Caribbean Community

EDICT OF GOVERNMENT

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CRS 33 (2010) (English): Garbage bags

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CARICOM REGIONAL STANDARD

Specification for polyethylene garbage bags – high density

CRS 33: 2010

Caribbean Community

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ATTACHMENT PAGE FOR AMENDMENT SHEETS

Committee representation

The preparation of this standard was carried out under the supervision of the Regional Technical Committee (RTC # 18) for General Commodities (hosted by CARICOM Member State, Trinidad and Tobago), which at the time comprised the following members:

Members	**Representing**
Dr. Angelus Pilgrim (**Chairman**)	Faculty of Engineering, University of the West Indies
Ms. Maria Doldron	Trinidad and Tobago Ministry of Legal Affairs, Consumer Affairs Division
Mr. Winston Fraiser	Plasti-Pak Limited
Mr. Wayne Herbert	Magic Mist Limited
Mr. Cecil Pope	Trinidad Ropeworks Limited
Mr. Rasheed Ramsaroop	ANSA Polymer Limited
Mr. Carl White	Maintenance Training Services Limited
Mr. Darryl Thomson (**Technical Secretary**)	Trinidad and Tobago Bureau of Standards

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Foreword

This regional standard was developed in response to the increasing use of high density polyethylene film in the manufacture of garbage bags and the decreasing use of low density polyethylene film in the industry.

In the development of this standard, considerable assistance was derived from:

a) AS 1251-1: 1982, Specification for low density polyethylene garbage bags;

b) AS 1326: 1972, Polyethylene film for packaging and allied purposes;

c) ASTM 2103: 1997, Standard specification for polyethylene film and sheeting.

1 Scope

This regional standard specifies requirements for high density polyethylene garbage bags which are normally used for the disposal of domestic and commercial waste.

It includes requirements and test methods for impact resistance, bag dimensions, burst resistance, heat seal integrity and leakage.

This standard does not apply to bags intended for the disposal of industrial, biological or medical waste.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASTM D 1709: 2003, Standard test methods for impact resistance of plastic film by the free falling dart method.

ISO 2859-1: 1999, Sampling plans indexed by acceptable quantity level (AQL) for lot-by-lot inspection.

ISO 7965-2: 1993, Sacks – Drop test – Sacks made from thermoplastic flexible film.

ASTM F 88: 2007, Standard test method for seal strength of flexible barrier materials

3 Terms and definitions

For the purposes of this standard, the following terms and definitions shall apply:

3.1
domestic waste
any solid waste retained by householders, pending its disposal

3.2
commercial waste
any solid waste retained by commercial enterprises such as restaurants, cafes, hotels, offices and retail shops, pending its disposal

3.3
high density polyethylene
HDPE
polyethylene with a density of 950 kg/m^3 ±10 kg/m^3

3.4
film
thin sheet of polyethylene or polyethylene blend from which the garbage bag is made

NOTE The blend refers to additives that are commonly added to the polyethylene resin, such as colouring agents and plasticizers.

3.5
impact resistance
degree of tearing that the bag can withstand, when subjected to a specified impact load

3.6
heat seal
seal formed by bonding of the film by a heating process

3.7
lot
manufacturing batch, shipment quantity or quantity available for sale at a retail outlet

3.8
acceptable quality level
AQL
quality level that is the worst tolerable process average when a continuous series of lots is submitted for acceptable sampling

NOTE This refers to the maximum percent defective that is allowed. For the purposes of this standard, an AQL of 2.5 % has been chosen for critical garbage bag properties and an AQL of 4.0 % has been chosen for non-critical properties.

4 Requirements

4.1 General

4.1.1 Pinholes, cuts and tears

4.1.1.1 Garbage bags shall be free from pinholes, cuts and tears when held up against a light source and visually examined.

4.1.2 Ease of opening

4.1.2.1 Garbage bags shall be readily opened by hand.

4.1.3 Dimensions

4.1.3.1 Garbage bags shall be classified according to the sizes specified in Table 1.

Table 1 - Bag dimensions

Size	Width cm	Length cm
Small	51 ± 1	55^{+4}_{-1}
Medium	61 ± 1	76^{+4}_{-1}
Large	76 ± 1	91^{+4}_{-2}
Jumbo	96 ± 1	127^{+4}_{-2}

4.1.4 Heat seal

4.1.4.1 All heat seals on the garbage bag shall be continuous.

NOTE Bags can be either side sealed or bottom sealed. Side sealed bags have a continuous heat seal along the entire length of the two ends of the bag. Bottom sealed bags have a continuous heat seal along the entire length of the bottom of the bag.

4.1.4.2 Heat seals shall withstand the application of a 9.8 N force for a period of 10 min when tested in accordance with Annex B.

4.1.5 Leakage

Garbage bags shall not exhibit any visible sign of leakage when filled with the volumes of water at 27 °C ± 5 °C as specified in Table 2. For this test, bags shall be held steadily and suspended in the air by grasping together the open end of the bag with a suitable holding device.

Table 2 - Leakage test requirement

Type	Test water volume l	Length of test min
Small	1.0	10
Medium	1.0	10
Large	1.2	10
Jumbo	1.5	10

4.1.6 Impact resistance

Garbage bags shall not show any tear in the film when tested in accordance with Annex A.

4.1.7 Burst resistance

Garbage bags shall not burst open when tested in accordance with Annex C.

4.2 Labelling

4.2.1 Packaging containing garbage bags shall be legibly labelled with lettering of minimum height 5 mm stating the following information:

a) country of origin;

b) name and address of manufacturer or distributor;

c) a registered brand or registered trademark which will identify the manufacturer or distributor;

d) size of bag and the corresponding dimensions;

EXAMPLE Small, medium, large or jumbo

e) number of bags in the package;

f) indication of whether bags are individually packed;

g) HDPE or High density polyethylene;

h) bag colour, if this is not obvious from the external packaging; and

i) batch code or date stamp.

5 Compliance

5.1 Sample selection

Samples shall be selected at random in accordance with ISO 2859-1: 1999.

5.2 Critical properties

5.2.1 The following properties shall be regarded as critical:

a) pinholes, cuts or tears;

b) heat seal strength;

c) burst resistance;

d) labelling,

e) leakage; and

f) impact resistance.

5.2.2 The sample size and the compliance criteria for each critical property shall be as shown in Table 3.

Table 3 - Critical properties – sample size and compliance criteria

Lot size (up to)	Sample	X - Number of bags that fail test at 2.5 % AQL	
		A – Accept[a]	R – Reject[b]
150	5	0	1
500	20	1	2
1 200	32	2	3
3 200	50	3	4
10 000	80	5	6
25 000	125	7	8
50 000	200	10	11
> 50 000	315	14	15

[a] Accept lot if X (number of bags failing) ≤ A (accept criteria)
[b] Reject lot if X (number of bags failing) ≥ R (reject criteria)

5.3 Non-critical properties

5.3.1 The following properties shall be regarded as non-critical:

a) ease of opening; and

b) dimensions.

5.3.2 The sample size and the compliance criteria for each non-critical property shall be as shown in Table 4.

Table 4 - Non-critical properties - sample size and compliance criteria

Lot size (up to)	Sample	Y - Number of bags that fail test at 4.0 % AQL	
		A - Accept[a]	R – Reject[b]
7150	13	1	2
500	20	2	3
1 200	32	3	4
3 200	50	5	6
10 000	80	7	8
25 000	125	10	11
50 000	200	14	15
> 50 000	315	21	22

[a] Accept lot if Y (number of bags failing) ≤ A (accept criteria)
[b] Reject lot if Y (number of bags failing) ≥ R (reject criteria)

Annex A
(normative)

Method for determining impact resistance

A.1 General

This annex sets out a method for determining the impact resistance of polyethylene film by means of a falling dart.

A.2 Apparatus

A.2.1 General

The apparatus consists of the components specified in A.2.2 to A.2.6 and is constructed essentially as shown in Figure A.1 or in conformance to ASTM D 1709: 2003.

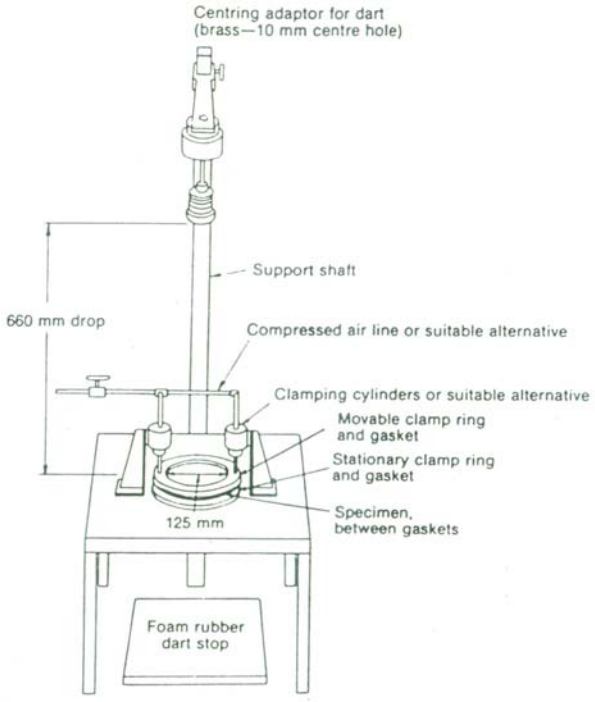


Figure A.1 - Impact resistance apparatus

A.2.2 Clamp

The apparatus includes a two-piece annular specimen clamp having an inside diameter of 125 mm which complies with the following requirements:

a) the lower or stationary half of the clamp is rigidly mounted so that the plane of the specimen is horizontal;

b) the upper or movable portion of the clamp is designed to maintain positive and planar contact with the lower portion of the clamp when in position. This portion of the clamp should be provided with suitable means for maintaining sufficient contact with the lower clamp to hold the film specimen firmly in place during the test; and

NOTE Pneumatically-operated clamps have been successfully employed.

c) gasketing materials prepared from rubber or similar materials are affixed to the specimen contact surfaces of both clamps. These provide a cushion which minimizes thickness variation effects, allows firm gripping of the specimen and minimizes slippage.

NOTE 1 Rubber gasketing 3 mm thick, 50 to 60 Shore A Durometer hardness, 125 mm ID, and 150 mm OD has been found satisfactory for the purpose.

NOTE 2 Slippage during the test may be determined by inserting straight pins into the clamped specimen periphery in contact with the outside wall of the clamps. Elongation of the holes after test indicates slippage. An applied pressure of 600 Pa has been found sufficient to minimize slippage.

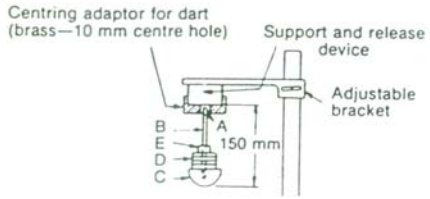
A.2.3 Support and release device

The device should be capable of supporting a dart assembly with a mass of up to 1 kg. The device should also be equipped with a centering and release device to ensure reproducible drops.

NOTE Electromagnetic or pneumatic support and release devices are considered suitable.

A.2.4 Dart

The apparatus includes a dart of known mass consisting of a hemispherical head with a radius of 19 mm fitted with a 6.5 mm diameter shaft 115 mm long to accommodate removable weights (as shown in Figure A.2). The head should be constructed of aluminium, phenolic plastics, or other low-density material of similar hardness. The shaft is attached to the centre of the flat upper surface of the head with its longitudinal axis at 90 ° to the surface. The shaft should be made of aluminium with a 13 mm long steel tip at the end which is attached to the support and release device.



LEGEND, DART ASSEMBLY
A Steel shaft tip ϕ 6.5 mm × 13 mm long
B Dart shaft—aluminium ϕ 6.5 mm × 115 mm long
Fine thread 13 mm long on bottom
C Hemispherical head of radius 19 mm
D Removable weights
E Collar and set screw

Figure A.2 - Dart assembly

A.2.5 Weights

The apparatus should include sufficient weights of approximate diameter 32 mm with a 6.5 mm hole in the center to achieve a total mass of dart and weights as specified in A.4.

A.2.6 Positioning

The apparatus should include a method for positioning the dart at a height of 660 mm from the impinging surface of the dart head to the surface of the test specimen.

A.3 Test specimen

Test specimens should be large enough to extend outside the specimen clamp gaskets at all points and should include samples from both the body and folds of the film. The test specimens are representative of the material under study and should be free of pinholes, wrinkles, or other obvious imperfections.

A.4 Procedure

The test samples are selected according to 5.1. The following test procedure is employed:

a) one test specimen is cut from each of the test samples, making certain that it is uniformly flat, free of folds and that it covers the gasket at all points;

b) the test specimen is placed over the bottom portion of the clamp and clamped by applying annular pressure with the top portion of the clamp;

c) for edge folds, test specimen is clamped with the inside surface uppermost;

d) the dart is loaded to give a total mass (dart mass inclusive) of:

1) 60 g ± 5 g for film minimum average thickness 15 μm; or

2) 80 g ± 5 g for film of minimum average thickness 25 μm;

e) the dart is positioned vertically with the steel shaft tip inserted in the centering and release device with the impinging surface 660 mm from the film surface;

f) the dart is released;

NOTE If the dart does not drop centrally and vertically onto the test specimen, the result cannot be taken into account. Care should be taken to avoid multiple impacts in cases where the dart bounces off the test specimen. The operator should attempt to catch the dart in such cases to prevent damage to the impinging surface and to the hemispherical head of the dart. Such damage will affect the test results.

g) the test specimen is examined to determine whether or not it has failed; and

NOTE Failure is defined as any break through the film. Such a break can be observed readily by viewing the test specimen under backlighting conditions.

h) a new test specimen is used for each impact test.

A.5 Report

The report on film impact strength states the following:

a) the lot size and the number of bags sampled;

b) the date of the test;

c) the number of impact failures which occurred on each bag as defined in A.4; and

d) the results of the impact resistance test, pass or fail, based on the compliance criteria specified in 5.2.

Annex B
(normative)

Heat seal test

B.1 General

This annex sets out a method for determining the resistance of the garbage bag heat seal to a tensile force.

B.2 Apparatus

B.2.1 The following equipment is required:

a) a matched set of clamping support jaws, suitably finished, to ensure that the film is adequately supported without being damaged;

b) a matched set of suitably finished lower jaws from which a weight may be suspended; and

c) one weight with a means of suspension such that when added to the lower jaw assembly the total mass is 1.00 kg ± 0.05 kg.

B.2.2 Alternatively, a universal testing tensile machine with pneumatic action grips which satisfies the requirements of ASTM F 88: 2007 may also be used.

B.3 Test specimen preparation

Garbage bag samples are selected from the lot in accordance with 5.1 and are prepared in the following manner:

a) three equally interspaced 25.0 mm ± 0.2 mm wide test specimens are cut from a bag;

b) the specimens are as shown in Figure B.1, cut across the seal such that the seal is perpendicular to the long axis of the test specimen; and

c) the total length of each test specimen is not more than 150 mm and the seal is situated 75 mm from either end.

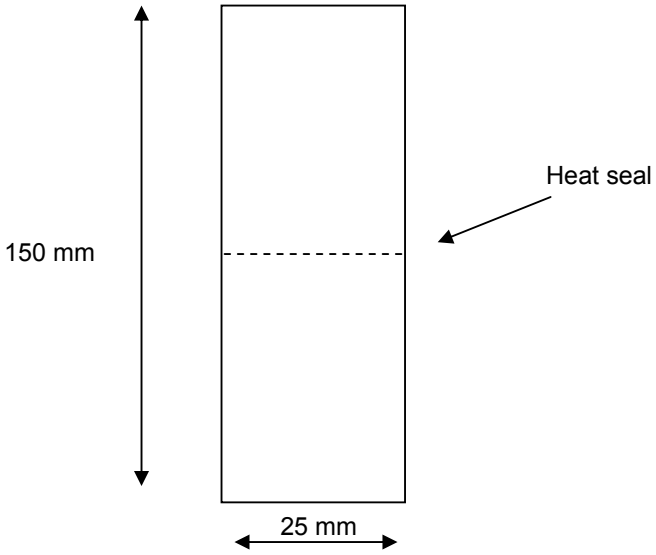


Figure B.1 - Heat seal test specimen

B.4 Procedure

B.4.1 The test procedure using clamps is as follows:

a) one end of the specimen is clamped between the support jaws such that the remainder of the specimen is firmly suspended with the seal in a horizontal position, 20 mm to 25 mm below the jaws;

b) the second set of clamping jaws is freely suspended with the weight attached from the other end of the film sample and 25 mm to 50 mm below the seal; and

c) if after 10 min in this position the seal is still intact, the test specimen is deemed to have passed.

B.4.2 If a universal tensile testing machine is used, the procedure should be in accordance with ASTM F 88: 2007.

B.5 Report

The report on the heat seal test states the following:

a) the lot size and the number of test specimens tested;

b) the date of the test;

c) the number of test specimens which failed; and

d) whether the sample of bags passed or failed the heat seal test, based on the compliance criteria in 5.2.

Annex C
(normative)

Garbage bag drop test

C.1 Apparatus

C.1.1 Drop testing machine

The drop testing machine should be in accordance with ISO 7965-2: 1993 and should be capable of suspending and dropping a mass of 15 kg from a height of 2.4 m.

C.1.2 Weights

The test load consists of several weights. Each weight consists of a sealed garbage bag, filled with polyethylene resin for a total mass of 500 g each.

C.1.3 Balls

Ten (10) balls with a diameter D, such that 38 mm ≤ D ≤ 61 mm.

C.2 Procedure

C.2.1 Test load

The test procedure is as follows:

a) garbage bag samples are obtained in accordance with 5.1;

b) test samples are filled in accordance with the test load specified in Table C.1, using the weights specified in C.1.2;

Table C.1 - Test loads for drop test

Size	Test load kg
Small	3
Medium	6
Large	10
Jumbo	15

c) the bag is gently deflated and sealed;

d) the loaded bag is suspended from the drop test machine specified in C.1.1, such that the height from the bottom of the bag to the floor is no less than 1.2 m;

e) the bag is dropped once onto its bottom surface;

f) the weights are removed and replaced with the balls specified in C.1.3;

g) the bag is suspended again from the drop test machine, such that the height from the bottom of the garbage bag to the floor is no less than 1.2 m; and

h) the suspended bag is shaken from side to side for a period of 10 s. If any balls fall out of the bag while it is being shaken, the bag has failed the drop test.

C.3 Report

The report on the drop test states the following:

a) the lot size and the number of test specimens tested;

b) the date of the test;

c) the number of test specimens which failed; and

d) whether the sample of bags passed or failed the drop test based on the compliance criteria in 5.2.

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CARICOM REGIONAL ORGANISATION FOR STANDARDS AND QUALITY

The CARICOM Regional Organisation for Standards and Quality (CROSQ) was created as an Inter-Governmental Organisation by the signing of an agreement among fourteen Member States of the Caribbean Community (CARICOM). CROSQ is the regional centre for promoting efficiency and competitive production in goods and services, through the process of standardization and the verification of quality. It is the successor to the Caribbean Common Market Standards Council (CCMSC), and supports the CARICOM mandate in the expansion of intra-regional and extra-regional trade in goods and services.

CROSQ is mandated to represent the interest of the region in international and hemispheric standards work, to promote the harmonization of metrology systems and standards, and to increase the pace of development of regional standards for the sustainable production of goods and services in the CARICOM Single Market and Economy (CSME), and the enhancement of social and economic development.

CROSQ VISION:

The premier CARICOM organisation for the development and promotion of an Internationally Recognised Regional Quality Infrastructure; and for international and regional harmonized CARICOM Metrology, Standards, Inspection, Testing and Quality Infrastructure

CROSQ MISSION:

The promotion and development of standards and standards related activities to facilitate international competitiveness and the sustainable production of goods and services within the CARICOM Single Market and Economy (CSME) for the enhancement of social and economic development

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