VANQUISH 100 Antimicrobial

FOR DIRECT INCORPORATION INTO PLASTIC AND RUBBER FOR FURTHER PROCESSING

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER
CORROSIVE. CAUSES IRREVERSIBLE EYE AND SKIN BURNS. HARMFUL IF SWALLOWED OR ABSORBED THROUGH SKIN OR INHALED. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING. DO NOT BREATH ELECTRIC FOG, MIST, SMOKE, LENSES. IF PRESENT, IF EXPOSED TO THE FIRST 5 MINUTES, THEN CONTINUE RINSING. CALL A POISON CONTROL CENTER OR DOCTOR FOR TREATMENT ADVICE.

KEEP OUT OF REACH OF CHILDREN.

DANGER

FIRST AID

IF IN EYES: HOLD EYES OPEN AND RINSE SLOWLY AND CONTINUOUSLY WITH WATER FOR 15-30 MINUTES. REMOVAL OF CONTACT LENSES, IF PRESENT, IS RECOMMENDED. IF IRRITATION PERSIST, SEEK MEDICAL ATTENTION. IF SWALLOWED: DO NOT INDUCE VOMITING UNLESS TOLD TO BY A POISON CONTROL CENTER OR DOCTOR.

ENVIRONMENTAL HAZARDS: THIS PRODUCT IS TOXIC TO FISH. DO NOT DISCHARGE EFFLUENT CONTAINING THIS PRODUCT INTO LAKES, STREAMS, PONDS, ESTUARIES, OCEANS, OR OTHER WATERS. MINIMIZING THE RELEASE OF A NATURAL POLITICIAN DISCHARGE (ELEVATION, PLANT, EXCAVATION SYSTEM, INFUSION) INTO THE ENVIRONMENT. THE PERMITTING AUTHORITY HAS BEEN NOTIFIED IN WRITING PRIOR TO DISCHARGE. DO NOT DISCHARGE EFFLUENT CONTAINING THIS PRODUC INTO SEWER SYSTEMS WITHOUT NOTIFICATION OF THE LOCAL SEWAGE TREATMENT PLANT AUTHORITY. FOR GUIDANCE CONTACT YOUR STATE WATER BOARD OR REGIONAL OFFICE OF THE EPA. DO NOT CONTAMINATE WATER BY CLEANING OF EQUIPMENT OR DISPOSAL OF RESIDUES.

MANUFACTURED BY:
Arch Chemicals, Inc.
501 Merritt #7
Norwalk, CT 06856

ACTIVE INGREDIENTS:
N-BUTYL-1,2-BENZISOTHIAZOLINE-3-ONE ... 94.5%
INERT INGREDIENTS ............... 5.5%
TOTAL INGREDIENTS ............. 100.0%

DIRECTIONS FOR USE
IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT IN A MANNER INCONSISTENT WITH ITS LABELING. SEE T.I. BULLETIN FOR DIRECTIONS FOR INCORPORATING THIS PRODUCT INTO PLASTIC FOR FURTHER PROCESSING.

STORAGE AND DISPOSAL: DO NOT CONTAMINATE WATER, FOOD OR FEED BY STORAGE OR DISPOSAL. OPEN DUMPING IS PROHIBITED.

PESTICIDE STORAGE: PROTECT FROM FROST. IF FROZEN, ALLOW TO THAW AND STIR WELL BEFORE USE.

PESTICIDE DISPOSAL: PESTICIDE WASTES ARE ACUTELY HAZARDOUS. IMPROPER DISPOSAL OF EXCESS PESTICIDE SPRAY MIXTURE OR RINSE WATER IS A VIOLATION OF FEDERAL LAW. IF THESE WASTES CANNOT BE DISPOSED OF BY USE ACCORDING TO LABEL INSTRUCTIONS, CONTACT YOUR STATE PESTICIDE OR ENVIRONMENTAL CONTROL AGENCY, OR THE HAZARDOUS WASTE RECEPTIVE AT THE NEAREST EPA REGIONAL OFFICE.

CONTAINER DISPOSAL: TRIPLE RINSE (OR EQUIVALENT), THEN OFFER FOR RECYCLING OR RECONDITIONING, OR PUNCTURE AND DISPOSE OF IN A SANITARY LANDFILL, OR BY OTHER PROCEEDS APPROVED BY STATE AND LOCAL AUTHORITIES.

EPA REG. NO. 1258-1249
EPA EST. NO. 74637-GBR-001

CONTENTS: 60
LES. NET MINIMUM
(APPROX. 6)
U.S. GALLONS

NOTICE TO PHYSICIAN

PROBABLE MUCOUS DAMAGE MAY CONTRADICATE THE USE OF GASTRIC LAVAGE FOLLOWING INGESTION.

SEE ADDITIONAL PRECAUTIONARY STATEMENTS ON SIDE PANEL

REV. DATE: 03/03/04
LOT NUMBER: 12345
PRODUCT CODE: 08239

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SUMMARY

VANQUISH™ 100 antimicrobial, effective for control of fungi and bacteria, are based on the active ingredient N-butyl-1,2-benzisothiazolin-3-one. VANQUISH 100 Antimicrobial is used for the protection of natural rubber and plastic products made from such polymers as polyvinylchloride, polyurethane, silicone, polyolefins, polyester (and others). VANQUISH 100 Antimicrobial is registered with the Environmental Protection Agency and has EPA registration No. 1258-1249. VANQUISH 100 Antimicrobial may be used for the manufacture of liquid or solid antimicrobial formulations or for the direct incorporation into plastics or their precursors for the intent of preserving plastic articles from microbial degradation.

GENERAL

Listed below are some of the organisms, which VANQUISH 100 Antimicrobial is effective against, and their minimum inhibitory concentrations (MIC):

<table>
<thead>
<tr>
<th>Fungi</th>
<th>MIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternaria alternata</td>
<td>2 ppm</td>
</tr>
<tr>
<td>Aureobasidium pullulans</td>
<td>4 ppm</td>
</tr>
<tr>
<td>Chaetomium globosum</td>
<td>&lt;0.5 ppm</td>
</tr>
<tr>
<td>Cladosporium cladosporoides</td>
<td>&lt;0.5 ppm</td>
</tr>
<tr>
<td>Cladosporium herbarum</td>
<td>2 ppm</td>
</tr>
<tr>
<td>Gliocladium virens</td>
<td>8 ppm</td>
</tr>
<tr>
<td>Paecilomyces variotii</td>
<td>4 ppm</td>
</tr>
<tr>
<td>Penicillium funiculosum</td>
<td>1 ppm</td>
</tr>
<tr>
<td>Scopulariopsis brevicaulis</td>
<td>1 ppm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>MIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcaligenes faecalis</td>
<td>31 ppm</td>
</tr>
<tr>
<td>Flavobacterium capsulatum</td>
<td>8 ppm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strepotomycetes</th>
<th>MIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streptoverticillum waksmanii</td>
<td>2 ppm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Algae</th>
<th>MIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorella vulgaris</td>
<td>16 ppm</td>
</tr>
<tr>
<td>Nostoc muscorum</td>
<td>16 ppm</td>
</tr>
<tr>
<td>Oscillatoria tenuis</td>
<td>16 ppm</td>
</tr>
<tr>
<td>Pleurococcus sp.</td>
<td>16 ppm</td>
</tr>
<tr>
<td>Trentepohlia aurea</td>
<td>16 ppm</td>
</tr>
</tbody>
</table>

VANQUISH 100 Antimicrobial provides effective control of a wide range of bacterial, fungal and algal organisms thereby preventing degradation of the product. It can protect the surface of substrates and prevents objectionable odors and aesthetic problems such as staining, or growth on or in the substrate. VANQUISH 100 Antimicrobial is easy to use due to its liquid form and excellent compatibility in most systems.

Typical Properties of VANQUISH 100 Antimicrobial

<table>
<thead>
<tr>
<th>Active Agent Content (neat), %</th>
<th>94.5 (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Form</td>
<td>brown liquid</td>
</tr>
<tr>
<td>Odor</td>
<td>Mild or none</td>
</tr>
<tr>
<td>Flash Point</td>
<td>178°C ( +/− 5°C )</td>
</tr>
<tr>
<td>Water Content, %</td>
<td>1.0 ( approx. )</td>
</tr>
</tbody>
</table>
VANQUISH™ 100 Antimicrobial
Antimicrobial / Antifungal Additive for the Preservation of Plastic and Rubber

TECHNICAL INFORMATION BULLETIN

DIRECTIONS FOR USE IN PLASTICS
It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

Many plastics are considered to be resistant to microbial attack, but there are significant exceptions that merit preventative action by the use of antimicrobial additive. Plasticized PVC, polyurethane and silicones are particularly susceptible. The biodeterioration of products based on these types of plastics can be a serious problem for manufacturers. Failure to add the proper amount of antimicrobial additive can lead to premature product failure due to loss of mechanical strength, flexibility or adhesive strength. Also, adverse aesthetic problems such as musty odor, permanent staining or microbial surface growth can lead to customer complaints.

VANQUISH 100 Antimicrobial is effective against the microbes which degrade plastics (and plastic additives) or natural rubber and can increase the useful life of articles made from these materials.

VANQUISH 100 Antimicrobial additive is effective in most plastics compositions and can be used to preservative natural rubber and such plastics as PVC, polyurethane, silicone, acrylics, and others to produce articles such as:
- coated fabric (e.g. ski wear, raincoats, tents, seat covers)
- floor coverings, underlay & mats
- vinyl wall coverings
- tarpaulins and awnings
- roofing membranes
- synthetic leather (e.g. sneakers and training shoe uppers)
- swimming pool liners, ornamental pond liners
- appliance gaskets (e.g. washers, refrigerator)
- shoe soles, mid-soles & outers
- sealants, caulks, weather stripping & non-food contact adhesives
- pet toys & general household items
  (shower curtains, bath mats)
- auto parts (e.g. landau tops, door seals, shock absorbers)
- foam (e.g. seat cushions, gaskets, insulation)
- tubing (e.g., marine hose and sleeving)
- electrical & pipe wrap
- furniture (e.g. outdoor, leisure, water bed liners, cushions)

Do not use this product to treat food/feed or drinking water contact items or toys

VANQUISH 100 Antimicrobial additive has been found to be an effective polymer preservative at concentrations of 0.03% to 1.0% based on the total weight of the substrate. Typical range of concentrations on which trials can be based, are:

<table>
<thead>
<tr>
<th>%VANQUISH 100 Antimicrobial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
</tr>
<tr>
<td>Plasticized PVC</td>
</tr>
<tr>
<td>Polyurethane</td>
</tr>
<tr>
<td>Silicones</td>
</tr>
<tr>
<td>Polyessters</td>
</tr>
<tr>
<td>Polyolefins</td>
</tr>
<tr>
<td>Acrylics</td>
</tr>
<tr>
<td>Synthetic elastomers such</td>
</tr>
<tr>
<td>as butadiene-styrene</td>
</tr>
<tr>
<td>styrene-isoprene and</td>
</tr>
<tr>
<td>acrylonitrile-butadienestyrene</td>
</tr>
<tr>
<td>Natural latex rubber</td>
</tr>
</tbody>
</table>

The concentration required to give protection depends on several factors. These include the susceptibility of the system to microbiological degradation, the extent to which microorganisms can gain access, the species involved, pH, temperature, moisture and length of time for which protection is required.

INCORPORATION OF VANQUISH 100 ANTIMICROBIAL INTO POLYMERS

PVC plastisols: For addition to PVC plastisols VANQUISH 100 Antimicrobial liquid may be added along with the other additives. Use levels should be calculated based upon the total weight of the formulation.
**VANQUISH™ 100 Antimicrobial**

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**Cross Linked Polyurethane:** For addition to cross linked polyurethane VANQUISH 100 Antimicrobial liquid should be added to the polyol at a concentration that will yield the desired use level in the final product after reaction with the isocyanate component. VANQUISH 100 Antimicrobial may also be incorporated at an injection port of a reaction injection molding (RIM) machine.

**Melt Processed Polymers:** For addition to melt processed polymers (PVC, thermoplastic polyurethane, synthetic elastomers and thermoplastic acrylates etc.) VANQUISH 100 Antimicrobial liquid may be metered into the melt to yield the desired end use concentration. For example at the injection point in an extrusion system. Alternatively, VANQUISH 100 Antimicrobial liquid may be made into a concentrated chip (as above at up to 20% VANQUISH 100 Antimicrobial) and these chips blended with non preserved chips in the users plant to yield the desired end use concentration upon subsequent melt processing. For thermoplastic polyurethane, concentrated granules may also be produced by absorbing VANQUISH 100 Antimicrobial liquid to granules through shear mixing (up to 20% VANQUISH 100 Antimicrobial). These can be blended with non preserved polymer chips in the users plant to the desired use concentration and then further heat processed (i.e. via extrusion).

**PVC:** VANQUISH 100 Antimicrobial liquid may be added to the mixed liquid components added to a blend of PVC resin and solids, shear mixed until a dry blend is achieved and then processed through extrusion, calendering, molding or other system.

**Acrylates:** In addition to the above, VANQUISH 100 Antimicrobial liquid can be added to the liquid monomers before polymerization, at levels to yield the desired use level in the final product after polymerization.

**Silicone:** For silicone sealants, the VANQUISH 100 Antimicrobial liquid may be added to the silicone oil before processing, or to the manufacturing vessel before packing off.

**Natural Rubber:** VANQUISH 100 Antimicrobial can be added to the latex.

The Arch Technical Service Group can provide additional guidance on the proper use of VANQUISH 100 Antimicrobial.

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**KEEP OUT OF REACH OF CHILDREN**

**WARNING**

**FIRST AID**

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. Call a poison control center or doctor for treatment advice.

If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor.

If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment.

If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

For additional information in case of emergency call toll free 1-800-654-6911. Have the product container or label with you when calling a poison control center or doctor or going for treatment.

**Note to Physician:** Probable mucosal damage may contraindicate the use of gastric lavage following ingestion.
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PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS
Corrosive. Causes irreversible eye and skin burns. Harmful if swallowed or absorbed through the skin or inhaled. Do not get in eyes, on skin, or on clothing. Do not breathe spray mist. Wear goggles or face shield and rubber gloves when handling. May be fatal if inhaled. Do not breathe vapors. Use with adequate ventilation. If needed, use NIOSH certified respirator for organic vapors, mists and fumes. Wash thoroughly after handling and before eating, drinking or using tobacco. Remove contaminated clothing and wash before reuse.

ENVIRONMENTAL HAZARDS
This product is toxic to fish. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollution Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA. Do not contaminate water by cleaning of equipment or disposal of wastes.

STORAGE AND DISPOSAL
Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited.

PESTICIDE STORAGE
Protect from frost. If frozen, allow to thaw and stir well before use.

PESTICIDE DISPOSAL
Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office.

CONTAINER DISPOSAL
Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

SAFE HANDLING INFORMATION
Refer to the Material Safety Data Sheet (MSDS) available from Arch Biocides for information on the safe use, handling and disposal of this product.

For more information, visit our website at: www.archchemicals.com

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FOR YOUR PROTECTION
Arch Chemicals, Inc. ("Arch") warrants that this product conforms to the chemical description on the label and that it is reasonably fit for the purposes stated on the label when used in accordance with Arch's directions under normal conditions of use. This warranty does not extend to the use of this product contrary to label instructions, or under abnormal use conditions, or under conditions not reasonably foreseeable to Arch, and the buyer or user assumes the risk of any such use. ARCH DISCLAIMS ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY. Statements herein, therefore, should not be construed as representations or warranties.

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