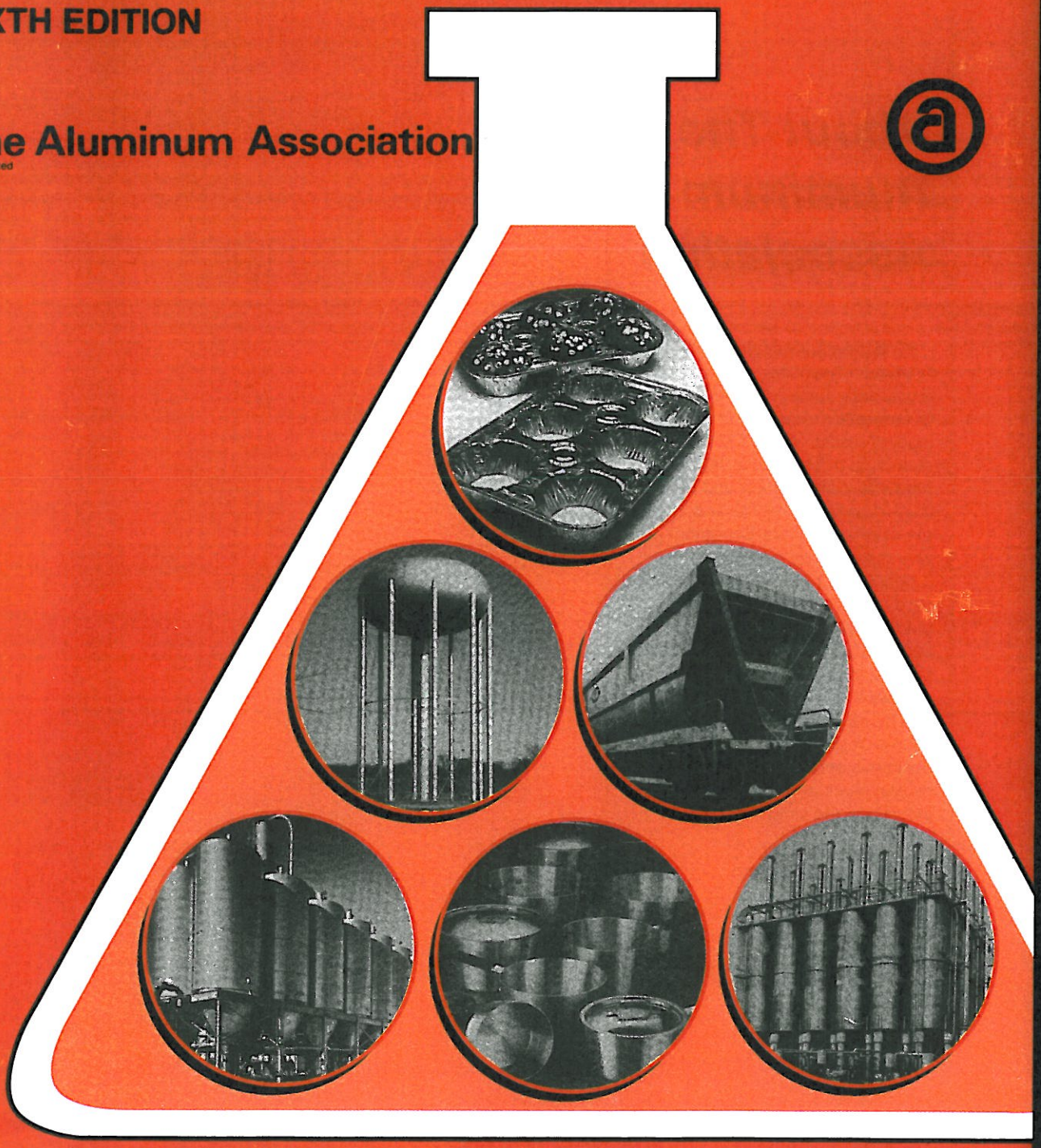
Guidelines for the use of Aluminum with food and chemicals

Compatibility data on aluminum in the FOOD and CHEMICAL PROCESS INDUSTRIES

SIXTH EDITION

The Aluminum Association
Incorporated



60

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About The Aluminum Association

The member companies of The Aluminum Association, Inc., represent approximately 85 percent of domestic production of primary ingot and shipments of U.S. aluminum mill products. Mill products include sheet and plate; foil; extrusions; forgings and impact extrusions; electrical conductor and wire rod and bar. In addition to producers of primary ingot and mill products, the association's membership also includes secondary smelters, foundries and producers of master alloy and additives.

The association is a primary source of statistics, standards and economic and technical information on aluminum and the aluminum industry in the United States.

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GUIDELINES for the use of ALUMINUM with FOOD and CHEMICALS

FOREWORD: Paralleling the growth of our industrial society are mounting corrosion losses and costs of corrosion control systems. The soaring cost of maintenance labor, alone, demands increased attention to low cost, corrosion resistant materials such as aluminum.

There is equal incentive for the use of processing, handling and storage equipment basically compatible with sensitive products.

Frequently, the materials engineer is faced with a choice of technically suitable, available materials for a given application. Where aluminum is suitable, it usually offers the lowest total costs.

This publication is intended to assist in determining the suitability of aluminum alloys for specific applications and in achieving their potential economy through proper specification and use.

TYPICAL CORROSION-RESISTANT APPLICATIONS: Aluminum alloys can be readily fabricated and welded into storage tanks, tank trailers, tank cars, covered hopper cars, reaction vessels, heat exchangers, process piping, distillation equipment and related process equipment.

Distilled water, condensate and demineralized water have been handled in laboratories, hospitals, chemical plants, paper plants, and power plants using aluminum alloy tanks and piping. Seawater and brine have been handled in aluminum alloy desalination equipment. Seawater applications for aluminum alloys include offshore drilling platforms, crude oil piping, gas piping, barges, boats and submarines. Natural water supplies have been piped in aluminum alloy irrigation pipe.

Nitrogen fertilizer solutions, ammonium nitrate, urea, ammonia and 98% nitric acid have been handled in aluminum alloy tanks, piping, heat exchangers, tank cars, covered hopper cars, prilling towers, drums and containers. High concentration, high purity nitric acid has been processed in high purity aluminum equipment. Ammonium nitrate and urea prills have been stored in aluminum alloy warehouses and aluminum alloy bins.

Sulfur, hydrogen sulfide and mercaptans have been processed and handled in aluminum alloy bins, piping and tanks. Sulfur dioxide in low concentrations and as dry gas refrigerant has been used in aluminum alloy food processing and refrigeration systems. Concentrated 95% sulfuric acid has been stored in aluminum alloy tanks in textile industries to avoid iron contamination in the textile fiber. Amine scrubbers for the removal of sulfur dioxide and carbon dioxide in petroleum refineries have often been made of aluminum alloys. Sulfite paper mills have used aluminum alloy conduit, drying machine rolls, hoods, vents and stacks. Tall oil has been distilled in aluminum alloy columns, condensers and receivers.