

International Hazard Datasheets on Occupation



Laboratory Worker

What is a Hazard Datasheet on Occupation?

This datasheet is one of the International Datasheets on Occupations. It is intended for those professionally concerned with health and safety at work: occupational physicians and nurses, safety engineers, hygienists, education and Information specialists, inspectors, employers' representatives, workers' representatives, safety officers and other competent persons.

This datasheet lists, in a standard format, different hazards to which laboratory workers may be exposed in the course of their normal work. This datasheet is a source of information rather than advice. With the knowledge of what causes injuries and diseases, it is easier to design and implement suitable measures towards prevention.

This datasheet consists of four pages:

- Page 1: Information on the most relevant hazards related to the occupation.
- Page 2: A more detailed and systematized presentation on the **different hazards** related to the job with indicators for preventive measures (marked as numbered shields and explained on the third page).
- Page 3: Suggestions for **preventive measures** for selected hazards.
- Page 4: **Specialized information**, relevant primarily to occupational safety and health professionals and including information such as a brief job description, a list of tasks, notes and references.






Who is a laboratory worker?

A worker who performs laboratory tests to determine chemical and physical characteristics or composition of various materials, and may also maintain laboratory equipment.

What is dangerous about this job?

- In laboratory work, toxic gases, fumes and liquids may break out (because of worker's error, equipment failure, or other accidental reason) and cause acute poisoning, suffocation, burns, and other traumas.
- Many laboratory chemical or biological agents are highly flammable and/or explosive, and their careless handling and storage may end in fires and explosions.
- Some chemical substances and biological materials may be harmful to Laboratory Workers who regularly deal with them for long times.
- Laboratory work is often done in a seating posture and involves continuous repetitive movements, which may, in the course of time, cause back, hands and arms pains.

Hazards related to this job

Accident hazards 	<ul style="list-style-type: none"> Falls from ladders and other elevated platforms Falls of heavy objects on head (from overhead storage shelves) and feet 	
	<ul style="list-style-type: none"> Slips and falls on wet, uneven or damaged floors (esp. hazardous when hand-transporting dangerous materials, e.g. chemicals) 	1
	<ul style="list-style-type: none"> Entanglement of clothes, hair, fingers, arms in rotating and other moving equipment, in particular centrifuges, mixers, blenders, etc. 	2
	<ul style="list-style-type: none"> "Freeze burns" or frostbite from skin contact with very cold surfaces or fluids, e.g., liquefied gases. 	3
	<ul style="list-style-type: none"> Electrocution and electric shock 	
	<ul style="list-style-type: none"> Acute poisoning by a wide variety of poisonous gases, liquids and solids used as starting materials or released in chemical reactions 	4
	<ul style="list-style-type: none"> Cuts and stabs from sharp edges, broken glass; Fire and explosions in work with flammable gases, liquids and solids Fires and explosions from uncontrolled chemical reactions 	
	<ul style="list-style-type: none"> Explosion of elevated-pressure equipment and implosion of vacuum equipment 	5
	<ul style="list-style-type: none"> Burns and scalds from flames, hot surfaces, hot gases and liquids 	
	<ul style="list-style-type: none"> Chemical burns from corrosive fluids 	6
	<ul style="list-style-type: none"> Flying particles from the bursting of centrifuges and autoclaves 	7
	<ul style="list-style-type: none"> Damage to eyes from laser beams, splashes of chemicals, corrosive gases, and flying particles 	
Physical hazards 	<ul style="list-style-type: none"> Radiation: Depending on types of equipment and processes employed in a particular laboratory, workers may be exposed to different kinds of radiation: <p>---- Ionizing radiation: Alpha particles, beta particles, gamma rays, x-rays, neutrons;</p> <p>---- Non-ionizing radiation: Infrared radiation, visible light, ultraviolet light, laser radiation, microwave and radiofrequency radiation; very- and extremely-low frequency electromagnetic fields</p> <p>---- High amplitude whole-body vibration and noise in subsonic (including infrasound) or ultrasonic ranges from vibrating or rotating mechanical equipment or from ultrasound equipment</p>	
Chemical hazards 	<ul style="list-style-type: none"> Exposure to an extremely wide variety of chemical substances (actually, chemical and biological laboratory workers may be exposed to any known chemical agents or combinations thereof) including substances that are corrosive, irritating, toxic, neurotoxic, asphyxiating, allergenic, carcinogenic, mutagenic, teratogenic, radioactive, etc. 	4
Biological hazards 	<ul style="list-style-type: none"> Exposure to an extremely wide variety of biological agents (biological laboratory workers may be exposed to any known biological agents or combinations thereof) including viruses, bacteria, fungi, parasites, etc., by way of inhalation, ingestion, skin or eye contact, transmission by laboratory animal bites or stings, accidental injection, etc. 	8
Ergonomic, psychosocial and organizational factors 	<ul style="list-style-type: none"> Musculoskeletal effects from routine work in a fixed position (esp. long time standing) 	
	<ul style="list-style-type: none"> Overexertion while moving or otherwise handling bulky and heavy pieces of equipment, package of chemicals, etc. 	9
	<ul style="list-style-type: none"> Eye strain from work with optical and electron microscopes, telescopic manipulators, computers (VDU), work in dark or semi-dark rooms, etc. Cumulative trauma disorders (CTD) as a result of repetitive manual operations, e.g., in pipetting, non-automated counting, manual polishing, etc. Psychological effect of "getting accustomed" to routinely encountered hazards with the resulting loss of alertness Nuisance odors from chemical substances and/or experimental animals Problems associated with unusual working schedules (work at night, on holidays, etc.) required by the continuity of experiments or the need to tend animals 	
	<ul style="list-style-type: none"> Risk of physical aggression and other forms of hostile behavior on the part of extremist groups (claiming to be "struggling for animals' rights", etc.) 	10
	<ul style="list-style-type: none"> Danger of developing addiction to drugs, due to easy availability of substances 	

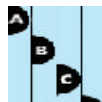
Preventive measures

- 1 Wear safety shoes with non-skid soles
 - 2 To prevent entanglement in moving machinery, do NOT wear loose hair or clothing with loose ends (loose sleeves, loose shirt ends, loose trousers, etc.)
 - 3 Wear heat-insulating gloves
 - 4 Apply chemical safety rules when handling or working with hazardous chemicals; read MSDS and consult a safety supervisor for specific chemicals
 - 5 Install a metal guard over and round vacuum bell jars
 - 6 Wear chemical - resistant gloves, coveralls and face and eye protection
 - 7 Wear appropriate eye protection; consult a safety supervisor or a supplier
 - 8 Apply biohazard safety rules when handling or working with hazardous substances, biological agents or laboratory animals ; consult a safety supervisor for specific cases
 - 9 Learn and use safe lifting and moving techniques for heavy or awkward loads; use mechanical aids to assist in lifting
 - 10 Train employees how to recognize and respond to threat of violence; provide alarm or other means for summoning help, or escort if needed
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Specialized information

Synonyms Laboratory hand / workhand / workman, etc.

Definitions and/or description



- a. [of Laboratory Worker (any industry), DOT]: A term for any worker in a laboratory performing routine or special tests, or research. Classifications are made according to type of work as Biochemist (profess. and kin.); Food Tester (any industry); Laboratory Tester (any industry); Scientific Helper (profess. and kin.).
- b. [of Laboratory Tester (any industry), DOT]: Performs laboratory tests according to prescribed standards to determine chemical and physical characteristics or composition of solid, liquid, or gaseous materials for such purposes as quality control, process control, or product development: Sets up, adjusts and operates laboratory equipment and instruments, such as microscopes, centrifuge, agitators, viscosimeter, chemical balance scales, spectrophotometer, gas chromatograph, colorimeter, and other equipment. Tests materials used as ingredients in adhesives, cement, propellants, lubricants, refractories, synthetic rubber, plastics, paint, paper, cloth, and other products for such qualities as purity, stability, viscosity, density, absorption, burning rate, and melting or flash point. Tests solutions used in processes, such as anodizing, waterproofing, cleaning, bleaching, and pickling for chemical concentration, specific gravity, or other characteristics. Tests materials for presence and content of elements or substances, such as hydrocarbons, manganese, natural grease, tungsten, sulfur, cyanide, ash, dust, or impurities. Tests samples of manufactured products to verify conformity to specifications. Records test results on standardized forms and writes test reports describing procedures used. Cleans and sterilizes laboratory equipment. May prepare graphs and charts. May prepare chemical solutions according to standard formulas. May add chemicals or raw materials to process solutions or product batches to correct or establish formulation required to meet specifications. May calibrate laboratory instruments. May be designated according to product or material tested
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Related and specific occupations

Laboratory aide; assistant; chief; clerk; equipment installer; helper; inspector; manager; researcher; sample carrier; sampler; supervisor; technician; tester; etc.

Tasks

Adding (chemicals to solution, etc.); adjusting (equipment); agitating; analyzing; anesthetizing; appraising; aspirating; assembling (systems); assisting; assuring (quality, consistency, etc.); attaching (tubing); attending; balancing (scales); bleaching; blending; boiling; burning; calculating; calibrating (instruments); centrifuging; cleaning; collecting (samples); comparing (to standards, etc.); computing; condensing; conducting (tests); connecting and disconnecting; controlling; cooling; counting; crushing; cutting (tissues); diluting; dipping; disinfecting; dispensing (aliquots); disposing; distilling; documenting; drying; evaluating; examining; feeding; filtering; fitting; flaming; flushing; freezing (tissues); glass-blowing; grinding; handling; heating; humidifying; identifying; immersing; incubating; inflating; injecting; inoculating; investigating; labeling; manipulating; marking; measuring; metering; mixing; monitoring; observing; pipetting; pouring; preparing (samples, etc.); processing, pulverizing; pumping; purchasing; recording; refrigerating; regulating (flows, etc.); repairing; reporting; researching; sampling; screwing; sealing; securing; separating; setting-up; sieving; sterilizing; storing; straining; studying; sucking; testing; transferring; washing; weighing

Primary equipment used

Disposable glass and plastic equipment; handling and securing devices; scales and balances; filters; pumps; mixers and blenders; sieves; sampling instruments; temperature measuring or maintaining equipment; vacuum pumps; flasks; gages; calculators, recorders, computers and peripherals; personal protective equipment; etc.

Specialized equipment for specific purposes, e.g.: optical and electron microscopes; pH meters; colorimeters; gas and liquid chromatographs; mass spectrometers; dosimeters and monitors; glove boxes; microtomes; etc.

Workplaces where the occupation is common

Chemical, petroleum and petrochemical, food, rubber, polymer, metallurgical and metal finishing, paper, and other industries; universities, schools, research institutes; hospitals and medical clinics; standards institutions; public and private testing, inspection and quality assurance laboratories

Notes



A special hazard exists when working with new chemical substances (NCS) whose physical, chemical, biological and other effects have not been adequately investigated. NCS may be explosive or highly flammable, or form explosive mixtures with air or other substances. NCS may be highly poisonous, corrosive to the skin, eyes or respiratory system, carcinogenic, teratogenic, mutagenic, etc., or have a synergistic effect with other substances.

References

Laboratory Safety Manual, WHO, Geneva, 1983.



Stricoff, R.S., and Walters, D.B.: Laboratory Health and Safety Handbook, Wiley-Interscience, 1995.

Mahn, J.W.: Fundamentals of Laboratory Safety - Physical Hazards in the Academic Laboratory, VNR, 1991.
