CleanerSolutions Database & P2OASys Tool: Process / Lifecycle Factors

Alicia McCarthy
Toxics Use Reduction Institute
University of Massachusetts Lowell

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Toxics Use Reduction Institute Laboratory

- Located at UMass Lowell (est. 1994)
- The laboratory works on such sectors as:
  - Industrial Parts Cleaning
  - Janitorial
  - Households
  - Disinfection
- Learning Laboratory
  - 20-25 undergraduate students
  - 2-3 graduate students

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Surface Cleaning

- What “clean” means
  - Free from dirt, stain, or impurities
  - More simply, unsoiled
- Contaminants can be defined as
  - Extraneous or unwanted material deposited and/or attached to a surface
- Cleaning is the process of getting rid of these impurities

Why Clean?

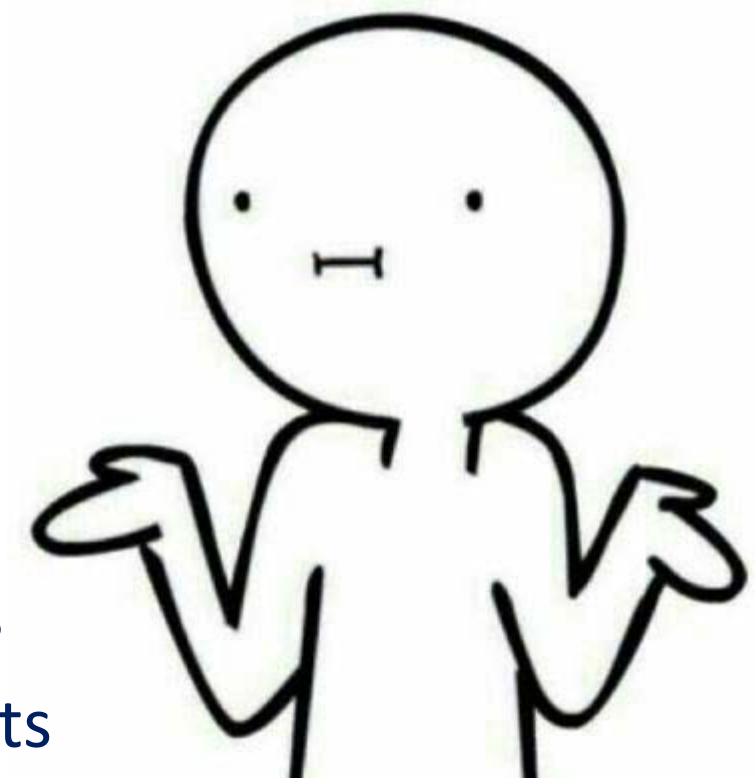
- To prepare the surfaces of parts prior to other manufacturing processes
  - Welding, plating or painting
- For aesthetic reasons as an aid for marketing and sales
- To ensure that the finished product will perform without failure caused by contamination

Typical Hazardous "Go-To" Cleaners

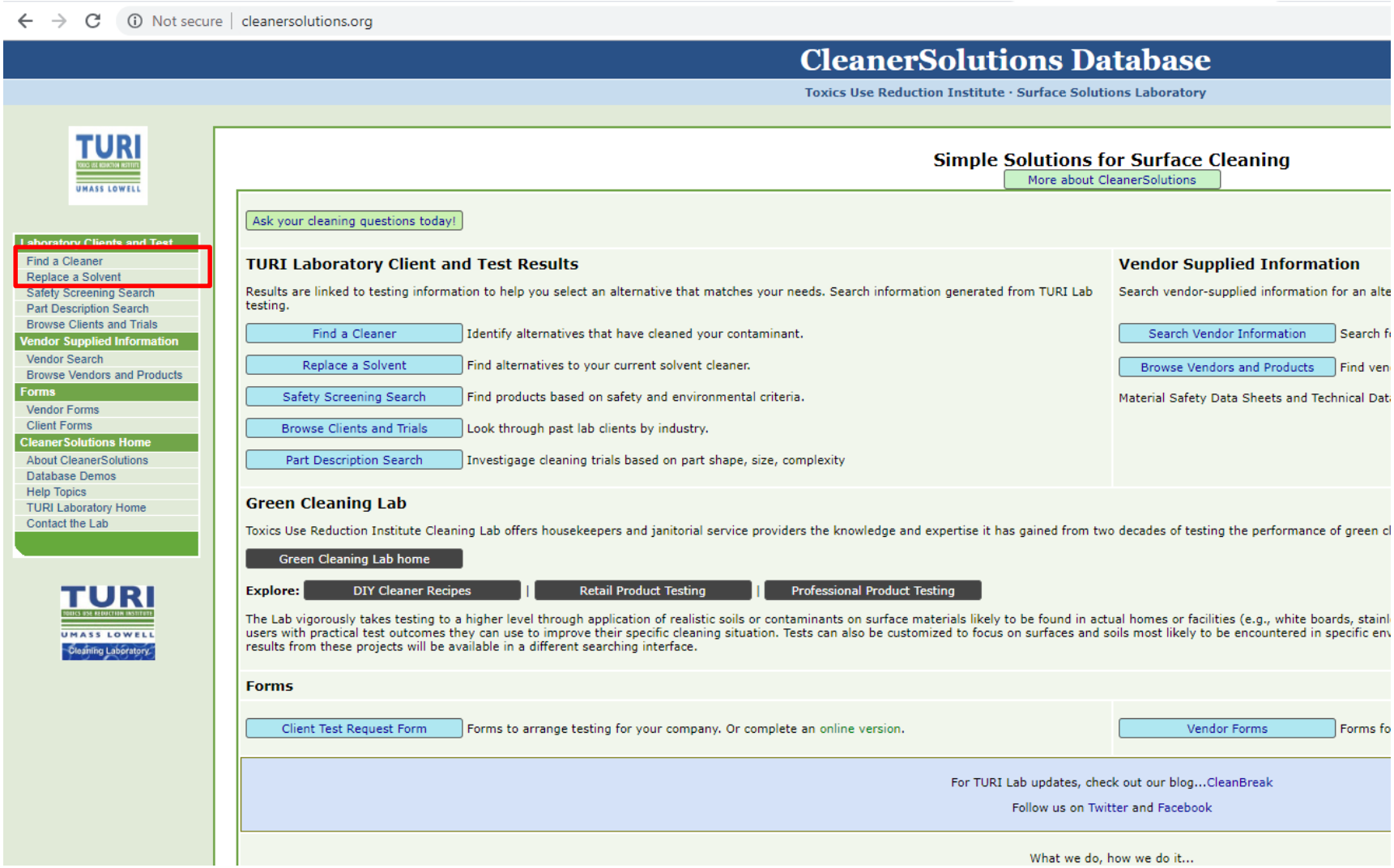
- Methylene chloride – DCM
  - Used because of its non-flammability, high solvency, vapor pressure, and stability
- Trichloroethylene - TCE
  - Still used in metal cleaning
- Normal Propyl Bromide – nPB
  - Introduced as TCE's less regulated replacement
- Perchlorethylene – PCE
  - Used because of its non-flammability, high solvency, vapor pressure, and stability
- Trans 1,2 Dichloroethylene – DCE
  - Introduced as the less-regulated replacement for nPB and TCE

We Need to Switch to a Safer Cleaner… But Where Do We Even Start Looking?

- Cleaner Solutions Database
  - 3rd Party Tested Products
  - Vendor and Product Information
  - Evaluates:
    - Cleaning Methods
    - Compatible Substrates
    - Variety of Contaminants



CleanerSolutions.org



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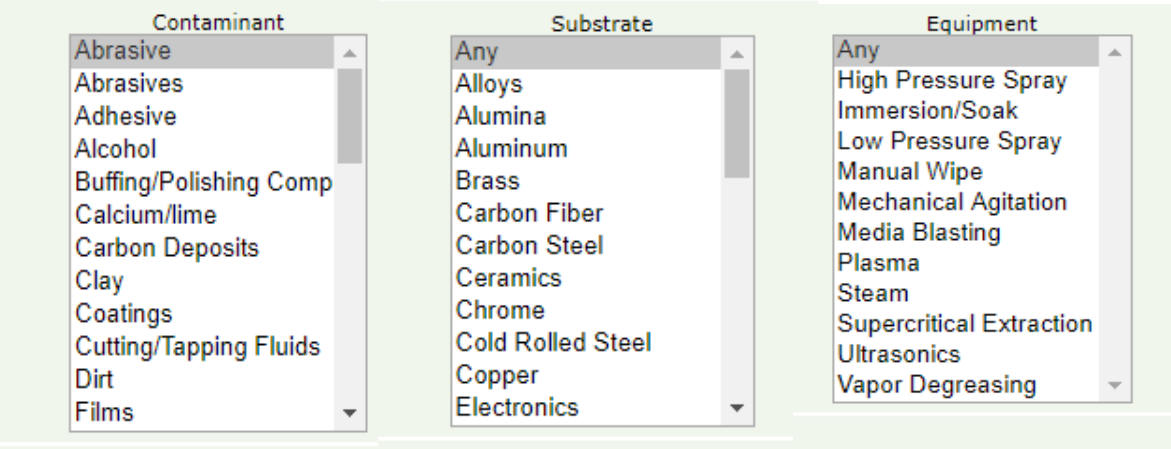
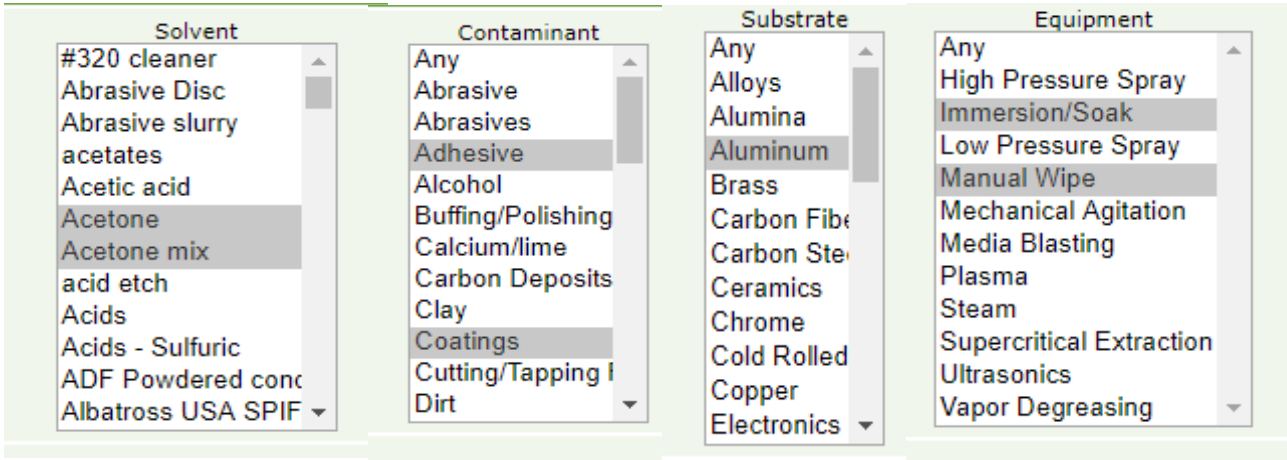
Searching for A Cleaner

- Find A Cleaner



- Replace A Solvent



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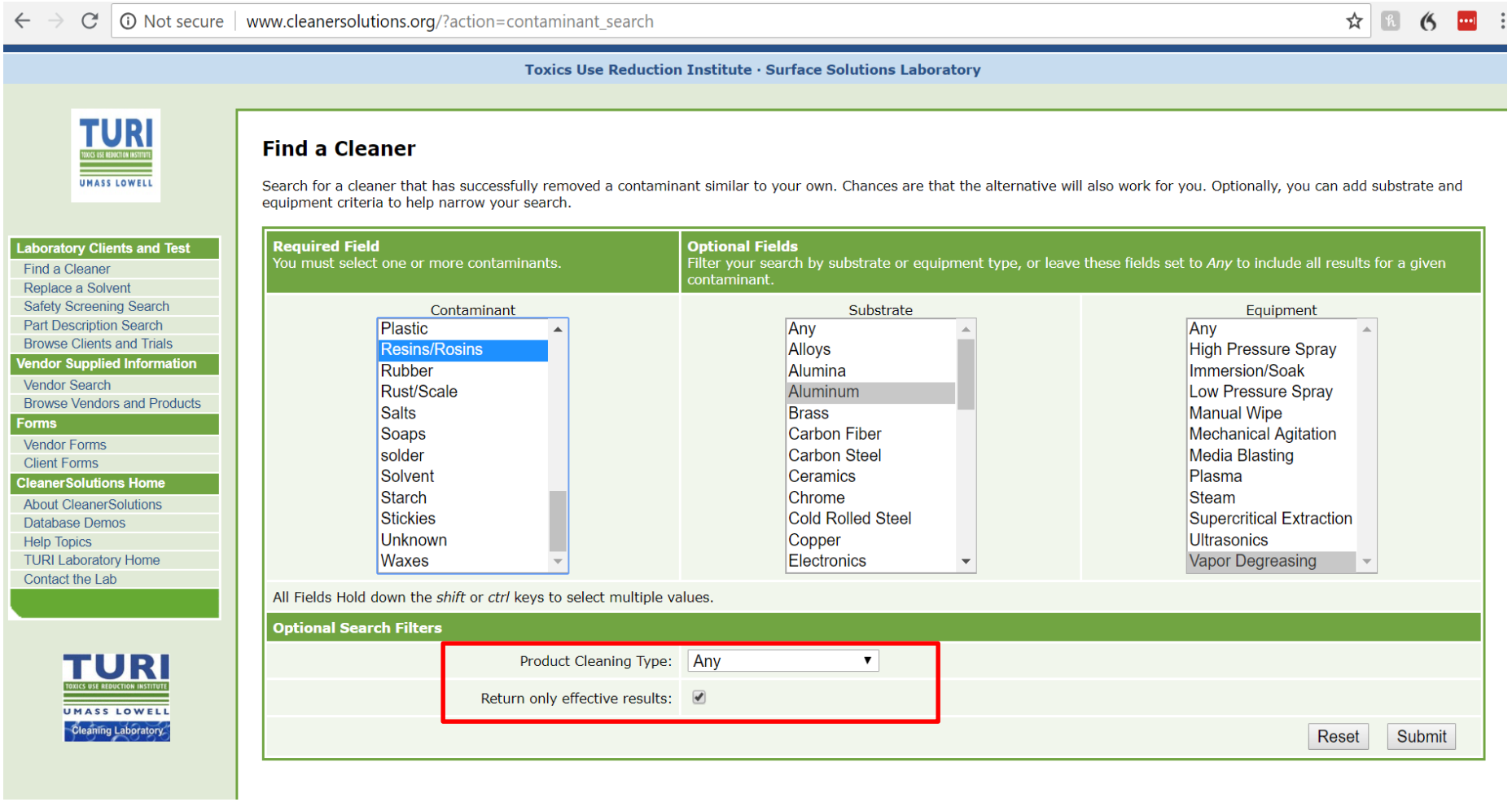
CleanerSolutions Database



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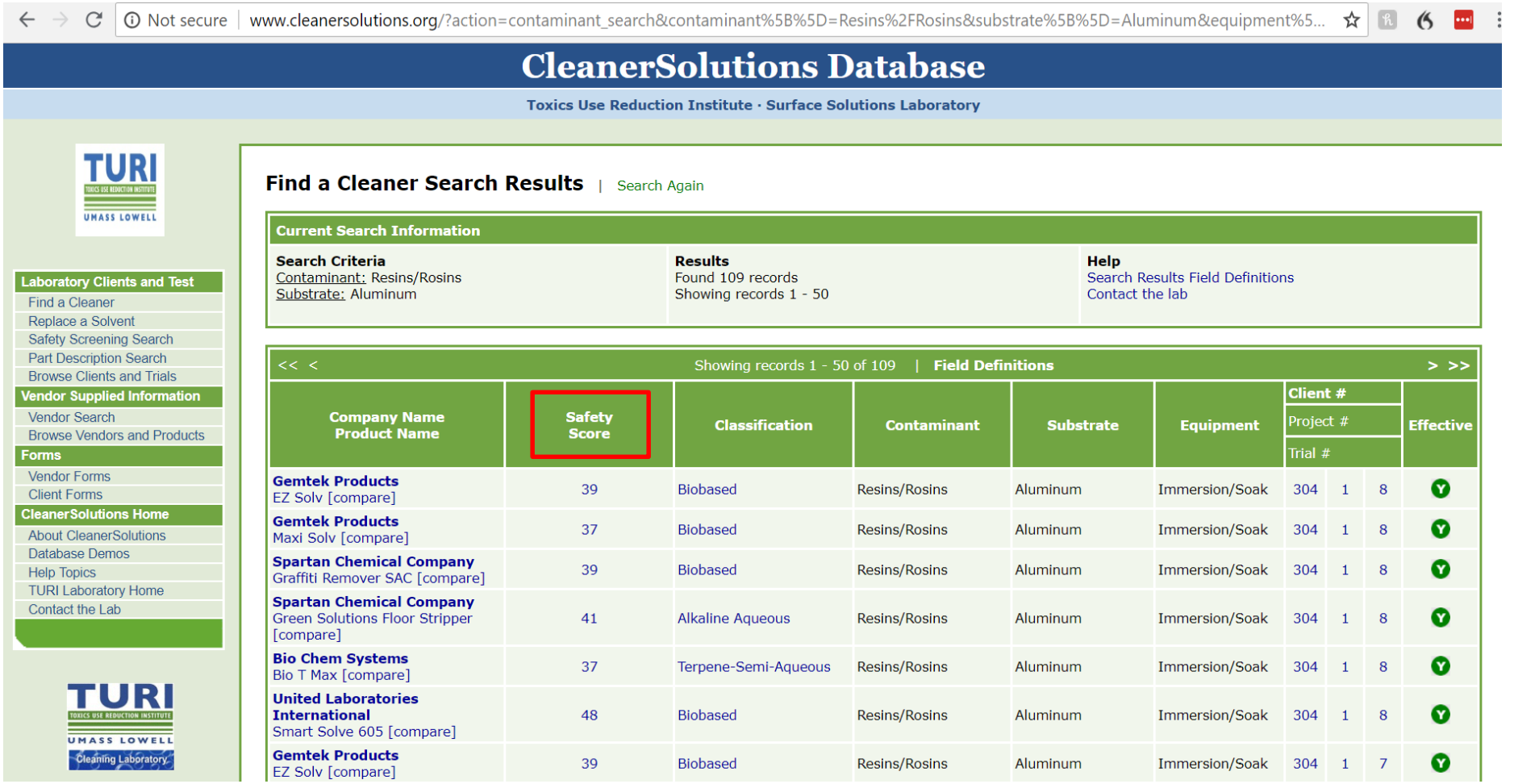

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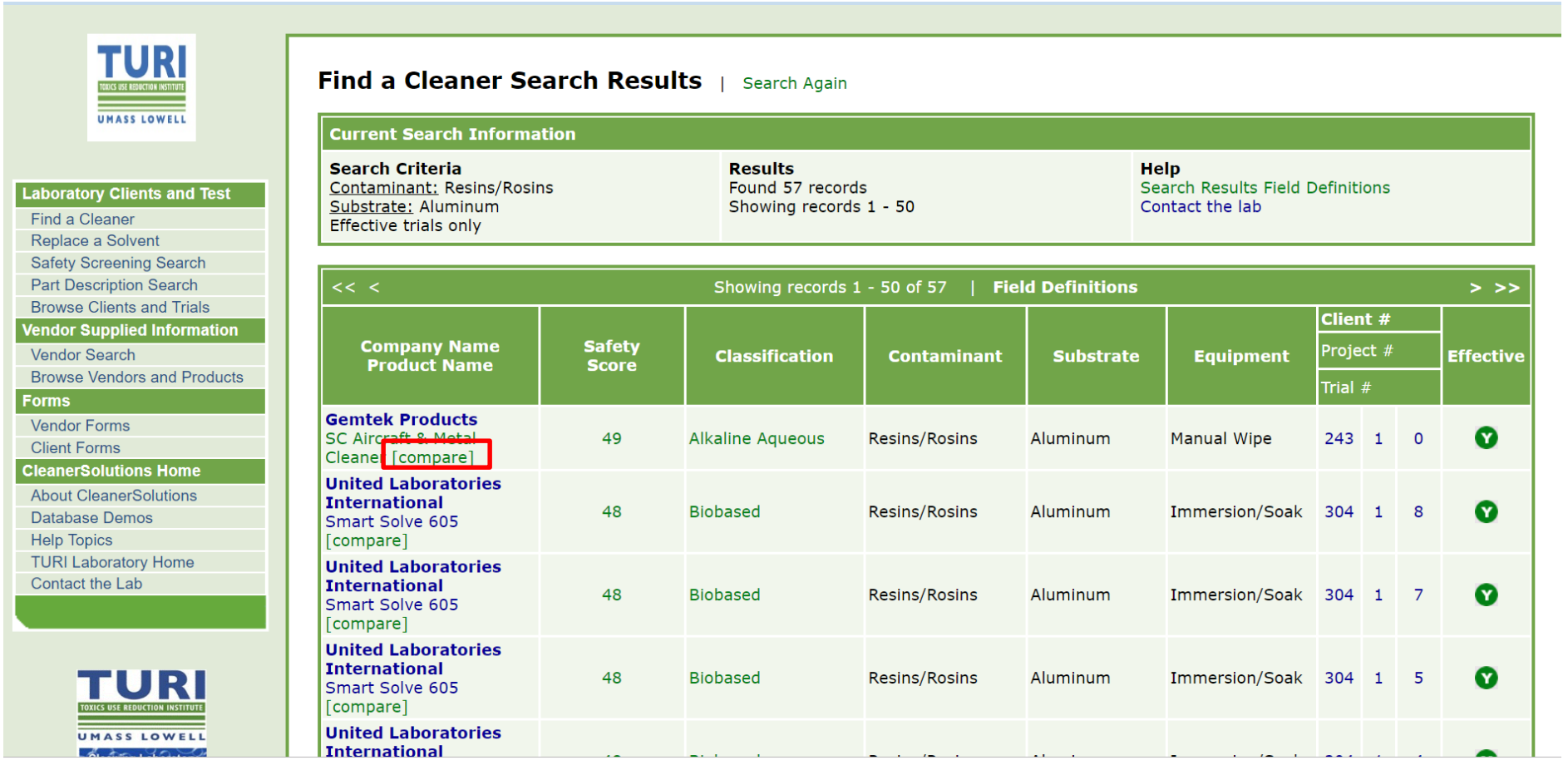
Let's Compare



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Laboratory Clients and Test
- Find a Cleaner
- Replace a Solvent
- Safety Screening Search
- Part Description Search
- Browse Clients and Trials

Vendor Supplied Information
- Vendor Search
- Browse Vendors and Products

Forms
- Vendor Forms
- Client Forms

CleanerSolutions Home
- About CleanerSolutions
- Database Demos
- Help Topics
- TURI Laboratory Home
- Contact the Lab

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Find a Cleaner Search Results | Search Again

Current Search Information

Search Criteria	Results	Help
Contaminant: Resins/Rosins Substrate: Aluminum Effective trials only	Found 57 records Showing records 1 - 50	Search Results Field Definitions Contact the lab

<< < Showing records 1 - 50 of 57 | **Field Definitions** > >>

Company Name Product Name	Safety Score	Classification	Contaminant	Substrate	Equipment	Client # / Project # / Trial #			Effective
Gemtek Products SC Aircraft & Metal Cleane [compare]	49	Alkaline Aqueous	Resins/Rosins	Aluminum	Manual Wipe	243	1	0	Y
United Laboratories International Smart Solve 605 [compare]	48	Biobased	Resins/Rosins	Aluminum	Immersion/Soak	304	1	8	Y
United Laboratories International Smart Solve 605 [compare]	48	Biobased	Resins/Rosins	Aluminum	Immersion/Soak	304	1	7	Y
United Laboratories International Smart Solve 605 [compare]	48	Biobased	Resins/Rosins	Aluminum	Immersion/Soak	304	1	5	Y
United Laboratories International									

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Compare Products Side By Side

Vendor Provided Information

Product information cited in this section is supplied directly by the vendors. The Institute has not verified the accuracy of any of this information and is not liable for any claims made by the vendors. TURI is likewise not responsible for any typographical errors.

Micro 90 [x]	Smart Solve 605 [x]	SC Aircraft & Metal Cleaner [x]
Vendor Name: International Products Corporation	**Vendor Name:** United Laboratories International	**Vendor Name:** Gemtek Products
Classification: Alkaline Aqueous	**Classification:** Biobased	**Classification:** Alkaline Aqueous
Recommended Contaminants: Adhesive, Buffing/Polishing Compounds, Carbon Deposits, Cutting/Tapping Fluids, Greases, Inks, Lubricating/Lapping Oils, Oil, Waxes	**Recommended Contaminants:** Adhesive, Carbon Deposits, Coatings, Cutting/Tapping Fluids, Fluxes, Greases, Inks, Lubricating/Lapping Oils, Oil, Paints, Resins/Rosins, Waxes	**Recommended Contaminants:** Buffing/Polishing Compounds, Carbon Deposits, Cutting/Tapping Fluids, Greases, Lubricating/Lapping Oils, Oil, Waxes
Recommended Equipment: Immersion/Soak, Manual Wipe, Ultrasonics	**Recommended Equipment:** Cold Solvent, Immersion/Soak, Manual Wipe, Mechanical Agitation	**Recommended Equipment:** Cold Solvent, High Pressure Spray, Immersion/Soak, Low Pressure Spray, Manual Wipe, Mechanical Agitation, Ultrasonics, Vapor Degreasing
Recommended Substrates: Alloys, Brass, Carbon Steel, Ceramics, Copper, Galvinized Steel, Glass/Quartz, Gold, Nickel, Plastic, Stainless Steel, Steel, Sterling/Silver, Tin	**Recommended Substrates:** Alloys, Aluminum, Brass, Copper, Galvinized Steel, Nickel, Stainless Steel, Steel	**Recommended Substrates:** Alloys, Aluminum, Brass, Carbon Steel, Ceramics, Copper, Galvinized Steel, Glass/Quartz, Gold, Nickel, Plastic, Rubber, Stainless Steel, Steel, Sterling/Silver, Tin
MSDS / TDS: MICRO 90 SDS, MICRO 90, elastomer compatibility, apr 8, 2015, MICRO 90, metal compatibility, apr 9, 2015, MICRO 90, plastic compatibility, apr 8, 2015, Micro 90 TURI TDS	**MSDS / TDS:** Smart Solve 605 MSDS, Smart Solve 605 TDS	**MSDS / TDS:** SC Aircraft & Metal Cleaner TURI TDS, SC Aircraft MSDS, SC Aircraft TDS-SCAQMD 2012, SC Aircraft TDS-Test List, SC Aircraft TDS

Safety Screening Information

Micro 90 [x]

Safety Score | Help

Indicator	Value	Points
VOC:	0	10
GWP:	0	10
ODP:	0	10
HMIS H:	2	
HMIS F:	0	8
HMIS R:	0	
pH:	9.7	8

Total: 46

Smart Solve 605 [x]

Safety Score | Help

Indicator	Value	Points
VOC:	0	10
GWP:	0	10
ODP:	0	10
NFPA H:	1	
NFPA F:	1	8
NFPA R:	0	
pH:	NA	10

Total: 48

SC Aircraft & Metal Cleaner [x]

Safety Score | Help

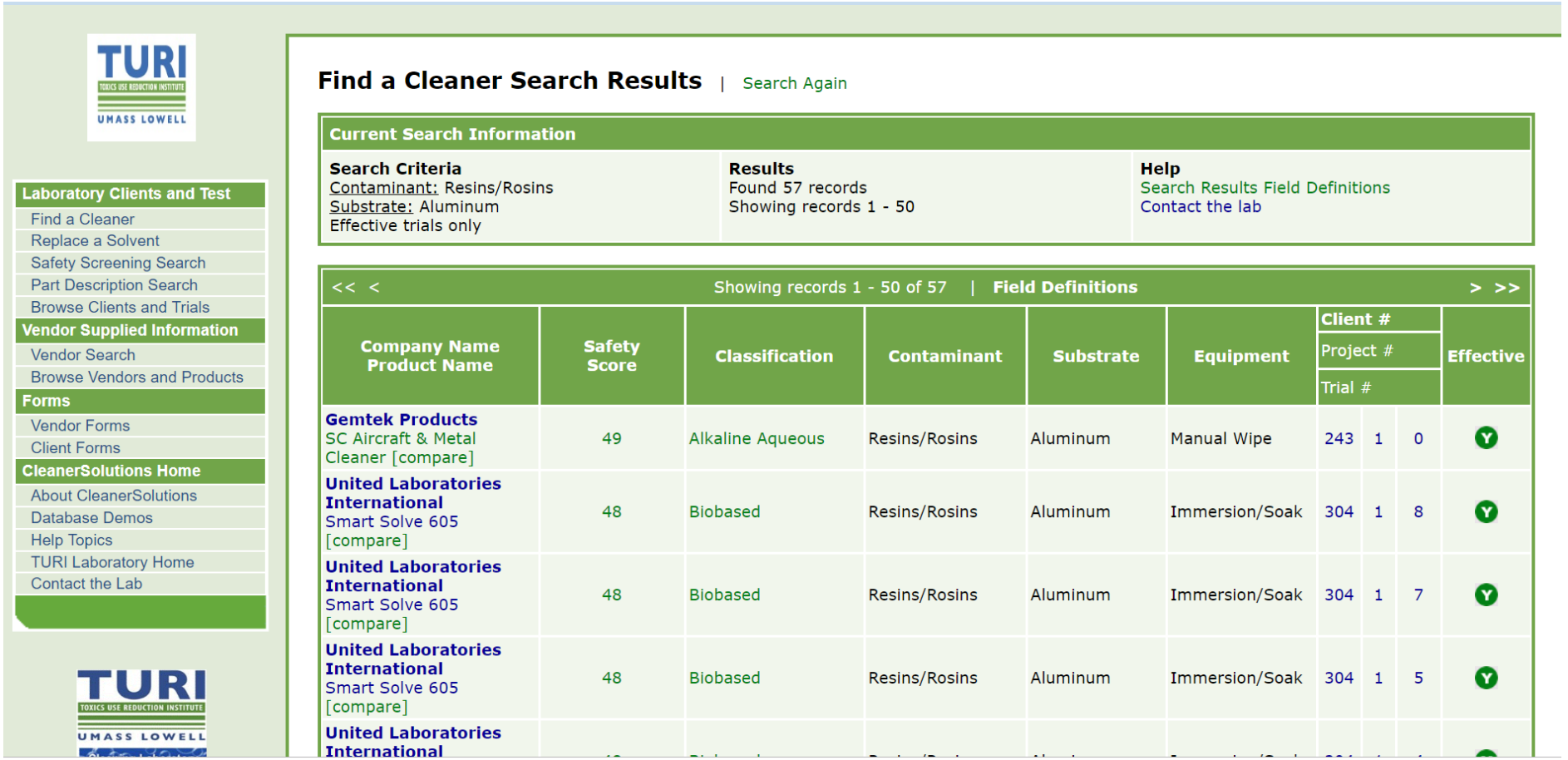
Indicator	Value	Points
VOC:	0	10
GWP:	0	10
ODP:	0	10
HMIS H:	0	
HMIS F:	0	10
HMIS R:	0	
pH:	8.4	9

Total: 49

Lab Evaluation Summary

Micro 90 [x]	Smart Solve 605 [x]	SC Aircraft & Metal Cleaner [x]
Number of Trials: 258 136 effective/122 ineffective	**Number of Trials:** 58 33 effective/25 ineffective	**Number of Trials:** 206 142 effective/64 ineffective
Tested Contaminants: Coatings, Buffing/Polishing Compounds, Oil, Alcohol, Greases, Pitch, Phthalates, Inks, Lubricating/Lapping Oils, Adhesive, Waxes, Carbon Deposits, Hucker's Soil, Abrasive, Cutting/Tapping Fluids, Fluxes, Starch, Resins/Rosins, Graphite, Paints, Metal fines	**Tested Contaminants:** Coatings, Cutting/Tapping Fluids, Oil, Inks, Adhesive, Lubricating/Lapping Oils, Resins/Rosins, Carbon Deposits, Greases	**Tested Contaminants:** Waxes, Oil, Lubricating/Lapping Oils, Dirt, Cutting/Tapping Fluids, Coatings, Greases, Fluxes, Alcohol, Carbon Deposits, Inks, Hucker's Soil, Paints, Buffing/Polishing Compounds, Mold Releases, Resins/Rosins, Starch, Graphite, Salts
Tested Substrates: Aluminum, Brass, Steel, Ceramics, Alumina, Stainless Steel, Glass/Quartz, Copper, Nickel, Plastic, Alloys, Titanium, Carbon Fiber, Liquid	**Tested Substrates:** Steel, Aluminum, Galvinized Steel, Glass/Quartz, Ceramics	**Tested Substrates:** Aluminum, Steel, Stainless Steel, Brass, Alumina, Ceramics, Alloys, Plastic, Copper, Nickel, Titanium, Carbon Fiber, Fiberglass, Liquid, Glass/Quartz
Tested Equipment: Immersion/Soak, Ultrasonics, Mechanical Agitation, Manual Wipe	**Tested Equipment:** Immersion/Soak, Ultrasonics, Manual Wipe	**Tested Equipment:** Immersion/Soak, Manual Wipe, Ultrasonics, Mechanical Agitation

Reviewing The Results



Product Overview

Product Information

SC Aircraft & Metal Cleaner

Add to Comparison List

Vendor Provided Information

Product information cited in this section is supplied directly by the vendors. The Institute has not verified the accuracy of any of this information and is not liable for any claims made by the vendors. TURI is likewise not responsible for any typographical errors.

Vendor Name: Gemtek Products

Product Classification: Alkaline Aqueous

Recommended Contaminants: Buffing/Polishing Compounds, Carbon Deposits, Cutting/Tapping Fluids, Greases, Lubricating/Lapping Oils, Oil, Waxes

Recommended Equipment: Cold Solvent, High Pressure Spray, Immersion/Soak, Low Pressure Spray, Manual Wipe, Mechanical Agitation, Ultrasonics, Vapor Degreasing

Recommended Substrates: Alloys, Aluminum, Brass, Carbon Steel, Ceramics, Copper, Galvinized Steel, Glass/Quartz, Gold, Nickel, Plastic, Rubber, Stainless Steel, Steel, Sterling/Silver, Tin

MSDS / TDS: SC Aircraft & Metal Cleaner TURI TDS, SC Aircraft MSDS, SC Aircraft TDS-SCAQMD 2012, SC Aircraft TDS-Test List, SC Aircraft TDS

Safety Screen | Help

Indicator	Value	Points
VOC:	0	10
GWP:	0	10
ODP:	0	10
HMIS H:	0	
HMIS F:	0	10
HMIS R:	0	
pH:	8.4	9

Total: 49/50 (higher is better)

Product Overview Continued

Laboratory Evaluation of SC Aircraft & Metal Cleaner | Field Definitions

Client #	Project #	Trial #	Contaminant	Substrate	Equipment	Effective
7	2	0	Waxes	Aluminum	Immersion/Soak	N
27	2	0	Waxes	Aluminum	Manual Wipe	Y
27	2	1	Waxes	Aluminum	Manual Wipe	N
27	2	2	Oil	Aluminum	Manual Wipe	Y
27	2	3	Oil	Aluminum	Manual Wipe	Y
27	2	4	Oil	Aluminum	Manual Wipe	Y
27	2	5	Oil	Aluminum	Manual Wipe	Y
27	2	6	Oil	Aluminum	Manual Wipe	Y
27	2	7	Oil	Aluminum	Manual Wipe	Y
27	2	8	Lubricating/Lapping Oils	Aluminum	Manual Wipe	Y
27	2	9	Oil	Steel	Manual Wipe	Y
27	2	9	Oil	Aluminum	Manual Wipe	Y
27	2	9	Oil	Steel	Manual Wipe	Y
27	2	9	Waxes	Steel	Manual Wipe	Y

Vendor Information

Vendor Information

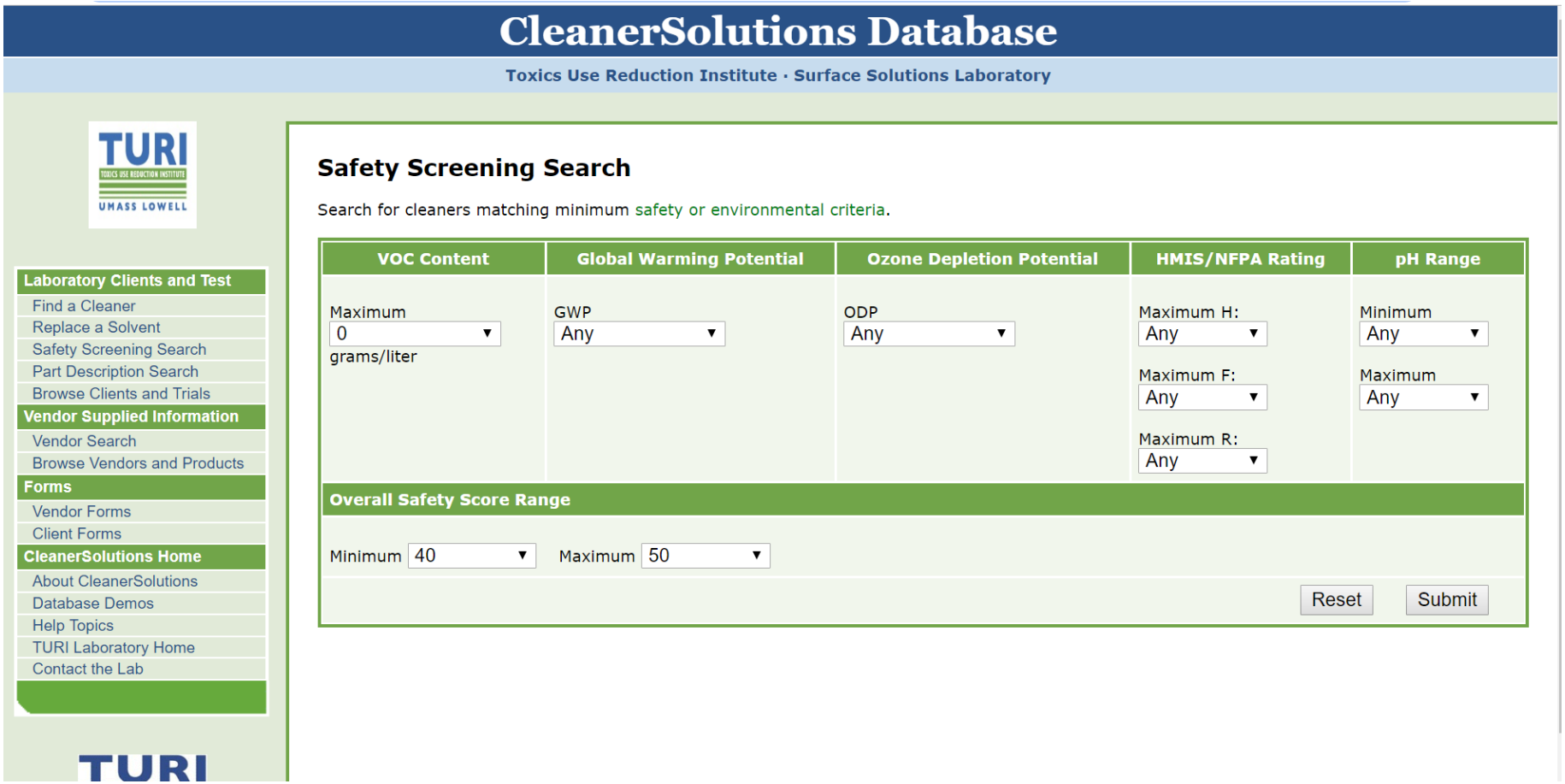
Gemtek Products

Address	Phone	Internet
3808 N. 28th Avenue Phoenix, Az 85017	Toll Free: 800 331 7022 Local: 602 265 8586 Fax: 602 265 7241	Website: www.gemtek.com

Products | Field Definitions

Product Name	Classification	Safety Score
SC 1000	Alkaline Aqueous	47
SC Supersolve	Biobased	47
SC Aircraft & Metal Cleaner	Alkaline Aqueous	49
ODOR-EX	Alkaline Aqueous	48
EZ Solv	Biobased	39
Maxi Solv	Biobased	37
SC Actisolv	Biobased	38
SC Toilet Bowl Cleaner	Biobased	47
SC Oven & Grill Cleaner	Biobased	47
SC More Than Glass Cleaner	Biobased	49
SC 2000 All Purpose	Biobased	47

Search Products by Safety Screening



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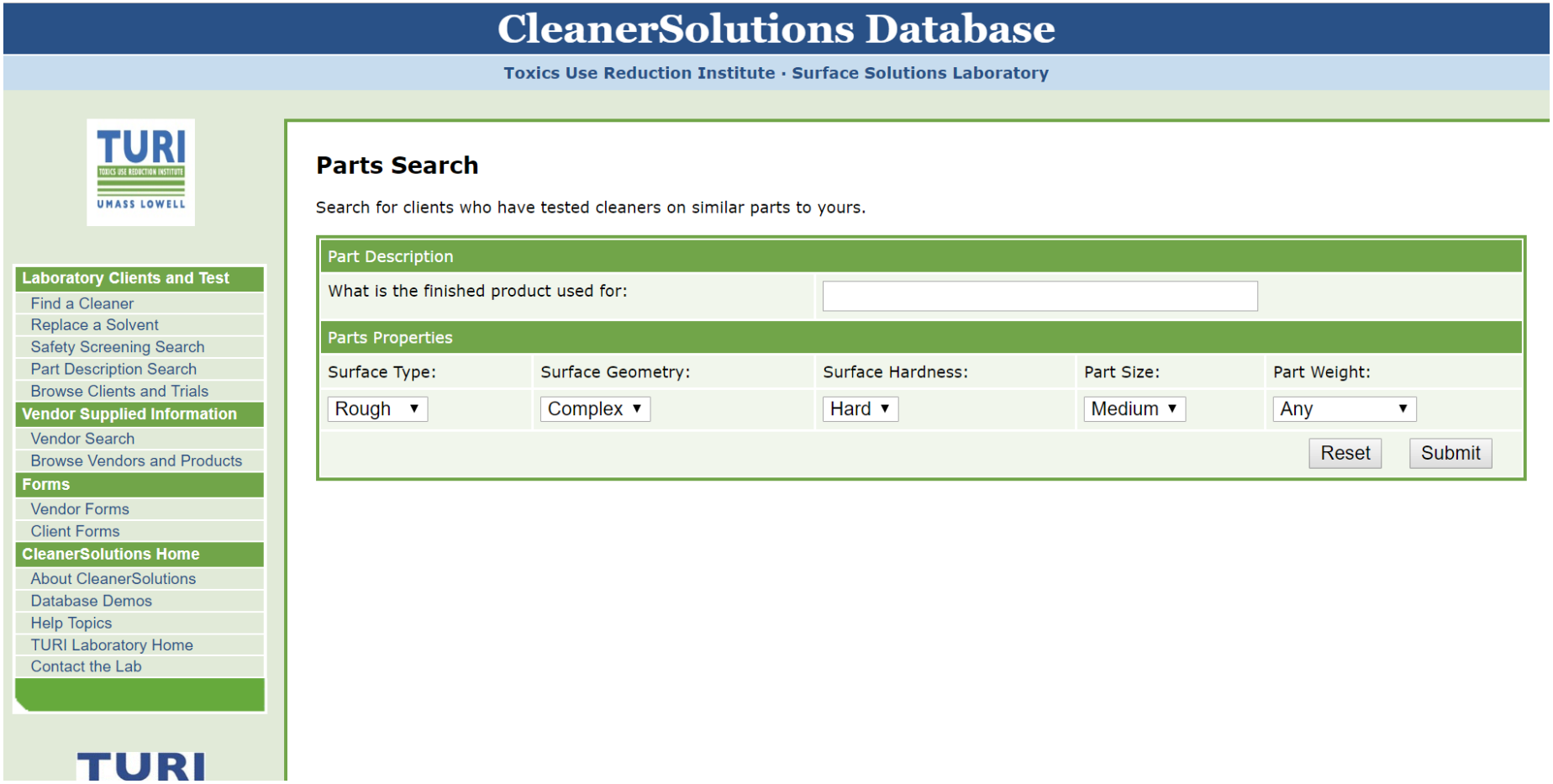
Search by Parts Similar to Yours



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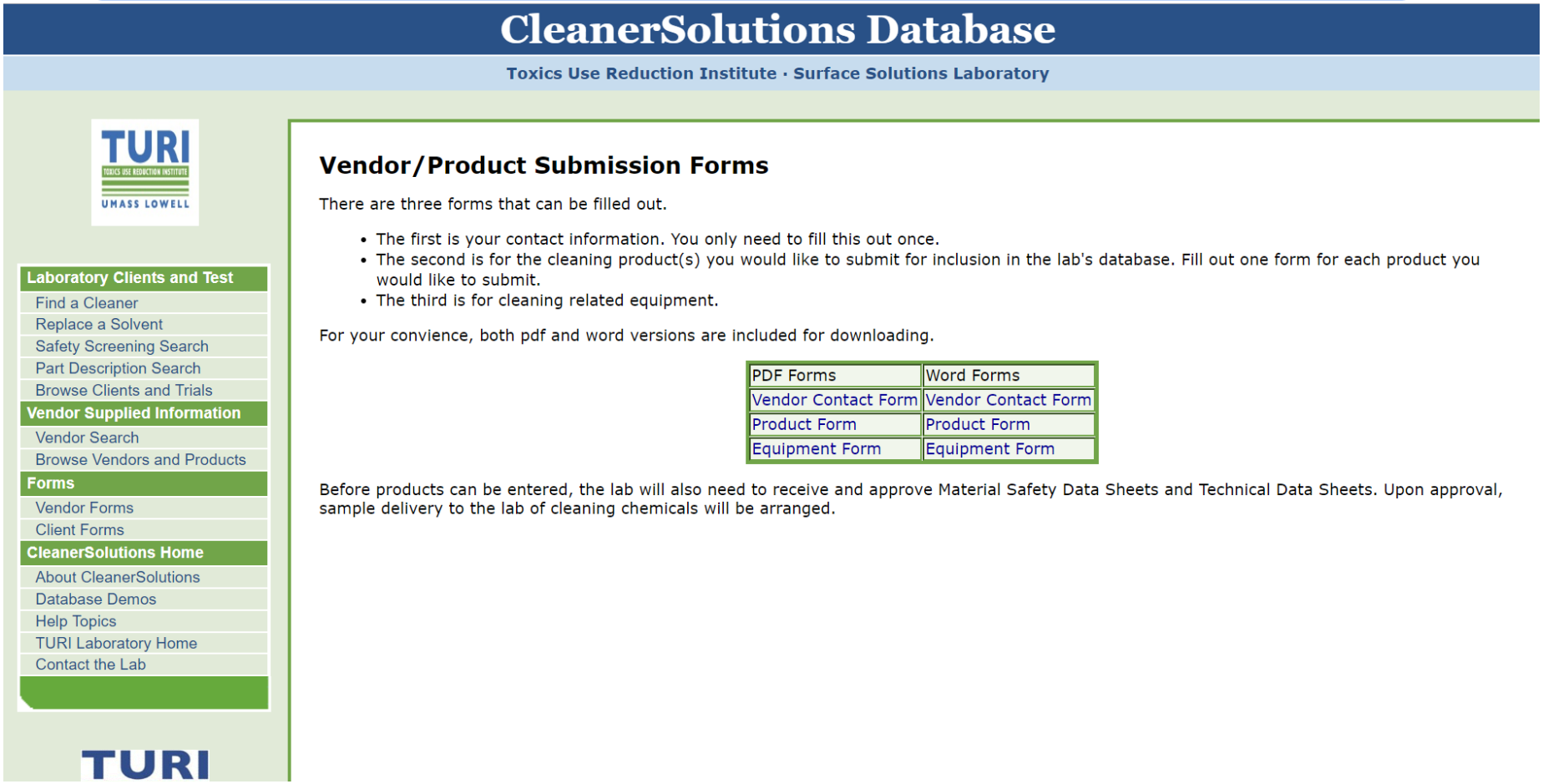
Vendor/Product/Equipment Forms



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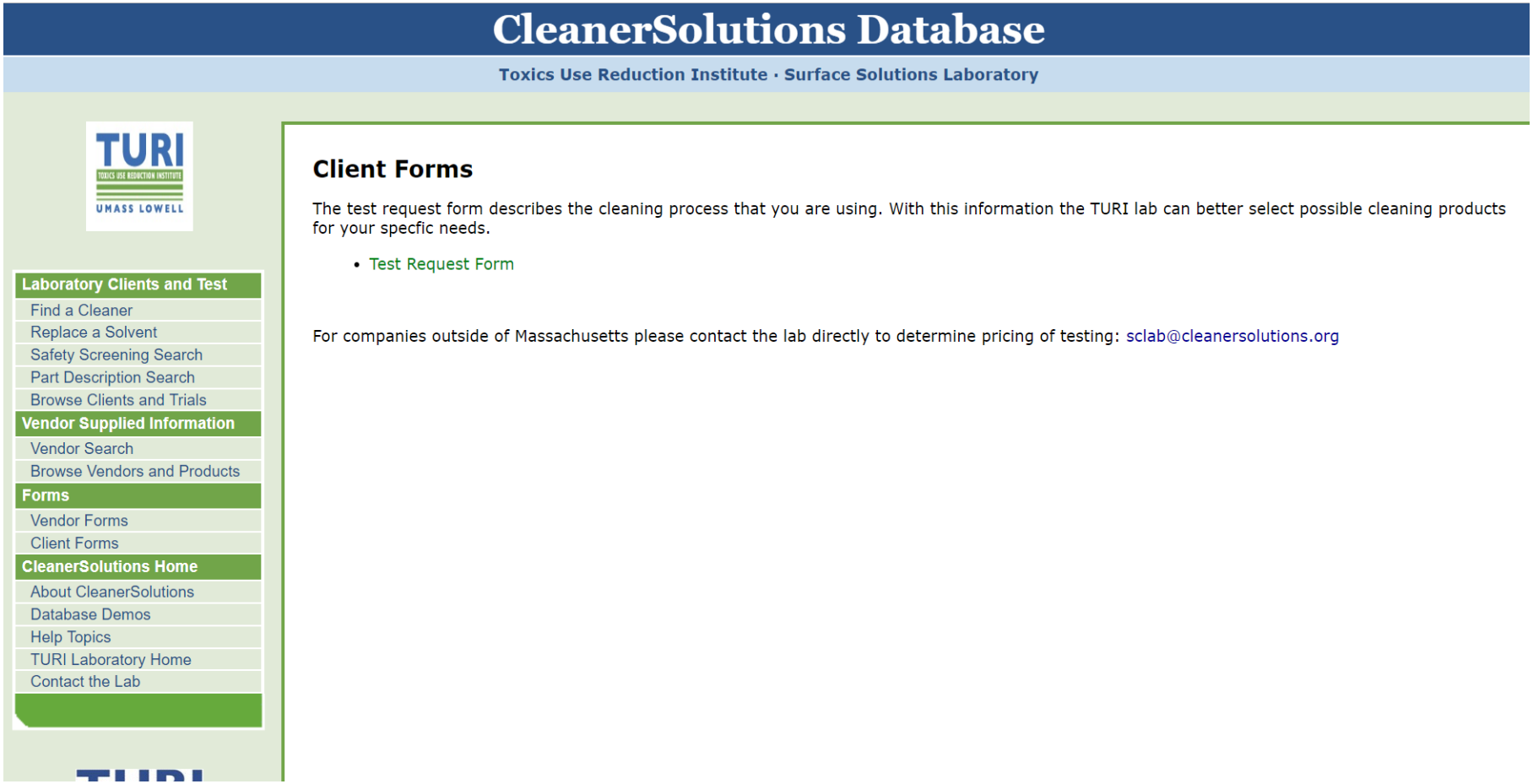
Request Testing of Products



Activity 1: Replacing a Solvent

Step 1: Go to "Replace a Solvent"

Step 2: Enter in Search Criteria:

- **Solvent:** Trichloroethylene (TCE)
- **Contaminant:**
  - Cutting/Tapping Fluids
  - Greases
- **Substrate:** Aluminum
- **Equipment:** Any
- **Product Cleaning Type:** Parts Cleaning
- Click on *Return Only Effective Results*

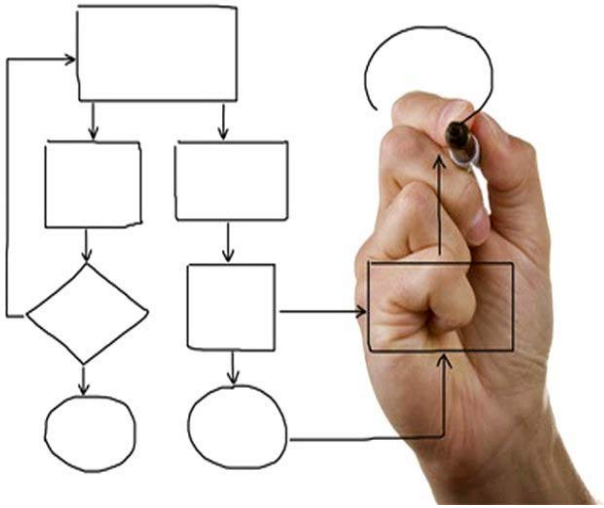
Step 3: Search and organize by a high Safety Score

Let's Pick Out Cleaners to Evaluate

<< < Showing records 1 - 10 of 10 | **Field Definitions** > >>

Company Name Product Name	Safety Score	Classification	Contaminant	Substrate	Equipment	Client # / Project # / Trial #			Effective
Gemtek Products SC Aircraft & Metal Cleaner [compare]	49	Alkaline Aqueous	Cutting/Tapping Fluids	Aluminum	Mechanical Agitation	299	1	8	Y
Gemtek Products SC Aircraft & Metal Cleaner [compare]	49	Alkaline Aqueous	Cutting/Tapping Fluids	Aluminum	Mechanical Agitation	299	1	7	Y
Oakite Products Inproclean 3800 [compare]	42	Alkaline Aqueous	Cutting/Tapping Fluids	Aluminum	Mechanical Agitation	299	1	7	Y
Brulin Corporation Aquavantage 1400 [compare]	46	Alkaline Aqueous	Cutting/Tapping Fluids	Aluminum	Mechanical Agitation	299	1	5	Y
Oakite Products Inproclean 3800 [compare]	42	Alkaline Aqueous	Cutting/Tapping Fluids	Aluminum	Mechanical Agitation	299	1	4	Y
Gemtek Products SC Aircraft & Metal Cleaner [compare]	49	Alkaline Aqueous	Cutting/Tapping Fluids	Aluminum	Mechanical Agitation	299	1	4	Y
Brulin Corporation Aquavantage 1400 [compare]	46	Alkaline Aqueous	Cutting/Tapping Fluids	Aluminum	Mechanical Agitation	299	1	4	Y
Bio Chem Systems Solsafe 245 [compare]	37	Petroleum Distillate	Cutting/Tapping Fluids	Aluminum	Immersion/Soak	299	1	2	Y
AG Environmental									

Information to Gather



- Safety Data Sheet (SDS)
- Technical Data Sheet (TDS)
- Current Engineering Controls, Personal Protective Equipment, and Management Controls
- Your Current Process & Equipment Specs.
  - Capabilities for other options (i.e. new equipment, space, cleaning time, waste stream)

Future Upgrades to CleanerSolutions

- Overall Face-Lift
- Different shading for Unavailable Products/Vendors
- Search by only Available Vendors/Products option
- Add P2OASys Scores and Link

But the question still Stands…
Is it Safer?

Let's Take A Closer Look at the Chemistry and Process

P2OASys Hazard Assessment Tool

- Allows user to assess potential impacts of alternative chemistries/technologies
  - Environmental
  - Worker
  - Public health
- Help users use a more comprehensive and systematic way of thinking about
  - Current and alternative processes
    - Based on quantitative and qualitative factors

Welcome to P2OASys

Get Started

What is P2OASys?

P2OASys allows companies to assess the potential environmental, worker, and public health impacts of alternative technologies aimed at reducing toxics use. The goal is more comprehensive and systematic thinking about the potential hazards posed by current and alternative processes identified during the TUR planning process. The tool can assist companies:

Systematically examine the potential environmental and worker impacts of options, examining the total impacts of process changes, rather than simply those of chemical changes

Compare options with current processes based on quantitative and qualitative factors.

Embedded formulas in P2OASys provide a numerical hazard score for the company's current process and identified options, which can then be combined with other information sources and professional expertise to make decisions on adoption of alternatives. Companies input both quantitative and qualitative data on the chemical toxicity, ecological effects, physical properties, and changes in work organization likely as a result of the proposed option.

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Any question or comments can be directed at Jason Marshall by phone or by email.

Jason Marshall:
Tel:(978) 934-3133
Email: Jason@turi.org

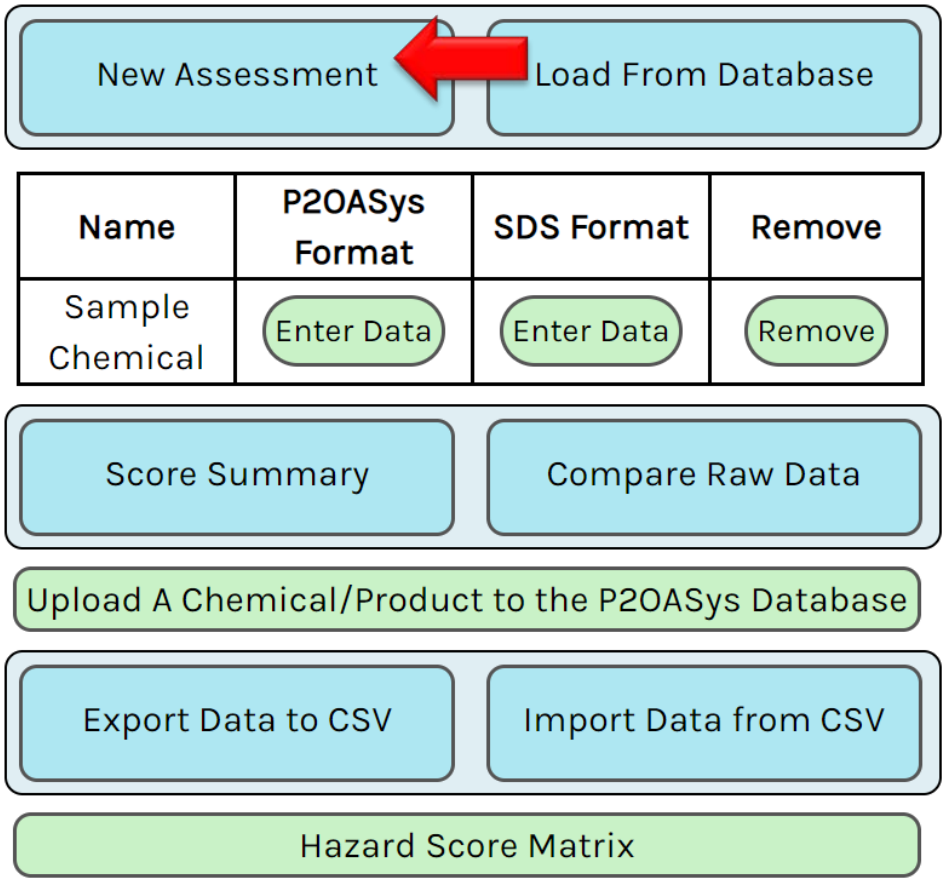
This web site is maintained by the Toxics Use Reduction Institute at the University of Massachusetts, Lowell.

The Massachusetts Toxics Use Reduction Institute
University of Massachusetts Lowell
600 Suffolk Street
Lowell, Massachusetts 01854-2866
Tel: 978-934-3275 Fax: 978-934-3050

http://p2oasys.turi.org/

Welcome to the P2OASys Tool!

Information about P2OASys can be found on the TURI webpage here.



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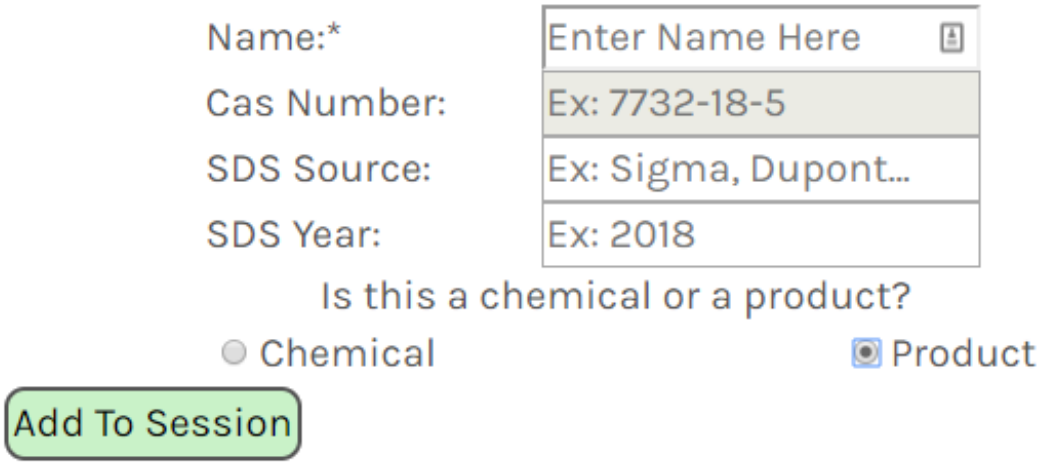
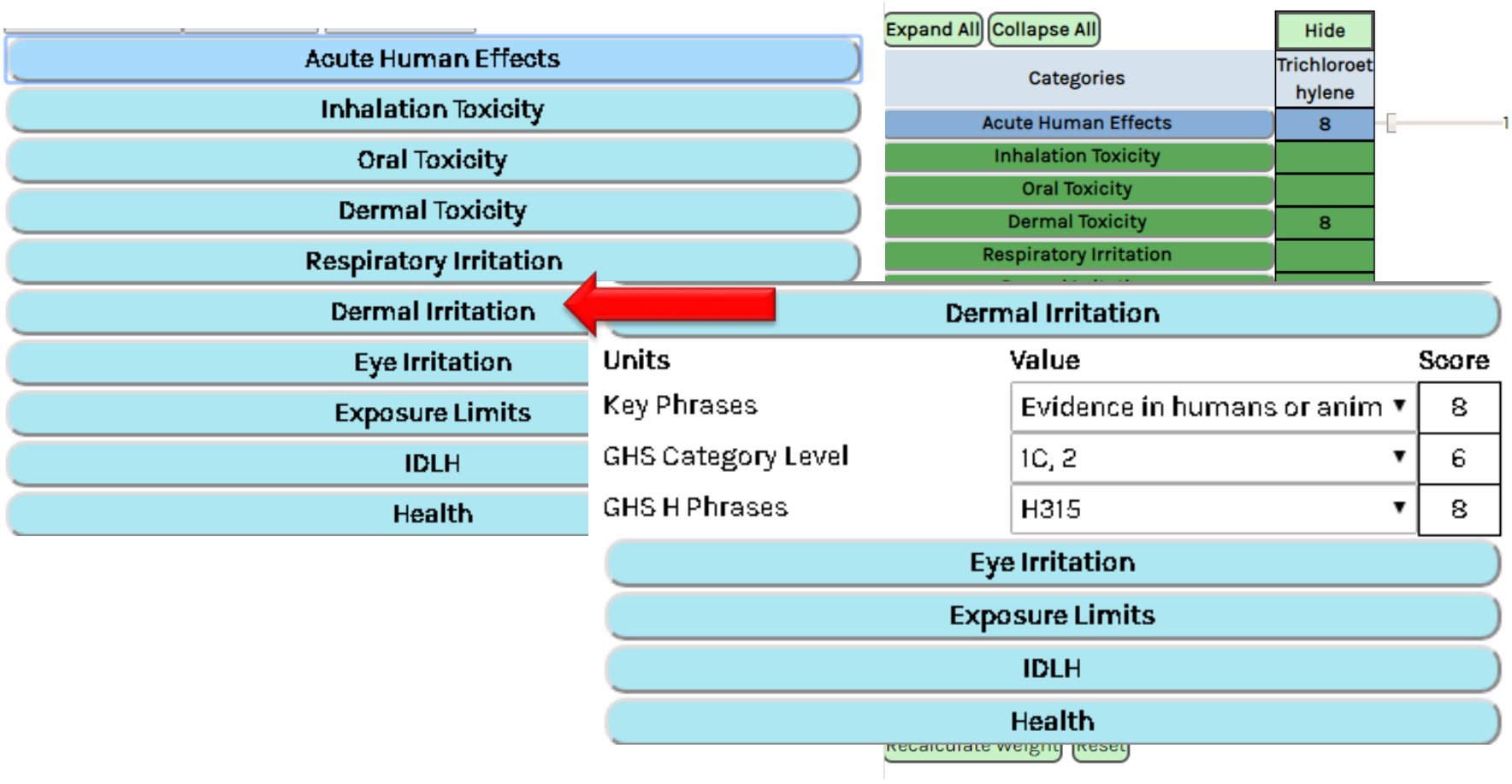
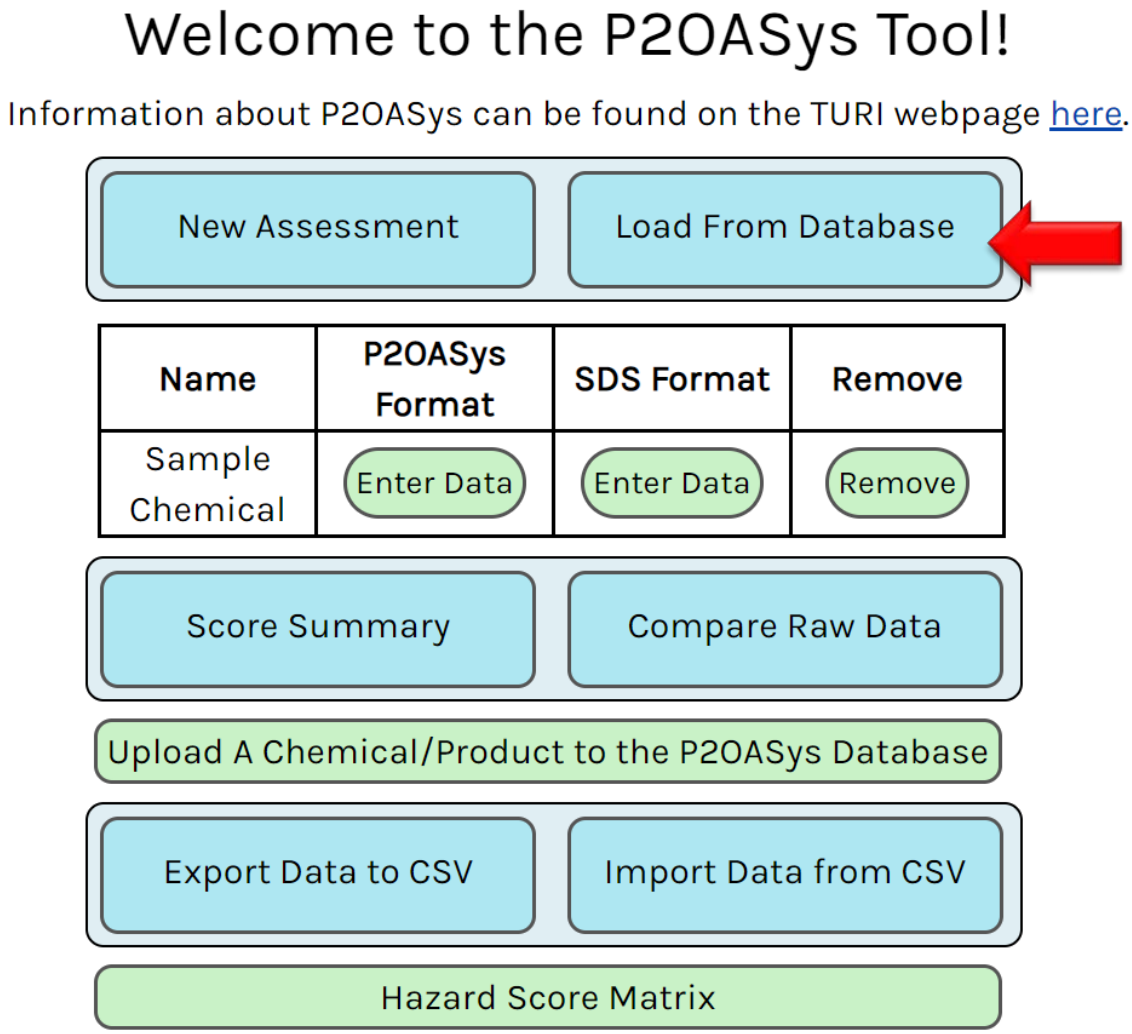
Adding a New Assessment



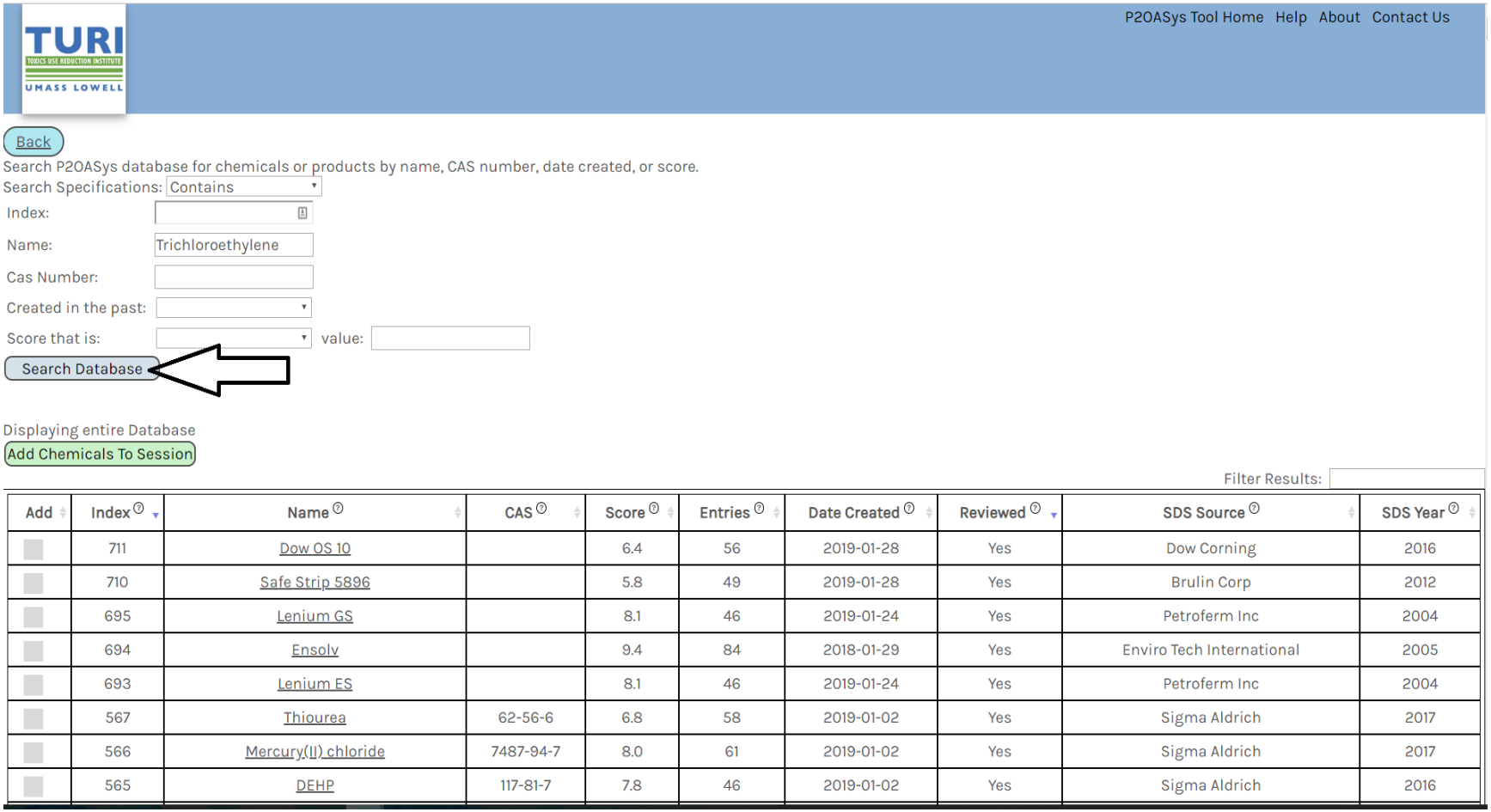
P2OASys Categories & Scores



Loading from Database



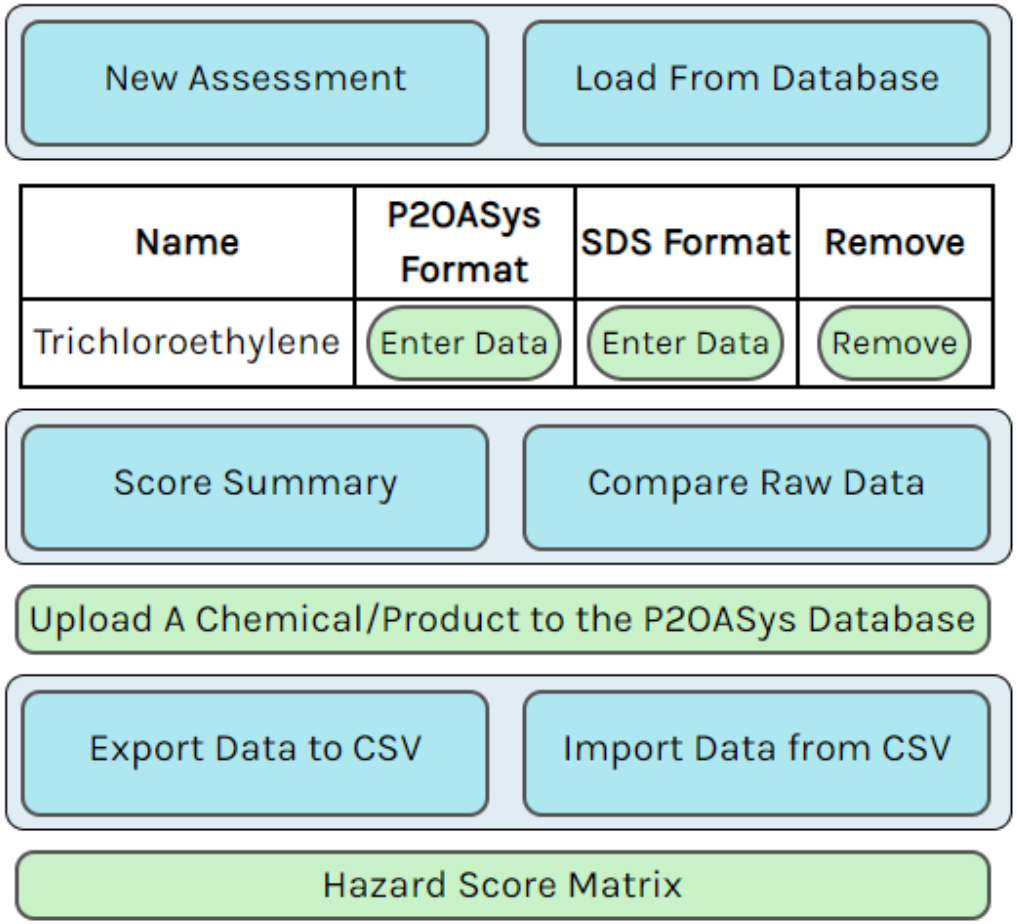
Looking for Chemicals/Products



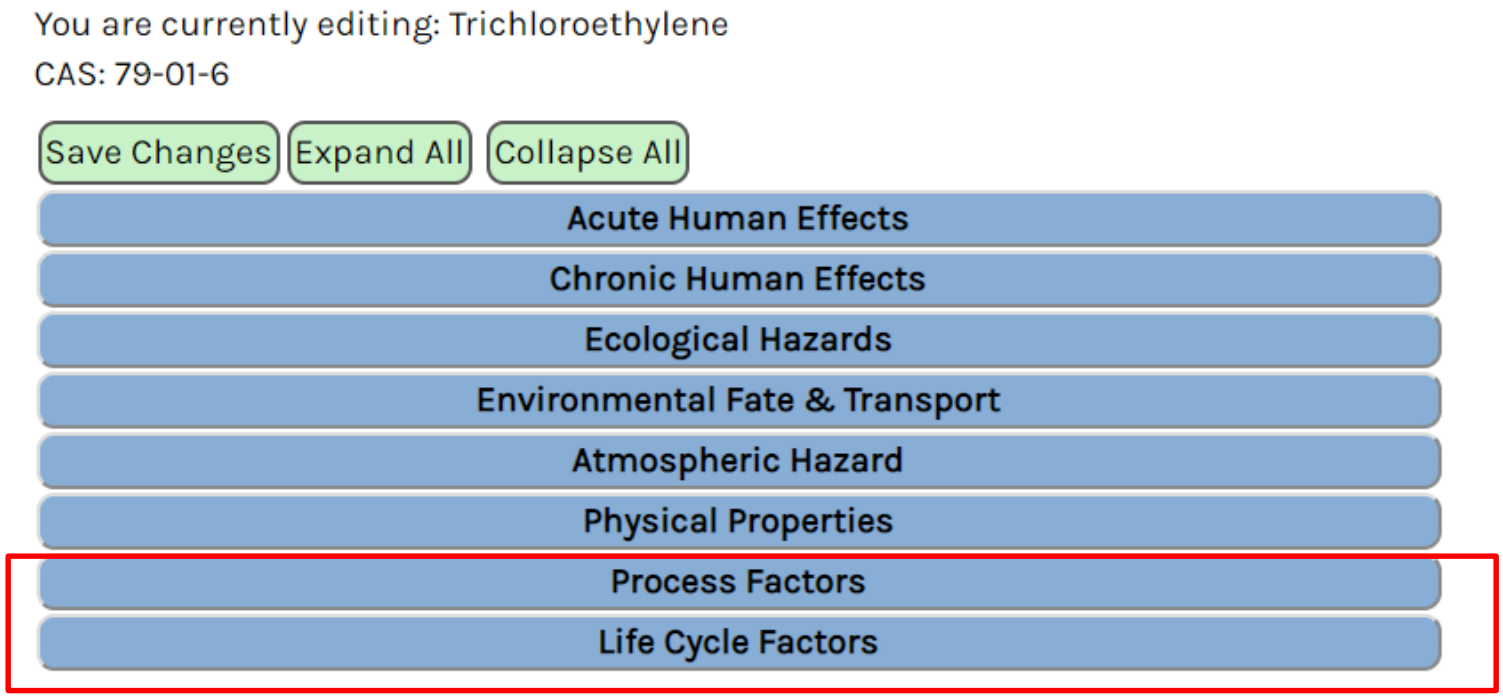
Add	Index	Name	CAS	Score	Entries	Date Created	Reviewed	SDS Source	SDS Year
	711	Dow OS 10		6.4	56	2019-01-28	Yes	Dow Corning	2016
	710	Safe Strip 5896		5.8	49	2019-01-28	Yes	Brulin Corp	2012
	695	Lenium GS		8.1	46	2019-01-24	Yes	Petroferm Inc	2004
	694	Ensolv		9.4	84	2018-01-29	Yes	Enviro Tech International	2005
	693	Lenium ES		8.1	46	2019-01-24	Yes	Petroferm Inc	2004
	567	Thiourea	62-56-6	6.8	58	2019-01-02	Yes	Sigma Aldrich	2017
	566	Mercury(II) chloride	7487-94-7	8.0	61	2019-01-02	Yes	Sigma Aldrich	2017
	565	DEHP	117-81-7	7.8	46	2019-01-02	Yes	Sigma Aldrich	2016

Welcome to the P2OASys Tool!

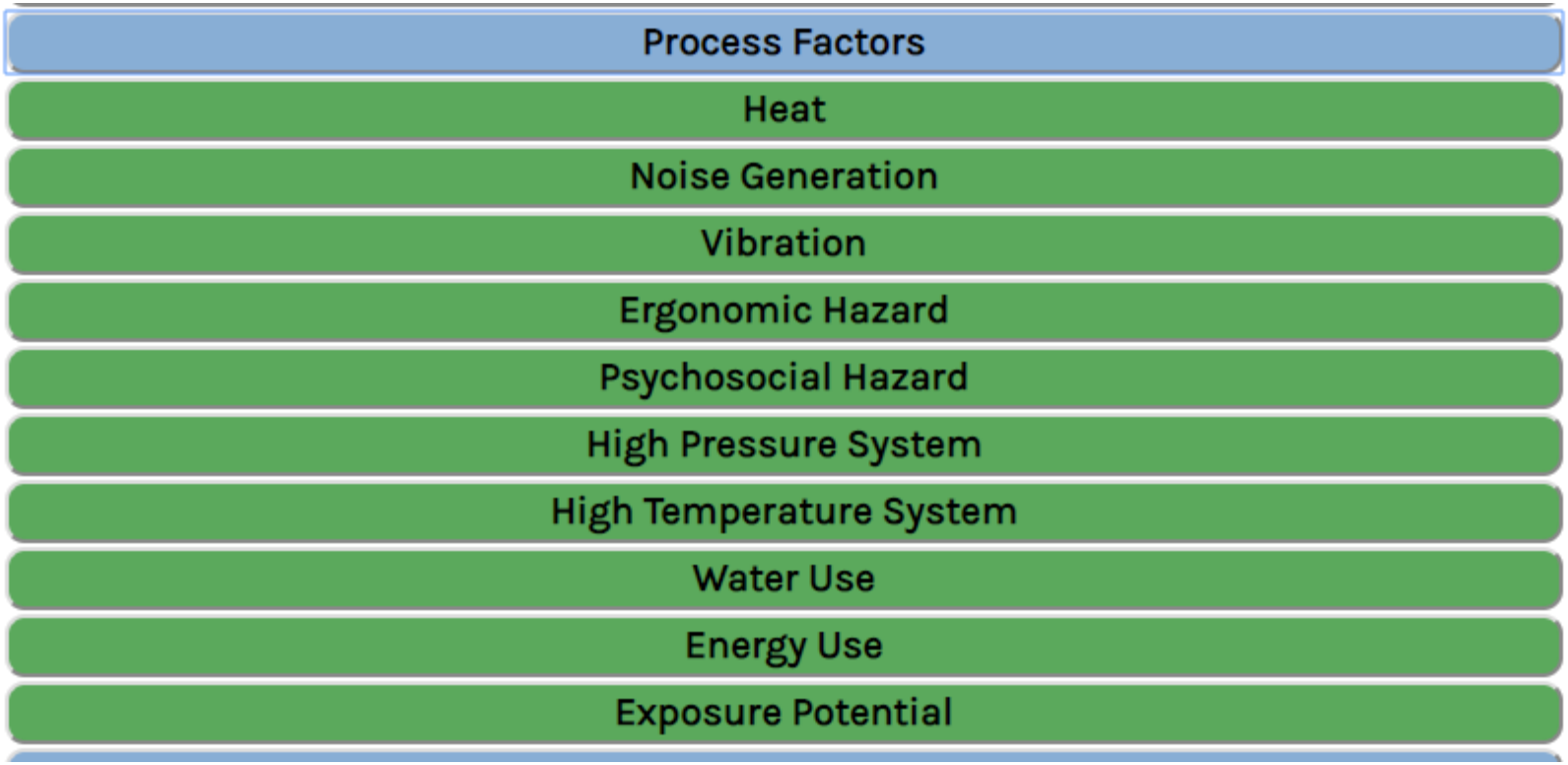
Information about P2OASys can be found on the TURI webpage here.



Process and Lifecycle Factors



Process Factors



Process Factors

Process Factors		
Heat		
Units	**Value**	**Score**
WBGT, deg C		
Noise Generation		
Units	**Value**	**Score**
dBA/hr		
Vibration		
Units	**Value**	**Score**
Class 1 Small Machine (mm/s)		
Class 2 Medium Machine (mm/s)		
Class 3 Large Rigid Foundation (mm/s)		
Class 4 Large Soft Foundation (mm/s)		
Ergonomic Hazard		
Units	**Value**	**Score**
Occurence	Possible	6
Hazard Level	Moderate injury, los	6

Process Factors Continued

Psychosocial Hazard

Units	Value	Score
Work Overload and Pace: Work Load		
Work Overload and Pace: Machine Pacing		
Work Overload and Pace: Time Constraints		
Work Schedule: Shift Work		
Work Schedule: Work Isolation	Process creates iso	8
Control	Process doesn't allc	8
Work Environment & Equipment: Equipment Stability		
Work Environment & Equipment: Work Space		

High Pressure System

Units	Value	Score
Pressure (Delta % Change From Ambient)	0.00	2

High Temperature System

Units	Value	Score
Temperature (Delta % Change From Ambient)	25.00	6

Water Use

Units	Value	Score
% Water Change		
Reuse		

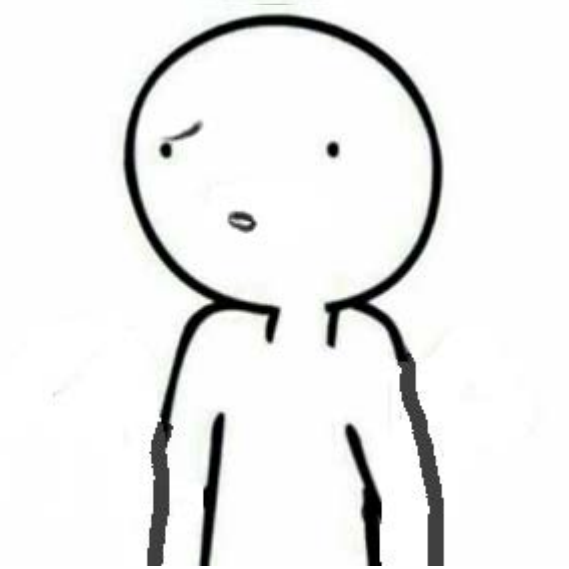
Process Factors Continued

Energy Use		
Units	**Value**	**Score**
% Energy Change		
% Renewable Energy		

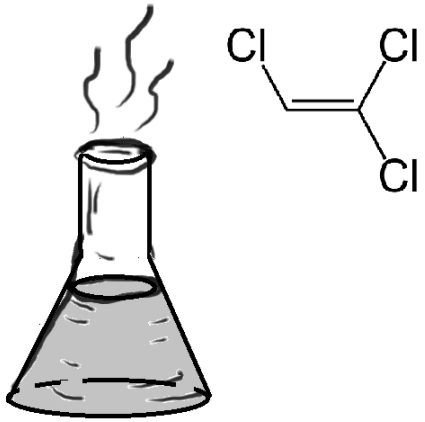
Exposure Potential		
Units	**Value**	**Score**
Occurence: Near Certain		
Occurence: Highly Likely		
Occurence: Likely	Critical hazard	6
Occurence: Unlikely		
Occurence: Remote		

But… It Looks Populated… Why Do I Need to Check It/Add Things?

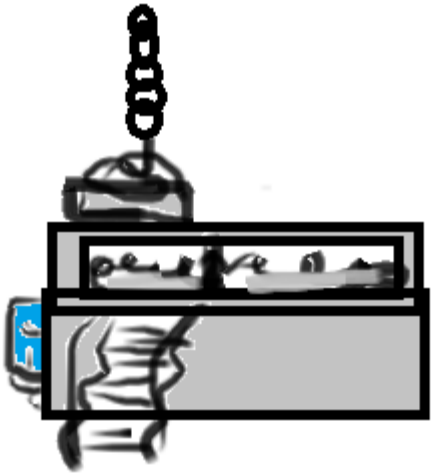
- Taken from a specific SDS
  - SDSs can differ slightly depending on date and timing of new information
- Some of the chemicals in the database have not been verified by the TURI lab
- **Your cleaning process is different than my cleaning process**

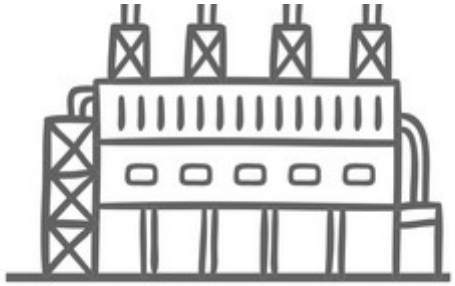


Same Chemical, Different Process

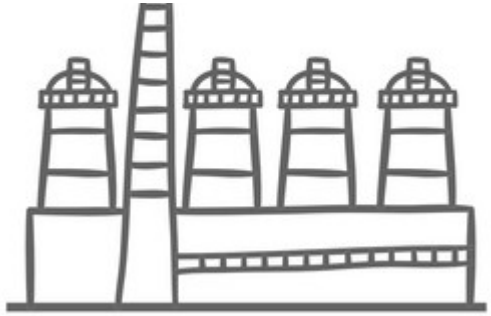


Company A

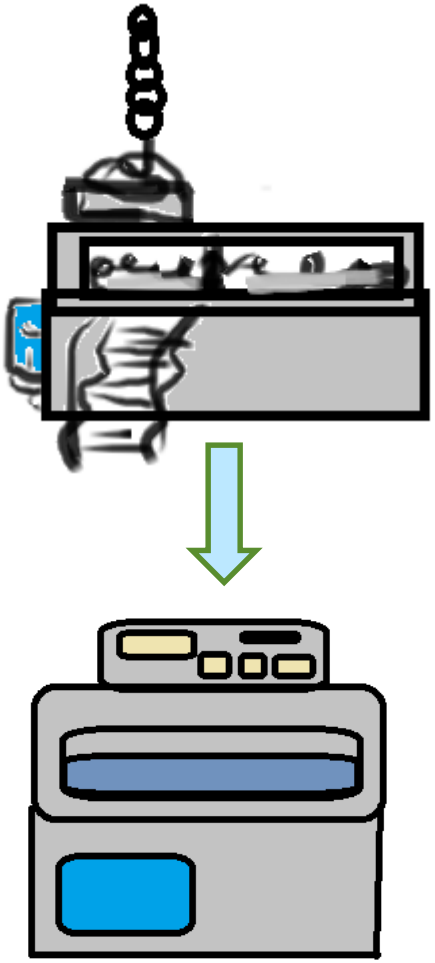




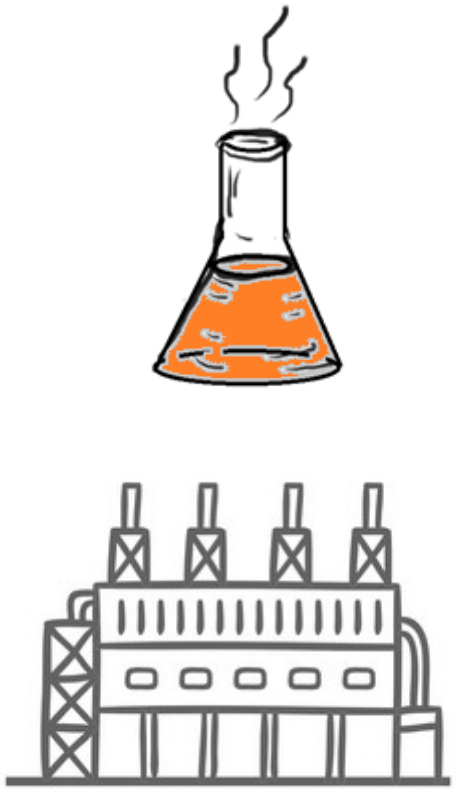
Company B



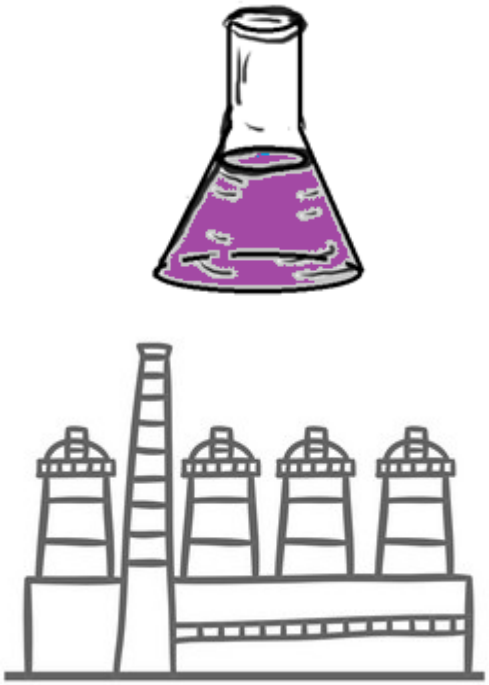
Evaluating Your Chemical and Process



Company A



Company B



Activity 2: Cleaning Process

Step 1: Go to p2oasys.turi.org

Step 2: Click on *"Load from Database"*

Step 3: Search for Trichloroethylene, click the box next to the first one, and click on *"Add to Session"*

Step 4: Repeat step 3 to add each identified alternatives from Activity 1

Step 5: Go Back to the main page and click on Score Summary

Welcome to the P2OASys Tool!

Information about P2OASys can be found on the TURI webpage here.

New Assessment | Load From Database

Name	P2OASys Format	SDS Format	Remove
Trichloroethylene	Enter Data	Enter Data	Remove
SC Aircraft and Metal Cleaner	Enter Data	Enter Data	Remove
Inproclean 3800	Enter Data	Enter Data	Remove
Aquavantage 1400 GD	Enter Data	Enter Data	Remove

Score Summary | Compare Raw Data

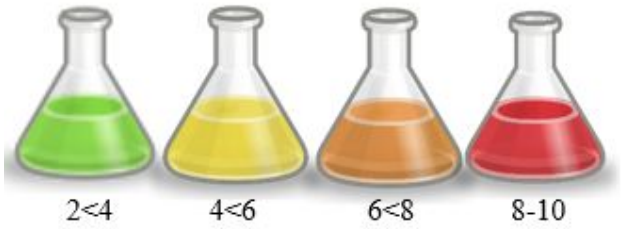
Upload A Chemical/Product to the P2OASys Database

Export Data to CSV | Import Data from CSV

Hazard Score Matrix

Categories	Trichloroethylene	SC Aircraft and Metal Cleaner	Inproclean 3800	Aquavantage 1400 GD	
Acute Human Effects	8	3	10	7	1
Chronic Human Effects	9	2	2	4	1
Ecological Hazards	8	4	4	6	1
Environmental Fate & Transport	9	4	6	8	1
Atmospheric Hazard	6	2	2	2	1
Physical Properties	10	7	8	8	1
Process Factors	7	4	6	3	1
Life Cycle Factors	10	2	7	6	1
Product Score	8.4	3.5	5.6	5.5	
Final Score	8.4	3.5	5.6	5.5	

Recalculate Weight Reset

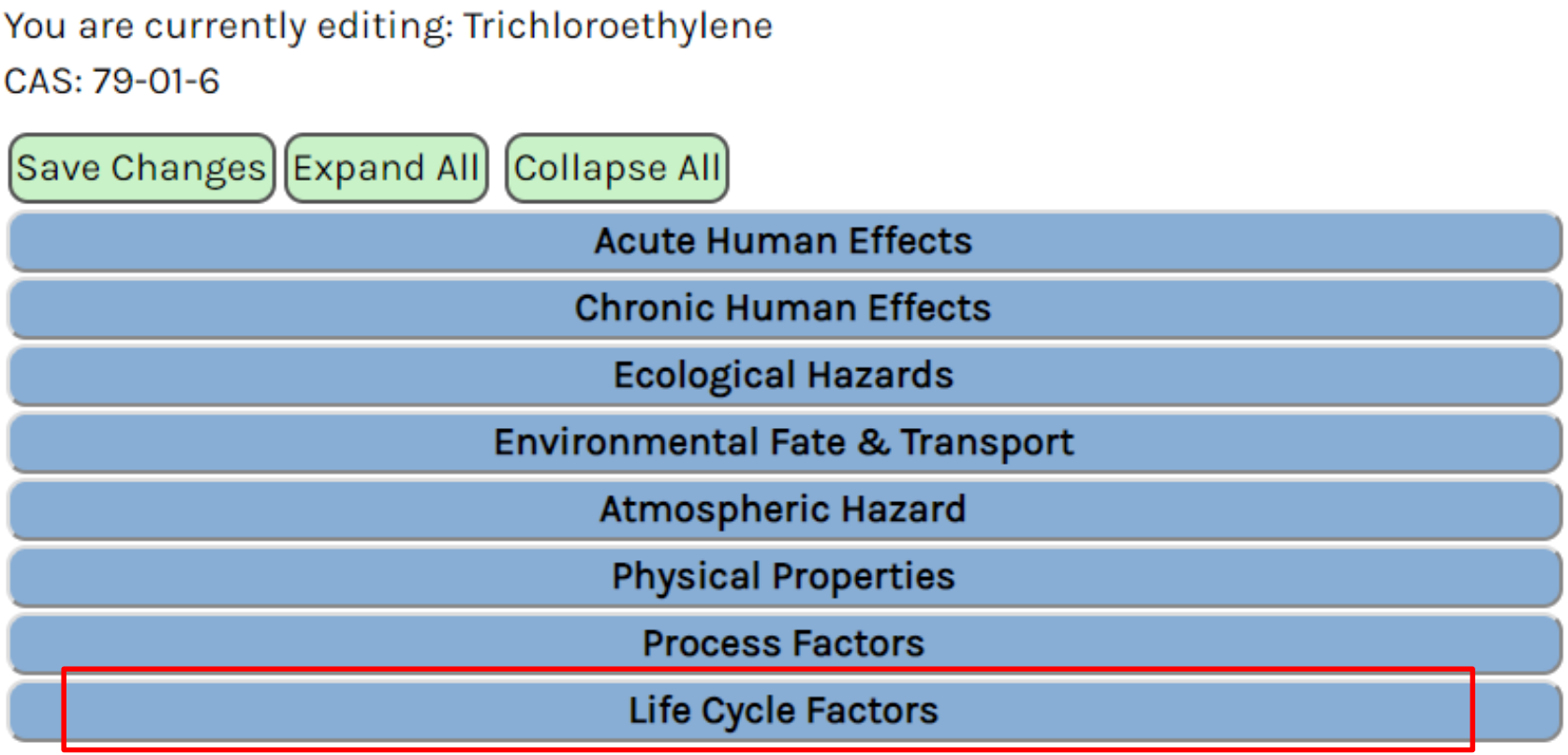


Step 6: Use the information given to fill out some of the endpoints in the Process Factors section

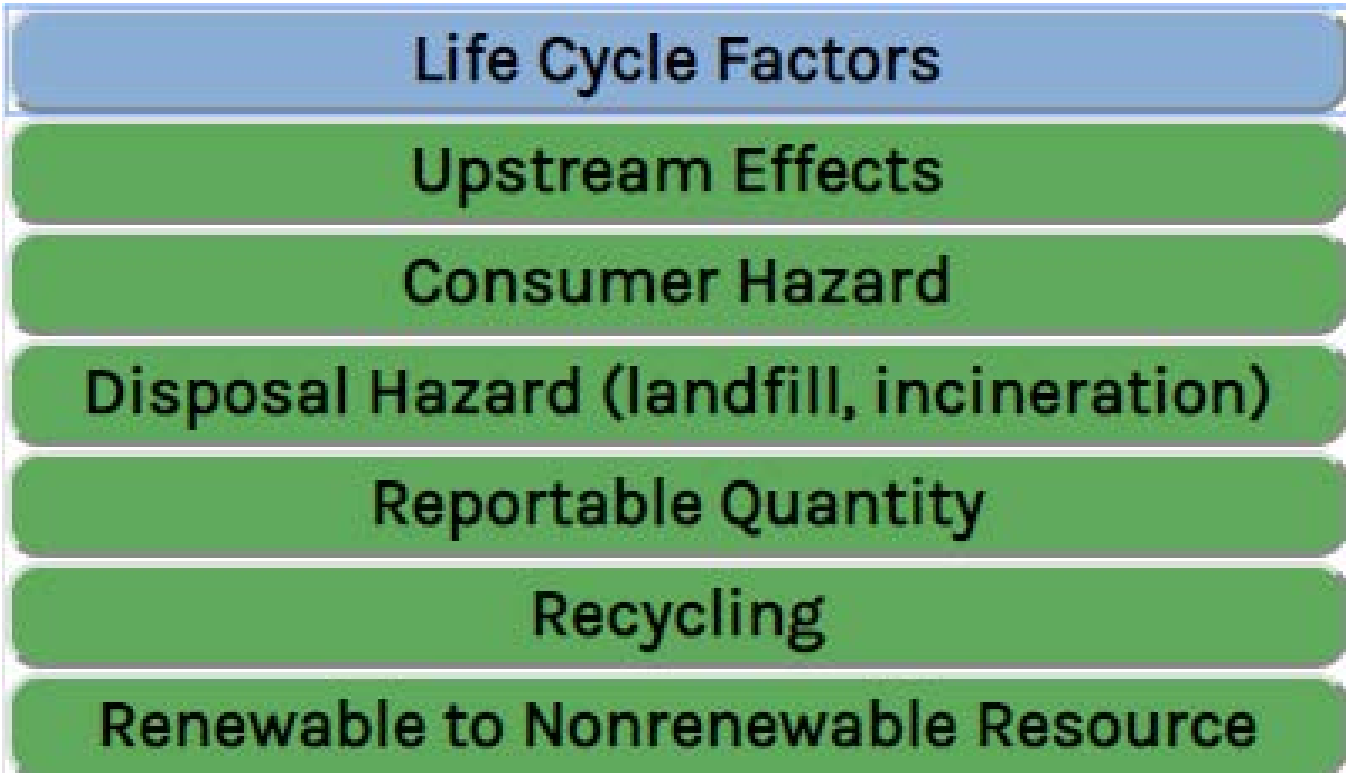
Chemical / Product	Method	Temp (F)	Dilution with Water	Rinse Step	Automated?
Trichloroethylene	Vapor Degreasing	180 F	0	No	No
SC Aircraft & Metal Cleaner	Immersion	68 F	0	No	Yes
Inproclean 3800	Heated Ultrasonics	130 F	10% dilution	No	No
Aquavantage 1400	Ultrasonics	68 F	10% Dilution	Yes	No

Section 7: Create a list of resources you would use to fill out the rest of the information.

Life Cycle Factors



Life Cycle Factors Continued



Life Cycle Factors

Upstream Effects

Units	Value	Score
Key Phrases		

Consumer Hazard

Units	Value	Score
Key Phrases		

Disposal Hazard (landfill, incineration)

Units	Value	Score
Key Phrases		

Reportable Quantity

Units	Value	Score
Pounds		

Recycling

Units	Value	Score
% Recyclable at End of Life		
Uses Products With % Recycled Material		

Renewable to Nonrenewable Resource

Units	Value	Score
% Renewable Materials		
Key Words		

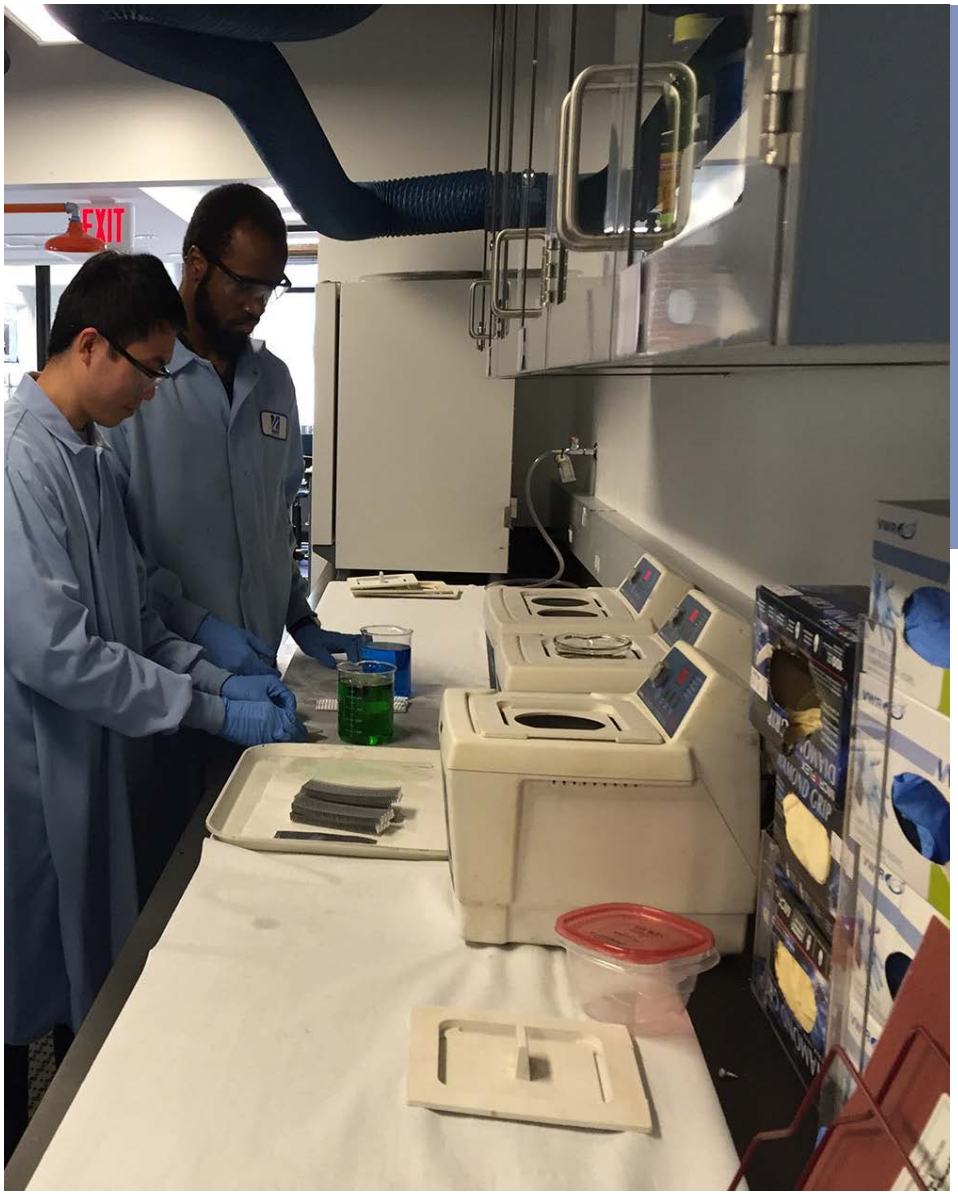
Activity 3

Step 1: Go back into the P2OASys Format for each chemical and fill out (to the best of your knowledge) the endpoints based on professional judgement.

Step 2: Create a list of resources where you may be able to get that information

Wrapping Up

- Cleanersolutions.org can be a great starting point
  - Request testing for chemicals not in database
- P2OASys is a great tool to organize your options and review the pros and cons of each alternative you are considering
- Resources available through TURI
  - http://guides.turi.org/beyondmsds
  - Alternative Assessments – byproducts
  - Alternative laboratory testing



Toxics Use Reduction Institute

www.turi.org

978-934-3275

The Offices at Boott Mills West
126 John Street, Suite 14
Lowell, MA 01852

Alicia McCarthy,
Laboratory Specialist
Alicia_McCarthy@uml.edu
978-934-3889

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