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 **15 November 2017**

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Item 2 (j) of the provisional agenda
Explosives and related matters: miscellaneous

Proposal to create a new UN Number for MINES with bursting charge 1.6D

Submitted by the Government of Finland

Background

1. The current edition of the Model Regulations contains the four following entries for MINES with bursting charge:

Name and description	*Class*	*UN Number*
MINES with bursting charge	1.1F	0136
MINES with bursting charge	1.1D	0137
MINES with bursting charge,	1.2D	0138
MINES with bursting charge	1.2F	0294

2. Underwater Influence Mine is an Influence Mine equipped with advanced sensor systems, customer programmable algorithms and parameters, Insensitive Munitions Plastic Bonded Explosives, exercise systems and an impressive total energy output equivalent of over 1000 kg of TNT. This type of Mine has no mass explosion hazard and therefore should not be classified to class 1.1.

3. Underwater Influence Mine is manufactured by OY FORCIT AB in Finland. Explosives in this product are FOXIT (the main charge) and FPX R1 (the booster). Both of these explosives are widely tested and qualified.

4. The main charge FOXIT is tested according to the UN Recommendations on the Transport of Dangerous Goods, the Manual of Tests and Criteria and qualification is performed by the Finnish Defence Forces Research Agency FDRA. Based on the tests, FOXIT meets the requirements of EIS material (Extremely Insensitive Substance).

5. Qualification for the explosive in the booster FPX R1 is performed by both Swedish Defence Forces and Finnish Defence Forces. Sensitivity and quality tests for the booster explosive FPX R1 have been performed in FDRA. Swedish Defence Materiel Adminstration's test methods for booster explosives in FSD 0214 standard were used as test guides. The test set contained a gap test, a fall hammer test, a temperature ignition test, a friction test, a shooting test, a koenen test, an electric sparkle test and a detonation

velocity test. The tests results have been compared with the results of tetryl which pass the FSD 0214 requirements for boosters. Test results prove that FOXIT is Extremely Insensitive Substance (EIS) and the booster FPX R1 is also insensitive enough. This main charge (FOXIT) and booster (FPX R1) combination is insensitive enough to be classified to class 1.6.D.

6. Current transport classification for Underwater Influence Mine is UN 0137 1.1D. The aim of this proposal is to prove that instead of 1.1, division 1.6 and compatibility group D would be more appropriate international transport classification for this product. Tests 7 (g) - 7(k) have been made to the whole Underwater Influence Mine (Article) and series 3, 5 and 7 (a) – 7(f) tests have been made to the FOXIT (Substance). According to tests performed by FDRA, Underwater Influence Mine is not too dangerous to transport (the Manual of Tests and Criteria, Series 4) and it is thermally stable (the Manual of Tests and Criteria, Series 3). Underwater Influence Mine passes all the test series 7 tests, and therefore Underwater Influence Mine could be assigned to division 1.6.

7. There is no entry for mines in division 1.6 and compatibility group D at the moment. However Finland is of the opinion that more suitable UN number for this product could be UN XXXX, MINES with bursting charge, 1.6D.

8. The technical information of Underwater Influence Mine, test results (FOXIT) from UN Test series 3, 5 and 7, other performed tests and FPX R1 (qualification tests according to FSD 0214 and AOP-7) are presented in Annex.

9. Consequential amendments will be checked in later stage.

Proposal

10. Finland proposes to create a new entry in the Dangerous Goods list for UN XXXX MINES with bursting charge as follows:

UN No.	Name and description	Class or division	Subsidiary risk	UN packing group	Special provisions	Limited and excepted quantities		Packagings and IBCs		Portable tanks and bulk containers	
								Packing instruction	Special provisions	Instruction	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
XXXX	MINES with bursting charge	1.6D				0	E0	P130 LP101	PP67 L1		

Annex

Technical information and test results:

Underwater Influence Mine technical information:

PHYSICAL AND OPERATIONAL CHARACTERISTICS	
Gross weight	710 kg
Net explosive quantity	560 kg
Shelf-life	25 years
Climate categories	C1-A3/B1, -32 °C up to +58 °C

Test results (FOXIT) from UN Test series 3, 5 and 7:

TEST	RESULT
3 (a)(iv) 30 kg Fall hammer Test	Pass
3 (b)(i) BAM Friction Test	Pass
3 (c) Thermal Stability at 75 °C	Pass
3 (d) Small-scale Burning Test	Pass
5 (a) Cap Sensitivity Test	Pass
5 (b)(i) DDT Test	Pass
5 (c) External Fire Test	Pass
7 (a) EIDS Cap test	no reaction – pass
7 (b) EIDS Gap test	50 mm - pass
7 (c) EIDS Impact Sensitivity	Not applicable since the diameter of test charges is well below the critical diameter.
7 (d) EIDS Bullet Impact Test	Fire - pass
7 (e) EIDS External Fire Test Close to SCB-test (Stanag 4491)	Pressure burst – pass
7 (f) EIDS Slow Cook-off Test Close to SCB-test (Stanag 4491)	Pressure burst – pass
7 (g) 1.6 Article External Fire Test	Burning - pass
7 (h) 1.6 Article Slow Cook-off Test	Burning - pass
7 (j) 1.6 Article Bullet Impact Test	Test performed on similar product-pass New test if required

7 (k) 1.6 Article Stack Test	Burning - pass
7 (l) 1.6 Article Fragment Impact Test	Will be tested, if required

Other performed tests

TEST	RESULT
4 (b) (ii) 12 metre drop test	pass
4 (a) Thermal stability test	pass
SCJ Impact test (according to STANAG 4526)	Deflagration/burning - pass

FPX R1 (qualification tests according to FSD 0214 and AOP-7)

TEST
NOL LSGT
Fall hammer test
Ignition temperature
Friction sensitivity
Shooting test
Koenen test
Electric spark test
Detonation velocity
Vacuum stability