



# Safe transport of biological material

The most important of every transport of biological material is that the samples arrive safely and in good condition at the destination. The basic requirements for a safe transport are the correct packaging (basic principle: three layers), including of information belonging to the sample (e.g. course of disease) and the correct labeling (hazard potential is visible on the outer package). Multiple factors determine the requirements of the transport:




- Consistence of the material to be analyzed: organs, blood, serum, milk, swabs, excrements, whole bodies
- Transport conditions: e.g. temperature sensitive material, must be sent with cooling elements, dry ice, quick transport with a shipping company or transport in special packaging container
- Receiver: National / international transport
- Origin of the material: from a healthy stock, from a suspicious case, culture of a highly contagious disease or gene modified organisms
- Hazard potential determines classification of the material (assignment into different transport categories)

In this document the different classes of biological material are described with indication of the correct packaging, demanded labeling and documentation.

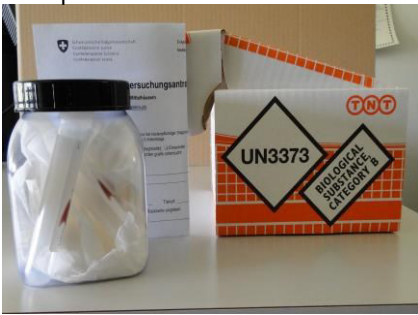
Indication of legal regulations and additional information:

- *European agreement concerning the international carriage of dangerous goods by road and rail (ADR/RID)*
- *Dangerous Goods Regulations (DGR) by IATA (International Air Transport Association) for international transport by air basing on the *Technical instructions for the safe transport of dangerous goods by air* published by the International Civil Aviation Organization (ICAO)*
- Swiss Expert Committee for Biosafety SECB, Transport, Import, Export [www.efbs.admin.ch](http://www.efbs.admin.ch)
- Guidance on regulations for the Transport of Infectious Substances, 2015-2016, WHO
- Template for labels and indication of addresses to order adhesive labels are available under <https://www.ivl.admin.ch/ivi/de/home/diagnostik/diagnostik-standort-mittelhaeusern.html>

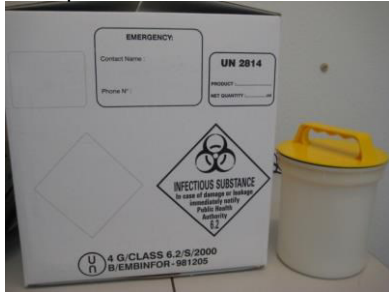




Classification	Examples	Packaging / Instructions	Documentation / Labeling	Transport
<p><b>Exempt specimen</b> (Patient specimens)</p> <p>(ADR 2.2.62.1.5.8) Human or animal specimens for which there is minimal likelihood that pathogens are present.</p>	<p>Blood, serum, milk samples from healthy animal populations for monitoring, surveillance of wild animal stocks, serum bank or export control</p>	<p>Packaging consisting of three layers:</p> <ul style="list-style-type: none"> <li>1) leak-proof primary receptacle(s)</li> </ul> <p>Examples:</p>  <ul style="list-style-type: none"> <li>2) leak-proof secondary container (additional absorbent material e.g. paper towel or paper issue in sufficient quantity to absorb the entire contents should be placed between the primary receptacle(s) and the secondary packaging)</li> </ul> <p>Examples:</p>  <ul style="list-style-type: none"> <li>3) An outer package with suitable cushioning material of adequate strength (with at least one surface having minimum dimensions of 100 x 100 mm)</li> <li>When multiple fragile primary containers are placed in a single secondary packaging they should be either individually wrapped or separated to prevent contact between them.</li> <li>Secondary or outer package should be rigid.</li> </ul>	<ul style="list-style-type: none"> <li>Declaration of name and address of the sender and receiver</li> <li>Label: Exempt human specimen or Exempt animal specimen</li> <li>Application for analysis (place between secondary and outer package), waybill if sent with shipping company</li> </ul> <p>Example:</p> 	<p>No limitations, by postal service, shipping company or private transport</p>



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<p><b>Exemptions</b> (ADR 2.2.62.1.5) Not subject to dangerous goods regulations of ADR/RID. Non pathogenic microorganisms, material with naturally occurring concentrations of microorganisms, material with neutralized or inactivated pathogens</p>	<p>Microorganisms of risk group 1, environmental samples (e.g. water and food samples), inactivated samples, DNA/RNA Diagnostic sample</p>	<p>No instruction, but it is recommended, to use the same packaging as with exempt specimens! Three layer principle protects the sample of leakage!</p>	<ul style="list-style-type: none"> <li>Declaration of name and address of the sender and receiver</li> </ul>	<p>No limitation</p>
<p><b>UN3373, Biological substance, Category B</b> Dangerous goods class 6.2 (ADR 2.2.62.1.4.2) Infectious substance which does not meet the criteria for inclusion in category A.</p>	<p>of a suspicious case (samples of clinically sick animals), cultures of <i>Salmonella enterica</i>, <i>Listeria monocytogenes</i></p>	<p>Packing instruction P650 according to ADR and PI650 according to IATA: The packaging material must consist of three layers: 1) a primary container, 2) a secondary packaging and 3) an outer packaging, of which either the secondary or the outer packaging shall be rigid (for air transport the outer package must be rigid). At least one surface of the outer package must have minimum dimensions of 100 x 100 mm. For liquid substances:</p> <ul style="list-style-type: none"> <li>Leakproof primary receptacle</li> <li>Leakproof secondary container</li> <li>If multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them.</li> <li>Absorbent material in sufficient quantity to absorb the entire contents should be placed between the primary receptacle(s) and the secondary packaging.</li> </ul> <p>The primary receptacle or the secondary package shall be capable of withstanding an internal pressure of 95 kPa (0.95 bar) without leakage. The complete package shall be capable of pass a drop test successfully from a height of 1.2 m.</p>	<ul style="list-style-type: none"> <li>Declaration of name and address of the sender and the receiver</li> <li>Label UN3373 (minimum dimensions 50 x 50 mm) and the official description Biological substance, Category B</li> <li>Application for analysis / packing list between secondary and outer package, waybill if sent with shipping company</li> <li>Additional for <b>international</b> transports: Pro forma invoice, required import/export permissions</li> <li>For air way additional indication of a responsible person with name and phone number on the outer package.</li> </ul> <p>Example:</p> 	<p>Private transport (no additional equipment is necessary), sending with postal service (national) or with different shipping companies is possible</p>



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		<p>Maximum quantity: For transport on road and rail no limitations. For air transport no primary container shall exceed 1 l and the outer packaging must not contain more than 4 l.</p>		
<p><b>Infectious substances, category A</b></p> <p><b>UN 2900</b> <b>Infectious substance, affecting animals, only</b></p> <p><b>UN2814</b> <b>Infectious substance, affecting humans</b></p> <p>(ADR 2.2.62.1.4.1) Dangerous goods class 6.2</p>	<p>Cultures of Foot and mouth disease virus, Rinderpest virus</p> <p>Cultures of Ebola Virus, Marburg Virus</p>	<p>Packaging instruction P620 according to ADR and PI602 according to IATA:</p> <ul style="list-style-type: none"> <li>1) Leakproof primary receptacle</li> <li>2) Leakproof secondary container If multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them. Absorbent material in sufficient quantity to absorb the entire contents should be placed between the primary receptacle(s) and the secondary packaging.</li> <li>3) Rigid UN-proofed outer package. At least one surface of the outer package must have minimum dimensions of 100 x 100 mm.</li> </ul> <p>Category A shipping (packaging, documentation, transport) can only be conducted by trained persons.</p>	<ul style="list-style-type: none"> <li>Indication of name and address of the sender and the receiver</li> <li>Indication of name and phone number of a responsible person</li> <li>Label Infectious Substance (minimum dimensions 50 x 50 mm)</li> <li>Indication of the UN number and proper shipping name and indication of the exact amount in ml or gr</li> <li>Covering letter with detailed description of content between secondary and outer package, ADR-transport document on road, written instructions (instructions for the driver in case of an accident), waybill</li> <li>For <b>international</b> transport additional pro forma invoice and shippers declaration for air transport instead of ADR-transport document, import/export permissions</li> </ul> <p>Example:</p> 	<p>Only possible with special shipping companies with authorization e.g. World Courier</p>

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<p><b>Carbon dioxide, solid (dry ice), UN 1845</b> Dangerous goods class 9 (no dangerous good according to ADR/RID, but see special provision 5.5.3)</p>	<p>For cooling</p>	<p>Dangerous good only in air transport (according to IATA-DGR PI954), not according to ADR/RID. Dry ice must be packed in a way that gaseous CO<sub>2</sub> can escape. Never pack it into the secondary container, danger of explosion!</p>	<ul style="list-style-type: none"> <li>Marking for national transport: "Carbon dioxide, solid, as cooling agent"</li> <li>International: Specification on air waybill, Carbon dioxide, solid (dry ice), UN 1845 and net weight</li> <li>International: Hazard label Miscellaneous dangerous substances and label for carbon dioxide, solid (dry ice) UN1845 with indication of net weight, only for air transport</li> </ul> 	<p>Dry ice shipping with postal services only national, private transport by car or train permitted, or with a shipping company.</p>
<p><b>UN3245, Genetically modified microorganisms or Genetically modified organisms</b> Dangerous goods class 9 (ADR 2.2.9.1.11)</p>	<p>Genetically modified bacteria, genetically modified mice</p>	<p>Packing Instruction P904 according to ADR and PI959 according to IATA:</p> <ul style="list-style-type: none"> <li>Inner packaging consisting of: <ul style="list-style-type: none"> <li>1) Leakproof primary receptacle and 2) a secondary package, whereat the primary or the secondary container must be leakproof for liquid substances or dust-tight for solid substances; for liquid substances there must be placed enough absorbent material between primary and secondary container to absorb the whole amount of liquid. If multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them.</li> <li>3) An outer package of adequate strength (with at least one surface having minimum dimensions of 100 x 100 mm)</li> </ul> </li> </ul> <p>Animals must be transported in escape-proof cages or containers that comply with the Ordinance on the protection of animals.</p>	<ul style="list-style-type: none"> <li>Indication of name and address of the sender and the receiver</li> <li>Indication of name and phone number of a responsible person</li> <li>Label UN3245 (minimum dimensions 50 x 50 mm) must be placed on the outer surface of the package.</li> <li>Detailed packing list between secondary and outer package with indication of the name of the organisms and genetic modification, addition 'for contained use'</li> <li>Waybill when sent with shipping company</li> <li><b>International</b> transport: addition of the UN number and the proper shipping name 'Genetically modified microorganisms or genetically modified organisms' and specification of the net amount in the air waybill, pro forma invoice, including of required specifications according to Art. 4 a-e of the Cartagena-Ordinance into documentation, import/export permission if required.</li> </ul> 	<p>In a private car (no additional equipment is necessary) or with a shipping company, not possible with postal services</p>