

ANTIMICROBIAL AGENTS

SECTION II-7
DISINFECTANT
INDUSTRY

How DOW Antimicrobials Serve the Disinfectant Industry

Industrially, disinfectants are used on walls and floors, in rest rooms, and on processing equipment to reduce the danger of microbial contamination of the product being manufactured. In hospitals they are utilized in sickrooms, corridors, operating rooms, laboratories, and rest rooms to maintain facilities in a sanitary condition. Housewives employ disinfectants to maintain cleanliness in sickrooms, nurseries, bathrooms and kitchens.

This bulletin discusses the various DOWICIDE antimicrobials that can be used in disinfectant applications and the types of formulations in which they are incorporated.

DOWICIDE* ANTIMICROBIALS ARE AMONG THE MOST EFFECTIVE, WIDELY USED MATERIALS AVAILABLE TO THE DISINFECTANT INDUSTRY**



They:

- Have high germicidal potency.
- Display a broad spectrum of activity against microorganisms.
- Are low in cost per unit of germicidal activity.
- Have good solubility in common organic solvents and compatibility with the common phosphate and chelate builders employed with detergents.
- May be formulated into a variety of products to meet specific requirements.

DOWICIDE 1 Antimicrobial*

DOWICIDE 1 is unique among phenolic antimicrobials because of its effectiveness against *Pseudomonas*-type organisms; therefore, it is incorporated into virtually all hospital disinfectant formulations. Supplied in flake form, it can be used alone or with other products such as DOWICIDE 9 GERMICIDE. It has a very mild odor and is not rapidly inactivated by organic matter. Concentrates containing 3-25% by weight have been used successfully and can be perfumed satisfactorily.

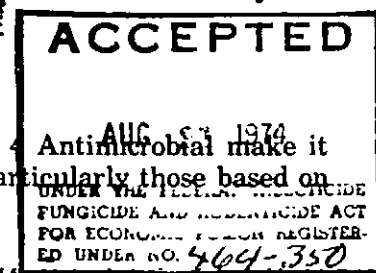
DOWICIDE 4 Antimicrobial

The mild odor and satisfactory phenol coefficient of DOWICIDE 4 Antimicrobial make it useful for manufacturing economical disinfectant formulations, particularly those based on pine oil. It is supplied in flake form.

* Trademark of The Dow Chemical Company

** DOWICIDE antimicrobials, or the disinfectant formulations containing them, are intended for use only on inanimate objects. They should not be applied to the skin of animals or human beings.

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NOTICE: Seller warrants that the product conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with directions under normal conditions of use, but neither this warranty nor any other warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE, express or implied, extends to the use of this product contrary to label instructions or under abnormal conditions, or under conditions not reasonably foreseeable to seller, and buyer assumes the risk of any such use. Freedom from patents of Dow or others is not to be inferred. Inasmuch as any assistance furnished by Dow with reference to the safe use and disposal of its products is provided without charge, Dow assumes no obligation or liability therefor, except to the extent that any such assistance shall be given in good faith.



THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN 48640

DOWICIDE 9 Germicide

This product is one of the most biologically active phenolic germicides available commercially. It is effective against a wide spectrum of pathogenic organisms, particularly against the tuberculosis bacterium. Because of its extreme activity, it can be used in smaller quantities than other phenolic antimicrobials, thereby resulting in cost savings to the formulator. Additional savings are realized because such formulations require less detergent. Since it is a liquid, it may be blended into formulations without the use of heat or excess solvents. It is employed in industrial disinfectant formulations and—combined with DOWICIDE 1—in hospital disinfectants. DOWICIDE 9 is commonly incorporated into formulations at levels of 2-5%. The Technical Bulletin, "How DOWICIDE 9 Serves the Detergent-Disinfectant Industry," (Section II-8) contains sample formulations.

DOWICIDE 32 Antimicrobial

Desirable qualities of DOWICIDE 32 Antimicrobial include low unit cost, good phenol coefficient, and balanced effectiveness against both Gram-positive and Gram-negative organisms. Like DOWICIDE 9, it is a liquid, hence it may be incorporated into detergent-disinfectant and pine-oil formulations without heat. Formulations can be perfumed satisfactorily. DOWICIDE 32 is used in industrial disinfectants and, together with DOWICIDE 1, in hospital disinfectants. It is an active ingredient of several formulations meeting government specifications for disinfectants.

NOTE: The DOWICIDE products mentioned above may present hazards in handling and use. Observe all precautions given on the product labels and in the product literature.

FORMULATION OF DISINFECTANTS

Detergent-Disinfectants

These are products which contain a surfactant along with a phenolic-type germicide and which clean as well as disinfect. DOWICIDE antimicrobials are the basic ingredients in a wide variety of such combined products.

Several basic factors must be kept in mind when detergent-disinfectants are formulated. These include:

- Type of surfactant used.
- Ratio of surfactant to germicide.
- pH of the formulation when diluted for use.
- Presence of organic matter on the surface to be cleaned.

Because phenolic germicides are anionic in nature, they should be formulated only with anionic surfactants. Other types are incompatible. Among synthetic materials, DOWFAX* 2A1 Surfactant has proved very satisfactory. Of the natural surfactants, only 100% coconut oil-based soaps should be utilized. At times it may be necessary to use two surfactants in combination, one to aid in solubilizing the phenol and the other for its detergent properties.

The germicidal power of DOWICIDE antimicrobials is increased by the addition of surfactant up to a certain concentration, after which more surfactant reduces germicidal power. The level of the surfactant should never exceed three or four times the level of the antimicrobial. As a starting point, the surfactant should be used at twice the concentration of the antimicrobial. If this proves satisfactory, the amount of surfactant can be adjusted to determine the minimum level required for the formulation to perform properly.

The finished detergent-disinfectant should have a pH of 11 to 11.5 to insure the proper pH when the formulation is diluted for use. With DOWICIDE 9, the diluted formulation pH should be about 10. If the pH is too high, the dissociation of the antimicrobial is increased and consequently its germicidal power is decreased.

* Trademark of The Dow Chemical Company.

FORMULATION OF DISINFECTANTS—continued

The presence of organic matter on the surface being cleaned also affects the germicidal potency of detergent-disinfectant formulations. Although DOWICIDE antimicrobials do maintain a good portion of their activity with organic matter present, there is some loss. Surfaces heavily contaminated with organic matter should, therefore, be given a preliminary cleaning before the disinfectant is applied.

A good detergent-disinfectant formulation should be clear in the concentrated form and clear or only slightly cloudy when diluted for use. These characteristics indicate the product has been properly formulated. Other requirements may include the ability to pass three freeze-thaw cycles and to remain stable during prolonged storage.

In order to confirm the antibacterial effectiveness of a disinfectant, the manufacturer must test his product per the AOAC (Association of Official Analytical Chemists) Use-Dilution Test. This test must be performed against each organism that is claimed on the manufacturer's label. The Environmental Protection Agency should be consulted prior to the application for registration of a product. This agency will determine how many replicate use-dilution tests are necessary before the product will be considered for registration.

Pine-Type Disinfectants

In the last two decades, manufacturers of disinfectants based on pine oil have turned increasingly to DOWICIDE antimicrobials in order to make their formulations effective against Gram-positive as well as Gram-negative bacteria. Three materials, DOWICIDE 4, DOWICIDE 9, and DOWICIDE 32, are utilized for this purpose. Since these antimicrobials are similar in chemical structure to the compounds found in pine oil, they are readily incorporated and present no added formulation difficulties. The finished product, which retains its characteristic pine odor, is used for household and industrial applications.

LABELING REQUIREMENTS

All of the DOWICIDE antimicrobials and the applications discussed in this bulletin are subject to registration under both federal and state economic poisons laws. Federal registration entails submission of the label intended for use on the product, the complete formula (confidential) and data supporting the various claims made on the label. To help its customers, Dow has prepared a bulletin, "Labeling Antimicrobial Preparations as Economic Poisons," (Form #122-209-68) which explains labeling requirements in detail. A copy is available upon request.

HANDLING, STORAGE, SAFETY

Detailed information for the various DOW antimicrobials is found in the specific product information literature. Additional useful information is contained in "Precautions For Handling DOW Antimicrobials," Form No. 192-93-72, Section IV-1.

FURTHER INFORMATION

For further information on DOW antimicrobials, contact Dow Chemical U.S.A., Designed Products Department, 2040 Dow Center, Midland, Michigan 48640, or your Dow sales representative.

CUSTOMER NOTICE

DOW encourages its customers to review their applications of DOW products from the standpoint of human health and environmental quality. To help ensure that DOW products are not used in ways for which they are not intended or tested, DOW personnel are willing to assist customers in dealing with ecological and safety considerations. Your DOW salesman can arrange the proper contacts.

