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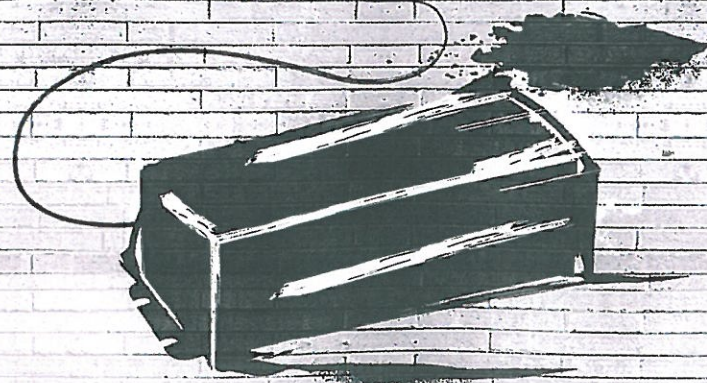
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ISSN 2050-9200



UE 011 | SEPT_OCT 2014 | £2.95/\$5.00

SUMMARY

Broadly speaking I think the variance between the digital ballasts is actually greater than I was expecting. What I initially thought was going to be the boring part where everything turned out to be the same has actually proved to be fairly interesting after all: Yay for investigative journalism.

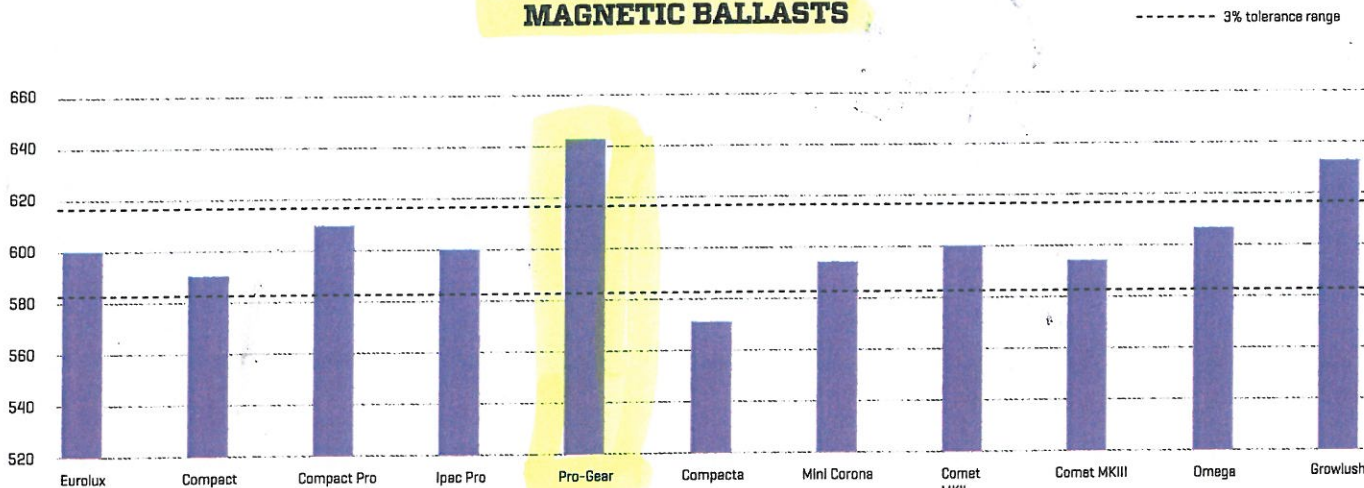
On the magnetic side of things, for the most part the results are fairly standard, one quite low admittedly, but the majority of ballasts performing reassuringly well. The Pro Gear and Grow Lush do seem to kick out a fair whack though. Even though this is technically over the 3%, I can imagine a lot of people having an in built and permanently on 'super lumens' setting a fairly attractive prospect.

Whether you are looking at choosing between magnetic or digital ballasts, these results are a good starting point for comparing the main brands. Main brands being the key words there. Like our last comparisons, we have concentrated on main branded products available from nationwide distributors. There are ballasts that

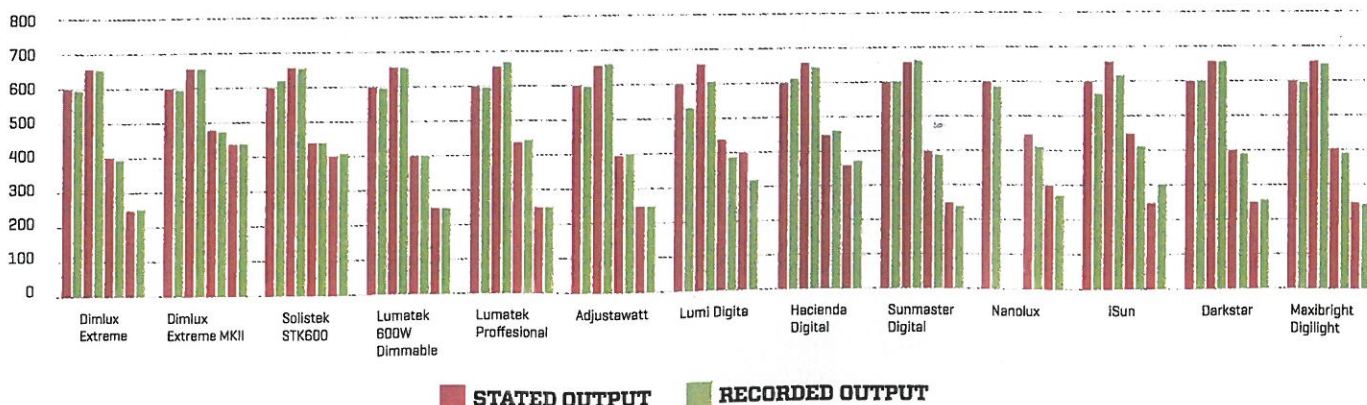
fall out of this category but are still widely available that we have not covered. Ballasts made directly for individual stores or ebay ballasts are something that will be involved in future testing. Ultimately we need to provide as much information to you as possible whilst supporting the industry as a whole so it continues to grow. By including store only products and ebay, cheap-as-chips products in these comparisons we are getting these two birds stoned at once.

So our first wave of tests on ballasts are out the way (and actually made it in time for the London Show!), and one or two surprising results have initially been thrown out. If you are looking to purchase new ballasts then these results serve as a good way of getting an initial idea of their performance. Wattage is a good indication of how a ballast fairs, but there are many other factors that affect its performance, and many ways to test said factors. Not to mention many ways to dispute said tests. All of which I'm sure we'll do and hear, but until then, here are some lovely bar graphs that quickly represent all the data we collected.

MAGNETIC BALLASTS



DIGITAL BALLASTS





GROW TEST

BALLASTS COMPARED

The importance of a ballast in an indoor grow-room is something that really doesn't need much explanation. If these products weren't in existence, it's likely that the entire indoor growing scene wouldn't be either.

As usual there are many types of ballasts around nowadays, and they come in many forms. There's also a multitude in ways of which you can compare and assess ballasts. In order to get a full and complete picture of every type of ballast we are looking at here, we would need a considerably more room in the magazine, time and not to mention ridiculously expensive equipment to measure with. In order to fit it all nice and concisely into a bite size article is a little bit unrealistic to say the least, so to correctly represent the ballasts we'll be conducting these tests over a series of articles and over a number of issues of the magazine.

So, what exactly are all the factors we could consider? Well, a few examples (but by no means everything) are as follows:

1. POWER CONSUMED AND DELIVERED

What the ballast is actually drawing from the wall and how much it is actually delivering to the lamp.

2. COMPONENTS USED / SAFETY FEATURES

Safety with electrical equipment is paramount. Components used should be in line with safety regulations/standards to ensure minimal risks to health, no hazardous substances used etc.

3. IGNITION SEQUENCES

How does the ballast actually strike and ignite the lamp? From the initial pulse creating the spark in the lamp, to the time taken to get up to full running power.

4. TOTAL HARMONIC DISTORTION

How well does the ballast replicate a sine wave and deliver it to the lamp? Looking at the various harmonics.

5. FREQUENCIES EMITTED

Particularly for digital ballasts. All sorts of shielding are used nowadays to prevent this from happening. But how well do they work?

6. FUNCTIONALITY

What features has the manufacturers put in place on their ballasts to give you more control over the product?

This is the first stage on the journey to understanding all your options regarding ballasts available to you on the market. Much like Frodo Baggins in 'The Lord of the Rings', any childlike innocence will slowly be eroded away as the adventure reveals more and more detail about the true workings of the world, in order for you to easily distinguish your White Wizards from your Ring Wraiths; The first thing to decide is which direction we should head in.

Our in-built hydroponic compass firmly pointed us in the direction of what many people see as the fundamental nature of ballasts. How much Wattage is actually being drawn from the plug socket and then in turn being delivered to the lamp? All 600w ballasts will fire up and get a 600w lamp to give off light, but the components used and manufacturing processes involved will dictate how well each ballast is burning a lamp, and whether it is producing 600w at all.

Burning is the key word in the last sentence. That is essentially what your ballast is getting done in the lamp as its main function. It is heating up the gases in the lamps by passing an electrical arc across them and burning them to a specific temperature. The light that is given off is really just a by-product to this reaction. It's a bit like how my brain switching off is a by-product of when my wife is dictating her current list of chores for me to do. The rate at which she reels these chores off and how she phrases things directly relates to how quickly and how much I actually switch off. Conversely for ballasts, the rate at which they supply the electricity, and the quality of the signal they generate will generally dictate how well the lamp will burn, and therefore also the quantity and quality of the resultant light given off.

HOW DID WE GO ABOUT TESTING?

I'm fairly sure you can guess the sort of tight budget we run to here. As much as we would love to have our own swanky facilities full of top notch testing equipment, we just can't afford it (yet). Subsequently we have to work very much within our meagre means. Fortunately for us, I managed to convince the chaps at Maxibright that it would be a good idea for them to let us use their testing equipment.

There were a few key bits of high grade technical equipment that ensured that we were able to get highly accurate results for the power drawn and delivered by each ballast.

Power Stabiliser

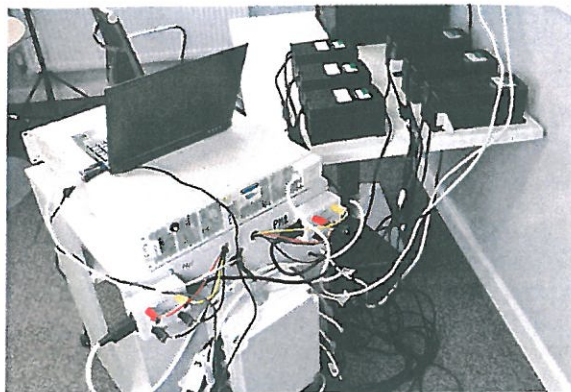
This nifty bit of kit took care of the pesky little problems that come with fluctuating voltage. Not necessarily much of an issue for digital ballasts as they compensate for these fluctuations themselves, but magnetic ballasts will significantly alter their output in Watts as the Voltage supply fluctuates. For every volt that your power supply fluctuates, you can expect a similar change to the tune of 1% of the total wattage; In other words, roughly six watts for every volt.

Power Analyser

The star bit of equipment in the line-up. It precisely analyses the electrical signals being generated from the plug to the ballast, and then also the ballast to the bulb. It's the ballast to the bulb measurement that's the really tricky bit in this. If, like every other normal human being, you don't own a power analyser that can handle the sort of electrical loads that are sent to the bulb, you can still perform a basic version of this test at home with a simple store bought power meter, correct for the fluctuating voltage as mentioned above, and then deduce the output. Of course this doesn't give you an exact measurement of what's being delivered, and that's the crucial bit of info that we're after today.

THE LAMP

We used the same SunMaster 600w lamp that had been run in for the recommended 100 hours across each of the ballasts that we tested. This ensures that the lamp is at its optimal running capacity and nicely stabilised to drastically reduce the chances of it giving any erroneous readings. We used the same lamp for the sake of consistency across the ballasts by way of a comparison. However, many ballasts are developed and manufactured to work in conjunction with particular lamps, so their performance may well be different when run with the recommended lamp. At the same time, it's all too common for growers to pick up lamps almost at random, a lot of the time going for the tempting new cheaper versions on the market; This, combined with the time involved with running in all the various lamps, means that the exact nature of the impact that specifically tailored lamps have on ballasts will have to be looked at in a later test.

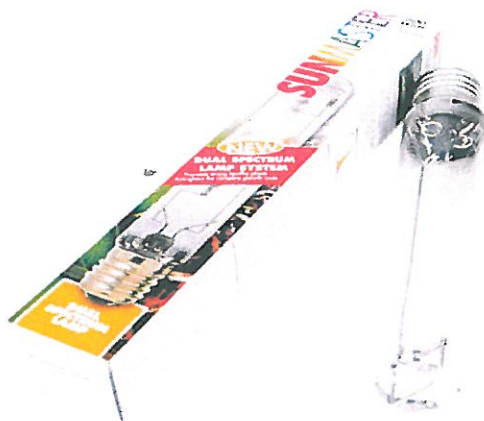


Contactors

Fairly basic when compared to the rest of the equipment, but for the custom built 8-way contactor to work in conjunction with the accompanying software meant that eight ballasts could be hooked up at once, all nice and safe like.

Software

The brain; We simply programmed in the amount of times that we want each ballast to fire, when to take the readings, how many times to repeat it all and hey presto, it goes to work. This software allows precision timings of the readings that you want so you can be sure they are evenly recorded across all ballasts. This takes the awkward failures that come with human error out of the fray, meaning that you don't have to stand there for days on end waiting for the bulb to cool down, or miss the window to take a reading because you were busy googling cat memes, not that that would happen or anything.



MAGNETIC BALLASTS

Most magnetic ballasts are developed and designed to operate at a stable 240v, and with the power stabiliser we were able to let them do exactly that.

In real life however, the area of the country you may be in, and the supply of electricity your area receives will have a direct impact on the output of magnetic ballasts. This is thanks to the relationship between those good old pals, voltage, wattage and amps. For example, in some more industrial areas of cities the supply voltage may well be 250v-260v, significantly higher the normal 240v. Each volt increase will have roughly a one percent increase in total output watts, so roughly six watts per volt in this case. This also applies the other way round: If your input voltage is low then you will see your wattage proportionally lower as a result. It is well worth bearing that in mind when looking at the below data.

Over/Under Power

There are definite consequences on the output of your lamp when either under or over powered. 600w lamps are designed to be burned at exactly that. If you ballast under supplies the bulb, the resultant spectrum and intensity of light emitted will be significantly less than optimum. Less PAR light is generally a bad thing if you are a plant. You want as much as you can get to photosynthesise at maximum capacity. I often get called a vegetable and so figure I need as good a spectrum as I can get.

Whilst it does increase the total light emitted, overpowering a bulb can also potentially have consequences on the spectrum that are less than desirable. It will also stress and work the lamp to its limits and so is likely to reduce its lifespan somewhat. Either way you look at it, according to British adopted European standard BS EN 60923, the delivered wattage should be to within 3% of the stated value. So plus or minus 18w on a 600w ballast.

The Power Factor

This is essentially a measure of how well the capacitors are performing their function. Most electronic equipment, particularly when constantly shifting magnetic forces are involved, have an inherent lag or delay when drawing current, and tend to misalign it with the voltage slightly. The capacitor's primary purpose is to try and reduce this lag each time the current alternates by providing a short burst of electricity to help correct the signal and minimise this lag. The higher the power factor, the more efficiently the system is running, and the happier I get.

So without further ado, here are the results that we obtained for magnetic ballasts:

Manufacturer/Distributor	Model	Wattage Drawn	Lamp Wattage	Power Factor	Frequency
Maxibright	Eurolux	661.7	600.5	0.89	50
Maxibright	Compact	664.7	592.9	0.88	50
Maxibright	Compact Pro	665.7	608.7	0.89	50
Maxibright	Ipac Pro	661.5	599.2	0.88	50
Highlight	Pro-Gear	706.4	642.5	0.88	50
Lumi	Compacta	625.5	571.9	0.89	50
Century	Mini Corone	658.6	593.5	0.89	50
Sunmaster	Comet MKII	657.7	599.8	0.89	50
Sunmaster	Comet MKIII	662.79	593.8	0.89	50
Eden	Omega	666.5	608.2	0.89	50
Ikon	Growlush	693.4	634.1	0.88	50

