



OUR VISION STATEMENT

Success through partnership.
Excellence through professionalism.
Truth through science.

**Forensic tape
examinations cover
numerous cases**

- Kidnapping
- Drug trafficking
- Vandalism or burglaries with tape wrapped tools
- Constructing home-made explosive devices

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Trace Evidence— tape examinations

Forensic tape examinations

Trace evidence in the form of tape can be present in a number of criminal cases. The types of cases which can involve tape evidence are as varied as the types of tapes we use in our lives and the way we use them. Tape evidence is often submitted for latent print or DNA examinations to identify individuals who handled the tape; however, physical and chemical examinations of the tape can also be performed to compare it with a known source of tape, other tape with visually similar features, or determine the possible manufacturer or source of the tape.

Unlike other forms of trace evidence which are often collected as transfers from contacts between individuals or objects, tape is generally encountered as intact piece or original rolls. On occasion, tape fragments can be present at a scene or on another item.

Duct tape is a commonly used all-purpose tape. The tape is relatively strong due a fabric layer incorporated into the tape construction. The adhesive used on duct tape generally has strong tack which also lends to its general usefulness.

Clear or brown packaging tape is not as widely used outside of

its designed purpose. Other possible tapes which can be examined include office tapes, medical tape, and other specialty tapes. Analysts from the Trace Evidence Section are available to answer any questions you may have related to the potential to perform tape examines in a specific case.



The types of tape available are nearly as varied as the different uses of tape. The varied physical and chemical properties of tape make it an excellent type of evidence for comparisons

Packaging tape evidence for submission

Packaging tape evidence for submission can be problematic because of the adhesive as well as the potential need for multiple types of forensic examinations.

If the tape is on an item which can be packaged, there's no need to separate the item and the tape for submission. Package the item with the tape

on it and analysts at the crime lab will remove the tape in a manner to preserve it for the necessary analyses.

If tape was used as a ligature or binding, identify any ends created by removing the tape from the individual and place the piece(s) adhesive side down on a clear acetate sheet (used in overhead projectors) or

adhesive side down on a clear plastic bag. Do not "fold over" the tape pieces by touching adhesive side to adhesive side.

Additionally, use care when handling the ends of a tape in order to preserve these ends for physical fit examinations.

Contact the Trace Evidence Section for more information for packaging tape for analysis.



Red tape collected from around a rifle associated with a burglary

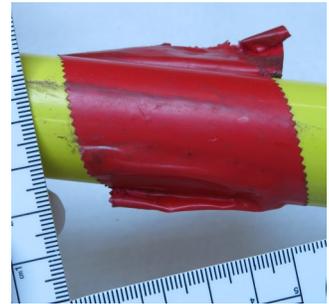
Comparisons when no known roll is available

Forensic tape comparisons do not require a known tape roll. Comparisons can be performed on any two or more items of tape to determine if they could share a common source.

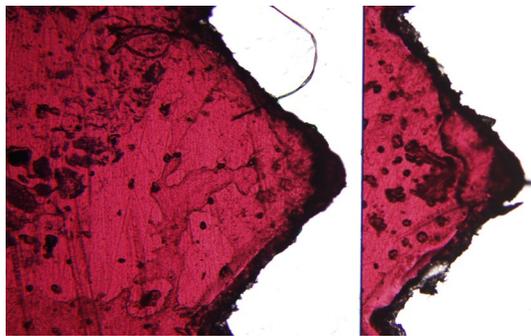
The image to the left shows a red piece of tape which was recovered from an item of evidence which had been associated with a burglary. Investigators were attempting to associate a specific suspect with a burglary involving the item bearing this red tape. A

suspect was developed and a yard tool was found at the suspect's residence which also had visually similar red tape on the handle. Although no known tape roll was found, the features of the two pieces of tape were compared to determine if the tape on the item from the burglary could have come from the same roll as the tape collected from the handle of the yard tool. The image below depicts a portion of the comparison.

All observed features between the two tape pieces were similar meaning they could share a common source.



Red tape on the handle of a yard tool recovered from the suspect's residence.



Photomicrographs of the two tapes showing similarities between multiple features within the tape pieces—color, shape of serration, and bubbles within the tape structure.

If the features between the two items correspond in all ways...then a physical fit, or Type I Association is made. A Type I Association means the two pieces were at one time a single continuous piece.

When a piece of tape is separated from a larger roll by cutting or tearing, two loose ends of tape are created on opposing sides of this cut or tear. In these cases, it may be possible to perform physical fit examinations on loose ends of tape. Physical fit examinations look at the features of a damaged area on one item and compare it to the features of the damaged area on a second item. If the features between the two items correspond in all ways, as shown in the example to the right, then a physical fit, or Type I Association is made. A Type I Association means the two pieces were at one time a single continuous piece. A Type I Association is the

strongest possible Association issued by the Trace Evidence Section.

Physical fit examinations rely on the quality and quantity of features present for comparison. As such, tape which has been torn rather than cut provides more features for comparison; however, physical fit exams can still be performed on tape which has been cut. If physical fit exams cannot be performed, the examination will transition to comparing the physical and chemical properties.

Because tape is an extremely pliable material, it easily deformed. Using caution when handling the ends of tape

during collection and packaging in order to avoid deformation.



An example of a positive physical fit (Type I Association) between two tape pieces.

What do the conclusions actually mean for tape exams?

Forensic tape examinations involving comparing various physical and chemical features of two different items of tape. Differences in these features between the questioned tape and the known standard may or may not be found. If a meaningful difference is found during the examinations, it means the questioned tape did not come from the same source as the submitted tape roll.

But what if no differences are found? Does this mean the questioned tape absolutely came from the submitted roll? Not necessarily unless a physical fit is made between the two items.

The techniques used by the Trace Evidence Section are capable of identifying differences in tape; however, because tape is a mass

produced material using procedures closely controlled by the manufacturer, it is possible for two tapes from different sources to have the same features. For example, ten rolls of electrical tape cut from the same jumbo roll may have identical characteristics. The same could be true for twenty rolls of duct tape produced using the same lots of raw materials. While studies have shown this is an uncommon occurrence for tapes selected at random when the proper techniques are used, it is still possible.

When no differences are found between two tapes, the report will state an "Association" has been made. This simply means it is possible for the two tapes to have originated from the same source. Even if no differences were found between two different items of

tape, there can still be differences in the significance of these findings. The "significance" relates to the number of other sources which could have the same features. A Type II association means some unusual features were found which are different than those found during the typical manufacturing process. On the other hand, if the questioned tape sample was too small to use all of the appropriate techniques, the candidate pool could be significantly larger than usual. In this case, the examiner would report out a Type IV Association.

Regardless, the Trace Evidence Section encourages our customers to contact the reporting analyst if there are any questions regarding the actual meaning of the report.

Even if no differences were found between two different items of tape, there can still be differences in the significance of these findings.

Determining the manufacturer of tape

If tape is collected as evidence in a case but no known roll is available for comparison, determining the manufacturer of the tape may be possible in certain circumstances.

Additionally, the identified manufacturer along with other features of the tape may make it possible to determine potential local retail sources for the tape.

The tape depicted to the right is one example. The tape was recovered as part of a homicide investigation. The physical and chemical properties of the tape were used to determine the specific manufacturer of the tape as well as limit the tape to two different tape lines produced by the manufacturer. Both of

these product lines were sold at a local retailer being considered by investigators as a potential purchase point for the tape.

Items of duct tape are good candidates for analyses which may determine the manufacturer and potential retail sources. Although the Trace Evidence Section at the Sheriff's Office laboratory does not perform these specific examinations, the FBI laboratory and others have the databases necessary for these investigative needs. Analysts at the Trace Evidence Section can be contacted to help facilitate submission of tape evidence for source determination.



Examinations of the tape depicted above were able to include a local retailer as possible purchase point for the tape. The condition of the tape determines the ability to perform these examinations. The extent of potential retailers depends on the specific manufacturer as well as product line identified. For example, a specific line of tape may be widely available across North and South America or only be sold in a specific region.

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Trace evidence examinations

The Trace Evidence Section at the Johnson County Sheriff's Office Criminalistics Laboratory is accredited to perform a number of different examinations involving a wide array of evidence types. These examinations can identify a specific material or compare a questioned material with one from a known source. The types of examinations currently offered by the Trace Evidence Section include fibers, cordage, fabric, paint, tape, hair (characterization and root assessment), fire debris, physical fit, and general chemical unknowns. Please contact staff from the Trace Evidence Section for more information on the various capabilities of the section.

For examinations which are currently not offered by the Sheriff's Office Trace Section, staff members will assist in facilitating the evidence to an appropriate forensic laboratory.

Making connections in a diverse array of cases

Forensic tape comparisons have utility in a diverse array of cases. Tape comparisons are routinely considered when the tape is used for an unusual purpose (i.e., binding and gagging a victim); however, tape comparisons are still possible when the tape was used for the intended purpose. These comparisons can assist in making associations between multiple incidents which are suspected to be connected or between a large number of items which are suspected to come from a common supplier.

Drug traffickers often wrap packages of cocaine, marijuana or other controlled substances using duct tape or packaging tape. If investigators are attempting to determine if multiple drug packages could have been distributed by the

same individual, tape examinations may assist by comparing the features of tape used in these packages.

If a series of crimes occur which involve shipping boxes or other packaging, it may be possible to examine the packaging tape on the boxes to determine if they could share a common source.

If a handmade explosive device is recovered and tape was used in the construction of the device, multiple examinations are possible on the tape. In addition to DNA and latent print examinations, the physical and chemical features of the tape can be examined to determine the

manufacturer of the tape as well as possible label brands and retail sources.

Hand tools used in the commission of crimes can be wrapped in tape. The tape on these items can be compared to tape rolls connected to other locations or individuals.



Tape exams may be able to assist drug distribution cases which involve tape wrapped packages

