

## **Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals**

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### **Sub-Committee of Experts on the Transport of Dangerous Goods**

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Item 2 (i) of the provisional agenda

**Explosives and related matters: miscellaneous**

## **Transport of PENTAERYTHRITE TETRANITRATE (PETN) with less than 25 % of water but more than 9% of water**

### **Transmitted by the expert from Spain**

#### **Introduction**

1. The purpose of this paper is to share the Spanish experience on transport of PETN under UN 0150 with less than 25% of water. For UN 0150 Special Provision 266 is assigned, which grants the possibility of carrying this substance with a lower percentage of water under the specific approval by a Competent Authority.
2. Transport of PETN has been authorised by the Spanish Competent Authority for several years with a percentage of water in between 9 and 25%.

#### **Background**

3. The UN Model Regulations contain three entries for the transport of PETN: UN 0150, UN 0411 and UN 3344, this last as class 4.1 “mixture, desensitized, solid”. From an industrial point of view and as raw material to produce other civil explosives, like detonators or detonating cord, only UN 0150 can be used, taking into account that UN 3344 is not possible for economic reasons and that UN 0411 includes a minimum contents of wax.

UN No.	Name and description	Class or division	Subsidiary risk	UN packing group	Special provisions	Limited and		Packagings and IBCs		Portable tanks and	
						(7a)	(7b)	Packing instruction	Special packing provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
	3.1.2	2.0	2.0	2.0.1.3	3.3	3.4	3.5	4.1.4	4.1.4	4.2.5/4.3.2	4.2.5
0150	PENTAERYTHRITE TETRANITRATE (PENTAERYTHITOL TETRANITRATE; PETN with not less than 25% water by mass or PENTAERYTHRITE TETRANITRATE (PENTAERYTHITOL TETRANITRATE; PETN) DESENSITIZED with not less than 15% phlegmatizer, by mass	1.1.D			266	0	E0	P112(a) P112(b)			
0411	PENTAERYTHRITE TETRANITRATE (PENTAERYTHITOL TETRANITRATE; PETN with not less than 7% wax, by mass	1.1.D			131	0	E0	P112(b) P112(c)			
3344	PENTAERYTHRITE TETRANITRATE (PENTAERYTHITOL TETRANITRATE; PETN MIXTURE, DESENSITIZED SOLID, N.O.S., with more than 10% but not more than 20% PETN, by mass	4.1		II	272 274	0	E0	P406	PP26 PP80		

4. In December of 2010 the Spanish Authority granted an approval to transport PETN with less than 25 % but more than 9% of water in mass by road. This approval was based on the negative results of tests series 3 provided by the applicant, which were carried out by a European Notified Body (Official European Testing Laboratory). The approval was extended for periods of one year on 2011, 2012, 2013, 2014 and 2015. Additionally, the Spanish Maritime Authority also granted an approval in March 2014 to transport PETN with less than 25% but more than 9% of water by sea, based on the same tests series 3 results.

5. During the aforesaid years more than 4.000 tons of PETN were transported without any problem and/or incident, both, at national and international level, by road and by sea.

## Proposal

6. As a consequence of the abovementioned information the purpose of this paper is to provide a basis for discussion, before sending an official paper, on the possibility of allowing the transport of PETN with less than 25 % water by mass, but with more than 9% of water by mass.

7. To avoid increasing the number of entries in the UN Model Regulations, and also to be compatible with the current separation in between UN 0150 and UN 0411, it is proposed to modify the entry for UN 0411 and to include there the possibility of a lower percentage of water. This would mean the following modifications for UN 0411:

- In column (2) "Name and description" add "...or 9% water..."
- In column (8) "Packing instruction" add.... P112(a)

8. Therefore the Dangerous Good List for UN 0411 would be as follows (new text underlined>):

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	
						(7a)	(7b)	Packing instruction	Special packing provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
	3.1.2	2.0	2.0	2.0.1.3	3.3	3.4	3.5	4.1.4	4.1.4	4.2.5/4.3.2	4.2.5
O411	PENTAERYTHRITE TETRA-NITRATE (PENTAERYTHITOL TETRA-NITRATE;PETN with not less than 7% wax <u>or 9% water</u> , by mass	1.1.D			131	0	E0	<u>P112(a)</u> P112(b) P112(c)			

9. Additionally, Special Provision SP 131 should be modified as follows (new text underlined>):

**SP131** The phlegmatized or wetted substance shall be significantly less sensitive than dry PETN.

## Justification

10. No safety implications are foreseen. Transport during the last 5 years has been carried out under similar conditions, in accordance with an approval of a National Competent Authority.

11. In the annex the results of tests series 3 provided by the applicant, which were carried out by a European Notified Body, are included.

## Annex: Test series 3 results

### PETN with 9% of water

#### Test 3 a) Sensitiveness to impact

##### 3 a ii) BAM Fallhammer

<i>Fall Height (cm)</i>	<i>Weight (kg)</i>	<i>Number of trials</i>	<i>Positive Results</i>
60	5	3	1
50	5	4	1
40	5	6	0
40	5	6	0

Sensitiveness to impact > 25J

Temperature during the trials: 25,1 +- 2,5 °C

Room Humidity: 47 %

#### Test 3 b) Sensitiveness to friction

##### 3 b BAM friction apparatus

<i>Load (N)</i>	<i>Number of trials</i>	<i>Positive Results</i>
160	2	1
120	3	1
80	6	1
60	6	0

Sensitiveness to friction: 80 N

Temperature during the trials: 21,5 +- 2,5 °C

Room Humidity: 48 %

#### Test 3 c) Thermal stability at 75 °C

No reaction

#### Test 3 d) Response to a fire

##### 3 d Small scale burning test

- Kraft paper and simple base powder
- Initiation: Safety fuse

<i>Trial</i>	<i>Weight (g)</i>	<i>Result</i>
1	10	No inflammation
2	10	No Inflammation
3	100	No Inflammation
4	100	No Inflammation