



Turbo-Coat™ HV Acrylic Conformal Coating

2109

2110 (Turbo-Coat Thinner)

Introduction



Techspray's new Turbo-Coat™ HV Acrylic Conformal Coating is a high viscosity version of our popular Turbo-Coat. This coating is tested and approved in Asymtek and PVA selective spray systems, both atomized and airless models.

Turbo-Coat is designed to speed up board production throughput without additional investment of expensive UV systems or other capital equipment. Conformal coating cure time is often considered a production bottleneck for PCB assembly operations. Turbo-Coat HV dries tack-free in under 10 minutes, allowing manufactures to handle boards in 1/2 the time of the leading acrylic coating!

Turbo-Coat Thinner is available to reduce the viscosity to fit ideal process parameters. Turbo-Coat, Turbo-Coat HV, and Turbo-Coat Thinner are all HAPs (Hazardous Air Pollutants) free, so do not contain common coating solvents like Toluene, Xylene, and MEK. This makes these coating more user friendly and safe.

Turbo-Coat HV uses the same acrylic resin as the original Turbo-Coat, so coatings can be mixed-and-matched through the process, e.g. using the faster curing Turbo-Coat in the rework area, Turbo-Coat HV in the assembly area, and Turbo-Coat pen for QC touch-up.

Features / Benefits

- Fastest Cure – Dry to Touch in Under 10 Minutes!
- Faster Throughput without Capital Investment
- Thick Coating – One-Pass Application
- Fast & Easy Rework & Repair
- IPC-CC-830B& MIL-I-46058C Certified
- UL94 V-0 Rated
- Crystal Clear & Glossy Finish
- UV Indicator for Black Light QC Inspection
- MEK, Toluene & Xylene Free

Applications

Electronic Assemblies for...

- Automotive
- Aviation
- Consumer Electronics
- Appliances
- Industrial Meters & Control

Thinning / Removal

Techspray coatings can be thinned to meet production requirements using Turbo-Coat Thinner (2110). Conformal Coating Remover (2510) is also available for rework and repair, although coating is often just burnt through in the soldering process for spot repairs.

Techspray coatings contain Opti/Scan to allow quality control inspection of coverage and evenness of the coating on a PCB. A coated board can be passed under a standard, low-cost long-wave UV (black) light, and the coated areas glow. The brighter the glow, the thicker the coating.

Chemical Components

TURBO-COAT HV (2109)

Chemical	CAS #
Acrylic Polymer (non-hazardous)	
tert-Butyl acetate.....	540-88-5
n-butyl acetate	123-86-4
1-Methoxy-2-propanol.....	107-98-2
1-(2-Methoxy-Methyl-Ethoxy)-2-Propanol Acetate.....	88917-22-0

TURBO-COAT THINNER (2110)

Chemical	CAS #
n-butyl acetate	123-86-4
propylene glycol monomethyl ether	107-98-2

Cure Profile

Accelerated Cure:	55 minutes @ 131°F / 55°C
Ambient Cure:	15 hours @ 74°F / 23°C (ambient temp)
Tack-Time (dry to touch):	9 minutes @ 74°F / 23°C (ambient temp)

Cure time depends on a number of factors, including the method and thickness of application. Dilution will also change the cure profile. 131°F / 55°C is recommended as the best accelerated temperature to optimize leveling, providing the smoothest possible finish. A faster cure may be achieved, but should be thoroughly tested first.

Test Data

Application

	Test Method*	2109 Test Results
Application Method		Spray system, dip, or brush
Cure time	TS-053	<15 hrs
Accelerated cure time	TS-054	55 Min. @ 55°C
Dry time to touch	TS-055	9 Min.
Quality inspection method of coverage		UV (long-wave black) light
Removal method		Alkane, Acetone or Acetate, Solder iron burn through

Characteristics

As Supplied:	Test Method	2109 Test Results
Visual appearance	TS-050	Clear
Density (25 C)	TS-019-1	0.91
Viscosity (25 C)	Instrument (Brookefield RVT) guide	53 to 60 Centipoise
Solids %	TS-015	24-26
Flash point	ASTM D-56 (TAG CC)	5°C (41°F)
Vapor pressure (20 C) (VOC composite)	calculated	1.12 mmHg
Initial boiling point	TS-051	Not Determined
Stability (30-day test @ 37 C/100 F)	TS-052	Stable
Stability (30-day test @ 6.1 C/21 F)	TS-052-1	Stable
Resin T _g	provided by supplier	50 – 55 C
Resin mol wt	provided by supplier	60,000

Certified Testing – pending, stated results based on 2108, which contains the same resin

As Cured - Physical	Test Method	2109 Test Results
Dielectric strength	ASTM D-149, IPC-TM-650 2.5.6.1, Rev. A	1000 volts
Adhesion	ASTM D-3359	5B
Film hardness	ASTM D-3363	2B
Film thickness (1 dip)	ASTM D-1005	1 mil (0.001")
UL Qualification	Test Method	2109 Test Results
Coating flammability	UL94/746E	V-0
IPC-CC-830B Qualification	Test Method	2109 Test Results
Appearance	IPC-CC-830B 3.5.2	pass
Fluorescence	IPC-CC-830B 3.5.3	pass
Flammability	IPC-CC-830B 3.5.6	pass
Fungus resistance*	IPC-TM-650 2.6.1.1	pass
Flexibility	IPC-TM-650 2.4.5.1	pass
Dielectric withstand voltage	IPC-TM-650 2.5.7.1	pass
Moisture & insulation resistance*	IPC-TM-650 2.6.3.4	pass
Thermal shock*	IPC-TM-650 2.6.7.1	pass
Temperature humidity ageing*	IPC-TM-650 2.6.11.1	pass

* Final results for 2109 pending. Results based on 2108, which uses the same resin. All other specification testing is complete.

Chemical Compatibility – Industrial Chemicals

INDUSTRIAL CHEMICALS	EFFECT	CAS #
Methanol	Soften	67-56-1
Ethanol	Dissolution	64-17-5
IPA	Dissolution	67-63-0
70% IPA	Dissolution	67-63-0
50% Ethanol	No effect	64-17-5
DPM	Dissolution	34590-94-8
Glycol ether EB	Dissolution	111-76-2
THF	Dissolution	109-99-9
Acetone	Dissolution	67-64-1
n-propyl acetate	Dissolution	109-60-4
t-butyl acetate	Dissolution	540-88-5
Hexane	Dissolution	110-54-3
Heptane	Soften	142-82-5
Cyclopentane	Dissolution	287-92-3
Cyclohexane	Dissolution	110-82-7
Toluene	Dissolution	108-88-3
Trans-dce	Dissolution	156-60-5

Chemical Compatibility – Household Chemicals

HOUSEHOLD CHEMICALS	EFFECT	EXAMPLE OF US BRAND NAME
5% Acetic acid	No effect	Heinz Vinegar
0.1N Hydrochloric acid	No effect	Lime-A-Way Toilet Bowl Cleaner
50% Nitric acid	No effect	
Parson's solution	No effect	Windex
0.1N Potassium hydroxide	No effect	10% Liquid Plumber
45% Potassium hydroxide	No effect	Liquid Plumber
d-limonene	Dissolution	Orange Glo
Chlorox neat	No effect	Chlorox
Chlorox 1:1	No effect	50% Chlorox
Chlorox 1:4	No effect	20% Chlorox
Pine-Sol Lemon	No effect	Pine-Sol Lemon
Pro 409	No effect	409 Professional

In most cases, Techspray corporate test methods (TS designation) correspond to standard ASTM Copies of Techspray corporate test methods are available upon request.

Environmental Policy

Techspray® is committed to developing products to ensure a safer and cleaner environment. We will continue to meet and sustain the regulations of all federal, state and local government agencies.

Packaging and Availability

Turbo-Coat HV:

2109-P	1 pint (0.47L) in glass bottle
2109-G	1 gallon (3.8L) in metal bottle
2109-5G	5 gallons (18.9L) in metal pail
2109-54G	54 gallons (204L) in metal drum

Turbo-Coat Thinner:

2110-G	1 gallon (3.8L) in metal bottle
2110-5G	5 gallons (18.9L) in metal pail

Original Turbo-Coat:

2108-12S	12oz aerosol
2108-N	10ml rework & retouch pen
2108-P	1 pint (0.47L) in glass bottle
2108-G	1 gallon (3.8L) in metal bottle
2108-5G	5 gallons (18.9L) in metal pail

Resources

Techspray® products are supported by a global sales, technical and customer services resources.

For additional technical information on this product or other Techspray® products in the United States, call the technical sales department at 800-858-4043, email tsales@techspray.com or visit our web site at: www.techspray.com.

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Asymtek Applications Demo Report

Tech Spray 2108-HV and 2108 Evaluations

Author: Mike Szuch

July 2010

Note: Final part number for 2108-HV, referenced in this document, is 2109.

Goal:

Evaluate a new material & develop some baseline parameters.

Parts:

None supplied.

Material:

Tech Spray 2108-HV is a higher viscosity (17.3s @ 74F) and higher solids content (~25%) than regular 2108 (13.3s/15%). 2108 is also known as "Turbo Coat".

Results:

Great results with 2108-HV in all three applicator technologies (atomized spray coat, non-atomized film coat and non-atomized jet coat). No thinning was required for any of the applicators. No cob-webbing was detected while atomizing. Nominal thicknesses of 1-3 mils can readily be dialed in by using standard machine parameters.

Although the regular 2108 can also be dispensed, it is less controllable than the -HV version. 2108 tends to break apart (splash) more easily and it seems to run easily. Clearly 2108-HV is the preferred version.

Although no unusual nozzle clogging occurred, this material dries very quickly when exposed to air. So prudent and frequent use of idle cups is recommended.

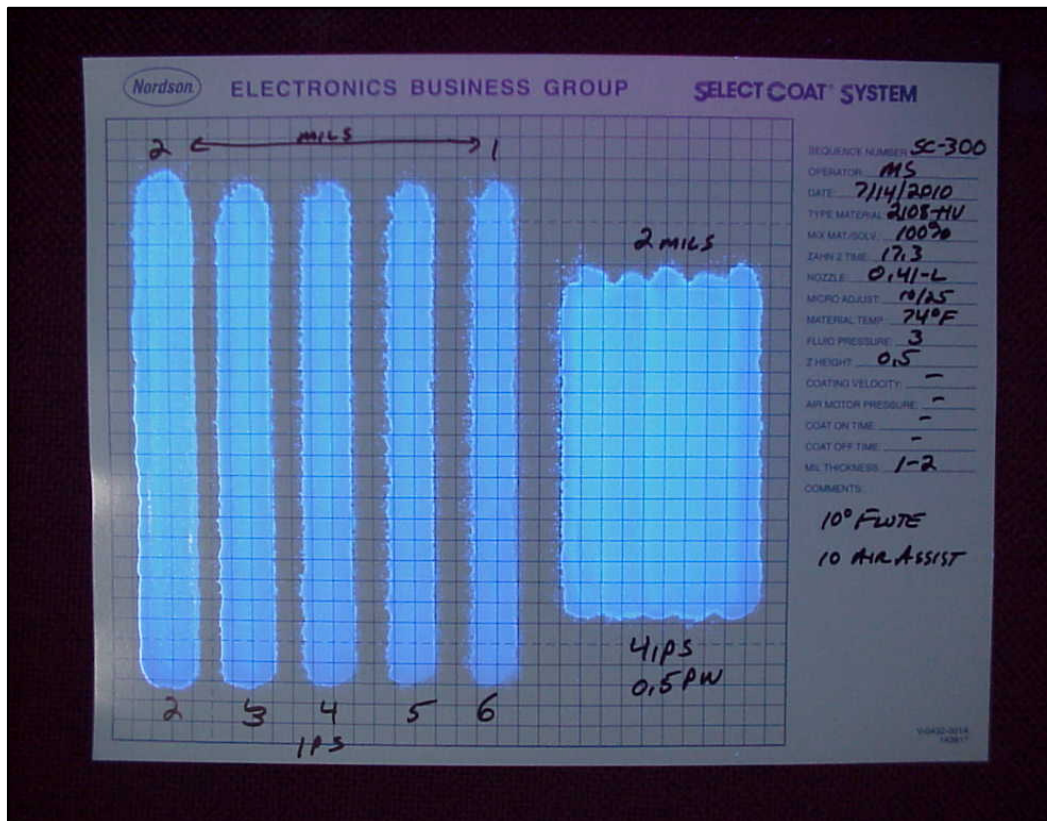
Note: The values listed below are for reference only. Actual results may vary. Consult Asymtek applications engineering for specific recommendations.

Details:

Non-Atomized Jet Coater	• Model: SC400 • Needle: 21 gage x 6.5mm, Iwashita • Micro Adjust: 5/10 increments
Parameters(nominal)	• Fluid Pressure: 3 PSI • Valve Pressure: 65 PSI • Duration: 7ms • Period: 14ms • Dispense Height: 0.1" • Line Speed: 1-4 IPS • Pass Width : 1/8"
Thickness (nominal)	• 1-2 mils

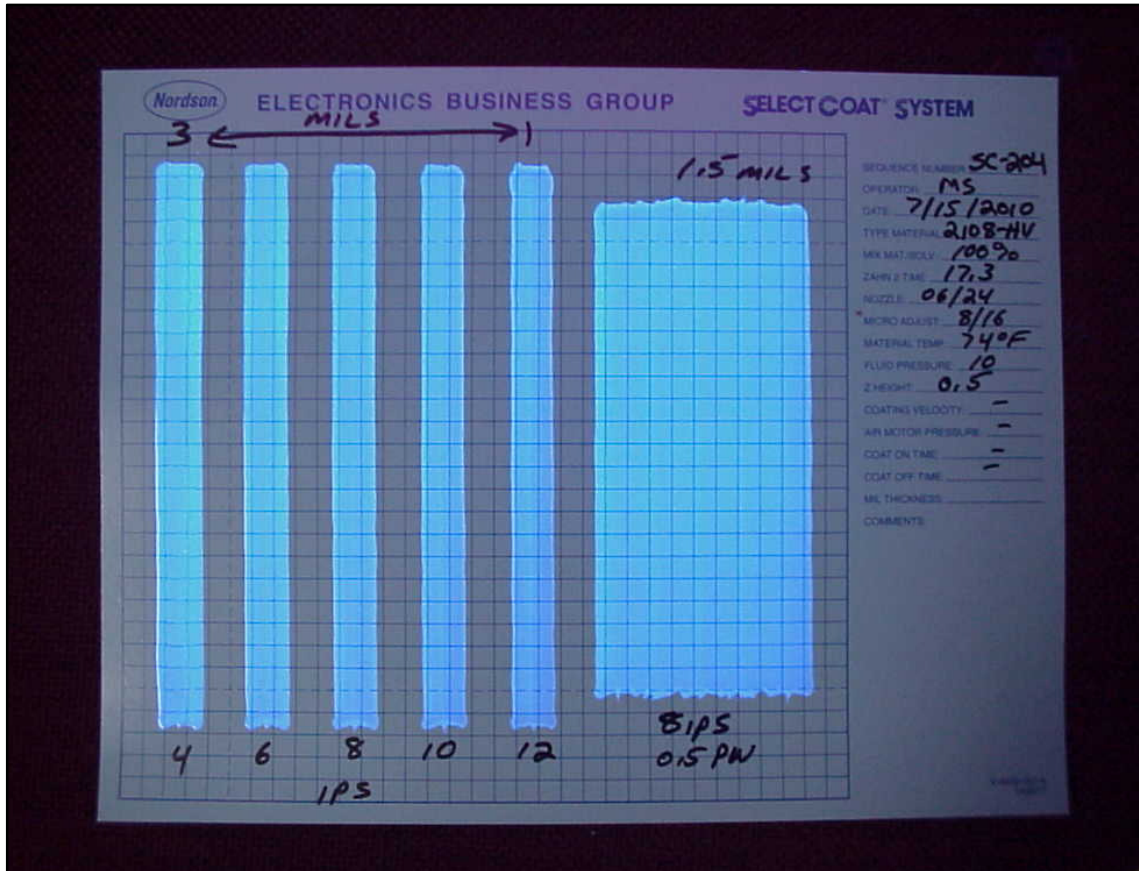
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Atomized Spray Coater	- Model: SC300 - Nozzle: 0.41-0 - Fluid Extension: 10 Degree - Micro Adjust: 10/25 increments
Parameters (nominal)	- Fluid Pressure: 3 PSI - Air Assist Pressure: 10 PSI - Dispense Height: 0.5" - Line Speed: 2-6 IPS - Pass Width : 0.6"
Thickness (nominal)	1-2 mils dry



Atomized Spray using SC300

Non-Atomized Film Coater	- Model: SC204 - Nozzle: 06/24 - Micro Adjust: 8/16 increments
Parameters (nominal)	- Fluid Pressure: 10 PSI - Dispense Height: 0.5" - Line Speed: 4-12 IPS - Pass Width : 0.5"
Thickness (nominal)	1-3 mils dry



Non-Atomized Film using SC204



Project Description

Test the spray quality of modified version of 2108 coating (2109 Turbo-Coat HV) using airless and atomized methods.

Equipment and Materials

- PVA650 coating machine
- FC100-CF airless spray valve
- FCS300-ES atomized spray valve
- Techspray 2108-HV (final part # 2109) Form #2
- Techspray 2108-HV Diluent (final part #2110)
- BYK Gardner white test cards

Application

A few sample patterns were sprayed onto the BYK cards to see how the coating reacts to being applied with the 2 application methods. The airless test used the coating as-is, and the atomized test was used 5, 10, and 20% dilutions. All samples were cured at room temperature.

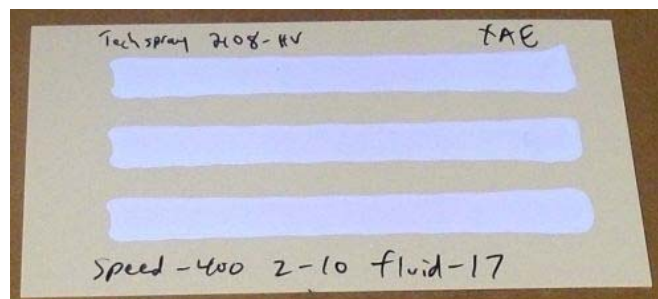
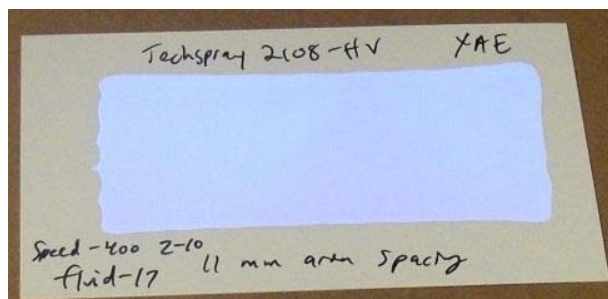
Settings

Valve:	FC100-CF	FCS300-ES
Dilution:	None	5, 10, 20%
Fluid Pressure:	17 PSI	5 PSI
Atomizing Air:	N/A	0.5 PSI
Valve Stroke:	0.045"	0.008"
Speed:	400 mm/sec	100 mm/sec
Z height:	10 mm	10 mm
Area Spacing:	8-11 mm	4-8 mm
Dry Film Thickness:	.0015" - .0025"	

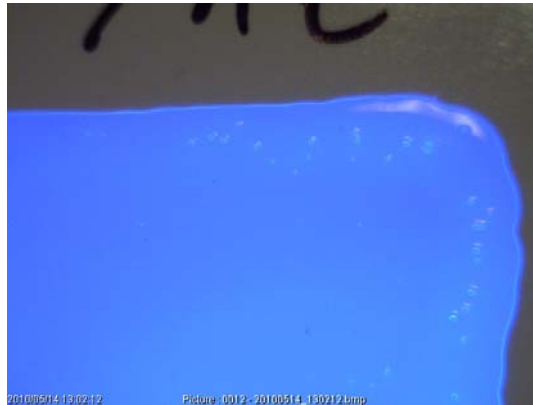
Summary

The material worked well with atomized and airless spray valves. Pictures and comments:

Airless Film:

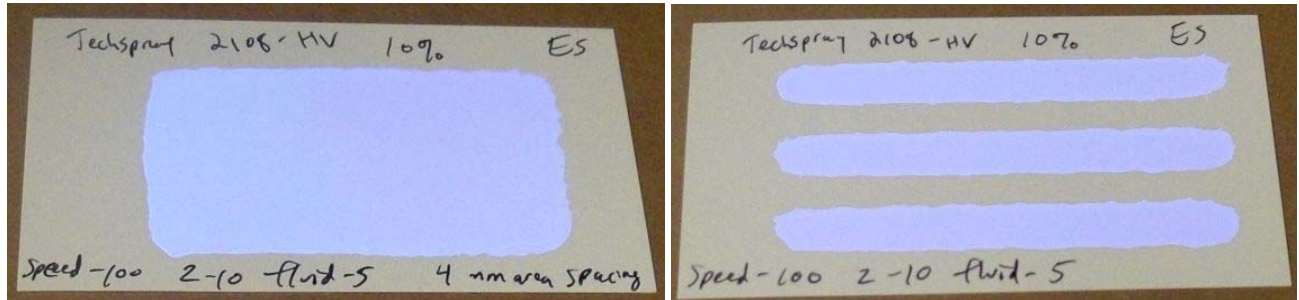


Summary (cont.)



The airless application produced better results than original testing but did tend to create slight ridges around edges of coated lines/areas and trap some small bubbles during cure.

Atomizing:



Atomizing at a 10%+ dilution gave decent results with OK edges but had no signs of bubbles and smooth finish.

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