Lamp impedance given by the voltage to current ratio. (Max power).

Specifications are subject to change without notice.

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Verre & Quartz

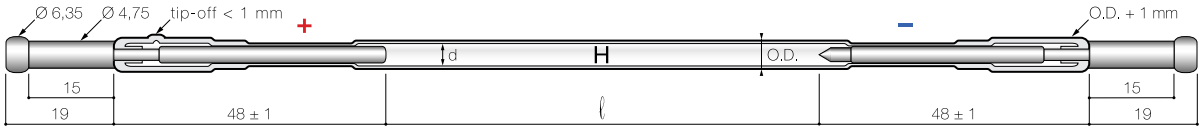
DC SERIES ORDERING CODE VQK N . . . DC4 M5 Note 1	5P2	5P3	5P4	5P5	6P2	6P3	6P4	6P5
d (I.D. ± 0,2 mm) (O.D. = d+1 mm) Note 2	4				5			
ℓ Arc length (mm)	50,8	76,2	101,6	127	50,8	76,2	101,6	127
Δ (± 0,1) (mm)	3	3	3	3	3	3	3	3
F (mm) Note 3	8	8	8	8	8	8	8	8
Average Power in water (W) Note 4 — Max.	2000	3000	4000	5000	2600	4000	5200	6500
Average Power in water (W) Note 4 — Min.	340	510	680	850	400	600	800	1000
Voltage (V) Note 5 — Max. Power	87	132	175	217	80	120	160	200
Voltage (V) Note 5 — 50% Max. Power	75	113	150	184	67	101	135	169
Current (A) Note 5 — Max. Power	23	23	23	23	32	32	32	32
Current (A) Note 5 — 50% Max. Power	13	13	13	13	19	19	19	19
Static Impedance (Ω) Note 6	3,8	5,7	7,6	9,4	2,5	3,7	5	6,2
Dynamic Impedance (Ω)	1,3	1,9	2,5	3,1	0,9	1,4	1,9	2,3

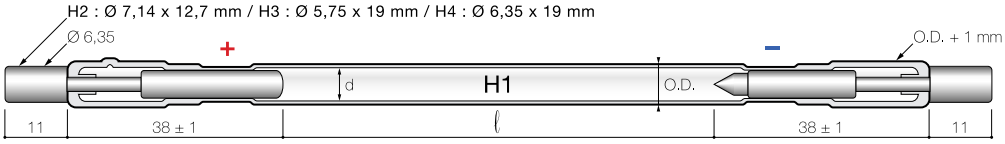
DC SERIES ORDERING CODE VQK N . . . DC4 M5 Note 1	7P2	7P3	7P4	7P5	8P2	8P3	8P4	8P5
d (I.D. ± 0,2 mm) (O.D. = d+1 mm) Note 2	6				7			
ℓ Arc length (mm)	50,8	76,2	101,6	127	50,8	76,2	101,6	127
Δ (± 0,1) (mm)	3	3	3	3	3,5	3,5	3,5	3,5
F (mm) Note 3	9	9	9	9	11	11	11	11
Average Power in water (W) Note 4 — Max.	3400	5100	6800	8500	4000	6000	8000	10000
Average Power in water (W) Note 4 — Min.	440	660	880	1100	460	690	920	1150
Voltage (V) Note 5 — Max. Power	76	114	152	190	71	107	143	180
Voltage (V) Note 5 — 50% Max. Power	63	95	127	158	59	89	119	148
Current (A) Note 5 — Max. Power	44	44	44	44	54	54	54	54
Current (A) Note 5 — 50% Max. Power	27	27	27	27	34	34	34	34
Static Impedance (Ω) Note 6	1,7	2,6	3,4	4,3	1,3	2	2,6	3,3
Dynamic Impedance (Ω)	0,7	1,1	1,5	1,8	0,6	0,9	1,2	1,5

Specifications are subject to change without notice - Standard features given in the table : other specifications on request.

Arc Lamps for Industry

DC SERIES Krypton Arc Lamps for CW solid-state laser pumping





Note 7

Lamps fitted with H2 ends have the same dimensions as those with H1 ends, except for the electrical connection itself (H1 : Ø 6,35 mm, length 11 mm. H2 : Ø 7,14 mm, length 12,7 mm. H3 : Ø 5,75 mm, length 19 mm. H4 : Ø 6,35 mm, length 19 mm). These standard lamps can be fitted with any of the above types of connection (or other standard tube-ends as shown in the catalog) upon request.

Note 8

The standard wall thickness of our DC tube series is 0,5 mm, favorable to heat exchange and the avoidance of cristobalite formation.

Note 9

Lamp impedance given by the voltage to current ratio at maximum power.

Note 10

Voltages are given with a fluctuation of + or – 5 Volts.

Note 11

Lifetime : depends on the number of lamp firings, type of HV booster used and direct lamp confinement. 1000 hours can be reached at maximum power given in the table, 2000 hours when the lamp is used at 50% of maximum power, lifetime being defined as ending when output drops below 80% of initial output power. Minimum power given in the table shows wattage below which lamps should not be operated with continuous rating. This value should be used for standby power when lamps reach maximum power from time to time and not be switched off in between.

DC SERIES ORDERING CODE									
VQK N . . .	5P2	5P3	6P2	6P3	7P3	7P4	7P4	8P3	8P4
Type	DC8	DC8	DC6	DC6	DC6	DC6	DC6	DC4	DC4
Tube end . *Note 7*	H	H	H1	H1	H1	H1	H	H2	H2
d (I.D. ± 0,2 mm) (O.D. = d+1 mm) Note 8	4		5		6			7	
***ℓ Arc length** (mm)*	50,8	76,2	50,8	76,2	76,2	101,6	101,6	76,2	101,6
***Overall length** (mm)*	185	210	149	175	175	200	236	178	203
***Average Power** in water (W) Note 11* — Max.	2200	3300	2600	3900	5100	6800	6800	6000	8000
***Average Power** in water (W) Note 11* — Min.	400	600	460	700	700	930	930	700	930
***Voltage** (V) Note 10* — Max. Power	110	165	90	134	127	170	166	107	143
***Voltage** (V) Note 10* — Min.Power	80	120	55	98	87	115	104	68	91
***Current** (A)* — Max. Power	20	20	29	29	40	40	41	54	54
***Current** (A)* — Min.Power	5	5	7	7	8	8	9	10	10
***Static Impedance** (Ω) Note 9*	5,5	8,2	3,1	4,6	3,2	4,2	4	2	2,6
***Dynamic Impedance** (Ω)*	2	3	1,1	1,7	1,3	1,7	1,9	0,9	1,2

Specifications are subject to change without notice - Standard features given in the table : other specifications on request.