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**SPECIFIC MEDICAL TESTS AND EXAMINATIONS  
PUBLISHED IN THE LITERATURE  
FOR OSHA-REGULATED SUBSTANCES**  
(OSHA = Occupational Safety and Health Administration)



[en español](#)

## Carbaryl (Sevin®)

CAS No: 63-25-2

**NOTE:**

- (1) Efficacy of Medical Tests has not been evaluated by NIOSH.
- (2) NIOSH references include diagnostic, screening, and other tests.
- (3) Revised (2004) OSHA mandated medical tests [OSHA 6(b) (5) standards] are provided in yellow background and are listed first.
- (4) Only OSHA-regulated substances (29 CFR 1910.1000, Table Z-1 -- Air Contaminants) with published medical tests are included.
- (5) N/R = Not Reported.

EDITOR(S) / AUTHOR(S)	SPECIFIC MEDICAL TEST(S) and EXAMINATION(S) ANALYTIC METHOD(S) ANALYTE(S) PAGE(S)	REFERENCE(S)
US DHHS PHS CDC NIOSH and US DOL OSHA.	<p>In General</p> <p><b>Carbaryl (Sevin) Dust is a Short-acting Anticholinesterase Agent. It Inactivates Cholinesterase, Resulting in the Accumulation of Acetylcholine at Synapses in the Nervous System, Skeletal and Smooth Muscles, and Secretory Glands. Carbaryl, when given to Several Species of Pregnant Animals, Has Caused Defects in their Offspring. Carbaryl's Rapid Reversibility of Cholinesterase inhibition is of Significance in Monitoring Exposure: Measurements of the Enzyme are Likely to give Clinically Misleading Values in the Normal Range of Activity and will not Reflect the True Magnitude of Exposure. Carbaryl is also rapidly Metabolized, which Further Diminishes the Severity of its Effect. Current Health Status Should Be Compared with the Baseline Health Status of the Individual Worker. Pages 1 -2 (1978); Page 5 (1995).</b></p>	<p>NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards DHHS (NIOSH) <i>Pub No. 81-123; 88-118; Suppls. I-IV. 1981-1995.</i></p> <p><b>Pages 1-5 (1978); Pages 1-8 (1995).</b></p>



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<p>LaDou J, ed.</p>	<p><b>Whole Blood (Chemical/Metabolite) End-Of-Shift</b></p> <p>Timing of Sampling is not Critical. RBC Cholinesterase to be Determined. No Adverse Level : &lt; 30 Depression Clinical level: &gt; 40%Depression. Terminal Half-Time: 1-2 Hours. Comment: Cholinesterase is Reactivated Quickly. Page 643.</p>	<p><i>Occupational &amp; Environmental Medicine. 2nd Edition. Appleton and Lange. 1997.</i> Page 643.</p>
<p>Lauwerys RR, Hoet P.</p>	<p><b>Blood Serum</b></p> <ul style="list-style-type: none"> <li>● N/R</li> </ul> <p>As: 1-Naphthol (Total) Good Correlation Between Serum and Urine 1-Naphthol. Because of Rapid Reactivation of Cholinesterase, Samples Should be Drawn and Analyzed within 4 Hours after Exposure. Page 506.</p>	<p><i>Industrial Chemical Exposure. Guidelines for Biological Monitoring. 3rd Edition. Lewis Publishers. CRC Press, Inc. 2001.</i> Pages 505-506.</p>
<p>Kneip TJ, Crable JV.</p>	<p><b>Blood Serum</b></p> <ul style="list-style-type: none"> <li>● Cholinesterase in Presence of Ellman's Reagent using Acetylthiocholine</li> </ul> <p>As: Color Development as a Function of Time. Pages 407-411.</p>	<p><i>Methods for Biological Monitoring - A Manual for Assessing Human Exposure to Hazardous Substances. Am Public Health Association. 1988.</i> Pages 407-411.</p>



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<p>US DHHS PHS CDC NIOSH and US DOL OSHA.</p>	<p><b>Blood Cholinesterase</b> <b>Whole Blood (Chemical/Metabolite)</b> <b>Pre- &amp; Post-Shift</b></p> <p><b>A Pre-Exposure Blood Cholinesterase Concentration Should be Obtained for Each Worker So that the Post-Exposure Concentration may be Expressed as a Percentage of that Worker's Normal Cholinesterase Activity.</b></p> <p><b>A Post-Exposure Blood Cholinesterase Level less than 70% of Worker's Normal Cholinesterase Activity indicates Excessive Exposure to Carbaryl.</b></p> <p><b>Although the Relationship between Airborne Concentrations of Carbaryl and Urinary Concentrations of 1-Naphthol has not been Established, Urinary Concentration of 1-Naphthol in Excess of 4 mg/L Urine May Reflect Overexposure to Carbaryl.</b></p> <p><b>Page 5 (1995).</b></p>	<p><b>NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards DHHS (NIOSH) <i>Pub No. 81-123; 88-118; Suppls. I-IV. 1981-1995.</i></b> <b>Pages 1-8 (1995).</b></p>
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<p><b>Baselt RC.</b></p>	<p><b>Blood Cholinesterase</b>  <b>Whole Blood (Chemical/Metabolite)</b>  <b>Pre- &amp; Post-Shift</b></p> <ul style="list-style-type: none"> <li>• <b>Colorimetry</b></li> </ul> <p><b>As: Erythrocyte Cholinesterase Activity</b></p> <p><b>A Post-Exposure Blood Cholinesterase Level less than 70% of Worker's Normal Cholinesterase Activity indicates Excessive Exposure to Carbaryl.</b>  <b>Pages 67-69 (1997).</b></p>	<p><i>Biological Monitoring Methods for Industrial Chemicals.</i> 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> Editions. Chemical Toxicology Institute, 1980. 1988, 1997.  <b>Pages 66-70 (1997).</b></p>
<p><b>ACGIH.</b></p>	<p><b>Blood Cholinesterase From:</b>  <b>Red Blood Cells</b>  <b>End-of-Shift</b></p> <p><b>For the Biological Exposure Index (BEI), the Worker Should Not Have any Exposure to Acetylcholinesterase-Inhibiting Pesticides for 30 days; the Average of 2 Baseline Values taken 3 days apart is recommended. The Optimal level recommended by ACGIH is 70% of the Pre-exposure Level.</b>  <b>A Notation of “Nonspecific” is attributed to the Cholinesterase Inhibitor Carbaryl since it is also Observed after Exposure to Other Chemicals.</b></p> <p><b>Carbaryl is Not Classified as a Human Carcinogen.</b>  <b>Pages 19; 77, 104; 108.</b></p>	<p><i>2021 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.</i> ACGIH Worldwide. 2021.  <b>Pages 19; 77; 104-108.</b></p>



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<p>Proctor NH, Hughes JP.</p>	<p><b>Blood Cholinesterase Red Blood Cells/Count Pre- &amp; Post-Shift</b></p> <p><b>Pre-placement and Annual Examinations Should be Conducted with Determination of Pre-exposure Red Blood Cell Cholinesterase Activity. Page 146.</b></p>	<p><i>Chemical Hazards of the Workplace.</i> JB Lippincott Company. 1978. <b>Pages 144-146.</b></p>
<p>US DHHS PHS CDC NIOSH and US DOL OSHA.</p>	<p><b>Ophthalmic Examination</b></p> <p><b>Signs and Symptoms of Overexposure May Include Miosis, Blurred Vision, and Lacrimation. Overexposure to Carbaryl May Cause Small Pupils and Watering of the Eyes. Page 1 (1978).</b></p>	<p>NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards DHHS (NIOSH) <i>Pub No. 81-123; 88-118; Suppls. I-IV. 1981-1995.</i> <b>Pages 1-5 (1978).</b></p>
<p>US DHHS PHS CDC NIOSH and US DOL OSHA.</p>	<p><b>Pregnancy/Reproductive Effects</b></p> <p><b>Carbaryl is a Mutagen and a Teratogen in a Wide Variety of <i>In Vivo</i> and <i>in Vitro</i> Tests. Workers Should be Informed of Animal Studies Showing Reproductive Effects Resulting from Exposure to Carbaryl. Exposure Should be Minimized During Pregnancy. Page 1 (1978).</b></p>	<p>NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards DHHS (NIOSH) <i>Pub No. 81-123; 88-118; Suppls. I-IV. 1981-1995.</i> <b>Pages 1-5 (1978).</b></p>



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<p>US DHHS PHS CDC NIOSH and US DOL OSHA.</p>	<p>Urine (Chemical/Metabolite)</p> <p><b>Urinary Concentration of 1-Naphthol Greater than 4mg/l urine may Reflect Overexposure to Carbaryl. Page 5 (1995).</b></p>	<p>NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards DHHS (NIOSH) <i>Pub No. 81-123; 88-118; Suppls. I-IV. 1981-1995. Pages 1-8 (1995).</i></p>
<p>Baselt RC.</p>	<p>Urine (Chemical/Metabolite)</p> <ul style="list-style-type: none"> <li>• <b>Colorimetry</b></li> </ul> <p><b>As: Conjugated 1-Naphthol</b></p> <p><b>Urinary 1-Naphthol Concentrations have not Exceeded 0.23 mg/L in Healthy Unexposed Workers.</b></p> <p><b>Post-Exposure Urinary Concentrations of 1-Naphthol Greater than 4 mg/L may Represent Significant Exposure to Carbaryl. Pages 66-67 (1997).</b></p>	<p><i>Biological Monitoring Methods for Industrial Chemicals. 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> Editions. Chemical Toxicology Institute, 1980. 1988, 1997. Pages 66-70 (1997).</i></p>
<p>Lauwerys RR, Hoet P.</p>	<p>Urine (Chemical/Metabolite)</p> <ul style="list-style-type: none"> <li>• <b>N/R</b></li> </ul> <p><b>As: 1-Naphthol</b></p> <p><b>A WHO Study Showed that if 1-Naphthol Concentration does not exceed 10 mg/L at the End of the Exposure Period, the Risk of Occurrence of Symptoms or Signs of Clinical Intoxication is low. It Should be Noted that 1-Naphthol is also a Metabolite of Naphthalene. Pages 505-506.</b></p>	<p><i>Industrial Chemical Exposure. Guidelines for Biological Monitoring. 3rd Edition. Lewis Publishers. CRC Press, Inc. 2001. Pages 505-506.</i></p>



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<p>Proctor NH, Hughes JP.</p>	<p>Urine (Chemical/Metabolite)</p> <ul style="list-style-type: none"> <li>• N/R</li> </ul> <p>As: 1-Naphthol (Total)</p> <ul style="list-style-type: none"> <li>• N/R</li> </ul> <p>As: Glucuronide</p> <p>The Urinary Excretion of 1-Naphthol, one of the Principal Metabolites of Carbaryl, Excreted as Free Naphthol or in the Form of Sulfate or Glucuronide, has been Used as an Index of Exposure, No Quantitative Relationship has been Established between Exposure to Carbaryl and Total Urinary 1-Naphthol Excretion. Page 145.</p>	<p><i>Chemical Hazards of the Workplace.</i> JB Lippincott Company. 1978. Page 144-146.</p>
<p>LaDou J, ed.</p>	<p>Urine (Chemical/Metabolite) End-Of-Shift</p> <ul style="list-style-type: none"> <li>• N/R</li> </ul> <p>As: 1-Naphthol [mg/g Creatinine (Cr)]</p> <p>No Adverse Effect Level: 10 mg/g Cr Clinical Effect Level: Insufficient Data. Page 643.</p>	<p><i>Occupational &amp; Environmental Medicine.</i> 2nd Edition. Appleton and Lange. 1997. Page 643.</p>
<p>US DHHS PHS CDC NIOSH and US DOL OSHA.</p>	<p>Urinalysis</p> <p><b>Carbaryl May Cause Kidney Damage. Urinalysis Should Include, at a Minimum, Specific Gravity, Albumin, Glucose, and a Microscopic Evaluation of Centrifuged Sediment. Page 1 (1978).</b></p>	<p>NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards DHHS (NIOSH) <i>Pub No. 81-123; 88-118; Suppls. I-IV. 1981-1995.</i> <b>Pages 1-5 (1978).</b></p>



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