

Tubing, Nylon 11

1. SCOPE

1.1 The materials defined by this specification shall be low plasticized virgin Nylon 11.

1.2 This specification may involve hazardous materials, apparatus, and procedures. This specification does not address the health and safety problems, if any, associated with its use or application. It is the specification user's responsibility to follow appropriate safety or health practices, and determine the applicability of regulatory limitations prior to use.

2. APPLICATION

This specification was originally released for fuel system plastic tubing where low moisture absorption, dimensional stability, and low temperature impact resistance is required. Not covered tubing shall operate within the temperature range of -40°C to 115°C.

3. RELATED STANDARDS

ASTM D638—Test Method for Tensile Properties of Plastics

ASTM D789—Test Methods for Determination of Relative Viscosity, Melting Point, and Moisture Content of Polyamide (PA)

ASTM D792—Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

ASTM D1505—Test Method for Density of Plastics by the Density-Gradient Technique

SAE J844—Nonmetallic Air Brake System Tubing

4. REQUIREMENTS

4.1 CONSTRUCTION AND MATERIALS

4.1.1 Materials supplied to this specification must be smooth and uniform, free from visible defects, foreign matter, kinks or seams, or any other condition that would impair the performance of the tubing.

4.1.2 The material shall consist of Nylon 11 containing additives which provide heat and light resistance.

4.2 COLOR AND UV RESISTANCE

The tubing shall, be constructed with a material blend which is resistant to UV. This tubing shall be in a **BLACK COLOR**.

4.3 MECHANICAL REQUIREMENTS

The mechanical requirements are listed in Table 1.

5. TEST METHODS

5.1 WATER ABSORPTION TEST

A test sample shall be preconditioned in a circulating air oven at 110 +/- 2°C for 24 hrs. Expose sample to 100% relative humidity at 25 +/- 2°C for 100 hrs.

5.2 RESISTANCE TO ZINC CHLORIDE TEST

The test shall be performed per SAE J844 (.6 test method). The sample shall be bent to its minimum bend radius and immersed in a 50% aqueous solution (by weight) of zinc chloride for 200 hrs. at 23 +/- 2°C.

					NAME	STD NYLON11 TUBE	
					 NEW HOLLAND	ENGINEERING SPECIFICATION	
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5.3 HIGH TEMPERATURE SHRINKAGE TEST

A sample 12 inches (300mm) long shall be conditioned by exposing it to dry air at 120 +/- 1°C for 168 hrs. The original and final test sample shall be measured. The final results shall be subtracted from the original and divided by the original length times 100. Report results in percent.

5.4 FUEL RESISTANCE TEST

A tube is immersed into an ASTM Reference fuel C for a period of 45 days at 23°C. The fuel C must be replaced every 7 days. After the 45 day period the tube is removed and a tensile test and elongation is performed. This information is reported and shall meet the minimum requirements mentioned in Table 1.

6. APPROVAL OF MATERIALS

Materials defined by this specification must have prior approval by the responsible Materials Engineering Activity. Suppliers desiring approval of their materials shall first obtain an expression of

interest from the affected Purchasing, Design, or Materials Engineering activity. Upon request, the supplier shall submit to the affected Materials Engineering activity its own laboratory report to the specification (test results, not nominal values), the material designation and code number, and test specimens for New Holland evaluation. Upon approval, the material will be added to the Engineering Materials Approved Source List.

7. SUPPLIER RESPONSIBILITY

All materials supplied to this specification shall be equivalent in all characteristics to the material upon which approval was originally granted. Prior to the making of any changes in the properties, composition, construction, color, dimension, processing, or labeling of the material originally approved under this specification, the supplier shall notify Purchasing and the affected Materials Engineering activity of the proposed changes and obtain the written acknowledgment of the Material Engineering activity. Test data, test samples, and a new identification code are to be submitted with the request.

Table 1

Tube Material Requirements		
Test	Method	Requirements
Specific Gravity	ASTM D 792 or D 1505	1.03 - 1.-05
Melting Point, °C min	ASTM D 789	185
Water Absorption, % max	5.1	2
Resistance to Zinc Chloride	5.2	No Cracks
High Temperature Shrinkage, % max	5.3	2
Impact Test at -40°C	SAE 844-94, 9.11	No visible cracks
Tensile Strength, psi (Mpa), min	ASTM D 638	5500 (37.9)
Elongation at Break, % min	ASTM D 638	200
Fuel Resistance % min.	4.4	75

Table 2

Part Number	Description	Length, Inches
86555371	TUBE .250D/.040W 86552343	
86555372	TUBE .375D/.062W 86552343	
86556065	TUBE .500D/.062W 86552343	

	NAME				PART NUMBER	
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