Dangerous Goods

A Brief Summary

OSFS
owen sound flight services

Content of Dangerous Goods Training Program

- Classify the 9 categories of Dangerous Goods
- Understand and apply industry changes
- List OSFS Approved Dangerous Goods
- Identify Reporting procedures for undeclared Dangerous Goods
- Practical Exercises and Written Exam

Roles of OSFS Staff

- Training Commensurate with Responsibilities

- ICAO TI – Part 1 – Chapter 4 – Categories of Staff

- **Category 13** – Operator's and ground handling agent's staff accepting cargo or mail (other than dangerous goods)
- **Category 14** - Operator's and ground handling agent's staff involved in the handling, storage and loading of cargo or mail and baggage
- **Category 15** - Passenger handling staff
- **Category 16** - Flight crew members, loadmasters, load planners and flight operations officers/flight dispatchers

Applicable Training

Table 1-5. Content of training courses for operators not carrying dangerous goods as cargo or mail

Contents	*Categories of staff*				
	13	14	15	16	17
General philosophy	X	X	X	X	X
Limitations	X	X	X	X	X
Labelling and marking	X	X	X	X	X
Dangerous goods transport document and other relevant documentation	X				
Recognition of undeclared dangerous goods	X	X	X	X	X
Provisions for passengers and crew	X	X	X	X	X
Emergency procedures	X	X	X	X	X

9 Classes of Dangerous Goods

- Dangerous goods are articles or substances that are capable of posing a risk to health, safety, property or the environment. There are nine classes of dangerous goods:

Class 1: **Explosives**;
Class 2: **Gases**;
Class 3: **Flammable liquids**;
Class 4: **Flammable solids**
Class 5**: Oxidizing substances; organic peroxides**;
Class 6: **Toxic and infectious substances;**
Class 7: **Radioactive material**;
Class 8: **Corrosives**; and
Class 9: **Miscellaneous** dangerous goods and articles

Determining When Substances Are Dangerous Goods

A substance is dangerous goods when

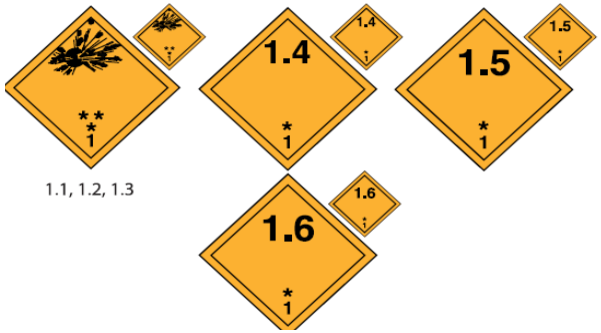
- (a) it is listed by name in Schedule 1 of the TDG Regulations, and is in any form, state or concentration that meets the criteria in this Part for inclusion in at least one of the 9 classes of dangerous goods; or

- (b) it is not listed by name in Schedule 1 but meets the criteria for inclusion in at least one of the 9 classes of dangerous goods

- OSFS **IS** authorized to carry some dangerous goods and passengers are allowed to carry some aswell

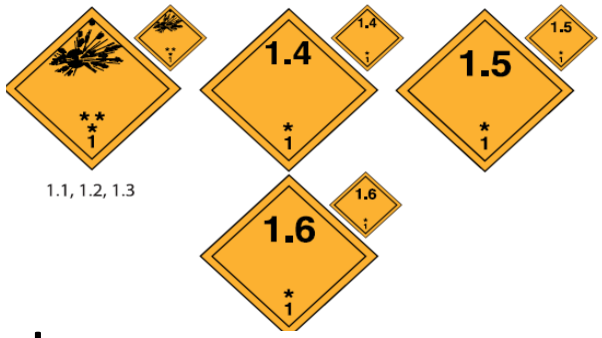
Class 1: Explosives

OSFS - Some



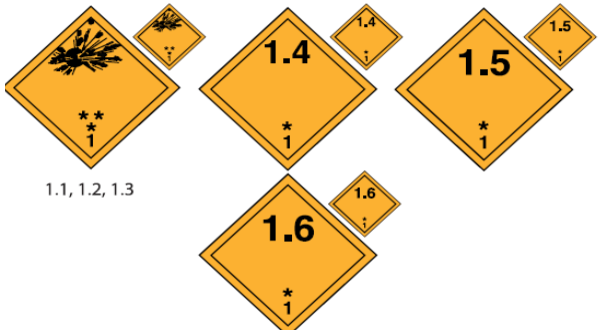
- Substances are included in Class 1, Explosives, if they are
- (a) capable, by chemical reaction, of producing gas at a temperature, pressure and speed that would damage the surroundings; or
- (b) designed to produce an explosive or pyrotechnic effect by heat, light, sound, gas or smoke or a combination of those means as a result of non-detonative, self-sustaining exothermic chemical reactions

Class 1: Explosives, has six divisions:



- (a) Class 1.1, mass explosion hazard;
- (b) Class 1.2, projection hazard but not a mass explosion hazard;
- (c) Class 1.3, fire hazard and either a minor blast hazard or a minor projection hazard or both but not a mass explosion hazard;
- (d) Class 1.4, no significant hazard beyond the package in the event of ignition or initiation during transport;
- (e) Class 1.5, very insensitive substances with a mass explosion hazard; and
- (f) Class 1.6, extremely insensitive articles with no mass explosion hazard.

Examples



- Ammunition/cartridges **(OSFS)**
- Fireworks/pyrotechnics
- Flares
- Blasting caps / detonators
- Fuse
- Primers
- Explosive charges (blasting, demolition etc)
- Detonating cord
- Air bag inflators
- Igniters
- Rockets
- TNT / TNT compositions
- RDX / RDX compositions
- PETN / PETN compositions

Class 2: Gases

OSFS - Some

A substance is included in Class 2, Gases, if it is

- (a) a gas;
- (b) a mixture of gases;
- (c) a mixture of one or more gases with one or more vapours of substances included in other classes;
- (d) an article charged with a gas;
- (e) tellurium hexafluoride; or
- (f) an aerosol.

Class 2: Gases, has three divisions:

- (a) Class 2.1, Flammable Gases, which consists of gases that, at 20°C and an absolute pressure of 101.3 kPa,
- (i) are ignitable when in a mixture of 13 per cent or less by volume with air, or
- (ii) have a flammability range with air of at least 12 percentage points determined in accordance with tests or calculations in ISO 10156;

- (b) Class 2.2, Non-flammable and Non-toxic Gases, which consists of gases that are transported at an absolute pressure greater than or equal to 280 kPa at 20°C, or as refrigerated liquids, and that are not included in Class 2.1, Flammable Gases, or Class 2.3, Toxic Gases; and

- (c) Class 2.3, Toxic Gases, which consists of gases that
- (i) are known to be toxic or corrosive to humans according to CGA P-20, ISO Standard 10298 or other documentary evidence published in technical journals or government publications, or
- (ii) have an LC50 value less than or equal to 5 000 mL/m cubic meters.

Examples

- Aerosols (Hair Spray, Cologne) **(OSFS)**
- Compressed air
- Hydrocarbon gas-powered devices
- Fire extinguishers **(OSFS)**
- Gas cartridges
- Fertilizer ammoniating solution
- Insecticide gases
- Refrigerant gases
- Lighters **(OSFS)**
- Acetylene / Oxyacetylene
- Carbon dioxide
- Helium / helium compounds
- Hydrogen / hydrogen compounds
- Oxygen / oxygen compounds
- Nitrogen / nitrogen compounds

- Natural gas
- Oil gas
- Petroleum gases
- Butane
- Propane
- Ethane
- Methane
- Dimethyl ether
- Propene / propylene
- Ethylene

Class 3: Flammable Liquids

OSFS - Some

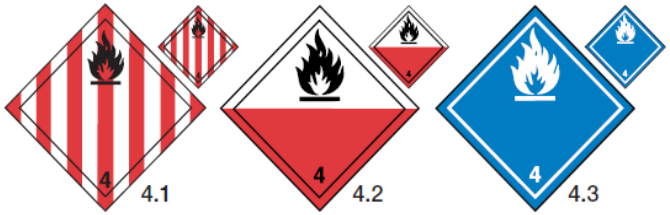
- (a) have a flash point less than or equal to 60.5°C
- (b) are intended or expected to be at a temperature that is greater than or equal to their flash point at any time while the substances are in transport
- (2) Despite paragraph (1) (a) , liquids that have a flash point greater than 35°C are not included in Class 3, Flammable Liquids, if they
- (a) do not sustain combustion
- (b) have a fire point greater than 100°C or
- (c) are water-miscible solutions with a water content greater than 90 per cent by mass.

Examples

- Acetone / acetone oils
- Adhesives
- Paints / lacquers / varnishes
- Alcohols **(OSFS)**
- Perfumery products
- Gasoline / Petrol
- Diesel fuel
- Aviation fuel
- Liquid bio-fuels
- Coal tar / coal tar distillates
- Petroleum crude oil
- Petroleum distillates
- Gas oil
- Shale oil
- Heating oil
- Kerosene
- Resins
- Tars
- Turpentine
- Carbamate insecticides
- Organochlorine pesticides
- Organophosphorus pesticides
- Copper based pesticides
- Esters
- Ethers
- Ethanol
- Benzene
- Butanols
- Dichloropropenes
- Diethyl ether
- Isobutanols
- Isopropyls
- Methanol
- Octanes

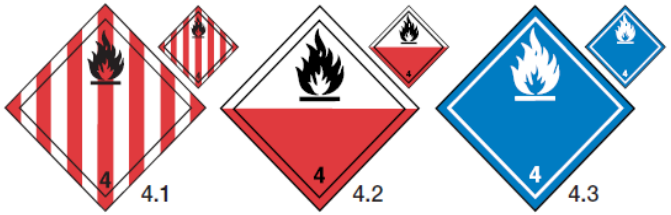
Class 4: Flammable Solids

OSFS - Some



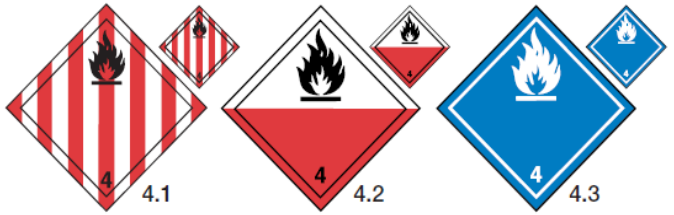
- Substances are included in Class 4 if they are flammable solids, substances liable to spontaneous combustion or substances that on contact with water emit flammable gases

Class 4 has three divisions



- (a) **Class 4.1** consists of substances that are

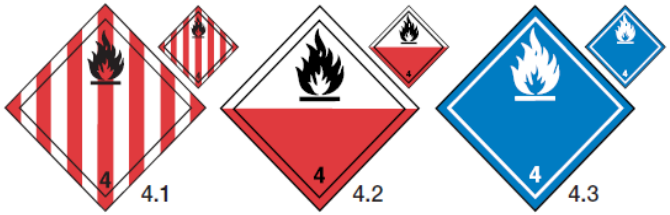
- (i) readily combustible
- (ii) under normal conditions of transport, liable to cause fire through friction,
- (iii) solid desensitized explosives, which are solid explosives desensitized through wetting with water or alcohols or diluted with other substances to form a homogeneous solid mixture to suppress their explosive properties so that they are not included in Class 1, Explosives,
- (iv) self-reactive substances that are liable to undergo a strongly exothermic decomposition even without the participation of oxygen (air)



- b) **Class 4.2** consists of

- (i) pyrophoric substances that spontaneously ignite within 5 minutes after coming into contact with air

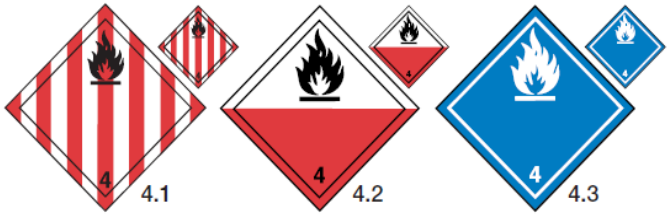
- (ii) self-heating substances that, when in large amounts (kilograms) , spontaneously ignite on contact with air after long periods (hours or days)



- (c) **Class 4.3**

- Water-reactive Substances, which consists of substances that emit a flammable gas at a rate greater than 1 L/kg of substance per hour or spontaneously ignite at any step in the test procedure.

Examples



- Alkali metals
- Metal powders
- Aluminium phosphide
- Sodium batteries
- Sodium cells
- Firelighters
- Matches
- Calcium carbide
- Camphor
- Carbon
- Activated carbon
- Celluloid
- Cerium
- Copra

(OSFS)

- Seed cake
- Oily cotton waste
- Desensitized explosives
- Oily fabrics
- Oily fibres
- Ferrocerium
- Iron oxide (spent
- Iron sponge/direct-reduced iron (spent)
- Metaldehyde
- Naphthalene
- Nitrocellulose
- Phosphorus
- Sulphur

Class 5: Oxidizing Substances and Organic Peroxides

OSFS - None

- Substances are included in Class 5 if they are oxidizing substances or organic peroxides and meet the criteria for inclusion in one of the divisions of Class 5.

Class 5 has two divisions:

- (a) Class 5.1, Oxidizing Substances, which consists of substances that yield oxygen thereby causing or contributing to the combustion of other material

- b) Class 5.2, Organic Peroxides, which consists of substances that

- (i) are thermally unstable organic compounds that contain oxygen
- (ii) are liable to undergo exothermic self-accelerating decomposition,
- (iii) have one or more of the following characteristics:

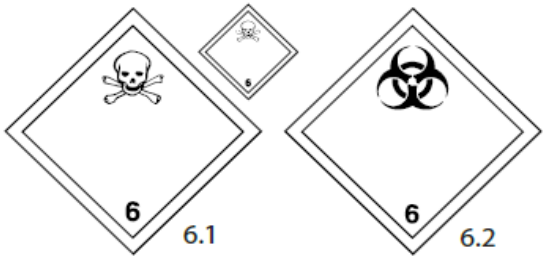
- (A) they are liable to explosive decomposition,
- (B) they burn rapidly,
- (C) they are sensitive to impact or friction,
- (D) they react dangerously with other substances, or
- (E) they cause damage to the eyes, or
- (iv) are in the list of currently assigned organic peroxides in section 2.5.3.2.4 of Chapter 2.5 of the UN Recommentations.

Examples

- Chemical oxygen generators
- Ammonium nitrate fertilizers
- Chlorates
- Nitrates
- Nitrites
- Perchlorates
- Permanganates
- Persulphates
- Aluminium nitrate
- Ammonium dichromate
- Ammonium nitrate
- Ammonium persulphate
- Calcium hypochlorite
- Calcium nitrate
- Calcium peroxide
- Hydrogen peroxide
- Magnesium peroxide
- Lead nitrate
- Lithium hypochlorite
- Potassium chlorate
- Potassium nitrate
- Potassium chlorate
- Potassium perchlorate
- Potassium permanganate
- Sodium nitrate
- Sodium persulphate

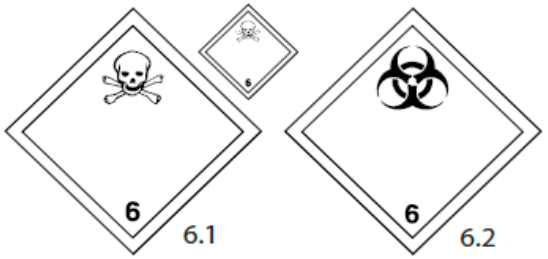
Class 6: Toxic and Infectious Substances

OSFS - Some



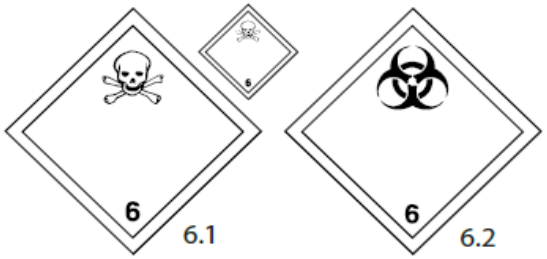
- Substances are included in Class 6 if they are
- (a) liable to cause death or serious injury or to harm human health if swallowed or inhaled or if they come into contact with human skin; or
- (b) infectious substances.

Class 6 has two divisions:



- (a) Class 6.1, Toxic Substances, which consists of substances that are liable to cause death or serious injury or to harm human health if swallowed or inhaled or if they come into contact with human skin; and
- (b) Class 6.2, Infectious Substances, which consists of infectious substances.

Examples

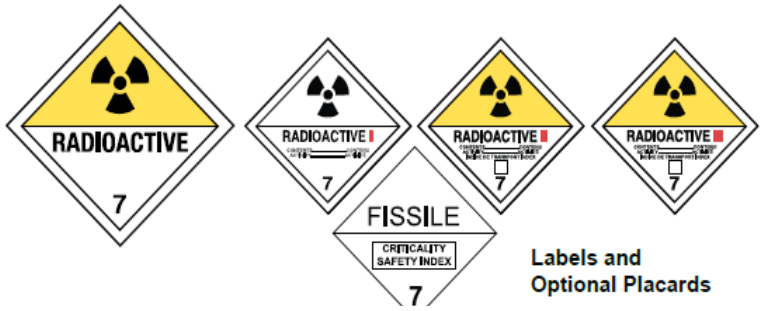


- Medical/Biomedical waste
- Clinical waste
- Biological cultures / samples / specimens
- Medical cultures / samples / specimens
- Tear gas substances
- Motor fuel anti-knock mixture
- Dyes
- Carbamate pesticides
- Alkaloids
- Allyls
- Acids
- Arsenates
- Arsenites
- Cyanides
- Thiols/mercaptans
- Light Bulbs with Mercury **(OSFS)**

- Cresols
- Barium compounds
- Arsenics / arsenic compounds
- Beryllium/ beryllium compounds
- Lead compounds
- Mercury compounds
- Nicotine / nicotine compounds
- Selenium compounds
- Antimony
- Ammonium metavanadate
- Adiponitrile
- Chloroform
- Dichloromethane
- Hexachlorophene
- Phenol
- Resorcinol

Class 7:
Radioactive Materials

OSFS - None



Labels and Optional Placards

- Substances with a specific activity greater than 70 kBq/kg are included in Class 7, Radioactive Materials

- There are no divisions for Class 7.

Examples

Labels and Optional Placards

- Radioactive ores
- Medical isotopes
- Yellowcake
- Density gauges
- Mixed fission products
- Surface contaminated objects
- Caesium radionuclides / isotopes
- Iridium radionuclides / isotopes
- Americium radionuclides / isotopes
- Plutonium radionuclides / isotopes
- Radium radionuclides / isotopes
- Thorium radionuclides / isotopes
- Uranium radionuclides / isotopes
- Depleted uranium / depleted uranium products
- Uranium hexafluoride
- Enriched Uranium

Class 8: Corrosives

OSFS - None

- Substances are included in Class 8, Corrosives, if they
- (a) are known to cause full thickness destruction of human skin, that is, skin lesions that are permanent and destroy all layers of the outer skin through to the internal tissues;
- (b) cause full thickness skin destruction, or
- (c) do not cause full thickness destruction of skin, but exhibit a corrosion rate that exceeds 6.25 mm per year at a test temperature of 55°C, as determined in accordance with the ASTM Corrosion Test.
- There are no divisions for Class 8.

Examples

- Acids/acid solutions
- Batteries
- Battery fluid
- Fuel cell cartridges
- Dyes
- Fire extinguisher charges
- Formaldehyde
- Flux
- Paints
- Alkylphenols
- Amines
- Polyamines
- Sulphides
- Polysulphides
- Chlorides
- Chlorosilanes
- Bromine
- Cyclohexylamine
- Phenol / carbolic acid
- Hydrofluoric acid
- Hydrochloric acid
- Sulfuric acid
- Nitric acid
- Sludge acid
- Hydrogen fluoride
- Iodine
- Morpholine

Class 9, Miscellaneous Products, Substances or Organisms

OSFS - Some

- a) is included in Class 9 in column 3 of Schedule 1; or
- (b) does not meet the criteria for inclusion in any of Classes 1 to 8 and
- There are no divisions for Class 9.

Examples

- Dry ice **(OSFS)**
- Expandable polymeric beads / polystyrene beads
- Ammonium nitrate fertilizers
- Blue asbestos / crocidolite
- Lithium ion batteries **(OSFS)**
- Lithium metal batteries **(OSFS)**
- Battery powered equipment
- Battery powered vehicles
- Fuel cell engines
- Internal combustion engines
- Vehicles
- Magnetized material
- Dangerous goods in apparatus
- Dangerous goods in machinery
- Genetically modified organisms
- Genetically modified micro-organisms
- Chemical kits
- First aid kits **(OSFS)**
- Life saving appliances
- Air bag modules
- Seatbelt pretensioners
- Plastics moulding compound
- Castor bean plant products
- Polychlorinated biphenyls
- Polychlorinated terphenyls
- Dibromodifluoromethane
- Benzaldehyde

Did You Know?

Lithium Batteries are Dangerous Goods?

- Lithium batteries are dangerous goods, much like gasoline, propane, and sulphuric acid.

- Lithium batteries are used in many electronic devices such as cameras, cell phones, laptop computers, medical equipment and power tools.

Cause for Concern

While most lithium batteries are safe, some have overheated and caught fire. Once ignited, they can cause any nearby batteries to overheat and catch fire. These fires are difficult to put out and produce toxic and irritating fumes.

Recent reports of incidents involving the failure of lithium batteries include:

- **Computer batteries have heated up and caused fires on cargo and passenger aircraft.**
- **A charging lithium ion battery exploded on a mini-submarine designed to carry U.S. Navy SEALs to shore.**
- **A passenger's camera batteries began smoking at the boarding gate.**
- **Two large battery packs in a checked baggage began smouldering. The bag burst into flames when an airline agent picked it up.**
- **During a flight, crew found a flashlight's counterfeit lithium metal battery overheating and giving off a strong odour. The damaged battery burned the inside of the flashlight.**

Lithium Ion vs Lithium Metal

A **lithium metal battery** is usually non-rechargeable, contains metallic lithium and features a higher energy density than other non-rechargeable batteries. Lithium metal batteries are often used in calculators, pacemakers, remote car locks and watches, to name a few.

A **lithium ion battery** is rechargeable, does not contain metallic lithium and features high energy density. A lithium polymer battery is considered a type of lithium ion battery. Lithium ion batteries are used in consumer products such as cell phones, electric vehicles, laptop computers, power tools and tablets.

Contained In Equitpment
vs
Packed With Equiptment

- A lithium ion or metal battery **contained in equipment** means that the battery is fitted or joined to the actual device. Examples include a calculator, laptop computer or watch—with an integrated lithium battery.
- A lithium ion or **metal battery packed** with equipment is not fitted or joined to the device. An example would be a power tool packed alongside a spare battery.
- A lithium battery inside equipment is protected from short circuit because it is secured in the actual device and cannot move around during transport. Make sure no switches or power buttons can be accidentally turned on during transport.

Short Circuit Protection

- Preventing lithium batteries from short circuit is very important to keep them from overheating and catching fire. Always keep lithium batteries isolated from metal objects (e.g. jewellery, keys) or other conductive materials by enclosing each one separately and insulating terminals with a non-conductive material (e.g. electrical tape). Pack them so they cannot shift during transport.

OSFS Approved Dangerous Goods

Ammunition

UN Number	Shipping Name
UN0012	CARTRIDGES FOR WEAPONS, INERT PROJECTILE, or CARTRIDGES, SMALL ARMS
UN0014	CARTRIDGES FOR WEAPONS, BLANK, or CARTRIDGES, SMALL ARMS, BLANK

- **(d)** the calibre of cartridges with the UN number UN0012 or UN0014 is
  - **(i)** less than 50 calibres, in the case of cartridges for rifles or pistols, or
  - **(ii)** greater than or equal to 8 gauge, in the case of cartridges for shotguns;
- **(e)** the gross mass of each means of containment is less than or equal to 25 kg;
- **(f)** the explosives are placed in an inner means of containment that is a box, in metal or plastic clips or in partitions that fit snugly in an outer means of containment that is designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no accidental release of the dangerous goods that could endanger public safety;

OSFS Approved Dangerous Goods

Ammunition

- **g)** the primers are protected from accidental initiation; and
- **(h)** each of the outer means of containment is marked with the gross mass in kilograms and the words “Explosives — Excepted” or “Explosifs — Exceptés”, in letters at least 25 mm high and in a colour that contrasts with the background colour of the means of containment.

- **(2)** Despite paragraph “…” of Part 8, Provisions Concerning Passengers and Crew, of the ICAO Technical Instructions, ammunition, or ammunition loaded in a firearm, “…” may be transported on board an aircraft by a peace officer as defined in section 3 of the “Canadian Aviation Security Regulations, 2012” or by an in-flight security officer. *SOR/2014-152*

Items or articles	*Location*			*Approval of the operator(s) is required*	*The pilot-in-command must be informed*	*Restrictions*
	Checked baggage	*Carry-on baggage*	*On the person*			
14) Securely packaged cartridges in Division 1.4S (UN 0012 or UN 0014 only);	Yes	No	No	Yes	No	a) no more than 5 kg gross mass per person for that person’s own use; b) must not include ammunition with explosive or incendiary projectiles; and c) allowances for more than one person must not be combined into one or more packages.

OSFS Approved Dangerous Goods

Survival Kits containing Dangerous Goods

- While the CARs don't mention protection from bugs, bears and other wild creatures when describing survival kits, Section 1.27 of the TDG Regulations exempts many dangerous goods on board a means of transport that people need for their safety.
- **This means that:**
- Aircraft survival kits that are carried for the safety of persons onboard are exempted from the TDG Regulations. The kit may contain "explosives" such as the actuating cartridges (cartridges, power device of Division 1.4C and 1.4S) used to inflate an article such as a dingy, or signal devices such as smoke and illumination signal flares.
- **NOTE:** Even though Subsection 1.27(2) of the TDG Regulations states that ammunition cannot be transported under this exemption, there is a provision under Part 8 of the International Civil Aviation Organization (ICAO) Technical Instructions that allows a person to transport onboard an aircraft up to 5 kg of cartridges (i.e. ammunition classified as UN0012 or UN0014) provided certain conditions are met.

OSFS Approved Dangerous Goods

Matches & Lighter

Items or articles	*Location*			*Approval of the operator(s) is required*	*The pilot-in-command must be informed*	*Restrictions*
	Checked baggage	*Carry-on baggage*	*On the person*			
15) Small packet of safety matches	No	No	Yes	No	No	a) no more than one per person; and b) intended for use by an individual.
"Strike anywhere" matches	No	No	No	n/a	n/a	Forbidden.
Small cigarette lighter	No	No	Yes	No	No	a) no more than one per person; b) intended for use by an individual; and c) does not contain unabsorbed liquid fuel (other than liquefied gas).
Lighter fuel and lighter refills	No	No	No	n/a	n/a	Forbidden.

OSFS Approved Dangerous Goods

Aerosols – (Hairspray, Cologne)

Items or articles	*Location*			*Approval of the operator(s) is required*	*The pilot-in-command must be informed*	*Restrictions*
	Checked baggage	*Carry-on baggage*	*On the person*			
Articles used in dressing or grooming						
10) Toiletry articles (including aerosols)	Yes	Yes	Yes	No	No	a) the term "toiletry articles (including aerosols)" is intended to include such items as hair sprays, perfumes and colognes; b) no more than 0.5 kg or 0.5 L total net quantity per single article; c) release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents; and d) no more than 2 kg or 2 L total net quantity of all articles mentioned in 3), 10) and 13) (e.g. four aerosol cans of 500 mL each) per person.

OSFS Approved Dangerous Goods

Alcohol

Items or articles	*Location*			*Approval of the operator(s) is required*	*The pilot-in-command must be informed*	*Restrictions*
	Checked baggage	*Carry-on baggage*	*On the person*			
12) Alcoholic beverages containing more than 24 per cent but not more than 70 per cent alcohol by volume	Yes	Yes	Yes	No	No	a) must be in retail packagings; b) no more than 5 L per individual receptacle; and c) no more than 5 L total net quantity per person for such beverages. *Note.— Alcoholic beverages containing not more than 24 per cent alcohol by volume are not subject to any restrictions.*

OSFS Approved Dangerous Goods

Life Vests

	Items or articles	Location: Checked baggage	Location: Carry-on baggage	Location: On the person	Approval of the operator(s) is required	The pilot-in-command must be informed	Restrictions
≠	18) Small cartridges fitted into a self-inflating personal safety device such as a life-jacket or vest	Yes	Yes	Yes	Yes	No	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) limited to carbon dioxide or another suitable gas in Division 2.2 without subsidiary risk; d) must be for inflation purposes; e) the device must be fitted with no more than two small cartridges; and f) no more than two spare cartridges.

OSFS Approved Dangerous Goods

Fire Extinguishers

- **Fire Extinguishers**
- **(8)** When dangerous goods are UN1044, FIRE EXTINGUISHERS, Class 2.2, they must
- **(a)** be in compliance with section 5.10 of Part 5, Means of Containment;
- **(b)** have a capacity less than or equal to 18 L when they are transported on board a passenger carrying aircraft; and
  SOR/2008-34
- **(c)** be packed in accordance with Packing Instruction 213 of Chapter 4, Class 2 – Gases, of Part 4, Packing Instructions, of the ICAO Technical Instructions.
  SOR/2008-34

OSFS Approved Dangerous Goods

Dry Ice

Items or articles	*Location*			*Approval of the operator(s) is required*	*The pilot-in-command must be informed*	*Restrictions*
	Checked baggage	*Carry-on baggage*	*On the person*			
21) Dry ice	Yes	Yes	No	Yes	No	a) no more than 2.5 kg per person; b) used to pack perishables that are not subject to these Instructions; c) the package must permit the release of carbon dioxide gas; and d) when carried in checked baggage, each package must be marked: — "DRY ICE" or "CARBON DIOXIDE, SOLID"; and — the net weight of dry ice or an indication that the net weight is 2.5 kg or less.

OSFS Approved Dangerous Goods

Light Bulbs Containing Mercury

	Items or articles	Location			Approval of the operator(s) is required	The pilot-in-command must be informed	Restrictions
		Checked baggage	Carry-on baggage	On the person			
≠	24) Energy efficient lamps	Yes	Yes	Yes	No	No	a) when in retail packaging; and b) intended for personal or home use.

OSFS Approved Dangerous Goods

8-1-8 Lithium Batteries – Contained in Equipment Part 8

	Items or articles	Location: Checked baggage	Location: Carry-on baggage	Location: On the person	Approval of the operator(s) is required	The pilot-in-command must be informed	Restrictions
≠	Portable electronic devices (including medical devices) containing lithium metal or lithium ion cells or batteries (articles containing lithium metal or lithium ion cells or batteries the primary purpose of which is to provide power to another device must be carried as spare batteries in accordance with the item below)	Yes	Yes	Yes	No	No	a) carried by passengers or crew for personal use; b) should be carried as carry-on baggage; c) each battery must not exceed the following: — for lithium metal batteries, a lithium content of not more than 2 grams; or — for lithium ion batteries, a Watt-hour rating of not more than 100 Wh; d) if devices are carried in checked baggage, measures must be taken to prevent unintentional activation; and e) batteries and cells 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.

OSFS Approved Dangerous Goods

Lithium Batteries – As Spares

Items or articles	*Location*			*Approval of the operator(s) is required*	*The pilot-in-command must be informed*	*Restrictions*
	Checked baggage	*Carry-on baggage*	*On the person*			
Spare batteries for portable electronic devices (including medical devices) containing lithium metal or lithium ion cells or batteries	No	Yes	Yes	No	No	a) carried by passengers or crew for personal use; b) 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); c) each battery must not exceed the following: — for lithium metal batteries, a lithium content of not more than 2 grams; or — for lithium ion batteries, a Watt-hour rating of not more than 100 Wh; and d) batteries and cells 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.

Watt-hour (Wh) Rating

- The Wh indicates the amount of energy contained in a lithium battery. TDG Regulations regulate lithium ion batteries based on their Wh rating.

- **How do I calculate the Wh rating?**
- The Wh rating must appear on the battery case if it was made on or after January 1, 2009. If it is not there, you can calculate the Wh rating by using one of these formulas:
- If you know the nominal voltage (V) and the capacity in ampere-hours (Ah), then **Wh = (V) x (Ah)**; or
- If you know the nominal voltage (V) and the capacity in milliampere-hours (mAh), then **Wh = (V) x (mAh ÷ 1000)**.
- If you are still not sure what your lithium battery's Wh rating, contact its manufacturer.

Calculate Watt Hour

Calculate Watt Hour

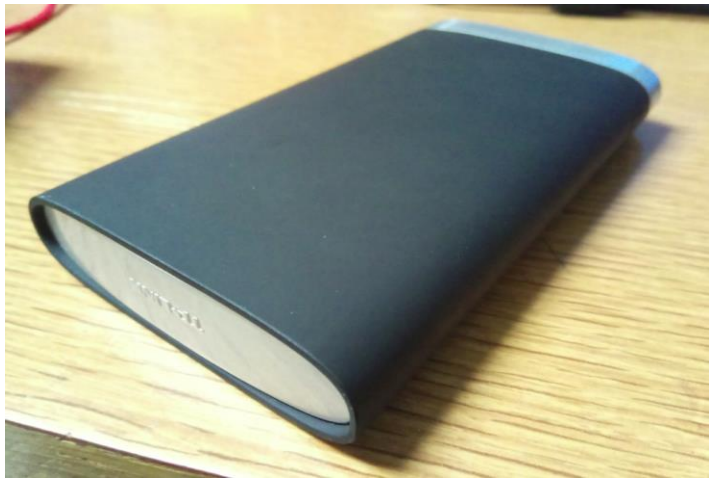
Amps – not Amp-Hours!
This device contains no battery, and is not a dangerous good.

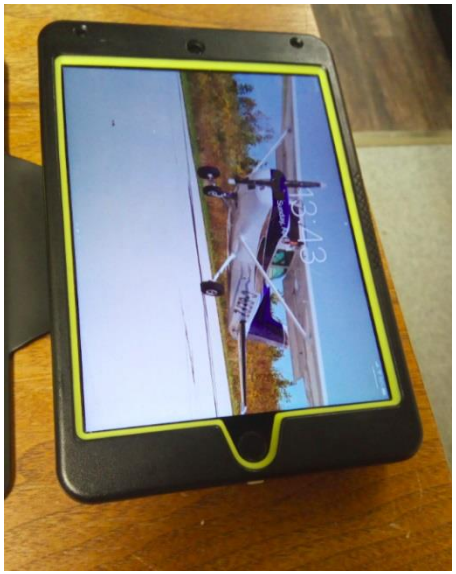
Calculate Watt Hour

Calculate Watt Hour

Determine Watt Hour

- For batteries contained in equipment, it may be difficult to calculate the Watt-Hour rating
- Many devices have no markings on them to help determine watt hour ratings:

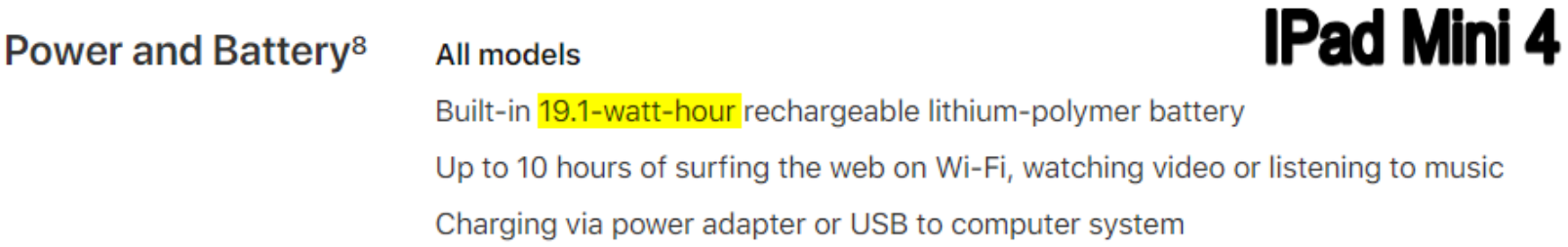




Determine Watt Hour

In these cases OSFS should use all available information to make a safe judgment

- Manufacturer's website may specify a watt-hour rating:



Determine Watt Hour

Approximations based on physical size and weight of batteries contained in equipment may aid in determining rough capacity

An example is this OSFS equipment which is correctly labeled with the watt hour rating:

If in doubt, err on the side of caution and do not carry.

Summary

OSFS Approved Dangerous Goods

Class 1.4S –Ammunition
Class 2.1 – Aerosols (Hairspray, Cologne)
Class 2.1 – Lighter
Class 2.2 – Fire Extinguisher
Class 2.2 – Life Vests with Gas Cartridges
Class 3 – Alcohol
Class 4.1 – Safety Matches
Class 6.1 – Light Bulbs with Mercury
Class 9 – Dry Ice
Class 9 – Lithium Batteries

OSFS NOT Approved Dangerous Goods

All Class 5,7,8

All Class 1-9 not specifically named as approved by OSFS

Class 2.1 – Propane Tanks

Class 4.1 – Strike anywhere Matches

Class 1.4S – Lighter Fluid

Class 9 – Lithium Ion Batteries over 100wh, Lithium Metal over 2g

The following UN Numbers are approved by OSFS for transport of Dangerous Goods as carried by passenger or crew baggage:
UN - 0012, 0014, 1057, 1950, 1044, 3065, 1944, 1845, 2809, 3480 and 3481

Determining if a substance is considered dangerous goods

- There are 4 resources for determining if a substance is a dangerous good:

- **Method 1:** Schedule 1 searchable database

http://wwwapps.tc.gc.ca/Saf-Sec-Sur/3/sched-ann/schedule1form.aspx

- **Method 2:** Schedule 3 alphabetical list

http://wwwapps.tc.gc.ca/Saf-Sec-Sur/3/sched-ann/schedule3.aspx

- **Reference 1** – TDG Regulations – Part 12 – Air Transport

https://www.tc.gc.ca/eng/tdg/clear-part12-466.htm

- **Reference 2** –ICAO Technical Instructions Chapter 8 – Provisions for Dangerous Goods Carried by Passengers or Crew

See internal documentation

Reporting Requirements

TYPES OF REPORT	Who must make the report?	When is the report required?	Who should receive the report?	Is a 30-Day Follow-up report required?
Dangerous Goods Accident or Incident Report - *Air*	Person who has the charge, management or control of the dangerous goods (DG).	• As soon as possible; • In the case of a release or an anticipated release of DG that are or could be in excess of the quantities set out in Subsection 8.9(1) of the TDG Regulations **and** if the release or anticipated release endangers or could endanger public safety; **and** • If the release or anticipated release resulted in one or more of the consequences listed in Subsection 8.9(3) of the TDG Regulations.	• CANUTEC; and, if applicable, • The Canadian Nuclear Safety Commission (CNSC).	Yes
Undeclared or Misdeclared Dangerous Goods Report - *Air*	Any person who discovers the DG.	• As soon as possible after the discovery, on board an aircraft, at an aerodrome or in an air cargo facility, of DG that are not accompanied by the documentation or DG marks set out for the DG in Parts 1 to 6 and 8 of the ICAO Technical Instructions.	• CANUTEC.	No
Loss or Theft Report – *All modes*	Any person who had the charge, management or control of the DG immediately before the loss of theft.	• As soon as possible after the loss or theft; • If the quantity of DG that was lost or stolen is greater than the quantities indicated in Subsection 8.16(2) of the TDG Regulations.	• CANUTEC; and, if applicable, • Natural Resources Canada, or • CNSC.	No
Unlawful Interference Report – *All modes*	Person who has the charge, management or control of the DG.	• As soon as possible after it is discovered that DG have been unlawfully interfered with.	• CANUTEC; and, if applicable, • Natural Resources Canada; or • CNSC.	No

Reporting Requirements

In the event of an emergency

In the event of an emergency involving dangerous goods, call CANUTEC at **1-888-CAN-UTEC (226-8832), 613-996-6666** or ***666 on a cellular phone.**

TDG Regional Offices

For regulatory questions, contact the TDG regional office in your region:

Atlantic
1-866-814-1477
TDG-TMDAtlantic@tc.gc.ca

Quebec
1-514-283-5722
TMD-TDG.Quebec@tc.gc.ca

Ontario
1-416-973-1868
TDG-TMDOntario@tc.gc.ca

Prairie & Northern
1-888-463-0521
TDG-TMDPNR@tc.gc.ca

Pacific
1-604-666-2955
TDGPacific-TMDPacifique@tc.gc.ca