CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2026
DateRun:	02/23/2026
Experimenters:	Amelia Wagner
ClientType:	Manufacturers of Surgical Tools and Equipments
ProjectNumber:	Project #1
Substrates:	Stainless Steel, Titanium, Zirconium
PartType:	Coupon
Contaminants:	Oil
Cleaning Methods:	Ultrasonics
Analytical Methods:	Gravimetric
Purpose:	To test the efficacy of alternative solvents to Hexane in removing machining oil from sample parts using ultrasonics.
Experimental Procedure:	Three sample parts of each part type were grouped together and assigned to one of each solvent to be cleaned. The three sample parts of each part type were weighed together using a gravimetric balance and had their initial weights recorded. Each sample part was then immersed in the provided Swisscut Ortho NF-X US 24 Machining Oil for 2 minutes. During the 2-minute immersion in the oil, the parts were inverted twice to aid in the filling of blind holes and complex thread geometry. The parts were then removed and re-weighed in their groups of three to have their dirty weights recorded. The parts were then subjected to 5 minutes of unheated ultrasonics cleaning in their respective solvents. Once removed from ultrasonics immersion, the groups of parts were allowed to air dry for 1 minute. After air drying, the groups of parts were weighed and had their final weights recorded.

Results:

Cleaner	Substrate	Initial wt of cont.	Final wt of cont.	%Cont Removed	% AVG
Acetone	BLX	0.1648	0.0002	99.88	97.40
	BLT-NC	0.1064	0.0001	99.91	
	TLX	0.1354	0.0055	95.94	
	BLC-WB	0.1408	0.0042	97.02	
	Variobase	0.0838	0.0017	97.97	
	Basel Screw	0.0568	0.0012	97.89	
	Analog	0.1081	0.0094	91.30	
	Sterile Nealing	0.0694	0.0005	99.28	
Methylal	BLX	0.1082	0.0000	100.00	99.46
	BLT-NC	0.0534	0.0000	100.00	
	TLX	0.0646	0.0000	100.00	
	BLC-WB	0.0695	0.0008	98.85	
	Variobase	0.0521	0.0004	99.23	
	Basel Screw	0.0124	0.0000	100.00	
	Analog	0.0683	0.0005	99.27	
	Sterile Nealing	0.0533	0.0009	98.31	
Ethyl Acetate	BLX	0.0961	0.0076	92.09	93.05
	BLT-NC	0.0683	0.0106	84.48	
	TLX	0.1080	0.0066	93.89	
	BLC-WB	0.1168	0.0044	96.23	
	Variobase	0.0831	0.0003	99.64	
	Basel Screw	0.0262	0.0001	99.62	
	Analog	0.0803	0.0052	93.52	
	Sterile Nealing	0.0212	0.0032	84.91	
Methyl Acetate	BLX	0.1709	0.0044	97.43	95.50
	BLT-NC	0.1341	0.0022	98.40	

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TLX	0.1486	0.0150	89.91
BLC-WB	0.1565	0.0179	88.56
Variobase	0.0761	0.0012	98.42
Basel Screw	0.0432	0.0009	97.92
Analog	0.1147	0.0067	94.16
Sterile Nealing	0.0644	0.0005	99.22

Noticeable residue left behind on some parts cleaned with Ethyl Acetate

Ethyl Acetate took slightly longer to fully evaporate from the surface of the parts than the other solvents.

Summary:

Substrates:	Stainless Steel, Titanium, Zirconium
Contaminants:	Oil

Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Fisher Scientific	Acetone (CAS: 67-64-1)	98%	97.40	☑	
Acros Organic	Dimethoxymethane (Methylal)	98%	99.46	☑	
Alfa Aesar	Ethyl Acetate	98%	93.05	☑	BLT-NC= 84.48% Sterile Nealing=84.91%
Alfa Aesar	Methyl Acetate	98%	95.50	☑	TLX=89.91% BLC-WB=88.56%

Conclusion:

Acetone and Methylal are both highly effective solvents in removing machining oil from the provided sample parts. The efficacy of Acetone ranged from 91%-99.91% while the efficacy of Methylal ranged from 98.31-100% showing that Methylal performed with more consistency than Acetone.