

POTENTIAL REACTIONS OF KRAFT MILL GASES DURING ARC WELDING
PHASE I: TESTING OF A WELDING-REACTIONS CHAMBER

SUMMARY

This report describes the first phase of a study to identify chemicals produced when arc welding is done in the presence of pulp mill gases. Arc welding produces ultraviolet radiation, heat, and a complex mixture of gases and fumes. In this reactive environment, pulp mill air contaminants can potentially form new compounds that may have an adverse affect on the health of welders.

Photochemical reactions of hydrogen sulphide, methyl mercaptan and other sulphur-containing gases could produce sulphurous, sulphuric or methanesulphonic acids. Other possible products include sulphur dioxide, formaldehyde and dimethyl sulphoxide. Chlorine could react to form chlorine oxides. Turpentine could give a complex mixture of oxidation products from reactions of its terpene components.

Some of the potential by-products are known or suspected of being skin, eye or lung irritants. If these compounds are formed in significant concentrations during welding, they could account for reports of an unusually high degree of irritation experienced by welders during some jobs.

A welding-reactions chamber was constructed to determine whether chemicals identified in a review of published literature are actually produced in welding reactions. A preliminary trial with the test chamber showed that more than 18 new compounds were are formed when welding was done in an atmosphere containing α -pinene, a major component of turpentine.

The next phase of the study is to identify the major products formed by welding in air contaminated with pulp mill gases, and evaluate their potential health hazards to mill employees.