

# International Hazard Datasheets on Occupation



## Tire Vulcanizer

### 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 tire vulcanizers 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  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 tire vulcanizer?

A worker who repairs vehicle tires using the rubber vulcanization process.

### What is dangerous about this job?

- A tire vulcanizers' feet or toes may be injured by dropping heavy tires.
- Some operations done by tire vulcanizers put them into contact with hot steam and surfaces, and they may get burnt.
- The work of tire vulcanizers requires an extensive use of solvents and other chemicals. They may cause acute or chronic poisoning, skin disorders, and other health problems.
- Tire vulcanizers need to handle heavy and bulky tires, use vibrating tools and work in uncomfortable postures. This may cause traumas and, in the course of time, back, arms, hands, and legs pains.

### 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"><li>• Slips, trips, and falls due to floor conditions in work area (cluttering, debris, moisture)</li><li>• Trapping and crushing injury due to being struck with falling tires or other heavy objects, e.g., components of the mold</li></ul>	
	<ul style="list-style-type: none"><li>• Crush and pinch injury to hands and digits while placing tire in mold</li><li>• Cuts caused by sharp edges of cutting tools</li></ul>	

	<ul style="list-style-type: none"> <li>• Abrasions caused by contact with mechanized buffing and grinding equipment</li> </ul>	2
	<ul style="list-style-type: none"> <li>• Injury (especially of eyes) caused by flying rubber and other debris during buffing and grinding operations</li> </ul>	3
	<ul style="list-style-type: none"> <li>• Burns caused by steam leaks (from steam-heated molds)</li> </ul>	
	<ul style="list-style-type: none"> <li>• Burns caused by contact with hot surfaces of molds and pressure vessels (steam or electrically heated)</li> </ul>	4
	<ul style="list-style-type: none"> <li>• Electric shock caused by contact with defective electric equipment</li> <li>• Acute poisoning caused by contact with solvents or other toxic chemicals</li> <li>• Potential explosion hazard due to improper safeguards on pressure vessels or improper maintenance or operation of pressure vessels</li> <li>• Potential explosion hazards due to improper tire inflation techniques or lack of safeguards [See Note 1]</li> </ul>	
<b>Physical hazards</b> 	<ul style="list-style-type: none"> <li>• Exposures to high temperatures in the work area from heated vulcanizing equipment may lead to worker fatigue or heat related illness</li> </ul>	5
	<ul style="list-style-type: none"> <li>• Exposure to high noise levels from pneumatic and other mechanized tools in the work area may lead to noise induced hearing loss</li> </ul>	
<b>Chemical hazards</b> 	<ul style="list-style-type: none"> <li>• Dermatoses due to exposure to various additives used during polymerization, curing, and processing [See Note 2]</li> <li>• Dermatoses or systemic allergic reactions due to exposure to latex allergens in rubber compounds</li> </ul>	6
	<ul style="list-style-type: none"> <li>• Exposure to nuisance dust and carbon black released during tire grinding and buffing operations</li> <li>• Exposure to organic solvents contained in rubber cement [See Note 3]</li> <li>• Potential exposure to chlorinated solvents contained in adhesives and solvent blends</li> </ul>	
<b>Biological hazards</b> 	<ul style="list-style-type: none"> <li>• Potential for increased exposure to mosquito-borne infectious diseases (malaria, dengue fever, encephalitides etc.). Used tires stored outdoors in appropriate climatic conditions serve as a breeding ground for various mosquito species and other insects or rodents</li> </ul>	7
<b>Ergonomic, psychosocial and organizational factors</b> 	<ul style="list-style-type: none"> <li>• Back and other musculoskeletal injury or hernia due to heavy lifting and/or awkward postures</li> </ul>	8
	<ul style="list-style-type: none"> <li>• Hand-arm vibration syndrome and carpal tunnel syndrome due to exposure to segmental vibration from handheld power tools</li> <li>• Psychological stress due to job dissatisfaction as a result of boredom, monotony, adverse peer relations or other factors</li> </ul>	

## Preventive measures

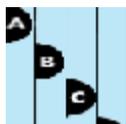
- 1 Wear safety shoes with non-skid soles
- 2 Use heavy work gloves during buffing and grinding work
- 3 Wear appropriate eye protection; consult a safety supervisor or a supplier

- 4** Use heat-insulating gloves and/or coveralls to handle hot parts
- 5** Install effective exhaust ventilation and air conditioning to prevent air contamination and heat stress
- 6** Protect hands with chemical-resistant gloves; if impractical, use a barrier cream
- 7** Cover tires stored outdoor, to prevent the formation of puddles of water
- 8** Learn and use safe lifting and moving techniques for heavy or awkward loads; use mechanical aids to assist in lifting

## Specialized information

**Synonyms** Tire cementer; tire patcher

**Definitions and/or description** Vulcanizes breaks and holes in casings and treads of motor vehicle tires: Cuts and trims broken sections of tire with knife. Scrapes and cleans area using electrically or air-rotated wire brush. Coats break on inside of tire with rubber cement. Cuts raw and corded rubber patches and rolls them into rupture, using hand roller, to ensure adhesion. May inject corded rubber patch into rupture, using gun. Covers rupture on outside of tire with tread rubber and works rubber into hole with hand roller. Trims patch, using knife. Places tire in tire mold of vulcanizing machine which has been heated to specified temperature. Adjusts air or steam bag inside tire, inflating it to exert pressure on tire in mold. Clamps tire in mold and allows it to remain until rubber is vulcanized and patch fused with surrounding rubber. May inspect and rebuff tire.



**Related and specific occupations** Tire trimmer; tire recapper; tire repairer.

**Tasks** Adjusting; applying; attaching; brushing; buffing; clamping; closing; coating; coring; covering; cutting; dispensing; drilling; estimating; feeling; fingering; fixing; gauging; gluing; handling; hoisting; inflating; inserting; inspecting; joining; lifting; loading and unloading; manipulating; opening; operating (equipment); patching; reaching; repairing; rolling; scraping; sealing; securing; smoothing; stacking; transporting; trimming.

**Primary equipment used** Air or steam bag; buffer (pneumatic or electric); brush; grinder (pneumatic or electric); hand roller; hand rasp; injection gun (for cord rubber) knife; lifting devices (mechanical); mold press; pressure chamber; safety equipment (gloves, goggles, particulate respirator) scissors; spray gun (air or airless); stitcher; tire stand (holder); wire brush (pneumatic or electric).

**Workplaces where the occupation is common** Tire retreading or recapping facilities.

- Notes**
- Injuries from tire and wheel explosions during servicing accounted in the U.S, over the period of 1978 through 1987, to 694 cases, including 143 fatalities. Although the operations associated with these fatalities are not likely to be conducted by tire vulcanizers, they may be conducted in the same workplace.
  - Dermatitis due to the exposure to finished rubber products including tires is not uncommon. This has been attributed to chemical agents employed in the various steps of rubber



manufacturing and processing.

3. Tire vulcanizers may utilize rubber cement to aid in the adherence of patch materials to the tire prior to vulcanization. The material is applied in comparatively small quantities using a hand brush or spray gun. Most formulations contain in excess of 90% organic solvents with smaller quantities of natural or styrene-butadiene rubber.

---

## References



Bever M.B. (Ed.): Encyclopedia of Materials Science and Engineering, Vol. 6, p. 4278 - 4280, Vol. 7, p. 5263 - 5267, The MIT Press, Cambridge, 1986.

Clayton G.D., and Clayton F.E.: Patty's Industrial Hygiene and Toxicology, 4th Ed. Vol. II Part E, p. 3727 - 3750, John Wiley and Sons, Inc. New York, 1994.

Sax N.I. and Lewis R. (Eds.): Hawley's Condensed Chemical Dictionary, 13th Ed., p. 24, VNR, New York, 1997.

Encyclopedia of Occupational Safety and Health, 3rd Ed., ILO, Geneva, 1983, Vol.1, p. 940 - 942.

Kent J.A. (Ed.): Riegel's Handbook of Industrial Chemistry, 9th Ed., pp.603-612, Van Nostrand Reinhold, New York, 1992.

Levy B.S. and Wegman D.H.(Ed.): Occupational Health: Recognizing and Preventing Work-Related Illness, 3rd Ed. pp. 343-344, p. 491 - 505.

Accident Prevention Manual for Business and Industry, 10th Ed., p.231 - 232, National Safety Council, 1992.

Suruda A., Floccare D.,Smith G.: Injuries from Tire and Wheel Explosions During Servicing, Annals of Emergency Medicine Vol. 20 No. 8, p. 848 - 851, 1991.