



IPC-CH-65B

Guidelines for Cleaning of Printed Boards and Assemblies

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Users of this publication are encouraged to participate in the
development of future revisions.

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Table of Contents

1 OVERVIEW	1	2.3 Other	6
1.1 Scope	1	2.3.1 American Standards for Testing Materials	6
1.2 Purpose	1	2.3.2 Standard Specification of Materials	7
1.3 Background	1	2.3.3 National Fire Protection Association (NFPA)	7
1.4 Current and Emerging Cleaning-Related Challenges	1	2.3.4 American National Standards Institute (ANSI), American Society for Quality Control (ASQC)	7
1.5 Document Chapters	1	2.4 Other Considerations	7
1.5.1 Section 2: Applicable Documents	1	2.4.1 ISO Standards	7
1.5.2 Section 3: Assembly Cleaning Value and Applicability	2	2.4.2 REACH	7
1.5.3 Section 4: Designing Assemblies for Cleaning	2	2.4.3 Cal/OSHA	7
1.5.4 Section 5: Materials Compatibility	2	2.4.4 FDA/EU cGMP	7
1.5.5 Section 6: Process Development and Verification	2	2.5 Terms and Definitions	7
1.5.6 Section 7: Contamination and Its Effects on PWBs	2	2.5.1 Solvent Cleaning	8
1.5.7 Section 8: Assembly Residues/Cleaning Considerations	3	2.5.2 Defluxing	8
1.5.8 Section 9: Environmental Considerations	3	2.6 Solvent Cleaning Steps	8
1.5.9 Section 10: Solvent Cleaning Agents	3	2.6.1 Wash or Washing	8
1.5.10 Section 11: Semi-Aqueous Cleaning Agents, Equipment, and Process Optimization	3	2.6.2 Rinse or Rinsing	8
1.5.11 Section 12: Aqueous Cleaning Agents, Equipment, and Process Integration	3	2.6.3 Drying	8
1.5.12 Section 13: Cleaning for Rework, Repair, and Restoration Operations	3	2.6.4 Solvent Cleaning Agent Recovery and Recycle	8
2 APPLICABLE DOCUMENTS	4	2.6.5 Solvent Agitation Methods	8
2.1 Industry Standards	4	2.6.6 Solvent Cleaning Agent Acronym Definitions	8
2.1.1 IPC Standards	4	2.7 Solvent Cleaning Process Definitions	9
2.1.2 Joint Industry Standards	5	2.7.1 Carbon Adsorption	9
2.1.3 Telcordia Technologies	5	2.7.2 Combustible	9
2.2 U.S. Federal Regulations	5	2.7.3 Co-solvent (Bi-solvent)	9
2.2.1 Federal Laws	5	2.7.4 Dragout	9
2.2.2 Federal Standards	5	2.7.5 Semi-Aqueous Cleaning	9
2.2.3 Department of Defense	5	2.8 Semi-Aqueous Cleaning Steps Definitions	9
2.2.4 Occupational Safety and Health Administration (OSHA)	6	2.8.1 Hydrocarbon-Surfactant (HCS, HC/S, HC-S) Cleaning	9
2.2.5 Environmental Protection Agency (EPA)	6	2.8.2 Wash or Washing	9
2.2.6 Department of Transportation	6	2.8.3 Emulsion or Emulsification	9
2.2.7 American Conference of Governmental Industrial Hygienists (ACGIH)	6	2.8.4 Rinse or Rinsing	9
2.2.8 National Institute of Occupational Safety and Health (NIOSH)	6	2.8.5 Dry or Drying	9
		2.8.6 Semi-Aqueous Cleaning Agent Acronym Definitions	10
		2.9 Semi-Aqueous Cleaning Process Definitions	10
		2.9.1 Carbon Adsorption	10
		2.9.2 Combustible	10
		2.9.3 Decanting	10

2.9.4	Dragout	10	3.6.6	Reliability Risks	21
2.9.5	Emulsion	10	4	DESIGNING ASSEMBLIES FOR CLEANING	23
2.9.6	Organic Solvent Emulsions in Aqueous Media	10	4.1	Design of Assemblies for Effective Cleaning	23
2.9.7	Water Softening	10	4.2	Design for Cleaning	23
2.10	Environmental Definitions	11	4.2.1	Substrate	23
2.10.1	BOD Biological Oxygen Demand	11	4.2.2	Assembly Components	24
2.10.2	COD Chemical Oxygen Demand	11	4.2.3	Assembly Contaminants	24
2.10.3	Volatile Organic Compounds (VOC)	11	4.2.4	Thermal Gradients	25
2.10.4	HAPs Hazardous Air Pollutants	11	4.3	Cleaning Agent Design Options	26
2.10.5	Global Warming	11	4.3.1	Solvent Cleaning Materials	26
2.11	Aqueous Cleaning	11	4.3.2	Semi-Aqueous Cleaning Materials	26
2.11.1	Aqueous Cleaning Steps Definitions	11	4.3.3	Aqueous Cleaning Materials	26
2.11.2	Aqueous Cleaning Agent Acronym Definitions	11	4.3.4	Cleaning Equipment Design Options	27
2.12	Other Definitions	12	4.3.5	Defining “An Optimized System”	28
2.12.1	Assembly	12	4.4	The $R_s + R_d$ Balance	28
2.12.2	Batch Cleaning	12	4.5	Environmental Factors	29
2.12.3	Fine Cleaning	12	5	MATERIALS COMPATIBILITY	30
2.12.4	In-Line Cleaning	12	5.1	Material Compatibility Considerations	30
2.12.5	Manual Cleaning	12	5.1.1	Cleaning Process Effectiveness	30
3	ASSEMBLY CLEANING VALUE AND APPLICABILITY	12	5.2	Reliability Considerations	30
3.1	Introduction	12	5.3	Material Compatibility Testing	30
3.2	Technology Innovation	12	5.3.1	Compatibility and Functionality	31
3.3	Process Residues and Their Impact on Product Reliability	13	5.3.2	Selecting Materials to be Tested for Compatibility	31
3.4	No Clean vs. Clean	14	5.3.3	Test Methods: Examples	32
3.4.1	Factors Involved with Implementing No Clean Technology	14	5.3.4	ASTM and Other Testing Standards	35
3.4.2	Cost Drivers	15	5.4	The Effects of Lead-Free on PCB Assembly	35
3.4.3	Selecting Materials for No Clean Product Design	15	5.4.1	PCB Fabrication	35
3.4.4	What are the Perceived No Clean Cost Benefits and Drivers?	15	5.4.2	Components	35
3.4.5	What are the No-Clean Cost Drivers?	15	5.4.3	Board and Component Finishes	36
3.5	What are the Costs of Cleaning?	16	5.4.4	Assembly Materials	36
3.5.1	Cost per Cleaned Part	16	5.4.5	Assembly Equipment	36
3.5.2	Cost Modeling	16	5.5	Design Issues and Compatibility	36
3.6	What are the Costs of Ignoring Cleanliness?	20	5.5.1	The Effects of Miniaturization	37
3.6.1	Lead Free Soldering	20	5.5.2	Density of Components	37
3.6.2	Miniaturization	20	5.5.3	Specific Compatibility Examples	37
3.6.3	Flux Changes	21	5.5.4	Black Oxide	39
3.6.4	Electrical Failure Mechanisms	21	5.5.5	Inductor Coil Attack	40
3.6.5	Electrochemical Migration	21	5.5.6	Solder Masks	40
			5.5.7	Flex Circuits	41
			5.5.8	Solder Joint Attack	41
			5.5.9	Part Marking/Labels	42
			5.5.10	Adhesives	42

5.5.11	Conformal Coating Adhesion	42	6.7.8	Periodic Product Qualification	58
6	PROCESS DEVELOPMENT AND VERIFICATION	43	6.7.9	Quality Information	58
6.1	Introduction	43	6.7.10	Field Performance Data	58
6.2	Phase 1 Tests	44	6.7.11	Process Monitoring	58
6.3	Phase 2 Tests and Considerations	45	6.7.12	Data Collection and Reporting	58
6.3.1	Phase 2 Test Vehicles	46	7	CONTAMINATION AND ITS EFFECTS ON PWBS	60
6.3.2	IPC-9202	49	7.1	Scope	60
6.3.3	IPC-9203	50	7.1.1	Purpose	60
6.4	Phase 3 Tests and Considerations	50	7.1.2	Background	60
6.5	Cleaning Process Qualification	51	7.2	Terms and Definitions (Items listed with an * are quoted from IPC-T-50)	60
6.5.1	Applicable Documents	51	7.2.1	*Anode	60
6.5.2	Initial Feasibility Assessment Phase 1	52	7.2.2	Anion	60
6.5.3	Material Analysis	52	7.2.3	*Bridging	60
6.5.4	Process Considerations	52	7.2.4	Cathode	60
6.5.5	Technical Business Assessment	53	7.2.5	Cation	60
6.5.6	Documentation of Process Plan	53	7.2.6	*Conductivity	60
6.5.7	Material and Process Testing Phase 2	53	7.2.7	*Conductor Spacing	60
6.5.8	Test Vehicles	53	7.2.8	Corrosion	60
6.5.9	Test Methods	54	7.2.9	*Corrosive Flux	60
6.5.10	Benchmark Testing Report	54	7.2.10	Creep Corrosion	60
6.6	Printed Board Assembly Evaluation Phase 3	54	7.2.11	*Dendritic Growth	61
6.6.1	Confirm Testing on Applicable Hardware Phase 3	54	7.2.12	Dendritic Migration	61
6.6.2	Confirm Cleaning on Most Challenging Assemblies Phase 3	54	7.2.13	Dipole	61
6.6.3	Develop and Document Process Range Phase 3	54	7.2.14	Dipole Moment	61
6.6.4	Material Compatibility Testing on Actual PWB Hardware Phase 3	54	7.2.15	Dissolution of Metallization	61
6.6.5	Verification	55	7.2.16	Electrochemical Migration	61
6.6.6	Visual Inspection	55	7.2.17	Electromigration (EM)	61
6.6.7	Mechanical	55	7.2.18	Flux	61
6.6.8	Chemical	55	7.2.19	*Flux Activity	61
6.6.9	Residue Analysis	56	7.2.20	Flux Residue	61
6.6.10	Functional Performance Testing	56	7.2.21	Galvanic Corrosion	61
6.6.11	Confirmation Run	56	7.2.22	Halide Content	61
6.7	Quality Program	56	7.2.23	*Inorganic Flux	61
6.7.1	Documentation of the Quality System	57	7.2.24	Ionic Cleanliness	61
6.7.2	Control of Procured Material	57	7.2.25	Ionic Contamination	61
6.7.3	Manufacturing Controls	58	7.2.26	*Leakage Current	62
6.7.4	Completed Item Inspection	58	7.2.27	*Metal Migration	62
6.7.5	Control of Nonconforming Materials	58	7.2.28	*Non-activated Flux	62
6.7.6	Corrective Action Program	58	7.2.29	*Nonionic Contaminant	62
6.7.7	Storage, Handling, and Packaging	58	7.2.30	Organic Contamination	62
			7.2.31	Organic Flux	62
			7.2.32	*Packaging Density	62

7.2.33	Polar Matter	62	8.3.20	Resin	76
7.2.34	Residue	62	8.3.21	Resin Flux	76
7.2.35	Short	62	8.3.22	Rosin	76
7.2.36	*Stand-Off	62	8.3.23	Rosin Flux	76
7.2.37	Whisker	62	8.3.24	Solder Ball	76
7.3	How Clean is Clean?	62	8.3.25	Temporary Solder Resist	76
7.3.1	A Discussion of “No Clean” Terminology and Flux History	63	8.3.26	Solvency	76
7.4	Ionic Residues	66	8.3.27	Reactants	76
7.4.1	Electrochemical Migration (ECM)	67	8.3.28	Stand-Off	76
7.4.2	Electromigration	71	8.3.29	Synthetic Resin	77
7.5	Creep Corrosion	71	8.3.30	Water Soluble Flux	77
7.5.1	Creep Corrosion and Miniaturization	71	8.4	Post Cleaning Residues	77
7.5.2	Creep Corrosion and PCB Board Finish	72	8.4.1	Rosin Based Fluxes	77
7.5.3	Creep Corrosion and Circuit Board Cleanliness	72	8.4.2	Water Soluble Fluxes	78
7.5.4	Locations Prone to Sulfide Creep	73	8.4.3	Synthetic Activated (more accurately ORH0 or ORH1) Fluxes	79
7.5.5	Corrosion Prevention Strategies	73	8.4.4	Low Solids (No-Clean) Fluxes	79
7.6	Tin Whiskers and Circuit Board Cleanliness	73	8.4.5	Lead-Free and Miniaturization Influences on Assembly Residues	79
7.7	Marine Corrosion	74	8.4.6	Solder Pastes	81
8	ASSEMBLY RESIDUES/CLEANING CONSIDERATIONS	75	8.4.7	Inorganic Acid Fluxes	81
8.1	Scope	75	8.4.8	Solder	82
8.2	Purpose	75	8.4.9	Wave Solder Pot Additives	82
8.3	Terms and Definitions	75	8.5	Other Residues	83
8.3.1	Acid Flux	75	8.5.1	Handling Soils	83
8.3.2	Activated Rosin Flux	75	8.5.2	Marking	83
8.3.3	Activator	75	8.5.3	Work Place and Ambient Storage Conditions	84
8.3.4	Adhesive	75	8.5.4	Component Packaging as a Source of Contamination	84
8.3.5	Adsorbed Contaminant	75	8.5.5	Temporary Solder Stops/Masks/Resists/ Tapes	84
8.3.6	Conductor Pitch	76	8.5.6	Lubricants and Greases	84
8.3.7	Conductor Spacing	76	8.5.7	Adhesives	85
8.3.8	Conformal Coating	76	8.6	Cleaning Considerations	85
8.3.9	Corrosive Flux	76	8.6.1	Visual Inspection Criteria	85
8.3.10	Depth from Board Surface to the Bottom side of a Component	76	8.6.2	Component Geometries	85
8.3.11	Dross	76	8.6.3	Standoff Height and its Influence on Cleaning	86
8.3.12	Flux	76	8.6.4	Trapped Fluids	86
8.3.13	Flux Residue	76	8.6.5	Component Issues and Residues	86
8.3.14	Leads on Surface Mount Components	76	8.6.6	Wetting of Surfaces	87
8.3.15	Non-activated Flux	76	8.6.7	Surface Tension and Capillary Force	87
8.3.16	Organic Flux	76	8.6.8	Filled vs. Un-Filled Gaps	87
8.3.17	Packaging Density	76	8.6.9	Flux Residue Variability	87
8.3.18	Paste Flux	76	8.6.10	Wash Chemistry Effects	88
8.3.19	Reflow Temperature	76			

8.7	White Residue Post Soldering	91	9.4.2	Spent Semi-Aqueous Cleaning Agent	110
8.7.1	White Residue Formation Mechanisms	91	9.5	Spill Reporting	111
8.8	Cleaning Process Controls	92	9.6	Superfund General	111
8.8.1	Process Variables	92	9.7	Toxic Release Inventory Reporting Requirements	111
8.8.2	Cleaning Agent	93	9.8	Health and SAFETY Issues	111
8.8.3	Setting Process Control Limits	93	9.8.1	Hazards and Controls	111
8.8.4	Avoiding Unwanted Material Effects	93	9.8.2	Materials Safety Data Sheets	112
8.9	Cleaning Equipment Considerations	93	9.8.3	Hazardous Materials Labeling Systems	112
8.9.1	Driving Forces Time, Temperature, Concentration, and Energy	93	9.8.4	Personnel Exposure	112
8.9.2	Static and Dynamic Cleaning Energy	93	9.8.5	Flammable Liquid Issues	113
8.9.3	Efficiency Improvements with Dynamic Energy	93	9.9	Water Resources and Quality	113
8.9.4	Excessive Energy	94	9.9.1	Measurement of Water Purity	113
8.10	Monitoring Wash Baths	94	9.9.2	Definitions	113
8.10.1	Titration	94	9.9.3	Water Purity Standards	114
8.10.2	Refractive Index	94	9.9.4	Water Purification Methods	114
8.10.3	Non-Volatile Residue	95	10 SOLVENT CLEANING AGENTS	116	
8.10.4	Other Bath Monitoring Methods	95	10.1	Purposes	116
8.10.5	Tank Foaming	95	10.2	Terms and Definitions	116
8.11	Cleanliness Testing	98	10.2.1	Solvent Cleaning	116
8.11.1	ROSE Testing	99	10.2.2	Kauri-Butanol value (KB Value)	116
8.11.2	ROSE Testing Limitations	99	10.2.3	Azeotrope	116
8.11.3	ROSE Test Equipment	99	10.2.4	Wash or Washing	116
8.11.4	Ion Chromatography	100	10.2.5	Rinse or Rinsing	116
8.11.5	Localized Contamination	100	10.2.6	Drying	116
8.11.6	Conformal Coating Adhesion and Wetting	100	10.2.7	Defluxing (Flux Removal or Post Solder Cleaning)	116
9 ENVIRONMENTAL CONSIDERATIONS	103		10.2.8	Chemical Material Acronym Definitions	116
9.1	Safety	103	10.3	Solvent Cleaning Background and Overview	117
9.1.1	Environmental Considerations	103	10.3.1	Overview of Solvent Cleaning	117
9.1.2	Environmental Issues	103	10.3.2	Process Map	117
9.2	Air Emissions	104	10.4	Solvent Cleaning Agent Technology	117
9.2.1	Volatile Organic Compounds	104	10.4.1	Single Solvent System	117
9.2.2	Hazardous Air Pollutants (HAPs)	105	10.4.2	Blended Solvent Systems	117
9.2.3	Ozone Depleting Substances	106	10.4.3	Co-Solvent Blends	118
9.3	Waste Water	106	10.4.4	Hansen-Engineered Solvent Blends (Non-Azeotrope)	118
9.3.1	Type of Flux and Contaminants to be Removed	107	10.4.5	Summary	119
9.3.2	Metals Removal	108	10.5	Properties of Cleaning Solvents	121
9.3.3	pH Adjustment	108	10.5.1	Introduction	121
9.3.4	BOD/COD Reduction	108	10.5.2	Physical Properties Examples for Common Solvents	121
9.3.5	Water Use Reduction	108	10.5.3	Effectiveness	121
9.3.6	Total Toxic Organics	109	10.5.4	Multiple Components	121
9.4	Solid Waste	109	10.5.5	Degradation	121
9.4.1	Spent Solvent Wastes	110			

10.5.6	Residues	121	10.10.9	Solvent Monitoring	136
10.5.7	Suspended Matter	122	10.10.10	Summary	137
10.5.8	Dissolved Contaminants	122	10.11	Environmental Considerations	137
10.5.9	Reclaimed Solvents	122	10.11.1	Introduction	137
10.5.10	Stability	122	10.11.2	The Clean Air Act	138
10.5.11	Resistance to Chemical Decomposition	122	10.11.3	The Clean Water Act	139
10.5.12	Resistance to Thermal Decomposition	122	10.11.4	RCRA - General	140
10.5.13	Safety	122	10.11.5	Superfund - General	141
10.5.14	Workplace Exposure	123	10.11.6	Toxic Release Inventory Reporting Requirements	141
10.5.15	PEL/STEL	123	10.11.7	Influencing the Regulatory Process	141
10.5.16	Workplace Exposure Monitoring	123	10.11.8	Applicability	141
10.5.17	Environmental	124			
10.5.18	Cost	125	11	SEMI-AQUEOUS CLEANING AGENTS, EQUIPMENT, AND PROCESS OPTIMIZATION	142
10.5.19	Summary	125	11.1	Purpose	142
10.6	Solvent Specific Material Compatibility Considerations	125	11.1.1	Terms and Definitions	142
10.6.1	Polymer and Marking Compatibility	125	11.2	Semi-Aqueous Cleaning Agents	142
10.6.2	Compatibility with Conformal Coating Solvents	125	11.2.1	Semi-Aqueous Overview	142
10.6.3	Metals Compatibility and Solvent Stability	125	11.2.2	Science of Semi-Aqueous	143
10.7	Solvent Classifications and Characteristics ..	126	11.2.3	Semi-Aqueous Cleaning Agents	144
10.7.1	Hydrocarbon Solvents	126	11.2.4	Properties of Semi-Aqueous Cleaning Agents	146
10.7.2	Halogenated Solvents	126	11.2.5	Compatibility of Cleaning Agents	146
10.8	Solvent Cleaning Equipment/Processes	127	11.2.6	Properties of Water for Rinsing in a Semi-Aqueous Process	146
10.8.1	Introduction	127	11.3	Semi-Aqueous Cleaning Processes	147
10.8.2	Batch Vapor Cleaning	127	11.3.1	Introduction	147
10.8.3	Conveyorized Spray Cleaning	128	11.3.2	Process Parameters	148
10.8.4	Ultrasonics in Cleaning Machines	129	11.3.3	Wash Section	148
10.8.5	Cold Cleaning Equipment	130	11.3.4	Temperature	148
10.8.6	Soak Tanks	130	11.3.5	Agitation	149
10.8.7	Equipment Retrofitting (Upgrading)	130	11.3.6	Rinse Section	151
10.9	Process Integration	131	11.3.7	Rinse Section for Water-Soluble (Type II) Cleaning Agent	152
10.9.1	Cleaning After Manual Soldering	131	11.3.8	Drying Section	152
10.9.2	Vapor Defluxing (Vapor Clean)	132	11.4	Semi-Aqueous Cleaning Equipment	153
10.9.3	Cleaning Protocol	132	11.4.1	In-Line Cleaning Machines	153
10.10	Process Control	132	11.4.2	Combustibility Protection	153
10.10.1	Introduction	132	11.4.3	Batch Cleaning Machines	153
10.10.2	Equipment Options and Recommendations	132	11.5	Process and Quality Control	154
10.10.3	Conveyorized Cleaning System	133	11.5.1	Wash Section	154
10.10.4	Equipment Location and Operation	133	11.5.2	Rinse Section	156
10.10.5	Hot Vapor Systems	134	11.6	Environmental Controls and Considerations	156
10.10.6	Maintaining the Cleaning System	134	11.6.1	Introduction	156
10.10.7	Proper Still Practices	134			
10.10.8	Still Solvent Drying Unit	136			

11.6.2	Waste Semi-Aqueous Cleaning Agent	157	12.6.3	Aqueous Neutral	166
11.6.3	Rinse Water	157	12.6.4	Saponified Cleaning Agents	167
11.6.4	Water Recycling	158	12.6.5	Organic Solvent Emulsions in Water	168
11.6.5	Volatile Organic Compounds (VOCs)	159	12.7	Aqueous Cleaning Agent Designs to Support Specific Processes	168
11.6.6	Greenhouse Effect	160	12.7.1	Bench-top Cleaning	168
12	AQUEOUS CLEANING AGENTS, EQUIPMENT, AND PROCESS INTEGRATION	160	12.7.2	Stencil Cleaning	169
12.1	Scope	160	12.7.3	Aqueous-Base for Removing Uncured Solder Paste and Double-Sided Misprints	169
12.2	Purpose	160	12.7.4	Batch Cleaning	169
12.3	Terms and Definitions	161	12.7.5	Immersion Ultrasonic	169
12.3.1	Aqueous Cleaning	161	12.7.6	Immersion Centrifugal	169
12.3.2	Wash or Washing	161	12.7.7	Spray-in-Air (Single or Multiple Chambers)	169
12.3.3	Rinse or Rinsing	161	12.7.8	Maintenance Cleaning	169
12.3.4	Drying	161	12.7.9	Wave Solder Finer Cleaning	169
12.3.5	Gross Drying	161	12.7.10	Aqueous Cleaning Machines	170
12.3.6	Defluxing (Flux Removal or Post Solder Cleaning)	161	12.7.11	Batch Cleaning Machines	170
12.3.7	Fine Cleaning	161	12.7.12	Batch Immersion	170
12.3.8	Screen and Stencil Cleaning	161	12.7.13	Ultrasonic	170
12.3.9	Semi-Aqueous Cleaning	161	12.7.14	Spray-under-Immersion	171
12.3.10	Organic Solvent Cleaning	161	12.7.15	Centrifugal	171
12.3.11	Functional Additives	161	12.7.16	Batch Spray-in-Air	172
12.3.12	Reactive Additives or Reactants	161	12.7.17	Single and Multiple Autonomous Chambers	172
12.3.13	Organic Solvent Emulsions in Aqueous Media	161	12.7.18	Progressive Chambers	173
12.3.14	Manual Cleaning	161	12.7.19	Inline Spray-in-Air	174
12.3.15	Batch Cleaning	161	12.8	Process Integration	176
12.3.16	In-Line Cleaning	161	12.8.1	Designing the Process to Meet the Cleaning Need	176
12.3.17	Saponification	162	12.9	Cleaning Equipment Selection	177
12.3.18	pH	162	12.9.1	Process Variable	178
12.4	Aqueous Cleaning Background	162	12.10	Ventilation	186
12.4.1	History	162	12.10.1	Balancing the Ventilation for Inline Systems	186
12.4.2	Overview of Aqueous Processing	162	12.10.2	Batch Systems	187
12.4.3	Process Map of Aqueous Processes	163	12.10.3	Drying	187
12.5	Aqueous Cleaning Agent Technology	163	13	CLEANING FOR REWORK, REPAIR, AND RESTORATION OPERATIONS	187
12.5.1	Solvents	164	13.1	Introduction	187
12.5.2	Activators (Reactants)	164	13.2	Terms and Definitions	187
12.5.3	Functional Additives	164	13.2.1	Rework	188
12.5.4	Surface Tension	164	13.2.2	Repair	188
12.5.5	Viscosity	164	13.3	Rework in the Factory	188
12.5.6	Corrosion Inhibition	165	13.4	Rework and Repair in the Field	188
12.5.7	Defoaming	165	13.5	Reconditioning and Restoration	189
12.6	Aqueous Cleaning Product Designs	166			
12.6.1	Matching the Cleaning Agent to the Soil	166			
12.6.2	Pure De-Ionized Water (DI-Water)	166			

13.6	Repair, Rework and Restoration Impact on Reliability	189
13.6.1	Conformal Coating	189
13.6.2	Reapplication of Conformal Coating	190
13.7	Cleaning for Rework, Repair and Reconditioning Operations	190
13.8	Methodology for Reconditioning Electronics Assemblies	190
13.8.1	Data Gathering	190
13.8.2	Analysis	191
13.8.3	Cleaning Process Selection Considerations for Reconditioning Circuit Card Assemblies	191

Figures

Figure 5-1	DI Water Sealed vs. Not Sealed	39
Figure 5-2	Cleaning Chemistry Attack	39
Figure 5-3	Polyurethane Coating Attack by Cleaning Solution	40
Figure 5-4	UV Solder Mask Curing Problem Example	40
Figure 5-5	UV Solder Mask Curing Problem Example	41
Figure 5-6	UV Solder Mask Curing Problem Example	41
Figure 5-7	Dry Film Lifting and Removal Post Cleaning ..	41
Figure 5-8	Extended Aqueous Cleaning Chemistry Exposure	41
Figure 5-9	Solder Joint Appearance Examples	42
Figure 6-1	Solder Paste with Beads	44
Figure 6-2	IPC-B-36 test Board	46
Figure 6-3	Umpire Board	47
Figure 6-4	Flawed BGA Pattern	47
Figure 6-5	Systems Test Coupon	49
Figure 6-6	SMTA Saber Board	49
Figure 6-7	IPC-B-52 Test Board	50
Figure 6-8	Three-Phase Approach to Process Validation	52
Figure 7-1	Electrochemical Migration	61
Figure 7-2	Electromigration	61
Figure 7-3	Electrochemical Failure Program	63
Figure 7-4	Evaluation of Solder Balls on Printed Wiring Boards with Dry Film Solder Resist	65
Figure 7-5	Sodium Atom and Ion	67
Figure 7-6	Chlorine Atom and Ion	67
Figure 7-7	Void in Single Glass Fiber	68
Figure 8-1	Flux Residue Trapped Under Component	87
Figure 8-2	Examples for Amorphous Crystalline Structures	88
Figure 8-3	Phase Transitions and T _g	88
Figure 8-4	SEM of White Residue Remaining on Solder Joint Following Cleaning	91
Figure 8-5	Refractive Index	94

Figure 8-6	Organic-Water Phase	95
Figure 8-7	Typical Stages of an In-line PCB Cleaning Process	96
Figure 8-8	Foam Beginning to Overflow Two Different Wash Stages	96
Figure 8-9	Adjust the Air Knives Away from Rinse	97
Figure 8-10	Rinse stage foam before Exhaust Adjustment	98
Figure 8-11	Rinse Stage Foam after Exhaust Adjustment	98
Figure 8-12	External Exhaust Damper	98
Figure 8-13	Internal Exhaust damper	98
Figure 8-14	Foam in the wash	99
Figure 8-15	Foam in the wash/rinse chamber impeding drainage between sequential rinses	99
Figure 8-16	Electronic Assembly Process	100
Figure 8-17	Conformal Coating Upstream/Downstream Process Considerations	101
Figure 8-18	Conformal Coating Cause and Effect Factors	101
Figure 11-1	Generalized Central Semi-Aqueous Cleaning Process	148
Figure 11-2	Semi-Aqueous Cleaning Machine Schematic	150
Figure 11-3	Centrifugal Batch Cleaner Configuration	150
Figure 11-4	Two-Stage Rinse Process	152
Figure 11-5	Continuous Rinse Process	153
Figure 11-6	Specific Gravity vs Rosin Flux Loading	155
Figure 12-1	Post Solder Assembly Cleaning Processes ..	163
Figure 12-2	Factors that Influence the Effectiveness of the Electronic Assembly Cleaning Process ...	176

Tables

Table 4-1	Bare Printed Board Ionic Contamination Maximum Limits (µg/cm ²)	24
Table 4-2	Electronic Assembly Cleaning Agent Design Options	27
Table 4-3	Static versus Dynamic Design Options (data findings are supported by several research studies)	29
Table 6-1	Material Qualification Specifications and Methods	43
Table 6-2	Performance Specifications	43
Table 6-3	Reference Documents	52
Table 6-4	Contamination Levels Per IPC-TM-650, 2.3.28	56
Table 6-5	Minimum SIR Values	56
Table 6-6	Elements of a Quality Assurance Program	57
Table 6-7	Documentation Hierarchy	57
Table 7-1	Flux Classification System	64

Table 7.2	Energy Levels and Maximum Number of Electrons	66	Table 10-3	Solvent Classifications and Characteristics	127
Table 8-1	IPC-A-610 Table 1-3	85	Table 11-1	Cleaning Properties Based on Semi-Aqueous Product Family	146
Table 8-2	Cleaning Chemistry Guidelines	89	Table 11-2	Cleaning Processing Parameters for Water-Insoluble (Type I) Semi-Aqueous Cleaning Agents	148
Table 8-3	Dynamic Energy Associated with Solder Cleaning Process	93	Table 11-3	Cleaning Processing Parameters for Water-Soluble (Type II & III) Semi-Aqueous Cleaning Agents	149
Table 9-1	Wash Media, Typical Cleaning Capability	107	Table 11-4	Flash Point Considerations (According to U.S. Regulations)	149
Table 9-2	Heavy Metal in Effluent	108	Table 12-1	Cleaning Agents	165
Table 9-3	Ratings for Reactivity	112	Table 12-2	Stencil Cleaning Agent Design	168
Table 10-1	Relative Cleaning Effectiveness	120			
Table 10-2	Electronic Assembly Contaminants (Residues)	126			

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Guidelines for Cleaning of Printed Boards and Assemblies

1 OVERVIEW

1.1 Scope This manual will only include assembly process printed wiring assembly cleaning. The corresponding information on printed wiring board cleaning will be contained in a separate companion document.

1.2 Purpose The purpose of this document is to collect and update all the pertinent information on printed wiring assembly (PWA) cleaning in a single, easy to revise/updated document.

1.3 Background Information on cleaning printed circuit boards (PCBs), printed wiring boards (PWBs), and printed wiring assemblies (PWAs) during manufacture could be found within a number of IPC documents and handbooks, specifically:

- CH-65 Guidelines for Cleaning of Printed Boards and Assemblies
- SM-839 Pre and Post Solder Mask Application Cleaning Guidelines
- SC-60 Post Solder Solvent Cleaning Handbook
- SA-61 Post Solder Semi-Aqueous Cleaning Handbook
- AC-62 Aqueous Post Solder Cleaning Handbook

While collecting relevant information in various places was recorded for its members to use, one was never sure that one had all the needed information at hand.

1.4 Current and Emerging Cleaning-Related Challenges With the advent of low residue (i.e., no-clean) flux/paste in the early 1990s, many concluded that cleaning was no longer needed. This conclusion neglected the continued drives toward tighter spacing, higher reliability requirements, higher density packaging, underfill adhesion and reduced costs. Since post assembly cleaning normally removed all upstream soils as well, the industry had to convert to clean printed wiring board and clean component manufacturing processes, clean packaging and ultraclean workplaces. Often this became more cumbersome and complicated than post assembly cleaning had been.

Recently, the conversion of soldering processes to lead-free platings/finishes and soldering alloys, often with much higher soldering process temperatures, have further complicated the demands made on solder flux/paste compositions, to accomplish a no clean joining operation, while burning away completely without voids, solder balls or other reliability issues.

The advent of halogen-free laminates, as well as other possible restrictions on the industry's processing chemicals, will generate new processing challenges to be met.

The ability to effectively clean stencils has become significantly more important. Greater demands on stencil printing have emerged with the advent of fine and ultrafine parts, as well as ball grid arrays. Clean stencils are a must in delivering the proper amount of paste. A partially or fully obstructed aperture on a stencil is more likely to occur with today's finer pitch devices. It has been estimated that approximately 70% of SMT solder defects are due to solder paste printing problems. Stencil cleaning processes are covered in a separate document.

Environmental and worker safety issues are very much a part of today's cleaning picture. Assemblers must consider factors such as VOCs, BODs, CODs (Volatile Organic Compounds, Biological Oxygen Demand and Chemical Oxygen Demand, respectively), waste water treatment, heavy metals, close-looping and pH. Because of demanding official regulations (federal and/or local), it can be one or more of these factors that determine the choice of a cleaning process and associated equipment.

1.5 Document Chapters

1.5.1 Section 2: Applicable Documents This section contains references to industry standards, federal regulations, test methods and vehicles that are applicable to post solder cleaning of electronic assemblies. Not all of these are cross-referenced in the text. They are listed below for the convenience of the readers.