

PFAS, the Recent 3M Announcement & Options for Critical Cleaning



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The PQCW offers practical, hands-on and independent, training in cleaning.
 More Info shsu.edu/pqcw and pqcw@shsu.edu

1

Hosts: The Product Quality Cleaning Workshop Team



Barbara and Ed Kanegsberg - "The Cleaning Lady and the Rocket Scientist"

- BFK Solutions - Consultants in Critical Cleaning
- Authors and Editors of the two-volume CRC Handbook for Critical Cleaning
- Independent evaluations and recommendations
- Co-chairs of the Product Quality Cleaning Workshops
- barbara@bfksolutions.com and ed@bfksolutions.com




Darren Williams - "The Professor"

- Professor of Physical Chemistry at Sam Houston State University
- Leader of the Cleaning Research Group
- Co-chair of the Product Quality Cleaning Workshops
- Performs cleaning trials and formulates cleaning chemistries
- williams@shsu.edu



2

PQCW - Workshops for Terrific Products



▶ “People with different functions within our company, including Strategic **Sourcing**, Project **Management**, and **Manufacturing Engineering**, attended.

▶ “We learned a lot; and we have made changes. We are **refining our own cleaning** requirements and putting together training programs.

▶ “For example, we used the workshop to develop **black light testing and fixtures**; and we have already set up a one-hour “**Parts Washing 101**” training course.

▶ “The section about **EPA amended TSCA** had **useful, timely information.**”

- Christian Johnson, Engineer, Yaskawa, participant, PQCW21

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3

Guests: Paul Blair and Kevin Pawlowski with Techspray



Paul Blair, Dir. of Product Technology at Illinois Tool Works (ITW), Contam. Control division.

- Responsible for product development and customer qualification testing for industry leading brands like Techspray, Chemtronics, and Coventry.
- In various roles, Paul has travelled the world solving cleaning and coating issues.
- He studied chemical engineering at Carnegie-Mellon, and earned a BA in both chemistry and economics from Washington and Jefferson College.



Kevin Pawlowski, Marketing Communications Mgr at ITW Contam. Control division

- He is responsible for working with engineers and technical specialists from around the world to generate helpful and engaging educational content.
- Kevin has traveled throughout North America, Latin America, Europe and Asia to work with customers and train on best practices for cleaning and coating electronic assemblies.
- He has a BS in Graphic Arts Technology from Indiana State University, MBA from Indiana Wesleyan University, and Marketing Certification from Cornell University.

4



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5

3M is Discontinuing Novec Solvents

- 3M sent notice Dec. 20, 2022
- Exiting PFAS chemical category by end of 2025
- Includes Novec 7100, 71DA, 71DE, 7200, 72DA, 72DE, 7300, 73DE, aerosol products
- Stated reason: "...accelerating regulatory trends..."
- Stockpiling will be discouraged

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6

6




Why is 3M Discontinuing Novec Solvents?

- 3M claims reason is “...accelerating regulatory trends...”
- but...
- Belgium plant was shut down March 2022
- Did not meet strict local discharge standards
- Led to global shortage
- 3M continued to struggle to open plant throughout 2022

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7



What Are Novec Solvents?

- Solvents for high precision cleaning
- Vapor degreasing – azeotropic or near-azeotropic
- Medical device manufacturing, aerospace, aviation MRO, oxygen cleaning
- Neat (pure) Novec 7100, 7200 & 7300 – more for rinsing, oxygen cleaning.
- Blended with cleaning solvents (e.g. trans, alcohols) to quench flammability and improve regulatory compliance (i.e. VOC)

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8

What Are PFAS?

- PFAS = polyfluoroalkyl / perfluoroalkyl
- Commonly called “forever chemicals” in the news media
- Used in everything from cleaning solvents, plastics & even make-up
- Flame suppressing capabilities
- Extremely low surface tension
- High density
- For vapor degreasing, moves industry away from toxic solvents like nPB, TCE & perc



 Chemtronics

 TECHSPRAY

 COVENTRY

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9

Are PFAS a Concern?

- Not all PFAS are “forever chemicals”
- Some PFAS do not readily break down, so collect in environment, animals & even people ...**but many do break down**
- Some PFAS associated with environmental affects (i.e. global warming)
- No ban proposed by EPA, but being scrutinized
- Regulatory activities at state level
- Focus is on minimizing release into the environment and targeting harmful PFAS



 Chemtronics

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10

10

Options for Novec Users

- 1 Direct drop-in replacement
 - Keep operation running
- 2 Qualify new chemistry
 - Longer term solution
 - Improve performance
 - Lower cost
- 3 Change cleaning process
 - PFAS-free options
 - Advanced environmental benefits

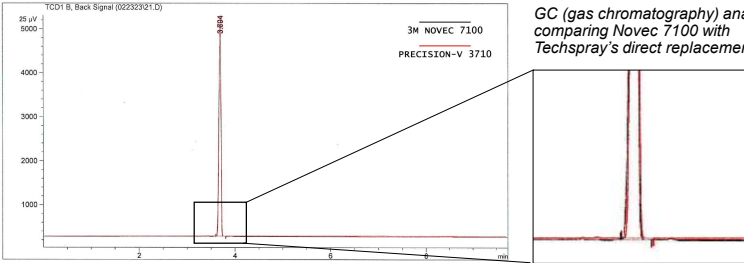



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11

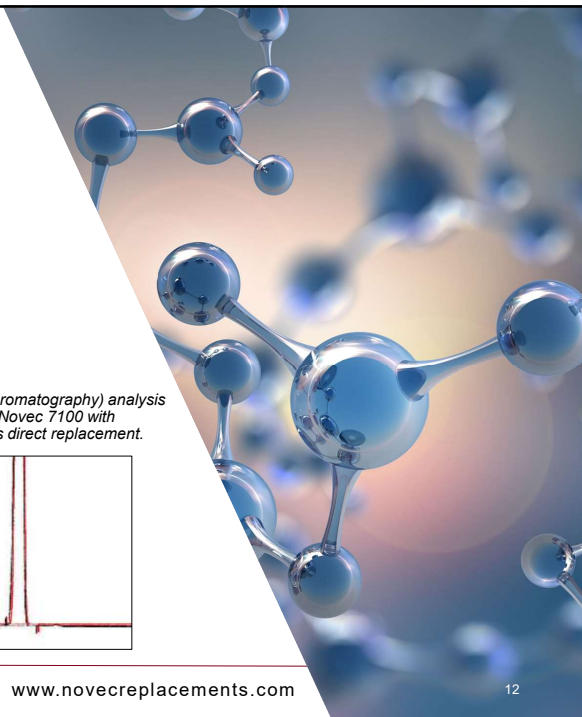
1 Direct Drop-in Replacements

- Novec solvents have been replicated
- Matched at a molecular level
- Cleaning qualification is optional – performance will be the same
- COAs available for validation



GC (gas chromatography) analysis comparing Novec 7100 with Techspray's direct replacement.




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12



12

1 Cross References for 3M Novec

| 3M Novec # | Techspray Replacement |
|------------|-----------------------|
| 7100 | Precision-V 3710 |
| 71DA | Precision-V 371DA |
| 71DE | Precision-V 371DE |
| 711PA | Precision-V 3711PA |
| 7200 | Precision-V 3720 |
| 72DA | Precision-V 372DA |
| 72DE | Precision-V 372DE |
| 7300 | Precision-V 3730 |
| 73DE | Precision-V 373DE |



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13

13



2 Qualify New Chemistry

- Goal to continue with current equipment
- Cleaning qualification required
- Avoid nPB, TCE & perc
 - Serious toxicity concerns – e.g. carcinogens, organ failure
 - Targeted by EPA & OSHA
- Potentially improve cleaning performance & lower cost
- Focus on substrate compatibility & soil solvency
- Anticipate regulations
 - Future-proof your process but...
 - Avoid over-engineering
 - Balance restrictions and anticipate timing

14

14



3 Change Cleaning Process

- Requires process & cleaning qualifications
- Techspray offers cleaners with advantages like...
 - PFAS-free
 - Environmental benefits – e.g. low GWP
- Vapor degreasing
 - Vacuum systems for flammable solvents
 - Vacuum systems or robust cooling systems for low temperature boilers
- Spray-in-air solvent cleaning systems
 - Explosion-proof for flammable solvents
- Aqueous cleaning systems

15



Full Service Product Development & Qualification Lab

- Small batch prototyping
- GC, IC, FTIR & other analytical equipment
- SMT assembly capability with reflow
- PVA selective spray system
- Vapor-degreaser, ultrasonic, inline & batch cleaning systems




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16

Available March 2023 PQCW On-Demand: Aqueous Cleaning



- Half day on-line program Includes 30 minutes individualized live consulting with a PQCW Instructor --\$399
- Convenient training modules
- Continuing education credit
- \$20 discount code for PQCW webinar registrants
- \$50 discount for Manufacturing Cleaning Association (MCA) members
- The Product Quality Cleaning Workshop Team
Professor Darren Williams, Sam Houston State Univ.
Ed Kanegsberg, PhD, BFK Solutions
Barbara Kanegsberg, BFK Solutions

Go to www.shsu.edu/pqcw to sign up for the course!



17

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Thank you for attending!



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18