CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2010
DateRun:	08/16/2010
Experimenters:	Jason Marshall, Timothy Weil
ClientType:	Cleaning Equipment Mfr
ProjectNumber:	Project #1
Substrates:	Vinyl Composite Tiles
PartType:	Coupon
Contaminants:	Dirt
Cleaning Methods:	Manual Wipe
Analytical Methods:	Gravimetric, Timing
Purpose:	To compare vacuum cleaning against dry mop for hard surface cleaning.

Experimental Procedure:

The supplied ProTeam Super Coach vacuum cleaner was operated for one hour with a wide-open inlet (without hose). Upon completion of the conditioning of the vacuum cleaner, the vacuum bag (ProTeam Intercept Micro Filter) was weighed three times on an analytical balance and reinserted into the vacuum cleaner.

An eight foot long by four foot wide by ¾" thick piece of plywood was covered with 32 vinyl composite tile floor of which the center four tiles were not adhered to the plywood. The loose tiles would allow for additional evaluation of the soil removal from cracks in the flooring.

Silica Sand, sieve size range, 40/+50 was applied to the tile surface at about 3 grams of soil per tile (100 grams total soil added). The soil was spread across each tile using a small paint brush to assist in even distribution.

The vacuum cleaner nozzle was placed on the hard surface floor so that the front edge of the vacuum cleaner nozzle lip was aligned with the edge. The nozzle was lifted off the hard surface floor and then the vacuum cleaner was turned on. The nozzle was then lowered to begin testing. Once the nozzle touched the floor, the timing began. Vacuum proceeded from one end of the floor to the other (8 feet) and then the nozzle was turned and headed back up the floor in the opposite direct. This back-and-forth cleaning proceeded until the entire floor was cleaned. When the nozzle reached the last corner of the flooring, the timer was stopped, and the clean time was recorded. The vacuum was run for an additional 10 seconds to capture all soil into the filter bag.

The filter bag was then removed and weighed three more times to determine the amount of soil collected.

The floor was then swept with a handheld brush to collect any missed soil. In addition, the center four tiles were removed, and the hand brush was used to collect soil trapped in the cracks of the floor. A final sweep along the sub floor outside the 8'x4' plywood floor was performed to collect any soil pushed outside the tile floor. This collected soil was added to the residual soil left on the tile flooring to determine the total soil left behind after cleaning.

Following the vacuum cleaning, the same basic procedure was followed using two types of dust mops. The first was a white cotton mop (Quicke Professional Hardwood Floor Mop) and the second was a microfiber mop (Quicke Microfiber Soft 'n Swivel Multi-surface floor care). For both a fresh mop head was weighed three times before cleaning floors, and then three times after, to determine total dust removed from the floor and contained in the mop head. Timing started when the dust mop began to move on the floor and stopped once the collected soil was swept into a dustpan. This collected soil was weighed and added to the weight of the soil remaining in the dust mop head. The same post cleaning procedure was followed as in the vacuum cleaning to determine the amount of soil left after cleaning.

Three runs were completed for the vacuum, cotton mop and microfiber mop.

Results:

The vacuum cleaner evaluated removed more sand in less time than the two dry mop types on a simulated vinyl tile floor. On average the vacuum cleaner removed more than 90% of the sand in 35 seconds from a 32 square foot area. The cotton mop removed about 70% of the sand in 38 seconds and the microfiber mop removed around 54% in 48 seconds. Both dust mops had difficulty with the soil removal from the cracks in the floor, but the vacuum cleaner removed nearly all soil from the cracks.

In each case the total soil collected after cleaning was less than the initial 100 grams added to the floor. Some of the fugitive soil can be accounted for in losses in transfer from the container to the floor, some to soil being moved outside the collection area or under the plywood flooring. Observations were made that the collected soil from the vacuum cleaner was drier than the soil applied, contributing to the decrease in collected soil weights. When calculating the soil removal efficiency based on total soil collected, each of the three methods had higher removal percents (4-8% improvement).

	Initial Residual Initial	Final	Soil on	Device wt Mop	Soil from	Ave Soil	Time for	
Method	Soil	Soil			floor		Removal	

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			Device wt					removal (sec)
Vacuum	100	3.6	44.65	132.54	NA	87.89	87.88	31
		44.72	132.56	NA	87.84			
		44.66	132.56	NA	87.9			
	100	0.8	46.45	138.82	NA	92.37	92.46	37
		46.32	138.86	NA	92.54			
		46.35	138.81	NA	92.46			
	100	3	46.99	137.83	NA	90.84	90.77	38
		47.03	137.79	NA	90.76			
		47.12	137.83	NA	90.71			
Cotton	100	21.1	53.7	54.92	1.22	61.64	62.85	30
		53.68	54.9	1.22				
		53.69	54.89	1.2				
	100	15.1	53.65	54.71	1.06	78.63	79.66	44
		53.69	54.68	0.99				
		53.7	54.73	1.03				
	100	22.4	53.7	54.12	0.42	69.23	69.65	40
		53.66	53.75	0.09				
		53.28	54.04	0.76				
Microfiber 100	32.4	91.49	98.64	7.15	50.72	57.83	50	
		91.43	98.55	7.12				
		91.53	98.58	7.05				
	100	50.4	91.93	93.25	1.32	41.65	42.65	45
		92.1	92.82	0.72				
		91.7	92.66	0.96				
	100	30.9	91.96	94.67	2.71	59.71	62.23	49
		92.08	94.16	2.08				
		91.66	94.44	2.78				

Summary

	Based on Soil Added	Based on soil collected	Average
Method	Final Composite Average	Final Removal	Collection Time (sec)
Vacuum	90.37	97.33	35.3
Cotton mop	70.72	78.2	38
Microfiber	54.24	58.92	48

Summary:

Substrates:	Vinyl Composite Tiles				
Contaminants:	Dirt				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
ProTeam	ProTeam ProVac		90.00	☑	
Fisher Scientific	Absolute Ethanol	0	0.00	☐	

Conclusion: For sand removal from a vinyl composite tiled floor, the vacuum cleaner was more efficient for soil removal and collection time as compared to dry mopping with a cotton head and microfiber head.