

TABLE II

HARD WATER AND ORGANIC SOIL TOLERANCE OF PER-VAD IN
 GERMICIDAL AND DETERGENT SANITIZERS TEST (CHAMBERS TEST)

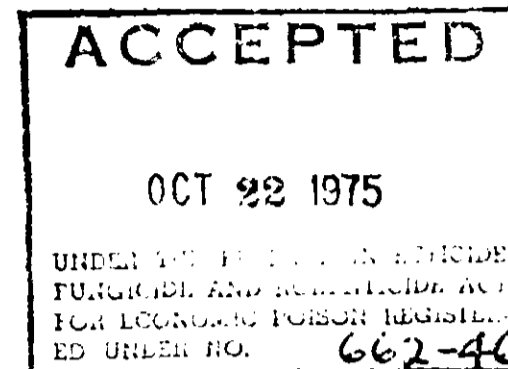
Test (in seconds) to obtain greater than 99.999% kill of test organism with Per-Vad at a dilution of one ounce per gallon.

	<u>Hard Water</u> <u>(ppm as CaCO₃)</u>			<u>Organic Soil</u> <u>Milk</u>	
	<u>1000</u>	<u>1500</u>	<u>2000</u>	<u>0.1%</u>	<u>1.0%</u>
<u>Escherichia coli</u> (ATCC #11229)	30	30	30	30	30
<u>Staphylococcus aureus</u> (ATCC #6538)	30	60	60	30	30

9/24/75

ISSUE " PLUSBacteriostatic Fabric Softener

EPA Reg. No. 662-46

INTRODUCTION

Bacteriostatic agents are chemicals used to control multiplication of infectious organisms. Studies have shown that disease producing bacteria can survive typical laundry methods. It has also been shown that the use of an anti-microbial agent in the last wash operation will inhibit proliferation of bacteria in moist soiled linen as it awaits laundering.

Issue Plus contains a scientifically selected blend of quaternary ammonium compounds and 5-chloro-2-(2,4 dichlorophenoxy) phenol. Quaternary ammonium compounds have been perhaps the most widely used antibacterial agents for fabric treatment because of their strong affinity for fabric. These compounds are extremely efficient against gram positive bacteria such as the antibiotic resistant *Staphylococcus aureus*. However, the quaternary ammonium compounds require repeated application before they acquire maximum effectiveness, and they are less effective against gram negative bacteria such as *Klebsiella pneumoniae*. The 5-chloro-2-(2,4 dichlorophenoxy) phenol shows maximum effectiveness after a single application and is effective against a wide spectrum of both gram positive and gram negative organisms. Both compounds are retained well by the fabric and are activated when the fabric is contacted by the medium containing the harmful bacteria, such as perspiration, urine, or other secretions.

Another type of quaternary ammonium compound is used by the laundry to impart a smooth, soft finish to fabric. The softening quaternary usually differs from the antibacterial type in that the former molecule contains two long chain alkyl groups (fatty chains), while the latter contains but one. Like the antibacterial quaternaries, the softening quaternaries are strongly absorbed by the fabric.

Issue Plus is a soluble bacteriostatic fabric softener which combines highly efficient antibacterial and fabric softening agents. Issue Plus can be conveniently added dry to the wheel at the start of the souring operation. It gives a very desirable, soft, smooth, bacteriostatic finish with bath towels, diapers, no-starch shirts, linens and wearing apparel. Fabric treated with Issue Plus is bacteriostatic against a wide spectrum of both gram positive and gram negative organisms.

WHERE TO USE

Issue Plus is recommended for use by laundries in hospitals, nursing homes and diaper plants to aid in controlling the growth of infectious bacteria, but should not be used as a mildew control agent (as in linen supply plants).

ADVANTAGESCONTINUED USE WILL PROVIDE

1. ~~Provides continuous~~ bacteriostatic activity against both gram positive and gram negative organisms on treated fabric.
2. Imparts softness, smoothness and pliability to fabric.
3. Controls static electricity.
4. Shortens extraction time.
5. Retards rolling on flatwork ironer.
6. Replaces viscous liquids and pastes.

USE DIRECTIONS

Issue Plus is added dry to the wheel, on the souring operation, using 2.5 weight ounces (75 grams), 3.5 volume ounces (105 grams), per each one hundred pounds (45 kilograms) of wash. A suitable temperature is 100°F. (38°C.), water level should be 6 inches (15 cm.), and treatment time 6 minutes.

Issue Plus is compatible with starch and can be used in the same laundry operation.

IMPORTANT USE PRECAUTIONS

1. Soap, bleach and anionic detergents will inactivate Issue Plus; avoid carryover of these materials to the treatment operation.
2. Avoid overloading the washer, as this retards uniform absorption of the active agent.
3. Avoid water levels below 6 inches (15 centimeters), for the same reason.
4. Avoid temperatures below 100°F. (38°C.), as lower temperatures slow down exhaustion of the active materials onto the fabric.
5. DO NOT USE when appreciable iron is present in the water supply to prevent discoloration of the fabric

TEST METHOD

The procedure used in determining bacteriostatic activity (zone of inhibition) is the "A.O.A.C. Antimicrobial Agents Used by Laundries on Fabrics and Materials Test." This is the official, first action method as published in the Journal of The Association of Official Analytical Chemists, Volume 55, No. 2, p. 400, 1972. The procedure is also that which is officially recognized by the Environmental Protection Agency in the registration of bacteriostatic fabric treatment compounds.

Two strains of bacteria are employed in the test. The gram positive organism is Staphylococcus aureus, ATCC 6538. The gram negative organism is Klebsiella pneumoniae, ATCC 4352 (formerly Escherichia coli).

Petri dishes containing A.O.A.C. Nutrient Agar are seeded with 1% of 24 hour broth cultures of the test organisms. Five samples (1 square inch or 6.5 square centimeters each) of the treated fabric to be tested are implanted on the seeded agar, and the test plates are then incubated for 48 hours at a temperature of 37°C. (98°F.).

A clear zone of inhibition adjacent to each of the test fabric squares is used as the indication of bacteriostatic activity. The size of the zone is not considered important, but the zone is required to extend along the entire edge to be accepted. Thus, for five replicate samples, a score of 20 (expressed as 20/20 sides) shows that bacteriostasis occurs on all four edges of each sample. A total of 18, or activity on 18 of 20 edges, has been established as the minimum acceptable for a satisfactory level of residual bacteriostatic effect. This test procedure is for the determination of residual bacteriostasis on fabric, and is not designed to measure Issue Plus levels in the washwheel.

UNSATISFACTORY TEST RESULTS

Sometimes the test results will reveal an unsatisfactory level of bacteriostatic activity. Should that happen, investigation of the circumstances surrounding use of the bacteriostatic agent is warranted. It should not necessarily be assumed that the bacteriostatic agent itself is ineffectual. Listed below are a number of possible reasons for such unsatisfactory performance:

- (1) Inadequate rinsing, leading to carryover of soap into the treatment operation (normally the sour bath).
- (2) Inadequate rinsing, leading to carryover of anionic detergent into the treatment operation.
- (3) Insufficient usage of the bacteriostatic agent.
- (4) Failure to run the treatment operation long enough (usually 6 minutes).
- (5) Failure to have the proper water level (usually about 6 inches or 15 centimeters) for the treatment operation.
- (6) Improper water temperature for the treatment operation.
- (7) Overloading the washer, thereby inhibiting thorough distribution of the bacteriostatic agent.

PHYSICAL PROPERTIES

Issue Plus is a tan, free flowing powder.