

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1999  
 DateRun: 02/17/1999  
 Experimenters: Jason Marshall  
 ClientType: Bolt, Screw & Nut Manufacturer  
 ProjectNumber: Project #1  
 Substrates: Alloys, Nickel  
 PartType: Coupon  
 Contaminants: Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil  
 Cleaning Methods: Low Pressure Spray  
 Analytical Methods: Gravimetric

Purpose: To further evaluate three aqueous cleaners in conjunction with spray washing.

Experimental Procedure: Five percent solutions were made of the three successful cleaning chemistries from the previous test. A 12-liter solution was required for operation of the Miele Automatic G7735 Spay Wash Unit. The solutions were heated to 140 F on hot plates. Twenty-one preweighed coupons were contaminated as described above. After recording contaminated weights, seven coupons were clipped onto the upper tray of the Miele Unit. After five minutes of cleaning, the coupons were rinsed in tap water at 120 F for 30 seconds and dried using a Master Appliance Corp, Hot-air gun model HG-301A at 500 F for one minute. Once the coupons returned to room temperature, final weights were recorded and cleaning efficiencies were calculated.

SUBSTRATE MATERIAL: Nickel Alloy - M400  
 CONTAMINANTS: Machine Lubricating oil S-50 (CAS#s: 64742-54-7, 64742-57-0), Die coolant oil W-373 (CAS#s: 64741-44-2, 64742-53-6, 64742-52-5)  
 CONTAMINATING PROCESS USED: Coupons were coated with the oils using a hand held swab and then placed in an oven at 160 F for one hour. Coupons were cooled to room temperature before reweighing.

Results: All three cleaners tested excellent removal of the two oils from the coupons. All yielded efficiencies in the upper 90's. The EMKAY product did have a slight problem with foaming, which may have reduced the effectiveness of the contaminant removal. Temperature adjustment could eliminate the excess foaming. Table 1 lists the calculated cleaning efficiencies for each product tested.

Cleaner	790 P	6333	Safety Wash
Coupon 1	99.61	100	97.94
Coupon 2	98.63	99.86	98.61
Coupon 3	99.92	99.6	97.29
Coupon 4	99.83	100	96.31
Coupon 5	99.13	100.1	96.86
Coupon 6	100.1	99.96	96.91
Coupon 7	100.1	99.81	97.54
Ave	99.62	99.9	97.35
Std Dev	0.6	0.2	0.8

Summary:

<b>Substrates:</b>	Alloys, Nickel				
<b>Contaminants:</b>	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil				
<b>Company Name:</b>	<b>Product Name:</b>	<b>Conc.:</b>	<b>Efficiency:</b>	<b>Effective:</b>	<b>Observations:</b>
US Polychem Corporation	Polyspray Jet 790 P	5	99.62	<input checked="" type="checkbox"/>	
Ardrox Inc	6333	5	99.90	<input checked="" type="checkbox"/>	
Emkay Chemical Company	Safety Wash Clear	5	97.35	<input checked="" type="checkbox"/>	

Conclusion: EMKAY, US Polychem and Ardrox all removed 97% or better of the two oils. Since the EMKAY product had foaming problems and a lower cleaning efficiency, it will not be tested in the next experiment. The other two cleaners, US Polychem 790 P and Ardrox 6333, will be used in the cleaning of the supplied parts using the spray wash unit.