



## The ultimate polymeric aziridine innovation.

All the performance, half the labeling.

**Neoadd® PAX**



# A breakthrough innovation for low-toxicity crosslinking

## A Covestro patent-pending technology

Innovative **Neoadd® PAX** from Covestro is a world-first polymeric aziridine crosslinker product family for waterborne coating systems that allows paint manufacturers, ink formulators and converters to gain all the high-reactivity performance benefits of traditional aziridines without the genotoxicity. So if you're looking for a crosslinker that delivers excellent functional performance, dramatically reduces labeling requirements, enables adhesion to a wide range of substrates, and can be cured at room temperature, look no further than **Neoadd® PAX**.

# Key benefits of Neoadd® PAX



Low toxicity  
reduces labeling  
requirements



Excellent chemical  
and scratch  
resistance



Quick and efficient  
processing:  
crosslinks at room  
temperature; no  
need for stoving



Great adhesion  
to wide range of  
substrates



Excellent pot life:  
up to 7 days  
depending on pH



REACH compliant ✓  
TSCA & DSL pending  
China ✓







## Addressing the needs of people and planet

At Covestro, we have a long history of developing truly innovative coating resins and crosslinkers that meet the needs of our customers and our planet. In line with our ambitious, industry-leading target of phasing out all chemicals of high concern from our final products by 2025, we proudly present a novel, world-first solution: our low-toxicity aziridine crosslinker family, **Neoadd® PAX**, which offers all the performance with half the labeling.

Developed by our dedicated team of experts who draw on our global scientific capabilities, this polymeric aziridine delivers the reactivity of traditional aziridines, but – thanks to its high molecular weight and specially designed polymer structure – offers much lower levels of toxicity. As such, it enables strong, resistant and durable coatings that open up new possibilities for a wide range of markets around the world, including industrial, architectural, packaging, ink, adhesives and leather.





## Neoadd® PAX eliminates CMR waste, causing less health and environmental damage

### A safer, more sustainable solution

Over the past few years, consumers and regulators have become progressively more concerned with the potential toxicity of paints, coatings, and ink formulations. Genotoxic, carcinogenic, mutagenic, and reprotoxic (CMR) substances are a particular cause for concern – with mutagens putting the health of both chemical handlers and future generations at risk. And, when these substances reach waterways, wildlife and the wider environment are also threatened. In fact, toxicity and environmental impact are increasingly key limiters in the use of traditional aziridines. With **Neoadd® PAX**, we've delivered a solution.

**Neoadd® PAX** products are low in toxicity due to their unique chemical structure and high molecular weight. This makes it non-genotoxic and non-mutagenic providing a safer, more sustainable alternative to traditional aziridines. In particular, this keeps chemical handlers safer, requires less protective equipment, and eliminates toxic waste, causing less environmental damage. **Neoadd® PAX** products have passed both the Ames and Toxtracker tests for genotoxicity and mutagenicity – so you can rest assured that your coatings are safer and more sustainable.



## Greater safety won't compromise performance

All the performance of traditional aziridines

What's more, this greater safety won't compromise performance: with **Neoadd® PAX**, we've made it possible to combine low toxicity with high reactivity. As a polymeric aziridine, **Neoadd® PAX** offers all the established performance benefits of aziridine chemistry without the drawbacks. This makes it competitive with carbodiimide alternatives on toxicity levels, while delivering much higher levels of functional performance – in particular, higher chemical resistance at lower dosing levels.

When tested in coating systems ranging from inks to packaging, flooring, and even industrial OEM, **Neoadd® PAX** delivers a performance comparable to traditional aziridines – and far outperforms carbodiimide crosslinkers in chemical resistance and mechanical properties.



## Neoadd® PAX dramatically reduces labeling requirements

Half the labeling

The low toxicity of the **Neoadd® PAX** products doesn't just make them better for people's health – it allows converters, ink formulators and paint manufacturers from a wide range of industries to remove critical safety labels, making the production of their products safer for their employees and more attractive to their consumers. As awareness around safety increases, these labeling limitations have been a key factor in the use of lower-performance crosslinkers as aziridine alternatives.

In fact, **Neoadd® PAX** requires only two safety labels, one of which applies to the solvent it is dissolved in, rather than the polymeric aziridine itself. This puts our low-toxicity polymeric aziridine on a similar labeling level to most carbodiimides – opening new high-performance possibilities for formulators around the world, especially for the highly regulated food packaging industry.



## Improves processing efficiency, thereby saving money, time, and energy

### Driving processing efficiency

It's not just the low toxicity of **Neoadd® PAX** that makes it more sustainable – our crosslinker is also operational over a wide temperature range. Specifically, unlike carbodiimides, which are typically cured at 176°F (80°C), **Neoadd® PAX** can be cured at room temperature. This means that no stoving is required – which improves processing efficiency, thereby saving money, time, and energy. By helping to reduce energy consumption and carbon emissions, **Neoadd® PAX** enables key sustainability advantages.



## Neoadd® PAX delivers good adhesion to a wide range of substrates

### Adhesion that sticks, sticks, and sticks

That's not all, though. A wide range of industries, including ink, can reliably benefit from the unique properties of the **Neoadd® PAX** products. Aziridines are well-known for providing good adhesion to plastics, especially treated plastic packaging films, and these new polymeric aziridines are no exception. Indeed, **Neoadd® PAX** delivers good adhesion to a wide range of substrates, and even outperforms traditional aziridines in some cases. So whether your coating is designed for industrial wood, metal, fabric, or leather, **Neoadd® PAX** has you covered, again and again.





Thanks to high levels  
of stability in water,  
**Neoadd® PAX** extends pot  
life from days to weeks

### Stability over time

If you're looking for flexible and reliable application, **Neoadd® PAX** has your back. Thanks to its special chemical properties and high levels of stability in water, its pot life can be as long as a week depending on the pH of the coating system used. By contrast, traditional aziridines typically have a pot life of less than 12 hours. In this way, it improves product reliability and allows manufacturers, converters, and applicators to reduce product waste – delivering high levels of efficiency without fail.







# A brighter horizon ahead

At Covestro, together with our partners from across the value chain, we're constantly developing new solutions to meet the evolving needs of our customers and end-users at a low environmental impact. Our **Neoadd® PAX** crosslinker product family opens up a world of new possibilities for waterborne coatings by offering a low-toxic, high-performance crosslinking solution – but we're not stopping there.

In the coming years, we'll keep pushing the boundaries of coatings chemistry, adding new products to the Neoadd® family that meet customers' specific needs and deliver even higher performance standards. As such, thanks to our bright science, **Neoadd® PAX** will help enable a brighter future, where sustainability, safety, and long-lasting functional performance are all possible.

## First Neoadd® PAX products

### Neoadd® PAX-521

Ideal for ink manufacturers and converters, **Neoadd® PAX-521** is specially designed for use in water-based inks, lacquers, coatings and adhesives. It is non-genotoxic and non-mutagenic and is expected to be Swiss ordinance approved\*. **Neoadd® PAX-521** is supplied as an 80% solution in ethyl acetate for use in various inks and coatings to improve chemical resistance and mechanical properties as well as enhance adhesion.

### Neoadd® PAX-523

Developed for paint manufacturers, **Neoadd® PAX-523** is specifically designed for use in waterborne industrial and architectural coating systems where superior performance is required. **Neoadd® PAX-523** is supplied as an 80% solution in methoxy propyl acetate and can be used in a wide range of paints, floor coatings, plus leather and textile coatings to improve their chemical resistance and mechanical properties.\*

\* Toxicological tests (Ames and Toxtracker) have proven that **Neoadd® PAX-521** and **Neoadd® PAX-523** are non-genotoxic alternatives to crosslinkers currently in use. These test results were used as a basis for our petition to the Swiss authorities regarding the polymer(s) in this product. We are expecting a positive response from the Swiss authorities prior to November 30, 2020.





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