

TRANSPORTATION OF BIOLOGICAL SUBSTANCES BY GROUND AND AIR BIO-125 COURSE NOTES



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Compliant with the Transportation of Dangerous Goods Regulations and IATA at the time of publication.

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ACTS AND REGULATIONS

The Transportation of Dangerous Goods Regulation (TDGR) require that the various people involved in the all aspects of transport comply with the prescriptions of the law. These people are:

Handlers, including receivers or consignees,

Carriers and transport companies

Shippers (distributors, brokers, importers);

And any other person involved in the logistics of transporting dangerous goods.

Repercussion to non-compliance

Federal inspectors and provincial peace officers and highway controllers are mandated to enforce these regulations. Possible repercussions include but not limited to:

- To the shipper and transport company: Penalties and sanctions: Up to \$50,000 and or 2 years
- To the driver: 3-9 demerit points on the driver’s license and \$250 to\$ 900 in fines

These sanctions apply unless a person can prove **due diligence** under the Act.

REGISTRATION: The TDGR now requires that dangerous goods shipping, transportation and handling sites register in the Transport Canada database. This registration is renewable every 12 months.

A site means a permanent place where the importation, presentation for transport, handling or transport of dangerous goods takes place which are in the direct possession of a person carrying out these activities.

This applies to any person who imports, presents for transport, handles or transports dangerous goods at a site located in Canada of which they are the owner or operator.

<https://canadagazette.gc.ca/rp-pr/p2/2023/2023-10-25/html/sor-dors206-eng.html>

IN THE CASE OF INFECTIOUS SUBSTANCES, ONLY CAT A SHIPMENTS REQUIRE REGISTRATION.

EMERGENCY RESPONSE ASSISTANCE PLAN (ERAP)

Some shipments of dangerous goods present a higher level of danger. These shipments are required to have an **Emergency Assistance Response Plan**. This plan must be approved by Transport Canada.

These substances must always be classified as Category A	
Crimean-Congo Hemorrhagic fever virus;	Ebola virus;
Flexal virus;	Guanarito virus;
Hantaviruses causing hemorrhagic fever with renal syndrome;	Hantaviruses causing pulmonary syndrome;
Hendra virus;	Herpes B virus (Cercopithecine Herpesvirus-1);
Junin virus;	Kyasanur Forest virus;
Lassa virus;	Machupo virus;
Marburg virus;	Monkeypox virus;
Nipah virus;	Omsk hemorrhagic fever virus;
Russian Spring - Summer encephalitis virus;	Sabia virus; and
Variola (smallpox virus).	

STEP 1 - TRAINING

Under TDGR requires all persons (Shippers, carriers, handlers and importers) must:

- Be adequately trained and hold a training certificate, OR work in the presence and under the direct supervision of a trained person; AND
- Present his training certificate to any inspector or peace officer requesting it.
- Keep training certificates for two years after the expiry date.

Training certificate:

- is valid for 2 years (air) and 3 years (ground) or when changing employers.
- must be signed by the employee and employer.

STEP 2 - CLASSIFICATION

The classification (or shipping description) includes four elements which are:

Category:

- Category A = high risk
- Category B = minor risk
- *Exempt specimens¹: no foreseeable risks*

Shipping name:

- BIOLOGICAL SUBSTANCES, CATEGORY B
- INFECTIOUS SUBSTANCE, AFFECTING HUMANS
- INFECTIOUS SUBSTANCE, AFFECTING ANIMALS, only
- DRY ICE
- *Exempt human specimen, OR exempt animal specimen²*

Hazard class: TDGR has assigned all the dangerous goods to one of 9 hazard classes. For the purposes of this book we will only discuss the classes involved in shipping biological samples.

- Class 6.2 - Infectious substances
- Class 9 - Miscellaneous dangerous goods

IDENTIFICATION NUMBER (UN NUMBER)

- UN3373 - BIOLOGICAL SUBSTANCES, CATEGORY B
- UN1845 - DRY ICE
- UN2814 - INFECTIOUS SUBSTANCE, AFFECTING HUMANS
- UN2900 - INFECTIOUS SUBSTANCE, AFFECTING ANIMALS, only

CLASS 6.2 - INFECTIOUS SUBSTANCES

An infectious substance is defined as “a substance known or reasonably believed to contain viable micro-organisms that are known or reasonably believed to cause disease in humans or animals.

- Viruses (HIV, H1N1), bacteria, rickettsias, parasites etc.

Inclusion in class 6.2 is based « on a reason to believe » (or professional judgement) that the substance contains an infectious substance. Classification **must not be based** on universal precautions or statistical inferences. While there are various contradictory interpretations from Transport Canada, a substance for which there is no reason to believe that it is infected

¹ Exempt specimen is not an official category under TDGR but included here for clarity and training purposes.

² Exempt human (animal) specimen are not proper shipping name per se but are terms used to describe certain samples and included here for clarity and training purposes.

should not be classified as an “infectious substance”.

CATEGORIES (class 6.2)

CATEGORY A (high risk): Infectious substances transported in a form that, in case of exposure, can provoke a permanent invalidity, constitutes a menace or cause death.

- UN2814 - INFECTIOUS SUBSTANCE, AFFECTING HUMANS
- UN2900 - INFECTIOUS SUBSTANCE, AFFECTING ANIMALS, only



Substances considered Cat. A (UN2814) at all times

Crimean-Congo Hemorrhagic fever virus;
 Ebola virus;
 Flexal virus;
 Guanarito virus;
 Hantaviruses causing hemorrhagic fever with renal syndrome;
 Hantaviruses causing pulmonary syndrome;
 Hendra virus;
 Herpes B virus (Cercopithecine Herpesvirus-1); *

Junin virus;
 Kyasanur Forest virus;
 Lassa virus;
 Machupo virus;
 Marburg virus;
 Monkeypox virus;
 Nipah virus;
 Omsk hemorrhagic fever virus;
 Russian Spring - Summer encephalitis virus;*
 Sabia virus; and
 Variola (smallpox virus).

Substances considered Cat. A (UN2814) in CULTURES ONLY

Bacillus anthracis
 Brucella abortus
 Brucella melitensis
 Brucella suis
 Burkholderia mallei - Pseudomonas mallei - Morve
 Burkholderia pseudomallei - Pseudomonas pseudomallei
 Chlamydia psittaci - (avian strains)
 Clostridium botulinum
 Coxioides immitis
 Coxiella burnetii
 Escherichia coli, verotoxigenic – ETEC
 Francisella tularensis
 Mycobacterium tuberculosis
 Polioviruses
 Rickettsia prowazekii
 Rickettsia rickettsii
 Shigella dysenteriae type 1

Tick-borne encephalitis virus
 Eastern equine encephalitis virus
 Venezuelan equine encephalitis virus
 Japanese encephalitis virus
 Hepatitis B virus
 Human Immunodeficiency virus (HIV)
 Highly pathogenic avian influenza virus
 Dengue virus
 Rift Valley Fever virus
 Yellow fever virus (wild type)
 West Nile fever virus
 Rabies virus
 Yersinia pestis
 Herpesvirus simiae (Canada only)
 Monkeypox virus (Canada only)
 Severe Acute Respiratory Syndrome -SARS (Canada only)

Substances considered Cat. A (UN2900) in culture only (FOR ANIMALS ONLY)

Mycoplasma mycoides - contagious bovine Pleuropneumonia

Avian paramyxovirus Type 1 Velogenic Newcastle virus

Lumpy skin disease virus

Foot and mouth disease virus

Hog Cholera virus (Classical Swine Fever)

African Swine fever virus

Swine vesicular disease virus

Peste des petits ruminants virus

Vesicular stomatitis virus

Goat pox virus

Sheep pox virus

Rinderpest virus

CATEGORY B (lower risk) : Infectious substances that do not meet the requirements for inclusion in Category A, but still represents a risk for public safety.

- HIV tainted blood sample (not a culture)
- Biological specimen infected with Hepatitis B

Category B substances are automatically assigned to **UN 3373 - BIOLOGICAL SAMPLE, CATEGORY B.**



ACCORDING TO A RECENT TRANSPORT CANADA INTERPRETATION, WHEN THE PATIENT'S MEDICAL HISTORY IS UNKNOWN OR NOT AVAILABLE, THE PATIENT SPECIMEN MUST BE CLASSIFIED AS UN3373, CATEGORY B

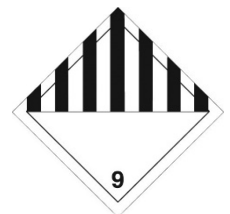
EXEMPTED SPECIMENS (minimal risk): A substance reasonably believe that it **does not contain** an infectious

- E.g. Blood sample on non-contaminated blood (routine testing), Urine sample (drug testing)

CLASS 9 - MISCELLANEOUS DANGEROUS GOODS

Dry ice UN1845 has three basic dangers associated to it:

Risk of suffocation by oxygen displacement, cold burns (dry ice is approximately -70 deg. C; or explosion form over-pressurisation of the packaging cause by the sublimation process.



STEP 3 - PACKAGING SURFACE (GROUND) TRANSPORT

Exempted specimens must use packaging that under normal conditions of transport will have no release of the specimen including:

- A primary leak proof receptacle
- A secondary receptacle (absorbent recommended - mandatory for Shared Health Manitoba)
- A sturdy, rigid outer package



Category B substances must be packed in accordance with **Packing Instruction 650** which requires:

- A primary leak proof receptacle
- A secondary leak proof receptacle (with absorbent for liquids)
- A sturdy, rigid outer package minimum size of 100 mm x 100 mm with a description of the contents.
- Testing is required



Category A substances must be packed in accordance with **Packing Instruction 620** which requires standardized packaging with:

- A primary leak proof receptacle
- A secondary leak proof receptacle (absorbent required for all liquid content)
- Rigid outer package with a minimum size of 100 mm x 100 mm bearing a certification (standardization) mark.



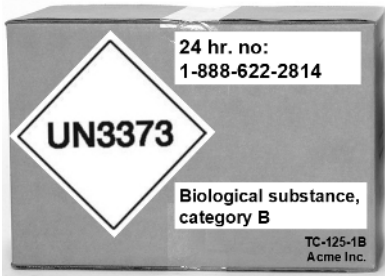
Dry ice does not require standardized packaging but must be packaged in such a manner as to **avoid over-pressurisation**.

STEP 4 - MARKING AND LABELLING

All packages must show appropriate safety marks as per TDGR. These safety marks must be visible, legible and resistant; be in French or in English (English only for the USA);

For exempt specimens:

- « Exempt Human Specimen » or « Exempt Animal Specimen », as required, or the equivalent in French



For Category B, the following are required:

- Shipping name: « Biological substances, category B»
- UN3373 label
- An emergency telephone number (24 hrs, 7 without any break in the communication with the mention: 24-hrs, or the equivalent in French).³

For Category A, the following are required:

- Shipping name
- Hazard class 6.2 label
- Identification number (UN)
- Package certification (TC125-1A)

Dry ice does not require any form of identification for surface transport.

STEP 5 - DOCUMENTATION

The term “ transport document ” , “ dangerous goods declaration ” , “ shipper’s declaration ”, are all synonymous and refer to the sheet of paper that must be used to indicate the presence of dangerous goods in a shipment.

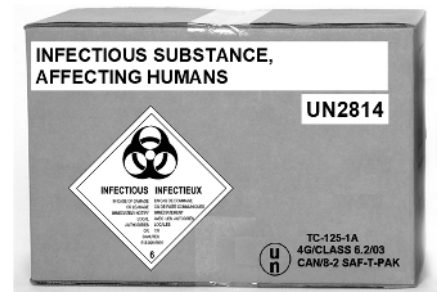
Only dangerous goods shipment of Cat. A require a transport document. No shipper’s declaration of dangerous goods is required for Category B or Dry Ice.

- In English or French (English only for shipments to the USA);
- Legible and in indelible ink
- Kept for two years (shipper, carrier and importer)
- Within easy reach of the driver;
- Visible to anyone entering from the driver's door, driver is away

The shipping document must have the following:

- Name and address of shipper
- A date
- A emergency number with the words *24-Hour Number* or *24-hr No.* or the equivalent in French
- number of packages, and total quantity (net or gross) in **metric units** (L or Kg)

³ The shipper may use CANUTEC if his/her firm is registered with that organization. Registration must be renewed every 3 years.



- the complete shipping description (S.H.I.P.). in the following order: UN number, Shipping name, Hazard class.
- For certain highly infectious substances (see ERAP section), the shipper must have an Emergency Response Assistance Plan number and a telephone number to activate it.

If the shipment consists of dangerous and non-dangerous goods on a single document, the dangerous goods information must be given in one of the following methods:

- The dangerous goods must be listed first under a heading "Dangerous Goods";
- The dangerous goods can be listed in any order but must be identified with an "X" in a column identified "DG" or "MD"; or
- The dangerous goods can be printed or highlighted in color.

STEP 6 - PLACARDING TRANSPORT UNITS

All large means of containment (trucks), in transport or storage in view of transporting, must have the appropriate safety marks (placards) as required by the TDGR. These safety marks must:

- Be visible, legible and resistant on all four sides;
- Removed when the container is cleaned and purged
- Showing the UN number when an ERAP is required
- For any quantity requiring an ERAP or 500 kg of Cat. A substances.

Any vehicle requiring placards becomes a "heavy truck" under Quebec Road Act and must therefore meet all requirements of this category.

STEP7 - LOADING

In Canada, it is forbidden to transport goods unless they are braced and secured using instruments of sufficient capacity. Please consult standard no. 10 of the Canadian Bracing and Securing Code.

STEP 8 - REPORTING

Any accidental release or imminent accidental release of class 6.2 materials must immediately be reported to 911, and CANUTEC (613-996-6666 or *666 on any cell phone). A written follow up report must be filed within 30 days.

If dangerous good, are discovered to have been lost or stolen or otherwise unlawfully interfered with, you must immediately make a report to the local police; CANUTEC at 613-996-6666 (*666 on any cell phone).

You must make all attempts to limit the damages following any spill of dangerous goods without putting your safety at risk. In general terms, you should:

- Advised persons concerned;
- Ensure adequate safety perimeter;
- Limit contamination to the environment;
- Collaborate with emergency personnel;
- Call Canutec *666



Tunnels: It is prohibited to travel in marked tunnels with a dangerous goods load requiring placards.



Level Crossings: The driver of a road vehicle that contains dangerous goods requiring placards must:

Stop at 5 meters from the crossing and look;

Use the by-pass lane if there is one. If not stay on the main road and use hazard lights while crossing.

Some exemptions exist - look for this road sign.



CHECKLIST

GROUND TRANSPORT	
PACKAGING AND LABELLING	YES
Exempt Specimens	
Good quality packaging	<input type="checkbox"/>
Label « Exempt Specimen »	<input type="checkbox"/>
Category B	
Packed according to PI 650	<input type="checkbox"/>
UN 3373 label as a diamond on a point	<input type="checkbox"/>
« Biological Substance, Category B » on the same surface as the label	<input type="checkbox"/>
A telephone number with the words « 24 hr no. »	<input type="checkbox"/>
Category A	
Packed according to PI 620	<input type="checkbox"/>
UN2814 Infectious material affecting humans, OR	<input type="checkbox"/>
UN2900 Infectious material affecting animals	<input type="checkbox"/>
Classe 6.2 (diamond on a point), next to the UN no.	<input type="checkbox"/>
Package certification mark (UN4G/class 6.2....)	<input type="checkbox"/>
SHIPPING DOCUMENT – CAT A ONLY	
Name and address of shipper	<input type="checkbox"/>
The date	<input type="checkbox"/>
Emergency number with the words 24-hr no.	<input type="checkbox"/>
Description, in the following order	<input type="checkbox"/>
• UN2814 Infectious material affecting humans, OR	<input type="checkbox"/>
• UN2900 Infectious material affecting animals	<input type="checkbox"/>
Include name of pathogens (in brackets)	<input type="checkbox"/>
Number of packages	<input type="checkbox"/>
Total qty. In kg or L	<input type="checkbox"/>
ERAP information (if required – 16 pathogens)	<input type="checkbox"/>
Shipper's certification and name	<input type="checkbox"/>
PLACARDS	
Supply / affix placards if required	<input type="checkbox"/>
LOADING	
Packages are secured	<input type="checkbox"/>
TRAINING	
My training certificat is valid and in your possession	<input type="checkbox"/>

AIR TRANSPORT

STEP 2 - CLASSIFICATION

Classification for air transport is exactly the same as for ground transport.

STEP 3 - PACKAGING

EXEMPT SPECIMENS

Shipments of *exempt specimens* must be packed as for ground transport in *good quality* packaging that will resist to normal conditions for air transport in **addition to absorbents for all liquid content**.

CATEGORY B

Category B substances must be packed in accordance with IATA packing instructions 650 (similar to Type 1B) including the 95 kPa test.

There is a limit of **4 litres** per package as well as 1 L per inner receptacle.

CATEGORY A

Category A shipments must be packed in accordance with IATA packing instructions 620 (similar to Type 1A). There is a limit of **50 mL** per package for passenger aircrafts and 4 L for cargo only aircrafts. Packages must bear the UN markings as illustrated in the section on surface transport.

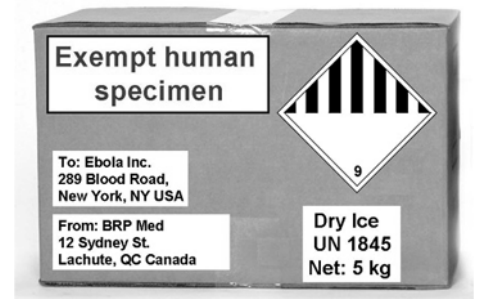
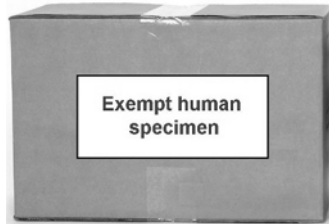
No other substances may be packed with infectious materials with the exception of dry ice and certain stabilizing materials (class 3 and 8)

STEP 4 - MARKING AND LABELLING

All packages prepared for transport must be marked and labelled. The same safety marks required for surface transport must be affixed with additional markings required.

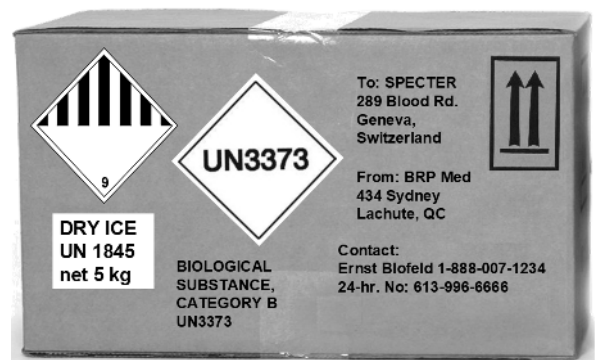
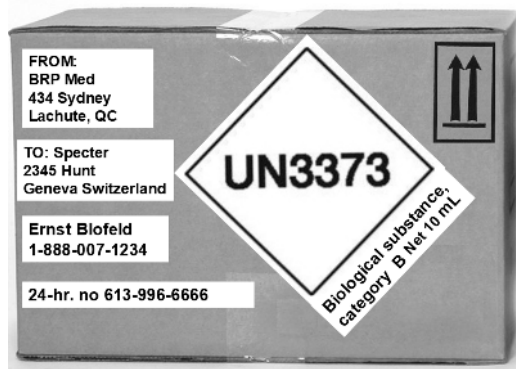
Labels must be at least 100 mm x 100 mm and may be reduced to **half-size** (50mm x 50mm) **only** if the package is too small to accept the full-size labels.

For exempt specimens

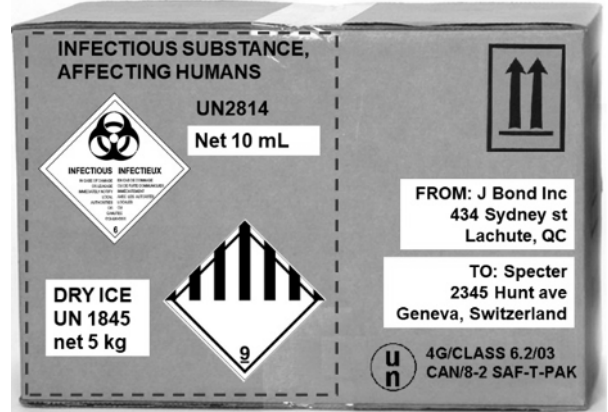
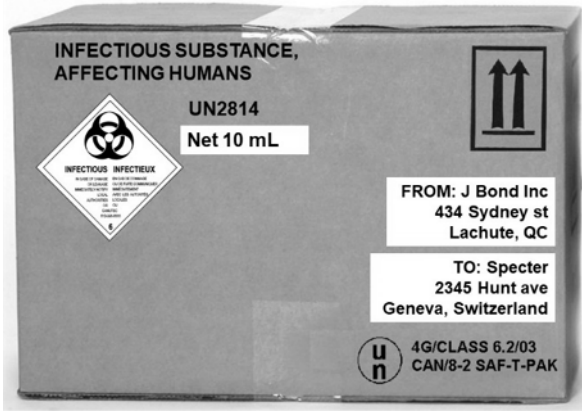


Exempt specimens with dry ice

For Category B:



Shipments of category A :



An additional phone number, for logistical purposes should be included either on the package or the air waybill.

Overpacks

Several packages may be grouped together to form one handling unit. This is known as "over packing". "Over packs" must bear all safety marks that are not visible and legible from the outside, except for package certification marks.

Cargo aircraft only :

Packages that must fly by cargo aircraft only, because of the quantity, must bear the orange CAO label on the same side as the hazard label.



Temperature sensitive label:



STEP 5 - DOCUMENTATION

Air waybill (AWB): An AWB is required for all shipments. This may be completed by the shipper or buy a third party. There are many forms to this document which is basically a transport contract, and the requirements can be completed by simple check marks. This may be completed manually or mechanically depending on your carrier. An additional phone number, for logistical purposes should be included either on the package or the air waybill.

Exempt specimens or Cat B with dry ice.

7 Special Handling / Manutention spéciale

HOLD at FedEx Location / RETENIR à la succursale FedEx
May not be in the same city. Not available for FedEx First Overnight. / Peut être située dans une autre ville. Pas disponible pour FedEx First Overnight.

SATURDAY Delivery / Livraison le SAMEDI
Available to select locations. Not available for FedEx First Overnight and FedEx 1Day Freight. / Disponible à certains endroits. Pas disponible pour FedEx First Overnight et FedEx 1Day Freight.

Does this shipment contain dangerous goods? / Cet envoi contient-il des marchandises dangereuses?*

Must check one box. / Cocher une seule case.

No / Non Yes As per attached Shipper's Declaration. / Oui Selon la déclaration de l'expéditeur, ci-jointe. Yes Shipper's Declaration not required. / Oui Déclaration de l'expéditeur non requise. Dry Ice / Dioxyde de carbone, solide UN 1845 1 x 5 kg

Exempt specimen *Dangerous goods (including dry ice) cannot be shipped in FedEx packaging. / Les marchandises dangereuses (y compris le dioxyde de carbone solide) ne peuvent pas être expédiées dans des emballages FedEx. Cargo Aircraft Only / Avion cargo uniquement

Category A with dry ice

7 Special Handling / Manutention spéciale

HOLD at FedEx Location / RETENIR à la succursale FedEx
May not be in the same city. Not available for FedEx First Overnight. / Peut être située dans une autre ville. Pas disponible pour FedEx First Overnight.

SATURDAY Delivery / Livraison le SAMEDI
Available to select locations. Not available for FedEx First Overnight and FedEx 1Day Freight. / Disponible à certains endroits. Pas disponible pour FedEx First Overnight et FedEx 1Day Freight.

Does this shipment contain dangerous goods? / Cet envoi contient-il des marchandises dangereuses?*

Must check one box. / Cocher une seule case.

No / Non Yes As per attached Shipper's Declaration. / Oui Selon la déclaration de l'expéditeur, ci-jointe. Yes Shipper's Declaration not required. / Oui Déclaration de l'expéditeur non requise. Dry Ice / Dioxyde de carbone, solide UN 1845 1 x 5 kg

infectious substances *Dangerous goods (including dry ice) cannot be shipped in FedEx packaging. / Les marchandises dangereuses (y compris le dioxyde de carbone solide) ne peuvent pas être expédiées dans des emballages FedEx. Cargo Aircraft Only / Avion cargo uniquement

SHIPPER'S DECLARATION -CATEGORY A ONLY

Air transport requires the IATA shipper's declaration in the proper format, with red borders. It must be completed in English, in permanent ink. Print and sign four copies, keeping one (for 2 years) and giving three to the carrier). Please use the supplied shipper's declaration in PDF format supplied with the course materials.

SHIPPER'S DECLARATION FOR DANGEROUS GOODS

Shipper

Air Waybill No.:

Page 1 of 1 Pages

Shipper's reference No.:
(optional)

Consignee

For optional use

Two completed and signed copies of this Declaration must be handed to the operator

Warning Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to penalties .

TRANSPORT DETAILS

This shipment is within the limitations prescribed for: (delete non-applicable)

Airport of Departure:

**PASSENGER
AND CARGO
AIRCRAFT**

**CARGO
XXXXXXXXXX
AIRCRAFT
XXXXXXXXXX
ONLY**

Shipment type: (delete non-applicable)

NON- RADIOACTIVE

XXXXXXXXXXXX

Airport of Destination:

NATURE AND QUANTITY OF DANGEROUS GOODS

Dangerous Goods Identification

UN or ID No.	Proper Shipping Name	Class or Div. (Subsidiary Risk)	Packing Group	Quantity and type of packing	Packing Inst.	Authorisation
UN2814	INFECTIOUS SUBSTANCES, AFFECTING HUMANS (add suspected pathogen)	6.2		1 FIBREBOARD BOX X 10 mL	620	

Additional Handling Information

Emergency 24 hour No.:

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. I declare that all of the applicable air transport requirements have been met.

Nom/ Name of Signatory

Signature
(see warning above)

Date/

Dry Ice in an overpack

In the case where dry ice is shipped out with a category A, the dry ice must also be declared. For dry ice overpacked with the infectious material, add the mention « Overpack used » followed by the number of overpacks.

In the following example one box of Cat. A is overpacked with dry ice.

NATURE AND QUANTITY OF DANGEROUS GOODS (See sub-section 8.1 of IATA Dangerous Goods Regulations)						
Dangerous Goods Identification						
UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing group	Quantity and type of packing	Packing Inst.	Authorization
UN2814	Infectious substance, affecting humans (HIV culture)	6.2		1 x fibreboard box x 50 mL	620	
UN1845	Dry ice			5 kg overpack used	954	

Dry ice in same box as sample (freezer pack) "All packed in one"

However, if the dry ice is inside the same package, this is known as an 'all packed in one' and the document must be prepared in the following manner:

- Insert only the quantity of the dangerous goods;
- Add the mention « all packed in one fibreboard box »

NATURE AND QUANTITY OF DANGEROUS GOODS (See sub-section 8.1 of IATA Dangerous Goods Regulations)						
Dangerous Goods Identification						
UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing group	Quantity and type of packing	Packing Inst.	Authorization
UN2814	Infectious substance, affecting humans (Suspected category A infectious substance)	6.2		50 mL	602	
UN1845	Dry ice	9		5 kg	904	
				All packed in one fibreboard box		

Quantity only (points to 50 mL and 5 kg)

Statement for all dangerous goods packed in same outer package (points to All packed in one fibreboard box)

CHECKLIST - AIR TRANSPORT BIOLOGICAL SUBSTANCES**Category A**

- Packing instructions 620
- Package identification
 - ✓ UN2814 Infectious substance affecting humans or UN2900 Infectious substance affecting animals
 - ✓ Class 6.2 label
 - ✓ Package certification
 - ✓ Package orientation labels (2) - if more than 50 mL
- Shippers declaration required (use de supplied template)
 - ✓ Date
 - ✓ Name and address of shipper and consignee
 - ✓ 24-Hr No.
 - ✓ Complete shipping description (with pathogen)
 - ✓ Number of packages and quantity per package (metric units)
 - ✓ Name and signature of shipper and date
 - ✓ ERAP information if required
- Air waybill required (Name and phone number of a person)

Category B

- Packing Instructions 650
- Package identification (in English)
 - ✓ Biological substance, category B
 - ✓ Label UN3373
 - ✓ Name and address of shipper and consignee
 - ✓ 24-HR NO with no. phone
 - ✓ Package orientation labels (2) - if more than 50 mL
- Air waybill required (Name and phone number of a person)

Exempt specimen

- Good quality packaging (3 levels of protection)
 - ✓ Absorbent required
- Package Identification: Exempt human specimen (or animal)
- Air waybill required

Dry ice

- Package identification
 - ✓ Dry Ice, class 9 label, UN1845
 - ✓ name and address of shipper and consignee
 - ✓ Net weight of dry ice at any time on parcels
- Shipper's declaration not required (except with Cat A)
- Air waybill required
 - ✓ Dry Ice, class 9, UN1845, number of packages + net quantity.

TDGR – APPENDIX 3 - GUIDE TO CATEGORY B ASSIGNMENT

If the symbol “@” appears beside an infectious substance listed in this Appendix, that infectious substance affects animals only.

UN3373, Category B — Virus, Bacteria and Fungi

Virus

Item	Column 1 - Family	Column 2- Genus	Column 3 - Species
1 (1)	Adenoviridae	(1) Aviadenovirus	Animal, all isolates@
		(2) Mastadenovirus	(a) Adenovirus (human, all types) (b) Animal, all isolates@
2 (2)	Arenaviridae	Arenavirus	(a) Lymphocytic choriomeningitis virus (b) Mopeia virus (c) Tacaribe viruses (d) Whitewater Arroyo virus
3 (3)	Arteviridae	Arterivirus	(a) Equine arteritis virus@ (b) Porcine reproductive/ Respiratory syndrome virus@ (c) Simian hemorrhagic fever virus
4 (4)	Astroviridae	Astrovirus	All serotypes
5 (5)	Birnaviridae	Birnavirus	(a) Infectious bursal disease virus@ (b) Infectious pancreatic necrosis virus@
6 (6)	Bornaviridae	Bornavirus	Borna disease virus (CNS-encephalo-myelitis)
7 (7)	Bunyaviridae	(1) Bunyavirus	(a) Aino virus@ (b) Akabane virus@ (c) Bunyamwera virus (d) California encephalitis virus (e) Jamestown Canyon virus (f) La Crosse virus (g) Lumbo virus (h) Oropouche virus (i) Snowshoe hare virus (j) Tahyna virus
		(2) Hantavirus	(a) Hantaviruses not causing pulmonary syndrome (b) Hantaviruses not causing hemorrhagic fever with renal syndrome
		(3) Nairovirus	(a) Hazara virus Nairobi sheep disease virus@
8 (8)	Caliciviridae	Calicivirus	(a) European brown hare virus@ (b) Feline calicivirus@ (c) Hepatitis E virus (d) Norwalk virus (e) Rabbit hemorrhagic disease virus@ (f) San Miguel sea lion virus@ (g) Vesicular exanthema of swine virus
9 (9)	Circoviridae	Circovirus	(a) Avian circovirus@ (b) Porcine circovirus@

10 (10)	Coronaviridae	(1) Coronavirus	(a) Avian infectious bronchitis virus@ (b) Bovine coronavirus, all strains (c) Canine, Rat and Rabbit coronavirus@ (d) Feline enteric coronavirus@ (e) Feline infectious peritonitis virus@ (f) Hemagglutinating encephalo-myelitis virus of swine@
			(g) Human coronavirus, all strains excluding SARS (h) Mouse hepatitis virus@ (i) Porcine epidemic diarrhea virus@ (j) Porcine respiratory coronavirus@ (k) Transmissible gastroenteritis virus of swine@ (l) Turkeys enteritis coronavirus@
		(2) Torovirus	(a) Berne virus@ (b) Breda virus@
11 (11)	Flaviviridae	(1) Flavivirus	(a) Kunjin virus (b) Louping ill virus (c) Murray Valley encephalitis virus (Australia encephalitis) (d) Powassan virus (e) Rocio virus (f) St. Louis encephalitis virus (g) Turkey meningoencephalitis virus (h) Wesselsbron virus (i) Yellow fever virus (vaccine strain 17D)
		(2) Hepacivirus	Hepatitis C virus
		(3) Pestivirus	(a) Border disease virus@ (b) Bovine viral diarrhea virus@
12 (12)	Hepadnaviridae	(1) Delta virus	Hepatitis D (Delta) virus
		(2) Avihepadna-virus	Duck hepatitis B virus@
		(3) Orthohepadna-virus	(a) Ground squirrel hepatitis B virus (b) Woodchuck hepatitis virus@
13 (13)	Herpesviridae (Alphaherpesvirinae)	(1) Simplexvirus	(a) Human herpes virus 1 (b) Human herpes virus 2 (c) Mammillitis virus (bovine herpes-virus 2)@
		(2) Varicellovirus	(a) All isolates, excluding pseudorabies virus (b) Bovine infectious rhinotracheitis (herpesvirus 1) (c) Equine abortion virus (equine herpesvirus 1)@ (d) Equine coital exanthema virus (equine herpesvirus 3)@ (e) Equine rhinopneumonitis (equine herpesvirus 4)@ (f) Feline rhinotracheitis (feline herpesvirus 1)@ (g) Human herpes virus 3 (Varicella-zoster virus) (h) Pseudorabies virus (suis herpes virus 1) (i) Pseudorabies virus (suis herpes virus 1)
		(3) Unclassified	(a) Canine herpesvirus 1 @ (b) Caprine herpesvirus 1 @ (c) Cervid herpesvirus 1 and 2@

14 (14)	Herpesviridae (Betaherpesvirinae)	(1) Cytomegalovirus	(a) Human cytomegalovirus (CMV) (b) Porcine cytomegalovirus (suid herpesvirus 2)@
		(2) Muromegalovirus	Caviid herpesvirus (guinea-pig cytomegalovirus)@
		(3) Roseolovirus	Equine cytomegalovirus (equine herpesvirus 2)@
15 (15)	Herpesviridae (Gammaherpesvirinae)	(1) Lymphocryptovirus	(a) Epstein-Barr-like virus (EBV) (Monkey virus) (b) Epstein-Barr virus (EBV) (Human herpes-virus 4) (c) Human B lymphotropic virus
		(2) Rhadinovirus	(a) Herpesvirus ateles (b) Herpesvirus saimiri (c) Malignant catarrhal fever virus (Alcelaphine herpesvirus)@
16 (16)	Orthomyxoviridae	Influenzavirus A, B and C	Influenza A, B, C and all isolates except influenza A — avian H5 and H7, Human H2 and 1918 H1N1 Spanish flu strain
17 (17)	Paramyxoviridae	Pneumovirus	Turkey rhinotracheitis virus@
18 (18)	Paramyxoviridae (subfamily Paramyxovirinae)	(1) Morbillivirus	(a) Canine distemper virus@ (b) Measles virus (c) Phocine distemper virus@
		(2) Paramyxovirus	Parainfluenza types 1-4
		(3) Respirivirus	(a) Bovine Parainfluenza virus Type 3@ (b) Sendai virus (mouse parainfluenza virus)@
		(4) Rubulavirus	(a) Avian paramyxovirus Types 2 to 9@ (b) Mumps virus
19 (19)	Paramyxoviridae (subfamily Pneumovirinae)	Pneumovirus	(a) Bovine respiratory syncytial virus@ (b) Human respiratory syncytial virus (c) Pneumonia virus of mice@
20 (20)	Parvoviridae	Parvovirus	All isolates
21 (21)	Picornaviridae	(1) Cardiovirus	(a) All isolates (human) (b) Swine encephalomyocarditis virus@ (c) Theiler's murine poliovirus
		(2) Enterovirus	(a) All isolates, excluding Swine vesicular disease virus and Polioviruses (b) Coxsackieviruses
		(3) Hepatovirus	All isolates (including Hepatitis A, human enterovirus type 72)
		(4) Rhinovirus	(a) All isolates (human) (b) Bovine rhinovirus Types 1 to 3@ (c) Equine rhinovirus@ (d) Feline Rhinovirus@ (e) Rhinovirus

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22 (22)	Poxviridae	(1) Avipoxvirus	(a) All isolates@ (animal) (b) All isolates (human)
		(2) Leporipoxvirus	(a) Rabbit (Shope) fibroma virus@ (b) Squirrel fibroma virus@
		(3) Orthopoxvirus	(a) All isolates@, excluding Monkeypox and Variola (smallpox virus) (b) Buffalo pox (c) Cowpox virus (d) Rabbit pox (e) Skunkpox (f) Vaccinia
		(4) Parapoxvirus	(a) All isolates@, excluding Sealpox virus (b) Bovine papular stomatitis virus (c) Orf virus (d) Pseudocowpox virus (paravaccinia) (e) Sealpox virus
23 (23)	Reoviridae	(1) Coltivirus	Coltivirus
		(2) Orbivirus	(a) Epizootic hemorrhagic disease virus@ (b) Equine encephalosis virus@ (c) Ibaraki virus (d) Palyam virus@
		(3) Orthoreovirus	(a) Animal, all isolates except Ndelle and Ourem viruses (b) Types 1, 2 and 3
		(4) Reovirus, types 1 and 2	Animal, all isolates@
		(5) Rotavirus	(a) Animal, all isolates@ (b) Rotavirus
24 (24)	Retroviridae	(1) Betaretrovirus	Mason-Pfizer monkey virus@
		(2) Gammaretrovirus	(a) Animal, all isolates@ (b) Avian reticuloendotheliosis virus
		(3) Deltaretrovirus	Human T-cell lymphotropic viruses (HTLV)
25 (25)	Retroviridae (subfamily Spumavirinae)	(1) Spumavirus	All isolates
		(2) Deltaretrovirus	Bovine leukemia virus@

26 (26)	Rhabdoviridae	(1) Lyssavirus	(a) Australian bat lyssavirus (b) Duvenhage virus (c) European bat lyssavirus I (d) European bat lyssavirus II (e) Lagos bat virus (f) Mokola virus (g) Rabies virus-Fixed virus
		(2) Vesiculovirus	(a) Alagoas virus (b) Chandipura virus (c) Cocal virus (d) Isfahan virus (e) Pyri virus (f) Vesicular stomatitis virus — Indiana lab strain

27 (27)	Togaviridae	(1) Alphavirus	(a) Bebaru virus (b) Chikungunya virus (c) Everglades virus (d) Getah virus (e) Highlands J virus (f) Mayaro virus (g) Mucambo virus (h) Ndumu virus (i) O'Nyong-Nyong virus (j) Ross River virus (k) Semliki forest virus (l) Sindbis (m) Tonate virus (n) Western equine encephalitis virus strain TC-83
		(2) Arterivirus	Equine arteritis virus@
		(3) Pestivirus	Border disease virus
		(4) Rubivirus	Rubella virus
28 (28)	Transmissible Spongiform Encephalopathies		(a) Bovine spongiform encephalopathy (b) Chronic wasting disease of captive mule deer/elk@ (c) Creutzfeldt-Jacob disease (d) Gertsman-Straussier-Scheinker (e) Kuru (f) Scrapie@ (g) Transmissible mink encephalopathy@
29 (29)	Unclassified	Unclassified	Swine hepatitis E virus@

Bacteria

Item	Column 1 - Genus	Column 2 Species
1 (1)	Acholeplasma	oculi@
2 (2)	Acinetobacter	(a) baumannii (b) calcoaceticus (c) lwoffii (d) spp
3 (3)	Actinobacillus	(a) actinomycetemcomitans (b) capsulatus@ (c) equuli@ (d) lignieresii@ (e) pleuropneumoniae@ (f) seminis@ (g) spp (h) suis@ (i) ureae@
4 (4)	Actinomadura	(a) madurae (b) pelletieri
5 (5)	Actinomyces	(a) bovis@ (b) gerencseriae (c) hordeovulneris@ (d) israelii (e) naeslundii (f) pyogenes (g) spp (h) suis@ (i) viscosus@
6 (6)	Aeromonas	(a) hydrophila (b) punctata (c) spp
7 (7)	Afipia	spp
8 (8)	Agrobacterium	Radiobacter
9 (9)	Alcaligenes	spp
10 (10)	Amycolata	Autotrophica
11 (11)	Anaplasma	(a) caudatum@ (b) centrale@ (c) marginale@ (d) ovis
12 (12)	Arcanobacterium	(a) haemolyticum (b) pyogenes
13 (13)	Arcobacter	(a) butzeri (b) cryoaerophilus (c) spp
14 (14)	Arizona	spp
15 (15)	Bacillus	Cereus
16 (16)	Bacteroides	(a) fragilis (b) heparinolyticus@ (c) levii (d) salivus@ (e) spp

17 (17)	Bartonella	(a) bacilliformis (b) elizabethae (c) henselae (d) quintana (e) spp
18 (18)	Bordetella	(a) avium@ (b) bronchiseptica (c) parapertussis (d) pertussis (e) spp
19 (19)	Borrelia	(a) burgdorferi (b) duttonii (c) recurrentis (d) spp (e) vincenti
20 (20)	Brachyspira	(a) hyodysenteriae (b) innocens
21 (21)	Brucella	(a) canis (b) ovis (c) spp, excluding abortus, melitensis and suis
22 (22)	Burkholderia	(a) cepacia genomovars I (b) cepacia genomovars III (c) gladioli (d) multivorans (e) spp, excluding mallei and pseudomallei (f) stabilis (g) vietnamensis
23 (23)	Campylobacter	(a) coli (b) fetus, subspecies fetus (intestinalis) (c) fetus, subspecies venerealis (d) hyointestinalis (e) jejuni (f) lari (g) mucosalis@ (h) spp (i) sputorum
24 (24)	Capnocytophaga	spp
25 (25)	Cardiobacterium	hominis
26 (26)	Chlamydia	(a) pneumoniae (b) psittaci (non-avian strains) (c) trachomatis
27 (27)	Chryseobacterium	meningosepticum
28 (28)	Citrobacter	(a) diversus (b) freundii (c) spp

29 (29)	Clostridium	(a) chauvoei (b) colinum@ (c) difficile (d) haemolyticum (e) histolyicum (f) novyi (g) perfringens (h) septicum (i) sordellii (j) spiriforme@ (k) spp, excluding botulinum (l) tetani (m) villosum@
30 (30)	Corynebacterium	(a) amycolatum (b) cystitidis@ (c) diphtheriae (d) jeikeium (e) kutscheri@ (f) minutissimum (g) pilosum (h) pseudotuberculosis (i) renale (j) spp (k) ulcerans
31 (31)	Dietzia	maris
32 (32)	Dermabacter	hominis
33 (33)	Dermatophilus	congolensis
34 (34)	Dichelobacter	nodosus
35 (35)	Edwardsiella	tarda
36 (36)	Eikenella	corrodens
37 (37)	Enterobacter	(a) aerogenes/cloacae (b) spp
38 (38)	Enterococcus	(a) faecalis (b) faecium (c) spp
39 (39)	Ehrlichia	(a) sennetsu (b) spp
40 (40)	Erysipelothrix	Tonsillarum
41 (41)	Escherichia	(a) coli (b) coli enteroinvasive — EIEC (c) coli enteropathogenic — EPEC
42 (42)	Eubacterium	suis@
43 (43)	Fluoribacter	Bozemaniae
44 (44)	Francisella	(a) novicida (b) philomiragia
45 (45)	Fusobacterium	(a) necrophorum (b) spp
46 (46)	Gardnerella	vaginalis
47 (47)	Gordonia	spp

48 (48)	Haemophilus	(a) ducreyi (b) influenzae (c) influenzaemurium@ (d) paragallinarum (e) parainfluenzae (f) parasuis@ (g) piscium@ (h) somnus@ (i) spp
49 (49)	Helicobacter	(a) cinaedi (b) felis@ (c) fennelliae (d) mustelae (e) nemestrinae (f) pullorum (g) pylori
50 (50)	Hemobartonella	felis@
51 (51)	Kingella	kingae
52 (52)	Klebsiella	(a) granulomatis (b) oxytoca (c) pneumoniae (d) spp
53 (53)	Lactococcus	garvieae
54 (54)	Lawsonia	intracellularis@
55 (55)	Legionella	(a) micdadei (b) pneumophilia (c) spp
56 (56)	Leptospira	(a) bratislava (b) canicola/copenhageni (c) grippityphosa (d) hardjo (e) icterohaemorrhagiae (f) interrogans (g) pomona (h) sejroe (i) var ballum
57 (57)	Listeria	(a) ivanovii@ (b) monocytogenes (c) spp
58 (58)	Mannheimia	haemolytica
59 (59)	Moraxella	(a) bovis@ (b) caprae (c) catarrhalis (d) lacunata (e) phenylpyruvica (f) spp
60 (60)	Morganella	morganii

61 (61)	Mycobacterium	(a) africanum (b) asiaticum (c) avium complex (d) avium/intracellulare (e) bovis (f) bovis (BCG) (g) chelonae (h) fortuitum (i) kansasii (j) leprae (k) malmoense (l) marinum (m) microti (n) paratuberculosis (o) scrofulaceum (p) simiae (q) szulgai (r) ulcerans (s) xenopi
62 (62)	Mycoplasma	(a) caviae (b) hominis (c) pneumoniae (d) spp, excluding mycoides
63 (63)	Neisseria	(a) elongata (b) gonorrhoeae (c) meningitidis (d) spp
64 (64)	Neorickettsia	helminthoeca@
65 (65)	Nocardia	(a) asteroides (b) brasiliensis (c) caviae (d) farcinica (e) nova (f) otitidis-caviarum (g) pseudobrasiliensis (h) spp (i) transvalensis
66 (66)	Ochrobactrum	spp
67 (67)	Oligella	spp
68 (68)	Ornithobacterium	rhinotracheale@
69 (69)	Pandoraea	spp
70 (70)	Pantoea	agglomerans

71 (71)	Pasteurella	(a) aerogenes (b) anatipestifer@ (c) caballi@ (d) canis (e) dagmatis (f) granulomatis@ (g) haemolytica (h) multocida (serotypes B:2 and E:2) (i) multocida, except serotypes B:2 and E:2 (j) multocida, subspecies gallicida (k) multocida, subspecies multocida (l) multocida, subspecies septica (m) pneumotropica (n) spp
72 (72)	Peptostreptococcus	(a) anaerobius (b) indolicus@ (c) spp
73 (73)	Plesiomonas	shigelloides
74 (74)	Porphyromonas	spp
75 (75)	Prevotella	(a) melaninogenica (b) spp
76 (76)	Propionibacterium	propionicum
77 (77)	Proteus	(a) mirabilis (b) penneri (c) spp (d) vulgaris
78 (78)	Providencia	(a) alcalifaciens (b) rettgeri (c) spp
79 (79)	Psychrobacter	(a) immobilis (b) phenylpyruvicus
80 (80)	Pseudomonas	(a) aeruginosa (b) spp
81 (81)	Ralstonia	spp
82 (82)	Rhodococcus	(a) equi (b) spp
83 (83)	Rickettsia	(a) akari (b) australis (c) canadensis (d) conorii (e) helvetica (f) montanensis (g) parkeri (h) rhipicephali (i) spp, excluding prowazekii and rickettsii (j) tsutsugamuchi (k) typhi (mooseri)
84 (84)	Rothia	(a) dentocarosia (b) mucilagenosas

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85 (85)	Salmonella	(a) abortus equi (c) agona (e) arizonae (g) derby (i) enteritidis (k) heidelberg (m) newport (o) paratyphi A, B and C (q) spp (s) typhimurium	(b) abortus ovis (d) anatum (f) choleraesuis (h) dublin (j) gallinarum@ (l) montevideo (n) (other serovars) (p) pullorum@ (r) typhi (t) typhisuis@
86 (86)	Serpulina	spp	
87 (87)	Serratia	(a) liquefaciens (b) marcescens	
88 (88)	Shigella	(a) boydii (b) dysenteriae (other than Type 1) (c) flexneri (d) sonnei	
89 (89)	Staphylococcus	(a) aureus (b) aureus (MRSA) (c) epidermidis (d) intermedius@	
90 (90)	Stenotrophomonas	maltophilia	
91 (91)	Streptobacillus	(a) moniliformis (b) spp	
92 (92)	Streptococcus	(a) agalactiae (b) bovis (c) dysgalactiae (d) equi (e) pneumoniae (f) pyogenes (g) spp (h) suis (i) uberis	
93 (93)	Taylorella	equigenitalis@	
94 (94)	Treponema	(a) carateum (b) pallidum (c) pertenuis (d) spp (e) vincentii	
95 (95)	Tsukamurella	spp	
96 (96)	Ureaplasma	urealyticum	
97 (97)	Vagococcus	salmoninarum@	
98 (98)	Vibrio	(a) cholerae (b) parahaemolyticus (c) spp (d) vulnificus	
99 (99)	Yersinia	(a) enterocolitica (b) pseudotuberculosis (c) ruckeri@	

Fungi

Item	Column 1 Genus	Column 2 Species
1 (1)	Aspergillus	(a) flavus (b) fumigatus (c) nidulans (d) niger (e) oryzae (f) terreus
2 (2)	Blastomyces	dermatitidis (formerly: Ajellomyces dermatitidis)
3 (3)	Candida	(a) albicans (b) glabrata (c) guilliermondii (d) krusei (e) parapsilosis
4 (4)	Cladophialophora	bantiana (formerly: Cladosporium bantianum)
5 (5)	Cladosporium	carrionii
6 (6)	Cryptococcus	neoformans
7 (7)	Emmonsia	parva
8 (8)	Epidermophyton	floccosum
9 (9)	Histoplasma	(a) capsulatum (formerly: Ajellomyces capsulatum) (b) capsulatum var capsulatum (c) capsulatum var duboisii (d) capsulatum var farciminosum
10 (10)	Loboa	loboi
11 (11)	Microsporium	(a) audouinii (b) canis (c) distortum (d) equinum (e) ferrugineum (f) fulvum (g) gypseum (h) nanum (i) persicolor (j) praecox (k) vanbreuseghemii
12 (12)	Paracoccidioides	brasiliensis
13 (13)	Penicillium	marneffeii
14 (14)	Sporothrix	(a) Schenckii var luriei (b) Schenckii var schenckii
15 (15)	Trichophyton	(a) concentricum (b) equinum/autotrophicum (c) equinum/equinum (d) gourvilii (e) megninii (f) mentagrophytes/erinacei (g) mentagrophytes/interdigitale (h) mentagrophytes/nodulare (i) mentagrophytes/mentagrophytes (j) mentagrophytes/quinckeanum (k) rubrum (l) schoenleinii (m) simii (n) sudanese (o) tonsurans (p) violaceum (q) yaoundei

EMERGENCY MEASURES

UN1845 – DRY ICE – CLASS 9 PG III

POTENTIAL HAZARDS

HEALTH Vapors may cause dizziness or asphyxiation without warning. Vapors from liquefied gas are initially heavier than air and spread along ground. Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.

FIRE OR EXPLOSION **Non-flammable gases.** Containers may explode when heated. Ruptured cylinders may rocket.

PUBLIC SAFETY

CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks). Keep out of low areas. Ventilate closed spaces before entering.

PROTECTIVE CLOTHING: Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

EMERGENCY RESPONSE

FIRE Use extinguishing agent suitable for type of surrounding fire. Move containers from fire area if you can do it without risk. Damaged cylinders should be handled only by specialists.

SPILL OR LEAK Do not touch or walk through spilled material. Stop leak if you can do it without risk. Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. Do not direct water at spill or source of leak. Prevent entry into waterways, sewers, basements or confined areas. Allow substance to evaporate. Ventilate the area.

FIRST AID Move victim to fresh air. Call 911 or emergency medical services. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. Clothing frozen to the skin should be thawed before being removed. Keep victim warm and quiet. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

UN 3373 and UN2814 CLASS 6.2

POTENTIAL HAZARD

HEALTH Inhalation or contact with substance may cause infection, disease or death. Runoff from fire control may cause pollution. Note: Damaged packages containing solid CO₂ as a refrigerant may produce water or frost from condensation of air. Do not touch this liquid as it could be contaminated by the contents of the parcel.

FIRE OR EXPLOSION Some of these materials may burn, but none ignite readily. Some may be transported in flammable liquids.

PUBLIC SAFETY

CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Obtain identity of substance involved.

PROTECTIVE CLOTHING Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

EMERGENCY RESPONSE

FIRE **Small Fire:** Dry chemical, soda ash, lime or sand.

Large Fire: Use extinguishing agent suitable for type of surrounding fire. Do not scatter spilled material with high pressure water streams. Move containers from fire area if you can do it without risk.

SPILL OR LEAK Do not touch or walk through spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Absorb with earth, sand or other non-combustible material. Cover damaged package or spilled material with damp towel or rag and keep wet with liquid bleach or other disinfectant. **DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.**

FIRST AID Move victim to a safe isolated area.

CAUTION: Victim may be a source of contamination. Call 911 or emergency medical service. Remove and isolate contaminated clothing and shoes. In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes. Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed. **For further assistance, contact your local Poison Control Center.** Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.