CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2025
DateRun:	11/07/2025
Experimenters:	Amelia Wagner
ClientType:	Lab
ProjectNumber:	Project #17
Substrates:	
PartType:	Coupon
Contaminants:	Oil
Cleaning Methods:	Immersion/Soak
Analytical Methods:	HSPiP
Purpose:	HSPiP testing to determine the dissolution criteria of the target soil of Mobil DTE Oil Medium and subsequently identify potential alternative solvents to Methylene Chloride. Dexmet Corp - CT

Experimental Procedure:

Hansen Solubility Parameters in Practice (HSPiP) was employed for this alternatives assessment process. A soil immersion test was performed to identify the HSP parameters of the target soil; Mobil DTE Oil Medium. 1 ml of Mobil DTE Oil Medium was added to each of 24 10 ml vials consisting of the 24 panel solvents. The full list of solvents is available in the results section. These scintillation vials were then placed on a vial roller for the purposes of mechanical agitation.

Dissolution was evaluated by two criteria: first, if the oil was able to be emulsified within the solvent and secondly, if the clearness and colorlessness of the solvent was maintained. If the soil was not visually identifiable in the vial based on color, shape, particulate, present oil slick appearance, or filming, the soil was then considered satisfactorily dissolved.

Once the HSP parameters of the soil were identified, alternative solvents were chosen based on having similar HSP parameters supporting the likelihood of effective dissolution of the Mobil DTE Oil Medium.

Results:

Table 1 lists the dissolution results of each of the 24 panel solvents. The dissolution criteria was 0=less than 90% dissolution and 1=dissolution greater than 90%.

Solvent	CAS	Dissolution
Toluene	108-88-3	**1**
Dimethyl Carbonate	616-38-6	0
Xylenes	108-38-3	**1**
Benzyl Alcohol	100-51-6	0
Ethylene Glycol	107-21-1	0
Methyl Acetate	79-20-9	0
Undecane	1120-21-4	**1**
Ethyl Lactate	97-64-3	0
Acetone	67-64-1	0
Ethyl Acetate	141-78-6	**1**
Methanol	67-56-1	0
Ethanol	64-17-5	0
1,3-Dioxolane	646-06-0	0
Diethyl Carbonate	105-58-8	0
1-Propanol	71-23-8	**1**
Isopropanol	67-63-0	0
Propylene Carbonate	108-32-7	0
Thiophene	110-02-1	**1**
1-Methoxy-2-Propanol	107-98-2	0
Dimethyl Sulfoxide	67-68-5	0
1-Butanol	71-36-3	**1**
Dimethyl Glutarate	119-40-0	**1**
Anisole	100-66-3	**1**
2-Butoxyethyl-Acetate	112-07-2	**1**

Table 2 shows the HSP values of the target soil, Mobil DTE Oil Medium, determined in the HSPiP analysis.

	Target_dD	Target_dP	Target_dH
	15.8	0.2	8.7

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Mobil DTE Oil Medium			

Table 3 lists the alternative solvents identified that are likely to have the ability to fully dissolve Mobil DTE Oil Medium.

Solvent	CAS	_dD	_dP	_dH
Tert-Pentyl-Alcohol	75-85-4	15.61	5.04	9.76
3_Pentanol	584-02-1	15.73	5.56	11.18
(R)-(-)-2-Butanol	14898-79-4	15.65	5.76	12.29
(S)-(+)-2-Butanol	4221-99-2	15.65	5.76	12.29
2-Butanol (Racemic)	15892-23-6	15.65	5.76	12.29
3-Methyl-2-Butanol	598-75-4	15.62	5.12	10.49
Methyl Isopropenyl Ketone	814-78-8	15.95	6.85	4.78
3-Hexanone	589-38-8	15.74	6.68	4.08
Pyridine	110-86-1	18.89	7.53	6.85
3,3-Dimethoxy-1-Propene	6044-68-4	15.44	5.11	4.64
Isobutyl Acetate	110-19-0	15.58	4.47	5.59

Summary:

Conclusion:

Next Steps:

Benchmark performance testing of the identified solvents in removing Mobil DTE Oi Medium from provided sample parts of various substrates.