

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 0

DateRun: 02/20/2025

Experimenters: Alexander Symko

ClientType: Chemistry Dept @ University

ProjectNumber: Project #2

Substrates:

PartType: Part

Contaminants: Paints

Cleaning Methods:

Analytical Methods:

Purpose: Evaluate the safety data sheets of paint alternatives utilizing P2OASys

Experimental Procedure: Standard p2oasys analysis procedure was used, gathering information from the SDS to input into the relevant categories.

Results: Table 1, Currently Utilized Paints:

| Category                       | Currently used Paints                                                    |                                                               |                                                        |                                                          |
|--------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------|
|                                | Behr Interior/<br>Exterior low-<br>luster porch and<br>patio floor paint | Behr Interior<br>Flat Paint +<br>Primer - Ultra<br>Pure White | Behr Interior<br>flat paint +<br>primer - deep<br>base | Behr interior<br>flat paint +<br>primer -<br>medium base |
| Acute Human Effects            | 8                                                                        | 8                                                             | 8                                                      | 8                                                        |
| Chronic Human Effects          | 4                                                                        | 4                                                             | 4                                                      | 5                                                        |
| Ecological Hazards             | 6                                                                        | 6                                                             | 6                                                      | 6                                                        |
| Environmental Fate & Transport | 6                                                                        | 6                                                             | 6                                                      | 6                                                        |
| Atmospheric Hazard             | 2                                                                        | 2                                                             | 2                                                      | 2                                                        |
| Physical Properties            | 7                                                                        | 5                                                             | 5                                                      | 5                                                        |
| Process Factors                | 4                                                                        | 4                                                             | 4                                                      | 4                                                        |
| Life Cycle Factors             | 10                                                                       | 9                                                             | 10                                                     | 10                                                       |
| Weighted Average               | <b>5.9</b>                                                               | <b>5.5</b>                                                    | <b>5.6</b>                                             | <b>5.8</b>                                               |

Table 2, Alternatives:

| Category                       | Potential Alternatives                                       |                                                     |                                                                    |                                                     |                              |
|--------------------------------|--------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------|------------------------------|
|                                | Benjamin Moore: Eco<br>Spec interior latex<br>primer - white | Sherman Williams<br>Superpaint: Interior<br>Acrylic | Benjamin Moore: Aura<br>Waterborne Exterior<br>Paint - Flat finish | Behr Pro i300 -<br>white eggshell<br>interior paint | Real M<br>paint -<br>soft wh |
| Acute Human Effects            | 4                                                            | 7                                                   | 6                                                                  | 4                                                   | 4                            |
| Chronic Human Effects          | 4                                                            | 4                                                   | 4                                                                  | 4                                                   | 4                            |
| Ecological Hazards             | 4                                                            | 4                                                   | 4                                                                  | 6                                                   | 6                            |
| Environmental Fate & Transport | 6                                                            | 6                                                   | 6                                                                  | 5                                                   | 6                            |
| Atmospheric Hazard             | 2                                                            | 2                                                   | 2                                                                  | 2                                                   | 2                            |
| Physical Properties            | 3                                                            | 7                                                   | 5                                                                  | 2                                                   | 5                            |
| Process Factors                | 4                                                            | 4                                                   | 4                                                                  | 2                                                   | 4                            |
| Life Cycle Factors             | 6                                                            | 6                                                   | 7                                                                  | 3                                                   | 4                            |
| Weighted Average               | <b>4.1</b>                                                   | <b>5.0</b>                                          | <b>4.8</b>                                                         | <b>3.5</b>                                          | <b>4.4</b>                   |

Table 3, pricing comparison:

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|                  |                                                                                                                                                                                                                                                                                                                                                                       |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Paint Product    | Benjamin Moore: Eco Spec interior latex primer: white                                                                                                                                                                                                                                                                                                                 |
| Price per gallon | \$56.99                                                                                                                                                                                                                                                                                                                                                               |
| Source URL       | <a href="https://www.paintoutlets.com/products/eco-spec-wb-paint-primer-372?variant=39621615878343&amp;country=US&amp;currency=USD&amp;utm_medium=product_sync&amp;utm_source=google">https://www.paintoutlets.com/products/eco-spec-wb-paint-primer-372?variant=39621615878343&amp;country=US&amp;currency=USD&amp;utm_medium=product_sync&amp;utm_source=google</a> |

Summary:

Conclusion:

Table 1 and 2 show the results of the environmental, health, and safety assessment using the P2OASys tool. Each of the colors in the tables represents the level of hazard. Red (score of 8-10) represents a very high hazard level, orange (score of 6-7) represents a high hazard level, yellow (score of 4-5) represents a medium hazard level, and green (score of 2-3) is considered a low hazard level. The goal of this research was to identify alternative solvents with few or no very high hazard scores.

*Regarding higher hazard scores in the currently utilized products:*

## **Behr interior/exterior low luster porch and patio floor paint:**

**Acute Human Effects:** The driving sources of the score of 8 in this category are “serious eye irritation” and “Skin irritant”.

**Life Cycle Factors:** This section is more associated with factors related to production of a product and where it ends up after it is disposed of. The Safety data sheet makes specific note that the container cannot be reused, giving it a score of 10 in “recycling”. The production necessary to make this product also necessitates the utilization of a known carcinogen (titanium dioxide) as well as other harmful chemicals, giving it a score of a 10 in “upstream effects”.

## **Behr Interior Flat Paint + Primer - Ultra Pure White**

**Acute Human Effects:** The driving sources of the score of 8 in this category are “irreversible eye damage” with a Global Harmonized System (GHS) category of 2A. And a National Fire Prevention Association (NFPA) health score of 2 - moderate hazard.

**Life Cycle Factors:** This score is high for identical reasons to the Behr product above. There is specific note regarding the inability to recycle used containers and the product requires hazardous chemicals including titanium dioxide to manufacture.

## **Behr interior flat paint + primer - deep base**

**Acute Human Effects:** A score of 8 in Respiratory irritation due to the fact that there is evidence in humans of significant respiratory irritation. It also earns an 8 in the Dermal irritation category for being a skin sensitizer. This means that it increases sensitivity to itself and can increase the likelihood and intensity of an allergic reaction

**Life Cycle Factors:** Like the other two Behr products, the high score in life cycle factors represents the inability of the container or product to be recycled, as well as the hazardous chemicals utilized in its production.

## **Behr interior flat paint + primer - medium base**

**Acute Human Effects:** The primary driver of the high score of 8 in this category is its classification in GHS as a 2A eye damage source. This means that this product can cause serious and irreversible eye damage upon contact.

**Life Cycle Factors:** This is the same as all other previous behr products evaluated, it seems to be a common trend.

## *Alternatives Higher Hazard Categories:*

None of the identified alternatives have any higher hazard categories, however this does not mean that these are “safe” products, merely “safer” than the currently used options. P2OASys’ greatest strength is comparative hazard assessment, meaning that it’s very good at comparing the hazards of two different

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chemicals or products. This does *not* mean that those chemicals/products are intrinsically safe, and safety guidelines present on the safety data sheets should still be followed.

While the Hazard score for both the Behr pro i300 and RMP soft white are both on the better end of the other options here, I have some reservations about the Behr Product. Its safety data sheet was quite sparse, and they are able to get away with not listing any components due to their formulation not containing any products considered hazardous by the Code of Federal Regulations concerning Safety Data Sheets. However, it is still a zero-VOC product and is green-guard certified, so I don't think there are any really nasty hazards hiding in the SDS, despite my reservations I think it is a safer option than your current paint.

### **A note on Carcinogenicity:**

One thing that came up consistently when putting together this report was the carcinogenicity of Titanium Dioxide (CAS# 13463-67-7). Titanium Dioxide was present in every paint evaluated, but the truth is that when present in paints such that titanium dioxide is bound to a different material within the paint, its risks as a carcinogen are minimized. This is because titanium dioxide is only known to be a carcinogen when in its pure dust solid form. Safety data sheets have been attached for the listed alternatives, but it's important to remember that seeing carcinogen warnings on some of these paints doesn't necessarily mean the paint in its used form is carcinogenic. One area you must be careful in is regarding sanding or filing of already-painted materials as that has the potential to aerosolize the paint, therefore turning it into a legitimate carcinogenic hazard. The author of this report wanted to include this section to explain why it seems carcinogenic hazards were ignored when compiling these evaluation scores.