DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
Transportation Laboratory
5900 Folsom Blvd.
Sacramento, California 95819-4612

METHOD OF TEST FOR FIELD-SAMPLING OF PAVEMENT MARKING MATERIALS

A. SCOPE

This test method describes the procedures for obtaining representative samples of pavement marking materials (traffic paint, thermoplastic and glass beads) at the jobsite and other points in the distribution chain.

B. REFERENCES

ASTM D5680-10 - "Standard Practice for Sampling Unconsolidated Solids in Drums or Similar Containers"

C. APPARATUS

1. Concentric tube sample thief (36 in. long), see ASTM D5680-10.
2. Slip-joint pliers (2 pair).
3. 1 qt and 1 gal friction top, polymer-lined metal paint cans with lids.
4. Adhesive tape and lid retainer clips for securing paint can lids.
5. Shallow metal sample pans (24 in. × 24 in. × 3 in. deep).
6. Large funnel.
7. Drop cloth or tarp.
8. Large disposable aluminum roasting pan (11 in. × 17 in. × 4 in.).
9. Personal Protective Equipment (insulated gloves, face-shield, eye protection, coveralls, etc.).
10. Sample identification cards (Form TL-0101).
11. Disposable rags or paper towels for clean-up.

D. SAMPLES

1. Improper sampling of traffic marking materials in the field can result in samples that are not representative of the lot. Whenever possible, take samples of striping materials in unopened, factory sealed bags (e.g., an entire 50 lb bag of glass beads). Sampling material in factory sealed bags avoids the uncertainty that comes from sampling material after the material has been mixed with other lots in the application equipment. Also, sealed bag samples are labeled with manufacturer's name and batch number which makes lot identification simpler (see Figure 1).

2. Sampling of material from bulk containers or tanks on the applicator truck should only be done after the material has been homogeneous blended. If it is uncertain whether the material in the bulk container is homogeneous blended, then multiple samples should be taken throughout the course of the application.

3. Glass beads in bulk containers or the applicator trucks' tanks have a tendency to segregate and cannot be easily remixed. Therefore, multiple grab samples should be taken during the course of the application and combined to create a composite sample of the lot.

4. Record all sample and contact information on a standard Form TL-0101 sample tag and enclose it with the samples when sending the samples to the laboratory.

Figure 1. A Factory Sealed Bag Sample is Generally Preferred

E. PROCEDURE

PART 1. FIELD SAMPLING PROCEDURE FOR GLASS BEADS:

1. SAMPLING GLASS BEADS IN MANUFACTURER'S BAGS

   Take one unopened 50 lb (25 kg) bag of glass beads, of the same manufacturer and lot number being used in the striping operation, and send it to the laboratory for testing.

2. SAMPLING GLASS BEADS IN DRUMS OR OTHER BULK CONTAINERS

   Use a concentric tube sample thief (see ASTM D5680-10 and Figures 2, 3 and 4) to take at least 5 full-depth, vertical samples of the beads in the drum or bulk container. First, close the sample ports on the sample thief, then plunge the sample thief into the beads until it reaches the bottom of the container. Next, rotate the inner sleeve to open the thief's sample ports and allow glass beads to flow into the thief. Close the thief's sample ports and withdraw the thief from the beads, then invert the sample thief and pour the captured sample of beads into a sample can with the aid of a funnel. Slip-joint pliers may be necessary to open and close the thief's sample ports as glass beads can cause binding of the mechanism. The samples should be taken at the center and equally spaced areas around the sides and corners of the bulk container. Combine all of these samples into a composite sample that is approximately ½ gal in volume and send it to the laboratory for testing.

FIGURE 2. Use a Sample Thief to Take Glass Bead Samples from a Bulk Container

Figure 3. Sample the Beads from at Least 5 Equally Spaced Locations within the Container

Figure 4. Combined the 5 (or More) Thieved Samples into One Composite Sample that is About ½ gal in Volume

3. SAMPLING GLASS BEADS FROM THE APPLICATOR TRUCK

Take at least 4 grab samples, of approximately ½ qt each, directly from the applicator gun at equally spaced intervals during the application of the load of beads within the on-board tank.

Have the applicator rig stop in a safe location off of the traveled way, then place a 1 gal paint can directly beneath the glass bead applicator gun. Back away from the applicator gun and signal the equipment operator to start and stop the flow of beads from the applicator gun. Combine the 4 (or more) collected samples into a composite sample that is approximately ½ gal in volume and send it to the laboratory for testing.

Please note on the sample tag that the samples were taken from the applicator gun. Wear appropriate personal protective equipment when collecting samples from the striping rig.

PART 2. FIELD SAMPLING PROCEDURE FOR WATERBORNE TRAFFIC PAINT

1. SAMPLING TRAFFIC PAINT IN 5 GAL. BUCKETS

Pour (or 'box') the traffic paint back and forth between two 5 gal buckets until the paint is well blended. Ensure that any settlement is homogeneously blended into the paint.

Alternatively, the paint can be mixed using an appropriately sized, high-speed, powered mixing apparatus to mix the container of paint until well blended. Take a 1 qt sample of the paint and send it to the laboratory for testing.

2. SAMPLING TRAFFIC PAINT FROM DRUMS AND BULK CONTAINERS

Use an appropriately sized, high-speed, powered mixing apparatus to mix the container of paint for at least 10 minutes. The mixing apparatus must be able to reach the bottom of the container for complete mixing (see Figure 5).

After this mixing, check the container to ensure that the 'float water' and any pigment settlement has been homogeneously blended into the paint. If not thoroughly homogenized, probe the container to loosen any settlement and continue mixing. For drums, take a 1 qt sample from the vortex area while mixing the already blended paint. For totes, open the bottom outlet valve and let the initial 5 to 10 gal flow into a container before obtaining a 1 qt sample of the homogeneously blended paint from the bottom outlet. A short section of hose attached to the outlet coupler will make collection easier and cleaner.

Figure 5. Appropriately-Sized, Powered, Mixing Equipment Must Be Used To Completely Mix the Traffic Paint For at Least 10 Minutes Before Sampling

3. SAMPLING TRAFFIC PAINT FROM THE APPLICATOR TRUCK

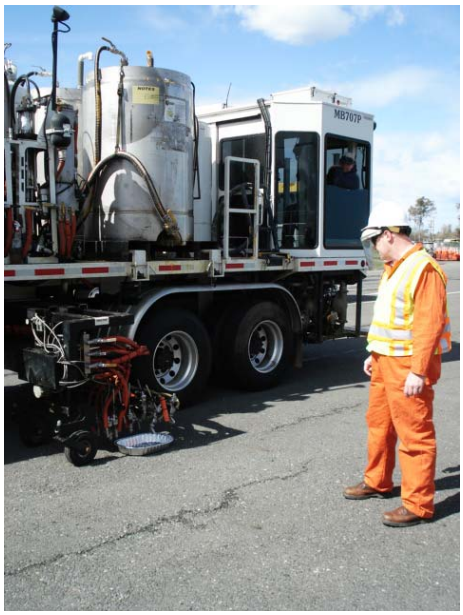
Agitate the paint in the applicator truck's on-board tank for at least 10 minutes to thoroughly mix the paint before sampling. Take at least 3 grab samples of approximately 1 qt each from the applicator gun at equally spaced intervals during the application of the load of paint within the on-board tank.

Avoid sampling the first 5 gal (1500 ft of stripe), or the last 5 gal of paint used from the tank. Wear proper personal protective equipment as paint may splatter during sample collection. Cover any pavement beneath the applicator gun with a drop cloth or a wide, shallow sample pan to catch any spillage. When stopping to collect samples, have the applicator rig pull well off of the traveled way and park on a level surface before proceeding with sample collection. When collecting these samples from the applicator gun, the spray nozzle tip may need to be removed, and the paint pressure decreased to reduce splattering. Place a 1 gal metal paint can beneath the applicator gun, then

back-away from the can to avoid any splatter and signal the equipment operator to start and stop the flow of paint into the collection container (see Figure 6).

Transfer the sample to a 1 qt can and return any excess sample to the striping rigs' tank. Label the 3 (or more) samples collected as "1 of 3", "2 of 3" and "3 of 3", etc., and send them to the laboratory for testing. Please note on the sample tag that the samples were taken from the applicator gun.

Figure 6. Take at Least 3 Grab Samples from The Applicator Gun at Equally Spaced Intervals During the Application of the Paint Within the On-Board Tank.



PART 3. FIELD SAMPLING PROCEDURE FOR THERMOPLASTIC STRIPING MATERIAL:

1. SAMPLING THERMOPLASTIC IN 50 LB BAGS

Take one unopened 50 lb bag of thermoplastic of the same manufacturer and lot number being used in the striping operation, and send it to the laboratory for testing.

2. SAMPLING THERMOPLASTIC FROM THE APPLICATOR TRUCK

Have the contractor load the application equipment and heat the material to application temperature and agitate for at least 10 minutes. Begin striping and about midway through the application of the material in the on-board tank, have the contractor stop for sample collection. Wear proper personal protective equipment as hot thermoplastic may splatter during sample collection. Also, park the applicator rig on level ground, safely away from the traveled way and cover the area beneath the applicator gun with a drop cloth, etc. Place a large disposable aluminum roasting pan (11 in. × 17 in. × 4 in. deep) beneath the applicator gun and back away from the applicator to avoid any splatter (See Figure 7). Signal the equipment operator to start and stop the flow of thermoplastic into the pan. Dispense thermoplastic into the pan until it is filled between 1 in. and 2 in. deep. Let the material in the pan cool and solidify before handling. Send the sample to the laboratory for testing.

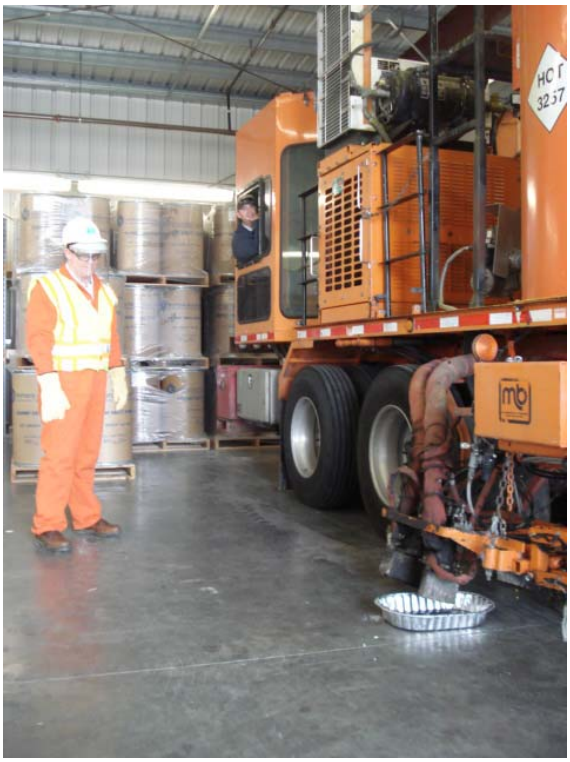


Figure 7. Sampling Molten Thermoplastic from the Applicator Gun

F. PRECAUTIONS

Collecting samples from traffic striping equipment can involve multiple hazards such as; splattering of hot thermoplastic material, splattering of paint and glass beads under high pressure, loud and hot machinery, traffic hazards, slipping on spilled glass beads, etc. When stopping to collect samples, have the applicator rig pull well off of the traveled way and park on a level surface before proceeding with sample collection. Appropriate personal protective equipment (i.e., hardhat, safety vest, safety glasses, face shield, thermally insulated gloves, coveralls, protective footwear, etc.) should be worn during sample collection.

G. HEALTH AND SAFETY

It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Prior to handling, testing or disposing of any materials, testers must be knowledgeable about safe laboratory practices, hazards and exposure, chemical procurement and storage, and personal protective apparel and equipment.

Caltrans Laboratory Safety Manual is available at:

http://www.dot.ca.gov/hq/esc/ctms/pdf/laboratory_safety_manual.pdf

End of Text
(California Test 406 contains 6 pages)