REMOVAL OF ORGANIC POLLUTANTS AND WARFARE AGENTS UTILIZING SURFACE MODIFIED FILTRATION DEVICES

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What is MYCELX ?

- A “Curable Polymeric Surface Modification”
  - Composition Patents: 5,437,793 and 5,746,925
  - **Chemical Abstract Services (CAS) #173967-80-1 and #173967-81-2**

- The reaction product of several natural drying oils, glycerides and isobutyl methacrylate

- MYCELX cross-links during the curing process (permanently infusing into the desired substrate)

- MYCELX-infused substrates are extremely “Hydrophobic” & “Oleophilic”

UNIQUE PROPERTIES OF MYCELX CHEMISTRY

- Permanent bonding into the substrate
- Full transfer of properties upon binding
- Affinity-ability to bind disparate phases of organic compounds
- Fixed footprint
- Low generated pressure differential to filter saturation
- Ability to handle concentrated slugs without clogging

MYCELX Cartridge Saturation (New vs. 50%)

KEY ORGANIC COMPOUNDS CAPTURED BY SURFACE MODIFIED FILTRATION DEVICES

- **Aromatic Hydrocarbons - BTEX**
- **Cycloalkanes**
- **Crude, Fuels, Lubes Oils, Transformer Oils, Vegetable Oils**
- **Complex Organics, Monomers & Polymers**
- **POPs (i.e., PCB's, Dioxin, Pesticides)**
- **Chlorinated Solvents (TCE/PCE)**
- **Phenolics**
- **MTBE**
- **Heavy Metals existing as Organ-Metallics**

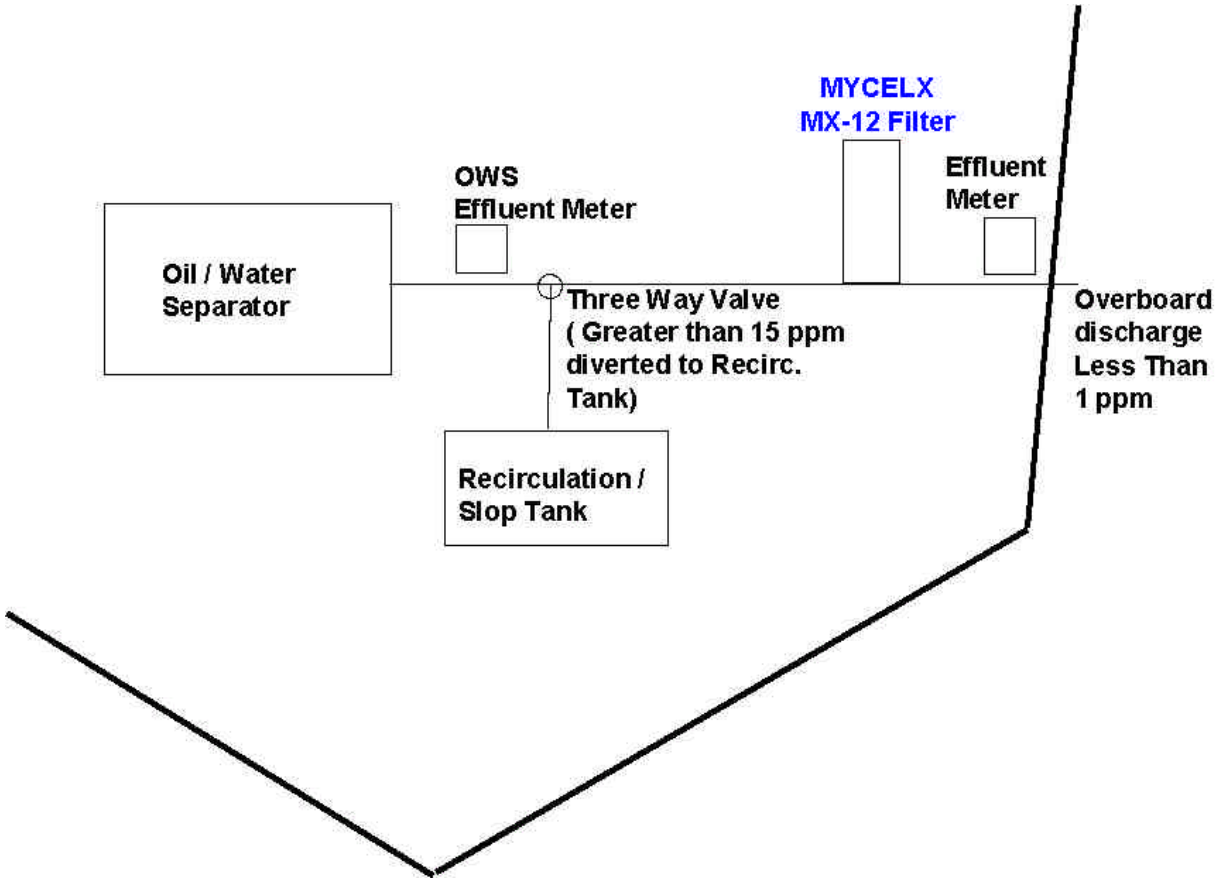
MARINE AND NAVAL BILGE WATER APPLICATION

MYCELX filters employed in treatment of Naval bilge water

MARINE AND NAVAL BILGE WATER APPLICATION

MYCELX filter removing emulsified oil from discharge water on oil drilling ship.

SCHEMATIC OF MYCELX UNIT DEPLOYMENT ON CRUISE SHIP



PROTECTION OF CROSS FLOW MEMBRANE FILTRATION DEVICES

MYCELX unit protecting Reverse Osmosis unit from organic fouling

PCB REMEDIATION AT SUPERFUND SITE

UNDERGROUND UTILITY –PCB & OIL MANHOLE EFFLUENT

Sample Date	6/22/00	Volume	PCB 1061 ug/l	Fluoride mg/l	TPH mg/l	O&G mg/l	Tot Pb mg/l	Tot Cu mg/l
Effluent			1.0	0.24	5.00	5.00	0.013	0.01
Manhole Influent		6000	1.0	0.31	7.31	5.00	0.1	0.011
Manhole Influent	2	6000	1.0	0.28	218	222	0.00065	0.01
Manhole Influent	7	6000	1.0	0.23	20	5.00	22	0.27
Manhole Influent	19	6000	40	0.0	139	141	1.2	0.084
Manhole Influent	33	6000	0	0.0	128	108	150	3.3
Manhole Influent	46	6000	1.0	0.01	2140	141000	31	1.8
Manhole Influent	49	6000	0	0.0	103	93	0.077	0.016
Manhole Influent	34	6000	1.0	0.18	8.5	5.00	0.013	87
Avg Influent			56.85	0.130	367.851	17698.000	33.050	11.563
Max Influent			950.0	0.310	2140.000	141000.000	150.000	87.000
Min Influent			1.0	0.010	5.000	5.000	0.007	0.010
Avg			0.123077	1.846154	0.013592	0.0002825	0.000575	0.000865
Avg = Differential			7.1	-0.11	362.9	17693.0	33.0	11.6

Removal of BTEX and MTBE from Contaminated Surface Water (ppm)

Sample ID	MTBE	Benzene	Toluene	Ethyl benzene	Xylene*
Inlet #1 **	87	2.0	12	3.8	24
Discharge #1	0.18	0.004	0.016	0.002	0.012
Knockdown #1	99.8%	99.8%	99.9%	99.9%	99.9%

Sample ID	MTBE	Benzene	Toluene	Ethyl benzene	Xylene*
Inlet #2	17	0.92	3.2	0.48	2.6
Discharge #2	0.21	0.034	0.14	0.030	0.14
Knockdown #2	98.7%	96.3%	95.6%	94%	95%

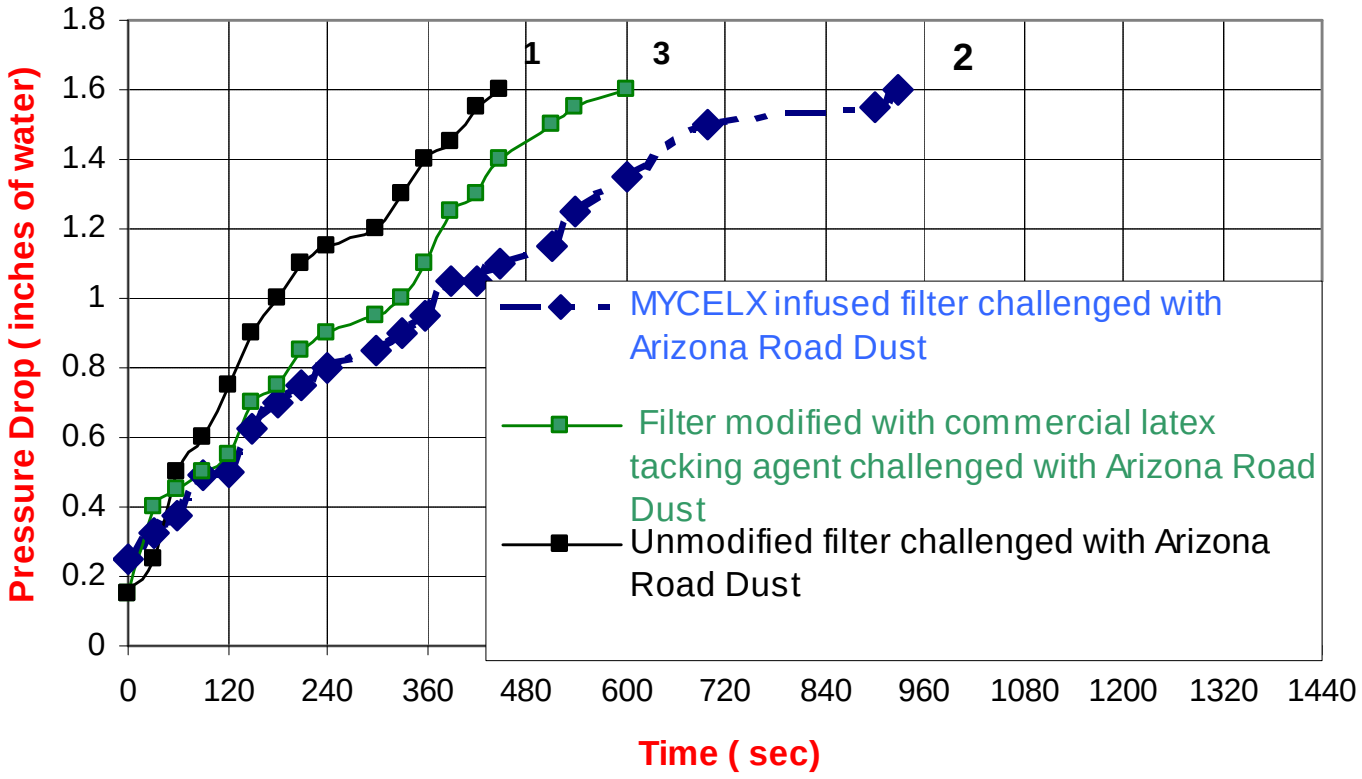
***Average of all Isomers**

****USEPA Method 8020 – Volatile Aromatic Hydrocarbons**

FILTRATION OF AIRBORNE ORGANIC POLLUTANTS

Comparison of Pressure Drop and Dust absorption characteristics

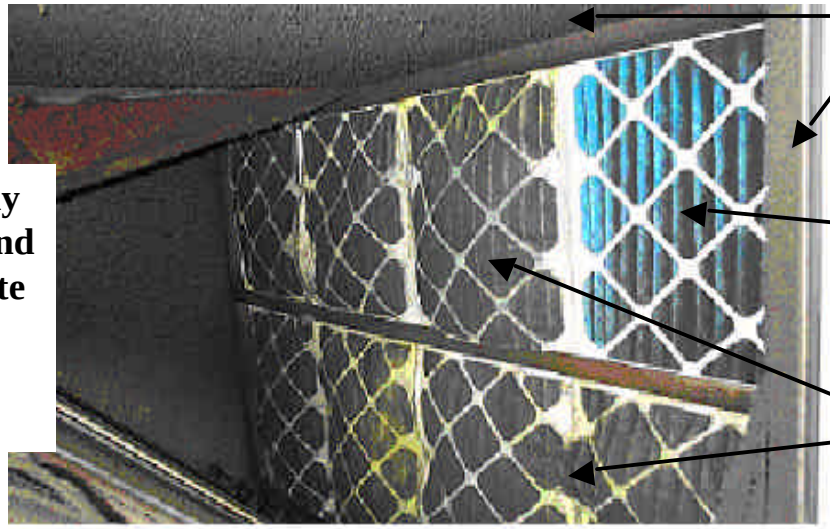
Arizona Road Dust (1-10 micron)



COMPARISON OF DUST HOLDING CAPACITIES TO A CONSTANT PRESSURE DROP

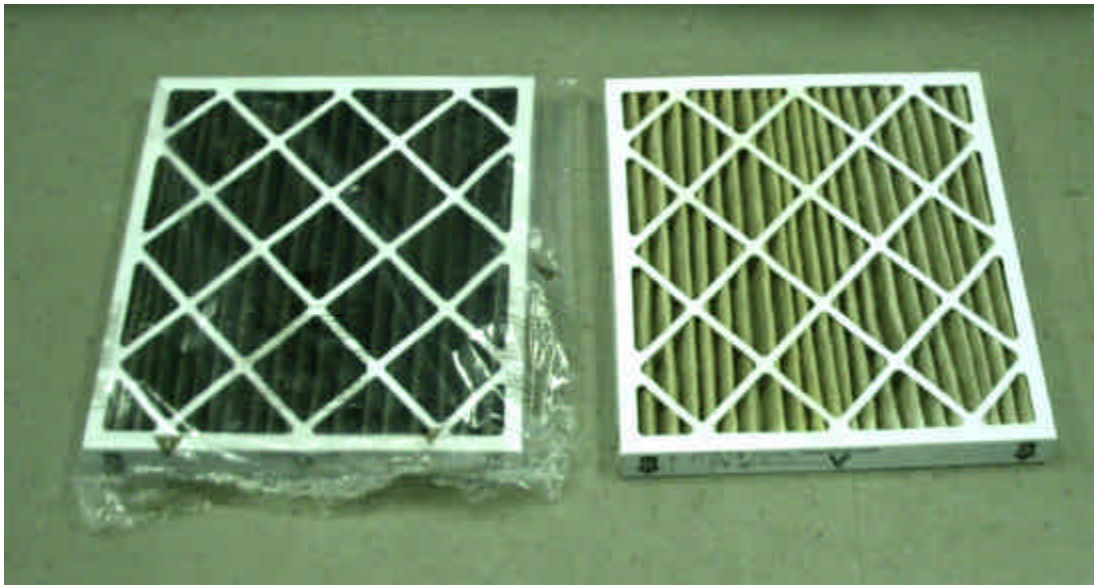
Challenged with Arizona Road dust alone	Arrestance %	Dust holding capacity (grams)
1.Unmodified filter	37.26	14.16
2.MYCELX infused filter	62.75	50.09
3.Filter modified with commercial tackifier	33.72	16.89

FILTRATION OF OILY AEROSOLS



Collection of microfine particulates by surface modified filters in mixed oily aerosol air stream

PURIFICATION OF AIR IN HOSPITALS



Picture showing the difference between new and used filter utilized to purify incoming air at SLOAN KETTERING Cancer Research Center. Filter has turned black due to Diesel soot emissions from city buses which stop near air intake.

CONCLUSIONS

- **Incorporation of emerging technologies with filter technology is making it possible for filter media to perform to more rigorous emergent regulations.**
- **Surface modification of filtration devices with MYCELX renders it amenable to fulfilling outstanding requirements in military, industrial and medical applications**
- **Surface modified filtration devices are highly efficient with no re-entrainment or re-release of contaminants.**
- **Provide the "safety margin" to meet stricter environmental discharge requirements.**
- **Protect expensive technologies from mixed particulates/oily influent.**
- **Non-toxic and Approved by EPA and California Fish & Game Commission for Pollution Remediation. Easily & inexpensively disposed (No Residual Water).**