

Replace nPB with 3M™ Novec™ Engineered Fluids

Protect worker health – and your business

Important News Regarding nPB

nPB Background

nPB (also known as 1-bromopropane) was introduced in the mid-1990s as a less toxic replacement for methylene chloride and for ozone-depleting substances in emissive applications such as vapor and immersion degreasing operations and in critical cleaning of electronics and metals. A number of studies in recent years have raised serious safety concerns regarding the use of nPB in these emissive applications.

Regulatory concerns for nPB

The European Chemicals Agency (ECHA) listed n-propyl bromide (nPB) as a Substance of Very High Concern (SVHC) in December 2012. This means it could be banned or have limitations placed on its use under the European Union's REACH (Regulation No. 1907/2006 on the Registration, Evaluation, Authorization and Restriction of Chemicals) legislation.

National Toxicology Program (NTP) concludes “clear evidence of carcinogenic activity”

The National Toxicology Program (NTP) recently issued a report concluding that there was “clear evidence of carcinogenic activity” in female mice and rats (NTP TR564, August 2011: http://ntp.niehs.nih.gov/ntp/htdocs/LT_rpts/TR564.pdf). This also references a report by the NTP Center for the Evaluation of Risks to Human Reproduction (CERHR). The overall NTP conclusion was that “there is serious concern for reproductive and developmental effects of 1-bromopropane at the upper end of the human occupational exposure range (18-381 ppm).” “Serious concern” is the highest level of NTP conclusion regarding the possibilities that human development and reproduction might be adversely affected.

Agencies propose lower exposure guidelines for nPB

Agencies concerned with worker safety have either updated exposure guidelines or have proposed lower exposure guidelines for nPB. Cal/OSHA has set an 8 hour worker permissible exposure limit (PEL) of 5 ppm. Other agencies have proposed lower exposure guidelines for nPB – some as low as 0.1 ppm. These levels are virtually impossible to meet in typical vapor degreasing operations.

Alternatives are available. Why switch to 3M™ Novec™ Engineered Fluids?

Worker Safety and Exposure Guidelines

Novec fluids offer a far wider margin of safety than nPB and most other regulated solvent replacements. Their exposure guidelines have either remained the same or become less restrictive since first established in the mid-1990s.

	Novec 7100 fluid	Novec 7200 fluid	Novec 72DE fluid	nPB
Exposure Guideline (Threshold Limit Value) 8-hr time weighted average	750 ppm	200 ppm	750/200/200 ¹ ppm	10 ppm
Margin of Safety*	37	10	10	0.5

*MOS in Use = Exposure Guideline
Assumed 20 ppmV 8-hr TWA/exposure

¹Azeotropic mixture that contains Novec 7100 – 750 ppm, Novec 7200 – 200 ppm and trans 1,2 dichloroethylene – 200 ppm



Cleaning Performance

3M™ Novec™ Engineered Fluids are versatile, sustainable cleaning solvents effective on a wide range of soils, ranging from fingerprints and particulates to tough no-clean and lead-free solder paste. Engineered fluids offer excellent compatibility with most metals, plastics and elastomers commonly used in electronics manufacturing. They are non-corrosive and dry quickly, leaving no residue. Additionally, they feature very low surface tension, making them more effective at cleaning parts with complex geometries, blind holes and tight spaces.

Comparable Cost in Use

Although the cost-per-pound of nPB is relatively low, it is important to consider the total cost-in-use over time. Novec fluids can offer cost savings in a number of areas, including lower energy costs; fewer regulatory recordkeeping requirements; and typically no need for costly abatement systems. However, the greatest cost savings are the result of reduced drag-out losses.

Additionally, to attain the exposure limit requirements for nPB, employers must look at investing in costly facility upgrades, including improved ventilation systems, equipment enclosures and modifications to vapor degreasers in order to minimize emissions. The added cost of equipment and process modifications, training and exposure monitoring can quickly negate the low purchase price.

Solvent Stability – Ease of Use

Novec fluids are inherently stable. nPB requires routine acid acceptance testing or stabilizer maintenance. It may require more frequent solvent bath changeouts to maintain the proper solvent properties. Improper maintenance of equipment using nPB can result in the bath “going acid” – resulting in costly product rework and equipment repairs. Novec fluids are easy to use: they do not need acid acceptance testing or stabilizer maintenance.

Global Acceptance

3M™ Novec™ Engineered Fluids have received overwhelming global acceptance as a safe, environmentally sustainable chemistry. The European Union has listed nPB under the following classifications, known as “Risk Phrases:” **R48/20** (Harmful: Danger of serious damage to health by prolonged exposure through inhalation); **R60** (May impair fertility); and **R63** (Possible risk of harm to the unborn child).

3M™ Novec™ Engineered Fluids are an ideal substitute for nPB and other first-generation ozone-depleting solvents (ODP). With Novec fluids, you get more peace-of-mind, knowing that your solvent choice provides a wide margin of worker safety; is safe for your process; is not scheduled for regulatory restriction or phaseout; and provides a sustainable, cost-effective solution to your toughest production challenges.

For Additional Information

To request additional product information or sales assistance, contact 3M Customer Service at one of the numbers below or visit www.3M.com/Novec. For other 3M global offices or information on other 3M products for electronics, visit our website at 3M.com/electronics.

The 3M™ Novec™ Brand Family

The Novec brand is the hallmark for a variety of proprietary 3M products. Although each has its own unique formula and performance properties, all Novec products are designed in common to address the need for safe, effective, sustainable solutions in industry-specific applications. These include precision and electronics cleaning, heat transfer, protective coatings and surface modifiers, fire protection, lubricant deposition and several specialty chemical applications.

3M™ Novec™ Engineered Fluids • 3M™ Novec™ Aerosol Cleaners • 3M™ Novec™ 1230 Fire Protection Fluid • 3M™ Novec™ Electronic Grade Coatings • 3M™ Novec™ Electronic Surfactants

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