

Technical Details - Components for Fluorescent Lamps

Energy efficiency classification

The following table taken from Regulation 245/2009/EC provides an overview of (1st- and 2nd-stage) ballast requirements, ordered according to efficiency values:

Lamp data					Ballast efficiency (P_{Lamp}/P_{Input}) (non-dimmable ballasts)				
Type	Nominal output W	ILCOS-Code	50 Hz W	HF W	A2 BAT %	A2 %	A3 %	B1 %	B2 %
T8	15	FD-15-E-G13-26/450	15	13.5	87.8	84.4	75.0	67.9	62.0
	18	FD-18-E-G13-26/600	18	16	87.7	84.2	76.2	71.3	65.8
	30	FD-30-E-G13-26/900	30	24	82.1	77.4	72.7	79.2	75.0
	36	FD-36-E-G13-26/1200	36	32	91.4	88.9	84.2	83.4	79.5
	38	FD-38-E-G13-26/1050	38.5	32	87.7	84.2	80.0	84.1	80.4
	58	FD-58-E-G13-26/1500	58	50	93.0	90.9	84.7	86.1	82.2
	70	FD-70-E-G13-26/1800	69.5	60	90.9	88.2	83.3	86.3	83.1
TC-L	18	FSD-18-E-2G11	18	16	87.7	84.2	76.2	71.3	65.8
	24	FSD-24-E-2G11	24	22	90.7	88.0	81.5	76.0	71.3
	36	FSD-36-E-2G11	36	32	91.4	88.9	84.2	83.4	79.5
TC-F	18	FSS-18-E-2G10	18	16	87.7	84.2	76.2	71.3	65.8
	24	FSS-24-E-2G10	24	22	90.7	88.0	81.5	76.0	71.3
	36	FSS-36-E-2G10	36	32	91.4	88.9	84.2	83.4	79.5
TC-D/ TC-DE	10	FSQ-10-E-G24q=1 FSQ-10-I-G24d=1	10	9.5	89.4	86.4	73.1	67.9	59.4
	13	FSQ-13-E-G24q=1 FSQ-13-I-G24d=1	13	12.5	91.7	89.3	78.1	72.6	65.0
	18	FSQ-18-E-G24q=2 FSQ-18-I-G24d=2	18	16.5	89.8	86.8	78.6	71.3	65.8
	26	FSQ-26-E-G24q=3 FSQ-26-I-G24d=3	26	24	91.4	88.9	82.8	77.2	72.6
TC-T/ TC-TE	13	FSM-13-E-GX24q=1 FSM-13-I-GX24d=1	13	12.5	91.7	89.3	78.1	72.6	65.0
	18	FSM-18-E-GX24q=2 FSM-18-I-GX24d=2	18	16.5	89.8	86.8	78.6	71.3	65.8
	26	FSM-26-E-GX24q=3 FSM-26-I-GX24d=3	26.5	24	91.4	88.9	82.8	77.5	73.0
TC-DD/ TC-DDE	10	FSS-10-E-GR10q FSS-10-L/P/H-GR10q	10.5	9.5	86.4	82.6	70.4	68.8	60.5
	16	FSS-16-E-GR10q FSS-16-I-GR10q FSS-10-L/P/H-GR10q	16	15	87.0	83.3	75.0	72.4	66.1
	21	FSS-21-E-GR10q FSS-21-I-GR10q FSS-21-L/P/H-GR10q	21	19	89.4	86.4	79.2	73.9	68.8
	28	FSS-28-E-GR10q FSS-28-I-GR10q FSS-28-L/P/L-GR10q	28	26	89.7	86.7	81.3	78.2	73.9
	38	FSS-38-E-GR10q FSS-38-L/P/L-GR10q	38.5	36	92.3	90.0	85.7	84.1	80.4
TC	5	FSD-5-I-G23 FSD-5-E-2G7	5.4	5	72.7	66.7	58.8	49.3	41.4
	7	FSD-7-I-G23 FSD-7-E-2G7	7.1	6.5	77.6	72.2	65.0	55.7	47.8
	9	FSD-9-I-G23 FSD-9-E-2G7	8.7	8	78.0	72.7	66.7	60.3	52.6
	11	FSD-11-I-G23 FSD-11-E-2G7	11.8	11	83.0	78.6	73.3	66.7	59.6
T5	4	FD-4-E-G5-16/150	4.5	3.6	64.9	58.1	50.0	45.0	37.2
	6	FD-6-E-G5-16/225	6	5.4	71.3	65.1	58.1	51.8	43.8
	8	FD-8-E-G5-16/300	7.1	7.5	69.9	63.6	58.6	48.9	42.7
	13	FD-13-E-G5-16/525	13	12.8	84.2	80.0	75.3	72.6	65.0
T9-C	22	FSC-22-E-G10q-29/200	22	19	89.4	86.4	79.2	74.6	69.7
	32	FSC-32-E-G10q-29/300	32	30	88.9	85.7	81.1	80.0	76.0
	40	FSC-40-E-G10q-29/400	40	32	89.5	86.5	82.1	82.6	79.2

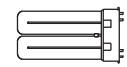
Lamp types



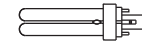
T8



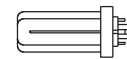
TC-L



TC-F



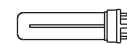
TC-D/TC-DE



TC-T/TC-TE



TC-DD/TC-DDE



TC



T5

1

2

3

4

5

6

7

8

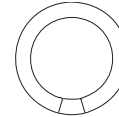
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Technical Details - Components for Fluorescent Lamps

Lamp data					Ballast efficiency (P_{Lamp}/P_{Input}) (non-dimmable ballasts)				
Type	Nominal output W	ILCOS-Code	Typical rating		A2 BAT %	A2 %	A3 %	B1 %	B2 %
			50 Hz W	HF W					
T2	6	FDH-6-L/P-W4.3x8.5d-7/220		5	72.7	66.7	58.8	-	-
	8	FDH-8-L/P-W4.3x8.5d-7/320		7.8	76.5	70.9	65.0	-	-
	11	FDH-11-L/P-W4.3x8.5d-7/420		10.8	81.8	77.1	72.0	-	-
	13	FDH-13-L/P-W4.3x8.5d-7/520		13.3	84.7	80.6	76.0	-	-
	21	FDH-21-L/P-W4.3x8.5d-7		21	88.9	85.7	79.2	-	-
	23	FDH-23-L/P-W4.3x8.5d-7		23	89.8	86.8	80.7	-	-
T5-E	14	FDH-14-L/P-G5-16/550		13.7	84.7	80.6	72.1	-	-
	21	FDH-21-L/P-G5-16/850		20.7	89.3	86.3	79.6	-	-
	24	FDH-24-L/P-G5-16/550		22.5	89.6	86.5	80.4	-	-
	28	FDH-28-L/P-G5-16/1150		27.8	89.8	86.9	81.8	-	-
	35	FDH-35-L/P-G5-16/1450		34.7	91.5	89.0	82.6	-	-
	39	FDH-39-L/P-G5-16/850		38	91.0	88.4	82.6	-	-
	49	FDH-49-L/P-G5-16/1450		49.3	91.6	89.2	84.6	-	-
	54	FDH-54-L/P-G5-16/1150		53.8	92.0	89.7	85.4	-	-
	80	FDH-80-L/P-G5-16/1150		80	93.0	90.9	87.0	-	-
	95	FDH-95-L/P-G5-16/1150		95	92.7	90.5	84.1	-	-
	120	FDH-120-L/P-G5-16/1450		120	92.5	90.2	84.5	-	-
T5-C	22	FSCH-22-L/P-2GX13-16/225		22.3	88.1	84.8	78.8	-	-
	40	FSCH-40-L/P-2GX13-16/300		39.9	91.4	88.9	83.3	-	-
	55	FSCH-55-L/P-2GX13-16/300		55	92.4	90.2	84.6	-	-
	60	FSCH-60-L/P-2GX13-16/375		60	93.0	90.9	85.7	-	-
TC-LE	40	FSDH-40-L/P-2G11		40	91.4	88.9	83.3	-	-
	55	FSDH-55-L/P-2G11		55	92.4	90.2	84.6	-	-
	80	FSDH-80-L/P-2G11		80	93.0	90.9	87.0	-	-
TC-TE	32	FSMH-32-L/P-GX24q=3		32	91.4	88.9	82.1	-	-
	42	FSMH-42-L/P-GX24q=4		43	93.5	91.5	86.0	-	-
	57	FSM6H-57-L/P-GX24q=5		56	91.4	88.9	83.6	-	-
		FSM8H-57-L/P-GX24q=5							
	70	FSM6H-70-L/P-GX24q=6		70	93.0	90.9	85.4	-	-
		FSM8H-70-L/P-GX24q=6							
	60	FSM6H-60-L/P-2G8=1		63	92.3	90.0	84.0	-	-
	62	FSM8H-62-L/P-2G8=2		62	92.2	89.9	83.8	-	-
82	FSM8H-82-L/P-2G8=2		82	92.4	90.1	83.7	-	-	
85	FSM6H-85-L/P-2G8=1		87	92.8	90.6	84.5	-	-	
120	FSM6H-120-L/P-2G8=1		122	92.6	90.4	84.7	-	-	
	FSM8H-120-L/P-2G8=1								
TC-DD	55	FSSH-55-L/P-GR10q		55	92.4	90.2	84.6	-	-

Lamp types



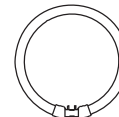
T9-C



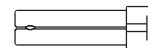
T2



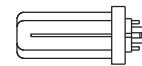
T5-E



T5-C



TC-LE



TC-TE



TC-DD

At the very latest, the following energy efficiency formula for ballasts will be introduced to coincide with the 3rd stage:

$$\begin{aligned} \text{If } P_{Lamp} \leq 5 \text{ W} & \quad E_{bFL} = 0.71 \\ \text{If } 5 \text{ W} < P_{Lamp} < 100 \text{ W} & \quad E_{bFL} = P_{Lamp} / [2 * \sqrt{P_{Lamp}/36} + 38/36 * P_{Lamp} + 1] \\ \text{If } P_{Lamp} \geq 100 \text{ W} & \quad E_{bFL} = 0.91 \end{aligned}$$

The following limiting values must be observed:

$\eta_{Ballast}$	Energy efficiency classes
$\geq E_{bFL}$	A2 and A1 BAT
$\geq 1 - 0.75 * (1 - E_{bFL})$	A2 BAT

The graph illustrates the difference between Classes A2, A1 BAT and A2 BAT (BAT = best available technology).

