LLF (Light Loss Factor) used by Philips Lumec for LED products

LLF is a multiplication of different factors: LLD (Lamp Lumen Depreciation), LDD (Lamp Dirt Depreciation) and BF (Ballast Factor).

We use 1 as LDD because our LED products are sealed, so dirt has almost no effect. In really dusty environments, 0.9 could be use as LDD.

As our LED products use electronic drivers, we use 1 as BF.

LLD used by Philips Lumec is directly calculated from the LM-80 test done on our LEDs (LM-80 is the test procedure used to determine LED's life span).
Historically, LLD of HID lamps has always been determined at half life of the lamp. In order to be able to fairly compare our HID and LED products, we use the same method to determine our LED products' LLD.
End of life of LED product (L_{70}) is when the luminaire's lumen output reaches 70% of the initial lumens.
Table below (extract for LM-80) shows that if I_F = 700mA:

L_{70} = 120,000 hours at T_{air} = 105°C
L_{70} = 240 000 hours at T_{air} = 85°C

LUXEON, CCT = 4000K, I_F = 0.7A

Normalized Flux

		0	24	168	500	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	alpha	B	r2	:L70
DATA SET 56 $T_S = T_{AIR}$ = 105C	median =	1.0000	0.9985	0.9996	1.0168	1.0220	1.0254	1.0270	1.0309	1.0331	1.0266	1.0259	1.0200	1.0195		3.4273E-06	1.0475	0.905	117,621
	average =	1.0000	0.9981	1.0004	1.0175	1.0234	1.0268	1.0252	1.0313	1.0326	1.0250	1.0249	1.0171	1.0161					
	st dev =	0.0000	0.0030	0.0033	0.0060	0.0088	0.0090	0.0103	0.0123	0.0137	0.0139	0.0137	0.0132	0.0131					
	min =	1.0000	0.9909	0.9921	1.0084	1.0114	1.0126	0.9999	1.0049	1.0031	0.9974	0.9989	0.9935	0.9953					
	max =	1.0000	1.0024	1.0056	1.0354	1.0460	1.0518	1.0461	1.0549	1.0509	1.0449	1.0477	1.0402	1.0431					
DATA SET 57 $T_S = T_{AIR}$ = 85C	median =	1.0000	0.9945	0.9978	1.0158	1.0173	1.0202	1.0212	1.0280	1.0303	1.0224	1.0205	1.0203	1.0224		1.6331E-06	1.0347	0.720	239,284
	average =	1.0000	0.9951	0.9979	1.0158	1.0177	1.0202	1.0197	1.0271	1.0294	1.0228	1.0220	1.0200	1.0212					
	st dev =	0.0000	0.0035	0.0039	0.0054	0.0050	0.0056	0.0064	0.0065	0.0062	0.0066	0.0068	0.0067	0.0070					
	min =	1.0000	0.9890	0.9891	1.0060	1.0083	1.0094	1.0052	1.0130	1.0156	1.0103	1.0101	1.0049	1.0050					
	max =	1.0000	1.0069	1.0103	1.0302	1.0305	1.0345	1.0340	1.0426	1.0451	1.0425	1.0416	1.0371	1.0376					

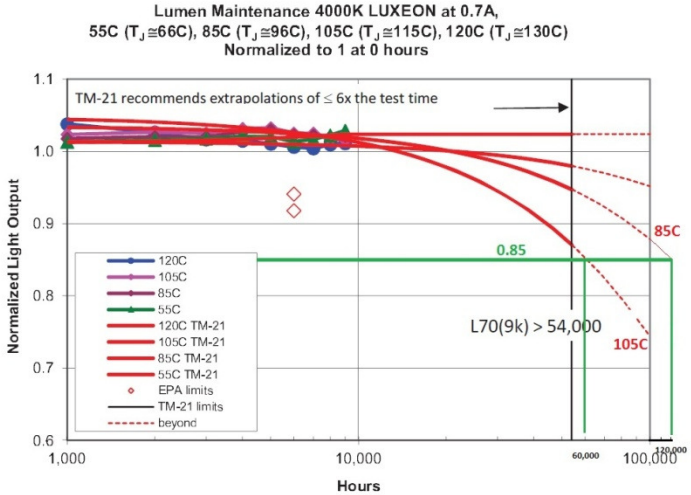
TM-21 L70(9k) > 54,000

TM-21 L70(9k) > 54,000

So, half life of our LED is respectively 60,000 hours and 120,000 hours.

Graph below illustrates that the lumens' depreciation at half life is:

- 85% for T_{air} = 105°C
- 85% for T_{air} = 85°C



So Philips Lumec uses 0.85 as LLD.

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