

**AT23P6082-01**

PERFORMANCE TESTS LAUNDRY SHEETS

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### 1. OBJECTIVE

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The objective of this study is to compare the stain removal performance of a laundry sheet product provided by Multitrade in comparison to one commercial product monodose from Italian market. The test protocol to use for this comparison is the AISE performance test published in its website and called “Minimum protocol for comparative detergent performance testing”.

## 2. MATERIALS AND CONDITIONS

### 2.1. TEST CRITERIA

For the evaluation of the products sent by Multitrade, the following test has been carried out, **Stain Removal** According to the “Minimum protocol for comparative detergent performance testing” published by A.I.S.E. on its website.

### 2.2. TEST PRODUCTS

- DETERGENTE ECOLOGICO EN TIRAS NoBacPro **LS**
- LAVATRICE MONODOSE ECO VersoNatura **LM**

#### Laundry Sheet Nobacpro Multitrade **LS**



#### Ecodosi Verso Natura Conad **LM**



<sup>1</sup> <https://www.aise.eu/our-activities/standards-and-industry-guidelines/detergent-test-protocol.aspx>

### 2.3. WASHING MACHINE

A programmable Miele electronic household washing machine has been used for the development of this test. Fuzzy logic type control has been disabled. The characteristics of the used program have been explained in the following table:

**Table 2. Characteristics of the used program**

Program	Cotton wash program (at 30°C)
Duration Main Wash	70 min
Total Program Duration	120 min
Water Quantity Main Wash	(15 ± 2) L
Total Water Quantity	(55 ± 5) L
Number of Rinse Cycles	3
Final Spin Speed	1200 rpm

### 2.4. WATER HARDNESS

2.5 mmol/L ± 0.2 mmol/L calculated as CaCO<sub>3</sub> (250 ppm = 14 ± 0.5 °dH) is the water hardness used in the development of this test.

### 2.5. WASH TEMPERATURE

The wash temperature used along this test is 30°C, as the client requested following Ecolabel recommendations for detergents in its test method.

### 2.6. BALLAST LOAD

3 kg of clean white ballast load as described in the user manual, normalized with 3 washes at 60°C with detergent ECE2 without brightener and bleach to have comparable low optical brightener levels for all test products.

### 2.7. SOIL

According to A.I.S.E. Test Protocol 4 new units of SBL2004 are included in the wash cycle (about 32g of ballast soil).

**2.8. DOSAGE** The dosage used is based on manufacture's recommendations:

**Table 3. Dosage/wash of each product**

Product	LS	LM
<b>Dosage</b>	1 sheet	1 liquid capsule
	4,8 g	19,4mL

**2.9. STAIN SET**

Find below the stain set used to evaluate the stain removal capacity of each product:

**Table 3. Set of stains**

Stain	Commercial code	Type of stain
<b>Tea</b>	WE5LTWKC	Drink – Bleachable
<b>Coffee</b>	WE5ECWKC	Drink – Bleachable
<b>Red Wine</b>	WE5RWWKC	Drink – Bleachable
<b>Fruit Juice</b>	CFT CS15	Drink – Bleachable
<b>Tomato Puree</b>	WE5TPWKC	Food – Bleachable
<b>Carrot Baby Food</b>	WE5IACBFWKC	Food – Bleachable Enzymatic
<b>French Squeezy Mustard</b>	WE5FSMWKC	Food – Bleachable/Enzymatic
<b>Chocolate</b>	WFK 10Z	Food – Enzymatic
<b>Grass</b>	E164	General soil – Bleachable/Enzymatic
<b>Grass/Mud</b>	WE5GMWKC	General soil – Bleachable/Enzymatic/Particulate
<b>Blood</b>	WE5DASBWKC	General soil – Enzymatic
<b>Unused Motor Oil</b>	WFK 10RM	Greasy, oil – Greasy/Particulate
<b>Frying Fat (Burnt Beef – Cooked Beef Fat)</b>	WE5BBWKC (on white cotton)	Greasy, oil – Greasy/ Enzymatic
<b>Make up</b>	WFK 10MU	Cosmetics – Greasy/ Particulate

The above AISE stains can be grouped into 4 categories, based on the soil type and the detergent category that acts to remove them

1. Drink- Bleachable stains
2. Food -Bleachable Enzymatic stains
3. General Soil - Bleachable Enzymatic Particulate
4. Greasy - Surfactant Enzymatic Particulate

### 3. CONCLUSIONS

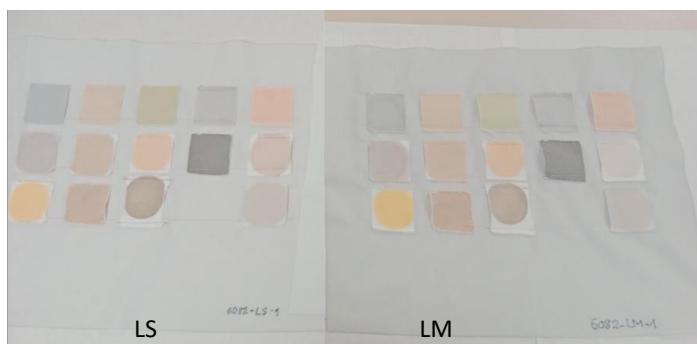
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The stain removal test shows overall parity stain removal performance and stain removal parity on three out of four stain category (not on general soil) which quite unexpected result considering the dosage difference between the laundry sheet LS and the monodose LM

LM shows statistically better performance only on few individual stains mainly in the general soil category.

On the contrary, the product Lavatrice Monodose Eco (**LM**) presents a high degree of redeposition which is clearly visible in the side by side picture below vs the LAUNDRY SHEETS (**LS**). This means there is a **visibly significant difference on the degree of whiteness** which we consider consumer relevant in favour of the Laundry Sheet (LS).

**Figure 1. Side by side comparison**



## 4. RESULTS

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The products are coded as:

- LAUNDRY DETERGENT SHEETS- **LS**
- LAVATRICE MONODOSE ECO- **LM**

The evaluation is done with the program available in the A.I.S.E.'s website.

### 4.1. STAIN REMOVAL

The stain removal evaluation is done with a spectrophotometer using the Y-value of the Y, x, y color coordinates measurement, light source D65 with a UV cut-off filter at 420 nm. Rank products based on statistic evaluation (95% confidence level).

According to A.I.S.E. evaluation, the significant differences between products are carried out.

After the reflectance measurement, the results for each stain and the comparison between products are explained below.

The **overall stain removal performance** (stain removal %) is shown in the table.

Product	Stain Removal %	Significant difference
LM	56,19	N
LS	53,65	N

### Category and individual stains removal performance

Category	LM AVG Stain Removal %	LS AVG Stain Removal %	Significant difference
Drink	54,87	56,88	N
-Fruit Juice	50,94	53,18	
-Tea	60,60	61,75	
-Red wine	53,09	55,55	
-Coffee	54,84	57,05	
Food	51,3	52,36	N
-Tomato puree	62,59	61,76	
-Salad dress balsamico	27,31	30,13s	
-French mustard	66,64	68,30s	
-Chocolate	48,69	49,25	
General Soil	51,83	60,05	Y
-Blood	57,42	70,61s	
-Grass	55,04	62,18s	
-Mud/Grass	43,02	47,35s	
Greasy	56,70	56,51	
- Motor oil	55,68	54,34	
- Make up	58,76	57,12	
- Cooked beef	55,68	58,06	

## ANNEX 1. STAIN REMOVAL. DETAILED RESULTS

	Laundry detergent sheets							
	LS							
STAIN	cycle 1	cycle 2	cycle 3	cycle 4	cycle 5	cycle 6	Mean	deviation
Fruit Juice	49,04	48,71	48,87	52,34	53,16	53,50	50,94	2,2939
Tea	61,41	60,77	60,02	60,39	60,86	60,13	60,60	0,5204
Grass	53,78	53,93	55,44	55,99	55,75	55,32	55,04	0,9449
Unused motor oil	55,71	56,12	55,82	55,92	56,15	54,38	55,68	0,6607
Make up	61,60	59,15	57,29	57,96	58,89	57,66	58,76	1,5650
Red wine	50,71	50,94	53,93	52,93	55,69	54,36	53,09	1,9693
Coffee	56,22	54,70	56,08	53,43	52,48	56,15	54,84	1,5960
Tomato puree	58,94	56,92	65,15	65,18	65,87	63,48	62,59	3,7492
Salad dressing balsamico	28,16	27,45	27,40	27,36	26,49	27,01	27,31	0,5505
Blood	60,44	56,29	58,66	57,13	56,20	55,80	57,42	1,7962
French squeezy mustard	68,10	66,40	66,52	65,49	66,91	66,39	66,64	0,8557
Chocolate	47,93	48,09	49,09	49,23	48,92	48,86	48,69	0,5424
Grass/mud	43,25	42,97	43,61	43,86	42,37	42,08	43,02	0,6950
Cooked beef fat	59,64	58,05	56,71	55,05	56,14	53,21	56,47	2,2519
	Lavatrice Monodose							
	LM							
STAIN	cycle 1	cycle 2	cycle 3	cycle 4	cycle 5	cycle 6	Mean	deviation
Fruit Juice	49,36	52,83	52,03	52,07	57,16	55,65	53,18	2,8004
Tea	60,44	61,15	61,23	61,17	64,00	62,51	61,75	1,2902
Grass	60,63	61,35	64,81	60,60	62,66	63,05	62,18	1,6427
Unused motor oil	55,91	55,10	52,49	52,35	55,10	55,09	54,34	1,5209
Make up	58,76	57,38	56,70	56,35	56,53	57,01	57,12	0,8817
Red wine	51,23	57,22	52,84	56,16	58,32	57,53	55,55	2,8552
Coffee	56,33	57,56	55,69	54,58	58,85	59,28	57,05	1,8408
Tomato puree	58,85	56,93	64,18	63,68	62,23	64,66	61,76	3,1613
Salad dressing balsamico	29,94	30,31	29,86	29,25	30,40	31,00	30,13	0,5909
Blood	71,61	69,73	69,59	69,50	70,35	72,86	70,61	1,3548
French squeezy mustard	69,09	67,51	68,25	67,01	68,80	69,11	68,30	0,8742
Chocolate	48,30	48,48	49,42	49,43	49,25	50,63	49,25	0,8320
Grass/mud	47,59	48,41	45,58	47,76	47,60	47,16	47,35	0,9572
Cooked beef fat	59,29	56,54	56,76	56,97	59,53	59,28	58,06	1,4388

ANNEX 2. PICTURES

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LAUNDRY DETERGENT SHEETS- LS



LAVATRICE MONODOSE ECO- LM





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