Tech Article

Ultimate Guide to nPB Replacements

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nPB has a high VOC rating that contributes to smog due to its release of harmful emissions into the air.

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Switching to an nPB Replacement

Many companies are looking for nPB replacements. Some companies are switching from nPB due to regulatory restrictions. However, there are even more that want to change from nPB (n-Propyl Bromide) to newer, safer cleaning fluid alternatives simply because it is the right thing to do. nPB is a powerful and effective commercial cleaner and degreaser. However, many metal fabricating companies require metal cleaning fluids that not only perform reliably and safely. They must also be clean and "green" too. In addition, the fluids must comply with an increasing number of environmental laws regulating cleaning fluid use and disposal. Growing numbers of regulatory agencies across the globe are increasing legislation and enforcing the laws around nPB use. This is to reduce any negative impact to the planet.

Therefore, many are consulting with the MicroCare critical cleaning application experts to help them find suitable substitutes for n-Propyl Bromide. MicroCare offers a number of nPB replacement options that not only provide the cleaning functionality required, but can do it affordably and safely. MicroCare technical experts, field engineers and chemists have the critical cleaning expertise you need to help you smoothly transition from nPB to next generation of better nPB alternatives.

Regulatory Issues Associated with nPB

Growing numbers of regulatory agencies across the globe are increasing legislation. They are enforcing the laws around nPB use more stridently in an effort to reduce any negative impact to the planet. In the US, the EPA added nPB, Perc and TCE to the environmental watch list. Canada and Japan are severely restricting, and are on the verge of banning, these solvents altogether. A phase down of "F-gas" emissions is also in effect in many European countries, and n-PB has been phased out completely. Therefore, with each passing year, it makes sense that metal fabricating companies and machine shops should be proactively upgrading from the less planet-friendly nPB solvent to more modern sustainable alternatives. By proactively changing now, it prepares companies for compliance with regulations not only today, but with those emerging in the future.

Worker Safety Concerns of nPB

Despite its harmfulness, many companies may still consider using nPB. It is less expensive than the other n-Propyl Bromide replacement cleaning fluids on the market today. nPB is also versatile and a very effective cleaner in a variety of applications in many industries. From a strictly monetary point of view, these may seem like good reasons to continue using nPB.

However, nPB may cause serious illnesses like cancer. Most worker exposure to nPB is through inhalation. Skin contact is also another route or method of exposure for workers.

The US EPA Permissible Exposure Limit (PEL) or OSHA-designated time limit for worker exposure to nPB is extremely low. It is just 0.1 ppm. Compare this to the 200-250 ppm for the new next-generation cleaning fluids. It is clear they are much safer for exposed workers to be around.

Some companies are switching from nPB to newer, safer cleaning fluid alternatives.

Chronic exposure to nPB can cause a whole host of health issues for humans. These range from slight from dizziness, headaches, upset stomachs, skin rashes and irritation to the eyes and throat to more severe problems. These include damage to the central nervous system, kidneys, liver, immune system, reproductive system, and even cancer.

Environmental Concerns of nPB

In addition to the human threat, nPB also causes environmental problems. nPB is a VOC (Volatile Organic Compound) that contributes to smog formation due to its release of harmful emissions into the air. It can also cause ground and water pollution that may be harmful to plants, fish and animals. nPB typically enters the drinking water system through industrial discharge. It also makes its way into landfills from improper disposal methods.

Special nPB Maintenance and Handling Required

n-Propyl Bromide needs special maintenance to prevent it from turning acid in the vapor degreaser, requiring additional investments in time and materials. When a vapor degreaser “goes acid” the nPB must be completely emptied from the vapor degreaser and disposed as a hazardous waste. In addition, the entire machine may potentially need to be re-passivized. That means the vapor degreaser could be out of commission for weeks or months for this intensive maintenance.

Regular maintenance is needed to prevent the vapor degreasing system from “turning acid” in the first place. Acid acceptance testing must be done weekly to measure the quantity of acid in the nPB. Based on the test results, solvent stabilizers may need to be added to bring the nPB back into balance.

High Performance Replacements for nPB

When used in a vapor degreaser, newer sustainable metal cleaning fluids perform at optimal levels. The sustainable cleaning fluids have high solvency and strong cleaning power. Like the nPB they are replacing, they feature low surface tension to allow the cleaning fluid to get into, and even more importantly, out of blind holes and other tight openings in the parts without leaving residue behind. They are compatible with a wide range of metals and plastics and clean a variety of soils including particulate, grease, wax and oils.

Top Benefits of Switching to an nPB Replacement

Be cautious not to evaluate nPB replacement fluids simply by cost alone. nPB is less expensive, based on the per gallon or per pound cost, than many of the safer nPB replacements. However, there are savings and benefits associated with nPB replacements in other areas.

Low Conversion Cost:

In many cases, most of the nPB replacement fluids are used in existing equipment, using the same methods. After emptying and cleaning the vapor degreaser many of the nPB replacement cleaning fluids “drop in” to the machinery without an appreciable change to the cleaning process.

Same or Better Cleaning:

The modern fluorinated nPB replacements are lab-tested and analyzed to ensure the cleaning results are reliable, consistent and just as good

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MicroCare offers effective nPB replacements.

as nPB. Cleaning efficiencies were maintained or improved. Using a nPB replacement fluid improves or increases cleaning consistency. This reduces scrap and rework which lessens the amount of raw materials used to complete an order. Plus, fewer scrapped parts make it to the landfill.

Improved Efficiency:
Some modern cleaning fluids boil at a lower rate than nPB. So, there's no need to let parts cool down. They come out of the vapor degreaser cool enough to handle and ready for the next step in production. This boosts overall productivity.

Conserved Natural Resources:
Many of the nPB replacement fluids have a lower boiling point and heat of vaporization than nPB, reducing the amount of energy needed to heat the cleaner. This reduces fossil fuel consumption resulting in a lower total carbon emission and less greenhouse gas output.

Better Waste Management:
When used in a vapor degreaser, nPB replacements recycle in the degreaser, allowing for hundreds of hours use before they need to be refreshed or replaced. In addition, the vapor degreaser concentrates the soil and contaminants as it works, minimizing the amount of hazardous waste generated.

Enhanced Safety:
Many of the new nPB replacement fluids are nonflammable for improved safety in the workplace. Their azeotropic properties ensure they are thermally stable and safe to use. This could also translate into to company insurance savings.

5 More Benefits of Switching to an nPB Replacement

Easier Maintenance and Recycling:
Modern sustainable cleaning fluids do not require the stabilizers, scavengers or weekly acid acceptance testing required of nPB reducing overall maintenance costs. In addition, the fluids easily recycle on-site because they do not contain any of the stabilizers or additives required when using nPB.

Good Reputation:
A reputation as an eco-efficient, sustainable company can interest potential employees, new customers and even investors. Being planet-friendly with a new nPB replacement fluid is a competitive business advantage.

Solid Workforce:
Companies with a good sustainability reputation, like using more planet-friendly nPB replacements, typically attract and retain more qualified employees who are happy within their workplace. Happier workers tend to perform better and stay longer at their companies, reducing employee turnover and the costs of hiring and training.

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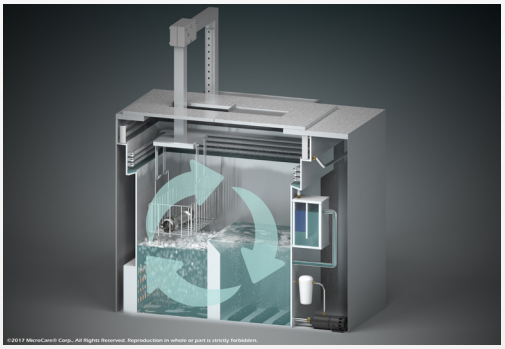

When used in a vapor degreaser, nPB replacements recycle in the degreaser for hundreds of hours use before replacement.

Better Environmental Impact:
Modern cleaning fluids do not carry a heavy regulatory burden. Using an nPB replacement helps you improve your environmental footprint. Most nPB replacements do not require NESHAP (National Emission Standards for Hazardous Air Pollutants) permits. They are also not considered a HAP (Hazardous Air Pollutant).

Improved Maintenance Procedures:
Except if exposed to a strong base, acid, or extreme heat, the nPB replacements do not "turn acid". They don't need the scavengers, stabilizers or weekly acid acceptance testing needed when using nPB.

Choosing the Right nPB Alternative

There are many substitutes for n-Propyl Bromide that are affordable and planet and people-safe. The best replacement for n-Propyl Bromide will depend on a some distinct factors.

First, identify the contamination. Contamination can include organic soils like drawing compounds, machining oils, stamping oils, spinning lubricants, fingerprints, buffing compounds and corrosion-preventative compounds. Inorganic types of soils include oxidation including rust and tarnish, heat scale, smuts, carbonaceous materials, and flux. Or the contamination can be a particulate like chips, dust and dirt. Knowing the contamination helps dictate which nPB replacement will be most effective.

Second, check for materials compatibility. There are a number of nPB replacement fluids that are strong enough (with a high enough Kb value) to clean effectively. Yet without damaging plastic, metal, ceramic or any other type of substrate. Matching the best nPB replacement fluid to the substrate ensures cleanliness. Plus, the fluid will safely displace soils without causing damage or flash-rusting.

Third, consider the geographic cleaning location and local regulatory restrictions. Depending on the location, regulations can be different. For instance, in the United States EPA standards apply. In Europe, REACH and F-gas regulations must be followed.

Five Easy Steps to Replacing nPB

When determining the best nPb replacement to use, it is recommended that companies work with a critical cleaning applications specialist. The nPB replacement fluid vendor has the best knowledge, training and experience. They help companies make the best selection for particular cleaning project.

With hundreds of years of combined critical cleaning expertise, the MicroCare team of cleaning engineers, chemists and technical experts help companies convert from nPB-based solvents to safer, affordable and compliant nPB alternatives. They will evaluate the contamination and the substrates and recommend the best n-Propyl Bromide replacement. The goal of the MicroCare team is that the nPB replacement fluid will deliver cleaning results as good as or better than nPB at a similar cost-per-part-cleaned.

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MicroCare technical experts can help you smoothly transition from nPB to a better cleaning.

Step 1: Schedule an On-Site Cleaning Audit
An on-site audit helps determine unique requirements. Learning about the applications helps us gather important information, such as viscosity and fluid density requirements, if special ultrasonic agitation or vapor degreaser methods are needed and any other limitations.

Step 2: Identify Possible nPB Replacements
MicroCare offers a range of safer substitutes for nPB that fulfill nearly any industrial cleaning requirement. The alternative fluids, in most cases, use the same equipment with the same methodologies. MicroCare overs a variety of mono-solvent, co-solvent and bi-solvent options for the best result.

Step 3: Pre-Testing at the MicroCare Critical Cleaning Lab
MicroCare operates state-of-the-art critical cleaning labs across the globe. Our chemists conduct cleaning trials or studies on customer-supplied sample parts. The soils are identified and then cleaned with the recommended MicroCare nPB replacement cleaning fluid. The process is fully documented with a written report and pictures. This allows reproduction of the process at the customer's site. This ensures that both the nPB replacement cleaning fluid and the cleaning process are perfect for the cleaning situation.

Step 4: Testing On-Site
After a likely nPB alternative cleaner is identified, a MicroCare regional engineer works with the company, using the company's equipment, to test how well the potential nPB replacement works.

Step 5: Formulate a Custom Fluid
If the sample testing doesn't deliver the results needed, MicroCare can alter the ingredients to create a custom nPB replacement.

Fortunately, when it comes to parts cleaning, there are a number of sustainable nPB replacement cleaning fluids. They clean exceptionally well and are highly cost effective. And they are also safe for workers and the planet. They help manufacturers operate in the most efficient, environmentally sound ways. Yet still produce high-quality parts and keep their company successful. Plus, they meet evolving regulatory requirements. By upgrading now to more sustainable nPB replacement cleaning fluids many companies can prepare. They meet their metal cleaning needs for today, but also comply with emerging, long-term regulations well into the future.

Effective nPB Replacement Cleaners
MicroCare offers a variety of good substitutes for n-Propyl Bromide. These high-purity, non-flammable, sustainable cleaning fluids provide superb cleaning on parts. Plus they don't leave unwanted spots, stains or residue, and they do not cause damage to the substrates.

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These fluids have low viscosity and surface tension. This allows them permeate tight crevices and wet all the surfaces of the parts. They are also are high solvency (with high Kb Values) which allows them to rigorously clean surfaces and displace tough soils. Some popular options include:

Tergo Metal Cleaning Fluid

Tergo Chlorine-Free Cleaning Fluid

Opteon SF79 Cleaning Fluid

Opteon SF80 Cleaning Fluid

Vertrel SDG Specialty Degreaser

Vertrel SFR Specialty Flux Remover

About the Author:
Venesia Hurtubise is a Technical Chemist at MicroCare which offers precision cleaning solutions. She has been in the industry more than 6 years and holds a MS in Green Chemistry from Imperial College. Hurtubise researches, develops and tests cleaning-related products that are used on a daily basis in precision cleaning and medical applications. For more information, visit www.microcare.com.

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