



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 (h) of the provisional agenda

Explosives and related matters:

Miscellaneous

UN 0012 and UN 0014 – Metal on metal contact between explosives and packaging

**Transmitted by the Sporting Arms and Ammunition Manufacturers'
Institute (SAAMI)***

I. Introduction

1. In document ST/SG/AC.10/C.3/2023/25 at the sixty-second session, SAAMI requested clarifying edits to the *Model Regulations* with respect to the filling of metal packagings with explosives articles made of metal.
2. Having received feedback from the Sub-Committee, SAAMI submitted this proposal for a new packing provision to clarify that UN 0012 and UN 0014 cartridges may be filled in single packagings¹ according to packing instruction 130, as well as other explosives approved for that configuration by a competent authority. An option is also provided for a more general solution.

II. Background

3. Section 4.1.5, “Special packing provisions for goods of Class 1”, paragraph 4.1.5.11 states: “Metallic components of articles shall be prevented from making contact with metal packagings ...”. However, packing instructions 130 and 132(a) allow metal on metal contact between articles and their packaging. Configurations with metal on metal contact have been shipped for decades in volume with no incidents. SAAMI requested a discussion to develop clarifying text that this practice was compliant. Please refer to document ST/SG/AC.10/C.3/2023/25 for detailed explanations of the technical questions. Also, the report of the explosives working group, informal document INF.47 of the sixty-second session of the Sub-Committee, includes responses to SAAMI’s questions.

* A/78/6 (Sect. 20), table 20.5.

¹ “Single packagings” are those packagings which do not require inner or intermediate packagings. This definition appears to be omitted from section 1.2 of the *Model Regulations*.

III. Explosives working group discussion

4. In document ST/SG/AC.10/C.3/2023/25, SAAMI asked whether any members had experienced the need to protect against contact between metal packagings and metallic explosive articles. This question specifically refers to scenarios where UN numbers which are often comprised of metal articles are assigned to packing instructions which do not require inner packagings². Australia, the United Kingdom and the United States of America have used this method extensively. No explosives experts had experience with incidents caused by this packing method.

5. SAAMI asked if there was a preference for a solution to apply to an entire packing instruction or be limited to certain UN numbers. There was a preference within the explosives working group for a limited approach.

6. A member of the working group queried whether there could be triboelectric charging between dissimilar metals which could possibly pose an initiation hazard. The thought is that the metal packaging might be a different metal than the article.

7. SAAMI responds that triboelectric charging may occur, but is not a credible source of initiation. The articles themselves frequently consist of an assembly of dissimilar metals, e.g., the small arms primer may be made of a different metal than the cartridge case, and triboelectric charging does not cause initiations. Additionally, there is a current design of a small arms cartridge case made from a steel head and cartridge brass body. Testing often requires the electrical ignition of articles, e.g., in the 6(d) test, resulting in common knowledge. Articles without electrical leads are frequently not susceptible to this form of initiation. A normal means of initiation is an electrical cord plugged into an electrical outlet with severed ends applied to the article, and causing an initiation when desired for testing can be problematic. Compared to this, the low electrical amperage from triboelectric charging is not a credible source of ignition.

8. An expert pointed out that the steel drum in SAAMI's example was painted. Several experts questioned whether the paint is a protective feature. SAAMI responds that the paint is not a safety feature. The relevant explosives initiation scenario is impact, and paint is not a reliable engineering safety control to control this stimulus. With respect to impacts in transport, an impact of the metal packaging on the metal articles inside is not more critical than the impacts between articles.

9. It was considered whether dunnage should be used to fill head space and prevent shifting within a package. SAAMI contends that this is not a viable or effective practice, nor is it generally used for other classes of dangerous goods. While inner packages should be appropriately sized and not shift within an outer packaging, there are no provisions for a substance or loose articles to be prevented from shifting by filling head space within a single packaging. Even if this was done, at great inefficiency, it would not completely prevent shifting and would not change the initiation scenario of metal on metal impact or friction between loose articles.

IV. Option for a general solution

10. Metal on metal contact between articles is already allowed in packing instructions 130 and 132(a). Paragraph 4.1.5.11 does not prohibit loose packing of metal articles in non-metal packagings, including seven different box types and three different drum types. Therefore, these packing instructions already allow metal on metal contact between articles.

11. Paragraph 4.1.5.11 states:

“Inner packagings, fittings and cushioning materials and the placing of explosive substances or articles in packages shall be accomplished in a manner which prevents the explosive substances or articles from becoming loose in the outer packaging under

² See document ST/SG/AC.10/C.3/2023/25, paragraph 4(c) for an enumeration of metal articles covered by packing instruction 130.

normal conditions of transport. Metallic components of articles shall be prevented from making contact with metal packagings...”

12. The portion of the first sentence addressing loose articles obviously does not apply to metallic explosives articles specified by packing instructions 130 or 132(a) to be shipped loose. “Inner packagings, fittings and cushioning” are not required for single packagings. The structure of this paragraph may infer that the second sentence is a supplementary text to the first sentence. Therefore, it can be reasoned that the second sentence prohibiting metal contact with metal packagings would not apply to those explosives which are permitted to ship loose.

13. In the discussions last year and in this proposal, SAAMI is demonstrating that UN 0012 and UN 0014 may be safely packed loose in metal single packagings. However, if a packing provision is added which expressly permits loose packing of UN 0012 and UN 0014 in metal single packagings, it could be implied that this is not allowed for other articles. SAAMI does not wish to cast doubt on existing practices for other explosives.

14. SAAMI believes that the regulations should not restrict operations without a strong basis, and requests that delegations give thought to whether there are any credible concerns about metal on metal contact for metallic explosive articles already assigned for loose packing (at least in non-metal single packagings), and what reason there would be to prohibit this packing method.

V. Competent authority approvals

15. It may be the case that competent authorities have approved loose packing of metal articles in metal single packagings, and this should be taken into account.

VI. Proposal

16. SAAMI proposes two options as follows:

Option 1: General Solution

Amend paragraph 4.1.5.11 as follows:

“4.1.5.11 Inner packagings, fittings and cushioning materials and the placing of explosive substances or articles in packages shall be accomplished in a manner which prevents the explosive substances or articles from becoming loose in the outer packaging under normal conditions of transport. Metallic components of articles shall be prevented from making contact with metal packagings. These provisions are not applicable to articles permitted to be packed loose in single packagings. ...”

Option 2: Solution for UN 0012 and UN 0014 and configurations approved by competent authorities

Amend packing instruction 130 by adding a new special packing provision:

“PPXX For UN 0012 and 0014, or for other entries approved for loose configurations by a competent authority, metal articles may be packed loose in metal packagings.”