# UL 2158A

## STANDARD FOR SAFETY

Clothes Dryer Transition Duct

UL Standard for Safety for Clothes Dryer Transition Duct, UL 2158A

First Edition, Dated December 11, 2013

***Summary of Topics***

***This revision of ANSI/UL 2158A dated October 11, 2021 includes a clarification to the status of the test sample in the Puncture Test; 13.1, 13.5 and Figure 13.1***

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The revised requirements are substantially in accordance with Proposal(s) on this subject dated July 23, 2021.

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# UL 2158A

## Standard for Clothes Dryer Transition Duct

Prior to the first edition, the requirements for the products covered by this standard were included in the Outline of Investigation for Clothes Dryer Transition Duct, UL 2158A.

**First Edition**

**December 11, 2013**

This ANSI/UL Standard for Safety consists of the First Edition including revisions through October 11, 2021.

The most recent designation of ANSI/UL 2158A as an American National Standard (ANSI) occurred on October 11, 2021. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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## CONTENTS

### INTRODUCTION

1 Scope ..... 5
2 Components ..... 5
3 Units of Measurement ..... 5
4 Undated References ..... 5
5 Glossary ..... 5

### CONSTRUCTION

6 General ..... 6
7 Corrosion Resistance ..... 6

### PERFORMANCE

8 Test Program ..... 6
9 Surface Burning Test ..... 7
10 Flame Resistance Test ..... 7
11 Bending Test ..... 8
12 Corrosion Resistance Test ..... 8
12.1 General ..... 8
12.2 Test for zinc-coated steel ..... 8
12.3 Tests for coated steel (other than zinc-coated steel) ..... 8
13 Puncture Test ..... 9
14 Impact Test ..... 11
15 Tension Test ..... 14
16 Torsion Test ..... 14

### MARKINGS

17 General ..... 14

### INSTRUCTIONS

18 Installation Instructions ..... 15
19 User Instructions ..... 15

No Text on This Page

## INTRODUCTION

### 1 Scope

1.1 These requirements apply to clothes dryer transition ducts intended for venting household and commercial clothes dryers.

1.2 The ducts covered by these requirements are intended to connect a clothes dryer to an existing permanent duct provided as a part of the building structure. The duct is intended to vent lint and humid air from drying clothes.

### 2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.2 A component is not required to comply with the specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard; or

b) Is superseded by a requirement in this standard.

2.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

### 3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

3.2 Unless indicated otherwise, all voltage and current values mentioned in this standard are rms.

### 4 Undated References

4.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

### 5 Glossary

5.1 For the purpose of this standard the following definitions apply.

5.2 CLOTHES DRYER – An appliance used to dry wet laundry by means of heat derived from the combustion of fuel, electric heating elements, or steam.

5.3 CLOTHES DRYER TRANSITION DUCT – A passageway assembled in a factory for conveying the exhaust of a clothes dryer to the venting system installed in the building structure.

## CONSTRUCTION

### 6 General

6.1 A transition duct shall be metal.

*Exception: Nonmetallic materials may be employed if constructed in layers in combination with metal. Layered constructions shall comply with the Surface Burning Test, Section 9.*

6.2 Flexible ducts shall be factory-made, either as a continuous piece or as a 2-part sectional assembly. Flexible ducts shall not exceed 8 ft (2.4 m) in length.

6.3 Sheet metal collars and clamps having a minimum thickness as shown in Table 6.1 may be provided as part of the assembly of the transition clothes dryer ducts. When collars and clamps are included as part of the assembly, the intended final assembly shall be evaluated as specified in the individual sections of this standard.

**Table 6.1**
**Minimum thickness**

| Galvanized steel (minimum thickness, in) | Aluminum (minimum thickness, in) |
|---|---|
| 0.013 | 0.016 |

### 7 Corrosion Resistance

7.1 Iron and steel parts other than stainless steel shall be provided with corrosion protection by enamelling, galvanizing, plating, or other equivalent means. Aluminum alloy parts shall be alloy 1100, 3003, or an alloy that has been found to have equivalent resistance to corrosion.

7.2 The corrosion resistant coating shall be that providing protection against atmospheric corrosion at least equivalent to steel having a uniform coating of zinc of not less than 0.3 ounce per square foot (1 g/mm$^2$) of surface area as determined in accordance with 12.2.1.

## PERFORMANCE

### 8 Test Program

8.1 Table 8.1 indicates the tests applicable to rigid and flexible type duct.

**Table 8.1**
**Test program**

| Section | Test | Type | |
|---|---|---|---|
| | | Rigid | Flexible |
| 9 | Surface Burning | Yes | Yes |
| 10 | Flame Resistance | Yes | Yes |
| 11 | Bending | No | Yes |
| 12 | Corrosion Resistance | Yes | Yes |

**Table 8.1 Continued on Next Page**

**Table 8.1 Continued**

| Section | Test | Type | |
|---|---|---|---|
| | | Rigid | Flexible |
| 13 | Puncture | Yes | Yes |
| 14 | Impact | Yes | Yes |
| 15 | Tension | No | Yes |
| 16 | Torsion | No | Yes |

## 9 Surface Burning Test

9.1 With reference to the Exception to 6.1, representative samples of duct employing nonmetallic materials layered with metal shall have surface burning characteristics of not over 25 without evidence of continued progressive combustion (flame spread). The tests for surface burning characteristics are to be conducted as specified in the Standard for Tests for Surface Burning Characteristics of Building Materials, UL 723.

9.2 Samples are to be positioned in the 25 feet (7.62 m) long fire test chamber specified in the Standard for Tests for Surface Burning Characteristics of Building Materials, UL 723. If the duct is sufficiently rigid, no supplemental supports are to be used. When necessary, due to characteristics of a duct that may affect the conduct of the test, 1/4 inch (6.4 mm) diameter steel rods may be used to support the duct. If supporting rods are used, they are to be spaced between 2 feet and 4 feet (0.6 m and 1.2 m) apart as required for support of the samples.

9.3 If the inside and outside surfaces of a duct are of different composition, tests for surface burning characteristics are to be conducted by exposing first one side and then the other to the test conditions, using different samples for each exposure.

## 10 Flame Resistance Test

10.1 Duct samples shall be subjected to the 5-inch (127 mm) flame test described in 10.2 – 10.4. As a result of the test:

a) The duct shall not continue to burn for more than 1 minute after the fifth 5-second application of the test flame,

b) Flaming drops or flaming or glowing particles shall not be emitted by the test sample at any time during the test that ignite the surgical cotton below the test specimen, and

c) The duct shall not exhibit burn-through.

*Exception: A duct that is constructed of materials that complies with the 5VA test specified in the Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances, UL 94, need not be subjected to this test.*

10.2 A Bunsen or Tirrill burner with a tube length of 3.94 ±0.39 inches (100 ±10 mm) and an inside diameter of 0.374 ±0.012 inch (9.5 ±0.3 mm), is to be placed remote from the specimen, ignited, and adjusted so that when the burner is in a vertical position, the overall height of the flame is 5 inches (127 mm), and the height of the inner blue cone is 1.5 inches (38 mm). The tube shall not be equipped with end attachments such as a stabilizer.

10.3 The duct, minimum 12 inches (305 mm) in length, is to be mounted vertically, in a draft-free test chamber, enclosure, or laboratory hood. A layer of surgical cotton is to be located 12 inches (305 mm) below the point of application of the test flame. The 5-inch (127 mm) flame is to be applied to the inside

surface at an angle of approximately 20 degrees, in so far as possible, from the vertical so that the tip of the blue cone touches the duct. The test flame is to be applied to the center of the duct and to any joints or seams on three different samples. A supply of technical-grade methane gas is to be used with a regulator and meter for uniform gas flow.

*Exception: Natural gas having a heat content of approximately 1000 Btu/ft$^3$ (37 Mj/m$^3$) at 73°F (23°C) may be used.*

10.4 The flame is to be applied for 5 seconds and removed for 5 seconds. The operation is to be repeated until the sample has been subjected to five applications of the test flame.

## 11 Bending Test

11.1 A flexible duct shall be bent through a 180-degree arc over a mandrel having a diameter equal to the inside diameter of the duct in accordance with 11.2 – 11.3. As a result of the test, the sample shall not rupture, break, tear, rip, or separate; any reduction in internal cross-sectional area shall not exceed 20 percent at any time during the test; and there shall be no evidence of other damage to the sample which would cause it to be unacceptable for further use.

11.2 Previously untested samples are to be tested. Samples, 8 feet (2.43 m) long, are to be selected. Acceptable steel clamps or collars, if not part of the assembly, are to be attached to each end of the test sample in accordance with the manufacturer's instructions. One end of the test sample is to be retained in place and the sample positioned adjacent to the test mandrel so that the center joint of the sample is not located in the area to be subjected to bending. The sample is to be bent through a 180-degree arc around the test mandrel.

11.3 The test is to be repeated five times, and each time the sample is to be returned to its original position. Observations are to be made during and following the test.

## 12 Corrosion Resistance Test

### 12.1 General

12.1.1 A duct which may have the protective coating damaged or the effectiveness reduced by the manufacturing process is to be tested after being subjected to such process.

### 12.2 Test for zinc-coated steel

12.2.1 To determine compliance with 7.2, the amount of zinc coating is to be determined in accordance with the Standard Method of Test for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles, ASTM A90.

12.2.2 If flaking or cracking of the zinc coating at the outside radius of a bent or formed section is visible at 25 power magnification, or if the coating is scored, the zinc coating is considered to be damaged and is unacceptable.

### 12.3 Tests for coated steel (other than zinc-coated steel)

#### 12.3.1 General

12.3.1.1 The tests in 12.3.2 – 12.3.3.1 are to be conducted on coated materials other than galvanized steel after the material has been formed for use in the finished product. The tests are to be conducted on samples of the coated material and on zinc-coated steel having the minimum coating of zinc specified in

7.2, and continued until equivalency is demonstrated. The test is to be terminated and equivalency is established when any of the control zinc coated samples demonstrate signs of corrosion sooner than the candidate samples. The test is to be terminated and equivalency is not established when any of the candidate samples demonstrate signs of corrosion sooner than the control zinc coated samples. Signs of corrosion are pitting, cracking, and red discoloration of the metal.

### 12.3.2 Salt-spray test

12.3.2.1 The apparatus for salt-spray (fog) testing is to consist of a fog chamber, the inside of which measures 48 by 30 by 36 inches (1219.2 by 762 by 914.4 mm); a salt-solution reservoir; a supply of conditioned compressed air; one dispersion tower constructed in accordance with Salt Spray Testing, ASTM B117, for producing a salt fog; specimen supports; provision for heating the chamber; and the necessary means of control.

12.3.2.2 The dispersion tower for producing the salt fog is to be located in the center of the chamber and is to be supplied with humidified air at a pressure of 17 to 19 psig (117.2 – 131 kPa) so that the salt solution is aspirated as a fine mist or fog into the interior of the chamber.

12.3.2.3 The salt solution is to consist of 20 percent by weight of common salt (sodium chloride) and distilled water, and the pH value of the collected solution is to be between 6.7 and 7.2 with a specific gravity of 1.126 to 1.157 at 35°C (95°F). The temperature of the chamber is to be maintained at 35 plus 1 or minus 2°C (95 plus 2 or minus 3°F) throughout the test.

12.3.2.4 Drops of solution that accumulate on the ceiling or cover of the chamber are not to be permitted to drop on the specimens, and drops of solution that fall from the specimens are not to be recirculated but are to be removed by drains located at the bottom of the apparatus.

### 12.3.3 High-temperature and humidity test

12.3.3.1 The test specimens are to be supported vertically in a closed chamber at a constant temperature of 40°C (104°F) and 100 percent relative humidity.

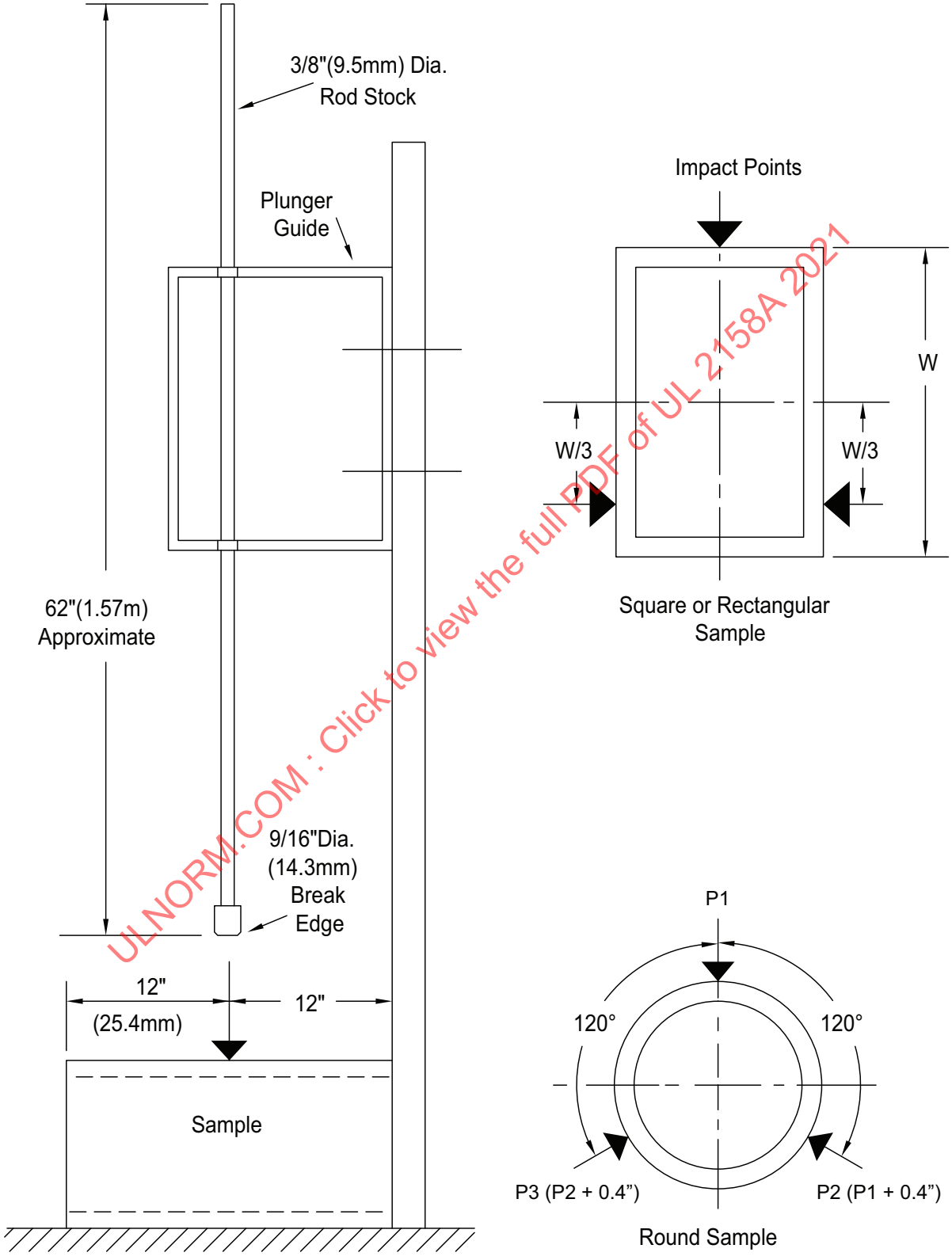
## 13 Puncture Test

13.1 A duct shall not be punctured when tested in accordance with 13.2 – 13.5. Following the test, the inner and outer surfaces of the samples shall not have ruptured, broken, torn, ripped, collapsed, or separated.

13.2 Test apparatus providing for a free fall of a plunger onto the surface of the sample is to be used for this test. The apparatus is to be as shown in Figure 13.1.

**Figure 13.1**

**Puncture test**

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13.3 The plunger is to consist of 3/8-inch (9.52 mm) diameter steel rod having a steel head, 9/16-inch (14.2 mm) diameter, attached to the impact end. The length of the plunger assembly is to be sufficient to provide a weight of 2 pounds (0.90 kg). The surfaces of the rod and head are to be smooth. The impact end of the rod is to be formed as shown in Figure 13.1.

13.4 Guides arranged to allow for an essentially frictionless fall of the plunger are to be provided. A means for measuring the height of fall is to be provided. The plunger head is to fall through a distance of 20 inches (508 mm) as measured to the top surface of the duct samples.

13.5 Two compacted samples, each measuring 8 feet (2.43 m) in length, of the finished duct construction are to be used. Each sample is to be extended to its full length. One two-foot length is to be randomly selected and cut from each sample and supported firmly below and throughout their length and width. At least three areas of each sample are to receive the impact of the plunger along its length and at the impact points (P1, P2, P3) around its perimeter with each test being offset by approximately 0.4 of an inch in succession as shown in Figure 13.1.

## 14 Impact Test

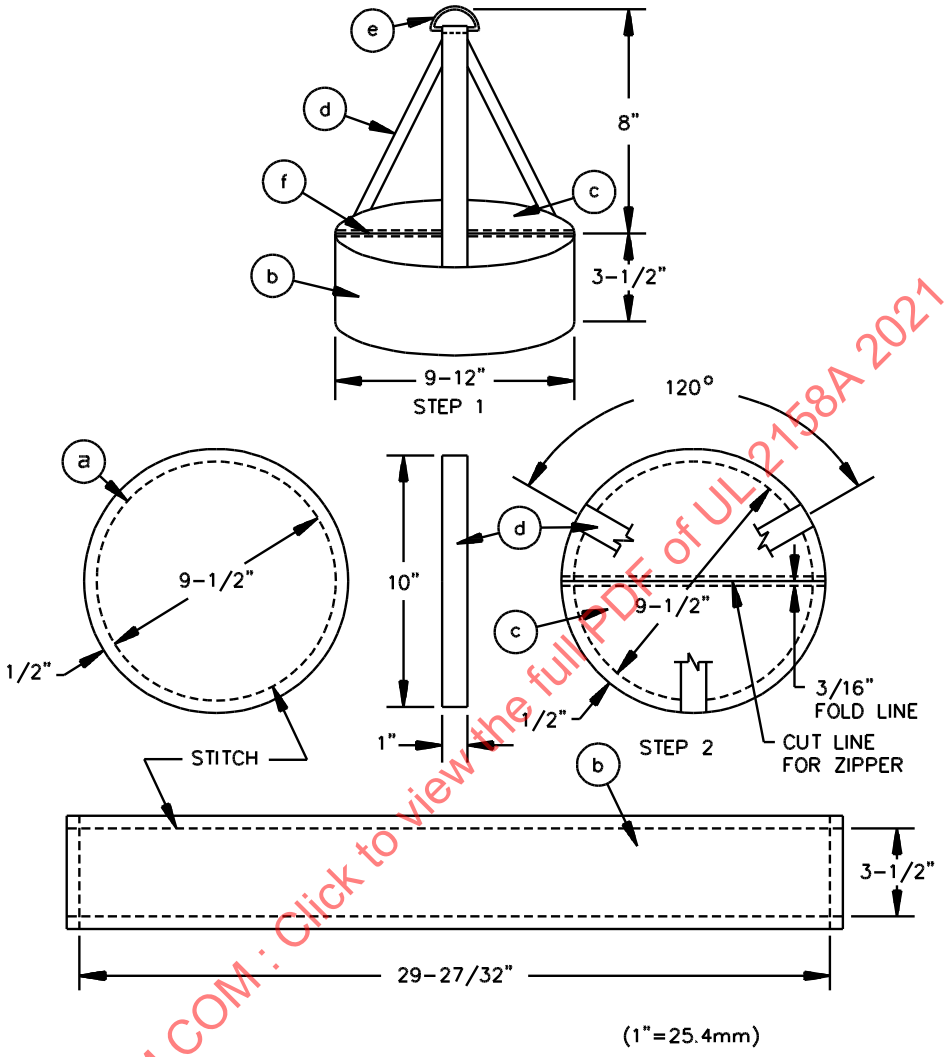
14.1 Samples of ducts shall not be damaged as a result of the impact applied as specified in 14.3 – 14.7. Following the test, the inner and outer surfaces of the samples shall not have ruptured, broken, torn, ripped, collapsed, or separated; and there shall be no evidence of other damage to the samples which would cause them to be unusable. The average reduction in internal cross-sectional area is to be determined for the three tests. A duct sample that has experienced an average internal cross-sectional area reduction in excess of 20 percent, or any individual reduction in cross-sectional area in excess of 25 percent is considered to have collapsed.

14.2 Three samples, each measuring 8 feet (2.43 m) in length, of the finished duct construction are to be used. All ducts are to be extended to their full length.

14.3 An impact test is to be performed on each of the three samples. The impact test is to be performed over a firm rigid flat surface. The impact is to be that of a canvas bag containing sand and weighing 15 pounds (6.8 kg). The bag is to be constructed of nominal 12 ounce (0.33 kg) canvas duck in accordance with Figure 14.1. The test fixture is to incorporate a mechanism which is capable of releasing the bag in a quick but smooth motion which imparts no lateral momentum to the sand bag.

**Figure 14.1**

**Canvas duck**




| | | |
|---|---|---|
| a | bottom | 12 oz. canvas duck |
| b | side | 12 oz. canvas duck |
| c | top | 5 oz. canvas duck |
| d | strap nylon | 1 in. wide |
| e | D-ring | 1-1/2 x 1/4 in. |
| f | nylon zipper | 1-5/8 in. wide x 10-1/2 in. long |

1. Cut piece a, b, and c from canvas material.
2. Sew piece b end-to-end with 1/2 inch seam allowance each piece.
3. Sew piece a to piece b as shown with 1/2 inch seam allowance each piece.
4. Cut piece c centerline, fold 3/16 inch each half and sew zipper as shown.
5. Sew nylon straps to piece c, 120° apart as shown in Step 2.
6. With all pieces inside-out sew piece c to piece b opposite piece a. (Note: Insure zipper is unzipped.)
7. Turn bag inside-out to obtain end construction shown in Step 1.
8. Sew 3 strap ends to D-ring leaving 8 inch length from top of D-ring to top of bag measured perpendicularly.

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