Effects of Welding on Health, XII
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Prepared for
AWS Safety and Health Committee

Research performed by
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Abstract

This literature review, with 216 citations, was prepared under contract to the American Welding Society for its Safety and Health Committee. The review deals with studies of the fumes, gases, radiation, and noise generated during various welding processes. Section 1 summarizes recent studies of occupational exposures, Section 2 contains information related to the human health effects, and Section 3 discusses the effects of welding on animals and cell cultures.
Foreword

(This Foreword is not a part of Effects of Welding on Health, XII, but is included for informational purposes only.)

This literature review was prepared for the Safety and Health Committee of the American Welding Society to provide an assessment of current information concerning the effects of welding on health, as well as to aid in the formulation and design of research projects in this area, as part of an on going program sponsored by the Committee. Previous work consists of the reports Effects of Welding on Health I through XI each covering approximately 18 months to two years. Conclusions based on this review and recommendations for further research are presented in the introductory portions of the report. Referenced materials are available from:

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Introduction

The health of workers in the welding environment is a major concern of the American Welding Society. To stay abreast of this subject, the health literature is periodically reviewed and published in the report *Effects of Welding on Health*. Eleven volumes have been published to date; the first covered data published before 1978, while the remainder covered 2- to 3-year periods between 1978 and December, 1996. The current report includes information published between January 1997 and December, 1999. It should be read in conjunction with the previous volumes for a comprehensive treatment of the literature on the *Effects of Welding on Health*. Included in Section 1 of this volume are studies of the characteristics of welding emissions that may have an impact on the control technologies necessary to protect the welder. In keeping with previous volumes, health reports and epidemiological studies of humans are discussed in Section 2 and organized according to the affected organ system. Research studies in animals and cell cultures are discussed in Section 3.

Many of the studies on the effects of welding on health published during the current report period focused on matters that have been explored in the older literature. The question of whether or not welding causes a decrease in the function of the lungs or causes an increased incidence of pulmonary diseases such as bronchitis continues to be explored. Investigations of the association of asthma with welding increase in number as the prevalence of both occupational and non-occupational asthma increases in industrialized countries worldwide. As in the past, attention is focused on the incidence of lung cancer in welders and the contribution of the potential carcinogens nickel and chromium encountered in stainless steel welding to the incidence of the disease. Current studies do not indicate that stainless steel welders are at a greater risk for developing lung cancer than are mild steel welders, although they may be at a greater risk for experiencing changes in lung function than are mild steel welders. In addition, animal studies indicate that stainless steel welding fumes may elicit a stronger inflammatory response in the lungs than do mild steel fumes. The neurological effects of manganese received considerable attention during this report period and point to the strong need for the use of protective measures by workers exposed to this metal.