# Petroleum and Petrochemical Bulletin

| Bunker Sampling for $H_2S$ | Bulletin 12-02<br>Rev. 0 |
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## Introduction

ISO 8217, *Specification of Marine Fuels*, is an international standard for the specification for marine fuels, frequently referred to as bunkers. The fourth edition of this standard was issued on June 15th, 2010, and contained additional testing requirements from the previous editions. One of these new requirements is the inclusion of the analysis for hydrogen sulfide ($H_2S$). This is of concern because the sampling and sample handling requirements for this test, which are critical to the method (IP 570/12, *Determination of hydrogen sulfide in fuel oils - Rapid liquid phase extraction method*) are not addressed by ISO 13739, *Procedure for Transfer of Bunkers to Vessels*, which is the standard that ISO 8217 normally requires to be used to collect the sample.

However, ISO 8217 states "where specific sampling requirements are documented in the referenced test methods, these shall be adhered to".

## IP 570/12 Requirements vs. ISO 13739 Requirements

The relevant points of contention of IP 570/12 are:

***6.1*** *Unless otherwise specified, samples shall be taken as described in IP 475. Care shall be taken to ensure that the integrity of the material is maintained and the possible loss of $H_2S$ is kept to a minimum. Where samples are drawn in a manner which does not minimise vapour loss (e.g. continuous drip sampling), dedicated samples for $H_2S$ determination shall be drawn.*

***6.2*** *Draw the sample directly into a suitable clean $H_2S$ inert container, of a minimum volume of 500 ml. The closure aperture shall allow the drawing of a test portion with the pipette (5.4) or syringe (5.5). To ensure sample integrity fill the sample container to approximately 95 % full and replace the cap immediately and securely.*

*NOTE 1 - It is recommended that containers such as dark brown borosilicate bottles or epoxy lined containers fitted with impervious gas-tight closures are used.*

*NOTE 2 - Lower volume containers may be used, however the precision could be affected.*

*NOTE 3 - Equipment used to take samples through the roof of storage tanks, and closed system samplers such as those commonly used for ship compartments blanketed with inert gas may not allow samples to be drawn directly into the sample container. In these situations it is acceptable to transfer the sample from the sampling device into the sample container, however care should be taken to keep losses of $H_2S$ from the sample to a minimum during the transfer.*

and,

***7.1*** *To minimize the loss of $H_2S$, do not homogenize, avoid unnecessary shaking of the sample, do not transfer the sample to another container and avoid unnecessary openings of the container before taking a test portion.*


Revisions/Reaffirmations

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| Rev. 0 | Dec 2012 |
| Reaffirmed | September 2017 |

ISO 13739 calls for drip sampling and:

- ***L.6*** *After the Cargo Officer and Chief Engineer are satisfied with the sample collected in the sampling container, the sample shall be thoroughly shaken or stirred to promote homogeneity.*
- ***L.7*** *The sample is then poured in small, equal portions into at least four sample bottles, making three or four passes to fill each bottle in turn to obtain nominally identical samples. The minimum quantity in each sample bottle shall be 750 ml.*

## Alternative Samples

While the custody transfer sample specified in ISO 13739 is clearly unsuitable for $H_2S$ testing in accordance with IP 570/12, alternative samples are also problematic.

Firstly, ISO 570/12 does not give any guidance as to where dedicated alternative samples for $H_2S$ should be drawn.

Further, IP 570/12 requires that the sample bottle must be approximately 95% full to ensure sample integrity. This would appear to rule out all levels or running samples in accordance with IP 475/ISO 3170 or API Chapter 8.1 as these limit the sample container to 90% and 85% fullness respectively, although IP475/ISO3170 allows 95% fullness for proprietary (purpose made) running samplers.

IP570/12 does allow sample transfer when working under closed or restricted conditions (see Note 3 under 6.2 above).

## Conclusion

The relevant standards writing bodies, ISO and EI, are addressing the outstanding issues and IFIA will continue to work with these organisations until they are resolved. However, it seems that a revision of ISO 13739 may be necessary for final clarification.

In the meantime, IFIA recommends that member companies advise clients of the above situation and, if possible, agree an alternative location for $H_2S$ samples (probably a shore tank or bunker vessel).

The sampling method also needs to be agreed with the client and it is suggested that the following methods should be acceptable:

1. An all levels or running sample with bottle and cage to 90% fullness (IP 475/ISO 3170) - in accordance with IP 570 as “approximately 95% full”.
2. A running sample taken with a proprietary sampler to approximately 95% full and transferred immediately to a secondary container.
3. Spot samples subject to individual tests (not composited).

The $H_2S$ sample location and method should be agreed in writing at the order confirmation stage and, if more than one client is involved, all will need to be in agreement.

**NOTE: Care should be taken to avoid exposing the 90% full sample containers to heat as they could become over pressurised.**

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