“Trans” The Last Chlorinated Solvent?

Strategy And Formulation
Trans 1,2 Dichloroethylene

**Chemical Properties:**

- KB Value – 117
- Appearance – Colorless Liquid
- Odor – Light Ethereal
- Flash Point – 36F
- Vapor Pressure @ 68F – 5.2 psia
- Solubility in 100g Water @77F – 400g
- Specific gravity – 1.27
- Auto Ignition: 860F
Physical Properties

- Fast Evaporation
- Low Odor
- Strong Solvent
- Low Residue
- Compatible with most Cosolvents
- Flammability can be reduced or eliminated
Environmental Properties

- Ozone Depleting – No
- Global Warmer – No
- VOC – Yes
- MIR Value – 123
- TLV – 200
- EPA Snap approved – Yes
- Hazardous Air Pollutant – No
- Prop 65 Chemical – No
- Carcinogen or Suspected Carcinogen - No
Applications

- Electronic cleaners
- Specialty cleaners
- Heavy duty solvent
- Increase evaporation
- Increase solvency
- Reduce odor
- Solubilizer
- Dense solvent
Reduced Chemical Inventory

• Currently we have lost many useful chemical Groups:
  • HFCs
  • HCFCs

• We have chemicals lost or restricted:
  • VOCs
  • Toxins
  • HFCs
Restricted Properties

- Non Flammable
- Low Odor/Strong solvent
- Fast Evaporator
- Low Residue
- Cost Effective
- Plastic Safe
Formulation Applications

• Trans is one component in various blends to achieve formulation goals:
  • Flammability
  • Solvency
  • Evaporation
  • Residue
  • Odor
  • Cost
Electronic Cleaners

- HFC 134
- HFC 152
- Vertrel XF (HFC 4310)
- HFC 365
- Trans
- Cosolvents (alcohols, hydrocarbons, ethers, glycol ethers, esters)
- Create a variety of products from a plastic safe non flammable cleaner to replacements for 141b, 225, 113, HCFC 22
Low VOC Solvent Blends

- Trans- Fast Evaporator (low flammability)
- HFC 365 – Fast Evaporator(low flammability)
- HFC 4310- Fast Evaporator(non flammable)
- Esters – Slow Evaporator( flammable)
- Hydrocarbons – Slow Evaporator( flammable)
- Glycol Ethers – Slow Evaporator(flammable)
- HFOs- low flammability, low solvency, high cost

- LOW RESIDUE
Penetrates/Lubricants

- Trans – specific gravity > 1.00 (1.27)
- high solvency – KB > 100 (117)
- Hydrocarbon solvents
- Glycol Ethers
- Esters
Heavy Duty Cleaners

- Paint Strippers/Cleaners
- Spot Lifters
- Degreasers

- Once dominated by 111 Trichlor, Perc, TCE, Methylene chloride, NPB, Toluene, Xylene
History

• Trans has been around for decades. Why has it not been previously utilized?
• Cost
• Marketing
Conclusion

• Formulators will find additional challenges in the future due to increased regulation and the loss or restrictions on chemicals.

• To provide the products that are environmentally responsible, efficacious, safe, and cost effective we will need utilize all our resources.

• Trans can be one of those resources.