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# POLISHES

## Contents

## 1. Introduction

In response to numerous requests from the public for information on various polishes and waxes, the following data have been collected. Many patents have been granted covering such preparations; abstracts of some will be found in Chemical Abstracts, published by the American Chemical Society and available in public libraries. The National Bureau of Standards has not developed standard or recommended formulas for manufacturing polishes.

## 2. Precaution

Gasoline, turpentine, mineral spirits, and many other volatile organic solvents are very flammable. In using these solvents, or preparations containing them, be sure to have good ventilation, and to avoid electric sparks, open flames, or smoking in the rooms or other spaces. Oily and greasy rags should be destroyed immediately after use or kept in closed metal containers. Animal and vegetable oils are the most likely to undergo spontaneous combustion.

## 3. Furniture and Automobile Polish

Furniture and automobile polishes are similar except that the automobile polish may contain an abrasive. Varnish, enamel, lacquer, baked enamel, and synthetic resin are the finishes that are generally encountered. They differ in hardness, fastness of colors, and resistance to solvents and abrasives.

Furniture and automobile polishes should remove dirt and grease readily from the surfaces, restore their luster, have no objectionable odor, and yield a film that does not hold or attract dust. They should be easily removed in order to simplify refinishing. Such polishes should contain no alkali or alkaline compound that will attack finishes; emulsions should be stable; and the nature and amount of solvents and oils used should be duly considered.

(a) Oil Polishes. Most of the straight oil polishes consist wholly, or mainly, of a mineral oil. They are cheap and give a glossy polish if rubbed off thoroughly. Mixtures of mineral oil (paraffin oil) and linseed oil, usually with other ingredients, are also used. Linseed oil is a component of many polishes for varnished surfaces. Polishes containing it or other drying oil should be rubbed off thoroughly from the surface being polished. Cloths used for applying the polish and rubbing down the surface should be kept in tightly closed metal containers because of the danger of spontaneous combustion.

(b) Wax Polishes are made in paste and liquid form. Some of the emulsion polishes contain wax, such as beeswax, carnauba, bleached montan, ceresin, and synthetic waxes. Although beeswax is used in many polishes, the harder waxes with higher softening or "melting" points, such as carnauba wax, are to be preferred. A silicone is frequently added to these waxes to aid in the spreading of the wax or the silicone itself may form a protective film. Some of the wax polishes soften at fairly low temperatures and may whiten by long contact with water. Polishes showing these properties would be more satisfactory on furniture than on automobiles.

(c) Special Mixtures. Most of the commercial polishes probably fall under this heading. They may consist of mixtures of oils, waxes, volatile solvents, abrasives, acetic acid (or vinegar), antimony trichloride ("butter of antimony"), camphor, drier, etc. Oil-soluble dyes are sometimes used to give a red or other color, and essential oils may be added to impart a pleasant odor or to mask the odor of certain ingredients. Many of these polishes are emulsions and require the use of an emulsifying agent. The abrasive used in making a polish, or a combined polish and surface cleanser, should be selected with care in order not to scratch or otherwise mar finished surfaces. Tripoli, diatomaceous earth (infusorial earth, tripolite, diatomite, kieselguhr, etc.), chalk, fuller's earth, bentonite, and air-floated silica are some of the commonly used abrasives. The abrasive should be a uniform and very finely powdered product. Very fine abrasives are used in small amounts in the preparation of some polishes for lacquer finishes. The polishes for varnish and enamel coatings as a rule do not contain any abrasive, as these finishes are easily scratched.

## 4. Metal Polish

(a) General Composition. Although polishing powders are in use, metal polishes usually consist of some abrasive material in suspension in a liquid or semiliquid vehicle. The principal difference in composition between the paste and liquid polishes is in the vehicle employed. The abrasive materials should possess such hardness, fineness, and shape of particles as will best accomplish the desired result without scratching. Metal polishes should not contain mineral acids or other materials that may have an injurious effect on metals. They should not contain cyanides or nitrobenzene and should be free from disagreeable odor. Obviously, a milder abrasive, such as rouge (oxide of iron), powdered talc, or precipitated chalk (calcium carbonate), is required for highly polished surfaces than for relatively dull surfaces, such as kitchen utensils, for which various siliceous materials are generally employed. The vehicle in the pastes is usually a

petroleum product (heavy mineral oil, vaseline, paraffin, etc.) or a fatty product (stearin, tallow, stearic acid, oleic acid, etc.) or both, to which soap and other materials (for example, oxalic acid, cream of tartar, etc.) are sometimes added. Pine oil is also a common and valuable solvent in soap-base metal polishes. It gives body and helps hold the abrasive matter in suspension. The nonflammable liquid polishes usually have as a vehicle water containing soap with kerosine and ammonia, or a mixture of kerosine or other petroleum distillate, with sufficient carbon tetrachloride to render the mixture nonflammable. The flammable polishes usually contain gasoline, kerosine, or other petroleum distillate. As a rule, where much tarnish is to be removed, the liquid polishes are more efficient than the pastes, but they should be used with care as they may contain flammable substances. The paste and liquid polishes sometimes contain essential oils to mask the odor of certain ingredients.

Polishing powders may be a single substance, such as rouge or chalk, or a mixture of various abrasives with or without added materials. On plated ware, such as chromium plate, nickel plate, silver plate, etc., only the mildest abrasive should be employed because of the thin coatings commonly used. Precipitated chalk, rouge, powdered talc, or other finely powdered abrasive, free from hard or gritty particles, would probably be the safest abrasive to use.

(b) Electrolytic Method for Cleaning Silver. Silver and silverware are also cleaned, especially in the household, by the so-called "electrolytic method". This method depends upon the fact that when silverware is heated in a solution containing about 1/2 oz. of sodium bicarbonate (baking soda), and 1/2 oz. of sodium chloride (common salt) to each quart of water, in contact with certain metals, such as aluminum or zinc, the tarnish is removed with practically no loss of silver. In using this method it is necessary to rinse the articles very thoroughly with hot water after the treatment, otherwise they will tarnish more rapidly than usual. This method leaves the surface of the silver slightly dull, and if a bright finish is required it will be necessary to polish the surfaces slightly with a mild abrasive. Sometimes sal soda or trisodium phosphate is used in hot water instead of baking soda, in which case it may not be necessary to heat the solution after introducing the silverware.

(c) Dip-Type Silver Cleaners. The dip-type silver cleaners usually consist of an acid, aqueous solution of thiourea plus a wetting agent. They are effective cleaners which do not remove an appreciable amount of silver, and they are relatively easy and quick to use. However, the cleaning action produces a gas

containing sulfur which will retarnish the silver unless it is quickly and thoroughly rinsed with water. It must be noted that these instant-type cleaners exert a cleaning action and not a polishing action, and a subsequent buffing may be desirable. Another factor in the use of these cleaners is that they may have a deleterious action on some types of stainless steel. Knife blades and other parts of silverware are frequently made of stainless steel.

## 5. Floor Polish

Floor polishes in general use fall into two classes, as follows: Volatile organic solvent class, known in the trade as paste and liquid polishes; and water-base emulsion class, known as water-emulsion polishes.

(a) Paste and Liquid Polishes. These polishes generally consist of a mixture of natural or synthetic waxes in organic solvents, such as volatile mineral oil or turpentine or a mixture of such solvents to produce the desired consistency. The waxes commonly used are carnauba, candelilla, beeswax, ceresin, ozokerite, and paraffin. The liquid polishes, which are in reality mainly suspensions or emulsions, are easier of application, as they have a larger proportion of solvent (volatile mineral oil or turpentine). Ammonia, water, and other substances have also been used in formulas for these products.

Paste or liquid polish should be applied in very thin coats and thoroughly rubbed with a heavy polishing brush or motor-driven brush or a heavy block wrapped in burlap or carpet.

(b) Water-Emulsion Polishes. These emulsions, commonly called "nonrubbing", "self-polishing" or "dry-bright" polishes or waxes, are widely used on cement, linoleum, rubber tile, cork, asphalt tile, mastic, and other floorings. Many of these preparations dry rapidly and require little or no buffing.

These emulsions may be divided into two broad types, one with a high wax content and the other with a high resin content, although some products may be on the border line between the two types.

In general, the high-wax type will scuff more readily than the high-resin type, but the scuff marks can be removed by buffing. This is not usually possible with the high-resin type.

The high-wax types consist of various natural or synthetic waxes, gums, or resins dispersed in water with the aid of numerous emulsifying agents. Shellac and other resins may be added to improve the spreading properties and increase the gloss. A number of materials such as colloidal silica, latex, and polystyrene are frequently added to improve the slip resistance of a particular product.

The high-resin types consist of various resins such as shellac, polystyrene, or polyethylene dispersed in water with an emulsifying agent. Plasticizers or waxes are also used in some products.

Water-emulsion polishes are usually applied with a lamb's wool applicator or a cotton mop. They should be applied in a thin film and if necessary a second coat is applied gently after the first coat has dried. They dry in about 20-30 minutes and the appearance of the floor is generally improved by slight buffing.

If the resin content of the finish is high, the film is more difficult to remove and care must be taken to prevent an accumulation of the finish on the low traffic areas of the floor.

## 6. Glass Polish and Cleaner

Polishes for glass may be liquids, powders, or pastes. Precipitated chalk, calcined magnesia, rouge, and fine siliceous materials are the abrasives usually employed. In addition, glass polishes frequently contain soap, silicone, sodium carbonate, trisodium phosphate, ammonium compounds, and possibly a small amount of wax or a wax-like substance.

The most common liquid cleaners for windows and mirrors are clear water or water to which has been added a synthetic detergent, an alkaline salt (sodium carbonate, phosphates, borates), an alcohol, or ammonia. Alkaline solutions and solutions containing alcohol should not come in contact with paint, lacquer, varnish, or enamel surfaces. The so-called glass waxes generally contain fine abrasives, some of the cleaners mentioned above, a small amount of silicone, and wax in an aqueous solution.

Some of the liquids used for cleaning automobile windshields and windows are essentially solutions containing about 15 to 25 percent by volume of straight grain alcohol or denatured alcohol, colored with a dye and sometimes perfumed. In some cases a little glycerol or ethylene glycol is present. Mixtures of isopropanol (isopropyl alcohol) and water, and water solutions of other alcohols

or solvents (such as "methyl cellosolve" and "butyl cellosolve"), with and without a small amount of a synthetic wetting agent and some ethylene glycol, are also used.

These solutions are often sprayed on with an atomizer, and the glass is then wiped with a soft cloth.

## 7. Stove Polish

The modern stoves do not require stove polish, but the appearance of older cast iron gas stoves and coal and wood stoves can be improved by the use of stove polish.

Stove polishes may be obtained as powders, liquids, pastes, and sticks or cakes. Graphite is usually the basic ingredient. Finely powdered graphite may be used directly as a stove polish after mixing with a little water. Lampblack, carbon black, and bone black are sometimes added to deepen the color, but these forms of carbon are more readily burned off than graphite. Nigrosine (a black aniline dye) has also been used to deepen the color of such polishes. Stove polishes may contain, in addition to graphite and other forms of carbon, such materials as copperas (ferrous sulfate), soap, "water glass" (sodium silicate), waxes, gums, sugar, glycerol, water, oils, etc. Turpentine or other readily flammable liquids should not be used in such polishes. The liquid polishes are generally of two types: (a) Graphite suspended in a water solution of sodium silicate, soap, etc.; and (b) a suspension of graphite in a petroleum distillate (oil) mixture, or such a mixture with the addition of carbon tetrachloride to render it nonflammable.

## 8. Shoe Polish

The ordinary black shoe polishes generally contain wax (beeswax or carnauba wax), nigrosine (a black dye), sodium or potassium carbonate solution, soap, turpentine, etc. After the wax has been emulsified by boiling in the soda (or potash) solution (a solution of borax may also be used), the emulsion is mixed with a hot aqueous solution of ordinary laundry soap and sufficient nigrosine to give the desired depth of color. This cools to a soft paste. If the liquid form is desired, a good grade of castile soap (pure olive oil-soda soap) or a soft (potash) soap may be substituted for the laundry soap. Another method is to dissolve carnauba wax or candelilla wax, or a mixture of the two with beeswax and ceresin or paraffin, in hot turpentine and mix with very finely pulverized bone charcoal. Tallow, lard, neat's-foot oil, spermaceti, rosin, gums, and various other materials have been used in making shoe polishes.

Brown shoe polishes consist of such substances as soft soap, wax, glycerol, linseed oil, turpentine, shellac, etc., to which is added some dye; for instance, annatto, aniline yellow, etc.

White shoe dressings are usually made up of pigment, adhesive or binder, a cleaner, and water. Sometimes, an organic solvent or a mixture of solvents is also used. When they contain glue, albumin, or other organic binder, a preservative is required. Some of these dressings are perfumed. Titanium dioxide, lithopone, zinc oxide, titanium pigment (about 25 percent of titanium dioxide and about 75 percent of calcium carbonate), zinc sulfate, talc, precipitated chalk, china clay, magnesium carbonate, magnesium oxide, and other materials have been used as pigments. The fluorescent dyes are used in white shoe cleaners to create a whiter, brighter appearance. The cleaners include the following: Trisodium phosphate, triethanolamine, soap, alcohol, and other organic solvents. Various gums (such as karaya and tragacanth), dextrin, gelatin or glue, albumin, bleached shellac solution (in borax or ammonia), casein, cellulose derivatives, and soap have been used as binders or adhesives. Phenol, sodium salicylate, salicylic acid, or a suitable essential oil may be used as a preservative.

## 9. Polishing Cloth

Cloths for polishing furniture may be of cotton, wool, or silk. Cheesecloth is probably the easiest to obtain, since it is widely used for purposes other than polishing, and is the most economical. Wool and silk cloths are more expensive, and when made for polishing furniture are woven so as to be soft and nonabrasive.

Polishing cloths or rags intended primarily for use on metals often consist of woolen fabrics which have been saturated with fatty oil, mineral oil, or paraffin, or mixtures of these, containing in suspension a very finely powdered abrasive, such as tripoli or infusorial earth. Fatty acids have been used with paraffin in the preparation of such cloths, but may cause corrosion on some metals if a film of the acid remains. Muslin rags are also in use. Suspensions of tripoli (or other abrasive) in soap solutions, or mixtures of soap solutions, pine oil, ammonia, etc., have also been used for preparing polishing cloths. Some of these mixtures are colored with dyes and may contain a little essential oil.

Wax polishing pads used on furniture and automobiles are usually cheesecloth or felt impregnated with a preparation similar to a paste wax.

## 10. Dust Cloth, Oiled

These cloths are commonly referred to as "dustless dust cloths". Such cloths may be made by saturating a fabric with kerosine, hanging up to allow the more volatile part to evaporate, and then rubbing the oiled cloth on a wooden surface until it no longer streaks. These cloths may also be made by saturating the fabric with a gasoline solution of paraffin, paraffin oil, linseed oil, or rapeseed oil, or a mixture of these, wringing out, and drying at room temperature. Sometimes essential oils or certain resins are added to the impregnating mixture.

## 11. Specifications

The Index of Federal Specifications, Standards, and Handbooks, and Monthly Supplements thereto can be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. The price of this index, including the supplements as issued, is $1.75. Printed Federal Specifications, Standards, Handbooks, Specification Supplements, Revisions, Amendments, Cancellations, and Notices listed in the Index or the Supplement thereto may be obtained at the prices indicated upon application, accompanied by check, money order, cash, or Government Printing Office coupons, from the Business Service Center, General Services Administration, Washington 25, D. C.

The following printed Federal Specifications cover the products in the polish field and are used for Federal Government procurement:

| Title | Specification Symbol | Price |
|---|---|---|
| Cloths, dust, oil-treated | DDD-C-411b | 5 cents |
| Cloths, polishing | DDD-C-441a | 5 cents |
| Polish, automobile, liquid | P-P-546a | 10 cents |
| Polish, furniture, wax | P-P-554 | 10 cents |
| Polish, furniture, liquid | P-P-552a | 5 cents |
| Polish, metal | P-P-556a | 5 cents |
| Polish, shoe, paste | P-P-567 | 5 cents |
| Polish, silver | P-P-571b | 5 cents |
| Polish, stove | P-P-576 | 5 cents |
| Wax, carnauba | JJJ-W-141b | 5 cents |
| Wax, floor, water emulsion, slip-resistant | P-W-155 | 10 cents |
| Wax, general purpose, solvent-type, liquid, and paste (for floors, furniture, etc.) | P-W-158 | 5 cents |
| Wax, paraffin | VV-W-95 | 5 cents |

## 12. References

Albin H. Warth, The Chemistry and Technology of Waxes
(Reinhold Publishing Corp., N. Y., N. Y., 1956)

H. Bennett, The Chemical Formulary
(Chemical Publishing Co., Inc., 1951)

H. Bennett, Commercial Waxes
(Chemical Publishing Co., Inc., 1956)

W. D. John, Modern Polishes and Specialties
(Chemical Publishing Co., Inc., 1947)

H. Bennett, Practical Emulsions
(Chemical Publishing Co., Inc., 1947)

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