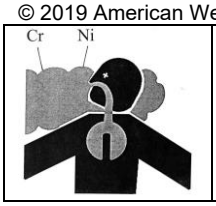

Chromium and Nickel in Welding Fume

INTRODUCTION

The fume from welding may contain compounds of chromium, including hexavalent chromium, and nickel. The composition of the base metals, welding materials used, and welding processes affect the specific compounds and concentrations found in the welding fume.

IMMEDIATE EFFECTS OF OVER-EXPOSURE TO FUMES CONTAINING CHROMIUM AND NICKEL

- Similar to the effects produced by fumes from other metals.
- Cause symptoms such as nausea, headaches, dizziness, and respiratory irritation.
- Some persons may develop a sensitivity to chromium or nickel which can result in dermatitis or skin rash.

CHRONIC (LONG TERM) EFFECTS OF EXPOSURE TO FUMES CONTAINING CHROMIUM AND NICKEL

- Conclusions from the National Institute for Occupational Safety and Health (NIOSH): some forms of hexavalent chromium and nickel and their inorganic compounds should be considered occupational carcinogens (cancer-causing agents).
- Definite effects are not yet determined.
- NIOSH Criteria Documents 76–129 and 77–164 contain these conclusions based on data from the chromate producing industry and from nickel ore-refining processes.

OVERALL EVALUATION

- Welding fume is on the International Agency for Research on Cancer (IARC) list as posing a lung cancer risk to humans.
- No determination has yet been made concerning the health effects on welders or users of chromium- or nickel-containing alloys.
- Nevertheless, give consideration to the NIOSH and IARC conclusions.

HOW TO PROTECT AGAINST OVER-EXPOSURE

- Do not breathe fumes and gases. Keep your head out of the fumes
- Use enough ventilation or exhaust at the arc or both to keep fumes and gases from your breathing zone and general area.
- If ventilation is questionable, use air sampling to determine corrective measures.

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- Keep exposure as low as possible.

- Read and follow the Safety Data Sheet (SDS) to ensure that you are aware of the hazards related to welding fume and take the required protective measures.

INFORMATION SOURCES

ACGIH, *Documentation of the Threshold Limit Values and Biological Exposure Indices,* American Conference of Governmental Industrial Hygienists, <www.acgih.org>.

ACGIH, *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices,* American Conference of Governmental Industrial Hygienists <www.acgih.org>.

AWS, *Fumes and Gases in the Welding Environment,* American Welding Society, <www.aws.org>.

IARC, *Monographs on the Evaluation of Carcinogenic Risks to Humans, Chromium, Nickel, and Welding*, Vol. 49 (1990), International Agency for Research and Cancer, <www.oup-usa.org>.

IARC, Volume 118, *Welding, Molybdenum Trioxide and Indium Tin Oxide*, Monographs on the Identification of Carcinogenic Hazards to Humans, International Agency for Research and Cancer, <www.oup-usa.org>.

NIOSH, Publication No. 76-129, *Criteria for a Recommended Standard: Occupational Exposure to Chromium (VI),* National Institute for Occupational Safety and Health <www.cdc.gov/niosh/homepage.html>.

NIOSH, Publication No. 77-164, *Criteria for a Recommended Standard: Occupational Exposure to Inorganic Nickel,* <www.cdc.gov/niosh/homepage.html>.

OSHA, Title 29 Labor, Parts 1910 and 1926, Occupational Safety and Health Administration, Code of Federal Regulations, Title 29 Labor, Parts 1910 and 1926, <www.osha.gov>.

The following references include the specific precautionary methods used to protect against exposure to fumes and gases:

ANSI, *Safety in Welding, Cutting, and Allied Processes* (ANSI Z49.1), American National Standards Institute, <www.aws.org>.

MSHA, Title 30 Mineral Resources, Parts 1 to 199, Mine Safety and Health Administration, Code of Federal Regulations, <www.msha.gov>.

NIOSH, Publication No. 78-138, *Safety and Health in Arc Welding and Gas Welding and Cutting,* National Institute for Occupational Safety and Health <www.cdc.gov/niosh>.