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Prepoznavanje razlitij olj - Nafta in naftni proizvodi v vodi - 1. del: Vzorčenje

Oil spill identification - Waterborne petroleum and petroleum products - Part 1: Sampling

Identifizierung von Ölverschmutzungen - Rohöl und Mineralölerzeugnisse aus dem Wasser - Teil 1: Probenahme

Identification des pollutions pétrolières - Pétrole et produits pétroliers dans l'eau - Partie 1 : Echantillonnage

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TECHNICAL REPORT

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Oil spill identification - Waterborne petroleum and petroleum products - Part 1: Sampling

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Identifizierung von Ölverschmutzungen - Rohöl und Mineralölerzeugnisse aus dem Wasser - Teil 1: Probenahme

This Technical Report was approved by CEN on 26 September 2006. It has been drawn up by the Technical Committee CEN/BT/TF 120.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (CEN/TR 15522-1:2006) has been prepared by CEN/BT/TF 120 “Oil spill identification”, the secretariat of which is held by SN.

Introduction

Where an oil pollution incident has occurred, samples should be collected from both the spill and, wherever possible, the potential source of the pollutant, e.g. ship, shore tank, pipeline or road vehicle, in order to assist in the identification or confirmation of the source of the spill. The aim of this document is to give guidance on the best current practice for taking such samples.

This document does not contain details relating to all types of spill situation, but should only be regarded as general guidelines. However, by following these guidelines it should be possible to collect and provide legally valid samples that can be used in the process of identifying or confirming the source of the spill.

The issues addressed only cover the mechanics of sample collection. The command and control that may be put in place during incident response, the authorities who may request sample collection and the individuals who have the authority to collect samples, will vary from country to country and as a consequence these issues are not addressed.

1 Scope

This document provides guidance on taking and handling samples that are collected as part of an investigation into the likely source of a crude oil or petroleum product spill into a marine or aquatic environment. Guidance is given on taking samples from both the spill and its potential source.

If samples are to be used in connection with legal proceedings, this document should be read in conjunction with any documents issued by the regulatory authorities in the country and location where the spill has occurred.

Taking samples may involve hazardous materials, operations and equipment. This document is not intended to address all the safety and health aspects associated with the guidance given. It is the responsibility of the user to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

For the sake of clarity the word ‘oil’ is used throughout this document to mean either crude oil, a petroleum product or mixtures of such.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 3170, *Petroleum liquids - Manual Sampling (ISO 3170:2004)*

3 Principle

Samples form an important aspect of any investigation and care should be taken to ensure that they are as representative of both the spill and the potential source as possible. The samples shall be taken and placed in containers that will enable the samples to be transported safely and will retain the samples integrity over the period of time required to transport the samples to the laboratory for analysis and storage prior to analysis. They shall be clearly, unambiguously and uniquely labelled and sealed so that they cannot be opened without breaking the seal.

When investigating a spill, samples are usually taken from:

— The water surface (sea, river or lake);

— shoreline or banks (sand, shingle, rocks and oiled animals and vegetation);

— marine or river vessel’s cargo tanks, fuel tanks, waste oil tanks, slop tanks, ballast tanks and bilges;

— land tanks and pipelines.

All spills and all potential sources of spills should be sampled. It is important to take samples from both the spill and the source even on such occasions where it seems quite clear from where the spill originates.

Sampling procedures, which are connected to liability investigations, shall be performed with great care and accuracy and every action shall be taken to prevent a decrease in the samples' value as evidence.

If a spill has scattered and only thin sheens remain on the water surface, every possible effort should be made to take a sample of the spill material. No sample volume is too small and samples that

seemingly consist of pure water or sample pads that do not show any traces of oil can, when analysed, provide useful data.

If any part of the spill differs in any respect from other parts, extra samples shall be taken to check if more than one spill has occurred in the area.

If the spill response operation continues for more than one day, samples should be taken every day to make it possible to determine the degree of weathering of the oil, as well as possible contamination by other oils.

If an oil sample is suspected to be contaminated with material already in the water, if possible also take samples of the water plus the 'contaminant'. Waters in harbours and estuaries may contain traces of various petroleum products and when spills in such waters are sampled it is therefore important to provide the laboratory with blank samples of the water.

Sampling equipment shall be handled and stored in such a manner that its use cannot contaminate the samples being taken.

Samples shall be handled as legal evidence and shall be kept in a chain of custody until identification and possible legal procedure has been completed.

NOTE Identity *per se* requires all measurable data to be the same. This definition is practically and technically impossible to fulfill, and instead the definition of identity is rephrased in operational terms: two samples are identical if no differences in the analysed GC-FID and GC-MS data are present that cannot be explained by weathering. The task of looking for differences in chemical composition instead of proving similarity is conceptually more logical and easier to comply with. According to this, only distinct differences between samples can be proved whereas identity *per se* cannot. Therefore, only when no differences between samples are observed can identity be concluded as being beyond reasonable doubt.

4 Precautions and avoidance of contamination of samples during collection

4.1 General

It is critical to take precautions in order to prevent contaminating the samples with traces of other oils during collection. Disposable nitrile gloves should be used and as far as possible, the sampling equipment should be disposable. If the equipment is to be reused great care needs to be taken to ensure that it is thoroughly cleaned and stored in a clean condition prior to further use.

4.2 Potential sources of contamination

Avoiding contamination of the samples during sampling is essential. All the following possible sources of contamination should be considered and the appropriate control applied if necessary. These are:

— residue of earlier samples remaining on sampling containers, funnels, scoops, spatulas and other equipment;

— material from the site during sampling;

— residual water in or on ropes, chains or extension handles;

— dust or dirty water on the container closure;

— hands, gloves and general handling.

4.3 Controls

Contamination may be minimised by taking the following appropriate action:

— Check that the equipment is clean;

— take care to avoid disturbance at the sampling site;

— wipe and dry ropes, chains or extension handles between sampling and prior to storage;

— store containers and closures in a clean environment;

— avoid touching the material to be sampled with fingers, hands or gloves.

If contamination is suspected this should be reported and if possible a fresh sample collected.

5 Sampling equipment and sample containers and closures

5.1 Introduction

It should be noted that some of the equipment described may only be available from specialist sources. It is recommended that sampling kits should be made up and readily available. A description of the contents of suitable sampling kits is given in Annex E and a list of suppliers of suitable equipment can be obtained from European Committee for Standardization (CEN) Central Secretariat.

5.2 General

All sampling devices, sample containers and closures should be designed and constructed so as to assure the function for which they are intended in order to maintain the initial characteristics of the material being sampled. Their cleanliness should be confirmed before use.

5.3 Sample containers, closures and packages

Glass jars or bottles with openings of a sufficient size to accommodate the material being sampled fitted with plastic closures with an inert insert. Metal closures, corks and rubber bungs should not be used as these may either react with, or contaminate, the material being sampled. The capacity of the container will be dependent on the material being sampled and will usually be 100 ml to 500 ml. Larger wide mouth air-tight containers may be necessary to contain tar-balls, see 7.3. The bottle and the lid should have the same serial number in order to prevent intermixing of lids, which could cause sample contamination.

Plastic sample containers should be avoided because components from the plastic material may migrate into the oil and interfere with the analysis. However, if only plastic containers, or even bags, are available, it is still better to use these than to obtain no samples at all.

Plastic bags in which the sample container can be sealed should be of sufficient strength and size to accommodate the sample and retain its sealed condition during transportation.

Wooden or cardboard boxes that can be sealed can be used for transporting the samples. If the samples are to be transported by air the packages should conform to all the necessary regulatory requirements and be International Aviation Transport Association (IATA) approved.

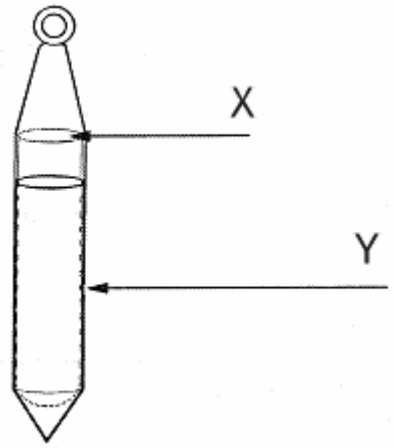
5.4 Sampling devices

5.4.1 For sampling ships cargo tanks, bunker tanks and bilges, barges, road tankers, shore tanks and pipelines

Sampling equipment, containers and closures as described in EN ISO 3170.

For sampling bunker tanks from the deck using sounding pipes use a thick-walled brass tube less than 25 mm in diameter containing a 10 ml glass tube. The brass tube is fitted with a ring to enable

attachment to a measuring tape. The brass tube should be constructed with an asymmetric end that ensures that it lies horizontally when touching the tank bottom and should be of sufficient weight to allow it to sink into viscous oils, see Figure 1.



Key
X 10 ml glass tube
Y Thick-walled heavy brass tube

Figure 1 — Thick-walled brass tube

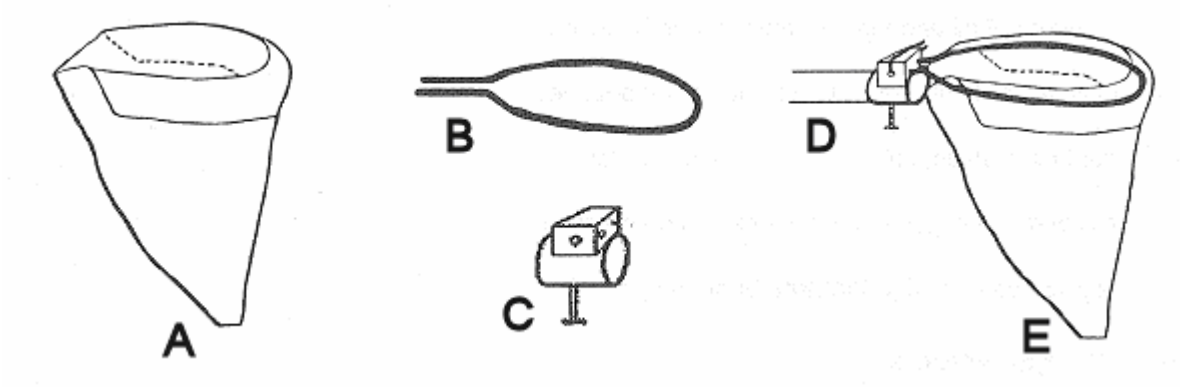
5.4.2 For sampling waterborne oil globules

Either wide-necked glass jars, if necessary fixed to a wooden pole or a small, one litre polytetrafluoroethylene (PFTE)[1] bucket with a number of small diameter holes drilled in the base to allow water to drain away from the oil.

5.4.3 For sampling waterborne oil layers greater than 1 mm thickness

Disposable polyethylene cornet suspended from a metal ring (in aluminium, 25 cm – 30 cm in diameter) fixed to a wooden pole, having a 10 mm to 15 mm hole in its base to allow the liquid to drain in a controlled manner, see Figure 2.

[1] Teflon® is an example of a suitable product available commercially. This information is given for the convenience of users of this CEN Technical report and does not constitute an endorsement by CEN of this product.



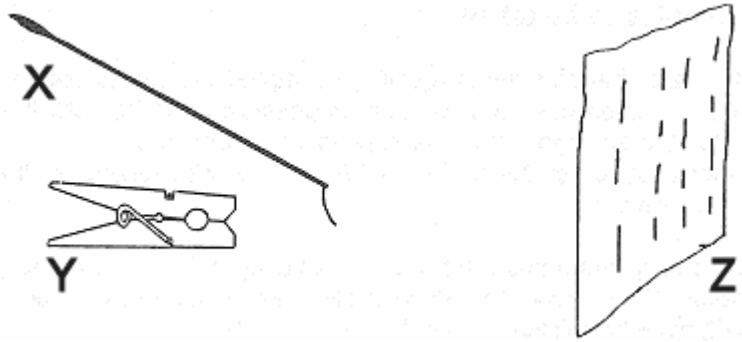
Key

A polyethylene cornet
B Metal ring
C Holder
D Wooden pole
E Hole

Figure 2 — Polyethylen cornet

5.4.4 For sampling waterborne oil layers of less than 1 mm thickness and oil sheens

PFTE net approximately 200 mm by 300 mm, fixed to a rod and line by means of a disposable clip, see Figure 3.



Key

X Rod and line
Y Clip
Z Teflon net

Figure 3 — PFTE net fixed to a rod and line by means of a disposable clip