



PRODUCT TECHNICAL BULLETIN

WD881 ENVIRONMENT, HEALTH & SAFETY FREQUENTLY ASKED QUESTIONS

Perimeter Solutions, through our product stewardship programme, develops, designs, manufactures, markets, and disposes of our products so that they meet societal needs and do not pose undue risk to human health and the environment during any stage of their life cycles. We continuously work with customers to be sure that these principles are followed, also, in end-use applications. We encourage the use of good industrial hygiene practices in the handling of PHOS-CHEK® WD881 Class A foam concentrate and good common-sense practices in the end-use application of the product in firefighting. The Material Safety Data Sheet should always be consulted as the primary source of health and safety information. This document will provide additional guidance on the handling and use of PHOS-CHEK WD881 Class A foam concentrate.

WHAT IS PHOS-CHEK WD881?

PHOS-CHEK WD881 is a foam forming water additive designed for use on Class A fires; those defined by the National Fire Protection Association (NFPA) as fires in ordinary combustible materials such as wood, cloth, paper, rubber, and many plastics.

WHAT DOES PHOS-CHEK WD881 CONTAIN?

WD881 contains a surfactant or wetting agent commonly used in shampoos and other cleaning compounds. Surfactants and wetting agents are terms that are used interchangeably for chemicals which reduce the surface tension of water so that it will more continuously cover and penetrate or soak into porous materials (such as wood) on which it is applied. The surfactant is

dissolved in a mixture of water and organic solvents in order to change it from a solid to a more user-friendly liquid that can be easily metered and mixed with water. PHOS-CHEK WD881 concentrate contains, also, a small amount of an additive which increases foam stability so that its contained water will remain in contact with the fuel long enough to increase penetration and absorption. The characteristic "orange blossom" aroma of WD881 is due to the presence of a small amount of an organic solvent that is extracted from orange peel.

WHY IS WD881 CALLED A CLASS A FOAM RATHER THAN A FIREFIGHTING FOAM?

There are several different types of water additives that are recommended for use in fire suppression. These include several different types of foams; e.g. those that have been formulated for use in extinguishing flammable liquid hydrocarbon pools or tanks which are on fire. These are commonly referred to as AFFF (Aqueous Film Forming Foam), FFFP (Film Forming Fluoroprotein Foam), AR (Alcohol Resistant), and AR-AFFF. Flammable liquids are classified as Class B fuels so these foam types are often referred to as Class B foam concentrates. PHOS-CHEK WD881 is referred to as a Class A foam to readily distinguish it from those formulated specifically for use on fires involving Class B fuels.

HOW IS WD881 USED?

PHOS-CHEK WD881 concentrate is mixed with water at very low concentrations (0.1 to 1.0% by volume) to prepare solutions. For example, 0.3 gallons of WD881

concentrate is mixed with 99.7 gallons of water to prepare a 0.3% solution. Also, for example, a use concentration of 0.5% is prepared by mixing 0.5 gallon of concentrate with 99.5 gallons of water. This solution is then mixed with air to form the firefighting foam that is subsequently applied to the burning or endangered fuels.

WHAT EFFECT WILL THE USE OF PHOS-CHEK WD881 HAVE ON MY HEALTH?

The acute toxicity of PHOS-CHEK WD881 concentrate and its solutions has been extensively tested. Acute toxicity refers to the effect of short-term exposure such as a single contact or ingestion. These tests revealed that the concentrated product is practically non-toxic at even the highest anticipated levels of exposure. No significant adverse health effects would be expected to develop if only a small amount (mouthful) is swallowed. If swallowed, immediate first aid is not likely to be required. A physician or poison control centre can be contacted for advice.

However, strong eye irritation and moderate skin irritation is experienced when the concentrate is allowed to get into the eye or remain in contact with the skin without washing it off. The degree of irritation, in both cases, is similar to that which would be expected from a general service, high performance liquid soap. It is recommended that skin and clothing that comes in contact with the concentrated product be washed at the earliest opportunity. All toxicity testing was conducted by independent testing laboratories using EPA protocols under the

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auspices of the U.S. Department of Agriculture, Forest Service.

The long term, or continual, exposure of workers to the surfactant ingredient which is present in PHOS-CHEK WD881 concentrate and its solutions has been tested also. It was found not to pose a significant hazard to human health during its manufacture or subsequent use. It, and all other ingredients present in WD881, have been studied by the U.S. Food and Drug Administration and approved for use in various types of indirect food additives.

Water solutions of PHOS-CHEK WD881, at the recommended use concentration, will contain at least 99% by volume water. Thus, toxic impacts from its solutions will be far less than from the concentrated agent. It should be recognized, however, that such solutions will exhibit a much lower surface tension and will, consequently, penetrate through clothing, leather footwear and other potentially absorbent apparel to a greater extent than water alone. Also, as water evaporates from the solution and the concentrate strength increases, chapping and skin irritation can become greater. For this reason, it is recommended that even dilute foam solutions be removed from the skin as soon as this is convenient. Also, contaminated clothing should be washed prior to reuse.

WHAT EFFECT WILL USE OF PHOS-CHEK WD881 HAVE ON THE ENVIRONMENT?

Is it biodegradable?

Many, but not all, chemicals that consist primarily of carbon, hydrogen, and oxygen are degraded and ingested by naturally occurring bacteria in the soil, air and water. When this occurs, bacterial enzymes (digestive juices) break the chemical into its individual elements that can then be consumed (used for food) by the bacteria. PHOS-CHEK WD881 contains biodegradable organic compounds that after use are converted by bacteria to carbon dioxide. Biodegradation, in effect, removes product residues from the environment eliminating potential accumulation in nature.

PHOS-CHEK WD881 has been extensively tested and has met the recognized criteria

for being classified as biodegradable in water systems. Testing has been conducted using three different types of measurements of biodegradability.

Measurement of oxygen depletion in a closed system:

PHOS-CHEK WD881 was tested by an independent laboratory under OECD Guideline 301D in which the rate of depletion of dissolved oxygen is measured as a function of time. The product successfully passed this test, showing >60% biodegradation in 28 days. These results confirmed similar Monsanto studies in which BOD and COD were measured at 28 days.

BOD testing was also conducted after only 5 days of exposure. Those tests showed that 30% biodegradation occurred during this initial period. This indicates that PHOS-CHEK WD881 should not place a great immediate oxygen demand on the receiving waters and should, consequently, result in a reduced rate of oxygen depletion in the stream and less probability of fish kill from oxygen depletion.

Measurement of carbon dioxide evolution in an aerated system:

PHOS-CHEK WD881 was tested by an independent laboratory using OECD Guideline 301B in which the rate of generation of carbon dioxide from biodegradation is measured. The product successfully passed this test, showing >60% of the theoretical carbon dioxide evolved in 28 days. This result confirmed Monsanto studies in which an earlier version of the product, PHOS-CHEK WD861, was tested using a similar method.

Measurement of disappearance of dissolved organic carbon in an aerated system:

PHOS-CHEK WD881 was tested by an independent laboratory using OECD Guideline 302B in which the rate of disappearance of dissolved organic carbon (DOC) is measured. The product successfully passed this test, showing >70% removal of dissolved organic carbon in 14 days.

These data, obtained by methods emulating many of the conditions found in

the real-world environment, lead the user to a degree of comfort that PHOS-CHEK WD881 residues which enter the water environment will disappear after a reasonable period of time. This does not mean, however, that it is acceptable to flush large volumes of either PHOS-CHEK WD881 concentrate or its water solutions into waste treatment facilities, streams or other bodies of water. Large volumes of even a biodegradable additive can shock or otherwise interfere with the operation of a waste treatment facility and disrupt the ecosystem.

We have also tested PHOS-CHEK WD881 for its ability to biodegrade in soil. The product successfully degraded, showing 62% of the theoretical carbon dioxide evolved in 97 days. This leads to the conclusion that PHOS-CHEK WD881 residues that remain in the soil after normal use will degrade in a reasonable time. More concentrated solutions, such as might occur from a small spill of foam concentrate, may require more time to be diluted by rainfall before they will degrade.

Is it harmful to plants and vegetation?

The impact of PHOS-CHEK WD881 solutions on vegetation has not been studied. However, millions of gallons of WD881 solutions containing 0.3 to 0.6% of the concentrate have been applied by both aerial and ground application on wildland fires during the past eleven years with no report of vegetative mortality.

There have been reports of needle browning when a Class A foam formulation containing a relatively large concentration of alcohol was applied on evergreen trees. Perimeter Solutions is not aware that these reports have been confirmed.

Will it kill fish?

Testing has been conducted to ascertain the impact of WD881 spills and applications on several aquatic dwelling organisms. The data indicate that the concentrate is slightly to moderately toxic to fish — more so to fingerlings than to larger species. Spills of large volumes of concentrate or foam solution, such as a helicopter load of solution or a full drum of concentrate, into a lake or stream could result in a fish-kill.

Application of foam solutions on or near

the edge of bodies of water should be avoided although significant impact in this case would be questionable because of the extremely low use concentrations. Moderate amounts of product run-off or foam that is flushed into streams after normal use are not likely to cause a fish-kill. When amphibious aircraft scoop water from lakes and rivers, some foam solution will be expelled because of residues in the tanks and the expelling of solution from over-filled tanks. Analyses of water following such an operation by the Province of Quebec (Canada) failed to find detectable quantities of the foam concentrate present the day following the operation.

Will PHOS-CHEK WD881 solutions leach into ground water?

With the highly dilute use concentrations, no ground water concerns would be expected from the application of PHOS-CHEK WD881 solutions. A limited number of analyses from studies in Newfoundland showed no measurable concentration of PHOS-CHEK WD881 ingredients in water from 8 ft deep wells after repeated application of the foam. We would assist in the analysis of water if concerns should arise in the future.

Is it harmful to wildlife or farm animals?

The acute toxicity of PHOS-CHEK WD881 foam solutions was studied by the National Biological Service. These studies indicated that no toxicity should be encountered at the highest practical exposure level. The data indicate, also, that foam residues remaining on vegetation after normal use in firefighting operations is unlikely to cause harm if subsequently ingested by animals. The reaction of the digestive systems of animals varies significantly among species, however. Thus, we recommend that if domestic animals such as cows or horses consume a large amount of PHOS-CHEK WD881, a veterinarian or Animal Poison Control Centre be contacted for advice specific to the situation.

WHAT SHOULD I DO IF PHOS-CHEK WD881 CONCENTRATE IS SPILLED?

All spills of all chemicals, including PHOS-CHEK WD881 concentrate, should be contained to minimize ground saturation and to prevent runoff into bodies of water. If the volume of concentrate spilled is large (greater than a few gallons), it should be contained with an earth dike or other barrier. It should then be cleaned up with a shop-vac system or some similar equipment, filtered to remove contaminants and reused if possible. If re-use is not possible, the collected material should be incinerated. Any liquid remaining on the ground after this should be absorbed with oil-dry type product, sand, sawdust or some similar compound, which then can be incinerated or placed in a landfill if the landfill authorities will accept it. The contaminated surface area can then be flushed with water if needed. Smaller spills that do not need containment should be absorbed the same way. It may not be necessary to dispose of the clean-up from this product as hazardous waste since there is nothing in PHOS-CHEK WD881 that would classify it as hazardous waste. However, this may vary in some jurisdictions, such as the State of California, where concentrate spills could generate hazardous waste. It is, therefore, recommended that the regulations of the jurisdiction where the spill occurs be considered in determining how best to handle clean-up debris.

HOW SHOULD I HANDLE CLEAN-UP OF PHOS-CHEK WD881 SOLUTIONS THAT WERE APPLIED IN FIRE SUPPRESSION?

PHOS-CHEK WD881 foam solution applied on vegetation for fire suppression activities does not require clean-up. The foam will collapse within a few hours, at most, and the released foam solution will penetrate into the soil where it will biodegrade. If applied on hard surfaces such as driveways or footpaths, it can be flushed into the sewer with plenty of water. Low velocity water streams will more successfully flush the area without forming additional foam.

When PHOS-CHEK WD881 foam solution is

applied for structure protection, it can be washed off with water. Again, water will be released from the foam and the product residues will then be biodegraded in the soil. If used within a structure, it can be picked up in the same manner as water. In this case, however, the surfaces that came in contact with the foam solution should be washed with plain water to remove any residues prior to repainting.

ARE THERE ANY SPECIFIC REGULATORY REQUIREMENTS OR REPORTING THAT I MUST FOLLOW WHEN USING PHOS-CHEK WD881?

Most Class B and some Class A foam additives contain components which are classified as hazardous wastes (e.g. diethylene glycol butyl ether, tertiary butanol, etc.). PHOS-CHEK WD881 Class A foam concentrate does not contain components that necessitate its collection and disposal as a hazardous waste. Note that this is true of WD881 but may not be true of all Class A agents. The Safety Data Sheet (SDS) provided by the manufacturer should be consulted in order to determine the safety of other products.

None of the ingredients of PHOS-CHEK WD881 Class A foam are on the traditional federal regulatory management lists such as the SARA 313 emission reporting list or the CERCLA spill reporting list. We would encourage, however, reporting to appropriate local authorities any significant spill of foam concentrate that enters a waterway or is not cleaned up.

DOES WD881 CONTAIN PFAS WHICH IS PERSISTENT IN THE ENVIRONMENT?

PHOS-CHEK WD881 Class A foam concentrate does not contain any Polyfluoroalkyl Substances (PFAS), ingredients commonly found in fluorinated Class B foam concentrates. Perimeter Solutions foam manufacturing process is intentionally separated between fluorinated and non-fluorinated concentrate types, thus eliminating the potential for cross contamination or residual contamination.



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