

Solution 9. Environmental Intelligence – Environmental samples testing drugs or alcohol metabolites and other harmful substances that have been released to the accommodation spaces on board.

For comprehensive details regarding this Solution, please contact ARTION D&A at +30 210 260 1475 or via email at info@artiondna.com

View a brief overview here:

1.9.1 Description

As a complementary—not competitive—solution to conventional drug and alcohol (D&A) testing based on human samples, Artion D&A offers an innovative alternative: the detection of alcohol, drugs and other harmful substances (benzene, toluene, etc.) in the vessel's sewage system. This method enables the identification of substances' use that may fall outside the observation window of traditional testing protocols.

This method is particularly effective in identifying substance use that may occur immediately after the most recent test of samples of the crew—at a time when crew members might feel confident that no unannounced testing will occur for an extended period. It is important to emphasize that the test detects metabolites (e.g., of alcohol), not the parent substances themselves, thereby avoiding false positives due to incidental sources such as alcohol-based cleaning agents.

Sampling is conducted via surface swabs, which are selectively applied to targeted areas within the accommodation spaces on board, with a particular focus on air conditioning intakes. Ideally, this process can be performed by the operator's superintendent, ensuring impartiality and the element of surprise.

Collected swabs are sent through ARTION to Green Biotech Laboratories, where they are analyzed in accordance with the attached certification. Results are non-individualized—they are reported per space and indicate only the presence or absence of alcohol and drug metabolites. **Furthermore, in coordination with the operator, the method can also be adapted to detect environmental contaminants that may pose health risks to the crew.**

This solution is offered to existing customers and to operators who may not yet be utilizing any of the aforesaid D&A testing solutions.

1.9.2 Analysis methods, the Cut-offs, the targeted substances.

Category	Compound	Analytical Method	Sample Type	Indicative Cut-off
Illicit Drugs	Cocaine / Morphine / Codeine	LC-MS/MS	Surface Swab	0.1-1 ng/cm2
Illicit Drugs	Methamphetamine	LC-MS/MS	Surface Swab	0.1-1 ng/cm2
Illicit Drugs	MDMA	LC-MS/MS	Surface Swab	0.1-1 ng/cm2
Illicit Drugs	Heroin	LC-MS/MS	Surface Swab	0.1-1 ng/cm2
Illicit Drugs	THC (Δ9-Tetrahydrocannabinol)/ Cannabinoids	LC-MS/MS	Surface Swab	0.1-1 ng/cm2
Illicit Drugs	Synthetic cannabinoids / Cathinones	LC-MS/MS	Surface Swab	0.1-1 ng/cm2
Illicit Drugs	Fentanyl	LC-MS/MS	Surface Swab	0.01-0.1 ng/cm2
Alcohol Biomarkers	EtG (Ethyl Glucuronide) / Ethanol (residue)	GC-FID, LC-MS/MS	Surface Swab	5-50 ng/cm2 / trace
Prescription Drugs	Diazepam / Lorazepam /Alprazolam	LC-MS/MS	Surface Swab	0.1-1 ng/cm2
Toxic Compounds	Benzene / Toluene / Xylene	GC-MS	Surface Swab	1-10 ng/cm2
Toxic Compounds	Formaldehyde / Acetone / Ethylbenzene	GC-MS / HPLC	Surface Swab	10-100 ng/cm2
Heavy Metals	Lead (Pb) / Chromium (Cr)	ICP-MS	Surface Swab	0.1-1 ng/cm2
Heavy Metals	Cadmium (Cd)	ICP-MS	Surface Swab	0.05-0.5 ng/cm2
Heavy Metals	Arsenic (As)	ICP-MS	Surface Swab	10 µg/nm2
Heavy Metals	Nickel (Ni)	ICP-MS	Surface Swab	1 ng/cm2
Heavy Metals	Zinc (Zn)	ICP-MS	Surface Swab	5 ng/cm2
Industrial Chemicals	Phenol	LC/GC-MS/MS	Surface Swab	10 ng/cm2
Industrial Chemical	Hydrogen Sulfide / Hydrochloric - Sulfuric acid	GC-MS/MS, Ion Chrom / Color	Surface Swab	pH-based
Industrial Chemicals	DEHP	GC-MS	Surface Swab	1-10 ng/cm2
Industrial Chemicals	PFOS	LC-MS/MS	Surface Swab	0.01-0.1 ng/cm2
PAHs	Benzo[a]pyrene / Naphthalene	GC-MS	Surface Swab	0.01-0.1 ng/cm2
POPs	PBDEs	GC-MS	Surface Swab	0.01-0.1 ng/cm2

Additional services provided by Artion:

- ARTION coordinates the shipment with the port agent and the courier companies. The Operator is only informed about the progress of the shipment, while its involvement is minimal.
- ARTION provides statistical analysis beyond the usual positive/negative. It allows the Operators to take proactive measures before their crew turn into positive, exercising Due Diligence. Further details are cited through Chapter 3 “ARTION Certificate-Interpretation” below.
- ARTION provides seminars or participates to Officers in-house meetings.
- ARTION provides training video with the collection instructions for the convenience of the Officer, who is responsible to collect the specimens and mail them for analysis.

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