



Microtaggants for Positive Identification

by Skip Garrett, P.E., Mechanical Engineer

INTRODUCTION

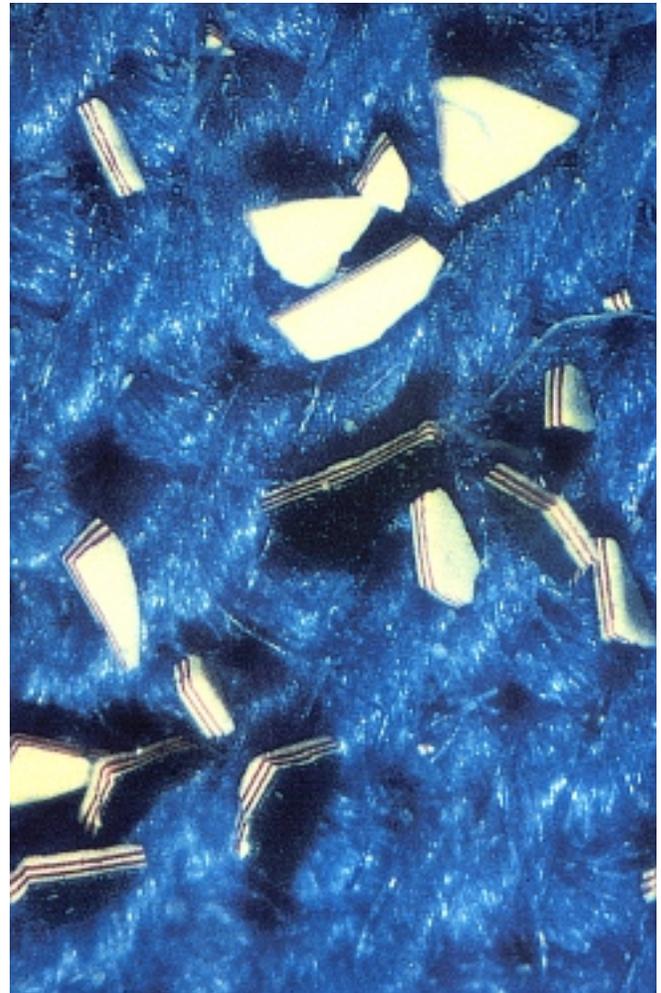
Microtaggants identification particles are commercially-available products which SDTDC investigated for use in timber marking. Our trials indicated that a cost-effective use of this tool would be in timber theft investigations and not for routine tree-marking practices.

BACKGROUND

Microtaggants are patented, microscopic, color-coded plastic particles that are specifically designed to be used to positively identify a wide variety of substances or objects. These unique identification particles are composed of distinct layers whose colors and sequences can be changed making several million codes available. Layers of fluorescent or magnetic material can be added to the particles so they can be found easily. Fluorescent layers are detected by viewing under long-wave ultraviolet light and particles with magnetic layers can be recovered from loose-flowing or bulk materials by using a magnet. The color codes can be read using a pocket microscope of at least 100X magnification.

DISCUSSION

Microtaggant particles are available in several sizes ranging from 1.2 mm (16 mesh) to .075 mm (200 mesh). Depending on the mesh size, there are from tens of thousands to hundreds of thousands of particles in a gram of Microtaggants. The codes color/number relationship is based upon the electrical resistor color code standard which allows for computerization to simplify record storage and retrieval. The buyer/user of Microtaggants purchases and registers a code or a number of codes. Microtaggants can be mixed with a bulk product, such as paint,



Microtaggant Particles (400X)





Reading codes with a pocket microscope

or attached to solid objects with a lacquer or other coating. They can be used to “tag” an object or product by manufacturer, date, purchaser, unit, sale area, or other specifier, providing precise identification in cases of product liability or theft.

Uses

Timber theft is one important area where Microtaggants could be very useful to the Forest Service. Using Microtaggants, Law Enforcement personnel would have the ability to mark and visually identify timber in investigations. Officers would be able to read and translate the code information using simple, inexpensive pocket microscopes and code comparison charts.

Application

The Microtaggants can be applied manually or with spray units to the bark of trees or logs that are the subject of an investigation. The particles can be mixed in a durable clear alkyd lacquer that is suitable for portable airbrush applications. Once on the bark, the Microtaggants are very difficult to see with the unaided eye. To make finding the particles easier, a convention on

marking could be adopted. For instance, all logs could be marked at several spots around the circumference at about four feet from the large end. The codes can be read while still on the bark using a pocket microscope or the particles can be removed using a solvent or simply scrapped off. Another method is to use clear film tape to capture the particles as they are scrapped off. Once the particles have been found, the color code sequences of each particle are read and translated into a numeric value.

Code Sequence

The code sequence proposed for FS timber theft investigations would be composed of three distinct particles, each of which contains a different color/code sequence. One particle would have several colored layers that represent the master or corporate code, which would be registered to the Forest Service. The manufacturer would then certify that this master code is sold only to authorized FS users, providing positive identification when needed. The other two particles would be three layer “prefix” and “suffix” index codes and these would designate a particular timber sale or theft investigation. A black layer (“0” in the color/numeric value resistor scheme) in the center of the particle serves as the indicator of the prefix index code. The two outer layers are the same color and represent the prefix number. A white layer (“9”) in the center serves to indicate the suffix index code, with the outer layers designating the suffix index code.

The investigator would need to identify all three distinct code sequences to form the complete FS identification code. Properly applied, each mark will contain a sufficient number of particles of each code sequence to form the complete code. An 8-ounce bottle of Microtaggants in clear lacquer would easily mark at least 1000 logs and would cost \$145. Pocket microscopes that are sufficient for reading the codes are

available from Radio Shack for \$15. Since a unique code sequence would be secured and registered to the Forest Service, coordinated purchases would be required. The minimum order for a Microtaggant theft identification system would be for 162 codes at \$145 per code for a total of \$23,490. Microtaggants could also be used to mark computers, tools, and other high-value equipment to deter and detect theft.

Manufacturer

The manufacturer-recommended applicator device is a portable airbrush made by Badger Air-Brush Company. It is the Mini Spray Gun Set, Model 250-4, and costs \$28. Information on this equipment can be obtained from Badger at 708-678-3104.

Additional information on Microtaggants is available from Microtrace, Inc. of Minneapolis, MN at 612-784-3787.

Questions regarding SDTDC trials and testing of this product can be directed to Skip Garrett, Project Engineer at SDTDC.

*USDA Forest Service
San Dimas Technology & Development Center
444 East Bonita Ave.
San Dimas, CA 91773*

