



Podcast: Helium usage in semiconductor fabs

By [Dominic Ellis](#) on Jun 27, 2025

The latest 1895 podcast was a live one, recorded on stage at the recent **gasworld** Specialty Gases Summit in Utrecht.

In this episode, Rich Brook, who leads a global consulting business specialising in helium, highlighted the challenges surrounding sourcing and recycling the precious molecule, and the dynamics that apply in operational semiconductor fabs.

"Inside a wafer fab, it's complicated. You have gases from a number of different suppliers, so who's going to do the recycling? Who's liable if things go wrong? So this is why you see so many smokestacks on top of wafer fabs: most people want to 'neutralise' them. If you have \$15bn investment, you want to do wafers – you don't want to take on added risk [from taking on extra tasks like gas recycling necessarily]. A 1% yield loss is still a fortune."

Brook, who has worked in the semiconductor industry for 35 years, noted that since helium is very expensive people are always thinking of ways to recycle and reuse it.

"What's the most expensive material in a wafer fab? It's the one you can't get," he said.

"Helium is a global product which can't be produced – so you always have to be worried that you can't get it. But when the shortage drops off [as it has lately], the motivation for recycling does."

"During helium shortage 4.0, the semiconductor industry was not put on allocation. Nobody missed a shipment, and that wasn't true in other industries, including MRI [in healthcare]. So where do we see a reduction in use? It's the absence of the molecule that's a far greater motivator than a higher price."

Despite the push towards sustainability, this may explain why moves with helium recycling in chip manufacture have been slow – particularly when you factor in old infrastructure, workforce limitations, and the cost of systems.

"The trick is to understand what fabs want," added Brook. "But a lot of people don't understand the critical elements they need. The goal of the wafer fab is not to recycle the product; [the] focus is always on productivity. The world is full of semiconductor companies that don't exist anymore."

Brook rounded off the talk by highlighting helium's far-reaching importance.

"A lot of companies are trying to get to space, and when they're there they will mine helium-3 and bring it back to earth," said Brook. "This is all aspirational. But if you fuse two helium-3 atoms together, you get very benign byproducts which aren't radioactive and [with] no nuclear waste." To read more on helium-3, click [here](#).

The worldwide semiconductor market is strongly placed right now, **and set to outperform global growth** by a factor of two in the years ahead.

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