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**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**
(Twenty-first session, 1-10 July 2002,
agenda item 3(a))

EXPLOSIVES, SELF-REACTIVE SUBSTANCES AND ORGANIC PEROXIDES

Classification criteria for fireworks

Transmitted by the expert from Japan

1. Introduction

During the twentieth session of the Sub-Committee of Experts on the Transport of Dangerous Goods, a discussion was held based on the Report of the UN Working Group on the Classification of Fireworks (UN/SCETDG/ 20/INF.9; ST/SG/AC.10/C.3/2002/1). As a result of the discussion, it was agreed that the default system for the classification of fireworks should be based on the test data available in all countries for the classification of existing fireworks (ST/SG/AC.10/C.3/40, para.77).

The shell known as, so-called “Shell of Shells” has been used in Japan for many years.

It is considered that the hazard properties of the “Shell of shells” are different from those of the shell (report or colour) shown in the “Default table” in the Annex of the Report of the Working Group.

Japanese “Shell of shells” has a double shell structure. Inner articles contain a small amount of explosives and are completely insulated by an inner shell, and then the inner shells are packed in an outer shell case.

On the other hand, report and colour shells shown in the “Default table” have a large amount of explosives without any insulation. Therefore, the difference of the fireworks' structure may result in the difference of classification.

The existing classification of the above “Shell of shells” has been confirmed by the tests performed for standard type Japanese “Shell of shells”.

2. Justification

From the results of tests conducted in Japan, it is considered that “Shell of shells” should be classified based on its calibre, as follows:

Report shell : > 120mm	1.1G
Report shell : ≤ 120mm	1.3G
Colour shell : > 300mm	1.1G
Colour shell : ≤ 300mm	1.3G

3. Test and Results

3.1 Samples of fireworks

Tests, 6(a), 6(b) and 6(c), were conducted on the following “Shell of shells”:

- (1) “Thousand bloom” (300mm calibre shell composed of multi colour inner-shells)
- (2) “Reports shell” (120mm calibre shell composed of some reports inner-shells)

3.2 Test results

All of the above samples were classified as 1.3G.

The details of the test results are attached as Annex 1.

4. Proposal

Add the following table to “shell, spherical or cylindrical” in “2.1.3.5.6 Default table” in the Annex to the report in ST/SG/AC.10/C.3/2002/1.

The proposed complete default table is attached as Annex 2.

Include:/Synonym	Definition	Calibre/Weight	HD
Shell of shells	Device without propellant, with delay fuse and bursting charge, many small shells and designed to be projected from a mortar.	report shell: > 120mm	1.1G
		report shell: ≤ 120mm	1.3G
		colour shell: > 300mm	1.1G
		colour shell: ≤ 300mm	1.3G

Annex 1

The details of test results

1. Test 6(a): Single package test

Test criteria	Test result	
	120mm reports shell	300mm Thousand bloom
A crater at the test site	-	-
Damage to the witness plate	-	-
Blast	-	-
Disruption and scattering of the confining material	-	-

Conclusion: All of the test results were considered as no mass explosion.
 Proceeded to Test 6(b).

2. Test 6(b): Stack test

Test criteria	Test result	
	120mm reports shell	300mm Thousand bloom
A crater at the test site appreciably larger than that given by Test 6(a)	-	-
Damage to the witness plate appreciably larger than that given by Test 6(a)	-	-
Measurement of blast which significantly exceeds that from Test 6(a)	-	-
Violent disruption and scattering of most of the confining material	-	-

Conclusion: All of the test results were not assigned to Division 1.1.
 Proceeded to Test 6(c)

3. Test 6 (c) : External fire(bonfire) test

Hazard division	Test criteria	Test result	
		120mm reports shell	300mm Thousand bloom
1.1	Mass explosion	-	-
1.2	A perforation of any of the witness screens	-	-
	A metallic projection with a kinetic energy exceeding 20 J	-	-
1.3	A fireball which extends beyond any of the witness screens	-	-
	Jet which emanates more than 3 m	-	-
	A fiery projection emanating from the product is thrown more than 15 m	+	+
1.4	A fireball or jet of flame which extends more than 1 m from the flames of the fire	-	-
	A fiery projection emanating from the product is thrown more than 5 m	+	+
	An indentation in any of the witness screens on more than 4 mm	+	-
	A metallic projection with a kinetic energy exceeding 8 J	-	-
	The thermal, blast, or projection which significantly hinder fire-fighting or other emergency response efforts	+	+

Conclusion: 120mm reports shell and 300mm colour shells are assigned to Hazard division 1.3.

Annex 2

2.1.3.5.1 Default table

Type	Includes: / Synonym:	Definition	Calibre /Weight	HD
shell, spherical or cylindrical	display shell: aerial shell, colour shell, dye shell, multi-break shell, multi-effect shell, nautical shell, parachute shell, smoke shell, star shell; report shell: maroon, salute, sound shell, thunderclap	device with or without propellant charge, with delay fuse and bursting charge, pyrotechnic unit(s) or loose pyrotechnic composition and designed to be projected from a mortar	all report shells	1.1G
			colour shell: ≥ 200 mm	1.1G
			colour shell: < 200 mm	1.3G
			all report shells	1.1G
			colour shell: ≥ 200 mm	1.1G
			colour shell: < 200 mm	1.3G
	aerial shell kit, preloaded mortar, shell in mortar	assembly comprising a shell inside a mortar from which the shell is designed to be projected	all report shells	1.1G
	Shell of shells	Device without propellant, with delay fuse and bursting charge, many small shells and designed to be projected from a mortar.	report shell:>120mm	1.1G
			report shell:≤120mm	1.3G
			colour shell:>300mm	1.1G
colour shell:≤300mm			1.3G	
combination/ batteries	barrage, bombardos, cakes, finale box, flowerbed, hybrid, multiple tubes	assembly including several elements either containing the same type or several types each corresponding to one of the types of fireworks listed in this table, with one or two points of ignition	the most hazardous firework type determines the classification	
Roman candles	exhibition candle, candle, bombettes	tube containing alternate propellant charge(s), pyrotechnic unit(s) and transmitting fuse(s)	< 25 mm	1.4G
			≥ 25 mm and < 50 mm	1.3G
			≥ 50 mm, containing no flash composition	1.2G
			≥ 50 mm containing flash composition	1.1G
rocket	avalanche rocket, signal rocket, whistling rocket, bottle rocket, sky rocket, missile type rocket, table rocket	tube containing pyrotechnic composition and/or pyrotechnic units, equipped with stick(s) or other means for stabilisation of flight, and designed to be propelled into the air	report as primary effect, limits to be determined	1.1G
			Other	1.3G
			to be defined	1.4G
mine	pot-a-feu	tube containing propellant charge and pyrotechnic units and designed to be placed on the ground or to be fixed in the ground	report as primary effect, limits to be determined	1.1G
			Other	1.3G

Type	Includes: / Synonym:	Definition	Calibre /Weight	HD
			[to be defined]	1.4G
	bag mine	bag containing propellant charge and pyrotechnic units and designed to be placed in a mortar	report as primary effect, limits to be determined	1.1G
			Other	1.3G
			[to be defined]	1.4G
fountain	volcanos, gerbs, showers, falls, rains, lances, Bengal fire, flame projectors, flitter sparkle, cylindrical fountains, cone fountains, illuminating torch, tourbillions, strobes, whistle	non-metallic case containing sparks- and flame producing pyrotechnic composition	Other	1.3G
			[to be defined]	1.4G
sparklers	handheld sparklers, non-handheld sparklers, wire sparklers, dipped sticks	rigid wire or thin stick partially coated (along one end) with slow burning pyrotechnic composition. with or without an ignition tip	pyrotechnic composition per item ≥ 10 g	1.3G
			pyrotechnic composition per item < 10 g	1.4G
low hazard fireworks and novelties	table bombs, throw downs, crackling granules, smokes, fog, chaser, snakes, glow worm, serpents	device designed to produce very limited visible and/ or audible effect which contains small amounts of pyrotechnic and/ or explosive composition	All	1.4G
spinners	aerial spinners, helicopters, ground spinners	non-metallic tube or tubes containing gas- or spark-producing pyrotechnic composition, with or without noise producing composition, with or without aerofoils attached	pyrotechnic composition per item > 20 g	1.3G
			pyrotechnic composition per item ≤ 20 g	1.4G
wheels	Catherine wheels, Saxon	assembly including a non-metallic tube or tubes containing pyrotechnic composition and provided with a means of attaching it to a support so that it can rotate	> 60 g pyrotechnic composition per driver	1.3G
			≤ 60 g pyrotechnic composition per driver	1.4G
aerial wheels	flying Saxon, UFO's, rising crown	tubes containing propellant charges and sparks-flame- and/ or noise producing pyrotechnic compositions, the tubes being fixed to a supporting ring	$> [60$ g] pyrotechnic composition per driver	1.3G
			$\leq [60$ g] pyrotechnic composition per driver	1.4G