



UN Scheme for Class 1: Design and Updating

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*maîtriser le risque |
pour un développement durable*



CONTENTS

- History
- Evolutions and Updates
- Dangerous Goods Regulations
- Conclusion



History

- Until the beginning of the 80's the classification of Explosives in Class 1 was based on the nature of the product.
- In the UN Recommendations there was a kind of flow chart with sensitivity tests and large scale tests, based on NATO e.g. bone fire test.

History

- 1983, in Morgantown (WV, USA): first meeting to prepare an update of the classification scheme for Class 1.
- Few meetings later and an adoption by the UN Committee of the so-called UN Manual Test and Criteria 1st edition in 1986. It contains 6 Test Series.



The 8 UN Test Series

- TS 1: is the material reactive enough?
- TS 2: is the material not too reactive?
- TS 3: is the material too sensitive to be transported.
- TS 4: is the article (or packed material) too sensitive to be transported.
- TS 5: for EIDS “Extremely Insensitive Detonating Substance” (Ammonium Nitrate based Blasting Agents).



The 8 UN Test Series

- TS 6: large scale tests for HD affectation.
- TS 7: for EIDA “Extremely Insensitive Detonating Articles”.
- TS 8: for ammonium nitrate based intermediate for blasting agents i.e. Ammonium Nitrate Emulsions (ANEs), new generation of mining explosives.

Evolutions and updates

- UN Test Series 5 was introduced very early to take care of the case of the “*Very insensitive explosive substances with a mass explosion hazard*”.
- It goes with the HD 1.5 initially for explosive materials such as commercial ammonium nitrate (TGAN) based blasting agents.

Evolutions and updates

- UN Test Series 7 was introduced in the 2nd edition of UN Manual T&C of 1990.
- It was based on works done in the USA and France following the concept of Insensitive Munitions.
- The HD 1.6 was also established for EIDA and the definition of HD 1.5 was slightly modified for EIDS.



Evolutions and updates

- Revision of the Class 1 packing methods end of 80's beginning of 90's.
- The Packing Methods coming mainly from the military sector became the Packing Instructions (in coherency with IMDG and IATA).

Evolutions and updates

- Mid 90's extensive works to modify the UN 6c) Test.
Revised test included in the Rev. 3 of the UN Manual T&C (1999).
- Introduction of the UN 6d) test in the Rev. 5 of the UN Manual T&C (2009).
Specific for the 1.4S allocation of few UN numbers, due to lobbying by air transport stakeholders: shaped charges for oil/gas wells, detonators, etc.



Evolutions and updates

- Revision of the UN Test Series 7 started in 2007 (UK proposal), due to difficulties to fulfil HD 1.6 criteria. Work carried out by the so-called “Bath’s WG”.
- Adoption of the revision during the 2010 UN Plenary Meeting.

The UN Test Series 7

■ Tests on substances

- 7 (a) EIDS cap test *
- 7 (b) EIDS gap test *
- 7 (c) (i) Susan test
- 7 (c) (ii) Friability test *
- 7 (d) (i) EIDS bullet impact test *
- 7 (d) (ii) Friability test
- 7 (e) EIDS external fire test *
- 7 (f) EIDS slow cook-off test *

* Recommended test

The UN Test Series 7

- Tests on articles

- 7 (g) 1.6 article external fire test *
- 7 (h) 1.6 article slow cook-off test *
- 7 (j) 1.6 article bullet impact test *
- 7 (k) 1.6 article stack test *
- 7 (l) 1.6 article fragment impact test

* Recommended test

- Only one UN number for HD 1.6

UN 0486 – 1.6N

ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES, EEI)

Evolutions and updates

- Introduction of a default fireworks classification table in 2005, follow-up of Enschede, NL in 2000.
- Introduction in the UN manual T&C Rev. 4 of the UN Test Series 8 for the classification of ammonium nitrate based intermediate for blasting agents.
- Work in progress regarding desensitized explosives in relation with GHS.

The UN Test Series

- Overall in the 8 Test Series 48 tests.
 - In each Test Series there are recommended tests.
 - Some tests were merged.
- At the end 35 tests are recommended.
- Future works regarding the availability of several components to perform the tests (steel tube, PETN/TNT booster charge, primed cambric...).



Transport of Dangerous Goods Regulations

- In 1957 the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) was done and enter into force in 1968.
- Before and after that there was national modal regulations.
- In 2008 the EU Directive 2008/68/CE on the inland transport of dangerous goods.
- IMDG code 2012 from the OMI.
- IATA Dangerous Goods Regulations 54th edition.

CONCLUSION

- UN Scheme for Class 1 as an example for other DG Classes (e.g. Organic Peroxide in Class 5.2 or Self Reactive Substances in Class 4.1)
=> i.e. Classification based on dangerous properties, not on chemical nature/composition
- TDG Classification was used for building the base of GHS Scheme, part 1 physico-chemical properties (WGs from 1994 to 2000)
=> Now GHS is implemented in EU by the means of CLP Regulation, included in REACH Regulation for Chemicals



CONCLUSION

- On-going work to update the Class 1 testing procedures => adaptation to innovation process or new technologies (new entries, designation...).
- Design and updating provide the opportunity of worldwide collaboration between testing institutes, regulators and stakeholders – a large part of the industry (manufacturers and users).



Thanks for your attention

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