

**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

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Item 2 of the provisional agenda

Explosives and related matters

Report of the Working Group on Explosives

Transmitted by the Chair of the Working Group

Introduction

1. The working group met from 24 – 27 June 2024 in a parallel session to the plenary meeting of the Sub-Committee of Experts on the Transport of Dangerous Goods. This meeting of the working group was well attended, with 35 experts in attendance from Belgium, Canada, China, France, Germany, Japan, Netherlands, Republic of Korea, Sweden, United Kingdom, United States of America, Australasian Explosives Industry Safety Group Inc. (AEISG), Council on Safe Transportation of Hazardous Articles (COSTHA), European Chemical Industry Council (Cefic), Institute of Makers of Explosives (IME), Responsible Packaging Management Association of Southern Africa (RPMASA), and Sporting Arms and Ammunition Manufacturers' Institute (SAAMI). Annex 1 of this report provides a list of participants. The group was tasked to discuss technical matters related to official papers and to discuss informal papers as time allowed. Mr. Martyn Sime (UK) served as chair of the working group, and Dr. Joshua Hoffman (IME) as secretary.

2. Throughout this report, the following abbreviations may be used:

- DGL – Dangerous Goods List
- EWG – Working Group on Explosives
- GHS – Globally Harmonized System
- ICG – Informal Correspondence Group
- UNMR – United Nations Model Regulations
- MTC – Manual of Tests and Criteria
- TDG – Transport of Dangerous Goods

3. As described below, the following documents identified in agenda items 2, 3, and 10 of the revised provisional agenda for the 64th session¹ were considered for discussion.

Document	Title	Paragraph
<u>Agenda Item 2(b)</u>	<u>Improvement of Test Series 8</u>	
ST/SG/AC.10/2024/8 (Japan), UN/SCETDG/64/INF.32 (UK)	Amendments to UN 8(e) (Minimum Burning Pressure) Test, Comments in document ST/SG/AC.10/C.3/2024/8 - “Amendments to UN 8(e) (Minimum Burning Pressure) Test”	5
UN/SCETDG/64/INF.21 (AEISG & IME)	Proposal to review requirement of Test Series 8 for assessing the suitability of ANEs for transport in portable tanks	6

¹ ST/SG/AC.10/C.3/127/Add.1

Document	Title	Paragraph
<u>Agenda Item 2(c)</u>	<u>Review of tests in parts I, II and III of the Manual of Tests and Criteria</u>	
UN/SCETDG/64/INF.20 (UK & USA)	UN Explosive Working Group (EWG) Koenen Tube Round-Robin Updated Test Results and ICG Discussion Points	7
<u>Agenda Item 2(e)</u>	<u>Energetic samples</u>	
ST/SG/AC.10/C.3/2024/26 (Cefic)	Transport of energetic samples	8
<u>Agenda Item 2(h)</u>	<u>Miscellaneous</u>	
ST/SG/AC.10/C.3/2024/16 (Cefic), UN/SCETDG/64/INF.54 (Cefic)	Screening procedures for estimating the self-accelerating decomposition temperature of 50 kg packages, Screening rules for estimating the SADT of 50 kg packages: Derivation under the Thomas model (Cefic)	9
ST/SG/AC.10/C.3/2024/18 (SAAMI)	UN 0012 and UN 0014 – Metal on metal contact between explosives and packaging	10
ST/SG/AC.10/C.3/2024/38 (China), UN/SCETDG/64/INF.33 (UK)	Termination time and method of assessing results for methyl violet paper test in appendix 10 of the Manual of Tests and Criteria, Comments in document ST/SG/AC.10/C.3/2024/38 – “Termination time and method of assessing results for the methyl violet paper test in appendix 10 of the Manual of Tests and Criteria” (United Kingdom)	11
ST/SG/AC.10/C.3/2024/41 (China on behalf of the ICG), UN/SCETDG/64/INF.5 (China on behalf of ICG)	Report of the informal correspondence group on the revision of subsection 51.4 of the Manual of Tests and Criteria regarding the burning rate, Report of the informal correspondence group on burning rate: Amendments to subsection 51.4 of the Manual of Tests and Criteria	12
ST/SG/AC.10/C.3/2024/52 (AEISG)	Corrections and amendments to the Model Regulations, the Globally Harmonized System and the Manual of Tests and Criteria	13
<u>Agenda Item 3</u>	<u>Listing, classification and packing</u>	
ST/SG/AC.10/C.3/2024/1 (Cefic)	Packing group II metal packagings for organic peroxides and self-reactive substances	14
ST/SG/AC.10/C.3/2024/23 (Italy)	Wearable airbag system	15
UN/SCETDG/64/INF.39 (Cefic on behalf of ICG)	Informal correspondence group on polymerizing substances and self-accelerating polymerization temperature (SAPT)	16
UN/SCETDG/64/INF.40 (Cefic)	Listing of Artemisinin and derivatives in 2.5.3.2.4	17
UN/SCETDG/64/INF.50 (USA)	Assignment of PP5 to UN 2029 Hydrazine Anhydrous	18
<u>Agenda Item 10(c)</u>	<u>Miscellaneous</u>	
ST/SG/AC.10/C.3/2024/24 (AEISG)	Consideration of Nitrocellulose mixtures in Chapter 2.17 (Desensitised explosives) of the Globally Harmonized System, section 51 of the Manual of Tests and Criteria and special provision 393 of the Model Regulations	19

Document	Title	Paragraph
ST/SG/AC.10/C.3/2024/25 (AEISG)	Consideration of amendments to Chapter 2.17 (Desensitised explosives) of the Globally Harmonized System and section 51 of the Manual of Tests and Criteria	20

4. There are two annexes to this report:

- Annex 1 – List of Participants
- Annex 2 – Recommended Changes for the Model Regulations (23rd Revised Edition) Globally Harmonized System of Classification and Labelling of Chemicals (10th Revised Edition), and the Manual of Tests and Criteria (8th Revised Edition)

Agenda Item 2(b) – Improvements to Test Series 8

5. **Subject.** Amendments to UN 8(e) (Minimum Burning Pressure) Test

Document: ST/SG/AC.10/2024/8 (Japan)

Informal document: UN/SCETDG/64/INF.32 (UK)

Discussion: Japan introduced 2024/8, which proposes improvements to the MTC type 8(e) test used to determine the sensitivity of substances, including Ammonium Nitrate Emulsions, Suspensions, and Gels (UN 3375). A slide show was given, which showed the experimental setup of the test and provided further justification for the proposed amendments. Amendments included sample loading techniques, tolerances on ignitor wire gauge, the inclusion of a thermocouple, and a process for ensuring an appropriate temperature.

Experts on the EWG exchanged views on the proposal and discussed INF.32, which offered alternative amendments to test 8(e).

AEISG questioned some of the specifics of the wire gauge, and the Netherlands agreed that the specific gauge of wire called for in the MTC (24 AWG/0.51 mm) is not available everywhere. A tolerance of that specified gauge, which would also capture what is available in other countries, would be helpful.

Sweden agreed with the comments in INF.32 and pointed out that even if the gas temperature has reached room temperature, that does not ensure the sample temperature has reached that room temperature; however, this small sample temperature differential does not substantively affect the result. Canada had similar comments to those in INF.32 regarding including a syringe as a suggestion but added that another loading instrument (piping or pastry bag) should also be included. IME pointed out that since emulsions have a wide range of viscosity, multiple filling techniques should be included. Canada also voiced that monitoring pressure is sufficient as the pressure will stabilize when the temperature has stabilized. Germany also favors the suggestions in INF.32.

Conclusion: After a thorough discussion of 2024/8 and INF.32, there was an agreement to recommend adopting the proposals in 2024/8 in para. 19, para. 20, and the alternative proposals in INF.32 para. 2 as amended to include a piping bag and para. three as amended. See Annex 2, Amendment 1.

6. **Subject.** Proposal to review requirement of Test Series 8 for assessing the suitability of ANEs for transport in portable tanks.

Document: None submitted.

Informal document: UN/SCETDG/64/INF.21 (AEISG & IME)

Discussion: IME introduced INF.21 and presented additional context for its paper. The presentation covered ANE's physicochemical properties, its behavior in tests, transport incidents involving

ANEs, and the differences between the two test types 8(d)(i) and 8(d)(ii). Key points during the presentation were:

- Test 8(d) had become a de facto classification test,
- when the test was introduced in 2004 there was not much information on ANEs, so a bulk test was introduced,
- six transportation incidents involving fire are known, and in five of them an explosion did not occur. The sixth event that led to a detonation involved an ANE (emulsion) that passed test 8(d)(ii).

IME questioned if the test correctly assesses hazards and pointed out how the test is hazardous to perform and environmentally unfriendly.

Germany noted that there are many parameters, such as compositions, formulations, and manufacturing controls, such as pH, which can affect the behavior of ANEs, and the paper contains no information about these parameters. There is also a lack of information about the results from the other Series 8 tests for the ANEs discussed in the paper. Germany highlighted that there is not enough information to draw conclusions as there is a lot of variation in the formulations of ANEs.

AEISG questioned if, at some point in the test, the material is no longer an ANE but rather a pure AN melt or AN with some fuel, and if so, what is the validity of testing ANE if it turns into a different substance. AEISG also raised the environmental impacts of the test. RPMASA experts noted they had conducted test 8(d) on AN, and they all passed and agreed that test 8(d) presents challenges from a practical standpoint, but it has value in evaluating the relative sensitivity of different formulations.

Belgium questioned if there were incidents with Mobile Emulsion Manufacturing Units and none were known other than the Norway event, which also had a bin with prilled AN. They also noted the benefit of venting in cases of an incident, and perhaps the results of test 8(d) could decide venting requirements since test 8(d) indicates the ability of an ANE to vent under specific conditions. Germany echoed the importance of vent size, which would be required for suitable transport, and reiterated the importance of formulation, composition, and production process, and without this information cannot consider the proposal. RPMASA noted that batch-to-batch and production output come with some variability in the product.

The Netherlands noted that when designing test series 8, experts considered the unique properties of ANE to produce the tests regarding thermal stability, larger gap test, and Koenen Tube test. They also included test 8(d) in an attempt to ascertain the reaction of bulk material subjected to fire. After recent incidents, the expert is beginning to question whether test 8(d) is, in fact, serving its purpose.

IME also requested a survey about which competent authorities recognize test 8(d)(i) or 8(d)(ii), tanker materials, and how authorities interpreted “suitable for transport.” The Chair summarized by pointing out that the requirement is for testing for suitability for transport in tanks, meaning there is some amount of time in which the material can be subjected to a transport fire before a catastrophic event might occur. It was noted that the information on the large-scale events focuses on ANEs but not suspensions or water gels. The authors were encouraged to provide additional information for all materials subject to SP 309 or limit future proposals to ANEs that are emulsions.

Conclusion: The EWG asked the proposers to convene the Informal Correspondence Group on Test 8(d) and consider the following: what is meant by “suitable for transport in portable tanks”; whether the 8(d) fulfills that original objective; the fact that there have been no fires that involved suspensions/gels; and how the evidence applies to SP 309. It was recommended that the table presented be circulated to manufacturers in addition to competent authorities. The Informal Correspondence Group on Test 8(d) should develop the terms of reference for the work which should consider batch-to-batch variations.

Agenda Item 2(c) – Review of tests in parts, I, II and III of the Manual of Tests and Criteria

7. **Subject.** UN Explosive Working Group (EWG) Koenen Tube Round-Robin Updated Test Results and ICG Discussion Points

Document: None submitted.

Informal document: UN/SCETDG/64/INF.20 (UK & USA)

Discussion: The UK introduced INF.20, which provided an update from the ICG overseeing the Koenen Tube Round-Robin testing and then deferred to the expert from SAAMI to elaborate on the testing findings. Of note was the fact that the MTC calls for qualifying Koenen tubes via quasi-static pressure testing; however, the originator of the test (BAM) has utilized dynamic pressure testing from the beginning. The paper includes a testing procedure for conducting dynamic pressure testing developed by the ICG. The paper also presented results that showed no statistically significant difference between using water or oil in the pressure testing. Additional results gathered since the last EWG meeting from the various round-robin testing participants were summarized. Results were constant between the thirteen testing organizations, which was attributed to a consistent testing protocol.

INF.20 proposes to change the MTC references from quasi-static to dynamic pressure testing and to include the dynamic pressure testing procedure in an appendix of the UN MTC to qualify the tubes. Sweden highlighted how the tests showed that different incompressible fluids (oil and water) showed the same results in the dynamic pressure tests and suggested including examples of water and oil in parenthesis after the term incompressible fluid. SAAMI noted that from an engineering perspective, that would not be necessary. IME suggested changing the term incompressible fluid to liquid.

The paper also proposes changes to the tube dimensions' tolerances based on the dimensional analysis of the tubes used in the study. There was unanimous support for the proposed changes, but the group questioned the need of specifying three dimensions associated with wall thickness. Sweden suggested that wall thickness isn't needed if the inner and outer diameters are given; however, it was pointed out that the maximum outer with the minimum inner could result in an excessively thick wall. The Netherlands noted that wall thickness is the driver and should be retained. It was also pointed out that all three are currently stipulated in the MTC. IME voiced that three is overly specific and only two are needed, and Sweden agreed. SAAMI noted that the tube inner diameter coupled with the wall thickness dimension are most important.

Cefic noted it was concerned about low-energetic materials in the Koenen test and that, in approximately 50 organic peroxides, the Dutch pressure vessel test governed the results of those materials.

The Netherlands agreed with the proposals but questioned the need for the round-robin testing procedure to be included in an MTC appendix but suggested simply referring to the national contacts for Germany, UK, and USA found in Appendix 4.

Conclusion: There was unanimous support for the proposal. The EWG asked the ICG to determine which two of the three tube dimensions (inner diameter, outer diameter, and wall thickness) are relevant and to consider the change from "incompressible fluid" to "liquid." The authors were invited to reintroduce a working paper for the December session and to work with the Secretariat regarding the best method for referencing the Koenen Round-Robin procedure.

Agenda Item 2(e) – Energetic samples

8. **Subject.** Transport of energetic samples

Document: ST/SG/AC.10/C.3/2024/26 (Cefic)

Informal document: None submitted.

Discussion: Cefic introduced 2024/26 and stated that regulations are built on classification, which is based on testing; however, for research and development of new and novel materials, sufficient amounts of materials do not exist for such testing or are cost prohibitive. Furthermore, researchers are not always aware of regulatory requirements for transporting samples of potentially hazardous materials. Cefic has worked to find a solution that would be safe, sound, and practicable. The paper provides a decomposition energy analysis showing salts and complexes of organic compounds with energies of 1500 J/g, or other organic substances with energies of 2000 J/g, would not be more dangerous than self-reactive Type B; therefore, no further testing should be required for relatively small samples. Above these energy thresholds additional testing would be necessary. The paper proposes new procedures and logic diagrams allowing such samples to be screened for their safe transport and tested when warranted. Many of these samples are used for product viability and pharmacological efficacy testing and research as well as classification purposes.

Belgium questioned the ease of the system proposed and its useability by institutions, which might not meet the intention of the proposal to be practicable; perhaps it could be simplified.

The Netherlands supported the proposal and the proposed decomposition energy levels and voiced its opinion that the proposal addresses an issue for R&D organizations and universities. Sweden supported the proposal and agreed that the energy thresholds were sound and on the safe side.

The USA was sympathetic to the proposal and a solution to prevent samples from being shipped unregulated; however, it has Special Permit 8451 for shipping energetic samples. The UK noted its regulatory framework for dealing with this issue and generally supported the proposal. Germany supported the paper as their competent authority uses the entries for self-reactives to receive samples to conduct classification work, and the proposal would be an improvement. COSTHA supported the proposal as an improvement over the pipes used to ship samples. SAAMI voiced support for the proposal and enquired about packing requirements, to which Cefic clarified that the existing packing instructions for P520 for self-reactives were intended.

Several delegations discussed clarifying the quantities that could be shipped under this regime, and the EWG found consensus with a maximum of 200 g per outer package. Ultimately, 2-3 kg would be required for classification testing, so moving samples of up to 200 g would be manageable. It was noted that current regulations have a limit of 10 kg per transport unit.

The EWG discussed the logic diagram, its decision points, and appropriate screening tests. Based on these discussions, the logic diagram and accompanying text were amended.

Conclusion: The EWG recognized that some competent authorities have addressed the issue of shipping samples domestically but also recognized the value in this paper's proposal. The authors amended their proposal based on the feedback and discussion around two main points: quantity limits and appropriate screening tests. The amended proposed logic and text were unanimously recommended for adoption. See Annex 2, Amendment 2. Following the announcement of the retirement of the paper's author, Dieter Heitkamp, the Chair thanked him on behalf of the EWG for his many years of participation in the EWG and his dedication to the advancement of explosives and energetic materials safety.

Agenda Item 2(h) – Miscellaneous

9. **Subject.** Screening procedures for estimating the self-accelerating decomposition temperature of 50 kg packages

Document: ST/SG/AC.10/C.3/2024/16 (Cefic)

Informal document: UN/SCETDG/64/INF.54 (Cefic)

Discussion: Cefic introduced 2024/16 and INF.54, which proposed new screening rules for self-reactives derived from the Semenov and the Thomas models, respectively. The intention is to strengthen the screening rules for self-reactives in Appendix 6 of the MTC. Specifically for self-reactive substances, Section A6.5.1 (b) states that classification procedures need not be applied if “the estimated SADT is greater than 75 °C,” which offers an exemption from classification as a self-reactive substance without going through extensive testing. Currently, there is no concrete guidance on how to make this estimation as it is only stipulated by “a suitable calorimetric technique.” Specifically, the papers propose a calorimetric methodology suitable for estimating if the SADT for a 50 kg package is higher than 75 C.

Conclusion: The EWG discussed the proposal and terms used for technical correctness, conformity with the MTC, and overall appropriateness and suggested minor changes that were agreed upon. There were no objections to the proposal as amended, and the EWG recommended its adoption. See Annex 2, Amendment 3.

10. **Subject.** UN 0012 and UN 0014 – Metal on metal contact between explosives and packaging

Document: ST/SG/AC.10/C.3/2024/18 (SAAMI)

Informal document: None Submitted

Discussion: SAAMI introduced 2024/18 regarding the shipment of military and bulk ammunition in metal containers without inner packaging. The paper provides two proposed options to clarify that UN 0012 and UN 0014 cartridges may be filled in single packagings according to packing instruction 130 and other explosives approved for that configuration by a competent authority.

UK, USA, Germany, Sweden, Netherlands, Belgium, and Canada supported option two in the proposal. Generally, there was recognition that this has been a common practice by militaries worldwide for decades. It was also noted that metal packagings are often painted, but this is not a requirement as this practice is for corrosion prevention during the container's lifecycle. The EWG discussed the term “loose” and suggested alternative language. The term “metal” was removed since it is unnecessary in the context of UN 0012 and 0014.

The EWG considered Spain’s suggestion in the plenary that the relevance of the 4(b) test be considered. The EWG did not believe the test would be diagnostic of risk.

Conclusion: After discussions, Option 2 was amended to be stylistically consistent with other packing provisions and to address technical points. The EWG recommended Option 2 of the proposal in 2024/18 as amended for adoption. See Annex 2, Amendment 4.

11. **Subject.** Termination time and method of assessing results for methyl violet paper test in appendix 10 of the Manual of Tests and Criteria

Document: ST/SG/AC.10/C.3/2024/38 (China)

Informal document: UN/SCETDG/64/INF.33 (UK)

Discussion: China introduced 2024/38 on the methyl violet paper test, which contains a proposal that seeks clarification on the 30-minute time requirement per appendix 10. The methyl violet paper test is used to assess the stability of nitrocellulose.

UK introduced INF.33 and communicated its neutrality on Proposal 1 unless it would add clarity for non-English speakers and would support Proposal 2 Option 2 with the suggested amendments in INF.33. SAAMI supported the language in INF.33 and noted that the inclusion of the methyl violet test in the MTC drew upon the US military specifications that have a 30-minute time. The

Netherlands communicated that it did not perceive the need for the change but would not oppose editorial changes for clarity. Sweden voiced preference for Option 2 as amended by INF.33.

Conclusion: The EWG's view was that the methodology was clear and that the test stops at 30 minutes. Therefore, Proposal 1 was not recommended for adoption as it states 40 minutes. The EWG recommended adopting Option 2 of Proposal 2 as amended by INF.33. See Annex 2, Amendment 5.

12. **Subject.** Report of the informal correspondence group on the revision of subsection 51.4 of the Manual of Tests and Criteria regarding the burning rate

Document: ST/SG/AC.10/C.3/2024/41 (China on behalf of the ICG)

Informal document: UN/SCETDG/64/INF.5 (China on behalf of ICG)

Discussion: China presented 2024/41 and INF.5, which provided an update on the work of the ICG on the revision of subsection 51.4 and presented the ICG's recommended amendments to the MTC for the EWG's consideration.

USA stated it was generally supportive but questioned the maximum irradiance being determined by an average of at least 30 seconds without a maximum time or other stipulation, noting how this could be regulatorily problematic.

Germany noted that it has checked the proposed amendments and supported the changes, finding that they make the subsection clearer. It is also working on a publication about the burn rate test, which may yield a more refined thermogram, given modern measurement techniques that may be utilized.

Conclusion: The EWG concluded that due to the ongoing work by Germany and the USA's intervention, the authors were encouraged to refine the proposal for a future session. The EWG applauded the work and looks forward to the findings of Germany's work to inform a stronger proposal that considers the USA's concerns.

13. **Subject.** Corrections and amendments to the Model Regulations, the Globally Harmonized System and the Manual of Tests and Criteria

Document: ST/SG/AC.10/C.3/2024/52 (AEISG)

Informal document: None submitted.

Discussion: AEISG introduced 2024/52 developed after extensive use of the Model Regulations for the Transport of Dangerous Goods (Rev.23), the Globally Harmonized System of Classification and Labelling of Chemicals (GHS, Rev.10) and the Manual of Tests and Criteria (Rev.8). Several relatively minor issues have been identified for potential correction. The EWG discussed 2024/52 paragraph by paragraph and concluded on each as follows.

2024/52 Para. 3-4. The EWG agreed this is a potential oversight and agreed to recommend acceptance.

2024/52 Para. 5-6. The EWG agreed this is a potential oversight and agreed to recommend acceptance.

2024/52 Para. 7-9. The EWG understood the desire for consistency; however, in figures, the use of fewer words is better, and, in the figure, it is obvious what the figure relates to. The EWG agreed to recommend acceptance as amended.

2024/52 Para. 10-12. The EWG agreed to recommend acceptance as amended.

2024/52 Para. 13-14. The EWG agreed the range of boxes currently referred to is incorrect, but there was no consensus on the correct range. Some of the boxes may lay outside of the decision logic, given the placement of the parenthetical in section 16.6.1.4.6. The EWG invited AEISG to develop a paper to address this issue in the future.

2024/52 Para. 15-16. The EWG agreed to recommend acceptance.

2024/52 Para. 17-18. The EWG agreed to recommend acceptance.

2024/52 Para. 19-20. AEISG noted there are different gap tests in the MTC, and it would be helpful to differentiate them for clarity when each is referenced. Belgium didn't agree with AEISG's premise, but the suggested naming convention for the different gap tests needs refinement. The Netherlands voiced that the amendment is not necessary as while there may be different gap tests, they essentially do the same thing. USA did not support the proposal, because of the potential downstream implications across a range of regulatory frameworks. Germany, too, did not think the proposal was necessary and noted that there is much old data that simply refers to gap test results, and it would cause many questions if distinctions were added. AEISG responded that they did not agree that the tests were identical and that if they were, why reproduce them in the manual? The competent authorities noted the perceived risks of change. AEISG was invited to produce a detailed analysis of the gap tests to identify any differences that the EWG could utilize to weigh the benefits of individually referencing them against the consequences. Alternatively, a unified test with differing criteria could be proposed.

Conclusion: The EWG recommended the majority of the proposals in 2024/52 for adoption and made suggestions for how AEISG could bring future papers for consideration in the instances where proposals were not recommended for acceptance. See above and Annex 2, Amendment 6.

Agenda Item 3 – Listing, classification and packing

14. **Subject.** Packing group II metal packagings for organic peroxides and self-reactive substances

Document: ST/SG/AC.10/C.3/2024/1 (Cefic)

Informal document: **None submitted.**

Discussion: Cefic introduced 2024/1, which explains how past actions during the thirty-fourth TDG session that removed a specific sentence, while appropriate in the context of explosives, have had unintended consequences for organic peroxides and self-reactive substances. The paper proposed to reintroduce the sentence. The EWG was reminded that Austria noted during plenary that most packages are tested at the PG II level, and that a package passing PG II was also likely to pass PG I. Cefic noted that these packagings that pass PGII but fail PGI, with respect to hydrostatic testing, are commercially available.

Sweden supported the proposal but questioned whether there should be a transitional period since this will reintroduce a requirement. Germany voiced that any transition period is not for the UN to stipulate but for the modal regulations to allow. Furthermore, authorities already take time to incorporate changes from the model regulations. It was also noted that the fact that these packagings are commercially available further diminishes the need for a transitional period.

USA voiced support for the proposal as it is aligned with their domestic regulations.

Belgium questioned which criteria of PG I the package should fail to avoid over-confinement. Cefic noted that if you fail any of the requirements for PG I, you are out of PG I; however, in practice the hydraulic pressure test is the distinguishing test between PG I and PG II. Belgium requested this be clarified, and the proposal was amended accordingly.

Conclusion: The EWG generally supported the proposal and recommended that the sentence be reintroduced with clarifying adjustments. See Annex 2, Amendment 7.

15. **Subject.** Wearable airbag system

Document: ST/SG/AC.10/C.3/2024/23 (Italy)

Informal document: **None submitted.**

Discussion: Following a request from the TDG Sub-committee the EWG considered and discussed 2024/23 in Italy's absence. The paper is in response to the growing availability of personal wearable life-saving systems and a question of where to include such lifesaving systems within the existing provisions of the *Model Regulations*.

EWG experts shared their opinions on the applicability of existing UN entries (e.g. UN 2990, 3268, and 3548) and their appropriateness for these new types of life-saving apparel. There was a general preference to use UN 2990 based on the information in 2024/23; however, experts identified that may not be a universally applicable entry. It was noted that these various apparel systems, regardless of their safety application, rely upon different technologies: compressed gas systems (with pyrotechnic actuators), gas-generant systems, and hybrid compressed gas with gas-generant additives. The EWG discussed that any specific exclusion criteria relating to quantities and types of explosives should be based on robust testing data.

Conclusion: The EWG recognized that globally, more products like this will be developed and marketed, and gratitude was expressed for Italy's introduction of 2024/23 to begin the conversation. More information will be needed on specific products to continue the discussion; however, before it would be appropriate for the EWG to discuss specific technical recommendations, the TDG Sub-committee will need to provide guidance on whether these devices should be excluded from Class 1, where they meet the requirements for that class, excluded from regulation, or if new entries e.g. in Class 9 are desired.

16. **Subject.** Informal correspondence group on polymerizing substances and self-accelerating polymerization temperature (SAPT)

Document: **None submitted.**

Informal document: UN/SCETDG/64/INF.39 (Cefic on behalf of ICG)

Discussion: Cefic presented INF.39, which provided an update from the ICG on polymerizing substances and self-accelerating polymerization temperature (SAPT). The ICG met twice to discuss a definition for polymerizing substances, criteria for classification, non-stabilized and stabilized substances, and criteria for temperature control. Cefic noted the lacking definition for polymerizing substances and the need for better distinction between stabilized or non-stabilized polymerizing substances, and the ICG will work on them. The author pointed out that the self-accelerating polymerization temperature (SAPT) is appropriate for non-stabilized polymerizing substances, whereas the polymerizing induction time (PIT) is relevant for stabilized polymerizing substances. The ICG is still discussing what is a reasonable PIT and at what temperature. Temperature control is appropriate for non-stabilized polymerizing substances, but its importance for stabilized polymerizing substances is still being investigated. The ICG is considering the merits of splitting SP 386 into two parts for temperature control and chemical stabilization.

The Netherlands thanked Cefic for its work and noted that it has participated in the ICG. It also voiced that the ICG's scope is very good and appropriately encompassing.

Germany noted its involvement in the ICG, supported the ongoing work, and noted that real and current transport times and encountered temperatures in transport are critical for determining appropriate classification parameters, but they can be challenging to define.

Cefic noted that they collect information on temperatures encountered in real containers and the corresponding product temperatures. They found that temperatures in harbors are higher, and there is more concern at this stage of the voyage, and lower at sea, where there is less of a concern. This is important data to inform the requisite testing.

Conclusion: The EWG thanked Cefic for the update, noting that this work is a great example of cooperation. The EWG looks forward to the ICG findings and noted that seeing assumptions or data that guide the choice of values (temperature, times) would be very valuable. The ICG will continue its work within the established, agreed-upon framework.

17. **Subject.** Listing of Artemisinin and derivatives in 2.5.3.2.4

Document: **None submitted.**

Informal document: UN/SCETDG/64/INF.40 (Cefic & China)

Discussion: Cefic introduced its paper and gave background on artemisinin, its derivatives, and their uses as an anti-malaria treatment. The substance was added to the list at UNMR 2.5.3.2.4 during the thirty-eighth session of Sub-Committee of Experts on the Transport of Dangerous Goods as "[3R-(3R, 5aS, 6S, 8aS, 9R, 10R, 12S, 12aR**)]-DECAHYDRO-10-METHOXY-3,6,9-TRIMETHYL-3,12-EPOXY-12H-PYRANO[4,3-j]-1,2-BENZODIOXEPIN." This entry name is inaccurate, and INF.40 proposes changes to the listing to the common name Artemisinin, which would also cover its isomers.

The Netherlands supported the proposal, and it was noted that "artemisinin" is not a trade name.

The USA generally supported the listing change; however, it had issues with including all derivatives, noting that one of the derivatives is a type C, and it cannot be assumed that all derivatives are Type D. It requested information on those present in INF.40 and suggested having four individual entries.

Cefic noted some of the technical issues with the existing listing including the fact that the currently listed name is in fact the rarest isomer. Cefic suggested a solution, which may be to remove "and other derivatives" from the listing note and just include the main stereoisomers, where other derivatives will need additional review and possibly testing by competent authorities.

Conclusion: This effort generally received support; however, there was concern about including all derivatives in the listing. The EWG would like more details on how the derivatives would be managed. The authors heard solutions and suggestions from the EWG to create a working paper for a future session.

18. **Subject.** Assignment of special packing provision PP5 to UN 2029 Hydrazine Anhydrous

Document: **None submitted.**

Informal document: UN/SCETDG/64/INF.50 (USA)

Discussion: The USA introduced INF.50, which raised concerns from its airspace and defense industries regarding proposals previously adopted for eventual ratification by the TDG Sub-committee. The EWG was presented by SAAMI with additional information about other risks associated with the substance hydrazine, as well as the appropriate training and personal protective equipment. Hazards include flammability at elevated temperatures, corrosivity, skin sensitization and damage, decomposition into other hazardous constituents, strong reducing agent and may lead to fire with oxidizers, sensitive to electrostatic discharge. These hazards can cause corrosion, catalytic decomposition, and thermal runaway, which may lead to loss of containment, explosion, fire, and personnel exposure. Correct packaging selection and design mitigate these hazards. USA asked the EWG to make a recommendation to the TDG Sub-committee regarding the inclusion of PP5 based on this additional information. SAAMI noted that the provision approved last meeting was based on limited configurations, which may not represent the market as a whole, and additional data should be developed.

Many of the EWG's experts echoed the USA's concerns, noting that they have also been communicating with their impacted industries.

The EWG requested additional information on quantities transported, concentrations, types of containers, and how the different risks are mitigated before changes to the transportation of anhydrous hydrazine are implemented.

Conclusion: The EWG recognized that when China came to the group with information about the properties of anhydrous hydrazine when confined, their proposal seemed appropriate; however, since then, other industries have expressed their concerns and have produced additional information that should be considered. The EWG recommends withdrawing the inclusion of PP5 for UN 2029 Hydrazine Anhydrous based on new information until impacted industries can come forward with additional information. The EWG asks the TDG Sub-committee to reopen the conversation to discuss balancing risks and benefits of PP5 specific to UN 2029.

Agenda Item 10(c) – Miscellaneous

19. **Subject.** Consideration of Nitrocellulose mixtures in Chapter 2.17 (Desensitised explosives) of the Globally Harmonized System, section 51 of the Manual of Tests and Criteria and special provision 393 of the Model Regulations

Document: ST/SG/AC.10/C.3/2024/24 (AEISG)

Informal document: No document

Discussion: AEISG introduced 2024/24, which continued work from the sixty-second TDG session but was unresolved at the GHS session regarding a proposal to delete the note to paragraph 2.17.2.3 of chapter 2.17 of the GHS on the exemption of nitrocellulose mixtures from sensitivity testing.

SAAMI agreed there needs to be a change, but the proposal would create a misalignment between GHS and TDG. UN 2555, 2556, and 2557 are numbers for nitrocellulose with water, alcohol, and plasticizers and phlegmatizers, respectively, (i.e. GHS mixtures) which do not require testing. UN 3380 Desensitized Explosive, Solid, N.O.S. is another number to which nitrocellulose could be assigned which requires approval and testing. In SAAMI's view, what is proposed in the paper would resolve a conflict with UN 3380 but will create a new conflict with UN 2555, 2556, and 2557, which currently do not require testing. Furthermore, SAAMI stated these entries are not subject to any MTC Part 1 testing. One entry, UN 2557, only uses testing for full deregulation. SAAMI proposed a revision of the note to refer to the MTC, where a statement would exclude testing of products assigned outside of Class 1 without testing requirements.

Not all participants agreed with SAAMI's views.

Germany noted the stated UN numbers UN 2555, 2556, and 2557 are not required to be tested via test series 3, but GHS does not allow reference to UN numbers.

The UK noted that nitrocellulose, even at a low level of nitration, can undergo autocatalytic decomposition, and as such, it needs to be tested for safe transport. SAAMI replied that there is no gap because nitrocellulose entries are subject to MTC Appendix 10.

The Netherlands opposes the proposal in para. 16 of 2024/24 as there are better ways of determining thermal stability, especially over time.

USA was generally supportive of the proposal as some mixtures still need to be tested to ensure no desensitizer incompatibility. The broad exemption to nitrocellulose mixtures still stands and might need to be addressed, and the note as it stands is a problem.

Conclusion: The EWG was generally sympathetic to AEISG's proposal but did not recommend the proposals for adoption. AEISG recognizes that the thermal stability of nitrocellulose can be an issue. As the GHS is drafted, there is a broad exemption for nitrocellulose mixtures. However, there was no consensus on how this could be addressed without introducing unintended consequences. AEISG

was encouraged to use the feedback and refine the approach after liaising with the delegations that voiced an opinion.

20. **Subject.** Consideration of amendments to Chapter 2.17 (Desensitized explosives) of the Globally Harmonized System and section 51 of the Manual of Tests and Criteria

Document: ST/SG/AC.10/C.3/2024/25 (AEISG)

Informal document: No document

Discussion: AEISG introduced their paper, which is a continuation of the work from the 62nd TDG session but unresolved at the 44th GHS session. This work is related to potential confusion or unintended consequences from changes to chapter 2.17 (Desensitized explosives) of the GHS during the 43rd session, the Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals. The EWG discussed AEISG proposals during the 62nd session of the TDG Sub-Committee. EWG recommended accepting two of the AEISG proposals but could not reach a consensus on the third one, which AEISG has revised in this paper.

Chapter 2.17 of the GHS and section 51 of the MTC deal with classifying products as desensitized explosives for GHS purposes. AEISG pointed out that chapter 2.17 of the GHS (note to 2.17.2.2) and section 51 of the MTC (51.4.4.3 and 51.4.4.5) declare products to be in the class of explosives despite the relevant criteria not being part of the explosives classification process and believes this creates confusion as to the correct classification process for explosives. Additionally, AEISG believes an inconsistency now exists between section 51 of the MTC and part 1 of the MTC, which classifies explosives without reference to a substance's burning rate. AEISG proposed amendments to the note to section 2.17.2.2 of chapter 2.17 of the GHS and to sections 51.4.4.3 and 51.4.4.5 of the MTC to remedy the perceived inconsistency.

Germany noted that it has issues with the proposed wording specifically for the situation when an explosive is phlegmatized to such a degree that it is not a desensitized explosive. However, it could escape explosive classification after going through the 2.1 classification route. Other delegates voiced uncertainty about how that could occur outside of a hypothetical.

SAAMI voiced that it does not perceive the gap, but the proposed change might add clarity.

Canada voiced concern about linking the classification as an explosive solely to the burning rate test.

Conclusion: The EWG recognized that AEISG's proposal has logical merit; however, the original GHS 2.1 working group's intention was to safeguard workers around these materials and that even the chance that a material could escape being classified as explosive should be avoided. The EWG amended the proposals which were recommended for approval. See Annex 2, Amendment 8.

Annex 1**Working Group on Explosives (24 - 27 June 2024)
List of Participants²**

Name	Representing
Kaylee Baker	RPMASA
Jun-Hwa Ban	Korea, Rep. of
Ben Barrett	SAAMI
Kyle Barrett	SAAMI
Richard Bilman	AEISG
Marie-France Dagenais	SAAMI
Gabriele Dudek	Germany
Bob Ford	SAAMI
Dieter Heitkamp	CEFIC
Joshua Hoffman	IME
Hatty Hoskyns	United Kingdom
Noel Hsu	IME
Ed de Jong	Netherlands
Jason Kennedy	CEFIC
Michael Lafleur	Canada
Hayleigh Lloyd	Netherlands
Dave Madsen	COSTHA
Williams Messina	CEFIC
Heike Michael-Schulz	Germany
Ken Okada	Japan
Michael O'Lena	United States of America
Brian Osowiecki	SAAMI
Florent Pessina	France
Lucas Petit	France
Andre Pienaar	RPMASA
Ken Price	AEISG
William Quade	United States of America
Peter Schuurman	CEFIC
Sen Xu	China
Jackson Shaver	COSTHA
Shulin Nie	Sweden
Martyn Sime	United Kingdom
Arnaud Vandenbroucke	Belgium
Ryan Vierling	United States of America
Graham Walsh	SAAMI
Tobias Wombacher	CEFIC

² It is recognized that some experts only participated in part(s) of the session.

Annex 2

Working Group on Explosives (24 – 27 June 2024)

Changes for the Model Regulations (23rd Revised Edition), Globally Harmonized System of Classification and Labelling of Chemicals (10th Revised Edition), and Manual of Tests and Criteria (8th Revised Edition)

Notes: The source of proposed change is indicated by *italicized text* (Source: XXX)

Unless otherwise indicated, ~~Red~~ indicates deleted text

Unless otherwise indicated, Blue indicates inserted text

Amendment 1.

A. Amend the first paragraph of section 18.8.1.2.1 of the *Manual of Tests and Criteria* as follows:

“The samples should be loaded in small cylindrical steel pipes (so-called test cells) having a nominal length of 7.6 cm and an internal diameter of at least 1.6 cm. Each test cell should have a 3-mm wide slit machined along the axis to allow combustion gases to escape during the tests (figure 18.8.1). The interior of each test cell should be painted with high-temperature non-conductive paint. Introduction of the sample into the cell should be done with caution to avoid causing crystallization of the sample and introducing air voids in the sample e.g. by use of a syringe, piping bag, or pastry bag where the viscosity of the sample allows. Once the ignition wire has been introduced in the sample (see 18.8.1.2.2), the ends of the cell are closed off with No. 0 neoprene, or similar, stoppers which must be reamed at their inside face to accommodate the splice connectors of the ignition wire assembly.”

B. Amend the first paragraph of section 18.8.1.2.2 of the *Manual of Tests and Criteria* as follows:

“Ignition is provided by a Ni/Cr wire having a nominal diameter of 0.50–0.51 mm (nominal resistance of 5.50–5.75 Ω·m⁻¹ at 20°C) and a length of 7 cm. Both ends of the ignition wire should be spliced onto 50 cm lengths of 14 AWG (American Wire Gage) (1.628 mm) or larger solid core bare copper wire using appropriate butt-end splice connectors. The ignition wire should be introduced in the sample, along the axis of the test cell. The stoppers are then inserted in place.”

C. Amend the first paragraph of section 18.8.1.2.3 of the *Manual of Tests and Criteria* as follows:

“The above test cell should be introduced in a pressure vessel so that the axis of the cell is held horizontal with the slit on top (figure 18.8.2). A minimum volume of 4 litres and an operating pressure resistance of 20.8 MPa (or 3000 psig) are recommended for this pressure vessel. The vessel must be equipped with two insulated rigid feedthrough electrodes capable of carrying an electric current up to 20 A and sealed so as to have a pressure rating equivalent to that of the vessel itself. The vessel should also be equipped with an inlet and an outlet. The inlet should be used to pressurize the vessel to a predetermined initial pressure before the test. For convenience, it is recommended that the vessel also be equipped with a 0-25 MPa pressure transducer and a Type-K thermocouple to measure the gas temperature.”

D. Amend the first paragraph of section 18.8.1.3.3 of the *Manual of Tests and Criteria* as follows:

“The vessel outlet is closed while the vessel inlet is opened. The vessel is then pressurized approximately to the required initial pressure for the test. If this is the first test with a given substance, this pressure should be an educated guess as the expected MBP, based on the formulation of the sample. The inlet is then closed, and the vessel is left pressurized for several minutes in order to check that the system has no leak. Once this is established, the pressure is adjusted to the required initial value and the vessel inlet is closed. The test should be started after the gas temperature drops to room temperature or the gas pressure has stabilised. The value of the pressure transducer is then recorded as the initial pressure.”

Source: *ST/SG/AC.10/C.3/2024/8 para. 19-20, UN/SCETDG/64/INF.32 para. 2-3 and para. 5 of this report.*

Amendment 2.

A. In the Model Regulations insert a new 2.0.4.3.2 as follows:

“2.0.4.3.2 Samples of organic substances carrying functional groups listed in tables A6.1 and/or A6.3 in Appendix 6 (Screening Procedures) of the Manual of Tests and Criteria may be assigned to one of the appropriate entries for self-reactive substances type C (UN 3223, UN 3224, UN 3233, UN 3234 as applicable)”

of Division 4.1 and transported under the provisions of 2.4.2.3.2.4 (b) for the transport in amounts of not more than 200 g per outer package provided that:

- (a) They fulfil the criteria of 2.0.4.3.1 (a) through (c), and
- (b) Their decomposition energy is
 - (i) Less than 1500 J/g for salts or complexes of organic compounds, or
 - (ii) Less than 2000 J/g for other organic substances, or
 - (iii) 1500 J/g or more for salts or complexes of organic compounds, and in test UN C.1 the result is not “yes, rapidly” and in any one of UN test series F the result is not “not low”, or
 - (iv) 2000 J/g or more for other organic substances, and in test UN C.1 the result is not “yes, rapidly” and in any one of UN test series F the result is not “not low”.

The assessment in (iii) and (iv) may be based on a single test C.1 and one single test from UN test series F. If the criteria in (b) above are fulfilled, it can be assumed that the sample is not more dangerous than self-reactive substances type B.

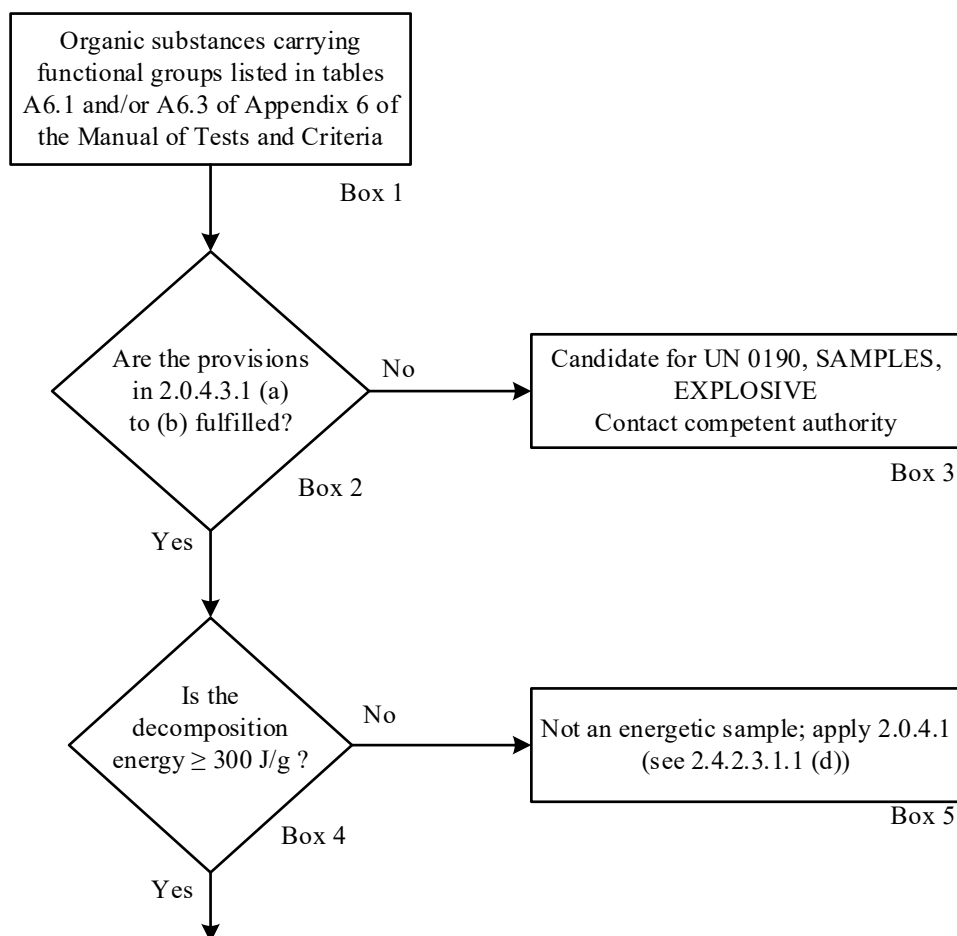
An appropriate method to determine temperature control requirements is described in section 20.3.4 of the Manual of Tests and Criteria.

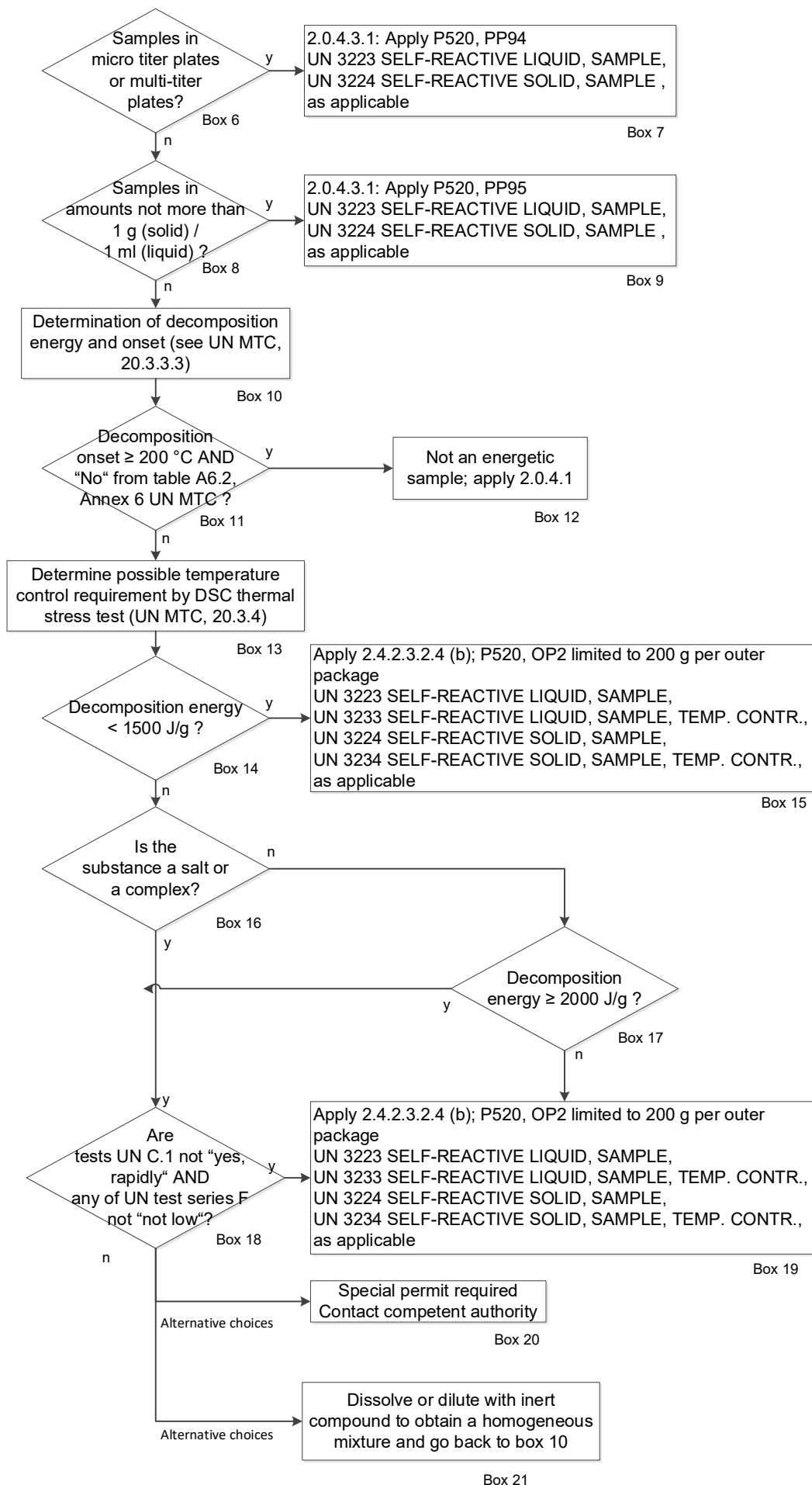
Samples not passing the criteria in (iii) or (iv) above may be transported by an approval issued by the competent authority of the country of origin. The statement of approval shall be based on the available information and contain the classification and the relevant transport conditions. Alternatively, the sample may be dissolved or diluted with an inert compound to form a homogenous mixture in agreement with the criteria in 2.0.4.3.2 (b) (i) or (ii) as applicable.”

B. Insert a new 2.0.4.3.3 as follows:

“A flow chart describing the classification of energetic samples is shown in figure 2.0.4.”

C. Insert the following flow chart figure 2.0.4.





Source: ST/SG/AC.10/C.3/2024/26 paras. 57-59 as amended and para. 8 of this report.

Amendment 3.

A. Amend paragraph A6.5.1. (b) of the MTC as follows:

“(b) For a single organic substance or a homogeneous mixture of organic substances, the estimated SADT for a 50 kg package is greater than 75 °C or the exothermic decomposition energy is less than 300 J/g. ~~The onset temperature and decomposition energy may be estimated using a suitable calorimetric technique (see 20.3.3.3).~~ A suitable method to estimate whether the SADT for a 50 kg package is greater than 75 °C is if:

1. The first detected exothermic reaction (onset, detection limit max. 20 W·kg⁻¹) in a screening DSC is not less than 175 °C for liquids or 200 °C for solids; or

2. The measured isothermal maximum heat flow at 75 °C is not greater than 100 mW·kg⁻¹ for liquids or 50 mW·kg⁻¹ for solids.

Calorimetric data should be obtained following the guidelines in Section 20.3.3.3.

Note: These screening rules can fail for substances showing strong autocatalytic behavior in the decomposition. For such substances, further information is needed to determine if these simple screening rules apply to the particular substance (e.g., the effect of sample aging on the decomposition). Information concerning potential autocatalytic behaviour may be obtained from further calorimetric measurements (e.g., comparison of DSC-measurements of tempered samples with fresh samples, or DSC-scans with different scan rates). The onset temperature criteria or heat flow criteria should always be met for fresh and aged samples representing the anticipated duration of transport.”

Source: ST/SG/AC.10/C.3/2024/16, UN/SCETDG/64/INF.54 para. 3, and para. 9 of this report.

Amendment 4.

A. Amend packing instruction 130 by adding a new special packing provision as follows:

“PP XX For UN 0012 and UN 0014, despite the requirements of 4.1.5.11, articles may be packed without internal cushioning, fittings, coating or liner in metal outer packagings.”

Source: ST/SG/AC.10/C.3/2024/18 para. 16 Option 2 as amended and para. 10 of this report.

Amendment 5.

B. Amend the MTC at A10.3.4.4 as follows:

“A10.3.4.4 The test result is considered “+” and the substance is classified unstable if the test paper completely changes colour in ~~less than~~ 30 min or less. If the colour change exceeds 30 min the result is “-“ and the substance is classified as stable.”

A10.3.5 Examples of results

<u>Test</u> time	Result
25 min	+
<u>30 min</u>	<u>+</u>
35 min	-

Source: ST/SG/AC.10/C.3/2024/38 para. 17, UN/SCETDG/64/INF.33 para. 2 and para. 11 of this report.

Amendment 6.

A. In Chapter 2.1 of the UNMR, amend paragraph 2.1.3.2.2, as follows:

“... grouped into ~~seven~~ eight series as listed ...”

B. In Chapter 2.8 of the GHS amend paragraph 2.8.1.1, second sentence as:

“... as explosives, organic peroxides or oxidizing liquids or solids.”

C. In Section 11 of the MTC, amend paragraph 11.1.1 as follows:

“The question: ~~“Is it an explosive substance?”~~ does the substance have explosive properties (i.e. Box 5 of Figure 10.2) is answered on the basis of the results of three types of tests to assess possible explosive effects. The question in Box 5 is answered “yes” if a “+” is obtained in any of the three types of test.”

- D. In Section 12 of the MTC, amend paragraph 12.1.1 as follows:
 “The question “Is the substance too insensitive for ~~inclusion~~ acceptance in the class of explosives?” (box 7 of Figure 10.2) is answered on the basis of three types of tests to assess possible explosive effects. The question in box 6 is answered “no” if a “+” is obtained in any of the three types of test.”
- E. In Section 32 of the MTC, amend paragraph 32.3.2.1 as follows:
 “... (see paragraph 2.3.1.4 of the Model Regulations and ~~note 2 to paragraph 2.1.1 of the GHS) by (see paragraphs 2.3.1.4 of the Model Regulations~~ 2.17.1.2 (b) of the GHS).”
- F. In Section 33 of the MTC, amend paragraph 33.3.1 as follows:
 ... (see sub-section 2.4.2.4 of the Model Regulations and ~~note 2 to paragraph 2.1.2.2~~ 2.17.1.2(a) of the GHS).

Source: ST/SG/AC.10/C.3/2024/52 paras. 3-12, 15-18, and para. 13 of this report.

Amendment 7.

- A. To the Model Regulations add to Section 4.1.7.1.1 the following sentence:
“To avoid the unnecessary confinement of liquids, metal packagings meeting the criteria of the internal pressure (hydraulic) test for Packing Group I shall not be used.”

Source: ST/SG/AC.10/C.3/2024/1 para. 11 as amended and para. 14 of this report.

Amendment 8.

- A. In chapter 2.17 of the GHS amend the note in 2.17.2.2 as follows.
 “**NOTE:** Phlegmatized explosives which do not meet the criteria of 2.17.2.2 should not be classified as a desensitized explosive and should be classified as an explosive in accordance with chapter 2.1 of the GHS. ~~explosives (see chapter 2.1).~~”
- B. In the MTC amend 51.4.4.3 as follows:
 “If a mass explosion or individual explosions or metallic projections (fragments) occur, the substance or mixture is not classified as a desensitized explosive and should be classified as an explosive in accordance with chapter 2.1 of the GHS ~~in the hazard class “explosives”.~~”
- C. In the MTC amend the last sentence of 51.4.4.5 as follows:
 “Any substance or mixture with a corrected burning rate greater than 1200 kg/min is not classified as a desensitized explosive and should be classified as an explosive in accordance with ~~an explosive (See chapter 2.1 of the GHS).~~”

Source: ST/SG/AC.10/C.3/2024/25 paras. 10-11 and para. 20 of this report.
