Transportation of Methanol in VOC Soil Vials in Canada

Air Transportation

For projects in remote locations, such as Canada's Far North, transporting samples to the laboratory by air is often the only viable option. Although most preserving agents dispensed in environmental sampling containers are not considered dangerous goods, the transport of methanol by air when using VOC methanol vials requires special considerations. There are many passenger air carriers that do not carry any dangerous goods and therefore Ground Transportation or Air Cargo may be your only options.

It is anticipated that within the year methanol preservation for soil VOC will be the required method nationwide.

Transport Canada regulates the air transport of dangerous goods (TDG) by incorporating the International Civil Aviation Organization Technical Instructions (ICAO TI). In addition to the ICAO TI manual, the industry's technical standards and guidelines are also outlined in the International Air Transport Association (IATA) Dangerous Goods Regulation (DGR) manual. These standards specify that proper training and certification is required prior to transporting methanol by air.

Since methanol is categorized as a Class 3 Flammable Liquid, special provisions are enforced when transporting any quantities of pure methanol. The 10 mL volume of methanol that VOC vials typically contain is, however, a small enough quantity to be considered available to the general public. As such, the transport of methanol vials may be shipped as Excepted Quantities (EQ). Dangerous goods shipped under the EQ scenario are exempt from some of the more onerous requirements of the ICAO / IATA TDG regulations, such as a Shipper's Declaration for Dangerous Goods and some complicated placarding (e.g., documents, labelling, placards, and containment restrictions).

IATA Training Requirements

IATA training is mandatory for anyone packing / shipping any quantity of methanol. Supervision by trained staff of untrained individuals is not permitted.

Airline-specific requirements must also be confirmed, as further restrictions are sometimes imposed. Regardless of the airline being certified, the party sending the package is considered the "Shipper" and the Shipper is also responsible for complying with the IATA regulations.

IATA training and certification may be procured through designated third party companies specializing in national and international transportation of dangerous goods and hazardous materials. Organizations providing dangerous goods training in Canada can be found on Transport Canada's website. Alternatively, the services of a third party consultant can be employed to assist and offer guidance with processing dangerous goods for transport. ALS has partnered with a TDG training company to provide a custom designed training course related to the Transportation of Dangerous Goods typically used for environmental samples in Canada and the US.

Excepted Quantities (EQ)

Volume & Weight Limitations

According to the IATA standards for EQ, each package must not exceed a net volume of 500 mL of methanol. This means that each package (e.g. cooler) cannot contain more than 50 VOC vials (assuming 10 mL of methanol / vial). The inner means of containment (i.e. vials or bottles) may not hold more than 30mL of methanol. There is no limit to the number of separate packages that can be included per shipment, other than the provisions for the aircraft's carrying capacity.

Post-Sampling Implications

After sampling, VOC vials will normally contain approximately 5 grams of soil, which does not affect the classification of the vial contents as being dangerous goods, so all of the same rules apply for return shipments to the laboratory. According to Transport Canada, the basis for the classification of methanol as a dangerous good is flashpoint (< 60°C for Class 3 Flammable Liquids). Studies have shown that the methanol in VOC vials containing 5 or even 10 grams of soil still has a flashpoint well below the 60°C limit.

Packaging Requirements & Applicable Documentation

Packaging must meet IATA requirements, including drop tests. Each outer package (i.e. cooler) must have an Excepted Quantities (EQ) label that lists the class of the dangerous good or goods (i.e. Class 3 for methanol). Unless listed elsewhere, the consignor and consignee's (sending and receiving parties) name and address must also be placed on the package, in the label area. The packaging must contain sufficient absorbent material to mitigate potential spillage of the entire volume of methanol being shipped. This absorbent material may also act as cushioning material.

A Shipper Declaration is not required; however, a Bill of Lading or Air Waybill must be included and must contain the following statement: "Dangerous Goods in Excepted Quantities".

Limited Quantity

In addition to shipping methanol as Dangerous Goods in Excepted Quantities, it can also be shipped as Limited Quantity, however, Limited Quantities requires more documentation, such as a Shipper's Declaration for Dangerous Goods form, as well as more extensive placarding, and different quantities to EQ.

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Ground Transporation

Ground transportation is an alternative option for shipment of methanol VOC vials that does not require training or paperwork but does have outer package/cooler placarding requirements. Both Limited and Excepted quantities can be shipped. See summary table below.

Below outlines the key steps for packaging of methanol VOC vials prior to return shipment:

1. The return packer / shipper should know the requirements for shipping dangerous goods in Canada and the quantities of methanol allowed per cooler or outer package for each mode of transportation.
2. Seal the vials securely and ensure the cap threads are clean (methanol evaporates very easily).
3. It is recommended that the sender use the cooler, packaging and sorbent materials in which the vials were originally shipped (this ensures compliance with IATA Air requirements).
4. Place vials in the packing materials in which they were provided, wrapped in Ziploc bags (normally provided by the lab).
5. Add ice or ice packs to the cooler in a separate Ziploc bag and fill voids with bubble wrap.
6. Non-hazardous materials (i.e. small soil jars for moisture content) may be added to the cooler.
7. Other types of hazardous materials that are also permitted under TDG (e.g. acid preservative vials) may in some circumstances be combined with methanol shipments within the same cooler, but the most stringent requirements for total quantities apply, as per the applicable TDG requirements. Contact your laboratory for further guidance.

A summary table of the requirements for shipping methanol VOC vials is provided below, but does not substitute training from a third party company specializing in TDG training services.

Summary of TDG Requirements for Transportation of Methanol in 40 mL Glass VOC Vials

TDG Requirement for Methanol (UN1230)Class 3 (6.1)	Ground, Sea & Rail Transportation		Air Transportation Cargo Only		Air Transportation + Cargo	
	Excepted Quantity	Limited Quantity	Excepted Quantity	Limited Quantity	Excepted Quantity	Limited Quantity
Training	Not required		TDG Air Certificate or under physical supervision of someone with an Air TDG Certificate - valid for 2 years			
Waybill Documentation	Dangerous Goods in Excepted Quantities	Dangerous Goods in Limited Quantities	Dangerous Goods in Excepted Quantities	Dangerous Goods in Limited Quantities	Dangerous Goods in Excepted Quantities	Dangerous Goods in Limited Quantities
Packing Code	E2	n/a	E2	n/a	E2	n/a
Shipper's Declaration for Dangerous Goods	No	Yes	No	Yes	No	Yes
Labelling of Cooler/Outer Package Label must be 100 mm X 100 mm	 * Class of 3 must be shown in this location ** Name of shipper or consignee must be shown in this location if not shown elsewhere on this package		 * Class of 3 must be shown in this location ** Name of shipper or consignee must be shown in this location if not shown elsewhere on this package	 Limited Quantity Air label must be shown along with labels below  Class 3 Flammable Hazard Label must be shown with Methanol UN1230  Hazard class 6.1 – Poisonous material label  Package label orientation	 * Class of 3 must be shown in this location ** Name of shipper or consignee must be shown in this location if not shown elsewhere on this package	 Limited Quantity Air label must be shown along with labels below  Class 3 Flammable Hazard Label must be shown with Methanol UN1230  Hazard class 6.1 – Poisonous material label  Package label orientation  Cargo Aircraft Only Label
Volume of Methanol Allowed Per Cooler/Outer Package	500 mL or 50 Soil VOC vials	1 L or 100 Soil VOC vials	500 mL or 50 Soil VOC vials	1 L or 100 Soil VOC vials	500 mL or 50 Soil VOC vials	60 L

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