Kino Flo Lamp Trouble Shooting

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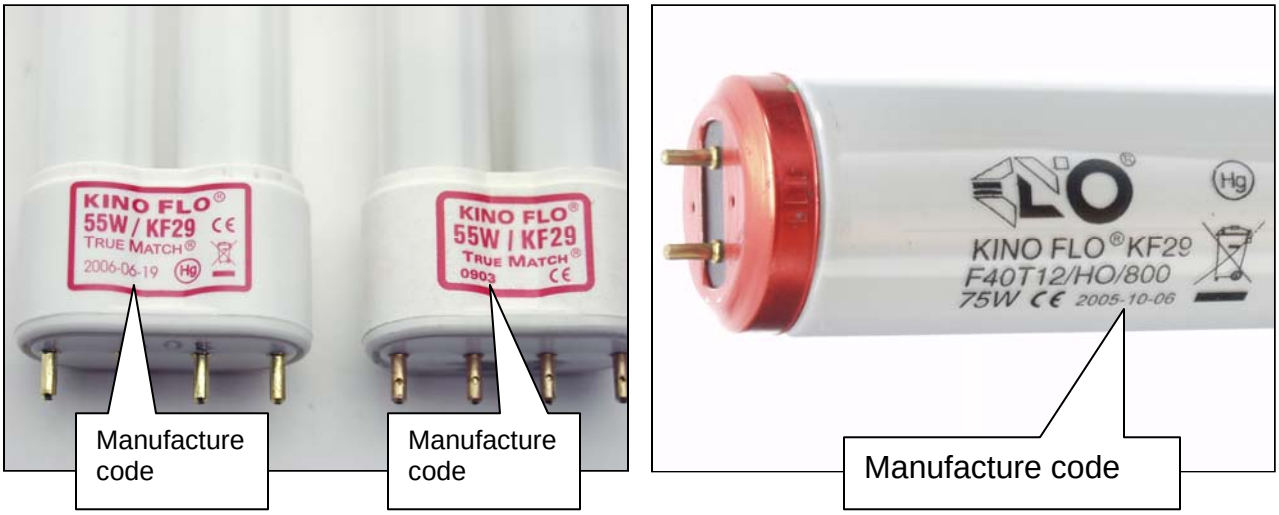
1. Identifying Manufacture codes



All lamps have a Manufacture code within the lamp label. Older lamps display a 4 digit code. Newer lamps show a date code; YYYY-MM-DD

2. Spiral arc stream or "Cat-tailing" of lamp

A new lamp may display a spiraling arc stream of bright light running along the length of the lamp. It is often referred to as "cat-tailing". It looks like a bright narrow tail of light that spirals in one direction.

This is mostly seen on new T12 or T8 lamps. Low voltage can also exasperate the condition. It is also seen on new lamps operating in dimming fixtures. Lamps that are to be dimmed should be aged about 100 hours at full brightness in order to realize their full dimming range and lamp life.

If the lamps are new and operating on select ballasts the following can be done to clear the problem:

- Confirm voltage to the ballast is correct and not low. (for 120Volt market not lower than 110Volts and for 230 Volt market not lower that 220Volts.)
- Turn the lamp off /on in the HO select mode about 5-10 times.
- If the condition persists, reverse the lamp polarity by flipping the lamp and attach the lamp connectors to the opposing lamp ends.
- Repeat the off/on cycle.
- Aging the lamps for a few hours in the HO select mode further reduces the effect of the cat tailing and should eliminate it all together.

Use only “burned in” lamps in dimming fixtures. New lamps should be aged at least 100 hours at full brightness in order to realize the full range of dimming and lamp life. We have not seen cat tailing in our 55Watt compact lamps. It has only been observed in T12 or T8 lamps.

Cat-tailing is a result of a lamp being insufficiently ionized. The cathode filament is coated with a white powdery substance known as emissive material. When a lamp rolls off the production line it is hit with a high voltage charge to ignite the lamp. This charge blows some of the emissive material off the cathode and deposits it along the lamp walls. This ionizes the lamp and enables the cathodes to emit an ultraviolet arc stream to the other end of the lamp.

If insufficient material is deposited the lamp may display cat-tailing. Every time a lamp is switched on and off more emissive material is released from the filament. Reversing the polarity of the lamp and repeating a few on/off cycles further ionizes a lamp. Aging lamps for a few hours also aids in stabilizing a new lamp.

If all procedures fail to stabilize a new lamp, the problem may be caused by a contaminant in the lamp. The lamp may be considered to have a manufacturing defect and would need to be replaced.

3. Lamp won’t start, or starts momentarily then ballast shuts down

Use Kino Flo lamp tester to check:

- Lamp cathode continuity
- Lamp gas test
- Lamp has amalgam/mercury balls

If lamp cathode has no continuity, lamp will not start. Check if lamp is new or old. If old, cathodes can wear out prior to their normal 5,000 hour life expectancy. If the lamp was new and never used it would be considered a manufacturing defect; return to Kino Flo.

No gas fill, lamp may have small internal gas leak. If new and no visible signs of abuse, it could be transport damage or manufacturing defect. Whether old or slightly used, the lamp may have experienced shock, resulting in internal damage.

If there are no amalgam balls or mercury balls, but the glass and cathodes are intact the lamp may not have sufficient mercury to start. This would be a manufacturing issue.

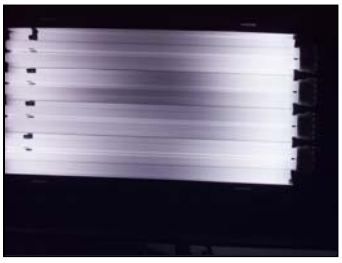
Lamp starts momentarily, and then shuts down the ballast. New lamp: the cathodes are intact, glass fill is good. This has been observed on 55Watt compact lamps. Diagnosis: the lamp is insufficiently ionized.

4. Lamp Unevenly Bright

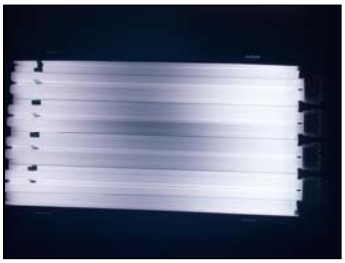
- How long has the lamp been burning?
- What is the ambient temperature?
- Is it under room temperature or below freezing?

At start up, new lamps may appear dark in the middle, bright at the cathode end and at the tip of the lamp. This can also be seen on cold lamps of any kind. This is not a defect but is related to the age of the lamp and/or ambient temperatures.

A new compact lamp can display uneven brightness at start up. Allow the lamps to operate for at least five minutes at room temperature or longer until they are hot to the touch. T12 lamps should also be allowed sufficient time to warm up. In extreme cold, sub zero temperatures, the lamps may never display their full light output.



Compact 55Watt at start-up



After one minute

After 2-3 minutes full brightness

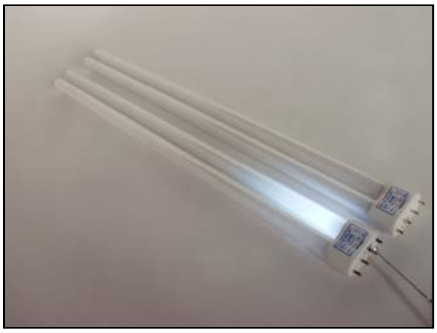
The new 55watt quad lamps used in the BarFly family and the new 96Watt lamps used in the VistaBeam family have been seen to display uneven brightness after being turned off briefly. They have taken about one minute to return to full brightness.

5. Lamp is dim with deep blue hue

- Can you see any mercury balls or amalgam balls in the lamp?
- Did the lamp operate at normal brightness for a short period of time?
- Does it light up with the lamp tester probe?

A lamp that appears to have intact glass and cathodes but displays low light output or a combination of low light output and a deep blue hue is suffering from insufficient mercury. This would be deemed a manufacturing defect.

Testing for Low Mercury



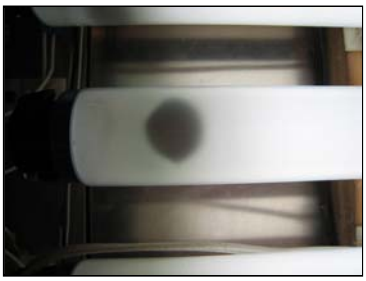
Low mercury, dim blue Normal lamp, brighter

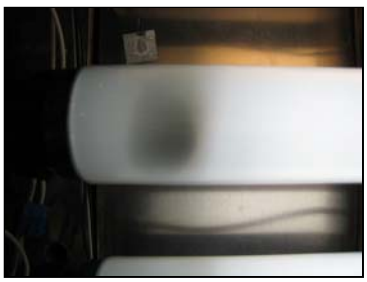
- Using Kino Flo's Lamp tester probe, compare the light output of the suspect lamp to a known good lamp. Hold the aerial to one of the pins and ignite the lamp. If the suspect lamp is dramatically lower in light output and different in color that the good lamp it reinforces the diagnosis of low mercury.
- Test the lamp in a fixture. If low mercury, the light level should be low, the cathodes glowing and the lamp would be bluish in color.

Low mercury lamps can occur in the manufacturing process when the mercury dosing nozzles become clogged. The lamps receive insufficient mercury. A visual inspection of the lamp would reveal a very small or no trace of any mercury ball or amalgam ball rolling around in the lamp. A new lamp could perform at full spec for a few days to a few hours then turn dim and shift color to a bluish hue. This would be deemed a manufacturing issue.

Since low mercury lamps all start up fine when they are new it is next to impossible to screen for this defect. For this reason it is very important to document the lamp type and batch number when reports such as this arise.

6. Dark Lamp Ends





As lamps age it is common for the cathode area of the lamp to turn dark.

It is also common for new lamps to display lamp darkening at the cathode ends. This darkening usually dissipates or is reduced as the lamp heats up. Darkening in new lamps is attributed to mercury condensation or emissive material splatter. Kino Flo lamps are designed with cathode guards that absorb some of these darkening agents.

For the most part, this is a cosmetic issue and not a performance or manufacturing concern.

7. Dark spots at various places in lamp

Sometimes a lamp may display dark spots. These spots are mercury condensation effects. They can be removed by applying a heat gun to the spot. The mercury vaporizes and disappears. These spots have no effect on the spectral or light output qualities of the lamp. This would strictly be a cosmetic issue.

8. Holes in the phosphor coating

Lamps may from time to time display small bare spots. These spots are usually about 1/8” to ¼ inch in diameter and can occur anywhere along the lamp wall. This is a cosmetic issue and has no effect on the light quality of the lamp. It is the result of high humidity at the time of manufacture usually during summer months. We try to screen for this and hold the lamps back from distribution.

At times we have seen larger exposed areas at the ends of the lamp. The clear area is usually in a triangular form. This is a manufacturing defect. It results when the phosphor has insufficient adhesion to the lamp walls. In transport the mercury

ball rocks back and forth and wears out a wedge of phosphor. These defects are usually caught in our safety coating process and are withheld form distribution.

9. Brown deposit in safety coating

At times a brown deposit forms inside the safety coating sleeve. We have duplicated this phenomenon in the lab but have found no solution for it other that to replace the safety coating. This deposit forms over time. It happens when lamps are subjected to a high temperature environment over a series of weeks. It took about eight weeks for us to produce the first signs of this brown condensate. As far as we can tell it is the result of a chemical reaction between the basing cement (the glue that holds the pin cap to the ends of the lamp) and the polycarbonate sleeve. The glue outgases, interacts with the polycarbonate plastic and condenses on the cooler part of the lamp or sleeve. Once the sleeve is removed the lamp can be cleaned with an abrasive pad and a new safety coat should be applied.

10. Lamp life

Kino Flo lamps are designed around a long life cathode. A long life cathode is measured and defined by the number of on/off cycles it can sustain before the cathode fails. Lamp manufacturers typically define a fluorescent lamp's life as between 10,000 to 20,000 hours. This spec is determined by a 12-hour burn cycle, interrupted by a period in which the lamp cools before start up. These specifications apply to the architectural industry where lamps are inserted in a fixture once and not changed until they burn out.

Kino Flo lighting systems are designed for a production environment in which lamps of different colors and characteristics are constantly changed in and out of a fixture. They experience wear and tear by being transported and by rough handling. The *average* usable lamp life in a production environment is about 2,000 to 5,000 hours. Lamps also experience lumen depreciation over time. That is to say that a lamp, which is one year old may appear to slightly lower in light output than a new lamp. A slight warming of the color temperature is also common as the lamp ages.

11. Lumen depreciation

All fluorescent lamps experience *lumen depreciation*. That is to say, lamps lose their brightness over time. A slight shift in color temperature is also normal. For this reason we recommend customers monitor the age of their lamps, especially in TV studios, and change them out every 12 to 18 months.

KF29 CFLs can drop 6/10 of an f-stop and warm up as much as 200K in color temperature. The color also can turn slightly magenta.

KF55 CFLs can drop 8/10 of an f-stop and warm up by 800–900K in color temperature. The color can also turn slightly magenta.

KF55 T12 lamps can drop over a one f-stop. In terms of color temperature it can increase slightly in green. The over all color temperature remained stable.

KF32T12 lamps can drop as much as one f-stop over a year's time. Color in general was stable

KF29T12 lamps can drop as much as ½ to ¾ f-stop color temperature remains stable.

Lamp	batch number	Minolta II	Minolta IIIF	Gossen	EV	Notes
aged KF29 CFL	0505	2710 -2cc	3050 6G	2800 0cc	16.6	burn date: 6-7-05
same lamp new	0505	2940 -1cc	3340 2G	3030 5M	17.2	sample date: 11-6-06
aged KF55 CFL	2005-10-19	4150 -3cc	4640 6G	4320 0cc	16.4	burn date: 12/21/05
same lamp new	2005-10-19	4850 -1cc	5570 1M	5180 0cc	17.2	sample date 11-7-06
aged KF55 T12	0523	5100 +2cc	5790 8M	5340 10M	15.4	burn date: 6-22-05
same lamp new	0523	5050 +0cc	5700 3M	5370 0cc	16.6	sampled: 11-6-06
aged KF32 T12	0519	3020+1cc	3350 0cc	3030 0cc	14.9	burn date: 06/07/05
same lamp new	0519	2960 -1cc	3270 2G	2960 0cc	15.9	sampled 11-6-06
aged F40 T12 KF29	2005-10-06	2810 +1cc	3170 2G	2850 0cc	15.2	burn date: 12-21-05
same lamp new	2005-10-06	2880 0cc	3260 2G	2930 0cc	15.7	sample date: 11-6-06

12. Determining age of a lamp and degree of usage

- Batch codes
- Discoloration of lamp base
- Condition of safety coating
- Condition of lamp pins
- Lamp blackening

All lamps have a date code. Determine the manufacture date of the lamp.

Look at the lamp base to note any discoloration. A compact lamp base is white when new. As it ages and is subjected to heat the base will slightly discolor around the area where the glass enters the base.

Look at the condition of the safety coating. Older lamps will display a scratched sleeve especially where the lamps make contact with the clips that hold it to the fixture. The sleeve may also show brown deposits between the lamp sleeve and the lamp.

Older lamps will display a discolored lamp pin. The pin will appear to have a patina in place of its shiny finish.

Old lamps nearing the end of their life will have darkened cathode areas.

13. Operating Temperature of Lamps

The average operating temperature of a T12 lamp in a Kino Flo fixture is 76°C at the cathode end and about 63°C at the center of the lamp. CFL lamps such as operate in the Diva-Lite operate at a cathode temperature of as much as 128°C and a mid point reading of about 90°C. These temperatures can be exceeded depending on how well the fixture is ventilated.

14. Lamp orientation and color temperature

T12 lamps can operate in any orientation without affecting color temperature or performance.

Compact lamps — such as in the Diva-Lite, ParaBeam, VistaBeam, and BarFly — do have an optimum orientation for best color performance. Avoid operating Compact Fluorescent Lamps (CFLs) in the base down position. This position results in higher mercury pressure affecting the green content of the lamp. The base down position forces heat from the cathode to rise to the lamp tips. CFLs need a cool spot at the tip of the lamp in order to maintain correct mercury pressure in the lamp. The ParaBeam and VistaBeam fixtures have cooling chambers at the lamp tips and at the cathode areas to maintain good heat dissipation and ensure stable lamp operation.

15. Color temperature and heat

Excess heat will affect the color temperature of a lamp. For this reason it is important to maintain good airflow around lamps. If diffusion gels are placed too close to the lamps and the ends of the fixtures are covered with black wrap, the temperature within the fixture rises. Increased heat increases the mercury pressure within the lamp. The higher the pressure climbs the higher the color temperature and the higher the green spike.

16. Color temperature data for Kino Flo True Match lamps

Unfortunately the color meters available to cinematographers are far from being scientifically accurate. They act as a great comparative tool to determine differences between two given light sources but are woefully inadequate in providing definitive data. You will rarely find two color meters, even if they are the same models, which provide equal data. Results between meters may be similar but not identical.

The following color temperature data are meant as a general guide for reading Kino Flo lamps on three of the most common photo industry color meters; the Minolta Color Meter II, Minolta Color Meter IIIF, and the Gossen Colormaster 3F.

Note: Minolta disclaims its meters' Color Compensating (CC) data when reading fluorescent lamps and recommends film tests to determine correct filtration.

Color Meter Readings					
	Select	Operating			
Lamp Type	setting	temperature	Minolta II	Minolta IIIF	Gossen
8ft Kino KF55	HO	38C	5050 -1cc	5640 2M	5550 0cc
6ft Kino KF55	HO	42C	5050 -0cc	5600 4M	5580 0cc
4ft Kino KF55	4ft	42C	4900 +0cc	5530 5M	5250 5M
3ft Kino KF55	4ft	43C	5200 -0cc	5800 2M	5680 0cc
3ft Kino KF55	2ft	37C	5050 -3cc	5560 0cc	5580 0cc
2ft Kino KF55	2ft	38C	4900 -1cc	5440 0cc	5260 0cc
15" Kino KF55	2ft	36C	4900 -1cc	5470 2M	5340 0cc
8ft Kino KF32	HO	41C	3090 -1cc	3420 1G	3190 0cc
6ft Kino KF32	HO	44C	3090 -1cc	3420 2G	3190 0cc
4ft Kino KF32	4ft	44C	3180 +1cc	3540 0cc	3240 0cc
3ft Kino KF32	4ft	44C	3320 +1cc	3730 4M	3490 5M
3ft Kino KF32	2ft	37C	3060 -0cc	3360 1M	3190 0cc
2ft Kino KF32	2ft	39C	3020 +0cc	3310 1G	3110 0cc
15" Kino KF32	2ft	41C	3050 0cc	3380 2G	3170 0cc
8ft Kino KF29	HO	50C	2830 -1cc	3160 1G	2980 0cc
6ft Kino KF29	HO	41C	2960 +0cc	3340 0cc	3070 0cc
4ft Kino KF29	4ft	44C	2920 +1cc	3260 1M	2970 0cc
3ft Kino KF29	4ft	44C	2870 +1cc	3200 2M	2950 5M
3ft Kino KF29	2ft	36C	2700 -0cc	2990 1G	2780 0cc
2ft Kino KF29	2ft	37C	2860 -0cc	3200 3G	2970 0cc
15" Kino KF29	2ft	40C	2870 +0cc	3190 0cc	2950 0cc

Color Reading Procedure

The safety-coated lamps were read in a single fixture, lying face up on a bench. The lamps were burned for 20 minutes in an ambient temperature of 76F (24C). Operating lamp temperature was measured with a surface probe at the middle of the lamp. The color meter was held about 12 inches (30cm) above the middle of the lamp. No other light source was on in the room.

Tips For Reading Color Temperature

- Hold meter about 12 inches (30cm) from the center of the light source. Do not hold the meter directly against a lamp, as the reading will be inaccurate.
- Do not hold the meter up against the louver. The louver shadows a portion of the meter's diffusion disc resulting in inaccurate data.
- Make sure no other light source is on or is able to reach the meter.

- Don’t confuse LB filter data with CC data. LB filters are Light Balancing Filters that appear orange or blue. CC filters are Color Compensating Filters, which appear magenta and green.

Color Meter Variables

The filtering data provided by the various meters differs in resolution and value assignment.

Minolta II

The older Minolta II shows Color Compensating Filter (CC) data as a range of ± values in single digit increments. These values translate to Kodak Wratten filters. A conversion chart is provided on the back of the meter. A plus value indicates the spectrum has additional green, a minus value indicates additional magenta. Magenta filters reduce the green content, green filters reduce the magenta content.

Minolta II cc+ Magenta conversion chart	
+2	5M
+4	10M
+8	20M
+13	30M
+18	40M

Minolta II cc- Green conversion chart	
-2	5G
-4	10G
-7	20G
-10	30G
-13	40G

Minolta III F2 and Gossen Colormaster 3F

The Minolta III F2 and the Gossen Colormaster 3F provide direct Kodak Wratten filter values. The resolution of the Minolta is in single digit increments. The Gossen is lower in resolution and provides data increments in filter values of 5. In other words, where the Minolta might render a filter value of 3M the Gossen will render a 5M value.

Color Compensation Filters

As a general guide, here are the cinema gels as they correspond to the CC meter readings to correct the light to a zero CC value.

Magenta Color Compensation

Filter Description	Minolta II	Minolta IIIF	Gossen
1/8 Minus Green (Magenta)	+2cc	4M	N/A
¼ Minus green (Magenta)	+3cc	8M	5M
½ Minus Green (Magenta)	+7cc	19M	10M
Full Minus Green (Magenta)	+12cc	31M	15M

Green Color Compensation

Filter Description	Minolta II	Minolta IIIF	Gossen
1/8 Plus Green (Green)	-2cc	6G	N/A
¼ Plus Green (Green)	-3cc	9G	5G
½ Plus Green (Green)	-7cc	17G	10G
Full Plus Green (Green)	-12cc	29G	15G

For an example of how Kodak Wratten Filters relate to Color Compensation gels, ROSCO has published a chart comparing their Cinegel series with Wrattens:

ROSCO Cinegel Green Color Compensating	Kodak Wratten
#3304 Plusgreen	Wratten CC-30G
#3315 ½ Plusgreen	Wratten CC-15G
#3316 ¼ Plusgreen	Wratten CC-075G
#3318 1/8 Plusgreen	Wratten CC-035G

ROSCO Cinegel Magenta Color Compensating	Kodak Wratten
#3308 Minusgreen	Wratten CC-30M
#3313 ½ Minusgreen	Wratten CC-15M
#3314 ¼ Minusgreen	Wratten CC-075M
#3317 1/8 Minusgreen	Wratten CC-035M

17. How Kino Flo lamps are different from architectural lamps.

Kino Flo's True Match lamps are designed to correspond to the spectral sensitivity curves of film, HD and video as well as digital imaging.

Architectural lamps are designed for the way our eyes perceive light. Our eyes are more stimulated by yellow green light. For this reason architectural lamps have a stronger green element in order to achieve high lumen per watt efficiencies as mandated by today's energy codes.

This is in direct opposition to what imaging technologies require. Imaging technologies require a broad continuous spectral distribution. The green spikes from architectural lamps affect skin tones and general color rendering. True Match lamps render the correct color on the various imaging formats.

18. Lamp labels explanation, old vs. current

Old Label

New Label

All T12 lamps have seen modifications of the lamp label. This was done to more accurately reflect the true wattage of the lamp when it is operated on a Kino Flo system. Other markings have been added to satisfy international regulatory requirements.

Previous lamps carried industry standard descriptions relating to wattage. We originally maintained these descriptions since Kino Flo lamps can operate in industry standard architectural fixtures as well as Kino Flo's systems. Lamps operate at higher wattages and with more light output in Kino Flo systems. To accurately reflect these true wattages on our systems we redefined the labels. Note: Kino Flo lamps can still be used in standard architectural fixtures.

Lamp Size	Old Lamp Type Description	Standard Wattage	Current Lamp Type Description	True Wattage
15"	F14T12	14W	F30/T12/HO	30W
24"	F20T12	20W	F40/T12/HO	40W
36"	F30T12	30W	F60/T12/HO	60W
48"	F40T12	40W	F75/T12/HO	75W
72"	F72/T12/HO	85W	F100/T12/HO	100W
96"	F96/T12/HO	110W	F120/T12/HO	120W

Some customers believe the new HO labeled lamps are brighter than previous models. The new lamps are brighter than old lamps due to the lumen depreciation of the older lamp. The formulation and construction have not changed. Only the label was changed. It's still the same lamp.

The Hg in a circle indicates the lamp contains mercury. The Trashcan with an X through it is an international WEEE compliance symbol indicating to the customer that the lamp should be disposed of according to local codes. The CE marking indicates the lamp was made in compliance with CE standards (European safety code). The date code indicates the date of manufacture. (YYYY-MMM-DD).

19. Determining BTU's for architectural or studio projects

In studio planning some engineers require turning wattage to BTU calculations to determine air-conditioning requirements. A simple BTU calculation follows:

Watts to BTU
1 KWH = 3413 BTU/Hr.
1 Watt = 3.413 BTU/Hr.

3.413 BTU per watt-hour

Example: Diva 400 = 220Watts
220 x 3.413= 750.86 BTU/KWHr

Check our catalogue listings or our Internet pages to determine the exact wattages of our lamps.

20. 55Watt CFL lamp/ Ballast shuts down when lamp is dimmed to low end.

On batch 2006-09-22, KF55, 55Watt CFL had one lamp, which displayed no excess wear or usage, no lamp blackening. Fixture was operated for about 30 minutes. When dimmed to the lowest setting the ballast would go into a hard latch-up. In order to reset ballast power was turned off for 30 seconds. When the lamp was replaced the ballast performed as per spec.

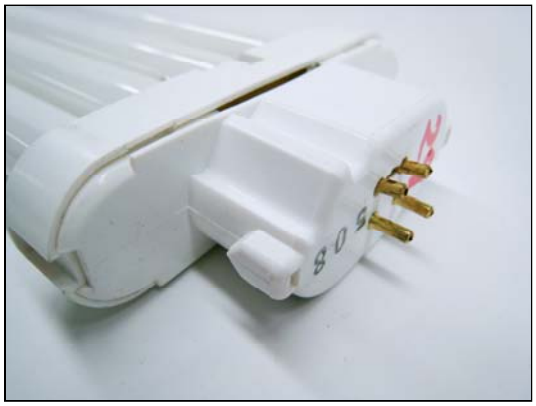
Closer inspection revealed the lamp had only one amalgam ball. The amalgam ball contains a small measure of mercury. Tilt the lamp down and look at the tips of the lamp. The glass is clear on the end. You should be able to see and count a number of small black beads. CFL lamps should have from two to three amalgam balls. One amalgam ball would represent low mercury content. The subsequent low mercury pressure in the lamp at low dim setting caused the lamp voltage to rise.

The Osram ballast used by Kino Flo has a sophisticated protection circuit that detects excess lamp voltage and shuts the ballast down. Excess lamp voltage is a common symptom of lamps reaching their end of life cycle. If the ballast did not shut down, the lamp voltage would continue to rise and ultimately result in ballast failure.

21. 55Watt Quad lamp base separation

The quad lamp base is made of two pieces; a shell and base insert with pins. Batches prior to 2007-03-01 might experience a separation of the two pieces if the lamps are not inserted correctly into the fixture. They simply snap back together again. Using a cyanoacrylate adhesive will bond the two pieces and correct the issue.

22. 55Watt Quad lamp pins broken



This image is representative of a lamp that has not been correctly inserted into the fixture. The lamp pins, parallel to each other have broken into the shell and the base of the lamp has separated from the other half.

23. Difference between 525 green and 550 green lamps

There are two types of green lamps used in composite effects shooting. The standard that has been around the longest is the 525nm green lamp. This was sometimes referred to as “super green”. Another lamp used in our industry is the “digital green” lamp, which is rated at 550nm.

To reduce the confusion between “green”, “super green”, “digital green”, or other name that may come into the industry, Kino Flo decided to name the colors based on their spectral wavelength as expressed in nanometers. The Kino Flo catalogue shows the different spectral distributions.

The 550nm lamp is yellower and has more UV in its spectrum and it offers more reflectance when used with a phosphorescent green screen. When looking at the two types of lamps side by side the 550nm appears paler and brighter than the more saturated 525nm lamp.

The 525nm green lamp is the one Kino Flo does 95% of our business with. On occasion we will supply the 550nm lamp. The 525nm is more saturated and is preferred by most effects supervisors. Both lamps will render good composites as long as the negative is properly exposed.

We can expect some continued confusion until everyone starts defining the lamps on the basis of their spectral definition.

Just to illustrate the interchangeability of the two types of lamps, Kino Flo lighted a job in 2007 in which we alternated the 525 and 550 lamps within an Image 80 fixture. We achieved another ½ stop in brightness while maintaining good green saturation.

24. Difference between 420 blue and 450 blue lamps

There are two types of blue lamps used in composite effects shooting. The standard that has been around the longest is the 420nm blue lamp. This was sometimes referred to as “super blue”. Another lamp introduced to our industry as a “digital blue” and it is rated at 450nm.

To reduce the confusion between “blue”, “super blue”, “digital blue”, or other names that may come into the industry, Kino Flo names the colors based on their spectral wavelength as expressed in nanometers. For example, 420 blue and 450 blue rather than super blue and digital blue. The Kino Flo catalogue shows the different spectral distributions. For on its lamps

Kino Flo uses the 420nm blue lamp for 95% of our blue screen lighting. The 450nm blue lamp is used more on camera as a blue colored lamp.

The bottom line: we can expect some continued confusion until the industry defines the lamps on the basis of their spectrum.