

BLACK MAGIC - IT'S MAGIC

Technical application

A state of the art complete modular product system of liquid photographic emulsions

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Overview

Welcome to the MACO world of Black & White. We at MACO are specialized in everything for Black & White, from photographic films and papers over to photochemistry and assorted hardware.

Thus you can take advantage of our competence and vast technological knowhow we have gained in all activities towards better solutions for your work.

You are invited to take the opportunity for producing unique and exhibition quality art work.

You want to realize your individual imaginations photographically ?

Your photographic ideas on the most unusual materials? No problem !

With BLACK MAGIC you buy an unique product system, which will make it possible to coat light sensitive photographic emulsions onto almost any kind of surface:





Glass, wood, textile fabric, ceramics, metal, stones, plastics etc.

= unlimited creativity

BLACK MAGIC is probably the most comprehensive product system of its kind and thus offers advantageous features:

- high speed/high silver content thus delivering short exposure times even with large format pictures and exceptionally high maximum density
- a complete modular system with interchangeable components
- 3 different emulsions, two graded and one variable contrast emulsion
- LPE110 and LPE210 excel by high edge sharpness and have a cold image tone due to its silver bromide halides
- LPE310 features variable contrast control and has a neutral image tone due to its chlorobromide silver halides
- long shelf life and exceptional archival qualities due to adding a minimum quantity (0,1%) of a powerful fungicide and bactericide (phenol) for long term conservation
- BLACK MAGIC additive LPE510 is free of formaldehyde and chromium potassium sulfate due to a new formula and acts as a powerful hardener
- The whole product system is backed up by proven high quality photographic chemistry which will deliver excellent results

BLACK MAGIC delivery assortment

description	grade	article no.	Safety data sheet
BLACK MAGIC liquid photo emulsion	normal	LPE110	
BLACK MAGIC liquid photo emulsion	hard	LPE210	
BLACK MAGIC liquid photo emulsion	variable	LPE310	
BLACK MAGIC pure photo gelatine	-	LPE410	
BLACK MAGIC ADDITIV HD* concentrate	-	LPE510	
BLACK MAGIC special bottle for warming up small amounts, lighttight	-	LPE610	
BLACK MAGIC ADDITIV BE** concentrate	-	LPE710	

* HD=special hardening additive

** BE = bubble egalizer/remover

1. Safety first

In all areas of life, any product may be harmful if not used properly. Of course this applies also to photographic products.

We at MACO care about our customers and our responsibility in regard of environmental aspects.

Therefore we have kept any potential health hazards to a minimum. However we urge you to use appropriate caution in handling our photographic products.

- Always keep the products out of the reach of children !
- Please read the instructions carefully - if in doubt please contact us for support.
- Working with photographic chemistry should take place in rooms with good ventilation.
- Furthermore, we keep Material safety data sheets available.

See Safety data sheets above.

2. Usage

The use of BLACK MAGIC should take place in a black & white darkroom.

The graded BLACK MAGIC emulsions LPE110 and LPE 210 may be mixed together in any ratio.

3. What do you need - a checklist

Depending on your goal, you should have all necessary components at hand. If you miss an important tool or material during your work it is too late. Most items are readily available in a well equipped darkroom - but some are special and have to be organised before your coating session:

Checklist:

1. First you have to decide what type of material you want to coat (see chapter 8 for detailed information).
2. Check the contrast of the negatives you want to use - do you have different grades, then go for BLACK MAGIC VC emulsion LPE310, or do you have fairly consistent contrast negatives, then go for BLACK MAGIC normal LPE110 or BLACK MAGIC hard LPE210.
3. For most coating applications the method of brushing will prove to be the best - get yourself a wide brush (5-10 cms/ 2"-4" width) made of natural hair, e.g. a Japan brush.
4. Keep small measures for quantities of 20-50cc at hand, it will be useful for adding small amounts of LPE510 or LPE710.
5. For coating metal, plastic, glass or ceramic tiles, a precoat with alkyd resin primer or oil-based polyurethane paint should be carried out, these special primers are available at art shops.
6. If you have absorbent materials such as textile fabric, papers or wood it is recommendable to precoat these materials with BLACK MAGIC pure photographic gelatin LPE410.
7. For liquification, you will need a bucket to be filled with warm water (40-45°C / 100 - 115 F).
8. If you want to liquify just a small amount, you need BLACK MAGIC special bottle LPE610.
9. For keeping a bigger amount liquified in order to coat large areas or several objects, it is best to fill the liquified emulsion into a smaller bucket (plastic or stainless steel or enamel coated only) and place this bucket into a larger container filled with warm water to keep the emulsion liquified.
10. For improving mechanical resistance you need BLACK MAGIC ADDITIV HD LPE510.
11. In order to make coating easy and keep the problem of unwanted bubbles low you need BLACK MAGIC ADDITIV AB LPE710.
12. Check your safelight before coating, in order to avoid unwanted fogging (see chapter 7 for details).
13. If you want to store materials coated with light-sensitive emulsion, have enough lighttight containers at hand, the containers should be designed in a way that these will cope with the wet emulsion (high moisture).

4. How much area can be coated

With non-absorbent materials, you can coat up to 8 m², with absorbent materials you can coat up to 4 m².

In practical use, this may vary due to the thickness of the coating and the absorbent properties of the chosen material.

5. How do you store BLACK MAGIC

The liquid emulsions LPE110, LPE210 and LPE310 should be stored in the refrigerator (6°C-8°C / 40 - 46 F).

All other components, LPE410, LPE510, LPE610 and LPE710 can be stored at room temperature.

6. How long is the shelf life

If stored according to our instructions, shelf life will be one year. If you deep freeze LPE110, LPE210 and LPE310 at temperatures below -10 C° / 14 F shelf life will be extended by far.

7. What type of Safelight is suitable

LPE 110: red or yellow green

LPE 210: red or yellow green

LPE 310: red or light brown, no yellow green

Keep in mind, that silver halides collect light in difference to the human eye.

Therefore, it is advisable to keep safelight exposure to a minimum. In reality no safelight is really safe - it's just a matter of exposure time. We recommend to do a fogging test under your own conditions - this is especially important if you want to coat large areas or many objects.

Carry out a trial coating and let it be exposed partially by your safelight at the place you want to coat all other materials. Place a black cardboard on top and move it in a way that you have an exposure bracketing of 15 minutes/ 30 minutes/ 45 minutes and so on.

Develop and see whether any exposure shows a gray fogging. If this is the case move or change your safelight.

8. What different approach is recommended for each type of material to be coated

Depending on the chosen material, the thoroughness of your preparation will be decisive for your final art work.

All materials have to be free from dust and grease. If in doubt clean twice - any trace of grease will lead to adhesion problems.

After you have selected a material to be coated, there is a different approach for 3 main groups of materials:

1. Absorbent materials such as fabric, papers or wood;
if you want to prevent the emulsion to be soaked into the base, a precoat with BLACK MAGIC LPE 510 - pure photo gelatine has to be made (also called baryta solution, but without barium sulphate).*
2. Smooth and/or hard surfaces such as polished stone, glass or metal;
we recommend also a precoat with LPE 510 in combination with LPE 410 - hardening additive solution (to improve adhesion and mechanical qualities).

If you encounter that the emulsion comes off during processing, precoat these materials with clear alkyd resin primer or oil-based polyurethane paint (available at art material shops).

Note on metal:

Due to the electrochemical reaction chain (there is low electrical current between precious and non-precious metals) it is important to coat an isolation layer onto the metal surface before coating the light sensitive emulsion.

For doing so you can use either a white enamel paint or a clear alkyde resin paint. Be sure that this precoat has dried off completely, as any remaining solvent will show up in

your final result..

Note on plastics:

As all plastics (acrylic etc.) are being produced in a way that embodies anti adhesion additives, the emulsion will come off during processing. Therefore, it is necessary to coat these materials with paint which sticks to the emulsion, withstands the photographic processing and delivers good adhesion to the emulsion. Try the a.m. alkyde resin paint.

3. All other materials can be coated directly with BLACK MAGIC photographic emulsion. With 3-D objects several thin coats ensure high maximum density (after setting before complete drying).

How to make a baryta solution: (this step may be carried out under normal lighting conditions)

Warm up 1000cc tap water until 70°-80°C and dissolve completely 40 grms of LPE 410 by continuous stirring, until free of lumps. To reduce surface tension you may add a few drops of LP-MASTERPROOF (wetting agent with bactericide and fungicide additives) to your solution, this makes it easier to evenly coat smooth /hard materials. Coat your material directly afterwards. To improve hardening of the emulsion add 20 - 50 cc of BLACK MAGIC additive LPE 510 to your solution. Since you coat under normal lighting conditions even coating will be much easier.

Note about hardening:

You can harden indirectly by adding BLACK MAGIC additive LPE510 to the baryta solution and harden directly by adding BLACK MAGIC additive LPE510 to the light sensitive photographic emulsion (in this case, please use the photographic emulsion within 2 hours). For better adhesion of the coating and to improve mechanical resistance of the surface you may combine both methods.

Furthermore, you can add BLACK MAGIC additive LPE510 directly to the developer.

9. How do you combine the modular components of the BLACK MAGIC system

The graded BLACK MAGIC emulsions LPE110 and LPE 210 may be mixed together in any ratio, to achieve in between grades. For a wide range of contrast control use BLACK MAGIC LPE310.

For absorbent materials use BLACK MAGIC LPE410, it is a purified photo gelatin, much cleaner than gelatin for food, and add for improved mechanical resistance BLACK MAGIC ADDITIV HD LPE510 instructions at the end of this manual, due to its special formula you can add LPE510 also to the emulsion itself and to the developer.

It's much easier to warm up partial amounts of emulsion if you use LPE610, the special bottle is lighttight and thus you avoid warming up the complete bottle - spare time and keep the emulsion quality high.

BLACK MAGIC ADDITIV BE LPE710 is a must to get rid of bubbles which almost always occur. Add 10-20cc of it directly into the liquified emulsion (amount based on 500cc). If you have a longer coating session, you can add LPE710 every 20 minutes.

10. How to achieve different image tones

If you decide to precoat your material with BLACK MAGIC LPE410, you can add water soluble photographic dyes to the solution - add as much until you have the desired tone, usually a few drops will suffice.

11. How does the liquification take place

Take out BLACK MAGIC photographic emulsion of your refrigerator and...

Carry out following working steps under safelight conditions !

Either take out the needed amount out of the bottle by using a solid plastic or stainless steel spoon fill it into the special bottle (article LPE610) and liquify it up in a bucket filled with warm water (35-40°C).

For larger application projects warm up the original bottle by the same means.

Note: For first trial coatings or smaller objects to be coated just take out needed amounts (under darkroom safelight) out of the original bottle , put them into a graduate and liquify by warming up in a container (or bucket) filled with warm water. By doing so you will ensure the quality of BLACK MAGIC (repeated warming and cooling harms light sensitive products).

If you want to coat larger objects (e.g. ceramics, stones) you may heat them in your oven (30-40°C /86 -104F) so your emulsion won't set while you are still coating.

12. What are the different ways of coating

If you have never worked with BLACK MAGIC photographic emulsion before, you can train the coating procedure with coffee cream since this liquid has a similar viscosity.

You can coat your objects different ways:

- pour and pan = with flat and rigid materials such as tiles, metal plates etc.
- pour and brush = with almost all materials
- dip and dunk = with smaller 3-dimensional objects
- spray * = with large and complex structured objects

* Use only spray guns with large jet opening, an air brush is not suitable. Wear protective clothing/mask to avoid inhaling spray particles.

For most applications best results will be achieved by using a brush with natural hair (e.g. Japan brush).

We recommend to coat test stripes at the same time for determining the correct exposure later on. Preferably of the same material or the backside of photographic paper).

Excessive emulsion may be reused immediately.

Note: By using an spray gun, you can adjust viscosity with distilled water up to an ratio of 1:1.
By doing so spray several layers.

Setting stage:

Cooling and setting stage follows directly after coating. In this stage the coated surface is very delicate. Setting will take about 1 to 2 hours. You can speed up setting by storing the coated materials in the refrigerator for about 30 min. To avoid unwanted exposure either use a light-tight container or unscrew the bulb of your refrigerator.

Drying stage:

Now you can dry the coated materials.

You can do so by using a hair dryer at low heat setting and midrange distance to avoid melting of the emulsion. Check hair dryer by turning it on in the dark before using it to make sure there is no electrical spark or glowing of the heat wires which could cause an exposure. Of course you can store objects in your darkroom (Do not turn on room light!) and let them dry off. This will take between several hours and 1 day depending on the kind of object and humidity.

13. Exposure - what do you have to consider

Procedure is similar to standard photographic paper, especially if you have coated flat materials. With 3-dimensional objects close down your enlarging lens to the maximum to reach maximum depth of field. (Note that by stopping down your lens, depth of field will be 1/3 before and 2/3 behind point of focus)

Hint: With cylindrical or evenly formed objects you can produce a large halftone negative (or if you wish also a graphic negative without grey values) by using MACOLITH Film Type 684. This negative can then be laid or taped onto your coated object (e.g. a bottle or a vase) and then turn it evenly under the enlarging light - by doing so a sharp and even exposure will be a lot easier !

Note: If you have used LPE310 for coating, you can change grades for optimum photographic results. This can be done equivalent to standard variable contrast photographic papers (e.g. MACO Multispeed F and Multibrom F or AGFA Multicontrast etc.)
either with filters for your filter drawer (e.g. LABOR PARTNER Fil 8/Fil 15, ORIENTAL Acrylicfilter, or ILFORD Multigrade Filter)
or with enlargers with Variocontrast - or Colorhead by turning the corresponding filter values:
Yellow = for softer image reproduction
Magenta = for harder image reproduction

In case your exposure was too intense, you can bleach until desired density is reached by
Note: using
LABOR PARTNER LP-SEPIA PART A, Art. No. LPH51A, dilution 1+30.

14. Processing - what is important for good results

Due to the high silver content, use high energy photographic chemistry only.

LABOR PARTNER photochemistry is especially well suited for BLACK MAGIC. Keep working temperature to a max. of 20°C or lower, to avoid damaging of the emulsion.

Developer:	LP-BROM 4, for universal application LP-docufine HC, for steeper grade
Short rinse:	Rinse with tap water or dunk in water filled tray to for 10-20 seconds
Stopbath:	LP-CITRIN, odorless, non allergic and environmentally friendly LP-CITRODUR, for improved mechanical resistance
Fixer:	LP-FIX NEUTRAL, pH-neutral for non acidic fixing, improved archival quality, avoids sulphur dioxide emissions, shorter washing times
Washing:	tap water, 68 F / 20°C, duration depending on coating thickness and base material.
Wetting agent:	LP-MASTERPROOF, 3rd generation, with bactericide and fungicide additives
After treatment:	LP-SELENIA, unsurpassed quality for protection of image silver, improved image brilliance
Drying:	Air drying, in case of need use a hair dryer

Hints for processing

- avoid mechanical influences onto the coated emulsion, (e.g. touching with hands or chemistry tongs) even though hardening may have taken place, emulsion is very delicate
- lay or position your object into a large enough tray and pour (or cautious dunking) your chemistry onto it with caution.
Proceed in the sequence developing - stop - fix - washing (p.4)
- with larger objects (heavy objects, room walls etc.) which can not be processed by described

means, pour the chemistry with a graduate or even a watering can onto your object starting from bottom and going up to the top. Procedure identical to a.m. steps

- always use fresh fixer and keep fixing time as short as possible - you will be rewarded with short washing times
- fixer with hardener may not be used, because the extensive washing time will damage the emulsion.

15. Notes on special aspects

- since BLACK MAGIC is a very versatile product, so before you have gained any experience you should follow our application information closely - later on, your own experience and your creativity will be the best coach.
- in addition you can protect finished objects by coating them e.g. with a clear polyurethane paint.
- if you wish to coat any metal objects, be sure to prime an undercoat before coating with light sensitive (containing a silver compound) emulsion in order to avoid an electrochemical reaction. You can use LPE 410 pure photographic gelatin.
- BLACK MAGIC additive LPE 510 - is free of formaldehyde and may also be used for emulsion hardening of films and papers: Dissolve 40 - 80cc of LPE 510 in 1000cc water and dunk the materials you want to harden for 2 - 3 minutes and let them dry afterwards.

16. Trouble shooting guide

Result	reason	remedy
Bubbles in the finished picture	heavy stirring or shaking has caused air bubbles	avoid heavy stirring or shaking add 10 - 20 cc of BLACK MAGIC ADDITIV BE LPE710 for 500cc Black Magic by slowly stirring
uneven coating	uneven storage during setting stage and coat several layers	level out your object
Emulsion take off during processing	grease or anti-adhesion agents on your object	thoroughly clean your object or precoat with alkyde resin paint

17. Support

If you have questions or any proposals after reading this manual, we are happy to receive your feedback under:

HOTLINE: ++49-40 - 237 008 - 88

Fax: ++40-40 - 23 35 77

E-mail: PHOTO@mahn.net

18. Hardening instructions

A short summary of the attributes of BLACK MAGIC ADDITIV HD LPE519 (formerly HARDENER LPE510) for liquid B&W photographic emulsions:

- specially suited for the use in combination with B&W liquid photographic emulsions.
- hardens the photographic emulsion and improves by doing so:
 - the mechanical resistance of the emulsion

- the adhesion of the emulsion on the base material
 - decrease of the drying time
- new and especially easy and elegant adding to the developing bath.
 - different methods for applying.
 - easy takeout and convenient preparation of partial amounts because of liquid concentrate.
 - no increase of processing times.

Product description / general informations:

LABOR PARTNER BLACK MAGIC ADDITIV HD LPE510 is a new hardener for use in combination with liquid photographic emulsions.

By the nature of liquid photographic emulsions following problems may occur:

- „Lift off“ of the emulsion during the stage of wet processing
- damages of the coating during or after wet processing
- long drying times because of manually applied coating of large thickness

The old and now superseded methods of hardening are more painstaking, need a relatively long time of duration before hardening has been achieved. Moreover they have a low efficiency.

Based on new research the use of hardening fixers sometimes mentioned in photographic literature as well as in photographic magazines has turned out to be negative in terms of washing out long term damaging thiosulphate complex as well as silver compounds.

(Even Ansel Adams warned about the use of hardening fixers as archival quality can hardly be achieved).

Moreover, even the „best“ hardening fixing bath cannot by nature avoid the „Lift off“ of a liquid emulsion coated object in the developer or stop bath.

LABOR PARTNER BLACK MAGIC ADDITIV HD LPE510 avoids these problems, because, and this is very convenient and successful, it may already be added to the developer.

By this application method the RAPID HARDENING is of great advantage.

Field of application

LABOR PARTNER BLACK MAGIC ADDITIV HD LPE510 is applied within the BLACK MAGIC Systems of liquid photographic emulsions (resp. comparable emulsions of other brands).

Safety advices

LABOR PARTNER BLACK MAGIC ADDITIV HD LPE510 is a very acidic concentrate with a pH value of 3.

Therefore, for your own safety, please follow the given advice while working with the concentrate. Follow strictly the described order of preparation !

- avoid direct contact of LPE510 with (alkaline) developer concentrates, because it may cause a chemical reaction thereby possibly producing poisonous and pungent vapors.
- avoid direct contact with other acids (vinegar-, citric acid).
- avoid also direct contact with alkaline concentrates next to developers e.g. toners.
- handling of LPE510 concentrate should be done with special care.
- photochemistry should be, as with other chemistry as well, kept out of the reach of children.
- after direct contact to the skin or eyes, flush thoroughly with water. If accidentally swallowed induce vomiting. In both cases medical assistance is recommended.

For further inquiries regarding BLACK MAGIC ADDITIV HD LPE510, an EU-Safety data sheet is available.

Use / Preparation

LABOR PARTNER BLACK MAGIC ADDITIV HD LPE510 may be applied by using different methods:

A: Direct adding while preparing b&w paper developer working solution:

$$\begin{aligned} & 125 \text{ cc developer concentrate (e.g. LP-BROM 4)} \\ + & 825 \text{ cc tap water} \\ + & \underline{50 \text{ cc LPE 510 HARDENER concentrate}} \\ = & 1.000 \text{ cc working solution} \end{aligned}$$

This procedure is easy to use and efficient for application purposes. It takes advantage of the RAPID HARDENING mentioned earlier.

It should always be applied (even if other described hardening procedures are additionally used).

or:

If a precoat with BLACK MAGIC LPE410 purified photographic gelatin will be applied; an indirect hardening can be achieved (hardening by diffusion).

Just prepare a working solution of ADDITIV HD LPE510 and add it to your dissolved pure gelatin solution (quantity to be added depending on prepared amount):

B: Preparation of a working solution ADDITIV HD LPE510 for adding purposes:

$$\begin{aligned} & 80 \text{ cc distilled water} \\ + & 5 \text{ cc LPE 510} \\ + & \underline{15 \text{ cc distilled water (stir thoroughly)}} \\ = & 100 \text{ cc hardening solution ready for use} \end{aligned}$$

Per 1000cc of prepared LPE410 gelatin solution add 20 - 50cc of your working solution LPE510 and mix well. Coating should take place right afterwards.

and/or:

- C: If a precoat with LPE410 gelatin is not applied, a direct hardening can be achieved by adding working solution LPE510 directly to the liquified (warm) BLACK MAGIC photographic emulsion. Depending on field of application and thickness of coating add between 10cc and 25cc to 500cc of liquified photographic emulsion. Careful mixing avoids drawing air into the emulsion thus preventing unwanted bubbles.

With smooth (polished or glossy) hard and non-absorbent objects, e.g. glass or ceramic tiles, to be coated it may be advisable to combine all 3 methods in order to avoid adhesion difficulties:

1. adding ADDITIV HD LPE 510 directly to the developer ("A"),
2. harden indirectly ("B") and
3. the direct hardening ("C").

Generally one can rely on the convenient and effective method „A" alone.

Shelf life + yield

Shelf life:

BLACK MAGIC ADDITIV HD LPE510 in originally closed bottles has a shelf life of at least 1 year, once opened approx. 6 months, provided normal storage.

Prepare only as much working solution of the hardener as needed directly.

If BLACK MAGIC ADDITIV HD LPE510 is used as an additive to developers, shelf life will be according to the data of the developer itself. It's shelf life, especially in used condition, can be improved by far if kept in tightly closed glass bottles.

For direct application of BLACK MAGIC ADDITIV HD LPE510 in combination either with BLACK MAGIC pure photo gelatine or with BLACK MAGIC liquid photographic emulsions, the question regarding shelf life is not relevant.

Yield:

Per 500 cc concentrate BLACK MAGIC ADDITIV HD you can prepare up to 10 liters of hardening-developer working solution.

Assortment + packaging:

BLACK MAGIC ADDITIV HD LPE510 is available in bottles with 500cc concentrate.

Note:

LABOR PARTNER uses different types of bottles:

- The white bottles have a threaded outer cap and an inner lid for additional protection.
- The black 500 cc + 1000cc bottles have a special protection sealing ring around the cap, which should be removed before unscrewing. Opening then will be easy.

Storage

BLACK MAGIC HARDENER LPE510, whether in original bottles, or added to developers, or as a working solution, should be stored at room temperature.

(temperature range between min. 5°C - max. 30°C)

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Errors, or omissions regarding technical progress, remain exempted
