TECHNICAL DATA SHEET
*Ultra-Fresh** NM-100

E.P.A. Registration No. 10466-38
For use in the United States of America

PRODUCT DESCRIPTION

Ultra-Fresh* NM-100 is a finely divided crystalline white powder designed to confer durable bacteriostatic properties to polymeric systems, and synthetic foams by inhibiting the growth of bacteria, and preventing the growth of bacteria leading to microbiologically induced corrosion of buried conduits (pipe). For manufacturing use only. For formulation only into end-use products which are intended to treat the article itself.

Ultra-Fresh* NM-100 can be incorporated into polymeric systems at the pre-extrusion stage in the manufacturing process through the use of a resin pellet concentrate (5% - 10% ***Ultra-Fresh**** NM-100). This product, when used according to recommendations, will last the lifetime of the product. Polymeric systems include all grades of polyolefins (polyethylenes, polypropylenes and polyolefin copolymers such as ethylene vinyl acetate, TPO's and TPR's (thermoplastic rubber)) and all styrenic thermoplastics such as polystyrene, ABS (acrylonitrile-butadiene styrene) and SAN (styrene acrylonitrile).

PHYSICAL PROPERTIES

Melting Point	56–58C / 133-136F
Freezing Point	not applicable
Ionic Nature	non-ionic
Decomposition Temperature	>280C / >536F
Vapor Pressure	2.0×10^{-7} mm Hg

TOXICITY

Acute Oral LD_{50} (rats)	>5,000 mg/kg
Skin Irritation (rabbits)	Irritant
Eye Irritation (rabbits)	Irritant

ACCEPTED
JUL 16 2003
Under the Federal Insecticide, Fungicide, and Rodenticide Act as amended, for the pesticide, registered under EPA Reg. No. 10466-38

APPLICATION PROCEDURES

1. **Polymeric Systems**
   Ultra-Fresh* NM-100 will inhibit the growth of microorganisms in polymeric systems. These include synthetic fibers (Polypropylene, Nylon, Acetate, Polyester, Rayon, Polyethylene fibers and blends of these fibers with natural fibers) molded plastics, and synthetic foams. An application of 0.05 to 0.3% based on weight of finished product is recommended. ***Ultra-Fresh**** NM-100 should be applied by adding the resin pellet concentrate to the bulk resin pellets before extrusion.

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2. **Coated Textiles**
   Textiles coated or laminated with polyvinyl chloride (PVC) or polyurethane (PUR), for use as mattress tickings, pillow tickings, curtains, covers and related articles for use in bio-burdened environments can be treated with ***Ultra-Fresh**** NM-100 at levels of 0.05% to 0.3% based on the weight of finished goods.

3. **Polyethylene Sleeves For Buried Conduits**
   Low density polyethylene films treated with ***Ultra-Fresh**** NM-100 at levels up to 2% (based on the weight of the film) used in the inner layer and co-extruded or laminated with a polyethylene high density middle layer film and a polyethylene low, linear low, medium, or high density outer layer film forming a sleeve for buried conduits that conforms with minimum physical characteristics specified in ANSI/AWWA Standard C105/A21.5-99. See the product information sheet for Polyethylene Sleeves for Buried Conduit.

4. For more details of application, please consult the Product Information Sheet on end-uses.

PRECAUTIONS

Ultra-Fresh* NM-100 should be handled with care and common sense that should be accorded to all biologically active chemicals. In case of contact with clothes, remove and launder contaminated clothing separately before reuse. Consult Material Safety Data Sheet for more information.

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NOTICE

The technical information and suggestions for use made herein are based on TRA's research and experience and are believed to be reliable, but such information and suggestions do not constitute a warranty, and no patent liability can be assumed. Since TRA has no control over the conditions under which this product is transported, stored, handled, used or applied, it is TRA's intent that its liability on any basis be limited to the price of the product used.

PRODUCT INFORMATION SHEET
Ultra-Fresh® NM-100

E.P.A. Reg. No. 10466-38

BACTERIOSTATIC AGENT FOR POLYETHYLENE SLEEVES FOR BURIED CONDUIT (PIPE)

Ultra-Fresh® NM-100 treated polyethylene films used in the manufacture of the inner layer of sleeves for buried conduit (pipe) are preserved by the bacteriostatic action imparted to their surfaces and also prevent the growth of Microbiologically Induced Corrosion (MIC)* of the conduit. Microbial contamination is known to result in the degradation of the polyethylene film and lead to corrosion of buried conduit of iron, steel, and reinforced concrete pipe. ***Ultra-Fresh***® NM-100 treatment in the polyethylene film inhibits the growth of micro-organisms to aid in the control of these effects.

Ultra-Fresh® NM-100 is incorporated into the matrix of the polyethylene film. Bacteriostatic action is exhibited on contact.

To provide preservation for polyethylene films against a wide variety of bacteria. Polyethylene films with ***Ultra-Fresh***® NM-100 agent used for the inner layer of the sleeve for buried conduit:

(1) Inhibits the growth of bacteria to ensure lasting protection for the treated article;
(2) Inhibits the growth of bacteria to prolong the life of the polyethylene conduit sleeve;
(3) Provides a durable, non-leachable antimicrobial treatment; and
(4) Prevents the growth of bacteria leading to Microbiologically Induced Corrosion of buried conduit.

The polyethylene sleeve is to be constructed of three layers of polyethylene. The innermost layer consists of a 1-mil thick film of low density polyethylene film containing ***Ultra-Fresh***® NM-100 as a bacteriostatic agent in a concentration of up to 2% based on the weight of the film. This layer will be in direct contact with the surface of the conduit. The center layer will be a nominal 1-mil minimum thickness high density polyethylene film acting as a barrier layer. The outer layer will be a low, linear low, medium, or high density polyethylene film providing tensile strength and be a nominal 6-mils minimum thickness. All three layers will be co-extruded or laminated for a total thickness of 8 mils minimum, with minimum physical characteristics conforming to American National Standards Institute/American Water Works Association (ANSI/AWWA) Standard C105/A21.5-99 for Polyethylene Encasement.

The conduit sleeve is to be installed according to ANSI/AWWA Standard C105/A21.5-99. This will ensure that the sleeve is properly sealed. Once the conduit is buried the backfill will compress the sleeve, and thereby the inner polyethylene layer treated with ***Ultra-Fresh***® NM-100, tightly against the conduit effectively providing a coating to the conduit to create a bacteria free zone around the conduit.

* Buried conduit made of iron, steel or reinforced concrete pipe is subject to corrosion. The elements of corrosion have historically been defined in terms of oxygenation or galvanic activity, where the presence of oxygen or stray direct current electrical current caused corrosive degradation of the conduit or its reinforcing metal structures. In the early 1950's research by the Cast Iron Pipe Research Association (CIPRA), now known as the Ductile Iron Pipe Research Association (DIPRA), proved that corrosion caused by oxygen or stray direct electrical current could be controlled by encasing the conduit in a sleeve of polyethylene film, nominally 8 mils in thickness. While engineers have chosen this method of protection for almost half of a century there were instances of unexplained corrosion, despite the absence of oxygen and stray electrical current. In more recent times a third element has been identified as the cause of this corrosion. Microbiologically Induced Corrosion, referred to as MIC, is generally associated with sulfate reducing anaerobic bacteria. These bacteria have been shown to exist in a biofilm on the conduit surface. It is generally accepted that the excreted products of these bacteria cause most of the corrosion damage. Other bacteria in the biofilm that are mutually beneficial to each other create a protective colony making it difficult to eradicate the corrosion causing bacteria.

NOTICE

The information and data contained herein are based on information we believe reliable. You should thoroughly test any application and independently conclude satisfactory performance before commercialization. Suggestions of uses should not be taken as inducements to infringe any particular patent.

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