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Master
Specification
No. 527

DEPARTMENT OF COMMERCE

BUREAU OF STANDARDS

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UNITED STATES GOVERNMENT MASTER SPECIFICATION FOR HOSE, FIRE, UNLINED LINEN

FEDERAL SPECIFICATIONS BOARD SPECIFICATION No. 527

This specification was officially promulgated by the Federal Specifications Board on September 22, 1927, for the use of the departments and independent establishments of the Government in the purchase of unlined linen fire hose.

[The technical requirements of this specification shall become mandatory for all departments and independent establishments of the Government not later than December 22 1927. They may be put into effect, however, at any earlier date after promulgation.]

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I. GENERAL SPECIFICATIONS

There are no general specifications applicable to this specification.

II. TYPE

The hose shall be of a single type—that woven from flax line yarn. The use of flax tow will not be permitted.

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III. MATERIAL AND WORKMANSHIP

1. Flax.—The hose shall be woven from threads spun from first quality flax line and shall be practically free from knots and shives.

2. Fabric.—The fabric shall be even and firm in texture throughout and free from all injurious or unsightly defects, or defects of any kind other than trifling ones incident to good practical manufacturing.

3. Interior of Hose.—The interior of the hose shall be as smooth as is possible with good practical manufacturing.

IV. GENERAL REQUIREMENTS

1. Diameter of Hose.—The internal diameter of the hose shall not be less than the nominal trade size (1¼ inch, 1½ inch, 2 inch, and 2½ inch) and not more than ⅛ inch in excess thereof.

2. Construction.—The fabric shall be seamless and have the fillers woven around the hose throughout its length and the warps interwoven with and covering the fillers.

3. Weight of Hose.—The weight of 100 feet of hose without couplings when in an absolutely (bone) dry condition shall be not less than indicated in Table 1.

Table 1.—*Weight of hose (bone dry)*

Nominal size (inches)	Pounds per 100 feet
1¼	11½
1½	14
2	18½
2½	23

V. DETAIL REQUIREMENTS

1. Yarn.—The yarn shall be carefully freed of vegetable gums by boiling in an alkaline solution until the soluble residue, removed by reboiling for four hours at atmospheric pressure in a 1° Twaddell solution, does not exceed 8 per cent by weight of the original weight (bone dry) of the specimen of yarn tested.

2. Bursting Test.—When lying straight, or curved to a radius of 27 inches, the hose shall be capable of withstanding a hydrostatic pressure of 500 pounds per square inch, held for five seconds.

3. Kinking Test.—When kinked, the hose shall be capable of withstanding a hydrostatic pressure of 300 pounds per square inch for five seconds.

4. Leakage Test.—After having been subjected for 10 minutes to a hydrostatic pressure of 75 pounds per square inch and thoroughly dried, the hose shall not, upon being subjected a second time to a 10-minute application of a hydrostatic pressure of 75 pounds per

square inch, show a total leakage per foot of fabric during the first minute or second five minutes in excess of that given in Table 2.

TABLE 2.—*Leakage of hose*

[Total leakage in fluid ounces per linear foot]

Nominal size	First minute	Second five minutes
1¼	2.7	0.7
1½	3.2	.8
2	4.2	1.0
2½	5.3	1.2

5. COUPLINGS.—(*a*) *Material.*—The couplings shall be made of an alloy of copper, tin, zinc, and lead, each within the proportion limits indicated in Table 3.

TABLE 3.—*Composition of couplings*

Metal	Minimum	Maximum
	Per cent	*Per cent*
Copper	83	----------
Tin	5	----------
Zinc	----------	7
Lead	----------	3

The metal shall be free from porosity and injurious defects.

(*b*) *Form.*—The couplings shall be of the expansion-ring type and shall conform to the national standard for fire-hose couplings, as recommended by the National Fire Protection Association, unless otherwise specified, in which case full details and gauges shall be furnished by the purchaser. They shall be made, finished, and fitted in a workmanlike manner throughout. The edges of the expansion rings shall be smooth and well rounded.

(*c*) *Thread dimensions.*—Thread dimensions, unless otherwise specified, shall conform to the standard adopted by the National Screw Thread Commission, August 19, 1924, and approved by the National Fire Protection Association.

6. LENGTH OF HOSE.—Hose shall be furnished in 25 or 50 foot lengths, as specified. The length of hose furnished, measured back to back of couplings, shall be not less than the specified length, except as provided in Section VI, 4.

7. MARKINGS.—Each length of hose shall be indelibly marked with the manufacturer's name or registered trade-mark, and with the year of manufacture, by letters and figures at least ¾ inch high. These marks shall be in two places on each length of hose, and shall begin not less than 4 feet from the couplings. In addition, the word "linen" shall be stenciled in letters ¾ inch high.

8. Identification.—The hose shall have a distinctive and conspicous identification, consisting of a colored warp thread or threads made from yarn dyed in fast colors that will neither wash nor fade to an extent making it difficult to distinguish them, provided the hose is given reasonable care.

VI. INSPECTION, SAMPLING, AND TESTS

1. Sample for Bursting Test.—A 3-foot specimen from a full length in every 6,000 feet or less of each type and size of finished hose shall be subjected to the bursting test.

2. Sample for Kinking Test.—A 3-foot specimen from a full length in every 6,000 feet or less of each type and size of finished hose shall be subjected to the kinking test.

3. Sample for Leakage Test.—A 3-foot specimen shall be cut from a full length in every 3,000 feet or less of each type and size of finished hose and subjected to the leakage test. The sample used for the leakage test may subsequently be used for either the kinking or bursting test, if desired.

4. Recoupling.—The length from which the 3-foot samples are cut shall be recoupled by the manufacturer and accepted as full lengths if the hose is accepted.

5. Bursting Test.—(*a*) *Preparation of sample.*—The test specimens shall be 3 feet long (measured between couplings) and in all instances will be taken from the end of the length. Couplings will be secured to each end of the specimens and a cap or blank coupling with a pet cock will be attached to the free end of the piece.

(*b*) *Test procedure.*—The specimen will be wet, to save time by reducing the leakage at start of test, and will then be connected to the test stub and filled with water from the low-pressure service.

While filling, the pet cock in the blank coupling at the free end will be left open so as to make sure that all of the air in the hose will escape. To insure all air being driven out, the free end of the hose with the pet cock open will be held up about 1 foot above the fixed end until the stream from the pet cock is solid without spurting or air spray. The pet cock will be closed before the free end is let down. Removal of the air from the hose is important for the sake of safety. Water does not compress when under pressure. Air does. The expansion of the air if suddenly released by the bursting of the hose or by the blowing off of a coupling might result in a serious or fatal accident. After the pet cock is closed the hose will be laid out flat and straight (if it is to be subjected to bursting test in the lying-straight position) or will be mounted in a frame (if it is to be tested in the curved position). It may then be covered with a tarpaulin, and the pressure will be increased at the rate of 100 pounds

per square inch per minute. When the bursting test pressure specified is reached it will be held for five seconds.

(*c*) *Retest.*—If the hose ruptures at the coupling at a pressure much below that called for in this specification, it is probable that the attachment of the coupling is faulty and that another test of the hose would meet the requirements. In such instances a retest of the hose will be made and the first result disregarded.

6. Kinking Test.—The method outlined above for "bursting-strength test" will be followed in the "kink test," excepting that after the pet cock is closed the hose will be sharply kinked (that is, bent over on itself) at about its center and tied together at the couplings. The hose thus kinked and tied will then be laid on the test table, covered with a tarpaulin, if desired, and the pressure applied as specified under "bursting-strength test."

7. Leakage Test.—(*a*) *Preparation of sample.*—The test hose shall be 3 feet long (measured between couplings), and in all instances will be taken from the end of the length. Couplings will be secured to each end of the hose and a cap or a blank coupling will be attached to the free end of the piece, or a suitable clamp may be used to close the free end of the hose and a cone fitting at the other end for securing the hose to the pressure source. The specimens, having been previously subjected to hydraulic pressure of 75 pounds per square inch for 10 minutes, will then be marked for identification and placed where air at ordinary temperature may circulate freely around and through them. When thoroughly dry (usually not less than 48 hours after the test) the samples will be subjected to the leakage test as follows:

(*b*) *Test procedure.*—The trough will be wet and then drained and set in place before connecting the hose to the pressure source. The dry hose will then be connected to the test stub. During the test the hose will not be touched or handled in any way. The stop watch will be started and at the same instant the hose will be filled with clear water at ordinary temperature and the application of pressure started. The pressure will be increased so that the test pressure specified will be reached within about 15 seconds after water is turned into the hose. The time will be reckoned from the instant the water is turned on. At the end of 60 seconds the water which has dripped off the hose and into the trough will be measured, and the amount recorded to the nearest milliliter or one-tenth ounce.

At the end of the fifth minute (reckoned from the start of the test) the trough will be again placed under the hose and allowed to remain there for five minutes (that is, until the end of the tenth minute from the start of the test), when the water which has accumulated will be measured and the amount recorded to the nearest milliliter or one-tenth ounce. During the test note will be made as to whether or not

the leakage is general over the whole length of the hose or is greater at some spots than at others.

(*c*) *Retest.*—If the leakage is excessive in one or more spots (instead of being uniform throughout the length) because of an imperfection in the thread or a flaw in the fabric the result will be disregarded and another sample taken, as the leakage test is principally a test of the nature of the yarn and the character of the weave and not a test for imperfections. If, however, imperfections are shown up in the leakage test the inspector will carefully note the nature of the imperfection and see that it is not present in hose examined for imperfections.

8. Twaddell Solution.—The 1° Twaddell solution used in the chemical test on the yarn shall be made up of one-fourth caustic soda and three-fourths soda ash, the combined weight of the caustic and ash being one-tenth of the weight of the specimen of yarn to be tested.

VII. PACKING AND MARKING OF SHIPMENTS

1. Packing.—The hose shall be packed in accordance with the best commercial practice so as to insure delivery in satisfactory condition, unless otherwise specified.

2. Marking.—Shipments shall be marked with the contractor's name, name of material, and contract or order number.

VIII. NOTE

The technical requirements of this specification are the same as those of the Underwriters' Laboratories Specification for unlined fire hose (flax line) as revised May, 1927.

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