UN/SCETDG/31/INF.16

COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS AND ON THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS

Sub-Committee of Experts on the
Transport of Dangerous Goods

Thirty-first session
Geneva, 2-6 July 2007
Item 3 of the provisional agenda

LISTING, CLASSIFICATION AND PACKING

1.4C Classification of smokeless propellants

Transmitted by the Sporting Arms and Ammunition Manufacturers' Institute (SAAMI)

SCOPE

This paper provides more data in support of a 1.4C classification of "Powder, smokeless" and addresses issues raised by the expert from Australia.

RELATED DOCUMENTS

ST/SG/AC.10/C.3/2007/12 - (SAAMI)
ST/SG/AC.10/C.3/2007/17 - (Australia)
UN/SCETDG/31/INF.7 - (Australia)

Introduction

1. In document ST/SG/AC.10/C.3/2007/12 the Sporting Arms and Ammunition Manufacturers' Institute (SAAMI) have proposed a new entry for smokeless powder under division 1.4 compatibility group C on the basis that when packaged in 3.7 kg inner packages or less it meets the test criteria for assigning to 1.4C.

2. Further data supporting the proposal is contained in this informal paper.

3. Comments in UN/SCETDG/31/INF.7 are addressed.

Issues

4. Extensive test results exist which demonstrate that smokeless powder in the proposed packaging meet 1.4C specifications. Data has been obtained continuously from burn testing of new products since before 1980, and for the last 15 years the tests have been conducted according to the Series 6 tests. Actually, five 6A tests have been performed per product instead of the normally mandated three tests. The products would be classified as 1.4C if an appropriate proper shipping name existed, but barring that, they have been assigned to 1.3C. A representative test report is included showing 1.4 results on eight different smokeless powders, including forty 6(a) tests and eight 6(c) tests.

5. Over 120 variations of smokeless powder are on the market and shipping as 4.1 flammable solids in North America, all of them tested, and would be candidates for 1.4C approval. Propellants produced globally are also tested to the same criteria when shipping within North America.

6. SAAMI advocates a 1.4C classification to harmonize the classification of this product globally in 3.73 kg max inner packages. It currently utilizes an exception in the USA, a permit in Canada, and elsewhere is shipped as 1.3C just like a 45 kg keg.

7. In ST/SG/AC.10/C/3/2007/12, SAAMI stated that smokeless powder typically meets the test criteria for 1.4C. The great majority of products submitted for testing have been approved or permitted in the US and Canada as a flammable solid, with test results which would qualify for the 1.4C rating. Any products failing the tests have not been approved for transportation, unless modified and later passing the tests to gain approval.

8. No smokeless propellant ships without competent authority approval. The proposal does not seek any automatic reclassification. Any smokeless powder submitted for transport as 1.4C would first have to receive competent authority approval based upon retesting or reevaluation of existing test results, at the discretion of the competent authority.

9. In ST/SG/AC.10/C.3/2007.INF.7, the expert from Australia raised two concerns:

* Requests testing of large volumes of propellants in closed transport units.
* Do classifications based on the UN test scheme remain valid for large shipments?

These concerns are addressed as follows:

(a) The main concern in INF.7 appears to be the confinement of ocean freight container shipments especially within the maritime mode.

(b) Testing of large volumes is prohibitive due to feasibility and cost. However a test report exists from Finland which addresses large quantity fires in freight containers. Three tests were performed of approximately 7,000 kg each in packagings exceeding 3.73 kg each, which were open on at least one side, which speeds propagation and is a worse case than the proposed packagings. No explosions occurred.

(c) In the 1980’s, a semi-truckload of over 10,000 kg of smokeless powder burned due to a vehicular accident. No explosion occurred. The inner packagings were a size of 3.73 kg or less.

(d) In the 1990’s a truck containing approximately 7,000 kg of smokeless in 45.4 kg drums impacted a bridge causing a fire. No explosion occurred.

(e) If the Committee remains concerned about a 1.4C product in a freight container in the maritime mode, the proposal can be modified to exclude the maritime mode until additional testing is performed.

(f) Australia also asks in INF.7 whether the classifications applied to these materials as a result of the UN test system remain valid for large volume shipments. This appears to be related to the concerns expressed in ST/SG/AC.10/C.3/2007/17. This is a larger question applicable to all Class 1 materials, and must be addressed with all Class 1 classifications in mind. The concerns in ST/SG/AC.10/C.3/2007/17 should be addressed in the Explosives Working Group before a decision is reached on a single product such as smokeless powder.

_____

Natural Resources Canada | Resources naturelles Canada

CANMET
Explosives Branch

555 Booth Street

Ottawa, Canada
K1A 0G1

CANMET
Direction des explosifs

555, rue Booth

Ottawa, Canada
K1A 0G1

Protected business information

CIE 10669 to 10676 (Revised)
ERD ref. number 2050H8-050620003
CERL sample numbers X002589 to X002596

2005/07/20

CLASSIFICATION OF SMOKELESS POWDERS IN HODGDON PACKAGINGS

Submitted by: Hodgdon Powder Co. Inc.
6231 Robinson, P.O. Box 2932
Shawnee Mission, KS 66201

For: Classification

At the request of the Hodgdon Powder Company, the Canadian Explosives Research Laboratory witnessed testing (UN Series 6 tests) of samples of 8 smokeless powders at Hodgdon's Pyrodex facility near Herington, KS.

These powders have been previously classified and were chosen to represent a total of 39 powders. The tests were performed to determine their classification in Hodgdon's consumer packaging (plastic bottle inner packaging) and their eligibility for transport as Division 4.1 under the United States CFR 49. Five trials were conducted in each Single Package Test - UN 6(a) to meet the CFR 49 requirement.

Based on the results of the tests, SMP 291, SMP 226, WC 869, WCR 845, WC 292, WC 297, OBP 500 and OBP 529 are recommended for transport with the classifications given in the attached Reports of Properties. Based on their similarity to tested powders, the following powders are are recommended for transport with the same classifications: WC 294, WC 295 and WC 296 (based on similarities with WC 869 and WC845) and OBP 501 to OBP 528 (28 powders, based on their similarities with OBP 500 and OBP 529). The following powders are marketing variations on the above tested powders: SMP 222, SMP 224 (SMP 226), SMP 287, SMP 289, SMP 293 (SMP 291), SMP 735, SMP 745, SMP 746, SMP 842, SMP 843, WCR 845S (WCR 845).

The results in these reports relate only to the samples supplied. These reports shall not be reproduced except in full, without the written approval of the Manager of the Canadian Explosives Research Laboratory.

R.A. Bowes
Head, Explosives Certification and Hazards Analysis
Canadian Explosives Research Laboratory

Attach.

Canada

The Canadian Explosives Research Laboratory is accredited by the Standards Council of Canada as a testing laboratory for specific tests registered with the Council.

REPORT OF PROPERTIES

Identification:

CIE No.	10669
CERL Sample I.D.:	X002589
Item	SMP 291 SMOKELESS POWDER
Submitter	Hodgdon Powder Co. Inc.
Reason for submission:	Classification

Packaging description:

Outer kind of packaging:	Box
Outer type of material:	Fibreboard
Dimensions in mm:	Height 325 Width: 335 Depth: 240 Diameter:
Packaging mark:	UN 4G/X10/S/05 USA/+BR4156
Proper shipping name:	POWDER, SMOKELESS
UN number:	UN 0161
Dangerous good label:	1.3C
Subs. dangerous goods label:	None
Explosives ladder	No
English and French	No
Shipper identification:	Hodgdon logo, full name and address.
Intermediate packaging:	None
Intermediate packaging additional information:	None
Inner packaging:	Bottle, 2 gal, black plastic with plastic cap
Inner packaging additional information:	Label with shipper name and address, safety warnings, product name and lot number hand written in black
Loose composition present:	No
Mass of loose composition in g:	0.0
Comments on packaging:	Product labelled WPR 291. The name has been replaced by SMP 291.

Figures

Figure - 1 Outer packaging

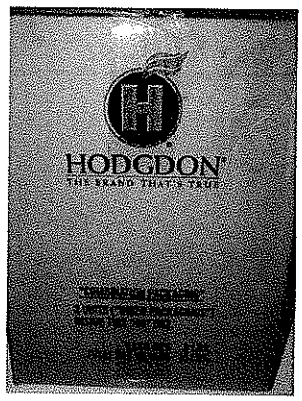
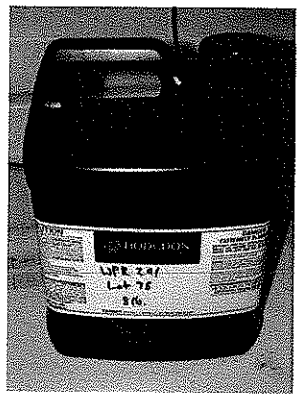


Figure - 2 Inner packaging



Sample description:

Article type:

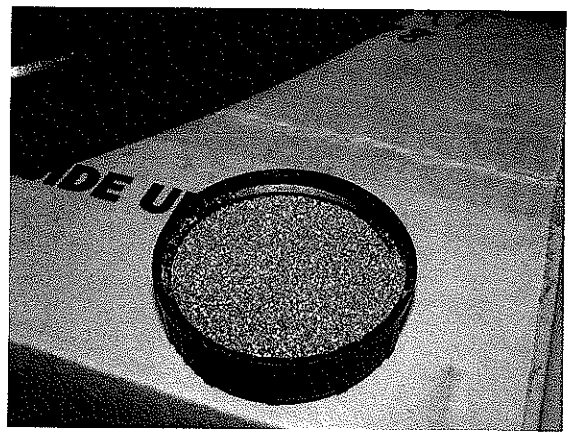
Shape:

Size:

Markings in both English and French?: No

Label wording or refer to declared:

Figure - photograph of article:



Additional description and comments: None

Single Package Test - UN 6(a):

Description of package/product Fibreboard box containing 2 plastic bottles each containing 3.6 kg (8 lb) of propellant powder.

Description of means of initiation An electric igniter, augmented with approximately 5 g of HF20 black powder substitute is inserted through a small hole made in the side of the "donor" bottle

Trial number	Package orientation	Confinement	Observation of blast	Crater formation	Disruption or scattering of confining material	Damage to witness plate	Blast measurement in kPa	Amount of material left after trial and other information specific to trial.
1	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 7s
2	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 9s
3	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 9s
4	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 10s
5	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	1/2 bottles reacted Total reaction time: 28s

Result: Large flame erupted through confined sand and flame projected upwards. No explosion.

Series 6 assessment: Outcome dependent on results of other tests.

Comments: None

External Fire Test - UN6(c):

Test configuration: 6 packages were placed on a steel grate 1 m high. Wood pallets were stacked below the packages to a height of 1 m and paper was added to the wood. The pallets were doused with fuel oil. Witness panels (2 mm thick Al, 2.4 m by 2.4 m) were placed in each of 3 quadrants 3.9 m from the packages. The fire was remotely ignited with an igniter (electric igniter with small charge of HF-20 powder) placed in the paper. The reaction was observed and recorded on video.

Number of packages: 6 **Vol per pkg (m3):** 0.026 **Total vol of packages (m3):** 0.157

Mass of energetic mat per pkg: 7.27 **Total mass (kg):** 43.62

Sample preparation: None

Narrative description: The fire was ignited at 17:06:02. The packages were engulfed in flames after approximately 32 s. The first reaction started after 51 s and consisted of a ball of flame. The largest reaction started after 56 s and continued for 28 s. The reaction consisted of intense and continuous flames extending vertically to approximately 8 m. There was no explosions or projections.

Observations relative to 1.1 criteria:

Observation of blast: None

Measurement of blast: N/A

Observations relative to 1.2 criteria:

Perforation of witness panels: None

Metallic projections - >20J or >25 g thrown > 50 m or >150 g thrown >15 m: None

Observations relative to 1.3 criteria

Fireball or jets of flame beyond witness panels: None

Fiery projections >15m: None

Burning time <35 s per 100 kg or thermal flux >4 kW/m: 28 s for 43 kg. Meets the criteria for div. 1.3.

Observations relative to 1.4 criteria

Fireball or jets of flame >1 m from flames of fire: Yes

Fiery projections >5 m: None

Indentations of witness panel with depth > 4 mm: None

Metallic projections with kinetic energy > 8 J: None

Burning time <330 s per 100kg: Yes

Other observations: Large flames up to 8 m high.

Video tape record: On Record

Result: The product burned rapidly and intensely producing large flames - consistent with Division 1.3.

Series 6 assessment: Division 1.3

Comments and deviations: None

Disposal:

Based on the results of the tests conducted, the smokeless powder is recommended for classification as follows:-

Name:	Powder, smokeless
Number:	UN 0161
Division/Compatibility group:	1.3C
Packing group:	II
Packing instruction:	P114(b)

Additionally, it is recommended that the smokeless powder may be reclassed (refer to 49 CFR §173.170 to 171, U.S.A. only) for shipments where the total quantity does not exceed 45.4 kg (100 pounds) only when packaged as per the listed options, as follows:-

Name:	Smokeless powder, for small arms
Number:	NA 3178
Division/Compatibility group:	4.1
Packing group:	I
Packaging options:	Inner packaging: Containers, plastic.
Intermediate packaging:	Not required.
Outer packaging:	4G fibreboard box each containing one of the following combinations in inner packagings:

1. Not more than forty (40) inner packagings, each containing not more than four (4) ounces of explosive;
2. Not more than ten (10) inner packagings, each containing not more than one (1) pound of explosive;
3. Not more than two (2) inner packagings, each containing not more than eight (8) pounds of explosive.

REPORT OF PROPERTIES

Identification:

CIE No.	10670
CERL Sample I.D.:	X002590
Item	SMP 226 SMOKELESS POWDER
Submitter	Hodgdon Powder Co. Inc.
Reason for submission:	Classification

Packaging description:

Outer kind of packaging:	Box
Outer type of material:	Fibreboard
Dimensions in mm:	Height 340 Width: 160 Depth: 300 Diameter:
Packaging mark:	UN 4G/X9.7/S/05 USA/+BR4334
Proper shipping name:	POWDER, SMOKELESS
UN number:	UN 0161
Dangerous good label:	1.3C
Subs. dangerous goods label:	None
Explosives ladder	No
English and French	No
Shipper identification:	Hodgdon logo, full name and address.
Intermediate packaging:	Fiberboard divider for securing top of bottles.

Intermediate packaging additional information:

None

Inner packaging: Bottle, 1 gal, black plastic with metal cap

Inner packaging additional information:

Label with shipper name and address, safety warnings, product name and lot number hand written in black

Loose composition present: No

Mass of loose composition in g: 0.0

Comments on packaging: None.

Figures

Figure - 1 Outer packaging

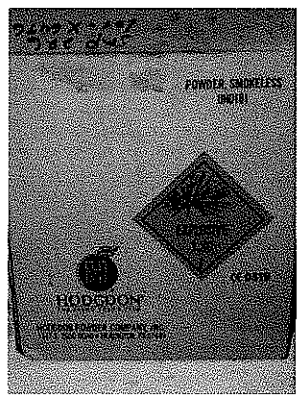


Figure - 2 Outer packaging

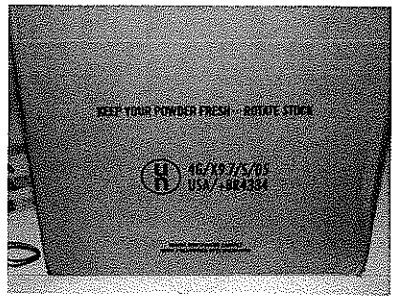


Figure - 3 Inner packaging

Sample description:

Article type:

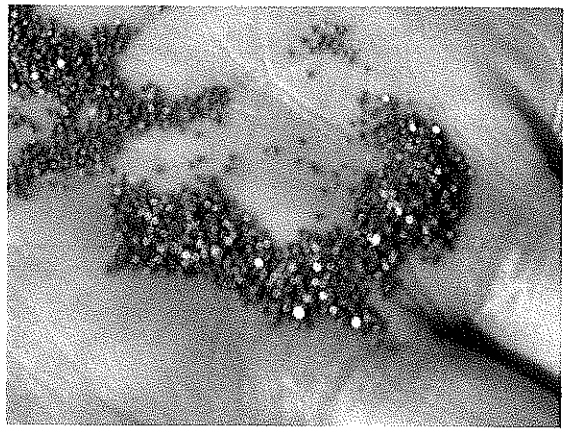
Shape:

Size:

Markings in both English and French?: No

Label wording or refer to declared:

Figure - photograph of article:



Additional description and comments: None

Single Package Test - UN 6(a):

Description of package/product Fibreboard box containing 2 plastic bottles each containing 3.6 kg (8 lb) of propellant powder.

Description of means of initiation An electric igniter, augmented with approximately 5 g of HF20 black powder substitute is inserted through a small hole made in the side of the "donor" bottle

Trial number	Package orientation	Confinement	Observation of blast	Crater formation	Disruption or scattering of confining material	Damage to witness plate	Blast measurement in kPa	Amount of material left after trial and other information specific to trial.
1	General	0.5 m sand, wet	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 22s
2	General	0.5 m sand, wet	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 13s
3	General	0.5 m sand, wet	None	None	Venting channel formed	None	N/A	1/2 bottles reacted Total reaction time: 6s
4	General	0.5 m sand, wet	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 22s
5	General	0.5 m sand, wet	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 14s

Result: Large flame erupted through confined sand and flame projected upwards. No explosion.

Series 6 assessment: Outcome dependent on results of other tests.

Comments: None

External Fire Test - UN6(c):

Test configuration: 11 packages were placed on a steel grate 1 m high. Wood pallets were stacked below the packages to a height of 1 m and paper was added to the wood. The pallets were doused with fuel oil. Witness panels (2 mm thick Al, 2.4 m by 2.4 m) were placed in each of 3 quadrants 3.9 m from the packages. The fire was remotely ignited with an igniter (electric igniter with small charge of HF-20 powder) placed in the paper. The reaction was observed and recorded on video.

Number of packages: 11 **Vol per pkg (m3):** 0.016 **Total vol of packages (m3):** 0.180

Mass of energetic mat per pkg: 7.27 **Total mass (kg):** 79.97

Sample preparation: None

Narrative description: The fire was ignited at 12:59:53. The packages were not fully engulfed in flames when the product started reacting. The first reaction started after 138 s and consisted of a ball of flame. The largest reaction started after 178 s and continued for 76 s. The reaction consisted of intense and continuous flames with burst of flames, extending vertically to approximately 6 m. There was no explosions or projections.

Observations relative to 1.1 criteria:

Observation of blast: None

Measurement of blast: None

Observations relative to 1.2 criteria:

Perforation of witness panels: None

Metallic projections - >20J or >25 g thrown > 50 m or >150 g thrown >15 m: None

Observations relative to 1.3 criteria

Fireball or jets of flame beyond witness panels: None

Fiery projections >15m: None

Burning time <35 s per 100 kg or thermal flux >4 kW/m: 76 s for 80 kg. Meets the criteria for div. 1.4.

Observations relative to 1.4 criteria

Fireball or jets of flame >1 m from flames of fire: Yes

Fiery projections >5 m: None

Indentations of witness panel with depth > 4 mm: None

Metallic projections with kinetic energy > 8 J: None

Burning time <330 s per 100kg: Yes

Other observations: Large flames up to 6 m high.

Video tape record: On Record

Result: The product burned rapidly and intensely producing large flames - consistent with Division 1.4.

Series 6 assessment: Division 1.4, other than Compatibility Group S

Comments and deviations: Very wet conditions

Disposal:

Based on the results of the tests conducted, the smokeless powder is recommended for classification as follows:-

Name:	Powder, smokeless
Number:	UN 0161
Division/Compatibility group:	1.3C
Packing group:	II
Packing instruction:	P114(b)

Additionally, it is recommended that the smokeless powder may be reclassed (refer to 49 CFR §173.170 to 171, U.S.A. only) for shipments where the total quantity does not exceed 45.4 kg (100 pounds) only when packaged as per the listed options, as follows:-

Name:	Smokeless powder, for small arms
Number:	NA 3178
Division/Compatibility group:	4.1
Packing group:	I
Packaging options:	Inner packaging: Containers, plastic.
Intermediate packaging:	Not required.
Outer packaging:	4G fibreboard box each containing one of the following combinations in inner packagings:

1. Not more than forty (40) inner packagings, each containing not more than four (4) ounces of explosive;
2. Not more than ten (10) inner packagings, each containing not more than one (1) pound of explosive;
3. Not more than two (2) inner packagings, each containing not more than eight (8) pounds of explosive.

REPORT OF PROPERTIES

Identification:

CIE No.	10671
CERL Sample I.D.:	X002591
Item	WC 869 SMOKELESS POWDER
Submitter	Hodgdon Powder Co. Inc.
Reason for submission:	Classification

Packaging description:

Outer kind of packaging:	Box
Outer type of material:	Fibreboard
Dimensions in mm:	Height 340 Width: 160 Depth: 300 Diameter:
Packaging mark:	UN 4G/X9.7/S/05 USA/+BR4334
Proper shipping name:	POWDER, SMOKELESS
UN number:	UN 0161
Dangerous good label:	1.3C
Subs. dangerous goods label:	None
Explosives ladder	No
English and French	No
Shipper identification:	Hodgdon logo, full name and address.
Intermediate packaging:	Fibreboard divider for securing top of bottles.

Intermediate packaging additional information:

None

Inner packaging: Bottle, 1 gal, black plastic with metal cap

Inner packaging additional information:

Label with shipper name and address, safety warnings, product name and lot number hand written in black

Loose composition present: No

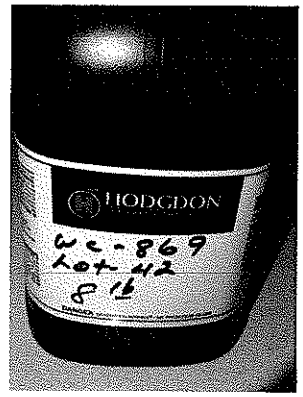
Mass of loose composition in g: 0.0

Comments on packaging: None.

Figures

Figure - 1 Outer packaging

Figure - 2 Inner packaging



Sample description:

Article type:

Shape:

Size:

Markings in both English and French?: No

Label wording or refer to declared:

Figure - photograph of article: *figure not available*

Additional description and comments: None

Single Package Test - UN 6(a):

Description of package/product Fibreboard box containing 2 plastic bottles each containing 3.6 kg (8 lb) of propellant powder.

Description of means of initiation An electric igniter, augmented with approximately 5 g of HF20 black powder substitute is inserted through a small hole made in the side of the "donor" bottle

Trial number	Package orientation	Confinement	Observation of blast	Crater formation	Disruption or scattering of confining material	Damage to witness plate	Blast measurement in kPa	Amount of material left after trial and other information specific to trial.
1	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	1/2 bottles reacted Total reaction time: 26s
2	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 21s
3	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 20s
4	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	1/2 bottles reacted Total reaction time: 27s
5	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	1/2 bottles reacted Total reaction time: 25s

Result: Large flame erupted through confined sand and flame projected upwards. No explosion.

Series 6 assessment: Outcome dependent on results of other tests.

Comments: None

External Fire Test - UN6(c):

Test configuration: 11 packages were placed on a steel grate 1 m high. Wood pallets were stacked below the packages to a height of 1 m and paper was added to the wood. The pallets were doused with fuel oil. Witness panels (2 mm thick Al, 2.4 m by 2.4 m) were placed in each of 3 quadrants 3.9 m from the packages. The fire was remotely ignited with an igniter (electric igniter with small charge of HF-20 powder) placed in the paper. The reaction was observed and recorded on video.

Number of packages: 11 **Vol per pkg (m3):** 0.016 **Total vol of packages (m3):** 0.180

Mass of energetic mat per pkg: 7.27 **Total mass (kg):** 79.97

Sample preparation: None

Narrative description: The fire was ignited at 16:42:25. The packages were engulfed in flames after approximately 28 s. The reaction started after 66 s and continued for 63 s. The reaction consisted of intense and continuous flames extending vertically to approximately 10 m. There was no explosions or projections.

Observations relative to 1.1 criteria:

Observation of blast: None

Measurement of blast: None

Observations relative to 1.2 criteria:

Perforation of witness panels: None

Metallic projections - >20J or >25 g thrown > 50 m or >150 g thrown >15 m: None

Observations relative to 1.3 criteria

Fireball or jets of flame beyond witness panels: None

Fiery projections >15m: None

Burning time <35 s per 100 kg or thermal flux >4 kW/m: 63 s for 80 kg. Meets the criteria for div. 1.4.

Observations relative to 1.4 criteria

Fireball or jets of flame >1 m from flames of fire: Yes

Fiery projections >5 m: None

Indentations of witness panel with depth > 4 mm: None

Metallic projections with kinetic energy > 8 J: None

Burning time <330 s per 100kg: Yes

Other observations: Large flames up to 10 m high.

Video tape record: On Record

Result: The product burned rapidly and intensely producing large flames - consistent with Division 1.4.

Series 6 assessment: Division 1.4, other than Compatibility Group S

Comments and deviations: Very wet conditions.

Disposal:

Based on the results of the tests conducted, the smokeless powder is recommended for classification as follows:-

Name:	Powder, smokeless
Number:	UN 0161
Division/Compatibility group:	1.3C
Packing group:	II
Packing instruction:	P114(b)

Additionally, it is recommended that the smokeless powder may be reclassed (refer to 49 CFR §173.170 to 171, U.S.A. only) for shipments where the total quantity does not exceed 45.4 kg (100 pounds) only when packaged as per the listed options, as follows:-

Name:	Smokeless powder, for small arms
Number:	NA 3178
Division/Compatibility group:	4.1
Packing group:	I
Packaging options:	Inner packaging: Containers, plastic.
Intermediate packaging:	Not required.
Outer packaging:	4G fibreboard box each containing one of the following combinations in inner packagings:

1. Not more than forty (40) inner packagings, each containing not more than four (4) ounces of explosive;
2. Not more than ten (10) inner packagings, each containing not more than one (1) pound of explosive;
3. Not more than two (2) inner packagings, each containing not more than eight (8) pounds of explosive.

REPORT OF PROPERTIES

Identification:

CIE No.	10672
CERL Sample I.D.:	X002592
Item	WCR 845 SMOKELESS POWDER
Submitter	Hodgdon Powder Co. Inc.
Reason for submission:	Classification

Packaging description:

Outer kind of packaging:	Box
Outer type of material:	Fibreboard
Dimensions in mm:	Height 340 Width: 160 Depth: 300 Diameter:
Packaging mark:	UN 4G/X9.7/S/05 USA/+BR4334
Proper shipping name:	POWDER, SMOKELESS
UN number:	UN 0161
Dangerous good label:	1.3C
Subs. dangerous goods label:	None
Explosives ladder	No
English and French	No
Shipper identification:	Hodgdon logo, full name and address.
Intermediate packaging:	Fibreboard divider for securing top of bottles.

Intermediate packaging additional information:

None

Inner packaging: Bottle, 1 gal, black plastic with metal cap

Inner packaging additional information:

Label with shipper name and address, safety warnings, product name and lot number hand written in black

Loose composition present: No

Mass of loose composition in g: 0.0

Comments on packaging: None.

Figures

Figure - 1 Outer packaging

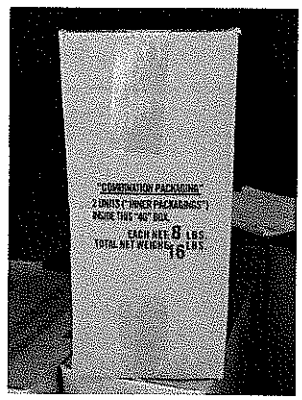


Figure - 2 Intermediate packaging

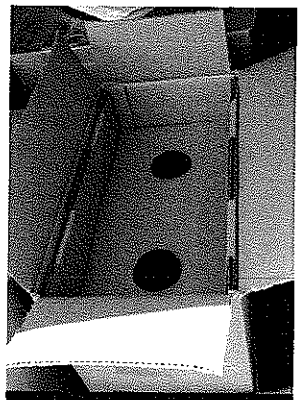
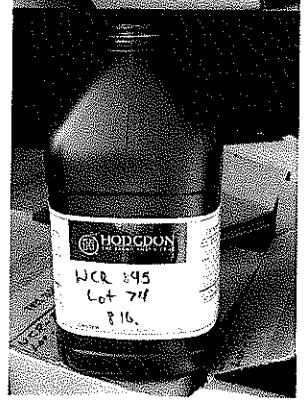


Figure - 3 Inner packaging



Sample description:

Article type:

Shape:

Size:

Markings in both English and French?: No

Label wording or refer to declared:

Figure - photograph of article:

Additional description and comments: None

Single Package Test - UN 6(a):

Description of package/product Fibreboard box containing 2 plastic bottles each containing 3.6 kg (8 lb) of propellant powder.

Description of means of initiation An electric igniter, augmented with approximately 5 g of HF20 black powder substitute is inserted through a small hole made in the side of the "donor" bottle

Trial number	Package orientation	Confinement	Observation of blast	Crater formation	Disruption or scattering of confining material	Damage to witness plate	Blast measurement in kPa	Amount of material left after trial and other information specific to trial.
1	General	0.5 m sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Reaction time: 22s
2	General	0.5 m sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Reaction time: 23s
3	General	0.5 m sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 47s
4	General	0.5 m sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 17s
5	General	0.5 m sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 43s

Result: Large flame erupted through confined sand and flame projected upwards. No explosion.

Series 6 assessment: Outcome dependent on results of other tests.

Comments: None

External Fire Test - UN6(c):

Test configuration: 11 packages were placed on a steel grate 1 m high. Wood pallets were stacked below the packages to a height of 1 m and paper was added to the wood. The pallets were doused with fuel oil. Witness panels (2 mm thick Al, 2.4 m by 2.4 m) were placed in each of 3 quadrants 3.9 m from the packages. The fire was remotely ignited with an igniter (electric igniter with small charge of HF-20 powder) placed in the paper. The reaction was observed and recorded on video.

Number of packages: 11 **Vol per pkg (m3):** 0.016 **Total vol of packages (m3):** 0.180

Mass of energetic mat per pkg: 7.27 **Total mass (kg):** 79.97

Sample preparation: None

Narrative description: The fire was ignited at 18:25:35. The packages were engulfed in flames after approximately 20 s. The reaction started after 53 s and continued for 46 s. The reaction consisted of intense and continuous flames extending vertically to approximately 10 m. There was no explosions or projections.

Observations relative to 1.1 criteria:

Observation of blast: None

Measurement of blast: None

Observations relative to 1.2 criteria:

Perforation of witness panels: None

Metallic projections - >20J or >25 g thrown > 50 m or >150 g thrown >15 m: None

Observations relative to 1.3 criteria

Fireball or jets of flame beyond witness panels: None

Fiery projections >15m: None

Burning time <35 s per 100 kg or thermal flux >4 kW/m: 46 s for 80 kg. Meets the criteria for div. 1.4.

Observations relative to 1.4 criteria

Fireball or jets of flame >1 m from flames of fire: Yes

Fiery projections >5 m: None

Indentations of witness panel with depth > 4 mm: None

Metallic projections with kinetic energy > 8 J: None

Burning time <330 s per 100kg: Yes

Other observations: Large flames up to 10 m high.

Video tape record: On Record

Result: The product burned rapidly and intensely producing large flames - consistent with Division 1.4.

Series 6 assessment: Division 1.4, other than Compatibility Group S

Comments and deviations: None

Disposal:

Based on the results of the tests conducted, the smokeless powder is recommended for classification as follows:-

Name:	Powder, smokeless
Number:	UN 0161
Division/Compatibility group:	1.3C
Packing group:	II
Packing instruction:	P114(b)

Additionally, it is recommended that the smokeless powder may be reclassed (refer to 49 CFR §173.170 to 171, U.S.A. only) for shipments where the total quantity does not exceed 45.4 kg (100 pounds) only when packaged as per the listed options, as follows:-

Name:	Smokeless powder, for small arms
Number:	NA 3178
Division/Compatibility group:	4.1
Packing group:	I
Packaging options:	Inner packaging: Containers, plastic.
Intermediate packaging:	Not required.
Outer packaging:	4G fibreboard box each containing one of the following combinations in inner packagings:

1. Not more than forty (40) inner packagings, each containing not more than four (4) ounces of explosive;
2. Not more than ten (10) inner packagings, each containing not more than one (1) pound of explosive;
3. Not more than two (2) inner packagings, each containing not more than eight (8) pounds of explosive.

REPORT OF PROPERTIES

Identification:

CIE No.	10674
CERL Sample I.D.:	X002593
Item	WC 292 SMOKELESS POWDER
Submitter	Hodgdon Powder Co. Inc.
Reason for submission:	Classification

Packaging description:

Outer kind of packaging:	Box
Outer type of material:	Fibreboard
Dimensions in mm:	Height 340 Width: 160 Depth: 300 Diameter:
Packaging mark:	UN 4G/X9.7/S/05 USA/+BR4334
Proper shipping name:	POWDER, SMOKELESS
UN number:	UN 0161
Dangerous good label:	1.3C
Subs. dangerous goods label:	None
Explosives ladder	No
English and French	No
Shipper identification:	Hodgdon logo, full name and address.
Intermediate packaging:	Fibreboard divider for securing top of bottles.
Intermediate packaging additional information:	None
Inner packaging:	Bottle, 1 gal, black plastic with metal cap
Inner packaging additional information:	Label with shipper name and address, safety warnings, product name and lot number hand written in black
Loose composition present:	No
Mass of loose composition in g:	0.0
Comments on packaging:	None.

Figures

Figure - 1 Outer packaging

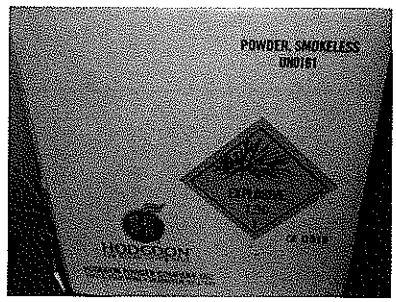
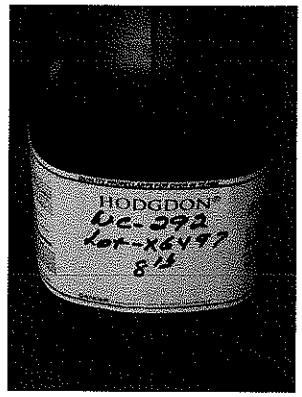


Figure - 2 Inner packaging



Sample description:

Article type:

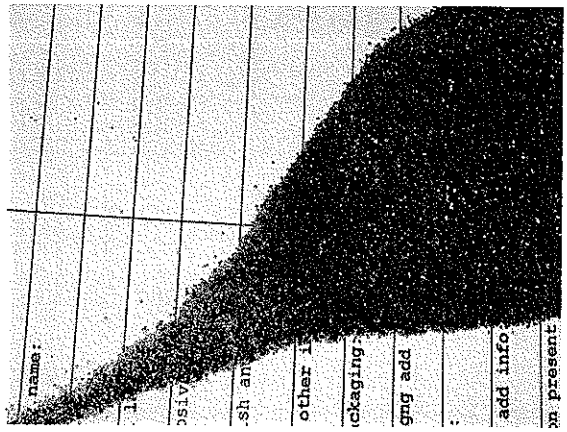
Shape:

Size:

Markings in both English and French?: No

Label wording or refer to declared:

Figure - photograph of article:



Additional description and comments: None

Single Package Test - UN 6(a):

Description of package/product Fibreboard box containing 2 plastic bottles each containing 3.6 kg (8 lb) of propellant powder.

Description of means of initiation An electric igniter, augmented with approximately 5 g of HF20 black powder substitute is inserted through a small hole made in the side of the "donor" bottle

Trial number	Package orientation	Confinement	Observation of blast	Crater formation	Disruption or scattering of confining material	Damage to witness plate	Blast measurement in kPa	Amount of material left after trial and other information specific to trial.
1	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	1/2 bottles reacted Total reaction time: 18s
2	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	1/2 bottles reacted Total reaction time: 21s
3	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 7s
4	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 53s
5	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 62s

Result: Large flame erupted through confined sand and flame projected upwards. No explosion.

Series 6 assessment: Outcome dependent on results of other tests.

Comments: None

External Fire Test - UN6(c):

Test configuration: 11 packages were placed on a steel grate 1 m high. Wood pallets were stacked below the packages to a height of 1 m and paper was added to the wood. The pallets were doused with fuel oil. Witness panels (2 mm thick Al, 2.4 m by 2.4 m) were placed in each of 3 quadrants 3.9 m from the packages. The fire was remotely ignited with an igniter (electric igniter with small charge of HF-20 powder) placed in the paper. The reaction was observed and recorded on video.

Number of packages: 11 **Vol per pkg (m3):** 0.016 **Total vol of packages (m3):** 0.180

Mass of energetic mat per pkg: 7.27 **Total mass (kg):** 79.97

Sample preparation: None

Narrative description: The fire was ignited at 17:33:51. The packages were engulfed in flames after approximately 25 s. The largest reaction started after 71 s and continued for 46 s. The reaction consisted of intense and continuous flames extending vertically to approximately 10 m. There was no explosions or projections.

Observations relative to 1.1 criteria:

Observation of blast: None

Measurement of blast: N/A

Observations relative to 1.2 criteria:

Perforation of witness panels: None

Metallic projections - >20J or >25 g thrown > 50 m or >150 g thrown >15 m: None

Observations relative to 1.3 criteria

Fireball or jets of flame beyond witness panels: None

Fiery projections >15m: None

Burning time <35 s per 100 kg or thermal flux >4 kW/m: 46 s for 80 kg. Meets the criteria for div. 1.4.

Observations relative to 1.4 criteria

Fireball or jets of flame >1 m from flames of fire: Yes

Fiery projections >5 m: None

Indentations of witness panel with depth > 4 mm: None

Metallic projections with kinetic energy > 8 J: None

Burning time <330 s per 100kg: Yes

Other observations: Large flames up to 10 m high.

Video tape record: On Record

Result: The product burned rapidly and intensely producing large flames - consistent with Division 1.4.

Series 6 assessment: Division 1.4, other than Compatibility Group S

Comments and deviations: Wet conditions

Disposal:

Based on the results of the tests conducted, the smokeless powder is recommended for classification as follows:

Name:	Powder, smokeless
Number:	UN 0161
Division/Compatibility group:	1.3C
Packing group:	II
Packing instruction:	P114(b)

Additionally, it is recommended that the smokeless powders may be reclassed (refer to 49 CFR §173.170 to 171, U.S.A. only) for shipments where the total quantity does not exceed 45.4 kg (100 pounds) only when packaged as per the listed options, as follows:-

Name:	Smokeless powder, for small arms
Number:	NA 3178
Division/Compatibility group:	4.1
Packing group:	I
Packaging options:	Inner packaging: Containers, plastic.
Intermediate packaging:	Not required.
Outer packaging:	4G fibreboard box each containing one of the following combinations in inner packagings:

1. Not more than forty (40) inner packagings, each containing not more than four (4) ounces of explosive;
2. Not more than ten (10) inner packagings, each containing not more than one (1) pound of explosive;
3. Not more than two (2) inner packagings, each containing not more than eight (8) pounds of explosive.

REPORT OF PROPERTIES

Identification:

CIE No.	10675
CERL Sample I.D.:	X002594
Item	WC 297 SMOKELESS POWDER
Submitter	Hodgdon Powder Co. Inc.
Reason for submission:	Classification

Packaging description:

Outer kind of packaging:	Box
Outer type of material:	Fibreboard
Dimensions in mm:	Height 340 Width: 160 Depth: 300 Diameter:
Packaging mark:	UN 4G/X9.7/S/05 USA/+BR4334
Proper shipping name:	POWDER, SMOKELESS
UN number:	UN 0161
Dangerous good label:	1.3C
Subs. dangerous goods label:	None
Explosives ladder	No
English and French	No
Shipper identification:	Hodgdon logo, full name and address.
Intermediate packaging:	Fibreboard divider for securing top of bottles.

Intermediate packaging additional information:

None

Inner packaging: Bottle, 1 gal, black plastic with metal cap

Inner packaging additional information:

Label with shipper name and address, safety warnings, product name and lot number hand written in black

Loose composition present: No

Mass of loose composition in g: 0.0

Comments on packaging: None.

Figures

Figure - 1 Outer packaging

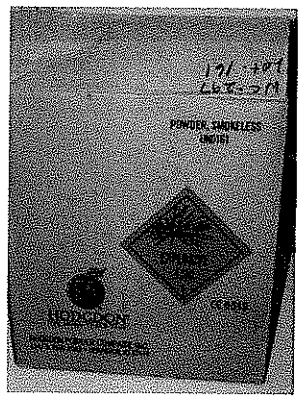
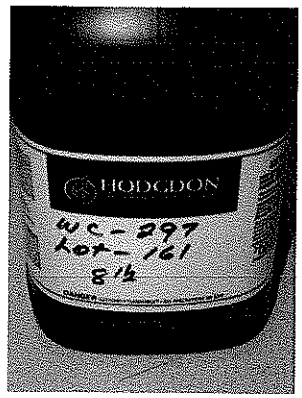


Figure - 2 Inner packaging



Sample description:

Article type:

Shape:

Size:

Markings in both English and French?: No

Label wording or refer to declared:

Figure - photograph of article: *figure not available*

Additional description and comments: None

Single Package Test - UN 6(a):

Description of package/product Fibreboard box containing 2 plastic bottles each containing 3.6 kg (8 lb) of propellant powder.

Description of means of initiation An electric igniter, augmented with approximately 5 g of HF20 black powder substitute is inserted through a small hole made in the side of the "donor" bottle

Trial number	Package orientation	Confinement	Observation of blast	Crater formation	Disruption or scattering of confining material	Damage to witness plate	Blast measurement in kPa	Amount of material left after trial and other information specific to trial.
1	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 53s
2	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 33s
3	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 51s
4	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 29s
5	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 23s

Result: Large flame erupted through confined sand and flame projected upwards. No explosion.

Series 6 assessment: Outcome dependent on results of other tests.

Comments: None

External Fire Test - UN6(c):

Test configuration: 11 packages were placed on a steel grate 1 m high. Wood pallets were stacked below the packages to a height of 1 m and paper was added to the wood. The pallets were doused with fuel oil. Witness panels (2 mm thick Al, 2.4 m by 2.4 m) were placed in each of 3 quadrants 3.9 m from the packages. The fire was remotely ignited with an igniter (electric igniter with small charge of HF-20 powder) placed in the paper. The reaction was observed and recorded on video.

Number of packages: 11 **Vol per pkg (m3):** 0.016 **Total vol of packages (m3):** 0.180

Mass of energetic mat per pkg: 7.27 **Total mass (kg):** 79.97

Sample preparation: None

Narrative description: The fire was ignited at 17:55:41. The packages were engulfed in flames after approximately 90 s. The largest reaction started after 91 s and continued for 88 s. The reaction consisted of intense and continuous flames extending vertically to approximately 10 m. There was no explosions or projections.

Observations relative to 1.1 criteria:

Observation of blast: None

Measurement of blast: N/A

Observations relative to 1.2 criteria:

Perforation of witness panels: None

Metallic projections - >20J or >25 g thrown > 50 m or >150 g thrown >15 m: None

Observations relative to 1.3 criteria

Fireball or jets of flame beyond witness panels: None

Fiery projections >15m: None

Burning time <35 s per 100 kg or thermal flux >4 kW/m: 88 s for 80 kg. Meets the criteria for div. 1.4.

Observations relative to 1.4 criteria

Fireball or jets of flame >1 m from flames of fire: Yes

Fiery projections >5 m: None

Indentations of witness panel with depth > 4 mm: None

Metallic projections with kinetic energy > 8 J: None

Burning time <330 s per 100kg: Yes

Other observations: Large flames up to 10 m high.

Video tape record: On Record

Result: The product burned rapidly and intensely producing large flames - consistent with Division 1.4.

Series 6 assessment: Division 1.4, other than Compatibility Group S

Comments and deviations: Very wet conditions

Disposal:

Based on the results of the tests conducted, the smokeless powder is recommended for classification as follows:

Name:	Powder, smokeless
Number:	UN 0161
Division/Compatibility group:	1.3C
Packing group:	II
Packing instruction:	P114(b)

Additionally, it is recommended that the smokeless powders may be reclassed (refer to 49 CFR §173.170 to 171, U.S.A. only) for shipments where the total quantity does not exceed 45.4 kg (100 pounds) only when packaged as per the listed options, as follows:-

Name:	Smokeless powder, for small arms
Number:	NA 3178
Division/Compatibility group:	4.1
Packing group:	I
Packaging options:	Inner packaging: Containers, plastic.
Intermediate packaging:	Not required.
Outer packaging:	4G fibreboard box each containing one of the following combinations in inner packaging:

1. Not more than forty (40) inner packagings, each containing not more than four (4) ounces of explosive;
2. Not more than ten (10) inner packagings, each containing not more than one (1) pound of explosive;
3. Not more than two (2) inner packagings, each containing not more than eight (8) pounds of explosive.

REPORT OF PROPERTIES

Identification:

CIE No.	10676
CERL Sample I.D.:	X002595
Item	OBP 500 SMOKELESS POWDER
Submitter	Hodgdon Powder Co. Inc.
Reason for submission:	Classification

Packaging description:

Outer kind of packaging:	Box
Outer type of material:	Fibreboard
Dimensions in mm:	Height 325 Width: 335 Depth: 240 Diameter:
Packaging mark:	UN 4G/X10/S/05 USA/+BR4156
Proper shipping name:	POWDER, SMOKELESS
UN number:	UN 0161
Dangerous good label:	1.3C
Subs. dangerous goods label:	None
Explosives ladder	No
English and French	No
Shipper identification:	Hodgdon logo, full name and address.
Intermediate packaging:	None
Intermediate packaging additional information:	None
Inner packaging:	Bottle, 2 gal, black plastic with plastic cap
Inner packaging additional information:	Label with shipper name and address, safety warnings, product name and lot number hand written in black
Loose composition present:	No
Mass of loose composition in g:	0.0
Comments on packaging:	None.

Figures

Figure - 1 Outer packaging

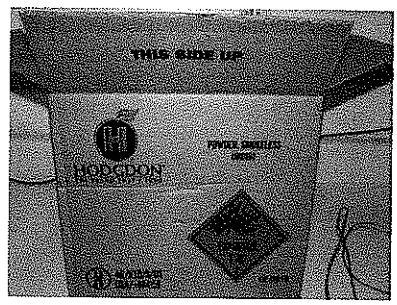


Figure - 2 Outer packaging

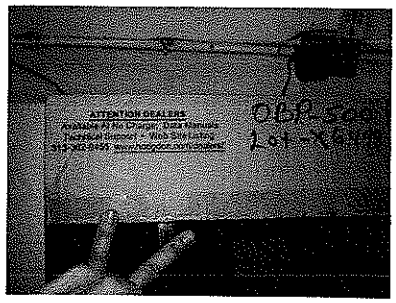


Figure - 3 Inner packaging

Sample description:

Article type:

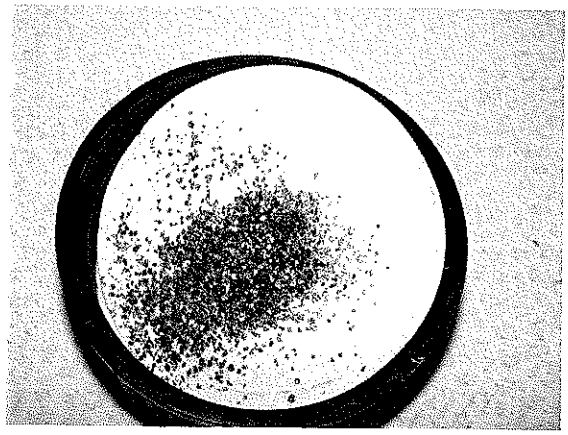
Shape:

Size:

Markings in both English and French?: No

Label wording or refer to declared:

Figure - photograph of article:



Additional description and comments: None

Single Package Test - UN 6(a):

Description of package/product Fibreboard box containing 2 plastic bottles each containing 3.6 kg (8 lb) of propellant powder.

Description of means of initiation An electric igniter, augmented with approximately 5 g of HF20 black powder substitute is inserted through a small hole made in the side of the "donor" bottle

Trial number	Package orientation	Confinement	Observation of blast	Crater formation	Disruption or scattering of confining material	Damage to witness plate	Blast measurement in kPa	Amount of material left after trial and other information specific to trial.
1	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	1/2 bottles reacted Total reaction time: 2s
2	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	1/2 bottles reacted Total reaction time: 6s
3	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	1/2 bottles reacted Total reaction time: 2s
4	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 16s
5	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 6s

Result: Large flame erupted through confined sand and flame projected upwards. No explosion.

Series 6 assessment: Outcome dependent on results of other tests.

Comments: None

External Fire Test - UN6(c):

Test configuration: 6 packages were placed on a steel grate 1 m high. Wood pallets were stacked below the packages to a height of 1 m and paper was added to the wood. The pallets were doused with fuel oil. Witness panels (2 mm thick Al, 2.4 m by 2.4 m) were placed in each of 3 quadrants 3.9 m from the packages. The fire was remotely ignited with an igniter (electric igniter with small charge of HF-20 powder) placed in the paper. The reaction was observed and recorded on video.

Number of packages: 6 **Vol per pkg (m3):** 0.026 **Total vol of packages (m3):** 0.157

Mass of energetic mat per pkg: 7.27 **Total mass (kg):** 43.62

Sample preparation: None

Narrative description: The fire was ignited at 14:07:11. The packages were engulfed in flames after approximately 70 s. The reaction started after 96 s and continued for 27 s. The reaction consisted of intense and continuous flames with bursts, extending vertically to approximately 10 m. There was no explosions or projections.

Observations relative to 1.1 criteria:

Observation of blast: None

Measurement of blast: None

Observations relative to 1.2 criteria:

Perforation of witness panels: None

Metallic projections - >20J or >25 g thrown > 50 m or >150 g thrown >15 m: None

Observations relative to 1.3 criteria

Fireball or jets of flame beyond witness panels: None

Fiery projections >15m: None

Burning time <35 s per 100 kg or thermal flux >4 kW/m: 27 s for 43 kg. Meets the criteria for div. 1.3.

Observations relative to 1.4 criteria

Fireball or jets of flame >1 m from flames of fire: Yes

Fiery projections >5 m: None

Indentations of witness panel with depth > 4 mm: None

Metallic projections with kinetic energy > 8 J: None

Burning time <330 s per 100kg: Yes

Other observations: Large flames up to 10 m high.

Video tape record: On Record

Result: The product burned rapidly and intensely producing large flames - consistent with Division 1.3.

Series 6 assessment: Division 1.3

Comments and deviations: Very wet conditions.

Disposal:

Based on the results of the tests conducted, the smokeless powder is recommended for classification as follows:

Name:	Powder, smokeless
Number:	UN 0161
Division/Compatibility group:	1.3C
Packing group:	II
Packing instruction:	P114(b)

Additionally, it is recommended that the smokeless powders may be reclassed (refer to 49 CFR §173.170 to 171, U.S.A. only) for shipments where the total quantity does not exceed 45.4 kg (100 pounds) only when packaged as per the listed options, as follows:-

Name:	Smokeless powder, for small arms
Number:	NA 3178
Division/Compatibility group:	4.1
Packing group:	I
Packaging options:	Inner packaging: Containers, plastic.
Intermediate packaging:	Not required.
Outer packaging:	4G fibreboard box each containing one of the following combinations in inner packaging:

1. Not more than forty (40) inner packagings, each containing not more than four (4) ounces of explosive;
2. Not more than ten (10) inner packagings, each containing not more than one (1) pound of explosive;
3. Not more than two (2) inner packagings, each containing not more than eight (8) pounds of explosive.

REPORT OF PROPERTIES

Identification:

CIE No.	10673
CERL Sample I.D.:	X002596
Item	OBP 529 SMOKELESS POWDER
Submitter	Hodgdon Powder Co. Inc.
Reason for submission:	Classification

Packaging description:

Outer kind of packaging:	Box
Outer type of material:	Fibreboard
Dimensions in mm:	Height 340 Width: 160 Depth: 300 Diameter:
Packaging mark:	UN 4G/X9.7/S/05 USA/+BR4334
Proper shipping name:	POWDER, SMOKELESS
UN number:	UN 0161
Dangerous good label:	1.3C
Subs. dangerous goods label:	None
Explosives ladder	No
English and French	No
Shipper identification:	Hodgdon logo, full name and address.
Intermediate packaging:	Fibreboard divider for securing top of bottles.

Intermediate packaging additional information:

None

Inner packaging: Bottle, 1 gal, black plastic with metal cap

Inner packaging additional information:

Label with shipper name and address, safety warnings, product name and lot number hand written in black

Loose composition present: No

Mass of loose composition in g: 0.0

Comments on packaging: None.

Figures

Figure - 1 Outer packaging

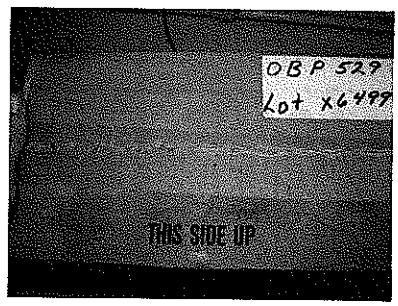


Figure - 2 Outer packaging

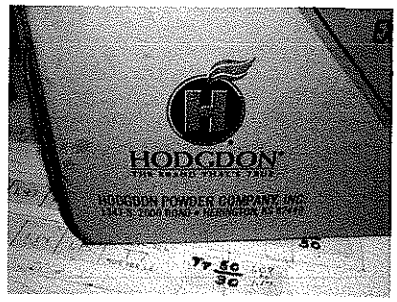
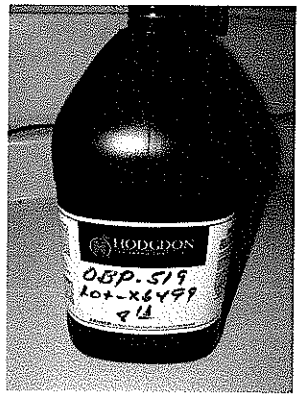


Figure - 3 Inner packaging



Sample description:

Article type:

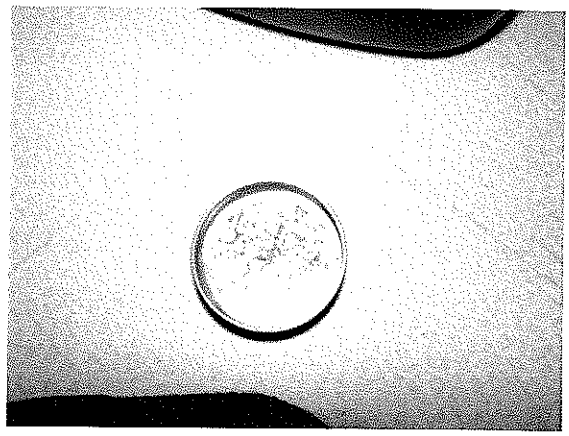
Shape:

Size:

Markings in both English and French?: No

Label wording or refer to declared:

Figure - photograph of article:



Additional description and comments: None

Single Package Test - UN 6(a):

Description of package/product Fibreboard box containing 2 plastic bottles each containing 3.6 kg (8 lb) of propellant powder.

Description of means of initiation An electric igniter, augmented with approximately 5 g of HF20 black powder substitute is inserted through a small hole made in the side of the "donor" bottle

Trial number	Package orientation	Confinement	Observation of blast	Crater formation	Disruption or scattering of confining material	Damage to witness plate	Blast measurement in kPa	Amount of material left after trial and other information specific to trial.
1	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 24s
2	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 20s
3	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	1/2 bottles reacted Total reaction time: 25s
4	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 16s
5	General	0.5 m wet sand	None	None	Venting channel formed	None	N/A	2/2 bottles reacted Total reaction time: 36s

Result: Large flame erupted through confined sand and flame projected upwards. No explosion.

Series 6 assessment: Outcome dependent on results of other tests.

Comments: None

External Fire Test - UN6(c):

Test configuration: 11 packages were placed on a steel grate 1 m high. Wood pallets were stacked below the packages to a height of 1 m and paper was added to the wood. The pallets were doused with fuel oil. Witness panels (2 mm thick Al, 2.4 m by 2.4 m) were placed in each of 3 quadrants 3.9 m from the packages. The fire was remotely ignited with an igniter (electric igniter with small charge of HF-20 powder) placed in the paper. The reaction was observed and recorded on video.

Number of packages: 11 **Vol per pkg (m3):** 0.016 **Total vol of packages (m3):** 0.180

Mass of energetic mat per pkg: 7.27 **Total mass (kg):** 79.97

Sample preparation: None

Narrative description: The fire was ignited at 14:43:20. The packages were engulfed in flames after approximately 134 s. The first reaction started after 151 s and consisted of a ball of flame. The largest reaction started after 167 s and continued for 93 s. The reaction consisted of intense and continuous flames with bursts extending vertically to approximately 5 m. There was no explosions or projections.

Observations relative to 1.1 criteria:

Observation of blast: None

Measurement of blast: None

Observations relative to 1.2 criteria:

Perforation of witness panels: None

Metallic projections - >20J or >25 g thrown > 50 m or >150 g thrown >15 m: None

Observations relative to 1.3 criteria

Fireball or jets of flame beyond witness panels: None

Fiery projections >15m: None

Burning time <35 s per 100 kg or thermal flux >4 kW/m: 93 s for 80 kg. Meets the criteria for div. 1.4.

Observations relative to 1.4 criteria

Fireball or jets of flame >1 m from flames of fire: Yes

Fiery projections >5 m: None

Indentations of witness panel with depth > 4 mm: None

Metallic projections with kinetic energy > 8 J: None

Burning time <330 s per 100kg: Yes

Other observations: Burst of flames up to 5 m high.

Video tape record: On Record

Result: The product burned rapidly and intensely producing large flames - consistent with Division 1.4.

Series 6 assessment: Division 1.4, other than Compatibility Group S

Comments and deviations: Very wet conditions.

Disposal:

Based on the results of the tests conducted, the smokeless powder is recommended for classification as follows:

Name:	Powder, smokeless
Number:	UN 0161
Division/Compatibility group:	1.3C
Packing group:	II
Packing instruction:	P114(b)

Additionally, it is recommended that the smokeless powders may be reclassed (refer to 49 CFR §173.170 to 171, U.S.A. only) for shipments where the total quantity does not exceed 45.4 kg (100 pounds) only when packaged as per the listed options, as follows:-

Name:	Smokeless powder, for small arms
Number:	NA 3178
Division/Compatibility group:	4.1
Packing group:	I
Packaging options:	Inner packaging: Containers, plastic.
Intermediate packaging:	Not required.
Outer packaging:	4G fibreboard box each containing one of the following combinations in inner packaging:

1. Not more than forty (40) inner packagings, each containing not more than four (4) ounces of explosive;
2. Not more than ten (10) inner packagings, each containing not more than one (1) pound of explosive;
3. Not more than two (2) inner packagings, each containing not more than eight (8) pounds of explosive.