DANGEROUS GOODS

Information for Crew, Task Specialists and Passengers in General Aviation (NCO, including NCO.SPEC)

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GENERAL INFORMATION ABOUT THIS BOOKLET

This booklet provides the General Aviation Community with more information about dangerous goods and the hazards they might pose to the aircraft and those onboard if handled or transported incorrectly. It will also gives information about the types of dangerous goods that are allowed to be taken aboard an aircraft during NCO (including NCO.SPEC) operations.

Note: Annex I aircraft are regulated under national law and therefore are not subject to this booklet. If you need more information, contact your national aviation authority (NAA).

DANGEROUS GOODS: WHAT ARE THEY AND HOW TO IDENTIFY THEM?

What are DANGEROUS GOODS?

Dangerous goods are defined as articles or substances which are capable of posing a hazard to health, safety, property or the environment and which are listed within the ICAO Technical Instructions (ICAO Doc 9284), or which are classified according to those Instructions.

The types of items that are dangerous goods?

There are many dangerous goods you might find around the home, workshop or garden shed that you might not think about as dangerous goods, some examples include:

Explosives	**distress flares, ammunition, fireworks**
Gases	**aerosols, camping gas, medical oxygen, nitrogen, carbon dioxide, insecticides, fire extinguishers**
Flammable liquids	**perfumes, alcoholic spirits, paints, thinners, adhesives and fuels (including residues within apparatus)**
Flammable solids	**hexamine fire lighters**
Oxidizing substances	**chemicals for swimming pools, bleaches, nitric acid, hair dyes**
Organic peroxides	**kits for repairing glass fiber products**
Toxic substances	**chemicals for agriculture (herbicides, insecticides)**
Infectious substances	**some vaccines, some biological samples**
Radioactive materials	**medical isotopes, scientific samples, some smoke detectors**
Corrosives	**bleaches, cleaning products, acid batteries, various acidic solutions, disinfectants, mercury**
Miscellaneous substances	**dry ice, various rescue devices, magnets**

Lithium batteries such as power banks, and portable electronic devices (PEDs) which contain lithium batteries such as phones, tablets, laptop computers, shavers, cameras, drones, tools, medical devices, e-bikes and scooters are also dangerous goods. In particular chargers, power banks and e-cigarettes from unofficial sources without CE markings have been identified as a particular risk.

How can I identify dangerous goods?

Consumer hazard symbols on the product container, or dangerous goods hazard warning or handling labels on the packaging. See Appendix 1 for consumer and dangerous goods labelling.

For substances and mixtures, dangerous goods may be identified by contacting the manufacturer or supplier of the product to request a Safety Data Sheet (SDS). Section 14 will show whether the product is classified as dangerous goods when transported.

The product or its packaging may be marked with a four-digit UN number (e.g. UN1950).

Although I use some dangerous goods at home quite safely, can take them with me when I go flying?
NO. In flight, these dangerous goods will be subject to additional conditions (temperature, pressure, vibration, acceleration) that may be different from the conditions of storage or use on ground that might lead to a problem in flight are that is much more difficult to solve than when you are on ground.
This is why carrying Dangerous Goods in the air is subject to strict regulations (EASA Air Operations Regulations referring to ICAO Technical Instructions) that guarantee flight safety.

For instance, with regards to lithium batteries and personal electronic devices (PEDs) that contain lithium batteries, if they are not protected from short-circuit or if they are damaged, for example if trapped in your seat or left switched on when placed within baggage, they can catch fire or explode. Furthermore, PEDs used in flight when not well ventilated could also overheat and lead to malfunction.

NOTE: Lithium batteries have to be successfully tested against the UN Manual of Tests and Criteria, Part III, subsection 38.3. If they are not tested, they are not allowed to be transported. To minimize the risk of buying untested batteries, you should purchase them from reputable suppliers. In case of doubt, you may ask your supplier or seller for evidence in the form of a summary test report. Consumer electronics bought from shops in the EU should carry the CE marking that makes it easy to tell that it is safe to take on an aircraft.

DANGEROUS GOODS THAT CAN BE TAKEN ON A GA AIRCRAFT

What can I carry with me or in my baggage when flying on a GA aircraft?
It is forbidden to carry dangerous goods either as or in baggage or on their person unless the dangerous goods are permitted in accordance with Table 8-1 of the ICAO Technical Instructions and are for personal use only. An extract of ICAO Table 8-1 is provided of at Appendix 2: it relates to the more common articles in NCO and NCO.SPEC operations.
EASA Air Operations, NCO.GEN.140.b2,

Where can I see the full list of dangerous goods which may be carried by passengers, task specialists and crew in their baggage or on them?
Consult the web pages of your national aviation authority, for instance the application airbag hosted in the French Ministry of Ecological and Solidarity Transition website:
www.ecologique-solidaire.gouv.fr/en/items-not-permitted-be-carried-airplanes-or-helicopters-or-subject-restrictions

For lithium batteries the 'Watt-hour rating' or Wh is important. Where do I find this information?
Most consumer electronics will have batteries that are fine to take on an aircraft. When it comes to spare batteries and more professional equipment like camera equipment etc it is important to check. The information may be shown on the battery, its packaging or in the manufacturer's documentation.
It can also be calculated if you find the information V and Ah. Wh is equal to V x Ah.
For instance, if you read on the battery 3.8 V and 2000 mAh, the calculation is:
Wh = V x Ah = 3.8 V x 2 Ah = 7.6 Wh (taking into account 2000 mAh corresponds to 2 Ah).

CARRYING DANGEROUS GOODS ON GA AND NCO OPERATIONS

What if I need to carry dangerous goods for the purposes of the flight?

In addition to the provisions for passengers, task specialists and crew, Commission Regulation (EU) No 965/2012 (the EASA Air Operations Regulations) allows dangerous goods to be transported:

1) **by NCO or NCO.SPEC operations for specific purposes, for example for dropping in connection with agricultural, horticultural, forestry, ice jam control and landslide clearance or pollution control activities.**
   EASA Air Operations, NCO.GEN.140.b1, referring to general exceptions set in Part 1 of ICAO Technical Instructions Chapter 1 § 1.1.5

   NOTE: The ICAO Technical Instructions apply specific requirements to the carriage of these dangerous goods.
   To be able to carry out these operations you may need other approvals. For example, dropping in connection with agricultural, horticultural or forestry control may need an approval from a national environmental protection agency. You may also need a low level flight permit if you plan to fly under a certain height/altitude.

2) **by NCO or NCO.SPEC, when required to be aboard the aircraft in accordance with the pertinent airworthiness requirements and operating regulations or that are authorised by the concerned authority, for example: fire extinguishers, lifejackets, navigational aid for the pilot in electronic flight bag, GPS, portable oxygen system when flying at high altitude, etc.**
   EASA Air Operations, NCO.GEN.140.b1, referring to exceptions for operator set in Part 1 of ICAO Technical Instructions Chapter 2 § 2.2

3) **When carried in NCO or NCO.SPEC operations in reasonable quantities to facilitate flight safety, where carriage aboard the aircraft is advisable to ensure their timely availability for operational purposes.**
   This could include items such as de-icing or anti-icing liquid, fuel, engine or gearbox oil.
   The carriage of dangerous goods in these cases is authorised only for the aircraft concerned (it cannot be to supply another aircraft).
   For NCO or NCO.SPEC operations, the packing and loading must be performed under the responsibility of the pilot in order to minimise the risks to the occupants or to the aircraft during flight or on the ground. It is recommended that the segregation and securing requirements of the ICAO Technical Instructions be complied with.
   EASA Air Operations, NCO.GEN.140.f

4) **For NCO.SPEC operations, parachutists may carry smoke train devices which are manufactured for this purpose and exit the aircraft for the purpose of parachute display.**
   EASA Air Operations, NCO.SPEC.PAR.120

   NOTE: If such devices or equivalent ones are installed on the aircraft, it is a design change that must be covered by a supplemental type certificate (STC) and the installation is not subject to the DG regulation. But if these devices are carried as cargo, they are under the scope of the DG regulation.

What if I need to transport other dangerous goods?

Any other dangerous goods may only be transported under an approval granted by the State of the Operator in accordance with the EASA Air Operations Regulations Part SPA.DG, except when carried in an ELA2 aircraft.

This includes dangerous goods which are underslung beneath a helicopter.

For the approval to be granted, dangerous goods operating procedures must be established and all persons involved must complete an appropriate initial and recurrent dangerous goods training, the training programme being subject to approval by the authority.

EASA Air Operations, NCO.GEN.140.b, SPA.DG.100, SPA.DG.105, SPA.DG.110

NOTE: Operators of ELA2 aircrafts have to comply with the Technical Instructions (ICAO Doc 9284), including its supplements and any other addenda or corrigenda.

EASA Air Operations, NCO.GEN.140.a

TRAINING AND RESPONSIBILITY OF THE PILOT

You mention dangerous goods training which is mandatory for personnel of SPA.DG operations. Is it also mandatory for non-SPA.DG operations?

No, training is not mandatory but it may assist the pilot-in-command fulfil their responsibilities for ensuring flight safety.

EASA Air Operations NCO.GEN.140, ORO.GEN.005; EASA Flight Crew Licensing AMC1 FCL.210, AMC1 FCL.215

What are the pilot-in-command's responsibilities?

The pilot is responsible for the safety of all members, passengers, task specialists and cargo on board.

The pilot-in-command must take all reasonable measures to prevent dangerous goods from being carried on board inadvertently.

EASA Air Operations, NCO.GEN.140.c

Reasonable measures could be to ask questions about dangerous goods and make reference to notices distributed by aviation authorities such as the following:

What if there is a dangerous goods incident?

The pilot-in-command shall, in accordance with the ICAO Technical Instructions, report without delay to the competent authority and the appropriate authority of the State of occurrence in the event of any dangerous goods accidents or incidents such an injury, leak or spill during flight. The finding of undeclared or misdeclared dangerous goods in cargo or forbidden dangerous goods in passenger, task specialist or crew baggage must be reported within 72 hours.

Report forms are provided within the websites of the NAAs.

EASA Air Operations, NCO.GEN.140.d,

WHERE CAN I FIND FURTHER INFORMATION?

Commission Regulation (EU) No 965/2012 defines the various types of general aviation operations including NCO and NCO SPEC, ELA2 aircraft etc. and includes the regulations concerning dangerous goods. EASA publishes 'Easy Access Rules for Air Operations' at www.easa.europa.eu/document-library/general-publications/easy-access-rules-air-operations

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This booklet addresses dangerous goods only in terms of safety. It does not take into account security requirements (prevention of malicious acts) or customs and health rules, which may introduce additional limitations or prohibitions.

Appendix 1: Consumer and dangerous goods labelling

1. Products bearing the following GHS labels ARE classified as dangerous goods:

NOTE**:** A product bearing the GHS corrosive label (depicted far right above) is NOT classified as dangerous goods if the signal word 'Danger' and hazard statement 'causes serious eye damage' applies.

2. Products bearing the following GHS labels (and none of the above) are NOT classified as dangerous goods:

NOTE**:** Confirmation of classification or non-classification as dangerous goods may be found with Safety Data Sheet (SDS), Section 14.

3. The following labels and marks are used for the transport of dangerous goods, so their presence makes it likely that packages contain DANGEROUS GOODS

CLASS 1 – EXPLOSIVE

* Division and compatibility group ** Compatibility group

CLASS 2 – GASES

Flammable gas (Division 2.1)

Non-flammable, non-toxic gas (Division 2.2)

Toxic gas (Division 2.3)

CLASS 3 – FLAMMABLE LIQUID

CLASS 4 – FLAMMABLE SOLIDS, SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION; SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES

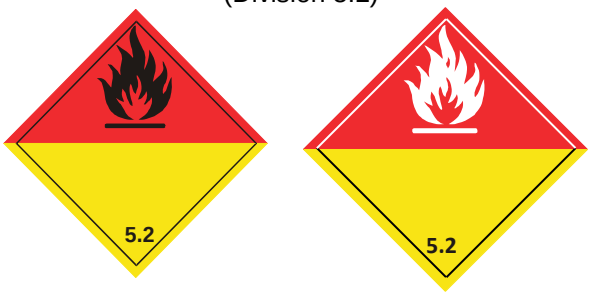
Flammable solid
(Division 4.1)

Substance liable to spontaneous combustion
(Division 4.2)

CLASS 5 – OXIDISING SUBSTANCES AND ORGANIC PEROXIDES

Oxidising substance
(Division 5.1)

Organic peroxide (flame may be black or white)
(Division 5.2)



CLASS 6 – TOXIC AND INFECTIOUS SUBSTANCES

Toxic substance
(Division 6.1)

Infectious substance
(Division 6.2)

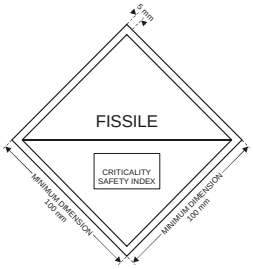
The bottom part of the label should bear the inscription:
“INFECTIOUS SUBSTANCE — In case of damage or leakage immediately notify public health authority”

CLASS 7 – RADIOACTIVE MATERIAL

Category I

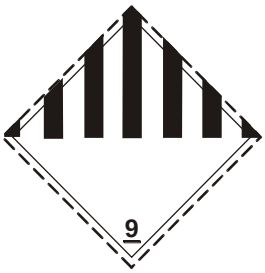
Category II

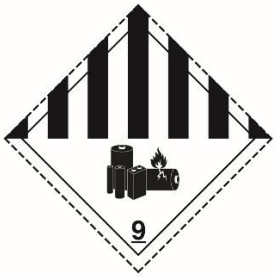
Category III



CLASS 8 – CORROSIVE

CLASS 9 – MISCELLANEOUS

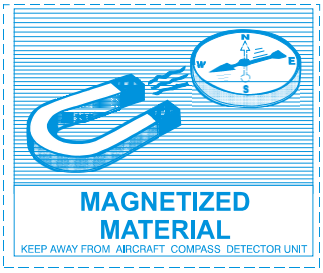




Class 9 label for Section I, IA and IB lithium battery shipments

HANDLING

Magnetized material

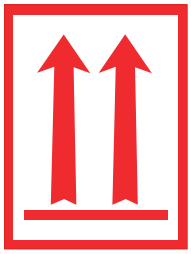


Cargo aircraft only

Cryogenic liquid label

Keep away from heat

Package orientation (MAY BE indication for DANGEROUS GOODS) :



(red or black)

LITHIUM BATTERIES

EXCEPTED QUANTITIES

Hatching and symbol of the same colour, black or red, on white or suitable contrasting background
* Place for class or, when assigned, the division number(s).
** Place for name of shipper or consignee, if not shown elsewhere on the package.

LIMITED QUANTITIES

ENVIRONMENTALLY HAZARDOUS SUBSTANCES

Packages containing environmentally hazardous substances (UN Nos. 3077 and 3082) must be durably marked with the environmentally hazardous substance mark with the exception of packages containing a net quantity per single or inner packaging of 5 L or less for liquids or having a net mass per single or inner packaging of 5 kg or less for solids - such packages are not subject to the ICAO Technical Instructions other than specified packaging requirements.

Appendix 2: Extract from Table 8-1 of the ICAO Technical Instructions

Dangerous Goods	Location		Approval of the operator(s) or Explicit agreement of the pilot is required, as applicable	Restrictions
	Baggage NOT accessible during flight	*Baggage accessible during flight*		
Batteries				
1) Lithium batteries (including portable electronic devices)	Yes (except for g) and h))	Yes	(see c) and d))	a) each battery must be of a type which meets the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, subsection 38.3; b) each battery must not exceed the following: — for lithium metal batteries, a lithium content of 2 grams; or — for lithium ion batteries, a Watt-hour rating of 100 Wh; c) each battery may exceed 100 Wh but not exceed 160 Wh Watt-hour rating for lithium ion with the approval of the operator; d) each battery may exceed 2 grams but not exceed 8 grams lithium content for lithium metal for portable medical electronic devices with the approval of the operator; e) batteries contained in portable electronic devices should be carried as carry-on baggage; however, if carried as checked baggage: — 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); f) batteries and heating elements must be isolated in portable electronic devices capable of generating extreme heat, which could cause a fire if activated, by removal of the heating element, battery or other components; g) spare batteries, including power banks: — must be carried as carry-on baggage; and — must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch); h) baggage equipped with a lithium battery(ies) exceeding: — for lithium metal batteries, a lithium content of 0.3 grams; or — for lithium ion batteries, a Watt-hour rating of 2.7 Wh must be carried as carry-on baggage unless the battery(ies) is removed from the baggage, in which case the battery(ies) must be carried in accordance with g); i) no more than two spare batteries meeting the requirements of c) or d) may be carried per person.

	Dangerous Goods	*Location*		*Approval of the operator(s) or Explicit agreement of the pilot is required, as applicable*	*Restrictions*
		Baggage NOT accessible during flight	*Baggage accessible during flight*		
3)	Battery-powered portable electronic smoking devices (e.g. e-cigarettes, e-cigs, e-cigars, e-pipes, personal vaporizers, electronic nicotine delivery systems)	No	Yes	No	a) if powered by lithium batteries, each battery must comply with the following restrictions i) each battery must be of a type which meets the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, subsection 38.3; ii) each battery must not exceed the following: — for lithium metal batteries, a lithium content of 2 grams; or — for lithium ion batteries, a Watt-hour rating of 100 Wh; iii) spare batteries, including power banks: — must be carried as carry-on baggage; and — must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch); b) the devices and/or batteries must not be recharged on board the aircraft; and c) measures must be taken to prevent unintentional activation of the heating element while on board the aircraft.

	Dangerous Goods	Location: Baggage NOT accessible during flight	Location: Baggage accessible during flight	Approval of the operator(s) or Explicit agreement of the pilot is required, as applicable	Restrictions
Flames and fuel sources					
5)	Cigarette lighter Small packet of safety matches	No	(see b))	No	a) no more than one per person; b) must be carried on the person; c) must not contain unabsorbed liquid fuel (other than liquefied gas); and d) if a cigarette lighter is powered by lithium batteries, each battery must comply with restrictions of 1) a), b) and g) and 3) b) and c).
6)	Alcoholic beverages containing more than 24 per cent but not more than 70 per cent alcohol by volume	Yes	Yes	No	a) must be in retail packagings; and b) no more than 5 L total net quantity per person. *Note.— Alcoholic beverages containing not more than 24 per cent alcohol by volume are not subject to any restrictions.*
Gases in cylinders and cartridges					
9)	Cylinders of oxygen or air required for medical use	Yes	Yes	Yes	a) no more than 5 kg gross mass per cylinder; b) cylinders, valves and regulators, where fitted, must be protected from damage which could cause inadvertent release of the contents; c) advance arrangements recommended; and d) the pilot-in-command must be informed of the number of oxygen or air cylinders loaded on board the aircraft and their loading location(s).
12)	Cartridges of Non-flammable and non-toxic gas only with no subsidiary hazard fitted into a self-inflating personal safety device such as a life-jacket or vest	Yes	Yes	Yes	a) no more than one personal safety device per person; b) the personal safety device must be packed in such a manner that it cannot be accidentally activated; c) must be for inflation purposes; d) no more than two cartridges are fitted into the device; and e) no more than two spare cartridges.
13)	Cartridges of Non-flammable and non-toxic gas only with no subsidiary hazard for other than a self-inflating personal safety device	Yes	Yes	Yes	a) no more than four cartridges per person; and b) the water capacity of each cartridge must not exceed 50 mL. *Note.— For carbon dioxide, a gas cartridge with a water capacity of 50 mL is equivalent to a 28 g cartridge.*
14)	Cartridges and cylinders of non-flammable and non-toxic gas only with no subsidiary hazard contained in an avalanche rescue backpack	Yes	Yes	Yes	a) no more than one avalanche rescue backpack per person; b) the backpack must be packed in such a manner that it cannot be accidentally activated; c) may contain a pyrotechnic trigger mechanism which must not contain more than 200 mg net of Division 1.4S; and d) the airbags within the backpack must be fitted with pressure relief valves.

Dangerous Goods	Location		Approval of the operator(s) or Explicit agreement of the pilot is required, as applicable	Restrictions
	Baggage NOT accessible during flight	*Baggage accessible during flight*		
Other dangerous goods				
17) Non-radioactive medicinal articles (including aerosols), toiletry articles (including aerosols) and other Non-flammable and non-toxic aerosols with no subsidiary hazard	Yes	Yes	No	a) no more than 0.5 kg or 0.5 L total net quantity per single article; b) no more than 2 kg or 2 L total net quantity of all articles (e.g. four aerosol cans of 0.5 L each) per person; c) release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents; and d) the release of gas must not cause extreme annoyance or discomfort to pilots so as to prevent the correct performance of assigned duties.
19) Cartridges in Division 1.4S (UN 0012 or UN 0014 only) (these cartridges correspond to "normal" sporting and hunting ammunition)	Yes	No	Yes	a) no more than 5 kg gross mass per person; b) must be securely packaged; c) must not include ammunition with explosive or incendiary projectiles; and d) allowances for more than one person must not be combined into one or more packages.