


Chemically Blackening Brass

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There is a lot of information about this subject to be found on the internet; however, to the novice, much of it is confusing. Considerable discussion can be found in modelling forums recommending various products and techniques. Hopefully, this summary will help in demystifying the subject.

This information sheet is a collection of ideas and recommendations resulting from the research I have conducted while trying to find a process for blackening brass using products available here in Australia. The objective is to offer-up suggestions and techniques useful to ship modellers written by a ship modeller. I hope it is of some value to fellow modelling shipwrights.

In developing my own process for blackening brass, and in researching this article, I have drawn on information provided in several online forums, and from the various product manufacturer's data sheets. I cannot take credit for much of the information provided and wish to acknowledge the various authors on the discussion forums, and the authors of the manufacturer's data sheets, from which I have drawn some of this information.¹



CAUTION

A word of Warning! Consistently, and emphatically, product makers and suppliers stress the same words of warning and caution.

'The chemical ingredients used in these products are dangerous.'

Even though the products used by modellers for blackening metal are safer than most industrial agents, they must be used with care! Follow the manufacturer's instructions closely, ventilate well and wear the appropriate Personal Protective Equipment (PPE) for the chemicals you are working with. Also, store these agents in a well secured, lockable cabinet; to keep them away from kids and pets. In other words, use common sense!

This document remains a work in progress and focuses on the blackening of brass. I have included most of the products that I have been able to locate and/or validate at the time of writing. However, there may be other products or blackening processes available.

¹ **Disclaimer:** I have no commercial or other financial interests with any of the products, services or suppliers mentioned in this article.

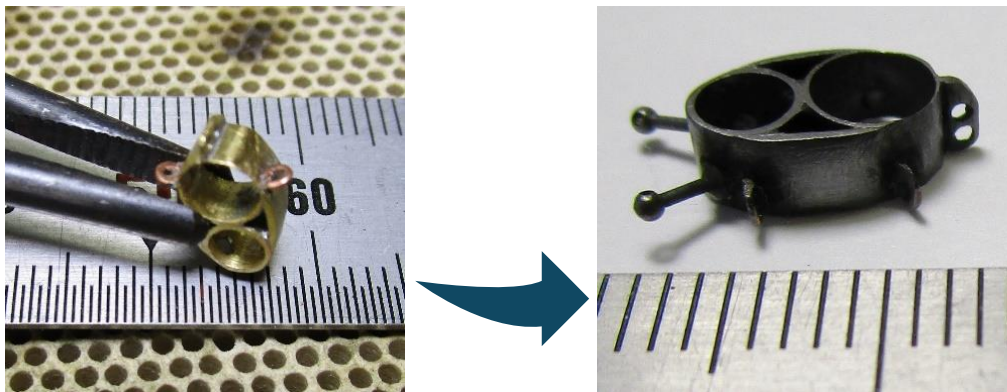
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Introduction

Firstly, what are we trying to achieve? Black oxide is a chemically attained conversion coating for ferrous materials, stainless steel, brass, copper, and other metal alloys. Some ship modellers prefer to buy brass fittings, others like to scratch make them, but we usually need to blacken these parts to achieve a realistic iron-like look. While some modellers choose to paint the parts, others prefer to use chemicals to oxidise the surface of the brass to give it an authentic 'blackened' iron or weathered/aged appearance.

Either method can achieve satisfactory results. However, paint will tend to fill some of the minute details of the brass pieces, whereas a chemical blackening process won't. When using the latter technique, we are finishing a raw part in this state (left) with this result (right). This is the bowsprit, jibboom and bobstay collar that I have scratch made and blackened for my model of HMCSS *Victoria* (1:72). The part is made from brass and copper and silver soldered with different grades (melting points). Hopefully, this is a good example of what can be achieved.



The chemical blackening of metal involves the replacement of a surface skin of base metal with a selenium-based compound (oxidant). There are many types of metal blackening agents; with many generally working on a particular metal to produce a black, green or brown patina. A patina is defined as:

A surface appearance of something grown beautiful especially with age or use. Usually used in reference to copper, but also applicable to bronze, steel, and other materials.

On a commercial scale, metal can be blackened using Parkerizing, or hot or cold Bluing processes. Some of these methods, previously the exclusive domain of gunsmiths, engravers, and metal shops, are readily adapted for home use with some solutions now supplied commercially in kit form. It is then, a matter of finding the most suited product or chemicals and applying the appropriate techniques.

Although these agents are generally named after the base metal for which they are designed to react with, some work better than others on different metals. Be aware that different alloys used within the same base metals often react differently to the same blackening agent; there are at least 12 varieties of brass. Additionally, other solutions and/or techniques may prove to be better and/or easier for blackening other metals, such as copper where using Liver of Sulphur may work better.

The Recommended Process

To achieve a satisfactory result, the following summarises the steps recommended by the various manufactures, other modellers, and gleaned from hard experience.

1. Remove all traces of grease and foreign substances from the surface. This may sometimes require several iterations of scrubbing and rinsing.
2. Rinse well in clean demineralised (distilled) water or under flowing fresh water. Do not touch the part with bare skin after cleaning.
3. De-oxidise the parts using an acidic solution. This work should, wherever possible, be done in a well-ventilated space.
4. Rinse well and dry. Do not touch the part with bare skin.
5. Blacken the part using your preferred agent/solution.
6. Inspect, reclean and blacken again if the finish is not acceptable.
7. Rinse well and dry.
8. Buff the part to obtain a good, consistent finish.
9. Weather the blackened part if desired.
10. Seal the finish to the sheen required (matte, gloss etc.).

Cleaning and Preparation Techniques

Regardless of which method you choose to blacken brass or, for that matter any metal, good preparation is essential. Parts that are not cleaned or prepared properly will result in poor finishes.

I cannot emphasise strongly enough the importance of proper cleaning and deoxidisation of the brass prior to blackening. This is the 'make or break' of a good result. The evidence from my trials reinforced prior advice I had been given, of the importance of proper preparation. Any residue from finger oils, contaminants, glue, flux etc consistently resulted in unsatisfactory blackening.

Many of the product manufacturers provide recommendations for the use and application of their products, on their websites. Users should note this information and, if necessary, adapt or modify their cleaning processes appropriately when using that product.

Cleaning

There are two main types of contamination to a metal surface; organic, which is oil, grease and dirt; and, inorganic, which is oxidation. Sometimes both types of contamination will be present on the metal. Most cleaning methods will only take care of one type of contamination, so they need to be addressed with separate processes. It is important that you determine the best cleaner for each application.

Organic contamination will always be on top. Therefore, always address the grease first, then the oxidation. Once the oils and grease are removed, any oxides can be removed by soaking in an acidic bath.

Note: Some brass stock, especially wire/rod, is coated with a sealing agent such as varnish which must be cleaned off before use. A scrub with a scratch pen or wire wool is usually sufficient.

Some modellers report that removing all of the soap film from the parts, especially parts with deep crevices, can be as problematic as getting the grease off. They therefore prefer to use lacquer thinner or acetone to clean the parts. I have often skipped the washing with detergent step and simply use Acetone or Isopropyl as a single cleaning process, especially where the parts show very little sign of oxidation.

Minimise the handling of parts after this initial clean. Be careful not to leave fingerprints on any of the pieces as these will, in turn, leave traces of oil and other impurities. Where possible, handle parts by their edges, preferably with tweezers or tongs. When this is not possible handle the parts wearing surgical gloves which works equally as well. I prefer nitrile rubber gloves for this purpose, but any powder free rubber gloves will work.

It is also important to blacken the parts immediately, or as soon as possible, after cleaning them. As soon as you rinse the acid off the part and drain them, that part is as clean as it will ever be. Depending on the temperature and humidity in your workplace, oxidation of the surface may start again very quickly.

Cleaning Agents

The ultimate cleaner for this purpose was trichloroethane which was the major ingredient in brake cleaner. It has now been phased out of industry since it is an ozone depleting substance.

Organic. These cleaners, such as solvents and detergents, will dissolve oil and grease. Some recommendations for the degreasing solution include:

- Liquid dishwashing detergents.
- Liquid clothes washing detergents.
- Bathroom/kitchen cleaning products such as Easy Off BAM, Purple Power, or citric based solutions.
- Mild soap (applied to brush bristles).
- Pumice stone slurry.

Inorganic. Mild acidic cleaners will attack surface oxidation. Diluted Hydrochloric acid is the most commonly suggested option. However, many modellers prefer not to store or use acids, and use vinegar instead.

Some recommendations for the degreasing solution include:

- Muriatic acid (between 35 - 10% solution).
- Nitric acid (between 35 - 10% solution).
- Ammonia (ventilate well or wear breathing apparatus).
- Acetone (my preference); however, Acetone is very volatile and like all solvents can be harmful to your health if used in an unventilated space. If you are concerned about this, use isopropanol, a less volatile, but also a less universal solvent.
- Undiluted household Vinegar: this did not work that well in my trials, but other modellers report good results; this may depend on the vinegar's pH level.

Notes: 1. Muriatic acid is really a mild hydrochloric acid used for cleaning concrete among other things (also known as brickies acid). It is usually available from hardware stores.

2. Vinegar can be very acidic, with a pH of 2–3.

CAUTION All acids are dangerous – read the safety precautions on the package!

Dilute acids with plain tap water and store in a well-marked plastic container; preferably one with a child-proof cap.

When mixing acid solutions, always add the acid to the water, not the other way.

Abrasive methods can also work well for this purpose also. One option is to use a slurry of ground pumice and water and scrub the parts with an old toothbrush. You can also use a fiberglass brush, or a small wire brush for larger parts.

Rinsing

Rinsing is vital – it is important that all traces of the cleaning solutions are removed. It is preferable to use clean distilled (demineralised) water as it won't leave any mineral deposits that may come from tap water. However, rinsing under running tap water can work.

Cleaning Techniques

Degrease

Wash the parts in a degreasing/cleaning solution agitating them vigorously. Only experimentation will determine what cleaning agent and technique works best for you, and with your selected blackening agent.

The most basic cleaning processes is a vigorous scrubbing with detergent and water. Use a stiff brush, toothbrush or similar, to assist the scrubbing process. Ensure you rinse all soap and residue from the parts.

For modellers with deeper pockets, an ultrasonic cleaner works well as it allows the use of relatively mild solutions. It is the ultrasonic scrubbing action that does the work; however, it will only remove loose surface corrosion. I use an ultrasonic cleaner with a small amount of detergent (made for the jewellery industry) for this purpose.

Deoxidise

After degreasing, if necessary, the parts must be deoxidised. Again, immerse the parts in an acidic solution agitating them vigorously. Ensure you rinse all residue from the parts. If after applying the blackening agent, you still see spotting, or light areas, try changing to another degreaser/cleanser. Some synthetics cannot be cut by all solvents, i.e. if you are using an acetone, switch to a keytone. No solvent or cleaner will remove 100% of the synthetics 100% of the time.

I found to my own cost, that when using acids, using the kitchen or laundry sink is not advisable. Not only are there odour issues, but also deterioration and staining of a metal sink and metal implements. Even when using diluted acid solutions, it will still corrode and/or etch the metal. I also found that acids, no matter how they are stored, will off-gas and corrode any nearby metal fittings and product lids/containers.

Another method that is often recommended by modellers is the use of Sparex #2 for this process. I have not had particularly good results with this method, but I may have done something wrong. The following are some notes from a source that I cannot recall; I hope the author does not mind me reposting.

- Sparex (which is just an expensive packet of sodium hydrogen sulfate) is an easy to use, longer-lasting, safe replacement for dangerous acids. Use it for removing surface oxidation, scale and for pickling gold, silver and copper-based alloys. It is non-flammable and non-explosive.
- To use Sparex add ⅓ cup (2 tablespoons) to 1 cup of water in a small crock (warming) pot. Set the crock pot for a low temperature. Sparex works only if heated. Protect the area using an old cookie sheet or piece of metal.
- Use only copper tongs when touching the pickle (solution). Do not put steel tweezers into the pickle, this will cause the pickle to become a copper plating bath. Everything inside your pickle will come out covered with a thin layer of copper.

- Place the part into the crock pot and let sit for about five (5) minutes or until the piece is clean. Rinse well in a bowl of water with baking soda.
- **CAUTION:** Boiling Sparex could be dangerous because once dissolved it is sulfuric acid. It is quite dilute initially but if it becomes concentrated by boiling, it will produce oxides of sulfur (chemically SO₂ and SO₃). These are dangerous gases and if inhaled could cause permanent respiratory damage.
- To dispose of the solution, pour it slowly into bicarbonate. It will fizz so do it slowly. Once the fizzing stops the Sparex is neutralized and you can dispose of it down the sink.
- **Do not** use the crock pot, or any of the utensils, used for pickling for food use.

Surface Preparation

While not essential, especially if the part has been thorough cleaned, my preference, is to prepare the surface to better key it for accepting the blackening agent. I also find that a surface prepared in this way results in a more realistic cast iron surface.



Carefully scrub the items with a stiff brush, such as a fibreglass/scratch pen; these are similar in construction to a propelling pencil but with the lead replaced with fine glass fibre rods or thin brass wire. The brass should be scrubbed until it shines; this process can also remove any oils/grease left on the surface.

These scratch pens are available from most train modelling or hobby supplies stores, and also from some electronics stores, as they are also used in soldering. The pens come in different brush (bristle insert) sizes. A word of warning though, the fibres break off in very small lengths and will stick into your skin becoming quite irritating if care is not taken.

An alternate, but more costly, option is to use a specialised airbrush, also called abrasive guns, to powder blast the parts to achieve the same effect. These airbrushes, such as those from Paasche, can be found in many hobby shops, or online, and generally allow the use of different grades of cutting compounds/abrasives.

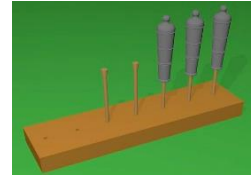
Cleaning and Preparation Tips and Jigs

The following tips and jigs have been suggested by various modellers, along with those that I have found work best for me.

1. If the items are very dirty, consider using a hair dryer to heat the metal to open the pores before degreasing.
2. A few ideas that I have used to assist the cleaning process are listed below. Any containers used with either an ultrasonic cleaner, or water, must have enough, and adequately sized, holes to allow rapid drainage but also prevent smaller parts escaping. Use brass wire or wood as the handle to ensure no contamination due to dissimilar metal reactions when dipping into the blackening agents or acids.
 - Small plastic containers (e.g. yogurt cup), small pill bottles, etc (picture point 1).
 - Medicine dose measuring cups (picture point 2).
 - Deeper sided plastic lids from screw on bottles (picture point 3).
 - Small plastic/nylon tea strainers; metal versions **should not** be used with acidic solutions (picture point 4).



3. For drying canon barrels, the jig shown opposite is easily made from small diameter dowel, skewers toothpicks inserted into scrap wood or a foam block. The tops of the columns should be sized for a snug fit in the bore, but not so snug that it might mar the surface.
4. Try a small brass bristle 'suede shoe' brush on larger parts. I also use these brushes for cleaning files (as a form of carding brush), so it could be dual usage.
5. Larger parts can be handled directly when wearing gloves to agitate, scrub and rinse the parts (such as cannon barrels etc.).
6. To clean the bore of canon barrels, and hard to access corners or niches, try using a dental care toothpick (see opposite). The longer, slimmer handle ones are best suited to this task. They also come with different sized heads, so having a range of them on hand may be of benefit.
7. If it is in your budget, consider using an ultrasonic cleaner. Small ones, suited to our hobby, are available online and at hobby supply stores at very reasonable prices.
8. My preferences are to degrease using an ultrasonic cleaner, then deoxidise by soaking in Acetone, before using a scratch pen to key the surface. I have found a good quality detergent used by jewellers to be the best degreaser to use in my ultrasonic cleaner. Talk with your local jeweller or their supplier for a recommendation.



Blackening Techniques

There are as many opinions expressed advocating the best techniques for blackening brass parts as there are products. You will need to experiment to determine which work best for the type of brass you are blackening, and with the products you are able to access. Many of the following techniques will work equally as well with steel and copper; however, some minor modification to your process may be required.



Many of the blackening solutions have a long shelf life, even after dilution. Do not throw-out the solution after each use; you will probably get several uses from it as long as you do not cross-contaminate the agent. Therefore, small bottles of the blackening agent should last quite some time.

Blackening Brass

The rate at which brass will blacken depends not only on its composition (alloy content), but also on whether it has been worked (turned etc.), whether it is a casting, the presence or lack of impurities, and/or whether the brass has been soldered (heat effects on the brass as well as solder/flux residue).

The most recommended method is to immerse the materials in a diluted blackening solution. My experience has shown that the best way to achieve a good patina on brass is to use a weaker solution so that the oxidizing agent works slowly and penetrates thoroughly. Simply pour a little blackening solution into a small container (non-metallic), dilute it to preference, immerse the parts and periodically agitate them until the desired depth of colour has been achieved (may need several dips – check regularly). The length of soaking time is dependent on the metal type, degree of oxidation and the size of the parts; only experimentation and experience will determine how long to dip them.

If you choose to use a full-strength blackening solution, keep a very close eye on the process, as the reaction is slow initially but accelerates rapidly. The pieces will darken rapidly but then, often it will start to flake. Also, depending on the type of brass, it might not flake off until later. There will usually be a grey/black powder residue formed on the brass which must be cleaned off. Should excessive oxidation or flaking happen, dilute the metal blackener further with distilled water.

After soaking, remove the parts to drain (I place them on clean paper towelling) and rinse them thoroughly to neutralise the oxidising process. Rinsing can be achieved by simply holding the container with the parts under running water, or by swishing in a jar/container of distilled water.

Alternatively, you could simply leave the pieces to soak in a container of water for a while. Some modellers recommend hot water, but I have found that distilled water at room temperature works well enough. Also note that some water, although drinkable, is not of the best quality for this purpose and may affect the blackening process.

When dry, buff the pieces with a lint free cloth, or paper towel, to enhance the effect and then seal the surface. If you do not seal the finish, there is a risk that continued reaction may occur later (imperceptible over the short term), or the patina might be more easily scratched/damaged down the track.

Alternate blackening technique

An alternate method of blackening is to brush or rub the full-strength solution directly onto the pieces using a cotton bud or small soft brush to work it in, rather than immersing the parts into the solution. Some agents work better using this method as they have been diluted when manufactured.

Again, after the patina is formed, be sure to neutralise the coating by rinsing thoroughly with water and place them on a paper towel or cloth to let the parts dry completely. An improperly rinsed item will continue oxidising, even if sealed.

Blackening Copper

Copper can be blackened using the same process used with brass; however, sometimes it is better to use another method using Liver of Sulphur (H₂S). Again, thorough cleaning of the part is essential for good results.

Ed Tosti, noted model maker and author, writes:

I have become a true believer in liver of sulphur on copper to make model parts. Every time I use the blue solutions on brass or soldered brass I become more convinced. One reason is that the sulphur acidic solution neutralizes to an inert state quickly and naturally, so there is no remaining residue to keep working on the metal - or the wood. ...

The solution has very short life. In a few minutes a neutral white oxide precipitate begins to form and H₂S is given off as a by-product as the solution becomes inert. The H₂S causes the odour, but in the small amounts I use in each application it is almost unnoticeable. With the sulphur going off as a gas the remaining neutral liquid is left. This is the reason it does not affect the wood, even if not washed off. It will also not blacken copper.

If you use a concentrated solution or just brush on the gel the black will scale off and the wood around it will probably be stained. Dilution is the solution. Make the solution only strong enough to do the job.

I do not heat either the part or the water. I use room temperature tap water. Sometimes it is filtered Brita water but that seems to make no difference. ...

If you want to blacken soldered parts, use a copper phosphorus silver solder. Normal silver solder resists the sulphur and does not blacken.

Blackening Britannia (White) Metal

Britannia metal is a tin/antimony/copper alloy so most blackening products should work, but results can vary widely. Some modellers have reported that they have had mixed results and prefer to use a blackener designed for pewter or white metals. Again, the most important aspect is a thorough clean / degrease of the part before using the blackening agent.

Blackening Tips and Jigs

Some of the following tips are based on jigs and tooling I have tried, while others are taken from the internet and other modelling forums.

1. My experience has been that I get better results with a diluted blackening solution (see earlier comments). I find I get a more consistent and deeper etched finish using this technique. My experience to date suggests that a dilution of between 40% and 50% works best for larger pieces; and about 35% to 40% for very small pieces.
2. Use a tall, narrow vessel for dipping (cylindrical) for cannon barrels and other long narrow items; especially if only doing a few. This allows the item to be immersed without using a great deal of the blackening or finishing solutions. When blackening, ensure the inside of the bore is also coated; use an old paint brush to swish inside the bore to release any trapped air bubbles.
3. Where necessary, use a pipette like a bellows, or a straw, to blow the excess solution off/out of nooks and crannies. You could just as easily blow it off without these aids, but blowing into a cannon bore tends to spray back in your face (probably not a good idea with the chemicals we're using).
4. For very small parts, use a small nylon tea strainer or a drilled container (discussed earlier) for all steps of the process. This eases the frustration of trying to fish small parts out with tweezers and the like between each step. It also allows the parts to be 'swished' about in the solutions much more thoroughly to ensure full coverage.
5. For a more durable matte black finish, similar to the inside of a camera or other optical equipment, either sand/powder blast the part for before blackening or use a scratch pen on them. I use the scratch pens discussed earlier to achieve this effect.
6. If your efforts are producing a crusty, or thick powdery layer, or an uneven brownish-grey colour to the finish, try gently warming the solution before you use it. I have never tried this, but the suggestion seems sound.
7. If you are getting a mottled or patchy finish, this is usually a result of the metal not being clean, and/or properly prepared in those spots. I usually give the affected part a good scrub with a scratch pen, in and around the affected area, rinse, then put it back into the blackening solution – rinse and repeat until the desired finish is achieved.
8. I always place the blackened parts on a clean paper towel to dry, then buff them with the same towel to remove excess oxidation (soot like). A better quality (tight wrapped) cotton bud/Q-Tip can also be used for buffing, but some care is necessary.

Finishing Techniques

The finish of the blackened brass can often be improved by a light buffing of the blackened surface with a lint-free cloth or paper towel. This provides a polished surface that, generally, also enhances the depth of colour.

Weathering

Some very realistic weathered and rusted finishes can also be achieved using different reactants after the base patina has been applied. Subsequent treatment with alternative metal blacks can produce other useful effects. For example, Carr's product description sheet recommends that after treating brass with the 'Brass blackening agent', follow-up with the 'Nickel Silver' blackening agent to achieve a rusty and aged finish. Applied to the appropriate parts of a canon, this may achieve that 'just fired' appearance, or, if applied to an anchor, will produce a rusted, well used metal anchor.

Sealing

As we are creating a patina, it is important to seal the finish with a light coat of lacquer or other sealing product. I have found that a low sheen or matte lacquer finish provides the most realistic appearance (opinion). Any non-yellowing paint-on or spray-on lacquer, such as Krylon, Nordglass, or some automotive topcoat products, would be suited to this purpose.



I have had good success with two products: Testors Dullcote lacquer and Zapon lacquer for sealing the blackened brass. I usually airbrush the latter on; however, due to the heavy pigmentation of Dullcote (it must be well shaken before use), I find it is better to brush this on in a single thin coat.

My new favourite, however, is ZAPON lacquer, which is available from good artist supplies, or by online order. It is used with gold leaf gilding as it dries with a glass-clear thin coating, and does not yellow over time. However, it can be expensive (shop around) but can be thinned with alcohol – a little goes a long way.



Carr Electrofix is another finishing product readily available, particularly in the UK. This is also a clear lacquer that will seal the finish and prevent the black being rubbed away.

According to the manufacturer, it will also provide a low strength seal for nuts and bolts where it is not desirable to use Loctite etc.

Modern Master's (White Knight is the agent in in Australia) also have a water-based sealing product called Permacoat Xtreme. Again, I have not tried this product, but using it would be a more eco-friendly as it is water based, and an easier product to store and clean-up after use.



Surface Monkey Metal Sealer (previously known as Black Oxide Sealer) is another product that can be used for sealing a blackened surface. The manufacturer describes it as a versatile metal sealer suitable for use on mild steel, stainless steel, brass, copper or aluminium. Again, I have not used this product, but the description suggests it has potential. I also do not know if it is available in smaller quantities.

Finishing Tips

Most of the following tips are based on products and techniques I have tried; while others are taken from the internet or modelling forums.

1. My experience has been that lacquers produce the best sealing result for our needs. Again, leave the coated item to dry thoroughly before handling.
2. If possible, use an airbrush to apply the finishing product. Thin coatings are best for preserving detail.
3. If applying by brush, use a wood toothpick or thin skewer (frayed at its tip), or a dental flossing brush, to get deeper inside the bore of a canon barrel. A brush is not recommended as the metal ferule may mar the blackened surface, especially at the muzzle.
4. Some modellers have reported that warming the blackened part before applying lacquer helps it to dry more quickly.
5. Another method reported by knifemakers is to use a Teflon coating [clear coat] on their knives. Simply, spray it on and cook in the oven. This finish is reported to better withstand normal abuse of a blade.

Blackening Products

A quick online search brought up a long listing of oxidising agents. I will only cover the more commonly used, or what look like they may have potential in this listing; it is far from being a comprehensive listing or discussion.

Furthermore, care must be taken in selecting a blackening agent as some of these products some are intended for creating rust-like patinas only. Your choice will also be governed by which products you may be able to purchase locally or available through online suppliers. I would also recommended, that for those of you just starting out, to first experiment with the tried and tested products such as Jax, Birchwood Casey and Carrs.

JAX Black



This product is a Brass, Copper and Bronze blackening product manufactured in New York state, USA by the [Jax Chemical Company](#). I have no experience with this product but it is regularly recommended to users on many modelling sites.

The manufacturer recommends, that after cleaning and preparation, to simply apply the solution. This implies it may not need to be diluted, or, that it has already been diluted. They provide instructions on their website which can be downloaded and/or printed.

Brass Black



These products are manufactured by Birchwood Casey of Eden Prairie, MN, USA: www.birchwoodcasey.com/sport/index.html. Brass Black is manufactured for use by gunsmiths and associated industry to blacken brass, copper and bronze parts. It is a fast-acting liquid with the resulting effect and depth of colour dependent on the alloy content of the brass, and amount of time the brass is exposed to the blackening agent.

It has been reported that it may not colour solder. However, my experience has shown otherwise, **BUT**, there is a marked difference in finish between the brass and the solder. The solder shows as a more 'matte' finish, depends on the metal content of the solder used.

Carr's Metal Black for Brass/Steel



There are several types of this popular metal blackener available but two of most interest to ship modellers are the 'Brass' and 'Steel' agents. There is also a product dedicated to solder blackening. The steel solution is reported to work on most solders and metals (including brass) which may eliminate the need to hold several different blackening agents.

Carrs is manufactured in the UK and available there through [Phoenix Precision](#).



Black Magic



This product, manufactured by [Sculpt Nouveau](#), blackens all metals except aluminium and stainless steel. It appears that it is mostly used by artists. The 'Traditional Midnight Black Patina' reacts on aluminium, bronze, brass, copper, iron, steel (not stainless), and zinc/galvanized. The company claims that this patina works quickly and has excellent durability.

Their product blurb states that it takes only 3-5 minutes to develop a patina and does not produce the quick rust that you normally see with other blackening agents. The first coat will be dark grey, but the finish will become black after a few coats. The manufacturer also recommends sealing with a coat of varnish; however, I think this may only be needed if working with steel or iron.

Photoetch Burnishing Fluid



Burnishing Fluid is generally used by model railroaders to blacken brass photoetch (PE). It is available through the Ammo range of paints and finishes manufactured by/for [MIG Jimenez](#).

I have not tried this product, but it is stated by the manufacturer, that it is an 'Instant blackening for turned brass barrels and photo etch within about 3-5 minutes. This product also blackens tin solder used for soldering photo-etch for a uniform effect'.

Solder Blackening

Some of the products mentioned earlier may also blacken any visible solder as well as the brass, but many products will produce blotchy or inconsistent results. For those instances where it has failed to do so, there are several products available.



Apart from Carr's Metal Black for Solder (C1066), there are a few other products used extensively by leadlight window makers and repairers. These products are 'paint on patinas' in liquid or paste form that are brushed directly onto the solder.

Another recommendation I have been given, is to use LA-CO Brite Flux to blacken soft, and some silver solders. The same product for two different jobs (flux and blackener); this has to be another cost saving 😊 This product may well work on higher content silver solder as well but has yet to be tested. The product is made by LA-CO Markal in the USA.



I have also found some recommendations that Gun Bluing products, such as Gun Blue Crème by G96 products will work. Some modellers report that despite the name, the result is actually black. However, I have no experience with these products and to my mind would create a more blueish tone and mirror-like, rather than soot-black finish. It is described online as:

Highly recommended by gun enthusiasts and gunsmiths over any other brand. Mirror like finish is guaranteed to blend perfectly into the original bluing and leaves no streaks or spots. Won't rub off or discolor.

Home Brew or Alternate Chemical Agents



Caution! Some of the following methods involve the use of caustic or poisonous liquids, and fumes that may also permeate throughout your house. Plastic gloves and adequate ventilation are essential. You, and the work area, should be well protected from possible damage or contact.

The cautions advised at the start of this article are also applicable.

The products listed below may also blacken metal parts and you don't have to be a chemist to use them (but it might help 😊). Many of the products are available in powdered/granular form that will need to be mixed with other commercial chemicals or distilled/demineralised water.

However, I have found to my dismay that this doesn't necessarily translate to a cheaper alternative. It does allow the modeller to buy bulk (sometimes cheaper), provides a longer shelf-life, and you can mix as much as you need when you need it. However, (yes there is always an however), you will need to experiment a little to find the best chemical mix ratios and soaking time to achieve the desired effect.

Some of these alternate solutions include:

1. **Selenium Dioxide** (selenium acid):– This is a good chemical for blackening copper and brass and is the first choice of many chemical trophy engravers for laminating brass plaques to make the lettering black (the lettering cuts through the lacquer). The finish is totally jet black and very hard. Selenium is also the base compound in many of the commercially made blackening agents discussed earlier.

One such product is 'Gravoxide'. It is advertised as a blue/black oxide finish for steel, but it is reputedly effective on brass and copper also.

2. **Copper Carbonate**:– Normally, this chemical is used to create a green patina similar to weathered copper on metals. However, it can also produce a black/dark finish on brass. Most scientific chemical suppliers only sell the pure version of the chemical in bulk, and it is expensive. Nonetheless, industrial grades of Copper Carbonate are available from pottery supplies outlets quite cheaply in small bags.

It is usually available in a granular form, and can be mixed with warm water or ammonia (either ammonia 800, better but more expensive; or cloudy ammonia). Both will work. The ammonia solutions clean the brass as they blacken; however, some brass preparation is still recommended.

A teaspoon or so of the granules mixed in a glass jar of water or ammonia solution usually works. Leave the brass in the solution from anywhere between 10 to 30 minutes, depending on how black you want to make it. Leave it out in the sun while it is working for better results.

Keep the solution; the carbonate will settle to the bottom, but a vigorous shake will soon have it ready for the next batch of blackening.

Note: this solution generally will not blacken solder!

3. **Sodium Polysulphide**:- Make a solution of sodium polysulphide by dissolving flowers of sulphur (pictured left) in a solution of sodium sulphide. The solution can be painted onto the part, or better still, soak the brass in the solution. It forms an adherent layer of copper sulphide, which is black; so the longer you leave it soak, the blacker the result.



The solution really smells (it is the old 'stink bomb' formula) and it will permeate into your hair and clothes. You will not be 'Mr. Popularity' if you go out partying after this! My trials have shown this to be a relatively poor performer; very slow and patchy results but I may not have experimented sufficiently. However, one of my ship modelling mentors swore by this method.

4. **Ammonia**:- **CAUTION** ventilate well



After preparation, moisten the brass surface with strong vinegar and then suspend the part in ammonia vapour (inside a lidded bucket with half an inch to an inch or so of ammonia should work). Repeat every five or ten minutes until the desired patina is achieved.

I have not been able to achieve a satisfactory result using this method. I suspect that the chemical content of modern ammonia products have changed since this method was first suggested.

Product Sources

Note: Many suppliers will not post/mail some of the products listed in this article. Some manufactures advise higher delivery costs for any product that contains chemicals which must be sent and packed under the 'hazardous goods' regulations, and must be transported by a carrier that is licensed to be able to transport. They are unable to send by regular post as it is now a criminal offence to send undeclared hazardous goods.

Potential sources for blackening agents include:

- Railroader and Ship Model hobby stores (blackening agents, finishing paints).
- Jewellery suppliers (solders, flux and some blackening agents).
- Gunsmiths (blackening agents).
- Chemical / Scientific equipment suppliers (chemicals and acids).
- Pottery suppliers (industrial grade copper carbonate).
- Leadlight suppliers (flux and paint on patinas).
- Artist's Supplies/Shops (blackening agents)
- Amazon and eBay