

Engineering the Invisible: Nikkiso, Aluminium and the Power of Partnership

Behind the fences of hospitals, refineries, beverage plants and remote mining sites across Australia, critical infrastructure is working quietly and reliably every day. Much of it goes unnoticed. Yet without it, operating theatres would fall silent, manufacturing lines would stop and entire facilities would struggle to function. At the centre of this unseen network is Nikkiso Australia, part of the global Nikkiso Clean Energy and Industrial Gases Group, delivering advanced cryogenic systems that support essential industries across Oceania and South East Asia.

Established in Australia for more than 25 years, Nikkiso designs, manufactures, installs and maintains equipment that stores and vaporises industrial gases, including liquid oxygen, nitrogen, argon and CO₂. These gases are stored at extremely low temperatures to maximise density and efficiency. Before they can be used, they must be converted safely back into gas. That conversion is achieved through Nikkiso's ambient air vaporisers, precision-engineered systems built in Melbourne and deployed across Australia and beyond.

"We take the liquid oxygen or nitrogen and bring it through our vaporiser," explains Tim Bourne, VP Oceania and South East Asia, Nikkiso Clean Energy and Industrial Gases Group. ***"It absorbs the heat from the air and turns it into a gas."***

The principle is simple. The engineering is not. Each vaporiser must be designed to suit its environment and application. In colder climates such as Tasmania or New Zealand, frost and snow can accumulate rapidly. In northern Australia, humidity and heat alter performance parameters. Nikkiso's engineers model every system based on flow rates, pressures, duration of operation and local ambient conditions to ensure optimal outcomes. **"We take the time to find out all the process requirements that the customer needs,"** Tim says. The result is a tailored solution built to meet stringent Australian standards and demanding site conditions.

Central to that solution is aluminium, and a long-standing partnership with Capral. For more than two decades, Capral has supplied the specialised extrusions that form the core of Nikkiso's vaporisers. The multi-fin extrusions are designed to maximise surface area within a compact footprint, allowing efficient heat transfer from the surrounding air. The design changes along the length of the unit. At the ultra-cold inlet end, fewer fins reduce ice buildup. At the warmer end of the outlet, additional fins increase efficiency. **"When you look at the extrusion, you think, why is it designed like that?"** Tim says. **"Well, it's there to get a lot of surface area into a very small space."**

The material itself is equally important. Vaporisers can experience temperature differentials of up to 200 degrees. **“A five metre unit can shrink by over an inch,”** Tim explains. Aluminium’s thermal conductivity, strength-to-weight ratio and ability to accommodate expansion and contraction make it ideally suited to this application. **“Aluminium’s really good at dealing with those expansions and contractions,”** he says.

Precision manufacturing is non-negotiable. Nikkiso’s proprietary extrusions incorporate interlocking features that allow components to slide together accurately. **“The tolerances need to be very, very accurate so that we can slide one over the other. If we don’t, then they don’t go together,”** adds Tim. Extrusions can be up to seven metres long and must remain perfectly straight. Many vaporisers operate at pressures up to 40 bar, demanding flawless material quality. **“We can’t have imperfections, we can’t have bubbles, we can’t have pinholes. So that quality is really crucial for us.”**

That level of performance relies on trust between manufacturer and supplier. Over 25 years, Capral has worked alongside Nikkiso to refine profiles, manage dies across multiple facilities and ensure timely supply. **“They took time to understand the things that we were doing,”** Tim says. **“It’s been a good partnership.”** When urgent demand arises, that local partnership becomes critical.

During the COVID pandemic, hospitals across Australia required increased oxygen capacity almost overnight. Nikkiso responded at speed. **“We built in that time period probably over a hundred vaporisers,”** Tim recalls. With Capral able to supply aluminium extrusions locally and reliably, the team in Melbourne could manufacture, assemble and deliver equipment without delay. It was a powerful example of Australian manufacturing capability and collaboration under pressure.

While the technology is sophisticated, Nikkiso’s strength lies equally in its people. The Australian business actively develops apprentices and engineers, maintaining a strong pipeline of skilled trades and technical expertise. **“We’re really proud to have developed a lot of apprentices,”** Tim says. The team spans generations, blending decades of experience with emerging talent, all united by a shared understanding of the importance of their work. **“That’s one of the things that we want our team to understand,”** Tim says. **“The things that they’re making are important and they go into some really important industries. If one of the things they’re making is going into a hospital, it needs to work first time.”**

Looking ahead, sustainability and innovation remain central to Nikkiso’s strategy. As clean energy systems evolve and remote operations seek lower-emission solutions, advanced gas infrastructure will continue to play a growing role. **“We can’t just stay still,”** Tim says. **“We need to be constantly evolving.”**

From Melbourne to markets across Southeast Asia and beyond, Nikkiso Australia continues to demonstrate how global capability and local expertise can combine to deliver critical infrastructure. Through precision engineering, deep technical knowledge and a long-standing



partnership with Capral, Nikkiso is quietly shaping the systems that modern life depends on, ensuring they perform when it matters most.

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This release is part of the Crafted with Capral series.

Video

<https://youtu.be/riX-CeCOpJ8?si=x3BQ4xfoJ-kvFREh>

Imagery to accompany this Release

https://www.dropbox.com/scl/fo/6a07yi48c3j53vb6dhaqz/ANkBX_Kqr_LuFi7fB0c8BkU?rlkey=a8mst73qkytrnwso5wj1ge1lo&st=n1hxx1nl&dl=0

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