

**NIEDNER**

## CARE & HANDLING OF NIEDNER LAY FLAT HOSE & COUPLINGS

To obtain the most from your fire hose investment, and to extend the useful life of the hose, prudent care and handling procedures should be followed. Niedner's philosophy is to design and manufacture fire hose that is lighter in weight, more compact for packing, and totally compliant with the requirements of NFPA. The following care and handling suggestions will extend Niedner's hose life with optimum performance.

**GENERAL CARE:** Even though Niedner hose products are made with synthetic components, and this hose may be stored without having to be dried, foreign materials trapped in the weave of the hose might be a breeding ground for mildew. Mildew will not attack the hose physically, but may look unpleasant and could have an odor. Therefore, it is recommended that dirty hose be cleaned with a mild detergent (not a solvent), and then be dried before reloading on the vehicle or storing. Whenever hose is left in-place for an extended period of time, either on an apparatus, a hose rack or in storage, hose should be exposed to freely circulating air.

**HOSE BED STORAGE:** Fire hose should always be loaded into the hose bed flat, and not on its edge. Loading flat will avoid premature hose wear that can occur when hose is loaded on its edge. Large diameter hose (LDH) should also be loaded flat, with the couplings placed together all the way forward in the hose bed. Periodically, hose beds and surrounding surfaces should be inspected for any sharp burrs, protrusions, rough edges or corners. If noted, these hose-damaging imperfections must be corrected before loading hose. A hose bed cover is recommended to prevent prolonged exposure of the hose to sunlight.

**DRAINING HOSE :** Under some circumstances when fire hose is drained, it is possible for the inner jacket to collapse and fold over on itself. This may appear as a twist, but it is not, and it can be easily corrected. Slowly recharge the hose, removing all kinks and twists, and then allow the hose to drain slowly. If needed, roll the couplings over so that the hose is in its original lay flat position. This is easily done if the hose still has some water in it. If the hose is not laid on an incline, walking its length with the hose elevated on a pike pole or hose roller should drain it completely.

**TESTING & INSPECTION:** As with all fire hose, Niedner hose should be inspected and service tested annually. Follow the guidelines of NFPA 1962, Current Edition. Any physical damage to hose should be addressed immediately. The purpose of the outside hose jacket is functional, but if damaged, the hose should be withdrawn from service. The interior of the hose should also be visually and manually inspected. If damage is evident, hose should be cut back and re-coupled. If the interior damage extends far into the hose, it may be defective. Bring this to the attention of your local distributor. If hose is re-coupled for any reason, that length must be re-tested before being placed back in service. See NFPA 1962, Current Edition.

**COUPLINGS:** Coupling gaskets for threaded or Storz couplings should be replaced when they become hard or cracked. Storz couplings should be lubricated at least twice a year. A dry silicone spray, or other lubricant that will not attract dirt or sand, nor be affected by heat or cold, should be applied to the Storz lugs, locks, and raceway. **Do not lubricate the coupling gaskets or seals.** If the gaskets or seals are inadvertently exposed to petroleum based products they should be removed, thoroughly cleaned and replaced.

## **POLYESTER versus NYLON**

Niedner prefers to use polyester instead of nylon because it makes a quality fire hose! The reason why some manufacturers use nylon in their fire hoses, even though it is slightly more expensive than spun polyester, is that it has a lower specific gravity that means a pound of the material goes further. This alone accounts for about a 10% gain in yield.

Nylon yarn is typically only available in a filament form as compared to the polyester that has been spun into a yarn. In order to approximate the physical dimensions and appearance of spun polyester, the nylon filament is bulked by means of crimping and air entanglement, which enables the same amount of yarn to occupy more space. Filament yarn is quite small in diameter and because of the high strength of the synthetic yarns, one would have to use far more than is structurally necessary just to ensure adequate coverage of the outer circumference of the hose. By bulking up the yarn, less nylon can be used to achieve the same coverage.

Because the yarn has been bulked it is not very stable and therefore any outside forces that act upon it try to return it to its original form. That is when the problems start to occur. Weaving tension such as that needed in a circular loom is one such force. Once woven, the yarn closely resembles a filament yarn that is very slippery, and does not cling well to itself, therefore resulting in a very flimsy jacket. The filament is also very susceptible to any abrasive objects that can snag and easily cut it.

Spun polyester, on the other hand, is physically stable because it was a filament yarn that was cut into staple and then spun into a yarn. There has been no falsification of its dimensions and it therefore remains intact. It also has a very high friction coefficient between its neighboring yarns, which mean that the yarns do not easily slip back and forth between each other, thus resulting in a sturdier jacket.

Nylon is hydroscopic in nature. That means it will chemically absorb water into its molecular structure, in the order of ten times higher than polyester. It also accounts for a 10% reduction in physical properties. In other words nylon is weaker when it is wet.

The melt temperature for both nylon and polyester is in the 500°F (260°C) range.

## **ENCAP Technical Polymer**

ENCAP is a highly technical polyurethane emulsion that was primarily developed for the rope and cable industry for use in marine applications. It was intended to act as a binder to keep the rope together as well as protecting it from the harsh marine environment. Now, compounded specifically for fire hose, it enables hose to resist wear and tear to a degree that was never before attainable.

Because ENCAP is a polyurethane resin, its melting point is roughly the same as that of polyester yarn. It therefore does not offer any significant increase in heat resistance. It does however, encapsulate all the fibers of an already very tightly woven jacket and bind these to the point whereby the abrasion resistance is increased up to 500% over the untreated hoses. The chemical resistance of ENCAP is phenomenal. With the exception of a few harsh solvents, ENCAP will protect hoses from most contaminants. Since it contains approximately 40% solids, the ENCAP emulsion also provides a good barrier against water absorption. This is particularly desirable since hose that soaks up water becomes very heavy and difficult to handle. It also make working in freezing temperatures much easier since the only the surface water on the hose will freeze and not the hose throughout.

In the past, some problems were encountered in that certain colors were fading prematurely. This was a problem with the pigment only. Even with the color completely dissipated, the ENCAP resin still remained intact and functional. Today, newer pigments with greater UV resistance allow ENCAP treated hoses to retain their vibrant colors for years.

ENCAP provides a technical solution for both user safety and ease of handling as well as added durability for your hose inventory.

## PRODUCT FEATURES

NIEDNER offers many features in its products which are not readily apparent in a condensed presentation such as our product sheets. A few of our principal products are outlined in our product sheets. The NIEDNER Sales Staff, Customer Service and Niedner distributor will be happy to assist you in learning more about the benefits of our fire hose contained herein or other specially developed products not described here.

### LINING

#### T.P.U.

Many of the hose products are made with T.P.U. lining in lieu of the conventional SBR rubber lining. T.P.U. is an elastomeric polymer made from a polyester-polyether compound. NIEDNER extrudes this lining thus ensuring the tightest quality control. This special fire hose lining compound offers these unique features:

- Flexibility at -60°F (-51°C)
- Tear strength three times greater than rubber
- Maximum resistance to hydrolysis (NL 8103-80)
- No plasticizer to weaken adhesion or leach out to cause lining stiffness and cracking
- No edge stress cracks as in direct extrusion process to cause eventual lining failure
- Virtually immune to aging and microbial attack
- Resistant to pure mineral oil, petroleum, hydrocarbons, most solvents and greases, weathering, ozone and ultra-violet light
- Maximum temperature for water flow is approximately 140°F
- Maximum temperature for hot air flow is approximately 150°F
- Approved for potable water use

#### E.P.D.M.

As an alternative to T.P.U., NIEDNER also offers a lightweight E.P.D.M. rubber lining that provides comparable weight and compactness to that of T.P.U. while retaining the desirable characteristics of rubber lined hose. Maximum temperature for water flow is approximately 160°F (71°C).

### JACKETS

NIEDNER offers circular woven jackets using filament polyester or spun polyester yarns woven in either plain (conventional) or bias weaves. Where abrasion is a problem, especially with single jacket hoses, the bias weave is especially designed to increase abrasion resistance by at least 50%. This is accomplished, in part, by the warp yarns offering 50% more coverage of the filler yarns without adding additional bulk/weight.

The outside of the hose can withstand temperatures in the short term of approximately 350°F (176°C) and is not to exceed 250°F (121°C) in the long term. The melting point is at 500°F (260°C).

### TREATMENT

#### ENCAP

A high performance polymeric dispersion. Due to the nature of the polymer and the process by which it is applied, ENCAP virtually encapsulates every fiber of the substrate thereby imparting superior physical properties such as:

- Abrasion resistance gain of 500%
- Resistance to pure mineral oils, petroleum, hydrocarbons, most solvents and greases
- Virtually immune to fungal growth
- Minimal water retention versus untreated hoses
- Excellent U.V. resistance
- A wide variety of colors available; i.e., yellow, green, red, blue, clear (white), beige (tan), orange and purple

#### DRAFTKOTE and DALCOAT

High performance outer jacket coatings that offer exceptional abrasion and chemical resistance. This makes it particularly desirable for industrial applications where damage from abrasion and absorption of contaminants must be kept to a minimum.

### TESTING

Each length of NIEDNER double jacket fire hose is guaranteed to be tested, coupled or uncoupled, before leaving the factory. Certifications of these tests are available from the factory: requests for certificates must be received with purchase orders. Effective July 1, 1988, all NIEDNER hose is required to be tested in accordance with the most current edition of NFPA 1961. NIEDNER complies with these guidelines as evidenced by all the information contained in our product sheets.

### FINISHED HOSE

Combining modern high-speed looms with the latest lining technology in a newly designed product offers features such as:

- \* 1/3 less storage area
- \* 1/3 product weight
- \* Flexibility to -60°F (-51°C)
- \* Versatility in product design
- \* Maximum strength to weight ratio
- \* Minimum twist, warp and elongation
- \* Maximum cold temperature resistance
- \* Maximum resistance to mildew, deterioration, ozone and cracking
- \* Oversize waterways for increased flow and decreased friction loss while using NFPA compliant couplings

## GLOSSARY

<b>Acceptance pressure</b>	A specified pressure applied to all new hose by the manufacturer determining hose capability to withstand working pressures. Acceptance pressure is twice the annual service pressure. Same as proof pressure. Acceptance or proof pressure tests for new hoses shall only be conducted at the point of manufacture or at a facility equipped to perform these tests.
<b>Attack hose</b>	Hose designed to be used by trained fire fighters and fire brigade members to combat fires beyond the incipient stage. Attack hose is designed to convey water to hand line nozzles, distributor nozzles, master stream appliances, portable hydrants, manifolds, standpipe and sprinkler systems, and pumps used by fire departments. It is designed with a minimum service test pressure of 300 psi (2070 kPa).
<b>Coating</b>	A protective material impregnated, saturated, or coated on the outside reinforcement layer of the hose to provide additional reinforcement or protection for the hose.
<b>Hose Assembly</b>	Hose furnished with couplings attached at each end.
<b>Labelled</b>	Equipment, materials or services that are labeled or with a tag or symbol to identify a firm that, under authorized jurisdiction involved in the evaluation of a product, maintains periodic inspections of the different specifications and performance in a specific fashion.
<b>Lining, EPDM rubber</b>	Ethylene Propylene Diene Monomer is a synthetic rubber that has excellent inherent resistance to UV and ozone. It extrudes smoothly, producing a thinner flexible lightweight tube. It is slightly thicker than Thermoplastic Urethane Liner but yields a hose only minimally heavier and bulkier. The heavier wall gives slightly better kink resistance than Thermoplastic Urethane lined hoses.
<b>Lining, SBR rubber</b>	Styrene Butadiene Rubber is a synthetic general purpose rubber compounded for many uses including hose tubing. It is typically extruded in a thicker wall than EPDM rubber and Thermoplastic Urethane Liner, and hence yields a heavier bulkier hose. The UV and ozone resistance is poor unless specifically compounded for that purpose. The heavier wall imparts better kinking resistance.
<b>Lining, - T.P.U.</b>	Thermoplastic Urethane is a high performance polyurethane elastomer that can be extruded into a very thin walled tube for use in fire hose. It has a very high tensile strength compared to rubber compounds and has excellent UV and ozone resistance. It remains flexible at extremely low temperatures and yields a lightweight and compact hose.
<b>Listed</b>	Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction over and concern about products or services; that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services; and whose listing states that either the equipment, material, or service meets identified standards or has been tested and found suitable for a specified purpose.
<b>Multiple jacketed hose</b>	A construction consisting of a combination of two separately woven reinforcements (double jacket) or two or more reinforcements interwoven.
<b>NFPA 1961</b>	National Fire Protection Associations guidelines titled
<b>NFPA 1962</b>	National Fire Protection Associations guidelines titled Inspection, Care, and Use of Fire Hose, Couplings, and Nozzles and the Service
<b>Pressure, burst</b>	A pressure equal to at least three times the service test pressure.
<b>Pressure, proof</b>	A specified pressure applied to new hose by the manufacturer to indicate its acceptability at intended working pressures. Same as acceptance pressure Equal to at least two times the service test pressure of a hose. Acceptance or proof pressure tests for new hoses shall only be conducted at the point of manufacture or at a facility equipped to perform these tests
<b>Pressure, service test</b>	The pressure to which the hose is periodically (annually) tested to determine that it can remain in service. The service test pressure is at least 10% greater than the maximum working pressure
<b>Pressure, working</b>	The maximum pressure, to which a hose should be subjected, including the momentary surges in pressure that can occur during service. The working pressure is sometimes abbreviated as WP, and is sometimes referred to as Use Pressure.
<b>PSIG</b>	Pounds per square inch gauge pressure. (1 PSIG equal 6.8948 Pa). This term is used to identify flowing pressure not static pressure
<b>Supply hose</b>	Hose used at pressures below 185 psi (1275 kPa), usually
<b>Warp threads</b>	The threads or yarns of a jacket that run lengthwise to the hose. Warp threads protect the filler threads, and handle about 25% of the water pressure.
<b>Weft (filler) yarn</b>	The yarn running circumferentially around the hose.
<b>Wye</b>	A fitting designed to have one hose line flowing in and two hose lines flowing out or a Siamese Wye, which has two hose lines flowing in and one hose line flowing out.

