



Version 1

SLIP RESISTANCE TESTING

R&D

Confidential

**STATIC FRICTION COEFFICIENT MEASUREMENT
ON A DIRTY HARD SURFACE CLEANED WITH 3
DIFFERENT FLOOR DEGREASERS**



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I. Objectives

The purpose of this study is to measure static friction coefficient on a surface cleaned with Polbio Enzyfloor, Polgreen Industry and a standard product widely used on the market. Water is used as internal standard in this experiment. The objective is to evaluate and compare the effectiveness of each product in terms of impact on surface friction coefficient (and consequently slip resistance).

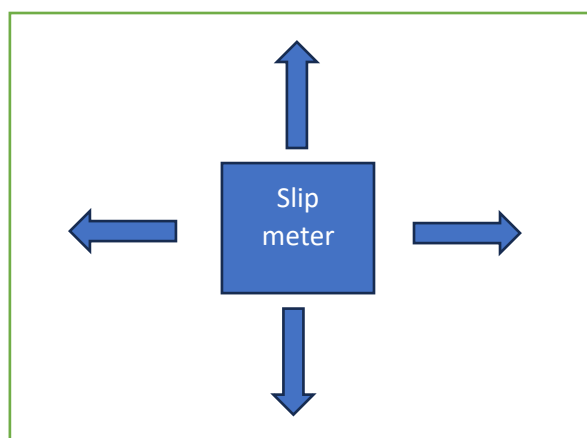
II. Test method

a. Measurement

Friction coefficient was measured with a digital slip meter ASM825A (www.americanslipmeter.com)

Friction coefficient value is on average of 3 measures.

Each measure is an average of 4 values generated by pulling the slip meter in 4 directions (north, east, south, west).



b. Protocol

1. The selected surface (ceramic benchtop) is divided in 4 equal parts (+/- 1.5 sq ft each) with some rubber tape.
2. The friction coefficient of each quadrant is measured.
3. Vegetable oil is then evenly applied on each part of the surface with an impregnated paper. The oil excess is removed with absorbing paper to obtained an even and smooth look.
4. The static friction coefficient is measured.
5. Each cleaning product solutions are prepared according to the dilution mentioned in the product technical data sheets. Solutions are stirred for 15 minutes.
6. Products are applied with a mop (wet but not damp):

7. Water is applied on quadrant A, Polgreen Industry 1% (1:100) is applied on quadrant B, reference standard 1.6% (1:64) is applied on quadrant C and Enzyfloor 0.8% (1:128) is applied on quadrant D.
8. After 5min, the residue is removed with a squeegee and the surface is allowed to dry for 30min.
9. Friction coefficient is then measured on each quadrant (with a new set of sensors).

III. Data and results

a. Raw data :

Surface	Time point	test	Measure				Average per test	Average value	Standard deviation
			0° (North)	90° (East)	180° (South)	270° (West)			
Quadrant A	Day 0	1	0,640	0,600	0,620	0,600	0,615	0,608	0,006
		2	0,600	0,600	0,580	0,630	0,603		
		3	0,630	0,620	0,580	0,600	0,608		
Quadrant A soiled with oil	Day 0	1	0,010	0,030	0,000	0,010	0,013	0,013	0,005
		2	0,000	0,010	0,010	0,050	0,018		
		3	0,000	0,000	0,030	0,000	0,008		
Quadrant A soiled with oil after 1 cleaning with water	Day 0	1	0,420	0,430	0,380	0,380	0,403	0,406	0,008
		2	0,440	0,410	0,370	0,440	0,415		
		3	0,410	0,390	0,400	0,39μ	0,400		
Quadrant A soiled with oil after 2 cleaning with water	Day 1	1	0,580	0,570	0,580	0,590	0,580	0,582	0,003
		2	0,580	0,600	0,570	0,590	0,585		
		3	0,600	0,580	0,570	0,570	0,580		
Quadrant A soiled with oil after 3 cleaning with water	Day 2	1	0,610	0,600	0,620	0,590	0,605	0,599	0,005
		2	0,600	0,610	0,590	0,580	0,595		



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		3	0,610	0,620	0,580	0,580	0,598		
Quadrant A soiled with oil after 4 cleaning with water	Day 3	1	0,600	0,600	0,620	0,590	0,603	0,603	0,001
		2	0,610	0,590	0,600	0,610	0,603		
		3	0,590	0,610	0,610	0,610	0,605		
Quadrant B	Day 0	1	0,610	0,580	0,600	0,600	0,598	0,599	0,003
		2	0,590	0,620	0,590	0,590	0,598		
		3	0,610	0,620	0,580	0,600	0,603		
Quadrant B soiled with oil	Day 0	1	0,000	0,010	0,030	0,000	0,010	0,013	0,004
		2	0,000	0,000	0,040	0,030	0,018		
		3	0,010	0,030	0,010	0,000	0,013		
Quadrant B soiled with oil after 1 cleaning with PG Industry 1%	Day 0	1	0,610	0,620	0,570	0,610	0,603	0,598	0,004
		2	0,590	0,610	0,590	0,600	0,598		
		3	0,580	0,570	0,610	0,620	0,595		
Quadrant B soiled with oil after 2 cleaning with PG Industry 1%	Day 1	1	0,610	0,620	0,590	0,620	0,610	0,601	0,008
		2	0,580	0,590	0,610	0,600	0,595		
		3	0,600	0,590	0,580	0,620	0,598		
Quadrant B soiled with oil after 3 cleaning with PG Industry 1%	Day 2	1	0,600	0,610	0,610	0,620	0,610	0,609	0,004
		2	0,590	0,620	0,610	0,600	0,605		
		3	0,610	0,610	0,610	0,620	0,613		
Quadrant B soiled with oil after 4 cleaning with PG Industry 1%	Day 3	1	0,600	0,600	0,620	0,610	0,608	0,605	0,002
		2	0,610	0,600	0,610	0,600	0,605		
		3	0,620	0,600	0,590	0,600	0,603		



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Quadrant C	Day 0	1	0,610	0,600	0,590	0,580	0,595	0,598	0,007
		2	0,620	0,620	0,540	0,590	0,593		
		3	0,620	0,610	0,590	0,600	0,605		
Quadrant C soiled with oil	Day 0	1	0,000	0,000	0,030	0,030	0,015	0,011	0,004
		2	0,020	0,000	0,000	0,010	0,008		
		3	0,010	0,000	0,020	0,010	0,010		
Quadrant C soiled with oil + 1 cleaning with reference standard 1,6%	Day 0	1	0,490	0,510	0,520	0,500	0,505	0,498	0,007
		2	0,500	0,490	0,470	0,510	0,493		
		3	0,470	0,510	0,490	0,510	0,495		
Quadrant C soiled with oil + 2 cleaning with reference standard 1,6%	Day 1	1	0,590	0,600	0,610	0,580	0,595	0,603	0,007
		2	0,610	0,620	0,600	0,590	0,605		
		3	0,620	0,590	0,610	0,610	0,608		
Quadrant C soiled with oil + 3 cleaning with reference standard 1,6%	Day 2	1	0,610	0,620	0,610	0,580	0,605	0,605	0,005
		2	0,620	0,610	0,590	0,620	0,610		
		3	0,590	0,620	0,610	0,580	0,600		
Quadrant C soiled with oil + 4 cleaning with reference standard 1,6%	Day 3	1	0,600	0,600	0,620	0,610	0,608	0,604	0,004
		2	0,580	0,610	0,620	0,610	0,605		
		3	0,590	0,600	0,620	0,590	0,600		
Quadrant D	Day 0	1	0,600	0,590	0,610	0,600	0,600	0,608	0,007
		2	0,620	0,640	0,590	0,600	0,613		
		3	0,600	0,610	0,620	0,610	0,610		
Quadrant D soiled with oil	Day 0	1	0,000	0,010	0,020	0,000	0,008	0,008	0,001

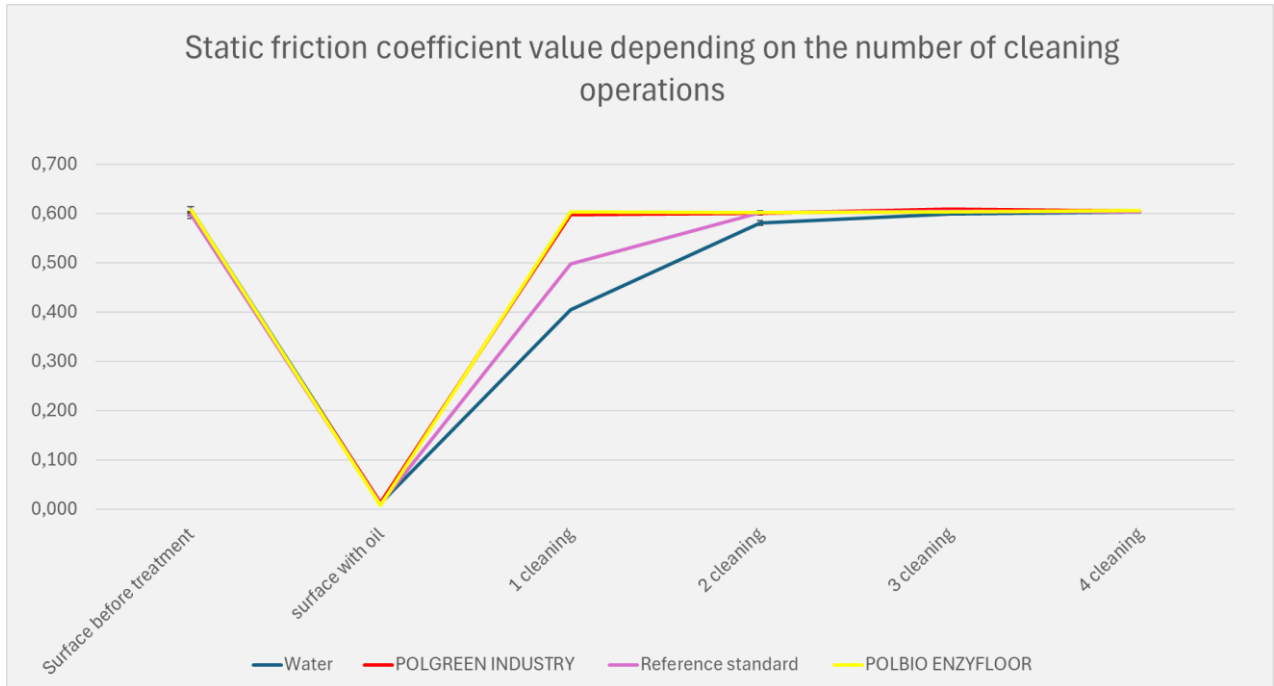


		2	0,000	0,010	0,000	0,030	0,010		
		3	0,000	0,000	0,000	0,030	0,008		
Quadrant D soiled with oil after 1 cleaning with Enzyfloor 0,8%	Day 0	1	0,580	0,610	0,590	0,620	0,600	0,603	0,006
		2	0,620	0,610	0,580	0,630	0,610		
		3	0,590	0,590	0,610	0,610	0,600		
Quadrant D soiled with oil after 2 cleaning with Enzyfloor 0,8%	Day 1	1	0,580	0,600	0,610	0,610	0,600	0,602	0,010
		2	0,610	0,610	0,610	0,620	0,613		
		3	0,610	0,590	0,590	0,580	0,593		
Quadrant D soiled with oil after 3 cleaning with Enzyfloor 0,8%	Day 2	1	0,580	0,620	0,590	0,620	0,603	0,603	0,004
		2	0,610	0,610	0,610	0,600	0,608		
		3	0,620	0,610	0,580	0,590	0,600		
Quadrant D soiled with oil after 4 cleaning with Enzyfloor 0,8%	Day 3	1	0,600	0,600	0,600	0,590	0,598	0,606	0,007
		2	0,600	0,610	0,610	0,620	0,610		
		3	0,610	0,620	0,600	0,610	0,610		

b. Results

Data showed very reliable reproducibility of the results with a very narrow standard deviation.

As observed on **graph 1**, one cleaning operation with Polgreen Industry 1% or Enzyfloor 0.8% allows the friction coefficient to go back to its initial value whereas 2 cleaning operations are required with the reference standard to achieve the same result (same as water).



Graph 1: Static friction coefficient evolution depending on the number of cleaning operations

IV. Conclusion

The data demonstrated that both Polbio Enzyfloor and Polgreen Industry are more efficient to remove oily material from the surface than the reference standard in the test conditions (hence both are more efficient at reducing the risk of slipping in these conditions).

Report approved by	Reviewed by	Issue Date
Guillaume BRET R&D Director	Jessica GACHET R&D Microbiology Manager	September 16th, 2024