



Defence  
Infrastructure  
Organisation

# Safety Alert                      Parts A, B & C

## Subject: Multi Gas Indicators – Incorrectly specified sample tubes

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**DIO Sponsor:** Bryan Dunn

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**This Safety Alert is to be read by the following so appropriate action can be taken:**

- 1. DIO Service Manager (or equivalent for non-NGEC contracts)**
- 2. DIO's Maintenance Management Organisations**
- 3. Others**

**Others interested in the content of this Safety Alert might include:**

DIO Staff and Contractors; Public, Private Partnerships, Private Finance Initiatives Project Managers/Commercial Officers, Commanding Officers / Heads of Establishment (CO/HoEs) and representatives; and Chief Environment and Safety Officers (CESOs) or equivalent, Estate Facilities Managers (EFMs), Senior Estate Facilities Managers (SEFMs), CAEs, Authorising Engineers (Pet) and Authorised Persons (Pet) (AP(Pet)), Authorising Engineers (Confined Spaces) and Authorised Persons (Confined Spaces).

**When it takes effect:** Immediately

**When it is due to expire:** When updated or rescinded.

Health and Safety

This Safety Alert does not necessarily cover all aspects of the subject matter and readers should make themselves aware of other potential issues. Readers should also not rely on DIO publications as their only means of becoming aware of safety, operational or technical issues, but they should consult widely across other media to maintain awareness.

## Aim

1. To bring to the attention of appropriate persons the risks associated with incorrectly specified sample tubes on gas monitors, and to highlight the importance correct sample tubes for the given application. This Safety Alert also highlights the need for vigilance when using gas monitors to identify the correct sample tubes when required, and the necessary testing requirements for ensuring these devices remain safe to use.

## Introduction

2. Compliance with the contents of this Alert will enable compliance with the Health & Safety at Work etc. Act 1974 and its subordinate Regulations.
3. The appropriate MOD officer shall arrange for the Maintenance Management Organisation (MMO) contractor to carry out all actions in accordance with this Safety Alert.
4. Any work required because of this Safety Alert must be carried out in accordance with JSP 375 Parts 1 & 2.
5. On MOD Establishments occupied by United States Visiting Forces (USVF) responsibility is jointly held by USVF and DIO(USF). At base level this jointly managed organisation is to take appropriate action to implement the contents of this Alert. Where this Alert contains procedures, which differ significantly from USVF practice a DIO (USF) code of practice will be issued.

## Background

6. A recent HSE Safety Alert ([Link](#)) highlighted an incident where a gas monitor (referred to here as Multiple Gas Indicator (MGI)) failed to detect the presence of a flammable atmosphere. This subsequently led to an explosion and resulted in a fatal injury.
7. The subsequent investigation found a significant contributor to this failure was absorption of the flammable vapour onto the inner surface of the sample tube. As such, no flammable vapour reached the detector before the test was completed, leading to the false conclusion that the area was free of flammable vapour.
8. This incident highlighted the importance of selecting the correct equipment for gas detection and verifying the effectiveness of the gas monitoring system.
9. The phenomenon of absorption of some substances on sample tubes is known and has been studied in previous HSE research ([Research Report RR635](#)).
10. While the incident to which this safety alert refers involved a highly flammable substance and measurement of LEL, similar issues may apply to some other gases, particularly reactive gases such as H<sub>2</sub>S and NO<sub>x</sub>.

## Requirements

11. Any new sampling configuration of an MGI which utilises a sample tube should be tested using the substance of interest, where practicable. This is of particular importance if the substance of interest is not the substance used to calibrate.
12. Sample tubes should be as short as possible. The increase in response time should not exceed the response time of the MGI without a sample tube plus the delay time specified in the MGI manual. Where no time is specified in the manual, 3 seconds per metre should be used, as per BS EN 60079-29-1: 2016, Section 3.4.15. The combination of gas detector and sample tube should be considered unsuitable where this time is exceeded.

13. Manuals for MGIs should be reviewed and where necessary manufacturers guidance should be sort in order to identify the suitability of existing sample tubes.
14. Consideration should be given to appropriate use of sample tubes for the intended application. For example, most MGIs are able to store the highest measured readings while performing an initial gas test and can often be lowered into tanks or pits without the need to use a sample tube.
15. Where relevant for use within MOD JSP 375 Part 2 Volume 3, the relevant Authorising Engineer should assure themselves that the arrangements for use of the GMI's within are suitable and sufficient.
16. Any work incurring expenditure of MOD funding requires appropriate authority from the MOD officer responsible for the establishment.

#### **Part A**

17. Clarification must to be obtained that sample tubes are suitable for use with MGIs. This should be prior to raising any safety documentation where MGIs form part of the Safe System of Work controlling a flammable substance.
18. Confirmation that sample tubes are suitable for use should be recorded in JSP 375 Part 2 Volume 3 Chapters 5 and 6 Operating Record. With evidence held in the Document Register.
19. The MMO AE / AP is to notify the SAA within DIO Technical Services and any other relevant parties of any changes required to comply with the requirements of this Safety Alert.

End