



Drop-In Novec Solvent Alternatives



TECHSPRAY HAS THE NOVEC REPLACEMENTS YOU NEED.

Immediate Chemical Replacements

For companies reacting to the unreliable availability of Novec solvents, Techspray offers a line of chemical replacements. These solvents are engineered to react and perform the same as Novec products. COC's are available to ensure your strict quality standards are maintained.

3M Novec #	Techspray Drop-in Replacement
7100	Precision-V 3710
71DA	Precision-V 371DA
71DE	Precision-V 371DE
71IPA	Precision-V 371IPA
7200	Precision-V 3720
72DA	Precision-V 372DA
72DE	Precision-V 372DE
7300	Precision-V 3730
73DE	Precision-V 373DE

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71DE	Precision-V 371DE
71IPA	Precision-V 371IPA
7200	Precision-V 3720
72DA	Precision-V 372DA
72DE	Precision-V 372DE
7300	Precision-V 3730
73DE	Precision-V 373DE



PWR-4 High Performance Vapor Degreaser Solvents

Under the brand name PWR-4, Techspray offers proprietary formulas that meet stringent cleaning and purity requirements, but at a higher cleaning performance and lower cost. These products are engineered to be less toxic than many other solvents commonly used in vapor-degreasers: e.g., TCE (trichloroethylene), nPB (n-propyl bromide), and perc (perchloroethylene).

Techspray's TechLab is available to help qualify new cleaning processes, evaluate current processes, or troubleshoot contamination issues. Contact Techspray at 678-819-1408 or info@itwccce.com for free TechLab qualification testing.



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Announcement of 3M Novec Phase-Out...

What Does It Mean?

by

Dr. Saroj Yadav,
Marketing Director
and Organic Chemist

On December 20, 2022, 3M announced their plans to phase-out their Novec PFAS-based product lines by the end of 2025:

“3M today announced it plans to exit per- and polyfluoroalkyl substance (PFAS) manufacturing and work to discontinue use of PFAS in its product portfolio by the end of 2025. This portfolio decision is based on careful consideration and a thorough evaluation of the external landscape, including multiple factors such as accelerating regulatory trends focused on reducing or eliminating the presence of PFAS in the environment and changing stakeholder expectations.”¹

At Techspray, our focus is on high-precision cleaning chemistries, which include immediate chemical replacements for Novec and proprietary formulas. Those will be the products discussed in this article. In the appendix to the Novec phase-out announcement, the following products were listed:

Liquid Cleaning Products

- 3M™ Novec™ 7100 Engineered Fluid
- 3M Novec 71DA Engineered Fluid
- 3M Novec 71DE Engineered Fluid
- 3M Novec 71IPA Engineered Fluid
- 3M Novec 7200 Engineered Fluid
- 3M Novec 72DA Engineered Fluid
- 3M Novec 72DE Engineered Fluid
- 3M Novec 7300 Engineered Fluid
- 3M Novec 73DE Engineered Fluid

Aerosol Cleaning Products

- 3M Novec Contact Cleaner Plus
- 3M Novec Electronic Degreaser
- 3M Novec Flux Remover



What Are PFAS, and Why Are They a Problem?

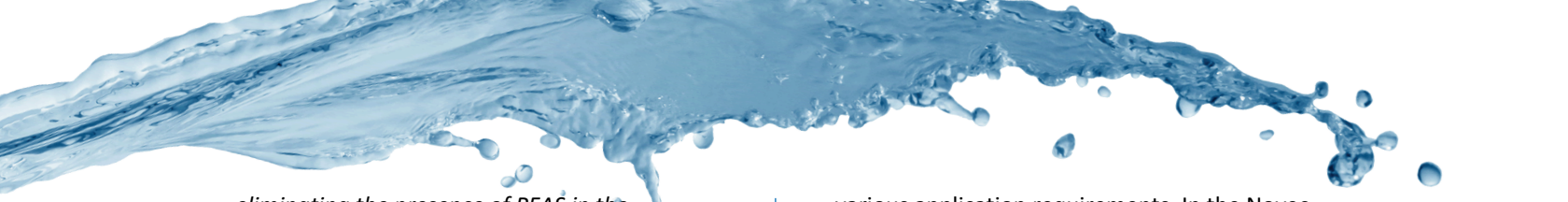
Polyfluoroalkyl (and perfluoroalkyl) Substances (PFAS) are chemicals used in a wide variety of applications, including high precision cleaning for industries like aerospace and medical device manufacturing. Environmental agencies, including the US Environmental Protection Agency (EPA), have been focused on PFAS because some of them tend to break down very slowly, and accumulate in the environment, animals and even people over time.²

That’s why they have been nicknamed “forever chemicals” in popular media. However, not all the PFAS are forever Chemicals. Some even breakdown relatively quickly in the environment. On the other hand, there are more persistent PFAS that can lead to a variety of negative health effects, such as reduced immune response, decreased fertility and increased risk of cancers.²

PFAS are so widely used, and in such a variety of industries and applications, the EPA isn’t proposing a sweeping ban. The goal rather is to “pursue a comprehensive approach to proactively prevent PFAS from entering air, land, and water at levels that can adversely impact human health and the environment.”³

Why Is 3M Discontinuing 3M Novec Solvents?

Per 3M’s official statement: “...accelerating regulatory trends focused on reducing or



eliminating the presence of PFAS in the environment...”¹ 3M has manufactured many of their PFAS in Belgium facilities. In early 2022, 3M found itself in the middle of a pollution scandal, which led to a plant shut-down for an extended period.⁴

This issue has led to supply chain shortages in Novec solvents across the globe, and escalating prices on the remaining material that can be procured. Companies in the aerospace, medical device manufacturing, and other mission-critical industries were left to scramble to find short-term supply any way they could, and to qualify replacement solvents.

With a 2025 Phase-Out, Why Replace 3M Novec Now?

As mentioned above, there has been a global shortage of 3M Novec solvents throughout most of 2022 because of issues with several of their facilities. With the latest announcement, there is no reason to assume the situation will improve.

On top of that, it is clear in 3M’s announcement that stockpiling will be discouraged:

“3M will manage customer last time buy requests based on availability of supply, and we will work with customers to determine specific needs and put in place an action plan to help ensure an orderly transition. 3M does not currently anticipate stockpiling these products.”¹

End-users that want to maintain control of their supply of high precision solvents for their critical cleaning needs should start the process of identifying and qualifying replacements as soon as possible. The alternative would be operating at the whims of global demand on a very restricted supply.

Can 3M Novec Solvents be Replaced?

Yes, alternatives do exist for 3M Novec solvents, and Techspray has a number of options to fit

various application requirements. In the Novec product line, 3M has offered a number of azeotrope and near-azeotrope solvent blends that offer advantages. Techspray has a large variety of solvents for vapor degreasing under the brand names PWR-4™ and Precision-V™. For replacing 3M Novec solvents, we have some equivalent chemical crosses and additional options that fit the same criteria, but at a higher cleaning performance.

How Do I Identify and Qualify a 3M Novec Replacement?

The temptation is to narrow your search to exact chemical replacements, which might be required because of the long timeline for a full qualification process. In the long term, it is best to open a dialog with your chemical supplier and discuss your requirement and cleaning process. It is quite possible better options are available.

For vapor degreasing, it’s important that a solvent is an azeotrope or as close to an azeotrope as possible, meaning that all the solvent constituents boil at around the same temperature. This ensures the formulation does not change as the solvent is vaporized and reconstituted hundreds of times in the closed-loop cycle.

Near-azeotropes, on the other hand, will fractionate (split) the two ingredients to a small degree as they boil. Although stable once equalized, the composition of the vapor and liquid phases are not exactly the same. One phase will be skewed greater with one component while the other phase will be greater in the second component. Due to this, there may be small differences in cleaning performance between the liquid and vapor phases.

As you research 3M Novec alternatives, pay close attention to toxicity. Chemicals like TCE (Trichloroethylene), nPB (n-Propyl Bromide), and Perc (Perchloroethylene) are commonly used in vapor degreasing, have great cleaning performance, but have very toxic side-effects (e.g. reproductive effects, carcinogens, organ failure, loss of cognitive functioning).

Avoid spending time and money to qualify a replacement solvent cleaner just to have it restricted by OSHA or the EPA in the future.

Techspray Has the Novec Replacements You Need

Techspray has a large variety of solvents intended for vapor degreasing under the brand names PWR-4™ and Precision-V™. For replacing 3M Novec solvents, we have some equivalent chemical crosses and options that fit the same criteria, but at a higher cleaning performance.

These products are engineered to be less toxic than many other solvents commonly used in vapor-degreasers like TCE, nPB, and Perc.

As an innovative chemical blender, our goal is to provide our customers safer and more environmentally-preferred alternatives to chemicals with high global warming potential (GWP) or 'forever chemicals'. We also diligently comply with all regulations, actively monitor emerging regulations across industries we support, and manufacture through strict controls regarding proper use and disposal of all materials.

Techspray's TechLab offers state-of-the-art cleaning, coating and analytical services to help customers qualify new products and optimize their processes. Cleaning equipment includes inline, batch, ultrasonic, and vapor degreasing systems. This equipment allows us to better duplicate your production environment for process optimization and troubleshooting.

Contact Techspray at **678-819-1408** or **info@itwccce.com** for free TechLab qualification testing. We are available to help qualify new cleaning processes, evaluate current processes, or troubleshoot contamination issues.



About the author: Dr. Saroj Yadav is Marketing Director for Techspray, and previously Director of Product Technology. She has a PhD in Organic Chemistry from Louisiana State University, and has been published in several chemistry journals including Tetrahedron and The Journal of Organic Chemistry.

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References

¹ 3M Announcement Letter, Dec. 20, 2022, David N. Schneider, VP Chemicals and Semiconductor, 3M Company, Electronics Materials Solution Division.

² "Our Current Understanding of the Human Health and Environmental Risks of PFAS", EPA, <https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas> (accessed 1/4/23).

³ "PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024", EPA, <https://www.epa.gov/pfas/pfas-strategic-roadmap-epas-commitments-action-2021-2024> (accessed 1/4/23).

⁴ The Brussels Times, by Lauren Walker, 8 March 2022, "Belgium rejects 3M appeal and tightens regulations on hazardous chemicals". <https://www.brusselstimes.com/209902/belgium-rejects-3m-appeal-further-tightens-standards-regarding-hazardous-pfas>

⁵ "7 Tips for Qualifying 3M Novec Replacement Vapor Degreaser Solvents", Techspray, <https://www.techspray.com/7-tips-for-qualifying-3m-novec-replacement-vapor-degreaser-solvents> (accessed 1/4/23)

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