

**TUNGSTEN
FILAMENTS
FOR
LIGHT
SOURCES**

TUNGSRAM

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In this Catalogue filaments manufactured by TUNGSRAM for use in light sources and for evaporation are listed.

Figures are not in scale and indicate filament dimensions.

Illuminating engineering data (life, luminous flux) are only information, because effective values depend on the method of lamp production.

We are in a position to vary filament shape and dimensions in a wide range to comply with customer demands. Exact specifications enable us to design and produce individual filament types, provided adequate quantities are needed.

To be sure of the identification, please state the code number with designation, voltage (V) and power (W), in your order.

The most common types are marked with a point after the Code No.

General aspects of the quality control

Filaments manufactured under strict control of the preparatory process and the production line, are qualified with a mathematical statistical method, according to the following considerations:

1. Clean surface

The filament surface is only acceptable if it is free of oxides and other contaminations. In halogen types, polished surfaces are needed. Visual inspection, microscopic and, if necessary, chemical tests are provided.

2. Geometry

Dimensions for checking and tolerances are shown in relevant drawings of the design. In the Catalogue, 0.3 . . . 0.5 mm tolerances are indicated for operating coil lengths and ± 0.5 mm for the total length, respectively, depending on filament type. Leg projection angles and their relative position with $\pm 10^\circ$ tolerance are determinant for stem mounting.

3. Strength test

To simulate mechanical stresses in assembling lamps, filaments are tested in tensile and compressive (bending) stress, respectively. This method is essentially a verification of the heat-treatment to which filaments have been subjected. Main characteristic values are obtained by extending the filament by 50% of its net length and/or the leg test by bending it by 45° (in continuous filaments the squeezing of the windings). For halogen filaments annealed at high temperatures, these tests are replaced by crystal testing.

4. Determination of the mass

The quantity of tungsten in ready-made filaments is verified by determining the mass, in addition to the geometric test. A convenient method is to weigh individual filaments or lots of 10 to 20 filaments each, without mandrel.

Packing and identification

Filaments are packed in glass vials closed by plugs in synthetic material and containing 100, 200, 600, 1000, 3000 filaments each, depending on the type. Vials are disposed on trays accompanied each by a sheet with the data to identify the type, the packed quantity and the date of the production. Trays are closed and packed in cardboard boxes, labelled with type designation and total packing quantity.

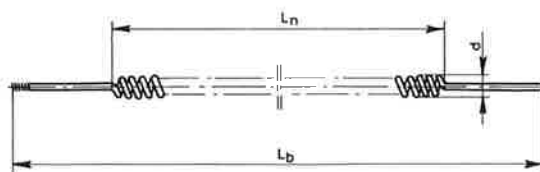
Transport and storage

In material handling, filaments should be protected from vibrations and mechanical shocks and humid atmosphere. It is not recommended to store a lot in original packing longer than one year. The contents of opened packs can be used conveniently in one week.

This information does not supplant the technical and quality specification for each order.

FILAMENTS FOR GLS LAMPS

DOUBLE FILAMENTS (COILED COILS) FOR GAS-FILLED GLS LAMPS

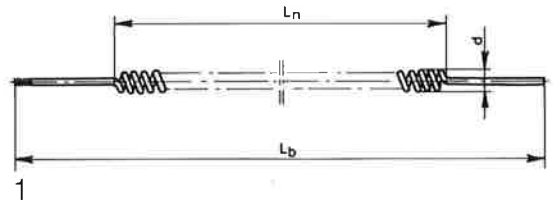


Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm.)			Fig.			
						L_b	L_n	d				
9-9-542-10370•	Gas CC	115	40	1000	530	19.5	14.3	0.59	1			
12270		120	30	1500	285	20.0	14.4	0.50				
10380•			40	1000	525	19.5	14.5	0.58				
11280										21.0	15.3	0.58
11320•											14.6	0.62
10390•		125	1000	520	15.2	0.56						
11890		130	30	4000	275	23.0	16.0	0.49				
10400•					515	21.0	15.7	0.56				
12310	Gas CC, short	225	1000	443	28.0	22.8	0.38					
10430•	Gas CC			1500	400	29.0	23.5	0.42				
12240	230	1000	442			28.0	23.1	0.38				
10440•				29.0								
11330	225	2500	373	31.0	24.9	0.37						
12710•					24.8							
10450•	235	1000	440	30.0	23.2	0.38						
11340•							2500	360		31.0	24.9	
10460•	240	1000	440	30.0	24.4	0.36						
12860•					1500		404	24.3		0.43		
11350•					2500		357	31.0		25.1	0.38	
10470•	245	1000	440	30.0	24.6	0.36						
11080•					434		24.7					
12870	250	1500	404	30.0	24.4	0.42						
12540					434		24.9	0.36				
12850	260	1000	426	24.1	0.42							
10360	110	4000	400	23.0	19.5	14.0	0.60					
12880	120				16.6	0.59						
12890•	130	16.7										
12720	245	2500	357	31.0	25.2	0.37						
12300	80	60	1000	933	19.0	12.3	0.89					
10480•	115				21.0	890	15.6	0.79				
11690•	120	50	2500	560		645	15.4	0.69				
11360•					22.0	16.2	0.68					
10490	60	1000	890	21.0	15.9	0.78						
11290•					24.0	17.0	0.84					
10500•	125	1000	870	23.0		16.8	0.76					
11900	130	50	4000		485	17.3	0.73					
10510•				863								
11090•	220	60	1000	749	34.0	27.9	0.51					
10520•	225					28.6						
10530•	230				720	35.0	28.8	0.46				
11370•					2500		610		28.9	0.53		
10540•	235	1000	716	35.0	28.8	0.46						
11380•					2500		609	29.1	0.53			

FILAMENTS FOR GLS LAMPS

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (min.)			Fig.		
						L _b	L _n	d			
9-9-542-12730	Gas CC	225	60	2500	609	35.0	28.2	0.54	1		
10550●		240		1000	715		29.0	0.46			
11390●				2500	663		28.6	0.48			
12910●				1500	670		29.0	0.50			
10560●				1000	714		29.5	0.46			
12920		250		1500	670		29.9	0.50			
10570●				1000	711		29.7	0.46			
12900		260		120	4000		670	29.0		30.3	0.49
12930		120								21.7	0.78
12940●		130		245	2500		603	35.0		28.5	0.48
12740		Gas CC, short	115	75	1000	1140	24.0	17.1		0.87	
10580●			120	70	1200	1005		18.8		0.75	
12280				1000	1130	17.4		0.88			
10590●			75	125	1500	1060		17.8		0.87	
11300●					1000	1120		17.7			
10600●			130	70	4000	825		26.0		19.2	0.92
11910					1000	1114		24.0		18.1	0.87
10610●			220	225	4000	880		29.0		22.5	0.87
12970					1000	992		34.0		28.0	0.60
11100●			225	225	1000	960		35.0		29.0	0.55
10620●		2500				812	36.0	30.0		0.57	
11400		Gas CC, short	230	75	1000	956	34.0	29.3		0.55	
12390						950	35.0	29.6		0.54	
10630●			235		2500	812	36.0	30.0		0.56	
10640●								30.3		0.57	
11420●			240		1000	950	36.0	29.8		0.54	
12750								2500		811	30.0
10650●			245		1000	954	36.0	30.5		0.54	
11430●	950							30.5			
12950	250		1500		904	35.0	27.8	0.61			
10660							1500	904	35.0	28.3	0.60
10670	245	2500	810	36.0	29.8	0.56					
12960					115	1000	1646	24.0	17.7	1.01	
10680●	120	1500	1507	18.9	1.01						
11310●			4000	1275	1275	29.0	21.9	1.11			
12470●	125	2000					1616	26.5	19.3	0.94	
13010			130	4000	1606	19.7	0.93				
10700●	220	1000			1380	34.0	28.5	0.70			
10710●			225	2500	1375		28.8	0.70			
11920●	230	1000			1154	36.0	29.6	0.74			
12580●			230	2500	1373	34.0	28.4	0.72			
10720●	235	1000			1155	36.0	29.9	0.74			
11440			240	2500	1373	34.0	28.7	0.72			
12110●	1500	1260			1153	36.0	29.6	0.74			
12770●			1000	1360	1360	34.0	29.0	0.72			
10740●	2500	1155			1155	36.0	29.9	0.73			
11460●			1500	1260	1260	35.0	28.9	0.75			
10750●											
11470●											
12990●											

FILAMENTS FOR GLS LAMPS



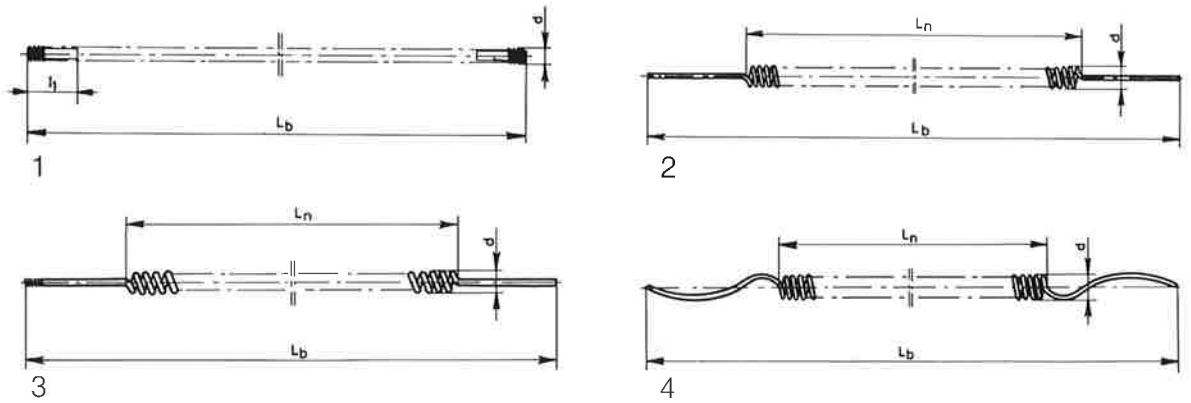
DOUBLE FILAMENTS (COILED COILS) FOR GAS-FILLED GLS LAMPS, Cont

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)			Fig.	
						L _b	L _n	d		
9-9-542-10760●	Gas CC	245	100	1000	1360	34.0	29.3	0.72	1	
11110●		1357			29.6		0.71			
13000		250		1500	1260	35.0	29.2	0.75		
12980					1000	34.0	29.7	0.72		
12780		245		2500	1148	1148	35.0	29.9		0.73
10780●		225								
10790		230	1000	2151	2151	40.0	30.7	1.01		
11480							2500	1808		33.2
10800●		235	1000	2136	2136	42.0	32.0	0.99		
11490							2500	1800		33.6
10810●		240	1000	2136	2136	42.0	32.0	0.98		
11500							2500	1800		34.1
10820		245	1000	2136	2136	42.0	32.0	0.96		
10830●							250	2121		32.4
13020●		220	1000	3090	3090	42.0	34.0	1.20		
11200●							225	3020		34.3
12370●		230	2500	2500	2500	45.0	38.3	1.19		
11510							1000	2990		44.4
11210●		235	2500	2500	2500	45.0	38.8	1.18		
11520							1000	2980		44.0
11220●		240	2500	2500	2500	45.0	39.3	1.18		
11530							2969	45.0		36.4
12380		245	2959	2959	2959	45.0	36.4	1.11		
11230		250								
11240●		225	1000	4950	4950	52.4	40.2	1.43		
13030●							230	4930		53.0
11250●		235	1000	4950	4950	53.6	41.6	1.40		
11260●							240	54.2		42.2
11270		250	4880	4880	4880	54.7	42.7	1.39		

DOUBLE FILAMENTS (COILED COILS) FOR VACUUM LAMPS

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)			Fig.
						L _b	L _n	d	
9-9-542-12410	Vacuum CC	230	25	1000	232	33.0	28.1	0.31	1
12120			40		390	35.5	28.5	0.53	

FILAMENTS FOR GLS LAMPS



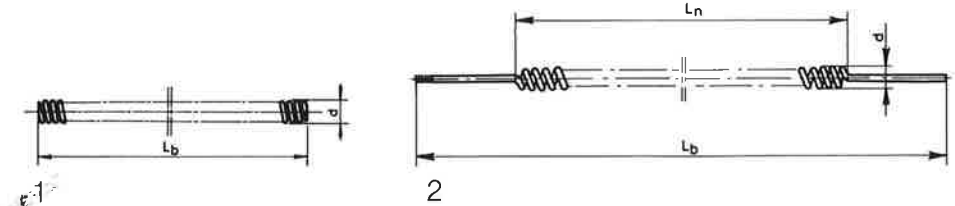
SINGLE FILAMENTS (COILS) FOR GAS-FILLED GLS LAMPS

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)				Fig.
						l_1	L_b	L_n	d	
9-9-541-10450●	Gas C	115	150	1000	2360	3.0	60.0	—	0.50	1
10430●		120		2500	2130	—		50.2	0.59	2
22510		125	1000	2330	3.0	—		0.50	1	
10440●		130	4000	2310	—	54.0		0.62	2	
10970		115	200	1000	3260	4.0		60.1	0.73	1
23360		120			3275				0.72	
11360		125			3230		0.71			
11370●		130			2750		32.3		1.16	
12570		24	150	1000	2750	5.0	35.3	1.37		
10960		42			200			3540	40.1	1.14
11340		115	300	1000	5150	4.0	78.0	0.79	1	
11350●		125			300			0.78		
11400●		225	1500	1000	30,300	7.0	190.0	1.51	1	
11550		235						1500		122.1
11560		220	2000	1000	40,000	7.0	201.7	1.92	1	
11580		235						2000		202.9
11590		240	2000	40,000	7.0	202.8	1.89	1		

FILAMENTS FOR KRYPTON LAMPS

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)				Fig.					
						l_1	L_b	L_n	d						
9-9-542-11550●	Krypton CC	125	15	1000	137	—	17.0	11.3	0.32	3					
11540		130						11.4	0.31						
11650●		120						24.0	17.2		0.78				
11560	Krypton CC, globular	125	60	1000	790	—	21.0	14.8	0.81	3					
11570		130						15.2	0.80						
11580●		225						32.0	26.6		0.58				
11600●		235						33.0	27.4		0.56				
11610●		240										27.6	0.55		
11620		245						27.8	28.1						
11630●		250						715			700	715	690	24.0	17.8
11640		260						690	26.0		19.2	1.11			
11660●	Krypton CC	120	75	3000	1000	—	24.0	17.8	0.92						
11670●		100	3000	1450	26.0	19.2	1.11								

FILAMENTS FOR GLS LAMPS



FILAMENTS FOR RESISTA LAMPS

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)		Fig.	
						L _b	d		
9-9-541-11720●	Gas Resista	115	40	1000	335	64.0	0.14	1	
11730●		125			327				
11740		225			260				
11750●		235			256				0.13
11760●		240							
11770●		250							
11780●		115	630		0.21				
11790●		125	620						
11800●		225	510						
11810●		235	504		0.20				
11820●		240							
11830●		250							
11840		115	492	0.19					
11850●		125	1200						
11860		225	1170						
11870●		235	1000	0.35					
11880●		240							
11890●		250							
12120		225	100	85.0	0.26				
12130		235							
12140●		240							
12150		250							
12160●		130				50	0.18		
12170		225							
12180●		235							
12190		240	60	0.22					
12300●		250							
12200		130			2500	64.0	0.15		
12210		225							
12220		235							
12230	240								
	250								
	1070								
	880	100	85.0	0.29					
	860								
	850								

FILAMENTS FOR DECORATIVE LAMPS

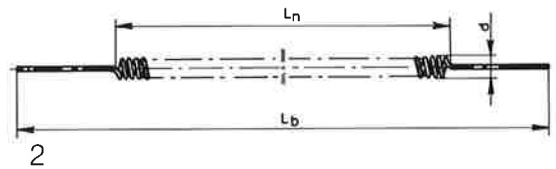
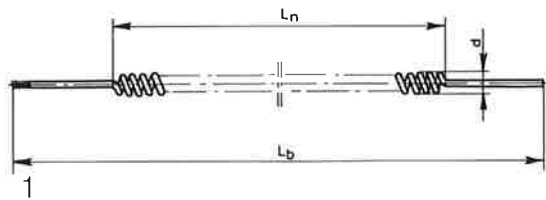
Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)		Fig.
						L _b	d	
9-9-541-10690	EL (Vacuum C)	120	10	1000	89	64.0	0.07	1

FILAMENTS FOR GLS LAMPS

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)			Fig.		
						L _b	L _n	d			
9-9-541-10700	EL (Vacuum C)	140	10	1000	80	64.0	—	0.07	1		
10710		15	115		145			0.09			
10720•			125							88	
12620			130								140
10730			135					125			
10740•			225							75.0	
12630•			230			124					
10750•			235		122						
10760•			240					120			
10770•			250			70.0					
12640			260		252						
10780•			265					254			
10790			115							252	
12650•		120	90.0								
10800•		125			250						
12660•		130				245					
10810		135						230			
12670•		140			230						
10820•		225				227					
12680•		230	226								
10830•		235			230						
10840•		240						0.11			
10850•		250	0.18								
10860•		260			—*						
10870		120				40					
10880		130	0.17								
10890•		230			0.16						
10900•		240						15			
10910		250	108								
10920		235			75.0						
10930		240				2500					
10940•		235	195								
10950•	240	90.0									
542-11120	Gas CC (candle)			115	1000		280	17.0	11.6	0.45	
12820			110	284			11.2				
11130•		120	280						11.9		0.44
12450			2500		240	13.8		0.41			
11140•		125		1000	277	12.8					
11680		130	275		13.2		0.40				
12520			25	4000		233		17.4	0.36		
12630•		1000			235	23.0	21.9	0.28			
11150•							225			236	22.1
12170•				230					235		
11170•								235			
11180•							240			234	22.4
12830			1500	214					22.0		
12640•		245			1000	232		22.6			
11190•							250			214	22.7
12840•			1500	210					22.6		
12250		225			210	22.7					

* Only for Coloured Decorative Lamps

FILAMENTS FOR GLS LAMPS



FILAMENTS FOR TUNGSRAPLEX REFLECTOR LAMPS*

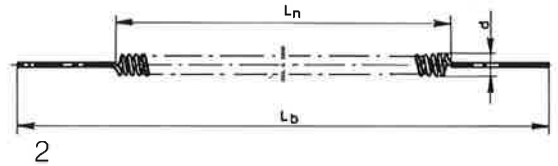
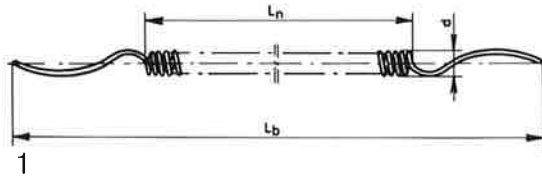
Code No	Designation	Volts	Watts	Life (Hours)	Lum flux (lm)	Dimensions (mm)			Fig.
						L _b	L _n	d	
9-9-542-12230●	T-flex CC	125	50	2000	520	21.0	15.6	0.76	1
12350●			75		951			0.72	
12360●		150	1000	1959	34.0	25.9	1.31		
12530●				225	1890	36.0	28.7	1.15	
12560				240	1903	36.0	28.9	1.09	

* These lamps can be equipped with Double Filaments for Gas-Filled GLS Lamps, too.

FILAMENTS FOR TUNGSRAPAR 38 LAMPS

Code No	Designation	Volts	Watts	Life (Hours)	Lum flux (lm)	Dimensions (mm)			Fig.
						L _b	L _n	d	
9-9-542-11720●	Reflector CC	130	75	2000	-	34.0	25.0	0.74	1
12150●				4000				0.84	
11740●		225	2000	0.71					
11750				235				0.73	
11760				240				0.72	
12420●		80	2000	0.74					
12500●				235				0.74	
12480●				240				0.74	
541-22870	Reflector C	24	100	4000	-	34.0	25.0	0.80	2
542-11770●	Reflector CC	120						0.90	
11790●		130	1.03						
11800●		225	0.81						
11810●		235	0.89						
11820●		240	0.89						
12430●		225	120	2000				0.99	
12510●								235	0.95
12490●	240	0.95							
541-22880●	Reflector C	24	150	4000	-	34.0	25.0	1.15	2
542-11830●	Reflector CC	120						1.26	
11840		130	1.28						
12160●			4000	1.44					
11860●		225	2000	1.21					
11870				235				1.23	
11880●		240	1.23						
12220●	INFRAPAR CC	225	5000	1.39					
12210●		240		1.38					
12650	Reflector CC	225	60	2000	0.55				
12660		235			0.54				
12670●		240			0.54				

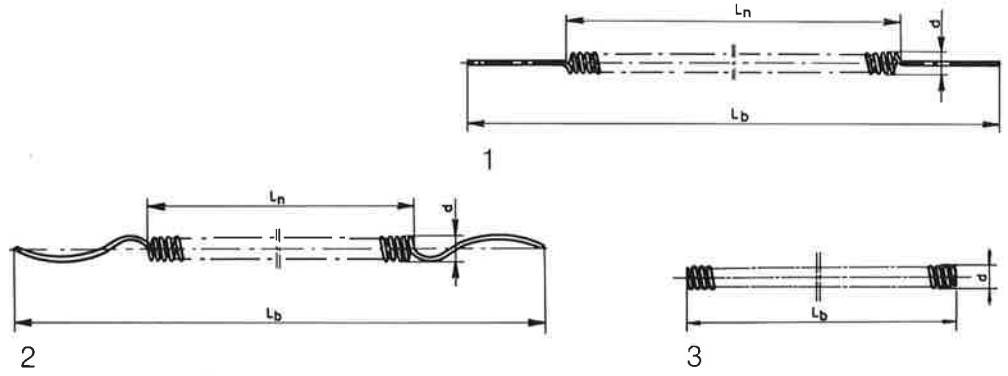
FILAMENTS FOR GLS LAMPS



FILAMENTS FOR LOW VOLTAGE GLS LAMPS

Code No	Designation	Volts	Watts	Life (Hours)	Lum flux (lm)	Dimensions (mm)			Fig.	
						L_b	L_n	d		
9-9-541-22110●	Gas C	24	15	1000	165	17.0	11.3	0.25	1	
22130		28			153		12.0	0.24		
22140		32			144		11.1	0.26		
22150		36			143		11.6			
22160		42			135		11.8			
22170		50			125		13.4	0.24		
22180		55			120		13.9			
22190●		24			25		328	13.0		0.37
22210		28					305	13.9		0.36
22220		32					300	12.4		0.38
22230		36	13.0			0.37				
22240		42	280			14.2	0.30			
22250●		50	25.0			265	18.9	0.27		
22260●		55				250	19.7	0.26		
22270●		65				242	23.2	0.21		
22280		78				230	24.8			
22360●		24	40			590	13.4	0.55	2	
22380		32			549	13.2	0.56			
22390●		36				19.0	13.8	0.54		
22980●		42			530	14.1				
22300●		50	60		500	28.0	0.37	1		
22310●		65			460	22.8	0.35			
22320●		78			29.0	420	23.0	0.36		
22400●		24				930	17.2	0.64		
22410●		36	900		23.0	17.4	0.63	2		
22330●		42			29.0	22.9	0.50			
22340●		50	75		860	29.0	0.48	1		
22350●		65			800	33.0	0.45			
22420●		24			1220	21.0	0.92			
22430●		36			1180	25.0	0.72			
22440●	42	100	1166	30.0	0.57	2				
22450	65		1080	33.0	0.52					
22460●	24		1742	19.3	0.91					
22470	36		25.0	1640	18.9		0.94			
22480●	42	1610		19.6	0.92					
22490●	50	1580	33.0	26.8	0.70					
22500	65		1576	35.0	29.4	0.64				

FILAMENTS FOR GLS LAMPS

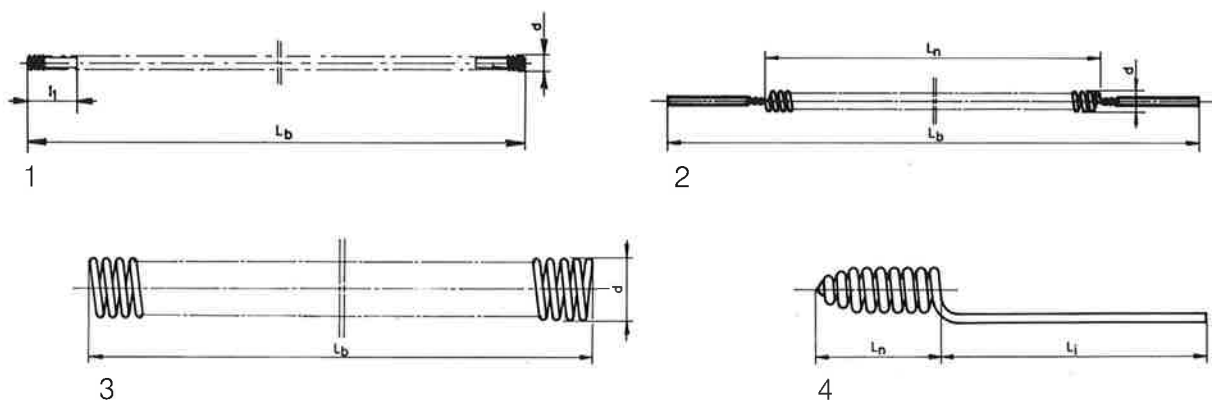


FILAMENTS FOR TRAIN LAMPS

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)			Fig.
						L_b	L_n	d	
9-9-541-22910●	Gas Train	26	15	1000	158	17.0	11.7	0.25	2
22920●			20		234		11.6	0.33	
22950			25		316	13.5	0.36	1	
22960●			30		388	13.7	0.40		
22970●		28	40		562	13.6	0.54	2	
22930●			20		220	17.0	12.0		0.32
22940			55		181	23.0	17.0		0.26
22980			42		40	532	19.0		14.1

FILAMENTS FOR SIGN LAMPS

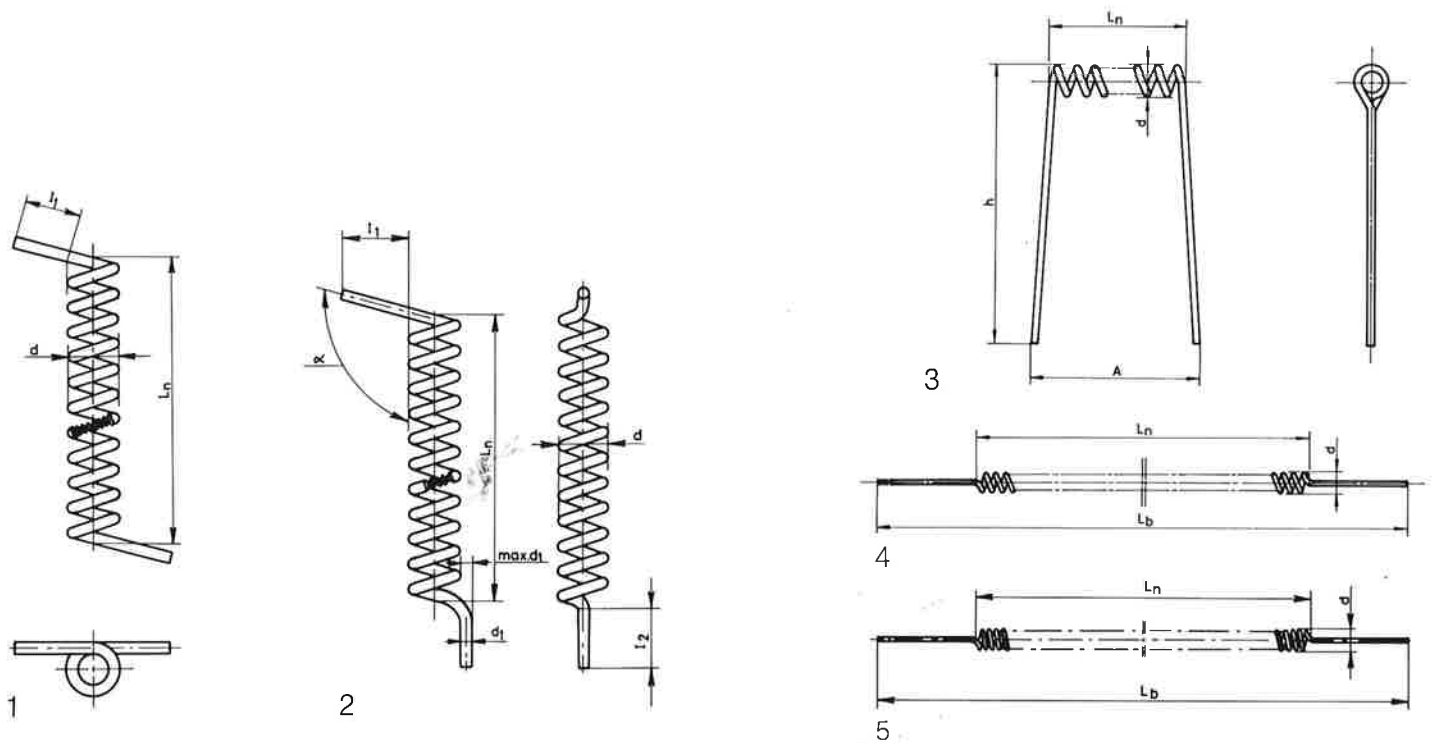
Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)			Fig.
						L_b	L_n	d	
9-9-541-22000●	Gas Sign.	24	10	1000	93	15.0	9.0	0.23	2
22020●		50			73	21.0	16.0	0.13	
22030		24	15		160	15.0	10.0	0.32	
22060		50	128		21.0	16.0	0.19		
22090		80	25		200	25.0	20.0	0.25	
10980		70	10		75			0.08	
10990●	Vac. Illum.	115	15	1000	120	65.0	—	0.10	3
11000●		125			115				
12580		130			120			0.09	
11010		135			100			0.10	
11020●		225			106				
12590●		230			100			0.10	
11030●		235			104				
11040●		240			100			0.15	
11050●		250			194				
12600●		260			206			0.14	
11060●		265			194				
11070●		115			190				
11080●		125							
12610		130							
11090●	135								
11100●	225								
11110●	235								
11120●	240								
11130●	250								
11140●	260								



FILAMENTS FOR HALOGEN FLOODLIGHT LAMPS for Linear Types

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)				Fig.
						L _b	L _n	L _l	d	
for Linear Types										
9-9-541-11910●	Halogen C	225	300	2000	5.0	83.0	—	—	0.96	1
11920●		240				—	—			
8-155-10010●		225	500		10.3	91.0	67.0	1.22		
10570●		225	750		15.0	162.0	131.0	1.08		
10580		240			—	—	—	0.98		
10490		208	1500		33.0	225.0	185.0	1.48		
10610		277			32.0			—	—	1.44
for Linear Types, mounted										
9-9-541-12790●	Halogen C	240	500	2000	9.5	66.0	—	—	1.25	3
112-32540●				—	—	—	2.2	7.0	—	4
541-12460●		225	1000	2000	18.4	130.1	—	—	1.70	3
112-32350●				—	—	—	3.9	9.8	—	4
541-12470●		240		2000	18.0	130.1	—	—	1.74	3
112-32360●				—	—	—	3.9	9.8	—	4
541-12480●		225	1500	2000	35.0	193.4	—	—	1.40	3
112-32370●				—	—	—	4.3	10.5	—	4
541-12490●		240		2000	33.0	193.4	—	—	1.47	3
112-32380●				—	—	—	4.3	10.5	—	4
541-12500●		225	2000	2000	44.0	238.4	—	—	1.55	3
112-32390●				—	—	—	6.0	16.0	—	4
541-12510●		240		2000	45.0	238.4	—	—	1.64	3
542-32400●				—	—	—	6.0	16.0	—	4

FILAMENTS FOR GLS LAMPS



FILAMENTS FOR HALOGEN FLOODLIGHT LAMPS, Cont. for Types with Edison Cap

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)						Fig.
						L _b	L _n	l ₂	l ₁	d	α°	
9-8-155-10650	Halogen C	120	300	2000	5.0	91.0	61.0	-	-	1.06	-	5
10660•		130								1.05		
10480•		120	1.46									
10560•		130	1.45									
9-542-20540	Halogen L-Z	120	150		2.6	-	-	4.0	2.5	1.95	103	2
20570		130								2.62		
20520		120	4.5		2.92							
20550		130	17.4		2.88							
20590	Halogen Z	120	500	10.0	-	-	-	2.05	3.90	-	1	
20580		130							1.94			4.13

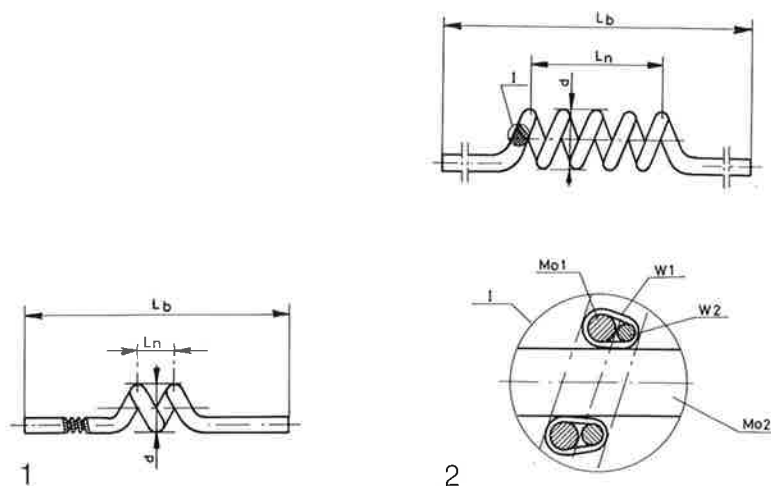
FILAMENTS FOR INFRARED LAMPS

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)					Fig.
						L _b	L _n	A	h	d	
9-9-542-12790•	Infra CC	130	150	5000	1065	34.0	25.0	-	-	1.77	4
-12800•			250		1892	68.0	60.2			1.87	
12680•		225	150		1020	60.0	0.87				
12340•			250		1750	59.9	1.40				
12690•		240	150		1050	60.0	0.87				
12700•			250		1750	59.9	1.41				

FILAMENTS FOR DICHROIC-MIRRORED HALOGEN SHOP-WINDOW LAMPS

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)					Fig.
						L _b	L _n	A	h	d	
9-9-541-32350•	Hal. reflector H	12	20	2000	345	-	4.5	9.2	1.00	3	
32540			35		602				1.44		
32360•			50	943	1.92						
32550•			65	1224	2.35						

FILAMENTS FOR FLUORESCENT LAMPS



TRIPLE FILAMENTS FOR COMPACT FLUORESCENT LAMPS FD 5, 7, 9, 11

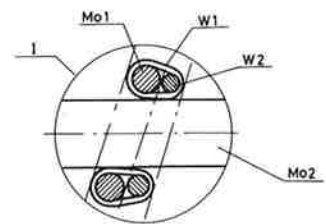
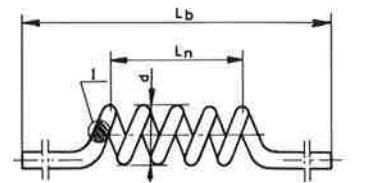
Code No	Designation	Watts*	Dimensions (mm)			Fig.
			L_b	L_n	d	
9-9-543-10640●	TR-FD 9	5, 7, 9, 11	8.0	1.2	1.46	1

TRIPLE FILAMENTS FOR ENERGY SAVING FLUORESCENT LAMPS \varnothing 26 mm

Code No	Designation	Watts*	Dimensions (mm)			Fig.
			L_b	L_n	d	
9-9-542-11980●	TR-18	18	12.0	3.0	2.05	2
11990●	TR-36	36	11.0	3.2	2.02	
12000●	TR-58	58	12.0	3.0	2.26	

* Power consumption of fluorescent lamp without ballast

FILAMENTS FOR FLUORESCENT LAMPS



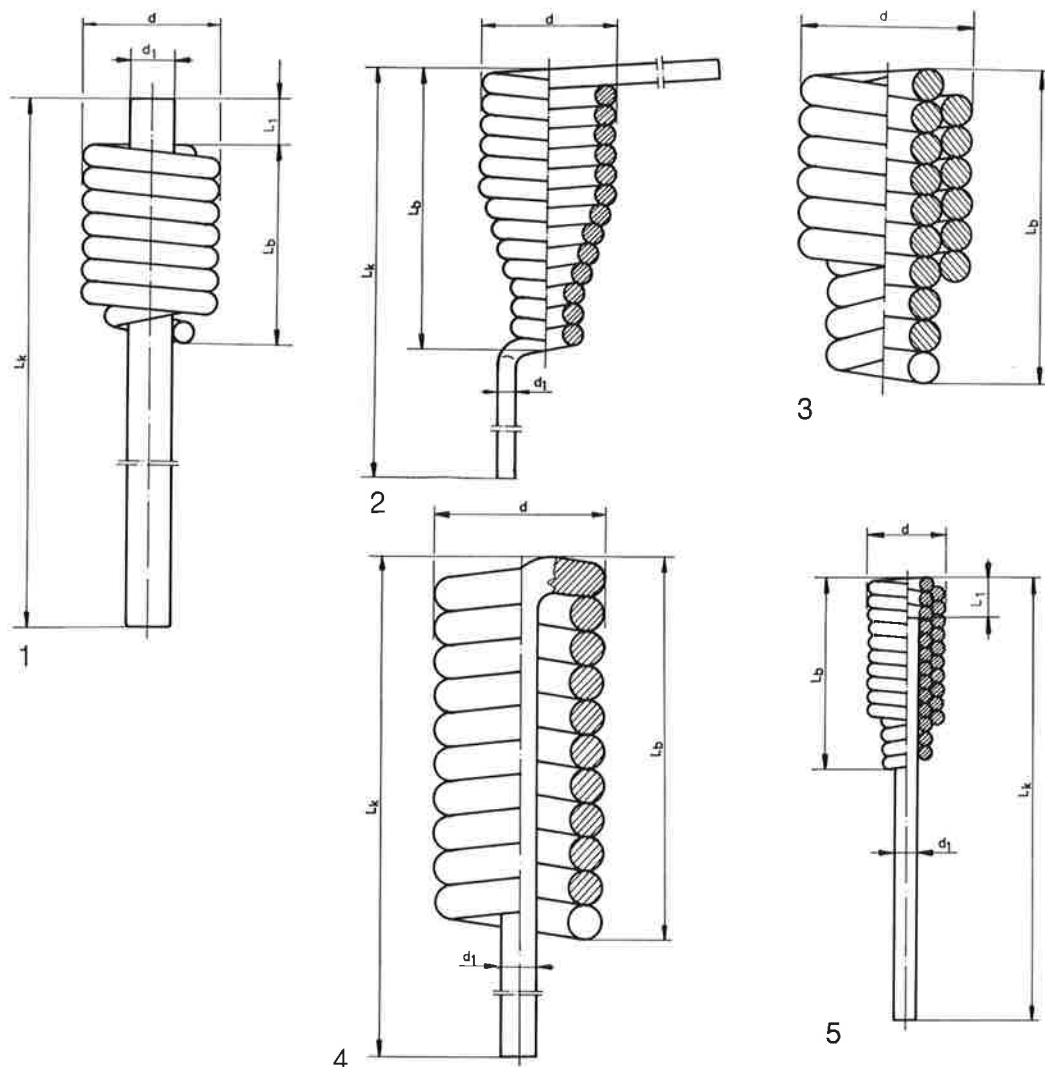
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TRIPLE FILAMENTS FOR FLUORESCENT LAMPS \varnothing 38 mm

Code No	Designation	Watts*	Dimensions (mm)			Fig.	
			L_b	L_n	d		
for Standard, De Luxe, Coloured and Safety Types							
9-9-542-12050●	TRD-20	15, 20, 25, 30	15.0	4.0	2.08	1	
12060●	TRD-40	40			2.14		
10130●	TR-65	65, 80			4.8		3.02
12100	TR-110/A	110	19.0	4.2	2.62		
for RAPIDSTART Types (without Ignition Device)							
10150●	RS-20	20	15.0	4.0	2.01	1	
10160●	RS-40	40			2.11		
10170●	RS-65	65			6.0		2.47
12200	RSA-40	40			4.0		2.11

* Power consumption of fluorescent lamp without ballast

FILAMENTS FOR HIGH PRESSURE DISCHARGE LAMPS



FILAMENTS FOR HIGH PRESSURE SODIUM LAMPS

Code No	Designation	Lamp Type	Dimensions (mm)					Fig.
			L_k	L_b	L_1	d_1	d	
9-8-151-01007•	KS-MI 043/B	TC...400 W	10.5	5.4	1.20	1.2	3.6	1
01008•	KS-MI 047/B	TC... 150 W/120 V	8.0	4.4	1.00	1.0	3.0	
01016•	KS-MI 060/3	TC... 35, 70 W/120 V	5.5	2.3	0.55	0.55	1.7	
01019•	KS-MI 080	TC... 100 W	6.5	3.2	0.70	0.7	2.1	
01020	KS-MI 075	TC... 1000 W	14.5	8.1	1.80	1.8	5.4	
01021•	KS-MI 097	TC... 150 W	7.0	3.1	0.80	0.8	2.5	
01026•	KS-MI 100	TC... 250 W	7.5	3.7	1.00	1.0	3.4	
01022•	KS-MI 093	TC... 100 W/120 V	6.5	3.2	0.85	0.85	2.5	

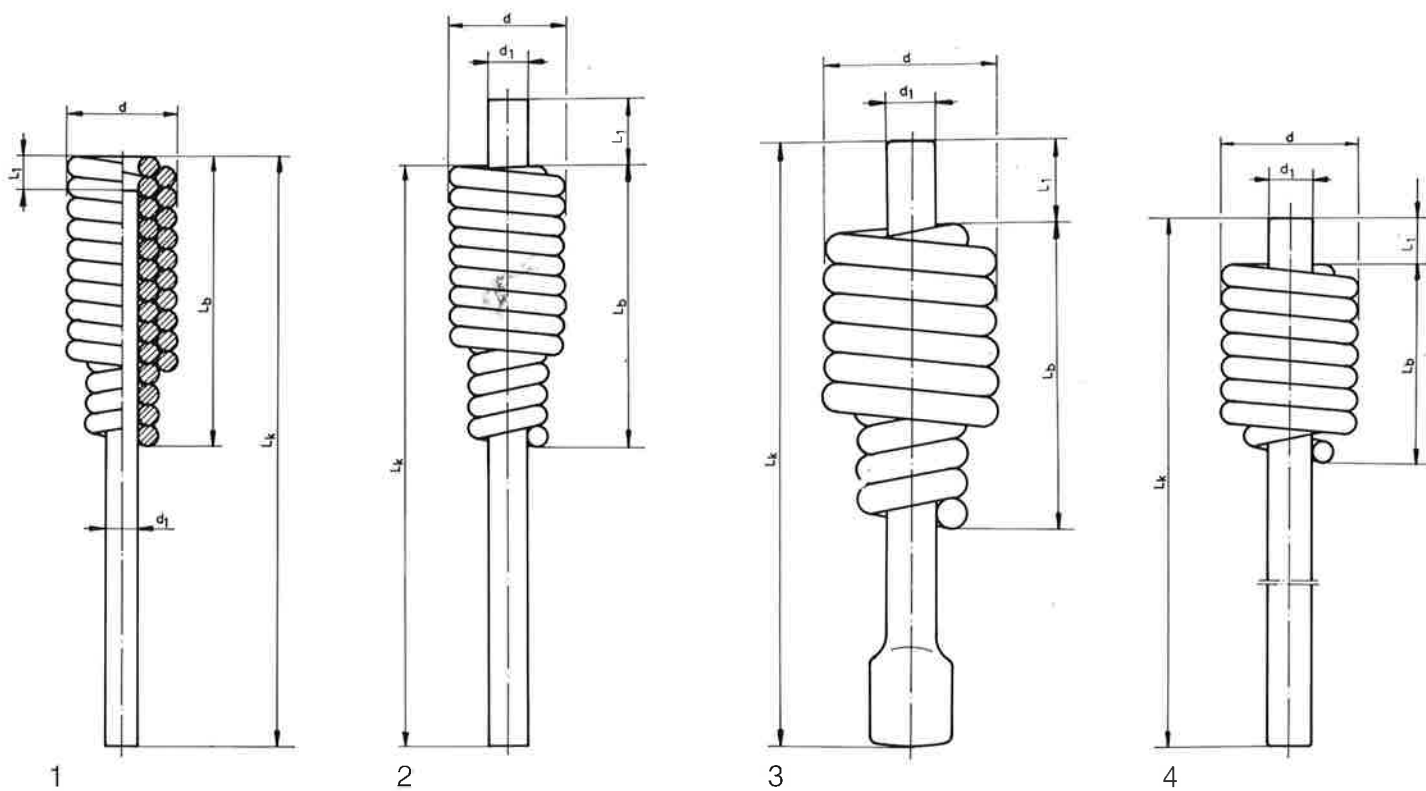
FILAMENTS FOR METAL HALIDE LAMPS

Code No	Designation	Lamp Type	Dimensions (mm)					Fig.
			L_k	L_b	L_1	d_1	d	
9-9-543-10450•	KS-MI 005/B	HgMI... 400 W	15.0	—	8.2	4.0	0.6	2
10420•	KS-MI 006/B		—		4.2	2.5	—	3
8-151-01005	KS-MI 041	HgMI... 400 W/D...	12.3	1.5	3.3	3.3	0.90	1
9-543-10380•	F/HM-200101*	HgMI 2000 W/220, 380 V	21.0	—	11.0	5.0	1.0	4
10400•	F/HM-200102*		—		4.5	2.8	—	3
8-151-01001	F/HO-25020	HgMIR 250 W/D...	13.2	1.2	6.0	2.4	0.90	5

* For one cathode, one F/HM-200101 and two F/HM-200102 are required.

FILAMENTS FOR HIGH PRESSURE DISCHARGE LAMPS

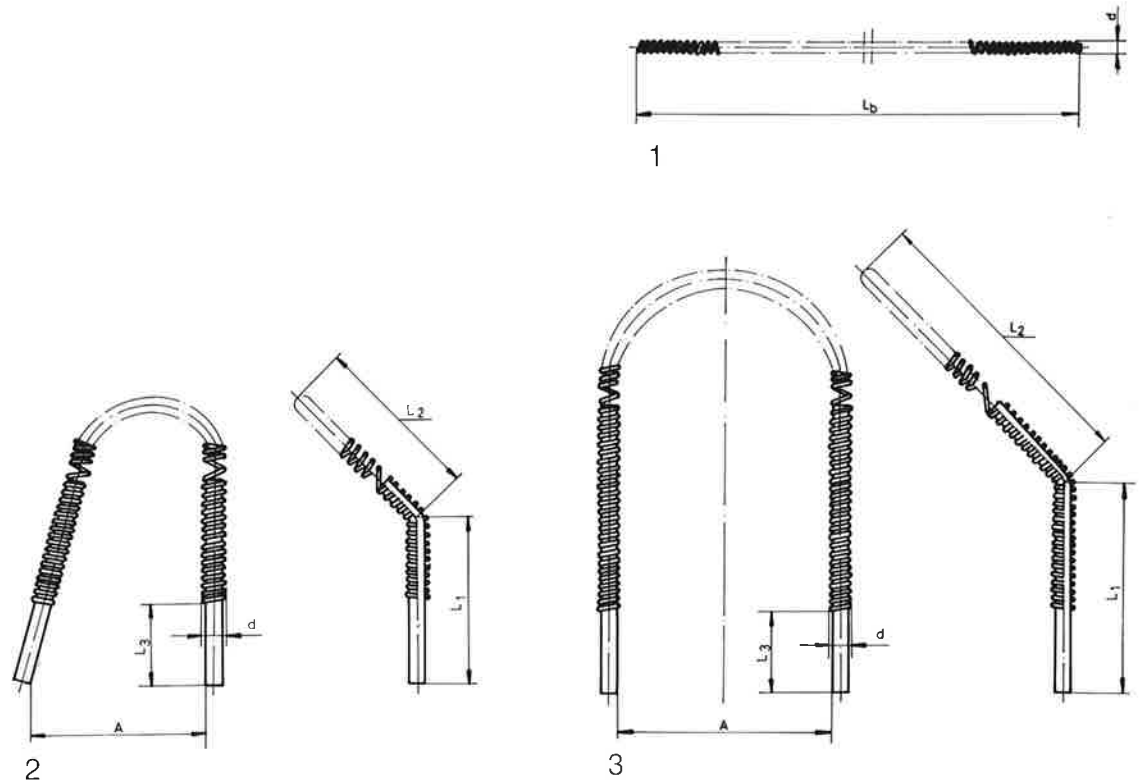
FILAMENTS FOR MAIN ELECTRODES OF HIGH PRESSURE MERCURY VAPOUR AND BLENDED LIGHT LAMPS



Code No	Designation	Lamp Type	Dimensions (mm)					Fig.
			L_k	L_b	L_1	d_1	d	
for High Pressure Mercury Vapour Lamps								
9-8-151-01010●	HgL 80 W	HgLI 80 W...	9.0	4.4	0.5	0.50	1.9	1
01011●	HgL 125 W	HgLI 125 W...	10.0	4.2	1.0	0.60	2.0	2
01012●	HgL 250 W	HgLI 250 W...	12.0	6.0	1.3	0.9	2.5	
01013●	HgL 400 W	HgLI 400 W...	14.8	8.8	1.5	1.00	3.5	3
01014	HgL 700 W		18.0	9.0	2.5	1.50	5.1	
01015	HgL 1000 W		22.0	13.5	1.7			
01024●	KS-MI 098	HgLI 125 Sylvania	10.0	3.1	0.8	0.80	2.5	4
01025●	KS-MI 106	HgLI 80, 100 W...	9.5	0.7	3.2	0.70	4.3	
for Blended Light Lamps								
01018	KS-MI 075	HMLI 500 W/120	16.0	5.8	1.4	1.20	2.1	4

FILAMENTS FOR HIGH PRESSURE DISCHARGE LAMPS

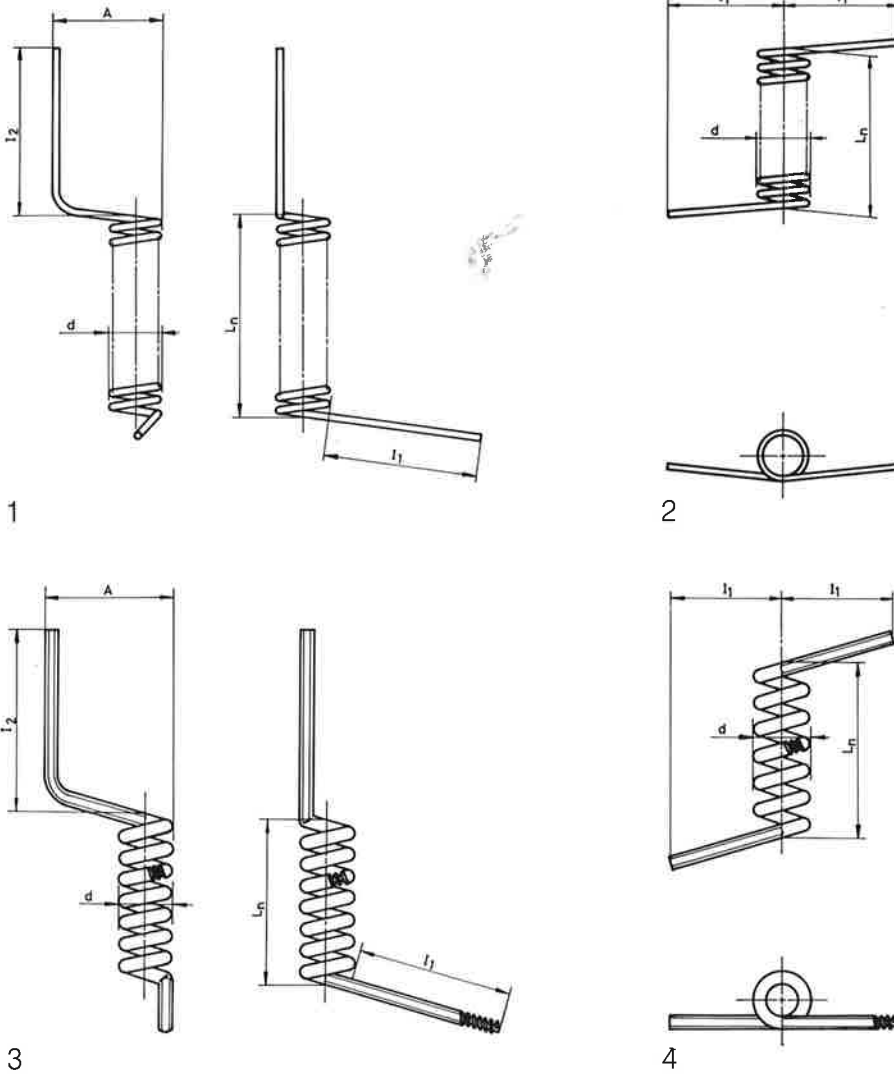
SINGLE INCANDESCENT AND HEATING FILAMENTS FOR BLENDED LIGHT LAMPS



Code No	Designation	Volts	Watts	Life (hours)	Dimensions (mm)						Fig.						
					L _b	d	L ₁	L ₂	L ₃	A							
9-9-541-11980	Blended Light C	120	160	6000	67.0	0.54	—	—	—	—	1						
12020			250		95.0	0.56											
12270			500		110.0	1.01											
11990●		225	160		67.0	0.54											
12030●			250		95.0	0.62											
12060●			500		110.0	0.94											
12000●		235	160		67.0	0.56											
12040●			250		95.0	0.65											
12070●			500		110.0	0.98											
12010●		245	160		67.0	0.58											
12050			250		95.0	0.68											
12080●			500		110.0	1.03											
31980		Blended Light U	120		160	—						0.71	4.0	4.2	1.5	3.2	2
31990					250	—						0.79	5.0	4.8	2.5	5.0	
32150					500	—						0.86	6.5	8.5		7.0	

FILAMENTS FOR AUTOMOTIVE LAMPS

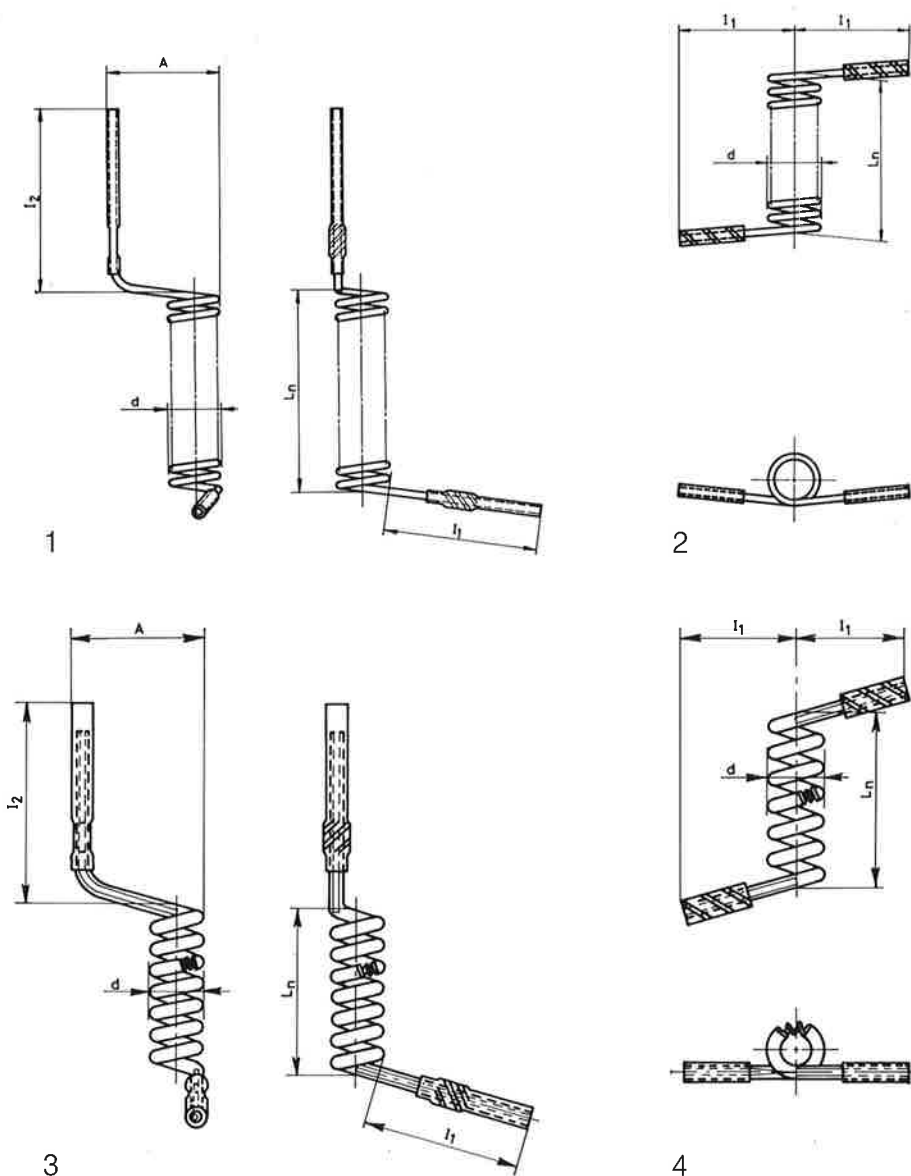
FILAMENTS FOR DOUBLE FILAMENT ASYMMETRIC HEADLIGHT LAMPS for Halogen Types without Mo-Tube



Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)					Fig.
						L_n	d	l_1	l_2	A	
9-9-541-32290	HS-1 HZ	6	35	200	440	3.8	1.23	4.3	6.9	3.1	1
32280	HS-1 Z			100	700		1.13	3.5	—	—	2
32310	HS-1 HZ	12		200	525	4.9	0.98	4.3	5.0	3.0	1
32300	HS-1 Z			100	784	4.4	0.93	3.5	—	—	2
30140	H4-HZ	12	55	300	1022	5.7	1.42	4.3	5.0	3.2	1
32160	H4-Z		60	150	1600	4.8	1.66	3.5	—	—	2
32560			85	100	2270	5.0	1.68				
542-20030	CC H4-HZ	24	70	300	1090	5.3	1.75	4.6	5.5	3.3	3
20020	CC H4-Z		75	150	1766		1.90	3.7	—	—	4
20620			100	100	2350		2.31				
541-32170	H4-Z	12	100	100	2401	4.9	1.81	3.5	—	—	2
32110	H4-HZ		80	200	1334	5.9	1.40	4.3	5.0	3.3	1
32220	H4-Z		140	25	3094	5.7	2.06	3.5	—	—	2
32230	H4-HZ		100	50	1530	5.8	1.66	4.3	5.0	3.3	1

FILAMENTS FOR FLUORESCENT LAMPS

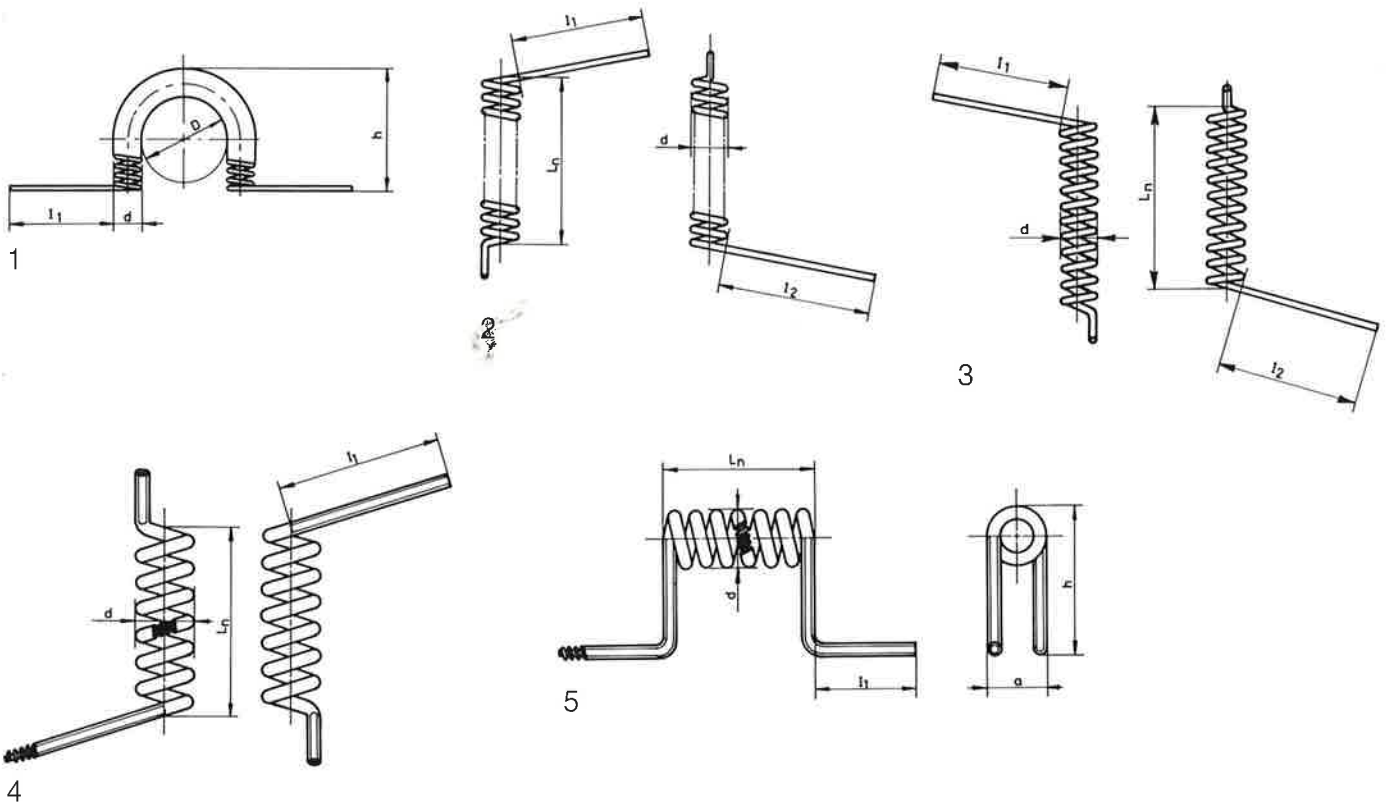
for Halogen Types with Mo-Tube



Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)					Fig.
						L_n	d	l_1	l_2	A	
9-8-153-10180	HS-1 HZ	6	35	200	440	3.8	1.23	4.5	7.5	3.21	1
10170	HS-1 Z			100	700		1.13	3.5	—	—	2
10200	HS-1 HZ	12	35	200	525	4.9	0.98	4.5	5.5	3.12	1
10190	HS-1 Z			100	784	4.4	0.93	3.5	—	—	2
10090	H4-HZ	12	55	300	1022	5.7	1.42	4.5	5.5	3.4	1
10150	H4-Z		60	150	1600	4.8	1.66	3.5	—	—	2
10320	H4-Z	85	100	2270	5.0	1.68	3.5	—	—		
10160	H4-Z	100	100	2401	4.5	1.81					
10130	H4-HZ	12	80	200	1334	5.9	1.40	4.5	5.5	3.5	1
10230	H4-Z		140	25	3094	5.7	2.06	3.5	—	—	2
10240	H4-HZ	12	100	50	1530	5.8	1.66	4.5	4.8	3.41	1
10280•	H4-HZ		70	300	1090	5.3	1.76	4.6	5.8	3.43	3
10270•	H4-Z	24	75	150	1766		1.90	3.7	—	—	4
10310•	H4-Z		100	100	2350	2.31					

FILAMENTS FOR AUTOMOTIVE LAMPS

FILAMENTS FOR DOUBLE FILAMENT ASYMMETRIC HEADLIGHT LAMPS, Cont. for Traditional Types

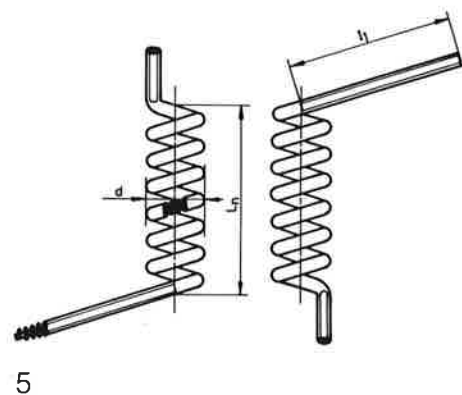
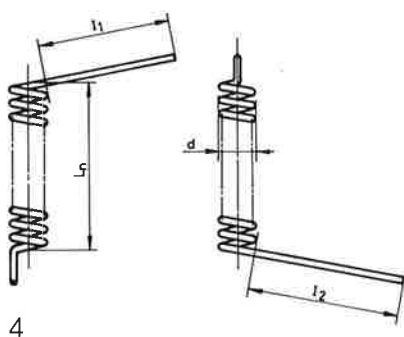
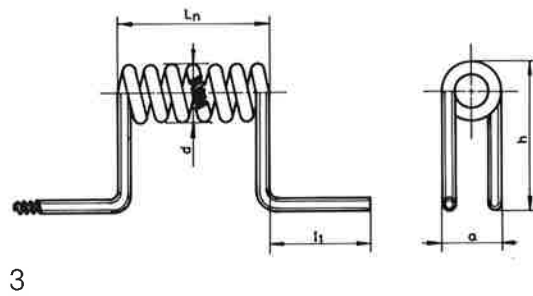
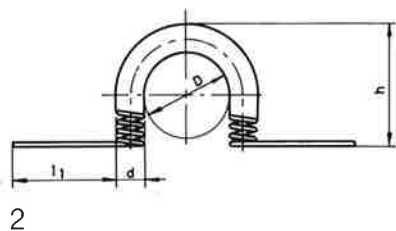
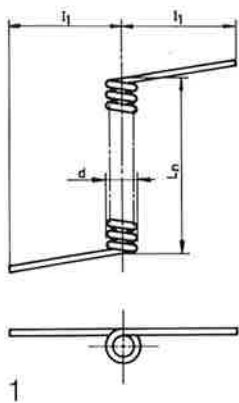


Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)							Fig.
						L_n	l_1	l_2	d	h	D	a	
9-9-541-31580●	UHZ	6	45	75	650	—	4.0	—	1.00	3.5	2.0	—	1
31740●	HZ		40	150	460	5.1		4.5	1.14	—	—		2
31630●	UHZ	75 ^{CP}	75	75	75 ^{CP}	—	—	1.08	3.4	2.0	1		
32480●	HZ	100	100	100	75 ^{CP}	5.7	3.8	4.5	1.23	—	—		3
31600●	UHZ	12	45	75	660	—	4.5	—	0.88	3.8	2.5		1
32050●	HZ		40	150	480	5.7		3.8	1.25	—	—	2	
31640●	UHZ		75	75	75	—		—	0.93	4.0	2.5	1	
32500●	HZ		100	100	100	75 ^{CP}		5.8	3.8	1.44	—	—	3
542-20320●	H	24	55	75	670	4.8	3.8	—	1.92	4.5	—	1.8	4
20350●	HZ		50	150	460	5.8	5.0	—	1.85	—	—	—	5

CP: candle power

FILAMENTS FOR AUTOMOTIVE LAMPS

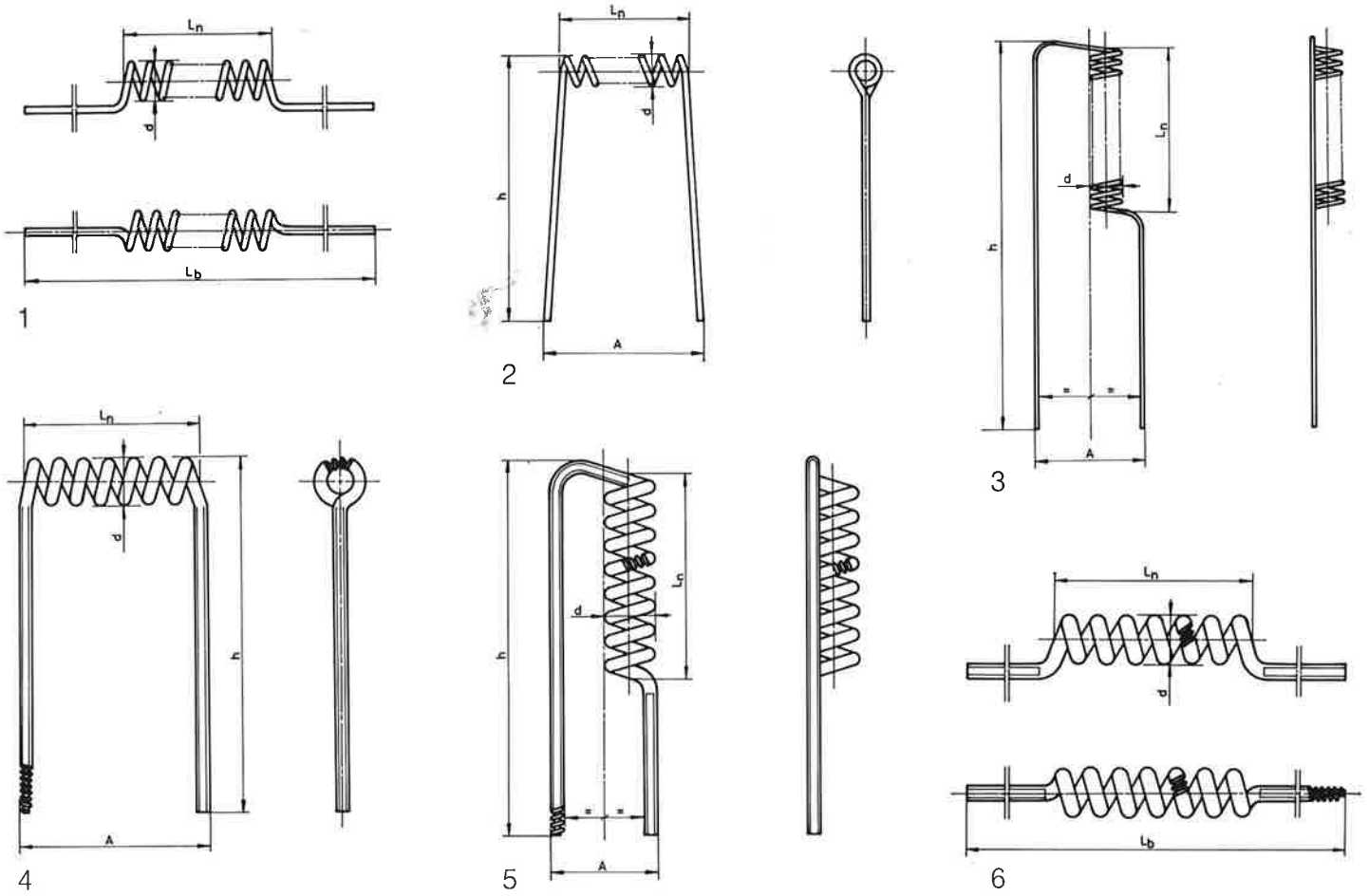
FILAMENTS FOR DOUBLE FILAMENT TRADITIONAL SYMMETRIC HEADLIGHT LAMPS



Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)							Fig.
						L_n	l_1	l_2	d	h	D	a	
for Main Spiral													
9-9-541-31770●	Z	6	15	100	235	3.1	3.4		0.70	—	—		1
31780●			18		270				0.76				
31540●	UHZ	6	25	75	383	—	4.0		0.64	2.5	2.0	—	2
31560●			35		595				0.73				
31580●			45		650				1.00				
31840●	U	12	20	75	334	—	3.5		0.45	2.9	2.0	—	2
31550●			25		412				0.50				
31570●	UHZ	12	35	75	630	—	4.5		0.63	3.4	2.5	—	2
31600●			45		660				0.88				
31620●			50		950				0.82				
542-20300	H	24	35	100	400	4.5	3.8		1.69	4.5	—	1.8	3
20310●			45		900				1.96				
20290●			50		640				1.98				
for Auxiliary Filaments													
9-9-541-31700●	Gas Auto HZ	6	15	100	165	3.2	3.0	3.0	0.69	—	—	—	4
31710●			18		193				0.74				
31650●			25		306				0.89				
31730●			35		428				0.99				
31720●		12	25	300	6.0	4.0	4.5		0.70	—	—	—	4
31660●			35	438	0.98								
542-20330			35	304	5.0				1.64				
20340●	24	40	610	5.2	5.0	—		1.68	—	—	—	5	
20350●		50	460	5.8				1.85					

FILAMENTS FOR AUTOMOTIVE LAMPS

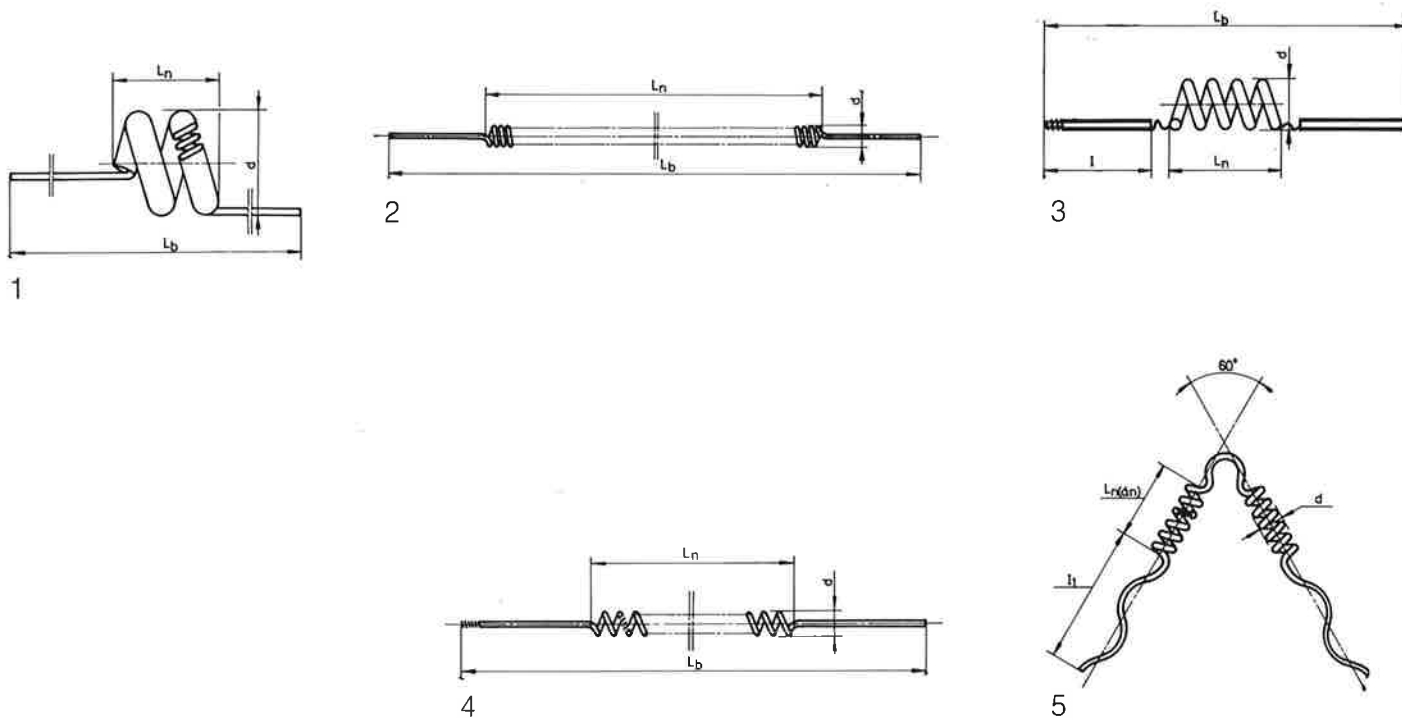
FILAMENTS FOR SINGLE FILAMENT HEADLIGHT LAMPS for Halogen Types



Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)					Fig.
						L_b	L_n	d	A	h	
Normal Range											
9-9-541-20190	H1L	6	55	150	1350	18.0	4.7	1.34	—	—	1
30090	H3				1030	—	4.1	1.07	4.4	11.0	2
32100●			35		750	—	4.6	1.09	5.3		
20200●	H1L	12	55	225	1550	17.0	5.0	1.24	—	—	1
30080●	H1/1Z				1475		4.75	1.05	3.5	13.3	3
30070●	H2Z				1665		5.5	1.09	3.5	12.5	
30100●	H3				1450		5.0	1.21	5.2	11.0	2
32330●	H3H	80	250	1890	—	4.8	1.45	5.5			
32130●	H2Z	100	100	2540	—	5.5	1.26	3.5	12.5	3	
542-20630	H3cc	24	45	500	1050	—	4.7	1.43	6.1	11.2	4
20610●	H3Hcc		60		1426		5.4	1.57			
20010●	H3Hcc		70		1700		5.7	1.65			
10030	H1Lcc	70	225	1900	18.0	6.1	1.63	—	—	6	
20040●	H2Zcc	150	150	1950	—	5.7	1.63	3.3	12.5	5	
20600	H3Hcc	80	3000	1660	—	5.0	2.35	6.1	11.5	4	
Rally Range											
9-9-541-20210●	H1/R L	12	100	150	2600	18.0	5.3	1.62	—	—	1
30110●	H3/R H			100	2260	—	4.7	1.58	5.5	11.0	2
542-20560●	H3/R H	24	100	100	2700	—	5.1	2.04	6.1	11.5	4

FILAMENTS FOR AUTOMOTIVE LAMPS

for Traditional Types*



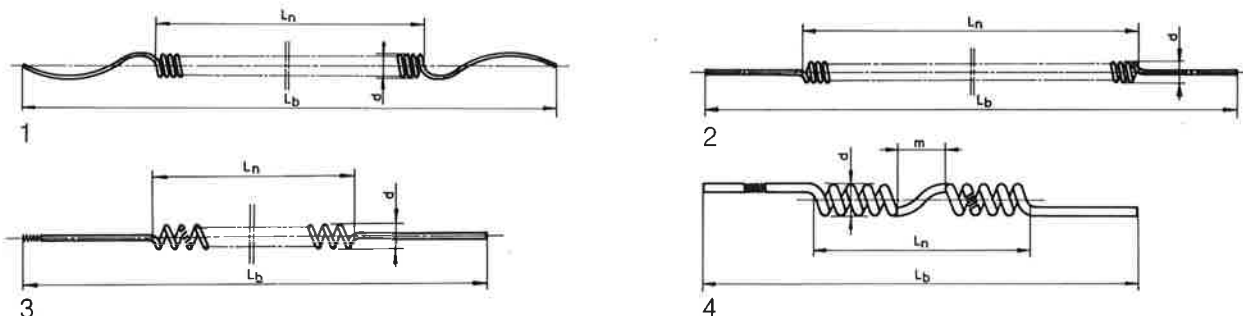
Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)					Fig.
						$L_n(\text{án})^{**}$	L_b	L_n	d	l_1	
9-9-542-10070	searching	6	25	75	442	2.5	10.3	2.3	2.05	-	1
541-21840	L		35	100	612		12.3	4.3	1.12		2
542-10080•	searching	12	25	75	450	2.5	7.3	2.3	1.67	-	1
541-21850	L		35	100	648		11.8	5.8	0.92		2
542-10980	searching	24	25	75	412	2.5	10.8	3.4	1.55	3.2	3
11030•	L		35	100	630		13.5	5.5	1.14		4
541-21600	searching/	6		75	595	2.5	9.2	3.2	1.43	-	2
542-10100•	L	12	50	1000	8.9		3.9	2.30	1		
20370•	V	24	25		400	2.5	-	-	0.78	4.0	5

* Main filament recommended to double filament symmetric headlight lamps can be assembled into single filaments traditional headlight lamps, too.

** $L_n(\text{án}) = L_n(\text{branch})$.

FILAMENTS FOR AUTOMOTIVE LAMPS

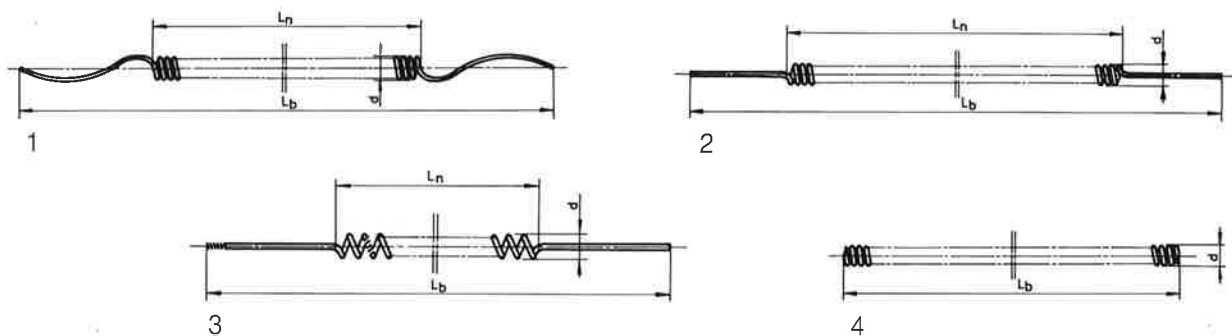
FILAMENTS FOR AUXILIARY LAMPS



Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)				Fig.		
						L _b	L _n	d	m			
for Main Filaments of Double Filament Auxiliary Lamps												
9-9-541-21800	Gas Auto Stop	4	8	100	90	12.4	3.4	0.37	-	1		
21910●		6	18	75	290	11.8	4.6	0.57				
21930			20		314	12.0	5.0	0.56				
21960●		12	6	21	100	415	13.2	4.2		0.84	-	2
21920●				18	75	297	11.4	4.4		0.64		
21940●			20	75	340	12.0	6.0	0.50				
23480●			12	12	150	451	12.8	5.8		0.65		
22750●		300			407	5.3		0.85				
22720●		Gas Auto Stop	24	32 ^{CP}	600	32 ^{CP}	13.0	6.0		0.8	-	3
542-11060		Gas Auto Stop		18	75	326		5.0		0.75		
12400●	Gas Auto Stop HD	24	21	150	426	13.0	6.2	0.99	1.5	4		
11070●	Gas Auto Stop				476		6.0	0.82	-	3		
541-23650	Gas Auto Stop	14	20	50	280	12.4	6.4	0.52	-	2		
for Auxiliary Filaments of Double Filament Auxiliary Lamps												
9-9-541-21740	Gas Auto C	4	3	100	21	13.0	4.0	0.17	-	1		
21750●		6	5	200	45	11.7	3.7	0.24		-	2	
21990●				1000	35	12.9	4.4	0.36				
23140●		12	4	1500	15	12.0	6.0	0.34		-	1	
21760				200	47		4.0	0.21				
21770●			5	1000	35	13.3	5.3	0.30				
21780●					33		0.31					
22760●		Krypton Auto C	24	3 ^{CP}	2000	35	13.0	6.0		0.43	-	2
22700●		3 ^{CP}			2000	3 ^{CP}		13.0		6.0		
542-11040●		Gas Auto CC	24	5	200	43	12.9	4.9		0.45	-	3
11050●	40				13.0	0.78						
541-23680●	14		7	1000	56	12.0	6.0	0.30	1			
for Single Filaments of Auxiliary Lamps												
9-9-541-21820	Gas Auto	6	L	15	75	225	12.8	4.8	0.49	-	2	
21910●				18		290	11.8	4.6	0.68			
21960			Stop	21	100	415	13.2	4.2	0.84			
21830●			12	L	15	75	248	13.0	5.0			0.45
21920					18		75	297	11.4			4.4
23480●				Stop Ind.	21	150	451	12.8	5.8			0.65
21940		20		75	340	12.0	6.0	0.50				
22720		32 ^{CP}	600	32 ^{CP}	13.0	6.0	0.80					
21730●		L	24	15	75	193	16.0	10.0	0.25	-	1	
542-11060●		18				75	326	13.0	5.0			0.75
11070●		21		150	476	13.0	6.0	0.82				
12400●		Stop HD	24	21	150	426	13.0	6.2	0.99	1.5	4	
541-23670●		Stop				12.8		25	75	420	12.8	4.08

CP: candle power

FILAMENTS FOR AUTOMOTIVE LAMPS

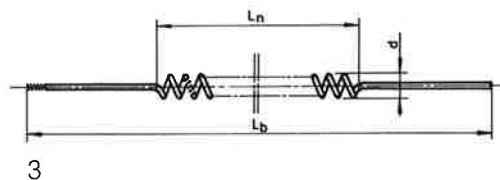
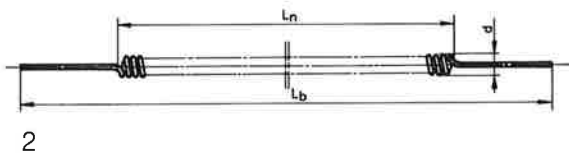
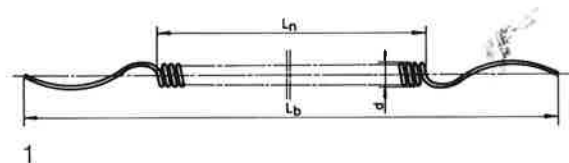


Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)			Fig.	
						L _b	L _n	d		
for Auxiliary Lamps in Spherical Bulb										
9-9-541-21630●	Gas Auto L	6	3	200	27	8.9	2.9	0.17	1	
21650●			5		50	9.2	3.2	0.26		
21700●			10		117	9.6	3.6	0.44		
21640●		12	3		27	9.0	3.0	0.17		
21660●			5		50	9.5	3.5	0.25		
21670			44		9.8	3.8	0.23			
22840●	Krypton Auto L	12	5	500	47	9.5	3.5	0.31	2	
22710	Gas Auto L		4 ^{CP}	2000	4 ^{CP}	10.0	4.2	0.49		
21690			7	100	65	8.8	3.8	0.30		
23150	Gas Auto L HD	24	10	200	113	13.0	8.0	0.27	1	
542-12290●	Gas Auto CC			300	125	14.0	5.9	0.53	3	
for Auxiliary Lamps in Tubular Bulb										
9-9-541-20930●	Vacuum Auto	6	0.6	200	4	9.3	3.3	0.08	1	
20940●			1.2		8	8.6	3.6	0.13		
21590●			2		12	9.5	4.5	0.18		
542-10880●		L HD	12	4	300	35	9.0	5.0	0.43	3
541-23170						12.5	8.5	0.23		
20960●		L	24	5	200	49	14.9	10.0	0.27	1
23160						15.0	9.9	0.25		
12260		L	27	3	200	42	11.0	—	0.18	4
542-10870●			24			16	8.0	4.0	0.34	3

CP: candle power

FILAMENTS FOR AUTOMOTIVE LAMPS

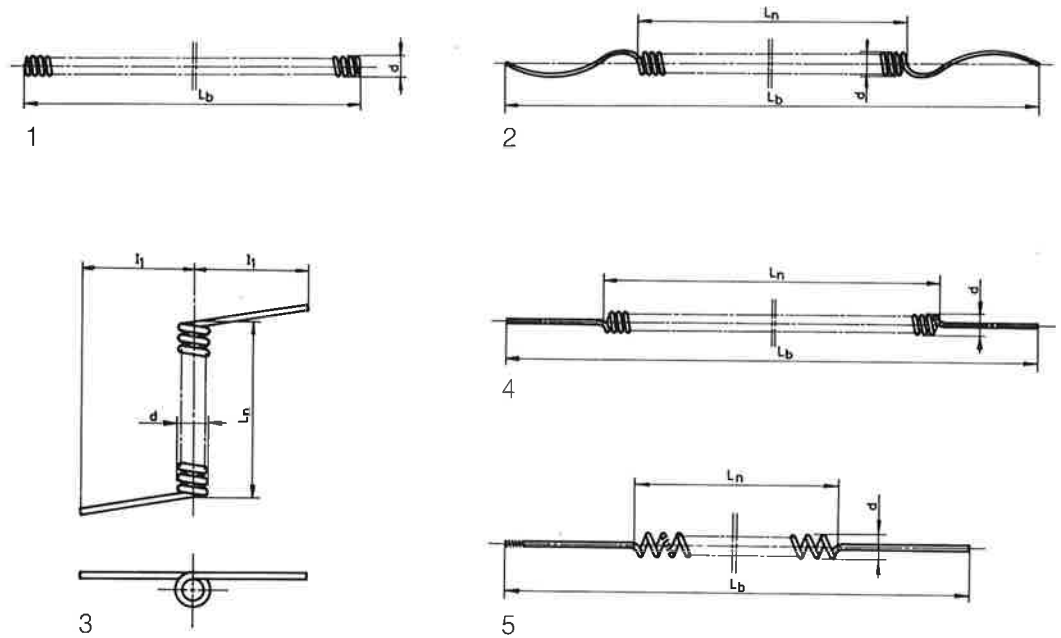
FILAMENTS FOR AUXILIARY LAMPS, Cont. for Auxiliary Lamps in Festoon Form



Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)			Fig.
						L_b	L_n	d	
for Vacuum Types									
9-9-541-21200•	Vacuum Auto Festoon Short	6	3	200	26	13.0	8.0	0.16	1
21210•		12			27			0.13	
21250•		24			25			0.08	
23690	Vac. Auto Festoon	28	5	200	45	22.0	14.0	0.13	2
23700•		32			45			0.14	
for Gas-Filled Types									
9-9-541-23550•	Gas Auto Festoon	6	5	200	45	13.3	5.3	0.16	2
21380			15	75	232	9.6	2.6	0.82	
23540		12	5	300	45	14.0	8.0	0.12	1
22860•			10	200	124	15.1	8.1	0.22	
21390•			15	75	232	14.0	6.0	0.38	2
21400•			18		270			0.47	
542-12570•		24	5	300	45	16.0	8.0	0.29	3
12330•			10	200	90	14.0	4.1	0.52	
10940•			15	75	200		6.0	0.54	
10950•			18		265	0.72			

FILAMENTS FOR AUTOMOTIVE LAMPS

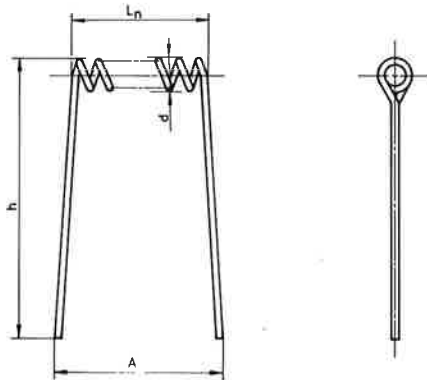
FILAMENTS FOR BICYCLE AND SCOOTER HEADLIGHT LAMPS



Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)				Fig.	
						L_b	L_n	d	l_1		
for Bicycle Headlight Lamps for Traditional Vacuum Types											
9-9-541-12320	Vacuum Bicycle	6	0.6	100	2	6.0	—	0.14	—	1	
20980			2.4		22	7.2	2.2	0.30		2	
20990			6		54	9.4	4.4	0.39			
for Halogen Types											
9-9-541-22890 22900	Halogen Bicycle	6	2.4 3	100	42 55	5.2	1.5 1.6	0.21 0.24	—	2	
for Krypton Types											
9-9-541-21550 21560	Krypton Bicycle	6	3 5	100	34 60	7.9 8.4	2.9 3.4	0.18 0.27	—	2	
for Traditional Scooter Headlight Lamps											
9-9-541-32380	Gas Scooter	Z	6	15	150	240	—	2.7	0.78	3.4	3
23530•		L	12				8.0	3.6	0.59	—	4
for Traditional Tractor Headlight Lamps											
9-9-542-11010	Gas Tractor	12	15	100	237	8.6	2.6	1.08	—	5	

FILAMENTS FOR AUTOMOTIVE LAMPS

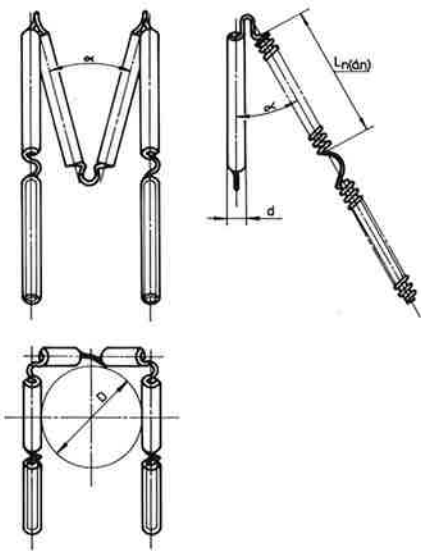
FILAMENTS FOR SPECIAL PURPOSES



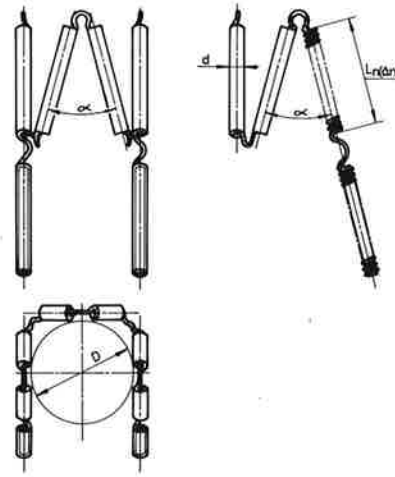
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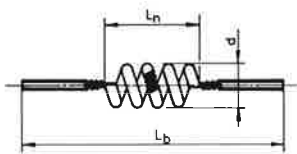
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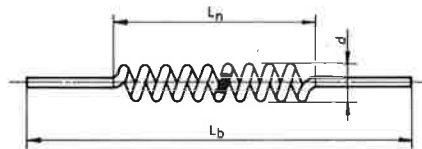
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Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)					Fig.
						L _b	L _n	d	A	h	
for Halogen Automotive Lamps for Inside Lighting											
9-9-541-32270●	Halogen Projector H	6	6	100	95	—	1.2	0.66	3.5	6.5	1
32210			8		140		1.5	0.67	—	—	
32010●			10		200		1.6	0.68	3.5	6.5	
32020			20		440		2.0	1.02			
32260●			420		1.09						
23560	Halogen Miniature Auto L	12	5	240	80	6.6	1.6	0.198	—	—	2
23570			10		200	6.71		0.345			
32030●			20		500	—		3.3	0.91	4.0	

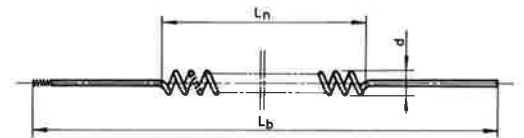
FILAMENTS FOR AUTOMOTIVE LAMPS



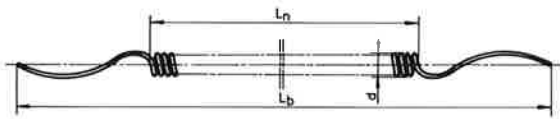
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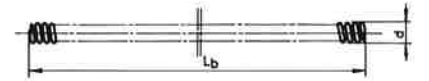
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7



8



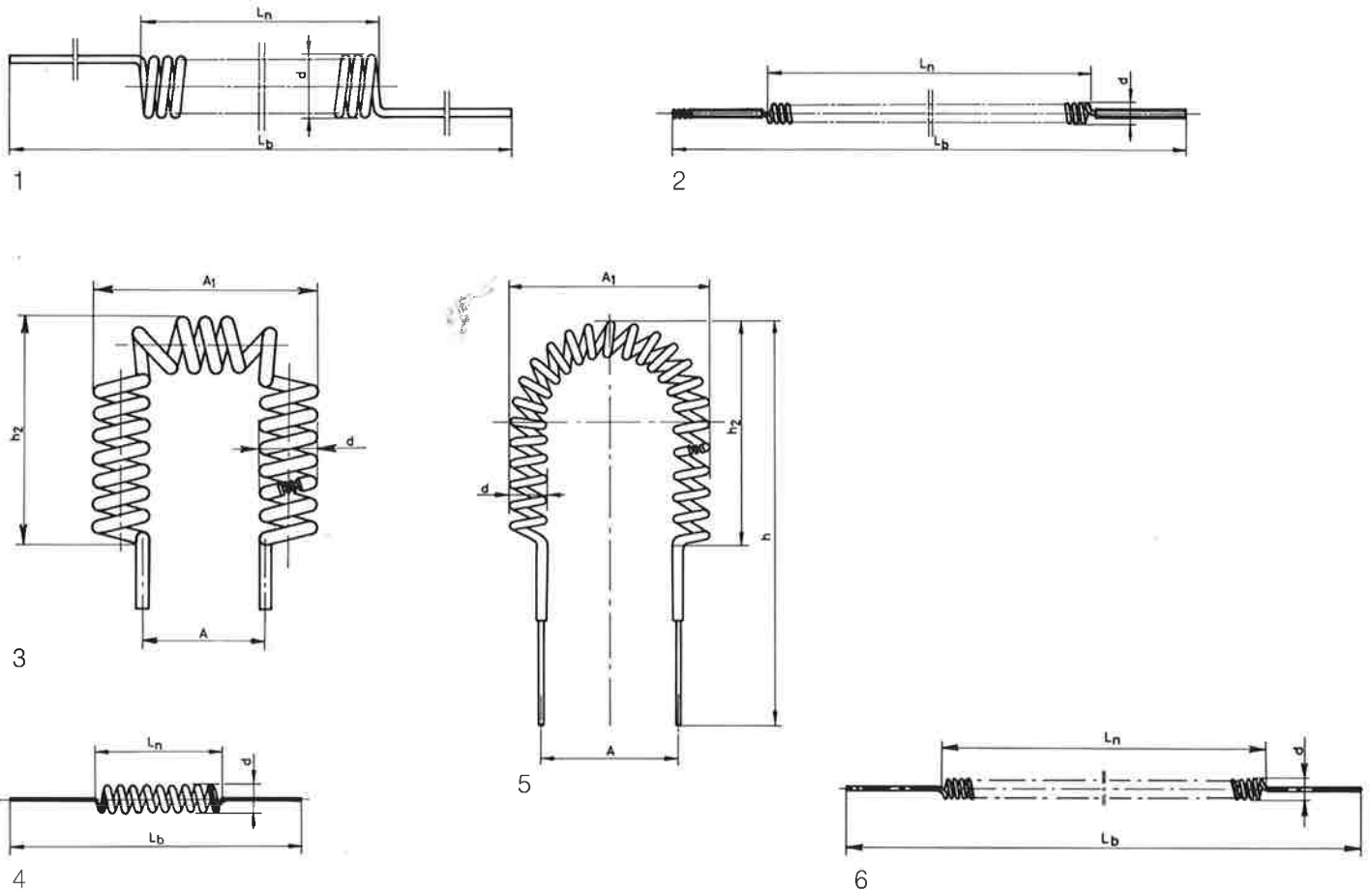
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Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)						Fig.
						L _b	L _{n(ân)*}	L _n	d	α(°)	D	
for Special Automotive Headlight Lamps												
9-9-541-31460•	Locomotive Headlight	24	100	1000	1580	—	6.6	—	0.67	30	6.0	3
31850		78			1210		8.7		0.34			4
31520			250		3825		7.8		1.01			70
8-153-10060•	Airplane Headl.	24	100	100	2200	15.7	—	5.7	2.85	—	—	5
9-542-10990	Special Headl.	28	40	200	640	11.6	—	6.0	1.2	—	—	6
541-21860	Gas Auto L	24	35	1000	472	23.0	—	15.0	0.45	—	—	2
21900			50		750			24.0	16.0			
for Other Special Automotive Lamps												
9-9-541-20220	Gas Accu. L	6	15	1000	188	10.0	—	4.0	0.64	—	—	2
20230					168	12.7		6.7	0.42			
20250			25		363	13.3		7.3	0.62			
20260•					518	14.1		8.1	0.75			
542-12320	Gas Instr. L	12	6	100	60	4.6	—	1.6	0.58	—	—	7
541-22850•	Gas Light. Barrier L		15	1000	165	13.0	—	8.0	0.37	—	—	2
23310	Gas Light Signal L	24	5	1000	40	12.0	—	7.0	0.21	—	—	8
10610•	Vac. Train Locking		1.2		5	11.0	—	0.09	—	—	—	—

* L_{n(ân)} = L_{n(branch)}

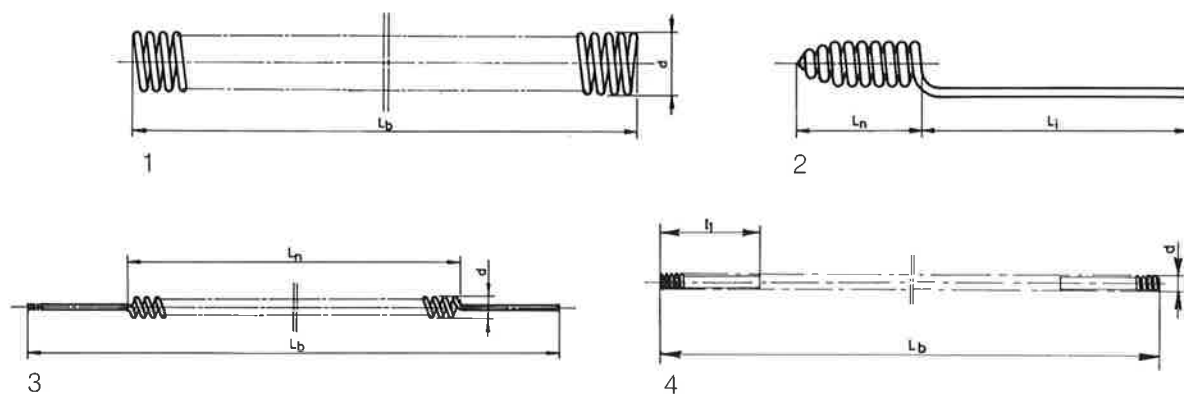
FILAMENTS FOR PHOTO, PROJECTION AND FLOODLIGHT LAMPS

FILAMENTS FOR HALOGEN PHOTO LAMPS



Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)						Fig.		
						L _b	L _n	h	h ₂	A ₁	A		d	
9-9-541-20170	Hal. Photo 3200 K	30	250	150	6.4	26.5	12.5					1.99	1	
8-155-10100	Hal. Photo C-I	115	1000	50	34.2	103.0	78.0					1.22	2	
10060	Hal. Repr. C-I	120	425	300	9.8	86.0	58.0					1.12		
10070			500		12.15			1.23						
10110	Hal. Photo C-I			50	34.2	103.0	78.0					1.22		
9-541-22770	Hal. Photo			300	27.5	92.0	58.0	-				2.13		6
8-155-10120	Hal. Photo C-I	125	1000	50	34.2	103.0	78.0					1.24	2	
10080		225			33.85			1.4						
10090		245			30.6			1.44						
9-542-20500	Hal. Photo form. CC	225	650	15	33.0				12.4	14.4	8.2	3.43	3	
20510				75	30.0				14.2	14.0	7.7	3.62		
20470	Hal. Photo U	240	650	15	21.0			24.0	13.8	8.6	8.5	2.33	5	
20490				75	17.1	14.8	9.8		9.3	2.74				
20480				15	21.5	13.9	10.0		2.80					
8-155-10150	Hal. Photo CC-D 3400 K	115/120	420	100	20.5	45.0	18.0					4.26	4	
10720	Hal. Photo CC-D	120	650		11.0	60.0	22.7							3.35
10620			1000		16.5						5.14			
10690			600		14.2						5.73			
10630	800	75	14.2	28.2		3.90								
10160	Hal. Photo CC-D 3400 K	225	15	22.5	45.0	28.1					4.20			
10710	Hal. Photo CC-D 3200 K		75	21.5	28.0						4.75			

FILAMENTS FOR PHOTO, PROJECTION AND FLOODLIGHT LAMPS



FILAMENTS FOR HALOGEN PHOTO LAMPS, MOUNTED

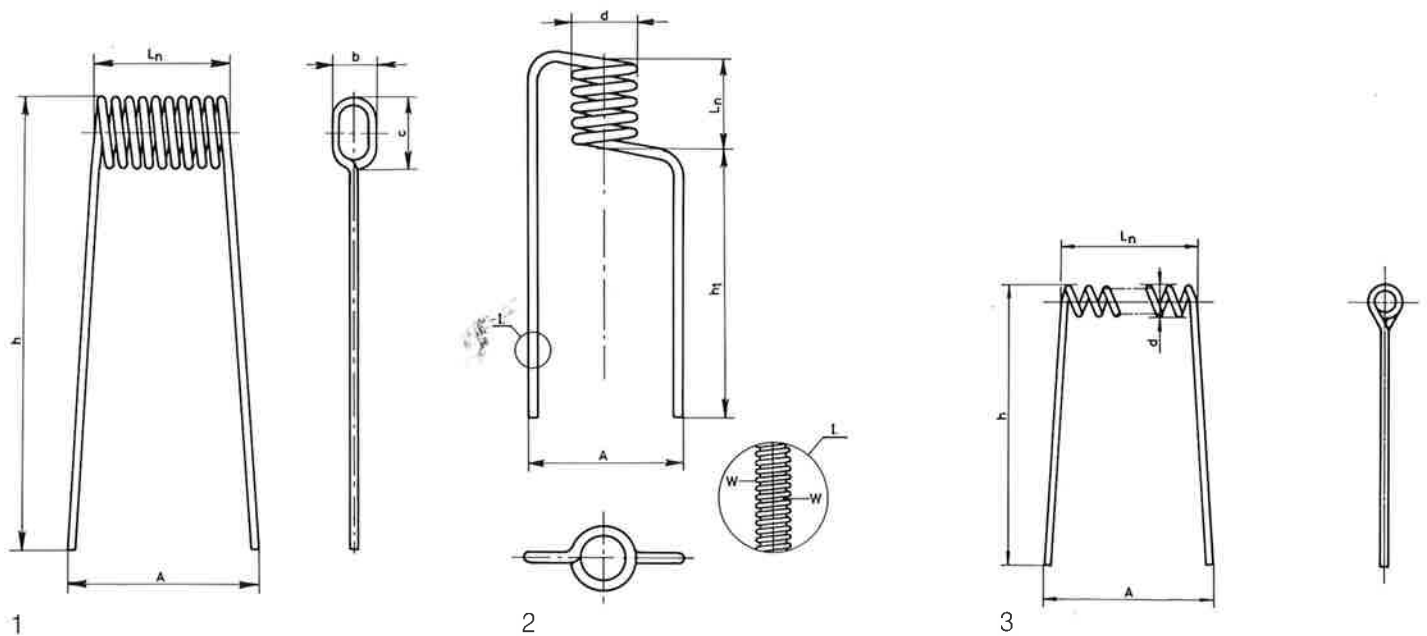
Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)				Fig.
						L_b	L_n	L_l	d	
9-9-541-12740	Hal. C Photo C	130	1000	50	33.2	70.2	—	—	1.97	1
9-9-112-32520				—	—	—	3.1	11.0	—	2
9-9-541-12780		225		200	27.1	130.0	—	—	1.24	1
9-9-112-32530				—	—	—	4.0	9.7	—	2

FILAMENTS FOR TUNGSRAPHOT PHOTO AND LARGIPHOT ENLARGING LAMPS

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)				Fig.												
						L_l	L_b	L_n	d													
9-9-542-10250	LARGIPHOT CC	125	75	100	1170	—	21	15.1	0.79	3												
10270			125		2200						24	17.4	1.02									
10290			150		2720									34	28.5	0.51						
10260			75		960												37	29.0	0.74			
10280			125		1850															38	30.2	1.02
10300			150		2350																	
10310		200	2870	43	33.4		1.24															
10340		250	6710					43	33.1		1.43											
10320		300	5240									38	29.5	1.09								
10330		300	5240												38	29.5	1.09					
10350		230	250															3	7500	3.0	62	0.50
541-10320		LARGIPHOT C	125															200	100			
10330	250			3	7110	64	0.63															
10350	300			100	5930			64	0.79													
10340	250			3	8030					42	4.0	0.63										
10360	TUNGSRAPHOT C	120	100	12000	—								84	5.0	0.92							
10400			6	16300		110	4.0									0.71						
10380			100	11000				71	5.0								0.81					
10410		220	6	14400						110	4.0	0.71										
10390			100	10930		71	5.0									0.83						
10420			6	14400				71	5.0								0.83					
10420	230	100	10930	71	5.0					0.83												
10420	6	14400	71			5.0	0.83															

FILAMENTS FOR PHOTO, PROJECTION AND FLOODLIGHT LAMPS

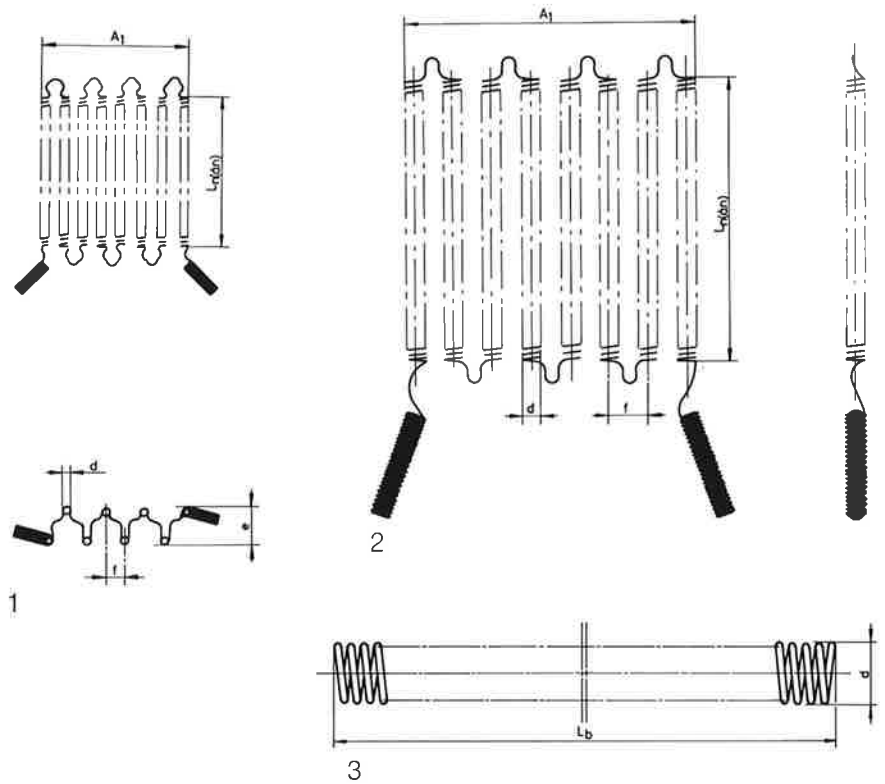
FILAMENTS FOR HALOGEN PROJECTION LAMPS



Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)							Fig.
						L _n	A	h	b	c	h ₁	d	
for Standard Types													
9-9-541-30010	Halogen Narrow Film H	12	50	50	1399	3.1	5.5	13.3	0.9	1.6	—	—	—
30020●			100		2850	4.0	5.7	13.6	1.3	2.2	—	—	—
32630●		15	150	50	2354	4.3	5.4	11.9	—	—	—	2.88	3
30040●					4993	4.5	5.8	13.9	1.12	2.95	—	—	1
30030●			4996	5.8	6.1	14.0	1.2	2.9					
30050●		24	250	300	9010	7.4	7.7	18.4	1.26	3.36	—	—	—
32240			Special Hal. Proj. H.		150	4500	6.4	6.6	14.6	1.08	3.48	—	—
for Dichroic-Mirrored Types													
30060	Halogen Narrow Film DM	8	50	50	1243	2.1	4.3	—	—	—	9.0	1.54	2
543-10010●		12	75		1856	1.9	4.7					1.83	
10020●			100		2751	2.3	4.8					2.04	
10030●		15	150	4150	2.8	5.2	2.37						
10040●		24	200	25	6406	4.1	6.0	8.5	2.34				
10050●			250		7912	4.8		9.0	2.58				

FILAMENTS FOR PHOTO, PROJECTION AND FLOODLIGHT LAMPS

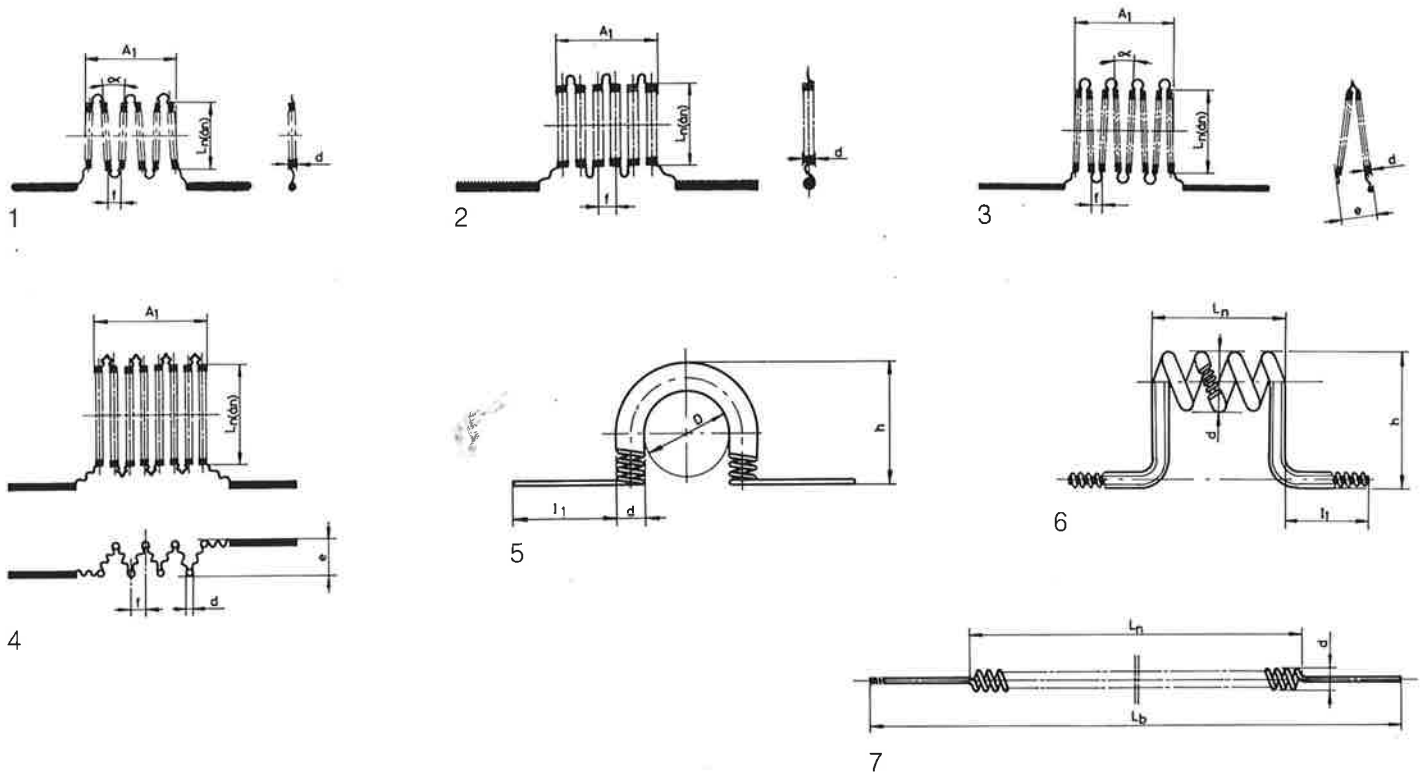
FILAMENTS FOR HALOGEN FLOODLIGHT LAMPS



Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)					Fig.
						L_1	$L_{n(an)} * A_1$	d	e	f	
9-9-541-32340•	Hal. Studio	220	650	100	15.5	—	9.5×11.6	1.30	3.4	2.8	1
31950•			1000	200	24.96		17.5×16.0	1.13	—	2.1	2
31940	Hal. Theatre Illum.		750	21.42	17.9×16.0		1.28	—	2.1	2	
31930			2000	400	50.0		23.9×22.0	1.47	5.6	2.9	1
32440•	Hal. Studio	240	650	100	15.037	—	9.5×11.6	1.30	3.4	2.8	1
32420•			1000	200	25.278		17.5×16.0	1.18	—	2.1	2
32410	Hal. Theatre Illum.		750	21.217	17.9×16.0		1.33	—	2.1	2	
32430•			2000	400	50.19		23.9×22.0	1.51	5.6	2.9	1
10150	Halogen C	225	5000	2000	126.0	260.0	—	3.40	—	—	3

* $L_{n(an)} = L_{n(branch)}$

FILAMENTS FOR PHOTO, PROJECTION AND FLOODLIGHT LAMPS



FILAMENTS FOR GAS-FILLED FLOODLIGHT LAMPS IN TUBULAR BULB

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)						Fig.
						$L_{n(\text{án})}^*$	A_1	d	e	f	$\alpha(^{\circ})$	
9-9-541-30310	Gas-Filled Tubular Projection	120	250	100	4.9	9.4	9.8	0.73	—	1.8	5	1
30330			500		11.1	9.7	12.3	1.28		2.2		
30410			1000		25.7	13.2	15.2	1.74	2.7	—		
30380		220	250		15.0	4.4	11.0	0.49	5.5	2.0	5	3
30340			500			9.84	12.5	0.84				
30420			1000			22.03	14.9	16.7				
30390		230	250		15.0	4.35	11.2	0.49	5.5	2.0	5	3
30360			500			9.76	12.8	0.84				
30430			1000			21.93	14.7	16.7				

* $L_{n(\text{án})} = L_{n(\text{branch})}$

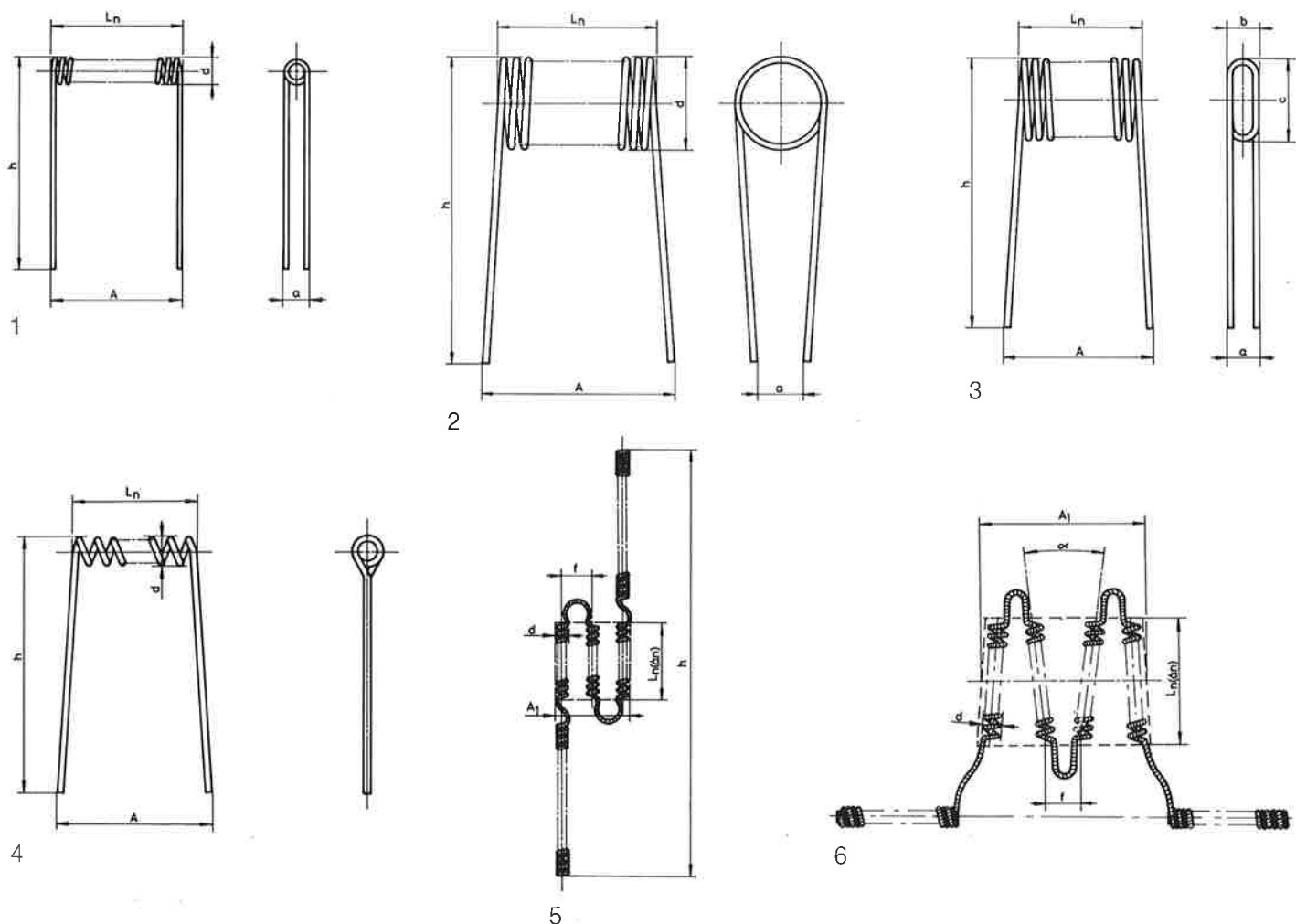
FILAMENTS FOR TOP-MIRRORED SURGICAL FLOODLIGHT LAMPS

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)					Fig.
						l_1	d	L_n	h	D	
9-9-541-31530	Surgical UHZ	6	15	500	164	4.0	0.50	—	2.8	1.8	5
542-20280•	Surgical H	12	30	1000	420	2.6	1.80	4.0	4.1	—	6

FILAMENTS FOR SEMAPHORE LAMPS

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)			Fig.
						L_b	L_n	d	
9-9-542-10040•	Gas-Integra	35	0.475	600	150	13.1	8.1	0.58	7

FILAMENTS FOR PHOTO, PROJECTION AND FLOODLIGHT LAMPS



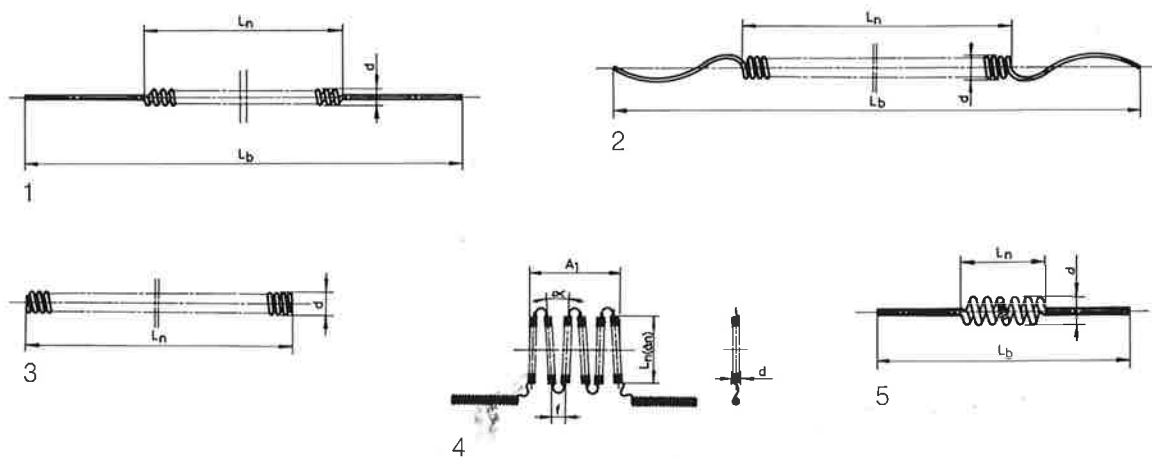
FILAMENTS FOR SPECIAL PHOTO AND PROJECTION LAMPS

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)							Fig.
						b	c	L_n	d	A	h	a	
9-9-541-30200	Gas Long H	6	5A	50	450	—	—	4.4	0.95	4.4	7.0	1.0	1
30150	Gas Point H	12	100	750	1460	—	—	5.0	3.14	6.3	10.1	1.5	2
30900	Krypton Plain H			25	2500	1.1	2.7	4.2	—	5.0	8.8	1.1	3
32370	Halogen Min. H	6	10	1500	138	—	—	2.0	0.73	3.5	6.0	—	4
32140•	Halogen Proj. H	12	50	2000	899	—	—	4.65	1.63	5.1	11.2	—	4

Code No	Designation	Volts	Watts	Life (hours)	Lum flux (lm)	Dimensions (mm)						Fig.
						A_1	$L_n(\hat{a}n)^*$	d	f	h	$\alpha(^{\circ})$	
9-8-155-10280	Gas Narrow Film CC-D	110	100	50	1875	5.0	5.0	0.97	2.0	28.0	—	5
10290		1850			0.96			29.0				
10300		220	150		1612	8.5	7.4	0.60	2.2	—	30	6
10370					2575				2.6		20	
10310		230	100		1596				2.2		30	
10380					1586				2.6		20	
10320		240	100		2525				2.2		30	
10440					2480				2.6		20	

* $L_n(\hat{a}n) = L_n(\text{branch})$

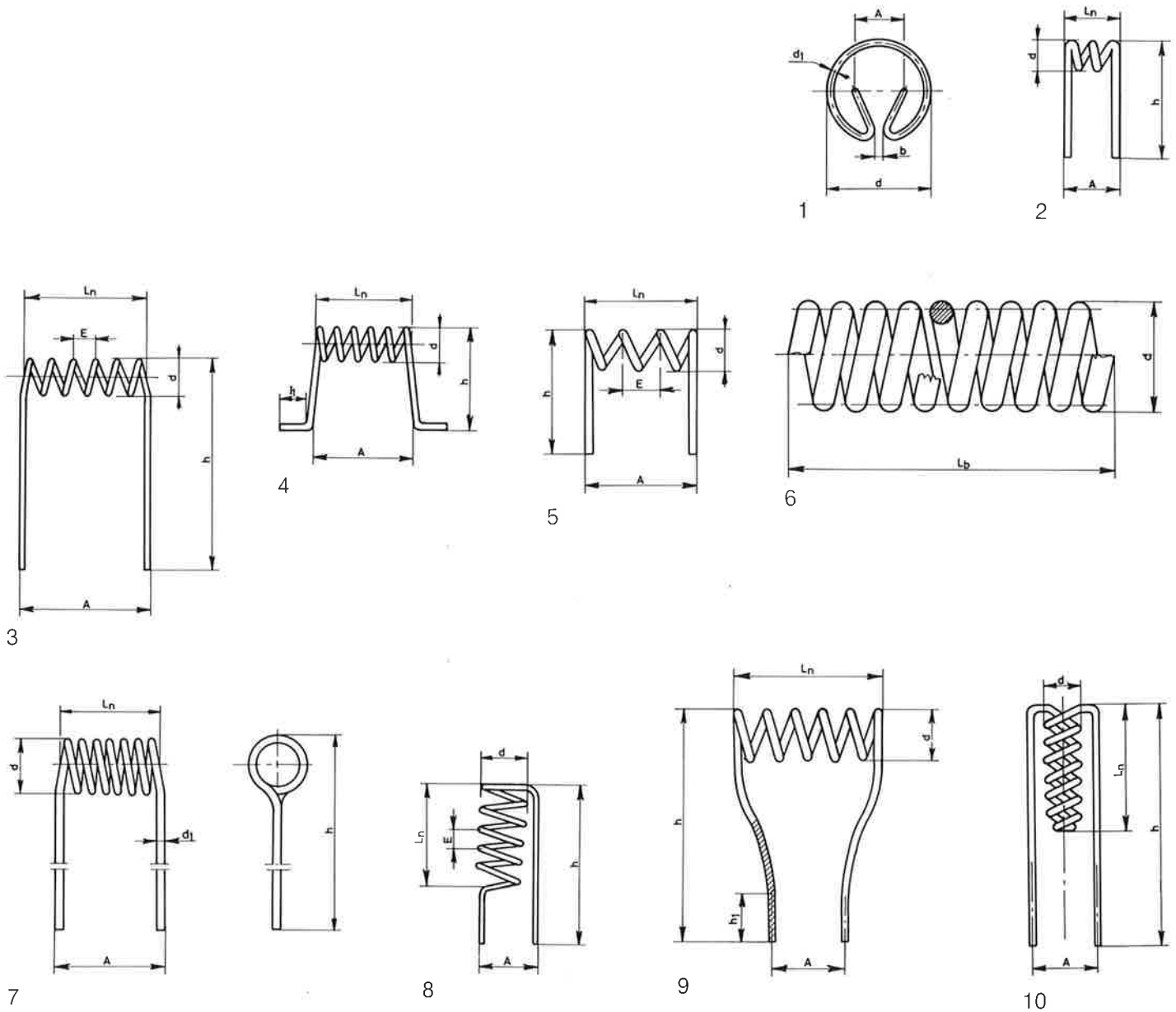
FILAMENTS FOR SPECIAL LAMPS



Code No	Designation	Volts	Amps. (Watts)	Life (hours)	Lum flux (lm)	Dimensions (mm)							Fig.						
						L_b	$L_{n(\hat{a}n)}$ *	L_n	f	A_1	$\alpha(^{\circ})$	d							
for Halogen Flashlight Lamps																			
9-9-541-23450●	Halogen Mini. Flashlight Lamp L	2.8	0.85	10	35	5.2	—	1.45	—	—	—	0.171	1						
23470●		4	0.5	15	33			1.40				0.163							
23400			0.85	25	60			1.50				0.213							
23410		5.2	0.5	15	48			1.60				0.156							
23420●			0.85	25	85			1.70				0.281							
23430		6.5	0.7	25	90			—				0.275							
23440●		7.2	0.8	50	125			—				0.337							
for Traditional Radio Panel Lamps																			
9-9-541-22810	Vacuum Panel	2	0.07	1000	—	6	—	2	—	—	—	0.1	2						
20910		12	0.1		8.6	11.6		6.6				0.12							
10580		35	0.05		4.3	13.5		—					0.1						
10590		24	(1,2)		3	12		11				0.13							
22780			(2)		3.6	17													
for Miners' Lamps for Krypton Types																			
9-9-541-20420●	Krypton Miners'	2.4	1.0	250	16	6.5	—	1.5	—	—	—	0.24	2						
20340●		2.5	0.5	200	7	6.3		1.3				0.17							
20370			0.8	14	6.5	1.5		0.20											
20470			1.5	26	7.1	2.1		0.32											
20350●		3.6	0.5	250	15	6.8		1.8				0.19							
20390●			0.8		24	7.5		2.5				0.21							
20430●			1.0		40	8.6		2.6				0.25							
20440●		3.75	36	7.6	2.6	0.26													
20480		4.5	1.5	60	7.8	2.8		0.39											
22680		3.0	1.2	40	6.8	1.8		0.26											
for Halogen Types																			
9-9-541-23390		Halogen Mini. Miners'	4	(3)	150	43		5.2				—		1.3	—	—	—	0.268	2
23460	(4)			400	50	1.6	0.362												
for Tubular Dentists' Projection Lamps for Gas-Filled Types																			
9-9-541-32200	Gas Tub. Dentists'	120	(125)	500	1600	—	7.0	—	1.6	11.5	5	0.45	4						
for Halogen Types																			
9-9-542-11950	Hal. Dentists' CC	25	(150)	2000	2800	31.0	—	9.2	—	—	—	3.05	5						

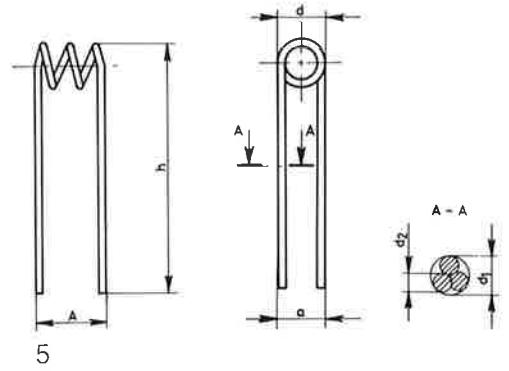
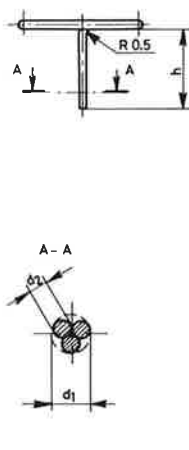
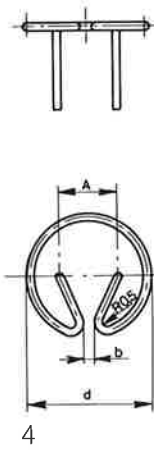
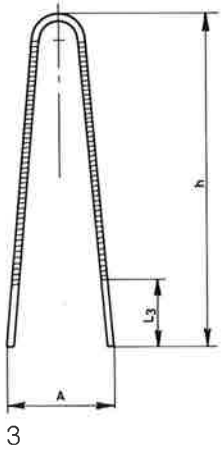
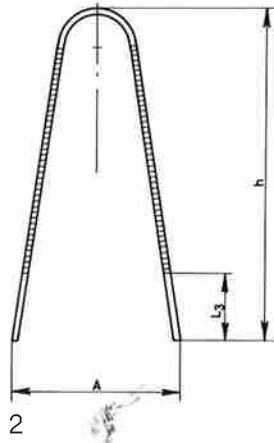
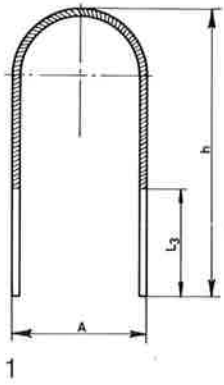
* $L_{n(\hat{a}n)} = L_{n(\text{branch})}$

METALLIZING COILS

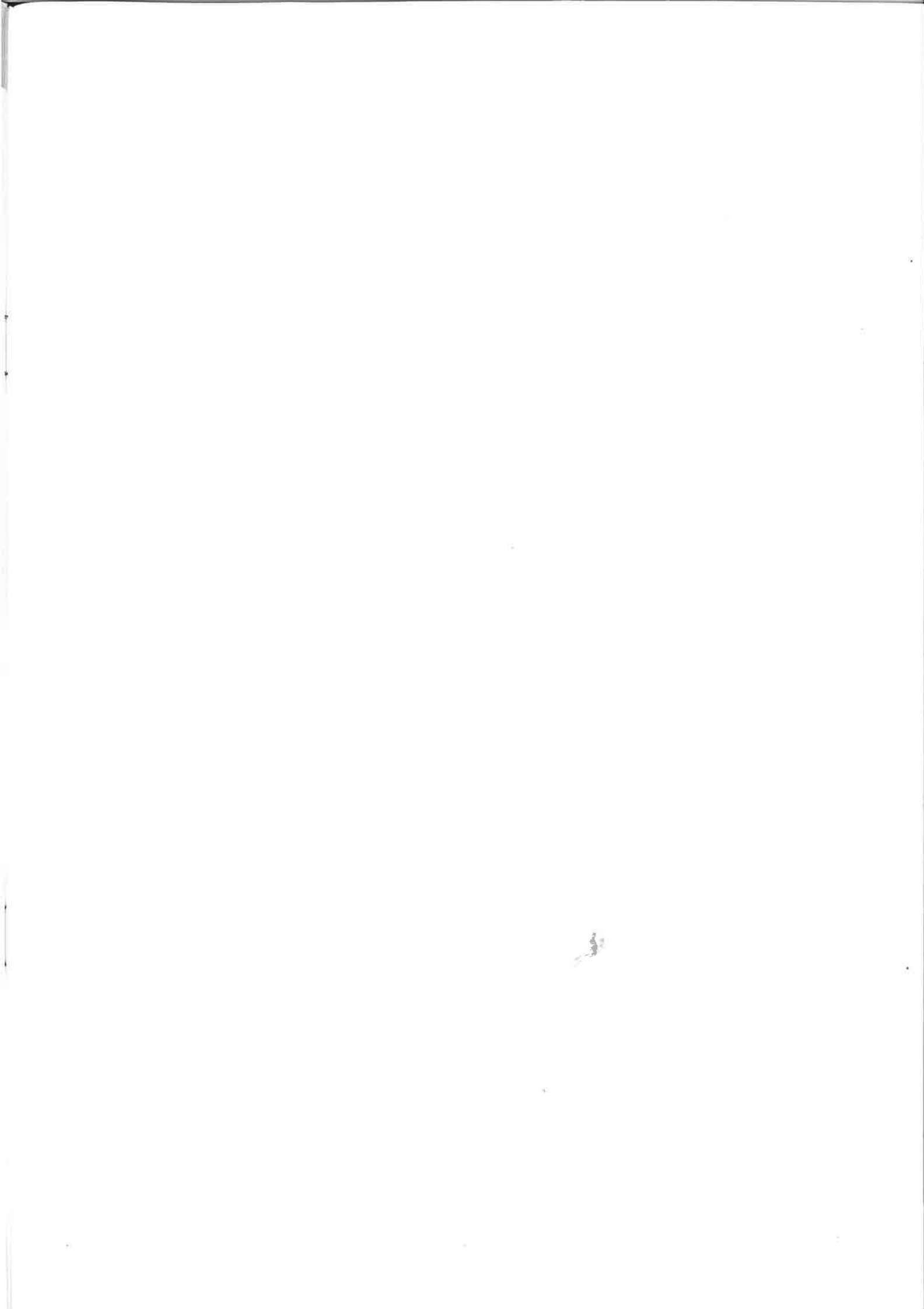


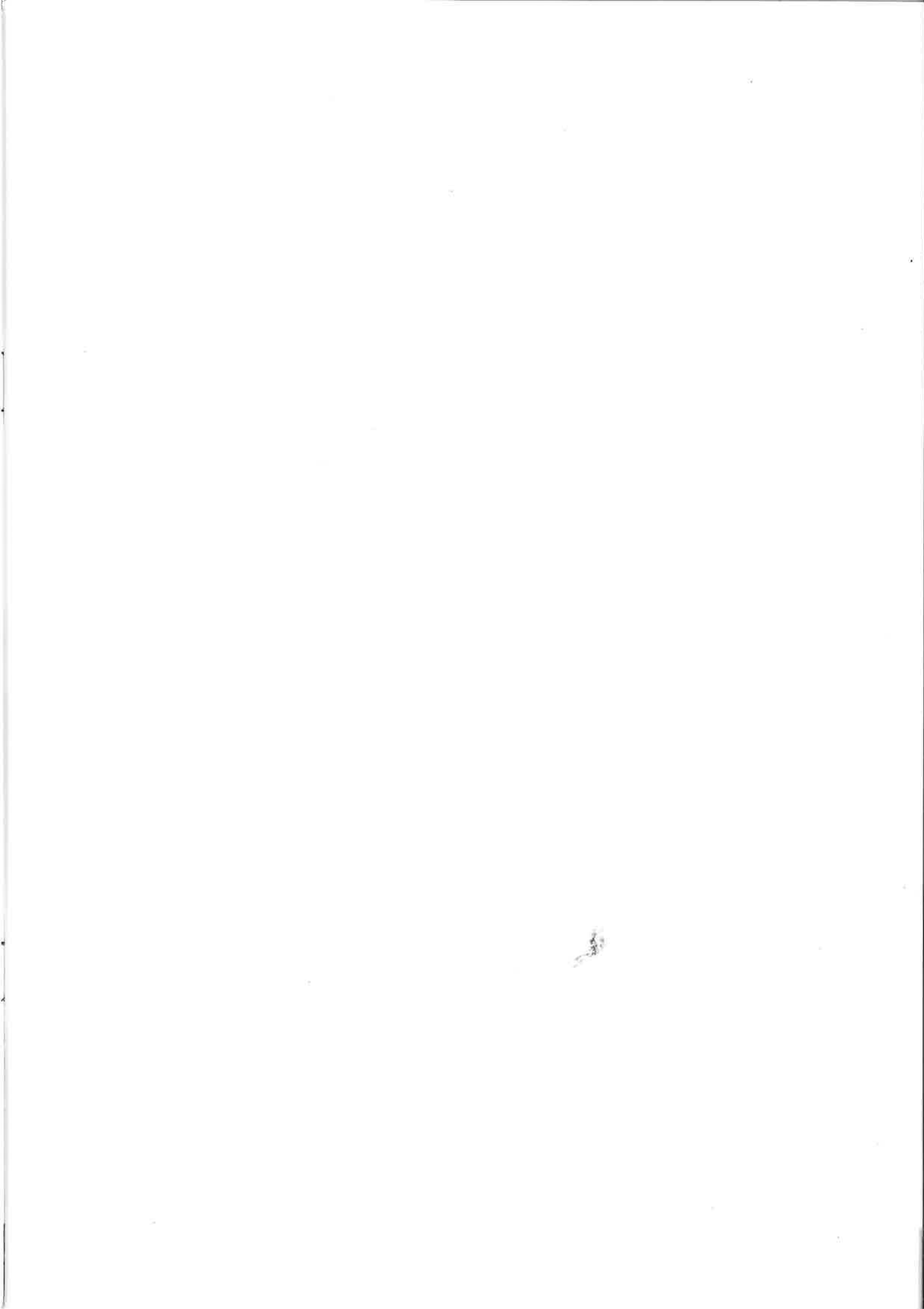
Designation	Dimensions (mm)										Fig.																	
	d	d_1	h	A	L_n	b	h_1	L	l_1	L_b																		
PFT 001●	18.1	1.1	—	9.0	—	1.0	—	—	—	—	1																	
PFT 002●	5.2	—	21.0	10.8	10.8	—					—	—	—	—	2													
PFT 003●			45.0	5.0	5.0											—	—	—										
PFT 004			75.0																									
PFT 005●	15.1	1.1	—	9.0	—	1.0									—				—	—	1							
PFT 007●	7.0	—	38.5	25.0	23.0	—															4.0	—	—	3				
PFT 008●	15.0		40.0	38.0	—																—			10.0	4			
PFT 010●	7.7		23.0	20.0	20.0																6.3			5				
PFT 011●	4.0		0.8	—	—																—			—	—	—	12.0	6
PFT 012				18.0	9.2																9.8							7
RTF 001	10.2	—	40.0	10.0	13.0		—	2.0	—	—											8							
204 W-M	9.0		50.0	12.0	20.0			10.0			9																	
002 SPK●	6.4		44.0	—	23.5			—			10																	

METALLIZING COILS



Designation	Dimensions (mm)								Fig.
	h	L ₃	A	b	d	d ₁	d ₂	a	
23 mm Mirroring	23.0	13.0	20.0	—	—	—	—	—	1
35 mm Mirroring	35.0	25.0							
55 mm Mirroring	55.0	10.0							
85 mm Mirroring•	85.0	41.0							
105 mm Mirroring	105.0	40.7							
200 mm Mirroring	200.0	106.5	25.0	—	—	—	—	—	2
SPK 006	55.0	10.0							
SPK 007									
TA 002/2•	14	—	8.0	1.0	15	1.1	0.5	—	4
TA 004•	13		6.0		11	0.9	0.4		
TA 001	32		9.8		—	5.2	1.1		





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