

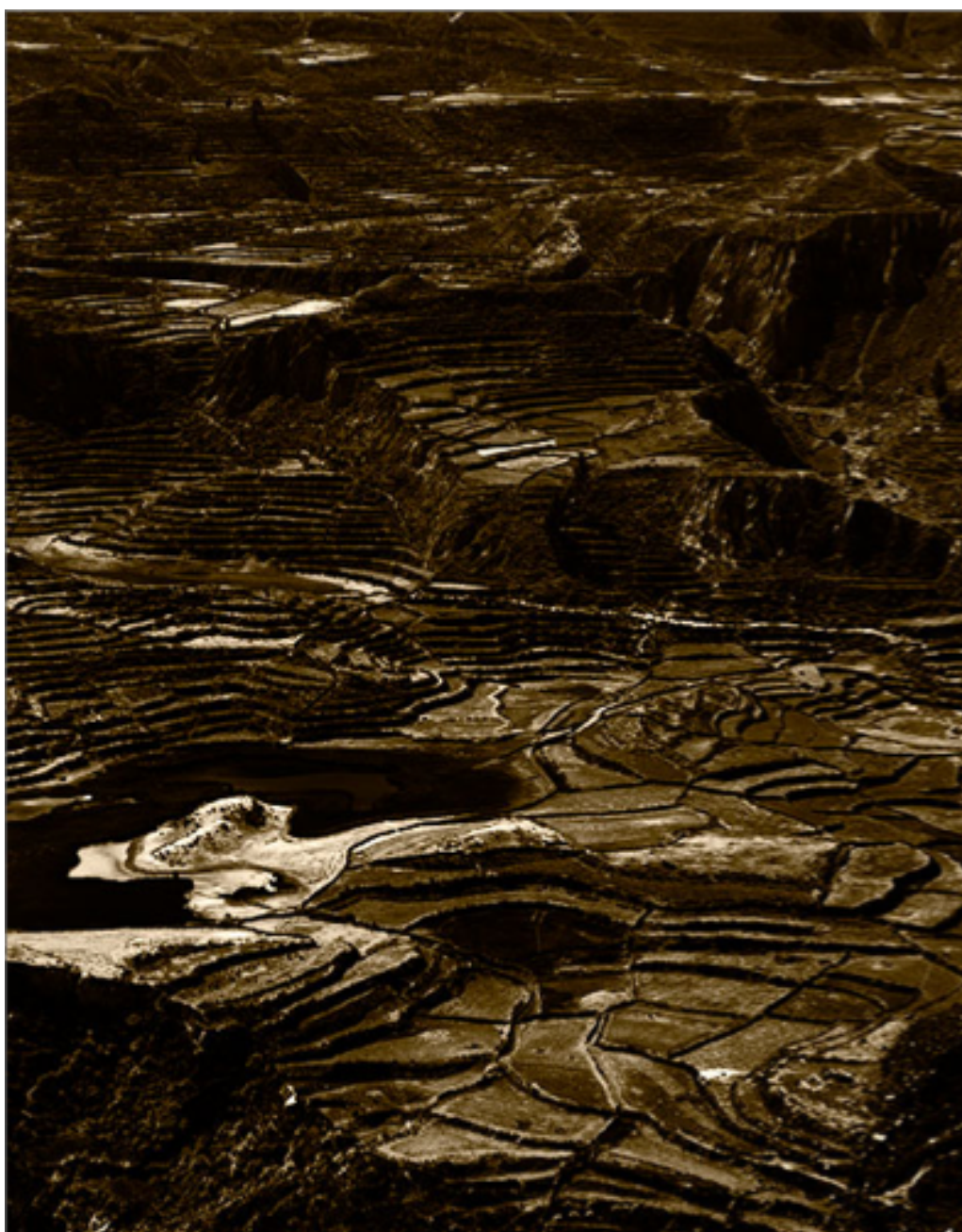
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# Dry Film Photopolymers for Printmaking & Photogravure

*a continuing materials guide for artists preparing their own photopolymer plates*

(Provided free of charge, this is the only source of this information, on planet Earth!)

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**(Direct-To-Plate) Photogravure**

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Maximum Image Control*

*Polymers Available Worldwide  
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# Workshops

If I have succeeded in my intent, there is nothing you can learn from me about this method of making photogravures that is not already contained in this book. I have held back no secrets. It is all there and you shouldn't need me, at all.

But, we are not all autodidacts. Some people simply do better with personal instruction. It is for this reason that I offer one-on-one workshops at my studio for a flat fee, materials included. You need only arrange for your own expenses, travel, lodging, food, etc., and with me for the dates for your workshop, then show up with your images. Workshops are three full days, holding a fourth day in reserve at no additional charge, if we agree it is needed. I will consider a two-student workshop if you desire, but it automatically becomes a four day workshop, at twice the standard fee. You are responsible for providing your own classmate.

I do not earn my living giving workshops instead of making photographs. The purpose of these workshops is to train practitioners, and especially, teachers of the process, with the idea that you will train others, also for a reasonable fee. University affiliation is not a prerequisite. This new approach needs to be disseminated around the globe.

During the workshop, I will not be cooking for you or entertaining you. There will be no celebrity photographers to enthrall you and no evening entertainment activities. We will not be following the widespread workshop custom of venturing out to look for photographic low-hanging fruit at nearby National parks. There will be no portfolio reviews and no flattering praise. We will be doing one thing only... teaching you to make photogravures. You will leave prepared. That is the reason for the optional fourth day... just in case you need a little more help.

I photograph the desert southwest. Therefore, I am likely to move from time to time and may have already moved at some point, if you have an older copy of this paper<sup>1</sup>. There are two *constants* with regard to contacting me, my web site address and email will always remain the same.

[www.davidkachel.com](http://www.davidkachel.com)  
[david@davidkachel.com](mailto:david@davidkachel.com)

The fee for my photogravure workshop is: \$600<sup>2</sup>

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<sup>1</sup> I am currently in Haskell, Texas, having moved from Bisbee, Arizona in 2021. Contact info is on my web site.

<sup>2</sup> At the time of this writing: 6/22/2023. Email for possible updates to fees and location. Make all arrangements via email. Other forms of communication are often less dependable.

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## Acknowledgement

Over the space of four years (2013~2017) I tried several times to break open the damn, so to speak, and made very little progress. In fact, I was able to get my hands on only one photopolymer sample which turned out to be a dud for photogravure use. It worked, but it worked quite poorly.

I would not be able to provide you with much of the information contained in this document were it not for the indispensable efforts of NY based photographer Greg Brophy...

<http://www.gregbrophy.com>

who had a bigger persuader than I, and was able to procure samples of several DuPont materials for me to test. These pages would definitely be fewer, were it not for his most generous assistance in coaxing the distributor into coughing up samples for testing.

## Foreward

This paper will be an ongoing effort. As new samples of potentially useful photopolymers become available to me for testing, I will do so and add the results to a new revision of this document. Case in point; this is now the seventh revision, I believe, with more to come.

Photographers making use of this document are asked to pitch in and make new materials available to me for testing, if in a position to do so. Photogravure of all types is on the brink of extinction (again, if not, still) and therefore, secret keeping is absolutely intolerable. If you want photogravure to survive, you have to help, and most importantly, *share your knowledge*. Join the photogravure group on Facebook where we are now up to more than 800 members and still growing. Whatever photogravure process you may prefer, you can learn and contribute, there.

Whether your interest is copper plate, Talbot-Klic photogravure, solar plate photogravure, or photopolymer do-it-yourself plates made with materials like those covered in this document; contribute if you don't want to see it all end. The finest presentation of the photograph is the *photogravure* and it simply must continue to exist.

And of course, a great many traditional printmakers also use these identical materials in significant numbers, also relying on them heavily.

This document is now split into multiple sections covering suitable materials, non-suitable materials, quasi-suitable materials, *rebranded* (and overpriced) mystery materials, manufacturers, distributors and even exposure units.

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Non-suitable materials are covered to prevent others from wasting time and money investigating or acquiring materials they might think I have not tested when in fact, I have.

The *mystery materials* section is to help put an end to the secret keepers. That is, *ImagonHD*, the recently (relatively) announced *Skylight* material and any other materials on the market, the sellers of which have chosen to keep the actual source for, secret. I did not initially plan to include these as I did not want to provide publicity for the secret keepers, but users need to know the characteristics of these materials and whether or not they have any properties that make them *special*. They absolutely do not, by the way.

There is also a section for photopolymers sorted by brand that remain to be acquired and tested. If you have access, please get at least twenty square feet for testing and send it to me at:

David Kachel  
PO Box 393  
Haskell, Texas 79521  
USA

Your contribution will of course be acknowledged in this document.

There are also sections for contact information for manufacturers, and then contact information for distributors.

The newest section of this document is all about LED UV lamps suitable and not suitable for exposing these materials. Why pay hundreds or even thousands of dollars for a plate burner you don't really need, when as little as US \$30.00 will work just fine.

Please do not consider that I must remain *the only* source for this information, though as of this writing, I still am. If someone else wants to test materials and publish results, I will not be the slightest bit offended. For me, this is not a contest. It is about making certain that photographers/printmakers can acquire the materials they need, easily and in perpetuity, and about ending the despicable, destructive practice of secret keeping.

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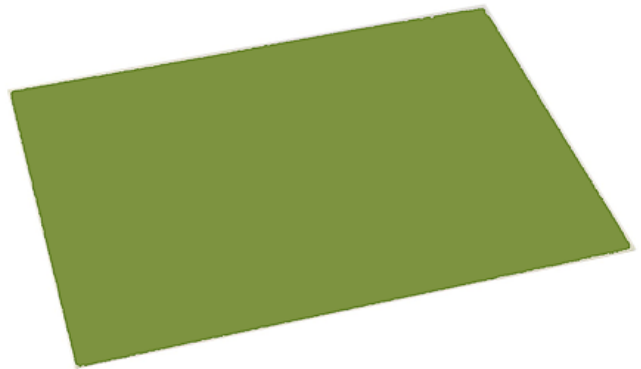
## Introduction

At the time of this writing there exist three avenues available to photographers for the pursuit of the photogravure image. They are listed here from most expensive to least:

- Traditional copper plate photogravure (and its variations)
- Factory-made, metal-backed polymer plates (and variations), (there are also transparent plastic backed versions of these plates), all washed out in plain water
- Photopolymer plates prepared by the printmaker, or photographer, using commercial dry photopolymer films made for the computer industry, processed in an easily obtained, mild alkali



A roll of one of the dry film photopolymers discussed in this paper.



A factory-made plate, with the polymer already on it. (Very expensive.)

This photographer's experience with making photogravure plates has thus far been limited strictly to the last variety above, because I wanted to pursue the relatively new idea of the direct-to-plate approach and also because the other two options were economically prohibitive. For me, it was either roll-your-own dry film polymer plates or, nothing at all. Fortunately, this turned out to be a very good choice: a great relief since for an extended period I believed I might be pursuing a dead-end path. For newcomers concerned that dry photopolymer plates might be a poor imitation of traditional photogravure or readymade plates, I can assure you that is most definitely not the case.

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For a long time the users of readymade polymer plates were accused by a few devotees of the copper plate process, of output that was inferior. That was not true either.

I started pursuing photogravures made with DIY polymer plates in 2013 and though the production of images moved steadily ahead, there was always a major concern: the photopolymer itself.

The photopolymer required, and absolutely the only one available (to my knowledge) at the time was called *Imagon HD* and sold by a small handful of retailers. (As of this writing, the number of retailers worldwide is down to exactly, one: [takachpress.com](http://takachpress.com). Great people to deal with, BTW, despite the things I will shortly say about the very misleading Imagon HD product. Takach is not responsible for that deception.)

In 2013 there was also a thinner, but otherwise identical material. This was intended for use in the process of directly etching metal plates, unlike Imagon HD where only the polymer carries the image that is destined for intaglio printing. This material was called Z\*Acryl.

My immediate concern with pursuing photogravure via this avenue was the continued availability of materials. I was very uncomfortable that there was only a single material available for the purpose, wholesaled by a single person, to less than a half dozen retailers, worldwide. This person did not want to share any information and went so far as to deny to my face, that he was the source of Imagon HD, when I had already confirmed through someone else that he indeed was.

What made matters much worse was the fact that the providers of these materials were simply buying them from the real manufacturers, relabeling them, removing all identifying information, then providing no information whatsoever about the technical characteristics of the material to end users. The latter made it impossible for someone working with the materials to simply go to a manufacturer and request a dry film photopolymer material with characteristics, x, y and z: the characteristics x, y and z being unknown. At the time, ALL the currently available dry photopolymers offered to artists making the various types of photogravure and other print types were in fact, repackaged and relabeled materials made by another, unrelated company.

I did not want to invest a great deal of time (it turned out to be more than four years) learning a process that could be wiped out in the blink of an eye, at the whim of a single person. As it turned out, I was 100% correct in my concern, except for the whim aspect.

The source of Z\*Acryl did in fact die, less than one week after I spoke with him on the phone. He took the secret of Z\*Acryl to his grave. His family did not continue distribution and has ignored



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my pleas to reveal its true nature, if not to me, then to artists in general. It is lost to photographers, permanently: unless one of us discovers it by accident and even then, we could only be certain to have encountered a similar product, not the exact same one. (I am 99.99% certain it was the 30 micron thick version of DuPont's MM500 series, the MM530 product. It seems an exact match.)

The source of Imagon HD died about a year and a half after that. That product continues to be retailed by Takach Press, apparently still made available by the family of the deceased.

This sort of behavior is absolutely unacceptable. Because one person decides to keep a secret, (especially one to which he has no rightful claim whatsoever, because he/she has no ownership of and plays no role in the making or legitimate sale, of the product), artists around the world constantly risk being deprived of an indispensable material, because they do not in fact, know what it really is, or whom to ask for similar products. It is a mystery material.

The purpose of this document and to my book on Photogravure by this method, is to put an end to the secret keepers, permanently. Not only do I intend to test every available and potentially suitable dry photopolymer on the planet and list the results in this document, I will also test the secret keepers' products and report on those, if for no other reason than to expose any possible claims of superiority. In addition, I provide a detailed description of the technical characteristics of suitable dry photopolymers in general so that in future, you need only approach a manufacturer or distributor with that description, to be offered a material that is extremely likely to prove suitable.

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# Description of Suitable Photopolymers

Imagon HD and Z\*Acryl, along with all the other fake products covered in the section titled *Mystery Materials*, were actually materials made for use in the manufacture of printed circuit boards for computers and all kinds of electronic devices. That is their original reason for existence. The material is attached to the surface of the metal-coated material to be used for circuitry and exposed to a photograph of the circuit pattern desired. Then the card is immersed in a mild alkaline solution and the areas of photopolymer representing the non-circuit pattern, are eaten away. After that, the plate is etched in acid to remove the metal exposed by the missing photopolymer. These materials were never intended for any other use and are generally sold only in substantial size rolls by distributors that the manufacturers have selected. They can be bought from the distributors, but not generally from the manufacturer. (Some will doubtless sell directly.)

Made by DuPont and others, there exists a significant variety of photopolymers and if one knows what to ask for, they are hardly scarce, or expensive, at all. The trick is to break up the secret keeping... which is going to begin happening right here, and right now.

First, I am going to give you the characteristics that describe a photopolymer suitable for making photogravure plates. This, so that should the materials I describe herein become unavailable at some point, you will be able to speak the language of the photopolymer world and communicate to them the kind of substitute material you need. No one has ever made this information public (to photographers and printmakers) before, so keep the latest version of this paper, handy.

The first thing to know is to not waste time contacting the actual manufacturers, unless to ask for the names of their distributors, or written data sheets. I tried on more than one occasion to get information from DuPont and they are simply not interested. *"I'll get back to you"* is as helpful as they get. They don't! Apparently, there is a single person in the US assigned to providing information and assistance regarding DuPont photopolymers to members of the public. That person is/was Gus Gustafson in Technical Service, and actually providing information is the very last thing on his mind. If you insist on trying to get information from DuPont directly, you will no doubt be transferred to him. Just hang up. He has no intention of providing information or service of any sort.

DuPont sell their products via distributors who are somewhat more helpful, but not by a lot and are not themselves interested in providing meaningful assistance to anyone they believe doesn't represent an immediate large purchase. The only way you can deal with these people is if you already know exactly what you want to buy and are able to do so in a quantity they like. Some have minimum purchases of \$500 or more. But at a small fraction of the price charged for

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Imagon HD (in the case of some non-DuPont products, some are only *one-thirteenth* the price!), that is a LOT of photopolymer and will keep you in materials for quite some time.

While you can download PDFs covering the characteristics of the various photopolymers they manufacture from DuPont's web site, these PDFs are generally cut-and-paste, boilerplate time-wasters that provide very little help, save available thicknesses and a naming convention that would make any sadist proud. I have in front of me at this moment, two PDFs from DuPont that describe two VERY different photopolymers in exactly the same words, save a couple of minor differences not amounting to one percent of the papers' text and definitely not explaining the observed behavior differences in any way, whatsoever. To read both PDFs, you would conclude that the two photopolymers described were identical, except that one processes a bit more quickly than the other.

Then, there is the terminology. Photopolymers being a light sensitive material, one would think the language of the photographic world might apply. It doesn't. The language employed in this industry is very narrowly focused and largely un-photographic. And, it is not universal. I am looking at one manufacturers web site right now that is total gibberish compared to what DuPont says on theirs. In their defense, these materials are not intended to be used by photographers, so we have to adapt to them, not the other way around.

Oddly enough, all the actual scientists who invent this stuff, speak nearly perfect *photography*. Go figure!!

Most important when trying to find these materials, is to refer to them as *dry film* or *dry resist photopolymers*. This is because there are also liquid photopolymers in existence, widely used, and definitely *not* what you want. It would be very difficult to make a layer of liquid photopolymer thin and uniform enough to provide the resolution we require for photogravure. Liquid photopolymers are used in a broad variety of industries and are generally neither designed for, nor expected to provide a degree of resolution compatible with photographic requirements. They are ideal for printing big font lettering on cardboard boxes, for example.

You must also know that there are *negative working* and *positive working* photopolymers. Only negative working photopolymers are suitable for photogravure, unless you wish to pursue making plates with original (or inkjet) negatives, instead of the customary positives. I know of no one taking this approach but in theory, it could work. It might be an interesting route to investigate, but most of the materials available are negative working, so there would be little to choose from and this approach would most likely, prove to be a dead end.

There is also the question of thickness. I was originally convinced that Imagon HD was 50 microns (2 mil) thick. I don't recall where I got this information, but it seemed reasonable

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and solid. Some time later I began to suspect that Imagon might in fact be slightly thinner, at between 38 and 40 microns. I am now back to believing it is in fact 50 microns as originally suspected, but now I have a bit more evidence to go on, as I have found a way to at least compare relative thicknesses to a known thickness. I was using a 40 micron material (at the original time of this writing) and Imagon is definitely thicker, about 50 microns. (If you are puzzled as to why I cannot simply measure the thickness, remember that there are temporary coverings on both sides of the material, coverings of unknown thickness from one material to the next. And also remember that this is not a hard substance so, measuring it without the coverings is akin to measuring Jello™.

The thicker the material, the better blacks you are going to be able to achieve: up to a point. Early on, I thought that anything thinner than 50 microns would not be able to supply sufficient depth to provide good blacks. The 40 micron thick material I used some years ago has thoroughly disproven that.

However, blacks do definitely get weaker as a thinner photopolymer is used. More recently, I tested a material that was only 30 microns thick. To my surprise, it provided a printable plate and was not subject to open bite. I had assumed prior to this that thin material meant guaranteed open bite. Not the case. But the intaglio blacks from this material were weak and unacceptable.

Consider 38 microns to be the absolute thinnest photopolymer serviceable for polymer plates. (Plates made on metal with intent to actually etch the image into the metal itself, can and should employ significantly thinner photopolymers: about 30 microns, or less.)<sup>3</sup>

The material you seek should be processable in a mild alkali. This is usually sodium carbonate (NOT bicarbonate-of-soda) and for our purposes is usually employed in a 1% solution. I have yet to discover any of these materials that are not processed in sodium carbonate, but there is always a possibility that one might exist. (Solar plates, aka readymade plates, are processed in plain water and represent a different class of material. Do not however, assume that a water processed plate means no chance of toxicity. It does not.) Sodium carbonate can be purchased where swimming pool supplies are sold, and as a laundry additive called *washing soda*, or, you can make your own with an oven and a box of bicarbonate-of-soda. Spread bicarbonate-of-soda on a baking tray, bake at 450 degrees for one hour. Presto! Instant sodium carbonate.

The material should be sensitive to UV light in the mid-300 nanometer range, 340-380. Most of them are.

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<sup>3</sup> The polymer layers on the older readymade plates are far, far thicker. Actually, much thicker than needed.



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And, no matter how good a material seems to be on paper, unless I've already done it for you (results reported in this paper), you have to test it. Manufacturer descriptions are absolutely, *not* accurate. Don't buy a roll of something not yet tested and listed in this document, that you have not first tried, unless you are willing to risk having to throw it out. If a distributor refuses to provide a sample (you may be asked to pay for it), don't risk it. There are materials that look great on paper and are also, useless! For example, stay away from materials designed for exposure by laser.

Lastly, you need to understand the naming conventions for these materials which are generally decipherable, but not uniform. Names usually consist of a category / class indicator plus a thickness indicator. The thickness indicator can be the most confusing part.

There seem to be some fairly standard thicknesses across the industry but they are measured in at least two different ways, which leads to potential confusion. Thicknesses are measured either in *mils* or *microns*. There are about 25 *microns* to one *mil*. A *mil* is one thousandth of an inch. The materials you want are 2 mils or 50 microns thick.

DuPont's MM550 for example is in the *Multi-Master* 500 series and 50 microns thick. Their MM540 is the same material, but 40 microns thick. Pretty easy.

But then you get to a company like *Eternal*. Their *Laminar* 9200 series (as opposed to the 9000 series, the 8000 series, etc.) has different thickness, 9215, 9220, 9225 and 9230, products. No, that last is not 30 microns thick. It is 75 microns thick. Also known as 3 mil. So, in their case, the last two digits represent the decimal thickness in mils. 1.5 mils (~38 microns), 2.0 mils (50 microns), 2.5 mils (~63 microns) and 3 mils (75 microns), without the decimal point. Make certain you are reading these names correctly with regard to thickness before you spend your money. And just to throw one last monkey wrench into the works, manufacturers of dry photopolymers are also fond of rounding off. For example, DuPont's MM540 is actually only 38 microns thick. It is highly likely that most materials labeled "40" are actually 38 microns thick.

OK, that wasn't the LAST monkey wrench. There is one more. DuPont randomly switches between BOTH thickness naming conventions, without telling you! Isn't that fun?!!

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## Photopolymers That Work

*Nota Bene: Most all of the dry film photopolymers covered in this paper have roughly similar exposure requirements, except where specifically noted. This is because they are designed (originally) to be automatically exposed and processed in the same types of machinery. Materials that require significantly different handling might not work well in the expensive machines already owned by manufacturers of printed circuit boards.*

### **DuPont... (only some DuPont products have been tested)**

#### **Riston MultiMaster MM500 Series**

In this series, there are three materials, identical in every way, except thickness.

- MM530 - 30 microns thick
- MM540 - 38 microns thick
- MM550 - 50 microns thick

Sensitivity range: 350-380

I first tested MM540. It behaved identically to Imagon HD in every way, except, that it was a slightly different color (my stock of Imagon was a bit stale which might account for the difference in color). MM540 requires a slightly shorter processing time, roughly 1/2 to 1 minute less, which makes sense. This is the material that made me believe for a while that Imagon HD might not be a 50 micron thick material, but rather, 38 microns instead.

I printed three different images with this material that I had previously printed using plates made with Imagon HD. I exposed, processed and handled MM540 identically to the way I made the Imagon HD plates. Prints from the MM540 plates were identical to those made from Imagon HD plates.

As of the second variation of this paper, I have now tested MM550. It seems to provide a somewhat deeper potential black because of its greater thickness. It is also somewhat more heat sensitive than the 38 micron version. I don't know why but, just be careful with the hair dryer. The thicker version is slightly prone to blistering from heat when preparing plates.

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If I were to return to using this material, I would use MM550 instead of MM540 in order to provide a little more elbow room, though both worked extremely well.

If you wish to use this material to act as a resist for etching directly into metal plates, the MM530 would be a better choice.

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## Riston PrintMaster PM200 Series

In this series, there are four materials, identical in every way, except thickness.

- PM240 - 38/40 microns thick
- PM250 - 50 microns thick
- PM275 - 75 microns thick
- PM299 - 100 microns thick

Sensitivity range: 350-380

*Nota Bene: PM299 may no longer exist. Documentation is a bit unclear. But, we don't really need that much thickness, anyway.*

This material works beautifully, though its behavior will disturb you if you are accustomed to using most any other material.

This is a material that is somewhat more contrasty than the MM500 series. Think of it in darkroom terms as about 1 paper grade higher in contrast. I got best results by adding a correction curve that raised the low end about 5-10 points and lowered the high end of the curve a few points too. If your images are consistently flat, this might be a better choice than the MM500 series, though the higher contrast should not be a deterrent.

Exposure sensitivity is about the same as the MM500 series.

Plates made with this seem to be a bit easier to wipe than some other materials. (Can't explain it.)

PM200 series plates also seem a bit less prone to open bite at the edges when too much agitation is applied in processing. In fact, it seems as though it might be difficult to apply too much agitation.

Initially, a disturbing milkiness in the process bath makes it more difficult to see what is going on, while at the same time, the obviously milky look of the plate itself on inspection leaves no doubt that processing is not yet complete.

Also, while some very gentle finger rubbing of the surface toward the end of processing, to encourage the dissolved materials to come free, seems helpful with other materials, with PM200, it seems more of a necessary step.

Thirty seconds to about a minute of increased processing time is likely.



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If you need to wash off the direct-to-plate printed image because of defects, like skid marks, the PM200 series seems to respond a bit better to this than some other materials. It washes off more easily and can be repeated one or two times more often, if required.

Prone to staining white trays, blue. If compulsive, rinse out trays more frequently. I easily made a plate I intend to print for public consumption with this material.

Absolutely recommended.

(I may be trying the 75 micron thickness at a future date.)

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## Riston MultiMaster MM100i Series

In this series, there are two materials, identical in every way, except thickness.

- MM115i - 50 microns thick
- MM120i - 75 microns thick

Sensitivity range: 350-380

*Nota Bene: Apparently, there is also an MM100 series (no “i”). that is identical to this series, except that it is made on a different machine. We were told that some government bureaucrat required this.*

Roughly two full stops slower than the MM500 and PM200 series, this material, though quite capable of producing excellent images, is perhaps a bit impractical for most plate burners, unless you have one that is a lot brighter than my nuArc 26-1K, or any of my LED based units.

However, for those who prefer their plates be exposed in the sun, this is *your* polymer. Quite at home with one to eight or more minutes of direct sunlight exposure, this somewhat higher-in-contrast material reduces in contrast as exposure intensity increases. (Shadows gain ground more quickly than highlights.) Think of it as a slightly, variable-contrast photopolymer!

I made an excellent plate from my test image exposing MM115i to direct, noon time Southern Arizona sunlight for eight full minutes.

This is another material you will find disturbing at first, if you are accustomed to most any other dry film photopolymer. Though it too changes color when exposed, it doesn't get very much darker, at all. It will make you think there is not much of an image there when in fact, there is plenty. It just won't look right until you get accustomed to it. And with those long exposures in the sun, the blue color may actually get lighter instead of darker. Don't worry, your image has not solarized. You'll just think it did.

Processing is very fast. Because the blue doesn't get significantly darker, it is quite difficult to judge or even see the image while processing. Only a psychological problem. It is a bit easier to see and judge wiping if you wipe on a light box, because of the lack of heavy blue coloration.

The MM100i series might be suitable for use with a plate burner if a substantial lower-contrast correction curve is applied along with a longer direct-to-plate exposure. I found significant reciprocity failure with exposure using my plate burner and so didn't pursue it further.

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# ElgaEurope... (only one product has been tested thus far)

Grateful thanks to Marek Wesołowski (Jan Sgawski on the Facebook Photogravure Group) from Poland for submitting a sample of the Ordyl Alpha 350 material for testing.

## Ordyl Alpha 300 Series

In this series, there are five materials, identical in every way, except thickness.

- Alphe 330 - 30 microns thick
- Alpha 340 - 40 microns thick
- Alpha 350 - 50 microns thick
- Alpha 375 - 75 microns thick

Sensitivity range: 360-380

At first, I thought this might be an Eternal product with a different label, since Eternal now owns ElgaEurope. I don't think so. It would appear that Eternal decided to keep manufacturing Elga's products. At least, the Ordyl Alpha 300 series seems significantly different from the Eternal products I have tested thus far.

Ordyl Alpha 350 is significantly higher in contrast than other dry resist products, perhaps closer to Eternal's Laminar E8020, but not quite as much as Hitachi Chemical's Photec H-6238. It also employs a different *Leuco* dye (used in dry film photopolymers as a very *rough* indication of exposure. The darker the image in the polymer, the more exposure it has received). Ordyl's Leuco dye is quite blue after processing, and doesn't change much, if at all, with shifts in ambient illumination or the color temperature of same. Eternal 9220 shifts from quite purple to much more blue, the color changing with the color of illumination (this sort of behavior is more common).

The speed of this material seems to be on a par with other recommended materials, producing similar prints, except for contrast, when I exposed and processed the same image, identically, on plates made with both Ordyl 350 and Eternal E9220.

Exposure was 15 minutes with my setup of six Kimbo UV lamps set at 21.5 inches from the exposure platform. (Remember that longer exposure with lower UV output results in higher contrast with these materials, and vice versa.)

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Processing is very quick, but ink does seem to cling a bit more to this material than to some others. Not to any detriment, but your processing tray may cloud with ink a little more quickly than with other materials. (This may be due to the inks in my new Epson P6000 printer, rather than the Ordyl plates, as the Eternal plates seemed to hold onto the ink longer, too. Not sure.)

Plates were easy to prepare with Ordyl, much easier than with E9220 which seems to like to fight with you a bit. I would be tempted to use Ordyl Alpha 350, but I don't believe it is available in the US. Too bad. But, European workers sure needed another source for materials and now they have it!

Elga's Ordyl products seem to be widely available across most of Europe, and in Egypt, Jordan and Argentina! Good news for many people.



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# Eternal Materials Co., Ltd. (Etertec)...

(Based in Taiwan and operating throughout Asia and the world.)

[www.eternal-group.com](http://www.eternal-group.com)

*A word of caution: DOW chemical used to sell Eternal dry photopolymers. DOW chemical is no more. They have merged with DuPont. If you see "DOW" on a web page offering Eternal dry photopolymers, it is possible that seller is no longer a valid Eternal retailer. Check prices, which should be in the neighborhood of twenty-five cents per square foot (in 2019). If much higher than that, the seller is possibly buying from a legitimate Eternal retailer and raising the price to you. (Guess how I know this!)*

## Laminar E9200 Series

In this series, there are four materials, identical in every way, except thickness.

- Laminar E9215 - 38 microns thick
- Laminar E9220 - 50 microns thick
- Laminar E9225 - 63 microns thick
- Laminar E9230 - 75 microns thick

Sensitivity range: 350-380

Available in various widths up to 24 inches, this material can be purchased only in boxes containing two identical rolls, of the same, variable length. It is comparatively inexpensive, though a group purchase might be more convenient. Remember, in such quantities, refrigeration will be paramount to keep the material fresh over extended periods while it slowly gets used.

Eternal in the US has definitely been the most cooperative and helpful company so far, though it took me a number of tries to get through to a live human being. That's just one of the pitfalls to expect when dealing with companies not accustomed to dealing with the general public.

I tested Laminar 9220. Exposure was in the same range as most of the other materials reported on positively here. For me, that is 15 minutes exposure under my NuArc 26-1K. The same as DuPont's MM 550 and PM250, Kolon's PK 1540. Right in the middle of the correct ballpark.

I only had to make and print three plates to zero in on this material. It is more contrasty than MM550, less contrasty than Kolon PK1540 and DuPont PM250. Again, in the middle and a pleasant compromise for those unsure whether to follow the low road or the high. Like DuPont's PM 250, these plates seem a little easier to wipe than others. Go figure.

---

Local contrast was exquisite and blacks luscious. If this were the only such material you could have for the rest of your life, I can't imagine you ever having any complaints.

I have a small handful of images that try my patience and therefore make good test images for trying out new photopolymers. Laminar 9220 gave me the best image so far from the test image selected, which of course is annoying since I may now have to print it, AGAIN!!!

---

## Laminar E8000 Series

Grateful thanks to Luc Van Quickenborne of Belgium for submitting a sample of the E8020 material for testing.

In this series, there are three materials, identical in every way, except thickness.

- Laminar E8013 - 33 microns thick
- Laminar E8015 - 38 microns thick
- Laminar E8020 - 50 microns thick

Sensitivity range: 350-380

Available in various widths up to 24 inches, this material can be purchased only in boxes containing two identical rolls, of the same, variable length. It is comparatively inexpensive, though a group purchase might be more convenient. Remember, in such quantities, refrigeration will be paramount to keep the material fresh over extended periods while it slowly gets used.

I tested Laminar E8020. Exposure was in the same range as most of the other materials reported on positively here. Contrast seems a bit higher than E9220 and speed may be a bit slower but the bulb in my NuArc is aging so that may be the reason. Exposure is still 15 minutes, but I had to slightly (5 points) reduce contrast and increase brightness substantially (from 45 to 180) in a Brightness/Contrast layer in Photoshop. Again, this material is well within the ballpark and my bulb is aging, too. So, don't take the difference too seriously.

Again, it took just three plates to zero in on this material. It is more contrasty than Imagon HD and MM550, slightly more contrasty than Kolon PK1540, Laminar E9220 and DuPont PM250. An easy pleasure to wipe.

Just like E9220 local contrast was exquisite and blacks as rich as they can be. Another winner for Eternal.

Second time Eternal has done this to me, I have to scrap my former plate of this test image and use the new E8020 plate instead... AGAIN!!! These guys make some great stuff. Additional materials may exist. Not listed in preferential order.

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# Hitachi Chemical... (A Japanese manufacturer)

These materials are available in most any country in the world, except the United States, where its import has been banned since the 1990s. The documents I have say Hitachi was caught dumping product and has been prohibited from selling in the US, ever since. I have been trying to acquire a sample of any of their dry film photopolymer products for years and been totally ignored by Hitachi. Not even polite enough to return a simple, “no”.

*After all this time, I am fortunate enough to have received a sample, just a short time ago, sent from Belfast Ireland, courtesy of Mr. Michael Taylor, a photographer there, to whom I am most grateful. Without his help it could easily have taken a number of years more waiting.)*

## Photec H-6200 Series

H-6230 - 30 microns thick

H-6238 - 40 microns thick

H-6250 - 50 microns thick

Sensitivity range: 350-380 (assumption based only on subjective testing)

Hitachi makes four dry film photopolymer series. See the section describing materials yet to be obtained for testing, for the other products that may or may not still be available.

As you may have surmised from the name, this is a 40 micron thick material (the number ‘40’ is an often used indicator for 38 micron products). I generally suggest that 50 (H-6250) microns is preferable for extra latitude, but it is not absolutely necessary. A 40 micron thick film will work for most images. The extra thin, H-6230, 30 micron thick material, is only suitable for metal plate etching through the dry film and into the copper / steel / etc., itself. It is too thin for photogravure printing where the image is contained only in the polymer.

I have no idea of cost or widths available, but they will certainly vary by region and country. I presume cost will be comparable to other materials in your area. Available lengths are quite limited compared to other manufacturers, apparently, you can buy in 150 meter, or 300 meter lengths, only.

When I test materials, I like to use an image from which I have recently created a successful plate using another material, preferably the one I am using most at the time. In this case, that would be Eternal’s 9220.



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Compared to E9220, Photec H6 238 is significantly higher in contrast, and therefore higher in contrast than most/all other dry film photopolymers listed in this document, to date. I used Photoshop and QTR settings and profiles, identical to those used for E9220 for the same image. The difference in contrast I achieved was quite substantial, but certainly not in any way objectionable. Simple changes to settings in Photoshop when using this material would be easy to make and for some workers, especially those whose images may be prone to lower contrast, this might be your preferred general use material.

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# Kolon Industries... (a South Korean manufacturer since 1957, materials widely available, especially where others may not be)

## Accuimage PK 1500 Series

*IMPORTANT WARNING: A few years back I decided to reprint some plates made with Kolon PK1540. This was approximately two years after printing them initially. Somehow the plates lost depth and could no longer provide quality prints. I have not been able to determine if this is a defect in the material (from the point of view of the makers of printed circuit boards, this is not a defect, at all... they don't need it to last), or if I had treated or stored them improperly. I then printed some significantly older plates made on DuPont MM550 for comparison. They had not deteriorated at all. So, be forewarned, you may find plates made with Kolon PH1540-1550 to be unprintable after a year or two of storage. This shouldn't be a big problem for most, as after that much time it is likely one would want to improve on the image, and would therefore want to make a new plate, regardless.*

In this series, there are two materials (possibly more), identical in every way, except thickness.

- PK1540 - 40 microns thick
- PK1550 - 50 microns thick

Sensitivity range: 350-380

Available in various widths, this material can be purchased only in boxes containing two identical rolls, almost 600(?) feet in length, each. On the upside, it is comparatively inexpensive, though a group purchase might be more convenient. Remember, in such quantities, refrigeration will be paramount to keep the material fresh over extended periods.

The people at Kolon's factory in Korea kindly provided me with a more than ample quantity for testing. They sent me their PK 1540 in a 13.5 inch width, a width that proved excellent for the way I work. Kolon apparently make only this one type of dry resist photopolymer, though it is difficult to make these companies/distributors understand that their products are vital to artists and are not something that can simply be acquired from another source, since they all seem to want to sell only in quantity and are all generally reluctant to provide material for testing or adequate information about what is available. Kolon is the only manufacturer to provide me with a free sample for testing, and quite a substantial quantity of it, at that.

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Exposure and contrast are good middle of the road characteristics for this material, on a par with Dupont's MM500 and PM200 series, and others. I found no difficulty working with PK 1540, at all. Preparing plates was easy. Processing was perhaps a bit shorter than some, about 4-5 minutes with gentle agitation, but then, the thinner material I had, would be faster to process.

Image quality was excellent, at least on a par with DuPont's MM500 and PM200 series. I would not hesitate to make this my go-to material. And I may do so anyway, since PK1540 gave me the very best print I had made at the time, of a particularly difficult image with which I have previously not been satisfied. (Kolon PK1540 was tested *before* many of the materials now covered in this paper. This is why my conclusions may appear contradictory.)

I have not tested the PK1550 but expect it would be no different in performance, save a slightly longer processing time and a potential for deeper blacks. The PK1540 provided more than adequate blacks, as good as any other photopolymer tested thus far, making me think that I might prefer PK1550, if only for the sake of a little extra elbow room with difficult images.

I don't know about other countries but, PK1500 photopolymers are distributed in the US by Toryon Technologies, Inc. ([toryon.com](http://toryon.com)). Kolon Industries did inform me that they have distributors in Europe, North and South America and of course, Asia, so it should not be difficult to track this product down in most any country.

This material is available in 6" to 24" widths in increments of .25 inches. 500 to 600 feet on a 6" core. A 3" inch core is also available. Always get the 3" core, if possible. Six inch cores are hard to get into even a full size refrigerator. Their Korean web site is not very informative. You may have better luck with your local distributor's web site, but don't bet the farm.

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## Photopolymers That DO NOT Work

### Dow Chemical...

Dow Chemical merged with DuPont in late 2017. Though Dow offered dry photopolymers, they did not manufacture any themselves. Instead, they purchased dry photopolymers from the manufacturer *Eternal* in Taiwan. Since DuPont makes more dry photopolymers than any other company, it would be senseless for Dow to continue to purchase photopolymers from Eternal for resale and indeed, they are no longer doing so.

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**DuPont...** (at this point in time, only some DuPont products have been tested)

### **Riston MultiMaster LDI7300 Series**

In this series, there are two materials, identical in every way, except thickness.

- LDI7330 - 30 microns thick
- LDI7340 - 38 microns thick

Sensitivity range: 355-405\*

While this material might be compatible with an approach other than direct-to-plate, which is all I do, it is a disaster with direct-to-plate. I tested the LDI7340 material. The matte black Epson ink puddles on the surface, somehow creating a double image in the more heavily ink-laden portions of the plate.

The 30 micron thickness would be inadequate regardless, unless making actual etched metal plates, but in either case, the only approach that might work (emphasis on *might*), would be the more traditional, screen and positive film exposure method, not direct-to-plate. If you have the inclination to test this for that class of use, please apprise me of the results.

If this material were to work with a screen and printed-positive approach, you might expect its behavior with regard to exposure, development, etc., to be quite similar to Riston MM540.

The stated sensitivity range might explain the double image. Sensitivity to both UV and some ambient blue light might have created exposures from essentially two different light sources. That is a wild guess. Treat it accordingly.

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## Riston PrintMaster PM300 Series

In this series, there are two materials, identical in every way, except thickness.

- PM338 - 38 microns thick
- PM350 - 50 microns thick

Sensitivity range: 350-380

Resolution too poor to consider using for anything photographic. If this were the last photopolymer available on the planet, you could make some quite attractive images with it, having characteristics quite similar to PM250, but the poor resolution would, while probably acceptable to the eyes of the public, keep you awake all night, every night. Not subtle!



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## Mystery Materials

*DO NOT BUY ANY OF THE PRODUCTS IN THIS SECTION! These fake products are the reason this document exists. They sell for outrageously high prices that are TEN TO THIRTEEN TIMES the cost of the exact same materials when purchased from legitimate sources under their real names. In addition, they are quite often stale by the time you get them, because of improper storage or other mishandling.*

This section will contain only those mystery materials I am able to obtain for testing without actually having to purchase them. Frankly, I don't care enough about what they are, or how well they work, to invest any money in acquiring them. I will test and publish results for any mystery material someone sends to me, but they are not worth the trouble of pursuing samples when we will still never know what materials they actually are. And at this point in time, we already have more than enough known, legitimate materials described in this document to equal and surpass anything the mystery materials could ever conceivably offer.

None of these mystery materials are actually called what their secret keepers have named them. It is exactly the same as if you purchased a roll of Kodak film, stripped off all identifying marks and relabeled it "HappyFilm". There is no such thing as *HappyFilm*, or *Imagon HD*, or *Skylight* or *DK3* or any of the other fake products that are listed here as *Mystery Materials*. These fake names are applied for the sole purpose of obfuscation, disguising the true source of the product so as to prevent you from purchasing them directly from the actual manufacturer/distributor or reading the real manufacturer's data on these products, not to mention, buying them at prices far, FAR lower than the mystery materials sell for.

## Imagon HD...

Sold by [takachpress.com](http://takachpress.com), repackaged, purportedly, by the Keith Howard family. I believe that Takach has nothing whatever to do with the deceit, so be nice!

I am quite certain this is really DuPont's MM550. One person has reported that Imagon HD was manufactured by a now defunct company (not DuPont), which might explain Imagon's waning availability. There have been two versions of Imagon, the first, was also understood to have been a DuPont product, though I have yet to test any DuPont product that has characteristics ascribed to the first, now discontinued, *Imagon* material.

50 micron thickness. Sensitivity range: 350-380

Until recently, this was the only mystery material offered in the U.S. that was suitable for making polymer plates intended to contain the intaglio image within the polymer itself. Like just about everyone, this is the material I started out with because no other options were known to exist in 2013, nor up until this paper was first published a few years later.

---

My first take on this material was not good. It turned out, after a couple of wasted years, that I was using poor inks (the popular water washable type) and that Imagon HD was not at all at fault. In fact, it proved excellent in performance, after I finally changed over to traditional intaglio inks. The difference was *enormous*. DON'T USE WATER SOLUBLE INKS!!

DuPont's product MM550 has working characteristics identical to Imagon HD such that, a switch to MM550 should cause no changes whatsoever in your working procedures. You can expose and process a plate made with MM550 exactly as you would one made with Imagon HD. It should print identically. Should you encounter, for whatever reasons, any differences, they will be quite small.

## Skylight...

Repackaged and sold by [www.capefearpress.com](http://www.capefearpress.com), this product was announced in the Spring of 2018.

40 micron thickness. Sensitivity range: 350-380

Skylight seems to provide a contrast similar to products like DuPont PM 250 and MM550 or Kolon's PK 1540. In a mid-range.

The image quality of *Skylight* is very good, easily on a par with any of the best materials I have tested thus far. It is not however, sufficiently photosensitive for practical use with direct-to-plate and generally available artificial light sources. In order to get a good image on this material I had to raise the exposure platform of my NuArc 26-1K to the halfway position between the normal platform and the light source. This is as high as you can safely place a plate for exposure without the risk of melting the photopolymer. I also had to retain my standard 15 minute exposure, despite closer proximity to the light source, and also cut back substantially on the amount of ink I allowed to be deposited on the plate surface. These changes together amounted to two stops, or more of additional exposure beyond that required by more suitable photopolymers. Normal procedures simply could not penetrate a conventional ink deposit. This reduced ink deposit could potentially cause discontinuity of gray tone transitions since a normal ink deposit is already quite low, though I experienced no problems with the image I used for testing.

In addition to being a mystery material, Skylight is only 40 microns thick. It works. In fact the material I was using for my own work until several years ago, was also only 40 microns thick, but in both cases, 50 would be better. A 50 micron thickness leaves more elbow room for images with substantial tonal ranges, can potentially contain more ink (important if you use brown or other colors of inks less capable of creating the darkest tones) and may also be less prone to open bite.

---

If you have a plate burner with at least twice the output of the NuArc 26-1K or plan to expose your plates in direct sunlight, this might be your preferred material, except of course for the fact that its only availability is at the whim of its secret keeper and it is expensive at approximately ten+ times the cost of Eternal's and most other materials.

## PURETCH...

Repackaged and sold by [www.capefearpress.com](http://www.capefearpress.com)

This material has been available for some time and is intended for etching images into copper or other metal plates, not for the purposes sought in this paper. It is therefore much too thin for our requirements. Like all untested mystery materials, its other characteristics are entirely unknown.

## DK3...

Repackaged and sold by Henrik Bøegh in Denmark

Web site: <http://www.grafiskeksperimentarium.dk/contact/?lang=en>

48 microns

No other information is available.

Mr. Bøegh has made it plain he wishes to continue to keep his secret.

06/09/2023 A few days prior to this date, it was reported to me that DK3 recently became unavailable. I have thus far found one site with confirmation of this.

## stellAprint...

Recently brought to my attention by Jean-pierre de Villartay. Thank you.

Web site: <http://www.joopstoop.fr/>

Warning on web page: "This product is no longer in stock with those attributes but is available with others."

06/09/2023 No longer found on their web site.

Was, 50 microns

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## Mungolux... (for some reason, this name makes me think of the film, *Blazing Saddles*)

Repackaged and sold by Mungolux Photoetching Supplies in Germany.

Web site: <https://mungolux.com>

50 microns

Some boilerplate information on their web site, but this is of course, another mystery material. Nothing else about it is known at this time.

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## Remaining Photopolymers to be Acquired and Tested

### DuPont...

These are listed in descending order of their likely usefulness.

**Riston 9020 (50 microns)**

**Riston FX250 (50 microns)**

**Riston FX500 (38 microns)**

**Riston FX950 (50 microns)**

**Riston GM120 (50 microns)**

**Riston TM200i (38 microns)**

### ElgaEurope...

Taken from the ElgaEurope web site: <https://www.elgaeurope.it/ENG/Default.aspx?SEZ=3&PAG=9&MOD=CTG&CAT=8>.

**Ordyl AM150 (50 microns)<sup>4</sup>**

**Ordyl AM175 (75 microns)**

**Ordyl AR250S (50 microns)**

**Ordyl Alpha850 (50 microns)**

**Ordyl Alpha950 (50 microns)**

**Ordyl Alpha960 (60 microns)**

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<sup>4</sup> All of the materials in this list are also available in thinner versions.

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## Eternal...

Designations may not be entirely accurate. Not listed in preferential order.

**Laminar 7620    (50 microns)**

**Laminar 7720    (50 microns)**

**Laminar 9020    (50 microns)**

## Hitachi Chemical... (Japan)

Additional materials may exist. Some materials may be obsolete. Not listed in preferential order. It remains impossible for me to attain materials from this manufacturer, directly. All products are categorized under the product group, "Photec"

**HM 4056            (56 microns)**

**HM 4075            (75 microns)**

**HM 40112          (112 microns)**

**HM 6050            (50 microns)**

**SL 1938            (38 microns)**

If you know of materials not yet tested and not listed here, please contact me with that information.



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## Known Manufacturers of Dry Film Photopolymers

Contact these manufacturer locations to ask what distributor(s) are nearest you.  
If you know of a manufacturer not listed in this paper, please make me aware of them.

### DuPont

[http://www.dupont.com/products-and-services/electronic-electrical-materials/  
printed-circuit-board-materials/brands/riston-film-photoresists.html](http://www.dupont.com/products-and-services/electronic-electrical-materials/printed-circuit-board-materials/brands/riston-film-photoresists.html)

#### Americas

##### **DuPont Electronic Technologies**

14 TW Alexander Drive  
Research Triangle Park, NC 27709  
Tel: 919.248.5000  
Fax: 919.248.5132

#### Europe

##### **DuPont de Nemours (Luxembourg) s.a.r.l.**

Rue General Patton  
L-2984 Contern  
Luxembourg  
Tel: +352 3666 5935

#### Asia

##### **DuPont China Holding Co. Ltd (Shenzhen)**

Che Gong Miao Industrial Area  
District No. 5  
Shenzhen, 518040  
Guangdong, China  
Tel: +86-755-8330.7867  
Fax: +86-755-8330.1651

##### **DuPont China Holding Co. Ltd (Shanghai)**

Bldg 11, 399 Keyuan Road,  
Zhangjiang Hi-Tech Park  
Pudong New District,  
Shanghai, P.R. China 201203  
General Tel: +86-21-3862 2888  
General Fax: +86-21-3862-2889  
ET Fax: 86-21-3862 2890

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**DuPont Korea Inc.**

4/5 F, Asia Tower Bldg  
#726 Yeoksam-dong  
Kangnam-ku, Seoul  
Korea 135-082  
Tel : +82-2-2222.5396  
Fax: +82-2-2222.5476

**DuPont Kabushiki Kaisha (Tokyo)**

Sanno Park Tower  
11-1, Nagata-cho 2-chome  
Chiyoda-ku, Tokyo 100-6111  
Tel: +81-3-5521-8660  
Fax: +81-3-5521.2371

**DuPont Company (Singapore) Pte Ltd.**

1 HarbourFront Place #11-01,  
HarbourFront Tower One  
Singapore 098633  
Tel : +65-6586.3421  
Fax : +65-6586-3640

**DuPont Taiwan, Ltd.**

No. 45 Hsing-Point Road  
Taoyuan  
Taiwan  
Tel: 866-3-3773635  
Fax: 866-3-3770480

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## ElgaEurope s.r.l. (Italy)

<https://www.elgaeurope.it/ENG/Homepage.aspx>

### Italy

Headquarters

Located in Milan (?) No address found (see information for Eternal Europe)

TEL: + 39 0331 586947

FAX: + 39 0331 587751 - 0331 580004

E-mail: [email: info@elgaeurope.it](mailto:info@elgaeurope.it) / [elgaeurope@pec.it](mailto:elgaeurope@pec.it)

### Argentina

Please Contact Elga Europe s.r.l.

Via Della Merlata, 8

20014 Nerviano(Mi)

[info@elgaeurope.it](mailto:info@elgaeurope.it)

ph.: ++39-0331-586.947

fax: ++39-0331-587.751

### Bulgaria

Petrex MC GMBH

MLADOST 1 A, BL. 510

1729 SOFIA BULGARIA

Mr. Stojanoff

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### Egypt

Target For trade, Fikry Al Awam

Mobile : (+2) 01000267144

Tel/Fax : (+2) 0224544337

Address: 9 El wafaa building, from Mekkah St, Hadaiyek El Kobba –Cairo – Egypt

Postal code: 11331

Email: [fikry@target-me.com](mailto:fikry@target-me.com)

Web: [www.target-me.com](http://www.target-me.com)

### France

Laminates Trading Service

26B Rue de Stalingrad

94110 Arcueil - France

[info@elgaeurope.it](mailto:info@elgaeurope.it)

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**Germany**

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Wasserburger Landstrasse 280  
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**Greece**

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31, Dervenion str. Poseidonos str.  
GR-14451 Metamorfossi Greece  
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ph: ++30-210-823.53.83  
fax: ++30-210-823.95.67

**Israel**

Metalchem LTD  
P.O.Box 1097  
Lod 71100 Israel  
[metalchm@netvision.net.il](mailto:metalchm@netvision.net.il)  
ph: ++972-8-9202488  
fax: ++972-8-9229825 Eternal Materials Co., Ltd. (Etertec) (Taiwan)

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## **Italy**

Elga Europe s.r.l.

Via Della Merlata, 8

20014 Nerviano (MI)

[info@elgaeurope.it](mailto:info@elgaeurope.it)

ph.: ++39-0331-586.947

fax: ++39-0331-587.751

<http://www.eternal-group.com/Home/EngIndex>

## **Lithuania**

C.H. Erbslöh Baltic

Taikos pr.141, Kaunas

LT51132, Lithuania

[linas@cheb.lt](mailto:linas@cheb.lt)

ph: ++370-37-333.805

fax:++370-69-849.564

## **Spain**

Comercial Electronica Feijoo

Avda Madrid 19 Nave 7-8

28342 Valdemoro Madrid

Spain

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ph: +34-91-80.83.170

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## **Switzerland**

CIPEL Distribution SA

route du Rhône, 10

CH-1963 Vétroz - Suisse

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Tel. +41 27 565 7830

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Skype : eurocipel-jean

[www.cipeldistribution.com](http://www.cipeldistribution.com)

## **Russia**

Petrocommerz LTD

195027 ST. Petersburg Russia

Magnitogorskaya street, 30

[bartuli@petrocom.ru](mailto:bartuli@petrocom.ru)

ph: ++7-812-676.5656

fax: ++7-812-676.4944

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**UK**

A-GAS ELECTRONIC MATERIALS LTS

Unit 3, IO centre

Valley Drive

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ph.: +44-1788537535



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## Eternal Materials Co., Ltd. (Etertec) (Taiwan)

<http://www.eternal-group.com/Home/EngIndex>

### USA

Eternal Technology Corporation

Main Product: Dry Film Photoresist

1800 Touchstone Road, Colonial Heights, Virginia 23834, U.S.A.

TEL: + 1-804-524-8555/524-8557

FAX: + 1-804-524-8556 E-mail: [david\\_li@eternal-group.com](mailto:david_li@eternal-group.com) (“david\_li” does not respond to emails)

### China

Eternal Photoelectric Material Industry (Yingkou) Co., Ltd.

Main Product: Dry Film Photoresist

No.102 Xinhai Street, Coastal Industrial Base, Yingkou, Liaoning, China.

TEL: +86-417-293-5000

FAX: +86-417-292-7938

E-mail: [hobo\\_zhang@eternal-group.com](mailto:hobo_zhang@eternal-group.com)

### Japan

Nikko-Materials Co., Ltd.

Main Product: Dry Film Photoresist、Vacuum Laminator、Dry Film Solder Mask、Process Chemicals

Choko-Kan 3rd Floor, 1-16-3 Nakamachi, Machida Shi, Tokyo 194-0021, Japan

TEL: +81-42-722-7310

FAX: +81-42-722-7320

E-mail: [Johnny\\_liao@eternal-group.com](mailto:Johnny_liao@eternal-group.com)

### India

Eternal Materials Co., Ltd. India Office

Main Product: Synthetic Resins for Coatings, Unsaturated Polyester Resins, Specialty Monomer, Specialty Coating

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Unit No.514, 5FL, The Summit – Business Bay Andheri Kurla Road, Andheri (E), Mumbai-400093,  
India

TEL: +91-22-4053-4053

FAX:

E-mail: [willis\\_wu@eternal-group.com](mailto:willis_wu@eternal-group.com)

### Indonesia

Eternal Materials Co.,Ltd. Indonesia Office

Main Product: Synthetic Resins for Coatings, Unsaturated Polyester Resins, Specialty Monomer,  
Specialty Coating

Manhattan Square Floor 16 Suite F Jl. TB. Simatupang Kav. 1S Cilandak Timur Jakarta Selatan  
12560 Indonesia

TEL: +62-21-2904-9838

FAX: +62-812-9621-6883

E-mail: [agus\\_zheng@eternalmaterials.co.id](mailto:agus_zheng@eternalmaterials.co.id)

### Italy

Elga Europe S.R.L.

Main Product: Dry Film Photoresist、Photoresist、Dry Film Solder Mask、Process  
Chemicals、HTE Copper Foil

Via della Merlata no.8, Nerviano, Milan, Italy 20014

TEL: +39-0331-586947

FAX: +39-0331-587751

E-mail: [g.favini@elgaeurope.it](mailto:g.favini@elgaeurope.it)

### Korea

Eternal Materials Co.,Ltd. Korea Office

Main Product: Specialty Monomer, Specialty Coating, Dry Film, Optical Material  
3-506, 304, Shinwon-Ro, Youngtong-Ku, Suwon-city, Kyungki-do, Korea

TEL: +82-31-8002-2151 ~ 7

FAX: +82-31-8002-2158

E-mail: [patrick\\_song@eternal-kr.com](mailto:patrick_song@eternal-kr.com)

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## Malaysia

Eternal Materials (Malaysia) Sdn.Bhd.

Main Product: General Purpose Resins, Synthetic Resins for Coatings, Unsaturated Polyester Resins

PTD 5044, Jalan Rumbia 2, Tanjung Langsat Industrial Estate, Mukim Sungai Tiram, 81700 Pasir Gudang Johor, Malaysia

TEL: +607-277 8600

FAX: +607-277 8609/+607-277 8610

E-mail: [miles\\_tien@eternal-group.com](mailto:miles_tien@eternal-group.com)

## Taiwan

Eternal Materials Co., Ltd. Kaohsiung, Head Office

Main Product: General Purpose Resins, Synthetic Resins for Coatings, Unsaturated Polyester Resins, Specialty Monomer, Specialty Coating, Copper-Clad Laminates, Dry Film, Optical Material, Specialty Chemical

No. 578, Jiangong Rd., Sanmin Dist., Kaohsiung City 807, Taiwan

TEL: +886-7-383-8181

FAX: +886-7-383-3355

E-mail: [diamond\\_dai@eternal-group.com](mailto:diamond_dai@eternal-group.com)

## Thailand

Eternal Electronic Material (Thailand) Co., Ltd.

Main Product: Dry Film Photoresist

335/8 MOO9, T.BANGCHALONG, A.BANGPLEE, SAMUTPRAKARN 10540

TEL: +662-750-9086/750-9097/750-9147/337-3009

FAX: +66-2750-9096

E-mail: [Dean\\_hsu@eternal-group.com](mailto:Dean_hsu@eternal-group.com)

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## Vietnam

Eternal Materials Co.,Ltd. Vietnam Office

Main Product: General Purpose Resins, Synthetic Resins for Coatings, Unsaturated Polyester Resins, Specialty Monomer, Specialty Coating

Copper-Clad Laminates Unit 1001, 10th Floor Citilight Tower 45 Vo Thi Sau Street, Dakao Ward, District 1, HCMC Vietnam

TEL: +84-8-3820-7751/3820-7752

FAX: +84-8-3820-7791

E-mail: [cobby\\_chung@eternal-group.com](mailto:cobby_chung@eternal-group.com)

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## Hitachi Chemical (Japan)

Nothing is provided here because contacting them is pointless. They simply ignore you. You will wish to reach their distributors, anyway, as they are the source of the materials. There is nothing to be gained from contacting Hitachi directly.

However, it may be that their policy is to ignore just Americans, so if you should be able to get a reaction from them, please let me know and provide the contact information you used, so that I can provide it here, for readers outside the US.

Their European distributors are listed in the next section.

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## Kolon Industries (S. Korea)

<http://www.kolonindustries.com/Eng/main.asp>

### USA

U.S. Subsidiary (Manufacture), Kolon USA  
3 Sperry Road, Fairfield, N.J. 07004 U.S.A  
Tel:1-973-575-2550 / Fax:1-973-575-1332

### USA

U.S. Subsidiary, Kolon EU GmbH  
547 S Western Ave #B, Los Angeles CA, 90020  
Tel: 1-213-382-1240

### Germany

German Subsidiary (Fashion), Kolon USA Corp.  
Arabella Center 7A Lyoner str. 44-48, 60528  
Frankfurt/Main, Germany  
Tel : 49-69-962-21500 / Fax : 49-69-962-21515

### China

Beijing Subsidiary, FnC Kolon Beijing Corp.  
NO.610 Air China Plaza No.36 Xiaoyun Road, Chaoyang  
District Beijing  
Tel : 86-10-8447-5684

### China

Shanghai Subsidiary, FnC Kolon Shanghai Corp.  
Shanghaishi Wuzhonglu 1079Hao Canhongdasha  
4Lou a zuo  
Tel : 86-21-5422-3520-3530

### China

Shanghai Office, China  
20F, Unit E, GEM Building No 487 Tianlin Road,  
Shanghai, 200233 China  
Tel : 86-21-6481-2616 / Fax : 86-21-6481-2655

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## China

Suzhou Subsidiary, Kolon GP Chemical Co Ltd.  
56, Qing Qiu Road, Suzhou Industrial Park, Suzhou,  
215126 P.R. China  
Tel: 86-0512-6283-3311 / Fax: 86-0512-6283-3165

## China

Beijing Office, China  
Room 718, Huapu International Plaza, #19, Chaoyang men  
wai Street, Beijing, China  
Tel : 86-10-8481-6552 / Fax : 86-10-8447-5694

## China

Nanjing Subsidiary, Kolon Nanjing Co Ltd.  
210046, Heng Jing Road, Nanjing Economic  
& Technological Development Zone, Qixia District, Nanjing  
City, Jiangsu Province, China  
Tel : 1-86-25-8557-3500 / Fax : 1-86-25-8557-1592

## Indonesia

Indonesian Subsidiary, PT Kolon Ina  
JL. Raya Jakarta-Serang KM80, SERANG BANTEN 42183,  
INDONESIA Desa Keserangan Kabupaten Serang Jawa,  
Barat, Indonesia  
Tel : 62-254-281-234 / Fax : 62-254-281-555

## Japan

Osaka Office  
KAL BLDG 10F, 1-9, 3-Chome, Hommachi, Chuo-Ku  
Osaka, 5410053 Japan  
Tel : 81-6-6265-1008 / Fax : 81-6-6265-1055

## Japan

Tokyo Office  
Daiichi Hibiya Bldg. 9/F, 18-21, 1-Chome, Shinbashi,  
Minato-Ku, Tokyo, Japan  
Tel : 81-3-3503-9986~7 / Fax : 81-3-3508-2105



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## Known Distributors of Dry Film Photopolymers

Contact these distributors locations to ask what distributor(s) are nearest you.  
If you know of a manufacturer not listed in this paper, please make me aware of them.

If you learn of any distributors anywhere in the world not already mentioned here, please send me their contact information. Send it to [david@davidkachel.com](mailto:david@davidkachel.com) The current information is quite obviously incomplete.

### DuPont

#### USA

Allen Woods Group  
2515 Clearbrook Dr.  
Arlington Heights, IL 60005  
Phone: 1-847-806-4000 Fax: 1-847-806-4010  
<http://allenwoodsgroup.com/home/pcb-solutions/dry-film>

#### Germany

Micro Resist Technology GmbH  
Köpenicker Str. 325  
12555 Berlin  
Telefon: +49 30 64 16 70 100 Telefax: +49 30 64 16 70 200  
E-Mail: [sales@microresist.de](mailto:sales@microresist.de)  
<https://www.microresist.de/en/products/duPont-dry-film-resists>

#### Poland

Micro Resist Technology GmbH  
Köpenicker Str. 325  
12555 Berlin  
Telefon: +49 30 64 16 70 100 Telefax: +49 30 64 16 70 200  
E-Mail: [sales@microresist.de](mailto:sales@microresist.de)  
<https://www.microresist.de/en/products/duPont-dry-film-resists>

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## Eternal

### England

Mark Nicholls  
Business Manager Interconnect Technologies (PCB / EIF)  
A-Gas Electronic Materials  
Unit 3, iO Centre  
Valley Drive  
Rugby, Warwickshire CV21 1TW, UK  
T [+44] (0) 1788 537535  
M [+44] (0) 7887544504  
mark.nicholls@agas.com  
www.AgasEM.com

### Switzerland

Cipel Distribution SA  
Canton Wallis (Valais)  
Route du Rhône 10  
CH-1963 VETROZ  
Phone +41 27 565 7830  
E-mail: info@cipeldistribution.com

### France

Chimie Tech Servies  
7, rue Marcelin Berthelot  
Zone industrielle  
92762 Antony cedex  
Paris  
Phone 01 55 59 55 75  
[https://www.chimietech.com/cms/index.php?](https://www.chimietech.com/cms/index.php?option=com_content&view=article&id=117&Itemid=123&lang=fr)  
[option=com\\_content&view=article&id=117&Itemid=123&lang=fr](https://www.chimietech.com/cms/index.php?option=com_content&view=article&id=117&Itemid=123&lang=fr)

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**USA + Canada**

Jennifer Lewis

International Electronic Components (Sales for Eternal {aka Etertec} for entire USA & Canada)

IEC USA, Inc.

809 Aldo Ave.

Suite 104

Santa Clara, CA 95054

Phone 408-477-2755

Phone 855-225-9333 (Tannie Narcelles – can also take orders)

Jennifer.Lewis@IECUS.com

[www.ieccan.com](http://www.ieccan.com) or

[www.iecus.com](http://www.iecus.com)

**Canada Distribution Office (buy from US)**

Blaine McLellan

International Electronic Components Inc

352 Signet Drive

Toronto Ontario

M9L 1V2

T- 1-800-363-4794 Ext 221 F- 1-416-293-6312

Email: [blaine.mclellan@ieccan.com](mailto:blaine.mclellan@ieccan.com)

Blaine and the phone numbers are in the US office. The warehouse address is obviously Canada.

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## Hitachi Chemical

Availability information is sketchy at the moment. Please let me know of any sources in your location, or near you, so that I may add it.

### Europe

#### UK

Green Door Printmaking Studio  
Studios 0.2, 0.3 & 0.4  
Banks Mill Studios  
71 Bridge Street  
Derby  
DE1 3LB  
United Kingdom  
<https://photopolymerfilm.co.uk/>

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## Kolon

Kolon has a single representative company in the US called Toryon Technologies  
Rather than hire distributors, Toryon has its own regional sales people Contact  
this location to determine the sales rep for your part of the US, OR...  
Just call this location and order direct.

### USA

Toryon Technologies, inc.  
1750 Todd Farm Drive  
Elgin, IL 60123  
Phone 630-540-1800  
Phone 877-867-9668  
<https://www.toryon.com/index.php?m=47&s=142>

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## UV Exposure Units

Options are growing instead of diminishing when it comes to light sources for UV exposure. Until quite recently, the only option for dry film photopolymers, the subject of this paper, was the traditional *plate burner* (such as the Nuarc 26-1k that I have used), or exposure to the sun which is not practical for continuous work. High output mercury vapor lamps or their successors, the metal halide lamps, were / are generally used in *plate burners*. These devices are large, heavy, expensive and quite inefficient for the amount of power they consume. But they do work. If you need a UV exposure unit for anything *but* the *direct-to-plate* approach, then you need either a traditional photographic contact printing frame(s) (inconvenient) plus a UV light source, or a vacuum unit such as those used in these traditional plate burners. Contact printing frames tend to be a bit pricey these days so the plate burner option might make more sense.



For dry film photopolymers *and* direct to plate, you cannot use and do not need the vacuum option of a plate burner, though with a unit that does not force you to use the vacuum option, you can use a plate burner and simply set the plate to be exposed on top of the vacuum platform for exposure. This option however is a senseless waste of money if you do not practice any type of printing method that uses the vacuum.<sup>5</sup>

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<sup>5</sup> Just for the record. For each exposure unit you buy of any kind, I receive a big fat envelope full of nothing! ;-)

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Output for such units is generally quite *spikey* with emission confined mostly to:

- 185 nm (UVC)
- 255 nm (UVC)
- 365 nm (UVA)
- 405 nm
- 435 nm
- 545 nm
- 575 nm

185nm, 255nm, 435nm, 545nm and 575nm outputs are useless for exposing just about any alternative photographic materials (though it is possible to sensitize them to such wavelengths). 365 nm output seems to be ideal for cyanotypes, the iron processes and most of the other *alternative* photographic print processes and for readymade polymer plates (350nm, I am told).

The sensitivity range generally given for dry film photopolymers is 350-380 nm but investigations on my part tend to suggest a somewhat broader sensitivity.

In recent months I have been acquiring and experimenting with UV light units that are based on the LED (light emitting diode). The LED bulb represents a substantial advancement in lighting for many different purposes but for us it has opened up a whole new realm of options for UV exposure at dramatically lower cost than the traditional plate burner. These options drastically cut down the cost of equipment for making photogravures with the direct-to-plate approach. One quite efficient and long lasting LED UV bulb in particular costs only \$30 and is big enough to expose images of 5"x7" and perhaps slightly larger. Several of these bulbs can be used at once to accommodate much larger plates.

These LED UV units were of course not intended for exposing photographic materials. Their manufacturers' intent was for entertainment. Music and dance functions. Fortunately for us, they work for photographic purposes, too. But not all.

That is why this new section has been added to the paper. As I slowly acquire LED UV units, I will test them and report on which are and are not suitable for dry film polymer direct-to-plate photogravure. Unsuitable units are covered so that you will not unwittingly buy them thinking I have not encountered them yet.



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Thus far it appears that LED UV units are available in two output levels: 365nm and 395nm. 365nm appears to be suitable for just about everything *but* dry film photopolymers while the 390-405nm range seems ideal for dry film polymers: us!

From one source I received two units, identical in every way except spectral output. Making test plates identically exposed with each of the identical units, the 365nm unit produced a plate, but one too high in contrast. The 395nm unit produced a much better plate with smooth tone transitions throughout.

## Suitable & Non-Suitable LED, UV Lamps

### KINGBO 36W LED Blacklight Bulb E26 PAR38

This is the unit I mentioned in my book and have also suggested numerous times on the Photogravure group on Facebook. At this time they are only \$30. In my studio I have an exposure platform employing six of these and it works beautifully. For small plates (about 5"x7") just one of these lamps will work. (However, different QTR profiles may be required, depending on the number of lamps used. See my book.)



**RECOMMENDED:** This is the “KINGBO 36W LED Blacklight Bulb E26 PAR38”. Those are 18 little bulbs of two Watts each, for a total of 36 Watts. Output is at 395-400nm and they are very long-lasting. KINGBO makes a number of very similar looking lamps. Only this exact lamp will work. Don’t accept any substitutions. Also, the price fluctuates on Amazon, where I bought these, and they disappear altogether from time to time, so if you can’t find them, be patient. They should come back. In the

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photogravure group on Facebook I linked this photograph to the Amazon web site but it turns out that if they are out of stock, you get sent to a page for one of those similar looking lamps that doesn't work. Be careful to buy only this exact lamp.

Below is the exposure setup I built with six of the KINGBO units. Easy, versatile, flexible, readily broken down and cheap. Put black cloth on nearby white walls (this was a "before" picture) or you will get double edges. The lamps are quite efficient so reflections matter. They also produce very little heat.



### **Chauvet Shadow, LED UV**

**NOT RECOMMENDED:** I bought the Chauvet Shadow in the Spring of 2018. They sell for \$160 which is considerably inflated, all things considered. But part of this is due to the fact that the unit contains software made for syncing the light output with music, something that satisfies the entertainment purposes, previously mentioned.

I made test plates at 19" with a 15' exposure, my standard base exposure with the NuArc 26-1K. This light unit produced a plate that was about 1/2 stop underexposed compared to the 26-1K at the same distance and time. One could reduce the distance from exposure unit to plate, to compensate.

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Though there was nothing wrong with the plates produced and though this unit is certainly capable of good performance, I have some misgivings.

The LEDs are *focused*. Coverage at 19" is only slightly larger than coverage at one inch. This is much tighter than the Nuarc 26-1K. Light fall off, because of this "focusing" does not follow the inverse square law, but falls off more gradually. This would be great if the light were stronger, but I consider a fifteen minute exposure to be about the practical limit. Covering a larger plate by moving the light source further away might be worth waiting for longer exposures, but the focus of the light source doesn't make moving the light further away practical. The projected light continues to cover about the same area. You'd have to move it back so far to cover a larger plate that exposure times would increase to a point of being impractical.

The problem is that this light isn't really focused. It's 192 tiny lights in a rectangular pattern. Each tiny light is focused narrowly, but the unit as a whole is not "focused" so much as it is, *collimated*.

Also, the LEDs are spaced much too far apart. The projected light has a definite Swiss cheese pattern that is noticeable even out to 19" and beyond. Though substantially softened at about eight inches and beyond, it is still present and may produce noticeable mottling in smooth areas like sky, at any practical exposure distance.

Lastly, the idea of covering bigger plates with multiple units seems unlikely to work well. There is no center of light projection that is more intense than the edges and therefore lights cannot be feathered or centers aimed diagonally to produce even coverage and greater intensity. There is about a one inch border all the way around these lights, so they cannot be butted up against each other, either, not without creating a substantial fall off on the plate to be exposed and you cannot compensate by aiming the lights in a direction not parallel to the plate being exposed because there would be significant fall off at the outside edges.

One of these units could probably be made to work under the right circumstances. Two or more units cannot be made to work together, period. And, they are substantially overpriced. Don't buy this party toy.

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## Waveform Lighting

**NOT RECOMMENDED:** Waveform Lighting out of San Francisco, California ([www.waveformlighting.com](http://www.waveformlighting.com)) very kindly sent me two lamps to try out. I mentioned these briefly above. They are identical except for wavelength, one outputting at 365nm, the other at 395nm. Both lamps are 20W<sup>6</sup> units. Twenty Watts it seems is simply not enough. (The 36W KINGBO units are what I would call the bare minimum for single lamps.) Because of the low wattage I exposed plates when testing these lamps at a distance of one foot, instead of the eighteen to twenty inches I customarily use as a starting point.



At that distance and giving a fifteen minute exposure with each, the 365nm lamp resulted in a plate with far too much contrast and also exhibited a considerable amount of open bite. The presence of open bite means the plate would require either more than fifteen minutes of exposure (impractical) or a weaker QTR profile (also impractical because I used the weakest I can recommend) or multiple lamps with overlapping coverage and a drastically different Brightness/Contrast layer adjustment in Photoshop. This lamp might be forcibly made workable, but I doubt it.

The 395nm version of this lamp produced a plate that was significantly too low in contrast but that is far more easily corrected by altering either a Brightness/Contrast layer in Photoshop or choosing a different profile in QTR, or both. And, this lamp would probably perform nicely in multiples as the local contrast would probably increase simply by virtue of having multiple lamps. (This happens to great benefit with the KINGBO lamps mentioned above.)

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<sup>6</sup> Wattage with UV emission is not a reliably consistent indicator of UV effectiveness.

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Though these lamps (the 395nm version) might well be a good performer in a multiple lamp situation, there is one major drawback... the price! The lamps are (last I checked) \$65 apiece, killing their potential practicality, completely. They need to be half that price to be tempting.

If this company ever comes up with a significantly higher wattage unit at a more reasonable price, such a lamp just might be a tempting possibility. Certainly their quality, customer service and eagerness to please would be a strong draw for such a lamp. You should probably not buy this, but keep an eye out for bigger & better things from them.

## ZHMA

**RECOMMENDED:** ZHMA is not exactly a catchy name for any kind of company, but don't worry, it gets worse. Apparently, the model name is the wattage of the unit. Each similar unit they make is marked, *IP66* in bold letters. You would think that IP66 is the model name if you saw only one unit, but no, everything is *IP66*. Their PR and marketing guy will no doubt kill this company but in the mean time, we seem to have a winner. At only \$51 this could be exactly the right UV unit for the newcomer to photogravure. It has a 120 degree angle of coverage, outputs at 100 Watts (visible light) and at 380-420nm in the UV range. We don't need the 420 end but it doesn't do any harm, either.



The other four models are in turn, 10W at \$15, 30W at \$26, 40W at \$25 (go figure) and 60W at \$37. All of these units are available from Amazon.

The 100W unit is what I have tested and to my mind, the only reasonable choice from this group of lamps from ZHMA. Just two of them should be sufficient for a fairly large area of even and effective exposure, though I suppose an argument could be made for four 60W units, or possibly even four 40W units. All of these units have the same problem with butting up against each other as the Chauvet Shadow: they don't. There is too much *frame* around the actual light output area that could get in the way. Getting multiple units to give even coverage could be difficult. But with only two of them, the problem is greatly simplified. Just cross them



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over each other like copy stand lights and there is no need to butt them up against each other, so the problem disappears. And, with more UV output than needed, these lamps can be raised to an even greater height, thereby providing a larger area of coverage.

These units weigh 3.66 lbs and the outside dimensions are 12.1" x 9.8" x 3". The literature says they can get hot but I had no difficulty with heat in testing. The most the lamp got was *very warm*. Your mileage may vary, so set them up in such a way that unexpected heat won't matter and won't present a fire hazard.

Coverage with this unit is broad and quite uniform with slow falloff, allowing for effective coverage from a single unit of an area of 11" x 16" at an elevation of 16.5", with falloff of only one-third stop. Two of these units with just a couple more inches of elevation should provide all the coverage one is likely to need for most any work, with reasonable exposure times. This unit also has a long power cord with an in-line switch.<sup>7</sup>

A test plate made using a QTR profile of 15-17.5 produced an excellent print that had I been attempting to get the best of out the image, I would have made another plate trying perhaps a QTR profile of 16-18.5 or adding 20 points of brightness in Photoshop. Perhaps a combination of the two. But the plate and print were certainly good enough to know this lamp will most definitely perform well, with ample output, especially with a pair of them. In fact, I ordered unit #2 for myself just before writing this.

Subsequent testing of two lamps at 45° angles gave about 18"x24" coverage, more than I will ever be likely to need. These lamps are of slightly less intensity and coverage than my setup employing six Kingbo lamps, so I recently decided to use the Kingbo products just for direct-to-plate exposure of dry film photopolymer plates and reassign the two ZHMA lights to function as the UV output for exposures of more traditional alternative materials, such as cyanotype and argyrotypes, that require the vacuum unit of my NuArc 26-1K, but not the recently developed propensity of that same machine for self-immolation when using the built-in exposure circuitry. This way, I can also resort to the ZHMA units exactly as-is, for direct-to-plate duty, if needed.

(Don't walk away from your NuArc and keep a fire extinguisher handy, or buy a pair of the ZHMA 100 Watt units, instead of using the NuArc light!)

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<sup>7</sup> Apparently, IP66 is an official, international measurement of enclosure quality, declaring this unit to be highly resistant to dirt, water and possibly speeding bullets, and is not in fact, a model or series name.

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## SAYHON

**RECOMMENDED, with some reservation:** Yet another catchy company name, SAYHON, markets an 80W unit with no markings on the actual device, whatsoever. It too is “IP66” and also is available from Amazon, for one dollar less than the ZHMA unit, above. The diodes (LEDs) are fewer and farther apart here and there is no in-line switch on the cord. I plug my UV lamps into a power strip so the switch is really superfluous for me, but might come in handy for some. In fact, they might easily serve for impromptu dodging and burning efforts.



UV output for the SAYHON lamp is rated at 390 - 400nm. At the same height as that used to test the 100W ZHMA lamp, this unit outputs a full 1.3 stops less *visible* light. But remember, the visible light output does not necessarily indicate the amount and effectiveness of UV output. It is at best a vague generalization. But, not in this case.

Coverage for this unit is about 12"x12.5", odd for a decidedly rectangular shape. As with the previous unit, this is calculated to be from brightest in the center to the points on each side where falloff reaches one-third stop. There is of course a much bigger area but falloff is quite rapid, reaching one-half stop in only a couple more inches, at most.

Using the 13-15.5 profile for QTR and the usual basic fifteen minute exposure. (I am using the exact same image for all of these lamp tests with no changes at all in the Photoshop file between plate exposures.)

A single plate was made with this lamp and aside from a test print pulled from that plate being about 40% to 50% too dark (easily fixed with a change to a Brightness/Contrast

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layer in Photoshop) the print is perfect. No need to make another plate or another test print. These lamps could absolutely be made to work. The greater distance between LEDs matters not at all. It doesn't show in the print and it was invisible on the exposure plane. These are very nice lamps and would be a great choice, with a little finagling and by using two or more of them, if it weren't for the fact that the ZHMA lamp does a much better job for the same money.

If you live in a corner of the world where you can't get the ZHMA lamps or the KINGBO bulbs, with just a little effort this lamp could be made to render very good plates. It's only real flaw is being too weak by at least 20 Watts. (The wattage claimed on many of these types of devices seems often to be more of a wish than a statement of fact.)

### LaMuVii



**RECOMMENDED, with reservation:** Available in pairs of 30W, 60W and 100W, these are usable only in the 100W version (I paid \$108 for the pair) and even then, marginally. Today As of 2022, I found them on Amazon where I bought them, but the 100W was at the time, not available.



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In order to make the pair of 100W units work, I had to raise the exposure platform to 15.5 inches below the two fixtures. Workable, but perhaps not ideal.

This is a short description because it is a short recommendation. If you can't find anything else, this will work.

## KUKUPPO

**NOT RECOMMENDED:** Available in pairs of 80W, 100W and 150W, these border on fraud. Most, if not all, LED UV units come out of China with no brand name on them, and the eBay or Amazon sellers just slap their own names on them. I bought this in the 150W version for obvious reasons... I wanted more power. I didn't get it. The output of these units didn't remotely match that of the 100W units I already owned. Plus, there are too few UV bulbs, too poorly distributed. Look at the LED distribution of the ZHMA units, above. That is the sort of number and distribution of LED lamps you need. This device is just useless.

Maybe you can use one for your next rave party, but make your guests stand very close!

