

## MEASURING NEW FUMIGANTS WITH DRÄGER-TUBES®

Draeger Safety AG&Co.KG aA, Germany, Frank Arnold\*

For more than 60 years, Dräger Safety has offered the well-known Dräger-Tubes®. The detection of gases and aerosols is the main focus with this system. Today, Dräger Safety offers more than 220 different tubes.

The Dräger Tubes® program works in an easy way, combining a precise pump with a glass tube filled with analytical chemicals. The measurement is made by drawing a definite volume of sample gas through the tube. Immediately after the measurement is finished, the concentration of the measured gas can be read on the detection layer of the tube. The chemical reaction inside the tube has left an easy-to-read stain.

The detection of fumigants is one of the most interesting markets for Dräger-Tubes®. Because of constraints and the decreased use of older products, new fumigants have to be developed for the future. Otherwise, a profitable production of crops, fruits and other plants is not possible.

A couple of new gases have received approval in several different countries. But only a cost efficient detection system helps to optimise the fumigation process.

Dräger Safety has focused on the development of new tubes for these gases. The first step was to develop a new tube for Methyl Bromide, giving an answer to a new threshold limit value in Europe of 0.5 ppm.

### New Dräger-Tube® for Sulfuryl Fluoride

This tube provides a measuring range of 1-5 ppm of Sulfuryl Fluoride. No cross sensitivities to other fumigants. A high temperature inside the tube cracks the molecules and the fragments can be detected specifically to the detection layer.

### New Dräger-Tube® for Chloropicrin

A very low measuring range of 0.1-2 ppm covers the threshold limit value. There are no cross sensitivities to other fumigants.

All other Dräger-Tubes® for fumigants in an overview

Name	Order number	Measuring range	Number of strokes
Phosphine 0.01/a	81 01611	0.1 to 1 ppm	3
		0.01 to 0.3 ppm	10
Phosphine 0.1/a	CH 31101	0.1 to 4 ppm	10

Name	Order number	Measuring range	Number of strokes
Phosphine 1/a	81 01801	20 to 100 ppm	2
		1 to 20 ppm	10
Phosphine 25/a	81 01621	200 to 10,000 ppm	1
Phosphine 50/a	CH 21201	50 to 1,000 ppm	3
Methyl Bromide 0.2/a	8103391	0.2-2 ppm	5+1
		2-8 ppm	2+1
Methyl Bromide 0.5/a	81 01671	5 to 30 ppm	2
		0.5 to 5 ppm	7
Methyl Bromide 3/a	67 28211	10 to 100 ppm	2
		3 to 35 ppm	5
Methyl Bromide 5/b	CH 27301	5 to 50 ppm	5

A new application for our tubes is the testing of fumigated transport containers. There are strong regulations for the fumigation of containers in the worldwide shipping of goods in order to protect the importing countries from foreign varmints.

After the fumigation process in the exporting harbour, the containers are purged with fresh air and a certificate confirms the process. No labelling is required. But depending on the goods placed inside the containers, an amount of fumigant stays inside.

Harbour workers, truckers and customs people who have to open the containers for inspection may come into contact with significant concentrations of fumigants. Dräger Safety has created two sets of tubes for a fast and simultaneous check to reduce the risk of an exposition.

Name	Part number	Detectable gases	Measuring time
SimulanTest Fumigation	8103410	Formaldehyde Methyl Bromide Phosphine Hydrocyanic acid Ammonia	3 minutes
SimulanTest Container Fumigation I	8103380	Formaldehyde Methyl Bromide Phosphine Hydrocyanic acid Ethylen Oxide	4 minutes

Future developments for the next Dräger-Tube®: Ethyl Formate, Carbonyl Sulfide, and Dicyanide.