PERFORMANCE OF COMPACT FLUORESCENT LAMPS (CFLS)

	Brand & model	MRP/ Retail price*	Rated Watt	Packing	Marking	Starting Time	Run-up Time	Wattage	Initial Lumens	Power Factor	Initial Efficacy	Colour Coordin-ates	Lumen Mainten-ance	Life upto 2000 hrs	Total (out of 100)
	% Weightage assigned →			2	6	5	5	10	12	8	12	10	20	10	100
	10-14 watts, 6500 ° K														
✦✦✦✦	Ajanta- Quartz (10W)	115/62	10	2.0	4.4	4.29	4.98	8.12	12.00	5.92	12	9.8	15.32	10	88.83
	OREVA-Power saver (14W)	120/75	14	1.5	6	4.76	5	7.63	9.23	6.27	10.92	8.2	17.12	9	85.63
	Finolex-Finoglow (13)	140/95	13	1.5	5.1	4.96	4.75	7.74	8.39	5.76	9.62	8.6	17.16	9	82.58
	15 watts, 6500 ° K														
✦✦✦✦	**GE Edison** **Best Buy**	130/105	15	1.5	6	4.86	5	7.17	9.15	6.56#	11.14	8.2	18.48	10	88.06
✦✦✦✦	Crompton Greaves -Energy Saver	135/78	15	1.5	6	4.92	5	6.77	8.81	6.11	10.92	8.8	19.04	10	87.87
✦✦✦✦	Halonix -ELD	135/75	15	1.5	6	4.84	4.99	6.97	9.25	5.86	11.42	9.4	17.4	10	87.63
	Philips -Tornado	210/145	15	1.5	6	4.96	5	9.96	9.77	6.37	10.08	8.4	15.12	10	87.16
	Osram - Dulux Star	130/95	15	1.5	5.6	4.7	4.99	8.86	9.27	6.16	10.18	8.8	17.08	10	87.14
	Wipro -Smartlite	130/75	15	1.5	5.6	4.9	5	7.55	9.33	5.79	11.14	8.2	17.72	10	86.73
	IndoAsian: Smart	140/85	15	1.5	6	4.27	4.74	9.72	9.59	5.97	9.77	9.4	14.80	9	84.76
	Surya Utility	170/90	15	1.5	4.3	4.82	5	8.2	8.61	6.05	9.67	8.8	16.44	10	83.39
	Havells Green	145/95	15	1.5	6	4.67	4.75	8.76	9.50	6.03	10.56	6.6	15.24	9	82.61
	Bajaj Ecolux	165/90	15	1.5	6	4.9	5	8.5	9.53	6.13	10.78	6.8	14.40	9	82.54
	Asian 15 watts, 2700 ° K	115/75	15	1.5	4.7	4.82	5	7.99	9.86	6	11.57	9	15.96	9	85.40
	Anchor Cool day Light 18 watts, 6500 ° K	170/111	18	1.5	6	4.98	5	8.27	11.10	5.92	10.82	7.6	14.76	10	85.95
	Philips Essential 18 watts, 2700 ° K	170/120	18	1.5	6	4.95	5	7.93	9.21	6.22	10.68	8.4	15.88	10	85.77

** At the time of sample purchase*

Rating: >90 – Very good ✦✦✦✦✦, 71-90- Good ✦✦✦✦, 51-70- Average ✦✦✦, 31-50- Poor ✦✦, upto 30 – Very Poor ✦

Note: The above scores are based on laboratory test results. The scores have been obtained on the basis of weightage assigned and actual perform ance in the tests. The evaluation has taken care of different wattage and colour temp. of various CFLs.

 # 4 of 10 lamps of High Power Factor (HPF): 0.9

COMPARATIVE TEST

June 2009

CONSUMER VOICE

Consumer interest above all

In a new light

CFLS: Protecting the environment

16 Models tested for efficiency

A CFL has become much more affordable to buy in the recent times but what about the quality? The most important quality considerations in a CFL are the number of hours it will last and how much light it emits. Laboratory tests show that while a CFL is expected to last at least 6,000 hours, some CFL lamps tested had a very short life span, of less than 2,000 hours. The lumen maintenance factor could also do with some improvement. As the lamp ages, the light output really dips for some CFLs

CFLs or Compact Fluorescent Lamps have gained a lot of popularity among consumers in the last few years. The fact that they lead to a high reduction in electricity bills has been the major contributor to their popularity and acceptance. As compared to a normal light bulb (incandescent bulb), a CFL consumes only 20-25% of energy and has higher output of light as compared to a traditional incandescent bulb. It also lasts around six times longer than an incandescent bulb. A CFL comes with several other benefits like the air conditioning or cooling costs of a building being less if CFLs are used, as these energy saving lamps convert more energy into light than heat as compared to other artificial light sources. All these factors make the CFL an ideal choice not just for businesses but also for households.

Consumer VOICE tested 16 models of CFLs to find out how true their light output and longevity claims were. The testing was undertaken to provide the Indian consumers with information on the performance of the CFLs being sold in India. Indian standards specify that the lumen maintenance (light output) of CFLs should be at least 85%. The 85% lumen maintenance standard essentially means that as compared to the initial light output (when the CFL is new), its light output when it has 'aged' (when it has run for a 2,000 hours) should still be 85% of the light that it was emitting initially.

Of the 16 models of CFLs tested, one lamp each of three models of CFLs did not match up to this requirement. This means less value for money as the quality yardstick for a good lamp is how much light output it gives. Fittingly, this parameter was awarded the highest weightage among the 9 parameters CFLs were tested for. *Consumer VOICE* tested 10 lamps of each of the 16 models of CFLs, that is 160 lamps in all.

The life span of a CFL is another important consideration because the longer a lamp lasts, the better cost returns a consumer gets. Indian standards specify that a CFL should last for at least 6,000 hours. *Consumer VOICE* ran each CFL for 2,000 hours to assess how the CFLs perform in the first 2,000 hours which may be indicative of their remaining life. We found that out of 16 models, one lamp each of three models of CFLs tested either did not run for the initial period of 100 hours or failed in the 2,000-hour test.

CFLs are surely a wise money and electricity-saving choice but some of the performance promises the brands make are not always true.

How much light will a CFL give and for how many hours

Both Indian and international standards specify that a CFL should last 6,000 hours, and after having run for 2,000 hours, its lumen maintenance (light output) should not be less than 85% of the initial measured lumens. That is,

the CFL should not emit less than 85% of the light than what it emitted when it was brand new.

Consumer VOICE tested not one but ten samples of each of the 16 models for this crucial test as well as other tests. Six of the sixteen models had their lumen maintenance in the 80% range but did not reach 85%, which is a minimum standards requirement.

- In one of Philip's Tornado CFL (out of the ten Philips samples tested), the lumen maintenance was just 40%
- One lamp each of (out of the ten lamps of each CFL tested) Havells, IndoAsian and Finolex had failed in the 'ageing' test of running a lamp for a 100 hours.
- One lamp of Oreva (out of the ten Oreva lamps tested) ran for just 828 hours; one Asian sample lasted for 1,498 hours and one Bajaj CFL had a life span of 1,630 hours.

If some of your CFLs don't seem to last long, the reason could be that they indeed are low on quality and not meant to last for their full lifespan of 6,000 hours.

The brand which really does well in this parameter is the Crompton Greaves Energy Saver. This 15-watt CFL had lumen maintenance of 92.6% and none of its samples failed in the 2,000 hour test.

Luminous flux

The brilliance of a source of visible light is called 'luminous flux'. This parameter is also known as 'lumen'. All brands do well in this parameter as only one CFL sample of Surya goes below the minimum lumens it declares on its label. All other CFLs managed to meet the minimum requirement of 90% of rated luminous flux.

Lamp efficacy

Lamp efficacy is one of the most important factors in energy saving and giving value for money to consumers. Lamp efficacy is described as the light output per unit of power consumed. The higher the efficacy, the better it is for consumers. Indian standards specify a minimum value for this parameter and the highest efficacy has been achieved by Ajanta. All CFL models perform well—above the minimum specified standard requirement of 90% of rated luminous flux.

Power wattage

Of the 16 models of CFLs chosen for testing, 11 were of 15 watts. The Ajanta Quartz CFL was of 10 watts, Finolex of 13 watts and Oreva of 14 watts. Anchor and Philips were of 18 watts each. Generally, a 15-watt lamp is sufficient for general lighting needs. However, the wattage required really depends on the size of the area that needs illumination.

How quickly does a lamp light?

Starting time is the time needed for the lamp to start fully after the supply voltage is switched on. While the maximum time limit specified in standards for starting is 4 seconds, all brands do much better than that and start within one second with the exception of Ajanta which took 1.420 seconds to start. We also tested the CFLs for the starting time after having ran them for a 100 hours. This was to see if the starting time was delayed once the lamp had 'aged'. This was done for 10 CFL samples of each brand.

One out of the 10 CFL samples of Havells, Finolex and Indo Asian did not operate after they had been 'aged' for a 100 hours.

Reaching 80% lumens after being switched on

Not only should a lamp light quickly enough after being switched on, it should also start to operate at full efficiency within a few seconds. Standards specify that after being switched on, a lamp should start to deliver 80% of its initial light (lumen) within 120 seconds. *Consumer VOICE* tested the lamps for this parameter when they were brand new, and then tested them again after they had aged for a 100 hours. There was only a marginal difference between the two timings and this speaks well of the CFLs' quality.

Colour temperature in a CFL

CFLs no longer only emit a cold blue light, but a range of light colours. This is expressed in Kelvins (K) and should be listed on the packaging. Warm white light (similar to an incandescent bulb) is 2700º to 3000º K, cool white is 4000º to 5000º K and daylight is 6400º to 7000º K. Brands Bajaj and Havells did not comply with requirements of standards.

Key findings

- Indian standards specify that the lumen maintenance (light output) of CFLs should be at least 85% of the initial lumens tested at 100 hours. Of the 16 models tested, six did not match up to this requirement of the national standards.
- A CFL should last for at least 6000 hours. *Consumer VOICE* ran each CFL for 2,000 hours and found that out of 16 models, one sample each of 3 models of CFLs tested failed to run during the initial period of 100 hours or for 2,000 hours.
- For every unit of power consumed, it is Ajanta Quartz which gives the maximum output in terms of light output in the 100-hour test. In the longer run, **it is the GE and** Crompton Greaves **lamps which give the maximum light, tested at 2,000 hours.**
- 12 out of the 16 models tested give less wattage that what they declare. Some 15-watt lamps were found to be consuming only 12 watts on testing. Earlier Indian standards prescribed a limit for how low the wattage could be from the declared value. Now no such limits are applicable. The standards however do prescribe an upper limit for when the wattage goes above the declared value.

New Power Factor requirements for CFLs

In October 2009, it will become mandatory for CFLs to conform to the power factor of 0.85. Power Factor is the ratio of real power to total power. Real, or productive power, is the actual power, measured in kilowatts (kW). The power factor does not affect the consumer experience with a CFL but the higher the system power factor, the more system capacity that is available. With more system capacity, voltage will remain more stable as loads are cycled on and off.

Comparison of CFL & Incandescent Lamp

	15 Watt CFL	75 Watt Incandescent Lamp
Cost of Lamps (Avg. retail price)	Rs. 115	Rs. 10
Lamp Life (6 hrs/day use)	1000 days (2.7 years)	167 days
Annual operating cost	Rs. 162	Rs. 810
Lamps Replaced in 2.7 years	0	6
Total operating cost	Rs. 552.4	Rs. 2187
Savings Over Lamp Life	Rs. 1634.6	0
Light (colour) quality	Cool day light	Yellowish
Environment-friendliness	Most	Least

15 watt best buy

Based on laboratory test results, we present the best buys for CFLs in the 10-14 watt and 15-watt category. The overall test findings show that the costliest CFL will not always be the best. The *Consumer VOICE* tests had CFLs of 10-14 watts, 15 watts (6500° K and 2700° K), 18 watts (6500° K and 2700° K). The 15 watts 6500° K category was the most popular and had GE Edison, Crompton Greaves Energy Saver and Halonix ELD in the top three positions.

GE Edison: This 15 watt 6500° K CFL has one of the highest lumen maintenance at 91.2%. This means that these GE lamps will continue to be bright even after they have run for 2,000 hours. The GE Edison's MRP is Rs 130 but it can be bought at a retail price of Rs 105 with some bargaining.

The Crompton Greaves Energy Saver is close behind GE. It tops in the lumen maintenance test, which means that this Crompton Greaves lamp will continue to emit a good amount of light even as it ages. From the cost point of view also, CG is affordable at the retail price of Rs 78 and MRP of Rs 135. The Crompton Greaves Energy Saver CFL had lumen maintenance of 92.6%, the highest, and none of its samples broke down in the 2,000-hour life test.

The Halonix ELD is in the same price bracket as GE of Rs 135 but its retail price is much less than that of GE—only RS 75, making Halonix one of the cheapest CFLs in the market in its category. Its lumen maintenance is an acceptable 88.5% and it does well in most other parameters.

All three of these CFLs have their MRPs in the range of Rs 135. Crompton Greaves and Halonix had Rs 78 and Rs 75 as their retail price, while GE Edison's retail price was Rs 105. All three of these CFLs are much cheaper than the Philips Tornado, for example, which is priced at Rs 210 (MRP) and can be purchased for Rs 145 if you bargain a little.

The Ajanta Quartz CFL is one of the cheapest at Rs 62 and comes with very sturdy packaging—round tough cardboard case. For every watt of electricity consumed, this Ajanta lamp gives the maximum light. If one has to illuminate a smaller area or use a CFL for a table lamp, Ajanta would be a economical and quality choice.

How we test

Consumer VOICE conducted laboratory testing of 16 models of CFLs manufactured in India and 58 brands/models of CFLs manufactured in a range of Asian countries including Australia, Philippines, Thailand, Vietnam and Indonesia. The objective of the study was to verify the quality of CFLs manufactured in these countries. *Consumer VOICE* presents the test findings of the India-made CFLs in this issue and the test report of CFLs manufactured in other countries will be published in one of the forthcoming issues of *Consumer VOICE* magazine. The test programme followed national (IS 15111 parts 1 & 2) and international (IEC 60969) standards. At least ten samples of each CFL brand were tested for 9 test parameters.

Overall, we did find that India-made CFLs tended to fare better than the CFLs made in other countries, included in this test. This could be because now the ISI mark is mandatory for CFLs in India and that ensures adherence to quality and performance standards for the product. Before publishing, the test results were shared with the manufacturers for their views.

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