Appendix B

1. Tippett, C.F., et. al., "The evidential value of the comparison of paint flakes from sources other than vehicles," Journal of the Forensic Science Society, 8(2,3),1968, pp. 61-65.
    - 2000 paint samples taken randomly from buildings
    - 1,999,000 possible pairs
    - 98% differentiated by microscopy and solvent tests alone (acetone, methylene chloride and concentrated sulfuric acid)
    - Only 2 pairs from different sources were indistinguishable using microscopy, solvent tests, emission spectrography and pyrolysis gas chromatography
    - Better than 99.999% discrimination power
    - All single layered paints, except blacks and varnishes, were differentiated on color and solvent tests alone
2. Gothard, J.A., "Evaluation of automobile paint flakes as evidence," Journal of Forensic Sciences, 21 (3), 1976, pp. 636-641.
    - 500 random automotive paints
    - 124,750 possible pairs
    - 99.996% discriminated by microscopic and solvent tests alone (5 pairs not discriminated)
    - All samples requiring additional tests to discriminate had less than four layers (not refinishes)
    - All but 2 pairs discriminated with the addition of IR, PGC and elemental
    - 99.998% discrimination power
    - indistinguishable pairs were same make, model and year
3. Gothard, J. and Maynard, P., "Evidential value of automotive paint," Proceedings of the 13th International Symposium of the ANZFSS (Australian and New Zealand Forensic Science Society); September 8-13, 1996, Sydney, Australia.
    - 500 random automotive paints
    - 124,750 possible pairs
    - 99.996% discriminated by microscopic and solvent tests alone (5 pairs not discriminated)
    - All but 3 pairs discriminated with the addition of IR and PGC
    - 99.997% discrimination power
    - indistinguishable pairs were same make, model and year
4. Ryland, S.G. and Kopec, R.J., "The evidential value of automobile paint chips," Journal of Forensic Sciences, 24 (1), 1979, pp. 140-147.
    - 200 random automotive paints
    - 19,900 possible pairs
    - 99.97% discriminated by microscopic and solvent tests alone (6 pairs not discriminated)
    - All requiring additional tests had less than four layers (not refinishes)
    - All pairs differentiated with the addition of IR, PGC, SEM/EDX, Emission Spectrography, and NAA

5. Ryland, S.G., et.al., "The evidential value of automobile paint. Part II: Frequency of occurrence of topcoat colors," Journal of Forensic Sciences, 26 (1), 1981, pp.64-74.
    - Topcoat color survey of 43,000 vehicles on the road in Florida and up the eastern seaboard
    - More specific topcoat color survey of 2000 vehicles on the road in Florida, including light/medium/dark tints and metallic vs. nonmetallic
    - In most instances, over 90% of the vehicles on the road can be eliminated as potential sources based on their general topcoat color alone.
6. Buckle, J., Fung, T., Ohashi, K., "Automotive topcoat colour occurrence frequencies in Canada," Canadian Society of Forensic Science Journal, 20 (2), 1987, pp. 45-56.
    - Topcoat color survey of 17,500 vehicles on the roads of Vancouver, Regina and Halifax, Canada.
    - The survey incorporated more specific color categories similar to Ryland's second study, including light/medium/dark tints, crossover colors (i.e. red-orange, red-brown, yellow-green, green-blue) and metallic vs. nonmetallic
    - In all instances, over 90% of the vehicles on the road can be eliminated as potential sources based on their general topcoat color alone. In most instances 95% of the vehicles on the road can be eliminated as potential sources based on their general topcoat color alone.
7. Edmondstone, G., Hellman, J., Legate, K., Vardy, G.L., and Lindsay, E., "An assessment of the evidential value of automotive paint comparisons," Canadian Society of Forensic Science Journal, 37 (3), 2004, pp. 147-153.
    - Study of 260 automotive paint samples collected from recently damaged vehicles at an auction yard
    - Study yielded 32,670 possible pairs
        - Newer finishes prevalent
        - 65% using decorative flake
        - 35% having interference flake
    - Samples differentiated initially by color of finish coats (visual, stereomicroscopic, compound microscopic)
    - Indistinguishable samples compared by FTIR single reflection diamond ATR micro-spectroscopy of their clear coats
    - Following visual comparisons, 28 pairs of samples could not be distinguished
    - Following FTIR analyses of the topcoats alone, only two pairs out of 32,670 sample pair comparisons could not be distinguished. Both had OEM paint systems present.
    - Subsequent FTIR analysis of the complete layer structure of the two pairs permitted the discrimination of one of the pairs based on analyses of the primer layers.
        - This pair originated from a 1995 Acura Integra and a 1997 Acura Integra both manufactured in the same plant

- The indistinguishable pair came from cars of the same make, model, year, having their original finish systems present and were manufactured in the same assembly plant
- 99.997% discrimination power, comparable to Gothard's 1976 and 1996 studies and Ryland's 1979 study.

8. Wright, D.M., Bradley, M.J., and Mehltretter, A.H., "Analysis and discrimination of architectural paint samples via a population study," Forensic Science International, 209, 2011, pp. 86-95.
    - Study of 964 architectural paint samples collected randomly throughout North America.
    - Study yielded 464,166 possible pairs
    - Inter-compared by stereomicroscopy, FTIR spectrometry, SEM-EDS spectrometry, and pyrolysis gas chromatography-mass spectrometry
    - Only eleven indistinguishable pairs were found, yielding a discrimination power of 99.998%
    - All eleven indistinguishable pairs originated from the same respective structures and were not false inclusions