

International Hazard Datasheets on Occupation



Wastewater Treatment Plant Operator

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 wastewater treatment plant operators 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 wastewater treatment plant operator?

A skilled worker who is responsible for the day-to-day operation, maintenance, trouble-shooting and handling of special problems of municipal, industrial, and other wastewater treatment plants

What is dangerous about this job?

- Wastewater treatment plant operators are exposed to a variety of hazardous chemical agents, contained within the effluents and the reagents used in the water processing, or generated during the water treatment. These chemical agents may cause acute poisoning, chemical accidents (e.g., skin burns, injury to the eyes, etc.) damage to the respiratory system, allergies, dermatitis, chronic diseases, etc. Wastewater treatment plant operators may be injured by slips, trips and falls on wet floors; by falls into treatment ponds, pits, clarifiers or vats and by splashes of hazardous liquids; they may suffer cuts and pricks from sharp tools, contusions, etc. They are exposed to hazards related to work in confined spaces. Other common hazards include electric shock, explosions, entanglement in moving machinery, etc.

Hazards related to this job

Accident hazards 	<ul style="list-style-type: none"> Slips and falls on floors made slippery by water, aqueous solutions or solvents 	1
	<ul style="list-style-type: none"> Blows and contusions caused by falling heavy articles, including containers of chemical reagents, e.g., from overhead conveyers, or by contact with moving machinery or vehicles 	2
	<ul style="list-style-type: none"> Falls into ponds, pits, clarifiers or tanks causing injuries or drowning 	1
	<ul style="list-style-type: none"> Hazards related to entry into confined spaces - suffocation due to oxygen deficiency, poisoning (e.g. by hydrogen sulfide), etc.\tab \tab \tab 	3 4
	<ul style="list-style-type: none"> Burns, by steam or hot vapors, by splashes of hot plating baths, solvents and other liquids, by contact with hot surfaces (e.g., annealing ovens), etc. 	3 4
	<ul style="list-style-type: none"> Electric shock caused by contact with faulty electrical equipment, cables, etc. 	5
	<ul style="list-style-type: none"> Cuts and pricks by sharp tools sharp edges of articles to be plated sharp deposits on jigs, etc. 	
	<ul style="list-style-type: none"> Injuries (especially of eyes) caused by flying particles, in particular from rotating brush cleaning or wheel grinding 	6
	<ul style="list-style-type: none"> Fire and explosions due to the formation and release of flammable gases during processing (e.g., methane, hydrogen) 	4 7
	<ul style="list-style-type: none"> Vigorous chemical reactions caused by uncontrolled mixing of chemicals (e.g., if water is mixed with concentrated sulfuric acid) during the preparation of reagents for wastewater treatment 	4 7 8
	<ul style="list-style-type: none"> Acute poisoning caused by various chemicals present in the wastes, used as reagents (e.g., gaseous chlorine), or released during the treatment; a particular hazard is caused by the possible release of a number of poisonous gases, e.g., hydrogen-cyanide (from metal plating or heat treatment wastes upon acidification), hydrogen-sulfide, etc. 	8 9
	<ul style="list-style-type: none"> Acute intoxication caused by erroneous drinking of untreated wastewater 	10
	<ul style="list-style-type: none"> Poisoning by phosgene, which may be formed if a worker smokes in the presence of chlorinated-solvent vapors, or if welding or other flames or arcs are used 	10
	<ul style="list-style-type: none"> Chemical burns by corrosive liquids 	8
<ul style="list-style-type: none"> Damage to eyes by splashes of irritating or corrosive liquids 	8	
Physical hazards 	<ul style="list-style-type: none"> Exposure to excessive noise levels from mechanical equipment 	
<ul style="list-style-type: none"> Exposure to UV radiation 		
<ul style="list-style-type: none"> Exposure to adverse weather (low or high temperature, rain, snow, storms, etc.) 		
Chemical hazards 	<ul style="list-style-type: none"> Chronic poisoning by inhalation or ingestion of many of the chemicals used in waste- water treatment (see Note 1) 	
<ul style="list-style-type: none"> Dermatoses caused by exposure of the skin to waste waters, cleaning formulations, acid and alkaline solutions, etc. 		
<ul style="list-style-type: none"> Irritation of mucous membranes (in particular of the respiratory tract) by acid or alkaline vapors or aerosols, by hydrogen sulfide, and other substances 	7	
<ul style="list-style-type: none"> Latex allergy caused by the use of latex gloves 	11	
Biological hazards 	<ul style="list-style-type: none"> Diseases caused by infectious agents (bacteria, viruses, protozoa, helminths and fungi - see appendix) present in the raw domestic wastewater (mainly from human origin) and in agricultural wastes 	12
<ul style="list-style-type: none"> Diseases caused by contact with the toxins released by the infectious agents 		
<ul style="list-style-type: none"> Diseases caused by insects or rodents proliferating in the sludge drying beds 		
Ergonomic, psychosocial and organizational factors 	<ul style="list-style-type: none"> Musculoskeletal injuries caused by overexertion while handling heavy loads, such as containers of chemicals, or by awkward working postures (including frequent bending), etc. 	13
<ul style="list-style-type: none"> Discomfort and psychological problems related to prolonged wear of protective clothing (including heavy boots, aprons and other impermeable pieces), to the bad smells of the wastes, to the feeling of working with "soiled" liquids in a "dirty" and not too "respectable" occupation, and to the apprehensions caused by awareness of the dangers of the workplace 		

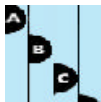
Preventive measures

- 1 Use safety shoes or boots with non-slip soles
 - 2 Wear personal protective equipment and chemical resistant clothing to avoid exposure of skin or eyes to corrosive and/or polluted solids, liquids, gases or vapors
 - 3 Do NOT mix chemicals without the supervision of a qualified chemist or safety professional
 - 4 Obey all safety-instructions regarding the storage, transport, handling or pouring of chemicals
 - 5 Check electrical equipment for safety before use; verify that all electric cables are properly insulated; take faulty or suspect electrical equipment to a qualified electricity technician for testing and repair
 - 6 Wear safety goggles in all cases where the eyes may be exposed to dust, flying particles, or splashes of harmful liquids
 - 7 Wear respirator, or gas mask, when exposed to harmful aerosols, dusts, vapors or gases
 - 8 Take extreme care when handling highly corrosive agents such as liquid or gaseous chlorine, concentrated acids or alkalis, or when toxic gases may be emitted from the reagents, etc.
 - 9 Obey all safety instructions concerning entry into confined spaces, e.g., check atmosphere for oxygen or for poisonous gases, use respiratory protection equipment if needed, have a coworker stand guard in case of need for help, etc.
 - 10 Do not smoke, eat or drink in areas where chemical or biological contamination may be expected
 - 11 Use non-latex gloves if sensitivity to latex has been diagnosed
 - 12 All workers should undergo periodic examinations by occupational physician to reveal early symptoms of possible chronic effects or allergies
 - 13 Learn and use safe lifting and moving techniques for heavy or awkward loads such as containers of chemicals; use mechanical aids to assist in lifting
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Specialized information

Synonyms Disposal-plant operator; sewage-plant attendant; sewage-plant operator; utilities operator; wastewater processing worker; wastewater-treatment-plant attendant

Definitions and/or description Operates sewage treatment, sludge processing, and disposal equipment in wastewater (sewage) treatment plant to control flow and processing of sewage: Monitors control panels and adjusts valves and gates manually or by remote control to regulate flow of sewage. Observes variations in operating conditions and interprets meter and gauge readings and test results to determine load requirements. Starts and stops pumps, engines, and generators to control flow of raw sewage through filtering, settling, aeration, and sludge digestion processes. Maintains log of operation and records meter and gauge readings. Gives directions to WASTEWATER-TREATMENT-PLANT ATTENDANTS and SEWAGE-DISPOSAL WORKERS in performing routine operations and maintenance. May collect sewage sample, using dipper or bottle and conduct laboratory tests, using testing equipment, such as colorimeter. May operate and maintain power-generating equipment to provide steam and electricity for plant. May be designated according to specialized activity or stage in processing as Activated-Sludge Operator; Grit-Removal Operator; Pump-And-Blower Operator; Sludge-Control Operator; Sludge-Filtration Operator. [DOT].



Related and specific occupations Instructor, wastewater-treatment plant; sewage-disposal worker; sewage-plant supervisor; sewer-line inspector; sewer-line repairer; sewer-pipe cleaner; waste-disposal attendant

Tasks Adjusting; aerating; attending; chlorinating; collecting (samples); conducting (tests); controlling (working conditions); conveying; detecting (malfunctions); determining (working parameters); directing; filtering; interpreting (results); maintaining; monitoring; observing; operating; performing; processing; reading (charts, meters and instruments); recording; regulating (flows); removing (obstructing materials); repairing; reporting; starting & stopping (engines, pumps, etc.); supervising; tending (machines); testing; treating;

Primary equipment used Blenders; calculators or computers; chemical dispensing equipment; chlorinators; laboratory and weighing equipment (for physical, chemical & biological testing, e.g. colorimeter, pH meters, thermometers, ovens, waste samplers, etc.); measuring and metering devices; mechanized lifting and disposal equipment; mixers; portable mechanical working tools; power-generating equipment; pumps; shovels, spades, etc.; vats

Workplaces where the occupation is common Municipal, organizational and other private/industrial wastewater treatment plants

Notes Examples of chemical reagents used in wastewater treatment include oxidizing agents (chlorine, chlorine-dioxide, hypochlorite, ozone, etc.), strong acids and alkalis, sedimentation or flotation aids, etc.



References ILO Encyclopaedia of Occupational Health and Safety, 3d Edition. Parmeggiani, L, Editor. Vol. 1, pp. 744-5 (1983)



ILO Encyclopaedia of Occupational Health and Safety, 4th Edition, Stellman, J. Mager, Editor, Vol. 2, pp. 55.29-32, 35-39 (1998)

DOT (Dictionary of occupational titles), 4th Edition, U.S. Department of Labor, 2 vol., (1991)

Occupational Diseases - A Guide to their Recognition. DHEW (NIOSH) publication No. 77-181, 1977, 609 PP. Multiple pagination - see entries "Sewage-treaters" or "Sewage treatment" in index,

USDL/OSHA - 29 CFR Part 1910 (1995), multiple pagination's - see entry "Waste disposal" in index

Metcalf & Eddy, Third Edition: Wastewater Engineering - Treatment, Disposal and Reuse, McGraw-Hill, Inc., 1991
