



**NORTH AMERICAN
FIRE HOSE
CORPORATION**

The difference is... **your** margin of safety.

POLY-FLOW 600 LDH™

SPECIFICATION FOR 4" & 5"

**DOUBLE JACKET MUNICIPAL FIRE HOSE
POLY-CORD™ FIBER CONSTRUCTION
PLAIN WHITE OUTSIDE JACKET
OR
ULTRA-SHIELD™ IMPREGNATED OUTSIDE JACKET
LIGHTWEIGHT DURA-THANE™ POLYURETHANE LINING**

***Friction Fighter*™ FOR REDUCED FRICTION LOSS AND IMPROVED
FLOW CHARACTERISTICS**

Copyright © 2010 North American Fire Hose Corporation. All rights reserved.

North American Fire Hose Corporation

910 East Noble Way · Santa Maria, CA 93454

Phone 805 922-7076 · Fax 805 922-0086

www.nafhc.com



POLY-FLOW 600 LDH™ FIRE HOSE SPECIFICATION

POLY-FLOW 600 LDH™ Specification for 4" and 5" Double Jacket Municipal Attack Grade Fire Hose featuring a 100% polyester construction with a lightweight Dura-Thane™ polyurethane lining in either a plain white color or with an optional high performance colored impregnation for the outside jacket.

Scope: The fire hose to be supplied under this specification shall be a superior quality, abrasion resistant, all polyester, double jacket, Dura-Thane™ thermoplastic polyurethane lining, attack grade fire hose designed for ease of handling and use. The heavy duty construction shall also be engineered for prolonged storage and for extended service life. All hose supplied shall meet or exceed the requirements of NFPA 1961, Standard on Fire Hose (Latest Edition), for attack hose, which is considered a minimum standard for the industry.

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.

Warranty: The manufacturer shall certify that the fire hose he proposes to furnish 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 five (5) 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. Manufacturer to accept delivery of any rejected hose by the Fire Department.

Lining: The Dura-Thane™ lining which is an important component of the **Friction Fighter System™** shall be composed of a single-ply polyurethane extrusion, and shall be unaffected by ozone deterioration. The finished form shall be free of pits or other imperfections and shall have a smooth bore. The thickness of the lining shall be .022 inch to .025 inch. The shore hardness shall not exceed 40 durometer on the "D" scale. The tensile strength of the lining shall not be less than 3000 psi with a minimum elongation of 400 percent.

The Dura-Thane™ polyurethane lining shall be directly bonded to the inner jacket without the use of adhesives, resulting in a permanent bond that is unaffected by hydrolysis and microbial degradation.

Adhesion: The adhesion between the lining and the inside jacket shall be such that the rate of separation of a 1½ inch wide strip cut transversely, shall not be greater than one inch per minute, over a 10 minute period, under a weight of 12 pounds.

Accelerated Aging: Lining specimens shall be subjected to ASTM-D 573 "Test Methods for Rubber Deterioration in an Air Oven". Specimens shall be exposed to 70 degrees C ± 1 degree for a duration of 96 hours, and shall normalize for 24 hours before testing. The tensile and elongation of the lining shall not be less than 75 percent of the initial values.

Ozone Resistance: Lining specimens shall be subjected to ASTM-D1149 (Latest Revision). Specimens shall be made in accordance with ASTM-D518 Procedure "C" and shall be elongated 15 percent. Ozone concentrations shall be 100 ± 5 parts per hundred million by volume. Temperature shall be 100 degrees F. Time shall be 100 hours. There shall be no appearance of cracking when viewed under a seven power magnifying glass at any time during or after the test.

Jacket Construction: Poly-Cord™ ring spun polyester warp yarns are combined with filament polyester filler yarns. The warp and filler yarns shall be of adequate number, size and strength to meet all of the hydrostatic requirements of this specification. Also, in order to ensure that the maximum abrasion resistance, durability, service life expectations, and performance margin of safety are achieved, the warp and filler yarns must comply with the minimum requirements contained in the following table:

	Inside	Jacket	Outside	Jacket
Nominal Diameter	Min. Warp Yarn Weight Lbs. / 50 foot	Min. Filler Yarn Weight Lbs. / 50 foot	Min. Warp Yarn Weight Lbs. / 50 foot	Min. Filler Yarn Weight Lbs. / 50 foot
4"	10	4½	10½	4½
5"	12	5½	13¾	6

The warp yarn in both the inner and outer jackets shall be constructed with a superior grade of ring spun polyester yarn. Also, the use of less expensive filament polyester as an inside jacket warp yarn material is **not acceptable** due to the following: 1, lower initial and long term lining adhesion capability, and 2, the development of a loose or baggy outer jacket. This bunching or baggy jacket condition results in hose that is subject to increased snagging and cutting during use, as well as concentrating any abrasion to the bunched or baggy areas.

The filler yarn in both jackets shall be high tensile strength, low elongation filament polyester yarn.

To further enhance the low friction loss characteristics of the hose construction, the inside jacket must be constructed with a reversed twill weave, which results in a smoother waterway surface than can be achieved with a regular twill or square weave. This reversed twill weave is another component of the **Friction Fighter System™** for friction loss reduction in fire hose.

The outside and inside jacket fit is also critical to the finished hose. The initial outside diameter of both the inner and outer jackets must be carefully monitored and controlled during weaving, coating, and final assembly. This is required to ensure a tight jacket fit and to avoid a bunching or baggy outer jacket, which can result in increased snagging, cutting and abrading in use. Also, after the initial proof test pressure, there shall be no excess outer jacket bagginess. The jackets must fit snugly inside one another under zero pressure, or under proof and service test pressures.

Impregnation: When required as a special option, the outside jacket shall be pressure impregnated with a high performance, high solids, 100% polyurethane Ultra-Shield™ coating matrix which thoroughly saturates and encapsulates the individual fiber bundles. The colored coating shall be heat set at temperatures not less than 250 degree F in a two-stage process to enhance the inherent abrasion resistance, durability, and environmental resistance of the two component polyurethane blend.

Coatings formulated from acrylic materials (as used in house paints), or dried with ambient temperatures which do not heat set the polymer to the fibers are **not acceptable**.

Hydrostatic Test: Every length of hose submitted under this specification shall be subjected to the Hydrostatic Proof Pressure Test at 600 psi in accordance with the procedures and requirements of NFPA 1961, “Standard on Fire Hose” (Latest Edition). This 100% hydrostatic testing will be conducted on hose equipped with couplings to be delivered on the order. Test measurements shall include the determination of elongation, twist, warp, rise and kink test, as well as visual inspection for leakage or coupling slippage under pressure. Any lengths of hose that do not meet the NFPA 1961, “Standard on Fire Hose” (Latest Edition) requirements for attack hose shall be rejected, tagged and placed into a separate holding area.

Burst Test: Two individual three foot long sections of hose shall be removed from full lengths of every finished hose lot and shall be subjected to a burst pressure test. The minimum burst pressure achieved shall not be less than 900 psi or that lot shall be rejected.

Hose Length: The average length of all hose within a lot shall not be less than the nominal hose length ordered (25 feet, 50 feet or 100 feet). Also, no individual length shall be less than one foot under the nominal length (e.g. 24 feet, 49 feet or 99 feet) except lengths which have had samples removed for burst or physical testing, which shall not be less than three feet under the nominal length (e.g. 47 feet or 97 feet). Burst or physical testing samples shall not be removed from 25 foot lengths.

Hose Weight: The hose maximum weight, which defines the strength, durability and longevity of service for a construction, along with the hose minimum weight, which defines the ease of deployment, handling and maneuverability, shall conform to the following table:

Weight in pounds per 100 foot uncoupled

	4"	5"
Minimum	80	95
Maximum	81	96

Coil Diameter: The coil diameter of a 100 foot length of hose coupled with lightweight couplings shall not exceed the values listed in the following table:

	4"	5"
Coil Diameter	26 inches	26 inches

Markings: Beginning at a point not less than four feet from each end, every length of hose shall be stenciled in indelible letters at least one inch in height, with the trade name, name of hose manufacturer and all additional marking required by NFPA 1961, “Standard

on Fire Hose” (Latest Edition) for attack grade fire hose. This NFPA marking must also include the Country of Origin marking, which conforms to the following format: MADE IN _____ (As required by the US Customs Service and the Federal Trade Commission, the full English name of the Country of Origin must be evident to the ultimate end user, with the only allowed exception being that USA may be abbreviated in lieu of the UNITED STATES OF AMERICA, per CFR regulations).

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 and are **not acceptable**.

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. 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”. Inferior, low cost molded gaskets are **not acceptable**.

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 lining, and shall be free from scale, grooving, indentations, cracks, scores, dents, and burrs.

Couplings must meet or exceed NFPA 1963, "Standard for Fire Hose Connects" (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 Standard 1963, "Standard For Fire Hose Connections" (Latest Edition).

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.

