WHEN AND HOW TO PAINT HOMES AND FARM BUILDINGS

Information Reviewed and Reaffirmed

August 1953

No. R962

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
FOREST PRODUCTS LABORATORY
Madison 5, Wisconsin
In Cooperation with the University of Wisconsin

WHEN AND HOW TO PAINT HOMES AND FARM BUILDINGS

By

F. L. BROWNE, Senior Chemist

Keeping a building satisfactorily painted depends on three things, good paint, good painting, and good maintenance. Before the paint is selected, however, and before any painting is done, the first thing to do is to decide what appearance is desired and how much trouble and expense the owner is willing to undergo to maintain that appearance.

Maintaining Buildings Without Paint

The least expensive procedure is to leave the building unpainted, and merely keep up the repairs as the building deteriorates with age and use. Paint does not prevent decay, and if decay is allowed to enter the structure, a painted building will rot just as quickly as an unpainted one. Decay is prevented by proper design and construction and the use of decay-resistant or treated wood where necessary, and not by painting. When the weathered appearance of old unpainted wood is not objectionable, therefore, painting may be omitted altogether. If so, the plan should call for patterns of exterior lumber of substantial thickness and of woods that weather well, in order to minimize checking, warping, and splitting of the wood and loosening of the fastenings.

Except for shingle roofs and timbering, however, weather-beaten wood is adaptable only to a limited number of architectural designs and to spaceous rustic settings. It is rarely appropriate for urban dwellings. Once it has become weather beaten, wood can seldom be painted satisfactorily, though it can be stained. On the other hand, properly maintained paint coatings protect wood against weathering and retain the original architectural effect indefinitely.

Using Stains Instead of Paint

When color is desired but painting is, for one reason or another, not considered practicable, a common procedure is to use an exterior stain. Exterior stains consist, in general, of linseed oil, turpentine, and only sufficient mineral pigment to give the desired color. They penetrate the wood surface without forming a substantial coating over it. Since they do not protect wood against weathering, they should be used where the appearance of a weather-beaten surface is not objectionable. Good stains are not expensive and they last longer than most paints. One coat only is the usual application, and a new coat is easy to apply.

Linseed oil is the essential constituent of the vehicle for wood stains, just as it is for paints. More volatile liquid and very much less pigment are used in stains than in paints, however, because a stain should be absorbed rapidly by the porous wood. At least one-third, some authorities say two-thirds, of the vehicle of a stain should be linseed oil. The remainder may be turpentine or mineral spirits and may also contain some creosote. Creosote is not necessary and must not be considered a satisfactory substitute for the linseed oil. If the creosote is of a kind that does not evaporate, it protects the surfaces with which it comes in contact from decay by fungus attack, but it does not penetrate deeply, hence the interior of the wood and the hidden surfaces are not protected. Exterior woodwork that is likely to be stained usually does not need protection against decay.

Compositions of some typical exterior stains that may be recommended are the following:

Vehicle, 2 parts linseed oil, 1 part turpentine. To 1 gallon of this mixture add --

For gray stain, 12-1/2 pounds white lead, a touch of lampblack.
For deep red-brown, 1 pint indian red.
For bright red, 1 pint venetian red.
For permanent green, 3/4 pint chromium oxide.
For fairly permanent green, 1-1/2 pints medium chrome green.
For golden brown, 1/4 pint raw italian sienna, 3/4 pint burnt turkey umber.
For seal brown, 1 pint raw turkey umber.
For deep brown, 1 pint burnt turkey umber.

The colors named should be pure colored pigments ground in linseed oil, which can be purchased at any paint store. The dry pigments should never be used for mixing stains. There are, of course, many other formulas that may be used.

Using Paints

The great majority of people consider that buildings usually look best when kept well painted and, if they can afford it, are willing to spend money for the purpose. Good paint maintenance not only keeps buildings looking well, keeps surfaces smooth, and retards warping and checking of the lumber, but it also gives the property a look of prosperity, encourages general tidiness of the premises, and gives the owner a well-deserved feeling of pride in his property.

When to Paint

Exterior woodwork should receive the first or priming coat of paint as soon after erection as practicable. Succeeding coats should be applied at intervals not greater than 2 weeks; in warm, dry weather the intervals

may be as short as 2 days. It is very poor practice to let exterior woodwork stand for weeks with only a priming coat, or to postpone the application of the third coat of paint for 6 months or more.

Metal surfaces that are to be painted are often primed at the mill. Succeeding coats should be applied promptly after erection. If galvanized iron is to be painted, however, it is helpful to let it first weather for several weeks.

Interior surfaces other than metal should not be painted until moisture from plastering, concrete work, or other operations of building have entirely disappeared. Woodwork should then be painted or varnished, because further delay is likely to entail more labor in sandpapering and properly cleaning the surfaces. Plaster and concrete, on the contrary, become more receptive to paint on aging and painting may therefore be deferred as long as desired.

Exterior painting may be done in any season of the year during which the painter can work with reasonable comfort. Obviously, paint should not be applied when it is raining or foggy and the surface should be allowed to dry after rain, fog, or dew before continuing to paint. During cold, damp weather paints harden more slowly than they do in warm, dry weather. A sudden drop in temperature while the coating is hardening may make it wrinkle or it may cause dew to form on the fresh paint and damage it. Coatings applied during late fall or winter are likely to become more seriously soiled as time passes than coatings applied in the spring or summer. On the other hand, during the summer, insects and seeds sometimes become embedded in fresh paint and disfigure it.

What kind of paint to use, and the very important matters of when and how to repaint, can be discussed to best advantage after the composition and various kinds of house paints have been described.

Composition and Kinds of House Paints

Only good, durable paint (or stain) should be used on exteriors of permanent structures because the principal cost of painting is the labor. If a cheap coating is desired for temporary structures or surfaces that must be repainted frequently and do not require protection against weathering, either whitewash or an exterior water paint containing casein may be used.

Many commercial paints bear a label giving the name and address of the manufacturer and the composition of the paint. In the absence of previous experience with a paint, appraisal of its quality must be based upon the information given by the formula label. It is wise to buy only paints that give the formula on the label, and to keep a record of the formula so that paint of similar composition can be purchased when it comes time to repaint the building.

Paint composition, of course, is a highly technical question with which the house owner and painter are compelled to deal as best they can in spite of their lack of the necessary technical training. What is needed is a reasonably simple system of classifying house paints by kind and quality, much as lumber is classified by species and grade. It would then be possible for paint users to select the kinds of paint best suited to their individual requirements and to learn to apply and maintain them correctly. Such a system of classification has been described in technical detail in Industrial and Engineering Chemistry, volume 29, page 1018, September 1937, to which reference should be made for a more complete discussion of paint composition and classification than is practicable in this mimeograph. That discussion is very technical, however, and was written for the information of paint technologists rather than for the average home owner.

House paint consists of two parts, a solid part (the pigments) and a liquid part (the vehicle). The kind and quality of a paint are determined by the nature of its vehicle, the nature of its pigment, and the proportion of pigment in the vehicle.

The Nature of the Vehicle

The vehicle in house paints consists of two parts, a drying oil and a volatile thinner. The volatile thinner is usually mineral spirits (a petroleum product) or turpentine. Thinner is necessary to give paint correct consistency for brushing but after application it evaporates and therefore forms no permanent part of the coating. Mineral spirits of suitable quality is just as satisfactory as turpentine and cheaper but it is often wiser for the painter, buying at retail, to use turpentine for thinning paint because there is greater assurance of obtaining it in suitable quality. Some paints contain water as part of the volatile thinner. On the label water is often called "colloidal solution", "soap solution", "emulsifying agent", or "aqueous bodying agent." If it amounts to less than 1 percent of the vehicle it may not be particularly objectionable but larger amounts betray a paint of inferior quality.

Linseed oil is the principal drying oil used in house paints. A small amount of paint drier or japan drier, the nature of which need not concern the ordinary paint buyer, is also necessary to make the paint harden promptly after application. It makes little difference whether raw linseed oil or boiled linseed oil is used, provided that there is the correct proportion of drier, because boiled linseed oil may be considered, for practical purposes, as raw linseed oil in which the drier has already been incorporated. Bodied linseed oil, however, is linseed oil that has been heated until its viscosity has been increased very greatly. In moderate proportions (up to roughly 10 percent of the total drying oil), bodied oil may often be used to advantage in improving the consistency of house paint but, in greater proportions, it makes enamelized paints, which are discussed in the second paragraph following. In paint formulas, bodied linseed oil is often called "heat treated" or "specially processed" linseed oil and sometimes the proportions of bodied and unbodied oils are not stated.

In recent years soybean oil has been substituted for part of the linseed oil in house and barn paints. There is no objection to this practice, which comes primarily from a desire to extend the market for a domestic farm crop, provided that the resulting paint hardens promptly under all reasonable weather conditions during application. To insure prompt drying, a third drying oil of superior drying properties, such as perilla oil or a small amount of tung oil, may be added to the mixture of drying oils. Fish oil may be used in much the same way as soybean oil provided that it does not impart objectionable odor to the paint. Raw tung oil cannot be used in material proportions, because it wrinkles badly during drying but, when properly bodied or heat treated, during which it becomes very viscous, it may be used in moderate proportions. When a mixture of drying oils has been used in a paint the formula often refers to "vegetable drying oils" or "vegetable oils" instead of naming the oils used specifically.

Large proportions of bodied drying oils or varnishes (heat treated mixtures of drying oils and resins) are not used in true house paints of good quality. Because of the high viscosity imparted by heat treatment, excessive proportions of volatile thinner must be added and, as a rule, the amount of pigment must likewise be reduced in order to obtain a brushable product. Moreover, the product takes on the flowing and leveling qualities of enamel, as distinguished from true house paint. Such products are sometimes called enamelized house paints. For special purposes, for example, where it may be the intention to wash the coating frequently, enamelized paints may be advantageous but, as a rule, they are inadvisable for ordinary house painting because they are difficult to apply and maintain correctly. Enamelized paints tend to "pull under the brush" unduly, they must be applied in rather thin coatings to avoid running, sagging, and formation of beads at sharp horizontal edges on vertical surfaces, and they accentuate irregularities in the underlying surface, such as raised grain in wood or flaked patches of the previous paint.

Varnish or resin of any kind in house paint has a rather bad reputation because very cheap paints often use varnish together with large proportions of mineral spirits and water. Such paints are unreliable and make it necessary to regard any paint that contains varnish or resin with suspicion. Nevertheless there are a few paints of good quality on the market in which small proportions of resins of high quality are used. Such paints are called "resin-fortified" paints and sometimes they are "quick-drying" paints. They are also likely to be enamelized paints, unless the amount of varnish used is very small. For most house paint purposes, quick drying has more disadvantages than advantages. Fortification with small amounts of resin is sometimes used in order to dispense with zinc oxide as one of the pigments, resin having some of the action of zinc oxide as a hardening agent in paint. It is still questionable, however, whether there is any real benefit to be gained from the use of resin in white or light colored house paints. In deeply colored paints like dark green, dark brown, and black, paints in which little or no white lead or zinc oxide can be used, addition of some varnish or of a substantial amount of bodied drying oil is often advisable to insure prompt hardening after application and to prevent unduly early fading of the color.

The Nature of the Pigment

Durability, opacity (hiding power), color, and to a large extent, brushing consistency are imparted to paint by the pigments. The opaque white and colored pigments (see next paragraph) provide all four of these qualities. Certain other less expensive pigments that are practically transparent in linseed oil are used in paint to improve brushing consistency, to reduce cost of manufacture, and to keep the pigments in prepared paint from settling into a hard cake at the bottom of the can. In the interest of economy, the transparent pigments are used as generously as is consistent with durability and opacity. Paints of inferior quality usually contain excessive amounts of transparent pigments.

The opaque white pigments commonly used in house and barn paints are: basic carbonate white lead, basic sulfate white lead, zinc oxide, the titanium pigments, the zinc sulfide pigments, and, in a few brands of paint, antimony oxide. Certain opaque white pigments, known as leaded zinc oxides, contain both basic sulfate white lead and zinc oxide but when they are used it is common practice to report the white lead and zinc oxide separately in the formula label.

The important opaque colored pigments are the manufactured iron oxide reds, browns, and yellows, the iron oxide earths such as "red oxide," indian red, umber, sienna, ochre, venetion red (iron oxide and calcium sulfate formed by calcining a mixture of ferrous sulfate and limestone), chrome yellow (lead chromate or lead chromate and lead sulfate), chrome orange (basic lead chromate), prussian blue or chinese blue (ferric ferrocyanide), chrome green (chrome yellow and prussian blue), ultramarine, zinc yellow (zinc chromate), red lead (lead oxide), aluminum powder, the carbon pigments (carbon black, lampblack, graphite, drop black, bone black), and mineral black (black oxide of iron).

The important transparent pigments are magnesium silicate, talc, barytes (barium sulfate mineral), blanc fixe (manufactured barium sulfate), silica, whiting or chalk (calcium carbonate), calcium sulfate, china clay (kaolin), and mica. On formula labels, mixtures of transparent pigments are sometimes ambiguously called "silicates," "inert pigments," or "extending pigments."

The white lead pigments and the zinc oxide pigments are called chemically active pigments because they are believed to react chemically with the drying oils during the hardening of paint. At any rate they impart desirable properties to paint that are obtainable with no other pigments except red lead and basic lead chromate. For that reason all good house paints should contain a substantial proportion of white lead, zinc oxide, or both, except in deep colors that do not admit opaque white pigments.

The titanium pigments include titanium dioxide, titanium-barium pigment (25 or 30 percent titanium dioxide and 75 or 70 percent barium sulfate), titanium-magnesium pigment (30 percent titanium dioxide and 70 percent magnesium silicate), titanium-calcium pigment (30 percent titanium dioxide

and 70 percent calcium sulfate), and lead titanate. (The term Titanox that occurs in some formula labels is a trade name for titanium pigments made by the Titanium Pigments Company). Titanium dioxide is so much more opaque than white lead or zinc oxide that the titanium-barium and titanium magnesium pigments, in spite of the large content of transparent pigment, may be considered opaque white pigments fully equal in opacity to white lead and zinc oxide. Lead titanate is also a very opaque white pigment and, though said to be chemically inactive, imparts some of the properties of white lead pigments to the paints made with it. Titanium-calcium pigment is intended for use in interior paints only and should not be used in exterior paints of high quality.

The zinc sulfide pigments include zinc sulfide, which is very opaque, lithopone, "double-strength" or "high-strength" lithopone, and titanated lithopone (a mixture of titanium dioxide and lithopone). (Cryptone is a trade name for certain zinc sulfide pigments made by the New Jersey Zinc Company). The zinc sulfide pigments are very useful in interior paints but in exterior paints their use, with few exceptions, is confined to manufacturers' second-grade paints and to cheap paints. House and barn paints containing zinc sulfide pigments of any kind cannot be generally recommended.

For house and barn painting the most widely used paints are white paints or tinted white paints. Tinted white paints are paints in which most of the pigment is made up of white pigments with just enough colored pigments to produce the desired color. A manufacturer's brand of paint that is offered in 32 colors, for example, may consist of 24 tinted white paints and only 8 colors made chiefly with colored pigments (colored pigment paints). As a rule the principal areas of buildings are painted with the white or tinted paints and the colored pigment paints are used only for trim and minor areas. Colored pigment paints made with iron oxide pigments, however, have long had a special field of usefulness because of the fact that, when properly made, they are less expensive and much more durable than the best white or tinted paints. They have long been used, therefore, for painting barns and other chiefly utilitarian buildings, where low cost of paint maintenance is preferred to a wider choice of brighter colors.

In recent years aluminum paint has come into use for some of the purposes for which iron oxide paints are commonly used. Aluminum paint consists of aluminum powder in a vehicle made especially for the purpose. For exterior use on wood the vehicle may be either a bodied drying oil containing not more than 40 percent thinner or a so-called very long oil spar varnish containing a small proportion of resin and not more than 50 percent thinner. The aluminum and the vehicle are either bought separately or are put up in two-compartment containers so that they may be mixed just before use. From 1-3/4 to 2 pounds of dry aluminum powder of "standard varnish grade" or 1-3/4 to 2 pounds of commercial paste aluminum are added to 1 gallon of the vehicle. Aluminum paint is slightly more expensive than good white paint but is fully as durable as good iron oxide paint and is bright in appearance though metallic in luster.

The Various Kinds of House Paints

There are many types and grades of house paint on the market. Until they are classified and graded for sale by some such system as that proposed by the Forest Products Laboratory it is possible to discuss them and to indicate how they can be recognized from the formula labels only in a very rough way.

There are three broad groups of high-grade white or tinted house paints whose serviceableness is well established by adequate experience and whose general use can be recommended. In all of them the liquid consists of linseed or other drying oil containing not more than 10 percent of bodied oil, no resin of any kind, and only moderate proportions of volatile thinner and drier. The groups differ in the nature of the pigments used and, in the Forest Products Laboratory system of classification, are designated groups L (lead), LZ (lead and zinc), TLZ (titanium, lead and zinc). Groups LZ and TLZ are available in a number of types, differing in proportions of white lead and zinc oxide, and each type in various divisions differing in content of opaque pigments, total pigments, and total nonvolatile (pigments plus nonvolatile vehicle) in the paint. Group L is represented by one type and division of paint only, namely pure white lead paint, which is sold in essentially the same composition by a number of different manufacturers.

Pure white lead paint is sold chiefly in the form of soft paste paint, in white only, to be thinned with more liquid and tinted, if tinted paint is desired, by the painter. The soft paste contains 89 percent basic carbonate white lead, 9 percent linseed oil, and 2 percent turpentine by weight. If thinned correctly it makes paint of the highest quality. Because it is essentially a standard article of commerce it is the simplest paint to buy and use consistently in a program of paint maintenance extending over a long period involving repeated repaintings. Pure white lead paint is rarely sold in the prepared (ready-mixed) form.

Paints of groups LZ and TLZ are sold in both the prepared and semipaste forms. Many of the prepared paints are of high quality but most of the semipaste paints of the mixed-pigment groups are either of inferior quality or are so made that the painter is encouraged to thin them with too much liquid, thereby making inferior paint. It is therefore safer, as a rule, to buy mixed-pigment paints in the prepared form.

Lead and zinc paints, group LZ, contain a mixture of one or both of the white leads and zinc oxide or leaded zinc oxide. In addition many of them contain transparent pigments. There are at least 9 different types on the market of which the 3 most important are those with (1) very high content of white lead (over 50 percent of the pigment by volume) and medium content of zinc oxide (25 to 35 percent), (2) high content of white lead (35 to 50 percent) and high content of zinc oxide (35 to 50 percent), and (3) high content of white lead and medium content of zinc oxide in the pigment. In LZ paints of good quality the sum of the white lead and zinc oxide should be not less than 90 percent of the pigment and the total pigment

should be not less than 67 percent of the paint by weight. At the present time, paints of group LZ are used chiefly for tinted paints, the white paints of most of the better known brands being of the TLZ group.

Titanium, lead, and zinc paints, group TLZ, contain one or more of the titanium pigments in addition to white lead and zinc oxide pigments. In addition, they contain very substantial proportions of transparent pigments either as ingredients of the titanium pigments or as additions by the paint manufacturer. There are at least 7 different types on the market, of which the 3 most important are those with (1) high content of white lead and medium content of zinc oxide, (2) medium content white lead and medium content of zinc oxide, and (3) low content of white lead (10 to 25 percent) and medium content of zinc oxide. In TLZ paints of good quality the sum of the white lead and zinc oxide should be not less than 45 percent of the pigment, the sum of white lead, zinc oxide, and titanium dioxide not less than 60 percent of the pigment, and the total pigment should be not less than 65 percent of the paint by weight. Paints of group TLZ are now the predominant mixed-pigment white paints and are also used widely for tinted paints.

In good iron oxide paints, not less than 30 percent of the pigment by weight should be iron oxide and the pigment should be not less than 53 percent of the paint. If the pigment contains more iron oxide, however, the content of total pigment in the paint should be higher, for example, if the pigment contains 75 percent iron oxide there should be not less than 61 percent pigment in the paint.

What Kind of Paint to Use

The kind of paint to use should be determined when the new building is to be painted for the first time or after previous paint has been removed completely by painters' blow torch or house paint remover and the bare wood is again exposed. Once the building has been painted, future repainting should be done with the same kind of paint used the first time. Changing kinds of paint for successive paint jobs often leads to abnormally early failure and unsatisfactory forms of failure of the new job. The renewed coating consists of the new paint plus what is left of the old paint and, unless there is past experience with the combination to judge by, no one can tell what the result will be. Certain repainting combinations that have repeatedly been observed to cause abnormal and usually unsatisfactory developments are white paints over yellow ochre primer or paint, white paints over colored pigment paints such as red, brown, green, or black, almost any house paint over clear varnish, pure white lead paint over mixed pigment paints that have not aged for a very long time, enamelized paints over softer house paints of the ordinary types, and ordinary house paints over enamelized paints.

In selecting the kind of paint for a new building, the first point to consider is the length of time that will elapse between paint jobs. In

Gradually pour back the clear liquid in small portions while continuing the stirring until all of the paint is mixed uniformly. Transfer the paint to the larger container and add any additional oil or turpentine that may be needed. Stir once more and finally pour the paint back and forth from one container to the other several times. If the paint is a colored one purchased in more than one container, it is desirable to pour and mix together all of the paint that will be needed for the job, to make sure that the color will be uniform.

To mix paste paint for application, transfer the paste to a container large enough to hold the amount of paint that is to be mixed. If the paint is to be tinted, enough paint to complete the job should be mixed at one time. Measure out the required amount of linseed oil and pour some of it into the original container to wash out any paste left clinging to its walls. Stir the paste in the larger container and add the linseed oil gradually until a smooth mixture results.

If the paint is to be tinted, it is best to thin the tinting colors with turpentine so that they will mix quickly with the white paint. Add the colors in successive small amounts, while stirring very thoroughly, until the chosen color is attained. Finally, add the required amounts of turpentine and drier and stir until the paint is uniformly mixed.

Do not adulterate your paint.--Substitutes for linseed oil, reinforcing oils, sealers, waterproofing agents, or other concoctions sold for addition to paint should be avoided.

The volatile thinner in most paints is mineral spirits, a petroleum product, but turpentine is commonly recommended for painters to use in thinning paint. Both are satisfactory. No other liquid possesses any advantage over these two.

New exterior woodwork.--Good prepared paints have usually been made on the assumption that three coats will be applied to new woodwork. Do not try to make two coats of such paints suffice. For the first or priming coat paint 1 pint of linseed oil and 1 pint of turpentine may be added to a gallon of prepared paint. For the second coat 1 pint of turpentine may be added to a gallon of paint. No addition should be necessary for third-coat paint.

In recent years certain paint manufacturers have developed special primers and paints to be used in two-coat painting. The best of these should give very good results if correctly applied, but if they are brushed out too thin the results are likely to be poor. In two-coat work it is desirable, for best results, to have about the same thickness of paint left on the wood as in the three-coat method. If a two-coat painting system is used, both primer and finish coat should be made by the same manufacturer for use together.

Formulas for Mixing White Lead Paste Paint

For three-coat painting on new woodwork soft paste white lead paint should be mixed as follows:

	Soft paste white lead	Raw linseed oil	Turpentine	Paint drier
	Pounds	Gallons	Gallons	Pints
For first coat.....	100	4	1-3/4	1
For second coat	100	1-1/2	1-1/4	1
For third coat	100	3	0	1

With soft paste white lead, a skillful workman can paint new woodwork acceptably with two coats. For this purpose the mixtures may be made as follows:

	Soft paste white lead	Raw linseed oil	Turpentine	Paint drier
	Pounds	Gallons	Gallons	Pints
For first coat	100	2	1	1
For second coat	100	2-1/2	1/4	1

Paint coatings do not last so long on heavy woods that have wide bands of hard, dark-colored summerwood, such as southern pine and Douglas-fir, as they do on light woods of more even texture. Such woods should be primed with one coat of aluminum paint of the kind previously described, and two coats of the paint of the desired color applied over it.

Repainting exterior woodwork.--If the old coating is not too dirty or is first washed, if there are no areas of wood left bare by loss of coating, and if vigorous rubbing of a small area will remove the superficial chalk and restore a fair degree of gloss, a single coat of paint may be sufficient repainting. For this purpose, prepared paint should be applied without addition of any oil or turpentine. Soft paste white lead paint should be mixed with 2-1/2 gallons of raw linseed oil, 1/4 gallon of turpentine, and 1 pint drier per 100 pounds of paste.

If the old coating is chalking too deeply to restore any gloss by rubbing or if there are small patches of bare wood, two coats of paint are needed. With prepared paint the first coat may be mixed with 1 pint of

turpentine per gallon and the second coat applied without addition. Soft paste white lead paint should be mixed as follows:

	Soft paste white lead	Raw linseed oil	Turpentine	Paint drier
	Pounds	Gallons	Gallons	Pints
For first coat	100	2	1-3/4	1
For second coat	100	3	0	1

If repainting of a mixed-pigment paint has been too long deferred so that the old coating is badly shattered and large areas of wood are bared, all loose paint must be removed with putty knife, wire brush, and sandpaper, and bare areas touched up with priming coat paint before proceeding with a two-coat painting job. Even when the surface is carefully prepared for repainting, the new job will suffer in appearance and durability from the neglect of the previous coating.

How Much Paint to Apply

Although paint coatings should be brushed thoroughly they should not be brushed out too thin. Good painters apply coatings of substantial thicknesses. On the other hand, coatings that are too thick wrinkle as they harden. The proper thickness must be learned by experience but the experience can be acquired rapidly if the beginner will observe the amount of paint he applies to measured areas of surface.

The following figures for the spreading rate of paint may be used for estimating the amount of paint needed for a job and for gaging the proper thickness of paint coatings:

	Spreading rate in square feet of surface per gallon of paint for --		
	First coat	Second coat	Third coat
Three-coat painting on new woodwork .	600	700	700
Two-coat painting on new woodwork ...	500	600	.....
Two-coat repainting on woodwork	650	700	.....
One-coat repainting on woodwork	600	.....	.....