DF-200HF

High Foaming Formulation Application for the Mitigation and Decontamination of Weapons of Mass Destruction

OPERATION INTRUCTIONS

NEOSAN LABS®

www.neosanlabs.com

READ ALL INSTRUCTIONS BEFORE USING THIS PRODUCT.
KEEP OUT OF REACH OF CHILDREN.
THIS PRODUCT IS A CBRNE DECONTAMINANT
FOR PROFESSIONAL USE.

SEE OPERATING INSTRUCTIONS
FOR ADDITIONAL PRECAUTIONARY STATEMENTS.
MIX FOR USE IN LIQUID, SPRAY, COLD FOG OR FOAM.

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DF-200HF: **Operation Instructions Introduction**

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The information contained herein has been compiled from sources considered by NeoSan Labs Inc. to be dependable and accurate to the best of the company's knowledge .

No guarantee of accuracy is made. It is the user's responsibility to determine the suitability of this information for the adoption of necessary safety precautions, decontamination protocols, and disposal considerations.

The information relates to the specific materials designated herein, and does not relate to the use in combination with any other material or process.

The listed hazard data herein only reflects the hazards related to the formulation as a whole or to individual components at 100% concentration.

Therefore, certain warnings and hazard statements contained on this document may not be applicable or included in the packaging labeling.

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DF-200HF: **Technology Description**

In response to the national initiative to combat chemical and biological warfare (CBW) threats, Sandia National Laboratories (SNL) has developed the Decon Formulation (DF); an environmentally benign, non-toxic, and low-corrosive aqueous formulation for the removal of chemical and biological warfare agents.

DF-200 is the second generation of SNL's decontamination formulation. It is an enhanced version that does not need a pH adjustment and contains a bleaching activator to speed up reaction kinetics and better efficacy and performance. DF-200 is recommended for decontamination of Chemical Agents (G, H and V), Toxic Industrial Chemicals, Biological Agents (*), and Radioactive Material (**).

The formulation, manufactured by NeoSan Labs Inc., can be deployed as a foam, liquid, spray, vapor, or fog. DF-200 is intended for portable decontamination usage against tested agents. DF-200 is formulated to decontaminate hard, non-porous environmental surfaces, materials, equipment and furniture, soil, air, air conditioning systems, and ventilation and duct filters.

DF-200HF is the enhanced version of DF-200, used for High Foaming (HF) applications. This HF formulation produces a stable, sticky, and dense foam.

(*) DF-200 decontamination efficacy against Anthrax spores has been certified.
(**) DF-200 decontamination efficacy against α, β, and γ isotopes has been tested.

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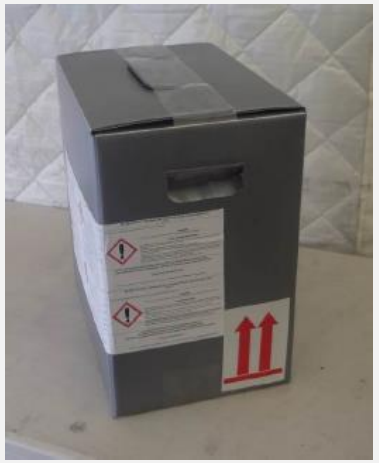
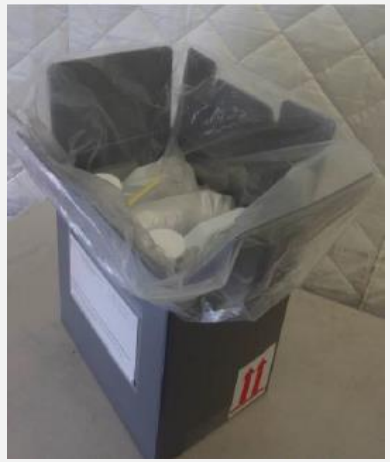
DF-200HF: 5 Gallon Kit. **Description**

DF-200HF is a three-part kit (A, B, & C). Part A is an aqueous solution with a special combination of solubilizing and foam forming agents. Part B has the reactive component, hydrogen peroxide. Part C is a bleaching activator.

For CBRNE contracts, DF-200HF is distributed in 5 Gallon kits with an outer packaging made up of polypropylene to allow outdoor storage.





Not contractual photos

For complete information, read the Material Safety Data Sheet (MSDS).

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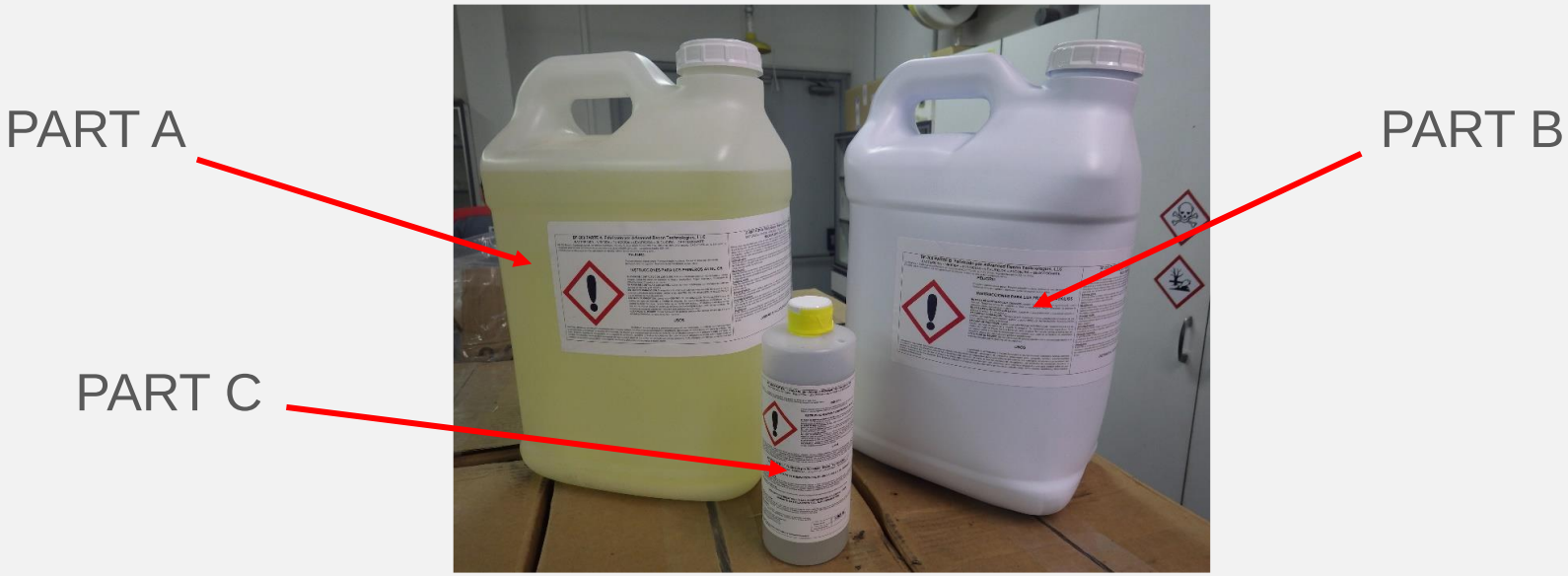
DF-200HF: 5 Gallon Kit **Description**

The DF-200HF 5 Gallon Kit contains a translucent 2.5-gallon bottle of Part A (yellowish liquid), a white 2.5-gallon bottle of Part B (clear liquid), and a 13-ounce bottle of Part C.

DF-200HF 5 Gallon Kit contains premeasured quantities of each part for optimal application.



Not contractual photo

For complete information, read the Material Safety Data Sheet (MSDS).

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DF-200HF: 5 Gallon Kit **Storage Indications**

Boxes should be stored in a cold, dry climate protected from sunlight and UV light.

Never store boxes or bottles in direct sunlight or where temperatures are expected to be below -21ºC/-6ºF or above 71ºC/160ºC. Avoid long-term storage temperatures of over 45ºC/113ºF.

If you know or suspect that the product has been stored under high temperature conditions (more than 45ºC/113ºF) for a long period of time (more than 12 months), DF-200HF Part B should be verified with a peroxide test prior to use. It passes if the H_2O_2 is at or above 6%.

Store the product in its original container in a well-ventilated storage facility.

Keep the boxes away from flammable material or open flames. Keep away from food, drink, and animal feeding stuffs. Keep the boxes away from other oxidizing agents or other decontamination products.

Do not stack more than two pallets high. Never store pallets on sensitive, unstable, or irregular surfaces.

Periodical checks of stored boxes should be performed to ensure integrity of boxes and bottles and ensure storage conditions.

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DF-200HF: PART A

CHEMICAL COMPOUND DESCRIPTION.

DF-200 HF Part A is a biodegradable detergent that combines cationic and nonionic surfactants: 6% is the quaternary ammonium ion compounds, chlorides, alkyl dimethyl benzyl ammonium, 2% is quaternary ammonium penthamethyltallowalkyl-1,3-propane diammonium dichloride, and 92% are inert ingredients.

DANGER

Causes severe eye irritation. Causes skin irritation. Harmful if inhaled. Harmful if swallowed.

FIRST AID INSTRUCTIONS

IF IN EYES: Rinse cautiously with water for several minutes. If the victim wears contact lenses, remove them if this can be done easily. Continue to rinse. If eye irritation persists, consult a doctor.

IN CASE OF SKIN CONTACT: Wash immediately and thoroughly for 15 to 20 minutes.

IF INHALED: Remove victim outside and keep at rest in a comfortable position for breathing. Call a poison control centre or doctor if the victim feels ill.

IF SWALLOWED: Call a poison control centre or physician if the victim feels unwell. Specific measures (see on this label): rapidly drink glasses of water or milk if the victim is able to swallow. Do not induce vomiting unless instructed to do so by a poison control centre or doctor. Do not give anything by mouth to an unconscious person.

NOTE TO PHYSICIAN: Probable mucosal lesions may contraindicate the use of gastric lavage.

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DF-200HF: PART A

TEMPERATURE STORAGE INDICATIONS & INSTRUCTIONS

Avoid product from freezing and storage temperatures from reaching below 10ºC/50ºF or greater than 50ºC/122ºF.

Part A will freeze at approximately -3ºC/26ºF. Storage temperatures have lead to liquid freezing when they have been, or suspected to have been, below 10ºC/50ºF. The container should always be inspected for the possible development of solid matter at the bottom of the container. If solid matter is present, all affected containers should be moved to a location where the temperature is greater than 22ºC/72ºF and left to equalize. The full contents of the container should be vigorously shaken to dissolve the solid matter. In the case where immediate use is required, the entire container of Part A should be thoroughly mixed with the contents of Part B in a separate container of sufficient capacity. The solid matter will dissolve into fully usable liquid with mixing. Partial containers of Part A with solid matter should be treated in the same manner.

Part A will not be damaged by high storage temperatures.

HANDLING RECOMMENDATIONS

Personnel handling the material should wear eye protection and gloves. See the MSDS for more information and instructions.
At temperatures above 50ºC/122ºF, some container bulging may be noted due to water vapor pressure inside the bottle.

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DF-200HF: PART B

CHEMICAL COMPOUNDS DESCRIPTION

DF-200HF Part B Active Ingredient: Hydrogen Peroxide (CAS n° 7722-84-1): 7.9% (m/m)

Inert Ingredients : 92.1% (m/m)

DANGER

Causes severe eye irritation. Causes skin irritation. Harmful if inhaled. Harmful if swallowed.

FIRST AID INSTRUCTIONS

IF IN EYES: Rinse cautiously with water for several minutes. If the victim wears contact lenses, remove them if this can be done easily. Continue to rinse. If eye irritation persists, consult a doctor.

IN CASE OF SKIN CONTACT: Wash immediately and thoroughly for 15 to 20 minutes.

IF INHALED: Remove victim outside and keep at rest in a comfortable position for breathing. Call a poison control centre or doctor if the victim feels ill.

IF SWALLOWED: Call a poison control centre or physician if the victim feels unwell. Specific measures (see on this label): rapidly drink glasses of water or milk if the victim is able to swallow. Do not induce vomiting unless instructed to do by a poison control centre or doctor. Do not give anything by mouth to an unconscious person.

NOTE TO PHYSICIAN: Probable mucosal lesions may contraindicate the use of gastric lavage.

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DF-200HF: PART B

TEMPERATURE STORAGE INDICATIONS & INSTRUCTIONS

Avoid product from freezing and storage temperatures from reaching below 10ºC/50ºF or greater than 50ºC/122ºF.

Part B will freeze at approximately -3ºC/26ºF. If freezing occurs, allow Part B to thaw.

Part B is the most highly sensitive part of the kit to high storage temperatures. In order to avoid Part B's self-acceleration decomposition, do not store above 50ºC/122ºF. High storage temperatures (>50ºC/122ºF) will decrease hydrogen peroxide activity.

HANDLING RECOMMENDATIONS

Personnel handling the material should wear eye protection and gloves. See the MSDS for more information and instructions.

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DF-200HF: PART C

CHEMICAL COMPOUND DESCRIPTION

DF-200 Part C Active Ingredient: Glycerol Diacetate (CAS No. 25395-31-7) 100% (m/m)

DANGER

Causes severe eye irritation. Causes skin irritation. Harmful if inhaled. Harmful if swallowed.

FIRST AID INSTRUCTIONS

IF IN EYES: Rinse cautiously with water for several minutes. If the victim wears contact lenses, remove them if this can be done easily. Continue to rinse. If eye irritation persists, consult a doctor.

IN CASE OF SKIN CONTACT: Wash immediately and thoroughly for 15 to 20 minutes.

IF INHALED: Remove victim outside and keep at rest in a comfortable position for breathing. Call a poison control centre or doctor if the victim feels ill.

IF SWALLOWED: Call a poison control centre or physician if the victim feels unwell. Specific measures (see on this label): rapidly drink glasses of water or milk if the victim is able to swallow. Do not induce vomiting unless instructed to do by a poison control centre or doctor. Do not give anything by mouth to an unconscious person.

NOTE TO PHYSICIAN: Probable mucosal lesions may contraindicate the use of gastric lavage.

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DF-200HF: PART C

TEMPERATURE STORAGE INDICATIONS & INSTRUCTIONS

DF200 Part C is a pure compound with a freezing point at -30ºC / 22ºF. It is not susceptible to freezing.

UV light will not degrade or affect the product. It has a boiling point of 280°F (138°C).

HANDLING RECOMMENDATIONS

Personnel handling the material should wear eye protection and gloves. See the MSDS for more information and instructions.

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DF-200HF 5-Gallon Kit: **Preparation for use**

INDICATIONS OF PREPARATION FOR USE

- Prior to preparing the mixture, inspect the boxes and bottles for damage or leakage. Check the product expiration date.
- Do not use DF-200HF without a lot number, if it is expired, or if the boxes or bottles show signs of damage.
- If you do not know the storage temperature or know that it has been higher than the recommended temperature, check the activity of Part B with a peroxide test kit.
- If solid matter is present in Part A due to its storage conditions, shake the bottle vigorously to dissolve the solid particles. In the case where immediate use is required, the entire container of Part A should be thoroughly mixed with the contents of Part B in a separate container of sufficient capacity. The solid matter will dissolve into fully usable liquid with mixing.
- Prepare DF-200HF in a well-ventilated area. Proper protective equipment must be used (see more information in MSDS).
- Do not mix DF-200HF with other products.

INSTRUCTIONS FOR PREPARATION FOR USE

- DF-200HF 5-Gallon Kit contains premeasured quantities of each part for optimal application. Mix all three parts according to the instructions. Do not mix with anything else.
- Combine Parts B & C, then A. Mix well.

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DF-200HF COMBINED FOR USE
INDICATIONS OF SAFETY DURING USE

- Avoid contact with skin, eyes, or mucus membranes.
- Do not ingest. Do not use on skin. Avoid breathing spray, mist, or gases.
- Use DF-200HF in a well-ventilated area.
- Wear eye protection (face shield or safety glasses).
- Wear protective clothing and chemical resistant gloves (butyl rubber, nitrile, neoprene, polyethylene, polyvinyl chloride).
- If ventilation is not sufficient to effectively prevent buildup of aerosols or vapors, appropriate NIOSH/MSHA rated respiratory protection must be provided, such as respiratory mask.
- If contact is made, flush eyes thoroughly, drink several glasses of water, or rinse exposed area thoroughly.

For complete information, read the Material Safety Data Sheet (MSDS).

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DF-200HF COMBINED FOR USE
INDICATIONS OF CAUTIONS DURING USE

- The product should no come in contact with foodstuff or animal feed. If product is used on surfaces that are in contact with food, it is necessary to rinse the surface with clean water before being in contact with food again.
- The product will produce surface corrosion on unpainted/uncoated bare metallic and alloy surfaces. The surface corrosion may decrease the product's efficacy to decontaminate.
- The product may cause alterations to sensitive surfaces. Check its suitability before use.
- Do not apply the product on sensitive equipment.
- Long exposures to the product may reduce the protection factors of protective equipment used.
- This product must be used within 10 hours of combination.

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DF-200HF COMBINED FOR USE
APPLICATION RECOMMENDATIONS

PRODUCT COVERAGE

- The recommended sprayer system for a CBRNE treatment must guarantee high density of product on the surface (50-70 drops/cm^2), small droplet size (150–250 micron diameter), and working pressure between 3 and 4 bars.

  For a totally wet surface, this sprayer system application requires 60-100ml of product to cover 1m^2.

- Compressed Air Foam System (CAFS) can be used to produce DF-200HF foam.

  Produced foam is stable for 1-4 hours (depending on environmental conditions and application).

  Low expansion ratio foam (8-30:1) is the recommended application for a CBRNE treatment.

  For biological decontamination, the product can be expanded 15-30 times. For chemical decontamination, the product can be expanded 8-15 times.

  With the CAFS recommended for a CBRNE application, 1L of DF-200HF will cover between 2-3m^2.

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DF-200HF COMBINED FOR USE
APPLICATION RECOMMENDATIONS

CONTACT TIME

Type of Surface	Type of AGENT			
	Chemical Agents			Biological Agent
	Nerve Agents		Blister Agents	
	G Agent	V Agent	H Agent/Lewisite	Bacillus anthracis spores
Non-porous material	15 minutes	15 minutes	30 minutes	30 minutes
Porous material	30 minutes	30 minutes	60 minutes	60 minutes

TABLE: Required contact time with DF-200HF for spray and foam application.

Indications:

- Keep surface totally wet with product. Perform additional applications as needed if surface becomes dry.
- If the DF-200HF dries before the recommended contact time, reapply regardless of the agent.
- Some contaminated material may need more time. For example, rubber tires need at least 60 minutes contact time.

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DF-200HF COMBINED FOR USE
APPLICATION RECOMMENDATIONS

OPTIMAL APPLICATION CONDITIONS

DF-200HF is best applied in relatively low to moderate humidity in a temperature range of 7ºC/45ºF to 30ºC/85ºF.

WORKING IN COLD CONDITIONS

If you use DF-200HF Part A and Part B in freezing conditions, thaw out each part and mix the formulation in accordance with the mixing instructions. Some visible white particles can be present in DF-200HF Part A, which is normal following freezing. Aggressive stirring should dissolve the solid particles back into the solution.

In the case where immediate use is required, the entire container of part A should be thoroughly mixed with the contents of Part B in a separate container of sufficient capacity. The solid matter will dissolve into fully usable liquid with mixing.

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DF-200HF COMBINED FOR USE
APPLICATION RECOMMENDATIONS

SURFACE TEMPERATURE CONDITIONS

In order to guarantee maximum contact time on any surface, control the surface temperature and choose the optimal application type. The product can be applied to any surface orientation (vertical, underside, horizontal).

- Surface temperature: 0ºC/32ºF to 30ºC/86ºF - use foam.
- Surface temperature: 0ºC/32ºF to 49ºC/120ºF - use spray.

ACTIVITY CONTROL

Mixed solution is only 100% active for 10 hours after mixing. After this time, the Hydrogen Peroxide activity decreases to zero within 62 hours. After this, only the active ingredients of Part A remain active for multiple days (21 days in laboratory tests).

The reaction with agents, the environment, and the application conditions decrease the product's decontaminant activity.

In order to control the mixed product's activity use, a Hydrogen Peroxide test kit must be used as well as checking the pH level.

- The pH range considered optimal for decontamination is between 9.6 – 9.8. Do not use the product if the pH value is below or has exceeded the limits, which are between 7.5 and 10.5.

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DF-200HF COMBINED WASTE **DISPOSAL**

DISPOSAL

- Dispose of all mixed and unused product in accordance with the applicable laws and regulations at the place of usage.
- To dispose of the used product, especially after chemical decontamination application, test the waste product in order to detect by-product. Usually, the by-product of the reaction is not toxic but can be considered at times hazardous and must be treated.
- In the case where a reduction of the reactive activity of the mixed product were necessary, store the product at least 24 hours before its disposal in order to dissipate the active oxygen.
- Do not clean tanks and facilities where mixed product has been used or stored with other products. Rinse them with water.