CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2008
DateRun:	10/01/2008
Experimenters:	Jason Marshall
ClientType:	Metal
ProjectNumber:	Project #1
Substrates:	Aluminum, Stainless Steel
PartType:	Coupon
Contaminants:	Adhesive, Dirt, Stickies, Oil
Cleaning Methods:	
Analytical Methods:	
Purpose:	To generate a list of alternatives for TCE in cleaning stainless steel and aluminum parts.
Experimental Procedure:	Using the lab's on-line database, www.cleanersolutions.org, a list of alternatives was generated matching the requirements put forth by the client. Follow up assistance was provided to review potential alternatives selected by the client after receiving specific product request.
Results:	The lab ran a query for adhesive removal from aluminum using ultrasonic equipment, another for stainless steel cleaning of adhesives, one for oil removal from both aluminum and stainless steel and a final query for stickies removal. These searches were conducted by looking at the previous lab testing results. In addition to searching the lab testing results, a search of vendor supplied data was conducted in an attempt to provide more potential TCE substitutes. After reviewing the generalized queries that the TURI lab ran for the client, the company provided more specifics on their process in an effort to narrow the list of alternatives down further. The details of the product that needed to be cleaned included: Lubricating oil filter element of Large Engine (Heavy Fuel Oil - HFO), Dimensions: O.D.=280 x I.D.=152 x Thick =8 (all dimensions in mm) The part was made up from two element halves. Each half comprises an Aluminum framework of eight equal sectors separated by radial ribs. Between each rib was a stainless steel filter screen. The client wanted an alternative that factored in a few additional considerations: 1) Flash point: should not be below room temp 2) Boiling point of solvent: 80"c - 90"c 3) It should be a cleaning agent 4) Acid based cleaning solvent is not required 5) Have distributor in Asia or India As part of their research, the company had identified some possible alternatives, but they would be thankful to get the TURI lab's view on them. The products included: • n-propyl bromide • Varsal Spirdane Haute teneur 40 from safety clean corp. • Gamlem Carbo Solvent 50 • Gamlem Gama Clean 28 Follow the company's list of criteria and reviewing the list of possible identified alternatives, the lab suggested to look into ultrasonic cleaning of the parts based on the description. The suggested avoiding using n-propyl bromide for cleaning as there are many unknown risks associated with that solvent. Although it may not be regulated like TCE, the regulatory status of nPB may change. The lab noted that nearly all of the aqueous based products and many of biobased solvents the lab identified using the CleanerSolutions database have boiling points above 100 C. The lab continued to conduct searches from the on-line database to try and identify possible products that match the specified requirements. The client came across a product from a vendor located in India that had a product that looked like a possible match. The vendor, M/s CUMI-CIMCOOL INDIA, supplied information for the product Cimclean PC410, which seemed to be a good alternative solvent of TCE for ultrasonic cleaning of almost all types of client's components. The MSDS was forwarded to the TURI lab to provide a view and opinion on the product. The materials sent on Cimclean PC 410 revealed that the product looked like a good step toward replacing TCE with a safer alternative. The product was designed for spray cleaning but this would not be a concern for using the product in ultrasonic cleaning. The fact that PC410 required low concentrations and lower temperatures was noteworthy. The only problem that may surface with the product was bath life. The MSDS implied that the product would emulsify the contaminants which would make filtration more challenging, but not impossible. As per the lab's suggestion, the client did a pilot on their aluminum and stainless-steel parts. The result they found was satisfactory. Any sort of damage seems to be out of question as the product was purely an aqueous based solvent.

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Summary:

Conclusion: Working with the TURI lab via the internet-based cleaning database, the client has taken a positive step toward the elimination of the health and environment hazardous associated with TCE in the workplace by replacing the solvent with a much safer and effective solvent PC 410.