

Keeping drugs out of the workplace – Dräger DrugCheck™

HEALTH & SAFETY

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The illegal trade in and manufacture of drugs represent enormous factors in the global economy and crime statistics world-wide. The number of people harmed is constantly growing as the average age of users decreases and the age of first time users falls. Nevertheless, drug abuse is a phenomenon which can be observed among both 50-year-olds and 15-year-olds. The earlier the abuse is discovered and the sooner countermeasures such as prevention and controlling are taken, the greater the chance of recovery.

Drugs may be ingested, inhaled or injected. After entering the bloodstream, they are rapidly metabolized via various pathways. Because of a person's changed perception and impaired response time when under the influence of drugs, the slightest mistake in, for example, a hazardous workplace setting or even during a very short drive can prove a high risk and have life-long consequences. Even so-called "soft" drugs such as cannabinoids can have a dangerous effect on persons operating machines or driving vehicles.



Fig. 1 – Dräger DrugCheck – key diagnostic element for workplace drug testing programmes

Working while under the influence of legal or illegal drugs results in substantial economic losses totalling millions of euros each year.

The consequences of drug abuse can be serious and costly. As a market leader in the field of breath alcohol testing, we know what is important to our customers.

Using the new Dräger DrugCheck™ (™ Dräger DrugCheck is a trademark of Dräger Safety AG & Co. KGaA, Lübeck, Germany) can help minimize this danger. A handy drug test kit for taking oral fluid samples, the Dräger DrugCheck can be used any time, anywhere – during routine medical examinations of new employees, random screening programmes within the framework of established workplace alcohol and drug policies, or in the event of an incident (Fig. 1). Because the Dräger DrugCheck is straightforward and quick to use, it is readily accepted by employees, employers, TPAs (Third Party Administrators) and laboratory service providers, allowing the test to be established as an objective check.

There has been an alarming increase in the extent to which designer drugs such as methamphetamine and Ecstasy are abused in our societies, in some cases leading to lasting damage to health even after the first use. Dräger DrugCheck detects these drugs.

Many drugs and drug metabolites are excreted in urine and can be detected by means of traditional drug urine screening assays. Alternative laboratory methods have been used to detect drugs in blood and serum.

The suitability of oral fluid as a biological specimen for the detection of recent drug use has been supported by various studies. The correlation between the presence of drugs in oral fluid and blood has also been reported. Unlike urine drug testing, oral fluid drug testing, as performed with the new Dräger Drug Check, is able to detect active drugs even when they are only present in low concentrations (recent drug use, typically within hours), meaning that the device reliably detects their consumption even in small doses.

Easy and reliable

Three very simple steps – sample collection, testing and storage – are the trademark of the Dräger Drug Check. The testing kit comprises a hygienically pouched sample collection device, a testing centrifuge tube and a separately pouched drug profile testing card or test strip (Fig. 2). The sampling process is minimally invasive, embarrasses neither the subject (donor) nor the operator unnecessarily, and permits precise control of the sampling process. This means that any attempts to tamper with or adulterate the sample or the collection process itself can be more or less completely thwarted, helping to establish a basis of trust between operator and test subject/donor (Fig. 3).



Fig. 2 – Dräger DrugCheck test kit contains: collection device, centrifuge tube, profile testing card

Sensitivity

Within just ten minutes, the test strip can be used to reliably detect illegal substances (cocaine, opiates, amphetamines, methamphetamines, phencyclidine and cannabinoids) even before they revert to their respective metabolites. The immunochemical detection of $\Delta 9$ tetrahydrocannabinol ($\Delta 9$ THC) – the psychoactive component in marijuana, hashish and

hashish oil – reacts with a particularly high level of sensitivity.

The Dräger DrugCheck testing profile is based, when possible, on the preliminary oral fluid testing requirements of the U.S. Federal Workplace Drug Testing Programs

Dräger DrugCheck cut-off concentrations

Abbreviation	Drug	ng/mL
C	Cocaine	20
O	Opiates	40
A	d-Amphetamine	50
M	d-Methamphetamine	50
P	Phencyclidine	10
T	$\Delta 9$ -Tetrahydrocannabinol	50

The Dräger DrugCheck provides only preliminary analytical test results. An alternative, more specific chemical method must be used to obtain confirmed analytical results. Gas chromatography/mass spectrometry (GC/MS or LC/MS/MS) is the preferred confirmation method for oral fluid specimens. Clinical consideration and professional judgment should be applied to drug abuse test results, and particularly to preliminary positive results.

Test principle

The Dräger DrugCheck test kit is an immunoassay which functions according to the principal of competitive inhibition. Drugs that may be present in the oral fluid compete with drug conjugate immobilized on the test membrane for binding sites on the antibody-coated microparticles. A visual signal is generated using conventional lateral flow technology within a unique patent-laminated drug profile testing card. During collection of the specimen, the oral fluid is collected by absorption directly into the Dräger DrugCheck foam-tipped oral fluid collection device and is then delivered into the collection centrifuge tube by pushing the collection device, foam-first, down into the expresser. The screening test itself – the immune-chromatography – is initiated once the profile drug card has been placed into the tube (see Fig. 4).

The oral fluid sample interacts with the antibody-coated microparticles and drug conjugate present on the test membrane. In the absence of any drugs, the antibody is free to react with the drug conjugate, causing a red/pink band to form in each drug zone. When drugs are present in the specimen, they bind to the antibody-coated microparticles. If sufficient drug concentrations are present, the microparticles are inhibited from binding with the drug conjugate, and a coloured band is formed. In the case of a preliminary positive (non-negative) oral fluid specimen, the detection area on the test membrane remains blank.



Fig. 3 – Dräger DrugCheck to build and enhance trust between operator and test subject

Hygiene

The sample collection devices are individually and hygienically pouched. When the oral fluid sample is released – squeezed out – into the test centrifuge tube, it clips into place automatically, ensuring hygienic and drip-free disposal of the test kit compounds.



Fig. 4 – Dräger DrugCheck application, step-by-step schematic overview

Conclusion:

Within the framework of in-vitro diagnostic and forensic investigation, the Dräger DrugCheck enables the simultaneous qualitative detection of up to six classes of illegal substances in one sample of oral fluid. This very straightforward test is designed to be performed by anyone, any time and anywhere. This high quality product is an efficient instrument which will ensure

transparency and quality in prevention and control programmes. As well as achieving excellent levels of sensitivity and reliability, the test offers the user many other advantages. The Dräger Drug Check principle ensures the sample can be analysed directly onsite, though oral fluid sample can also be preserved in the centrifuge tube, stored and sent to a laboratory analysis, if this is required.

Implementation and use of the Dräger DrugCheck is an investment in safety, quality and your good reputation and image.

Step-by-step screening procedure (Fig. 4, pictures 1 to 7)

1. The donor/client should keep the foam collector device in the mouth until thoroughly soaked (normally less than 1 minute). Donor should not chew or suck on the foam part of the collection device.
2. The administrator/operator should place the collector device foam-first into the expresser in the centrifuge tube. Slowly push the collection device down into the expresser. The oral fluid will flow into the tube.
3. To express the maximum amount of sample, lift up slightly and push downwards a second time. A minimum of approx. 1 ml of sample should be collected.
4. Lift the collection device out of the centrifuge tube at a straight upward angle, removing the expresser with it. Both pieces are then thrown away. Open the foil pouch and remove the drug profile testing card. Record name or ID number in the writable section of the card.
5. Place the profile testing card in the centrifuge tube arrow-tip first. Allow testing card to drop to the bottom of the tube. Wait 10 minutes and interpret results. Discount results if 15 minutes or more have elapsed. The presence of any line indicates a negative result, while the absence of any line indicates a preliminary positive result.
6. Tightly seal the tube with the cap to send in for confirmation. Complete your facility's chain-of-custody procedures and pack into a box for safe shipment to the lab; ship according to local, state or federal regulations.