



WORKING PAPER

**DANGEROUS GOODS PANEL (DGP)
WORKING GROUP MEETING (DGP-WG/23)**

Rio de Janeiro, Brazil, 15 to 19 May 2023

- Agenda Item 2: Managing air-specific safety risks and identifying anomalies (REC-A-DGS-2025)**
2.2: Develop proposals, if necessary, for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2025-2026 Edition
- Agenda Item 3: Facilitating safe transport of dangerous goods by air (Ref: REC-A-DGS-2025)**
- Agenda Item 4: Managing safety risks posed by the carriage of lithium batteries by air (Ref: Job Card DGP.003.04)**

**TRANSPORT OF PORTABLE ELECTRONIC DEVICES CONTAINING LITHIUM
BATTERIES BY PASSENGERS**

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SUMMARY

This working paper discusses unintended safety issues caused by Addendum No.1 to the 2023-2024 Edition of the Technical Instructions that is allowing different types of portable electronic devices to be carried by passengers and crew switched on in their checked baggage.

Action by the DGP-WG is in paragraph 2.

1. INTRODUCTION

1.1 Working paper DGP-WG/22-WP/18 was discussed at the 2022 DGP Working Group Meeting (DGP-WG/22, Montréal, 21 to 25 November 2022) (see paragraph 4.4.3 of the DGP-WG/22 Report). That document presented a proposal related to issues with transport of lithium battery powered tracking devices carried by passengers or crew.

1.2 According to DGP-WG/22-WP/18, passengers were starting to “place tracking devices in their checked baggage so that these devices could help them locate their bags in case they went missing”, mainly because of problems with mishandled baggage that started to occur during the COVID-19 pandemic.

1.3 At the time the discussion took place, the Technical Instructions only allowed those devices to be transported in checked baggage if they were completely switched off, which would not allow the device to properly achieve its purpose of tracking passenger's checked baggage.

1.4 The working paper mentioned tests that were performed with different types of tracking devices, which were also presented with more details in DGP-WG/22-IP/8 (see paragraph 4.4.4 of the DGP-WG/22 Report). Tests were conducted using three different types of Bluetooth tracking devices powered by lithium metal batteries commonly used by passengers and three different types of GPS/Cellular tracking devices powered by lithium ion batteries, not commonly used by passengers but that could be used by them. The results of the tests showed that Bluetooth tracking devices powered by lithium metal button cells with 0.1 gram lithium metal content did not produce any flames or fire, which could indicate that they were not capable of posing risks to air transport. The results have also shown that GPS/Cellular tracking devices containing lithium ion pouch cells of 2.2 Wh and 5.5 Wh did not produce any flames or fire, although in one of the tests with a device containing a battery of 2.2 Wh the pouch cell was ejected from the device. This could also be interpreted as an indication that those devices are not capable of posing significant risks to air transport.

1.5 Although tests were limited only to lithium battery powered tracking devices, the proposal, which was agreed during last WG meeting, was open enough to allow any type of portable electronic device powered by lithium metal cells or batteries with a lithium content of 0.3g or less or by lithium ion cells or batteries with 2.7 Wh or less, switched on in passengers' checked baggage.

1.6 The proposal changed the provisions of Table 8-1 and was incorporated into the 2023-2024 Edition of the Technical Instructions by the means of Addendum No. 1 published 27 March 2023.

1.7 After the discussions in DGP-WG/22, we have received safety information that is concerning us about the decision that was made in the recent past. At the time a decision was taken, we did not have access to some of the information we are presenting in this working paper, such as occurrences that were reported involving devices that are now excepted from the provisions to be switched off.

1.8 The first occurrence was caused by LED light-up sneakers owned by the daughter of a Brazilian cabin crew member. The LED sneakers were carried in checked baggage and caught fire after flying. The child was severely injured after wearing them. A simple research showed that the same situation happened in the past few years in other States as well. Those shoes use lithium metal button cells with 0.3 grams of lithium content and would be excepted from the former Table 8-1 provisions after the publication of Addendum No. 1.

1.9 The second occurrence was related to the transport of an overpack containing a small cargo tracking device that caught on fire in the cargo warehouse right after flying. Fire and smoke were detected. The tracking device used a GPS/Cellular technology. The initial occurrence report did not contain information about the brand/model of the tracking device or lithium content/Wh rating of its batteries. Further investigation concluded that the device was powered by a small rechargeable lithium ion battery. This device could be used by a passenger, and this is another situation that could be excepted from the former Table 8-1 provisions after the publication of Addendum No. 1.

1.10 A third occurrence was reported and is related to the carriage of a small shipment of electronic anklets for tracking purposes. The anklets started to overheat. Ground handling employees were able to notice that the package was very warm during the aircraft loading and left it on ground.

Unintentional activation might have occurred but could not be confirmed. The devices use assisted GPS (AGPS)/Cellular technology. It is important to note that police officers regularly transport a few of those items in their baggage when travelling on duty. Those devices normally use lithium polymer batteries up to 6 Wh. Some devices could be powered by batteries under 2.7 Wh and could be excepted from the former Table 8-1 provisions after the publication of Addendum No. 1.

1.11 Appendix B presents details and pictures of those occurrences.

1.12 Other devices that would fall under the exception of Addendum No. 1 are small portable electronic devices commonly carried by passengers, such as electric razors, electric toothbrushes, small power tools, wireless earphones, e-book readers, flashlights, digital cameras, portable speakers, two-way radios, and other equipment.

1.13 Simple research can point that some of those devices, including electric razors, wireless earphones, portable speakers, and cameras, were involved with multiple incidents in the past few years.

1.14 We are of the opinion that allowing some of the devices listed above to be carried switched on raises the probability of having a safety issue. Also, none of these devices need to be carried switched on during air transport. The requirement should then be based on the necessity of the device to be switched on during transport so that it can perform its expected function. Tracking devices, for example, have to be transported switched on so that they are able to perform their function of recording and sending information about location, temperature, vibration etc. Other devices, such as electric razors and power tools, are not intended to be switched on during transport but are now captured by the exception of Addendum No. 1.

1.15 Additionally, no tests were conducted to evaluate possible interactions between lithium battery powered portable electronic devices that fall under the new conditions specified in Table 8-1 and other dangerous goods commonly carried by passengers in their checked baggage, such as aerosols. In fact, those devices, if switched on, might increase the risks to air transport safety and those risks may be augmented if hazards from other dangerous goods are present in the same environment.

1.16 We are of the opinion that the proposal approved by Addendum No. 1, which successfully solved the problem with the carriage of tracking devices by passengers and crew, will cause unintended consequences to safety by allowing other devices that are related to past occurrences to be transported without any requirements to keep them switched off.

1.17 In order to solve the issue, we present two options for the consideration of DGP-WG/23. Both Option 1 and 2 keep the initial decision taken after the DGP-WG/22 to allow tracking devices carried by passengers and crew in their checked luggage while switched on but limit other devices that should not be switched on during flight.

1.18 Option 1 limits the applicability of the text changed by Addendum No. 1 only to “battery-powered portable electronic tracking devices”. This option is aligned with the tests that were presented until the moment, which were performed only with tracking devices.

1.19 Option 2 keeps Table 8-1 with text as general as possible without using specific terms such as “tracking device” and limits the conditions for dangerous goods to be carried switched on only if they need to.

2. ACTION BY THE DGP-WG

2.1 The DGP-WG is invited to consider the suggested amendments to Table 8-1 presented in Appendix A to this working paper and also to express preference for Option 1 or Option 2.

APPENDIX A

PROPOSED AMENDMENT TO PART 8 OF THE TECHNICAL INSTRUCTIONS

Option 1

Part 8

PROVISIONS CONCERNING
PASSENGERS AND CREW

Chapter 1

PROVISIONS FOR DANGEROUS GOODS
CARRIED BY PASSENGERS OR CREW

1.1 DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

Table 8-1. Provisions for dangerous goods carried by passengers or crew

| <i>Dangerous Goods</i> | <i>Location</i> | | Approval of the operator(s) is required | <i>Restrictions</i> |
|--|----------------------------|------------------|---|--|
| | Checked baggage | Carry-on baggage | | |
| Batteries | | | | |
| 1) Lithium batteries (including portable electronic devices) | Yes (except for g) and h)) | Yes | (see c) and d)) | <p>...</p> <p>e) portable electronic devices containing batteries should be carried as carry-on baggage; however, if carried as checked baggage:</p> <ul style="list-style-type: none"> — measures must be taken to prevent unintentional activation and to protect the devices from damage; and — the devices must be completely switched off (not in sleep or hibernation mode), <u>except for battery-powered portable electronic tracking devices, which may be transported when intentionally active</u> if the batteries <u>do not</u> exceed: <ul style="list-style-type: none"> — for lithium metal batteries, a lithium content of 0.3 grams; or — for lithium ion batteries, a Watt-hour rating of 2.7 Wh. <p>...</p> |

Option 2

| <i>Dangerous Goods</i> | <i>Location</i> | | Approval of the operator(s) is required | <i>Restrictions</i> |
|--|----------------------------|------------------|---|--|
| | Checked baggage | Carry-on baggage | | |
| Batteries | | | | |
| 1) Lithium batteries (including portable electronic devices) | Yes (except for g) and h)) | Yes | (see c) and d)) | <p>...</p> <p>e) portable electronic devices containing batteries should be carried as carry-on baggage; however, if carried as checked baggage:</p> <ul style="list-style-type: none"> — measures must be taken to prevent unintentional activation and to protect the devices from damage; and — the devices must be completely switched off (not in sleep or hibernation mode) <u>unless, for their functioning purposes, they need to be carried switched on during transport and the batteries do not</u> exceed: <ul style="list-style-type: none"> — for lithium metal batteries, a lithium content of 0.3 grams; or — for lithium ion batteries, a Watt-hour rating of 2.7 Wh. <p>...</p> |

APPENDIX B

OCCURRENCES INVOLVING PORTABLE ELECTRONIC DEVICES WITH LOW ENERGY BATTERIES IN BRAZIL

Occurrence 1 – LED Light-up Sneakers

Description: Sneakers of a daughter of a cabin crew member caught fire after flying. The child was severely injured. The same situation happened in other States as well.

Type of batteries: lithium metal coin cells with approximately 0.3g lithium content.

Additional comment: some sneakers might use different types of batteries. The images below are examples.





Occurrence 2 – Small active tracking device

Description: Small tracking device caught on fire in the cargo warehouse right after flying.

Type of batteries: small lithium ion battery or cell.

Additional comment: The initial report did not contain information about the brand of the tracking device or lithium content/Wh rating. Further investigation concluded that the “device was powered by a very small lithium ion battery”.



Occurrence 3 – Electronic ankle monitor/tracking device for prisoners

Description: A small shipment of electronic anklets started overheating during the aircraft loading. Temperature inside the package became so high that ground handling employees were able to notice that and left it on ground.

Type of batteries: Lithium polymer batteries of the equipment transported varied between 2.4Wh and 6Wh.

Additional comment: Unintentional activation might have occurred. Police officers transport a few of those items in their baggage when travelling on duty.

