

TruScan RM Handheld Raman Analyzer Method Transfer Study

Introduction

As of July 1, 2023, some critical hardware components in the Thermo Scientific™ TruScan RM Handheld Raman Analyzer (TSRM) have been changed due to the original components reaching end-of-life. All TruScan RM Handheld Raman Analyzers with serial numbers greater than 10000 (for example, “TM10015”) feature these new hardware components.

To ensure that Methods created on TruScan RM Handheld Raman Analyzers containing the original hardware could be successfully transferred and used on instruments containing the new hardware, a Method transferability study was done.

Method Transfer Study

Three TruScan RM Handheld Raman Analyzers with original hardware (TM1758, TM3038, and TM6594), and three TruScan RM Handheld Raman Analyzers with new hardware (TM10045, TM10046, and TM10047) were used in the Method transfer study, along with twenty-seven chemicals. These chemicals are listed in Table 1 and their behaviors span the range from strong Raman scattering to weak Raman scattering. Samples that exhibit differing amounts of fluorescence were also included in the set.

ID Number	Test Chemicals
1	Acetaminophen
2	Acetic acid
3	Acetylsalicylic acid
4	Calcium carbonate
5	Calcium stearate
6	Cellulose
7	Ciprofloxacin
8	D-Mannitol
9	Dibutyl sebacate
10	Diethylene glycol
11	Dimethyl succinate
12	EDTA
13	Ethylene glycol
14	Glycerol
15	L-Ascorbic acid
16	L-Glutamine
17	L-Histidine HCl monohydrate
18	L-Serine
19	Methanol
20	Mineral Oil
21	Polydimethylsiloxane
22	Polysorbate 20
23	Potassium phosphate monobasic
24	Sodium bicarbonate
25	Sodium salicylate
26	Sulfathiazole sodium salt
27	Titanium (IV) oxide (anatase)
28	alpha-Lactose monohydrate

Table 1. Chemicals used for Method transfer testing.

First derivative signatures of each chemical were generated on each of the original hardware instruments. For each instrument, Methods were made using the instrument's signatures and then exported. Each set of Methods was then transferred to each of the new hardware instruments and the same set of chemicals run for identification. This gave nine data set combinations as shown in Table 2.

TM10045 / TM1736	TM10045 / TM3038	TM10045 / TM6594
TM10046 / TM1736	TM10046 / TM3038	TM10046 / TM6594
TM10047 / TM1736	TM10047 / TM3038	TM10047 / TM6594

Table 2. Data Combinations.

In Table 2, the first instrument listed is the device to which the Methods from the second instrument were transferred. For example, TM10045 / TM1736 means the Methods from TM1736 were transferred to TM10045.

For chemical identification, the new hardware TruScan RM Handheld Raman Analyzer continues to use the Thermo Fisher Scientific patented p-value methodology that statistically confirms or denies the spectral match of a sample spectrum to a Method spectrum, within a specified amount of error. Any p-value < 0.05 will result in a FAIL (no-match) between the sample and method spectra, while p-values ≥ 0.05 will result in a PASS (match), confirming the identity of the sample chemical to the Method chemical.

The results of the measurements are shown in Figure 1. The p-value is > 0.05 for every combination of data cases (Table 2), indicating a 100% PASS rate for every chemical identification across 252 chemical analyses. The red line at 0.05 in Figure 1 indicates the pass/fail threshold for positive chemical identification for the p-value statistical method.

Conclusion

The results of this transferability study show that signatures and methods developed on older hardware TruScan RM Handheld Raman Analyzers can be transferred to instruments with the newer hardware while maintaining the same accurate chemical identification as provided by the older instruments.

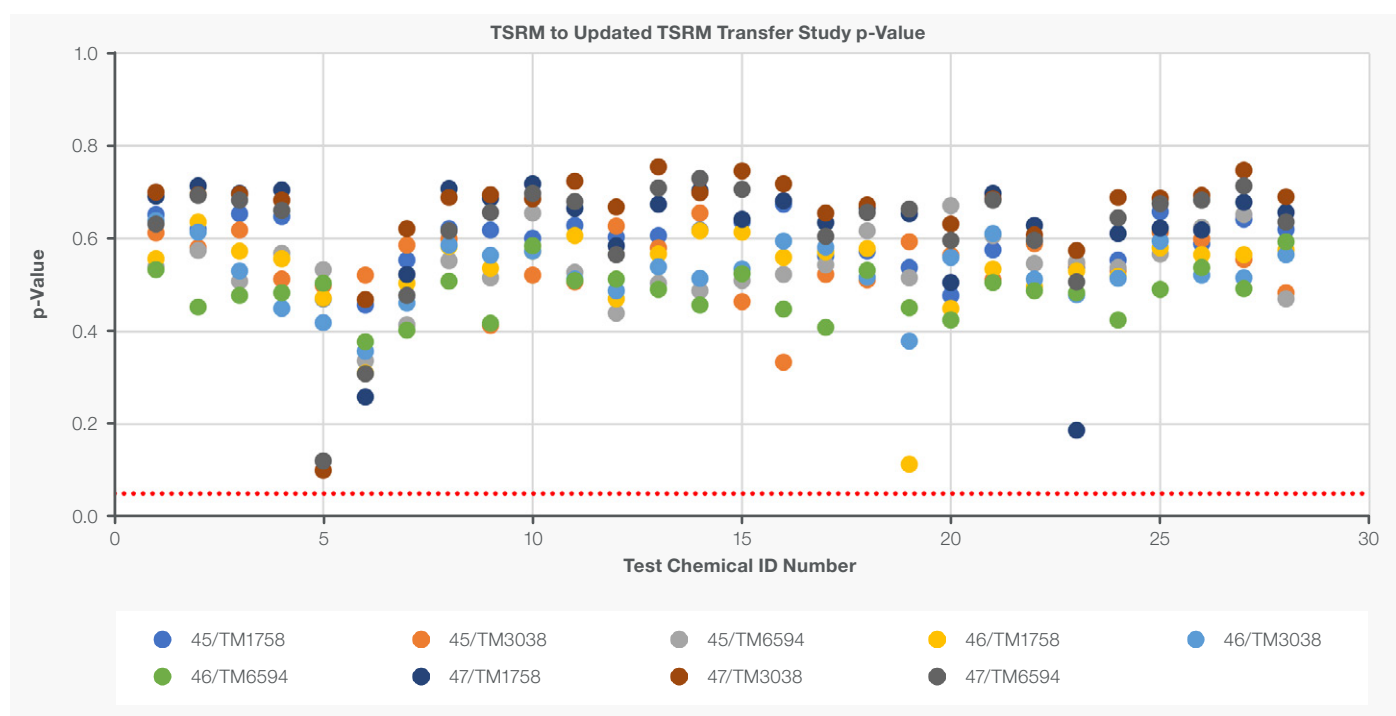


Figure 1. Method Transfer p-value results. In the legend, for brevity, “45” is TM10045, “46” is TM10046, and “47” is TM10047. Individual legend series names have the same meaning as in Table 2. For example, 45/TM1768 means the methods from TM1758 are used on TM10045.

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