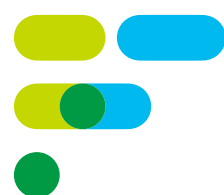


50th
1975-2025



FORBLUETM
FLEMION

50th Anniversary of the Development of FLEMIONTM Ion-exchange Membranes

The cornerstone of electrolysis, supporting industry and advancing energy efficiency

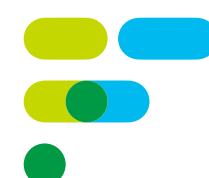


Key global bases for AGC's chlor-alkali business Left: AGC Vinythai Public Company Limited (Thailand); right: P.T. Asahimas Chemical (Indonesia)
These operational sites of AGC's chlor-alkali business are supported by membrane technology spanning half a century.

The chlor-alkali electrolysis process produces caustic soda and chlorine, used across various industrial fields. The mercury-based manufacturing method, once widely employed in this process, was identified as a potential cause of environmental pollution, leading AGC to develop a new ion-exchange membrane cell technology in 1975. This year marks the 50th anniversary of the introduction of the FLEMIONTM fluorinated ion-exchange membrane. AGC, engaged in the chlor-alkali business, has leveraged

its extensive knowledge as an electrolyzer user, combined with half a century of polymer design technology and membrane design and production expertise, to enhance the energy efficiency and longevity of chlor-alkali electrolysis plants.

Henceforth, by reducing customer costs and CO₂ emissions during power generation, AGC will continue to contribute to societal development and global environmental preservation.

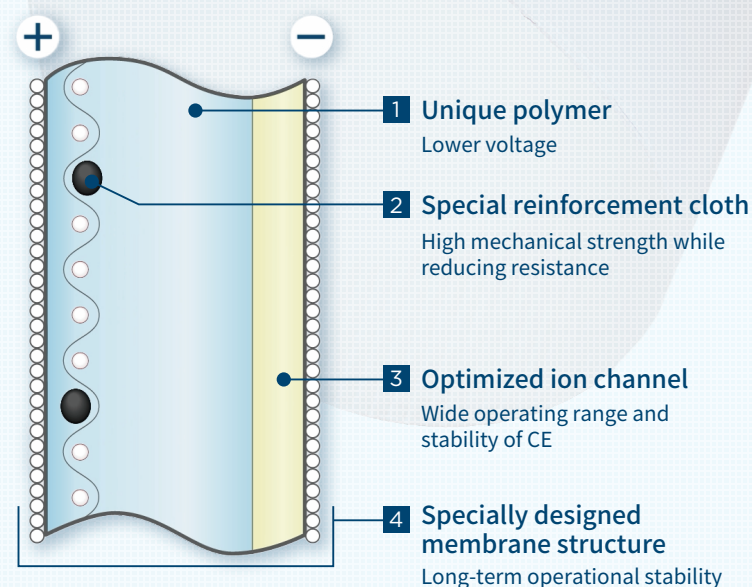


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FLEMIONTM s Strengths

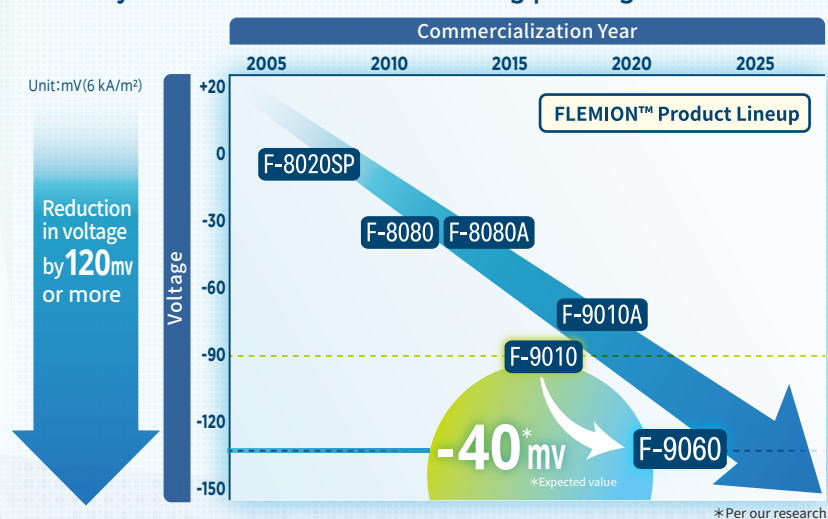
Four unique structures enabling long-term operation

FLEMIONTM possesses an optimized multilayer membrane structure, incorporating a proprietary high-performance polymer, a special reinforcement cloth, and a channel structure that enhances ion selectivity. The integration of these technologies ensures high resistance to chemical and mechanical stress, delivering stable performance over the long term.



Achieving energy efficiency in the chlor-alkali electrolysis process

In the electricity-intensive chlor-alkali electrolysis process, FLEMIONTM's energy efficiency contributes to reduced electricity costs and CO₂ emissions during power generation.



Knowledge from electrolysis business remaining highly valuable despite electrolyzer withdrawal



I was involved for many years in AZEC business, a chlor-alkali electrolysis system integrating both AGC's ion-exchange membrane and electrolyzer technologies. In 2001, AGC withdrew from this business to focus on manufacturing and selling ion-exchange membranes. Through membrane products, we can offer customers solutions that leverage our longstanding operational expertise in chlor-alkali electrolysis plants, which has been highly helpful in expanding FLEMIONTM's sales.

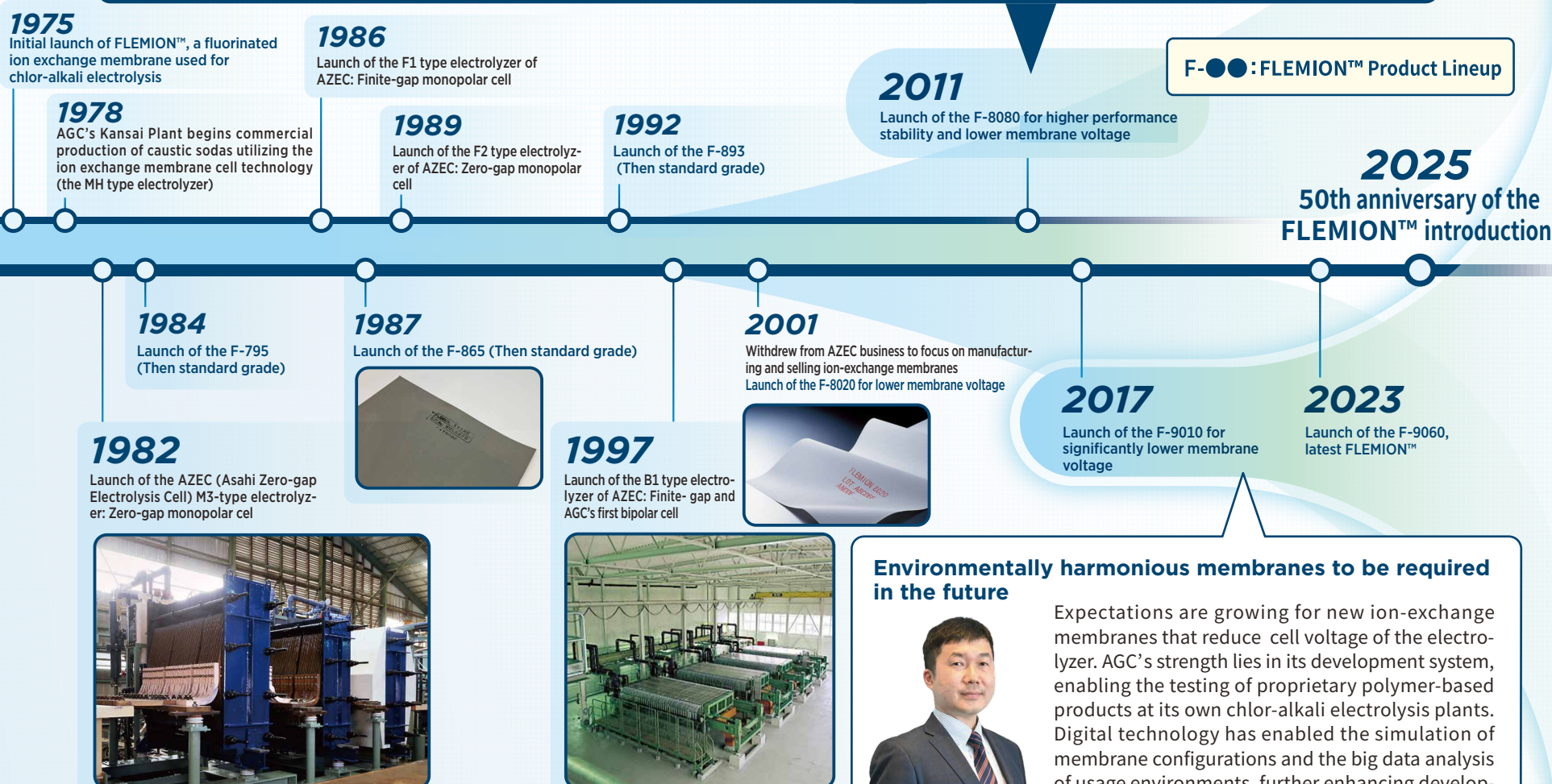
Tatsuji Ozawa Senior Manager of SCM Group, Strategy Planning Div., Performance Chemicals General Div., Chemicals Company, AGC Inc. (Former: FLEMIONTM Group Leader of Fluorochemicals Div.)

Developing multiple grades to meet diverse conditions



It took 11 years to commercialize the F-8080, the successor to the F-8020. Development began with basic research, but as the ideal performance could not be achieved, a change in direction was necessary. However, the time invested in basic research was not wasted. To meet various conditions, four grades were developed in parallel, with a sense of achieving success. After its commercialization, the F-8080 was ultimately expanded to seven grades.

Takuo Nishio General Manager of New Product Development Div., R&D General Div., Chemicals Company, AGC Inc. (Former: Functional Membrane Team leader of Technology Development Center)



Environmentally harmonious membranes to be required in the future



Expectations are growing for new ion-exchange membranes that reduce cell voltage of the electrolyzer. AGC's strength lies in its development system, enabling the testing of proprietary polymer-based products at its own chlor-alkali electrolysis plants. Digital technology has enabled the simulation of membrane configurations and the big data analysis of usage environments, further enhancing development efficiency. Moving forward, providing added value through life cycle assessments will also be essential. AGC will advance considerations for collecting used FLEMIONTM and recycling it into other fluorine products.

Takayuki Kaneko Functional Membrane Group Leader, New Product Development Div., R&D General Div., Chemicals Company, AGC Inc.

JOURNEY WITH FLEMIONTM

FLEMIONTM Firmly established worldwide

India F-9010: Driving favorable outcomes, sparking even greater expectations

In India, when I began my work with FLEMIONTM, the company was not yet familiar to its customers. After the launch of the F-8080, the perception and experience of customers toward FLEMIONTM saw a positive change, and with the launch of the F-9010 in 2017, things took a dramatic turn. Presently, almost every member of the chlor-alkali industry in India recognizes FLEMIONTM as the best-operated membrane. Many customers have informed us that the F-9010 exhibits the lowest voltage when compared to others. With the launch of the F-9060, with even more expectations from industry circles, and with the F-9060, things seem to be very positive in terms of both voltage and efficiency. Presently, all members of the chlor-alkali industry in India have full confidence in FLEMIONTM, and almost all of them operating industrial facilities prefer FLEMIONTM over others.



Premprakash V.
Consultant of FLEMIONTM Business (Area_India)

Europe Enhancing brand loyalty and customer trust

In the past five decades, FLEMIONTM has embraced breakthroughs that align with regional trends and consumer expectations. In our region, expectations for FLEMIONTM will remain high in the future, driven by an increasing awareness of sustainability and energy efficiency. However, challenges such as fluctuating energy and commodities prices and competition from emerging markets pose significant obstacles to future expansion. To overcome these obstacles, it is important for FLEMIONTM to foster partnerships with our customers and implement various activities that build brand loyalty and consumer trust. FLEMIONTM's 50th anniversary is not only a milestone but a celebration of our unwavering commitment to our customers. As we look toward the future, we remain true to the principles that have guided us thus far—innovation, sustainability and further product optimization—ensuring that FLEMIONTM will continue to provide value in an ever-changing market.



Christoph Eckersham
Consultant of FLEMIONTM Business (Area_Europe)

China Enhancing membrane performance and technical support to further expand market share

Over the 40 years that I have been involved in the chlor-alkali business, China has become the world's largest region for caustic soda demand, now accounting for half of global production capacity. In 2016, most chlor-alkali electrolysis plants in China adopted the ion-exchange membrane cell technology, and as the membrane market grew, we significantly increased FLEMIONTM's market share. The introduction of the F-8080 series, offering multiple grades tailored to electrolytic cell types and customer management levels, marked a pivotal moment. Beyond membrane performance, expanding our technical support system greatly contributed to market share growth. Establishing an

analysis center in Shanghai in 2018 was part of this effort. Additionally, the "FLEMIONTM Seminar" held for customers in 2015 and 2019 provided an effective platform for sharing troubleshooting case studies, fostering interaction among users, and promoting FLEMIONTM, playing a significant role in market share expansion.

China is a "fair" market where membrane performance, robust technical support, and sales conditions are carefully balanced. To further expand our share, we will continue to stabilize membrane performance and enhance technical support.



Yue Qun
Consultant of FLEMIONTM Business (Area_China)

AGC

Your Dreams, Our Challenge