RBM HoldWash-HD Health, Safety and Environmental Report

HEALTH, SAFETY & ENVIRONMENT

I. INTRODUCTION

The following report is a comprehensive review of RBM Hold Wash-HD and aspects relating to its impact on occupational health and safety, toxicology, ecology and other related environmental issues.

RBM Hold Wash-HD has been formulated to achieve a precise balance of safety and performance, ensuring that the end user is compromising neither. While there is much to be said regarding the performance related attributes of RBM Hold Wash-HD, this report focuses solely on how RBM Hold Wash-HD has been designed to achieve the highest possible worksite and environmental safety standards in its product class.

II. HEALTH & SAFETY RATING

Based on the results shown in the subsequent tests as well as additional information, appropriate health and safety ratings have been established to ensuring the safety of workers.

a) WHMIS (Workplace Hazardous Materials Information System):
Class B, Division 3

b) HMIS (Hazardous Materials Information System):

Health	1
Flammability	2
Reactivity	0
PPE	B

c) NFPA

III. HEALTH AND SAFETY TESTING

1. Acute Toxicity

It is obviously unethical to test for acute toxicity in humans and most acute toxicity data comes from animal testing. However, it is important to protect animal welfare and discourage testing in animals. Since each ingredient of RBM Hold Wash-HD has been tested according to OECD Guidelines for the testing of chemicals and the current toxicological information of each of them is available the product can be determined by adding the toxicity of individual components of the product.

a) Test: Dermal ATE_{max} (Acute Toxicity Estimate)

Test Method: The dermal ATE of the mixture is determined by calculation from all relevant ingredients with a known acute toxicity.

Test Result: LD 50 (Dermal, rabbit) $\geq$ 2,400 mg / kg

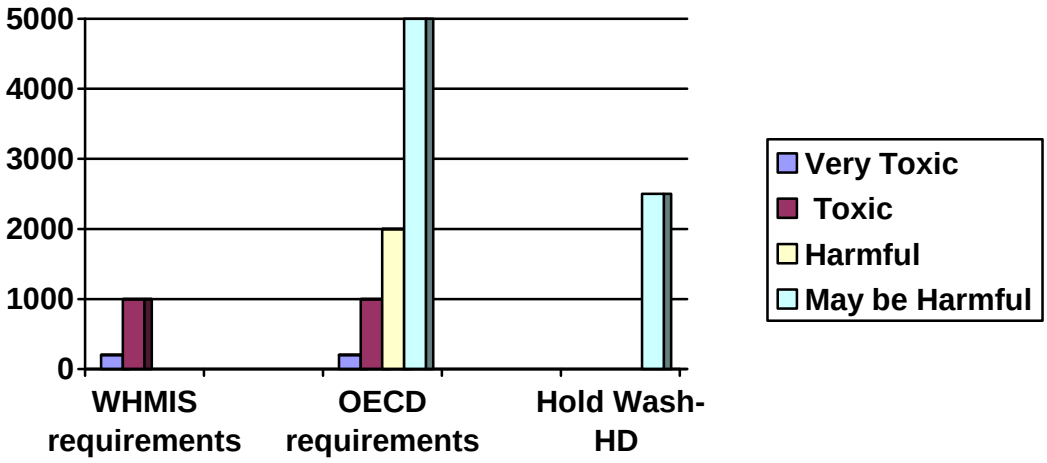
Description: The dermal toxicity test is probably the most relevant toxicity test relating to health and safety because the exposure to RBM Hold Wash-HD by the dermal route is most likely, as opposed to other exposure routes. The dermal toxicity test provides useful information on health hazards likely to arise from a short-term exposure by the dermal route.

According to WHMIS / OSHA, RBM Hold Wash-HD is non-toxic. RBM Hold Wash-HD exceeds WHMIS / OSHA's requirement for a chemical being dermal toxic by at least 200%.

In analyzing RBM Hold Wash-HD dermal toxicity, the Harmonized Hazard Classification System for Chemical Substances was also consulted. The basis for the harmonized criteria are those which are currently in use in OECD countries as well as those recommended by the United National Committee of Experts on the Transport of Dangerous Goods (UNCETDG).

According to the OECD, RBM Hold Wash-HD is classified as a Category 5, (class 1 being the highest toxicity, class 5 being lowest toxicity) as it has a dermal LD50 within the range of 2,000 - 5,000. Criteria for Category 5 are intended to enable identification of substances which are of relatively low acute toxicity hazard. The dermal toxicity value indicates that RBM Hold Wash-HD is classified as a 'Slightly Toxic' chemical in concentrated form.

RBM Hold Wash-HD Dermal Toxicity compared to WHMIS/OECD requirements, mg/kg



b) Test: Oral ATE_{max} (Acute Toxicity Estimate)

Test Method: The oral ATE of the mixture is determined by calculation from all relevant ingredients with a known acute toxicity.

Test Result: LD 50 (Oral, rat) $\geq$ 4,066 mg / kg

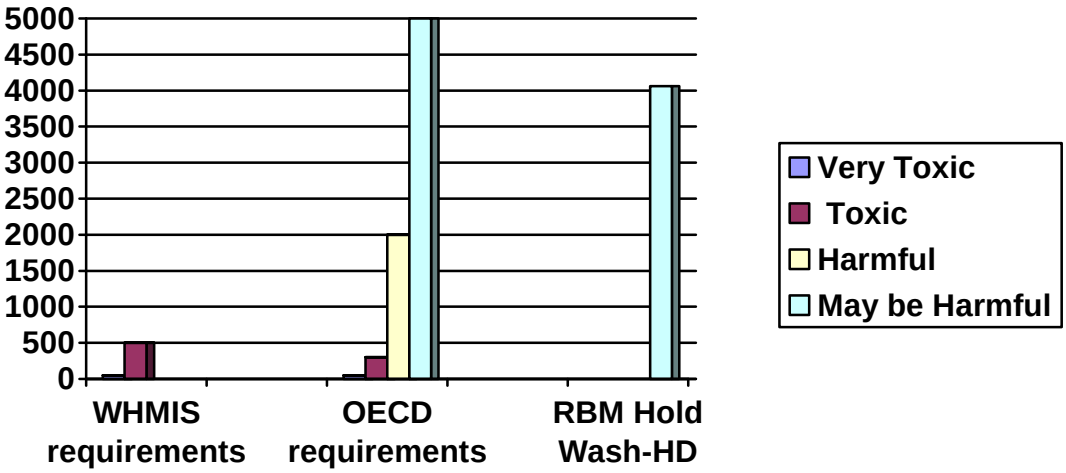
Description: The oral toxicity test provides useful information on health hazards likely to arise from a short-term exposure by the oral route.

According to WHMIS / OSHA, Hold Wash-HD is non-toxic. RBM Hold Wash-HD exceeds WHMIS / OSHA's requirements in relation to oral toxicity by at least 800%.

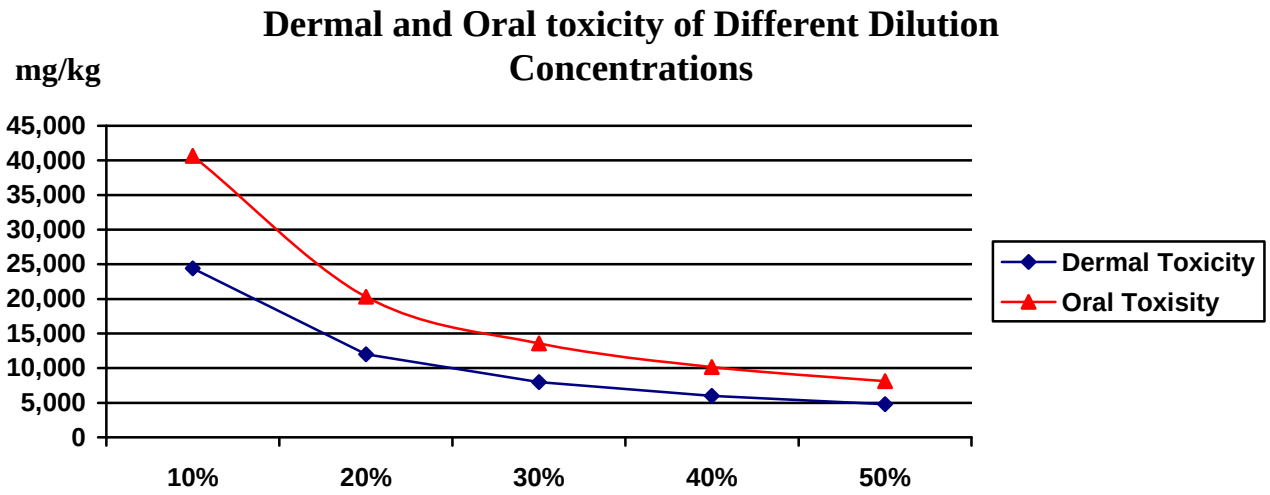
According to the OECD, RBM Hold Wash-HD is classified as a Category 5 as it has an oral LD50 within the range of 2,000 - 5,000 mg / kg. The oral toxicity value indicates that RBM Hold Wash-HD is classified as a 'Slightly Toxic' chemical in concentrated form.

Considering that RBM Hold Wash-HD is classcified as a heavy-duty industrial degreaser, designed to cut and penetrate heavy hydrocarbons in the way traditional petroleum based, extremely toxic chemicals have done in the past, a 'slightly toxic health rating in its concentrated form is certainly worth noting.

RBM Hold Wash-HD Oral Toxicity compared to WHMIS/OECD requirements, mg/kg



Numbers of above studies reflect toxicity for the pure product. Nevertheless, in most of applications RBM Hold Wash-HD is required to be diluted 1:1, 1:3 or 1:10 with water. We can estimate the oral and dermal toxicity of different dilution solutions.



2. Carcinogen and Reproductive Toxins

Test: Carcinogenicity and Reproductive Toxicity

Test Method: Carcinogenicity and reproductive toxicity of the mixture is determined by adding all relevant ingredients which are known as carcinogenic or have reproductive toxicity.

Test Result: RBM Hold Wash-HD is not carcinogenic and does not have reproductive toxins.

Description: RBM Hold Wash-HD does not contain any ingredients that are listed as Group 1 (known), Group 2a (probable) or Group 2b (possible) carcinogens in the international Agency for Research on Cancer (IARC) Monographs on the Evaluation of the Carcinogenic Risk of the Chemicals to Humans.

3. Skin Sensitization

Test: Skin Sensitization Study

Test Facility: Nucro-Technics, Scarborough, ON
Tested by: Emil Mihalcea, B.Sc., and M.Sc.
Test Method: The method used for conducting this study is the accepted standard described in the OECD Guideline for Testing of Chemicals, Section 406, (OECD, 1992).

Test Result: Based on these findings, the test article RBM Hold Wash-HD (at 10% (w/v) in Water for Injection) was found to be non-sensitizing in the Buehler Skin Sensitization Study in guinea pigs. For detailed test result information, please refer to *Schedule C***.**

Description: The test system, which uses guinea pigs, is internationally recognized and acceptable to regulatory authorities requiring skin sensitization testing. Moreover, The Harmonized Hazard Classification System for Chemical Substances states that evidence from animal studies is usually much more reliable than even evidence from human exposure. The result shows that RBM Hold Wash-HD is not capable to cause response affecting the skin.

4. Skin Corrosion / Irritation

a) Test: Skin Study

Test Method: Determining the corrosion and irritation potential of a chemical before testing is undertaken.

Test Result: RBM Hold Wash-HD is not corrosive to skin.

Description: Based on OECD criteria substances may be viewed as corrosive based simply on pH test. Substances with a demonstrated pH<2 or pH>11.5, especially when buffering capacity is present, are considered being corrosive to skin. RBM Hold Wash-HD is not corrosive to skin since its pH is 10.35

IV. ENVIRONMENTAL DATA

RBM Hold Wash-HD has been carefully designed to do its job efficiently and allow our customers to obtain outstanding performance, while minimizing the effect of their activities on the environment.

1. Biodegradability

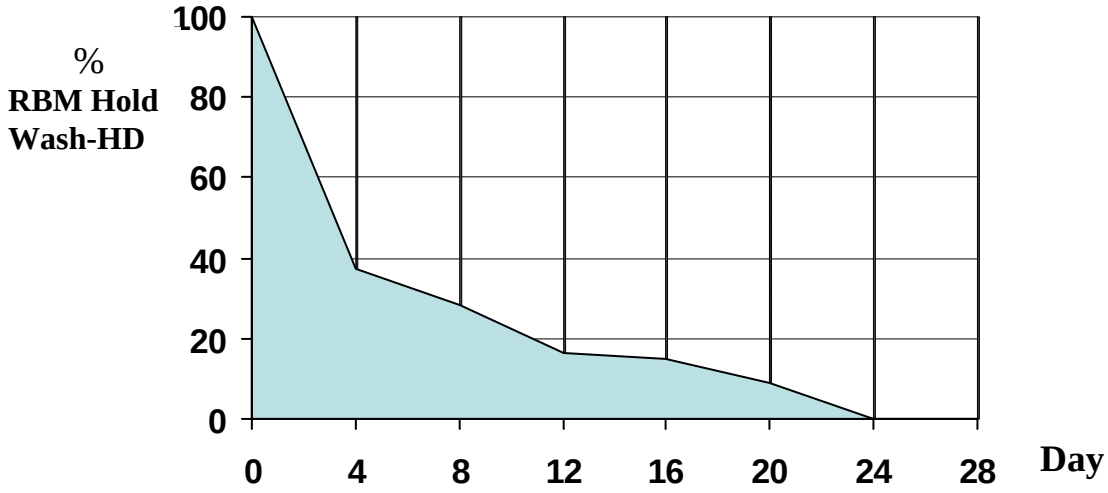
Test: Readily Biodegradability

Test Method: OECD 301D (Organization for Economic Cooperation and Development) Closed Bottle Test
Test Facility: Biodegradation and Ecotoxicity Laboratory, MPOB

Test Result: Readily and the Ultimate biodegradable.
For specific test results, please refer to *Schedule E.*

Description: Because of product's extensive use, the ability of RBM Hold Wash-HD to biodegrade is very critical. Due to this, RBM Hold Wash-HD was formulated with solvents, surfactants and other chemicals that rapidly biodegrade and can be quickly removed from the environment. While effects can occur, particularly in the event of a spillage or accident, they will be localized and of very short duration. Laboratory studies have shown that RBM Hold Wash-HD is readily biodegradable. RBM Hold Wash-HD will undergo readily biodegradation in 4 days, while the ultimate biodegradability (full mineralization) will be achieved within 28 days. Biodegradation was defined using the OECD301D, Closed Bottle Test.

Biodegradation Curve of RBM Hold Wash-HD



2. Aquatic Toxicity

RBM Hold Wash-HD has been formulated to minimize the impact of its discharge to an aquatic ecosystem. It has been established that the level of toxicity to both fish and lower organisms on the aquatic food chain are very low. Evaluations were conducted on pure product on Rainbow Trout (a very sensitive fish species) Tilapia Nilopia (tropical species), Daphnia Magma (a water flea low on the aquatic food chain) and Raphidocelis Subcapitata (plant-like organisms). Results of these tests are given as LC 50 (lethal concentration to 50% of the test population over a given time frame) and EC50 (the concentration of a compound where 50% of its maximal effect is observed).

Acute aquatic toxicity was determined using a fish 96 hours LC_{50}, crustaceans species 48 hours EC_{50} and algal species 72hours EC_{50}. Based on acute toxicity data and environmental fate data RBM Hold Wash-HD is slightly toxic to aquatic life with following values.

a) Test: 72h Algal Growth Inhibition Test

Test Method: Growth inhibition test using the freshwater Alga Selenastrum, 1992. Environment Canada, EPS 1/RM/25
Test Facility: HydroQual Laboratories

Test Result: 72 hours $EC_{50\ (Raphidocelis\ subcapitata)}$ = 40 mg/l

b) Test: Trout 96h Static Acute Test

Test Method: Reference method for determining acute lethality of effluents to rainbow trout, 1990. Environment Canada, EPS 1/RM/13
Test Facility: HydroQual Laboratories

Test Result: 96 hour $LC_{50(Rainbow\ trout)}$= 20 mg/l

c) Test: Tropic fish 96h Acute Test

Test Method: OECD 203, Fish, Acute Toxicity
Test Facility: Biodegradation and Ecotoxicity Laboratory, MPOB

Test Result: =22.6 mg/l

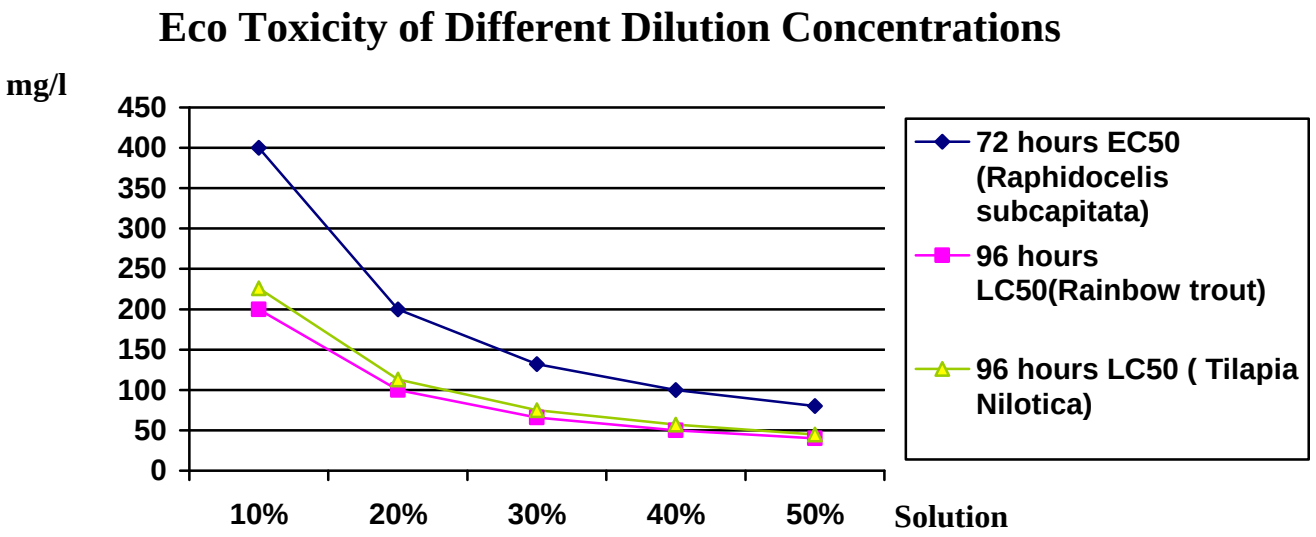
d) Test: Daphnia 48h Static Acute Test

Test Method: Reference method for determining acute lethality of effluents to Daphnia magna, 1990. Environment Canada EPS 1/RM/14
Test Facility: HydroQual Laboratories

Test Result: 48 hours $EC_{50(Daphnia\ magna)}$=27ppm

It should be noted that a number of above studies reflect toxicity for the pure product. Nevertheless, in most of applications RBM Hold Wash-HD is not used strait and is required to

be diluted 1:1, 1:3 or 1:5 with water. We can estimate the aquatic toxicity of 30% and 50% working solution by using a dilution factor of 5 for 20%, 3,3 for 30% and 2 for 50%.



50% working Solution

96 hours $LC_{50\ (\text{Tilapia Nilotica})}$ =45.2 mg/l
96 hours $LC_{50(\text{Rainbow trout})}$= 40 mg/l
48 hours $EC_{50(\text{Daphnia magna})}$=54ppm
72 hours $EC_{50\ (\text{Raphidocelis subcapitata})}$ = 80 mg/l

30% working Solution

96 hours $LC_{50\ (\text{Tilapia Nilotica})}$ =74.6 mg/l
96 hours $LC_{50(\text{Rainbow trout})}$= 66 mg/l
48 hours $EC_{50(\text{Daphnia magna})}$=89.1ppm
72 hours $EC_{50\ (\text{Raphidocelis subcapitata})}$ = 132 mg/l

20% working Solution

96 hours $LC_{50\ (\text{Tilapia Nilotica})}$ =113 mg/l
96 hours $LC_{50(\text{Rainbow trout})}$= 100 mg/l
48 hours $EC_{50(\text{Daphnia magna})}$=135ppm
72 hours $EC_{50\ (\text{Raphidocelis subcapitata})}$ = 200 mg/l

Furthermore, it is rare for the full strength product to be released directly to the environment since it requires being rinsed at least with 10 parts of water. We can estimate the aquatic toxicity of this waste solution.

Waste Solution

96 hours $LC_{50\ (\text{Tilapia Nilotica})}$ =226 mg/l
96 hours $LC_{50(\text{Rainbow trout})}$= 200 mg/l
48 hours $EC_{50(\text{Daphnia magna})}$=270ppm
72 hours $EC_{50\ (\text{Raphidocelis subcapitata})}$ = 400 mg/l

This is very important because should the waste get into the water during the time it takes to biodegrade, there will not be a negative impact on the environment.

3. Ozone Depletion

Test: Ozone Depleting Potential

Test Method: The ozone depletion content of the mixture is determined by calculation from all relevant ingredients with a known ozone depletion factor.

Test Result: RBM Hold Wash-HD has ozone-depleting potential of zero.

Description: Ozone depletion describes two distinct, but related observations: a slow, steady decline of about 4 percent per decade in the total amount of ozone in Earth's stratosphere; and a much larger, but seasonal, decrease in stratospheric ozone over Earth's polar regions during the same period. The content of RBM Hold Wash-HD does not have any ozone depletion chemicals (ODCs) that contribute to decreasing of the ozone layer.

4. Eutrophication

Test: Euprophication Potential

Test Method: The amount of phosphorus and nitrogen of the mixture is determined by adding all relevant ingredients with a known phosphorus and nitrogen content.

Test Result: RBM Hold Wash-HD does not contain any phosphorus and nitrogen.

Description: RBM Hold Wash-HD does not contain any substances that fertilize water bodies with nitrogen and phosphorus, often leading to changes in animal and plant populations and degradation of water and habitat quality.