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December 14, 1951

GENERAL EDUCATIONAL SEMINARS
TRADE SALES AND MAINTENANCE FINISHES

DEFINITION:

The Trade Sales segment of the paint business deals mainly with those products which are sold directly to the consuming public via such retail outlets as the corner hardware store, paint store etc. Our sales of Trade Sales merchandise involve three categories of customers namely the individual home owner, the painter, and painting contractors. Maintenance customers involve chemical plants, factories, hospitals, schools, hotels, mills, apartment buildings etc. who purchase paint for the protection and maintenance of these buildings and equipment.

SCOPE:

To give you some idea of the scope of our Trade Sales business the Finishes Division figures for 1950 show that approximately 16% of the total gallonage and approximately 24% of the total Sales dollars were Trade Sales merchandise.

GENERAL REQUIREMENTS:

Practically all Trade Sales products should meet certain general requirements as follows:

1. Foolproofness. Since Trade Sales products may be applied by almost anyone to a wide variety of surfaces, it is essential that their application and performance properties be sufficiently foolproof to provide satisfaction under this variety of conditions.

2. Stability. It is not uncommon for cans of paint to sit on dealers shelves for periods of five years and when the customer purchases such material he doesn't know the age involved and is perfectly justified in expecting satisfactory performance from such material. In other words the merchandise in the package must be sufficiently stable to (1) maintain for long periods of time adequate drying properties, (2) should not change in viscosity to such a degree that the material is no longer useable, (3) should be free from skinning, and (4) the degree of settling in the bottom of the container should not be of a hard, dry and caking nature making reincorporation of the pigment either impossible or extremely difficult. You are probably all familiar with the dissatisfaction which is experienced upon opening a can of paint and finding hard settled pigment on the bottom or even worse after application of the material you find that it fails to dry. Dissatisfied customers are not repeat buyers.

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3. Ease of Application. Practically all Trade Sales products are designed for brush application although many of them may be sprayed or applied with a roller if desired. Ease of application involves the actual expenditure of time and effort necessary to apply the material uniformly on the surface in such a manner that a satisfactory result will be obtained. The material should dry slowly enough during the early stages so that a newly painted area may be satisfactorily joined (lapped in) with the section or area just previously painted. Materials should also be controlled for flow properties so that when applied to vertical surfaces they will stay put and not flow towards the floor leaving unsightly curtains or sags.

All of the above are important not only from the appearance angle but from the economic viewpoint since they have a direct bearing on the speed with which professional painters can do a job. The final cost for paint and labor per unit area is the economic factor which will ultimately decide whose brand of paint will be used providing the brands in question are reasonably comparable in their performance characteristics after application.

4. Uniform Film Appearance. When a paint job is just completed the home owner has every reason to expect a finished job presenting a pleasing appearance without obvious gloss or color irregularities. This question of uniformity of appearance is affected not only by the quality of the merchandise but by the condition of the substrate or surface to be painted and the skill of the applicator either amateur or professional. This re-emphasizes the need for foolproofness.

5. Positive dry. All Trade Sales products are air-dry materials. These may vary over a wide range of drying speed but almost without exception they should be suitable for recoating or use within a 24 hour period after application.

6. Odor. The odor of Trade Sales products should be as mild and unobjectionable as possible. The use of solvents which are irritating to the eyes or respiratory tract should be avoided and additives used for control of skinning should not possess undesirable odors which will linger for a long period after application. Anything that can be done to improve or eliminate odor from Trade Sales merchandise will be welcomed by both the home owners and painters.

7. Fire Hazard. Trade Sales materials should be sufficiently high in flash point so that they may be used with reasonable safety in the presence of open flames. It is common practice for painters to smoke at will when doing interior finishing work and usually painting goes on without consideration of the pilot light on gas stoves, automatic gas hot water heaters and similar appliances. Although most Trade Sales labels carry some type of warning about flammability, and open flames, it is still considered desirable to make the paint in a manner which will offer reasonable insurance against fire.

LMC 0080364

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8. Label Directions. All Trade Sales products should carry directions on the label which will briefly describe the manner in which the material should be used and how surfaces should be prepared prior to painting. Label directions should also carry precautionary statements where deemed necessary to avoid using the material for the wrong purposes.

USES OF TRADE SALES PRODUCTS:

Our own homes and the surrounding neighborhood are of personal interest to all of us and represent the largest potential market for Trade Sales materials. A survey of the uses for paint found in these environments will show the need for a surprisingly wide variety of paint materials.

EXTERIOR SURFACES:

Let us first consider the exterior surface of our house which is painted for two principle reasons, first for protection of the structure itself and second for maintenance of an attractive appearance. If we are dealing with a clapboard house the main body is generally painted with a pigmented product using primarily raw linseed oil as the vehicle. Raw linseed oil (or slight modifications thereof) is used for this purpose because it gives a relatively low strength film which will permit some passage of moisture vapor from the inside out and reduces the tendency of paint to blister and peel from the wood. Linseed oil paints on the other hand produce relatively slow, soft drying films which are subject to collection of mildew growth to an objectionable degree if not properly formulated. For most locations the use of zinc oxide in the pigmentation will provide a practical level of resistance to mildew but under severe conditions, toxic agents such as chlorinated phenols or mercury compounds may be needed to provide greater protection.

For masonry construction namely brick, stucco, stone etc. the same type of raw linseed oil paints may be employed but the faster drying more water impermeable long oil alkyds may also be used to provide longer film life and better resistance to color change and mildew. Durable exterior emulsions paints are also being exploited for this type of finish. All masonry surfaces prevent an alkali saponification problem. Stucco or concrete surfaces are alkaline overall whereas brick and stone construction present a problem only at the mortar joints. On any newly constructed masonry surface the fresh stucco, concrete or mortar areas contain lime and moisture in sufficient amounts to readily react with linseed oil and alkyd resins in a saponification reaction to form soaps thereby destroying the film integrity of the paint finish. This is commonly called lime burning. After a period of time the carbon dioxide in the atmosphere reacts with the surface lime to form calcium carbonate, the moisture content also drops to a safe level and the surfaces may then be satisfactorily painted. This generally involves 60 to 90 days under favorable weather conditions.

LMC 0080365

DUP150054367

CONFIDENTIAL

- 4 -

CONFIDENTIAL

For the trim which involves window frames, sash, shutters, doors, etc. durable long oil alkyd enamels are popular today because they provide the maximum in appearance with good retention of both gloss and color and satisfactory resistance to mildew growth. The more common linseed oil paints may also be used with good success from the protection angle but at a sacrifice in appearance retention. The alkyd type trim colors are not generally used on the body of clapboard houses because of their stronger less water permeable films which tend to increase blister and peeling failures.

The finishing of porch floors is generally done with gloss enamel and alkyds provide good finishes for this purpose. Alkyd enamels of this nature are generally somewhat shorter in oil than trim colors to provide faster and harder dry so the porches may be used as quickly as possible after painting. Exterior concrete floors laid directly on the ground will allow passage of moisture upward carrying water soluble alkali from the lime and this will react with any paint film containing saponifiable material. The situation here is appreciably worse than the masonry construction mentioned previously because there is a continual source of moisture from the ground. The only reasonably foolproof method for finishing this type of surface is to use alkali-proof products which will not saponify such as finishes based on rubber or vinyl compositions.

There are miscellaneous iron surfaces such as steel sash, ornamental iron fence, clothes poles, etc. which require protection. Primers containing rust inhibiting pigments such as red lead and zinc chromate are used next to the metal. To obtain the best paint performance on metal surfaces it is necessary to thoroughly remove rust, dirt etc., prior to priming. Even the best quality metal protective primers will fail to provide satisfactory service unless the substrate is properly prepared. For priming galvanized iron special precautions are necessary to insure adequate adhesion and long oil alkyd or linseed oil primers pigmented with finely divided metallic zinc and zinc oxide have proven to be excellent for this purpose. Copper is used for flashing, gutters and drainspouts and bronze or brass for hardware and window screen. These copper bearing surfaces are extremely resistant to deterioration through corrosion but they do corrode sufficiently to cause severe staining of adjacent painted surfaces, with resultant unsightly appearance. To reduce staining these surfaces are often painted and here again the zinc dust/zinc oxide primer does an excellent job. After the metal surfaces are properly primed they may be finished with durable topcoat such as alkyd enamels or ordinary linseed oil house paints.

INTERIOR SURFACES:

Interior surfaces are painted mainly for appearance and color effects with protection normally a secondary consideration

LMC 0080366

DUP150054368

CONFIDENTIAL

WALLS AND CEILINGS:

In the finishing of walls and ceilings consideration should be given to the usage or service expected from the finish as well as the decoration effect. Points which should be considered are color and lighting effects, abnormally rough treatment expected, resistance to smudging, ease of cleaning and washability.

The overall effect of interior painting is influenced by both the color and gloss of the finish. Dark colors absorb light and reduce the illumination whereas light colors act the reverse. That is why ceilings are normally painted white or a light tint to provide maximum illumination from the available light sources. Reds and Yellows are known as warm colors and will make cool areas seem warmer. Conversely Blues and Greens are known as cool colors and will make hot areas seem cooler. Low gloss or flat paints diffuse light and also make defects in the wall or ceiling surface less noticeable. However, as a class they are more generally subject to dirt collection and smudging and are less easily cleaned. High gloss paints or enamels reflect light, give an undesirable glare effect and also magnify substrate defects. Between the flat and high gloss ranges are numerous gloss levels defined as Eggshell, Semi-gloss, etc. and these products possess intermediate properties as far as light reflection, dirt collection and washability are concerned.

Resistance to smudging and ease of cleaning are important properties to consider in those areas where heavier than normal dirt or grease collection may be encountered. Bathrooms and kitchens are examples where high humidity exists and where soap and grease are prevalent. In these rooms maximum resistance to smudging and easy washability are important and normally gloss or semi-gloss finishes will give the best performance under these conditions. Closed or semi-closed stairways are another example where a severe dirt collection problem exists because people using the stairs often put their hands on the walls for support. Another similar example is the area immediately around light switches. Products with maximum resistance to smudging and with excellent washability are needed in order to enable the housewife to keep these areas clean and neat in appearance.

Walls and ceilings which are freshly plastered contain a large amount of water and free-alkali and the safest procedure is to allow these surfaces to thoroughly age, dry out and carbonate on the surface before painting is attempted. Otherwise a saponification problem may develop with subsequent color change and loss of adhesion of the finishing system. When the plaster is thoroughly dry a Primer Sealer should be applied to seal the porous plaster and present a uniformly non-porous surface for application of the subsequent finishing coats. When fresh plaster must be painted before it has an opportunity to properly age, then special alkali resistant sealers should be used.

LMC 0080367

DUP150054369

CONFIDENTIAL

Dry wall construction, which is prevalent today, particularly on low cost housing developments, consists mainly of composition board nailed to the studs with the joints covered with a special perforated paper tape and spackling compound or patching plaster. These joints are then sanded smooth and the wall is ready for priming with Primer Sealer. The use of some of the newer types of emulsion sealers have given excellent results on this type of work.

With respect to finishing coats available for use on walls and ceilings there is available a wide variety both as to composition and quality. The best quality materials available in gloss, semi-gloss, eggshell and flat enamels are generally based on alkyd resins. Soya oil resins are generally used because they provide better retention of original color and this is particularly important in the case of white finishes. Oleoresinous vehicles based on mixtures of linseed oil, Chinawood oil or soya oil in combination with rosin or rosin derivatives are commonly used and are definitely inferior to the alkyds in color retention and generally inferior in smudge resistance and washability. Blends of alkyds and oleoresinous vehicles give intermediate qualities as expected. In the eggshell, gloss and flat ranges we find a wide variety of alkyd and oleoresinous products being used plus such items as rubber base emulsion, Casein resin emulsions, pigmented casein solutions and calcimine.

WOODWORK AND TRIM:

Woodwork and Trim is generally finished with either gloss or semi-gloss enamel in order to maintain the maximum resistance to smudging and the best washability. However, there are available low gloss products, so called flat enamels, which are reasonable good for this purpose. Alkyd enamels are generally preferred for this type of work because of their freedom from residual tackiness. Finishing of woodwork and trim is normally done with one or two coats of enamel undercoater applied to the wood followed by one or two coats of the finishing enamel. On recoat work the same products may be employed using one coat of each. Undercoaters for this type of work should possess good dry and easy sanding properties so that sanding may be done quickly and economically. Undercoaters should also have good flowing properties consistent with adequate resistance to sagging so that brush marks will be at a minimum. Undercoaters are used primarily to provide a rapid build-up of film thickness which when sanded will provide a smooth even surface for application of the finishing coat materials.

The use of clear varnish for interior trim has been largely replaced by pigmented enamels. However, many interior doors are still varnished and there are several clear finishing systems available for this purpose. If the wood is open grain such as Oak, Walnut or Mahogany, it is necessary to use a wood filler to fill the pores of the wood if a smooth piano-like finish is desired. Wood fillers are generally heavy pastes containing

LMC 0080368

DUP150054370

CONFIDENTIAL

silicious pigments in an oleoresinous or alkyd vehicle. For use, they are thinned liberally with turpentine or mineral spirits, brushed or wiped on the surface and rubbed across the grain to pack the pigment into the pores of the wood. Fillers may also contain coloring pigments to provide various color effects. Close grain wood such as Pine, Maple, Birch, do not require the use of a filler.

For a wide variety of color effects, stains are generally used and there are several types available. The most durable but the least brilliant shades are provided by the so-called oil stains which generally consist of the natural earth colors such as siennas and umbers dispersed in an oleoresinous vehicle. Less durable but more brilliant, are the penetrating stains which are oil soluble dyes dissolved in a volatile thinner like mineral spirits. One distinct disadvantage of penetrating stain is that on recoating with varnish the oil soluble dye will be dissolved into the varnish topcoat (known as bleeding) and will retard dry and also color the varnish. This bleeding may be prevented by using a Sealer coat over the stain made from a vehicle which will not dissolve the dye. A thin coat of shellac cut in alcohol may be used for this purpose. Acid stains are also available and these are water-soluble dyes in an aqueous vehicle. Very striking color effects are possible with acid stains but they have the disadvantages of extreme water sensitivity, inferior color permanence and they tend to raise the grain of the wood making it more difficult to produce a uniform smooth finish.

All clear finishing of interior wood surfaces will follow along the following pattern of operation:

1. Sand the surface thoroughly.
2. Stain in the selected color if desired.
3. Fill open grain wood if desired.
4. Sand lightly.
5. Apply first coat of varnish.
6. Sand lightly.
7. Apply second coat of varnish.
8. Apply third coat of varnish if desired.

This system should provide a smooth high gloss finish with good fullness and appearance. If a lower gloss satin sheen finish is desired the easiest way to obtain this result is to use a so-called flat varnish with low gloss as the final coat. However, if a really high quality job is wanted, the reduced gloss should be obtained by rubbing the final coat of varnish after it is thoroughly dry with a mixture of pumice stone and linseed oil or water. This is a time consuming operation, however, and may not be justified except for finishing of furniture or other special cases.

LMC 0080369

DUP150054371

CONFIDENTIAL

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FLOORS:

Interior floors requiring finishing are generally confined to wood or concrete. They may be finished with either pigmented enamels or a clear finish as desired. Concrete floors above grade present no special problem except to allow adequate time for the initial thorough aging to avoid saponification troubles as mentioned previously under exterior masonry and concrete floors. Either alkyd, oleoresinous enamel or clear may be used with satisfaction. However concrete floors below grade, like basement or game room floors, are generally not moisture-proof and are therefore subject to the same moisture and alkali problems as mentioned previously in connection with painting exterior concrete porch floors laid directly on the ground. To repeat ordinary alkyd and oleoresinous materials should be used with caution because they are likely to saponify and if they do they become tacky and sticky and will be tracked to other parts of the house. This presents a difficult problem because the saponified finish must be removed before this condition can be corrected. If you want to paint your basement floor, use finishes based on rubber type vehicles which are available for this purpose

Wood floors present no problem if they are to be enameled with a pigmented product and either alkyd or oleoresinous finishes are satisfactory. The characteristic: freedom from after tack of alkyds provides an advantage during the first few days after application, which is reflected in less dirt collection from traffic across the floor

The finishing of wood floors with a clear is normally confined to three types of products namely shellac, varnish and so-called penetrating wood finishes. Shellac dissolved in alcohol is universally used as a means of finishing a new floor or refinishing an old one in quick fashion. Applied in thin coats it provides reasonable good service. Its main advantages are speed of dry and pale initial color and its biggest disadvantage is poor water resistance since it turns white when in contact with water for even a short period of time. Varnish generally provides a more serviceable floor finish than shellac but requires longer drying times between coats which is a distinct disadvantage. Both shellac and varnish build up a film on the surface and are subject to marring and damage from movement of furniture, rough handling, heavy traffic, etc. It is considered poor practice to intermix shellac and varnish systems when floors are refinished. If shellac or varnish were used originally it is considered advisable to continue with the same material when refinishing.

Penetrating wood finishes provide the most serviceable floor finish and they may be applied with relative ease. They are designed for application to new wood or old floors which have been sanded to the bare wood. They are not recommended for use over shellac or varnish but may be used over themselves as often as desired. These materials are applied by brush, mop, or wiped on, allowed to sink into the wood for about 1/2 hour and the excess

LMC 0080370

DUP150054372

CONFIDENTIAL

wiped off with rags. After overnight dry a second coat is applied in the same manner and then a final coat of wax is recommended. The resulting finish is not a high gloss like shellac or varnish but is a pleasing medium gloss which has a rich appearance. Its biggest advantage is the result of thin film thickness on top of the wood which greatly diminishes damage from marring and where traffic is heavy worn spots may be easily patched to match the adjoining areas. Penetrating wood finish differs from alkyd and oleoresinous varnishes in that they are designed to penetrate the wood rather than lie on top. They are somewhat unusual in composition because they normally contain a relatively high percentage of uncured China-wood oil.

In finishing floors, stain and filler may also be used if desired in the same manner as discussed under woodwork and trim above.

MAINTENANCE FINISHES:

As we mentioned at the beginning, maintenance customers involve chemical plants, factories, hospitals, schools, mills, apartment buildings, etc. Many of the finishes which we have already discussed are used extensively in the maintenance and upkeep of these types of buildings. However, in the case of chemical plants and factories, many operating conditions exist which require finishes with greater chemical resistance to protect not only the building structure itself, but also the equipment and machinery involved.

In almost all maintenance painting it is necessary to establish the painting schedule so that it does not conflict or interfere with the duties of personnel or operation of equipment in the area to be painted. In the case of schools or office buildings this is relatively easily accomplished by merely painting at night or over weekends. Hotels, hospitals, etc. present a more difficult problem, but the most troublesome situation is found in industrial plants which operate on a 24-hour a day 7-day week basis.

In addition, the maintenance painting of industrial plants must be carried out under the atmospheric conditions which exist while the chemical process is in operation. Many times this involves painting under a wide variety of temperature conditions with relative humidities approaching 100% and walls and ceilings dripping wet with condensed moisture. Many times gas, fume or dust conditions are encountered which not only contaminate the surface to be painted but may be deposited between coats of paint destroying adhesion and promoting peeling failures. All manner of inorganic and organic chemicals are encountered and their action on paint films must be considered because sooner or later an accidental spill may occur and the paint on surrounding areas and equipment should satisfactorily resist this occasional spillage.

Speed of dry is more important in chemical plant maintenance than in other maintenance or Trade Sales fields because of the necessity of meeting close timing on painting schedules and the desirability of rapid recoating to reduce contamination between coats. In addition, operation of many pieces of machinery

LMC 0080371

DUP150054373

CONFIDENTIAL

- 10 -

CONFIDENTIAL

or equipment cannot be interrupted to carry out a painting program for obvious economic and production reasons. Attempts to paint equipment of this nature are generally limited to those occasions when the machine is shut down for repairs and will be placed back in service just as soon as the repair is made.

There are four general classes of chemical resistant finishes which are available and their selection depends not only on their inherent inertness to the particular atmosphere or chemical involved but also to their ability to perform under conditions of surface preparation and application which are far from ideal. These are asphalt, phenolic, synthetic rubber and vinyl coatings.

Asphalt solutions and bitumenous coatings are widely used because they are low in cost and provide good resistance to moisture, acid and alkali and may be applied by either brush or spray. They have the disadvantage of limited decoration value because they are black. They are also thermoplastic and may flow under hot summer temperatures and may also become extremely brittle and may crack and craze during cold weather. However, asphalt solutions or emulsions may be fortified with fibrous pigments like asbestos to provide improvement in these objectionable properties and when these types of materials (commonly referred to as mastics) are applied in continuous films of at least 1/16th inch thickness they provide very excellent performance.

Air-dry phenolics are used where good moisture and water resistance are required or where mild exposure to acids or alkali may exist. They are available in a range of colors for decorative and identification purposes. They are easily applied either by brush or spray and, under favorable drying conditions, they may be recoated in from six to eight hours.

Chlorinated rubber finishes possess excellent alkali and water resistance, and fairly good acid resistance and are available in a range of colors. They have the disadvantages of poor adhesion characteristics, low film build due to low solids and tendency to dissolve or lift previous coats of paint because of strong solvents in their makeup. This lifting tendency may necessitate the use of multiple coats of chlorinated rubber and often eliminates the possibility of using conventional metal primers. Sandblasting of the substrate is often required to obtain adequate adhesion and this definitely limits their usefulness because it is the exception rather than the rule to be able to sandblast under most chemical process operating conditions. These products can be easily applied by brush but spraying requires special techniques in order to lay down a continuous film. These products dry solely by solvent evaporation and may be recoated in 3 to 4 hours.

Other synthetic rubber finishes based on Goodyear's Pliolite, du Pont Neoprene, etc. are also available for this type of maintenance. They too are reported to possess very good chemical resistance and compete with the chlorinated rubber finishes mentioned above.

LMC 0080372

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The air-dry vinyls are the most chemical resistant finishes currently available and will do an excellent job under water, acid or alkali conditions providing the substrate is sandblasted and a good thorough application job is done. They are also available in a range of colors. Some vinyl systems are being promoted today in an effort to circumvent the sand-blasting operation, but their practical value has yet to be established. These materials can be brushed with difficulty, but may be readily sprayed. They carry ketone solvents and present fire hazard, lifting and ventilation problems during application. Despite their many limitations, there are numerous conditions which justify their use and they appear to be gaining in popularity. They also dry by solvent evaporation only and may be recoated in 2 to 4 hours.

Vinyl dispersion products in aqueous vehicles are entering the picture for chemical plant maintenance and they are reported to possess very excellent chemical resistance. They have advantages of exceptionally fast dry, freedom from lifting, fire hazard and ventilation problems because of the aqueous vehicle. However, they are relatively poor in stability and are recommended to be used within a month or two after manufacture, which is a serious limitation.

As we see the chemical plant maintenance picture today, all of the available chemical resistant coatings or systems have certain drawbacks and deficiencies which limit their usage. We would define the ideal finishing system as one which can be made available in a variety of colors, may be applied either by brush or spray to poorly cleaned metal surfaces, air-dries rapidly by evaporation for recoating in a few minutes rather than hours, based on an aqueous or other type vehicle which presents no lifting, fire hazard or ventilation problems, and one which is stable in the package. In other words, a foolproof painting system with excellent resistance to many chemicals which can be applied in multiple coats within a time limit of 1 hour or less.

In conclusion, I wish to state that the Trade Sales and Maintenance markets cover such a multitude of miscellaneous finishes that there is a good chance that any new type of air-drying materials can find a use in these fields. During your daily work do not overlook the possibility of utilizing any new film former as a potential Trade Sales candidate. Just because it does not measure up to the requirements you have defined for some specific objective, don't throw it overboard without consulting someone familiar with Trade Sales requirements.

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