

-275-27

**ACCEPTED**  
SEP 22 1976  
Under the Federal Insecticide,  
Fungicide, and Rodenticide Act  
as amended, on the pesticide  
registered under  
EPA Reg. No. 275-27

Net Weight:

# AMICAL<sup>®</sup>-50

No. 5238

## ANTIMICROBIAL AGENT

**CAUTION:** Observe normal safety precautions when handling AMICAL<sup>®</sup>-50. Avoid breathing dust. Wash thoroughly after handling.

May cause eye irritation. In case of eye contact, flush with water and call physician.

Active Ingredient:	Percent
Diiodomethyl para-	
tolyl sulfone .....	75%
Inert Ingredients: .....	25%
Total .....	100%

AMICAL<sup>®</sup>-50 is recommended as an exterior latex paint preservative active against bacteria, fungi, and algae. See technical bulletin for details and directions for use.

See both side panels for cautions.



Chemical Division  
Abbott Laboratories  
North Chicago, Ill. 60064,  
U.S.A.

### ENVIRONMENTAL CAUTION:

Toxic to fish—Do not contaminate any body of water by cleaning of equipment or disposal of waste.

Do not reuse empty container. Destroy it by burying with waste or burning. Stay away from smoke or fumes.

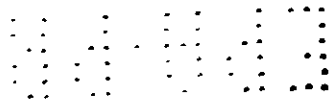
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EPA Reg. No. 275-27

EPA Est. 275-IL-1

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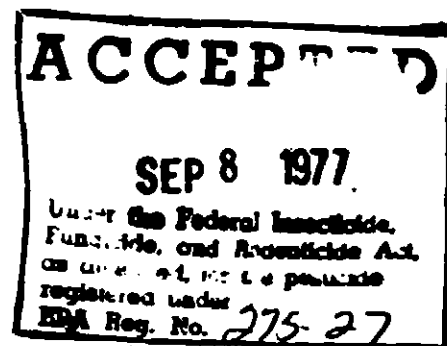
AMICAL® MILDEWICIDES

ADHESIVE AND SEALANT APPLICATIONS

AMICAL® 48 DISPERSION      EPA REG. NO. 275-30

AMICAL® 48                      EPA REG. NO. 275-21

AMICAL® 50                      EPA REG. NO. 275-27



## AMICAL 48 DISPERSION

## AMICAL 48 POWDER

## AMICAL 50 POWDER

### ORGANIC CHEMICAL ANTIMICROBIAL AGENTS

Amical mildewcides are available as fine powders or as an aqueous dispersion. The form used will be dependent upon the particular needs of the formulation to be protected; specific usage recommendations are found on page 3.

Amical 48 powder, Amical 48 Dispersion and Amical 50 powder are each based on diiodomethyl *p*-tolyl sulfone, a new organic chemical antimicrobial agent developed by Abbott Laboratories and first marketed in 1972. These products provide adhesives and sealants with effective protection from attack by molds which are problems to the industry.

Data show that Amical mildewcides are especially effective against such common molds as *Aspergillus niger*, *Aspergillus oryzae*, *Aureobasidium pullulans* and *Penicillium* species.

These molds grow on exposed surfaces of inadequately protected adhesives and sealants subjected to humid conditions, detracting from their appearance. Fungi can also attack covered surfaces. For example, inadequately protected wall covering adhesives may support mold growth after application but before drying, causing unsightly dark blotches to show through light colored coverings.

Amical mildewcides prevent these and similar problems, plus offer the following significant benefits.

### AMICAL MILDEWCIDES ARE EFFECTIVE

Providing a broad spectrum of antifungal activity, Amical mildewcides are especially effective against molds common to indoor and outdoor environments.

### AMICAL MILDEWCIDES ARE EASY TO HANDLE

Normal bulk chemical handling precautions are adequate. Amical mildewcides are not considered to be hazardous materials to ship or to store, nor are these products corrosive to the skin or eyes. With Amical powders, only the standard precautions for handling fine powders are required. Dusting or inhalation irritation is absent when Amical 48 Dispersion is used.

### AMICAL MILDEWCIDES PROVIDE LONG LASTING PROTECTION

Because the active ingredient is essentially insoluble in water, Amical mildewcides do not tend to leach out of the system.

### AMICAL MILDEWCIDES ARE COST COMPETITIVE

Amical mildewcides provide equal or superior protection on a competitive cost/use comparison with organomercurials or other nonmercurial mildewcides. They are effective at levels as low as 0.03 percent active ingredient, as a dry powder, or 0.04 percent (weight/weight) active ingredient in aqueous dispersion form.

### RECOMMENDATIONS

Amical mildewcides are recommended for use in adhesives and sealants where mildew growth on the applied product may be a problem.

Water based products are especially susceptible to fungal attack. However, fungi will also grow on many solvent based products, including silicone or oil containing materials.

Typical applications for Amical mildewcides include products for the lumber, construction, home improvement, textile and automotive industries. Amical mildewcides are especially effective in gypsum wall board joint compounds, ceramic tile adhesives, adhesives for wall coverings, adhesive emulsions, and acrylic, polyvinyl acrylic and silicone based interior and exterior sealants.

### USE LEVELS

In most standard adhesive or sealant applications, 0.03 to 0.3 percent by weight of diiodomethyl *p*-tolyl sulfone (active ingredient) will be sufficient to prevent mold growth.

The percent of diiodomethyl *p*-tolyl sulfone present in each of Amical mildewcides is stated in Table 1. Suggested Amical mildewcide use levels are reviewed in Table 2.

TABLE 1/AMICAL MILDEWCIDES PERCENT ACTIVE INGREDIENT

Product	Diiodomethyl <i>p</i> -tolyl sulfone'
Amical 48	not less than 95%
Amical 48 Dispersion	not less than 47%
Amical 50	not less than 75%

\*weight/weight

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In general, to achieve an equivalent amount of active ingredient with the dispersion form of Amical 48, use levels should be about twice those of the powder form, since the dispersion is about 50 percent by weight of the powder form.

On the other hand, experience has shown that in many adhesive and sealant applications -- especially in very low shear operations or where an Amical 48 powder has not first been dissolved in a suitable solvent -- the dispersion form has provided more uniform protection, and has therefore been used at less than two times an equivalent amount of Amical 48 powder.

TABLE 2/SUGGESTED AMICAL MILDENCIDE USE LEVELS

Application	Suggested Use Levels* (% by weight active ingredient)
Ceramic Tile Adhesives	0.05 to 0.15
Wall Board Joint Compounds (Ready-Mixed)	0.15 to 0.30
Vinyl Wallpaper Pastes	0.03 to 0.12
Mastics	0.10 to 0.15
Latex Caulks	0.10 to 0.30

\*NOTE: These use levels apply to the percent active ingredient; please refer to Table 1 for the percentage of active ingredient in each Amical mildewcide product. Ranges are wide, since exact levels must be optimized by performing a ladder series of microbiological tests.

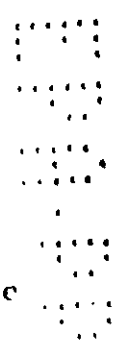
WHEN TO USE AMICAL 48 DISPERSION VS. AMICAL 48 POWDER

Amical 48 Dispersion is recommended for most water-based adhesive and sealant applications, because a dispersion facilitates introduction into low shear mixing operations, and provides more uniform dispersion of the mildewcide into the final product.

Amical 48 powder can be used in operations utilizing high shear equipment, which gain more uniform dispersion of a powder into a liquid. The powder form is also recommended for non-aqueous systems; in this case, the powder is first dissolved in an appropriate solvent prior to introduction.

WHEN TO USE AMICAL 50

Since Amical 50 contains the same active ingredient as Amical 48 and Amical 48 Dispersion, its antifungal performance characteristics in any given system will be dependent upon the relative amount of active ingredient present and the degree to which it is uniformly dispersed throughout the system.



Amical 50 differs from Amical 48 only in that the product, in addition to the active ingredient, contains effective color suppressants.

Diiodomethyl *p*-tolyl sulfone has been reported to cause a transient yellow color in some white adhesive and sealant applications, such as some latex caulks. However, evaluated in these same systems, Amical 50 has significantly alleviated the off-color sometimes occurring with the use of diiodomethyl *p*-tolyl sulfone without color suppressants.

Amical 50 contains not less than 75% diiodomethyl *p*-tolyl sulfone plus 20% color suppressants. The color suppressants are classified as inert ingredients, having no harmful effects on product stability either in the package or as applied. They function only to inhibit the development of discoloration in the applied product.

Color development is system dependent and -- if it occurs -- has often been associated with the particular resin used. Any off-color occurrence will be observed within the first .72 hours after a system is exposed to a laboratory ultraviolet light source, or to direct sunlight.

#### HOW TO DETERMINE SPECIFIC USE LEVELS

Optimum use levels can be determined by performing the American National Standards Institute Test for mold inhibition (ANSI Test No. A136.1 - 1967) or an appropriate modification of this test.

When conducting an ANSI test series, several Amical mildewcide use levels should be evaluated to determine optimum cost/benefit levels. Results should be compared to concurrent evaluation of your present mildewcide and to a control sample containing no mildewcide.

#### WHERE TO ADD AMICAL TO THE SYSTEM

As stated previously, Amical 48 Dispersion should be evaluated where low shear, low speed mixing equipment is used. Amical 48 Dispersion is easily incorporated into these systems, and will provide more uniform protection.

If the aqueous medium present in Amical 48 Dispersion is incompatible with the adhesive or sealant being evaluated, the appropriate Amical 48 or Amical 50 powder can often be dispersed with other suitable ingredients, or dissolved in a solvent prior to introduction.

For example, in solvent based products, Amical 48 powder, or in color-critical systems, Amical 50, have been first dissolved in oils used in the system. The mildewcide is added to the oils, which are then heated at 50°C (122°F) for 20 minutes. Solubility data are detailed in Table 3.

In systems where adequate mixing is assured, Amical 48 or Amical 50 powder can be used as is. However, without sufficient mixing action to disperse the powder, the mildewcide may tend to clump.

Amical mildewcides should be added at a point in the production cycle where sufficient ingredients have been incorporated to cause the formulation to take on "body." These products should not be added to a thin liquid, to prevent clumping of the powder or a "kicking out" of the dispersion.

Also, Amical mildewcides should not be added near the end of the production process where the viscosity may be too high to allow adequate mixing.

### PHYSICAL AND MICROBIOLOGICAL PROPERTIES

Chemically, Amical 48 is diiodomethyl *p*-tolyl sulfone, an organic chemical mildewcide developed and offered exclusively by Abbott Laboratories. Its structural formula and physical properties are summarized in Table 3.

Amical 48 Dispersion and Amical 50 are each based on diiodomethyl *p*-tolyl sulfone. Refer to Table 3 for specific active ingredient levels for each specific Amical mildewcide.

Amical 48 Dispersion contains diiodomethyl *p*-tolyl sulfone in an aqueous medium. This dispersion has been formulated to be compatible with latex and other water based adhesives and sealants.

Diiodomethyl *p*-tolyl sulfone is essentially insoluble in water. It is stable through a pH range of 4.0 to 10.5. In a laboratory evaluation, Amical 48 was heated in water buffered to pH 9.2 at 50°C (122°F) for 8 days. No adverse effects were noted on the compound.

TABLE 3/AMICAL PHYSICAL PROPERTIES

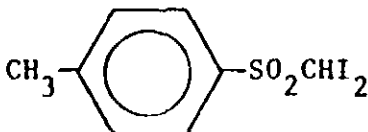
Active Ingredient	
Diiodomethyl <i>p</i> -tolyl sulfone	
Amical 48	
Appearance	Fine tan powder
Melting Point	147-150°C
Specific Gravity	2.20 g/cc
Bulking Value	5.46 gal./100 lb.
Assay	Minimum 95% active ingredient
Active Ingredient	C <sub>8</sub> H <sub>8</sub> I <sub>2</sub> O <sub>2</sub> S
Amical 48 Dispersion	
Appearance	Viscous light tan liquid
Assay	44% to 50% active ingredient
Active Ingredient	C <sub>8</sub> H <sub>8</sub> I <sub>2</sub> O <sub>2</sub> S

TABLE 3/CONTINUED

Amical 50	
Appearance	Fine tan powder
Specific Gravity	1.96 g/cc
Bulking Value	6.12 gal./100 lb.
Assay	Minimum 75% active ingredient
	Maximum 25% inert materials
Active Ingredient	$C_8H_8I_2O_2S$

MINIMUM SOLUBILITY OF ACTIVE INGREDIENT AT 25°C (MG/ML)

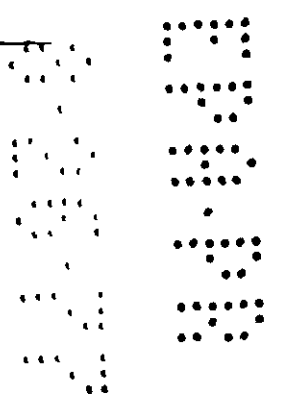
Water	0.1	Toluene	43
Ethyl Alcohol	20	Dimethyl formamide	1000
Isopropyl Alcohol	10	Diocetyl phthalate	6
Ethylene Glycol	10	Diisooctyl phthalate	16
Acetone	350	Dibutyl phthalate	58
Hexane	2	Cellosolve acetate	75
Heptane	3	Carbitol acetate	114
Mineral Spirits	4	Methyl cellosolve	182
Benzene	80	Tributyl phosphate	220
Xylene	33	n-Propyl acetate	263

ANTIFUNGAL PROPERTIES

Amical mildewcides provide a broad spectrum of antifungal activity. Minimum inhibitory concentration (MIC) data for diiodomethyl *p*-tolyl sulfone against a series of fungal microorganisms are given in Table 4.

TABLE 4/DIIODOMETHYL *P*-TOLYL SULFONE MINIMUM INHIBITORY CONCENTRATION (MIC, PPM)

Organism	Diiodomethyl <i>p</i> -tolyl Sulfone, ppm
<i>Chaetomium globosum</i>	0.2
<i>Myrothecium verrucaria</i>	0.8
<i>Aspergillus versicolor</i>	0.8
<i>Penicillium citrinum</i>	0.8
<i>Fusarium oxysporum</i>	6.2
<i>Alternaria</i> species	0.4
<i>Rhizopus nigricans</i>	100
<i>Aspergillus oryzae</i>	1.56
<i>Aspergillus niger</i>	0.4
<i>Aureobasidium pullulans</i> ( <i>Pullularia pullulans</i> )	0.78





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### SAFETY AND HANDLING

#### NORMAL BULK CHEMICAL HANDLING PRECAUTIONS ARE ADEQUATE

Test data show that Amical mildewcides have low oral toxicity values and are not subject to any hazardous materials definitions of the Department of Transportation.

Amical 48 and Amical 50 are very fine powders. Though it is not irritating to the skin, diiodomethyl *p*-tolyl sulfone can cause slight, temporary irritation of the eyes. No hypersensitivity reaction was noted when diiodomethyl *p*-tolyl sulfone was administered intracutaneously in a study according to the methods of Draize.

A dermal LD<sub>50</sub> study has been performed with Amical 48 and Amical 48 Dispersion with rabbits (single dosage of 20,000 mg/kg). Though slight transient local irritation was noted, no systemic toxicity was observed. Specific dermal LD<sub>50</sub> values for these products could not be determined, since no mortalities occurred when the maximum dosage was applied.

Though diiodomethyl *p*-tolyl sulfone is not considered to be a toxic substance when inhaled, care should be taken to avoid breathing the dust. For further safety data for diiodomethyl *p*-tolyl sulfone, please refer to Table 5 and its footnotes. It is good practice for workers to take the standard precautions of wearing gloves, protective glasses and dust masks when handling Amical mildewcides as the powder form.

Dusting or inhalation irritation are absent with the use of Amical 48 Dispersion.

TABLE 5/DIIODOMETHYL *P*-TOLYL SULFONE TOXICOLOGICAL PROPERTIES

Study	Results
Oral LD <sub>50</sub> mice rats	> 10,000 mg/kg 9,400 mg/kg
Dermal Irritation; rabbits, normal & abraded skin	None
Hypersensitivity; guinea pigs, Draize Test (1)	None
Eye Irritation, Draize Test (2)	Slight
Inhalation Toxicity (3)	Not Toxic
TL <sub>50</sub> (4) rainbow trout bluegills	0.29 ppm 0.35 ppm

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NOTES: (1) Administered as a 50% suspension in water. (2) The pure chemical put directly into the eye causes no corneal damage but can cause slight, temporary irritation. See first aid suggestions below. (3) Amical mildewcides are not considered toxic substances when inhaled as defined under 40 CFR 162.8. (4) Substances having a TL50 less than 1 ppm bear the warning "toxic to fish." Care should be taken not to contaminate any body of water with Amical mildewcides by cleaning equipment or disposing of wastes.

FIRST AID

If Amical mildewcides get on the skin, wash the affected area immediately with soap and water. If Amical mildewcides get into the eye, flush immediately with a copious amount of water and call a physician. If Amical mildewcides are ingested, induce vomiting at once and call a physician.

SAMPLES

For more information or samples for evaluation, write or telephone: Amical Mildewcides, Abbott Laboratories, Chemical and Agricultural Products Division, D-902, North Chicago, Illinois 60064; (312) 688-5160.

CAUTION: Amical mildewcides have been reported to cause transient yellow color in certain paint, adhesive or sealant applications. The problem is more common at higher Amical use levels, in oil modified systems (paints) and in systems (paints) without zinc oxide. The problem is less likely to occur with Amical 50 than it is with Amical 48 or Amical 48 Dispersion. Usually the yellow color has no effect on mildewcide activity or the general stability of the protected product.

Since the amount and persistence of the yellow color depends on the total formulation, it is important that Amical mildewcides be tested in each system in which they are to be used.

NOTE: Our recommendations for use of this product are based upon tests believed to be reliable. The data and statements contained herein are based on information received from many sources, and Abbott Laboratories does not undertake to guarantee the accuracy of any information herein set forth. The use of this product being beyond the control of Abbott, no guarantee, expressed or implied is made as to the effects of such or the results to be obtained if not used in accordance with directions or established safe practice. The buyer must assume all responsibility, including injury or damage, resulting from its misuse as such, or in combination with other materials. Abbott does not assure customers or recipients of the information herein set forth of freedom from infringement of patents owned by Abbott or by others in combination with the use of any product, formula, process or use described herein.

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