

# ATTACK FORCE 1000™

**1-3/4" AND 2-1/2"  
MUNICIPAL HOSE**

**NORTH AMERICAN FIRE HOSE**

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# SPECIFICATION FOR ATTACK FORCE 1000™ 1-3/4" AND 2-1/2" MUNICIPAL FIRE HOSE

## HOSE CONSTRUCTION:

Hose meeting specification shall be designed and constructed specifically for aggressive interior fire attack operations. Outer jacket shall be woven from high quality 100% synthetic filament yarns. The outer jacket over an inner lining consisting of a one piece extruded through-the-weave tube that makes the tube, jacket, liner, and cover one piece. The finished hose shall be heat resistant, kink resistant and have a low friction loss design. The finished hose shall be designed with the lowest resistance to drag. Friction loss and water pick-up are primary items.

## INNER HOSE PROPERTIES

When tested in accordance with the procedures listed in NFPA 1961-2007 edition and other related standards, liner or cover shall have the following properties as indicated:

**Ultimate Tensile Strength:** Tensile strength of liner shall not be less than 1500 psi.

**Ultimate Elongation:** Ultimate Elongation of liner compound shall not be less than 400%.

**Permanent Elongation:** Permanent elongation of liner rubber compound shall not exceed 20%.

**Accelerated Aging Test:** Hose shall meet requirements of U.L. Standard 19 for accelerated aging. The Fire Department reserves the right to forward 3 foot samples, cut from lengths of delivered hose, to a nationally recognized laboratory for testing. The tests shall cover the physical requirements on the linings as well as the jackets as outlined in these specifications. If the hose passes, the cost will be paid by the Fire Department. If the hose fails, the cost shall be paid by the supplier. Failure to comply with these specifications will be cause for all hose to be rejected.

The Fire Department also reserves the right to request one sample cut from each 1000 feet of delivered hose. The sample will be a minimum length necessary to conduct ozone resistance, accelerated aging, adhesion and liner tensile tests by the manufacturer. The results of these test, along with the samples are to be forwarded to the Fire Department.

**Adhesion:** Adhesion between reinforcement and liner shall be a minimum of 20 lbs. When tested using the NFPA 1961 procedure.

**Ozone Resistance:** Hose shall show no visible signs of cracking of the liner or cover when tested in accordance with ASTM D1149-91 and ASTM D518-86 (R91), Procedure B, 100 pphm/118° F/70 hours.

**Chemical Resistance:** Exposure to sea water and contamination by most chemical substances, hydrocarbons, oil, and grease must have no effect on the short or long term performance of the hose. Standard chemical resistance charts for the liner shall be provided by manufacturer.

## OUTER HOSE PROPERTIES:

Outer jacket shall be woven from high quality filament polyester yarn. To ensure adequate abrasion resistance, the minimum number of warp plies per inch shall be 52.

## SAFETY FACTORS

**Abrasion Resistance Safety Factors:** Abrasion resistance bears a direct relationship to the safe performance of fire hose. The U.L. abrasion test is felt to most closely reproduce fire department's actual fire ground conditions and is therefore considered of prime importance. Hose meeting all the abrasion resistance safety factors listed below shall do so without exceeding the average weights listed.

**Abrasion Resistance - U.L. Method:** Hose shall pass a burst test after 3,000 cycles on a reciprocating abrasion tester - as specified in U.L. Standard 219. **Factory Mutual Method:** When a sample of coupled hose is submitted to the procedure listed in FM Standard 2111 or Mil-H-24606A (SH), there shall be no signs of leakage after 20,000 cycles of abrasion.

**Cold Resistance Safety Factor:** Hose shall be capable of safe use down to -50°F. Hose shall have no apparent damage to cover reinforcement or lining when subjected to the following cold bending test. A 50 ft. length of dry hose is to be firmly coiled and placed in a cold box at 50°F for a duration of 24 hours. The hose shall not leak or show any damage to the reinforcement when subjected to hydrostatic acceptance test pressure.

**Flashover Resistance Safety Factor:** Heat resistance bears a direct relationship to the safe performance of the hose on the fire ground and as such will not be compromised. Hose meeting the heat resistance safety factors listed below shall do so without exceeding the weights listed. The hose when subjected to a static pressure of 100 psi shall be capable of safely withstanding a surface temperature of 1000°F for a minimum of 45 seconds without bursting.

**Water Pick-up Weight:** The tendency for a hose to absorb water while in a wet environment can create significant handling difficulties. When tested against the procedure listed in Mil-H-24606, the maximum weight gain shall not exceed 3 lbs. Per 50 ft. length.

**Burst Resistance Safety Factor:** Hose failure due to bursting is the single most important safety concern. Hose shall have the capability of passing a 500 psi service test with a 1/2" diameter hole through both jacket and liner. Only a through-the-weave design liner will be acceptable. Hose shall have a minimum burst pressure of 1500 psi.

**Hydrostatic Pressure Tests:** The hose shall comply with the National Fire Protection Association Standard NFPA 1961-2007 edition.

## HYDROSTATIC TESTS:

All hoses shall be in compliance with NFPA 1961 (Latest Edition) requirements for Double Jacket, 1000 PSI Proof Test Pressure, Attack Grade Fire Hose. All measurements and tests necessary to determine compliance of the fire hose with the specified requirements, shall be made in accordance with NFPA 1961 (Standard on Fire Hose), and ASTM D-30 (Standard Test Methods for Rubber Hose), except as otherwise specified. The results of these test shall be ready available, upon request by The Fire Department.

## PHYSICAL DATA

Diameter	Service Pressure	Acceptance Pressure	Kink Proof Pressure	Short Length Burst	Curved Length Burst	Average Wt. 50' Coupled	Coil Size 50' Coupled
1 3/4"	500 psi	1000 psi	750 psi	1500 psi	1500 psi	21 lbs.	17 in.
2 1/2"	500 psi	1000 psi	750 psi	1500 psi	1500 psi	30 lbs.	19 in.

**Quality Control:** The producer shall maintain total quality control over the entire manufacturing process from the procurement of premium quality raw materials, through the weaving, extrusion, curing and coupling attachment processes. The quality of the coupled hose assemblies shall be validated during the 100% hydrostatic testing procedures, as well as through the other physical laboratory testing methods. A quality control procedure system shall be maintained by the manufacturer and shall be available for inspection and audit by the purchasing authority. When requested at the time of order placement, hydrostatic test

reports of the coupled hose assemblies shall be provided to the purchaser, and shall be preserved on file for a period of five years. The Fire Department also reserves the right to request one sample cut from each 5,000 feet of delivered hose. The sample will be a minimum length necessary to conduct ozone resistance, accelerated aging, adhesion and liner tensile tests by the manufacturer. The results of these tests, along with the samples are to be forwarded to the Fire Department.

Lot Acceptance Inspection: The Fire Department shall have the option of sending two inspectors to the point of manufacture of the fire hose to witness the physical and hydrostatic lot acceptance tests.

Also, the manufacturer shall provide a coupling attachment hands-on instructional class at the hose manufacturing site at the time of the lot acceptance testing, if requested.

**Warranty:** The manufacturer shall certify that the fire hose proposed shall meet the requirements and specifications as herein set forth. The manufacturer shall also, as part of his proposal, warranty such fire hose for a period of three (3) years against failure due to defects in material and workmanship, and shall provide for the replacement of any such hoses as may be defective in this respect at no additional cost to the Fire Department.

**Markings:** Beginning at a point not less than 4 feet from each end, each length shall be stenciled in indelible letters at least 1" high with the trade name of the hose, hose length, diameter, service test pressure, the hose manufacturer's identification, "Made in" plus the country of origin identification, and the manufacturing date.

### **Couplings:**

The couplings must be made of 6061-T6 seamless extruded aluminum complying with ASTM B-221. Non-seamless extrusions, such as "port-hole" or "structural" extrusions, have several mechanical bonds or seams running down the entire length of the extruded tube and provide inferior and inconsistent strength characteristics to the finished coupling. Also, non-seamless extrusions are not rated for burst pressure and are not recommended by the aluminum extrusion manufacturers (e.g. ALCOA) for pressure applications.

All coupling components must be "Hardcoat Anodized" in accordance with MIL-A-8625, Type III, Class 1. The "Hardcoat Anodize" process creates a hard aluminum oxide coating which improves the abrasion, corrosion and electrolysis resistance of the completed fitting, while also preventing excessive wear on the male and female threads. Dye anodize, plain anodize, conventional anodize, along with paint or powder coated processes provide inferior protection to the couplings and do not meet the requirements of this specification.

All couplings shall be American made, with the words "Made In USA", as well as the manufacturer's name permanently stamped into the coupling before hardcoat anodizing.

The male and female coupling bowls, along with the male coupling lugs, shall incorporate the "LA Taper" to allow the coupling to be more easily moved over and around edges and corners. The threads shall have a blunt start Higbee cut, with Higbee indicators on both the male and female lugs. Swivels must be attached with either metal rings or metal bearings to improve swivel retention under pressure. Swaged swivels are not acceptable.

The gaskets must be lathe cut to insure precise dimensional consistency, in order to insure leak free performance for the life of the coupling. Inferior, low cost molded gaskets are not acceptable. The tail and swivel gaskets shall be composed of synthetic rubber or ozone resistant EPDM. The swivel gasket hardness shall be 60 +/- 5 durometer, Shore "A", while the tail gasket shall be 70 +/- 5 durometer, Shore "A".

The expansion rings shall be fabricated from soft annealed seamless 85/15 red brass per UNS 23000 for maximum expansion without danger of cracking or breaking. The rings must have chamfered edges to prevent cutting of the hose liner, and shall be free from scale, grooving, indentations, cracks, scores, dents, and burrs.

Couplings must meet or exceed NFPA Standard 1963 (Standard Fire Hose Connections, latest edition), and Military Standard A-A-59227 (Coupling Assembly, Fire Fighting Hose).

A Certificate of Origin for the couplings must be provided with each delivery to the fire department, if requested. Also, if requested at the time of order placement, certifications shall be provided for conformance to the following standards: ASTM B-221, Federal Spec. A-A-59227A, A-A-55535, MIL-A-8625 Type III Class 1, and NFPA 1963.

**Place of Delivery:** Hose supplied under the terms of this contract shall be delivered, at no additional charge to the Fire Department.

Complete detailed specifications, including a written warranty, along with a 12 inch sample of the hose proposed to meet this specification, shall be submitted with the hose bid.

**Exceptions to Specifications:** Any and all exceptions to these specifications must be noted in detail below. Failure to note these exceptions shall be cause for rejecting and returning any hose supplied at no cost or obligation to the Fire Department.

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