

Net Weight:

# AMICAL™-79

ANTIMICROBIAL AGENT

No. 5240

**WARNING:** Observe normal safety precautions when handling AMICAL™-79. Avoid breathing dust. Wash thoroughly after handling. Harmful or fatal if swallowed. In case of ingestion, call physician.

Causes eye irritation. Do not get into eyes. In case of eye contact, flush with water and call physician.

TM—Trademark

01-5238—F1

Active Ingredient:	Percent
para-chlorophenyl diiodomethyl sulfone	75%
Inert Ingredients:	25%
Total	100%

AMICAL™-79 is recommended as an exterior latex paint preservative providing a broad spectrum of anti-bacterial and anti-fungal activity. See technical bulletin for details and directions for use.

See both side panels for warning and caution.



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. 275-28

EPA Est. 275-IL-1

Lot No.

BULLETIN NO. 75-4

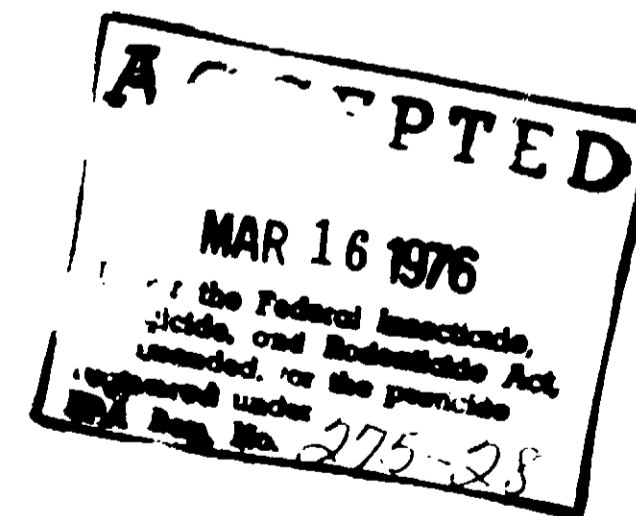
# TECHNICAL INFORMATION



AMICAL<sup>®</sup> 79

(EPA Reg. No. 275-28)

PRESERVATIVE FOR LATEX PAINTS



ABBOTT LABORATORIES

AMICAL<sup>®</sup> 79

PRESERVATIVE FOR LATEX PAINTS

NEW ORGANIC CHEMICAL ANTIMICROBIAL AGENT

DOES NOT TEND TO CAUSE YELLOWING

Amical 79 is one of a series of new highly effective organic chemical antimicrobial agents. It provides mildewcide activity superior to that of organomercurials, and also provides package preservative action when used at higher mildewcide levels.

Amical 79 contains the same active ingredients as Amical 77. However, Amical 79 also contains effective color suppressants.

Amical 77 has been reported to cause a transient yellow color in some paint systems. Evaluated in these same systems, Amical 79 has significantly alleviated the off color sometimes associated with the use of non-mercurial mildewcides.

Amical 79 contains not less than 75% p-chlorophenyl diiodomethyl sulfone plus 20 percent color suppressants. The color suppressants have no harmful effects on paint stability in the can nor on the applied coating. They function only to inhibit the development of discoloration of the paint film.

Comparative laboratory and field exposure testing show the following advantages for Amical 79 preservative.

■ AMICAL 79 MILDEWCIDE ACTIVITY IS SUPERIOR TO MERCURIALS IN LATEX PAINT SYSTEMS.

Outdoor exposure studies, including a two year exposure study in southern Florida, indicate that p-chlorophenyl diiodomethyl sulfone (the active ingredient in Amical 79) is superior to standard mercurials for mildew inhibition.

■ AMICAL 79 MILDEW PROTECTION IS COMPARABLE OR SUPERIOR TO THAT OF COMPETITIVE ORGANIC CHEMICAL MILDEWCIDES.

Recent outdoor exposure studies in severe mildew climates demonstrate equal or superior effectiveness for Amical 79 at use levels as low as two pounds per 100 gallons of paint, with the concurrent use of zinc oxide. Amical 79 was compared to competitive mildewcides at comparable cost and reduced cost/use levels. Refer to the test program reported on page 8.

### AMICAL 79 ALSO ACTS AS A PACKAGE PRESERVATIVE.

Amical 79 provides latex paints with in-can preservative action when used at high mildewcide levels. Tests indicate that a separate preservative is not necessary when the concentration of active ingredient p-Chlorophenyl diiodomethyl sulfone reaches 0.5% of the formulation. Refer to the Recommendations below and the in-can stability study reported on page 9 for additional information.

#### ■ AMICAL 79 IS EFFECTIVE WITH OR WITHOUT ZINC OXIDE.

Amical 79 does not require zinc oxide to be effective. However, Amical 79 is compatible with zinc oxide. Data show that the concurrent use of zinc oxide allows the use of lower levels of mildewcide.

#### ■ AMICAL 79 DOES NOT TEND TO CAUSE YELLOWING.

The color suppressants in Amical 79 effectively control any tendency of the p-chlorophenyl diiodomethyl sulfone to cause yellowing. This has been shown both by drawdowns in the laboratory and by observation of painted panels on outdoor exposure.

#### ■ AMICAL 79 IS EASY TO HANDLE.

Amical 79 does not require any unusual handling precautions. Amical 79 is not considered to be a hazardous material to ship or store, nor is the product corrosive to the skin or eyes. Only the standard precautions for handling fine powders are required.

## RECOMMENDATIONS

### AMICAL 79 AS A MILDEWCIDE

Use levels are dependent upon the type and formulation of the latex paint system to be protected, and upon the expected severity of field conditions. Thus, thorough laboratory tests and field exposures are recommended to determine the optimum Amical 79 use level for a particular formulation. Suggested use levels for several common latex paint systems are presented in Table 1.

Field data show that when zinc oxide is used in the formulation, lower levels of Amical 79 will be needed. Please refer to Table 5 on page 9 for specific test results.

TABLE 1/AMICAL 79 USE LEVELS IN LATEX PAINTS

	Amical use Levels (Pounds per 100 Galions Paint)					
	Straight Acrylic		20% Alkyd Modified Acrylic		Vinyl Acrylic	
	No ZnO	50 lb ZnO	No ZnO	50 lb ZnO	No ZnO	50 lb ZnO
Severe Humidity	4-6	2-4	4-6	2-4	4-6	2-4

For best results and economy in white paint formulations, Amical 79 is recommended at a use level of 2 pounds per 100 gallons of paint, plus 50 lbs. of zinc oxide.

#### AMICAL 79 AS AN IN-CAN PRESERVATIVE

When present in latex paints at a level of 0.5%, p-Chlorophenyl diiodomethyl sulfone provides in-can preservation in addition to mildewcide activity.

Additional data about the role of p-Chlorophenyl diiodomethyl sulfone as an in-can preservative has been published by the Kansas City Society for Paint Technology in "Non-mercurial Preservatives, Their Effectiveness and Relationship to Raw Materials in Latex Paints," JOURNAL OF PAINT TECHNOLOGY, Vol. 46; No. 589; pages 37-45. In the Kansas City study, p-Chlorophenyl diiodomethyl sulfone is reported to have demonstrated activity at a level of one pound per 100 gallons of paint.

#### WHERE TO ADD AMICAL 79 TO YOUR PAINT SYSTEM

Amical 79 is a micronized powder and can be dispersed easily in the pigment grind, preferably as the last material added to the dispersion. The following is a suggested procedure:

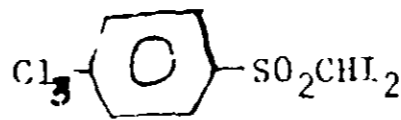
- Add the water, glycols, wetting agents and pigments to the mixing tank.
- Disperse until the desired grind is achieved.
- Add the Amical 79 and disperse five more minutes.
- Avoid heat build up and prolonged mixing.

#### PHYSICAL AND MICROBIOLOGICAL PROPERTIES OF AMICAL 79

##### PHYSICAL PROPERTIES

Amical 79 is one of a series of newly developed organic chemicals, offered exclusively by Abbott Laboratories. The active ingredient in Amical 79 is p-chlorophenyl diiodomethyl sulfone. Color suppressants are also present.

TABLE 2/PHYSICAL PROPERTIES OF AMICAL 79

Appearance	Fine Tan Powder		
Bulking Value	5.17 gal/100 lb		
Specific Gravity	2.10 g/cc		
Assay			
active ingredient			
inert ingredients	max. 25%		Active ingredient
Minimum Solubility at 25°C (mg/ml)			
Water	0.2	Toluene	95
Ethyl alcohol	40	Dimethyl formamide	300
Isopropyl alcohol	20	Dioctyl phthalate	96
Ethylene glycol	20	Diisooctyl phthalate	84
Acetone	350	Dibutyl phthalate	176
Hexane	1	Cellosolve acetate	509
Heptane	1	Carbitol acetate	211
Mineral Spirits	2	Methyl cellosolve	625
Benzene	150	Tributyl phosphate	286
Xylene	57	n-Propyl acetate	270

## MICROBIOLOGICAL PROPERTIES

Amical 79 provides a broad spectrum of antimicrobial activity, and is especially effective against major paint mildew-causing organisms.

Field tests show the activity of Amical 79 does not differ significantly from the activity of Amical 77, on a pound for pound basis. Table 3 lists the minimum inhibitory concentration (MIC's) for Amical 77 against a series of organisms, including those of concern in in-can spoilage and mildew.

TABLE 3 /MINIMUM INHIBITORY CONCENTRATION (MIC,PPM)

Organism	AMICAL 77
<u>Bacteria</u>	
Staphylococcus aureus	10
Pseudomonas aeruginosa	1000
Proteus vulgaris	100
Proteus mirabilis	100
Escherichia coli	100
Salmonella typhimurium	100
Streptococcus faecalis	100
Enterobacter aerogenes	1000
Salmonella choleraesuis	100
Xanthomonas pruni	10
Erwinia amylovora	100
Pseudomonas syringae	100
Erwinia cartovora	100
Agrobacterium tumefaciens	100
<u>Fungi</u>	
Chaetomium globosum	0.2
Myrothecium verrucaria	0.8
Aspergillus versicolor	0.8
Penicillium citrinum	0.8
Fusarium oxysporum	3.1
Alternaria species	0.4
Rhizopus nigricans	100
Alternaria solani	1
Ceratocytis ulmi	1
Microsporum gypseum	1
Aspergillus oryzae*	0.8
Aspergillus niger*	0.4
Aureobasidium pullulans* (Pullularia pullulans)	0.4

\*Of major interest in paint mildew.

### SAFETY AND HANDLING

#### NORMAL BULK CHEMICAL HANDLING PRECAUTIONS ARE ADEQUATE.

Amical 79 is not dangerous to handle, and requires no unusual handling precautions.

Amical 79 is a very fine powder. Though it is not irritating to the skin, Amical 79 can cause slight, temporary irritation of the eyes.

Although Amical 79 is not considered a toxic substance when inhaled, care should be taken to avoid breathing the dust. For more detail, please refer to Table 4 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 preservatives.



TABLE 4/AMICAL 79 TOXICOLOGICAL PROPERTIES

Amical 79 Report	Results
Oral LD <sub>50</sub>	
Mice	3,600 mg/kg
Rats	600 mg/kg
Dermal Irritation; rabbits, normal and abraded skin	None
Eye Irritation, Draize Test <sup>(1)</sup>	Slight
Inhalation Toxicity <sup>(2)</sup>	Not Toxic
Fish Toxicity <sup>(3)</sup>	

Notes (1) The pure chemicals put directly into the eye cause no corneal damage but can cause slight, temporary irritation. See First Aid suggestions below. (2) Amical 79 is not considered a toxic substance when inhaled, as defined under 40 CFR 162.8. (3) Amical 79 is toxic to fish. Specific data for Amical 79 have not been determined, but are comparable to Amical 77 data. Amical 77 data are as follows: Amical 77 TL<sub>50</sub>: 0.14 ppm for rainbow trout, 0.24 ppm for bluegills. Thus, care should be taken not to contaminate any body of water with Amical 79 by cleaning equipment or disposing of wastes.

#### FIRST AID

If Amical 79 gets on the skin, wash the area immediately with soap and water. If Amical 79 gets in the eye, flush immediately with copious amounts of water and call a physician. In case Amical 79 is ingested, induce vomiting at once and call a physician.

#### AMICAL TEST PROGRAMS

Discussion of an outdoor exposure study to determine mildewcide activity follows. Also included is a discussion of an evaluation of p-chlorophenyl diiodomethyl sulfone as an in-can preservative.

Abbott has underway a continuing program of outdoor exposure studies at three test locations, and results will be published periodically in the format of supplementary research reports.

#### AMICAL 79 MILDEWCIIDE ACTIVITY TWELVE MONTH EXPOSURE/SOUTHERN FLORIDA/1975

##### RESULTS OF THE TEST PROGRAM

Amical 79 was found to be a very suitable replacement as a mildewcide for organomercurial products in protective coatings.

Amical 79 provided protection comparable to competitive organic chemical mildewcides at favorable cost/use ratios. Additionally, Amical 79 did not tend to cause yellowing.

#### TWELVE MONTH EXPOSURE/SOUTHERN FLORIDA/1973

##### Test Conclusions

- ☑ Amical 79 is effective with or without zinc oxide.
- ☑ Lower levels of Amical 79 can be used if zinc oxide is included in the formulation. With 50 pounds of zinc oxide, Amical 79 was effective at a level of 2 pounds per 100 gallons. Control panels with 50 pounds of zinc oxide alone were failing.
- ☑ Performance of Amical 79 equals that of non-mercurial "M" and nonmercurial "N" on a competitive or lower cost/use basis.
- ☑ Formulations containing Amical 79 did not tend to yellow.

#### FORMULATIONS EVALUATED

Antimicrobial agents: Amical 79 was evaluated at levels ranging from two to six pounds per 100 gallons of paint, both with and without the concurrent use of zinc oxide. PMA and competitive non-mercurial mildewcides were also evaluated.

Paint vehicles: The formulations used were standard formulas recommended by latex suppliers and are available on request. The formulations included straight acrylic, alkyd modified acrylic, and vinyl acrylic exterior house paints.

#### EXPOSURE TESTING

Application methods: Two coats of each paint were brush applied on white pine at a spreading rate of 325 square feet per gallon with 24 hours drying between coats. After drying for at least one week, the panels were then exposed in southern Florida in June, 1973.

A pine substrate was chosen as an effort to exaggerate mildew conditions. White pine contains a high degree of nutrients that support fungus growth, and is a common construction material. During the exposure test, the panels were examined periodically for mildew formation and appearance. The results at the end of twelve months of exposure are summarized in table 5.

TABLE 5/EXPOSURE DATA/MILDEW RATINGS (12 MONTHS NORTH VERTICAL FLORIDA EXPOSURE)

Mildewcide	Use Level	Acrylic	Modified Acrylic	Modified Acrylic + 50 lbs. ZnO	Modified Vinyl + 50 lbs. ZnO
Control	1.5	0	0	0	0
Amical 79	2.0	-	-	10	10
Amical 79	4.0	9	7-8	10	10
Mildewcide "M"	2.0	-	-	10	10
Mildewcide "N"	10.0	9	7-8	10	10

#### IN-CAN STABILITY

Amical 79 will provide in-can preservative action when the concentration of p-Chlorophenyl diiodomethyl sulfone reach 0.5% of the formulation. At this use level, it is not necessary to add a package preservative when Amical 79 is incorporated into the paint for mildewcide activity.

Paints containing p-chlorophenyl diiodomethyl sulfone that had been used in a panel exposure study for Amical 77 were retained and examined at 12 and 18 months for pH, viscosity, appearance and odor. The paint systems included straight acrylic alkyd modified acrylic and ethylene vinyl acetate house paints. p-chlorophenyl diiodomethyl sulfone at levels of 0.25, 0.5, 0.75 and 1.0% caused:

- No significant change in pH.
- No significant change in viscosity.
- No pigment flocculation.
- No foreign odors.

In another laboratory test, p-chlorophenyl diiodomethyl sulfone was tested at a 0.5% level in alkyd modified acrylic and alkyd modified polyvinyl acetate exterior paints.

The paints were inoculated with a mixed bacterial culture consisting of *Pseudomonas aeruginosa*, *Escherichia coli*, *Aerobacter aerogenes* and *Bacillus subtilis*, with 150,000,000 cells present per milliliter of inoculum. The bacterial inoculum was added to the sterile paint system at a concentration of 4 ml. per 200 ml. of paint.

Samples of the paint were streaked on nutrient agar petri plates at 4, 24 and 48 hour intervals after introduction of the bacterial inoculum. The plates were incubated for one week at controlled temperature and humidity optimal for bacterial growth. The plates were observed daily during the incubation period. Results are presented in Table 6.

In this test, p-Chlorophenyl diiodomethyl sulfone at a use level of 0.5% prevented bacterial growth.

The same paint samples were reinoculated and retested one week later using the same procedure. Again, 0.5% p-Chlorophenyl diiodomethyl sulfone prevented bacterial growth.

TABLE 6/P-CHLOROPHENYL DIIDOMETHYL SULFONE IN-CAN PRESERVATIVE ACTION

Agent	Paint System	Time After Inoculation		
		4 Hours	24 Hours	48 Hours
Control	Acrylic	Growth	Growth	Growth
0.5% Amical 77	Acrylic	No Growth	No Growth	No Growth
Control	PVA	Growth	Growth	Growth
0.5% Amical 77	PVA	No Growth	No Growth	No Growth

**CAUTION:** Amical paint preservatives have been reported to cause transient yellow color in certain paint systems. The problem is more common at higher Amical levels, in oil modified paints and in systems without zinc oxide. The problem is less likely to occur with Amical 50 or Amical 79 than it is Amical 48 or Amical 77. Usually the yellow color disappears in one to three days on exposure to daylight. The color has no effect on mildewcide activity or general paint stability.

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

#### SAMPLES

For more information or samples for evaluation, write or phone: Amical, Abbott Laboratories, Chemical Division, D-902, North Chicago, Illinois 60064; Area Code 312-688-5160.

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 connection with the use of any product, formula, process or use described herein.

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