

Introduction to Vapor Degreasing

- Part 1:** Critical Cleaning — Definitions, Applications and Case Studies
- Part 2:** Vapor Degreasers — The Equipment, the Process and the Cost/Benefit Equation In Critical Cleaning
- Part 3:** Choosing a Solvent for Vapor Degreasing

You Have Just Downloaded Part 3



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Selecting a Solvent for Critical Cleaning

*Facts and Figures to Help Companies
Sort Through the Hype*



This Presentation

- Reviews **SOLVENT NEEDS** for Vapor Cleaning
- Compares the **CHOICES**
- Introduces a Superior Option: **Bromothane™** from Micro Care

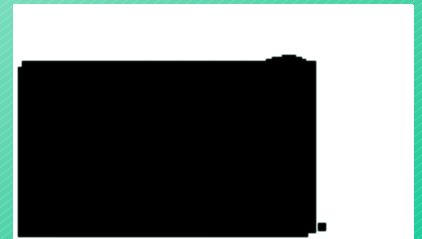
*This Presentation Focuses on the
Solvent Issues
Associated with Vapor Degreasing*



A Review of Solvent Choices

Rev. 2/2004

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The Optimal Solvent

- **Thoroughly Clean the Contamination**
 - **Dense, Low Surface Tension, Low Viscosity**
- **Be Compatible with Parts & Materials**
- **Easily Tailored for Your Cleaning Needs**
- **But Not Miscible with Water**
- **Be Easy & Safe to Store, Use and Handle**
- **Evaporate Completely, With No Residues**
- **Be Available Worldwide**
- **Be Environmentally Benign**
- **Be Affordable**

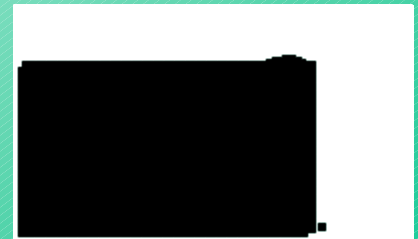
Let's Look at the Various Choices...



First, A few Words About **Water Cleaning**

- **Very Safe, Nonflammable, But a “High Boiler” Not Suited to Vapor Cleaning**
- **High Surface Tension Makes It Difficult to Clean & Dry from under Tight Spaces**
- **Requires Additives to Hit Different Contamination**
- **Water-Treatment Issues Add to Cost, Complexity**
- **Systems Are BIG and Costly**

Everybody Would Like to Use Water, But It Doesn't Work in Many Advanced Applications...



Solvent Choices: **Hydrocarbons**

- **Good Degreasing Agents**
- **High-Boilers** (Will Leave Residues on Parts)
- **Often Used as Additives in “Co-Solvent Systems” to Target Cleaning Power**
- **Flammable, Smelly**
- **Waste Handling & Disposal Usually Is Not Difficult**
- **Many Vendors, Many Choices, Many Price Points**



Solvent Choices:

Chlorinated Solvents

- **Old-Style Choices: Perc, TCE, Methylene Chloride**
- **Great Cleaners**
- **Main Selling Point: Cheap**
- **Many Toxicity Worries** (Classified as Hazardous Air Pollutants, Require Sophisticated Machines for Safe Use)
- **Many Disposal Issues**
- **Will Mix with Water; “Turns Acid”**
 - Need Stabilizers
 - Constant Monitoring



Solvent Choices:

nPB

- **Based on “normal Propyl Bromide”**
- ***Very Aggressive; Very Good Cleaner***
- ***Very Strong Aroma***
- ***Concerns About Toxicity***
- ***Mixes with Water; “Turns Acid” Easily***
 - ***Needs Stabilizers, Constant Monitoring***
- ***Operates at Higher Temperatures***
- ***Many Vendors; Quality Varies***



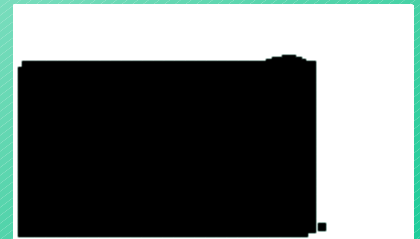
Solvent Choices: **HCFC-225**

- **Very Good Cleaner, Good Degreaser**
- **Test on Plastics, Electronic Components**
- **Few Grades or Formulations**
- **Classified as Hazardous Waste**
- **Low VOC Ratings Boost Appeal in Some Areas**
- **Class II Ozone-Depleter**
 - Phase-Out Date of 2015
- **Some Concerns About Toxicity**
- **Single Source of Supply**



Solvent Choices: Fluorinated (HFCs, HFES)

- **Mild Cleaners**
- **Easily Blended**
- **Low Surface Tension**
- **Easy to Heat & Distill**
- **Do Not Mix with Water**
 - **Do Not “Turn Acid”, No Stabilizers**
- **Very Good Environmentally**
- **Very Good Toxicity Ratings**
- **Expensive to Buy**



Summary: Your Cleaning Choices

- **Water** Not Suited — High Surface Tension, Low Density, Disposal & Treatment Costs, Large Machines, Energy Intensive
- **Hydrocarbons** Not Suited — Combustible, Slow to Clean, Slow to Dry, Energy Intensive
- **Chlorinateds** Not Suited — Many Environmental, Toxicity Worries
- **Brominateds** Suited in Special Applications. Powerful Degreaser. Toxicity Worries, Strong Aroma; Quality, Prices Vary
- **HCFC-225** Suited in Special Applications. Ozone-Depleter
- **HFCs, HFEs** Best Choices. Good Cleaners, Easily Blended



The Punchline

- **Vapor Degreasing with Bromothane™ Produces Results That Other Technologies Can't Deliver As Reliably & Effectively...**
 - **Great Cleaning**
 - **Easy to Use**
 - **Very Cost-Effective**
 - **Great Materials Compatibility**
 - **Safe When Used Properly**
 - **Easy Recycling/Disposal**
 - **Simple, Low-Maintenance Processes**



Bromothane™

A Very Affordable Choice for Vapor Degreasing

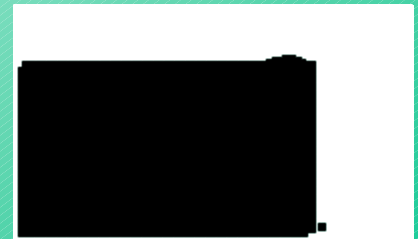
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Introducing Bromothane™

- **Based on nPB**
- **Produced by Great Lakes Chemical**
 - **The Largest Producer of Brominated Products in North America**
- **Marketed by Micro Care**
 - **The World's Critical Cleaning Experts**



The Bromothane™ Products

- **For Precision Vapor Degreasing:
Bromothane™ R**
- **For Particulate Cleaning:
Bromothane™ S**
- **For Defluxing:
Bromothane™ E**
- **As a Carrier Fluid** (for Lubricants)
Bromothane™ S

(Brominated Solvents Are Generally Not Used for
Solvent Drying Applications)



Bromothane™ Properties

– Boiling Point	65-75° C (Grade-specific)
– Flash Point	None
– Thermal Stability	Very Stable
– Materials Compatibility	Testing Required
– Drying Time	Medium-Fast
– Non-Volatile Residues	<10 ppm
– Azeotropes?	Yes
– Exposure Limit (8 Hr)	10 ppm (Great Lakes) 25 ppm (U.S. E.P.A.)
– Ozone Impact	Almost Zero
– Global Warming Factor	Low
– Volatile Organics (VOC)	100%



Why Chose Bromothane™

- **The Only nPB Based Solvent Made in North America**
- **Highest Quality**
- **Great Tech Support**
- **Great Product Stewardship**
- **Very Competitive Prices**
- **Superior Customer Service**



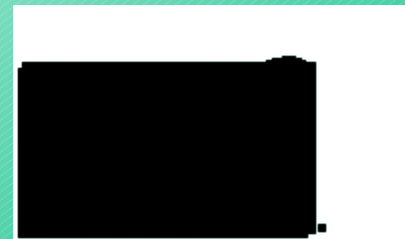
Important Features

- **High Density**
- **Low Surface Tension**
- **Low Viscosity**
- **Very Powerful (High Kb Values)**
- **Are Great Replacements for Chlorinated Solvents**
- **Must Be Used with Tight Cleaning Systems to Control Worker Exposures**



Bromothane™ Product Stewardship

- **Micro Care Offers the Best Program in the Industry**
 - **Site Visits**
 - **Worker Training**
- **Equipment Inspection, Assistance with Configurations and Operation**
- **Annual Vapor Monitoring**



For Further Info

- **Call Micro Care at—
(888) 595-4525**
- **Check Out—
www.Bromothane.com**
- **Email Us at—
TechSupport@Bromothane.com**

Micro Care Is Your Direct Source for
Bromothane™ Solvents

