

# COST-EFFECTIVE NITROGEN FOR ELECTRONICS PRODUCTION USING MODERN HYDROGEN TECHNOLOGY



## IMT PN KOMPAKT

A PLUG & SOLUTION COMPRISING NITROGEN GENERATOR AND NKAT HYDROGEN CATALYST FACILITATES THE PRODUCTION OF HIGH-PURITY NITROGEN WITH AN AIR FACTOR FROM 2.9

**Nitrogen is needed in the production of electronic assemblies. Nitrogen therefore features in common soldering processes such as selective, wave and reflow soldering. Its use serves to prevent oxidation on printed circuit boards and ensure high-quality soldered connections. Using generators to produce nitrogen on site thus helps reduce costs. Modern and environmentally friendly hydrogen technology makes it possible to lower compressed air requirements and, consequently, energy costs even further.**

As an inert gas, nitrogen offers many advantages: the low-reaction gas, which makes up approx. 78% of the atmosphere, effectively prevents chemical reactions. It is used in the production of electronic assemblies to displace oxygen in soldering systems and at the soldered joint to prevent oxidation. Time-consuming and cost-intensive rework and repairs due to whisker or dross formation on the printed circuit board can be avoided in this way. This results in improved soldered connections, cleaner assemblies, and higher wetting speeds. Reduced solder and flux consumption also enables other significant savings. In addition, using lead-free solders means it is possible to solder in an environmentally sound manner.

### Provided in an environmentally friendly way on site

But how can nitrogen be provided in the right amount and in the required purity for production? Nitrogen production directly on-site is an environmentally friendly method of achieving this. In this context, nitrogen is extracted from the ambient air using modern INMATEC nitrogen generators. Nitrogen generators equipped with membrane technology enable a continuous nitrogen supply with a purity of up to 99.5%. Air is pressed through a hollow fibre to this end. Water vapour, oxygen, noble gases and carbon dioxide contained in the air diffuse through the membrane due to their molecular structure,

while nitrogen is discharged at the end of the hollow fibre. Nitrogen generators fitted with "pressure swing adsorption" (PSA) technology enable the production of nitrogen with a purity of up to 99.9999% (6.0) and 1 ppm residual oxygen. To this end, ambient air is guided into a valve block at the required pressure via an air compressor. This automatically ensures that the compressed air is guided alternately into two adsorption vessels filled with a carbon molecular sieve. These vessels switch successively from filter mode to regeneration mode. In this way, oxygen and carbon dioxide molecules from the ambient air are adsorbed in the sieve in one vessel, while the sieve in the second vessel regenerates under compressed air relief. The nitrogen obtained from this is guided into a product vessel.

### Nitrogen quality 5.0 or even 6.0

Using a special INMATEC hydrogen catalyst allows the efficiency of on-site nitrogen production to be drastically increased once again. The NKat ensures that nitrogen generated with a quality of 2.5 to 3.0 is enriched with small amounts of hydrogen. This hydrogen reacts with the residual oxygen, which purifies the nitrogen to a quality of 5.0 or even 6.0. The technical improvement facilitates the production of a greater amount of high-purity nitrogen, especially for THT production, using smaller, more energy-saving air compressors with an air factor from 2.9.

## A compact plug & play solution

INMATEC, a major manufacturer of nitrogen and oxygen generators, has also developed a compact plug and play solution for electronics production based on the company's many years of experience in the electronics industry. The nitrogen provided meets the requirements for various soldering applications and, with a low air factor of 2.9, helps to reduce costs on a large scale. The solution called IMT PN KomPact consists of a combination of energy-efficient PNC generators equipped with innovative flow and vortex technology and an NKat hydrogen catalyst. Mounted on a compact, space-saving platform with two N<sub>2</sub> product vessels, easy installation on site is thus ensured. The continuous measuring of the purity, the evaluation and controlling of all operating values via a large touch control panel as well as state-of-the-art remote management capabilities ensure optimum ease of operation. Immediate commissioning of the system is possible in next to no time without any prior knowledge thanks to automatic purging.

## Significant savings

Customers who use INMATEC hydrogen technology are impressed by the solution's efficiency:

"We have been using INMATEC nitrogen generators since 2005. The flexible production of nitrogen directly on site, and the independence that comes with it, convinced us. By using innovative nitrogen generators together with INMATEC's NKat hydrogen technology as well as energy-efficient compressors and superordinate control electronics, we are now able to make electricity savings of between 15,000 and 20,000 kW or between 3,000 and 4,000 euros per month. The self-generated nitrogen makes it possible to effectively prevent oxidation, reduce solder consumption, produce improved soldered connections and increase product quality."

Mario Sabbarth, Production Manager at VTQ Videotronic GmbH.



IMT PN Kompakt System