

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2015  
 DateRun: 07/27/2015  
 Experimenters: Loc Nguyen, George Liang, Luis Raudales  
 ClientType: Cleaner Manufacturer  
 ProjectNumber: Project #1  
 Substrates: Liquid  
 PartType: Coupon  
 Contaminants: Odor  
 Cleaning Methods: Low Pressure Spray  
 Analytical Methods: Smell  
 Purpose: To evaluate supplied products for malodor elimination

Experimental Procedure: Clean carpet was cut into sixteen 2 in x 4 in rectangular strips. A panel of three then examined the odors to determine the baseline values using seven bottles, including a control. These strips were placed into glass bottles and the cat urine was directly applied to the carpet to determine baseline dirty odor characteristics.

Each panelist was asked to describe the odor and rank the level of intensity of the malodor. After the panelists observed the initial odors, bottles were recapped and allowed to sit overnight for three days. After aging the contaminated carpets, each bottle was subjected to rounds of cleaning agent treatments and each panelist was used to assess malodor levels after each cycle of treatment. Treatments of contaminated bottles are stopped after the 3rd cycle of treatment. An effective cleaner will have a malodor level of under 2 after the 3rd round of treatment. The ranking of malodor level is as follows: 1 being close to no smell of malodor to 5 being the worse malodor level. Then the malodor was allowed to sit overnight to determine if there was any change of malodor levels. If there is a high increase in malodor level that results in a malodor level of 2 and higher; an additional spray of treatment is applied onto the carpet to see if the cleaning agent can eliminate the increased malodor from the overnight sit.

Chemistries Evaluated: Good Riddance; E-50; Wurth Eco Odour Eliminator (Kiwi Mango); Febreze; Wurth Odor Eliminator (Spring Scent)

Results:

| Cleaner  | Good Riddance  | Original  |     | Average |
|----------|----------------|-----------|-----|---------|
| Bottle 1 | 3.8            | 4         | 4.5 | 4.1     |
| Bottle 2 | 3.5            | 3.5       | 3.5 | 3.5     |
| Bottle 3 | 4              | 4         | 4   | 4       |
|          | % Average: 3.9 |           |     |         |
| Cleaner  | Good Riddance  | Sprays: 2 |     | Average |
| Bottle 1 | 3.5            | 3         | 3.5 | 3.3     |
| Bottle 2 | 3              | 3         | 3   | 3       |
| Bottle 3 | 4              | 3         | 3   | 3.3     |
|          | % Average: 3.2 |           |     |         |
| Cleaner  | Good Riddance  | Sprays: 4 |     | Average |
| Bottle 1 | 2              | 2.5       | 2   | 2.2     |
| Bottle 2 | 1.5            | 2.5       | 2   | 2       |
| Bottle 3 | 1.1            | 2         | 2   | 1.7     |
|          | % Average: 2.0 |           |     |         |
| Cleaner  | Good Riddance  | Sprays: 6 |     | Average |
| Bottle 1 | 1              | 2.5       | 2   | 1.8     |

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|          |                                   |           |     |         |
|----------|-----------------------------------|-----------|-----|---------|
| Bottle 2 | 1.2                               | 2         | 1.5 | 1.6     |
| Bottle 3 | 1                                 | 2         | 2   | 1.7     |
|          | % Average: 1.7                    |           |     |         |
| Cleaner  | E-50                              | Original  |     | Average |
| Bottle 1 | 3.8                               | 4         | 3   | 3.6     |
| Bottle 2 | 3.8                               | 4         | 4   | 3.9     |
| Bottle 3 | 4                                 | 4         | 4   | 4       |
|          | % Average: 3.8                    |           |     |         |
| Cleaner  | E-50                              | Sprays: 2 |     | Average |
| Bottle 1 | 2                                 | 2         | 3   | 2.3     |
| Bottle 2 | 2.5                               | 2         | 2.5 | 2.3     |
| Bottle 3 | 2.5                               | 2         | 2.5 | 2.3     |
|          | % Average: 2.3                    |           |     |         |
| Cleaner  | E-50                              | Sprays: 4 |     | Average |
| Bottle 1 | 1                                 | 1         | 2   | 1.3     |
| Bottle 2 | 1                                 | 2         | 1.5 | 1.5     |
| Bottle 3 | 1                                 | 1         | 1.5 | 1.2     |
|          | % Average: 1.3                    |           |     |         |
| Cleaner  | E-50                              | Sprays: 6 |     | Average |
| Bottle 1 | 1                                 | 1         | 1.5 | 1.2     |
| Bottle 2 | 1.2                               | 1.5       | 1   | 1.2     |
| Bottle 3 | 1.5                               | 1         | 1.5 | 1.3     |
|          | % Average: 1.2                    |           |     |         |
| Cleaner  | Eco Odour Eliminator (Kiwi Mango) | Original  |     | Average |
| Bottle 1 | 4                                 | 4         | 4   | 4       |
| Bottle 2 | 3.8                               | 3.5       | 3   | 3.4     |
| Bottle 3 | 4                                 | 4         | 4   | 4       |
|          | % Average: 3.8                    |           |     |         |
| Cleaner  | Eco Odour Eliminator (Kiwi Mango) | Sprays: 2 |     | Average |
| Bottle 1 | 2                                 | 2         | 3   | 2.3     |
| Bottle 2 | 1.5                               | 1.5       | 2.5 | 1.8     |
| Bottle 3 | 2.5                               | 2         | 2   | 2.2     |
|          | % Average: 2.1                    |           |     |         |
| Cleaner  | Eco Odour Eliminator (Kiwi Mango) | Sprays: 4 |     | Average |
| Bottle 1 | 1.5                               | 2         | 1.5 | 1.7     |

## CLEANING LABORATORY EVALUATION SUMMARY

|          |   |           |     |         |
|----------|---|-----------|-----|---------|
| Bottle 2 | 2   | 1.2       | 1   | 1.4     |
| Bottle 3 | 1.5   | 1.5       | 1   | 1.3     |
|          | % Average: 1.5                              |           |     |         |
| Cleaner  | Eco Odour Eliminator (Kiwi Mango) Sprays: 6 | Average   |     | Average |
| Bottle 1 | 1.2   | 2         | 1   | 1.4     |
| Bottle 2 | 1.2   | 1.2       | 1   | 1.1     |
| Bottle 3 | 1.2   | 1         | 1   | 1.1     |
|          | % Average: 1.2                              |           |     |         |
| Cleaner  | Febreze                                     | Original  |     | Average |
| Bottle 1 | 4   | 4         | 4   | 4       |
| Bottle 2 | 3   | 3         | 3.5 | 3.2     |
| Bottle 3 | 4   | 4         | 4   | 4       |
|          | % Average: 3.7                              |           |     |         |
| Cleaner  | Febreze                                     | Sprays: 2 |     | Average |
| Bottle 1 | 2   | 2.5       | 3.5 | 2.7     |
| Bottle 2 | 1.5   | 1.5       | 2   | 1.7     |
| Bottle 3 | 2   | 2         | 1.5 | 1.8     |
|          | % Average: 2.1                              |           |     |         |
| Cleaner  | Febreze                                     | Sprays: 4 |     | Average |
| Bottle 1 | 1.5   | 2         | 3.5 | 2.3     |
| Bottle 2 | 1.5   | 1.5       | 2   | 1.7     |
| Bottle 3 | 2   | 1.5       | 1.5 | 1.7     |
|          | % Average: 1.9                              |           |     |         |
| Cleaner  | Febreze                                     | Sprays: 6 |     | Average |
| Bottle 1 | 1.2   | 1.5       | 1.5 | 1.4     |
| Bottle 2 | 1   | 1.5       | 1   | 1.2     |
| Bottle 3 | 1   | 1.5       | 1   | 1.2     |
|          | % Average: 1.2                              |           |     |         |
| Cleaner  | Odor Eliminator (Spring Scent)              | Original  |     | Average |
| Bottle 1 | 5   | 5         | 4.5 | 4.8     |
| Bottle 2 | 4   | 4         | 4   | 4       |
| Bottle 3 | 4.2   | 4         | 4   | 4.1     |
|          | % Average: 4.3                              |           |     |         |
| Cleaner  | Odor Eliminator (Spring Scent)              | Sprays: 2 |     | Average |
| Bottle 1 | 1.5   | 2         | 2   | 1.8     |

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|          |                                |           |     |         |
|----------|--------------------------------|-----------|-----|---------|
| Bottle 2 | 2                              | 2         | 2.5 | 2.2     |
| Bottle 3 | 1.5                            | 2         | 2.5 | 2       |
|          | % Average: 2.0                 |           |     |         |
| Cleaner  | Odor Eliminator (Spring Scent) | Sprays: 4 |     | Average |
| Bottle 1 | 1.1                            | 1.5       | 1   | 1.2     |
| Bottle 2 | 1                              | 1.5       | 1.5 | 1.3     |
| Bottle 3 | 1.1                            | 1.5       | 1   | 1.2     |
|          | % Average: 1.2                 |           |     |         |
| Cleaner  | Odor Eliminator (Spring Scent) | Sprays: 6 |     | Average |
| Bottle 1 | 1                              | 1         | 1   | 1       |
| Bottle 2 | 2                              | 1         | 1   | 1.3     |
| Bottle 3 | 1.1                            | 1.2       | 1   | 1.1     |
|          | % Average: 1.1                 |           |     |         |

| Summary Table                  |  |        |           |
|--------------------------------|--|--------|-----------|
| Cleaner                        |  | Sprays | % Average |
| Good Riddance                  |  | 6      | 1.7       |
| E-50                           |  | 4      | 1.3       |
| Eco Odour Eliminator           |  | 4      | 1.5       |
| Febreze                        |  | 4      | 1.9       |
| Odor Eliminator (Spring Scent) |  | 4      | 1.2       |

| Cleaner  | Good Riddance                               | Overnight |     | Average |
|----------|---|-----------|-----|---------|
| Bottle 1 | 2   | 3         | 1.5 | 2.2     |
| Bottle 2 | 2   | 3         | 2.5 | 2.5     |
| Bottle 3 | 2.5   | 2.5       | 2.5 | 2.5     |
|          | % Average: 2.4                              |           |     |         |
| Cleaner  | Good Riddance Sprays: 2                     | Overnight |     | Average |
| Bottle 1 | 1   | 3         | 2   | 2       |
| Bottle 2 | 1.5   | 2         | 1.5 | 1.7     |
| Bottle 3 | 1.5   | 2         | 1   | 1.5     |
|          | % Average: 1.7                              |           |     |         |
| Cleaner  | E-50  | Overnight |     | Average |
| Bottle 1 | 1   | 2         | 2   | 1.7     |
| Bottle 2 | 2   | 2         | 1   | 1.7     |
| Bottle 3 | 1.5   | 1         | 1.5 | 1.3     |
|          | % Average: 1.6                              |           |     |         |
| Cleaner  | Eco Odour Eliminator (Kiwi Mango)           | Overnight |     | Average |
| Bottle 1 | 2   | 2.5       | 3   | 2.5     |
| Bottle 2 | 3   | 2.5       | 2   | 2.5     |
| Bottle 3 | 2.5   | 2         | 2   | 2.2     |
|          | % Average: 2.4                              |           |     |         |
| Cleaner  | Eco Odour Eliminator (Kiwi Mango) Sprays: 2 | Overnight |     | Average |
| Bottle 1 | 1.5   | 1.5       | 1.5 | 1.5     |
| Bottle 2 | 2   | 2         | 1   | 1.7     |
| Bottle 3 | 2   | 1.5       | 1.5 | 1.7     |
|          | % Average: 1.6                              |           |     |         |
| Cleaner  | Febreze                                     | Overnight |     | Average |
| Bottle 1 | 1.5   | 2         | 1.5 | 1.7     |
| Bottle 2 | 1.5   | 1.5       | 1.5 | 1.5     |
| Bottle 3 | 2   | 2         | 1   | 1.7     |
|          | % Average: 1.6                              |           |     |         |

# CLEANING LABORATORY EVALUATION SUMMARY

| Cleaner  | Odor Eliminator (Spring Scent) | Overnight |     | Average |
|----------|--------------------------------|-----------|-----|---------|
| Bottle 1 | 2                              | 1.5       | 1.5 | 1.7     |
| Bottle 2 | 1.5                            | 1.5       | 1   | 1.3     |
| Bottle 3 | 1.2                            | 1.5       | 1   | 1.2     |
|          | % Average: 1.4                 |           |     |         |

| Overnight Summary Table           |                |             |
|-----------------------------------|----------------|-------------|
| Cleaner                           | Overnight Avg. | After Spray |
| Good Riddance                     | 2.4            | 1.7         |
| E-50                              | 1.6            | N/A         |
| Eco Odour Eliminator (Kiwi Mango) | 2.4            | 1.6         |
| Febreze                           | 1.6            | N/A         |
| Odor Eliminator (Spring Scent)    | 1.4            | N/A         |

Summary:

| <b>Substrates:</b>       | Liquid                          |        |             |                                     |                                     |
|--------------------------|---------------------------------|--------|-------------|-------------------------------------|-------------------------------------|
| <b>Contaminants:</b>     | Odor                            |        |             |                                     |                                     |
| Company Name:            | Product Name:                   | Conc.: | Efficiency: | Effective:                          | Observations:                       |
| Maxim Technologies Inc.  | Good Riddance Odor control      | 100    |             | <input checked="" type="checkbox"/> | Effective at reducing malodor level |
| Fisher Scientific        | Absolute Ethanol                | 0      | 0.00        | <input type="checkbox"/>            |                                     |
| EcoLogic Solutions, Inc. | Deodorizing Cleaner E-50        | 100    |             | <input checked="" type="checkbox"/> | Effective at reducing malodor level |
| Wurth                    | Eco Odour Eliminator Kiwi-Mango | 100    |             | <input checked="" type="checkbox"/> | Effective at reducing malodor level |
| Procter & Gamble         | Febreze Free Nature             | 100    |             | <input checked="" type="checkbox"/> | Effective at reducing malodor level |
| Wurth                    | Odor Eliminator                 | 100    |             | <input checked="" type="checkbox"/> | Effective at reducing malodor level |

Conclusion:

A cleaner is considered effective once it has reached a malodor level that is under 2 within 3 cycles of treatment. Cleaning agents E-50, Eco Odour Eliminator (Kiwi Mango), Febreze and Odor Eliminator (Spring Scent) all had reached a malodor level that was under 2 after its second cycle of treatment. Noticeably Odor Eliminator (Spring Scent) had the lowest malodor level of 1.2 after 2 rounds of treatment. Whereas cleaning agent Good Riddance took 3 cycles of treatment to reach a malodor level that was under 2; with a rating of 1.7.

After an overnight sit, cleaning agents E-50, Febreze and Odor Eliminator (Spring Scent) did not require a second round of treatment because it did not have an overall significant rise in malodor level from the overnight sit. However, bottles treated with cleaning agent Good Riddance and Eco Odour Eliminator (Kiwi Mango) did need a second round of treatment. Eco Odour Eliminator (Kiwi Mango) had a 0.2 higher rise in malodor level compared to Good Riddance treated bottles from the overnight sit. Although, both cleaning agents did remove the malodor level from the overnight sit after the second treatment.

Overall, the most effective cleaning agent at removing malodor level would be as follows: Odor Eliminator (Spring Scent), E-50, Febreze, Eco Odour Eliminator (Kiwi Mango) and Good Riddance.