

International Hazard Datasheets on Occupation



Evaporator operator

Who is an evaporator operator?

An evaporator operator is a worker who controls single-stage and multiple-effect evaporators to concentrate chemical solutions to a specified density by evaporation.

What is dangerous about this job?

- Falls caused by slips, particularly on floors made slippery as a result of extensive use of water and liquids.
- Electric shock and lethal electrocution due to defective electrical equipment.
- Hazard of explosion or implosion due to extreme pressures or damage to a sealed device.
- Burns and scorchs caused by contact with red hot surfaces, hot water and leaking steam.
- Exposure to excessive heat and high humidity, due to the heavy use of steam, may cause fatigue and thermal exhaustion.
- Exposure to volatile organic substances in various evaporation processes (depending on the composition of the solution).
- Exposure to dust that contains various metals and other toxic substances, while cleaning the evaporator, may cause irritation of the respiratory tract and the eyes.
- Exposure to bad smells produced throughout the process of evaporation may cause uncomfortable feeling and physical suffering.

Hazards related to this job

Specific preventive measures can be seen by clicking on the respective  in the third column of the table.

Accident hazards 	<ul style="list-style-type: none"> • Falls caused by slips, particularly on floors made slippery as a result of extensive use of water and liquids 	
	<ul style="list-style-type: none"> • Falls from elevated places throughout inspection of evaporators or taking samples for analysis 	
	<ul style="list-style-type: none"> • Capture of fingers and other parts of body between various parts of evaporator 	
	<ul style="list-style-type: none"> • Burns and scorchs caused by contact with red hot surfaces, hot water and leaking steam 	
	<ul style="list-style-type: none"> • Electric shock and lethal electrocution due to defective electrical equipment 	 
	<ul style="list-style-type: none"> • Hazard of explosion or implosion due to extreme pressures or damage to a sealed device 	
	<ul style="list-style-type: none"> • Accidental exposure to toxic substances released in an outburst from the 	

	evaporator	
	<ul style="list-style-type: none"> • Fire hazard due to release of gases during evaporation, or of particulate matter released during the cleaning of the evaporator 	6
	<ul style="list-style-type: none"> • Injury of eyes and other parts of the body caused by splashes of the liquid that is used for evaporation, from defective pipes 	2
Physical hazards 	<ul style="list-style-type: none"> • Exposure to excessive heat and high humidity, due to wide use of steam, may cause fatigue and thermal exhaustion 	6
	<ul style="list-style-type: none"> • Exposure to high noise levels 	7
Chemical hazards 	<ul style="list-style-type: none"> • Exposure to toxic gases released throughout the evaporation process 	6 8
	<ul style="list-style-type: none"> • Exposure to dust that contains various metals and other toxic substances, while cleaning the evaporator, may cause irritation of the respiratory tract and the eyes 	6 8
	<ul style="list-style-type: none"> • Exposure to heavy metals during evaporation of solutions intended for use in metal plating 	6 8
	<ul style="list-style-type: none"> • Exposure to volatile organic substances in various evaporation processes (depending on the composition of the solution) 	6 8
Biological hazards 	<ul style="list-style-type: none"> • Some solutions worked with may contain harmful microorganisms 	
	<ul style="list-style-type: none"> • Damage to the environment, mostly to flora and fauna, due to release of acid vapours to the atmosphere 	
Ergonomic, psychosocial and organizational factors 	<ul style="list-style-type: none"> • Exposure to unpleasant odours produced throughout the process of evaporation may cause feelings of discomfort 	9
	<ul style="list-style-type: none"> • Musculoskeletal disorders, esp. of back, neck and shoulders, as a result of prolonged action, separate or combined, of such factors as: incorrect seating posture, ergonomically inadequate chair, etc., while controlling the evaporation process through the control panel 	10

Preventive measures

- 1 Use shoes with non-slip soles
- 2 Use suitable clothing according to the nature of the work, including gloves, appropriate headgear, goggles, earmuffs, boots, etc.
- 3 Install warning signs and warning marks regarding high voltage.

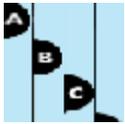
Verify, by periodical inspections, that all electrical appliances correspond to the relevant electrical safety

- 4 rules; do NOT perform yourself any repair of electrical devices; call always a qualified electrician to resolve electrical problems.
- 5 Check periodically the condition of the pressure gauges and the other indicators; verify that there is no corrosion in the boilers and in the other metallic devices, and that their rubber gaskets are in order.
- 6 Install effective exhaust ventilation and air conditioning, to prevent air contamination and heat stress; if necessary, use personal protection equipment to protect the respiratory tract, eyes, and ears.
- 7 Use specific personal protection equipment for the ears; if necessary, consult a safety supervisor.
- 8 Maintain a high level of personal hygiene; shower and change clothes at the end of the work shift; don't take home work-soiled clothing.
- 9 Install effective exhaust ventilation and air conditioning, to prevent air contamination and odours; if necessary, use personal protection equipment for respiratory protection.
- 10 Plan the workstation according to ergonomic requirements, with appropriate consideration of human factors such as the height and the personal characteristics of the worker.

Specialized information

Synonyms Multiple-effect evaporator operator; vacuum-pan operator.

Definitions and/or description



Controls single-stage or multiple-effect evaporators to concentrate chemical solutions to specified density by evaporation: Starts pumps and turns valves to admit liquid solution, steam, and cooling water into system. Observes temperature, pressure, and vacuum gauge readings and adjusts pumps to conform to specifications. Turns feed valves to regulate flow of solution through system and to obtain specified concentration. Tests solution pumped from last effect, using hydrometer, to ascertain that solution is concentrated to specified density. Observes manometers and looks through sight glass to ensure that steam vapors are not carried to next effect with solution. Tests steam condensate with reagents to detect contaminated solution. May control equipment from instrumented control board. May tend equipment, such as preheaters, thickeners, settlers, and filters that prepare solution for evaporation. May clean evaporator shell and tube nest with chemical to remove scale. May operate multiple-effect unit as one or more single evaporators [Acc. To DOT].

Related and specific occupations

Operator of an evaporator in various industries: paper, food, dairies, beverages, etc.

Tasks

Adding; adjusting; analyzing; application; changing; classifying; cleaning; comparing; concentrating; controlling; detecting; diagnosing; evaporating; feeding filling; filtering; fixing; following-up; identifying; localizing; monitoring; observing; operating; performing; planning; preventing; processing; pumping; recording; reporting; sampling; scrubbing; securing; separating; supervising; taking; transferring; testing; treating; twinning; unloading; updating; warning; writing.

Primary equipment used

Basket Evaporator; Falling-film- Evaporator; Forced Circulation Evaporator; heating devices; Kestner long-tube Evaporator; Plate Evaporator; mechanical tools for cleaning; Rising-film Evaporator; storage containers; various chemicals; etc.

Workplaces

**where the
occupation
is common**

Chemical industry; coffee processing plants; dairies; paper industry; food and beverage plants; etc.

Notes



1. Certain studies indicate a high incidence of heart disease among workers employed for a prolonged time in industries with high temperature environments.
 2. The employer should implement an inspection and maintenance programme for all vacuum vessels. The object of the program should be: a) to identify faulty vacuum vessels due to corrosion, physical damage, deteriorated rubber liners, etc.; b) to assure that all maintenance and repair of those vessels are completed in accordance with the manufacturer's specifications.
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References



1. ILO Encyclopaedia of Occupational Health and Safety, 3rd Ed., Geneva, 1983.
 2. ILO Encyclopaedia of Occupational Health and Safety, 4th Ed., Geneva, 1998.
 3. Kirk-Othmer, Encyclopedia of Chemical Technology, 4th Ed., 1992.
 4. U.S. Department of Labor: Dictionary of Occupational Titles – DOT, 2 Vol., 1991.
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This datasheet was authored by a group of experts headed by prof. Donagi from the Israel Institute for Occupational Safety and Hygiene

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