

ALKALINE FUEL CELLS AT ELENCO

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Introduction

Elenco has been working on fuel cells since 1976. Its present capital is owned by DSM (Netherlands; 42.5%), SCK (Belgium; 42.5%), Euroventures Benelux (Belgium and the Netherlands; 14%) and the management.

Until 1985 work was exclusively on hydrogen-air; from then onwards both hydrogen-air and hydrogen-oxygen have been pursued.

General status of the technical development

In the 1976 - 1985 period the basic electrochemical hardware was developed. Figure 1 shows a 4.5 kW H₂-air stack. Further information can be found in ref. 1.

From 1984 onwards technical development has largely been focused on the fuel cell system as a whole, including all ancillary equipment needed. A general description of this equipment is also presented in ref. 1.

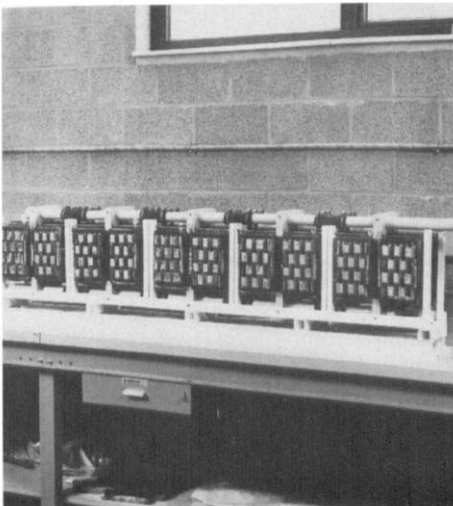


Fig. 1. 4.5 kW H₂-air fuel cell stack.

Application areas and projects

At the present stage of development, it is felt that the main applications of the Elenco type alkaline cell are to be found in space, defense, electric traction and some specific stationary situations.

As the alkaline cell needs pure hydrogen, excluding substantial amounts of CO_2 and CO , applications must fit into scenarios where this fuel is or can be made available.

The main projects in which Elenco is involved are the following.

- Space: Elenco is part of an industrial team with the German companies Dornier and Siemens for the development of the fuel cell system for the ESA space plane Hermes

- Defense: a first series of six 1.2 kW fuel cell systems has been manufactured and is under assessment by several users

- Traction: after positive test results obtained with the Elenco fuel cell stacks in an electric van (Fig. 2), projects for the implementation of fuel cells in large commercial vehicles (such as city buses, refuse collecting trucks) are being set up.

First city bus project

The definition phase of a first city bus project has practically been concluded, and the start of the construction phase is imminent. Elenco's industrial partners for this project are Air Products Nederland, Holec and Den Oudsten, all of them companies based in the Netherlands. The prototype bus is to be tested first in the city of Amsterdam.



Fig. 2. Testing of fuel cell stacks in an electric van.

Air Products will take care of the hydrogen part in the project (storage on the bus and tanking facility in the bus garage); liquid hydrogen will be used.

Elenco will take care of the fuel cell system, and Holec of the electric traction components (the a.c. motor, the d.c./a.c. inverter and other electronics).

Finally, bus builder Den Oudsten will build the bus and will be in charge of obtaining all official authorizations.

The fuel cell size will be 70 kW and a mechanical energy accumulating system will be used for acceleration.

The design of the bus is such that its general specifications will be comparable to those of a diesel bus.

Reference

- 1 Status of Elenco's alkaline fuel cell technology, *Proc. IECEC Meeting, Philadelphia, PA, U.S.A., Aug. 10 - 13, 1987.*