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Marshall Laboratory
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MEMORANDUM REPORT #M-501

THE SPRAY-CON COMPANY
PRIMER "FLOCOTING" TESTS FOR
TROY SUNSHADE COMPANY

NOT FOR CIRCULATION

Introduction:

This report covers tests in the flocote paint applicator at the Chicago Plant of the Spray-Con Company. The purpose of these tests was to determine if the primers which we had developed would be satisfactory for the Troy Sunshade Company in the new Spray-Con paint applicator being installed in connection with their new Finishing Department.

The flocoting paint applicator used was a regular production sized unit equipped with a conveyor and baking oven. It was installed a year or two ago by the Spray-Con people in their new plant for conducting tests by themselves and by paint companies to determine: (1) the feasibility of flocoting the ware of prospective customers and (2) for paint companies to test and experiment with flocoting materials.

The Troy Sunshade Company is primarily interested in a flocoting primer to be used on metal lawn furniture. For this purpose we had developed a gray analogue for flocoting of 828-011 (coded P-828-U-24314) and a gray analogue of P-764-U-24228 white undercoater originally developed for the Barcalo Manufacturing Company for flocote application coded P-764-U-24308. Since Troy Sunshade Company had not determined on whether they wished a white or a gray color for their primer P-764-U-24228 white was also tested. Both P-764-U-24228 white, and P-764-U-24308 gray, are undercoaters with a very low gloss for good enamel adhesion developed merely to act as a first coater to get good enamel hiding. They were not developed to give any particular degree of rust protection. We learned however, that Troy was planning to consider flocoting windshield frames for trucks and metal awning sections where good durability would be required so the testing of 828-Line with its good moisture and rust resistance was considered of particular interest.

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SUMMARY AND CONCLUSIONS:

Test Results:

Troy had shipped to Chicago for test practically all of the various sizes and shapes which they planned to flocote. These parts included an odd shaped chair-back fabricated from cold rolled steel, tubular and hot rolled heavy metal chair-sides, glider springs, a lattice type seat and chair-back assembly, a complicated round shaped seat and chair-back assembly, and a large round table top. Also two types of truck windshield frames and a metal awning section were to be flocoted. These were the first set of parts which had actually been flocoted in a Spray-Con unit and Mr. Deisenroth, Engineer in charge of this new finishing equipment was more than pleased with the excellent results which were obtained on all three primers. The best results were obtained with the two gray colors, as would be expected because of better hiding but from a purely flocoting standpoint the white gave satisfactory results. Based on the fact that an all-purpose primer, may be required, as outlined above, Mr. Deisenroth favors the 828-Line gray but perhaps may want a slightly lighter shade. The 828-U-24314 being slightly higher in gloss than the 764 Line primers gave a smoother finish but it showed some silking and flooding. Since this is a prime coat this is not considered objectionable. Deisenroth seemed impressed by the fact that these "one-shot" tests turned out so well because it showed that both the materials and the process were quite foolproof and practical. Because of the limited number of articles to work with, the best hanging procedures, etc., could not be worked out, but Mr. Deisenroth was satisfied that the results would be okay on their proposed production set-up. The Troy Sunshade people apparently realize that there will be some pocketed areas, drips and areas where two pieces come together and give a "blow-out" of material when baked, and they are providing an area after flocoting, and just before baking, to evacuate and remove excess paint where required.

It is the writer's opinion that the appearance obtained on the flocoted work in this Spray-Con applicator is equal to or better than could be obtained by either hand or slow withdrawal dipping. The secret seems to be in the use of a solvent laden area immediately following the actual flocoting operation at which point bubbles have time to break and the finish to uniform or level itself out. (See description of applicator). The Troy installation will have a six minute period in the solvent laden area followed by 6 minutes in a zone with controlled ventilation, and finally a 3 minute period in a hot zone (150°F).

All three primers were reduced approximately 30 to 35% with T-8844 thinner (Solvesso #150) to a flocoting viscosity of 19 to 24 seconds at 70°F. in a Zahn #2 cup.

Description of Paint Applicator

The Spray-Con paint applicator is basically a flocoting operation. Instead of a great number of stationary nozzles flooding the paint on to the article, it employs a rotating arm with a nozzle

at each end. A typical installation would consist of, first a ventilated splash area at the entrance end of the unit. Next is the floccoting operation proper which consists of 3 rotating arms - one is placed at the bottom with nozzles pointing upwards and one on each side. At the top are placed three or four stationary, or flooding nozzles. The arms are rotated at 50-100 RPM and are hollow allowing the paint to be fed through to the nozzles at each end. Paint is pumped at 10 to 20 pounds pressure. Pressures are shown on guages and may be regulated. These rotating arms are very efficient in coating relatively inaccessible areas. The unit has a heat exchanger so that floccoting temperatures of the paint may be properly controlled. Paint is pumped from a paint supply tank holding up to 200 gallons, thru the nozzles, and excess paint flows back thru pipe lines to the same tank. Provision is also made to merely circulate the paint within the supply tank so as to keep it from settling. Adjacent to the paint tank is a thinner tank of like capacity, so piped that thinner can be fed into the paint tank for normal reducing, and also so that it may be bled slowly into the tank while floccoter is in operation to replace evaporated solvent. Provision is also made for the thinner to be pumped through the nozzles in the floccoter proper to flush down the whole system when the unit is being shut down. The floccoting zone is not ventilated. Silhouettes are placed between the splash zone, floccoting zone, the solvent laden area, and the controlled ventilation areas. The solvent laden area which follows the floccoting operation is equipped with ventilation for purging as desired, but normally this area is kept laden with solvent fumes to help level out the finish and to accelerate the breaking up of bubbles. The control ventilation area is an area equipped with recirculation and exhaust ducts similar to an oven ventilating and circulating system, except that fumes are withdrawn for recirculation or exhausting from the bottom of the zone. Length of time in the solvent laden area and the controlled ventilation area is dependent upon individual requirements and is usually determined by experimentation. It usually varies from 6 to 12 minutes. Conveyor speeds of up to 20 feet per minute can be used. Our tests were conducted at 15 feet per minute.

The Spray-Con Company has had some trouble in getting fire underwriter approvals because of the heavy concentrations of solvent fumes in the unit. It is argued, however, that these areas are way above the explosion level and are no more hazardous then would be a ventilated area which was around the explosive level or under. The Ohio Fire Underwriters have approved the Troy installation based on this contention but are to run some explosive level tests.

Based on what we were able to learn from this demonstration and from discussions with Spray-Con personnel the following are some of the advantages of this type of paint applicator:

1. A relatively small amount of material can be employed to coat relatively large objects where a dip tank would be much too large to be practical.
2. The Spray-Con floccoting application will satisfactorily coat recessed areas that might pocket under normal dipping operations and be very difficult to hand spray.
3. The same high coating efficiency is obtained as for dipping.
4. The unit has lower power cost for operation than a spray-booth, and, of course, labor costs would be much lower.

Some of the disadvantages are:

1. Because of initial cost, size of the unit, the necessity for continuous conveyerizing, this type of paint application is best adapted to large and continuous finishing operations only.
2. Considerable floor area and head room is required since the overall height must be two to three times the height of the actual article to be coated.
3. Conveyor shut-downs for lunch periods etc. will give extra time in the solvent laden area which may in some cases give an unsatisfactory coating due to solvent washing, etc. An unsatisfactory appearance and too thin a film may result. This means therefore that the unit is not too flexible, and will not allow momentary shut-downs, and shut-down for lunch or rest periods, unless the conveyor is cleared through the applicator.
4. As is true with all floccoting operations there is a large amount of solvent loss due to evaporation.
5. There is believed to be more of a fire hazard with this type of unit than is usually present with dipping or spraying installations, and at present the Spray-Con applicator does not have 100% underwriter approval.

General Comments

The Spray-Con personnel were very cooperative and seemed anxious for us to utilize this unit for as much experimentation as we wished. They have a feeling that we have not done as much work on their application method as we should or as much work as other paint people, notably Glidden and Nubian. It was stated that Glidden and Nubian have spent as much as \$20,000. on experimentation in this unit in their formulating work and for customer test.

It was obvious that someone has been experimenting with one coat white enamels and the Spray-Con people stated that one or two paint companies were getting very close to a satisfactory one coat floccoting white enamel for use in this type of paint applicator.

It is the writer's opinion as stated above that this

painting process is entirely practical for many uses particularly for priming and where large coating operations are involved, it is bound to have extended acceptance.

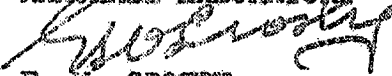
This unit has one drawback for experimental uses in that around 45 gallons of reduced material is required to run a test. It has been stated, however, and we are forced to agree, that no small laboratory unit can give the final answer as to whether the material will work satisfactorily for Spray-Con application. As a matter-of-fact it is claimed the 15 to 20% better work can be obtained in an actual production unit with conveyor chain loaded and the solvent laden area functioning properly, then can be obtained in an experimental unit with only a few pieces being coated.

ACTION RECOMMENDED:

It is recommended that Industrial Sales give consideration to the following:

1. Development of a one coat floccoting white enamel.
2. Determine the floccoting properties of our standard refrigerator primers.
3. Investigate the feasibility of floccoting colored enamels. At the present time silicone containing products bubble badly but with some new types of silicone and other anti-flooding agents it is possible that something might be developed. This type of enamel would be of great value for floccoting lawn and porch furniture and other industrial uses.

MARSHALL LABORATORY


E. W. CROSBY

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