



## DOWICIDE 1E Antimicrobial

### General

DOWICIDE\* 1E Antimicrobial is readily soluble in most organic solvents and oils, and is only slightly soluble in water. DOWICIDE 1E Antimicrobial can be formulated with the aid of anionic emulsifiers. However, it is usually incompatible with most other types of surfactants and emulsifiers.

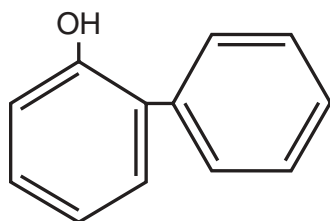
DOWICIDE 1E Antimicrobial is Dow's brand of o-phenylphenol.

This product is uniquely effective against a wide variety of organisms, including *Pseudomonas spp.*, *Mycobacterium spp.* and many types of molds and fungi.

Manufacturers of metalworking fluids incorporate DOWICIDE 1E into soluble oil and semi-synthetic concentrates to control spoilage of the diluted concentrate. The utility here stems from a favorable balance of oil and water solubility characteristics.

DOWICIDE 1E Antimicrobial is also utilized in preserving ceramic glazes, adhesives, and leather articles.

### Structure



### Physical Properties

These are laboratory or literature data typical of the product and are not to be considered as, or confused with, specifications.

Formula	C <sub>6</sub> H <sub>4</sub> (C <sub>6</sub> H <sub>5</sub> ) OH
Molecular weight	170.2
Freezing Point, °C	57
Boiling Point, °C	286
Flash Point, C.O.C.	124°C/255° F
Fire Point, C.O.C.	149°C/300° F
Specific Gravity, 25/25°C	1.2
Bulk Density, lb/ft <sup>3</sup>	35-41
Vapor Pressure, mm Hg	
20°C	0.0017
50°C	0.0326
100°C	1.13
140°C	7

**Solubility, approx g/100g solvent at 25°C**

DOWANOL * PM glycol ether	420
Methanol	870
Ethanol (95%, F2B)	580
Ethylene glycol	140
Isopropanol	460
CARBOWAX PEG400	180
Polyglycol P400	180
Polyglycol P1200	140
Propylene glycol	280
Water	
25°C	0.08
60°C	0.16

**Sales  
Specifications**

Description: White to light buff to pink free-flowing flakes and powder

Active ingredient, o-phenylphenol	99%
Inert ingredients	1%

**Packages**

DOWICIDE 1E Antimicrobial is sold in multiwall bags having a net weight of 25 kg (55.12 lb).

**E.P.A.  
Registration  
No. 464-126**

DOWICIDE 1E Antimicrobial, when used according to good manufacturing practices, meets the requirements of the F.D.A. for use in defoaming agents (21CFR 176.210), adhesives (21CFR 175.105), and rubber articles (21CFR 177.2600).

**Antifungal  
and  
Antibacterial  
Efficacies**

Test Organism	% for Inhibition
<b>FUNGI</b>	
<i>Rhizopus nigricans</i>	0.015 - 0.02
<i>Rhizoctonia solani</i>	0.001 - 0.002
<i>Chaetomium globosum</i> (ATCC #6205)	0.0025 - 0.005
<i>Hormiscus gelatinosum</i>	0.005 - 0.01
<i>Aspergillus niger</i>	0.025 - 0.05
<i>Polyporus tulipiferae</i> (F.P.L. No. 517, ATCC #11245)	0.005 - 0.01
<i>Aspergillus flavus</i> (ATCC #9643)	0.005 - 0.01
<i>Lenzites trabea</i> (ATCC #11539)	0.0025 - 0.005
<i>Ceratostomella pilifera</i>	0.005 - 0.01
<i>Trichophyton interdigitale</i>	0.002 - 0.0035
<i>Trichophyton rosaceum</i>	0.0035 - 0.005
<b>BACTERIA</b>	
<i>Staphylococcus aureus</i> (ATCC #6538)	0.01 - 0.015
<i>Bacillus subtilis</i> (ATCC #8473)	0.01 - 0.015
<i>Enterobacter aerogenes</i> (ATCC #13048)	0.01 - 0.015
<i>Klebsiella pneumoniae</i> (ATCC #8308)	0.01 - 0.015
<i>Pseudomonas aeruginosa</i> (ATCC #10145)	0.02 - 0.025
<i>Pseudomonas aeruginosa</i> (ATCC #15442)	0.045 - 0.05
<i>Proteus vulgaris</i> (ATCC #881)	0.005 - 0.01
<i>Escherichia coli</i> (ATCC #11229)	0.01 - 0.015
<i>Salmonella choleraesuis</i> (ATCC #10708)	0.01 - 0.015

## Applications

Industry	Reason for Addition	Suggested Concentration		Application Method
<sup>†</sup> <b>Glues and Adhesives</b>	To protect from deterioration during manufacture, storage and service life.	Glues: Bone/plant Leather, Skin & Fish Gelatin based Starch based liquid Starch based solid Albumin containing Adhesives: cellulose/dextrin Polymer dispersion based Casein containing	0.1 - 0.15% 0.15 - 0.4% 0.15 - 0.3% 0.1 - 0.25% 0.15 - 1.0% 0.2 - 0.4% 0.1 - 0.3% 0.1 - 0.3% 0.2 - 0.4%	Add to organic portion of the ingredients, mix then add to the formulation..
<sup>†</sup> <b>Gaskets</b>	To preserve felt gaskets.	1% by wt. of organic solvent.		Saturate felt with solution of DOWICIDE 1E in a volatile solvent such as alcohol or Stoddard solvent.
<b>Concrete Admixtures</b>	To control the growth of fungi and bacteria in concrete admixtures.	0.01 - 0.6% by weight of admixture.		Add at a suitable point during the manufacture of the admixture. Conversion to a water dilutable alkaline concentrate, using sodium hydroxide, is recommended.
<sup>†</sup> <b>Slurries</b>	To control the growth of fungi and bacteria in aqueous based slurries and dispersed pigments, such as clay, calcium carbonate, kaolin and other filler suspensions.	0.05 - 0.9% by weight of slurry.		Add at a suitable point during the manufacture, container loading/filling or shipment of the slurry. If needed, add caustic to make a water dilutable alkaline concentrate.
<b>Ceramics</b>	To prevent decomposition of ceramic glazes and clay slips.	0.05 - 0.1% by wt. of glaze or slip formulation.		Add to ingredients of formulation as they are charged into ball mill.
<b>Metalworking Fluids</b>	To prevent decomposition of fluids prepared from water-emulsifiable oil concentrates.	0.1 - 1.5% by wt. of diluted concentrate.		Add to water-emulsifiable oil concentrate during formulating process.
<sup>†</sup> <b>Leather</b>	To impart temporary mold resistance to shoeliners, hat bands, gloves, etc.	1.5% by wt. of leather.		Apply from petroleum and vegetable oil formulation.

<sup>†</sup>PRODUCT NOT REGISTERED FOR THIS USE IN THE STATE OF CALIFORNIA

## DOWICIDE 1E Antimicrobial Toxicological Data

Test	Subject	Results
Acute Oral	Rat	LD <sub>50</sub> – 2700 mg/kg body weight
	Guinea Pig	LD <sub>50</sub> – 3500 mg/kg body weight
Chronic Oral	Rabbit	Doses up to 1000 mg/kg were administered daily, 5 days a week for 4 weeks, with no apparent ill effects
	Rat	Doses up to 200 mg/kg were administered daily, 5 days/week for 6 months, with no ill effects; 500 mg/kg produced only minimal changes of questionable significance.
	Rat	Rats were maintained on diets containing 0.02 and 0.2% of DOWICIDE 1E for 2 years with no ill effects. 2.0% level inhibited growth slightly and showed slight changes in the kidneys.
	Dog	Dogs were maintained on diets containing 0.02, 0.2 and 0.5 g/kg/day for 6 months with no ill effects.
Eye Irritation	Rabbit	Diffuse-crimson or beefy red conjunctival redness, moderate to severe conjunctival chemosis causing the eyelids to be half or more than half closed, moderate circumcorneal injection of the iris, and slight to moderate corneal injury.
Skin Irritation	Rabbit	The concentrated material was nonirritating. Solutions of the material, depending upon vehicle and concentration, caused mild irritation.
	Human	No skin irritation produced by a 5% sesame oil solution of the material.
Skin Sensitization	Human	Not a skin sensitizer.
Skin Absorption	Rabbit and Guinea Pig	Not absorbed through the skin in toxic amounts.
Mutagenicity		At a dose range of 0.025-25 µg per plate, the product did not demonstrate mutagenic activity in a series of <i>in vitro</i> microbial assays employing <i>Salmonella</i> and <i>Saccharomyces</i> indicator organisms. The product was tested directly and in the presence of liver microsomal enzyme preparations from Aroclor-induced rats.
Teratogenicity, Embryotoxicity	Rat	The product was not teratogenic or embryotoxic at dose levels up to 700 mg/kg body weight per day, a level which produced some evidence of maternal toxicity.
Immunotoxicity	Female Rat	Exposure to relatively high doses (up to 200 mg/kg body weight per day) for 10 days failed to alter immune functions or to impair host resistance to bacterial challenge or transplantable tumor cells.
Fish Toxicity	Bluegill	96-hour LC <sub>50</sub> = 4.6 mg/L
	Fathead Minnow	96-hour LC <sub>50</sub> = 5.1 mg/L
	Rainbow Trout	96-hour LC <sub>50</sub> = 4.0 mg/L
	Daphnid	48-hour LC <sub>50</sub> = 2.7 mg/L
Biodegradability		Uniformly <sup>14</sup> C-labeled o-phenylphenol (OPP), labeled on the phenol ring, was tested by OECD Method 301B. The rate and extent of mineralization of [ <sup>14</sup> C]OPP to <sup>14</sup> CO <sub>2</sub> , indicative of rapid biodegradation of the phenolic ring, was consistent with a classification of "Ready Biodegradability"

NOTE: The World Health Organization (1982) has classified o-phenylphenol as unlikely to present any acute hazard in normal use. The classification is based primarily on the acute oral and dermal toxicity to the rat since these determinations are standard procedures in toxicology. The hazard referred to in this recommendation is the acute risk to health, that is, the risk of single or multiple exposures over a relatively short period of time.

## Hazards Due to Toxicity and Precautions for Handling and Use

The following statements on health hazards summarize our laboratory and application data. The precautions for handling and use are general in nature. Assistance in evaluating particular plant conditions may be obtained from consulting laboratories, State Departments of Health or Department of Labor.

## Toxicological Properties

DOWICIDE 1E Antimicrobial is an eye irritant. The product is capable of causing moderate to severe conjunctival redness, moderate to severe swelling, slight to moderate iritis and slight to moderate corneal injury. It is neither a primary skin irritant nor a skin sensitizer. It is not absorbed through the skin in toxic amounts. The dusts are irritating to the upper respiratory tract.

## Handling Precautions for Cleaning Up Spills or When Gross Contact Is Likely

**Eyes** – Wear goggles or face shield when handling.

**Skin** – Avoid skin contact. Wear protective clothing as required by circumstances to prevent skin contact.

**Inhalation** – Avoid breathing dusts. If dusty atmospheres are encountered, wear a NIOSH-approved dust/mist respirator. Airborne concentrations should be maintained to levels below the recommended Dow Industrial Hygiene Guide of 1 mg/m<sup>3</sup>.

## First Aid Measures

Refer to product MSDS for more information.

**Eye Contact** – Contaminated eyes should be washed promptly and thoroughly with flowing water for at least 30 minutes. Medical attention should be obtained.

**Skin Contact** – Immediately wash any size exposure with non-abrasive soap and large quantities of water for 30 minutes while removing contaminated clothing and shoes. Items that cannot be decontaminated, such as shoes, should be destroyed.

**Inhalation** – Anyone experiencing any noticeable ill effects from breathing the dust of this material should be removed to fresh air. Consult a physician.

## Product Stewardship

Dow encourages its customers to review their applications of Dow products from the standpoint of human health and environmental safety. To help ensure that DOW products are not used in ways for which they were not intended or tested, Dow personnel are willing to assist customers in dealing with ecological and product safety considerations. Dow literature, including Safety Data Sheets, should be consulted prior to the use of Dow products. Contact your Dow representative if you need any assistance or information.

This product only available in the U.S.

For further information visit our website:  
[www.dowbiocides.com](http://www.dowbiocides.com) or call...

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