the declining consumption of recent decades. The environmental and economic factors involved are examined. While the future will be affected by new factors of market policy, an evaluation of foreseeable developments will be attempted. The current and projected supply/capacity of another classic inorganic ingredient of detergents, sodium perborate, is reviewed. Trends in washing technology, a main influencing factor, are stressed.

3.4 Sodium Silicates and Sodium Aluminosilicates—A Worldwide Update

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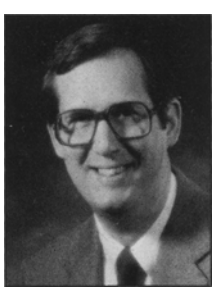
Estimated worldwide market consumption for both sodium silicates and zeolites by geographical areas and by major end-use categories is presented. Market volume on a worldwide basis for both product lines into the near future is projected. The chemistry and commercial manufacturing processes involved in making these important detergent raw materials are summarized and reviewed, as is their utility in detergent formulations. It is suggested that present and projected manufacturing capabilities are more than ample to keep in balance with the projected near-term market growth for most industrialized geographical areas of the world, both for sodium silicate and zeolite NaA.

Session IV—Equipment/Textiles

4.1 A State-of-the-Market Report on Domestic Automatic Clothes Washers, Clothes Dryers and Dishwashers in the United States



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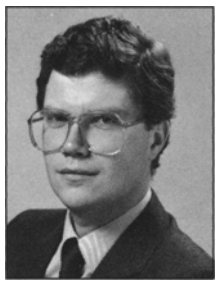
This report presents a general overview of the current status of domestic clothes washers, clothes dryers and dishwashers being manufactured and sold in the United States. Specific areas considered include market share, demographics, operating systems, materials and finishes, common operating practices, product features and anticipated future trends.

4.2 Europe: Washing Machine Evolution



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Automatic washing machines with a horizontal-axis rotation drum, front- and top-load versions, today dominate the European market. Despite the dominance of these washing machines, there still are different washing habits in various countries. On this point you may consider Europe divided into the following areas: (a) Mediterranean, (b) Central Europe, (c) Scandinavia and (d) United Kingdom. The differences in washing habits are mainly (a) placement and installation of the machine; (b) frequency of use; (c) kind of textiles and load; (d) expected results of washing, spinning efficiency, wrinkling, etc.; and (e) the way of using the machine. Progress of the washing machine, which started in the late 1950s, has been followed by the evolution of detergent products. The early improvements came with the introduction of low-lather detergents followed by introduction of enzymes; in the past few years, low-temperature washing has led to development of detergents containing perborate activators and more selective enzymes. Today, in compliance with new phosphorus-reduction laws, a new generation of detergents, powder or liquid type, is coming up. In the washing machine field, such developments have been followed closely. In this respect, washing programs were adjusted, specifically designed for lower wash temperatures. Washing also has been modified from the mechanical point of view. Due to the energy crisis caused by the Kippur War in 1973, great care was paid to domestic and national energy problems. At the same time, the washing machine industry started on new developments aimed (a) to lower energy consumption in washing without jeopardizing the results; (b) to lower water consumption; (c) to avoid detergent waste and detergent mechanical loss; (d) to increase spinning efficiency to reduce energy used in drying; and (e) to increase the flexibility of the use in the machine—small linen loads, special washing, etc. Obviously as time passed the results of these studies became less and less interesting. The Electrolux-Zanussi group will carry out a strategy of strong development to make a significant change in the present situation. As a result of this strong development, an important change has been reached in 1986 with the new washing system called "Jet-System." The main characteristics of this new machine are (a) washing without water in the tub, but rather recirculation of lye that is heated in a little container outside the tub; (b) performance the same as those of the best European machines; (c) lower energy, water and detergent consumption; (d) high flexibility of use with consumption optimization even with low linen loads; and (e) reduction of both washing cycle length and heating power. We believe that with this new washing system, new developments can be opened also in the detergent field.