PRESENCE OF HYDROGEN SULFIDE IN PETROLEUM CRUDE OIL AND CLASSIFICATION

This document does not change, create, amend or suggest deviations to the *Transportation of Dangerous Goods Regulations* (TDG Regulations).

This safety advisory is directed specifically to those who handle petroleum crude oil in transport with the aim to raise safety awareness among consignors, carriers and stakeholders who classify, import, handle, offer for transport or transport petroleum crude oil.

Presence of hydrogen sulfide in petroleum crude oil

While first responders should be aware of the risks, hydrogen sulfide (H_2S) in low concentration should dissipate rapidly when a means of containment is breached in an open and ventilated area, which greatly reduces their risk of exposure to this toxic gas. However, since hydrogen sulfide is slightly heavier than air, it will tend to stay low to the ground and may accumulate where the ground is lower. Additional precautions must always be taken in closed or confined areas.

Petroleum crude oil test methods

The TDG Regulations do not specify which test method to use. However, the United Nations (UN) Recommendations provide a list of suggested test methods. These are suggestions, which do not apply to every situation.

Although consignors may use ASTM D86-07a, "Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure" to determine the initial boiling point of some refined petroleum products, its scope makes it unsuitable for determining the initial boiling point of petroleum crude oils containing highly volatile components such as methane, ethane, propane, and butane.

The consignor must determine the initial boiling point using a suitable test that ensures sample integrity and minimal loss of all volatile components.

Shipping names selection and importance of proper classification

Part 2 of the TDG Regulations requires the consignor to use the shipping name that most precisely describes the dangerous goods and that is consistent with the hazards determined by the criteria and tests.

Therefore, identifying the applicable hazards and appropriate shipping name are the first steps to determine the transportation requirements applicable to a product. The dangerous goods list of the TDG Regulations currently provides two shipping names specifically addressing petroleum crude oil, which are: PETROLEUM CRUDE OIL (UN1267) and PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC (UN3494).

While these shipping names may be deemed the most suitable for many petroleum crude oil types, ultimately, the most appropriate shipping name should be selected based on the results of classification testing, which may dictate an alternative more suitable shipping name.

The composition of petroleum products can vary greatly, which affects their properties and hazard characteristics that are reflected and communicated through classification. Incorrect classification may lead to applying inappropriate mitigation measures such as selecting an improper means of containment or firefighting approach. Therefore, ensuring proper classification will allow first responders to have the right information to stay safe when responding to incidents.

Please consult the classification scheme bulletin for additional information and guidance regarding classification, or contact us at TC.TDGClassification-ClassificationTMD.TC@tc.gc.ca.

Please consult Schedule 1 for additional information regarding the list of dangerous goods.

For more information

To consult the abstracts of research on crude oil done by the TDG Directorate:

- Crude Oil Research

To access information on the standards referenced in the TDG Regulations:

- Part 5.1 of the TDG Regulations (Interpretation – Crude Oil, Oil and Refined Petroleum Products)

Compliance with the TDG Act and Regulations

Failure to comply with the TDG Act and TDG Regulations may lead to fines and/or imprisonment. For more information, you can visit the TDG website and the Department of Justice website.

Contact us

For any regulatory questions, please contact us.