**Nitroglycerin (NG)**

***Who is this guidance for?***

This guidance is primarily aimed at employers or individuals with delegated responsibility for managing workplace exposure to substances. Whilst it is not exhaustive, the information presented is intended to demonstrate how biomonitoring can help with this duty. Some simple advice is presented to help non-specialist users to get the most out of biomonitoring covering (1) when to take a sample to ensure reliable and comparable results over time; (2) putting the result into context with respect to background (environmental) levels or what can reasonably be achieved with good exposure control; and (3) some basic technical data that can help to evaluate an analytical service provider. For further information you should consult your chosen analytical service provider who should be happy to discuss your specific requirements and find solutions.

**Hazardous Substance:**

Nitroglycerin CAS number: 55-63-0

**Workplace Exposure Limits:**

8-hour TWA: 0.01 ppm, 0.095 mg/m3

15-minute STEL: 0.02 ppm, 0.19 mg/m3

Skin notation

**Nitroglycerin**

Monitored by analysis of nitroglycerin (GTN) and its metabolites 1,2 and 1,3 glycerol dinitrate (GDN) in urine

**BMGV**: 15µmol nitroglycols/mol creatinine

***Biological Monitoring Guidance Value (BMGV)***

Guidance value: 15µmol nitroglycols/mol creatinine

Conversion: 1mmol/mol = 2.007µg/g

***Other Guidance Values***

None

***Sample Collection***

Urine samples should be collected at the end of shift into polystyrene universal containers (30mL).

***Sample Transport to Laboratory***

Send samples to the laboratory by first class post (or equivalent) to arrive within 48 hours of collection. If any delay is anticipated, store samples chilled – ideally frozen if suitable facilities are available. Packaging must comply with relevant postal regulations for biological samples (UN3373).

***Description of Suggested Method***

Urine samples are treated with glucuronidase to free any conjugated metabolites, followed by liquid-liquid extraction. Samples are quantified using liquid chromatography with mass-spectrometry detection. Results are reported as the sum of all analytes.

**Analytical Evaluation**

Detection limit: 0.3 nmol/L (3 x background)

Calibration range: Typically 0-250 nmol/L

Precision: 21% RSD at 300 nmol/L

Sample stability: >2 days at ambient temperature, >2 months at -20°C

Analytical Interferences: None known

Quality assurance: no external QA scheme

***Elimination Half-Life***

Elimination half-life is a measure of the rate of removal of a substance that has been taken into the body. It helps to identify when it is best to take a sample following potential exposure and indicates the potential ‘exposure window’ that will be reflected by a result.

Nitroglycerin is fairly rapidly cleared from the body, following exposure. Urine half-lives have not been well-characterised, but a urine sample will reflect the previous few hours exposure. An end-of-shift urine sample is best when potential exposure is continuous throughout the day. However, if exposure is related to a specific task, it is better to collect a sample within two hours of completion.

**Other Information**

***Confounding factors***

Nitroglycerin is used in pharmaceuticals prescribed to treat angina. It should be noted if workers take nitroglycerin therapeutically as this will affect their urine levels.

***Unexposed level***

None detected.

**Creatinine correction is advised**

***Interpretation***

Urinary nitroglycerin/GDN results reflect systematic exposure to nitroglycerin that may have entered the body by inhalation or more likely, through the skin. If biological monitoring results are greater than the guidance value, it does not necessarily mean that ill health will occur, but it does mean that exposure is not being adequately controlled. Under these circumstances employers will need to look at current work practices to see how they can be improved to reduce exposure.

***Links***

EH40 List of Approved Workplace Exposure Limits <http://www.hse.gov.uk/pubns/books/eh40.htm>

Biological Monitoring: A tool for helping to assess workplace exposure (August 2021). Published by British Occupational Hygiene Society (www.bohs.org). [BOHS-Biological-Monitoring-A-tool-for-helping-to-assess-workplace-exposure-rebranded.pdf](https://www.bohs.org/app/uploads/2021/08/BOHS-Biological-Monitoring-A-tool-for-helping-to-assess-workplace-exposure-rebranded.pdf)

For further advice, please contact us:

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**Biological Monitoring at HSE**

<https://www.hsl.gov.uk/online-ordering/analytical-services-and-assays/biological-monitoring>