



UK Research
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Innovation Hub

Fundamentals: Carriage of Dangerous Goods by Remotely Piloted Aircraft Systems

Including for COVID-19 relief efforts

Overview

Airspace users, including operators of remotely piloted aircraft systems (RPAS), need approval to carry items that are classified as 'dangerous goods'. The purpose of this guidance is to help RPAS operators understand the requirements and application process for carrying dangerous goods in the UK.

This is not a step-by-step guide as to all the safety measures that you will need to consider, as each application will be dependent on the facts and circumstances, and it is ultimately for the CAA (Dangerous Goods, Flight Operations) to independently assess your application and decide whether or not to grant approval.

Rather, this guidance covers the [fundamental areas](#) that you may consider and some [practical tips](#) to help with the approvals process.

COVID-19

Throughout this guidance, we have included pop-out boxes explaining how the requirements apply to [COVID-19 test samples](#), which are considered dangerous goods given their potential to infect others. Carrying test samples is one of the ways in which RPAS operators can assist bodies such as NHS trusts with their efforts to combat COVID-19. However, there are multiple other ways in which RPAS operators can assist with the UK's response to COVID-19, [not all of which require dangerous goods approval](#). [Page 4](#) gives examples of goods which do or do not require dangerous goods approval.

The CAA's Dangerous Goods team are also refining their approach for assessing dangerous goods applications from RPAS operators. As a first step, we have published an [example Dangerous Goods Manual for RPAS operators carrying dangerous goods falling within UN3373 Biological Substances, Category B as cargo](#). We plan to update this guidance to reflect additional future developments.

Summary of contents

It is very important to identify what articles and substances are considered dangerous goods and how they are classified. [Page 3](#) summarises the classes of dangerous goods and the key sources to help with classification, and [page 4](#) looks at dangerous goods in the context of COVID-19.

Dangerous goods are capable of posing a hazard to health, safety, property or the environment. Shippers and operators have responsibilities to make sure this doesn't happen. The operator's responsibilities are summarised on [page 5](#).

Carrying dangerous goods is currently only possible in the Specific category of RPAS operations. [Page 6](#) outlines the requirements for operations in the Specific category, including that your operation does not result in a high risk for third parties in case of an accident.

CAA approval for the carriage of dangerous goods is separate from, and in addition to, the authorisation required for RPAS operations in the Specific category. [Page 7](#) gives more detail on the application process for dangerous goods approval.

[Page 8](#) outlines the CAA's next steps regarding the carriage of dangerous goods by RPAS.

Finally, [page 9](#) summarises the key sources of regulation relevant to the carriage of dangerous goods by RPAS in the UK and [page 10](#) includes references to further guidance material published by the CAA.

Identifying Dangerous Goods

As a first step, it is very important to identify what articles and substances are considered dangerous goods and how they are classified.

Many forms of dangerous goods have been classified by the [United Nations Committee of Experts on the Transport of Dangerous Goods](#), with articles or substances assigned a four-digit number (UNXXXX) to help identify them. Typically, there are different requirements for how dangerous goods may be transported depending on their hazards and the danger they pose.

Extensive requirements on the carriage of dangerous goods by air are set out in [Annex 18](#) to the Chicago Convention and corresponding [Technical Instructions](#) in ICAO Document 9284 (Technical Instructions).

IATA also publishes a “field manual” called the [Dangerous Goods Regulations](#) (DGRs). They may help you understand how to apply the Technical Instructions to your proposed operations, but note that they do not have any regulatory status under UK law and are not directly applicable to RPAS operators.

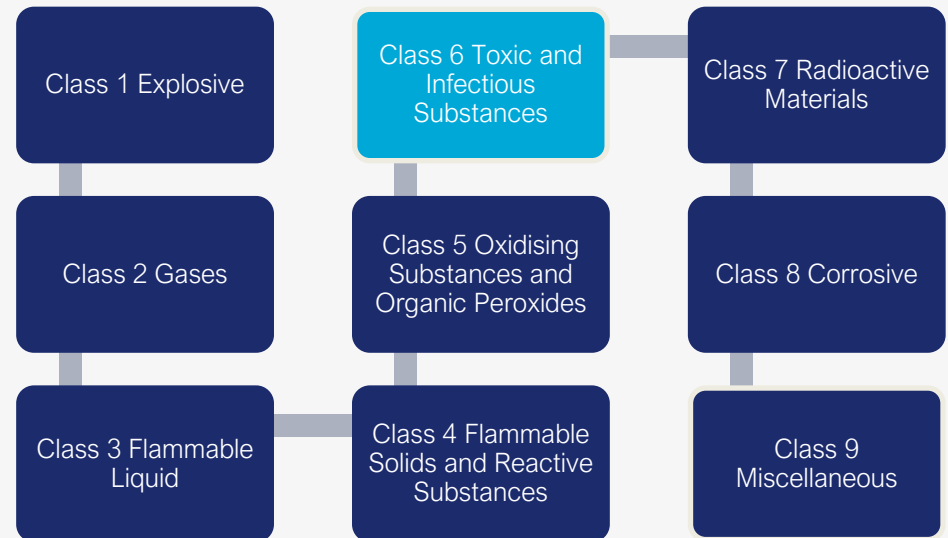
COVID-19 test samples

COVID-19 test samples are considered dangerous goods due to the risk that a person who comes into contact with a sample could be infected with the virus. These test samples come within the [infectious substances](#) category of dangerous goods and are classified as [UN3373 Biological Substance, Category B, Division 6.2](#).

In this example, the owner of the test samples, for example an NHS trust, is the [shipper](#) and the owner of the RPAS is the [operator](#).

The responsibility for identifying and classifying dangerous goods ultimately rests with the [shipper](#). The [operator](#) must also inspect the package and documentation to determine whether or not they are acceptable for transport.

UN Classes of Dangerous Goods



See further

[CAP1162](#) gives a brief introduction on how to identify dangerous goods and includes links for further information. Section 4 of the [example Dangerous Goods Manual for RPAS operators carrying dangerous goods falling within UN3373 Biological Substance, Category B as cargo](#) also includes details on the recognition of undeclared or hidden dangerous goods.



RPAS and COVID-19

There are multiple different ways in which RPAS operators can assist with the UK's response to COVID-19. Not all of these operations will need dangerous goods approval.

First, you need to consider whether the goods that you wish to carry are classified as dangerous goods. For example:

Dangerous goods	Not dangerous goods
COVID-19 test samples <u>after</u> a sample has been collected	COVID-19 testing kits <u>before</u> a sample has been collected
Alcohol-based hand sanitizer	COVID-19 vaccines when authorised for use (including those containing GMOs and GMMOs – e.g. the Oxford University / AstraZeneca vaccine)

Second, if non-dangerous goods are accompanied by other substances that are classified as dangerous goods, such as [dry ice](#) (used to regulate temperature), you will still need a dangerous goods approval from the CAA.



Dangerous goods exception for certain COVID-19 vaccines:

The UN has decided that COVID-19 vaccines containing Genetically Modified Organisms (GMOs) or Genetically Modified Microorganisms (GMMOs) are not classified as dangerous goods when authorised for use.¹ This includes the [Oxford University/AstraZeneca COVID-19 vaccine](#).²



Tips for Innovators

Remember that, aside from any dangerous goods approval, you will need to consider whether any medical or other regulations restrict what goods you can carry. The Medicines and Healthcare products Regulatory Agency (MHRA) may be able to assist you with this.

¹ http://www.icao.int/safety/OPS/OPS-Normal/Pages/Safety-transport_complying.aspx

² <http://vk.ovg.ox.ac.uk/vk/vaccine-ingredients>

Operator Responsibilities

Dangerous goods are capable of posing a hazard to health, safety, property or the environment. Shippers and operators have responsibilities to make sure this doesn't happen.

It is up to the **operator** to assign various responsibilities relating to the carriage of dangerous goods, including:

Allocating a **Nominated Responsible Person** in respect of the operator's dangerous goods approvals, whose responsibilities include ensuring all necessary permissions are held

Ensuring persons receiving or handling dangerous goods follow the required **procedures for acceptance, inspection and documenting** the carriage of dangerous goods

Ensuring that operations personnel **report any incidents or accidents** involving dangerous goods

Ensuring that trainers provide the required **initial and recurrent dangerous goods training** to relevant personnel

Allocating a **Compliance Monitoring Manager** to ensure that activities involving dangerous goods are monitored for compliance with the requirements



Training

In order to obtain approval, it is important to demonstrate that all relevant staff involved in the handling and transport of the dangerous goods receive **appropriate and effective training** beforehand. The training programme needs to be approved by the CAA and individuals' completion of the training verified and recorded.

- Due to the bespoke nature of an RPAS carrying dangerous goods, RPAS operators will not be able to rely solely on generic off-the-shelf dangerous goods training designed for commercial air transport (CAT) operations. You will need to either develop your own training or supplement CAT dangerous goods training with additional material specific to your operations.
- The CAA publishes a [list of companies approved to provide dangerous goods training](#), which may be able to assist you with your training requirements.
- The [CAA's checklist for operators with dangerous goods approval](#) gives a summary of what the training needs to cover. This checklist will need to be submitted as part of the application for dangerous goods approval.
- More detailed training requirements are set out in [CAP483](#) "Training in the Safe Transport of Dangerous Goods by Air".

Specific Category of RPAS Operations

Carrying dangerous goods is currently only possible in the Specific category of RPAS operations.

As explained in Chapter 2.7 of [CAP 722](#), Unmanned Aircraft System Operations in UK Airspace, in the UK the three categories of RPAS operations come from the [UAS Implementing Regulation](#):

Open	Specific	Certified
Cannot carry dangerous goods	Dangerous goods may be carried unless assessed as a high risk for third parties in case of accident	Can carry dangerous goods

To carry dangerous goods in the Specific category, you will need to establish that your operations do not pose a high risk for third parties in the case of accident. Factors relevant to this safety risk include the area of operation, quantity and type of dangerous goods carried, and the [packaging](#) and container used.

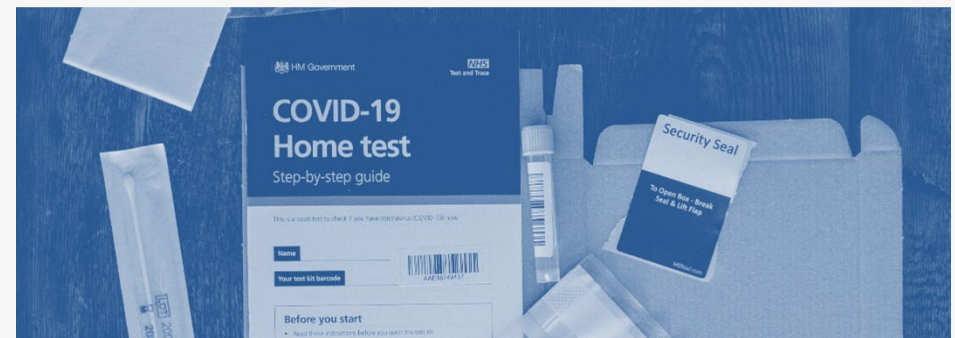
Annex B of [CAP 722](#) gives further detail on the requirements for operations in the Specific category.

RPAS operations in the Specific category, regardless of whether or not they are carrying dangerous goods, require [operational authorisation](#) from the [CAA RPAS Unit](#).



Tips for Innovators

UK regulations relating to the Certified category are still being developed and are not yet published. Further details are available at: caa.co.uk/Commercial-industry/Aircraft/Unmanned-aircraft/Certified-Category/



COVID-19 test samples

When considering packaging materials, the Packing Instructions applicable to each type of dangerous good may be a helpful starting point. Packing Instruction 650 (PI650) applies to dangerous goods falling within UN3373 Biological Substance, Category B, including COVID-19 test samples. Public Health England (PHE) has published a [summary of packaging requirements](#) for COVID-19 samples specifically.

Applying for Dangerous Goods Approval

CAA approval for the carriage of dangerous goods is separate from, and in addition to, the authorisation required for RPAS operations in the Specific category. The application for dangerous goods approval needs to be submitted to dgo@caa.co.uk.

To enable the CAA (Dangerous Goods, Flight Operations) to carry out this assessment, you need to submit the following information as part of your application:

Details of Dangerous Goods Standard Operating Procedures (DG-SOP).

- The DG-SOP forms part of the Dangerous Goods Manual and contains information about dangerous goods so that ground staff and crew members can carry out their responsibilities, including the actions to be taken in the event of emergencies.

A dangerous goods safety risk assessment specific to the proposed operation.

- The risk assessment identifies all hazards associated with the carriage of dangerous goods and sets out how these hazards will be adequately mitigated. The application needs to make reference to the specific requirements of the Technical Instructions, and in each case explain how the mitigations in place achieve an overall level of safety which is at least equivalent to the level of safety provided for in the Technical Instructions.



Forms available at [the CAA's Dangerous Goods website](#)

You are advised to submit your application as early as possible to avoid delays to your planned operation.

COVID-19 test samples

An [example Dangerous Goods Manual](#) for RPAS operators carrying dangerous goods falling within UN3373 Biological Substance, Category B (including COVID-19 test samples) as cargo is available on the CAA [website](#).

The Dangerous Goods Manual is separate from the RPAS Operating Safety Case (OSC). We suggest that you include a reference to your Dangerous Goods Manual in your OSC.

Looking Ahead

Initially, the CAA will focus on approving applications from RPAS operators carrying dangerous goods in support of the NHS' COVID-19 response, followed by other medical supplies.

The CAA's Dangerous Goods team are refining their approach for assessing dangerous goods applications from RPAS operators, taking into account the distinct features of RPAS operations and the regulatory framework under which RPAS operate.

We plan to update this guidance to reflect these future developments. In addition to this guidance and the example Dangerous Goods Manual for RPAS operators carrying dangerous goods falling within UN3373 Biological Substance, Category B, we are currently planning the following additional steps (subject to change):

Bespoke application form

- A bespoke application form for RPAS operators applying for dangerous goods approval

Further guidance material

- Guidance relating to other classes of dangerous goods which may be suitable for carriage by RPAS



Regulatory Sources

The requirements and guidance relevant to the carriage of dangerous goods by RPAS in the UK come from a range of international and UK sources, and are a mix of RPAS-specific sources and those applicable to airspace users in general.

Dangerous Goods sources

- [Annex 18 to the Chicago Convention on Civil Aviation](#), published by ICAO, covers the Safe Transport of Dangerous Goods by Air. In accordance with Chapter 2.7, the CAA is designated as the authority responsible for ensuring compliance with Annex 18 in the UK.
- Annex 18 is supplemented by the [Technical Instructions For the Safe Transport of Dangerous Goods by Air](#) in ICAO Document 9284, which is published every two years and is subject to addenda.³
- The [Air Navigation \(Dangerous Goods\) Regulations 2002](#) are the legal basis for the CAA to enforce dangerous goods requirements in the UK. As a general rule, aircraft cannot carry dangerous goods unless approved to do so by the CAA.

³ The UK has filed limited State Variations to the Technical Instructions, available here: <http://www.icao.int/safety/DangerousGoods/Pages/StateVariationPage.aspx>.



RPAS sources

- Regulations (EU) 2019/947 ([UAS Implementing Regulation](#)) and 2019/945 ([UAS Delegated Regulation](#)), as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018, govern the operation of RPAS in UK airspace.
- These regulations are accompanied by [acceptable means of compliance and guidance material](#) issued by EASA and are reflected in [CAP 722](#) for operations in UK airspace.

Further Information

Visit the CAA's Dangerous Goods web pages for the most up-to-date information on the requirements for dangerous goods approvals:

www.caa.co.uk/dangerous-goods/

Additional CAA guidance:

- **CAP 1162** – Dangerous Goods Guidance
<http://www.caa.co.uk/cap1162>
- **CAP 483** - Training in the Safe Transport of Dangerous Goods by Air
<http://www.caa.co.uk/cap483>
- **Training checklist** for operators with dangerous goods approval
<http://www.caa.co.uk/Commercial-industry/Airlines/Dangerous-goods/Dangerous-goods-training-requirements/>
- **Example Dangerous Goods Manual** for RPAS operators carrying dangerous goods falling within UN3373 Biological Substances, Category B as cargo
(available at <http://www.caa.co.uk/Our-work/Innovation/Regulatory-toolkit-for-innovators-working-in-aviation/>)
- **CAP 722** - Unmanned Aircraft System Operations in UK Airspace
<http://www.caa.co.uk/cap722>



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